Toddington Lane
Littlehampton, BN17 7PN

Drainage Strategy

for

Worthing Homes

20240453

January 2025

Green Structural Engineering

Toddington Lane

Drainage Strategy

for

Worthing Homes

Revision	Date of issue	Notes	Compiled By	Checked By
0	04/10/24	Preliminary Issue	TS	GG
1	13/01/25	Updated to suit LLFA comments	MK	TS

Green Structural Engineering

Appendices

1.0 Introduction

1.1 This Drainage Strategy (DS) report has been produced by Green Structural Engineering (GSE) on behalf of the Worthing Homes Ltd to support a planning application for the redevelopment of the existing land, for a new residential development at the site, Toddington Lane, Littlehampton, BN17 7PN. Figure 1 below shows the location of the site.

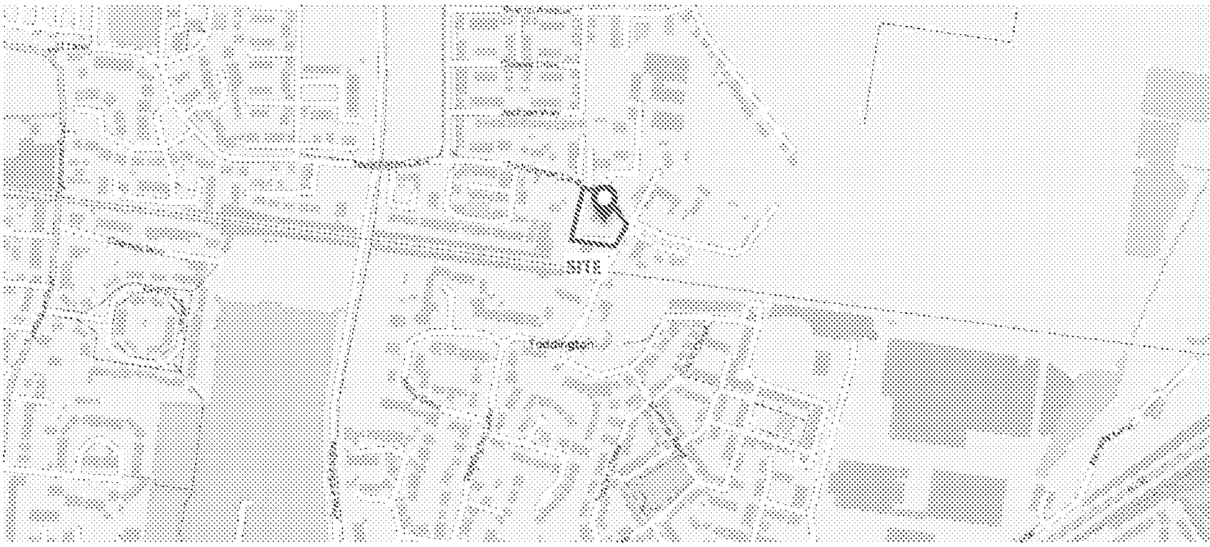


Figure 1 – Site Location Plan

1.2 This DS had been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) and its planning practice guidance, national design standards, local surface water policies and the nationally recognised SuDS Hierarchy, to demonstrate that the proposed development can be drained in an acceptable and sustainable manner and will not increase the risk of flooding to the site and surrounding area.

1.3 This report should be read in conjunction with the site-specific Flood Risk Assessment produced by GSE, reference 20240453- R02- rev P0- FRA.

1.4 This report is not intended to provide the final details of the detailed drainage design for the proposed development. It rather provides the design concepts and systematic approach used for the drainage strategy to meet the requirements of the relevant guidelines. The scope of this Report is as follows:

(i) To show that flood risk from the site associated with surface water (pluvial) can be satisfactorily managed so that the site and adjacent land will not be subject to unacceptable flood risk whilst considering allowances for climate change over the anticipated lifespan of the development.

(ii) To demonstrate that there will be no increased risk of flooding off site or on adjacent land and nearby property elsewhere; and

(iii) To demonstrate that wastewater and surface water runoff from the proposed development has satisfactory and achievable sustainable disposal strategies.

2.0 Site Parameters

Site Description

2.1 The site is located along Toddington Lane, Littlehampton, BN17 7PN, it lies approximately 560m to a watercourse noted as the Black Ditch, at its closest point. The existing site is currently occupied by a barn structure, with an access road leading on to Toddington Lane to the east, with a mixture of tarmac, concrete, skalpings, thistles and dense vegetation occupying the remainder of the site.

Site Topography

2.2 A topographical survey of the site and adjacent areas is included in Appendix A. The survey shows the site to be elevated above the surrounding highways, with high elevations of approximately 7m AOD, sloping down to 5m AOD towards the northern boundary and 3.6m AOD, where the access road meets Toddington Lane to the east.

Site Geology

2.3 Soakage testing was undertaken on site in December 2023 by Southern Testing, where the geologies encountered were noted. The various exploratory holes found that made ground, featuring Brown clayey silty sandy gravel, with patches of gravelly clay was present, with other foreign items identified.

2.4 Beneath the made ground, layers of sandy gravelly clay, gravelly sand and structureless chalk were found. A copy of the soakage report is included in Appendix B, with an extract summarising the soils encountered, shown on Table 1 below:

Depth (m)	Thickness (m)	Soil Type	Description
0.00-0.40/2.80	0.40-2.80	MADE GROUND	Brown clayey silty sandy GRAVEL with patches of gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and varying anthropogenic materials such as brick, concrete, plastic bottle, rubber tyre, metal bars and slate roof tile fragments.
0.40/1.00-2.60/3.00	1.20-1.30	Sandy gravelly CLAY	Brown silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and occasional chalk.
2.80-3.80 (TP2 only)	Unproven	Gravelly SAND	Greenish yellow very clayey gravelly SAND. Gravel is fine to coarse subrounded flints.
2.60-3.00m (TP3 only)	Unproven	Structureless Chalk	Recovered as: Structureless chalk comprising off white and yellowish brown clayey gravelly SILT. Gravel is fine to coarse medium density chalk and occasional flint.

Table 1 – Summary of site Geology

2.5 The soakage report states that no groundwater was observed during the fieldwork.

2.6 A total of 5 infiltration tests were undertaken, with the findings summarised in Table 2 Below:

Test ID	Test Depth (mbgl)	Design Infiltration Rate		Notes
		mm/minute	m/sec	
TP01	2.5	0.0087	1.45x10-7	Pit not emptied. negligible soakage
TP01A	1.0	0.601	1.00x10-5	Pit not emptied.
TP02	3.8	0.092	1.53x10-6	Pit not emptied. Poor soakage
TP02A	1.20	0.429	7.16x10-6	Pit not emptied.
TP03	3.0	0.253	4.21x10-6	Pit not emptied. Poor soakage

Table 2 – Infiltration test results

2.7 The report states that the lowest soakage result should be taken as the design rate, which in this instance was taken within TP01, with a rate of 1.45×10^{-7}, with '*negligible soakage*'. The report goes on to state *'The soakage results indicated that the shallow soils on site have variable but generally poor soakage potential. Given that Made Ground was encountered in each of the trial holes to variable depths but generally greater than 1m we would not recommend that any permeable paving or soakaways be placed within any made ground soils due to their inherent variability and the risk of inundation settlement'.*

Development Proposals

2.8 The proposals will see the erection of a new 10-unit residential development, featuring a mixture of 2- and 3-bedroom units, some semi-detached and some terraced. Associated access roads and parking facilities are also proposed to serve the development. A copy of the proposed site plan is included in Appendix C.

3.0 Existing Drainage

Public Sewers

3.1 Southern Water serves the surrounding area for the disposal of wastewater. Asset record have been obtained from Southern Water showing the public sewer networks surrounding the site, a copy of which is included in Appendix D. As can be seen, there are no public sewers within the immediate vicinity of the site, with a section of pumped foul public drainage to the west of the site, serving the adjacent development, with foul and surface water sewers present to the south, the other side of the railway line.

3.2 Drainage records have been obtained from the Highways Authority, which are included in Appendix E. These show a series of gullies and pipes adjacent to the site, that are shown to discharge into a nearby ditch. It is believed these records are out of date, with the previous ditch now culverted.

3.3 The residential site, 50m to the west of the development site, is under the client, Worthing Homes ownership. A CCTV survey of this site was undertaken in August 2024 and is included in Appendix F. The CCTV survey shows a network of foul pipes and manholes, flowing to the west and discharging to the Southern Water pumped system.

Site Drainage

3.4 As the existing site is undeveloped, there is no formal drainage serving it, with no manhole covers or other drainage features identified on the topographical survey included in Appendix A.

3.5 The site is approximately 3,430m^2 in area, of which 1,640m^2 of this is proposed as hardstanding land, when a 10% allowance has been applied for urban creep. A greenfield runoff rate calculation has been undertaken and is included in Appendix G, which shows a QMED rate of 0.7l/s, for the proposed hardstanding area of 1,640m^2.

4.0 Planning Policy Context

National Planning Policy Framework and Planning Practice Guidance

4.1 The National Planning Policy Framework (NPPF), originally published in 2012, was reissued in December 2024. The NPPF includes policies on flood risk and minimising the effect of flooding. The NPPF requires local authorities to adopt proactive strategies to mitigate and adapt to climate change, taking account of flood risk, coastal change and water supply and demand considerations.

4.2 Within the context of a drainage strategy the most applicable requirements of National and Local Planning Policy are that developments should not cause new, or exacerbate, existing flooding problems either on the proposal site, or elsewhere, and should incorporate Sustainable Drainage Systems (SuDS) in order to restrict or reduce surface water run-off.

4.3 Planning Practice Guidance has been issued to ensure the effective implementation of the planning policies set out in the NPPF on development in areas at risk of flooding. The guidance sets out an expectation that for major development SuDS will be provided unless demonstrated inappropriate but also that SuDS may not be practical for all development types and this will depend upon the nature of the proposed, development, its location and the existing flood risk. New developments will, however, only be considered appropriate if priority has been given to sustainable drainage. The Planning Practice Guidance to the NPPF outlines the following drainage hierarchy to be considered when disposing of surface water, with the aim of discharging as high up the hierarchy as possible:

- To the ground (infiltration)
- To a surface water body
- To a surface water sewer, highway drain or other drainage system
- To a combined sewer

The Non-Statutory technical standards for sustainable drainage systems (2015)

4.4 In March, 2015, the Department for Environment, Food and Rural Affairs (DEFRA) published the Non-statutory technical standards for sustainable drainage systems; which are intended to be used in conjunction with the NPPF and the planning practice guidance. The Non-statutory technical standards for sustainable drainage systems provide guidance for developers to ensure that flood risk, from surface water, is managed appropriately so as not to lead to an increase in flood risk on and off site. This non-statutory guidance includes advisory standards on the peak flow rate, runoff volume and flood risk within the development. These standards also set out that that pumping would not normally be acceptable unless it is not reasonably practice to provide gravity drainage, that drainage systems should be structurally sound and that any damage from its construction must be minimised and rectified before the drainage system is considered completed.

Adoption Arun Local Plan 2011-2031 (July 2018)

4.5 The Arun Local Plan covers the period between 2011 and 2031 and was produced in July 2018. This document was produced to provide key policies in promoting sustainable development.

4.6 Section 18 of this document relates to water and provides policies on drainage and flood risk.

4.7 Policy W DM3 relates to Sustainable Urban Drainage Systems, and states:

To increase the levels of water capture and storage and improve water quality, all development must identify opportunities to incorporate a range of Sustainable Urban Drainage Systems (SUDS), appropriate to the size of development, at an early stage of the design process.

Proposals for both major and minor development proposals must incorporate SUDS within the private areas of the development in order to provide source control features to the overall SUDS design. These features include:

- *Green roofs*
- *Permeable driveways and parking*
- *Soakaways*
- *Water harvesting and storage features including water butts*

Proposals for major development must also integrate SUDS within public open spaces and roads, reflecting discussion with the appropriate bodies. SUDS must therefore be integrated into the overall design of a development and must:

a) Contribute positively to the appearance of the area, integrating access to allow maintenance of existing watercourses and the system.

b) Effectively manage water (including its quality)

c) Accommodate and enhance biodiversity by making connections to existing Green Infrastructure assets and

d) Provide amenity for local residents (ensuring a safe environment)

e) Retain the existing drainage network of the site and the wider area,

f) Be maintained in perpetuity, supported through a Maintenance and Management Plan/Regime, including its financing, agreed with the Local Planning Authority

In order to ensure that SUDS discharge water from the development at the same or lesser rate, as prior to construction, developers must:

f) Follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations and the SUDS manual produced by CIRIA.

g) *Undertake up to six months groundwater monitoring within the winter period. h. Undertake winter percolation testing in accordance with BRE365.*

h) *The proposed drainage system must be designed to ensure that there is no flooding on a 1 in 30 year storm event.*

i) *The design must also take account of the 1 in 100 year storm event plus 30% allowance for climate change, on stored volumes, to ensure that there is no flooding of properties or the public highway or inundation of the foul sewerage system. Any excess flows must be contained within the site boundary, and within designated storage areas.*

Policy analysis

4.8 The drainage hierarchy presented by all levels of policy documents, despite differences in wording, largely follow the same concept. The drainage hierarchy should be considered as follows; infiltration to ground, rainwater discharge direct to a watercourse, controlled discharge to surface water sewer.

4.9 Both local and national planning policy and guidance indicate that, wherever possible, developments should aim for discharge of surface water at greenfield rates regardless of development type, if infiltration cannot be used. The different levels of policy and guidance vary as to what should be achieved in the case of brownfield sites, or where discharge at greenfield rates is not practical. It is, however, clear that the development should not result in additional flood risk with discharge rates above that of the existing brownfield runoff rates and that betterment would be expected.

5.0 SuDS Hierarchy

Table 3 has been produced and shows the SuDS Hierarchy in order along with comments specific to the development site and their suitability:

Discharge hierarchy	Viable	Comments
Rainwater use as a resource (for example rainwater harvesting)	Partially	Water Butts can be utilised at property level for partial rainwater reuse.
Rainwater infiltration to ground at or close to source	No	As detailed in Section 2.3 to 2.7 of this report, the soil conditions on site are unsuitable for infiltration.
Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)	Partially	The only green spaces that could accommodate open water features such as swales and basins, along the eastern boundary of the site, slope steeply towards Toddington Lane, to account for the level difference between the raised site and public highway. Incorporating swales/basins has therefore been discounted. Rainwater pipes can discharge directly to rain garden planters, before discharging to the underground network.
Attenuate rainwater by storing in tanks or sealed water features for gradual release	Yes	Underground attenuation tanks proposed.
Rainwater discharge direct to a watercourse	No	No watercourses located within the immediate vicinity of the site to discharge to.
Controlled rainwater discharge to a surface water sewer or drain.	Yes	New proposed off-site surface water sewer, that can form the discharge point, refer to Section 7 for further details.
Controlled rainwater discharge to a combined sewer	N/A	N/A, option higher up the hierarchy available.

Table 3 – SuDS Hierarchy

6.0 Proposed Drainage

Surface Water Drainage

6.1 As detailed in Section 3, the proposed 1,640m^2 of hardstanding area has an associated greenfield runoff rate of 0.7l/s.

6.2 Given the low greenfield runoff rate, it is not considered that utilising this low rate will be practical, as such a rate will be prone to blockages causing greater risks of flooding, contrary to the intent of the initiative. It is considered that a proposed surface water discharge rate of 2l/s would be suitable without reducing rates to a value that may cause maintenance issues on site due to blockages.

6.3 It is proposed that a new network of surface water pipes and manholes will be installed to convey surface water runoff generated from the proposed houses to a new underground attenuation facility, which will be lined with an impermeable membrane. Runoff generated along the proposed access roads and external hardstanding areas is to be sloped towards porous paving parking bays, wherever possible, which will be lined and served by perforated pipes and restricted by orifice plate chambers, that will act as a collection point and also a water quality treatment facility. Footpaths adjacent to soft landscaping, will be graded to these areas.

6.4 Porous finishes will be incorporated wherever possible, however, within the parking areas, not along the access roads, which will be required to support HGVs, such as moving vehicles. Utilising porous pavement along the access road is not considered suitable, due to potential damage that may be sustained by the HGV movements, a more robust surface would be needed to accommodate such vehicles. External areas that cannot be routed to porous car park sections will however receive water quality treatment in the form of petrol interceptors with the necessary indices required to mitigate pollution based on the proposed land use.

6.5 Additional source control features are proposed in the form of rain garden planters, that will accommodate rainwater pipes from roofs. The rainwater from the planters will then drain to the below ground network, before draining to the main attenuation tank in the centre of the site.

6.6 This tank will then be restricted via a flow control chamber, at a rate of 1.3l/s and cascade to a final section of below ground attenuation, another tank, located at the sites entrance, the low point topographically, that will also accommodate runoff from the front section of access road and lined with impermeable membrane, that is to pass through a petrol interceptor. The central attenuation tank will have approximate dimensions of 100m^2 x 1.2m deep, with 95% porosity, with the final tank measuring 36m^2 x 0.4m deep, also with 95% porosity. The final outlet from site will then discharge at a restricted rate of 2l/s, via a flow control chamber.

6.7 The proposed point of connection will not be an existing feature, rather a new proposed network of surface water drainage that is to be installed along Toddington Lane. The proposed surface water network will form part of a set of highways improvement works, that are proposed by a neighbouring development. A copy of the off-site surface water drainage works is included in Appendix H. The proposed surface water sewer along Toddington Lane, will not only form the discharge position for surface water from site, it will also serve the dual purpose of alleviating the apparent surface water flood risk, which is discussed further in the report 20240453- R02- rev P0-FRA.

6.8 The full surface water network has been sized to accommodate all storms, up to and including the 100-year event, including a 45% allowance for climate change. CVs (Runoff coefficients) of 1 have been used, with a 10% increased allowance applied to all drained hardstanding areas, to allow for urban creep. The calculations provided have been undertaken using Microdrainage. Microdrainage does not allow for updates post 2020. The FEH input information used is 2022, however, as the version of Microdrainage is older than 2022, the software assumes the inputs are older, when in fact the latest FEH2022 rainfall parameters have been used.

6.9 The proposed drainage plans, showing exceedance flow routes, are included in Appendix I, with a Microdrainage network model and half drain times, that correlates with the plans included in Appendix J. As can be seen for the 50% AEP event, the drainage network will be free of surcharging except downstream of storage and flow control features, with no flooding occurring on site for the 3.33% and 1% AEP events, including a 45% allowance for climate change.

Foul Water Drainage

6.10 A new network of foul manholes and pipes is to be installed to serve the proposed houses via gravity to a pumping chamber that is to be located at the northwestern end of the site.

6.11 As there are no formal public sewers to discharge to within the vicinity of the site, it is proposed the full site foul drainage will discharge to the adjacent sites foul water network, which is shown in Appendix F.

6.12 To enable this arrangement, the foul rising main will need to pass through public land along the northern boundary, where it will either discharge to the nearest available manhole on the adjacent site, or further downstream at the end of the run. The layout of these 2 arrangements are shown on the drainage plans, included in Appendix I, with drawing 251-B showing one option, and drawing 254-B, the other.

Water Quality

6.13 The CIRIA SuDS Manual has been reviewed for guidance on pollution mitigation indices. Table 26.2 of this document has been extracted below, indicating expected pollution hazards for different land uses, with the items applicable to the site highlighted.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

6.14 As can be seen the proposed residential roof use is considered to have a very low pollution hazard level, with the parking areas/low traffic roads noted as low.

6.15 Table 26.3 below has also been extracted the CIRIA SuDS Manual and shows how certain pollution indices can be mitigated.

ABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Type of SuDS component	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area		

6.16 As can be seen the proposed permeable paving, will prove suitable for mitigating any contaminants generated from the access roads which drain to these sections, with the raingardens, consistent with filter drains, suitable of mitigating contaminants from the residential roofs. External areas that cannot be routed to the permeable parking bays will pass through a petrol interceptor, with mitigation indices consistent with parking areas/low traffic roads

6.17 It is proposed that catchpit chambers will be installed upstream of tanks that will help filter out other potential residual contaminants.

7.0 SuDS Maintenance, Management & Construction

Maintenance & Management

7.1 It is recommended that catchpit sumps be monitored 3 monthly, and after periods of intense rainfall and cleared where required. Jetting of the pipework may be required on occasion, if and when a decrease in the performance of the drainage network has been identified. For the correct methods of maintenance on the various drainage features, refer to S.H.W., Volume 1, Series 500, Clauses 520, 521 and 526.

7.2 The following maintenance regime for tanks should be adopted to ensure efficient performance.

Maintenance Schedule	Required Actions	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter- remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
	System inspection after heavy storms	After every extreme storm event
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

7.3 The following maintenance regime for permeable paving should be adopted to ensure efficient performance.

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove debris and leaves etc.	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds	As required- once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting etc	As required
	Rehabilitation of surface and upper substructure	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action.	Three-monthly, 48 hours after large storms in the first six months
	Inspect silt accumulation rates and establish appropriate frequencies for rehabilitation	Annually
	Monitor inspection chambers	Annually

7.4 The following maintenance regime for raingardens should be adopted to ensure efficient performance.

Maintenance Schedule	Required Actions	Typical Frequency
Regular Maintenance	Water new planting regularly in dry periods during establishment period (2-5 years)	Every 2 weeks in summer months as required
	Water established planting in prolonged dry periods	As required
	Check and clear water inlets and soil aeration vents	6 monthly
	Clear leaf debris from water inlet channels	Annually
	Remove grills (if used) and clean accessible water channels	Annually, or as required
	Inspect, check and clean filter media in trough systems	After every extreme storm event

Construction Works

7.5 It will be the duty of the site owner/management team to ensure that the proposed surface water drainage system is maintained correctly during the lifetime of the site, as per the regime listed above, to mitigate the risk of drainage failure that may lead to flooding.

7.6 Listed below are some potential risks that may be encountered during the construction of the new drainage network, and how these risks can be mitigated.

Item	Potential Effects	Recommended Actions
Deep excavations required for installation of drainage	Excavations required for drainage installation may be subject to collapse, and/or workers/plant/material falling in.	Temporary support to be provided along excavations. Edge support required along excavations.
Protection of installed infrastructure during work suspensions	During work suspensions, excavations and installed drainage that are exposed may be subject to ingress of debris and other material, also presenting risk to site operators.	Contractor to utilise appropriate protection measures including but not limited to temporary pipe stoppers and trench covers.
Storage of construction materials and surplus materials.	Construction materials and surplus materials to be exported from site may be obstructive to working areas and access routes.	Designated areas to store materials away from working areas and pedestrian/vehicle access routes to be provided.
Perched groundwater	Perched groundwater encountered during the construction phase may impact on work proposals	Appropriate dewatering techniques to be utilised to mitigate the risk of groundwater effects.

7.7 A construction management of quantity and quality of water on site statement has been produced for the site and is included in Appendix K.

8.0 Summary/Conclusion

8.1 This Drainage Strategy has been produced to review the proposed drainage strategy for the proposed development at Toddington Lane, Littlehampton, BN17 7PN. The development proposals will see the erection of a new 10-unit residential development, featuring a mixture of 2- and 3-bedroom units, some semi-detached and some terraced. Associated access roads and parking facilities are also proposed to serve the development.

8.2 National and local policies have been reviewed regarding preferred methods of surface water disposal. The use of infiltration as a means of surface water disposal will not be possible due to the poor soakage potential of the soil on site, along with mass buildups of made ground, a medium unsuitable for infiltration. The option of discharging to a watercourse is not possible, as there are none within the vicinity of the site to discharge to.

8.3 It is proposed that surface water generated on site will be stored in a combination of porous paving and below ground attenuation tanks, with rain garden planters/water butts used as additional source control provisions, to collect rainwater pipe outlets. Porous paving will be utilised in parking bays, with, that will accommodate runoff from the adjacent access roads and hardstanding, restricted by orifice plates which will then drain to the central below ground attenuation tank. restricted via orifice plates. The central attenuation tank will then cascade into a smaller one, which will also accommodate runoff generated on the front section of access road, that will pass through a petrol interceptor, where the total discharge from site will be restricted to 2l/s, via a flow control chamber. Surface water will discharge to the soon to be developed off-site surface water drainage network to serve Toddington Lane. The surface water drainage system has been designed to cater for all flood events up to and including the 100-year storm, including a 45% allowance for climate change.

8.4 It is proposed that foul water will discharge to the neighbouring residential site via pumping, with 2 options identified and illustrated in Appendix I.

8.5 This report clearly demonstrates that the proposed development can be served sustainably for drainage, in line with local and national policies and guidance.

Green Structural Engineering

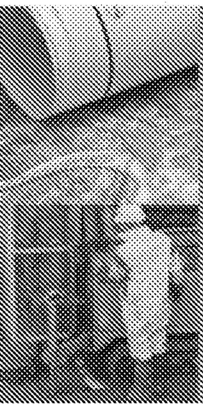
APPENDIX A – Topographical Survey


FERNY BANKS
THE OLD FARMHOUSE
OLD BYRE HOUSE
HOLLYACRE
BARN
TODDINGTON LANE
Tarmac
Brick Paving
Grass
Overhead Cable
Limited Access Due To Dense Brambles
Skalpings/Thistles/Tarmac/Concrete
Dense Brambles
Skalpings Track
Gate
Barrier
Bushes/Brambles
Line of Posts
Reptile Fencing

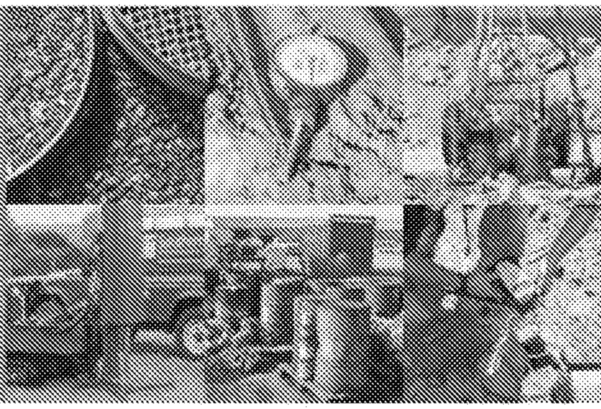
APPENDIX B – Soakage Report

Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical



Soakage Test Report



Project Name: Land to the south of Toddington Lane

Location: Lyminster, Littlehampton, BN17 7FU

Client: Worthing Homes

Project ID: J15618

Report Date: 22 December 2023

Report Issue: 1

Author	J A Clifford BSc FGS	[redacted]
Check / Review	S F Pratt BSc MSc CGeol FGS DIC	

For and on behalf of Southern Testing Laboratories Limited

DOCUMENT HISTORY AND STATUS

Issue No.	Date	Purpose or Status	Author	Check / Review
1	22-Dec-2023	Soakage Test Report	JAC	SFP

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a Project Order from Approved by S Gearing of Worthing Homes on the 27th November 2023.

2 Location

The site is located 1.8km north East of Littlehampton Railway station, and just to the south of Toddington Lane. The approximate National Grid Reference of the site is TQ 03400 03859. The site location is indicated on Figure 1 within Appendix A.

3 Investigation Brief

In accordance with the Client's instructions, and our quotation, the following was included in our brief for this soakage investigation:

Soakage tests to be carried out on site using the BRE 365 method at locations specified by the client's engineer.

4 Scope

This factual report presents our exploratory hole logs and test results only.

A UXO risk assessment was not included within our brief for the investigation, however a preliminary UXO risk assessment has been carried out prior to our initial site investigation dated November 2021.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Worthing Homes and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

B SITE SETTING

5 Geological Records

No formal desk study has been carried out, but reference has been made to both online and published geological maps to put the site into context. A geotechnical investigation report has been previously carried out by ourselves (Ref: J14912 November 2021) and the reader is referred to this report for additional information.

5.1 Geology

The British Geological Survey Map No317/332 indicates that the site geology consists of River Terrace Deposits over Raised Beach Deposits over the New Pit Chalk Formation

5.1.1 River Terrace Deposits

The River Terrace Deposits are of fluviatile origin and were laid down by the Thames when the climate was much wetter and cooler than at present. The terraces consist of sheets of gravel and sand with an overlying deposit of Brickearth (really an ancient alluvium). Some variability in soils is to be expected at junctions with the various terraces, as riverbanks existed there. The remains of these former riverbanks can be soft and silty or contain clay.

5.1.2 Brickearth

Brickearth (loess deposit) is a recent deposit which is so called as it is suited to brick manufacture. It is predominantly an aeolian deposit; formed during cold, dry climatic conditions. There is evidence that brickearth has been reworked as part of 'sheet flooding' which helped incorporate flint gravels into the deposit. Brickearth consists mainly of ferruginous silty clay, which is often sandy and may contain some finely divided chalk, scattered flints and gravelly seams, or other locally derived material. It is usually poorly consolidated and may contain numerous hollow root tubes and worm burrows.

5.1.3 Raised Beach Deposits (South Coast)

There are four raised beaches on the south coast. These are:

1. The Higher Raised Beach (30m Beach, Goodwood Slindon Raised Beach).
2. The 15 to 20 m Beach.
3. The Sussex Low Raised Beach (The 7.5 m Raised Beach).
4. The 4 m Beach.

The principal beaches in Southeast England are the Higher and Low beaches, as described below:

The Higher Raised Beach (Goodwood-Slindon Raised Beach)

The higher beach is variously referred to as the 100 foot beach, the 30 m beach, the Goodwood Beach and the upper beach.

The beach deposits consist of uniformly graded, often buff, silty sand, which lie beneath a superficial cover of (usually) clayey gravel. They are above 4 m thick and are dated to the second warm interglacial period (the Hoxnian). They rest on a wave-cut platform which falls gently from its maximum elevation of just over 30 m AOD to about 25 m AOD over a distance of 1 to 2 km. Where the base platform is in chalk there is often a thin gravelly layer and the upper 150 mm or so of the chalk is hard and calcreted. At the interface between the chalk and the overlying beach large solution features may be found.

The northern margin of the beach is marked by a slight break in slope at about +45 m AOD - the beach deposits and overlying cover are about 15 m thick there. A "buried cliff" line may be found and intense reworking and variability of soils must be anticipated.

It is noted that coarse beach deposits are usually absent and it is not entirely clear whether the northern margin is a cliff line or a fault scarp.

Low Sand Beach (7.5 m Beach) (Sussex/Hampshire Low Raised Beach)

The Low Beach deposits comprise fine uniform silty sands with some gravel, which rest on a platform that falls from about +15 m AOD, to present sea level, over a distance of up to 15 km. They lie beneath a superficial cover of brickearth or Coombe deposits.

As the deposits are up to about 5 m thick, the ground level at the inland margin is about +20 m AOD, and a slight change in slope can sometimes be detected at this point. There is a former cliff at the margin, usually in soft Tertiary clays which have been highly degraded but which may have been up to 10 to 12 m high. Highly variable soil conditions must be anticipated in the region of the ancient cliffs.

The beaches were formed in a complex marine transgression which is traditionally considered to belong to the Ipswichian Interglacial (about 80,000 years ago) and there are also deep local cryoturbation and solution features.

5.1.4 New Pit Chalk Formation

The New Pit Chalk Formation typically comprises a blocky creamy white, smooth textured chalk with well-developed marl seams. Small finger shaped flint occurs sporadically in the lower part of the sequence. Conjugate fractures are usually clay-coated and slickensided, reflecting the presence of many clay-rich marl seams.

The White Chalk outcrop in particular is frequently highly fractured and highly permeable, and usually has good infiltration characteristics. On the other hand, Chalk Head, highly weathered Chalk and Chalk under a low permeability superficial cover may have very poor infiltration characteristics.

Chalk is slightly soluble in water and, while it has excellent bearing properties when unweathered, this solubility can lead to deep weathering and softening, and the upper layers of chalk often have an irregular boundary with overlying strata

The Chalk may be softened by solution to a depth of 5 to 15 metres and bearing capacities and engineering properties improve with depth. Where there is an outcrop of impermeable soil overlying the chalk there may be a dramatically increased solution effect due to concentrated surface water flow to the Chalk close to the outcrop boundary.

Solution features are common in the Chalk, and these can present significant difficulties to development on affected sites.

Man has also worked the chalk for flints, and for other purposes, for thousands of years and any signs of old workings should be carefully investigated.

C FIELDWORK

6 Strategy and Method

The strategy adopted for the soakage testing comprised the following:

Activity / Method	Purpose	Max Depth Range (mbgl)	Installations / Notes
TP01,TP01A,TP02,TP02A and TP03 JCB 3CX	Trial pit to investigate the shallow ground conditions and allow for assessment of soakage potential using the BRE365 method.	1.00-3.80	BRE365 Soakage tests

Exploratory hole locations were specified by the Client's Engineer and are shown in Figure 2 in Appendix A.

In-situ test method descriptions employed are given in Appendix B together with the test results.

7 General Site Description

The site was roughly rectangular in shape measuring approximately 100m across in the east to west direction and 70m in a north to south direction. The site comprised mostly vacant land overgrown with vegetation, with a part brick and part concrete agricultural barn measuring approximately 15m x 30m. This had a suspected asbestos cement pitched roof and sides. The site was bound by Toddington Lane to the north east, residential housing to the south and commercial buildings and workshops to the west.

7.1 Topography and Drainage

The topography of the site was elevated in comparison to Toddington Lane to the north, south and east and overlooked the flat lying land to the north. The topography of the surrounding area is predominantly flat towards the coastline but rises steeply to the north towards Arundel.

7.2 Vegetation

The site was heavily vegetated with weeds and brambles with the northern and eastern boundaries being the most heavily vegetated. An ecological boundary fence was also in place along the southern boundary.

7.3 Buildings and Land Use on Site and Nearby

A single building was present on site and this comprised a part brick part concrete barn with concrete floor slab and suspected asbestos cement roof and sides that had partially collapsed in several places.

8 Weather Conditions

The fieldwork was carried out on the 6th December 2023 at which time the weather was generally cold following a period of higher than average rainfall.

9 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised a covering of Made Ground over variable natural superficial deposits over Chalk. A summary is given below.

Depth (m)	Thickness (m)	Soil Type	Description
0.00-0.40/2.80	0.40-2.80	MADE GROUND	Brown clayey silty sandy GRAVEL with patches of gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and varying anthropogenic materials such as brick, concrete, plastic bottle, rubber tyre, metal bars and slate roof tile fragments.
0.40/1.00-2.60/3.00	1.20-1.30	Sandy gravelly CLAY	Brown silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and occasional chalk.
2.80-3.80 (TP2 only)	Unproven	Gravelly SAND	Greenish yellow very clayey gravelly SAND. Gravel is fine to coarse subrounded flints.
2.60-3.00m (TP3 only)	Unproven	Structureless Chalk	Recovered as: Structureless chalk comprising off white and yellowish brown clayey gravely SILT. Gravel is fine to coarse medium density chalk and occasional flint.

10 Groundwater Observations

Groundwater was not observed in any of the exploratory holes during the fieldwork.

D TEST RESULTS

11 Soakage Test Results

The BRE paper DG365, Ref [22] describes a method for site testing to determine soil infiltration rates at the proposed site of a soakaway. The in-situ test method is described in Appendix B.

A total of 5 soakage tests were carried out across the site, at the locations shown on the attached site plan Figure 2, Appendix A. The full results of the soakage tests are presented within Appendix B.

The DG365 Ref [22], states that each pit should be allowed to drain three times to near empty, with filling on the same or consecutive days. This was not possible given the slow soakage rates on site and the one day of testing allowed for.

The infiltration rate from each trial hole is summarised in the table below. The soakage rate in this report in expressed as ℓ/m²/minute, which is a convenient rate to use. The BRE use a unit of m/sec, which is the value in l/m²/minute divided by 60,000.

Test ID	Test Depth (mbgl)	Design Infiltration Rate		Notes
		ℓ/m²/minute	m/sec	
TP01	2.5	0.0087	1.45x10-7	Pit not emptied. negligible soakage
TP01A	1.0	0.601	1.00x10-5	Pit not emptied.
TP02	3.8	0.092	1.53x10-6	Pit not emptied. Poor soakage
TP02A	1.20	0.429	7.16x10-6	Pit not emptied.
TP03	3.0	0.253	4.21x10-6	Pit not emptied. Poor soakage

Note: The Design Infiltration Rate is the lowest of the three tests

Where three fillings have not been carried out, a reduction factor should be applied to the result to provide a design infiltration rate.

The soakage results indicated that the shallow soils on site have variable but generally poor soakage potential. Given that Made Ground was encountered in each of the trial holes to variable depths but generally greater than 1m we would not recommend that any permeable paving or soakaways be placed within any made ground soils due to their inherent variability and the risk of inundation settlement.

12 General Guidance on Design of Soakaways

Any soakaway scheme may require the approval of the Environment Agency, Building Control and, where applicable, the adopting Highways Authority.

Soakaways are used to store the immediate surface water run-off from hard surfaced areas, such as roof or carparks, and allow for efficient infiltration into the adjacent soil. They should be designed to discharge their stored water sufficiently quickly to provide the necessary capacity to receive run-off from a subsequent storm. The time taken for discharge depends upon the soakaway shape and size, and the surrounding soil's infiltration characteristics.

Groundwater levels can vary considerably from season to season and year to year, often rising in wet or winter weather, and falling in periods of drought. As such, a high groundwater table may affect the storage capacity of soakaways. In addition, it should be noted that an unsaturated zone may be required between the base of soakaways and the groundwater table, by the Environment Agency. Longer term monitoring may be required to establish actual groundwater levels as part of the planning approval process.

The design of soakaways can be square, circular (conventional) or trench excavations, and may be rubble filled, perforated precast concrete ring units, plastic cells or any similar structure that collects rainwater and run-off and allow discharge directly into the ground. Depending on the geological conditions, and depth at which suitable infiltration is achieved, soakaways can also be deep bored.

Long-term maintenance and inspection must be considered during the design and construction process. Maintenance of silt traps, gully pots and interceptors will improve the long-term performance of soakaways. The use of wet well chambers within the soakaway system can further assist in pollutant trapping and extending the operating life of soakaways.

Risk of pollution to the quality of groundwater must be considered as part of the design.

Generally, roof and surface run-off should not significantly impact on groundwater quality and subject to appropriate approvals from the Environment Agency could be discharged directly to soakaways. However, although again subject to approvals from the Environment Agency, paved surface run-off for larger trafficked areas should generally be passed through a suitable form of oil interception device prior to discharge to the soakaway.

Care must be taken to ensure that the discharge of large volumes of surface run-off into the soil does not disrupt the existing sub-surface drainage patterns. Similarly in areas of sloping topography, consideration should be given to the siting of soakaways to avoid potential discharge and or flooding of down slope areas.

Soakaways should not normally be constructed closer than 10m to buildings.

REFERENCES

[1] Building Research Establishment (BRE), “DG365 Soakaway Design,” 2016.

[2] BSI Standards, “BS 5930 Code of practice for ground investigations,” 2015.

[3] BSI Standards, “BS 3882:2015 Specification for Topsoil,” 2015.

[4] CIRIA, “C574 Engineering in Chalk,” 2002.

[5] R. N. Mortimore, Logging the Chalk, 2014.

