



DRAINAGE STATEMENT

LAND EAST OF NORTHFIELDS LANE, WESTERGATE PO20 3UH

Residential Development

2026-C109-DS06

March 2026

Prepared on Behalf of Domusea Northfields Limited

DOCUMENT CONTROL

Project Name: Land East of Northfields Lane, Westergate PO20 3UH
Development Type: Residential Development
Report Type: Drainage Statement
Client Name: Domusea Northfields Limited
Document Reference: 2026-C109-DS06
Prepared by: Dan Lytton

REVISIONS:

Issue	Date	Status	Issued by
01	22/10/2025	Initial Issue for Review	DJL
02	26/10/2025	Issue for Submission	DJL
03	04/12/2025	Revised Issue	DJL
04	09/01/2026	Revised Issue	DJL
05	03/02/2026	Revised Issue	DJL
06	13/03/2026	Re-Design	DJL

DRAWINGS

2025-C109-001 Engineering GA - Below Ground Drainage
2025-C109-002 Engineering GA – Levels Design
2025-C109-003 Construction Details Sht 1 of 2
2025-C109-004 Construction Details Sht 2 of 2
2025-C109-005 Manhole Schedule & Impermeable Areas Schedule
2025-C109-006 Watercourse Long-Sections

APPENDICES

Appendix A Greenfield Runoff Calculation
Appendix B Groundwater Flotation Calculations (Tank)
Appendix C Hydraulic Modelling Calculations
Appendix D Maintenance Schedule
Appendix E Groundwater Monitoring Results
Appendix F ACO SuDS Swale Inlet Detail
Appendix G Sudsstore Controflow Universal Flow Control Detail
Appendix H Arun Byelaws Discharge Consent

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FLOOD AND DRAINAGE STATEMENT

Harbourstone Design Limited is instructed by Domusea Northfields Limited to prepare a Drainage Statement to support a Discharge of Condition Application for a Residential Development at Land East of Northfields Lane, Westergate PO20 3UH. This report is for the benefit of the Client only.

The below sets out information about the drainage design for the benefit of the application.

Existing Site Information	
Location:	Land East of Northfields Lane, Westergate PO20 3UH
Area:	0.39 Ha.
Existing Topography:	Fairly flat, with fall towards boundary watercourses. Site levels vary from 12.05m to 12.69m AOD.
Existing Site Use:	Greenfield
Proposed Development Type:	Single residential dwelling
Existing Site Greenfield Rate:	0.8 l/s

Existing Geology	
Geology:	Superficial Deposits: Head – Clay, silt, sand and gravel Bedrock: London Clay Formation – Clay, silt and sand
Hydrogeology:	Superficial Drift Aquifer: 'Secondary A / Undifferentiated' Bedrock Aquifer: 'Unproductive Strata' - Potential for some/limited shallow infiltration, above bedrock only. Groundwater Vulnerability: Low - Low vulnerability to groundwater from pollutants
Groundwater Depth:	Peak winter groundwater levels at 0.7mbgl, November 2025 to January 2026. ADC Comments - January 2026 comments request impermeable liner. Neighbouring Development (Taylor Wimpey, major development, north and east of site): - peak groundwater levels at 0.70mbgl in 2013 - peak groundwater levels at 0.67mbgl in 2018 re-testing



	Strategic Flood Risk Assessment: - Groundwater affected Northfields Lane in 2014, shallow groundwater levels expected at site
Other Ground Conditions:	Neighbouring Development (Taylor Wimpey, major development, north and east of site): - Clay from 0.10mbgl to full depth, minimal gravel - failed tests, or very slow infiltration across site

Existing Drainage	
Nearest Watercourse:	East, north, and west boundaries. Watercourses flow north to south.
Nearest Surface Water Sewer:	Approx. 200 metres to south of site
Nearest Foul Sewer:	Adjacent site, along Northfields Lane on west boundary of site. Nearest manhole 8801, recorded depth 1.40mbgl.
Existing Site Drainage:	Overland runoff to boundary watercourses
Highway Drainage:	Over-the-edge runoff to adjacent ditches, either side of private highway.
Other Drainage Conditions:	At neighbouring sites, shallow groundwater, Clay strata & failed infiltration tests, or very slow infiltration across site. Full reliance on infiltration not viable.



Surface Water Drainage Solution	
Proposed Catchment (Hardstanding) Area:	534m ² (0.053 Ha)
Proposed Catchment Greenfield Rate (Pro-Rata):	Qbar: 0.15 l/s Q30: 0.37 l/s Q100: 0.53 l/s
5 times Proposed Catchment Greenfield Rate (Pro-Rata):	Qbar: 0.75 l/s Q30: 1.85 l/s Q100: 2.65 l/s
Drainage Hierarchy:	In accordance with findings & previous ADC guidance, proposal is an attenuation system with controlled discharge to boundary watercourses. Permeable pavement and swales will provide interception drainage for all runoff, as well as treatment and attenuation at source. Permeable pavement will utilise impermeable base liner, per latest ADC instruction (January 2026), given shallow groundwater levels. Proposed attenuation tank will also be lined with an impermeable liner. The tank will also be designed with mitigation against groundwater flotation.
Viable SuDS:	Swales, permeable pavement, shallow attenuation storage tank
Surface Water Storage:	45.3m ³ (9.2m ³ swales to design level, 9.5m ³ attenuation tank (95% voids) & 26.6m ³ permeable pavement (30% voids)
Surface Water Discharge:	Restricted discharge at each outfall via Controflow Universal Flow Control Chamber: - Protected orifice - S2: 10mm diameter (0.2 l/s design rate, 0.85m design head) - S10: 16mm diameter (0.5 l/s design rate, 0.8m design head) - Combined calculated flow rates (inc. climate change): 1-year storm: 0.60 l/s 30-year storm: 0.63 l/s 100-year storm: 0.64 l/s Proposed discharge rates less than 0.75 l/s which represents 5 x greenfield rate for catchment area



Design Standards:	1 in 100 year storm, 45% climate change, 10% urban creep
Further Comments:	Proposal to tier landscape northwest boundary to provide increased watercourse network capacity, as well as managed wetland for ecological benefits.
Surface Water Treatment: (Pollution Hazard Indices / Pollution Treatment Indices)	Residential Parking: Low, TSS = 0.5, M = 0.4, H = 0.4 Residential Roofs: Very low, TSS = 0.2, M = 0.2, H = 0.05 Permeable Pavement: TSS = 0.7, M = 0.6, H = 0.7 Swales: TSS = 0.5, M = 0.6, H = 0.6
Mitigation against flood risk:	Proposed development is raised above flood risk including with an allowance for climate change, in accordance with the approved planning application. Proposals in the NW corner of the site provide further mitigation by providing an increase in watercourse capacity. Drainage design has included allowance for surcharged outfalls to the top of bank of the receiving ditches.

Foul Drainage Solution	
Drainage Hierarchy:	Public foul sewer on Northfields Lane (private highway), west boundary of site
Foul Proposals:	Private foul run from proposed residential building to public sewer, by gravity
Discharge:	Discharge to public foul sewer with direct connection to existing public foul manhole.
Further Comments:	Expected peak foul discharge 0.05 l/s (in accordance with Water UK Design & Construction Guidance).



Adherence to ADC Drainage Comments, March 2026	
The design for interception drainage does not appear to meet the criteria within NSfS. The lined permeable pavement is acceptable for self-drained area. The roof areas can be served by swales, or other vegetated areas and should be supported by calculations in the report to confirm the areas are sufficient.	Re-design has proposed permeable pavement to drain pavement area only. All roof areas will drain to swales, which will be constructed 300mm deep, with 1:3 vegetated sides (soft planting/grasses only). ACO SuDS Swale Inlets will connect the drainage to the swales for interception, treatment and conveyance. Unlike traditional in-situ concrete structures, the low-profile inlet blends naturally with its surroundings, enhancing the environment rather than disrupting it. Revised calculations are provided to demonstrate the re-designed system.
The design still does not make an effective case for relaxation of Standard 3 of the NSfS in terms of peak flow restriction to Greenfield Runoff. The greenfield runoff calculation in the DS is for the site area whereas the calculated GFR should be based upon the drained area only. I cannot see calculations for this area (0.058ha) in the report. Where this is too low to achieve on a reasonably practicable basis evidence needs to be provided that measures are in place to achieve the lowest rates approaching greenfield runoff and no more than 5 times GFR rate. It is likely that 5xGFR is lower than that currently proposed as a total discharge from the site and that special consideration of blockage risk reduction upstream of the flow control will be needed and potentially a rate agreed per chamber which is lowest feasible once effective blockage protection is employed.	The re-design has assessed the site hardstanding catchment area to be 0.053 Ha. Greenfield rate for this is 0.15 l/s, which is unachievable for the design, however the system has been re-designed to reduce runoff as low as possible and the proposed discharge rates are less than 0.75 l/s – which is the '5XGFR' (5 times the Greenfield rate for the system catchment area).
It should be noted that we have repeatedly sought to engage on the above points, but in lieu of any response have designed these to best meet ADC's requirements.	

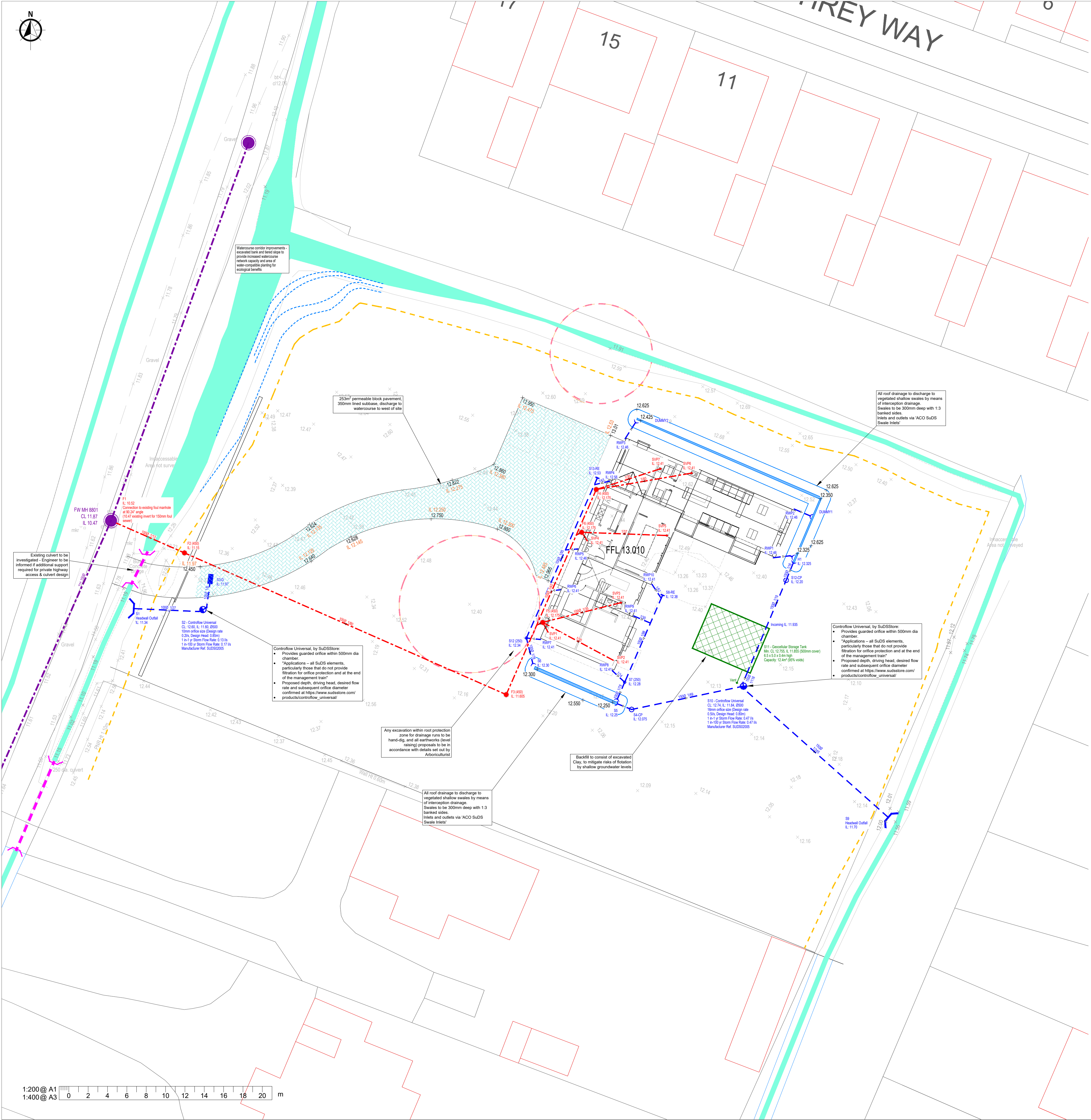


Further Design Notes	
Drainage Plans (inc. areas, full drainage details, specification, details, water quality):	Detailed drainage plan provided, and accompanying construction details and flow control specification. Water quality treatment is covered on the previous page.
Biodiversity & Amenity Benefits:	The proposals for an expanded bank with a softly sloped area, approximately 400mm above the watercourse invert, allows for an area to be landscaped with water compatible planting, developed into an attractive feature that provides ecological benefits – as well as increasing watercourse capacity.
Arboricultural Constraints:	Root protections are shown. No excavation is proposed within the root protection zones, other than at the edge of one area for a shallow 100mm diameter foul run, which is to be hand excavated. Some minor earthworks (fill only) at a 1:3 slope will also encroach the edge of the root protection zone where returning levels to tie-in with existing levels. This is to be unloaded landscaping only, however the Arboricultural consultant will be engaged on final earthworks design, and any mitigation, if required.
Hydraulic Modelling:	Modelling includes allowance for a surcharged outfall to the top of bank of the watercourse at the outfall point. Modelling results are provided for 1yr, 10yr + 35%CC (climate change), 30yr + 35%CC, 100yr + 45%CC & 10%UC (urban creep) Modelling results show no flooding up to the design event.
Riparian Maintenance Responsibilities:	1.5m riparian maintenance buffer shown on drainage plan.
Discharge Consents:	As confirmed by Paul Cann (23/10/25), an 'Arun Drainage Byelaws Consent' still applies even where headwall does not protrude into watercourse profile (and therefore WSCC don't require a OWC for a headwall outfall). Copy of consent attached.