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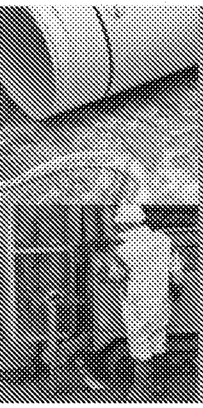
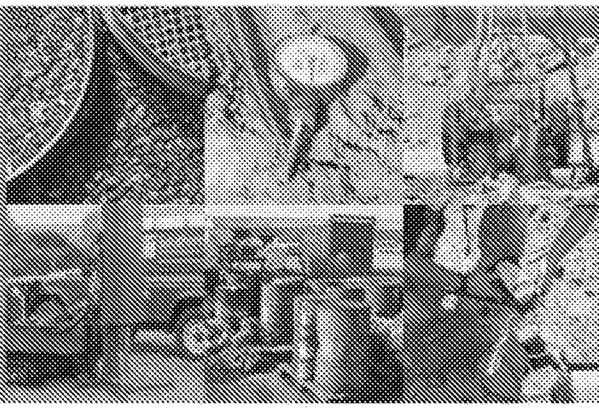
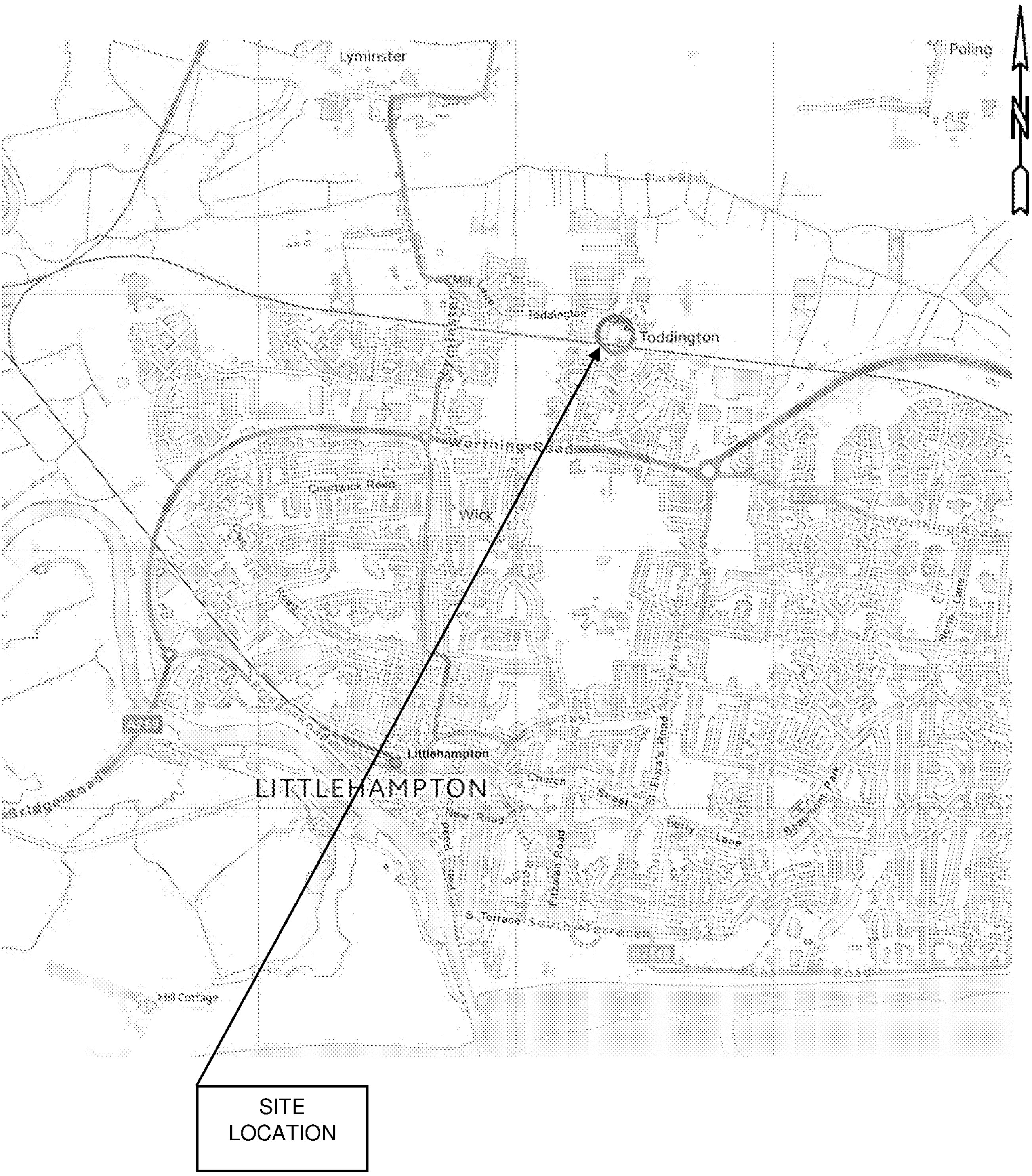


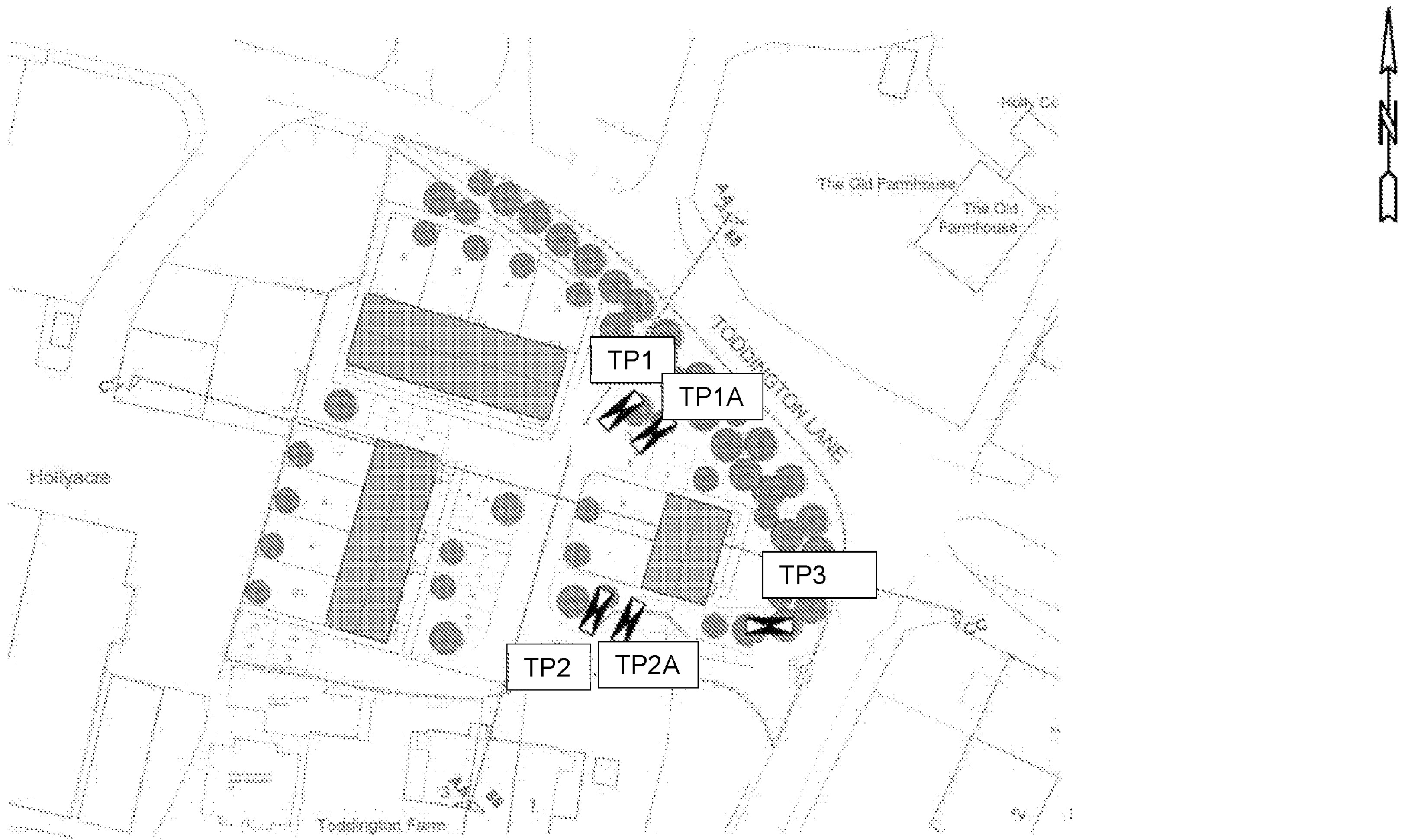
APPENDIX A

Site Plans and Exploratory Hole Logs





Site:	Land at Toddington Lane, Littlehampton, BN17 7PN	Project ID	J15618
Figure 1	Site Location Plan	Date:	21/12/2023



NB: Positions of exploratory holes / test positions are only indicative unless dimensioned.

Site:	Land to the south of Toddington Lane, Littlehampton	Project Id:	J15618
Figure 2	Site Location Plan	Date:	12/12/2023

Key to Exploratory Hole Logs, Plans and Sections

Backfill Symbols		Pipe Symbols		Principal Soil Types		Principal Rock Types		Drilling Records	
Arisings		Plain Pipe		Topsoil		Mudstone		Water Strike	
Concrete		Slotted Pipe		Made Ground		Claystone		Depth Water Rose	
Blacktop		Piezometer		Clay		Siltstone		Total Core Recovery (%) [TCR]	
Bentonite		Piezometer Tip		Silt		Sandstone		Solid Core Recovery (%) [SCR]	
Gravel Filter		Filter Tip		Sand		Limestone		Rock Quality Index (%) RQD]	
Sand Filter		Extensometer		Gravel		Chalk		Fracture Index (fractures / m) [FI]	
		Inclinometers		Peat					

All soil and rock descriptions are in general accordance with BS5930 2015, BS EN ISO 14688-1:2002+A1:2013 and BS EN ISO 14689-1:2003. Chalk descriptions are also based on CIRIA C574 and "Logging the Chalk – R.N. Mortimer 2015". The Geology Code is only provided where a positive identification of the sample strata has been made.

Location / Method Identifiers	
BH	Borehole (undefined)
CP	Cable Percussive
RC	Rotary Core
RO	Rotary Open Hole
ODC	Rotary Odex/Symmetrix drilling cased
CP+RC	Cable Percussive to Rotary Core
SNC	Sonic
CFA	Continuous Flight Auger
FA	Flight Auger
VC	Vibro Core
WLS+RC	Windowless (Dynamic) Sampler to Rotary Core
WLS	Windowless Sampler
WS	Window Sampler
HA	Hand Auger
C	Road / Pavement Core
IP	Inspection Pit (Hand Excavation)
TP	Trial Pit (Machine Excavated)
OP	Observation Pit (Supported Excavation Hand or Machine)

In-situ Test Location / Method	
DP	Dynamic Probe
CPT	Cone Penetration Test
CBR	In-situ CBR Test
DCP	CBR using Dynamic Cone Penetrometer
CBRT	CBR using TRL Probe
PB	Plate Bearing Test
SPT (S)	Standard Penetration Test (Split Barrel Sampler)
SPT (C)	Standard Penetration Test (Solid Cone)
N	SPT Result
-/-	Blows/Penetration (mm) after seating drive
-*/-	Total Blows / Penetration (mm)
( )	Extrapolated Value
PPT	Perth Penetration (In-House Method - Equivalent N Value)
HP / UCS	Strength from Hand Penetrometer (kN/m^2)
IVN	Strength from Hand Vane ((kN/m^2) P = peak, R = residual
PID	Photo Ionisation Detector (ppm)
MEXE	Mexi-Cone CBR (%)

Samples / Test Type	
B	Bulk Sample
BLK	Block Sample
C	Core Sample
CBRS	CBR Mould Sample
D	Small Disturbed Sample
ES	Environmental Sample (Soil)
EW	Environmental Sample (Water)
GS	Environmental Sample (Gas)

Samples / Test Type	
SPTLS	Standard Penetration Test Split Barrel Sample
TW	Thin Wall Push In Sample (e.g. Shelby Sampler)
U	Undisturbed Open Drive Sample (blows to take)
UT	Thin Wall Undisturbed Open Drive Sample (blows to take)
W	Water Sample (Geotechnical)
SP	Sample from Stockpile
P	Piston Sample
AMAL	Amalgamated Sample

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP1
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	**Co-ordinates:**		**Level (m AOD)**	**Logger:** JAC
Project Name:	Land to the south of Toddington Road	**Location:**	Littlehamton		

Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
				(1.00)		1.00	Brown silty sandy GRAVEL. Gravel is fine to coarse subangular brick, concrete, roots, tile fragments and cobbles of concrete. (MADE GROUND)
				(0.80)		1.80	Stiff light brown silty lightly fine sandy CLAY. *1.50m slightly gravelly. Gravel is fine to coarse subangular flint.*
				(1.20)		3.00	Orange brown and yellow brown very sandy slightly gravelly CLAY with occasional patches of clayey sand. Gravel is fine to coarse subrounded and subangular flint.
							Pit terminated at 3.00m

Pit Dimension (m)		Pit Stability:	Stable	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:	0.45	Remarks:				
Length:	2.10					
Depth:	3.00					

Status:	DRAFT	**Log Print Date and Time:**	12/12/2023 09:48	**Log Approved By:**	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP1A
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	**Co-ordinates:**	**Level (m AOD)**	**Logger:**
Project Name:	Land to the south of Toddington Road	**Location:**	Littlehamton	

Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
				(0.40)		0.40	Brown silty GRAVEL. Gravel is fine to coarse concrete, brick, flint, tile, chalk, rubber and plastic (MADE Ground)
				(0.60)		1.00	Firm brown and orange brown silty slightly sandy CLAY.
							Pit terminated at 1.00m

Depth scale: 1, 2, 3, 4

Pit Dimension (m)		**Pit Stability:**	Stable.	Water Strikes	
		Weather:		Depth (m)	Date/Time	Remarks
Width:	0.45	**Remarks:**			
Length:	2.10				
Depth:	1.00				

Status:	DRAFT	**Log Print Date and Time:**	12/12/2023 09:48	**Log Approved By:**	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP2
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	**Co-ordinates:**	**Level (m AOD)**	**Logger:** JAC
Project Name:	Land to the south of Toddington Road	**Location:**	Littlehamton	

Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
				(1.20)		1.20	Probably loose brown clayey silty sandy GRAVEL with patches of gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint, brick, concrete, plastic bottle, rubber tyre, metal bars. (MADE GROUND) *0.1m geotextile fabric*
				(1.10)		2.30	Orange brown silty slightly gravelly very sandy CLAY. Gravel comprises fine brick and tile fragments (MADE GROUND)
				(0.50)		2.80	Orange brown silty gravelly clayey SAND/slightly very sandy CLAY. Gravel comprises fine brick and tile fragments (MADE GROUND)
				(1.00)		3.80	Greenish yellow very clayey gravelly SAND. Gravel is fine to coarse subrounded flints.
							Pit terminated at 3.80m

Depth scale: 1, 2, 3, 4

Pit Dimension (m)		**Pit Stability:**	Minor collapse in top 1.0m	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:		**Remarks:**				
Length:						
Depth:	3.80					

Status:	DRAFT	**Log Print Date and Time:**	12/12/2023 09:48	**Log Approved By:**	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP2A
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	**Co-ordinates:**	**Level (m AOD)**	**Logger:**
				JAC
Project Name:	Land to the south of Toddington Road	**Location:**	Littlehamton	

Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
				(0.90)		0.90	Brown clayey GRAVEL. Gravel comprises fine to coarse subangular to subrounded concrete, brick, plastic, metal, wire, tile (MADE GROUND)
				(0.30)		1.20	Soft to firm orange brown silty slightly fine sandy CLAY with fragments of tile and fine brick (MADE GROUND)
							Pit terminated at 1.20m

1
2
3
4

Pit Dimension (m)		Pit Stability:	Stable	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:	0.45	Remarks:				
Length:	1.20					
Depth:	1.20					

Status:	DRAFT	**Log Print Date and Time:**	12/12/2023 09:48	**Log Approved By:**	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	TP3
	06/12/2023	J15618	TP	Sheet 1 of 1

Client:	Worthing Homes	**Co-ordinates:**	**Level (m AOD)**	**Logger:**
				JAC
Project Name:	Land to the south of Toddington Road	**Location:**	Littlehamton	

Samples and Insitu Testing: Depth (m bgl)	Type	Results	Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
				(1.30)		1.30	Dark brown silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded brick, plastic, roots, flint, slate, aluminium can, paving slab. (MADE GROUND)
				(1.30)		2.60	Firm brown and light brown silty gravelly CLAY. Gravel is fine to coarse subrounded flint and occasional chalk.
				(0.40)		3.00	Recovered as: Structureless chalk comprising off white and yellowish brown clayey gravelly SILT. Gravel is fine to coarse medium density chalk and occasional flint.
							Pit terminated at 3.00m

Depth scale: 1, 2, 3, 4

Pit Dimension (m)		Pit Stability:	Generally stable with minor collapse in upper 0.8m	Water Strikes		
		Weather:		Depth (m)	Date/Time	Remarks
Width:		Remarks:				
Length:						
Depth:	3.00					

Status:	DRAFT	Log Print Date and Time:	12/12/2023 09:48	Log Approved By:	

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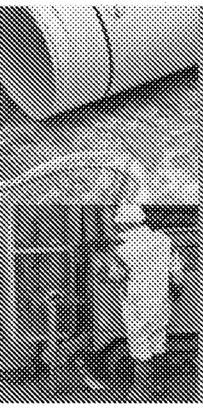
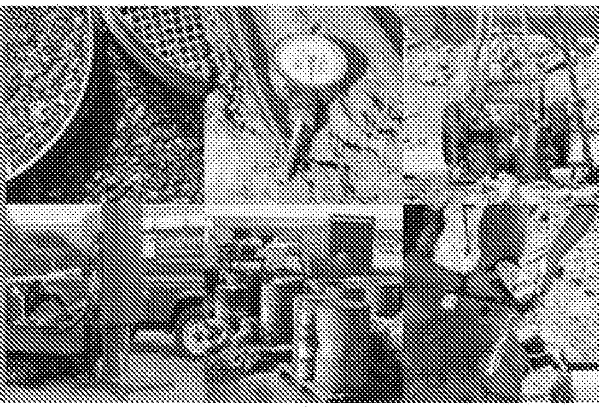


APPENDIX B

In-Situ Test Methods and Results



B

Soil and Rock Descriptions

All soil and rock descriptions are in general accordance with BS5930 Ref [4].

Anthropogenic soils ('made ground' or 'fill') describe materials which have been placed by man and can be divided into those composed of reworked natural soils and those composed of or containing man-made materials. 'Fill' is used to describe material placed in a controlled manner and 'made ground' is used to describe materials placed without strict engineering control.

The classification of materials such as topsoil is based on visual description only and should not be interpreted to mean that the material complies with criteria used in BS 3882 Ref [33].

Chalk descriptions are based on CIRIA C574 Ref [34] and Mortimore Ref [35].

The geology code is only provided on logs where a positive identification of the sample strata has been made.

Soakage Tests (after BRE DG365 2016)

The BRE DG365 Ref [22] paper on soakaway design allows for the design of trench soakaways as well as traditional square and circular soakaways.

The test to measure the soil infiltration rate is carried out in pits which are excavated to the full depth of the proposed soakaway. The trial pits are filled and allowed to drain to empty or near empty, three times, on the same day or on consecutive days. Water levels are recorded against time. Where the sides are unstable the pit should be filled with granular material to provide stability during the test.

Calculated soakage rates are expressed as l/m^2/minute, which is a convenient rate to use. The BRE use a unit of m/sec, which is the value in l/m^2/minute divided by 60,000.

Summary Sheet

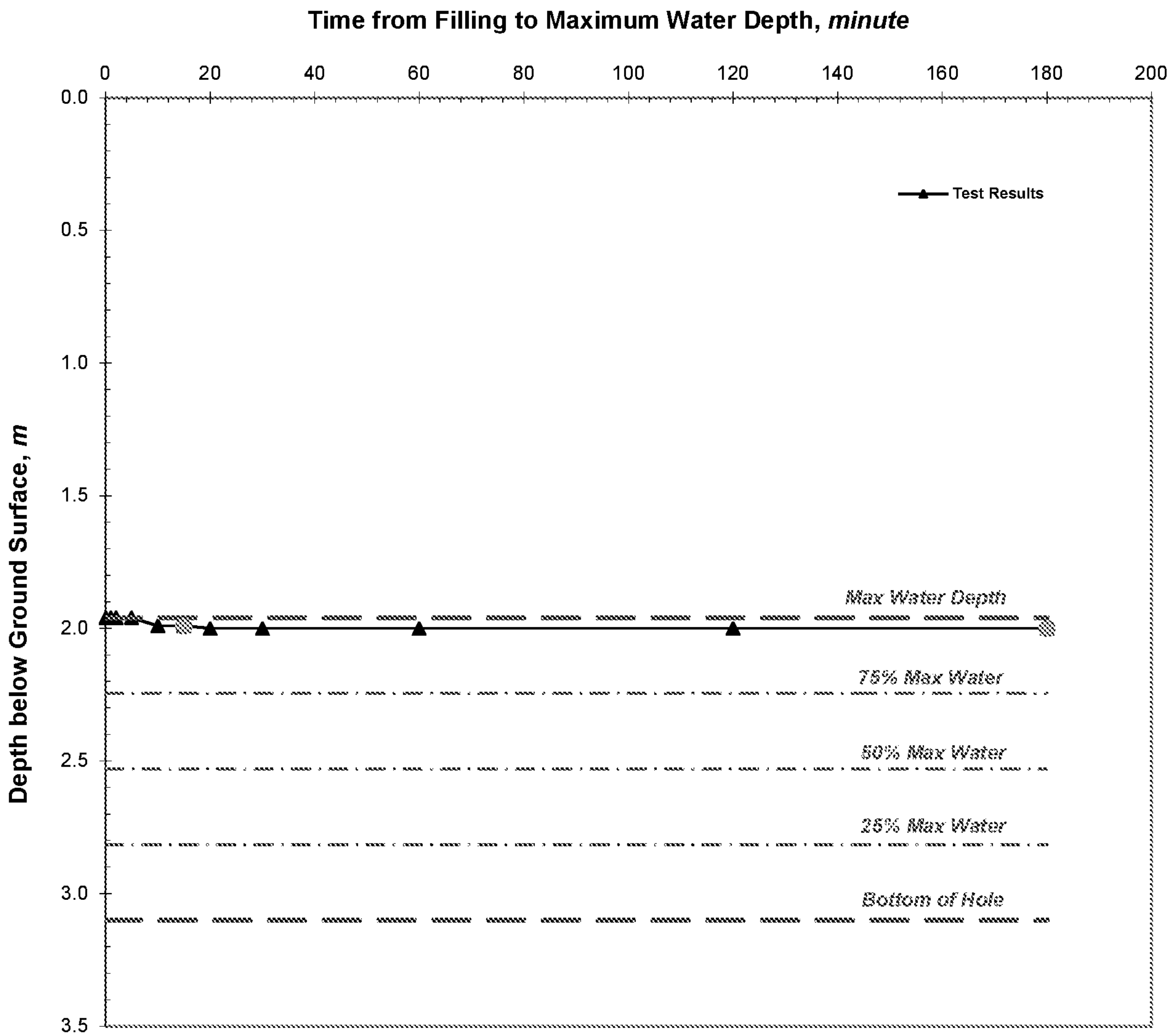
Results of BRE Digest DG365 Soakage Tests

Site :	Land to the South of Toddington Lane	**Job No :**	J15618
Client :	Worthing Homes	**O S Reference :**	
Tested By : JB	**Engineer:** JC	**Test Date :**	06/Nov/2023

Hole No	Test No	Hole Depth (m)	Soakage Rate for Each Test (litre/m^2/min)	Soakage Rate for Each Hole (litre/m^2/min)	Soakage Rate for Each Hole (m/sec)	Water Level at Finish of Test	Remarks
TP03	No 1	3.00	0.253	0.253	4.21E-6	Pit was not emptied; Non compliant value was calculated.	
TP02	No 1	3.80	0.092	0.092	1.53E-6	Pit was not emptied; Non compliant value was calculated.	
TP02A	No 1	1.20	0.429	0.429	7.16E-6	Pit was not emptied; Non compliant value was calculated.	
TP01	No 1	3.10	0.0087	0.0087	1.45E-7	Pit was not emptied; Non compliant value was calculated.	
TP01A	No 1	1.00	0.601	0.601	1.00E-5	Pit was not emptied; Non compliant value was calculated.	
Mean Value of All Calculated Soakage Rates :				**0.277** litre/m^2/min	**4.61E-6** m/sec		

BRE Digest DG365 Soakage Test

Test Hole No: TP01
Test No: Test No 1 (Initial)



Pit Length, m	2.100	Depth to Water at Start of Test, *m*	1.960
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.040
Depth to Pit Base, m	3.100	Total Soakage Test Time, *min*	180.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	6.581
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	0.057
Depth to Top of Granular Fill, *m*		Soakage Rate, $litre/m^2/min$	**0.0087**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**1.45E-07**

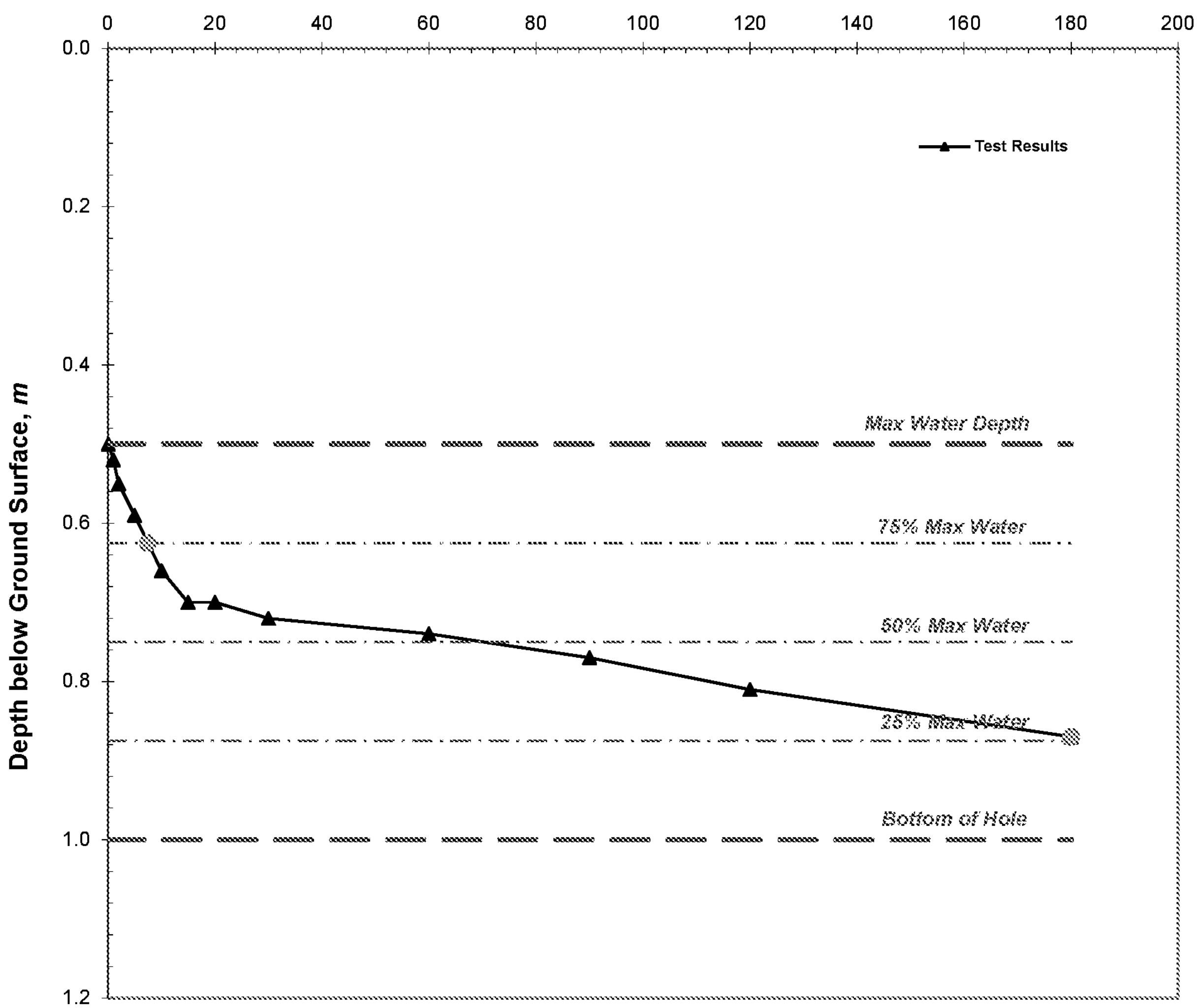
Comments:

Water level did not fall to 75% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:**	J15618	**Test Date:**	06/Nov/2023	
Site: Land to the South of Toddington Lane	**Tested By:**	JB	**Engineer:**	JC	**Fig. S4**

BRE Digest DG365 Soakage Test

Test Hole No: TP01A
Test No: Test No 1 (Initial)



Pit Length, m	2.100	Depth to Water at Start of Test, *m*	0.500
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.370
Depth to Pit Base, m	1.000	Total Soakage Test Time, *min*	180.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, *m*^{2}	2.233
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	1.342
Depth to Top of Granular Fill, *m*		Soakage Rate, *litre/m*^{2}*/min*	**0.601**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**1.00E-05**

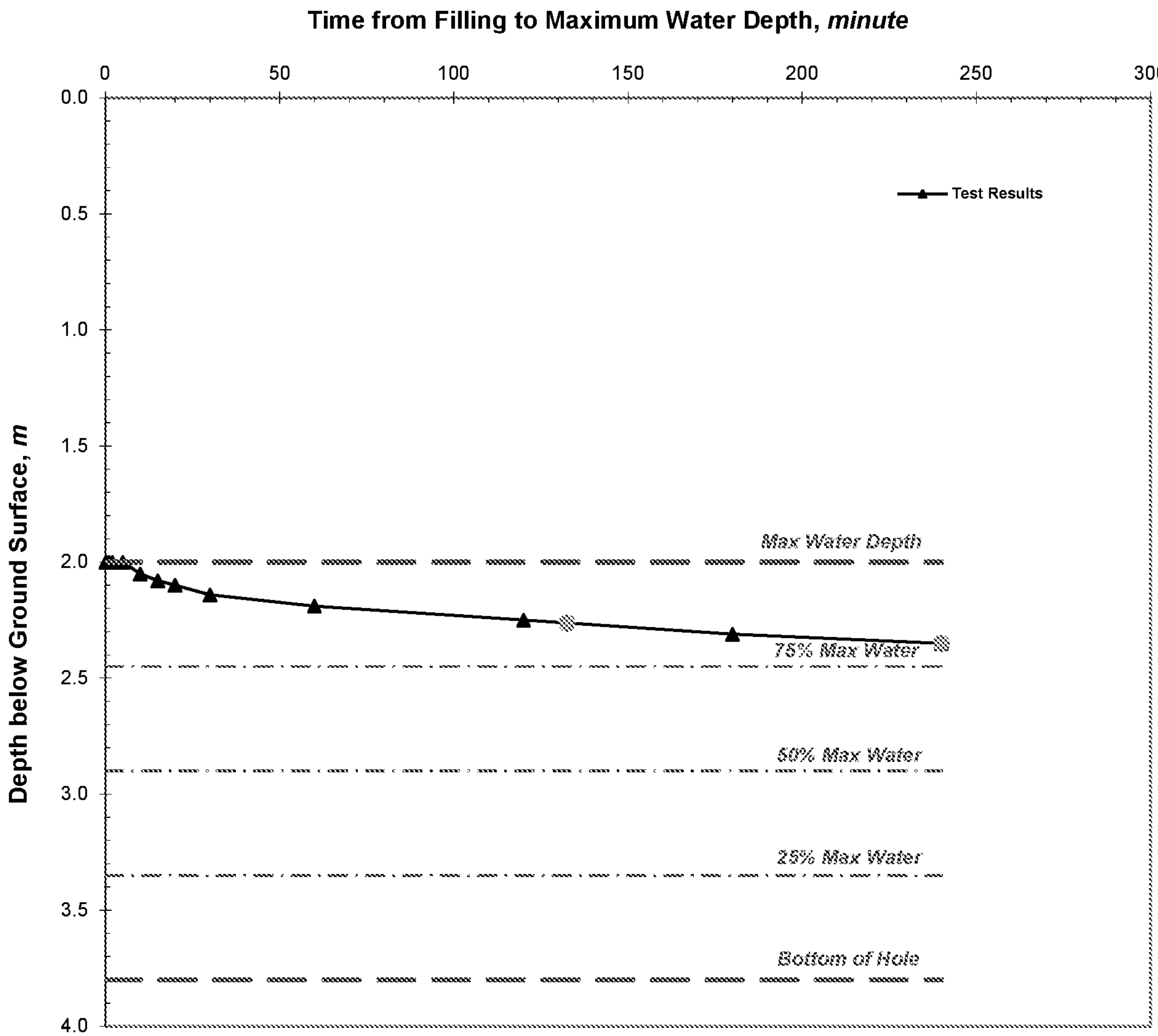
Comments:

Water level fell to 50% -- 25% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:**	J15618	**Test Date:**	06/Nov/2023		
Site: Land to the South of Toddington Lane	**Tested By:**	JB	**Engineer:**	JC	**Fig. S5**	

BRE Digest DG365 Soakage Test

Test Hole No: TP02
Test No: Test No 1 (Initial)



Pit Length, m	2.400	Depth to Water at Start of Test, *m*	2.000
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.350
Depth to Pit Base, m	3.800	Total Soakage Test Time, *min*	240.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	9.594
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	0.879
Depth to Top of Granular Fill, *m*		Soakage Rate, *litre/m^2/min*	**0.092**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**1.53E-06**

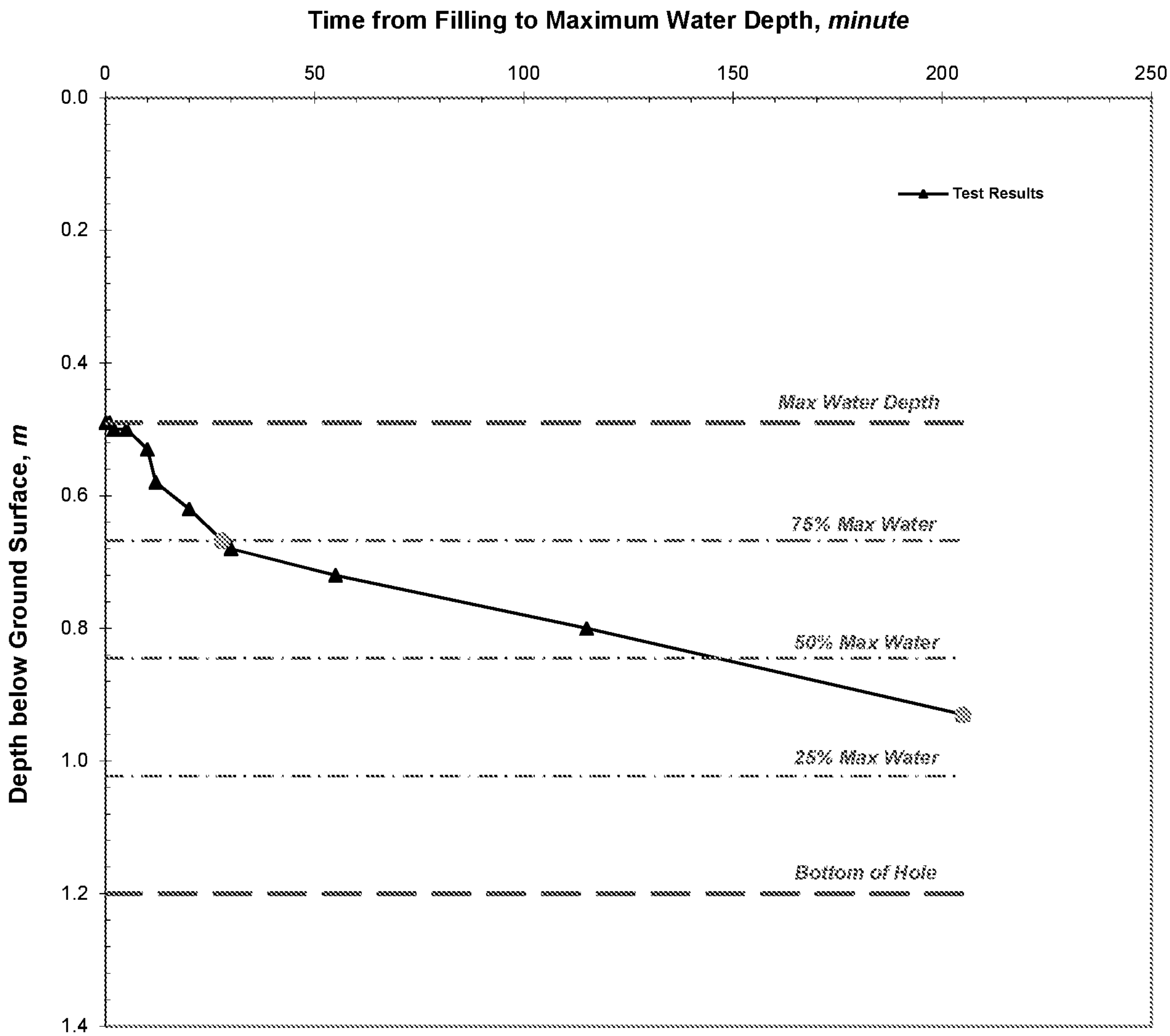
Comments:

Water level did not fall to 75% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:**	J15618	**Test Date:**	06/Nov/2023	
Site: Land to the South of Toddington Lane	**Tested By:**	JB	**Engineer:**	JC	**Fig. S2**

BRE Digest DG365 Soakage Test

Test Hole No: TP02A
Test No: Test No 1 (Initial)



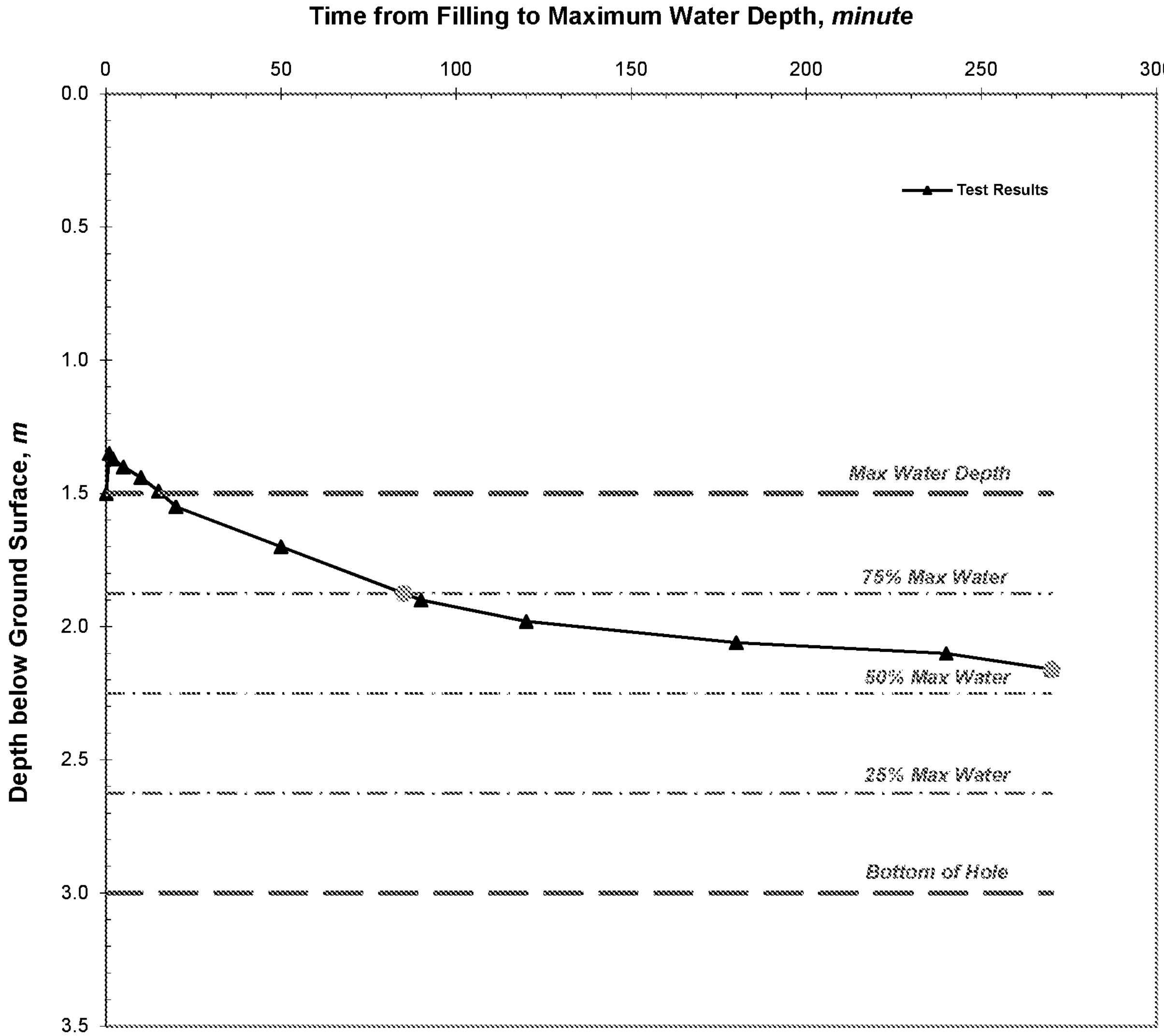
Pit Length, m	1.200	Depth to Water at Start of Test, *m*	0.490
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.440
Depth to Pit Base, m	1.200	Total Soakage Test Time, *min*	205.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	1.864
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	0.800
Depth to Top of Granular Fill, *m*		Soakage Rate, $litre/m^2/min$	**0.429**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**7.16E-06**

Comments:
Water level fell to 50% -- 25% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes		**Job No:** J15618		**Test Date:** 06/Nov/2023	
Site: Land to the South of Toddington Lane		**Tested By:** JB		**Engineer:** JC	**Fig. S3**

BRE Digest DG365 Soakage Test

Test Hole No: TP03
Test No: Test No 1 (Initial)



Pit Length, m	2.700	Depth to Water at Start of Test, *m*	1.500
Pit Width, m	0.450	Max Water Dropdown during Test, *m*	0.660
Depth to Pit Base, m	3.000	Total Soakage Test Time, *min*	270.0
Depth to Top of Permeable Soils, *m*		Mean Internal Discharge Area, m^2	7.405
Depth to Groundwater Surface, *m*		Discharge Rate, *litre/min*	1.872
Depth to Top of Granular Fill, *m*		Soakage Rate, *litre/m²/min*	**0.253**
Voids Assumed for Granular Fill, %	100%	BRE Soil Infiltration Rate, *m/sec*	**4.21E-06**

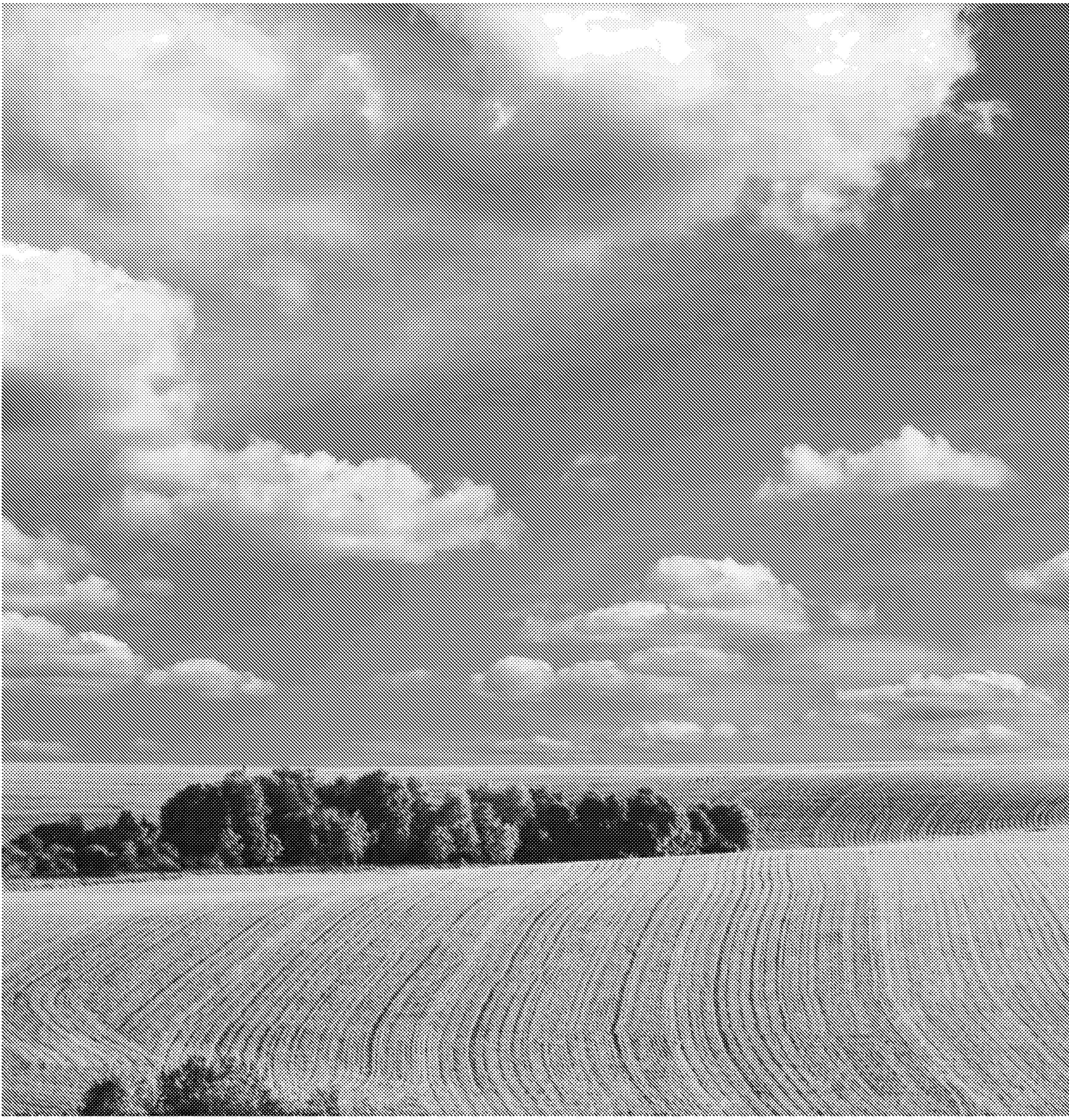
Comments:

Water level fell to 75% -- 50% max water depth, calculations were based on actual fall of water level achieved.
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client: Worthing Homes	**Job No:** J15618	**Test Date:** 06/Nov/2023			
Site: Land to the South of Toddington Lane	**Tested By:** JB	**Engineer:** JC	**Fig. S1**		

Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical



Head Office
East Grinstead

ST Consult Midlands
Northampton

ST Consult Thames Valley
Hannington

ST Consult North West
Warrington

[redacted]

Green Structural Engineering

APPENDIX C – Proposed Site Plan

Notes

1. This drawing is the copyright of MH Architects Ltd
2. Do not scale this drawing except for Local Authority planning purposes
3. All dimensions must be checked on site by the contractor prior to commencement of the works.

Client Approval

A - Approved

B - Approved with comments

C - Do not use

Rev.	Revision Note/Purpose of Issue	Drw By	Date	Chk By	Date

SCHEDULE OF ACCOMMODATION

UNIT	ACCOMMODATION	Internal Area	
01	5 person 3 Bed house	93.2 sq. m	affordable rent
02	5 person 3 Bed house	93.2 sq. m	affordable rent
03	4 person 3 Bed house	80.0 sq. m	affordable rent
04	4 person 2 Bed house	80.0 sq. m	affordable rent
05	5 person 3 Bed house	93.2 sq. m	affordable rent
06	5 person 3 Bed house	93.2 sq. m	affordable rent
07	4 person 2 Bed house	79.0 sq. m	affordable rent
08	4 person 2 Bed house	79.0 sq. m	affordable rent
09	4 person 2 Bed house	79.0 sq. m	affordable rent
10	4 person 2 Bed house	79.0 sq. m	affordable rent

TOTALS:-

4 person 2 Bed house	= 6 units
5 person 3 Bed house	= 4 units

Development Site	0.35 Ha
Site Density	28.5 Units/Ha
Car Parking	TOTAL = 21 spaces on site
	2 spaces for each 2 bed house
	2 spaces for each 3 bed house
	1 visitors space

Cycle Parking:

2 secure cycle space per house in private gardens (see plans)

Refuse & recycling :

House bins integrated into rear garden (access is near to roadside)

WORK IN PROGRESS

Plans 1:200 @ A1

N

2 0 2 4 6 8 10 12 14 16 18m

1:200

Client

Worthing Homes

Job title

Land at Toddington Lane
Toddington
West Sussex

Drawing title

Site Plan

Drawn	Date	Checked	Date	Scale at A1
MD	07/01/22			1:200

Job No.	Pro.	Org.	Zone	Level	Type	Role	No.	Rev.
21-097	TDL	MHA	00	ZZ	DR	A	003	P07

Purpose of Issue

PRELIMINARY

Ground Floor : Bicentennial Building
Southern Gate : Chichester
West Sussex : PO19 8EZ

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e. admin@mharchitects.co.uk
www.mharchitects.co.uk

Limited Company
Registered in England No.1994233

mh ARCHITECTS

APPENDIX D – Southern Water Sewer Records

(c) Crown copyright and database rights 2024 Ordnance Survey 100031673 | Date: 23/07/24 | Scale: 1:1000 | Map Centre: 503427,103844 | Data updated: 23/07/24 | Our Ref: 1527172 - 1

Wastewater Plan A1
Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey 100031673 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Foul Gravity Sewer | Combined Gravity Sewer | Culverted Water Course or Treated Effluent | Surface Water Gravity Sewer | Rising Main, Vacuum or Syphon

Combined Outfall | Foul Outfall | Surface Water Outfall | Surface Water Inlet

Combined Pumping Station | Surface Water Pumping Station | Foul Pumping Station | Water Treatment Works | Section 104 Area | Building Over Agreement Area

Foul Manhole | Combined Manhole | Surface Water Manhole | Side Entry Manhole, Decantation Chamber, Dummy Manhole or Surface Water Soakaway

tim.seekings@gseltd.co.uk

Toddington

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
1601	F	0.00	0.00	
1602	F	0.00	0.00	
1603	F	0.00	0.00	
1604	F	0.00	0.00	
1605	F	0.00	0.00	
1701	F	7.33	6.31	
2502	F	4.21	2.56	
2601	F	4.22	2.74	
2602	F	6.27	3.69	
2603	F	4.30	2.95	
2604	F	5.69	3.84	
2605	F	6.16	4.33	
2606	F	6.41	4.46	
2607	F	6.52	4.80	
2608	F	6.43	4.08	
2609	F	6.66	4.31	
2610	F	6.62	4.85	
2611	F	6.70	5.08	
2612	F	6.47	4.93	
2613	F	6.67	5.22	
2614	F	6.94	5.41	
2701	F	5.87	3.53	
2702	F	6.65	4.77	
2704	F	6.67	5.00	
2705	F	6.79	5.20	
2706	F	6.79	5.49	
2707	F	7.01	5.95	
2708	F	7.05	5.31	
2709	F	7.31	5.41	
2710	F	0.00	5.50	
2711	F	7.36	5.59	
2712	F	7.38	6.67	
2801	F	101.27	97.71	
3501	F	4.74	3.08	
3601	F	0.00	3.23	
3602	F	0.00	3.15	
3603	F	0.00	3.07	
3604	F	0.00	0.00	
3605	F	0.00	0.00	
3606	F	0.00	0.00	
3607	F	0.00	0.00	
3701	F	4.60	2.93	
3702	F	3.95	3.02	
3703	F	4.01	3.18	
3704	F	0.00	0.00	
3801	F	101.15	97.89	
4505	F	0.00	4.54	
4506	F	0.00	5.00	
4601	F	0.00	5.10	
4602	F	0.00	4.02	
4603	F	0.00	3.85	
4604	F	0.00	3.69	
4605	F	0.00	0.00	
4606	F	0.00	3.46	
4607	F	0.00	3.90	
4608	F	0.00	4.16	
4609	F	0.00	3.40	
4610	F	0.00	3.33	
4701	F	4.84	3.38	
4702	F	0.00	3.58	
4703	F	0.00	3.23	
4704	F	0.00	1.36	
4705	F	0.00	0.00	
5503	F	0.00	4.44	
5504	F	0.00	4.31	
5601	F	0.00	3.80	
5602	F	0.00	2.43	
5603	F	0.00	2.26	
5604	F	0.00	4.24	
5605	F	0.00	3.80	
5606	F	0.00	3.40	
5607	F	0.00	2.73	
5608	F	0.00	2.75	
5609	F	0.00	2.46	
5610	F	0.00	4.50	
5611	F	0.00	3.86	
5612	F	0.00	3.50	
5613	F	0.00	0.00	
5614	F	0.00	0.00	
5615	F	0.00	0.00	
5616	F	0.00	0.00	
5701	F	0.00	2.11	
5702	F	0.00	3.10	
5703	F	0.00	3.00	
5704	F	0.00	1.83	
5705	F	0.00	1.94	
5706	F	0.00	1.50	
6502	F	0.00	4.37	
6503	F	0.00	4.40	
6601	F	0.00	3.05	
6602	F	0.00	3.77	
6603	F	0.00	3.18	
4557	S	6.50	4.86	
4650	S	6.22	5.08	
4651	S	6.21	5.02	
4652	S	6.30	5.14	
4653	S	6.44	5.03	
4654	S	6.32	4.65	
4655	S	6.16	4.52	
4656	S	5.63	4.29	
4657	S	5.87	4.22	
4658	S	6.04	4.26	
4659	S	6.00	4.18	
4660	S	5.28	0.00	
4661	S	5.54	4.22	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
4750	S	6.01	3.93	
4751	S	5.52	3.91	
4752	S	5.16	0.00	
4753	S	5.78	4.10	
4754	S	5.64	4.14	
5554	S	6.39	5.25	
5555	S	6.40	5.16	
5556	S	5.97	4.47	
5557	S	6.03	4.63	
5650	S	6.35	5.08	
5651	S	6.27	4.73	
5652	S	6.10	4.53	
5653	S	6.00	4.50	
5654	S	6.28	4.85	
5655	S	5.27	4.32	
5656	S	6.13	4.68	
5657	S	6.41	4.61	
5658	S	6.63	4.54	
5750	S	6.48	4.49	
5751	S	6.28	4.42	
5752	S	5.65	4.54	
5753	S	6.30	4.13	
6550	S	6.19	4.88	
6650	S	5.90	3.75	
6651	S	5.50	3.73	
6652	S	5.50	0.00	
6653	S	6.37	5.06	
6654	S	5.42	4.05	
7650	S	5.97	4.64	

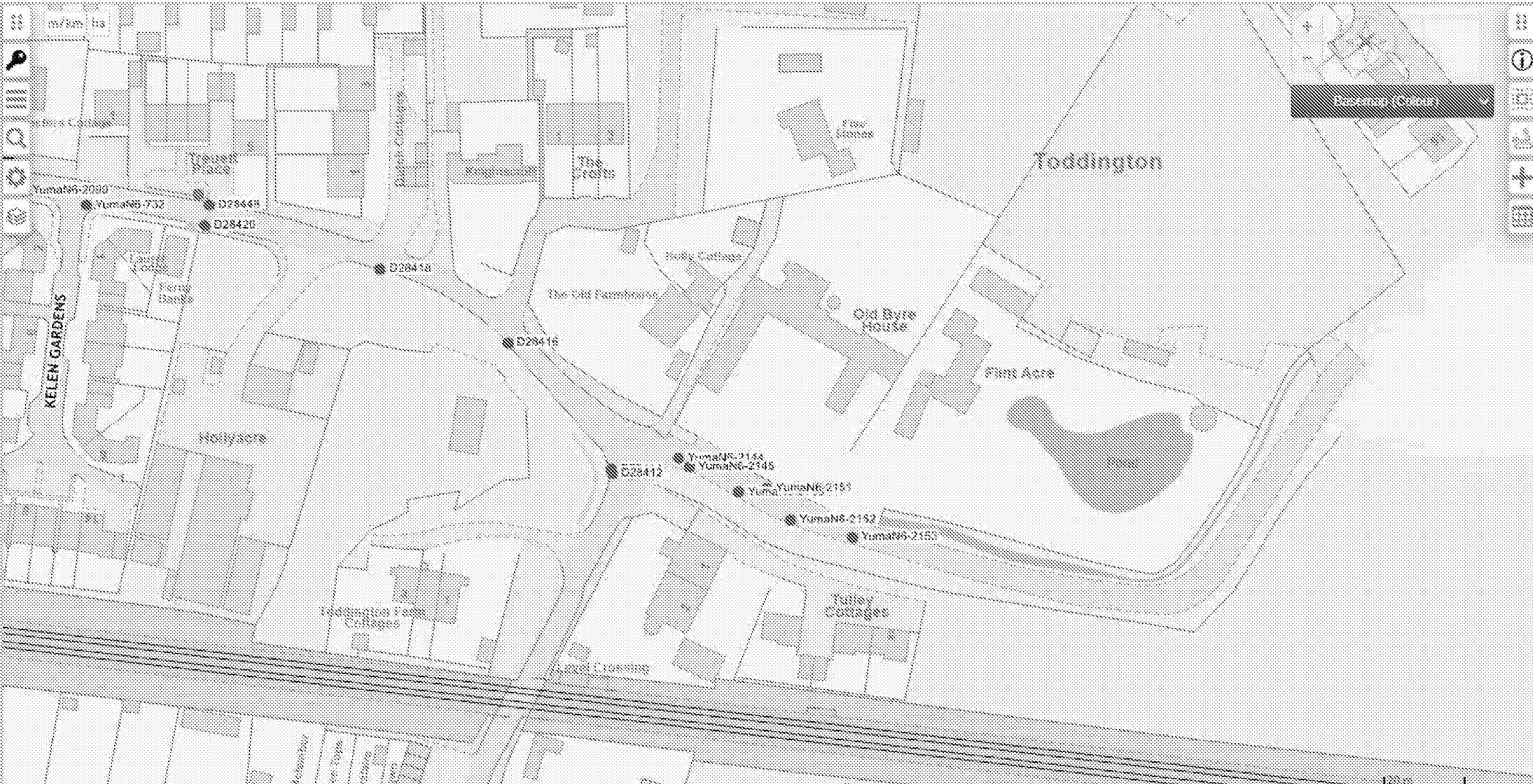
Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

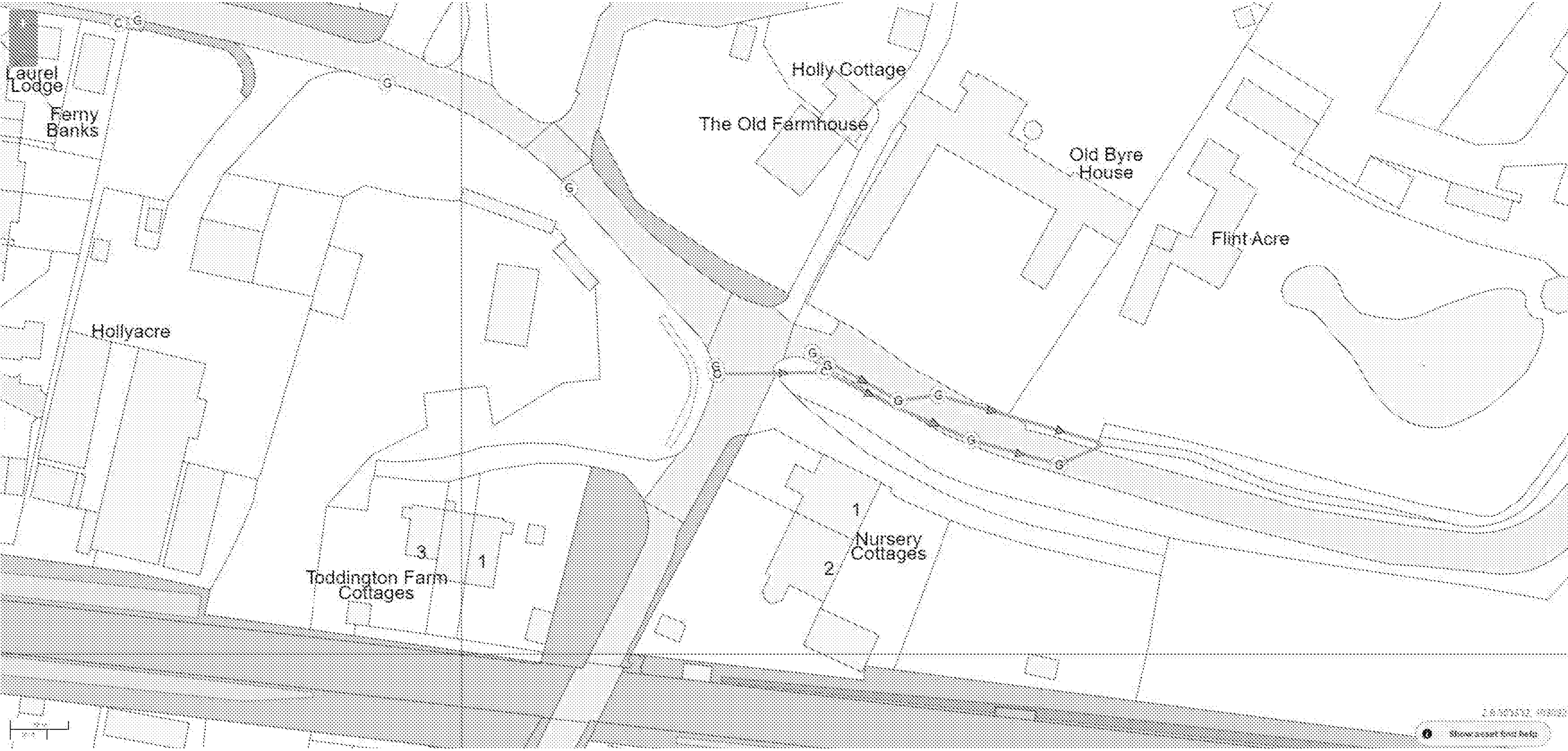
Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

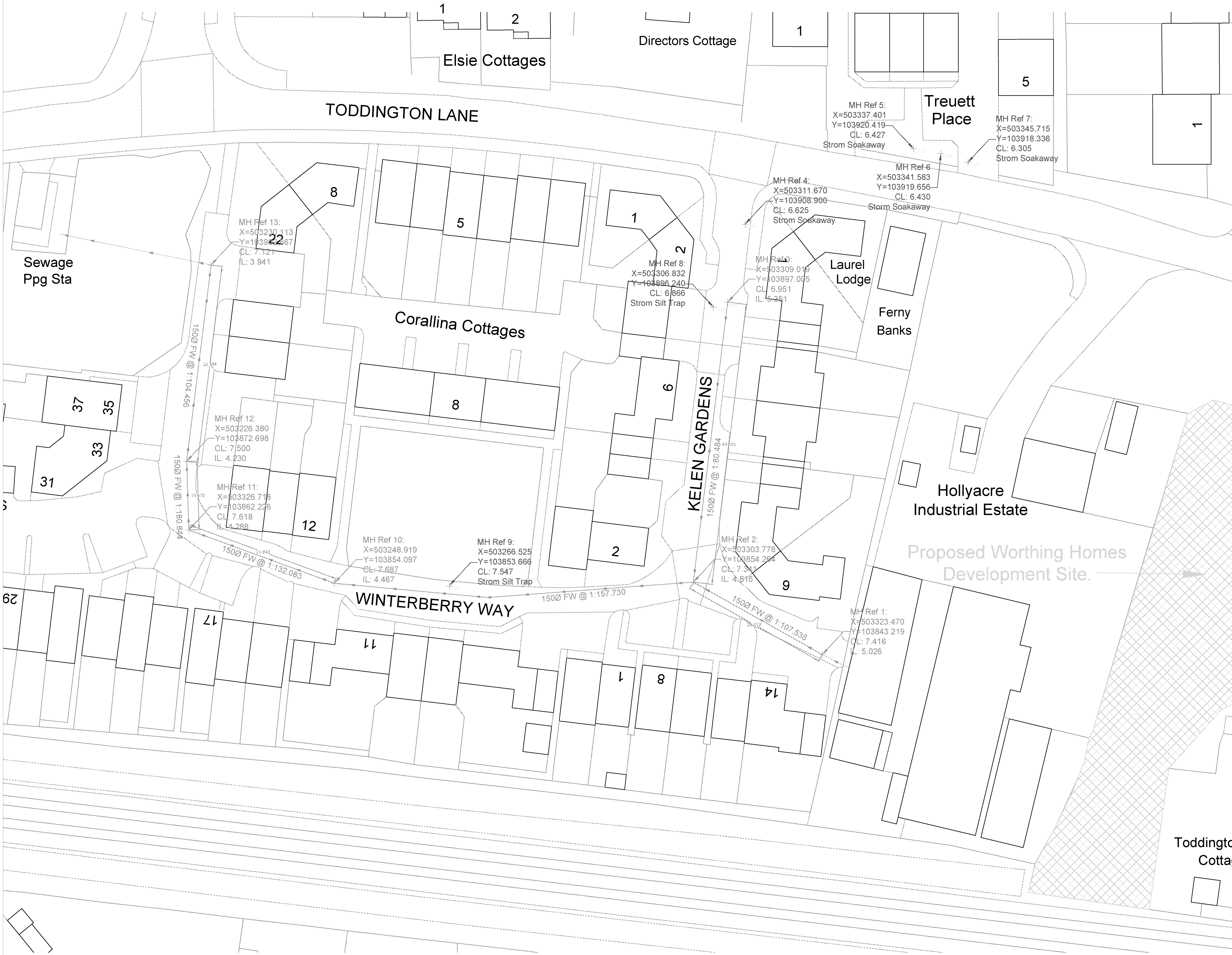
APPENDIX E – Highways Drainage Records


m/km
ha
Toddington
Old Byre House
Flint Acre
Holly Cottage
The Old Farmhouse
Trevett Place
The Crofts
KELEN GARDENS
Hollyacre
Toddington Farm Cottages
Tulley Cottages
Level Crossing
YumaN6-2090
YumaN6-732
D28448
D28420
D28418
D28416
D28412
YumaN6-2144
YumaN6-2145
YumaN6-2151
YumaN6-2152
YumaN6-2153



ARUN DISTRICT COUNCIL LU/246/24/PL

APPENDIX F – Neighbouring Site Drainage CCTV Survey



NOTES:

This Drawing is for As Built / Technical Query reasons only and not to be used for setting out unless drawing is approved and signed off and copies emailed to Nick Rogers - NRS Surveying Ltd.

Ordnance Survey (OS) national grid coordinates have been established for survey control points using GPS and related to OSTN15(GB). The survey grid is orientated Grid North. All levels relate to Ordnance Survey (OS) level datum at survey control points.

The grid is related to OS using Industry Standard Network RTK GPS.

All levels are related to OS Grid using Industry Standard Network RTK GPS.

Survey completed Using GPS Only: 06/08/2024 N.Rogers - NRS Surveying Ltd.

Drawing Issued. 06/08/2024 - N.Rogers - NRS Surveying Ltd.

ALL DIMENSION & SETTING OUT TO BE CHECKED & VERIFIED BY CLIENT PRIOR TO CONTINUING TO ENSURE THEY ARE HAPPY & TIES INTO CONSTRUCTION DRAWINGS ISSUED.

smas worksafe contractor
www.smasltd.com

SAFEMARK

CHAS Accredited Contractor
www.chas.gov.uk

nrs surveying limited

NRS Surveying Limited,
6 Purbrook Way,
Havant,
Hampshire
PO9 3RY
Mobile:
07564 602518.
Email:
nrsurveying@gmail.com

Client: HAMPSHIRE HOMES

Project: Toddington Lane & Kelen Gardens, Littlehampton.

Drawing Title: GPS As Built Location & Level Survey Existing Foul Manholes; Kelen Gardens & Winterberry Way, Littlehampton.

Scale @ A1: XXXXX	Drawn Date: 06/08/2024.	Project Number: HHOMES - TODDINGTON- NRS001 - Rev -.
Drawn By: Nick Rogers.		Checked By: Nick Rogers.

APPENDIX G – Greenfield Runoff Rate

FEH Mean Annual Flood

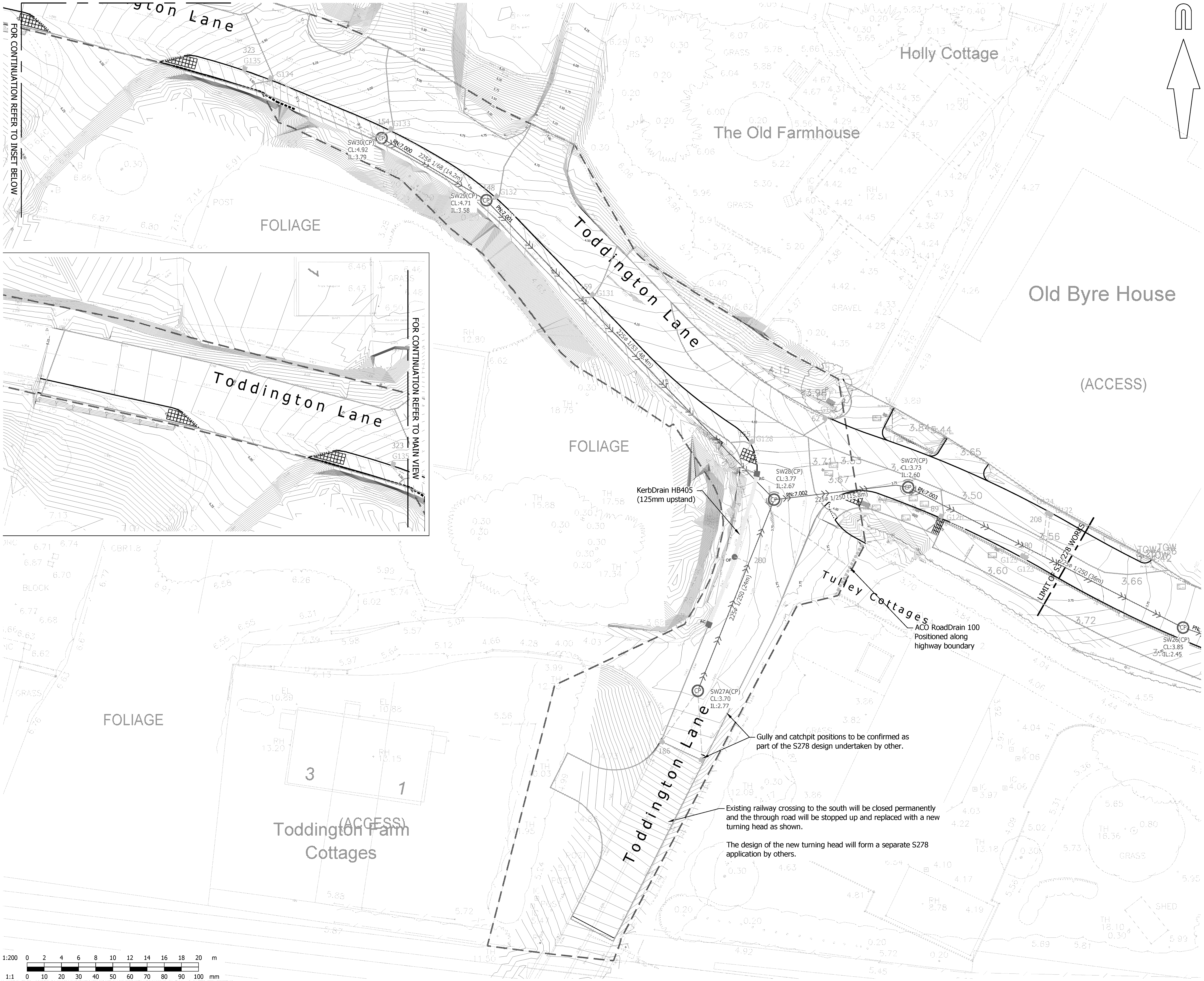
Input

QMED Method	2008	URBEXT (2000)	0.0000
Site Location	GB 503397 103865 TQ 03397 03865	SPRHOST	0.000
Area (ha)	0.164	BFIHOST	0.650
SAAR (mm)	733	FARL	1.000

Results

QMED Rural (l/s) 0.7 QMED Urban (l/s) n/a

APPENDIX H – Proposed Toddington Lane Surface Water Drainage



A1 ORIGINAL

KEY

- PROPOSED HIGHWAY DRAINAGE AND CATCHPIT
- PROPOSED ROAD GULLY AND GULLY LEAD
- PROPOSED ACO ROADDRAIN 100
- PROPOSED ACO KERBDRAIN HB405
- PROPOSED CONTOURS
- EXISTING CONTOURS
- PROPOSED GULLY DRAINAGE AREA (SQ.M)
- PROPOSED EMBANKMENT
- PROPOSED RETAINING WALL
- EXISTING HIGHWAY BOUNDARY

NOTES:

1. This drawing is not to be scaled.
3. Based on topographic survey undertaken by Subvision Survey Ltd on March 2022, drawing reference SS-PH-013.
4. This drawing is to be read in conjunction with all other relevant engineering and landscaping drawings. Any discrepancies are to be reported to the Engineer immediately for clarification.
5. All on-site civils and drainage works constructed in accordance with the Mayer Brown Limited Specification, details and MH schedules.
8. Proprietary items are to be constructed in accordance with manufacturers recommendations / requirements.
9. All drainage works shall be carried out in accordance with the requirements of the Local Authority, the Environment Agency and in conjunction with all relevant British Standards, Codes of Practice, the Design and Construction Guidance for foul and surface water sewers and any addendums as appropriate.
10. Invert levels and positions of existing drains / chambers / sewers where new connections are to be made must be checked and confirmed to the engineer prior to the commencement of any works.
11. Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected. Any structural defects shall be repaired using appropriate and approved means.
12. All new manholes and catchpits are soffit to soffit unless noted otherwise. Invert level shown is outlet pipe.
13. All drainage shall comply with the typical details and the requirements of BS EN 752 and Part H of the Building Regulations.
14. All precast concrete units used in the drainage works shall be manufactured using sulphate resisting cement.
15. Cover levels are to be adjusted locally to suit finished ground levels.
16. HEALTH AND SAFETY: The works shall be carried out by specialist competent and experienced contractors who are members of a recognised national organisation.Operatives shall have received full and appropriate training for the operations they are to undertake. All work shall be carried out in accordance with all pertinent Health and Safety Regulations.

FOR APPROVAL
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
A2	Extent of S278 works amended. S38 area added to submission. Viewports amended and drawing title/number revised accordingly. Design revised to suit latest WSCC technical review. (IC)	SF	20/10/2023
A1	Issued to WSCC for approval. (TC)	SF	29/06/2023
P1	Initial issue. (IC)	SF	15/12/2022

mayer brown

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Telephone 01483 750 508 Fax 01483 750 437
wokingoffice@mayerbrown.co.uk www.mayerbrown.co.uk

client
PERSIMMON HOMES THAMES VALLEY

project
NORTH LITTLEHAMPTON
TODDINGTON LANE / S38 SPINE ROAD

scale	drawn by	checked by
1:200	IC	SF

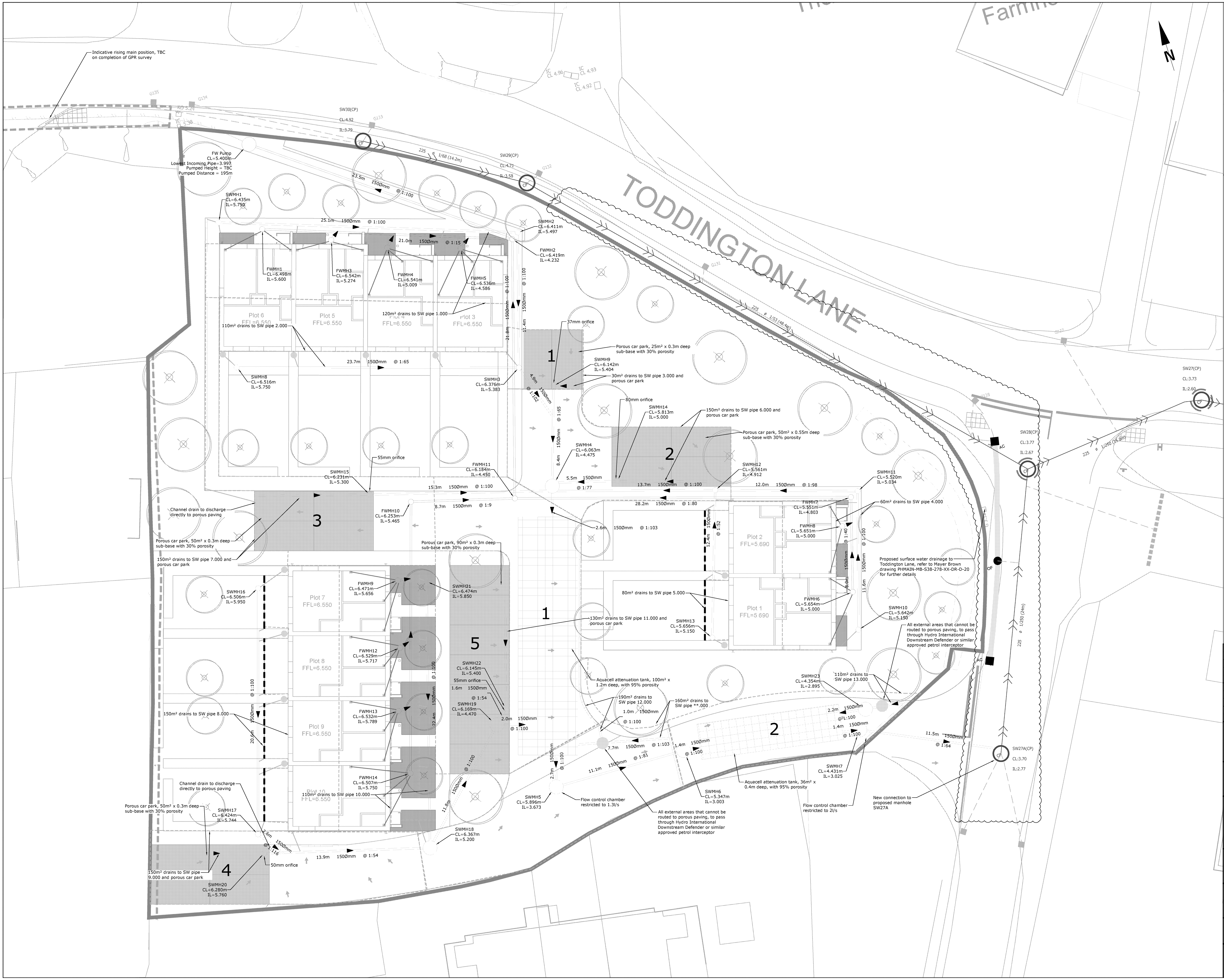
date	cad file
AUGUST 2021	PHMAIN-MB-278-XX-DR-D-10.DWG

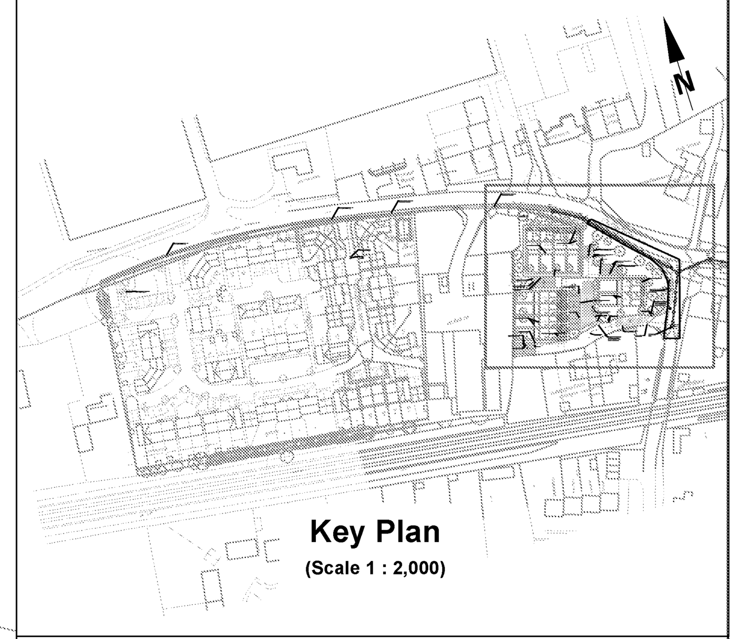
title
SECTION 38/278 HIGHWAY WORKS -
DRAINAGE GENERAL ARRANGEMENT

Mayer Brown Limited jobcode	suitability	revision
	-	A2

drawing number
PHMAIN-MB-S38-278-XX-DR-D-20

APPENDIX I – Drainage Plans





Legend

- SW Drainage
- FW Drainage
- Channel Drain
- Perforated Pipe
- Land Drain
- Porous Paving
- Overland Flow Routes
- Petrol Interceptor
- Water Butt
- Rain Garden
- Drained Areas

Notes

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REV	DATE	REVISION NAME	BY	CHKD	APP
T3	13.01.25	Revised to suit LLFA comments	MK	TS	TS
T2	13.12.24	Foul drainage revised	MK	TS	TS
T1	30.10.24	Tender Issue	MK	TS	TS
P2	29.08.24	Preliminary	TS	TS	TS
P1	20.08.24	Preliminary	TS	TS	TS

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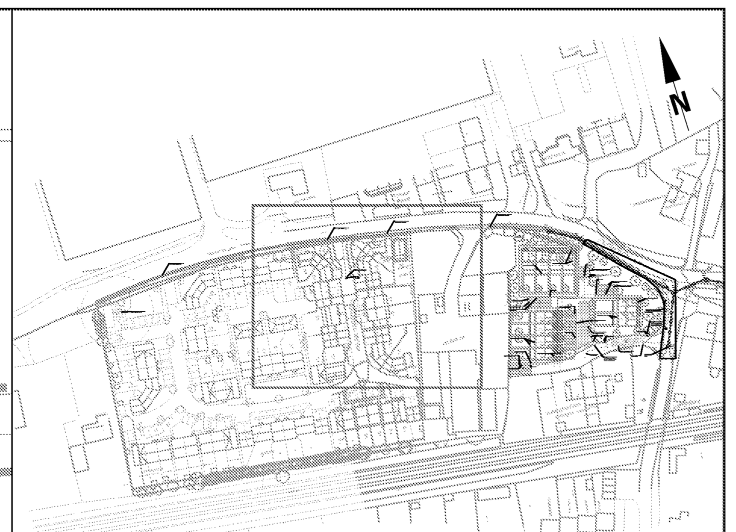
Job Name:
Toddington Lane, Littlehampton

Drawing Title:
Drainage Layout - Option 1 Sheet 1 of 2

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
TS	TS	Aug 2024	A0	1:100

PROJECT NO:	DRAWING NO:	REV:
20240453	251-A	T3



Key Plan
(Scale 1 : 2,000)

Legend

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Job Name:
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Drawing Title:
Drainage Layout - Option 1 Sheet 2 of 2

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
MK	TS	Dec 2024	A0	1:100

PROJECT NO:	DRAWING NO:	REV:
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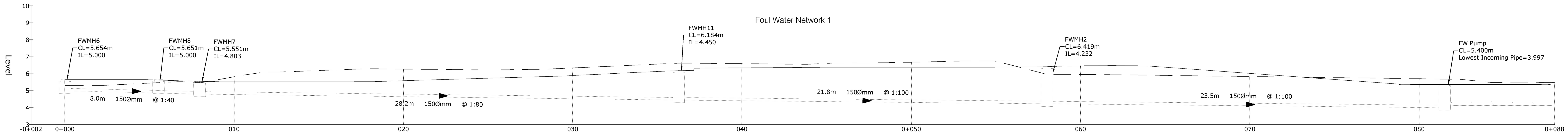

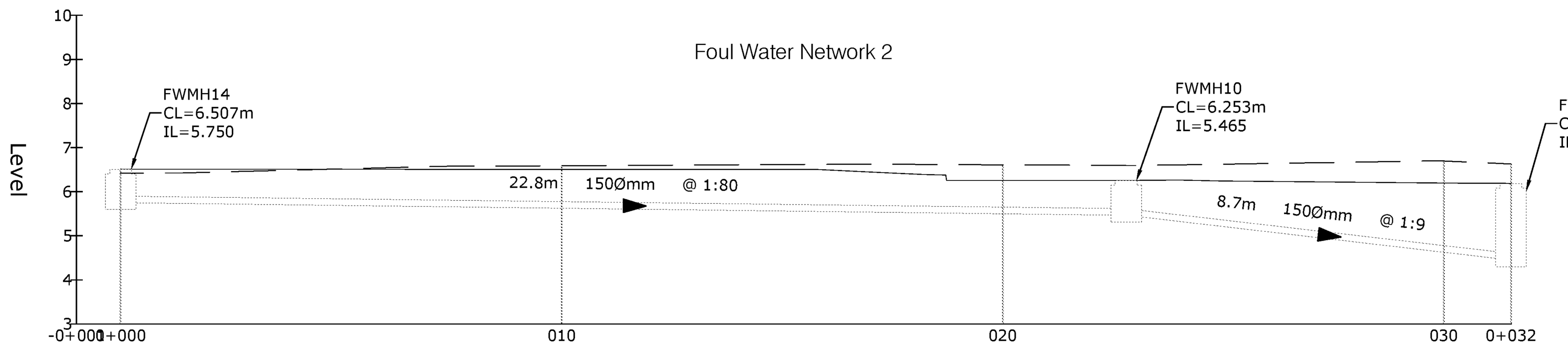

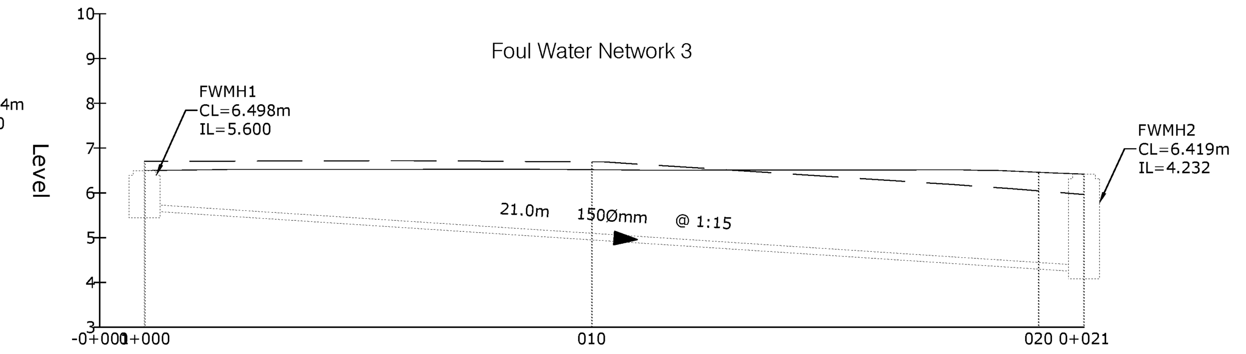

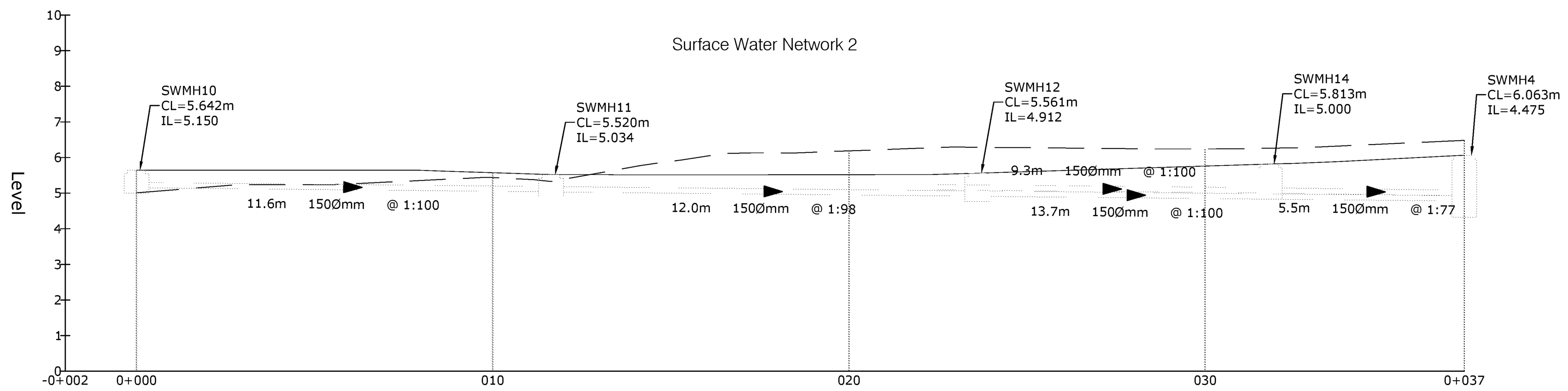

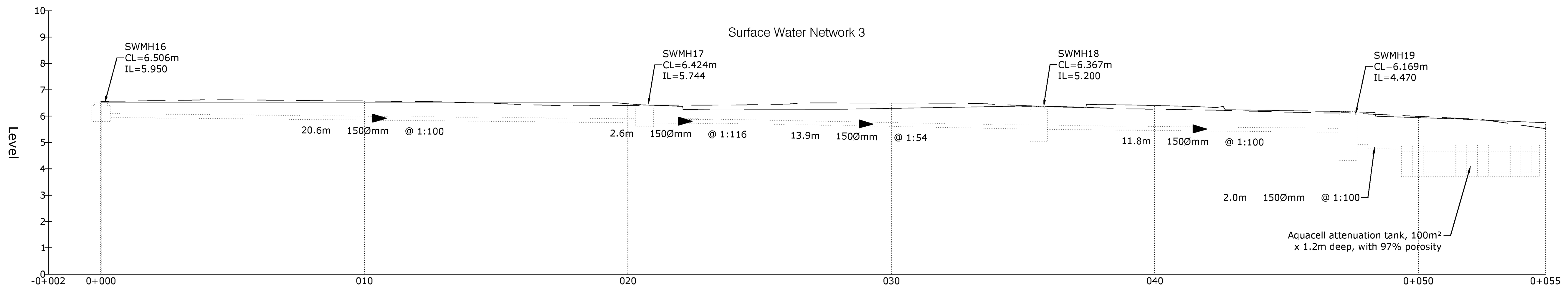

Manhole Schedule

MH Name	CL	IL	Depth	MH Ø	MH Type	Cover Size	Cover Grade	Pipe Bedding	Sump Depth	Easting	Northing	Notes
FW Pump	5.400				Manufacturer Spec	Manufacturer Spec	B125	Manufacturer Spec		503393.090	103895.177	
FWMH1	6.498	5.600	0.898	450	PPIC-A	430x430	B125	Z	0.000m	503392.147	103888.035	
FWMH2	6.419	4.232	2.186	450	PPIC-B	300x300	B125	Z	0.000m	503412.050	103881.295	
FWMH3	6.542	5.274	1.268	450	PPIC-B	300x300	B125	Z	0.000m	503397.447	103885.528	
FWMH4	6.541	5.009	1.533	450	PPIC-B	300x300	B125	Z	0.000m	503401.778	103883.580	
FWMH5	6.536	4.586	1.950	450	PPIC-B	300x300	B125	Z	0.000m	503407.667	103881.784	
FWMH6	5.654	5.000	0.654	450	PPIC-A	430x430	B125	Z	0.000m	503431.117	103844.827	
FWMH7	5.551	4.803	0.748	450	PPIC-A	430x430	B125	Z	0.000m	503433.214	103852.503	
FWMH8	5.651	5.000	0.651	450	PPIC-A	430x430	B125	Z	0.000m	503431.817	103850.371	
FWMH9	6.471	5.656	0.814	450	PPIC-A	430x430	B125	Z	0.000m	503394.747	103856.529	
FWMH10	6.253	5.465	0.788	450	PPIC-A	430x430	D400	Z	0.000m	503397.669	103862.554	
FWMH11	6.184	4.450	1.734	450	PPIC-B	300x300	D400	Z	0.000m	503406.113	103860.363	
FWMH12	6.529	5.717	0.812	450	PPIC-A	430x430	B125	Z	0.000m	503393.333	103851.053	
FWMH13	6.532	5.789	0.744	450	PPIC-A	430x430	B125	Z	0.000m	503391.709	103845.991	
FWMH14	6.507	5.750	0.757	450	PPIC-A	430x430	B125	Z	0.000m	503391.203	103840.691	