DRAWINGS

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- SURFACE WATER DRAINAGE-**
- Surface water disposal should be managed in view of the SuDS hierarchy, set out by Arun District Council;
 - 1. Re-use / Interception
 - 2. Infiltration
 - 3. Watercourse
 - 4. Public Surface Water Sewer(s)
 - 5. Combined Sewer
- In accordance with Arun District Council's drainage guidance, all runoff from the site will be captured and/or conveyed to interception drainage.
 - Permeable pavement will provide interception drainage for its own surface area only
 - Vegetated swales will convey runoff from roof areas
- Ground investigation, infiltration testing and groundwater monitoring in the vicinity of the site shows that the site is underlain by Clay, and with groundwater levels expected to be at least 0.8mbgl. Infiltration is therefore not considered viable.
 - A 6.5 x 5.0 x 0.4m high geocellular storage tank, with a controlled discharge to the boundary watercourse using a Controflow protected orifice chamber (16mm, max. discharge rate in a 1% AEP storm - 0.47 l/s)
 - In addition, the driveway and the frontage of the proposed dwelling will be captured and attenuated within 253m² of tanked permeable pavement with a 350mm sub-base, and will drain via a diffuser unit to the boundary watercourse via a Controflow protected orifice chamber (10mm, max. discharge rate in a 1% AEP storm - 0.17 l/s).
 - The controlled discharge rates will ensure that runoff is limited to as close as possible to Greenfield runoff rate (Q_{ar}) for the proposed catchment area, and no more than 5 times Q_{ar}. The surface water drainage strategy has been designed to accommodate a 1-in-100-year storm event, inclusive of an allowance for climate change (45%) and urban creep (10%).
 - A Land Drainage Consent has been approved for the watercourse outfalls.

- FOUL WATER STRATEGY-**
- Foul water disposal should adhere to the following hierarchy;
 - 1. Public Sewer
 - 2. Private Treatment Plant
 - 3. Septic Tank and Drainage Field
 - 4. Cesspool
- There is an existing public foul sewer within 5 metres of the site, within the private highway adjacent. As a result, the proposed foul drainage will be discharged to the public sewer, with a soffit-to-soffit connection to an existing manhole.
 - Connection is subject to a S106 Sewer Connection Application to Southern Water.

- DRAINAGE KEY-**
- Existing Surface Water Drain/Culvert
 - Existing Surface Water Headwall
 - Private (Individual) Surface Water Drainage
 - Proposed Diffuser Unit
 - Proposed Permeable Paving (350mm Sub-Base, permeable base liner)
 - Proposed Inspection Chamber (Max 1.2m dp., or 3.0m w/ restricted access)
 - Proposed Surface Water Flow Control Manhole - As detailed or otherwise agreed
 - Proposed Culvert / Headwall Construction Details subject to Consent
 - Rodding Point (Below Ground)
 - Watercourse Maintenance Buffer (1.5m)
 - SW Attenuation Tank Construction Details as Shown, based on Wavin AquaCell Manufacturer Standards
 - Existing Watercourse (Confirmed / Assumed)
 - Proposed Banking (Watercourse)
 - Proposed On-Site Swale
 - Existing Foul Water Drain/Sewer
 - Proposed Foul Water Drainage
 - Inspection Chamber (Shallow) (Max 0.6m Depth) (Svp shall use main channel)
 - Inspection Chamber (Max 1.2m dp., or 3.0m w/ restricted access) (Svp shall use main channel)

- ARBORICULTURAL KEY-**
- Proposed Root Protection Area (Provided by Architect)

DRAINAGE DESIGN NOTES:

ALL INTERNAL FOUL CONNECTIONS (SVPs, DCS ETC.) ARE ASSUMED TO BE 910mm & SET 600mm BELOW DESIGN FFL, WITH MIN 1:40 INTERNAL FALLS TO INSPECTION CHAMBERS.

GROUNDWATER LEVELS INDICATED AS APPROXIMATELY 0.8mbgl. SOIL STRATA INFORMATION CONFIRMED AS CLAY. EXCAVATED CLAY TO BE USED AS BACKFILL FOR ATTENUATION TANK FOR MITIGATION AGAINST GROUNDWATER FLOTATION.

FINAL DESIGN TO BE COORDINATED WITH ARCHITECTS PLANS, STRUCTURAL DESIGN & SERVICES DESIGN.

LEVELS DESIGN NOTES:

THRESHOLD ACCESS POINTS SHOWN AS FLUSH OR WITH 150mm STEP. PER ARCHITECTS PLANS, WITH BUILDING REGULATIONS M4(1) COMPLIANT ACCESS SLOPES.

ANY EARTHWORKS WITH A SLOPE EXCEEDING 1:6 ARE TO BE REVIEWED BY A STRUCTURAL ENGINEER, WITH APPROPRIATE GUIDANCE ON IMPLICATIONS & LAND DRAINAGE PROVIDED TO CIVIL ENGINEER.

GENERAL

- The main contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
- The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
- The contractor must comply with all current legislation relating to health & safety.
- All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any Harbournstone Design drawings, the manufacturers instructions must be used.
- All concrete and cement mortar to be in accordance with BS8500, BS206 and BS2098.
- The contractor is responsible for managing surface water run off during construction.

DRAINAGE NOTES:

- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK & BS2098).
- Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with Harbournstone Design.
- For location and setting out of building drainage points refer to architects drawings.
- All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
- Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
- Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
- Where a pipe, under a vehicular area other than a carriageway has a depth of cover of less than 0.9m the pipe shall be protected with a concrete slab set above it.
- In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. compressible boards (fireboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). The boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section, a board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
- All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of (1 in 40) i.e. = 1 in 80 for foul drains and 1 in 60 for surface water drains.
- All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
- All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BS2098 and BS2098, with flexible joints and kitemark certified.
- All pipes, bends and junction materials for adoptable drainage shall be vitrified clay, extra strength or super strength to BS2095, with flexible joints and kitemark certified.
- All back inlet gullies to be roddable or connected to inspection chambers.
- All gully connections other than at manholes to be 'Y' junctions.
- All road gully connections to be 150mm diameter.
- All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
- No low point shall be without a method of drainage.
- All connections to be soffit to soffit unless otherwise noted.
- All concrete and concrete products to be in accordance with BRE 363 for sulphates.
- The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
- Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
- The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
- Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
- Should groundwater be encountered on site during construction Harbournstone Design shall be informed to determine if additional measures are required. This includes design against flotation.
- The drainage system shall be fully cleansed on completion of the project using methods that ensure pollution off site does not occur.
- Any existing land drains severed during construction shall be reinstated.

- A1**
- This drawing is to be read in conjunction with any other information, drawings and specification issued by Principle Designer, Architect and the Harbournstone Design package for this project. Any discrepancies found are to be reported immediately to the Engineer.
 - Harbournstone Design accepts no responsibility for inaccuracies in data provided by third parties such as topographic surveys or Ordnance Survey mapping.
 - Do not scale, work to figured dimensions only. All dimensions are in millimetres unless noted otherwise and all levels are in metres from the topographic survey datum.
 - Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain. The main contractor is responsible for checking all information on site prior to work commencing and taking due care whilst undertaking the works.
 - All dimensions to be checked on site. All details and dimensions relating to sub-contractors work must be checked and agreed between the sub-contractor or supplier and the general contractor.
 - The electronic information from this drawing can not be guaranteed as dimensionally drawn exact. Figured dimensions must be used for setting out and detailing. Harbournstone Design logos and company information must be removed from copies if information is re-used.
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- RESIDUAL HAZARDS**
- In addition to the hazards/risks normally associated with the type of work detailed on this drawing, note the following:
- Buried services. Contractor to refer to locate existing services and undertake necessary precautions and investigation prior to excavating.
 - Excavations close to existing root protection zones. Arboriculturalist to be engaged with regard to civils proposals and appropriate mitigation measures. Contractor to prepare method statement to ensure protection of existing tree roots, in accordance with root protection proposals.
 - Connection to public drainage system. Contractor to ensure drains are shut off during works and ensure operatives are familiar and competent with procedure.
 - Excavations close to existing structures. Contractor to prepare method statement to ensure stability of existing structure.
 - Working in vicinity of Waterbodies with variable surface water flows & debris. Contractor to provide method statement and ensure operatives have appropriate safeguarding equipment.
- It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement.

E	Re-Design	13/3/26
D	Revised Issue	3/2/26
C	Revised Issue	9/1/26
B	Revised Issue	4/12/25
A	Revised Issue	4/12/25
-	Original Issue	-
Rev.	Amendments	Date

HARBOURSTONE DESIGN

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Drawing Status	FOR SUBMISSION
Client	Domusea Northfields Limited
Project	Land East of Northfields Lane, Westergate PO20 3UH
Drawing Title	Engineering GA - Below Ground Drainage
Scale	1:200
Date	Mar '26
Drawn By	DJL
Checked By	CT
Drawing No.	2025-C109-001
Rev.	E



-LEVELS KEY-	
Ex 134.11	Existing Spot Level
+134.11	Proposed Spot Level
###	Proposed Finished Floor Level
---	Level/Stepped Threshold/Access
---	Proposed Contour (Primary)
---	Proposed Contour (Secondary)
---	Ex. / Pr. Landscape Contour (Primary)
---	Ex. / Pr. Landscape Contour (Secondary)
1:40	Landscape Gradient Arrow/Fall Direction
1:40	Proposed Gradient Arrow/Fall Direction
---	Proposed Bank Batter, and tie-in line (to existing levels)
20	Raised DPC & number of courses
---	Existing Watercourse

Refer to structural drawings for further information on structural slab levels.

Topographical information shown is based on site survey undertaken by others as part of site-wide development.

Contours are only as accurate as initial land survey information. Contours are approximate, and spot levels may vary slightly on site.

THRESHOLD PLATFORM SUMMARY:	
L	= Level Threshold
R	= Ramped (Part M)
S	= Stepped Approach

-ARBORICULTURAL KEY-	
---	Proposed Root Protection Area (Provided by Architect)

LEVELS DESIGN NOTE:
ALL FLUSH THRESHOLD ACCESS POINTS WITH 1:60 FALL FROM BUILDING. FOR MINIMUM 900mm FROM FRONT / MAIN ACCESS & FOR PATIO DISTANCE SHOWN TO SPOT LEVEL.

GENERAL

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- The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
- The contractor must comply with all current legislation relating to health & safety.
- All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any Harbournstone Design drawings, the manufacturers instructions must be used.
- All concrete and cement mortar to be in accordance with BS8500, BSEN206 and BSEN998.
- The contractor is responsible for managing surface water run off during construction.

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- Connection of existing private drainage. Contractor to ensure drains are shut off during works and ensure operatives are familiar and competent with procedure.
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It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement.