Manhole Schedule

MH Name	CL	IL	Depth	MH Ø	MH Type	Cover Size	Cover Grade	Pipe Bedding	Sump Depth	Easting	Northing	Notes
SWMH1	6.435	5.750	0.685	450	PPIC-A	430x430	B125	Z	0.000m	503388.783	103889.603	
SWMH2	6.411	5.497	0.914	450	PPIC-A	430x430	B125	Z	0.000m	503412.644	103881.719	
SWMH3	6.376	5.383	0.993	450	PPIC-A	430x430	B125	Z	0.000m	503409.542	103870.790	
SWMH4	6.063	4.475	1.588	1200	Catchpit	600x600	D400	Z	0.300m	503409.424	103860.465	
SWMH5	5.896	3.673	2.222	1200	Hydrobrake	600x600	D400	Z	0.000m	503402.613	103836.146	
SWMH6	5.347	3.003	2.344	1200	Catchpit	600x600	D400	Z	0.300m	503413.741	103836.063	
SWMH7	4.431	3.025	1.407	1200	Hydrobrake	600x600	D400	Z	0.000m	503428.414	103833.557	
SWMH8	6.516	5.750	0.766	450	PPIC-A	430x430	B125	Z	0.000m	503386.813	103877.503	
SWMH9	6.142	5.404	0.739	450	PPIC-A	430x430	D400	Z	0.000m	503411.883	103868.506	
SWMH10	5.642	5.150	0.492	450	PPIC-A	430x430	B125	Z	0.000m	503430.676	103841.649	
SWMH11	5.520	5.034	0.486	450	PPIC-A	430x430	B125	Z	0.000m	503433.896	103852.831	
SWMH12	5.561	4.912	0.649	450	PPIC-A	430x430	B125	Z	0.000m	503422.443	103856.282	
SWMH13	5.656	5.150	0.506	450	PPIC-A	430x430	B125	Z	0.000m	503418.720	103844.471	
SWMH14	5.813	5.000	0.813	450	PPIC-A	430x430	D400	Z	0.000m	503414.794	103859.331	
SWMH15	6.231	5.300	0.931	450	PPIC-A	430x430	D400	Z	0.000m	503394.521	103864.107	
SWMH16	6.506	5.950	0.556	450	PPIC-A	430x430	B125	Z	0.000m	503383.305	103859.198	
SWMH17	6.424	5.744	0.680	450	PPIC-A	430x430	B125	Z	0.000m	503377.471	103839.400	
SWMH18	6.367	5.200	1.167	1200	Catchpit	600x600	D400	Z	0.300m	503391.006	103834.228	
SWMH19	6.169	4.470	1.699	1200	Catchpit	600x600	D400	Z	0.300m	503399.305	103842.546	
SWMH20	6.280	5.760	0.520	450	PPIC-A	430x430	D400	Z	0.000m	503377.513	103837.714	
SWMH21	6.474	5.850	0.624	450	PPIC-A	430x430	B125	Z	0.000m	503397.032	103855.756	
SWMH22	6.145	5.400	0.745	450	PPIC-A	430x430	D400	Z	0.000m	503400.397	103843.678	
SWMH23	4.354	2.895	1.459	1200	Catchpit	600x600	D400	Z	0.300m	503429.353	103835.078	

REV	DATE	REVISION NAME	BY	CHKD	APP
T3	13.01.25	Revised to suit LLFA comments	MK	TS	TS
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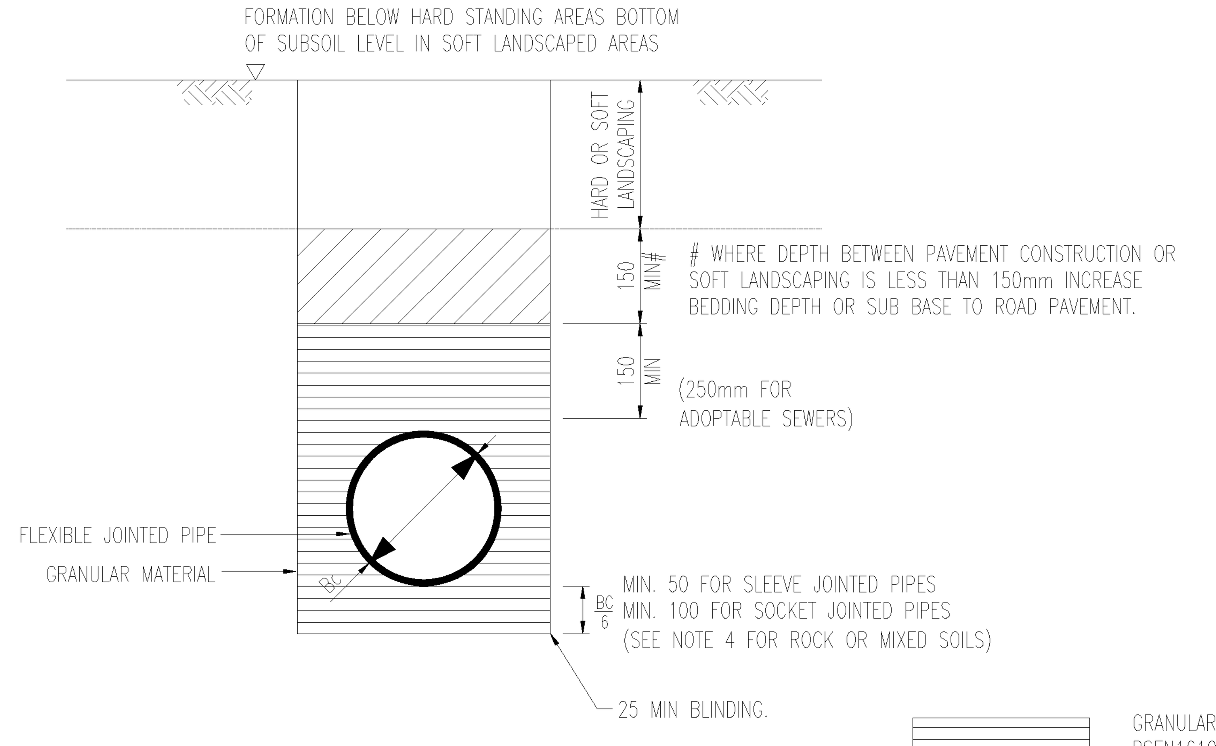
W14 0HN
020 3405 3120

Job Name:
Toddington Lane, Littlehampton

Drawing Title:
Drainage Sections & Schedules

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
MK	TS	Oct 2024	A0	1:100

PROJECT NO:	DRAWING NO:	REV:
20240453	252	T3



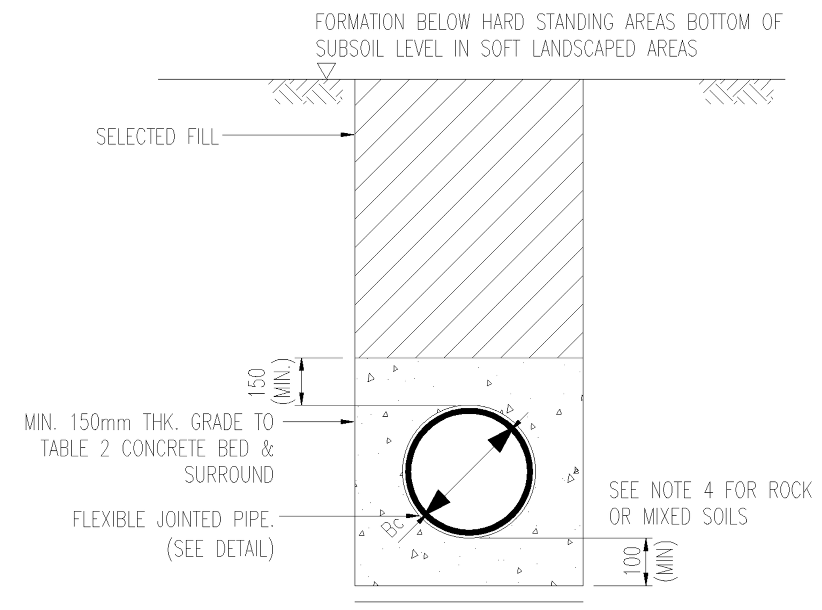
CLASS S GRANULAR BEDDING AND SURROUND

BEDDING FACTOR 2.2

GRANULAR MATERIAL TO CONFORM TO BSEN1610 ANNEX B TABLE B.15 AND TO BE SINGLE SIZED MATERIALS OR GRADED MATERIAL FROM 5mm TO :-

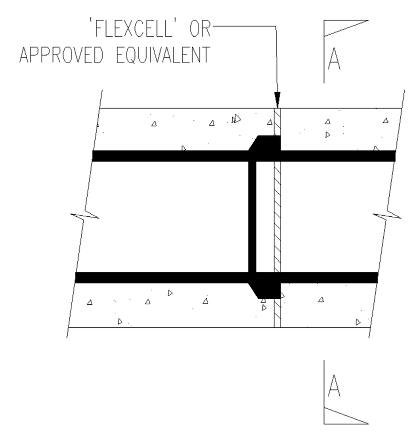
- 10mm MAX FOR 100ø PIPES
- 14mm MAX FOR 150ø PIPES
- 20mm MAX FOR >150ø – 600ø PIPES
- 40mm MAX FOR >600ø PIPES

SELECTED FILL FREE FROM STONES LARGER THAN 40mm, LUMPS OF CLAY OVER 100mm, TIMBER, FROZEN MATERIAL, VEGETATION MATTER.

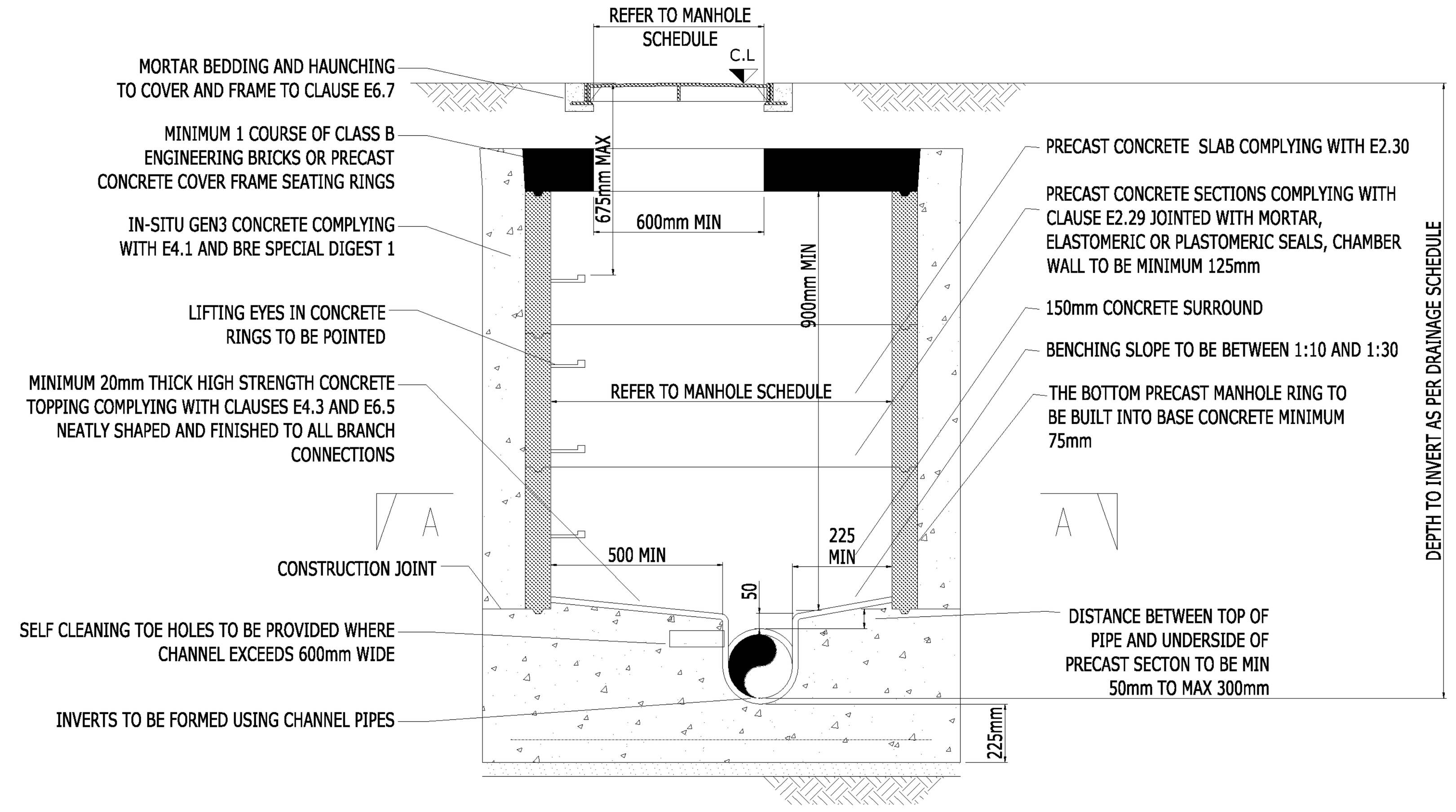


SECTION A–A

CLASS Z1 CONCRETE SURROUND



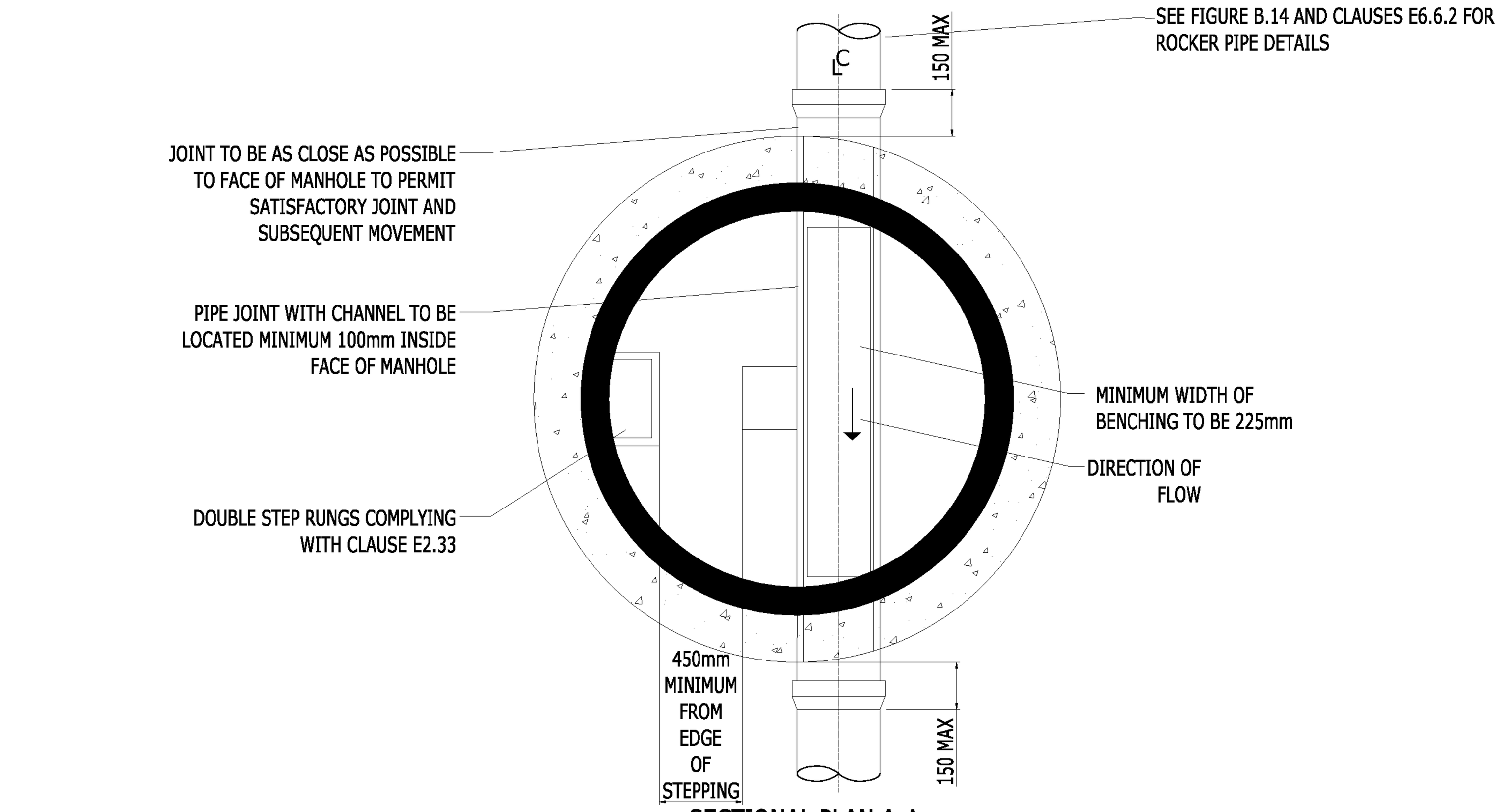
FLEXIBLE JOINT DETAIL FOR CLASS Z1 SURROUND



SECTIONAL ELEVATION

MANHOLE TYPE B

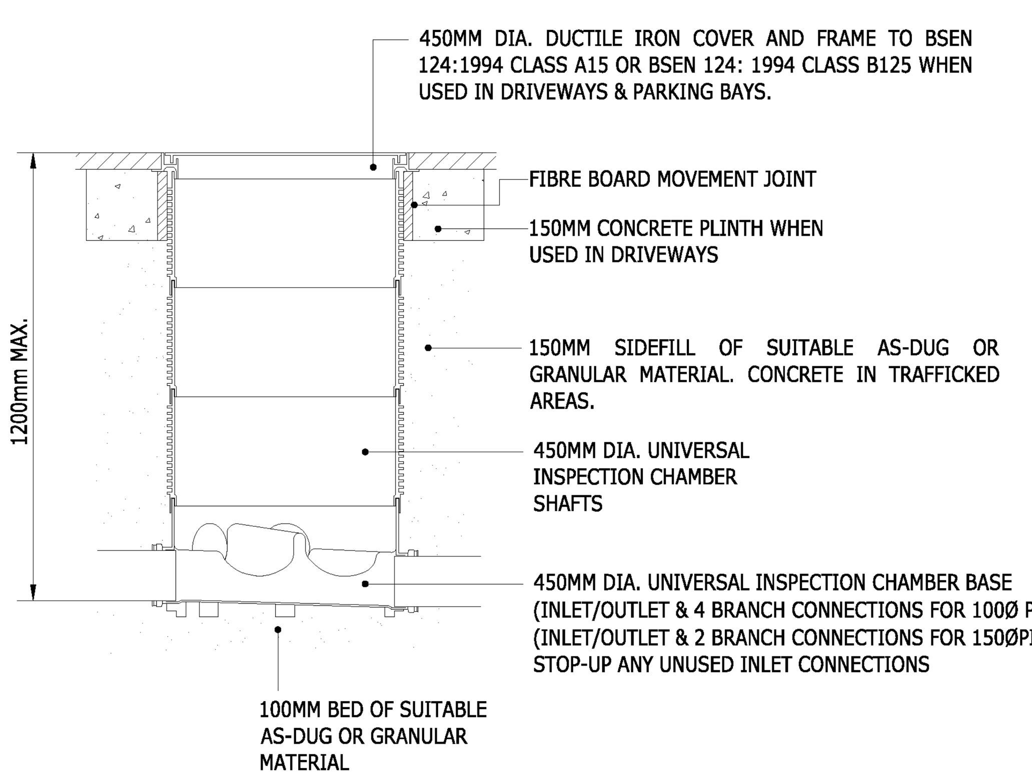
FOR USE WHERE COVER TO PIPE SOFFIT OF PIPE 1.5m TO 3.0m (N.T.S)



SECTIONAL PLAN A-A

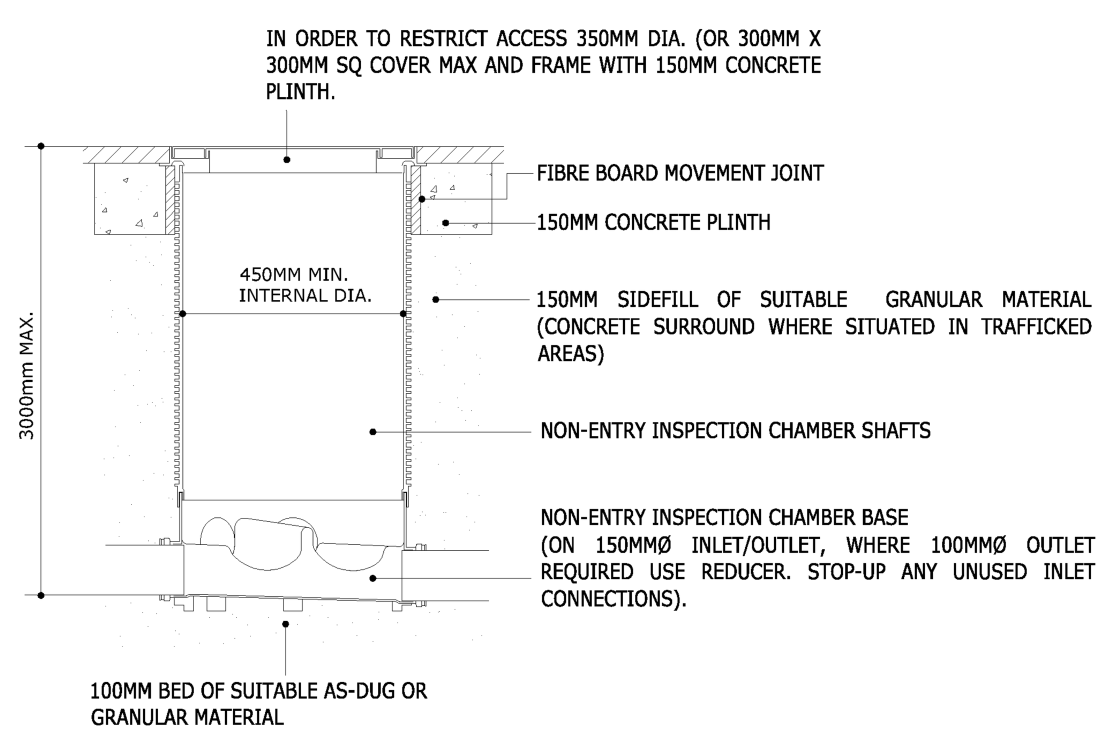
CIRCULAR CHAMBER PLAN

FOR USE WHERE COVER TO PIPE SOFFIT OF PIPE 1.5m TO 3.0m (N.T.S)



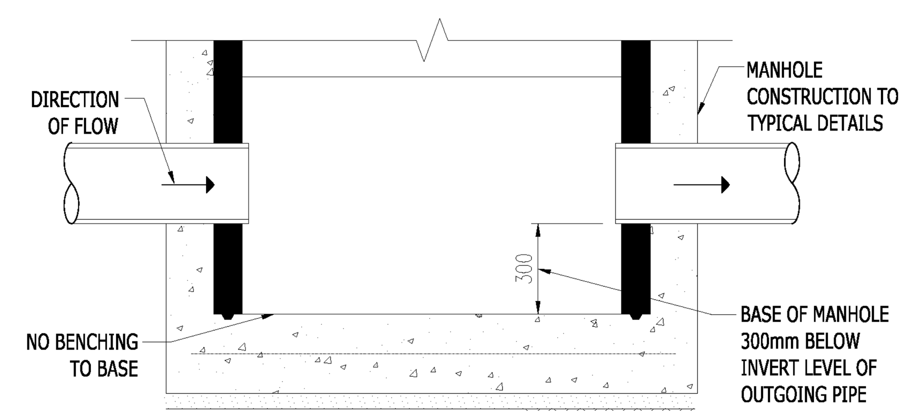
1.2m MAX. UNIVERSAL INSPECTION CHAMBER - PPIC-A

FOR USE IN SOFT AREAS, DRIVEWAYS AND PARKING BAYS ONLY



1.2m - 3.0m DEEP NON-ENTRY INSPECTION CHAMBER - PPIC-B

FOR USE IN SOFT AREAS, DRIVEWAYS AND PARKING BAYS ONLY



CATCHPIT MANHOLE

(SCALE 1:20)

REV	DATE	REVISION NAME	BY	CHKD	APP
T2	13.01.25	Revised to suit LLFA comments	MK	TS	TS
T1	30.10.24	Tender Issue	MK	TS	TS

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Hammersmith
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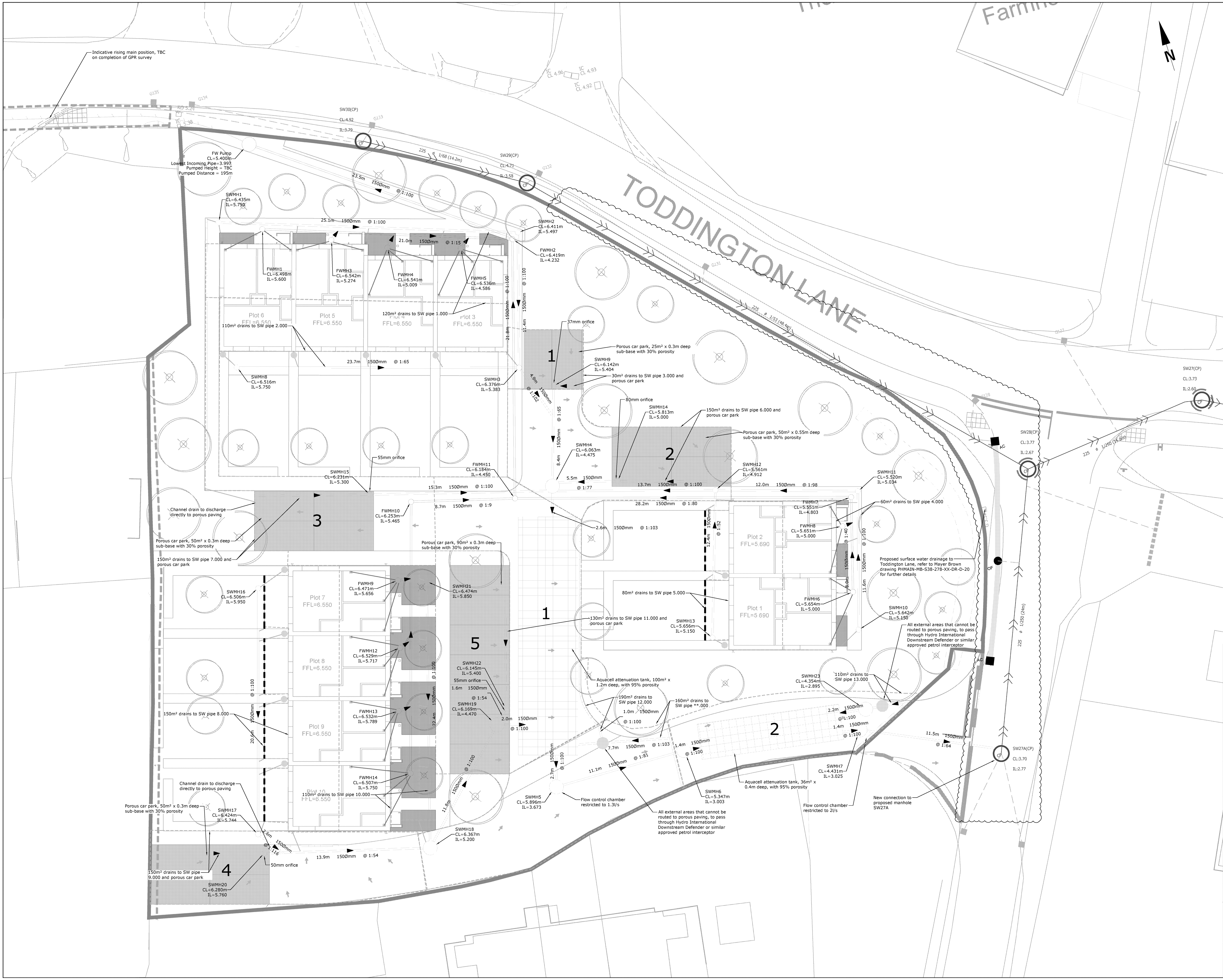
020 3405 3120

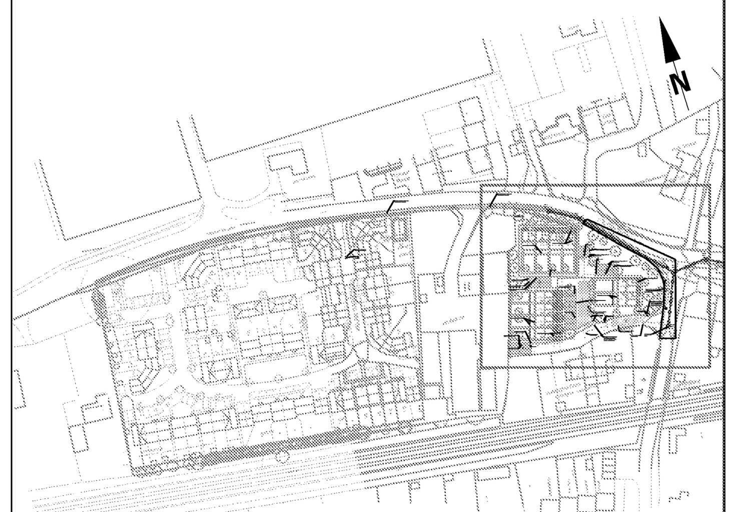
Job Name: **Toddington Lane, Littlehampton**

Drawing Title: **Drainage Construction Details**

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
MK	TS	Oct 2024	A1	NTS

PROJECT NO:	DRAWING NO:	REV:
20240453	253	T2





Key Plan
(Scale 1 : 2,000)

Legend

- SW Drainage
- FW Drainage
- Channel Drain
- Perforated Pipe
- Land Drain
- Porous Paving
- Overland Flow Routes
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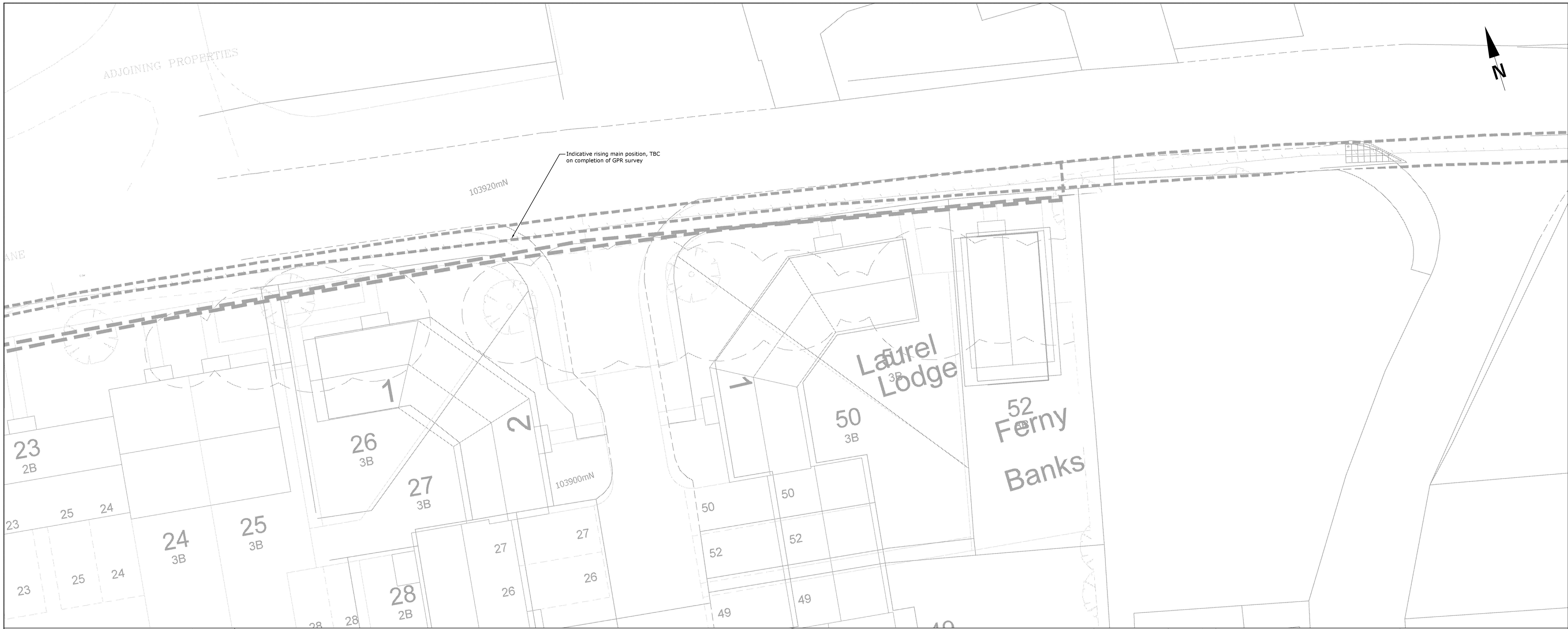
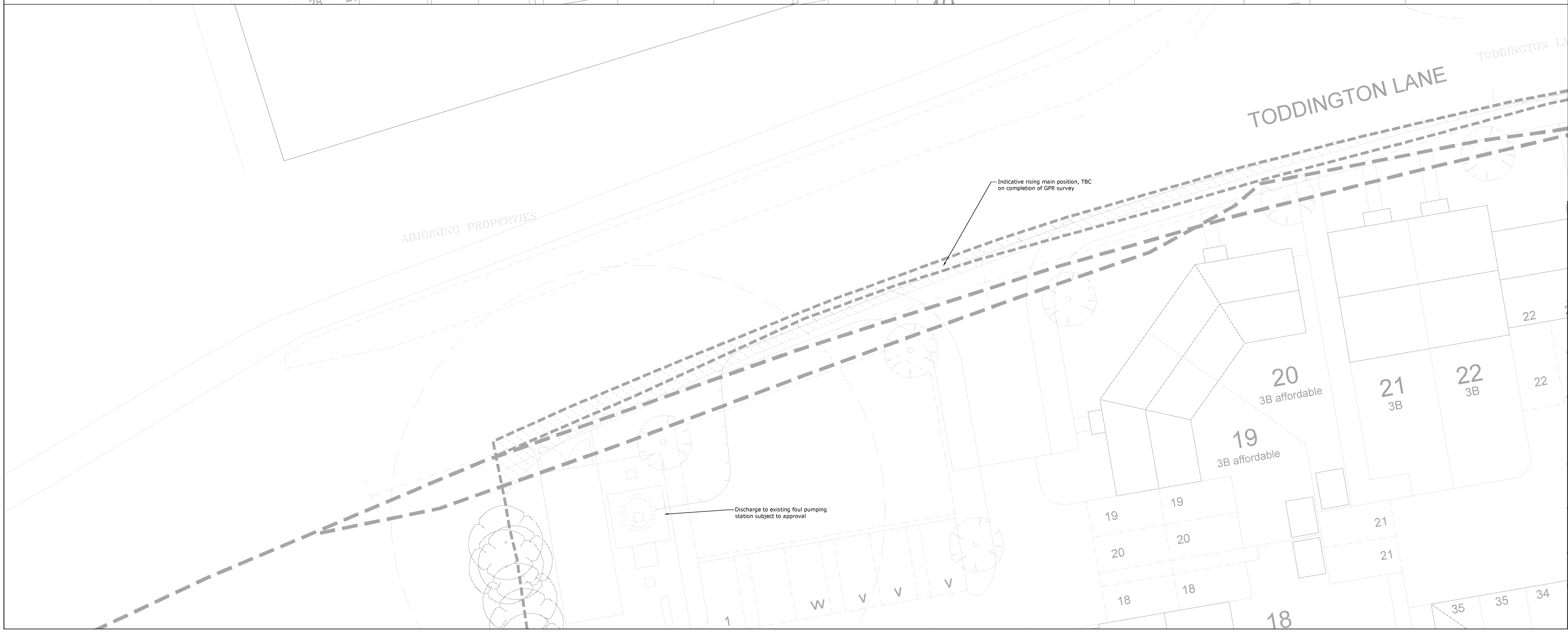
Job Name:
Toddington Lane, Littlehampton

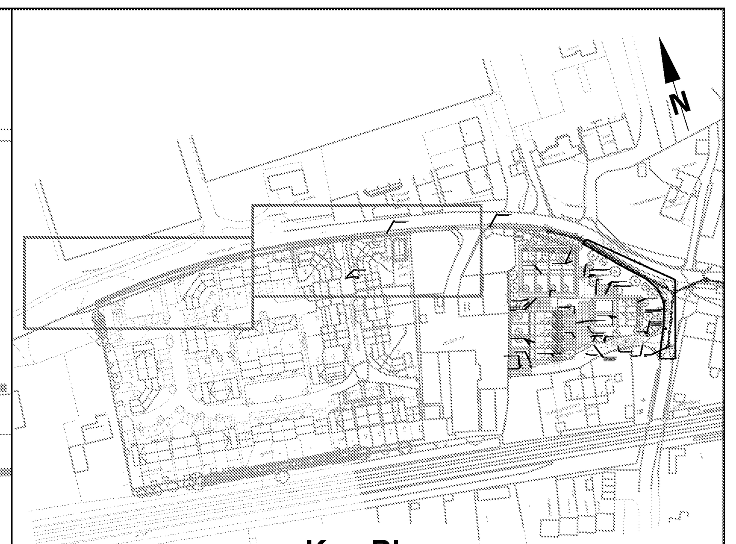
Drawing Title:
Drainage Layout - Option 2 Sheet 1 of 2

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
TS	MK	Dec 2024	A0	1:100

PROJECT NO:	DRAWING NO:	REV:
20240453	254-A	T2







Key Plan
(Scale 1 : 2,000)

Legend

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020 3405 3120

Job Name:
Toddington Lane, Littlehampton

Drawing Title:
Drainage Layout - Option 2 Sheet 2 of 2

DRAWN	CHECKED	DATE	PAPER SIZE	SCALE
MK	TS	Dec 2024	A0	1:100

PROJECT NO:	DRAWING NO:	REV:
20240453	254-B	T2

APPENDIX J – Microdrainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - 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
1.000	25.225	0.253	99.7	0.012	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	11.360	0.114	99.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	23.909	0.367	65.1	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	4.830	0.048	100.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	2.198	0.022	99.9	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	8.409	0.129	65.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	11.637	0.116	100.3	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	12.191	0.122	99.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	12.777	0.238	53.7	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	13.675	0.137	99.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	9.345	0.093	100.5	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	5.473	0.071	77.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	9.368	0.094	99.7	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
7.001	15.262	0.153	99.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.42	5.750	0.012	0.0	0.0	0.0	1.01	17.8	1.6
1.001	50.00	5.61	5.497	0.012	0.0	0.0	0.0	1.01	17.8	1.6
2.000	50.00	5.32	5.750	0.011	0.0	0.0	0.0	1.25	22.1	1.5
1.002	50.00	5.69	5.383	0.023	0.0	0.0	0.0	1.00	17.7	3.1
3.000	50.00	5.04	5.426	0.003	0.0	0.0	0.0	1.01	17.8	0.4
3.001	50.00	5.15	5.404	0.003	0.0	0.0	0.0	1.25	22.0	0.4
4.000	50.00	5.19	5.150	0.006	0.0	0.0	0.0	1.00	17.7	0.8
4.001	50.00	5.40	5.034	0.006	0.0	0.0	0.0	1.01	17.8	0.8
5.000	50.00	5.15	5.150	0.008	0.0	0.0	0.0	1.38	24.3	1.1
4.002	50.00	5.62	4.912	0.014	0.0	0.0	0.0	1.01	17.8	1.9
6.000	50.00	5.16	5.093	0.015	0.0	0.0	0.0	1.00	17.7	2.0
6.001	50.00	5.23	5.000	0.015	0.0	0.0	0.0	1.15	20.3	2.0
7.000	50.00	5.16	5.394	0.015	0.0	0.0	0.0	1.01	17.8	2.0
7.001	50.00	5.41	5.300	0.015	0.0	0.0	0.0	1.01	17.8	2.0