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Drawing Status **FOR SUBMISSION**

Client **Domusea Northfields Limited**

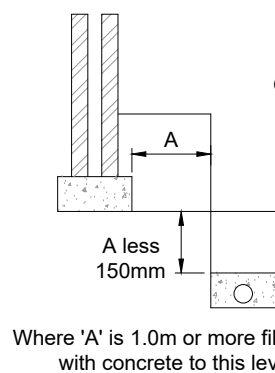
Project **Land East of Northfields Lane, Westergate PO20 3UH**

Drawing Title **Engineering GA - Levels Design**

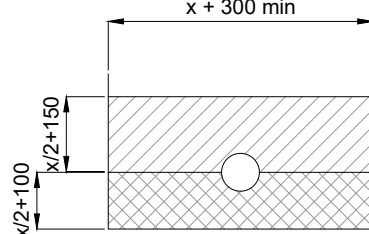
Scale	Date	Drawn By	Checked By
1:200	Mar '26	DJL	CT
Drawing No.	2025-C109-002		Rev.
			B

Minimum Dimensions for Access Fittings and Inspection Chambers						
Type	Min Internal Sizes				Cover Sizes	
	Depth to invert (m)	Size of largest pipe (DN)	Length x Width (mm)	Circular (mm)	Length x Width (mm)	Circular (mm)
Rodding Eye	As Drain but Minimum 100mm ^a					
Access Fitting	0.6 or less except where situated in a chamber		150x100	150	150x100 ^a	Same size as access fitting
Small			225x100	225	225x100 ^a	
Large						
Inspection Chamber	0.6 or less 1.2 or less		450x450	190 ^b	190 ^b	190 ^b 430 ^b
Shallow				450	450x450	
Deep				1.2 - 3.0	450	
					to Max 350	Access restricted ^c to Max 350

- Notes:
- the clear opening may be reduced by 20mm in order to provide proper support for the cover and frame
 - Drains up to 150mm
 - A larger clear opening cover may be used in conjunction with a restricted access. the size is restricted for health a safety reasons to deter entry,



Where 'A' is 1.0m or more fill trench with concrete to this level.



Generally suitable in all soil conditions granular fill to half depth of pipe

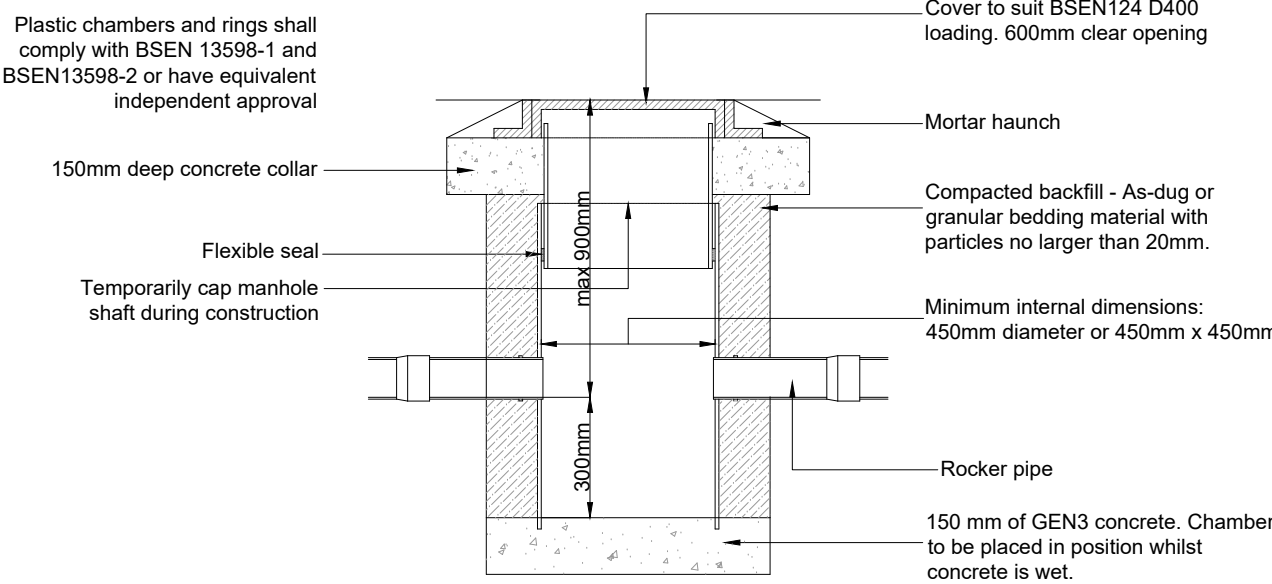
LEGEND:

- Selected fill: free from stones larger than 40mm, lumps of clay over 100mm, timber frozen material and vegetable matter.
- Granular material: should conform to BS 882:1983 table 4 or BS8301:1985 Appendix D. Compaction fraction > 0.3 for class N > 0.2 for class F and B.

'X' - Denotes external pipe diameter.

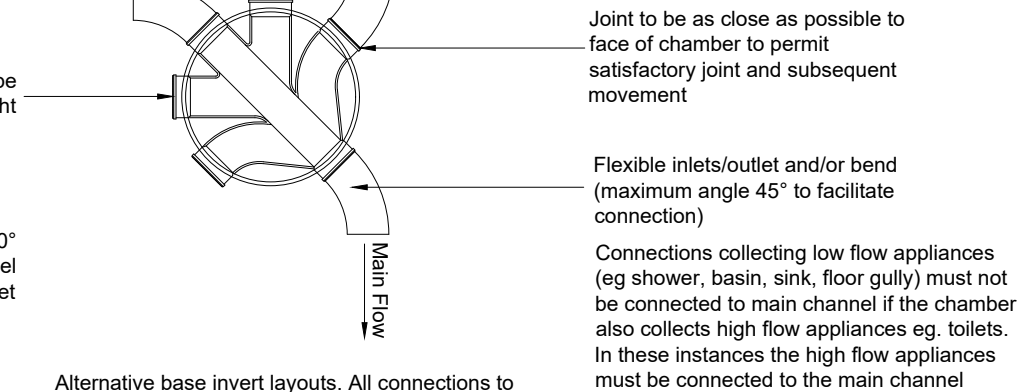
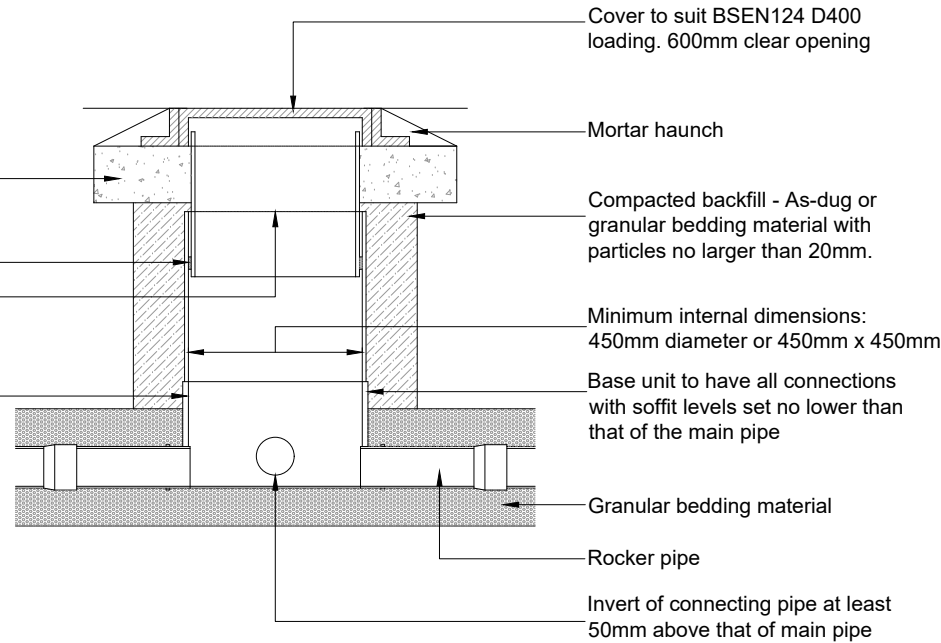
PIPE BEDDING DETAIL UNDER DRIVES AND GARDENS

Min depth of cover 0.35m under private gardens and 0.5m under private drives



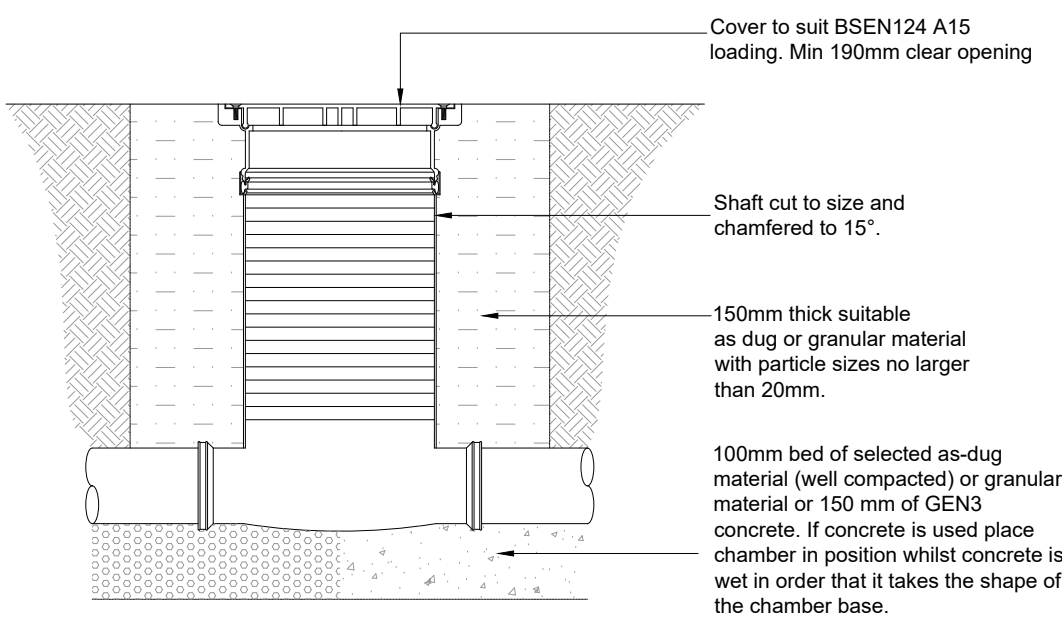
TYPICAL CATCHPIT DETAIL (450Ø) (FOOTPATHS AND PRIVATE DRIVES)

1.2m MAXIMUM DEPTH TO FROM COVER TO PIPE INVERT (OR ACCESS RESTRICTED TO MAX 300 X 300 / 350Ø). LOCATED IN AREAS SUBJECT TO LIGHT VEHICLES AND FOOTPATHS



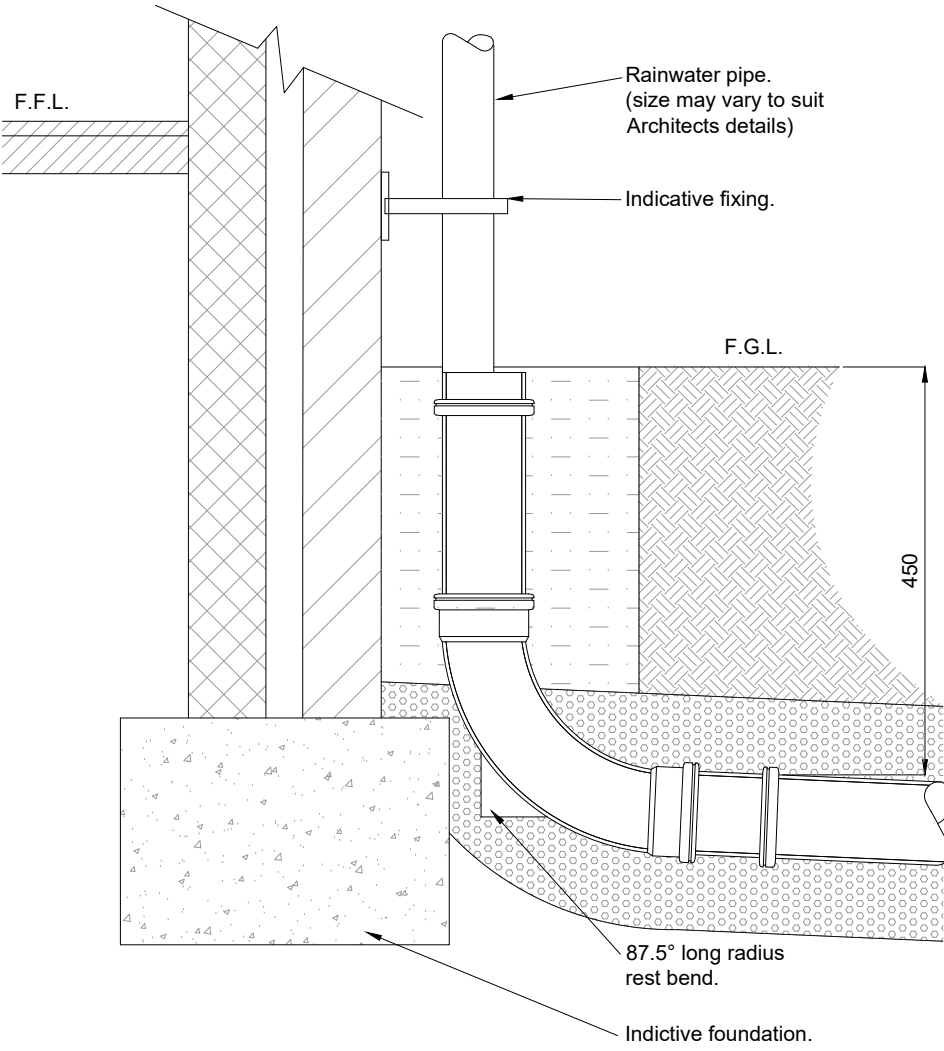
TYPICAL ACCESS CHAMBER DETAIL - 450Ø (FOOTPATHS AND PRIVATE DRIVES)