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	2.577	0.025	103.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.000	20.640	0.206	100.2	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	2.613	0.022	118.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
9.000	8.470	0.085	99.6	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
9.001	13.936	0.139	100.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
10.000	22.356	0.224	99.8	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.002	11.750	0.118	99.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
11.000	11.490	0.120	95.8	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit	
11.001	1.573	0.029	54.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.003	2.031	0.020	101.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
12.000	1.000	0.010	100.0	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit	
12.001	7.445	0.074	100.6	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	2.676	0.027	99.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	11.128	0.137	81.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	1.400	0.014	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	5.73	4.775	0.070	0.0	0.0	0.0	0.99	17.5	9.5
8.000	50.00	5.34	5.950	0.015	0.0	0.0	0.0	1.00	17.7	2.0
8.001	50.00	5.39	5.744	0.015	0.0	0.0	0.0	0.92	16.3	2.0
9.000	50.00	5.14	5.845	0.015	0.0	0.0	0.0	1.01	17.8	2.0
9.001	50.00	5.37	5.760	0.015	0.0	0.0	0.0	1.00	17.7	2.0
10.000	50.00	5.37	5.850	0.011	0.0	0.0	0.0	1.01	17.8	1.5
8.002	50.00	5.58	5.500	0.041	0.0	0.0	0.0	1.01	17.8	5.6
11.000	50.00	5.19	5.515	0.013	0.0	0.0	0.0	1.03	18.2	1.8
11.001	50.00	5.21	5.400	0.013	0.0	0.0	0.0	1.37	24.2	1.8
8.003	50.00	5.62	4.770	0.054	0.0	0.0	0.0	1.00	17.6	7.3
12.000	50.00	5.02	5.000	0.019	0.0	0.0	0.0	1.00	17.8	2.6
12.001	50.00	5.14	4.824	0.035	0.0	0.0	0.0	1.00	17.7	4.7
1.004	50.00	5.77	3.700	0.159	0.0	0.0	0.0	1.01	17.8«	21.5
1.005	50.00	5.94	3.673	0.159	0.0	0.0	0.0	1.12	19.7«	21.5
1.006	50.00	5.96	3.303	0.159	0.0	0.0	0.0	1.00	17.8«	21.5

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	3.865	0.039	100.0	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
13.001	2.183	0.022	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	1.449	0.014	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	11.534	0.190	60.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	5.06	3.350	0.011	0.0	0.0	0.0	1.00	17.8	1.5
13.001	50.00	5.10	3.311	0.011	0.0	0.0	0.0	1.00	17.8	1.5
1.007	50.00	5.99	3.039	0.170	0.0	0.0	0.0	1.00	17.8«	23.0
1.008	50.00	6.14	3.025	0.170	0.0	0.0	0.0	1.29	22.9«	23.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SWMH1	6.435	0.685	Open Manhole	450	1.000	5.750	150				
SWMH2	6.411	0.914	Open Manhole	450	1.001	5.497	150	1.000	5.497	150	
SWMH8	6.516	0.766	Open Manhole	450	2.000	5.750	150				
SWMH3	6.376	0.993	Open Manhole	450	1.002	5.383	150	1.001	5.383	150	
								2.000	5.383	150	
PP1	6.050	0.624	Junction		3.000	5.426	150				
SWMH9	6.142	0.738	Open Manhole	450	3.001	5.404	150	3.000	5.404	150	
SWMH10	5.642	0.492	Open Manhole	450	4.000	5.150	150				
SWMH11	5.520	0.486	Open Manhole	450	4.001	5.034	150	4.000	5.034	150	
SWMH13	5.656	0.506	Open Manhole	450	5.000	5.150	150				
SWMH12	5.561	0.649	Open Manhole	450	4.002	4.912	150	4.001	4.912	150	
								5.000	4.912	150	
PP2	5.450	0.357	Junction		6.000	5.093	150				
SWMH14	5.813	0.813	Open Manhole	450	6.001	5.000	150	6.000	5.000	150	
PP3	6.231	0.837	Junction		7.000	5.394	150				
SWMH15	6.231	0.931	Open Manhole	450	7.001	5.300	150	7.000	5.300	150	
SWMH4	6.063	1.288	Open Manhole	1200	1.003	4.775	150	1.002	5.335	150	560
								3.001	5.275	150	500
								4.002	4.775	150	
								6.001	4.929	150	154
								7.001	5.147	150	372
SWMH16	6.506	0.556	Open Manhole	450	8.000	5.950	150				
SWMH17	6.424	0.680	Open Manhole	450	8.001	5.744	150	8.000	5.744	150	
PP4	6.280	0.435	Junction		9.000	5.845	150				
SWMH20	6.280	0.520	Open Manhole	450	9.001	5.760	150	9.000	5.760	150	
SWMH21	6.474	0.624	Open Manhole	450	10.000	5.850	150				
SWMH18	6.376	0.876	Open Manhole	1200	8.002	5.500	150	8.001	5.722	150	222
								9.001	5.621	150	121
								10.000	5.626	150	126
PP5	6.145	0.630	Junction		11.000	5.515	150				
SWMH22	6.145	0.750	Open Manhole	450	11.001	5.400	150	11.000	5.395	150	
SWMH19	6.169	1.399	Open Manhole	1200	8.003	4.770	150	8.002	5.382	150	612
								11.001	5.371	150	601
CD	5.725	0.725	Junction		12.000	5.000	150				
CD	5.425	0.601	Junction		12.001	4.824	150	12.000	4.990	150	166
TANK 1	5.825	2.125	Junction		1.004	3.700	150	1.003	4.750	150	1050
								8.003	4.750	150	1050
								12.001	4.750	150	1050
SWMH5	5.896	2.223	Open Manhole	1200	1.005	3.673	150	1.004	3.673	150	
SWMH6	5.347	2.044	Open Manhole	1200	1.006	3.303	150	1.005	3.536	150	233
Channel Drain	4.105	0.755	Junction		13.000	3.350	150				
SWMH23	4.354	1.043	Open Manhole	1200	13.001	3.311	150	13.000	3.311	150	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
TANK 2	4.530	1.491	Junction		1.007	3.039	150	1.006	3.289	150	250
								13.001	3.289	150	250
SWMH7	4.431	1.406	Open Manhole	1200	1.008	3.025	150	1.007	3.025	150	
	3.700	0.865	Open Manhole	1200		OUTFALL		1.008	2.835	150	

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

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	SWMH1	6.435	5.750	0.535	Open Manhole	450
1.001	o	150	SWMH2	6.411	5.497	0.764	Open Manhole	450
2.000	o	150	SWMH8	6.516	5.750	0.616	Open Manhole	450
1.002	o	150	SWMH3	6.376	5.383	0.843	Open Manhole	450
3.000	o	150	PP1	6.050	5.426	0.474	Junction	
3.001	o	150	SWMH9	6.142	5.404	0.588	Open Manhole	450
4.000	o	150	SWMH10	5.642	5.150	0.342	Open Manhole	450
4.001	o	150	SWMH11	5.520	5.034	0.336	Open Manhole	450
5.000	o	150	SWMH13	5.656	5.150	0.356	Open Manhole	450
4.002	o	150	SWMH12	5.561	4.912	0.499	Open Manhole	450
6.000	o	150	PP2	5.450	5.093	0.207	Junction	
6.001	o	150	SWMH14	5.813	5.000	0.663	Open Manhole	450
7.000	o	150	PP3	6.231	5.394	0.687	Junction	
7.001	o	150	SWMH15	6.231	5.300	0.781	Open Manhole	450
1.003	o	150	SWMH4	6.063	4.775	1.138	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)
1.000	25.225	99.7	SWMH2	6.411	5.497	0.764	Open Manhole	450
1.001	11.360	99.6	SWMH3	6.376	5.383	0.843	Open Manhole	450
2.000	23.909	65.1	SWMH3	6.376	5.383	0.843	Open Manhole	450
1.002	4.830	100.6	SWMH4	6.063	5.335	0.578	Open Manhole	1200
3.000	2.198	99.9	SWMH9	6.142	5.404	0.588	Open Manhole	450
3.001	8.409	65.2	SWMH4	6.063	5.275	0.638	Open Manhole	1200
4.000	11.637	100.3	SWMH11	5.520	5.034	0.336	Open Manhole	450
4.001	12.191	99.9	SWMH12	5.561	4.912	0.499	Open Manhole	450
5.000	12.777	53.7	SWMH12	5.561	4.912	0.499	Open Manhole	450
4.002	13.675	99.8	SWMH4	6.063	4.775	1.138	Open Manhole	1200
6.000	9.345	100.5	SWMH14	5.813	5.000	0.663	Open Manhole	450
6.001	5.473	77.1	SWMH4	6.063	4.929	0.984	Open Manhole	1200
7.000	9.368	99.7	SWMH15	6.231	5.300	0.781	Open Manhole	450
7.001	15.262	99.8	SWMH4	6.063	5.147	0.766	Open Manhole	1200
1.003	2.577	103.1	TANK 1	5.825	4.750	0.925	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
8.000	o	150	SWMH16	6.506	5.950	0.406	Open Manhole	450
8.001	o	150	SWMH17	6.424	5.744	0.530	Open Manhole	450
9.000	o	150	PP4	6.280	5.845	0.285	Junction	
9.001	o	150	SWMH20	6.280	5.760	0.370	Open Manhole	450
10.000	o	150	SWMH21	6.474	5.850	0.474	Open Manhole	450
8.002	o	150	SWMH18	6.376	5.500	0.726	Open Manhole	1200
11.000	o	150	PP5	6.145	5.515	0.480	Junction	
11.001	o	150	SWMH22	6.145	5.400	0.595	Open Manhole	450
8.003	o	150	SWMH19	6.169	4.770	1.249	Open Manhole	1200
12.000	o	150	CD	5.725	5.000	0.575	Junction	
12.001	o	150	CD	5.425	4.824	0.451	Junction	
1.004	o	150	TANK 1	5.825	3.700	1.975	Junction	
1.005	o	150	SWMH5	5.896	3.673	2.073	Open Manhole	1200
1.006	o	150	SWMH6	5.347	3.303	1.894	Open Manhole	1200
13.000	o	150	Channel Drain	4.105	3.350	0.605	Junction	

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)
8.000	20.640	100.2	SWMH17	6.424	5.744	0.530	Open Manhole	450
8.001	2.613	118.8	SWMH18	6.376	5.722	0.504	Open Manhole	1200
9.000	8.470	99.6	SWMH20	6.280	5.760	0.370	Open Manhole	450
9.001	13.936	100.3	SWMH18	6.376	5.621	0.605	Open Manhole	1200
10.000	22.356	99.8	SWMH18	6.376	5.626	0.600	Open Manhole	1200
8.002	11.750	99.6	SWMH19	6.169	5.382	0.637	Open Manhole	1200
11.000	11.490	95.8	SWMH22	6.145	5.395	0.600	Open Manhole	450
11.001	1.573	54.2	SWMH19	6.169	5.371	0.648	Open Manhole	1200
8.003	2.031	101.6	TANK 1	5.825	4.750	0.925	Junction	
12.000	1.000	100.0	CD	5.425	4.990	0.285	Junction	
12.001	7.445	100.6	TANK 1	5.825	4.750	0.925	Junction	
1.004	2.676	99.1	SWMH5	5.896	3.673	2.073	Open Manhole	1200
1.005	11.128	81.2	SWMH6	5.347	3.536	1.661	Open Manhole	1200
1.006	1.400	100.0	TANK 2	4.530	3.289	1.091	Junction	
13.000	3.865	100.0	SWMH23	4.354	3.311	0.893	Open Manhole	1200

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.001	o	150	SWMH23	4.354	3.311	0.893	Open Manhole	1200
1.007	o	150	TANK 2	4.530	3.039	1.341	Junction	
1.008	o	150	SWMH7	4.431	3.025	1.256	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)
13.001	2.183	100.0	TANK 2	4.530	3.289	1.091	Junction	
1.007	1.449	100.0	SWMH7	4.431	3.025	1.256	Open Manhole	1200
1.008	11.534	60.7		3.700	2.835	0.715	Open Manhole	1200

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		3.700	2.835	0.000	1200	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.930	24	0.930	47	0.930	70	0.930	93	0.930	116	0.930	139	0.930	162	0.930
2	0.930	25	0.930	48	0.930	71	0.930	94	0.930	117	0.930	140	0.930	163	0.930
3	0.930	26	0.930	49	0.930	72	0.930	95	0.930	118	0.930	141	0.930	164	0.930
4	0.930	27	0.930	50	0.930	73	0.930	96	0.930	119	0.930	142	0.930	165	0.930
5	0.930	28	0.930	51	0.930	74	0.930	97	0.930	120	0.930	143	0.930	166	0.930
6	0.930	29	0.930	52	0.930	75	0.930	98	0.930	121	0.930	144	0.930	167	0.930
7	0.930	30	0.930	53	0.930	76	0.930	99	0.930	122	0.930	145	0.930	168	0.930
8	0.930	31	0.930	54	0.930	77	0.930	100	0.930	123	0.930	146	0.930	169	0.930
9	0.930	32	0.930	55	0.930	78	0.930	101	0.930	124	0.930	147	0.930	170	0.930
10	0.930	33	0.930	56	0.930	79	0.930	102	0.930	125	0.930	148	0.930	171	0.930
11	0.930	34	0.930	57	0.930	80	0.930	103	0.930	126	0.930	149	0.930	172	0.930
12	0.930	35	0.930	58	0.930	81	0.930	104	0.930	127	0.930	150	0.930	173	0.930
13	0.930	36	0.930	59	0.930	82	0.930	105	0.930	128	0.930	151	0.930	174	0.930
14	0.930	37	0.930	60	0.930	83	0.930	106	0.930	129	0.930	152	0.930	175	0.930
15	0.930	38	0.930	61	0.930	84	0.930	107	0.930	130	0.930	153	0.930	176	0.930
16	0.930	39	0.930	62	0.930	85	0.930	108	0.930	131	0.930	154	0.930	177	0.930
17	0.930	40	0.930	63	0.930	86	0.930	109	0.930	132	0.930	155	0.930	178	0.930
18	0.930	41	0.930	64	0.930	87	0.930	110	0.930	133	0.930	156	0.930	179	0.930
19	0.930	42	0.930	65	0.930	88	0.930	111	0.930	134	0.930	157	0.930	180	0.930
20	0.930	43	0.930	66	0.930	89	0.930	112	0.930	135	0.930	158	0.930	181	0.930
21	0.930	44	0.930	67	0.930	90	0.930	113	0.930	136	0.930	159	0.930	182	0.930
22	0.930	45	0.930	68	0.930	91	0.930	114	0.930	137	0.930	160	0.930	183	0.930
23	0.930	46	0.930	69	0.930	92	0.930	115	0.930	138	0.930	161	0.930	184	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
185	0.930	241	0.930	297	0.930	353	0.930	409	0.930	465	0.930	521	0.930	577	0.930
186	0.930	242	0.930	298	0.930	354	0.930	410	0.930	466	0.930	522	0.930	578	0.930
187	0.930	243	0.930	299	0.930	355	0.930	411	0.930	467	0.930	523	0.930	579	0.930
188	0.930	244	0.930	300	0.930	356	0.930	412	0.930	468	0.930	524	0.930	580	0.930
189	0.930	245	0.930	301	0.930	357	0.930	413	0.930	469	0.930	525	0.930	581	0.930
190	0.930	246	0.930	302	0.930	358	0.930	414	0.930	470	0.930	526	0.930	582	0.930
191	0.930	247	0.930	303	0.930	359	0.930	415	0.930	471	0.930	527	0.930	583	0.930
192	0.930	248	0.930	304	0.930	360	0.930	416	0.930	472	0.930	528	0.930	584	0.930
193	0.930	249	0.930	305	0.930	361	0.930	417	0.930	473	0.930	529	0.930	585	0.930
194	0.930	250	0.930	306	0.930	362	0.930	418	0.930	474	0.930	530	0.930	586	0.930
195	0.930	251	0.930	307	0.930	363	0.930	419	0.930	475	0.930	531	0.930	587	0.930
196	0.930	252	0.930	308	0.930	364	0.930	420	0.930	476	0.930	532	0.930	588	0.930
197	0.930	253	0.930	309	0.930	365	0.930	421	0.930	477	0.930	533	0.930	589	0.930
198	0.930	254	0.930	310	0.930	366	0.930	422	0.930	478	0.930	534	0.930	590	0.930
199	0.930	255	0.930	311	0.930	367	0.930	423	0.930	479	0.930	535	0.930	591	0.930
200	0.930	256	0.930	312	0.930	368	0.930	424	0.930	480	0.930	536	0.930	592	0.930
201	0.930	257	0.930	313	0.930	369	0.930	425	0.930	481	0.930	537	0.930	593	0.930
202	0.930	258	0.930	314	0.930	370	0.930	426	0.930	482	0.930	538	0.930	594	0.930
203	0.930	259	0.930	315	0.930	371	0.930	427	0.930	483	0.930	539	0.930	595	0.930
204	0.930	260	0.930	316	0.930	372	0.930	428	0.930	484	0.930	540	0.930	596	0.930
205	0.930	261	0.930	317	0.930	373	0.930	429	0.930	485	0.930	541	0.930	597	0.930
206	0.930	262	0.930	318	0.930	374	0.930	430	0.930	486	0.930	542	0.930	598	0.930
207	0.930	263	0.930	319	0.930	375	0.930	431	0.930	487	0.930	543	0.930	599	0.930
208	0.930	264	0.930	320	0.930	376	0.930	432	0.930	488	0.930	544	0.930	600	0.930
209	0.930	265	0.930	321	0.930	377	0.930	433	0.930	489	0.930	545	0.930	601	0.930
210	0.930	266	0.930	322	0.930	378	0.930	434	0.930	490	0.930	546	0.930	602	0.930
211	0.930	267	0.930	323	0.930	379	0.930	435	0.930	491	0.930	547	0.930	603	0.930
212	0.930	268	0.930	324	0.930	380	0.930	436	0.930	492	0.930	548	0.930	604	0.930
213	0.930	269	0.930	325	0.930	381	0.930	437	0.930	493	0.930	549	0.930	605	0.930
214	0.930	270	0.930	326	0.930	382	0.930	438	0.930	494	0.930	550	0.930	606	0.930
215	0.930	271	0.930	327	0.930	383	0.930	439	0.930	495	0.930	551	0.930	607	0.930
216	0.930	272	0.930	328	0.930	384	0.930	440	0.930	496	0.930	552	0.930	608	0.930
217	0.930	273	0.930	329	0.930	385	0.930	441	0.930	497	0.930	553	0.930	609	0.930
218	0.930	274	0.930	330	0.930	386	0.930	442	0.930	498	0.930	554	0.930	610	0.930
219	0.930	275	0.930	331	0.930	387	0.930	443	0.930	499	0.930	555	0.930	611	0.930
220	0.930	276	0.930	332	0.930	388	0.930	444	0.930	500	0.930	556	0.930	612	0.930
221	0.930	277	0.930	333	0.930	389	0.930	445	0.930	501	0.930	557	0.930	613	0.930
222	0.930	278	0.930	334	0.930	390	0.930	446	0.930	502	0.930	558	0.930	614	0.930
223	0.930	279	0.930	335	0.930	391	0.930	447	0.930	503	0.930	559	0.930	615	0.930
224	0.930	280	0.930	336	0.930	392	0.930	448	0.930	504	0.930	560	0.930	616	0.930
225	0.930	281	0.930	337	0.930	393	0.930	449	0.930	505	0.930	561	0.930	617	0.930
226	0.930	282	0.930	338	0.930	394	0.930	450	0.930	506	0.930	562	0.930	618	0.930
227	0.930	283	0.930	339	0.930	395	0.930	451	0.930	507	0.930	563	0.930	619	0.930
228	0.930	284	0.930	340	0.930	396	0.930	452	0.930	508	0.930	564	0.930	620	0.930
229	0.930	285	0.930	341	0.930	397	0.930	453	0.930	509	0.930	565	0.930	621	0.930
230	0.930	286	0.930	342	0.930	398	0.930	454	0.930	510	0.930	566	0.930	622	0.930
231	0.930	287	0.930	343	0.930	399	0.930	455	0.930	511	0.930	567	0.930	623	0.930
232	0.930	288	0.930	344	0.930	400	0.930	456	0.930	512	0.930	568	0.930	624	0.930
233	0.930	289	0.930	345	0.930	401	0.930	457	0.930	513	0.930	569	0.930	625	0.930
234	0.930	290	0.930	346	0.930	402	0.930	458	0.930	514	0.930	570	0.930	626	0.930
235	0.930	291	0.930	347	0.930	403	0.930	459	0.930	515	0.930	571	0.930	627	0.930
236	0.930	292	0.930	348	0.930	404	0.930	460	0.930	516	0.930	572	0.930	628	0.930
237	0.930	293	0.930	349	0.930	405	0.930	461	0.930	517	0.930	573	0.930	629	0.930
238	0.930	294	0.930	350	0.930	406	0.930	462	0.930	518	0.930	574	0.930	630	0.930
239	0.930	295	0.930	351	0.930	407	0.930	463	0.930	519	0.930	575	0.930	631	0.930
240	0.930	296	0.930	352	0.930	408	0.930	464	0.930	520	0.930	576	0.930	632	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
633	0.930	689	0.930	745	0.930	801	0.930	857	0.930	913	0.930	969	0.930	1025	0.930
634	0.930	690	0.930	746	0.930	802	0.930	858	0.930	914	0.930	970	0.930	1026	0.930
635	0.930	691	0.930	747	0.930	803	0.930	859	0.930	915	0.930	971	0.930	1027	0.930
636	0.930	692	0.930	748	0.930	804	0.930	860	0.930	916	0.930	972	0.930	1028	0.930
637	0.930	693	0.930	749	0.930	805	0.930	861	0.930	917	0.930	973	0.930	1029	0.930
638	0.930	694	0.930	750	0.930	806	0.930	862	0.930	918	0.930	974	0.930	1030	0.930
639	0.930	695	0.930	751	0.930	807	0.930	863	0.930	919	0.930	975	0.930	1031	0.930
640	0.930	696	0.930	752	0.930	808	0.930	864	0.930	920	0.930	976	0.930	1032	0.930
641	0.930	697	0.930	753	0.930	809	0.930	865	0.930	921	0.930	977	0.930	1033	0.930
642	0.930	698	0.930	754	0.930	810	0.930	866	0.930	922	0.930	978	0.930	1034	0.930
643	0.930	699	0.930	755	0.930	811	0.930	867	0.930	923	0.930	979	0.930	1035	0.930
644	0.930	700	0.930	756	0.930	812	0.930	868	0.930	924	0.930	980	0.930	1036	0.930
645	0.930	701	0.930	757	0.930	813	0.930	869	0.930	925	0.930	981	0.930	1037	0.930
646	0.930	702	0.930	758	0.930	814	0.930	870	0.930	926	0.930	982	0.930	1038	0.930
647	0.930	703	0.930	759	0.930	815	0.930	871	0.930	927	0.930	983	0.930	1039	0.930
648	0.930	704	0.930	760	0.930	816	0.930	872	0.930	928	0.930	984	0.930	1040	0.930
649	0.930	705	0.930	761	0.930	817	0.930	873	0.930	929	0.930	985	0.930	1041	0.930
650	0.930	706	0.930	762	0.930	818	0.930	874	0.930	930	0.930	986	0.930	1042	0.930
651	0.930	707	0.930	763	0.930	819	0.930	875	0.930	931	0.930	987	0.930	1043	0.930
652	0.930	708	0.930	764	0.930	820	0.930	876	0.930	932	0.930	988	0.930	1044	0.930
653	0.930	709	0.930	765	0.930	821	0.930	877	0.930	933	0.930	989	0.930	1045	0.930
654	0.930	710	0.930	766	0.930	822	0.930	878	0.930	934	0.930	990	0.930	1046	0.930
655	0.930	711	0.930	767	0.930	823	0.930	879	0.930	935	0.930	991	0.930	1047	0.930
656	0.930	712	0.930	768	0.930	824	0.930	880	0.930	936	0.930	992	0.930	1048	0.930
657	0.930	713	0.930	769	0.930	825	0.930	881	0.930	937	0.930	993	0.930	1049	0.930
658	0.930	714	0.930	770	0.930	826	0.930	882	0.930	938	0.930	994	0.930	1050	0.930
659	0.930	715	0.930	771	0.930	827	0.930	883	0.930	939	0.930	995	0.930	1051	0.930
660	0.930	716	0.930	772	0.930	828	0.930	884	0.930	940	0.930	996	0.930	1052	0.930
661	0.930	717	0.930	773	0.930	829	0.930	885	0.930	941	0.930	997	0.930	1053	0.930
662	0.930	718	0.930	774	0.930	830	0.930	886	0.930	942	0.930	998	0.930	1054	0.930
663	0.930	719	0.930	775	0.930	831	0.930	887	0.930	943	0.930	999	0.930	1055	0.930
664	0.930	720	0.930	776	0.930	832	0.930	888	0.930	944	0.930	1000	0.930	1056	0.930
665	0.930	721	0.930	777	0.930	833	0.930	889	0.930	945	0.930	1001	0.930	1057	0.930
666	0.930	722	0.930	778	0.930	834	0.930	890	0.930	946	0.930	1002	0.930	1058	0.930
667	0.930	723	0.930	779	0.930	835	0.930	891	0.930	947	0.930	1003	0.930	1059	0.930
668	0.930	724	0.930	780	0.930	836	0.930	892	0.930	948	0.930	1004	0.930	1060	0.930
669	0.930	725	0.930	781	0.930	837	0.930	893	0.930	949	0.930	1005	0.930	1061	0.930
670	0.930	726	0.930	782	0.930	838	0.930	894	0.930	950	0.930	1006	0.930	1062	0.930
671	0.930	727	0.930	783	0.930	839	0.930	895	0.930	951	0.930	1007	0.930	1063	0.930
672	0.930	728	0.930	784	0.930	840	0.930	896	0.930	952	0.930	1008	0.930	1064	0.930
673	0.930	729	0.930	785	0.930	841	0.930	897	0.930	953	0.930	1009	0.930	1065	0.930
674	0.930	730	0.930	786	0.930	842	0.930	898	0.930	954	0.930	1010	0.930	1066	0.930
675	0.930	731	0.930	787	0.930	843	0.930	899	0.930	955	0.930	1011	0.930	1067	0.930
676	0.930	732	0.930	788	0.930	844	0.930	900	0.930	956	0.930	1012	0.930	1068	0.930
677	0.930	733	0.930	789	0.930	845	0.930	901	0.930	957	0.930	1013	0.930	1069	0.930
678	0.930	734	0.930	790	0.930	846	0.930	902	0.930	958	0.930	1014	0.930	1070	0.930
679	0.930	735	0.930	791	0.930	847	0.930	903	0.930	959	0.930	1015	0.930	1071	0.930
680	0.930	736	0.930	792	0.930	848	0.930	904	0.930	960	0.930	1016	0.930	1072	0.930
681	0.930	737	0.930	793	0.930	849	0.930	905	0.930	961	0.930	1017	0.930	1073	0.930
682	0.930	738	0.930	794	0.930	850	0.930	906	0.930	962	0.930	1018	0.930	1074	0.930
683	0.930	739	0.930	795	0.930	851	0.930	907	0.930	963	0.930	1019	0.930	1075	0.930
684	0.930	740	0.930	796	0.930	852	0.930	908	0.930	964	0.930	1020	0.930	1076	0.930
685	0.930	741	0.930	797	0.930	853	0.930	909	0.930	965	0.930	1021	0.930	1077	0.930
686	0.930	742	0.930	798	0.930	854	0.930	910	0.930	966	0.930	1022	0.930	1078	0.930
687	0.930	743	0.930	799	0.930	855	0.930	911	0.930	967	0.930	1023	0.930	1079	0.930
688	0.930	744	0.930	800	0.930	856	0.930	912	0.930	968	0.930	1024	0.930	1080	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1081	0.930	1137	0.930	1193	0.930	1249	0.930	1305	0.930	1361	0.930	1417	0.930	1473	0.930
1082	0.930	1138	0.930	1194	0.930	1250	0.930	1306	0.930	1362	0.930	1418	0.930	1474	0.930
1083	0.930	1139	0.930	1195	0.930	1251	0.930	1307	0.930	1363	0.930	1419	0.930	1475	0.930
1084	0.930	1140	0.930	1196	0.930	1252	0.930	1308	0.930	1364	0.930	1420	0.930	1476	0.930
1085	0.930	1141	0.930	1197	0.930	1253	0.930	1309	0.930	1365	0.930	1421	0.930	1477	0.930
1086	0.930	1142	0.930	1198	0.930	1254	0.930	1310	0.930	1366	0.930	1422	0.930	1478	0.930
1087	0.930	1143	0.930	1199	0.930	1255	0.930	1311	0.930	1367	0.930	1423	0.930	1479	0.930
1088	0.930	1144	0.930	1200	0.930	1256	0.930	1312	0.930	1368	0.930	1424	0.930	1480	0.930
1089	0.930	1145	0.930	1201	0.930	1257	0.930	1313	0.930	1369	0.930	1425	0.930	1481	0.930
1090	0.930	1146	0.930	1202	0.930	1258	0.930	1314	0.930	1370	0.930	1426	0.930	1482	0.930
1091	0.930	1147	0.930	1203	0.930	1259	0.930	1315	0.930	1371	0.930	1427	0.930	1483	0.930
1092	0.930	1148	0.930	1204	0.930	1260	0.930	1316	0.930	1372	0.930	1428	0.930	1484	0.930
1093	0.930	1149	0.930	1205	0.930	1261	0.930	1317	0.930	1373	0.930	1429	0.930	1485	0.930
1094	0.930	1150	0.930	1206	0.930	1262	0.930	1318	0.930	1374	0.930	1430	0.930	1486	0.930
1095	0.930	1151	0.930	1207	0.930	1263	0.930	1319	0.930	1375	0.930	1431	0.930	1487	0.930
1096	0.930	1152	0.930	1208	0.930	1264	0.930	1320	0.930	1376	0.930	1432	0.930	1488	0.930
1097	0.930	1153	0.930	1209	0.930	1265	0.930	1321	0.930	1377	0.930	1433	0.930	1489	0.930
1098	0.930	1154	0.930	1210	0.930	1266	0.930	1322	0.930	1378	0.930	1434	0.930	1490	0.930
1099	0.930	1155	0.930	1211	0.930	1267	0.930	1323	0.930	1379	0.930	1435	0.930	1491	0.930
1100	0.930	1156	0.930	1212	0.930	1268	0.930	1324	0.930	1380	0.930	1436	0.930	1492	0.930
1101	0.930	1157	0.930	1213	0.930	1269	0.930	1325	0.930	1381	0.930	1437	0.930	1493	0.930
1102	0.930	1158	0.930	1214	0.930	1270	0.930	1326	0.930	1382	0.930	1438	0.930	1494	0.930
1103	0.930	1159	0.930	1215	0.930	1271	0.930	1327	0.930	1383	0.930	1439	0.930	1495	0.930
1104	0.930	1160	0.930	1216	0.930	1272	0.930	1328	0.930	1384	0.930	1440	0.930	1496	0.930
1105	0.930	1161	0.930	1217	0.930	1273	0.930	1329	0.930	1385	0.930	1441	0.930	1497	0.930
1106	0.930	1162	0.930	1218	0.930	1274	0.930	1330	0.930	1386	0.930	1442	0.930	1498	0.930
1107	0.930	1163	0.930	1219	0.930	1275	0.930	1331	0.930	1387	0.930	1443	0.930	1499	0.930
1108	0.930	1164	0.930	1220	0.930	1276	0.930	1332	0.930	1388	0.930	1444	0.930	1500	0.930
1109	0.930	1165	0.930	1221	0.930	1277	0.930	1333	0.930	1389	0.930	1445	0.930	1501	0.930
1110	0.930	1166	0.930	1222	0.930	1278	0.930	1334	0.930	1390	0.930	1446	0.930	1502	0.930
1111	0.930	1167	0.930	1223	0.930	1279	0.930	1335	0.930	1391	0.930	1447	0.930	1503	0.930
1112	0.930	1168	0.930	1224	0.930	1280	0.930	1336	0.930	1392	0.930	1448	0.930	1504	0.930
1113	0.930	1169	0.930	1225	0.930	1281	0.930	1337	0.930	1393	0.930	1449	0.930	1505	0.930
1114	0.930	1170	0.930	1226	0.930	1282	0.930	1338	0.930	1394	0.930	1450	0.930	1506	0.930
1115	0.930	1171	0.930	1227	0.930	1283	0.930	1339	0.930	1395	0.930	1451	0.930	1507	0.930
1116	0.930	1172	0.930	1228	0.930	1284	0.930	1340	0.930	1396	0.930	1452	0.930	1508	0.930
1117	0.930	1173	0.930	1229	0.930	1285	0.930	1341	0.930	1397	0.930	1453	0.930	1509	0.930
1118	0.930	1174	0.930	1230	0.930	1286	0.930	1342	0.930	1398	0.930	1454	0.930	1510	0.930
1119	0.930	1175	0.930	1231	0.930	1287	0.930	1343	0.930	1399	0.930	1455	0.930	1511	0.930
1120	0.930	1176	0.930	1232	0.930	1288	0.930	1344	0.930	1400	0.930	1456	0.930	1512	0.930
1121	0.930	1177	0.930	1233	0.930	1289	0.930	1345	0.930	1401	0.930	1457	0.930	1513	0.930
1122	0.930	1178	0.930	1234	0.930	1290	0.930	1346	0.930	1402	0.930	1458	0.930	1514	0.930
1123	0.930	1179	0.930	1235	0.930	1291	0.930	1347	0.930	1403	0.930	1459	0.930	1515	0.930
1124	0.930	1180	0.930	1236	0.930	1292	0.930	1348	0.930	1404	0.930	1460	0.930	1516	0.930
1125	0.930	1181	0.930	1237	0.930	1293	0.930	1349	0.930	1405	0.930	1461	0.930	1517	0.930
1126	0.930	1182	0.930	1238	0.930	1294	0.930	1350	0.930	1406	0.930	1462	0.930	1518	0.930
1127	0.930	1183	0.930	1239	0.930	1295	0.930	1351	0.930	1407	0.930	1463	0.930	1519	0.930
1128	0.930	1184	0.930	1240	0.930	1296	0.930	1352	0.930	1408	0.930	1464	0.930	1520	0.930
1129	0.930	1185	0.930	1241	0.930	1297	0.930	1353	0.930	1409	0.930	1465	0.930	1521	0.930
1130	0.930	1186	0.930	1242	0.930	1298	0.930	1354	0.930	1410	0.930	1466	0.930	1522	0.930
1131	0.930	1187	0.930	1243	0.930	1299	0.930	1355	0.930	1411	0.930	1467	0.930	1523	0.930
1132	0.930	1188	0.930	1244	0.930	1300	0.930	1356	0.930	1412	0.930	1468	0.930	1524	0.930
1133	0.930	1189	0.930	1245	0.930	1301	0.930	1357	0.930	1413	0.930	1469	0.930	1525	0.930
1134	0.930	1190	0.930	1246	0.930	1302	0.930	1358	0.930	1414	0.930	1470	0.930	1526	0.930
1135	0.930	1191	0.930	1247	0.930	1303	0.930	1359	0.930	1415	0.930	1471	0.930	1527	0.930
1136	0.930	1192	0.930	1248	0.930	1304	0.930	1360	0.930	1416	0.930	1472	0.930	1528	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1529	0.930	1585	0.930	1641	0.930	1697	0.930	1753	0.930	1809	0.930	1865	0.930	1921	0.930
1530	0.930	1586	0.930	1642	0.930	1698	0.930	1754	0.930	1810	0.930	1866	0.930	1922	0.930
1531	0.930	1587	0.930	1643	0.930	1699	0.930	1755	0.930	1811	0.930	1867	0.930	1923	0.930
1532	0.930	1588	0.930	1644	0.930	1700	0.930	1756	0.930	1812	0.930	1868	0.930	1924	0.930
1533	0.930	1589	0.930	1645	0.930	1701	0.930	1757	0.930	1813	0.930	1869	0.930	1925	0.930
1534	0.930	1590	0.930	1646	0.930	1702	0.930	1758	0.930	1814	0.930	1870	0.930	1926	0.930
1535	0.930	1591	0.930	1647	0.930	1703	0.930	1759	0.930	1815	0.930	1871	0.930	1927	0.930
1536	0.930	1592	0.930	1648	0.930	1704	0.930	1760	0.930	1816	0.930	1872	0.930	1928	0.930
1537	0.930	1593	0.930	1649	0.930	1705	0.930	1761	0.930	1817	0.930	1873	0.930	1929	0.930
1538	0.930	1594	0.930	1650	0.930	1706	0.930	1762	0.930	1818	0.930	1874	0.930	1930	0.930
1539	0.930	1595	0.930	1651	0.930	1707	0.930	1763	0.930	1819	0.930	1875	0.930	1931	0.930
1540	0.930	1596	0.930	1652	0.930	1708	0.930	1764	0.930	1820	0.930	1876	0.930	1932	0.930
1541	0.930	1597	0.930	1653	0.930	1709	0.930	1765	0.930	1821	0.930	1877	0.930	1933	0.930
1542	0.930	1598	0.930	1654	0.930	1710	0.930	1766	0.930	1822	0.930	1878	0.930	1934	0.930
1543	0.930	1599	0.930	1655	0.930	1711	0.930	1767	0.930	1823	0.930	1879	0.930	1935	0.930
1544	0.930	1600	0.930	1656	0.930	1712	0.930	1768	0.930	1824	0.930	1880	0.930	1936	0.930
1545	0.930	1601	0.930	1657	0.930	1713	0.930	1769	0.930	1825	0.930	1881	0.930	1937	0.930
1546	0.930	1602	0.930	1658	0.930	1714	0.930	1770	0.930	1826	0.930	1882	0.930	1938	0.930
1547	0.930	1603	0.930	1659	0.930	1715	0.930	1771	0.930	1827	0.930	1883	0.930	1939	0.930
1548	0.930	1604	0.930	1660	0.930	1716	0.930	1772	0.930	1828	0.930	1884	0.930	1940	0.930
1549	0.930	1605	0.930	1661	0.930	1717	0.930	1773	0.930	1829	0.930	1885	0.930	1941	0.930
1550	0.930	1606	0.930	1662	0.930	1718	0.930	1774	0.930	1830	0.930	1886	0.930	1942	0.930
1551	0.930	1607	0.930	1663	0.930	1719	0.930	1775	0.930	1831	0.930	1887	0.930	1943	0.930
1552	0.930	1608	0.930	1664	0.930	1720	0.930	1776	0.930	1832	0.930	1888	0.930	1944	0.930
1553	0.930	1609	0.930	1665	0.930	1721	0.930	1777	0.930	1833	0.930	1889	0.930	1945	0.930
1554	0.930	1610	0.930	1666	0.930	1722	0.930	1778	0.930	1834	0.930	1890	0.930	1946	0.930
1555	0.930	1611	0.930	1667	0.930	1723	0.930	1779	0.930	1835	0.930	1891	0.930	1947	0.930
1556	0.930	1612	0.930	1668	0.930	1724	0.930	1780	0.930	1836	0.930	1892	0.930	1948	0.930
1557	0.930	1613	0.930	1669	0.930	1725	0.930	1781	0.930	1837	0.930	1893	0.930	1949	0.930
1558	0.930	1614	0.930	1670	0.930	1726	0.930	1782	0.930	1838	0.930	1894	0.930	1950	0.930
1559	0.930	1615	0.930	1671	0.930	1727	0.930	1783	0.930	1839	0.930	1895	0.930	1951	0.930
1560	0.930	1616	0.930	1672	0.930	1728	0.930	1784	0.930	1840	0.930	1896	0.930	1952	0.930
1561	0.930	1617	0.930	1673	0.930	1729	0.930	1785	0.930	1841	0.930	1897	0.930	1953	0.930
1562	0.930	1618	0.930	1674	0.930	1730	0.930	1786	0.930	1842	0.930	1898	0.930	1954	0.930
1563	0.930	1619	0.930	1675	0.930	1731	0.930	1787	0.930	1843	0.930	1899	0.930	1955	0.930
1564	0.930	1620	0.930	1676	0.930	1732	0.930	1788	0.930	1844	0.930	1900	0.930	1956	0.930
1565	0.930	1621	0.930	1677	0.930	1733	0.930	1789	0.930	1845	0.930	1901	0.930	1957	0.930
1566	0.930	1622	0.930	1678	0.930	1734	0.930	1790	0.930	1846	0.930	1902	0.930	1958	0.930
1567	0.930	1623	0.930	1679	0.930	1735	0.930	1791	0.930	1847	0.930	1903	0.930	1959	0.930
1568	0.930	1624	0.930	1680	0.930	1736	0.930	1792	0.930	1848	0.930	1904	0.930	1960	0.930
1569	0.930	1625	0.930	1681	0.930	1737	0.930	1793	0.930	1849	0.930	1905	0.930	1961	0.930
1570	0.930	1626	0.930	1682	0.930	1738	0.930	1794	0.930	1850	0.930	1906	0.930	1962	0.930
1571	0.930	1627	0.930	1683	0.930	1739	0.930	1795	0.930	1851	0.930	1907	0.930	1963	0.930
1572	0.930	1628	0.930	1684	0.930	1740	0.930	1796	0.930	1852	0.930	1908	0.930	1964	0.930
1573	0.930	1629	0.930	1685	0.930	1741	0.930	1797	0.930	1853	0.930	1909	0.930	1965	0.930
1574	0.930	1630	0.930	1686	0.930	1742	0.930	1798	0.930	1854	0.930	1910	0.930	1966	0.930
1575	0.930	1631	0.930	1687	0.930	1743	0.930	1799	0.930	1855	0.930	1911	0.930	1967	0.930
1576	0.930	1632	0.930	1688	0.930	1744	0.930	1800	0.930	1856	0.930	1912	0.930	1968	0.930
1577	0.930	1633	0.930	1689	0.930	1745	0.930	1801	0.930	1857	0.930	1913	0.930	1969	0.930
1578	0.930	1634	0.930	1690	0.930	1746	0.930	1802	0.930	1858	0.930	1914	0.930	1970	0.930
1579	0.930	1635	0.930	1691	0.930	1747	0.930	1803	0.930	1859	0.930	1915	0.930	1971	0.930
1580	0.930	1636	0.930	1692	0.930	1748	0.930	1804	0.930	1860	0.930	1916	0.930	1972	0.930
1581	0.930	1637	0.930	1693	0.930	1749	0.930	1805	0.930	1861	0.930	1917	0.930	1973	0.930
1582	0.930	1638	0.930	1694	0.930	1750	0.930	1806	0.930	1862	0.930	1918	0.930	1974	0.930
1583	0.930	1639	0.930	1695	0.930	1751	0.930	1807	0.930	1863	0.930	1919	0.930	1975	0.930
1584	0.930	1640	0.930	1696	0.930	1752	0.930	1808	0.930	1864	0.930	1920	0.930	1976	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1977	0.930	1982	0.930	1987	0.930	1992	0.930	1997	0.930	2002	0.930	2007	0.930	2012	0.930
1978	0.930	1983	0.930	1988	0.930	1993	0.930	1998	0.930	2003	0.930	2008	0.930	2013	0.930
1979	0.930	1984	0.930	1989	0.930	1994	0.930	1999	0.930	2004	0.930	2009	0.930	2014	0.930
1980	0.930	1985	0.930	1990	0.930	1995	0.930	2000	0.930	2005	0.930	2010	0.930	2015	0.930
1981	0.930	1986	0.930	1991	0.930	1996	0.930	2001	0.930	2006	0.930	2011	0.930	2016	0.930

Online Controls for Storm

Orifice Manhole: SWMH9, DS/PN: 3.001, Volume (m³): 0.2

Diameter (m) 0.037 Discharge Coefficient 0.600 Invert Level (m) 5.404

Orifice Manhole: SWMH14, DS/PN: 6.001, Volume (m³): 0.3

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 5.000

Orifice Manhole: SWMH15, DS/PN: 7.001, Volume (m³): 0.3

Diameter (m) 0.055 Discharge Coefficient 0.600 Invert Level (m) 5.300

Orifice Manhole: SWMH20, DS/PN: 9.001, Volume (m³): 0.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 5.760

Orifice Manhole: SWMH22, DS/PN: 11.001, Volume (m³): 0.3

Diameter (m) 0.055 Discharge Coefficient 0.600 Invert Level (m) 5.400

Hydro-Brake® Optimum Manhole: SWMH5, DS/PN: 1.005, Volume (m³): 2.6

Unit Reference	MD-SHE-0047-1300-1750-1300
Design Head (m)	1.750
Design Flow (l/s)	1.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	47
Invert Level (m)	3.673
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.750	1.3	Kick-Flo®	0.419	0.7
Flush-Flo™	0.206	0.8	Mean Flow over Head Range	-	1.0

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	0.8	0.800	0.9	2.000	1.4	4.000	1.9	7.000	2.5
0.200	0.8	1.000	1.0	2.200	1.4	4.500	2.0	7.500	2.5
0.300	0.8	1.200	1.1	2.400	1.5	5.000	2.1	8.000	2.6
0.400	0.7	1.400	1.2	2.600	1.6	5.500	2.2	8.500	2.7
0.500	0.7	1.600	1.2	3.000	1.7	6.000	2.3	9.000	2.8
0.600	0.8	1.800	1.3	3.500	1.8	6.500	2.4	9.500	2.8

Hydro-Brake® Optimum Manhole: SWMH7, DS/PN: 1.008, Volume (m³): 1.6

Unit Reference	MD-SHE-0068-2000-0950-2000
Design Head (m)	0.950
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	3.025
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.950	2.0	Kick-Flo®	0.596	1.6
Flush-Flo™	0.292	2.0	Mean Flow over Head Range	-	1.8

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	1.7	0.800	1.8	2.000	2.8	4.000	3.9	7.000	5.0
0.200	2.0	1.000	2.0	2.200	2.9	4.500	4.1	7.500	5.2
0.300	2.0	1.200	2.2	2.400	3.1	5.000	4.3	8.000	5.4
0.400	2.0	1.400	2.4	2.600	3.2	5.500	4.5	8.500	5.5
0.500	1.9	1.600	2.5	3.000	3.4	6.000	4.7	9.000	5.7
0.600	1.6	1.800	2.7	3.500	3.6	6.500	4.9	9.500	5.8

Storage Structures for Storm

Porous Car Park Manhole: SWMH9, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.404	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH14, DS/PN: 6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.000	Cap Volume Depth (m)	0.550

Porous Car Park Manhole: SWMH15, DS/PN: 7.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.300	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH20, DS/PN: 9.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.760	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH22, DS/PN: 11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.0
Max Percolation (l/s)	25.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.400	Cap Volume Depth (m)	0.300

Cellular Storage Manhole: TANK 1, DS/PN: 1.004

Invert Level (m)	3.700	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.97
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	1.200	100.0	0.0	1.201	0.0	0.0

Cellular Storage Manhole: TANK 2, DS/PN: 1.007

Invert Level (m) 2.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.97
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	36.0	0.0	0.400	36.0	0.0	0.401	0.0	0.0

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 7 Number of Storage Structures 7 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 1.000
Site Location GB 503397 103865 TQ 03397 03865 Cv (Winter) 1.000

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

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	SWMH1	15 Summer	2	+0%					5.789	-0.111	0.000	0.15
1.001	SWMH2	15 Summer	2	+0%					5.537	-0.110	0.000	0.16
2.000	SWMH8	15 Summer	2	+0%					5.784	-0.116	0.000	0.11
1.002	SWMH3	15 Summer	2	+0%					5.446	-0.087	0.000	0.36
3.000	PP1	15 Summer	2	+0%					5.450	-0.126	0.000	0.06
3.001	SWMH9	60 Summer	2	+0%					5.434	-0.120	0.000	0.01
4.000	SWMH10	15 Summer	2	+0%					5.179	-0.121	0.000	0.08
4.001	SWMH11	15 Summer	2	+0%					5.063	-0.121	0.000	0.08
5.000	SWMH13	15 Summer	2	+0%					5.178	-0.122	0.000	0.08
4.002	SWMH12	15 Summer	2	+0%					4.956	-0.106	0.000	0.19
6.000	PP2	15 Summer	2	+0%					5.137	-0.106	0.000	0.18
6.001	SWMH14	30 Summer	2	+0%					5.064	-0.086	0.000	0.09
7.000	PP3	15 Summer	2	+0%					5.437	-0.107	0.000	0.18
7.001	SWMH15	30 Summer	2	+0%					5.370	-0.080	0.000	0.07
1.003	SWMH4	15 Summer	2	+0%					4.885	-0.040	0.000	0.89
8.000	SWMH16	15 Summer	2	+0%					5.995	-0.105	0.000	0.19
8.001	SWMH17	15 Summer	2	+0%					5.800	-0.094	0.000	0.30
9.000	PP4	15 Summer	2	+0%					5.888	-0.107	0.000	0.18
9.001	SWMH20	60 Summer	2	+0%					5.832	-0.078	0.000	0.07
10.000	SWMH21	15 Summer	2	+0%					5.888	-0.112	0.000	0.14
8.002	SWMH18	15 Summer	2	+0%					5.564	-0.086	0.000	0.38
11.000	PP5	15 Summer	2	+0%					5.555	-0.110	0.000	0.16
11.001	SWMH22	120 Summer	2	+0%					5.449	-0.101	0.000	0.06
8.003	SWMH19	15 Summer	2	+0%					4.853	-0.067	0.000	0.59

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

PN	US/MH Name	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SWMH1			2.6	OK	
1.001	SWMH2			2.6	OK	
2.000	SWMH8			2.4	OK	
1.002	SWMH3			5.0	OK	
3.000	PP1			0.6	OK*	
3.001	SWMH9		30	0.2	OK	
4.000	SWMH10			1.3	OK	
4.001	SWMH11			1.3	OK	
5.000	SWMH13			1.7	OK	
4.002	SWMH12			3.0	OK	
6.000	PP2			3.2	OK*	
6.001	SWMH14		18	1.5	OK	
7.000	PP3			3.2	OK*	
7.001	SWMH15		20	1.2	OK	
1.003	SWMH4			9.6	OK	
8.000	SWMH16			3.2	OK	
8.001	SWMH17			3.2	OK	
9.000	PP4			3.2	OK*	
9.001	SWMH20		28	1.1	OK	
10.000	SWMH21			2.4	OK	
8.002	SWMH18			6.2	OK	
11.000	PP5			2.8	OK*	
11.001	SWMH22		55	0.7	OK	
8.003	SWMH19			6.4	OK	

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.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
12.000	CD	15 Summer	2	+0%					5.064	-0.086	0.000
12.001	CD	15 Summer	2	+0%					4.892	-0.082	0.000
1.004	TANK 1	360 Winter	2	+0%	2/30 Summer				4.032	0.182	0.000
1.005	SWMH5	360 Winter	2	+0%	2/30 Summer				4.033	0.210	0.000
1.006	SWMH6	1440 Winter	2	+0%					3.330	-0.123	0.000
13.000	Channel Drain	15 Summer	2	+0%					3.395	-0.105	0.000
13.001	SWMH23	15 Summer	2	+0%					3.359	-0.102	0.000
1.007	TANK 2	960 Summer	2	+0%					3.084	-0.105	0.000
1.008	SWMH7	960 Summer	2	+0%					3.083	-0.092	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
12.000	CD	0.38			4.1	OK*	
12.001	CD	0.41			7.0	OK*	
1.004	TANK 1	0.08			0.9	SURCHARGED*	
1.005	SWMH5	0.05			0.8	SURCHARGED	
1.006	SWMH6	0.08			0.8	OK	
13.000	Channel Drain	0.19			2.4	OK*	
13.001	SWMH23	0.22			2.4	OK	
1.007	TANK 2	0.10			1.1	OK*	
1.008	SWMH7	0.05			1.1	OK	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - 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
1.000	25.225	0.253	99.7	0.012	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	11.360	0.114	99.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	23.909	0.367	65.1	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	4.830	0.048	100.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	2.198	0.022	99.9	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	8.409	0.129	65.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	11.637	0.116	100.3	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	12.191	0.122	99.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	12.777	0.238	53.7	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	13.675	0.137	99.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	9.345	0.093	100.5	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	5.473	0.071	77.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	9.368	0.094	99.7	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
7.001	15.262	0.153	99.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.42	5.750	0.012	0.0	0.0	0.0	1.01	17.8	1.6
1.001	50.00	5.61	5.497	0.012	0.0	0.0	0.0	1.01	17.8	1.6
2.000	50.00	5.32	5.750	0.011	0.0	0.0	0.0	1.25	22.1	1.5
1.002	50.00	5.69	5.383	0.023	0.0	0.0	0.0	1.00	17.7	3.1
3.000	50.00	5.04	5.426	0.003	0.0	0.0	0.0	1.01	17.8	0.4
3.001	50.00	5.15	5.404	0.003	0.0	0.0	0.0	1.25	22.0	0.4
4.000	50.00	5.19	5.150	0.006	0.0	0.0	0.0	1.00	17.7	0.8
4.001	50.00	5.40	5.034	0.006	0.0	0.0	0.0	1.01	17.8	0.8
5.000	50.00	5.15	5.150	0.008	0.0	0.0	0.0	1.38	24.3	1.1
4.002	50.00	5.62	4.912	0.014	0.0	0.0	0.0	1.01	17.8	1.9
6.000	50.00	5.16	5.093	0.015	0.0	0.0	0.0	1.00	17.7	2.0
6.001	50.00	5.23	5.000	0.015	0.0	0.0	0.0	1.15	20.3	2.0
7.000	50.00	5.16	5.394	0.015	0.0	0.0	0.0	1.01	17.8	2.0
7.001	50.00	5.41	5.300	0.015	0.0	0.0	0.0	1.01	17.8	2.0

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	2.577	0.025	103.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.000	20.640	0.206	100.2	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	2.613	0.022	118.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
9.000	8.470	0.085	99.6	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
9.001	13.936	0.139	100.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
10.000	22.356	0.224	99.8	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.002	11.750	0.118	99.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
11.000	11.490	0.120	95.8	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit	
11.001	1.573	0.029	54.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.003	2.031	0.020	101.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
12.000	1.000	0.010	100.0	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit	
12.001	7.445	0.074	100.6	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	2.676	0.027	99.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	11.128	0.137	81.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	1.400	0.014	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	5.73	4.775	0.070	0.0	0.0	0.0	0.99	17.5	9.5
8.000	50.00	5.34	5.950	0.015	0.0	0.0	0.0	1.00	17.7	2.0
8.001	50.00	5.39	5.744	0.015	0.0	0.0	0.0	0.92	16.3	2.0
9.000	50.00	5.14	5.845	0.015	0.0	0.0	0.0	1.01	17.8	2.0
9.001	50.00	5.37	5.760	0.015	0.0	0.0	0.0	1.00	17.7	2.0
10.000	50.00	5.37	5.850	0.011	0.0	0.0	0.0	1.01	17.8	1.5
8.002	50.00	5.58	5.500	0.041	0.0	0.0	0.0	1.01	17.8	5.6
11.000	50.00	5.19	5.515	0.013	0.0	0.0	0.0	1.03	18.2	1.8
11.001	50.00	5.21	5.400	0.013	0.0	0.0	0.0	1.37	24.2	1.8
8.003	50.00	5.62	4.770	0.054	0.0	0.0	0.0	1.00	17.6	7.3
12.000	50.00	5.02	5.000	0.019	0.0	0.0	0.0	1.00	17.8	2.6
12.001	50.00	5.14	4.824	0.035	0.0	0.0	0.0	1.00	17.7	4.7
1.004	50.00	5.77	3.700	0.159	0.0	0.0	0.0	1.01	17.8«	21.5
1.005	50.00	5.94	3.673	0.159	0.0	0.0	0.0	1.12	19.7«	21.5
1.006	50.00	5.96	3.303	0.159	0.0	0.0	0.0	1.00	17.8«	21.5

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	3.865	0.039	100.0	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
13.001	2.183	0.022	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
1.007	1.449	0.014	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
1.008	11.534	0.190	60.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	5.06	3.350	0.011	0.0	0.0	0.0	1.00	17.8	1.5
13.001	50.00	5.10	3.311	0.011	0.0	0.0	0.0	1.00	17.8	1.5
1.007	50.00	5.99	3.039	0.170	0.0	0.0	0.0	1.00	17.8«	23.0
1.008	50.00	6.14	3.025	0.170	0.0	0.0	0.0	1.29	22.9«	23.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SWMH1	6.435	0.685	Open Manhole	450	1.000	5.750	150				
SWMH2	6.411	0.914	Open Manhole	450	1.001	5.497	150	1.000	5.497	150	
SWMH8	6.516	0.766	Open Manhole	450	2.000	5.750	150				
SWMH3	6.376	0.993	Open Manhole	450	1.002	5.383	150	1.001	5.383	150	
								2.000	5.383	150	
PP1	6.050	0.624	Junction		3.000	5.426	150				
SWMH9	6.142	0.738	Open Manhole	450	3.001	5.404	150	3.000	5.404	150	
SWMH10	5.642	0.492	Open Manhole	450	4.000	5.150	150				
SWMH11	5.520	0.486	Open Manhole	450	4.001	5.034	150	4.000	5.034	150	
SWMH13	5.656	0.506	Open Manhole	450	5.000	5.150	150				
SWMH12	5.561	0.649	Open Manhole	450	4.002	4.912	150	4.001	4.912	150	
								5.000	4.912	150	
PP2	5.450	0.357	Junction		6.000	5.093	150				
SWMH14	5.813	0.813	Open Manhole	450	6.001	5.000	150	6.000	5.000	150	
PP3	6.231	0.837	Junction		7.000	5.394	150				
SWMH15	6.231	0.931	Open Manhole	450	7.001	5.300	150	7.000	5.300	150	
SWMH4	6.063	1.288	Open Manhole	1200	1.003	4.775	150	1.002	5.335	150	560
								3.001	5.275	150	500
								4.002	4.775	150	
								6.001	4.929	150	154
								7.001	5.147	150	372
SWMH16	6.506	0.556	Open Manhole	450	8.000	5.950	150				
SWMH17	6.424	0.680	Open Manhole	450	8.001	5.744	150	8.000	5.744	150	
PP4	6.280	0.435	Junction		9.000	5.845	150				
SWMH20	6.280	0.520	Open Manhole	450	9.001	5.760	150	9.000	5.760	150	
SWMH21	6.474	0.624	Open Manhole	450	10.000	5.850	150				
SWMH18	6.376	0.876	Open Manhole	1200	8.002	5.500	150	8.001	5.722	150	222
								9.001	5.621	150	121
								10.000	5.626	150	126
PP5	6.145	0.630	Junction		11.000	5.515	150				
SWMH22	6.145	0.750	Open Manhole	450	11.001	5.400	150	11.000	5.395	150	
SWMH19	6.169	1.399	Open Manhole	1200	8.003	4.770	150	8.002	5.382	150	612
								11.001	5.371	150	601
CD	5.725	0.725	Junction		12.000	5.000	150				
CD	5.425	0.601	Junction		12.001	4.824	150	12.000	4.990	150	166
TANK 1	5.825	2.125	Junction		1.004	3.700	150	1.003	4.750	150	1050
								8.003	4.750	150	1050
								12.001	4.750	150	1050
SWMH5	5.896	2.223	Open Manhole	1200	1.005	3.673	150	1.004	3.673	150	
SWMH6	5.347	2.044	Open Manhole	1200	1.006	3.303	150	1.005	3.536	150	233
Channel Drain	4.105	0.755	Junction		13.000	3.350	150				
SWMH23	4.354	1.043	Open Manhole	1200	13.001	3.311	150	13.000	3.311	150	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
TANK 2	4.530	1.491	Junction		1.007	3.039	150	1.006	3.289	150	250
								13.001	3.289	150	250
SWMH7	4.431	1.406	Open Manhole	1200	1.008	3.025	150	1.007	3.025	150	
	3.700	0.865	Open Manhole	1200		OUTFALL		1.008	2.835	150	

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

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	SWMH1	6.435	5.750	0.535	Open Manhole	450
1.001	o	150	SWMH2	6.411	5.497	0.764	Open Manhole	450
2.000	o	150	SWMH8	6.516	5.750	0.616	Open Manhole	450
1.002	o	150	SWMH3	6.376	5.383	0.843	Open Manhole	450
3.000	o	150	PP1	6.050	5.426	0.474	Junction	
3.001	o	150	SWMH9	6.142	5.404	0.588	Open Manhole	450
4.000	o	150	SWMH10	5.642	5.150	0.342	Open Manhole	450
4.001	o	150	SWMH11	5.520	5.034	0.336	Open Manhole	450
5.000	o	150	SWMH13	5.656	5.150	0.356	Open Manhole	450
4.002	o	150	SWMH12	5.561	4.912	0.499	Open Manhole	450
6.000	o	150	PP2	5.450	5.093	0.207	Junction	
6.001	o	150	SWMH14	5.813	5.000	0.663	Open Manhole	450
7.000	o	150	PP3	6.231	5.394	0.687	Junction	
7.001	o	150	SWMH15	6.231	5.300	0.781	Open Manhole	450
1.003	o	150	SWMH4	6.063	4.775	1.138	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)
1.000	25.225	99.7	SWMH2	6.411	5.497	0.764	Open Manhole	450
1.001	11.360	99.6	SWMH3	6.376	5.383	0.843	Open Manhole	450
2.000	23.909	65.1	SWMH3	6.376	5.383	0.843	Open Manhole	450
1.002	4.830	100.6	SWMH4	6.063	5.335	0.578	Open Manhole	1200
3.000	2.198	99.9	SWMH9	6.142	5.404	0.588	Open Manhole	450
3.001	8.409	65.2	SWMH4	6.063	5.275	0.638	Open Manhole	1200
4.000	11.637	100.3	SWMH11	5.520	5.034	0.336	Open Manhole	450
4.001	12.191	99.9	SWMH12	5.561	4.912	0.499	Open Manhole	450
5.000	12.777	53.7	SWMH12	5.561	4.912	0.499	Open Manhole	450
4.002	13.675	99.8	SWMH4	6.063	4.775	1.138	Open Manhole	1200
6.000	9.345	100.5	SWMH14	5.813	5.000	0.663	Open Manhole	450
6.001	5.473	77.1	SWMH4	6.063	4.929	0.984	Open Manhole	1200
7.000	9.368	99.7	SWMH15	6.231	5.300	0.781	Open Manhole	450
7.001	15.262	99.8	SWMH4	6.063	5.147	0.766	Open Manhole	1200
1.003	2.577	103.1	TANK 1	5.825	4.750	0.925	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
8.000	o	150	SWMH16	6.506	5.950	0.406	Open Manhole	450
8.001	o	150	SWMH17	6.424	5.744	0.530	Open Manhole	450
9.000	o	150	PP4	6.280	5.845	0.285	Junction	
9.001	o	150	SWMH20	6.280	5.760	0.370	Open Manhole	450
10.000	o	150	SWMH21	6.474	5.850	0.474	Open Manhole	450
8.002	o	150	SWMH18	6.376	5.500	0.726	Open Manhole	1200
11.000	o	150	PP5	6.145	5.515	0.480	Junction	
11.001	o	150	SWMH22	6.145	5.400	0.595	Open Manhole	450
8.003	o	150	SWMH19	6.169	4.770	1.249	Open Manhole	1200
12.000	o	150	CD	5.725	5.000	0.575	Junction	
12.001	o	150	CD	5.425	4.824	0.451	Junction	
1.004	o	150	TANK 1	5.825	3.700	1.975	Junction	
1.005	o	150	SWMH5	5.896	3.673	2.073	Open Manhole	1200
1.006	o	150	SWMH6	5.347	3.303	1.894	Open Manhole	1200
13.000	o	150	Channel Drain	4.105	3.350	0.605	Junction	

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)
8.000	20.640	100.2	SWMH17	6.424	5.744	0.530	Open Manhole	450
8.001	2.613	118.8	SWMH18	6.376	5.722	0.504	Open Manhole	1200
9.000	8.470	99.6	SWMH20	6.280	5.760	0.370	Open Manhole	450
9.001	13.936	100.3	SWMH18	6.376	5.621	0.605	Open Manhole	1200
10.000	22.356	99.8	SWMH18	6.376	5.626	0.600	Open Manhole	1200
8.002	11.750	99.6	SWMH19	6.169	5.382	0.637	Open Manhole	1200
11.000	11.490	95.8	SWMH22	6.145	5.395	0.600	Open Manhole	450
11.001	1.573	54.2	SWMH19	6.169	5.371	0.648	Open Manhole	1200
8.003	2.031	101.6	TANK 1	5.825	4.750	0.925	Junction	
12.000	1.000	100.0	CD	5.425	4.990	0.285	Junction	
12.001	7.445	100.6	TANK 1	5.825	4.750	0.925	Junction	
1.004	2.676	99.1	SWMH5	5.896	3.673	2.073	Open Manhole	1200
1.005	11.128	81.2	SWMH6	5.347	3.536	1.661	Open Manhole	1200
1.006	1.400	100.0	TANK 2	4.530	3.289	1.091	Junction	
13.000	3.865	100.0	SWMH23	4.354	3.311	0.893	Open Manhole	1200

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.001	o	150	SWMH23	4.354	3.311	0.893	Open Manhole	1200
1.007	o	150	TANK 2	4.530	3.039	1.341	Junction	
1.008	o	150	SWMH7	4.431	3.025	1.256	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)
13.001	2.183	100.0	TANK 2	4.530	3.289	1.091	Junction	
1.007	1.449	100.0	SWMH7	4.431	3.025	1.256	Open Manhole	1200
1.008	11.534	60.7		3.700	2.835	0.715	Open Manhole	1200

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		3.700	2.835	0.000	1200	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.930	24	0.930	47	0.930	70	0.930	93	0.930	116	0.930	139	0.930	162	0.930
2	0.930	25	0.930	48	0.930	71	0.930	94	0.930	117	0.930	140	0.930	163	0.930
3	0.930	26	0.930	49	0.930	72	0.930	95	0.930	118	0.930	141	0.930	164	0.930
4	0.930	27	0.930	50	0.930	73	0.930	96	0.930	119	0.930	142	0.930	165	0.930
5	0.930	28	0.930	51	0.930	74	0.930	97	0.930	120	0.930	143	0.930	166	0.930
6	0.930	29	0.930	52	0.930	75	0.930	98	0.930	121	0.930	144	0.930	167	0.930
7	0.930	30	0.930	53	0.930	76	0.930	99	0.930	122	0.930	145	0.930	168	0.930
8	0.930	31	0.930	54	0.930	77	0.930	100	0.930	123	0.930	146	0.930	169	0.930
9	0.930	32	0.930	55	0.930	78	0.930	101	0.930	124	0.930	147	0.930	170	0.930
10	0.930	33	0.930	56	0.930	79	0.930	102	0.930	125	0.930	148	0.930	171	0.930
11	0.930	34	0.930	57	0.930	80	0.930	103	0.930	126	0.930	149	0.930	172	0.930
12	0.930	35	0.930	58	0.930	81	0.930	104	0.930	127	0.930	150	0.930	173	0.930
13	0.930	36	0.930	59	0.930	82	0.930	105	0.930	128	0.930	151	0.930	174	0.930
14	0.930	37	0.930	60	0.930	83	0.930	106	0.930	129	0.930	152	0.930	175	0.930
15	0.930	38	0.930	61	0.930	84	0.930	107	0.930	130	0.930	153	0.930	176	0.930
16	0.930	39	0.930	62	0.930	85	0.930	108	0.930	131	0.930	154	0.930	177	0.930
17	0.930	40	0.930	63	0.930	86	0.930	109	0.930	132	0.930	155	0.930	178	0.930
18	0.930	41	0.930	64	0.930	87	0.930	110	0.930	133	0.930	156	0.930	179	0.930
19	0.930	42	0.930	65	0.930	88	0.930	111	0.930	134	0.930	157	0.930	180	0.930
20	0.930	43	0.930	66	0.930	89	0.930	112	0.930	135	0.930	158	0.930	181	0.930
21	0.930	44	0.930	67	0.930	90	0.930	113	0.930	136	0.930	159	0.930	182	0.930
22	0.930	45	0.930	68	0.930	91	0.930	114	0.930	137	0.930	160	0.930	183	0.930
23	0.930	46	0.930	69	0.930	92	0.930	115	0.930	138	0.930	161	0.930	184	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
185	0.930	241	0.930	297	0.930	353	0.930	409	0.930	465	0.930	521	0.930	577	0.930
186	0.930	242	0.930	298	0.930	354	0.930	410	0.930	466	0.930	522	0.930	578	0.930
187	0.930	243	0.930	299	0.930	355	0.930	411	0.930	467	0.930	523	0.930	579	0.930
188	0.930	244	0.930	300	0.930	356	0.930	412	0.930	468	0.930	524	0.930	580	0.930
189	0.930	245	0.930	301	0.930	357	0.930	413	0.930	469	0.930	525	0.930	581	0.930
190	0.930	246	0.930	302	0.930	358	0.930	414	0.930	470	0.930	526	0.930	582	0.930
191	0.930	247	0.930	303	0.930	359	0.930	415	0.930	471	0.930	527	0.930	583	0.930
192	0.930	248	0.930	304	0.930	360	0.930	416	0.930	472	0.930	528	0.930	584	0.930
193	0.930	249	0.930	305	0.930	361	0.930	417	0.930	473	0.930	529	0.930	585	0.930
194	0.930	250	0.930	306	0.930	362	0.930	418	0.930	474	0.930	530	0.930	586	0.930
195	0.930	251	0.930	307	0.930	363	0.930	419	0.930	475	0.930	531	0.930	587	0.930
196	0.930	252	0.930	308	0.930	364	0.930	420	0.930	476	0.930	532	0.930	588	0.930
197	0.930	253	0.930	309	0.930	365	0.930	421	0.930	477	0.930	533	0.930	589	0.930
198	0.930	254	0.930	310	0.930	366	0.930	422	0.930	478	0.930	534	0.930	590	0.930
199	0.930	255	0.930	311	0.930	367	0.930	423	0.930	479	0.930	535	0.930	591	0.930
200	0.930	256	0.930	312	0.930	368	0.930	424	0.930	480	0.930	536	0.930	592	0.930
201	0.930	257	0.930	313	0.930	369	0.930	425	0.930	481	0.930	537	0.930	593	0.930
202	0.930	258	0.930	314	0.930	370	0.930	426	0.930	482	0.930	538	0.930	594	0.930
203	0.930	259	0.930	315	0.930	371	0.930	427	0.930	483	0.930	539	0.930	595	0.930
204	0.930	260	0.930	316	0.930	372	0.930	428	0.930	484	0.930	540	0.930	596	0.930
205	0.930	261	0.930	317	0.930	373	0.930	429	0.930	485	0.930	541	0.930	597	0.930
206	0.930	262	0.930	318	0.930	374	0.930	430	0.930	486	0.930	542	0.930	598	0.930
207	0.930	263	0.930	319	0.930	375	0.930	431	0.930	487	0.930	543	0.930	599	0.930
208	0.930	264	0.930	320	0.930	376	0.930	432	0.930	488	0.930	544	0.930	600	0.930
209	0.930	265	0.930	321	0.930	377	0.930	433	0.930	489	0.930	545	0.930	601	0.930
210	0.930	266	0.930	322	0.930	378	0.930	434	0.930	490	0.930	546	0.930	602	0.930
211	0.930	267	0.930	323	0.930	379	0.930	435	0.930	491	0.930	547	0.930	603	0.930
212	0.930	268	0.930	324	0.930	380	0.930	436	0.930	492	0.930	548	0.930	604	0.930
213	0.930	269	0.930	325	0.930	381	0.930	437	0.930	493	0.930	549	0.930	605	0.930
214	0.930	270	0.930	326	0.930	382	0.930	438	0.930	494	0.930	550	0.930	606	0.930
215	0.930	271	0.930	327	0.930	383	0.930	439	0.930	495	0.930	551	0.930	607	0.930
216	0.930	272	0.930	328	0.930	384	0.930	440	0.930	496	0.930	552	0.930	608	0.930
217	0.930	273	0.930	329	0.930	385	0.930	441	0.930	497	0.930	553	0.930	609	0.930
218	0.930	274	0.930	330	0.930	386	0.930	442	0.930	498	0.930	554	0.930	610	0.930
219	0.930	275	0.930	331	0.930	387	0.930	443	0.930	499	0.930	555	0.930	611	0.930
220	0.930	276	0.930	332	0.930	388	0.930	444	0.930	500	0.930	556	0.930	612	0.930
221	0.930	277	0.930	333	0.930	389	0.930	445	0.930	501	0.930	557	0.930	613	0.930
222	0.930	278	0.930	334	0.930	390	0.930	446	0.930	502	0.930	558	0.930	614	0.930
223	0.930	279	0.930	335	0.930	391	0.930	447	0.930	503	0.930	559	0.930	615	0.930
224	0.930	280	0.930	336	0.930	392	0.930	448	0.930	504	0.930	560	0.930	616	0.930
225	0.930	281	0.930	337	0.930	393	0.930	449	0.930	505	0.930	561	0.930	617	0.930
226	0.930	282	0.930	338	0.930	394	0.930	450	0.930	506	0.930	562	0.930	618	0.930
227	0.930	283	0.930	339	0.930	395	0.930	451	0.930	507	0.930	563	0.930	619	0.930
228	0.930	284	0.930	340	0.930	396	0.930	452	0.930	508	0.930	564	0.930	620	0.930
229	0.930	285	0.930	341	0.930	397	0.930	453	0.930	509	0.930	565	0.930	621	0.930
230	0.930	286	0.930	342	0.930	398	0.930	454	0.930	510	0.930	566	0.930	622	0.930
231	0.930	287	0.930	343	0.930	399	0.930	455	0.930	511	0.930	567	0.930	623	0.930
232	0.930	288	0.930	344	0.930	400	0.930	456	0.930	512	0.930	568	0.930	624	0.930
233	0.930	289	0.930	345	0.930	401	0.930	457	0.930	513	0.930	569	0.930	625	0.930
234	0.930	290	0.930	346	0.930	402	0.930	458	0.930	514	0.930	570	0.930	626	0.930
235	0.930	291	0.930	347	0.930	403	0.930	459	0.930	515	0.930	571	0.930	627	0.930
236	0.930	292	0.930	348	0.930	404	0.930	460	0.930	516	0.930	572	0.930	628	0.930
237	0.930	293	0.930	349	0.930	405	0.930	461	0.930	517	0.930	573	0.930	629	0.930
238	0.930	294	0.930	350	0.930	406	0.930	462	0.930	518	0.930	574	0.930	630	0.930
239	0.930	295	0.930	351	0.930	407	0.930	463	0.930	519	0.930	575	0.930	631	0.930
240	0.930	296	0.930	352	0.930	408	0.930	464	0.930	520	0.930	576	0.930	632	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
633	0.930	689	0.930	745	0.930	801	0.930	857	0.930	913	0.930	969	0.930	1025	0.930
634	0.930	690	0.930	746	0.930	802	0.930	858	0.930	914	0.930	970	0.930	1026	0.930
635	0.930	691	0.930	747	0.930	803	0.930	859	0.930	915	0.930	971	0.930	1027	0.930
636	0.930	692	0.930	748	0.930	804	0.930	860	0.930	916	0.930	972	0.930	1028	0.930
637	0.930	693	0.930	749	0.930	805	0.930	861	0.930	917	0.930	973	0.930	1029	0.930
638	0.930	694	0.930	750	0.930	806	0.930	862	0.930	918	0.930	974	0.930	1030	0.930
639	0.930	695	0.930	751	0.930	807	0.930	863	0.930	919	0.930	975	0.930	1031	0.930
640	0.930	696	0.930	752	0.930	808	0.930	864	0.930	920	0.930	976	0.930	1032	0.930
641	0.930	697	0.930	753	0.930	809	0.930	865	0.930	921	0.930	977	0.930	1033	0.930
642	0.930	698	0.930	754	0.930	810	0.930	866	0.930	922	0.930	978	0.930	1034	0.930
643	0.930	699	0.930	755	0.930	811	0.930	867	0.930	923	0.930	979	0.930	1035	0.930
644	0.930	700	0.930	756	0.930	812	0.930	868	0.930	924	0.930	980	0.930	1036	0.930
645	0.930	701	0.930	757	0.930	813	0.930	869	0.930	925	0.930	981	0.930	1037	0.930
646	0.930	702	0.930	758	0.930	814	0.930	870	0.930	926	0.930	982	0.930	1038	0.930
647	0.930	703	0.930	759	0.930	815	0.930	871	0.930	927	0.930	983	0.930	1039	0.930
648	0.930	704	0.930	760	0.930	816	0.930	872	0.930	928	0.930	984	0.930	1040	0.930
649	0.930	705	0.930	761	0.930	817	0.930	873	0.930	929	0.930	985	0.930	1041	0.930
650	0.930	706	0.930	762	0.930	818	0.930	874	0.930	930	0.930	986	0.930	1042	0.930
651	0.930	707	0.930	763	0.930	819	0.930	875	0.930	931	0.930	987	0.930	1043	0.930
652	0.930	708	0.930	764	0.930	820	0.930	876	0.930	932	0.930	988	0.930	1044	0.930
653	0.930	709	0.930	765	0.930	821	0.930	877	0.930	933	0.930	989	0.930	1045	0.930
654	0.930	710	0.930	766	0.930	822	0.930	878	0.930	934	0.930	990	0.930	1046	0.930
655	0.930	711	0.930	767	0.930	823	0.930	879	0.930	935	0.930	991	0.930	1047	0.930
656	0.930	712	0.930	768	0.930	824	0.930	880	0.930	936	0.930	992	0.930	1048	0.930
657	0.930	713	0.930	769	0.930	825	0.930	881	0.930	937	0.930	993	0.930	1049	0.930
658	0.930	714	0.930	770	0.930	826	0.930	882	0.930	938	0.930	994	0.930	1050	0.930
659	0.930	715	0.930	771	0.930	827	0.930	883	0.930	939	0.930	995	0.930	1051	0.930
660	0.930	716	0.930	772	0.930	828	0.930	884	0.930	940	0.930	996	0.930	1052	0.930
661	0.930	717	0.930	773	0.930	829	0.930	885	0.930	941	0.930	997	0.930	1053	0.930
662	0.930	718	0.930	774	0.930	830	0.930	886	0.930	942	0.930	998	0.930	1054	0.930
663	0.930	719	0.930	775	0.930	831	0.930	887	0.930	943	0.930	999	0.930	1055	0.930
664	0.930	720	0.930	776	0.930	832	0.930	888	0.930	944	0.930	1000	0.930	1056	0.930
665	0.930	721	0.930	777	0.930	833	0.930	889	0.930	945	0.930	1001	0.930	1057	0.930
666	0.930	722	0.930	778	0.930	834	0.930	890	0.930	946	0.930	1002	0.930	1058	0.930
667	0.930	723	0.930	779	0.930	835	0.930	891	0.930	947	0.930	1003	0.930	1059	0.930
668	0.930	724	0.930	780	0.930	836	0.930	892	0.930	948	0.930	1004	0.930	1060	0.930
669	0.930	725	0.930	781	0.930	837	0.930	893	0.930	949	0.930	1005	0.930	1061	0.930
670	0.930	726	0.930	782	0.930	838	0.930	894	0.930	950	0.930	1006	0.930	1062	0.930
671	0.930	727	0.930	783	0.930	839	0.930	895	0.930	951	0.930	1007	0.930	1063	0.930
672	0.930	728	0.930	784	0.930	840	0.930	896	0.930	952	0.930	1008	0.930	1064	0.930
673	0.930	729	0.930	785	0.930	841	0.930	897	0.930	953	0.930	1009	0.930	1065	0.930
674	0.930	730	0.930	786	0.930	842	0.930	898	0.930	954	0.930	1010	0.930	1066	0.930
675	0.930	731	0.930	787	0.930	843	0.930	899	0.930	955	0.930	1011	0.930	1067	0.930
676	0.930	732	0.930	788	0.930	844	0.930	900	0.930	956	0.930	1012	0.930	1068	0.930
677	0.930	733	0.930	789	0.930	845	0.930	901	0.930	957	0.930	1013	0.930	1069	0.930
678	0.930	734	0.930	790	0.930	846	0.930	902	0.930	958	0.930	1014	0.930	1070	0.930
679	0.930	735	0.930	791	0.930	847	0.930	903	0.930	959	0.930	1015	0.930	1071	0.930
680	0.930	736	0.930	792	0.930	848	0.930	904	0.930	960	0.930	1016	0.930	1072	0.930
681	0.930	737	0.930	793	0.930	849	0.930	905	0.930	961	0.930	1017	0.930	1073	0.930
682	0.930	738	0.930	794	0.930	850	0.930	906	0.930	962	0.930	1018	0.930	1074	0.930
683	0.930	739	0.930	795	0.930	851	0.930	907	0.930	963	0.930	1019	0.930	1075	0.930
684	0.930	740	0.930	796	0.930	852	0.930	908	0.930	964	0.930	1020	0.930	1076	0.930
685	0.930	741	0.930	797	0.930	853	0.930	909	0.930	965	0.930	1021	0.930	1077	0.930
686	0.930	742	0.930	798	0.930	854	0.930	910	0.930	966	0.930	1022	0.930	1078	0.930
687	0.930	743	0.930	799	0.930	855	0.930	911	0.930	967	0.930	1023	0.930	1079	0.930
688	0.930	744	0.930	800	0.930	856	0.930	912	0.930	968	0.930	1024	0.930	1080	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1081	0.930	1137	0.930	1193	0.930	1249	0.930	1305	0.930	1361	0.930	1417	0.930	1473	0.930
1082	0.930	1138	0.930	1194	0.930	1250	0.930	1306	0.930	1362	0.930	1418	0.930	1474	0.930
1083	0.930	1139	0.930	1195	0.930	1251	0.930	1307	0.930	1363	0.930	1419	0.930	1475	0.930
1084	0.930	1140	0.930	1196	0.930	1252	0.930	1308	0.930	1364	0.930	1420	0.930	1476	0.930
1085	0.930	1141	0.930	1197	0.930	1253	0.930	1309	0.930	1365	0.930	1421	0.930	1477	0.930
1086	0.930	1142	0.930	1198	0.930	1254	0.930	1310	0.930	1366	0.930	1422	0.930	1478	0.930
1087	0.930	1143	0.930	1199	0.930	1255	0.930	1311	0.930	1367	0.930	1423	0.930	1479	0.930
1088	0.930	1144	0.930	1200	0.930	1256	0.930	1312	0.930	1368	0.930	1424	0.930	1480	0.930
1089	0.930	1145	0.930	1201	0.930	1257	0.930	1313	0.930	1369	0.930	1425	0.930	1481	0.930
1090	0.930	1146	0.930	1202	0.930	1258	0.930	1314	0.930	1370	0.930	1426	0.930	1482	0.930
1091	0.930	1147	0.930	1203	0.930	1259	0.930	1315	0.930	1371	0.930	1427	0.930	1483	0.930
1092	0.930	1148	0.930	1204	0.930	1260	0.930	1316	0.930	1372	0.930	1428	0.930	1484	0.930
1093	0.930	1149	0.930	1205	0.930	1261	0.930	1317	0.930	1373	0.930	1429	0.930	1485	0.930
1094	0.930	1150	0.930	1206	0.930	1262	0.930	1318	0.930	1374	0.930	1430	0.930	1486	0.930
1095	0.930	1151	0.930	1207	0.930	1263	0.930	1319	0.930	1375	0.930	1431	0.930	1487	0.930
1096	0.930	1152	0.930	1208	0.930	1264	0.930	1320	0.930	1376	0.930	1432	0.930	1488	0.930
1097	0.930	1153	0.930	1209	0.930	1265	0.930	1321	0.930	1377	0.930	1433	0.930	1489	0.930
1098	0.930	1154	0.930	1210	0.930	1266	0.930	1322	0.930	1378	0.930	1434	0.930	1490	0.930
1099	0.930	1155	0.930	1211	0.930	1267	0.930	1323	0.930	1379	0.930	1435	0.930	1491	0.930
1100	0.930	1156	0.930	1212	0.930	1268	0.930	1324	0.930	1380	0.930	1436	0.930	1492	0.930
1101	0.930	1157	0.930	1213	0.930	1269	0.930	1325	0.930	1381	0.930	1437	0.930	1493	0.930
1102	0.930	1158	0.930	1214	0.930	1270	0.930	1326	0.930	1382	0.930	1438	0.930	1494	0.930
1103	0.930	1159	0.930	1215	0.930	1271	0.930	1327	0.930	1383	0.930	1439	0.930	1495	0.930
1104	0.930	1160	0.930	1216	0.930	1272	0.930	1328	0.930	1384	0.930	1440	0.930	1496	0.930
1105	0.930	1161	0.930	1217	0.930	1273	0.930	1329	0.930	1385	0.930	1441	0.930	1497	0.930
1106	0.930	1162	0.930	1218	0.930	1274	0.930	1330	0.930	1386	0.930	1442	0.930	1498	0.930
1107	0.930	1163	0.930	1219	0.930	1275	0.930	1331	0.930	1387	0.930	1443	0.930	1499	0.930
1108	0.930	1164	0.930	1220	0.930	1276	0.930	1332	0.930	1388	0.930	1444	0.930	1500	0.930
1109	0.930	1165	0.930	1221	0.930	1277	0.930	1333	0.930	1389	0.930	1445	0.930	1501	0.930
1110	0.930	1166	0.930	1222	0.930	1278	0.930	1334	0.930	1390	0.930	1446	0.930	1502	0.930
1111	0.930	1167	0.930	1223	0.930	1279	0.930	1335	0.930	1391	0.930	1447	0.930	1503	0.930
1112	0.930	1168	0.930	1224	0.930	1280	0.930	1336	0.930	1392	0.930	1448	0.930	1504	0.930
1113	0.930	1169	0.930	1225	0.930	1281	0.930	1337	0.930	1393	0.930	1449	0.930	1505	0.930
1114	0.930	1170	0.930	1226	0.930	1282	0.930	1338	0.930	1394	0.930	1450	0.930	1506	0.930
1115	0.930	1171	0.930	1227	0.930	1283	0.930	1339	0.930	1395	0.930	1451	0.930	1507	0.930
1116	0.930	1172	0.930	1228	0.930	1284	0.930	1340	0.930	1396	0.930	1452	0.930	1508	0.930
1117	0.930	1173	0.930	1229	0.930	1285	0.930	1341	0.930	1397	0.930	1453	0.930	1509	0.930
1118	0.930	1174	0.930	1230	0.930	1286	0.930	1342	0.930	1398	0.930	1454	0.930	1510	0.930
1119	0.930	1175	0.930	1231	0.930	1287	0.930	1343	0.930	1399	0.930	1455	0.930	1511	0.930
1120	0.930	1176	0.930	1232	0.930	1288	0.930	1344	0.930	1400	0.930	1456	0.930	1512	0.930
1121	0.930	1177	0.930	1233	0.930	1289	0.930	1345	0.930	1401	0.930	1457	0.930	1513	0.930
1122	0.930	1178	0.930	1234	0.930	1290	0.930	1346	0.930	1402	0.930	1458	0.930	1514	0.930
1123	0.930	1179	0.930	1235	0.930	1291	0.930	1347	0.930	1403	0.930	1459	0.930	1515	0.930
1124	0.930	1180	0.930	1236	0.930	1292	0.930	1348	0.930	1404	0.930	1460	0.930	1516	0.930
1125	0.930	1181	0.930	1237	0.930	1293	0.930	1349	0.930	1405	0.930	1461	0.930	1517	0.930
1126	0.930	1182	0.930	1238	0.930	1294	0.930	1350	0.930	1406	0.930	1462	0.930	1518	0.930
1127	0.930	1183	0.930	1239	0.930	1295	0.930	1351	0.930	1407	0.930	1463	0.930	1519	0.930
1128	0.930	1184	0.930	1240	0.930	1296	0.930	1352	0.930	1408	0.930	1464	0.930	1520	0.930
1129	0.930	1185	0.930	1241	0.930	1297	0.930	1353	0.930	1409	0.930	1465	0.930	1521	0.930
1130	0.930	1186	0.930	1242	0.930	1298	0.930	1354	0.930	1410	0.930	1466	0.930	1522	0.930
1131	0.930	1187	0.930	1243	0.930	1299	0.930	1355	0.930	1411	0.930	1467	0.930	1523	0.930
1132	0.930	1188	0.930	1244	0.930	1300	0.930	1356	0.930	1412	0.930	1468	0.930	1524	0.930
1133	0.930	1189	0.930	1245	0.930	1301	0.930	1357	0.930	1413	0.930	1469	0.930	1525	0.930
1134	0.930	1190	0.930	1246	0.930	1302	0.930	1358	0.930	1414	0.930	1470	0.930	1526	0.930
1135	0.930	1191	0.930	1247	0.930	1303	0.930	1359	0.930	1415	0.930	1471	0.930	1527	0.930
1136	0.930	1192	0.930	1248	0.930	1304	0.930	1360	0.930	1416	0.930	1472	0.930	1528	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1529	0.930	1585	0.930	1641	0.930	1697	0.930	1753	0.930	1809	0.930	1865	0.930	1921	0.930
1530	0.930	1586	0.930	1642	0.930	1698	0.930	1754	0.930	1810	0.930	1866	0.930	1922	0.930
1531	0.930	1587	0.930	1643	0.930	1699	0.930	1755	0.930	1811	0.930	1867	0.930	1923	0.930
1532	0.930	1588	0.930	1644	0.930	1700	0.930	1756	0.930	1812	0.930	1868	0.930	1924	0.930
1533	0.930	1589	0.930	1645	0.930	1701	0.930	1757	0.930	1813	0.930	1869	0.930	1925	0.930
1534	0.930	1590	0.930	1646	0.930	1702	0.930	1758	0.930	1814	0.930	1870	0.930	1926	0.930
1535	0.930	1591	0.930	1647	0.930	1703	0.930	1759	0.930	1815	0.930	1871	0.930	1927	0.930
1536	0.930	1592	0.930	1648	0.930	1704	0.930	1760	0.930	1816	0.930	1872	0.930	1928	0.930
1537	0.930	1593	0.930	1649	0.930	1705	0.930	1761	0.930	1817	0.930	1873	0.930	1929	0.930
1538	0.930	1594	0.930	1650	0.930	1706	0.930	1762	0.930	1818	0.930	1874	0.930	1930	0.930
1539	0.930	1595	0.930	1651	0.930	1707	0.930	1763	0.930	1819	0.930	1875	0.930	1931	0.930
1540	0.930	1596	0.930	1652	0.930	1708	0.930	1764	0.930	1820	0.930	1876	0.930	1932	0.930
1541	0.930	1597	0.930	1653	0.930	1709	0.930	1765	0.930	1821	0.930	1877	0.930	1933	0.930
1542	0.930	1598	0.930	1654	0.930	1710	0.930	1766	0.930	1822	0.930	1878	0.930	1934	0.930
1543	0.930	1599	0.930	1655	0.930	1711	0.930	1767	0.930	1823	0.930	1879	0.930	1935	0.930
1544	0.930	1600	0.930	1656	0.930	1712	0.930	1768	0.930	1824	0.930	1880	0.930	1936	0.930
1545	0.930	1601	0.930	1657	0.930	1713	0.930	1769	0.930	1825	0.930	1881	0.930	1937	0.930
1546	0.930	1602	0.930	1658	0.930	1714	0.930	1770	0.930	1826	0.930	1882	0.930	1938	0.930
1547	0.930	1603	0.930	1659	0.930	1715	0.930	1771	0.930	1827	0.930	1883	0.930	1939	0.930
1548	0.930	1604	0.930	1660	0.930	1716	0.930	1772	0.930	1828	0.930	1884	0.930	1940	0.930
1549	0.930	1605	0.930	1661	0.930	1717	0.930	1773	0.930	1829	0.930	1885	0.930	1941	0.930
1550	0.930	1606	0.930	1662	0.930	1718	0.930	1774	0.930	1830	0.930	1886	0.930	1942	0.930
1551	0.930	1607	0.930	1663	0.930	1719	0.930	1775	0.930	1831	0.930	1887	0.930	1943	0.930
1552	0.930	1608	0.930	1664	0.930	1720	0.930	1776	0.930	1832	0.930	1888	0.930	1944	0.930
1553	0.930	1609	0.930	1665	0.930	1721	0.930	1777	0.930	1833	0.930	1889	0.930	1945	0.930
1554	0.930	1610	0.930	1666	0.930	1722	0.930	1778	0.930	1834	0.930	1890	0.930	1946	0.930
1555	0.930	1611	0.930	1667	0.930	1723	0.930	1779	0.930	1835	0.930	1891	0.930	1947	0.930
1556	0.930	1612	0.930	1668	0.930	1724	0.930	1780	0.930	1836	0.930	1892	0.930	1948	0.930
1557	0.930	1613	0.930	1669	0.930	1725	0.930	1781	0.930	1837	0.930	1893	0.930	1949	0.930
1558	0.930	1614	0.930	1670	0.930	1726	0.930	1782	0.930	1838	0.930	1894	0.930	1950	0.930
1559	0.930	1615	0.930	1671	0.930	1727	0.930	1783	0.930	1839	0.930	1895	0.930	1951	0.930
1560	0.930	1616	0.930	1672	0.930	1728	0.930	1784	0.930	1840	0.930	1896	0.930	1952	0.930
1561	0.930	1617	0.930	1673	0.930	1729	0.930	1785	0.930	1841	0.930	1897	0.930	1953	0.930
1562	0.930	1618	0.930	1674	0.930	1730	0.930	1786	0.930	1842	0.930	1898	0.930	1954	0.930
1563	0.930	1619	0.930	1675	0.930	1731	0.930	1787	0.930	1843	0.930	1899	0.930	1955	0.930
1564	0.930	1620	0.930	1676	0.930	1732	0.930	1788	0.930	1844	0.930	1900	0.930	1956	0.930
1565	0.930	1621	0.930	1677	0.930	1733	0.930	1789	0.930	1845	0.930	1901	0.930	1957	0.930
1566	0.930	1622	0.930	1678	0.930	1734	0.930	1790	0.930	1846	0.930	1902	0.930	1958	0.930
1567	0.930	1623	0.930	1679	0.930	1735	0.930	1791	0.930	1847	0.930	1903	0.930	1959	0.930
1568	0.930	1624	0.930	1680	0.930	1736	0.930	1792	0.930	1848	0.930	1904	0.930	1960	0.930
1569	0.930	1625	0.930	1681	0.930	1737	0.930	1793	0.930	1849	0.930	1905	0.930	1961	0.930
1570	0.930	1626	0.930	1682	0.930	1738	0.930	1794	0.930	1850	0.930	1906	0.930	1962	0.930
1571	0.930	1627	0.930	1683	0.930	1739	0.930	1795	0.930	1851	0.930	1907	0.930	1963	0.930
1572	0.930	1628	0.930	1684	0.930	1740	0.930	1796	0.930	1852	0.930	1908	0.930	1964	0.930
1573	0.930	1629	0.930	1685	0.930	1741	0.930	1797	0.930	1853	0.930	1909	0.930	1965	0.930
1574	0.930	1630	0.930	1686	0.930	1742	0.930	1798	0.930	1854	0.930	1910	0.930	1966	0.930
1575	0.930	1631	0.930	1687	0.930	1743	0.930	1799	0.930	1855	0.930	1911	0.930	1967	0.930
1576	0.930	1632	0.930	1688	0.930	1744	0.930	1800	0.930	1856	0.930	1912	0.930	1968	0.930
1577	0.930	1633	0.930	1689	0.930	1745	0.930	1801	0.930	1857	0.930	1913	0.930	1969	0.930
1578	0.930	1634	0.930	1690	0.930	1746	0.930	1802	0.930	1858	0.930	1914	0.930	1970	0.930
1579	0.930	1635	0.930	1691	0.930	1747	0.930	1803	0.930	1859	0.930	1915	0.930	1971	0.930
1580	0.930	1636	0.930	1692	0.930	1748	0.930	1804	0.930	1860	0.930	1916	0.930	1972	0.930
1581	0.930	1637	0.930	1693	0.930	1749	0.930	1805	0.930	1861	0.930	1917	0.930	1973	0.930
1582	0.930	1638	0.930	1694	0.930	1750	0.930	1806	0.930	1862	0.930	1918	0.930	1974	0.930
1583	0.930	1639	0.930	1695	0.930	1751	0.930	1807	0.930	1863	0.930	1919	0.930	1975	0.930
1584	0.930	1640	0.930	1696	0.930	1752	0.930	1808	0.930	1864	0.930	1920	0.930	1976	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1977	0.930	1982	0.930	1987	0.930	1992	0.930	1997	0.930	2002	0.930	2007	0.930	2012	0.930
1978	0.930	1983	0.930	1988	0.930	1993	0.930	1998	0.930	2003	0.930	2008	0.930	2013	0.930
1979	0.930	1984	0.930	1989	0.930	1994	0.930	1999	0.930	2004	0.930	2009	0.930	2014	0.930
1980	0.930	1985	0.930	1990	0.930	1995	0.930	2000	0.930	2005	0.930	2010	0.930	2015	0.930
1981	0.930	1986	0.930	1991	0.930	1996	0.930	2001	0.930	2006	0.930	2011	0.930	2016	0.930