1.2m MAXIMUM DEPTH TO FROM COVER TO PIPE INVERT (OR ACCESS RESTRICTED TO MAX 300 X 300 / 350Ø). LOCATED IN AREAS SUBJECT TO LIGHT VEHICLES AND FOOTPATHS



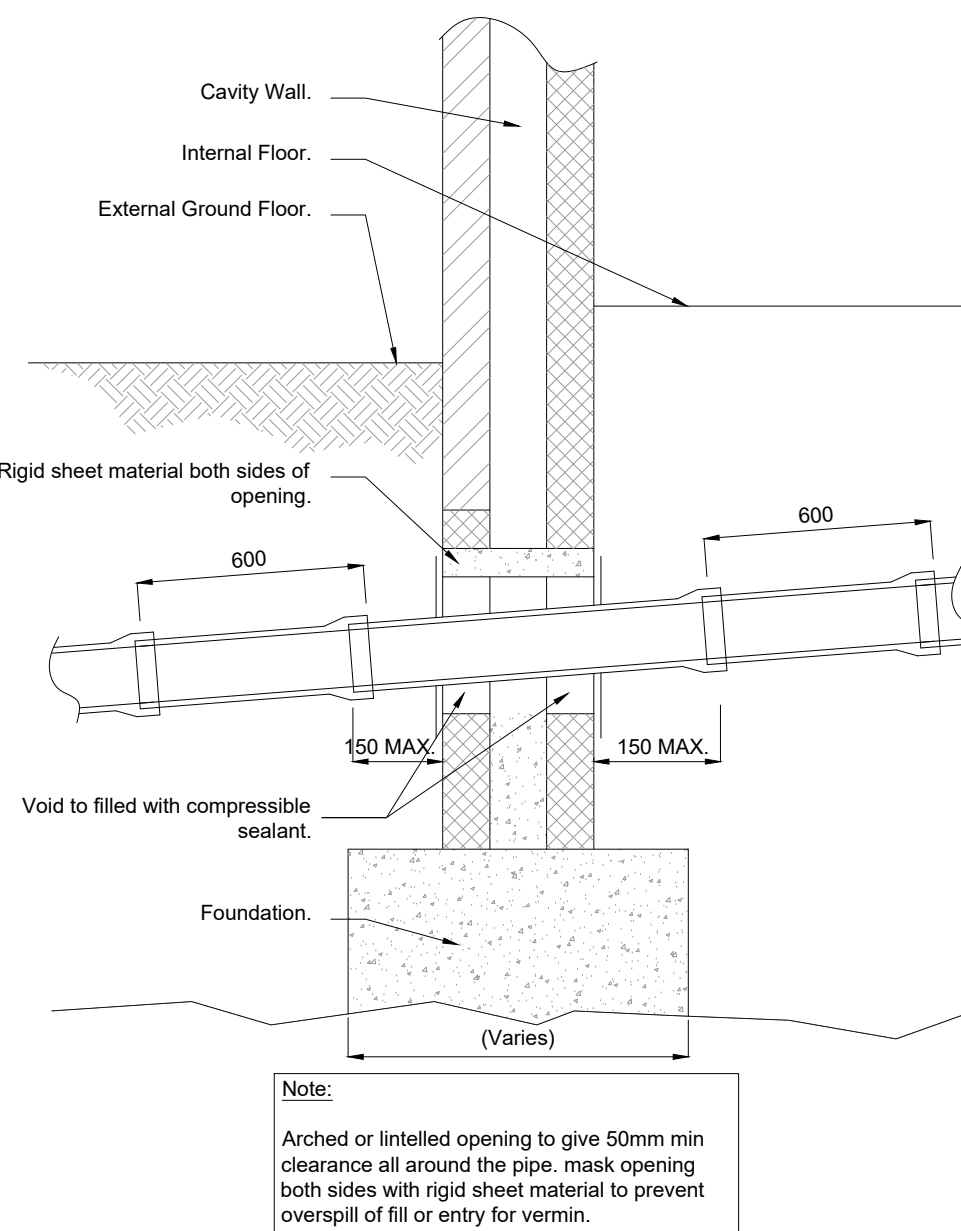
TYPICAL SHALLOW ACCESS CHAMBER DETAIL - 250Ø

0.6m MAXIMUM DEPTH TO FROM COVER TO PIPE INVERT.



DETAIL OF RAINWATER PIPE

(Scale 1:20)



TYPICAL SECTION PIPE PASSING THROUGH WALL PIPE THROUGH LITTELLED OPENING

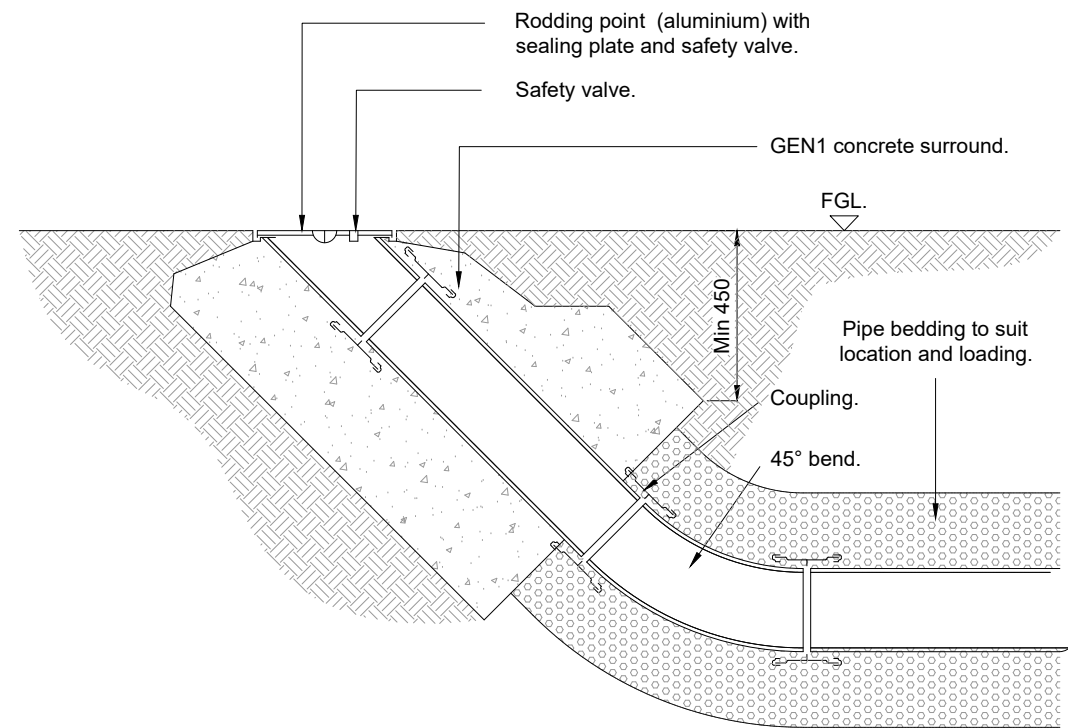
(Scale 1:20)

GENERAL

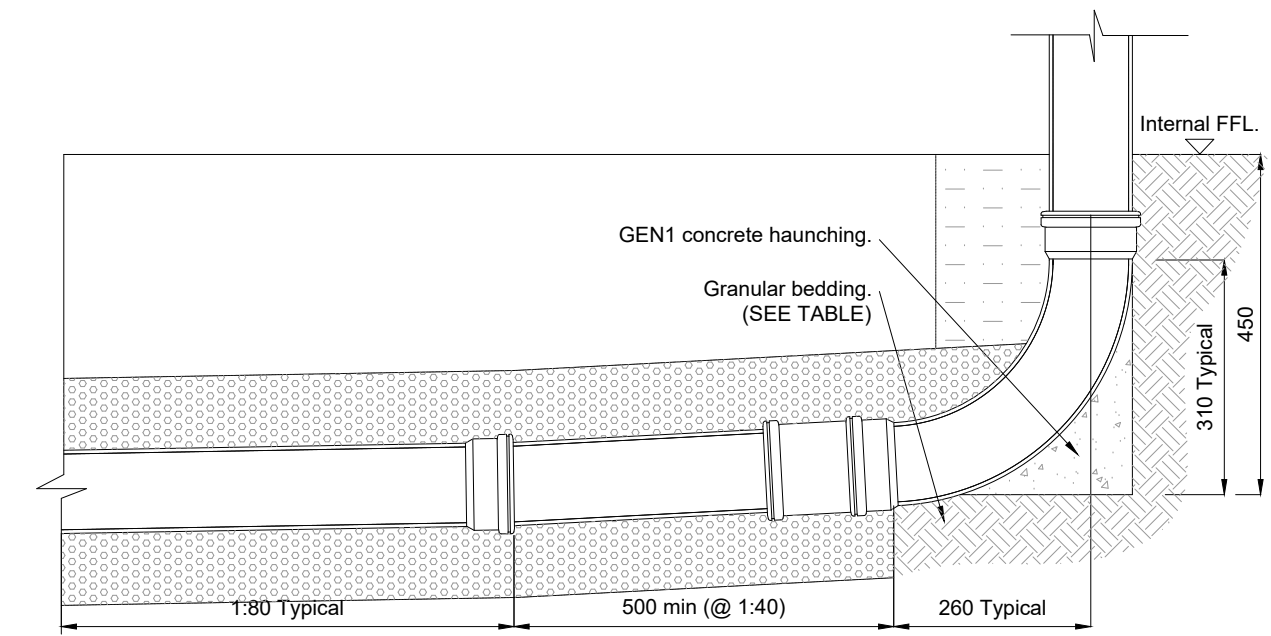
- The main contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
- The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
- The contractor must comply with all current legislation relating to health & safety.
- All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any Harbournstone Design drawings, the manufacturers instructions must be used.
- All concrete and cement mortar to be in accordance with BS8500, BSEN206 and BSEN998.
- The contractor is responsible for managing surface water run off during construction.

DRAINAGE NOTES:

- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK & BSEN 752).
- Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with Harbournstone Design.
- For location and setting out of building drainage points refer to architects drawings.
- All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
- Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
- Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
- Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
- In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. compressible boards (fibreboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section, a board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
- All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drains beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of 1:116 = 1 in 40'-116 = 1 in 80) for foul drains and 1 in 80 for surface water drains.
- All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
- All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
- All pipes, bends and junction materials for adoptable drainage shall be vitrified clay, extra strength or super strength to BSEN295, with flexible joints and kitemark certified.
- All back inlet gullies to be roddable or connected to inspection chambers.
- All gully connections other than at manholes to be 'Y' junctions.
- All road gully connections to be 150mm diameter.
- All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
- No low point shall be without a method of drainage.
- All connections to be soffit to soffit unless otherwise noted.
- All concrete and concrete products to be in accordance with BRE 363 for sulphates.
- The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
- Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
- The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
- Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
- Should groundwater be encountered on site during construction Harbournstone Design shall be informed to determine if additional measures are required. **This includes design against flotation.**
- The drainage system shall be fully cleansed on completion of the project using methods that ensure pollution off site does not occur.
- Any existing land drains severed during construction shall be reinstated.