Online Controls for Storm

Orifice Manhole: SWMH9, DS/PN: 3.001, Volume (m³): 0.2

Diameter (m) 0.037 Discharge Coefficient 0.600 Invert Level (m) 5.404

Orifice Manhole: SWMH14, DS/PN: 6.001, Volume (m³): 0.3

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 5.000

Orifice Manhole: SWMH15, DS/PN: 7.001, Volume (m³): 0.3

Diameter (m) 0.055 Discharge Coefficient 0.600 Invert Level (m) 5.300

Orifice Manhole: SWMH20, DS/PN: 9.001, Volume (m³): 0.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 5.760

Orifice Manhole: SWMH22, DS/PN: 11.001, Volume (m³): 0.3

Diameter (m) 0.055 Discharge Coefficient 0.600 Invert Level (m) 5.400

Hydro-Brake® Optimum Manhole: SWMH5, DS/PN: 1.005, Volume (m³): 2.6

Unit Reference	MD-SHE-0047-1300-1750-1300
Design Head (m)	1.750
Design Flow (l/s)	1.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	47
Invert Level (m)	3.673
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.750	1.3	Kick-Flo®	0.419	0.7
Flush-Flo™	0.206	0.8	Mean Flow over Head Range	-	1.0

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	0.8	0.800	0.9	2.000	1.4	4.000	1.9	7.000	2.5
0.200	0.8	1.000	1.0	2.200	1.4	4.500	2.0	7.500	2.5
0.300	0.8	1.200	1.1	2.400	1.5	5.000	2.1	8.000	2.6
0.400	0.7	1.400	1.2	2.600	1.6	5.500	2.2	8.500	2.7
0.500	0.7	1.600	1.2	3.000	1.7	6.000	2.3	9.000	2.8
0.600	0.8	1.800	1.3	3.500	1.8	6.500	2.4	9.500	2.8

Hydro-Brake® Optimum Manhole: SWMH7, DS/PN: 1.008, Volume (m^3): 1.6

Unit Reference	MD-SHE-0068-2000-0950-2000
Design Head (m)	0.950
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	3.025
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.950	2.0	Kick-Flo®	0.596	1.6
Flush-Flo™	0.292	2.0	Mean Flow over Head Range	-	1.8

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	1.7	0.800	1.8	2.000	2.8	4.000	3.9	7.000	5.0
0.200	2.0	1.000	2.0	2.200	2.9	4.500	4.1	7.500	5.2
0.300	2.0	1.200	2.2	2.400	3.1	5.000	4.3	8.000	5.4
0.400	2.0	1.400	2.4	2.600	3.2	5.500	4.5	8.500	5.5
0.500	1.9	1.600	2.5	3.000	3.4	6.000	4.7	9.000	5.7
0.600	1.6	1.800	2.7	3.500	3.6	6.500	4.9	9.500	5.8

Storage Structures for Storm

Porous Car Park Manhole: SWMH9, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.404	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH14, DS/PN: 6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.000	Cap Volume Depth (m)	0.550

Porous Car Park Manhole: SWMH15, DS/PN: 7.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.300	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH20, DS/PN: 9.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.760	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH22, DS/PN: 11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.0
Max Percolation (l/s)	25.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.400	Cap Volume Depth (m)	0.300

Cellular Storage Manhole: TANK 1, DS/PN: 1.004

Invert Level (m)	3.700	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.97
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	1.200	100.0	0.0	1.201	0.0	0.0

Cellular Storage Manhole: TANK 2, DS/PN: 1.007

Invert Level (m) 2.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.97
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	36.0	0.0	0.400	36.0	0.0	0.401	0.0	0.0

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 7 Number of Storage Structures 7 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 1.000
Site Location GB 503397 103865 TQ 03397 03865 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 30
Climate Change (%) 45

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	SWMH1	15 Summer	30	+45%					5.825	-0.075	0.000	0.48
1.001	SWMH2	15 Summer	30	+45%					5.575	-0.072	0.000	0.51
2.000	SWMH8	15 Summer	30	+45%					5.813	-0.087	0.000	0.36
1.002	SWMH3	15 Summer	30	+45%	30/15 Summer				5.545	0.012	0.000	1.16
3.000	PP1	30 Summer	30	+45%					5.486	-0.090	0.000	0.17
3.001	SWMH9	30 Summer	30	+45%					5.486	-0.068	0.000	0.04
4.000	SWMH10	15 Summer	30	+45%					5.202	-0.098	0.000	0.26
4.001	SWMH11	15 Summer	30	+45%					5.150	-0.034	0.000	0.24
5.000	SWMH13	15 Summer	30	+45%					5.201	-0.099	0.000	0.25
4.002	SWMH12	15 Summer	30	+45%	30/15 Summer				5.136	0.074	0.000	0.51
6.000	PP2	30 Summer	30	+45%					5.216	-0.027	0.000	0.52
6.001	SWMH14	30 Summer	30	+45%	30/15 Summer				5.199	0.049	0.000	0.31
7.000	PP3	30 Summer	30	+45%					5.533	-0.011	0.000	0.52
7.001	SWMH15	60 Summer	30	+45%	30/15 Summer				5.523	0.073	0.000	0.17
1.003	SWMH4	15 Summer	30	+45%	30/15 Summer				5.103	0.178	0.000	2.64
8.000	SWMH16	15 Summer	30	+45%					6.036	-0.064	0.000	0.62
8.001	SWMH17	15 Summer	30	+45%					5.861	-0.033	0.000	0.96
9.000	PP4	30 Summer	30	+45%					5.995	0.000	0.000	0.52
9.001	SWMH20	60 Summer	30	+45%	30/15 Summer				5.998	0.088	0.000	0.15
10.000	SWMH21	15 Summer	30	+45%					5.921	-0.079	0.000	0.45
8.002	SWMH18	15 Summer	30	+45%	30/15 Summer				5.701	0.051	0.000	1.21
11.000	PP5	15 Summer	30	+45%					5.590	-0.075	0.000	0.50
11.001	SWMH22	60 Summer	30	+45%					5.536	-0.014	0.000	0.19
8.003	SWMH19	15 Summer	30	+45%	30/15 Summer				5.008	0.089	0.000	1.95

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

PN	US/MH Name	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SWMH1			8.2	OK	
1.001	SWMH2			8.3	OK	
2.000	SWMH8			7.6	OK	
1.002	SWMH3			15.9	SURCHARGED	
3.000	PP1			1.8	OK*	
3.001	SWMH9		17	0.7	OK	
4.000	SWMH10			4.2	OK	
4.001	SWMH11			3.9	OK	
5.000	SWMH13			5.6	OK	
4.002	SWMH12			8.3	SURCHARGED	
6.000	PP2			9.3	FLOOD RISK*	
6.001	SWMH14		13	5.1	SURCHARGED	
7.000	PP3			9.3	OK*	
7.001	SWMH15		25	2.8	SURCHARGED	
1.003	SWMH4			28.6	SURCHARGED	
8.000	SWMH16			10.3	OK	
8.001	SWMH17			10.4	OK	
9.000	PP4			9.2	FLOOD RISK*	
9.001	SWMH20		30	2.4	FLOOD RISK	
10.000	SWMH21			7.6	OK	
8.002	SWMH18			19.4	SURCHARGED	
11.000	PP5			9.0	OK*	
11.001	SWMH22		31	2.1	OK	
8.003	SWMH19			21.1	SURCHARGED	

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.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
12.000	CD	15 Summer	30	+45%					5.150	0.000	0.000
12.001	CD	15 Summer	30	+45%	30/15 Summer				5.066	0.092	0.000
1.004	TANK 1	480 Winter	30	+45%	30/15 Summer				4.803	0.953	0.000
1.005	SWMH5	480 Winter	30	+45%	30/15 Summer				4.803	0.980	0.000
1.006	SWMH6	480 Winter	30	+45%					3.334	-0.119	0.000
13.000	Channel Drain	15 Summer	30	+45%					3.436	-0.064	0.000
13.001	SWMH23	15 Summer	30	+45%					3.405	-0.056	0.000
1.007	TANK 2	480 Summer	30	+45%					3.150	-0.039	0.000
1.008	SWMH7	480 Summer	30	+45%					3.150	-0.025	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
12.000	CD	1.21			13.1	SURCHARGED*	
12.001	CD	1.46			24.8	SURCHARGED*	
1.004	TANK 1	0.11			1.2	SURCHARGED*	
1.005	SWMH5	0.06			1.1	SURCHARGED	
1.006	SWMH6	0.10			1.1	OK	
13.000	Channel Drain	0.62			7.6	OK*	
13.001	SWMH23	0.70			7.6	OK	
1.007	TANK 2	0.17			1.8	OK*	
1.008	SWMH7	0.09			1.8	OK	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - 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
1.000	25.225	0.253	99.7	0.012	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	11.360	0.114	99.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	23.909	0.367	65.1	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	4.830	0.048	100.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	2.198	0.022	99.9	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	8.409	0.129	65.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	11.637	0.116	100.3	0.006	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	12.191	0.122	99.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	12.777	0.238	53.7	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	13.675	0.137	99.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	9.345	0.093	100.5	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	5.473	0.071	77.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	9.368	0.094	99.7	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
7.001	15.262	0.153	99.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.42	5.750	0.012	0.0	0.0	0.0	1.01	17.8	1.6
1.001	50.00	5.61	5.497	0.012	0.0	0.0	0.0	1.01	17.8	1.6
2.000	50.00	5.32	5.750	0.011	0.0	0.0	0.0	1.25	22.1	1.5
1.002	50.00	5.69	5.383	0.023	0.0	0.0	0.0	1.00	17.7	3.1
3.000	50.00	5.04	5.426	0.003	0.0	0.0	0.0	1.01	17.8	0.4
3.001	50.00	5.15	5.404	0.003	0.0	0.0	0.0	1.25	22.0	0.4
4.000	50.00	5.19	5.150	0.006	0.0	0.0	0.0	1.00	17.7	0.8
4.001	50.00	5.40	5.034	0.006	0.0	0.0	0.0	1.01	17.8	0.8
5.000	50.00	5.15	5.150	0.008	0.0	0.0	0.0	1.38	24.3	1.1
4.002	50.00	5.62	4.912	0.014	0.0	0.0	0.0	1.01	17.8	1.9
6.000	50.00	5.16	5.093	0.015	0.0	0.0	0.0	1.00	17.7	2.0
6.001	50.00	5.23	5.000	0.015	0.0	0.0	0.0	1.15	20.3	2.0
7.000	50.00	5.16	5.394	0.015	0.0	0.0	0.0	1.01	17.8	2.0
7.001	50.00	5.41	5.300	0.015	0.0	0.0	0.0	1.01	17.8	2.0

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	2.577	0.025	103.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
8.000	20.640	0.206	100.2	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
8.001	2.613	0.022	118.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
9.000	8.470	0.085	99.6	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
9.001	13.936	0.139	100.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
10.000	22.356	0.224	99.8	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
8.002	11.750	0.118	99.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
11.000	11.490	0.120	95.8	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
11.001	1.573	0.029	54.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
8.003	2.031	0.020	101.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
12.000	1.000	0.010	100.0	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit	🔒
12.001	7.445	0.074	100.6	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
1.004	2.676	0.027	99.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
1.005	11.128	0.137	81.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒
1.006	1.400	0.014	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	5.73	4.775	0.070	0.0	0.0	0.0	0.99	17.5	9.5
8.000	50.00	5.34	5.950	0.015	0.0	0.0	0.0	1.00	17.7	2.0
8.001	50.00	5.39	5.744	0.015	0.0	0.0	0.0	0.92	16.3	2.0
9.000	50.00	5.14	5.845	0.015	0.0	0.0	0.0	1.01	17.8	2.0
9.001	50.00	5.37	5.760	0.015	0.0	0.0	0.0	1.00	17.7	2.0
10.000	50.00	5.37	5.850	0.011	0.0	0.0	0.0	1.01	17.8	1.5
8.002	50.00	5.58	5.500	0.041	0.0	0.0	0.0	1.01	17.8	5.6
11.000	50.00	5.19	5.515	0.013	0.0	0.0	0.0	1.03	18.2	1.8
11.001	50.00	5.21	5.400	0.013	0.0	0.0	0.0	1.37	24.2	1.8
8.003	50.00	5.62	4.770	0.054	0.0	0.0	0.0	1.00	17.6	7.3
12.000	50.00	5.02	5.000	0.019	0.0	0.0	0.0	1.00	17.8	2.6
12.001	50.00	5.14	4.824	0.035	0.0	0.0	0.0	1.00	17.7	4.7
1.004	50.00	5.77	3.700	0.159	0.0	0.0	0.0	1.01	17.8«	21.5
1.005	50.00	5.94	3.673	0.159	0.0	0.0	0.0	1.12	19.7«	21.5
1.006	50.00	5.96	3.303	0.159	0.0	0.0	0.0	1.00	17.8«	21.5

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	3.865	0.039	100.0	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
13.001	2.183	0.022	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	1.449	0.014	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	11.534	0.190	60.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	5.06	3.350	0.011	0.0	0.0	0.0	1.00	17.8	1.5
13.001	50.00	5.10	3.311	0.011	0.0	0.0	0.0	1.00	17.8	1.5
1.007	50.00	5.99	3.039	0.170	0.0	0.0	0.0	1.00	17.8«	23.0
1.008	50.00	6.14	3.025	0.170	0.0	0.0	0.0	1.29	22.9«	23.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SWMH1	6.435	0.685	Open Manhole	450	1.000	5.750	150				
SWMH2	6.411	0.914	Open Manhole	450	1.001	5.497	150	1.000	5.497	150	
SWMH8	6.516	0.766	Open Manhole	450	2.000	5.750	150				
SWMH3	6.376	0.993	Open Manhole	450	1.002	5.383	150	1.001	5.383	150	
								2.000	5.383	150	
PP1	6.050	0.624	Junction		3.000	5.426	150				
SWMH9	6.142	0.738	Open Manhole	450	3.001	5.404	150	3.000	5.404	150	
SWMH10	5.642	0.492	Open Manhole	450	4.000	5.150	150				
SWMH11	5.520	0.486	Open Manhole	450	4.001	5.034	150	4.000	5.034	150	
SWMH13	5.656	0.506	Open Manhole	450	5.000	5.150	150				
SWMH12	5.561	0.649	Open Manhole	450	4.002	4.912	150	4.001	4.912	150	
								5.000	4.912	150	
PP2	5.450	0.357	Junction		6.000	5.093	150				
SWMH14	5.813	0.813	Open Manhole	450	6.001	5.000	150	6.000	5.000	150	
PP3	6.231	0.837	Junction		7.000	5.394	150				
SWMH15	6.231	0.931	Open Manhole	450	7.001	5.300	150	7.000	5.300	150	
SWMH4	6.063	1.288	Open Manhole	1200	1.003	4.775	150	1.002	5.335	150	560
								3.001	5.275	150	500
								4.002	4.775	150	
								6.001	4.929	150	154
								7.001	5.147	150	372
SWMH16	6.506	0.556	Open Manhole	450	8.000	5.950	150				
SWMH17	6.424	0.680	Open Manhole	450	8.001	5.744	150	8.000	5.744	150	
PP4	6.280	0.435	Junction		9.000	5.845	150				
SWMH20	6.280	0.520	Open Manhole	450	9.001	5.760	150	9.000	5.760	150	
SWMH21	6.474	0.624	Open Manhole	450	10.000	5.850	150				
SWMH18	6.376	0.876	Open Manhole	1200	8.002	5.500	150	8.001	5.722	150	222
								9.001	5.621	150	121
								10.000	5.626	150	126
PP5	6.145	0.630	Junction		11.000	5.515	150				
SWMH22	6.145	0.750	Open Manhole	450	11.001	5.400	150	11.000	5.395	150	
SWMH19	6.169	1.399	Open Manhole	1200	8.003	4.770	150	8.002	5.382	150	612
								11.001	5.371	150	601
CD	5.725	0.725	Junction		12.000	5.000	150				
CD	5.425	0.601	Junction		12.001	4.824	150	12.000	4.990	150	166
TANK 1	5.825	2.125	Junction		1.004	3.700	150	1.003	4.750	150	1050
								8.003	4.750	150	1050
								12.001	4.750	150	1050
SWMH5	5.896	2.223	Open Manhole	1200	1.005	3.673	150	1.004	3.673	150	
SWMH6	5.347	2.044	Open Manhole	1200	1.006	3.303	150	1.005	3.536	150	233
Channel Drain	4.105	0.755	Junction		13.000	3.350	150				
SWMH23	4.354	1.043	Open Manhole	1200	13.001	3.311	150	13.000	3.311	150	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
TANK 2	4.530	1.491	Junction		1.007	3.039	150	1.006	3.289	150	250
								13.001	3.289	150	250
SWMH7	4.431	1.406	Open Manhole	1200	1.008	3.025	150	1.007	3.025	150	
	3.700	0.865	Open Manhole	1200		OUTFALL		1.008	2.835	150	

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

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	SWMH1	6.435	5.750	0.535	Open Manhole	450
1.001	o	150	SWMH2	6.411	5.497	0.764	Open Manhole	450
2.000	o	150	SWMH8	6.516	5.750	0.616	Open Manhole	450
1.002	o	150	SWMH3	6.376	5.383	0.843	Open Manhole	450
3.000	o	150	PP1	6.050	5.426	0.474	Junction	
3.001	o	150	SWMH9	6.142	5.404	0.588	Open Manhole	450
4.000	o	150	SWMH10	5.642	5.150	0.342	Open Manhole	450
4.001	o	150	SWMH11	5.520	5.034	0.336	Open Manhole	450
5.000	o	150	SWMH13	5.656	5.150	0.356	Open Manhole	450
4.002	o	150	SWMH12	5.561	4.912	0.499	Open Manhole	450
6.000	o	150	PP2	5.450	5.093	0.207	Junction	
6.001	o	150	SWMH14	5.813	5.000	0.663	Open Manhole	450
7.000	o	150	PP3	6.231	5.394	0.687	Junction	
7.001	o	150	SWMH15	6.231	5.300	0.781	Open Manhole	450
1.003	o	150	SWMH4	6.063	4.775	1.138	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)
1.000	25.225	99.7	SWMH2	6.411	5.497	0.764	Open Manhole	450
1.001	11.360	99.6	SWMH3	6.376	5.383	0.843	Open Manhole	450
2.000	23.909	65.1	SWMH3	6.376	5.383	0.843	Open Manhole	450
1.002	4.830	100.6	SWMH4	6.063	5.335	0.578	Open Manhole	1200
3.000	2.198	99.9	SWMH9	6.142	5.404	0.588	Open Manhole	450
3.001	8.409	65.2	SWMH4	6.063	5.275	0.638	Open Manhole	1200
4.000	11.637	100.3	SWMH11	5.520	5.034	0.336	Open Manhole	450
4.001	12.191	99.9	SWMH12	5.561	4.912	0.499	Open Manhole	450
5.000	12.777	53.7	SWMH12	5.561	4.912	0.499	Open Manhole	450
4.002	13.675	99.8	SWMH4	6.063	4.775	1.138	Open Manhole	1200
6.000	9.345	100.5	SWMH14	5.813	5.000	0.663	Open Manhole	450
6.001	5.473	77.1	SWMH4	6.063	4.929	0.984	Open Manhole	1200
7.000	9.368	99.7	SWMH15	6.231	5.300	0.781	Open Manhole	450
7.001	15.262	99.8	SWMH4	6.063	5.147	0.766	Open Manhole	1200
1.003	2.577	103.1	TANK 1	5.825	4.750	0.925	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
8.000	o	150	SWMH16	6.506	5.950	0.406	Open Manhole	450
8.001	o	150	SWMH17	6.424	5.744	0.530	Open Manhole	450
9.000	o	150	PP4	6.280	5.845	0.285	Junction	
9.001	o	150	SWMH20	6.280	5.760	0.370	Open Manhole	450
10.000	o	150	SWMH21	6.474	5.850	0.474	Open Manhole	450
8.002	o	150	SWMH18	6.376	5.500	0.726	Open Manhole	1200
11.000	o	150	PP5	6.145	5.515	0.480	Junction	
11.001	o	150	SWMH22	6.145	5.400	0.595	Open Manhole	450
8.003	o	150	SWMH19	6.169	4.770	1.249	Open Manhole	1200
12.000	o	150	CD	5.725	5.000	0.575	Junction	
12.001	o	150	CD	5.425	4.824	0.451	Junction	
1.004	o	150	TANK 1	5.825	3.700	1.975	Junction	
1.005	o	150	SWMH5	5.896	3.673	2.073	Open Manhole	1200
1.006	o	150	SWMH6	5.347	3.303	1.894	Open Manhole	1200
13.000	o	150	Channel Drain	4.105	3.350	0.605	Junction	

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)
8.000	20.640	100.2	SWMH17	6.424	5.744	0.530	Open Manhole	450
8.001	2.613	118.8	SWMH18	6.376	5.722	0.504	Open Manhole	1200
9.000	8.470	99.6	SWMH20	6.280	5.760	0.370	Open Manhole	450
9.001	13.936	100.3	SWMH18	6.376	5.621	0.605	Open Manhole	1200
10.000	22.356	99.8	SWMH18	6.376	5.626	0.600	Open Manhole	1200
8.002	11.750	99.6	SWMH19	6.169	5.382	0.637	Open Manhole	1200
11.000	11.490	95.8	SWMH22	6.145	5.395	0.600	Open Manhole	450
11.001	1.573	54.2	SWMH19	6.169	5.371	0.648	Open Manhole	1200
8.003	2.031	101.6	TANK 1	5.825	4.750	0.925	Junction	
12.000	1.000	100.0	CD	5.425	4.990	0.285	Junction	
12.001	7.445	100.6	TANK 1	5.825	4.750	0.925	Junction	
1.004	2.676	99.1	SWMH5	5.896	3.673	2.073	Open Manhole	1200
1.005	11.128	81.2	SWMH6	5.347	3.536	1.661	Open Manhole	1200
1.006	1.400	100.0	TANK 2	4.530	3.289	1.091	Junction	
13.000	3.865	100.0	SWMH23	4.354	3.311	0.893	Open Manhole	1200

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.001	o	150	SWMH23	4.354	3.311	0.893	Open Manhole	1200
1.007	o	150	TANK 2	4.530	3.039	1.341	Junction	
1.008	o	150	SWMH7	4.431	3.025	1.256	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)
13.001	2.183	100.0	TANK 2	4.530	3.289	1.091	Junction	
1.007	1.449	100.0	SWMH7	4.431	3.025	1.256	Open Manhole	1200
1.008	11.534	60.7		3.700	2.835	0.715	Open Manhole	1200