DETAIL OF RODDING EYE



DETAIL OF FOUL REST BEND

(Scale 1:20)

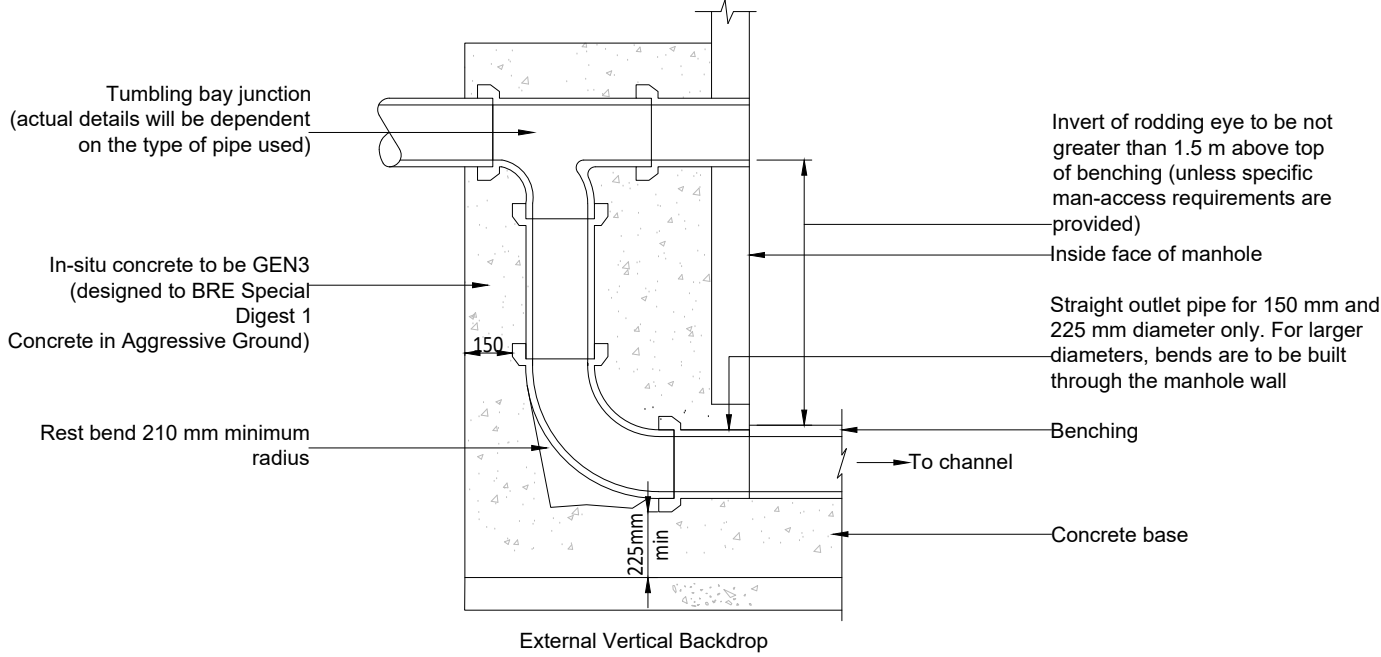
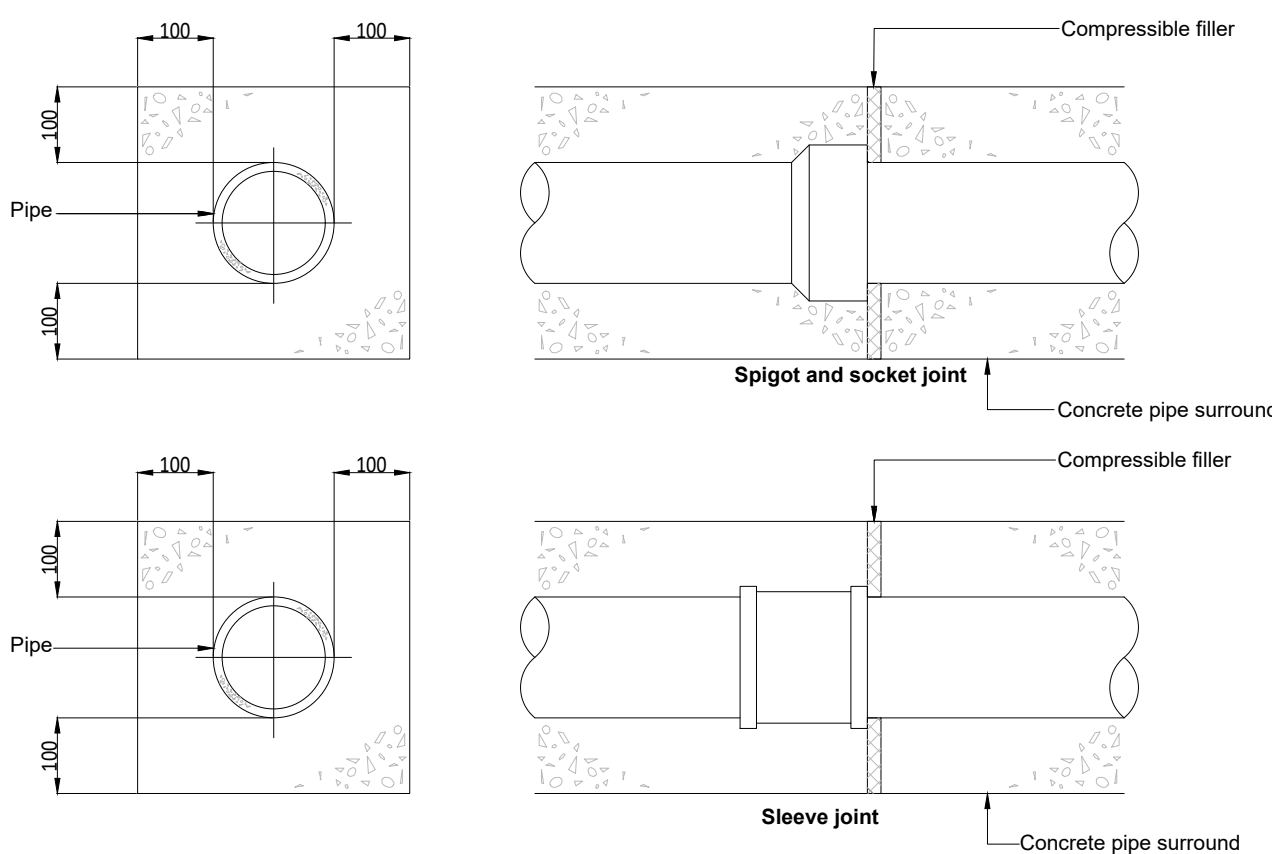
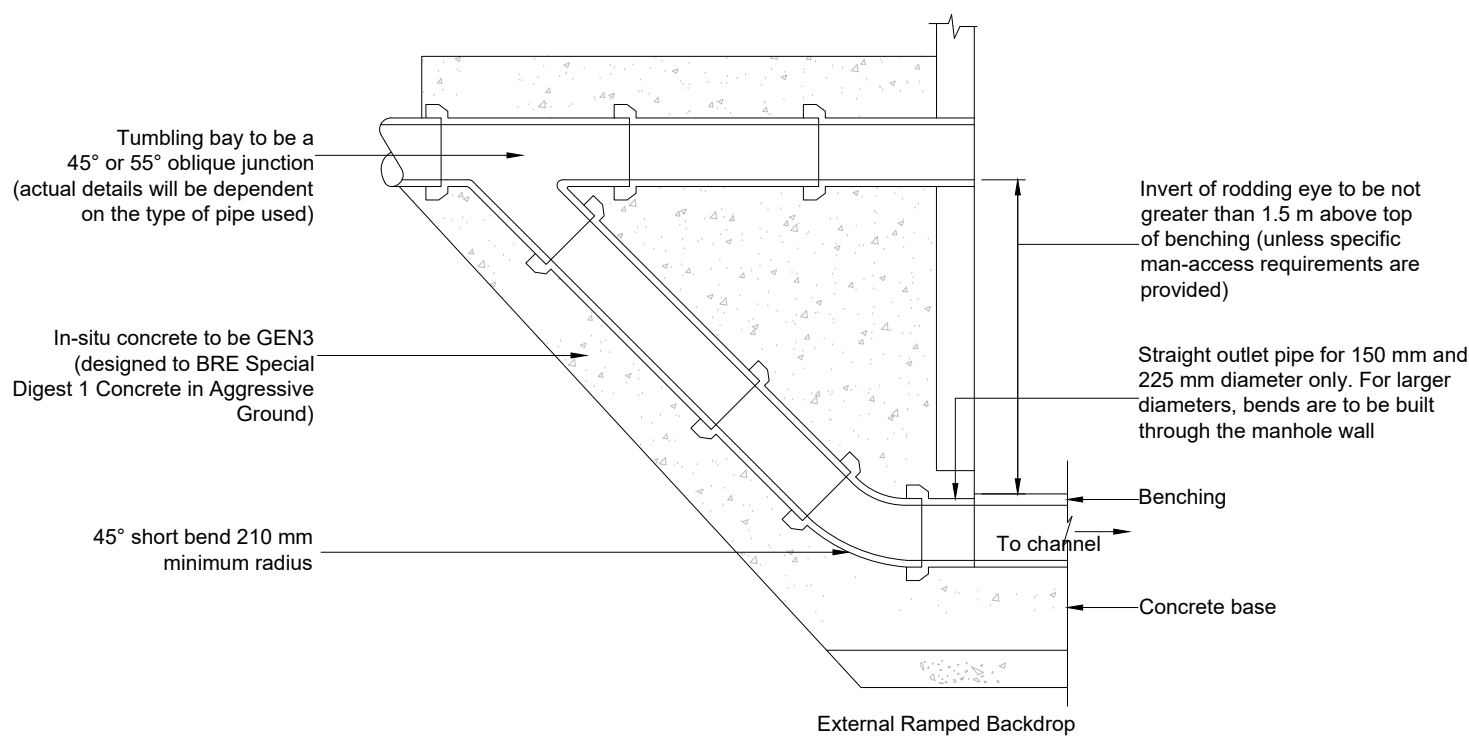
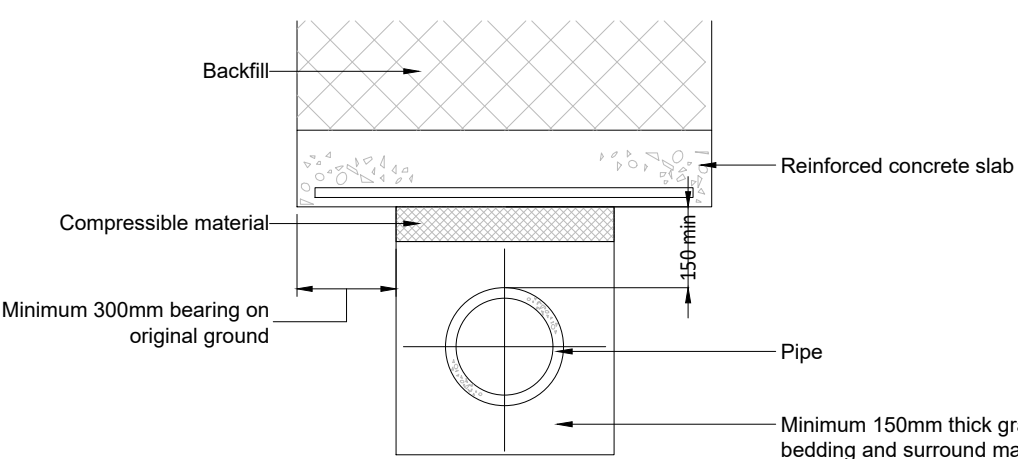


FIGURE B16 TYPICAL VERTICAL AND RAMPED BACKDROP DETAIL (RIGID MATERIALS)



JOINTS FOR ENCASED PIPES



PROTECTION OF PIPES AT SHALLOW DEPTH

- A1**
- This drawing is to be read in conjunction with any other information, drawings and specification issued by Principle Designer, Architect and the Harbournstone Design package for this project. Any discrepancies found are to be reported immediately to the Engineer.
 - Harbournstone Design accepts no responsibility for inaccuracies in data provided by third parties such as topographic surveys or Ordnance Survey mapping.
 - Do not scale, work to figured dimensions only. All dimensions are in millimetres unless noted otherwise and all levels are in metres from the topographic survey datum.
 - Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain. The main contractor is responsible for checking all information on site prior to work commencing and taking due care whilst undertaking the works.
 - All dimensions to be checked on site. All details and dimensions relating to sub-contractors work must be checked and agreed between the sub-contractor or supplier and the general contractor.
 - The electronic information from this drawing can not be guaranteed as dimensionally drawn exact. Figured dimensions must be used for setting out and detailing. Harbournstone Design logos and company information must be removed from copies if information is re-used.
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RESIDUAL HAZARDS

In addition to the hazards/risks normally associated with the type of work detailed on this drawing, note the following:

- Buried services. Contractor to refer to locate existing services and undertake necessary precautions and investigation prior to excavating.
- Excavations close to existing root protection zones. Arboriculturalist to be engaged with regard to civils proposals and appropriate mitigation measures. Contractor to prepare method statement to ensure protection of existing tree roots, in accordance with root protection proposals.
- Connection of existing private drainage. Contractor to ensure drains are shut off during works and ensure operatives are familiar and competent with procedure.
- Excavations close to existing structures. Contractor to prepare method statement to ensure stability of existing structure.
- Working in vicinity of Waterbodies with variable surface water flows & debris. Contractor to provide method statement and ensure operatives have appropriate safeguarding equipment.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement

A	Re-Design	13/3/26
-	Original Issue	-
Rev.	Amendments	Date



Harbournstone Design Limited
Civil Engineering Consultants - harbournstonedesign.co.uk
Registered in England No: 16608131

Drawing Status: **FOR SUBMISSION**

Client: **Domusea Northfields Limited**

Project: **Land East of Northfields Lane, Westergate PO20 3UH**

Drawing Title: **Construction Details**
Sht 1 of 2

Scale	Date	Drawn By	Checked By
As Shown	Mar '26	DJL	CT
Drawing No.	2025-C109-003	Rev.	A

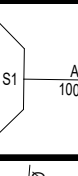
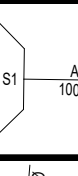
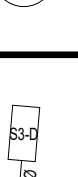
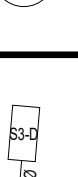
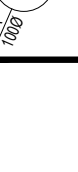
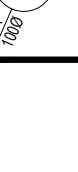
- ## RESIDUAL HAZARDS

1. Buried services. Contractor to refer to locate existing services and undertake necessary precautions and excavations prior to excavating.
2. Excavations close to existing root protection zones. Aboveground trees to be protected by referring to civils proposals and appropriate mitigation measures. Contractor to prepare method statement to ensure protection of existing tree roots, in accordance with root protection protocols.
3. Connection of existing private drainage. Contractor to ensure drains are shut off during works and ensure operatives are familiar and competent with procedure.
4. Excavations close to existing structures. Contractor to prepare method statement to ensure stability of existing structure.
5. Working in vicinity of Waterbodies with variable surface water flows & debris. Contractor to provide method statement and ensure operatives have appropriate safeguarding equipment.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement

PHASE: 0 (PRIVATE)

MH No.	MANHOLE DIMENSION (mm)	MANHOLE TYPE	COVER TYPE	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	EASTING (m)	NORTHING (m)
H1	225Ø	Type E		12.625	12.325	0.150	493961.462	105834.061
S1	---	HEADWALL		11.864	11.340	0.424	493893.257	105829.242
S2	500Ø	Unknown		12.600	11.600	0.900	493900.404	105829.137
S4	450Ø	CATCHPIT		12.558	12.075	0.333	493944.704	105818.815
S5	225Ø	Type E		12.550	12.250	0.150	493943.052	105819.476
S6	225Ø	Type E		12.550	12.300	0.025	493934.591	105823.184
S7	250Ø	250 Inspection		12.693	12.280	0.313	493943.990	105821.630
S9	---	HEADWALL		11.959	11.700	0.109	493971.227	105807.662
S10	600Ø	Unknown		12.740	11.840	0.750	493956.043	105821.178
S11	180Ø	Type E		12.753	11.855	0.748	493956.732	105822.809
S12	250Ø	250 Inspection	B125	12.812	12.340	0.372	493933.832	105826.202
S11-A	180Ø	Type E		12.762	11.935	0.677	493958.676	105827.425
S12-CP	450Ø	CATCHPIT		12.671	12.200	0.321	493960.675	105832.170
S13-RE	100Ø	Unknown		12.996	12.530	0.366	493941.172	105842.762
S3-D	1000x500	Type E	B125	12.444	11.970	0.374	493900.648	105832.028
S8-RE	100Ø	Unknown		12.830	12.380	0.350	493947.909	105830.639
F1	450Ø	450 Inspection		11.688	10.520	1.068	493890.908	105838.324
F2	450Ø	450 Inspection		12.321	11.150	1.071	493898.494	105834.997
F3	450Ø	450 Inspection		12.408	11.605	0.703	493931.744	105820.353
F4	450Ø	450 Inspection		12.998	12.175	0.723	493941.054	105841.550
F5	450Ø	450 Inspection	B125	12.878	12.175	0.603	493935.514	105827.816
F6	450Ø	450 Inspection	B125	12.991	12.175	0.716	493939.549	105837.126

	COVER I A 12.35m N V 12.62m E C 12.35m R D 12.35m Type E T E		COVER I A 12.38m N V 12.83m E C 12.38m R D 12.38m Type E T E
	COVER I A 11.84m N V 12.60m E C 12.60m R D 12.60m Type E T E		COVER I A 11.70m N V 11.99m E C 11.99m R D 11.99m Type E T E
	COVER I A 11.60m N V 12.60m E C 12.60m R D 12.60m Type E T E		COVER I A 11.84m N V 12.40m E C 12.40m R D 12.40m Type E T E
	COVER I A 11.87m N V 12.44m E C 12.44m R D 12.44m Type E T E		COVER I A 11.855m N V 12.73m E C 12.73m R D 12.73m Type E T E
	COVER I A 12.05m N V 12.58m E C 12.05m R D 12.05m Type E T E		COVER I A 11.935m N V 12.73m E C 12.73m R D 12.73m Type E T E
	CATCHP I A 12.25m N V 12.50m E C 12.50m R D 12.50m Type E T E		COVER I A 12.34m N V 12.81m E C 12.81m R D 12.81m Type E T E
	COVER I A 12.30m N V 12.55m E C 12.55m R D 12.55m Type E T E		COVER I A 12.20m N V 12.67m E C 12.67m R D 12.67m Type E T E
	COVER I A 12.28m N V 12.80m E C 12.80m R D 12.80m Type E T E		COVER I A 12.53m N V 12.96m E C 12.96m R D 12.96m Type E T E
			COVER I A 10.52m N V 11.68m E C 11.68m R D 11.68m Type E T E
			COVER I A 11.19m N V 11.59m E C 11.59m R D 11.59m Type E T E
			COVER I A 11.85m N V 11.60m E C 11.60m R D 11.60m Type E T E

	COVER	I	A	12.175m
	12.966m	N	B	12.175m
	DIMETER	N	C	12.175m
	400mm	R	D	
	450 inspection	T	E	
	COVER	I	A	12.175m
	12.878m	N	B	12.175m
	DIMETER	N	C	12.175m
	400mm	R	D	
	450 inspection	T	E	
	COVER	I	A	12.175m
	12.991m	N	B	12.175m
	DIMETER	N	C	12.175m
	400mm	R	D	
	450 inspection	T	E	
	COVER	I	A	12.41m
	13.01m	N	B	
	DIMETER	N	C	
	180mm	R	D	
	Type E	T	E	
	COVER	I	A	12.41m
	13.01m	N	B	
	DIMETER	N	C	
	180mm	R	D	
	Type E	T	E	
	COVER	I	A	12.41m
	13.01m	N	B	
	DIMETER	N	C	
	180mm	R	D	
	Type E	T	E	
	COVER	I	A	12.41m
	13.01m	N	B	
	DIMETER	N	C	
	180mm	R	D	
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	COVER	I	A	12.41m
	13.01m	N	B	
	DIMETER	N	C	
	180mm	R	D	
	Type E	T	E	
	COVER	I	A	12.41m
	13.01m	N	B	
	DIMETER	N	C	
	180mm	R	D	
	Type E	T	E	

Manhole No.	Pipe No.	Adoptable IMP	Adoptable UC	Private IMP	Private UC	Total IMP + UC
RWP4	0.000	0.000	0.000	0.000	0.000	0.000
RWP5	0.000	0.000	0.000	0.000	0.000	0.000
RWP6	0.000	0.000	0.000	0.000	0.000	0.000
RWP9	0.000	0.000	0.000	0.000	0.000	0.000
RWP3	1.000	0.000	0.000	0.000	0.000	0.000
S3-D	1.000	0.000	0.000	276.892	2.350	279.242
PS1	1.000	0.000	0.000	0.000	0.000	0.000
DUMMY2	1.001	0.000	0.000	53.475	5.347	58.822
S2	1.001	0.000	0.000	0.000	0.000	0.000
DUMMY1	1.002	0.000	0.000	59.953	5.995	65.948
H1	1.003	0.000	0.000	0.000	0.000	0.000
S12-CP	1.004	0.000	0.000	0.000	0.000	0.000
S11-A	1.005	0.000	0.000	0.000	0.000	0.000
S11	1.006	0.000	0.000	0.000	0.000	0.000
S10	1.007	0.000	0.000	0.000	0.000	0.000
RWP2	2.000	0.000	0.000	0.000	0.000	0.000
RWP1	3.000	0.000	0.000	0.000	0.000	0.000
S13-RE	4.000	0.000	0.000	0.000	0.000	0.000
S12	4.001	0.000	0.000	0.000	0.000	0.000
S6	4.002	0.000	0.000	0.000	0.000	0.000
S5	4.003	0.000	0.000	0.000	0.000	0.000
S4	4.004	0.000	0.000	0.000	0.000	0.000
RWP7	5.000	0.000	0.000	0.000	0.000	0.000
RWP10	6.000	0.000	0.000	0.000	0.000	0.000
S8-RE	6.001	0.000	0.000	143.678	14.368	158.046
S7	6.002	0.000	0.000	0.000	0.000	0.000
RWP8	7.000	0.000	0.000	0.000	0.000	0.000
Totals:		0.000	0.000	533.998	28.061	562.059

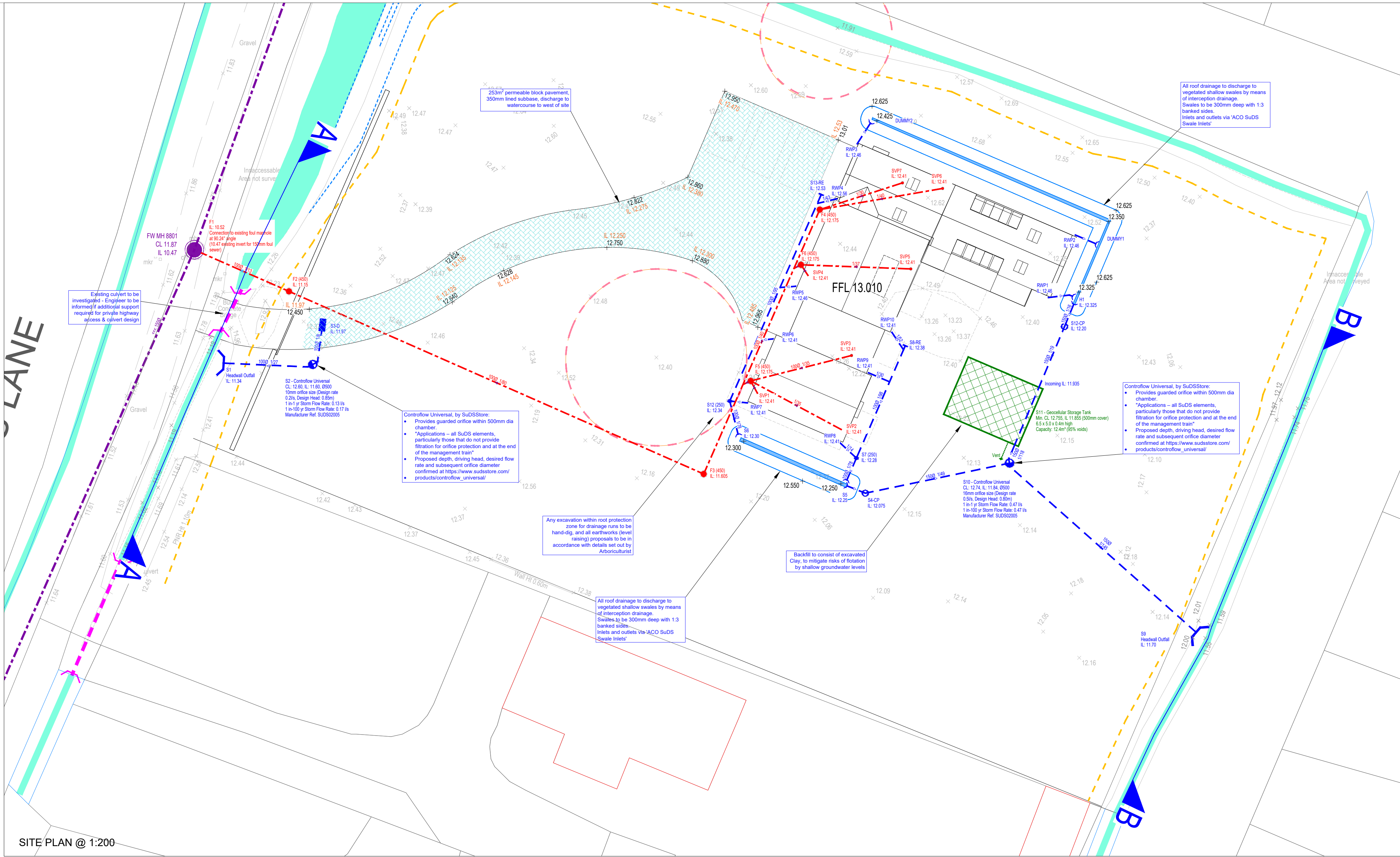


Drawing Status **FOR SUBMISSION**

Project Land East of Northfields Lane,
Westergate PO20 3UH

Scale As Shown	Date Oct' 2025	Drawn By DJL	Checked By CT
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Drawing No. 2025-C109-005	Rev. A
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APPENDICES