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		3.700	2.835	0.000	1200	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.930	24	0.930	47	0.930	70	0.930	93	0.930	116	0.930	139	0.930	162	0.930
2	0.930	25	0.930	48	0.930	71	0.930	94	0.930	117	0.930	140	0.930	163	0.930
3	0.930	26	0.930	49	0.930	72	0.930	95	0.930	118	0.930	141	0.930	164	0.930
4	0.930	27	0.930	50	0.930	73	0.930	96	0.930	119	0.930	142	0.930	165	0.930
5	0.930	28	0.930	51	0.930	74	0.930	97	0.930	120	0.930	143	0.930	166	0.930
6	0.930	29	0.930	52	0.930	75	0.930	98	0.930	121	0.930	144	0.930	167	0.930
7	0.930	30	0.930	53	0.930	76	0.930	99	0.930	122	0.930	145	0.930	168	0.930
8	0.930	31	0.930	54	0.930	77	0.930	100	0.930	123	0.930	146	0.930	169	0.930
9	0.930	32	0.930	55	0.930	78	0.930	101	0.930	124	0.930	147	0.930	170	0.930
10	0.930	33	0.930	56	0.930	79	0.930	102	0.930	125	0.930	148	0.930	171	0.930
11	0.930	34	0.930	57	0.930	80	0.930	103	0.930	126	0.930	149	0.930	172	0.930
12	0.930	35	0.930	58	0.930	81	0.930	104	0.930	127	0.930	150	0.930	173	0.930
13	0.930	36	0.930	59	0.930	82	0.930	105	0.930	128	0.930	151	0.930	174	0.930
14	0.930	37	0.930	60	0.930	83	0.930	106	0.930	129	0.930	152	0.930	175	0.930
15	0.930	38	0.930	61	0.930	84	0.930	107	0.930	130	0.930	153	0.930	176	0.930
16	0.930	39	0.930	62	0.930	85	0.930	108	0.930	131	0.930	154	0.930	177	0.930
17	0.930	40	0.930	63	0.930	86	0.930	109	0.930	132	0.930	155	0.930	178	0.930
18	0.930	41	0.930	64	0.930	87	0.930	110	0.930	133	0.930	156	0.930	179	0.930
19	0.930	42	0.930	65	0.930	88	0.930	111	0.930	134	0.930	157	0.930	180	0.930
20	0.930	43	0.930	66	0.930	89	0.930	112	0.930	135	0.930	158	0.930	181	0.930
21	0.930	44	0.930	67	0.930	90	0.930	113	0.930	136	0.930	159	0.930	182	0.930
22	0.930	45	0.930	68	0.930	91	0.930	114	0.930	137	0.930	160	0.930	183	0.930
23	0.930	46	0.930	69	0.930	92	0.930	115	0.930	138	0.930	161	0.930	184	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
185	0.930	241	0.930	297	0.930	353	0.930	409	0.930	465	0.930	521	0.930	577	0.930
186	0.930	242	0.930	298	0.930	354	0.930	410	0.930	466	0.930	522	0.930	578	0.930
187	0.930	243	0.930	299	0.930	355	0.930	411	0.930	467	0.930	523	0.930	579	0.930
188	0.930	244	0.930	300	0.930	356	0.930	412	0.930	468	0.930	524	0.930	580	0.930
189	0.930	245	0.930	301	0.930	357	0.930	413	0.930	469	0.930	525	0.930	581	0.930
190	0.930	246	0.930	302	0.930	358	0.930	414	0.930	470	0.930	526	0.930	582	0.930
191	0.930	247	0.930	303	0.930	359	0.930	415	0.930	471	0.930	527	0.930	583	0.930
192	0.930	248	0.930	304	0.930	360	0.930	416	0.930	472	0.930	528	0.930	584	0.930
193	0.930	249	0.930	305	0.930	361	0.930	417	0.930	473	0.930	529	0.930	585	0.930
194	0.930	250	0.930	306	0.930	362	0.930	418	0.930	474	0.930	530	0.930	586	0.930
195	0.930	251	0.930	307	0.930	363	0.930	419	0.930	475	0.930	531	0.930	587	0.930
196	0.930	252	0.930	308	0.930	364	0.930	420	0.930	476	0.930	532	0.930	588	0.930
197	0.930	253	0.930	309	0.930	365	0.930	421	0.930	477	0.930	533	0.930	589	0.930
198	0.930	254	0.930	310	0.930	366	0.930	422	0.930	478	0.930	534	0.930	590	0.930
199	0.930	255	0.930	311	0.930	367	0.930	423	0.930	479	0.930	535	0.930	591	0.930
200	0.930	256	0.930	312	0.930	368	0.930	424	0.930	480	0.930	536	0.930	592	0.930
201	0.930	257	0.930	313	0.930	369	0.930	425	0.930	481	0.930	537	0.930	593	0.930
202	0.930	258	0.930	314	0.930	370	0.930	426	0.930	482	0.930	538	0.930	594	0.930
203	0.930	259	0.930	315	0.930	371	0.930	427	0.930	483	0.930	539	0.930	595	0.930
204	0.930	260	0.930	316	0.930	372	0.930	428	0.930	484	0.930	540	0.930	596	0.930
205	0.930	261	0.930	317	0.930	373	0.930	429	0.930	485	0.930	541	0.930	597	0.930
206	0.930	262	0.930	318	0.930	374	0.930	430	0.930	486	0.930	542	0.930	598	0.930
207	0.930	263	0.930	319	0.930	375	0.930	431	0.930	487	0.930	543	0.930	599	0.930
208	0.930	264	0.930	320	0.930	376	0.930	432	0.930	488	0.930	544	0.930	600	0.930
209	0.930	265	0.930	321	0.930	377	0.930	433	0.930	489	0.930	545	0.930	601	0.930
210	0.930	266	0.930	322	0.930	378	0.930	434	0.930	490	0.930	546	0.930	602	0.930
211	0.930	267	0.930	323	0.930	379	0.930	435	0.930	491	0.930	547	0.930	603	0.930
212	0.930	268	0.930	324	0.930	380	0.930	436	0.930	492	0.930	548	0.930	604	0.930
213	0.930	269	0.930	325	0.930	381	0.930	437	0.930	493	0.930	549	0.930	605	0.930
214	0.930	270	0.930	326	0.930	382	0.930	438	0.930	494	0.930	550	0.930	606	0.930
215	0.930	271	0.930	327	0.930	383	0.930	439	0.930	495	0.930	551	0.930	607	0.930
216	0.930	272	0.930	328	0.930	384	0.930	440	0.930	496	0.930	552	0.930	608	0.930
217	0.930	273	0.930	329	0.930	385	0.930	441	0.930	497	0.930	553	0.930	609	0.930
218	0.930	274	0.930	330	0.930	386	0.930	442	0.930	498	0.930	554	0.930	610	0.930
219	0.930	275	0.930	331	0.930	387	0.930	443	0.930	499	0.930	555	0.930	611	0.930
220	0.930	276	0.930	332	0.930	388	0.930	444	0.930	500	0.930	556	0.930	612	0.930
221	0.930	277	0.930	333	0.930	389	0.930	445	0.930	501	0.930	557	0.930	613	0.930
222	0.930	278	0.930	334	0.930	390	0.930	446	0.930	502	0.930	558	0.930	614	0.930
223	0.930	279	0.930	335	0.930	391	0.930	447	0.930	503	0.930	559	0.930	615	0.930
224	0.930	280	0.930	336	0.930	392	0.930	448	0.930	504	0.930	560	0.930	616	0.930
225	0.930	281	0.930	337	0.930	393	0.930	449	0.930	505	0.930	561	0.930	617	0.930
226	0.930	282	0.930	338	0.930	394	0.930	450	0.930	506	0.930	562	0.930	618	0.930
227	0.930	283	0.930	339	0.930	395	0.930	451	0.930	507	0.930	563	0.930	619	0.930
228	0.930	284	0.930	340	0.930	396	0.930	452	0.930	508	0.930	564	0.930	620	0.930
229	0.930	285	0.930	341	0.930	397	0.930	453	0.930	509	0.930	565	0.930	621	0.930
230	0.930	286	0.930	342	0.930	398	0.930	454	0.930	510	0.930	566	0.930	622	0.930
231	0.930	287	0.930	343	0.930	399	0.930	455	0.930	511	0.930	567	0.930	623	0.930
232	0.930	288	0.930	344	0.930	400	0.930	456	0.930	512	0.930	568	0.930	624	0.930
233	0.930	289	0.930	345	0.930	401	0.930	457	0.930	513	0.930	569	0.930	625	0.930
234	0.930	290	0.930	346	0.930	402	0.930	458	0.930	514	0.930	570	0.930	626	0.930
235	0.930	291	0.930	347	0.930	403	0.930	459	0.930	515	0.930	571	0.930	627	0.930
236	0.930	292	0.930	348	0.930	404	0.930	460	0.930	516	0.930	572	0.930	628	0.930
237	0.930	293	0.930	349	0.930	405	0.930	461	0.930	517	0.930	573	0.930	629	0.930
238	0.930	294	0.930	350	0.930	406	0.930	462	0.930	518	0.930	574	0.930	630	0.930
239	0.930	295	0.930	351	0.930	407	0.930	463	0.930	519	0.930	575	0.930	631	0.930
240	0.930	296	0.930	352	0.930	408	0.930	464	0.930	520	0.930	576	0.930	632	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
633	0.930	689	0.930	745	0.930	801	0.930	857	0.930	913	0.930	969	0.930	1025	0.930
634	0.930	690	0.930	746	0.930	802	0.930	858	0.930	914	0.930	970	0.930	1026	0.930
635	0.930	691	0.930	747	0.930	803	0.930	859	0.930	915	0.930	971	0.930	1027	0.930
636	0.930	692	0.930	748	0.930	804	0.930	860	0.930	916	0.930	972	0.930	1028	0.930
637	0.930	693	0.930	749	0.930	805	0.930	861	0.930	917	0.930	973	0.930	1029	0.930
638	0.930	694	0.930	750	0.930	806	0.930	862	0.930	918	0.930	974	0.930	1030	0.930
639	0.930	695	0.930	751	0.930	807	0.930	863	0.930	919	0.930	975	0.930	1031	0.930
640	0.930	696	0.930	752	0.930	808	0.930	864	0.930	920	0.930	976	0.930	1032	0.930
641	0.930	697	0.930	753	0.930	809	0.930	865	0.930	921	0.930	977	0.930	1033	0.930
642	0.930	698	0.930	754	0.930	810	0.930	866	0.930	922	0.930	978	0.930	1034	0.930
643	0.930	699	0.930	755	0.930	811	0.930	867	0.930	923	0.930	979	0.930	1035	0.930
644	0.930	700	0.930	756	0.930	812	0.930	868	0.930	924	0.930	980	0.930	1036	0.930
645	0.930	701	0.930	757	0.930	813	0.930	869	0.930	925	0.930	981	0.930	1037	0.930
646	0.930	702	0.930	758	0.930	814	0.930	870	0.930	926	0.930	982	0.930	1038	0.930
647	0.930	703	0.930	759	0.930	815	0.930	871	0.930	927	0.930	983	0.930	1039	0.930
648	0.930	704	0.930	760	0.930	816	0.930	872	0.930	928	0.930	984	0.930	1040	0.930
649	0.930	705	0.930	761	0.930	817	0.930	873	0.930	929	0.930	985	0.930	1041	0.930
650	0.930	706	0.930	762	0.930	818	0.930	874	0.930	930	0.930	986	0.930	1042	0.930
651	0.930	707	0.930	763	0.930	819	0.930	875	0.930	931	0.930	987	0.930	1043	0.930
652	0.930	708	0.930	764	0.930	820	0.930	876	0.930	932	0.930	988	0.930	1044	0.930
653	0.930	709	0.930	765	0.930	821	0.930	877	0.930	933	0.930	989	0.930	1045	0.930
654	0.930	710	0.930	766	0.930	822	0.930	878	0.930	934	0.930	990	0.930	1046	0.930
655	0.930	711	0.930	767	0.930	823	0.930	879	0.930	935	0.930	991	0.930	1047	0.930
656	0.930	712	0.930	768	0.930	824	0.930	880	0.930	936	0.930	992	0.930	1048	0.930
657	0.930	713	0.930	769	0.930	825	0.930	881	0.930	937	0.930	993	0.930	1049	0.930
658	0.930	714	0.930	770	0.930	826	0.930	882	0.930	938	0.930	994	0.930	1050	0.930
659	0.930	715	0.930	771	0.930	827	0.930	883	0.930	939	0.930	995	0.930	1051	0.930
660	0.930	716	0.930	772	0.930	828	0.930	884	0.930	940	0.930	996	0.930	1052	0.930
661	0.930	717	0.930	773	0.930	829	0.930	885	0.930	941	0.930	997	0.930	1053	0.930
662	0.930	718	0.930	774	0.930	830	0.930	886	0.930	942	0.930	998	0.930	1054	0.930
663	0.930	719	0.930	775	0.930	831	0.930	887	0.930	943	0.930	999	0.930	1055	0.930
664	0.930	720	0.930	776	0.930	832	0.930	888	0.930	944	0.930	1000	0.930	1056	0.930
665	0.930	721	0.930	777	0.930	833	0.930	889	0.930	945	0.930	1001	0.930	1057	0.930
666	0.930	722	0.930	778	0.930	834	0.930	890	0.930	946	0.930	1002	0.930	1058	0.930
667	0.930	723	0.930	779	0.930	835	0.930	891	0.930	947	0.930	1003	0.930	1059	0.930
668	0.930	724	0.930	780	0.930	836	0.930	892	0.930	948	0.930	1004	0.930	1060	0.930
669	0.930	725	0.930	781	0.930	837	0.930	893	0.930	949	0.930	1005	0.930	1061	0.930
670	0.930	726	0.930	782	0.930	838	0.930	894	0.930	950	0.930	1006	0.930	1062	0.930
671	0.930	727	0.930	783	0.930	839	0.930	895	0.930	951	0.930	1007	0.930	1063	0.930
672	0.930	728	0.930	784	0.930	840	0.930	896	0.930	952	0.930	1008	0.930	1064	0.930
673	0.930	729	0.930	785	0.930	841	0.930	897	0.930	953	0.930	1009	0.930	1065	0.930
674	0.930	730	0.930	786	0.930	842	0.930	898	0.930	954	0.930	1010	0.930	1066	0.930
675	0.930	731	0.930	787	0.930	843	0.930	899	0.930	955	0.930	1011	0.930	1067	0.930
676	0.930	732	0.930	788	0.930	844	0.930	900	0.930	956	0.930	1012	0.930	1068	0.930
677	0.930	733	0.930	789	0.930	845	0.930	901	0.930	957	0.930	1013	0.930	1069	0.930
678	0.930	734	0.930	790	0.930	846	0.930	902	0.930	958	0.930	1014	0.930	1070	0.930
679	0.930	735	0.930	791	0.930	847	0.930	903	0.930	959	0.930	1015	0.930	1071	0.930
680	0.930	736	0.930	792	0.930	848	0.930	904	0.930	960	0.930	1016	0.930	1072	0.930
681	0.930	737	0.930	793	0.930	849	0.930	905	0.930	961	0.930	1017	0.930	1073	0.930
682	0.930	738	0.930	794	0.930	850	0.930	906	0.930	962	0.930	1018	0.930	1074	0.930
683	0.930	739	0.930	795	0.930	851	0.930	907	0.930	963	0.930	1019	0.930	1075	0.930
684	0.930	740	0.930	796	0.930	852	0.930	908	0.930	964	0.930	1020	0.930	1076	0.930
685	0.930	741	0.930	797	0.930	853	0.930	909	0.930	965	0.930	1021	0.930	1077	0.930
686	0.930	742	0.930	798	0.930	854	0.930	910	0.930	966	0.930	1022	0.930	1078	0.930
687	0.930	743	0.930	799	0.930	855	0.930	911	0.930	967	0.930	1023	0.930	1079	0.930
688	0.930	744	0.930	800	0.930	856	0.930	912	0.930	968	0.930	1024	0.930	1080	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1081	0.930	1137	0.930	1193	0.930	1249	0.930	1305	0.930	1361	0.930	1417	0.930	1473	0.930
1082	0.930	1138	0.930	1194	0.930	1250	0.930	1306	0.930	1362	0.930	1418	0.930	1474	0.930
1083	0.930	1139	0.930	1195	0.930	1251	0.930	1307	0.930	1363	0.930	1419	0.930	1475	0.930
1084	0.930	1140	0.930	1196	0.930	1252	0.930	1308	0.930	1364	0.930	1420	0.930	1476	0.930
1085	0.930	1141	0.930	1197	0.930	1253	0.930	1309	0.930	1365	0.930	1421	0.930	1477	0.930
1086	0.930	1142	0.930	1198	0.930	1254	0.930	1310	0.930	1366	0.930	1422	0.930	1478	0.930
1087	0.930	1143	0.930	1199	0.930	1255	0.930	1311	0.930	1367	0.930	1423	0.930	1479	0.930
1088	0.930	1144	0.930	1200	0.930	1256	0.930	1312	0.930	1368	0.930	1424	0.930	1480	0.930
1089	0.930	1145	0.930	1201	0.930	1257	0.930	1313	0.930	1369	0.930	1425	0.930	1481	0.930
1090	0.930	1146	0.930	1202	0.930	1258	0.930	1314	0.930	1370	0.930	1426	0.930	1482	0.930
1091	0.930	1147	0.930	1203	0.930	1259	0.930	1315	0.930	1371	0.930	1427	0.930	1483	0.930
1092	0.930	1148	0.930	1204	0.930	1260	0.930	1316	0.930	1372	0.930	1428	0.930	1484	0.930
1093	0.930	1149	0.930	1205	0.930	1261	0.930	1317	0.930	1373	0.930	1429	0.930	1485	0.930
1094	0.930	1150	0.930	1206	0.930	1262	0.930	1318	0.930	1374	0.930	1430	0.930	1486	0.930
1095	0.930	1151	0.930	1207	0.930	1263	0.930	1319	0.930	1375	0.930	1431	0.930	1487	0.930
1096	0.930	1152	0.930	1208	0.930	1264	0.930	1320	0.930	1376	0.930	1432	0.930	1488	0.930
1097	0.930	1153	0.930	1209	0.930	1265	0.930	1321	0.930	1377	0.930	1433	0.930	1489	0.930
1098	0.930	1154	0.930	1210	0.930	1266	0.930	1322	0.930	1378	0.930	1434	0.930	1490	0.930
1099	0.930	1155	0.930	1211	0.930	1267	0.930	1323	0.930	1379	0.930	1435	0.930	1491	0.930
1100	0.930	1156	0.930	1212	0.930	1268	0.930	1324	0.930	1380	0.930	1436	0.930	1492	0.930
1101	0.930	1157	0.930	1213	0.930	1269	0.930	1325	0.930	1381	0.930	1437	0.930	1493	0.930
1102	0.930	1158	0.930	1214	0.930	1270	0.930	1326	0.930	1382	0.930	1438	0.930	1494	0.930
1103	0.930	1159	0.930	1215	0.930	1271	0.930	1327	0.930	1383	0.930	1439	0.930	1495	0.930
1104	0.930	1160	0.930	1216	0.930	1272	0.930	1328	0.930	1384	0.930	1440	0.930	1496	0.930
1105	0.930	1161	0.930	1217	0.930	1273	0.930	1329	0.930	1385	0.930	1441	0.930	1497	0.930
1106	0.930	1162	0.930	1218	0.930	1274	0.930	1330	0.930	1386	0.930	1442	0.930	1498	0.930
1107	0.930	1163	0.930	1219	0.930	1275	0.930	1331	0.930	1387	0.930	1443	0.930	1499	0.930
1108	0.930	1164	0.930	1220	0.930	1276	0.930	1332	0.930	1388	0.930	1444	0.930	1500	0.930
1109	0.930	1165	0.930	1221	0.930	1277	0.930	1333	0.930	1389	0.930	1445	0.930	1501	0.930
1110	0.930	1166	0.930	1222	0.930	1278	0.930	1334	0.930	1390	0.930	1446	0.930	1502	0.930
1111	0.930	1167	0.930	1223	0.930	1279	0.930	1335	0.930	1391	0.930	1447	0.930	1503	0.930
1112	0.930	1168	0.930	1224	0.930	1280	0.930	1336	0.930	1392	0.930	1448	0.930	1504	0.930
1113	0.930	1169	0.930	1225	0.930	1281	0.930	1337	0.930	1393	0.930	1449	0.930	1505	0.930
1114	0.930	1170	0.930	1226	0.930	1282	0.930	1338	0.930	1394	0.930	1450	0.930	1506	0.930
1115	0.930	1171	0.930	1227	0.930	1283	0.930	1339	0.930	1395	0.930	1451	0.930	1507	0.930
1116	0.930	1172	0.930	1228	0.930	1284	0.930	1340	0.930	1396	0.930	1452	0.930	1508	0.930
1117	0.930	1173	0.930	1229	0.930	1285	0.930	1341	0.930	1397	0.930	1453	0.930	1509	0.930
1118	0.930	1174	0.930	1230	0.930	1286	0.930	1342	0.930	1398	0.930	1454	0.930	1510	0.930
1119	0.930	1175	0.930	1231	0.930	1287	0.930	1343	0.930	1399	0.930	1455	0.930	1511	0.930
1120	0.930	1176	0.930	1232	0.930	1288	0.930	1344	0.930	1400	0.930	1456	0.930	1512	0.930
1121	0.930	1177	0.930	1233	0.930	1289	0.930	1345	0.930	1401	0.930	1457	0.930	1513	0.930
1122	0.930	1178	0.930	1234	0.930	1290	0.930	1346	0.930	1402	0.930	1458	0.930	1514	0.930
1123	0.930	1179	0.930	1235	0.930	1291	0.930	1347	0.930	1403	0.930	1459	0.930	1515	0.930
1124	0.930	1180	0.930	1236	0.930	1292	0.930	1348	0.930	1404	0.930	1460	0.930	1516	0.930
1125	0.930	1181	0.930	1237	0.930	1293	0.930	1349	0.930	1405	0.930	1461	0.930	1517	0.930
1126	0.930	1182	0.930	1238	0.930	1294	0.930	1350	0.930	1406	0.930	1462	0.930	1518	0.930
1127	0.930	1183	0.930	1239	0.930	1295	0.930	1351	0.930	1407	0.930	1463	0.930	1519	0.930
1128	0.930	1184	0.930	1240	0.930	1296	0.930	1352	0.930	1408	0.930	1464	0.930	1520	0.930
1129	0.930	1185	0.930	1241	0.930	1297	0.930	1353	0.930	1409	0.930	1465	0.930	1521	0.930
1130	0.930	1186	0.930	1242	0.930	1298	0.930	1354	0.930	1410	0.930	1466	0.930	1522	0.930
1131	0.930	1187	0.930	1243	0.930	1299	0.930	1355	0.930	1411	0.930	1467	0.930	1523	0.930
1132	0.930	1188	0.930	1244	0.930	1300	0.930	1356	0.930	1412	0.930	1468	0.930	1524	0.930
1133	0.930	1189	0.930	1245	0.930	1301	0.930	1357	0.930	1413	0.930	1469	0.930	1525	0.930
1134	0.930	1190	0.930	1246	0.930	1302	0.930	1358	0.930	1414	0.930	1470	0.930	1526	0.930
1135	0.930	1191	0.930	1247	0.930	1303	0.930	1359	0.930	1415	0.930	1471	0.930	1527	0.930
1136	0.930	1192	0.930	1248	0.930	1304	0.930	1360	0.930	1416	0.930	1472	0.930	1528	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1529	0.930	1585	0.930	1641	0.930	1697	0.930	1753	0.930	1809	0.930	1865	0.930	1921	0.930
1530	0.930	1586	0.930	1642	0.930	1698	0.930	1754	0.930	1810	0.930	1866	0.930	1922	0.930
1531	0.930	1587	0.930	1643	0.930	1699	0.930	1755	0.930	1811	0.930	1867	0.930	1923	0.930
1532	0.930	1588	0.930	1644	0.930	1700	0.930	1756	0.930	1812	0.930	1868	0.930	1924	0.930
1533	0.930	1589	0.930	1645	0.930	1701	0.930	1757	0.930	1813	0.930	1869	0.930	1925	0.930
1534	0.930	1590	0.930	1646	0.930	1702	0.930	1758	0.930	1814	0.930	1870	0.930	1926	0.930
1535	0.930	1591	0.930	1647	0.930	1703	0.930	1759	0.930	1815	0.930	1871	0.930	1927	0.930
1536	0.930	1592	0.930	1648	0.930	1704	0.930	1760	0.930	1816	0.930	1872	0.930	1928	0.930
1537	0.930	1593	0.930	1649	0.930	1705	0.930	1761	0.930	1817	0.930	1873	0.930	1929	0.930
1538	0.930	1594	0.930	1650	0.930	1706	0.930	1762	0.930	1818	0.930	1874	0.930	1930	0.930
1539	0.930	1595	0.930	1651	0.930	1707	0.930	1763	0.930	1819	0.930	1875	0.930	1931	0.930
1540	0.930	1596	0.930	1652	0.930	1708	0.930	1764	0.930	1820	0.930	1876	0.930	1932	0.930
1541	0.930	1597	0.930	1653	0.930	1709	0.930	1765	0.930	1821	0.930	1877	0.930	1933	0.930
1542	0.930	1598	0.930	1654	0.930	1710	0.930	1766	0.930	1822	0.930	1878	0.930	1934	0.930
1543	0.930	1599	0.930	1655	0.930	1711	0.930	1767	0.930	1823	0.930	1879	0.930	1935	0.930
1544	0.930	1600	0.930	1656	0.930	1712	0.930	1768	0.930	1824	0.930	1880	0.930	1936	0.930
1545	0.930	1601	0.930	1657	0.930	1713	0.930	1769	0.930	1825	0.930	1881	0.930	1937	0.930
1546	0.930	1602	0.930	1658	0.930	1714	0.930	1770	0.930	1826	0.930	1882	0.930	1938	0.930
1547	0.930	1603	0.930	1659	0.930	1715	0.930	1771	0.930	1827	0.930	1883	0.930	1939	0.930
1548	0.930	1604	0.930	1660	0.930	1716	0.930	1772	0.930	1828	0.930	1884	0.930	1940	0.930
1549	0.930	1605	0.930	1661	0.930	1717	0.930	1773	0.930	1829	0.930	1885	0.930	1941	0.930
1550	0.930	1606	0.930	1662	0.930	1718	0.930	1774	0.930	1830	0.930	1886	0.930	1942	0.930
1551	0.930	1607	0.930	1663	0.930	1719	0.930	1775	0.930	1831	0.930	1887	0.930	1943	0.930
1552	0.930	1608	0.930	1664	0.930	1720	0.930	1776	0.930	1832	0.930	1888	0.930	1944	0.930
1553	0.930	1609	0.930	1665	0.930	1721	0.930	1777	0.930	1833	0.930	1889	0.930	1945	0.930
1554	0.930	1610	0.930	1666	0.930	1722	0.930	1778	0.930	1834	0.930	1890	0.930	1946	0.930
1555	0.930	1611	0.930	1667	0.930	1723	0.930	1779	0.930	1835	0.930	1891	0.930	1947	0.930
1556	0.930	1612	0.930	1668	0.930	1724	0.930	1780	0.930	1836	0.930	1892	0.930	1948	0.930
1557	0.930	1613	0.930	1669	0.930	1725	0.930	1781	0.930	1837	0.930	1893	0.930	1949	0.930
1558	0.930	1614	0.930	1670	0.930	1726	0.930	1782	0.930	1838	0.930	1894	0.930	1950	0.930
1559	0.930	1615	0.930	1671	0.930	1727	0.930	1783	0.930	1839	0.930	1895	0.930	1951	0.930
1560	0.930	1616	0.930	1672	0.930	1728	0.930	1784	0.930	1840	0.930	1896	0.930	1952	0.930
1561	0.930	1617	0.930	1673	0.930	1729	0.930	1785	0.930	1841	0.930	1897	0.930	1953	0.930
1562	0.930	1618	0.930	1674	0.930	1730	0.930	1786	0.930	1842	0.930	1898	0.930	1954	0.930
1563	0.930	1619	0.930	1675	0.930	1731	0.930	1787	0.930	1843	0.930	1899	0.930	1955	0.930
1564	0.930	1620	0.930	1676	0.930	1732	0.930	1788	0.930	1844	0.930	1900	0.930	1956	0.930
1565	0.930	1621	0.930	1677	0.930	1733	0.930	1789	0.930	1845	0.930	1901	0.930	1957	0.930
1566	0.930	1622	0.930	1678	0.930	1734	0.930	1790	0.930	1846	0.930	1902	0.930	1958	0.930
1567	0.930	1623	0.930	1679	0.930	1735	0.930	1791	0.930	1847	0.930	1903	0.930	1959	0.930
1568	0.930	1624	0.930	1680	0.930	1736	0.930	1792	0.930	1848	0.930	1904	0.930	1960	0.930
1569	0.930	1625	0.930	1681	0.930	1737	0.930	1793	0.930	1849	0.930	1905	0.930	1961	0.930
1570	0.930	1626	0.930	1682	0.930	1738	0.930	1794	0.930	1850	0.930	1906	0.930	1962	0.930
1571	0.930	1627	0.930	1683	0.930	1739	0.930	1795	0.930	1851	0.930	1907	0.930	1963	0.930
1572	0.930	1628	0.930	1684	0.930	1740	0.930	1796	0.930	1852	0.930	1908	0.930	1964	0.930
1573	0.930	1629	0.930	1685	0.930	1741	0.930	1797	0.930	1853	0.930	1909	0.930	1965	0.930
1574	0.930	1630	0.930	1686	0.930	1742	0.930	1798	0.930	1854	0.930	1910	0.930	1966	0.930
1575	0.930	1631	0.930	1687	0.930	1743	0.930	1799	0.930	1855	0.930	1911	0.930	1967	0.930
1576	0.930	1632	0.930	1688	0.930	1744	0.930	1800	0.930	1856	0.930	1912	0.930	1968	0.930
1577	0.930	1633	0.930	1689	0.930	1745	0.930	1801	0.930	1857	0.930	1913	0.930	1969	0.930
1578	0.930	1634	0.930	1690	0.930	1746	0.930	1802	0.930	1858	0.930	1914	0.930	1970	0.930
1579	0.930	1635	0.930	1691	0.930	1747	0.930	1803	0.930	1859	0.930	1915	0.930	1971	0.930
1580	0.930	1636	0.930	1692	0.930	1748	0.930	1804	0.930	1860	0.930	1916	0.930	1972	0.930
1581	0.930	1637	0.930	1693	0.930	1749	0.930	1805	0.930	1861	0.930	1917	0.930	1973	0.930
1582	0.930	1638	0.930	1694	0.930	1750	0.930	1806	0.930	1862	0.930	1918	0.930	1974	0.930
1583	0.930	1639	0.930	1695	0.930	1751	0.930	1807	0.930	1863	0.930	1919	0.930	1975	0.930
1584	0.930	1640	0.930	1696	0.930	1752	0.930	1808	0.930	1864	0.930	1920	0.930	1976	0.930

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1977	0.930	1982	0.930	1987	0.930	1992	0.930	1997	0.930	2002	0.930	2007	0.930	2012	0.930
1978	0.930	1983	0.930	1988	0.930	1993	0.930	1998	0.930	2003	0.930	2008	0.930	2013	0.930
1979	0.930	1984	0.930	1989	0.930	1994	0.930	1999	0.930	2004	0.930	2009	0.930	2014	0.930
1980	0.930	1985	0.930	1990	0.930	1995	0.930	2000	0.930	2005	0.930	2010	0.930	2015	0.930
1981	0.930	1986	0.930	1991	0.930	1996	0.930	2001	0.930	2006	0.930	2011	0.930	2016	0.930

Online Controls for Storm

Orifice Manhole: SWMH9, DS/PN: 3.001, Volume (m³): 0.2

Diameter (m) 0.037 Discharge Coefficient 0.600 Invert Level (m) 5.404

Orifice Manhole: SWMH14, DS/PN: 6.001, Volume (m³): 0.3

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 5.000

Orifice Manhole: SWMH15, DS/PN: 7.001, Volume (m³): 0.3

Diameter (m) 0.055 Discharge Coefficient 0.600 Invert Level (m) 5.300

Orifice Manhole: SWMH20, DS/PN: 9.001, Volume (m³): 0.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 5.760

Orifice Manhole: SWMH22, DS/PN: 11.001, Volume (m³): 0.3

Diameter (m) 0.055 Discharge Coefficient 0.600 Invert Level (m) 5.400

Hydro-Brake® Optimum Manhole: SWMH5, DS/PN: 1.005, Volume (m³): 2.6

Unit Reference	MD-SHE-0047-1300-1750-1300
Design Head (m)	1.750
Design Flow (l/s)	1.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	47
Invert Level (m)	3.673
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.750	1.3	Kick-Flo®	0.419	0.7
Flush-Flo™	0.206	0.8	Mean Flow over Head Range	-	1.0

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	0.8	0.800	0.9	2.000	1.4	4.000	1.9	7.000	2.5
0.200	0.8	1.000	1.0	2.200	1.4	4.500	2.0	7.500	2.5
0.300	0.8	1.200	1.1	2.400	1.5	5.000	2.1	8.000	2.6
0.400	0.7	1.400	1.2	2.600	1.6	5.500	2.2	8.500	2.7
0.500	0.7	1.600	1.2	3.000	1.7	6.000	2.3	9.000	2.8
0.600	0.8	1.800	1.3	3.500	1.8	6.500	2.4	9.500	2.8

Hydro-Brake® Optimum Manhole: SWMH7, DS/PN: 1.008, Volume (m^3): 1.6

Unit Reference	MD-SHE-0068-2000-0950-2000
Design Head (m)	0.950
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	3.025
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**	**Control Points**	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	0.950	2.0	Kick-Flo®	0.596	1.6
Flush-Flo™	0.292	2.0	Mean Flow over Head Range	-	1.8

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	1.7	0.800	1.8	2.000	2.8	4.000	3.9	7.000	5.0
0.200	2.0	1.000	2.0	2.200	2.9	4.500	4.1	7.500	5.2
0.300	2.0	1.200	2.2	2.400	3.1	5.000	4.3	8.000	5.4
0.400	2.0	1.400	2.4	2.600	3.2	5.500	4.5	8.500	5.5
0.500	1.9	1.600	2.5	3.000	3.4	6.000	4.7	9.000	5.7
0.600	1.6	1.800	2.7	3.500	3.6	6.500	4.9	9.500	5.8

Storage Structures for Storm

Porous Car Park Manhole: SWMH9, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.404	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH14, DS/PN: 6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.000	Cap Volume Depth (m)	0.550

Porous Car Park Manhole: SWMH15, DS/PN: 7.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.300	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH20, DS/PN: 9.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.760	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SWMH22, DS/PN: 11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	9.0
Max Percolation (l/s)	25.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.400	Cap Volume Depth (m)	0.300

Cellular Storage Manhole: TANK 1, DS/PN: 1.004

Invert Level (m)	3.700	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.97
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	100.0	0.0	1.200	100.0	0.0	1.201	0.0	0.0

Cellular Storage Manhole: TANK 2, DS/PN: 1.007

Invert Level (m) 2.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.97
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	36.0	0.0	0.400	36.0	0.0	0.401	0.0	0.0

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	7	Number of Storage Structures	7	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 503397 103865 TQ 03397 03865	Cv (Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	45

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	SWMH1	15 Summer	100	+45%					5.836	-0.064	0.000
1.001	SWMH2	15 Summer	100	+45%					5.624	-0.023	0.000
2.000	SWMH8	15 Summer	100	+45%					5.822	-0.078	0.000
1.002	SWMH3	15 Summer	100	+45%	100/15 Summer				5.577	0.044	0.000
3.000	PP1	30 Summer	100	+45%					5.509	-0.067	0.000
3.001	SWMH9	30 Summer	100	+45%					5.509	-0.045	0.000
4.000	SWMH10	480 Winter	100	+45%	100/240 Summer				5.514	0.214	0.000
4.001	SWMH11	480 Winter	100	+45%	100/15 Summer				5.514	0.330	0.000
5.000	SWMH13	480 Winter	100	+45%	100/240 Summer				5.515	0.215	0.000
4.002	SWMH12	480 Winter	100	+45%	100/15 Summer				5.514	0.452	0.000
6.000	PP2	15 Summer	100	+45%					5.243	0.000	0.000
6.001	SWMH14	480 Winter	100	+45%	100/15 Summer				5.517	0.367	0.000
7.000	PP3	15 Summer	100	+45%					5.544	0.000	0.000
7.001	SWMH15	60 Summer	100	+45%	100/15 Summer				5.595	0.145	0.000
1.003	SWMH4	480 Winter	100	+45%	100/15 Summer				5.514	0.589	0.000
8.000	SWMH16	15 Summer	100	+45%					6.051	-0.049	0.000
8.001	SWMH17	15 Summer	100	+45%	100/15 Summer				5.911	0.017	0.000
9.000	PP4	15 Summer	100	+45%					5.995	0.000	0.000
9.001	SWMH20	60 Summer	100	+45%	100/15 Summer				6.162	0.252	0.000
10.000	SWMH21	15 Summer	100	+45%					5.932	-0.068	0.000
8.002	SWMH18	15 Summer	100	+45%	100/15 Summer				5.779	0.129	0.000
11.000	PP5	15 Summer	100	+45%					5.602	-0.063	0.000
11.001	SWMH22	60 Summer	100	+45%	100/30 Summer				5.574	0.024	0.000
8.003	SWMH19	480 Winter	100	+45%	100/15 Summer				5.514	0.594	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SWMH1	0.61			10.3	OK	
1.001	SWMH2	0.64			10.3	OK	
2.000	SWMH8	0.46			9.5	OK	
1.002	SWMH3	1.43			19.6	SURCHARGED	
3.000	PP1	0.21			2.3	OK*	
3.001	SWMH9	0.04		18	0.8	OK	
4.000	SWMH10	0.03			0.6	FLOOD RISK	
4.001	SWMH11	0.03			0.6	FLOOD RISK	
5.000	SWMH13	0.03			0.7	FLOOD RISK	
4.002	SWMH12	0.08			1.3	FLOOD RISK	
6.000	PP2	0.71			12.6	FLOOD RISK*	
6.001	SWMH14	0.08		179	1.4	FLOOD RISK	
7.000	PP3	0.72			12.8	SURCHARGED*	
7.001	SWMH15	0.20		28	3.3	SURCHARGED	
1.003	SWMH4	0.59			6.4	SURCHARGED	
8.000	SWMH16	0.78			13.0	OK	
8.001	SWMH17	1.21			13.1	SURCHARGED	
9.000	PP4	0.71			12.6	FLOOD RISK*	
9.001	SWMH20	0.19		34	3.1	FLOOD RISK	
10.000	SWMH21	0.57			9.5	OK	
8.002	SWMH18	1.46			23.5	SURCHARGED	
11.000	PP5	0.63			11.4	OK*	
11.001	SWMH22	0.22		33	2.4	SURCHARGED	
8.003	SWMH19	0.44			4.8	SURCHARGED	

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.	Water Level (m)	Surcharged Depth (m)
12.000	CD	15 Summer	100	+45%					5.150	0.000
12.001	CD	15 Summer	100	+45%	100/15 Summer				5.140	0.166
1.004	TANK 1	1440 Summer	100	+45%	100/15 Summer				4.901	1.051
1.005	SWMH5	480 Winter	100	+45%	100/15 Summer				5.513	1.690
1.006	SWMH6	480 Summer	100	+45%					3.359	-0.094
13.000	Channel Drain	15 Summer	100	+45%					3.451	-0.049
13.001	SWMH23	15 Summer	100	+45%					3.422	-0.039
1.007	TANK 2	480 Summer	100	+45%	100/360 Summer				3.359	0.170
1.008	SWMH7	480 Summer	100	+45%	100/360 Summer				3.358	0.183

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
12.000	CD	0.000	1.56			16.9	SURCHARGED*	
12.001	CO	0.000	1.84			31.4	FLOOD RISK*	
1.004	TANK 1	0.000	0.13		1447	1.5	SURCHARGED*	
1.005	SWMH5	0.000	0.07			1.3	SURCHARGED	
1.006	SWMH6	0.000	0.12			1.3	OK	
13.000	Channel Drain	0.000	0.78			9.6	OK*	
13.001	SWMH23	0.000	0.88			9.6	OK	
1.007	TANK 2	0.000	0.20			2.2	SURCHARGED*	
1.008	SWMH7	0.000	0.10			2.0	SURCHARGED	

Storage Structure	Volume (m3)	Porosity	Effective Volume (m3)	50% Effective Volume (m3)	50% Effective Volume (litres)	Discharge Rate (l/s)	Half Drain Time (seconds)	Half Drain Time (minutes)	Half Drain Time (hours)
Attenuation Tank 1	120.00	0.95	114.00	57.00	57000.00	1.30	43846.15	730.77	12.18
Attenuation Tank 2	14.40	0.95	13.68	6.84	6840.00	2.00	3420.00	57.00	0.95
Porous Car Park 1	7.50	0.30	2.25	1.13	1125.00	0.80	1406.25	23.44	0.39
Porous Car Park 2	27.50	0.30	8.25	4.13	4125.00	1.40	2946.43	49.11	0.82
Porous Car Park 3	15.00	0.30	4.50	2.25	2250.00	3.30	681.82	11.36	0.19
Porous Car Park 4	15.00	0.30	4.50	2.25	2250.00	3.10	725.81	12.10	0.20
Porous Car Park 5	27.00	0.30	8.10	4.05	4050.00	2.40	1687.50	28.13	0.47

APPENDIX K – Construction management of quantity and quality of water on site

Construction management of quantity and quality of water on site

Water Quality assessment

Site name: Toddington Lane

Contractor name: Hampshire Home Group Ltd

Project code: TBC

Contract address: Toddington Lane, Toddington.

Content amendment record

Issue no	Revision	Name	date	Signature
01	1	TW	09/01/2024	Tom Wallace

Index

1. Introduction –

The requirement for a Construction Water Management Plan is based on the duty to ensure that surface water quality and quantity is managed throughout the construction process to mitigate impacts off site.

2. Site details

Location

Scaffold house, Toddington lane, Littlehampton, BN17 7PN

Insert image below

3. Roles and responsibilities

This section identifies the key roles and responsibilities for the scheme. This is to be completed by the appointed contractor

Role	Contact	Company	Contact details	Responsibilities
Site Manager	TBC	HHG LTD	TBC	Managing the process
Groundworks Foreman	TBC	TBC	TBC	Implementing the process

4. Managing surface water during construction

Tick one option box from the type of surface water you intend to use and supply details as an appendix

Option 1 – Build, use and remediate permanent surface water drainage system ☐

Option 2 – Install, use and remove a temporary surface water drainage system ☐

Option 3 – Utilise existing system with pollution control measure ☐

Please provide details bellow – Details must include

- Construction surface water drainage system design

Attenuated storage tanks discharged into highways owned drainage. Drainage layout to be appended once full construction issue drawings formed and approved by LPA / Build control.

- Construction management maintenance and remediation schedules

Monitor and review water levels in control chambers on a regular basis and record findings. In the event of weather warnings or high levels of rain fall the inspections to become more frequent. Through dry spells chambers to be checked on a weekly basis and recorded. Through spells of heavy rain chambers to be checked on daily basis and recorded. Water quality to be tested on a regular basis and recorded. Testing to identify pH, turbidity, and pollutant concentrations.

- Required consents (eg. Land drainage act, Environment permit etc.)

S106/S104 agreement required for storm connection. Storm water to be attenuated on site prior to be discharged into highways drainage. TBC once construction issue drawings approved by LPA.

- Floor risk controls

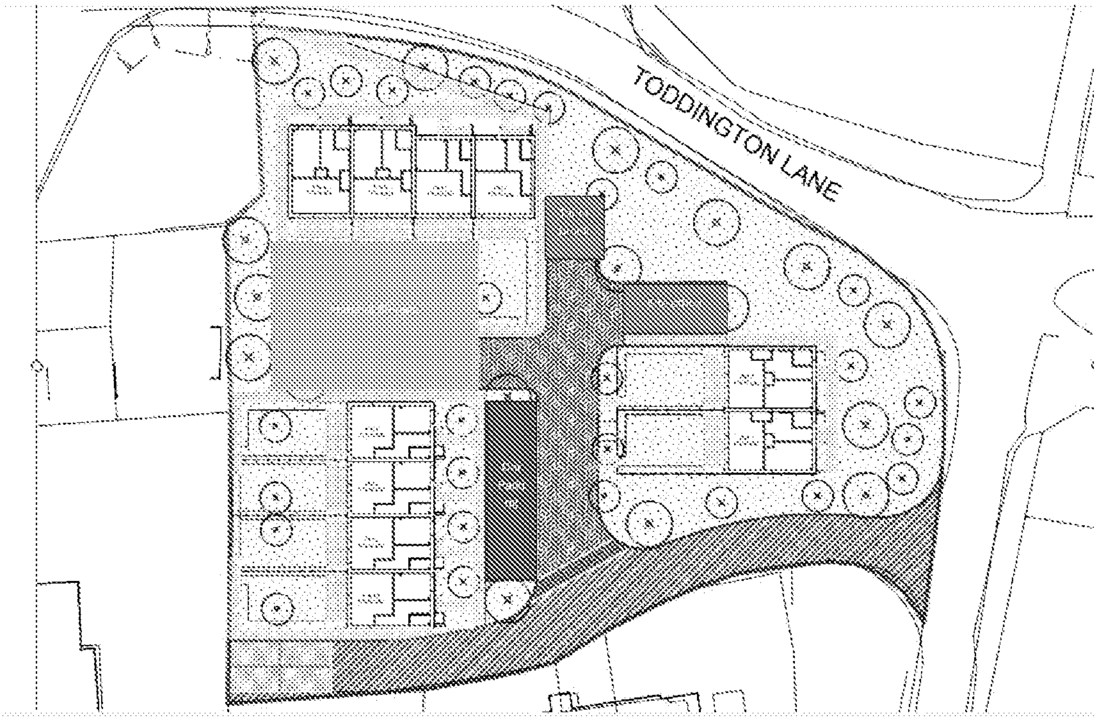
In in the event of the development flooding, water will be over pumped from control chamber into highways outlet. Silt busters will be used to prevent discharging silt into mains storm lines. If the flooding severity affects the whole network and isn't centralised to the development tankers maybe called upon to remove the excess surface water from the control chambers.

- Pollution, water quality and emergency control measures

- Emergency spill kits will be contained on site at all times. - Pumps will be contained on site through the development process. - Silt busters will be contained on site through the development process. - Any road gulleys / outlets will be protected with hay bails to prevent any contaminants entering the storm lines. - Designated wash out areas to be indicated - Materials to be stored away from drainage outlets

- Construction site plan showing compounds, material storage areas, temporary parking etc

Attached below



5. **Flood and weather alert**

6. Project Manager and Works Manager should sign up to the Environmental Agency flood warning system https://www.gov.uk/sign-up-for-flood-warnings if the site is within a flood zone 2 or 3.

Alert level	Definition	Action	Responsibility
Flooding alert	Flooding is possible – be prepared	Ensure equipment is readily available to be deployed in the event of flooding.	Site manager
Flood warnings	Flooding is expected – immediate action required	Ensure equipment is deployed and ready for the forecasted flooding.	Site Manager
Severe flood warning	Severe flooding danger to life	Notify relevant parties / authorities. Evacuate Development	Site Manager

Weather Alerts (Surface Water Flood Risk) Project Manager and Works Manager should sign up to the Met Office weather warning system https://www.metoffice.gov.uk/public/weather/warnings

Alert level	Definition	Action	Responsibility
Yellow: Be Aware	Yellow warnings can be issued for a range of weather situations. Many are issued when it is likely that the weather will cause some low level impacts, including some disruption to travel in a few places. Other yellow warnings are issued when the weather could bring much more severe impacts to many people but the certainty of those impacts occurring is much lower. It is important to read the content of yellow warnings to determine which weather situation is being covered by the yellow warning	Ensure equipment is readily available to be deployed in the event of flooding.	Site Manager

Amber: Be Prepared	There is an increased likelihood of impacts from severe weather, which could potentially disrupt your works plans. This means there is the possibility of travel delays, road and rail closures, power cuts and the potential risk to life and property.	Ensure equipment is deployed and ready for the forecast flooding.	Site Manager
Red: T ake Action	Dangerous weather is expected and, if you haven't already done so, you should take action now to keep yourself and your works force safe from the impact of the severe weather. It is very likely that there will be a risk to life, with substantial disruption to travel, energy supplies and possibly widespread. You should avoid travelling, where possible, and follow the advice of the emergency services and local authorities.	Notify relevant parties / authorities. Evacuate Development	Site Manager

7. Legislation and guidance

The Water Environment (England and Wales) regulation 2009

Land Drainage Act 1991

Methods

Control of Water Pollution from Construction Sites – Guide to Good Practice (SP156)

Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors (C532)

Control of Water Pollution from Linear Construction Projects – Technical Guidance (C648

Control of Water Pollution from Linear Construction Projects – Site Guide (C649)

Environmental Good Practice – Site Guide (C650)

The SUDS Manual (C753)

BS 8582:2013 Code of practice for surface water management for development sites

BS 8582:2013 Code of practice for surface water management for development sites

8. Environmental policy

At Hampshire homes group Limited we are committed to conducting our construction activities in an environmentally responsible manner. We recognize the impact of our operations on the environment and are dedicated to minimizing our ecological footprint, promoting sustainability, and complying with all applicable environmental laws and regulations. This policy outlines our commitment to environmental protection and sets the framework for our construction projects.

Policy Objectives:

Compliance: We will comply with all local, regional, and national environmental laws, regulations, and permits relevant to our construction activities. We will also strive to meet or exceed industry best practices and standards.

Resource Conservation: We will implement measures to conserve natural resources such as water, energy, and raw materials during construction. This includes reducing waste generation, reusing materials whenever possible, and promoting efficient resource management practices.

Pollution Prevention: We will take proactive steps to prevent pollution and minimize the release of harmful substances into the environment. This includes implementing effective erosion and sediment control measures, properly managing hazardous materials, and ensuring proper disposal of construction waste.

Biodiversity Protection: We will identify and protect areas of ecological importance on or near our construction sites. We will take measures to minimize disturbance to sensitive habitats and species, promote biodiversity conservation, and consider the ecological impact of our construction activities.

Green Building Practices: We will promote the use of environmentally friendly and sustainable building practices. This includes integrating energy-efficient design principles, utilizing renewable energy sources, implementing green building certifications where applicable, and incorporating sustainable materials into our construction projects.

Stakeholder Engagement: We will engage with our employees, contractors, suppliers, and other stakeholders to raise awareness and foster a culture of environmental responsibility. We will provide training and resources to ensure that everyone involved in our construction projects understands and complies with our environmental policies.

Continuous Improvement: We will monitor and review our environmental performance regularly. We will set measurable goals and targets to drive continuous improvement in our construction practices and environmental management systems.

Responsibilities:

Top management will provide leadership and allocate necessary resources to implement and support this environmental policy.

All employees, contractors, and suppliers are responsible for adhering to this policy and promoting environmental stewardship in their respective roles.

The Environmental Manager or designated personnel will oversee the implementation, monitoring, and reporting of this policy and provide guidance to ensure compliance.

Communication and Training:

We will communicate this environmental policy to all employees, contractors, and relevant stakeholders, making it readily accessible to them. We will provide appropriate training, resources, and guidance to ensure understanding and compliance with the policy requirements.

Review and Updates:

This environmental policy will be reviewed periodically to ensure its relevance, effectiveness, and alignment with changing environmental standards and regulations. Updates will be made as necessary to reflect new goals, targets, and best practices.

9. Water quality impacts

Pollution Prevention

- Store fuels, oils, and chemicals in secondary containment to prevent leaks or spills.
- Designate washout areas for concrete and equipment to avoid contaminating runoff.
- Implement spill response plans to address potential incidents promptly.

Sediment Control

- Use erosion control blankets, sediment traps, and proper grading to minimize sediment transport.
- Monitor turbidity levels in nearby water bodies to ensure compliance with water quality standards.

Runoff Treatment

- Install filtration systems, such as sand filters or biofilters, to treat runoff before discharge.
- Use buffer strips and vegetative swales to naturally filter pollutants.

Monitoring and Testing

- Regularly test water quality parameters, including pH, turbidity, and pollutant concentrations, to identify issues early.
- Use visual inspections alongside laboratory testing to ensure comprehensive oversight.

Compliance with Regulations

- Adhere to relevant local, state, and federal water quality regulations, such as the Clean Water Act or local permitting requirements.
- Maintain clear documentation and communication with regulatory bodies.

10. Water quantity impacts

Erosion and Sediment Control

- Install silt fences, sediment basins, and check dams to slow water flow and capture sediment.
- Stabilize exposed soils with vegetation, mats, or mulch to reduce runoff velocity.

Stormwater Management

- Design and implement a site-specific Stormwater Pollution Prevention Plan (SWPPP).
- Incorporate temporary drainage channels or retention ponds to control runoff volume.
- Use infiltration systems where feasible to promote groundwater recharge.

Dewatering Operations

- Treat dewatered water to remove sediments before discharge to surface water.
- Time dewatering to minimize interference with local water systems and natural flow regimes.

Scheduling and Phasing

- Limit the size of disturbed areas at any given time to reduce the risk of excessive runoff.
- Schedule activities during dry seasons to minimize stormwater challenges.