Appendix A Greenfield Runoff Calculation

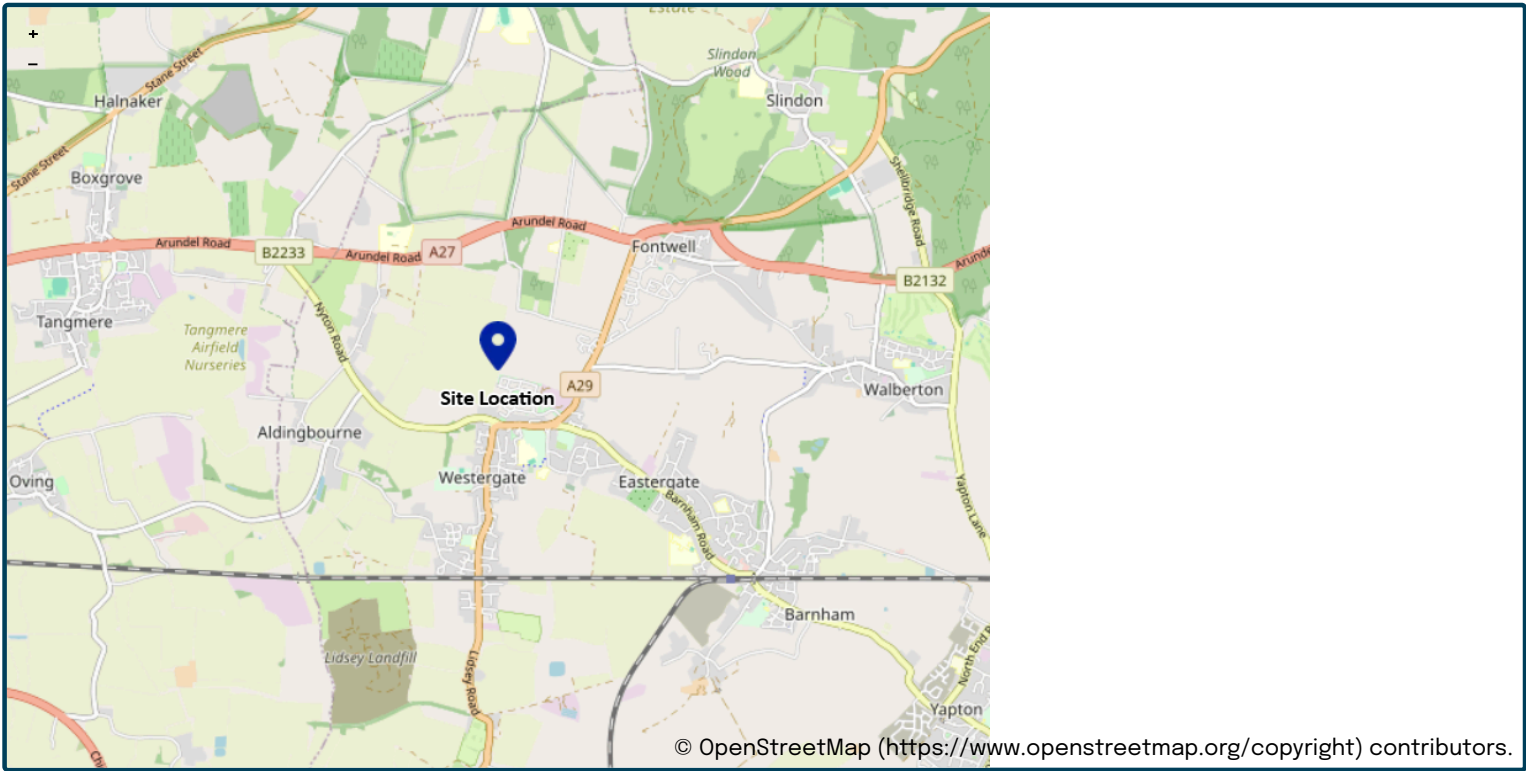
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	22/10/2025
Calculated by	DJL
Reference	C109
Model version	2.2.1

Location

Site name	Northfields Lane
Site location	Westergate



Site easting (British National Grid)	493931
Site northing (British National Grid)	105847

Site details

Total site area (ha)	0.1
----------------------	----------------------------------

Greenfield runoff

Method

Method	IH124
--------	-------

IH124

	<u>My value</u>	☐	<u>Map value</u>
SAAR (mm)	760 mm		760
How should SPR be derived?	WRAP soil type		
WRAP soil type	3	☐	2
SPR	0.37		
QBar (IH124) (l/s)	0.3 l/s		

Growth curve factors

	<u>My value</u>	☐	<u>Map value</u>
Hydrological region	7		7
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

Results

Method	IH124
Flow rate 1 year (l/s)	0.3 l/s
Flow rate 2 year (l/s)	0.3 l/s
Flow rate 10 years (l/s)	0.5 l/s
Flow rate 30 years (l/s)	0.7 l/s
Flow rate 100 years (l/s)	1.0 l/s
Flow rate 200 years (l/s)	1.2 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.1) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.



Appendix B

Groundwater Flotation Calculations (Tank)



Project No: C109
Project Name: Land East of Northfields Lane
Sheet No: 1 Node / System

GEOCELLULAR STORAGE TANK HYDROSTATIC UPLIFT ANALYSIS FOR SOFT GROUND

Level Data:

Ground Level = 12.75 m
Depth to Groundwater = 0.6 m
Invert of Tank = 11.855 m
Top Level of Tank = 12.255 m

Depth of Penetration
in groundwater = 0.30 m

Hydrostatic Uplift = 2.95 kN/m²

Factor of Safety = 1.2

Min' downward force required = 3.54 kN/m²

Height of Tank = 400 mm
(Existing ground level) TOTAL = 400 mm

Thickness of surfacing above Tank:

Soil = 400 mm
Clay = 0 mm
TOTAL = 400 mm

(Minus sand bedding surround from
total surfacing above tank)

Densities:

Top Soil = 15.7 kN/m³
Clay = 22 kN/m³

Weight of Topsoil = 6.28 kN/m²
Weight of Clay = 0.00 kN/m²

Downward force of layers over liner = 6.28 kN/m²

Make-up over TANK OK



Appendix C Hydraulic Modelling Calculations

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Size (mm)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
RWP3	0.000	180	Type E	12.860	12.460	0.300	493944.029	105846.791
DUMMY2	0.006	100	Unknown	12.625	12.430	0.095	493945.331	105848.819
RWP2	0.000	180	Type E	12.836	12.460	0.276	493961.506	105839.530
DUMMY1	0.007	225	Type E	12.625	12.350	0.175	493964.231	105840.613
RWP1	0.000	180	Type E	12.860	12.460	0.300	493959.342	105834.495
H1	0.000	225	Type E	12.625	12.325	0.200	493961.462	105834.061
S12-CP	0.000	450	450 Inspection	12.671	12.200	0.321	493960.675	105832.170
S11-A	0.000	180	Type E	12.762	11.935	0.677	493958.676	105827.425
S11	0.000	180	Type E	12.753	11.855	0.748	493956.732	105822.809
S13-RE	0.000	100	Unknown	12.996	12.530	0.366	493941.172	105842.762
RWP7	0.000	180	Type E	12.838	12.410	0.328	493935.292	105826.049
S12	0.000	250	250 Inspection	12.812	12.340	0.372	493933.832	105826.202
S6	0.000	225	Type E	12.550	12.300	0.150	493934.591	105823.184
RWP10	0.000	180	Type E	12.856	12.410	0.346	493946.813	105831.749
S8-RE	0.016	100	Unknown	12.830	12.380	0.350	493947.909	105830.639
RWP8	0.000	180	Type E	12.857	12.410	0.347	493942.641	105822.885
S7	0.000	250	250 Inspection	12.693	12.280	0.313	493943.990	105821.630
S5	0.000	225	Type E	12.550	12.250	0.200	493943.052	105819.476
S4	0.000	450	450 Inspection	12.558	12.075	0.333	493944.704	105818.815
S10	0.000	600	Unknown	12.740	11.840	0.750	493956.043	105821.178
S9	0.000	---	Type E	11.959	11.700	0.109	493971.227	105807.662

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (mm)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	RWP3	12.460	DUMMY2	12.430	Circ	100	2.410	80	0.600	0.300	0.095
1.001	DUMMY2	12.430	DUMMY1	12.350	Circ	225	20.605	258	0.600	-0.030	0.050
2.000	RWP2	12.460	DUMMY1	12.350	Circ	100	2.932	27	0.600	0.276	0.175
1.002	DUMMY1	12.350	H1	12.325	Circ	225	7.113	285	0.600	0.050	0.075
3.000	RWP1	12.460	H1	12.325	Circ	100	2.163	16	0.600	0.300	0.200
1.003	H1	12.325	S12-CP	12.200	Circ	150	2.048	16	0.600	0.150	0.321
1.004	S12-CP	12.200	S11-A	11.935	Circ	150	5.149	19	0.600	0.321	0.677
1.005	S11-A	11.935	S11	11.855	Circ	150	5.008	63	0.600	0.677	0.748
1.006	S11	11.855	S10	11.840	Circ	150	1.771	118	0.600	0.748	0.750
4.000	S13-RE	12.530	S12	12.340	Circ	100	18.113	95	0.600	0.366	0.372
5.000	RWP7	12.410	S12	12.340	Circ	100	1.468	21	0.600	0.328	0.372
4.001	S12	12.340	S6	12.300	Circ	100	3.113	78	0.600	0.372	0.150
4.002	S6	12.300	S5	12.250	Circ	225	9.238	185	0.600	0.025	0.075
6.000	RWP10	12.410	S8-RE	12.380	Circ	100	1.561	52	0.600	0.346	0.350
6.001	S8-RE	12.380	S7	12.280	Circ	100	9.824	98	0.600	0.350	0.313
7.000	RWP8	12.410	S7	12.280	Circ	100	1.842	14	0.600	0.347	0.313
6.002	S7	12.280	S5	12.250	Circ	100	2.349	78	0.600	0.313	0.200
4.003	S5	12.250	S4	12.075	Circ	150	1.779	10	0.600	0.150	0.333
4.004	S4	12.075	S10	11.840	Circ	150	11.582	49	0.600	0.333	0.750
1.007	S10	11.840	S9	11.700	Circ	150	20.328	145	0.600	0.750	0.109

Outfall Details

Outfall Manhole S9 : Surcharged (Constant Level)

Surcharged Constant

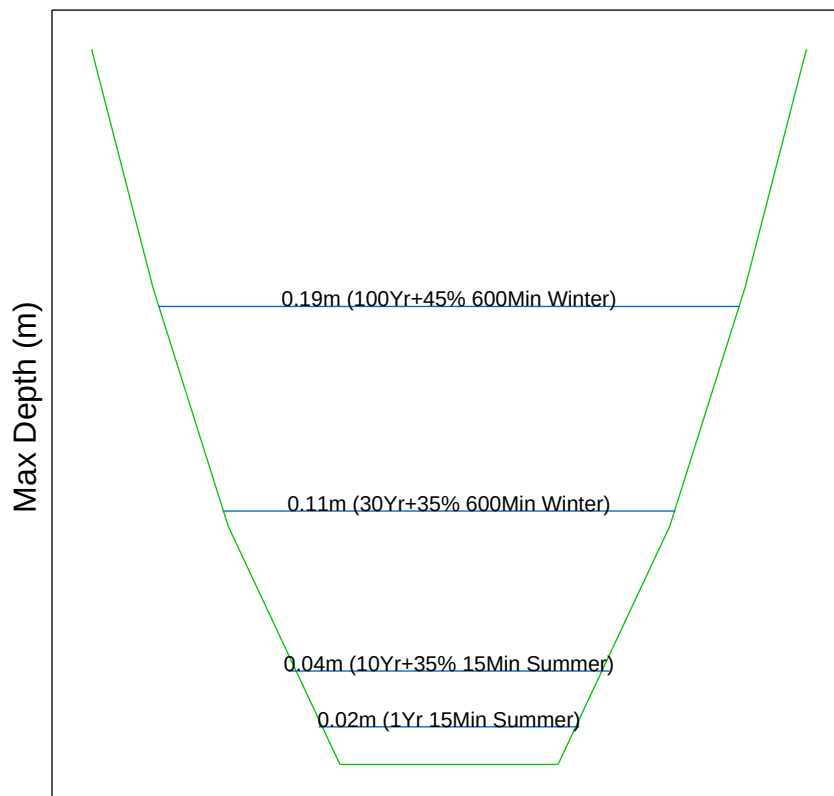
Water Elevation (m)	Water Depth (m)
12.000	0.300

Flow Control Details

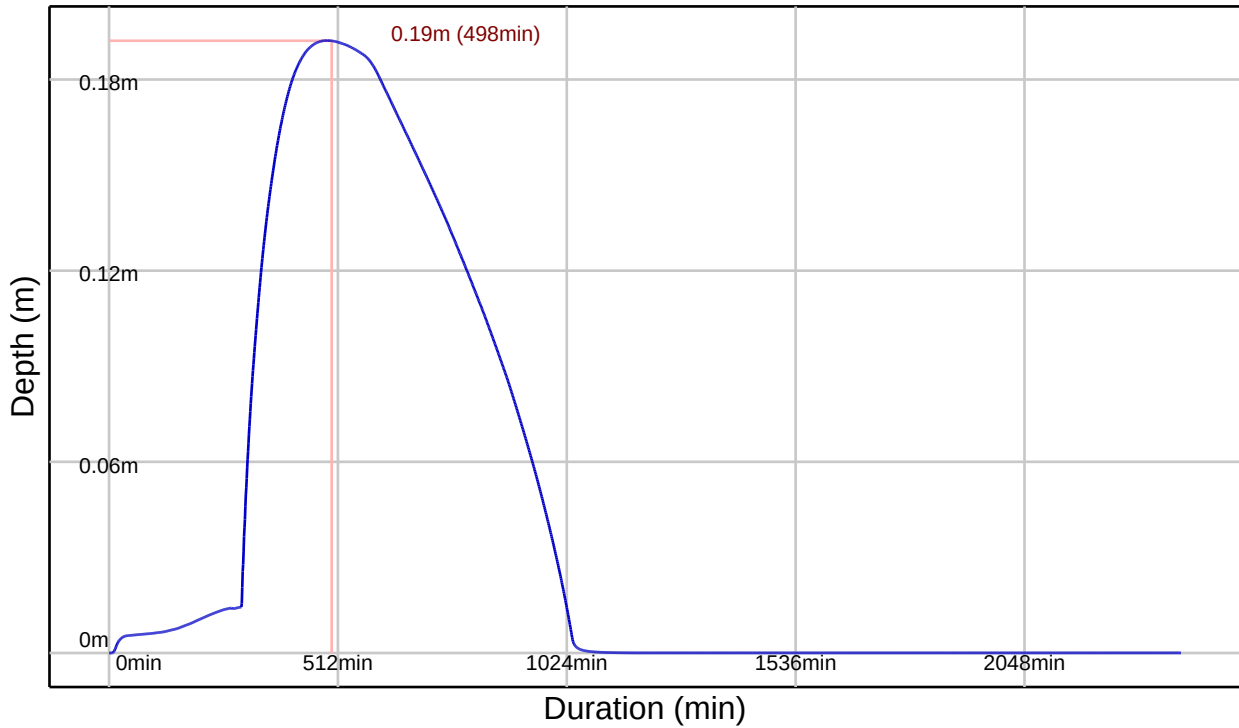
Pond Structure at Manhole H1

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
12.325	0.300	6.682	12.575	0.050	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at H1



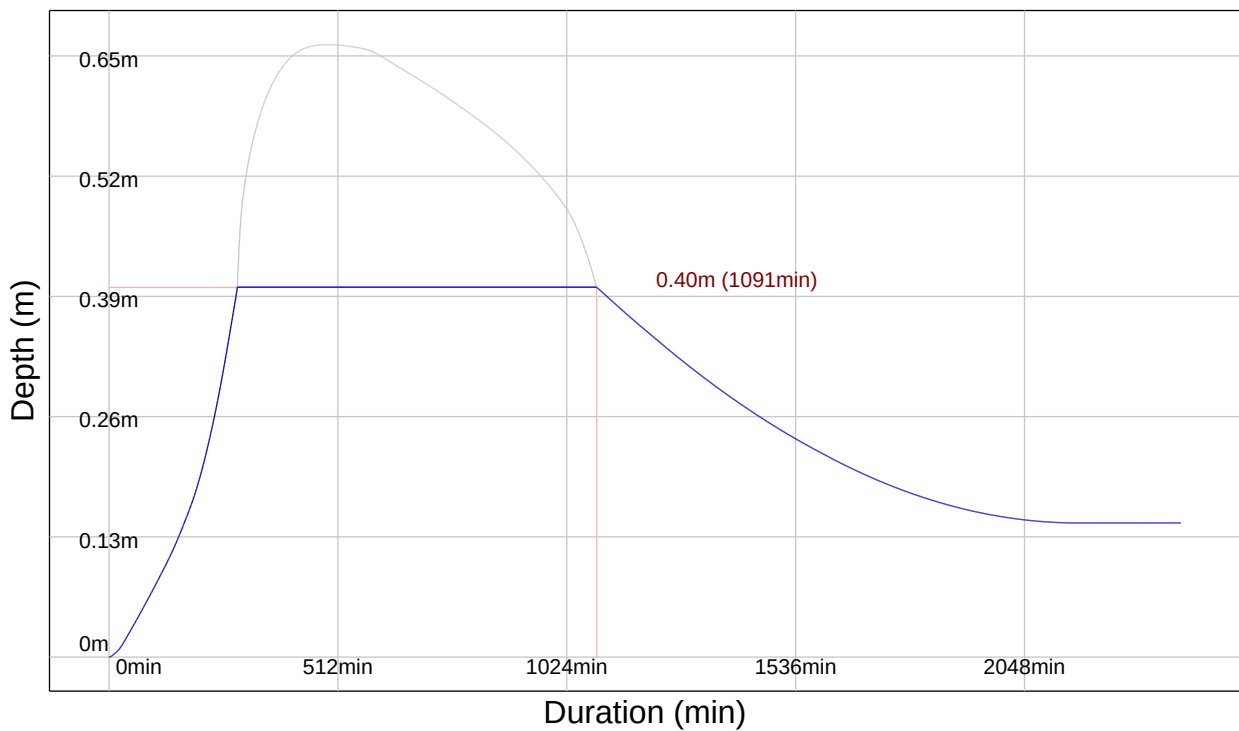
Pond 1 at H1 (100Yr+45% 600Min Winter)



Tank Structure at Manhole S11

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
11.855	0.400	95.00	32.515	30.890	12.356	0.00000000	0.00000000	1.00

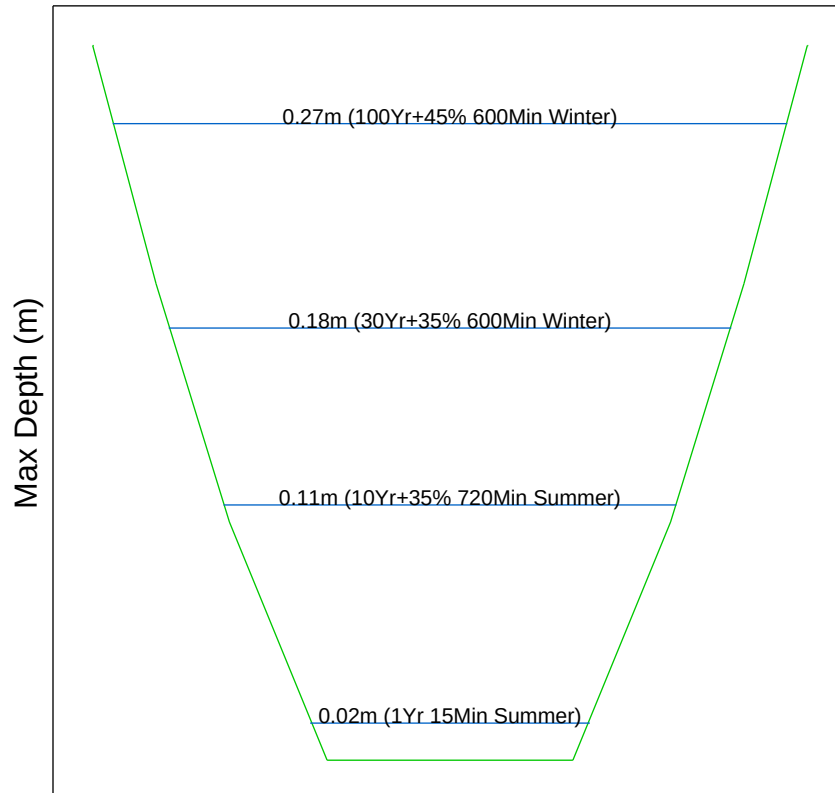
Tank 1 at S11 (100Yr+45% 600Min Winter)



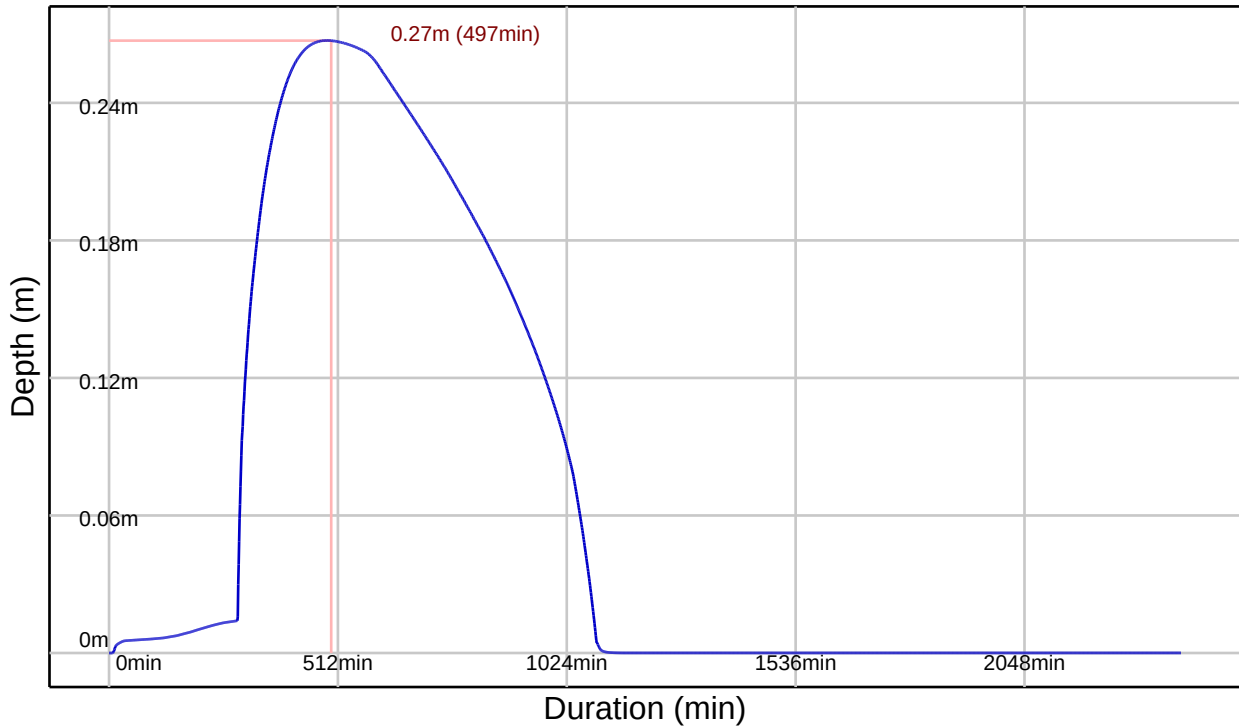
Pond Structure at Manhole S5

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
12.250	0.300	2.608	12.500	0.050	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S5



Pond 2 at S5 (100Yr+45% 600Min Winter)



Controls within Manhole S10

Orifice Control

Invert Offset (m)	Orifice Diameter (m)	Discharge Coeff
0.000	0.016	0.600

Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_493934_105827_v5_1_0.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (1, +0%), (10, +35%), (30, +35%), (100, +45%)

Manhole Flood Risk Freeboard: 0.300m

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Winter	15.653	0.00	0.00	30Yr+35% 15Min Summer	110.177	0.00	2.29
1Yr 15Min Summer	15.653	0.00	0.00	30Yr+35% 15Min Winter	110.177	0.00	2.22
1Yr 30Min Winter	10.370	0.00	0.00	30Yr+35% 30Min Summer	73.477	0.00	2.93
1Yr 30Min Summer	10.370	0.00	0.00	30Yr+35% 30Min Winter	73.477	0.00	2.97
1Yr 60Min Winter	6.643	0.00	0.00	30Yr+35% 60Min Summer	46.696	0.00	2.90
1Yr 60Min Summer	6.643	0.00	0.00	30Yr+35% 60Min Winter	46.696	0.00	2.90
1Yr 120Min Summer	5.343	0.00	1.25	30Yr+35% 120Min Summer	28.564	0.00	2.03
1Yr 120Min Winter	5.343	0.00	1.24	30Yr+35% 120Min Winter	28.564	0.00	2.00
1Yr 180Min Summer	4.504	0.00	0.00	30Yr+35% 180Min Summer	21.155	0.00	1.40
1Yr 180Min Winter	4.504	0.00	0.00	30Yr+35% 180Min Winter	21.155	0.00	1.21
1Yr 240Min Summer	3.726	0.00	0.00	30Yr+35% 240Min Summer	16.967	0.00	0.78
1Yr 240Min Winter	3.726	0.00	0.00	30Yr+35% 240Min Winter	16.967	0.00	0.62
1Yr 360Min Summer	2.902	0.00	0.00	30Yr+35% 360Min Summer	12.320	0.00	0.28
1Yr 360Min Winter	2.902	0.00	0.00	30Yr+35% 360Min Winter	12.320	0.00	0.32
1Yr 480Min Summer	2.418	0.00	-0.60	30Yr+35% 480Min Summer	9.778	0.00	-0.13
1Yr 480Min Winter	2.418	0.00	-0.58	30Yr+35% 480Min Winter	9.778	0.00	0.14
1Yr 600Min Summer	2.065	0.00	-0.96	30Yr+35% 600Min Summer	8.147	0.00	0.00
1Yr 600Min Winter	2.065	0.00	-0.98	30Yr+35% 600Min Winter	8.147	0.00	0.00
1Yr 720Min Winter	1.802	0.00	-1.34	30Yr+35% 720Min Summer	7.002	0.00	-0.33
1Yr 720Min Summer	1.802	0.00	-1.31	30Yr+35% 720Min Winter	7.002	0.00	-0.25
1Yr 960Min Summer	1.455	0.00	-1.96	30Yr+35% 960Min Summer	5.511	0.00	-0.73
1Yr 960Min Winter	1.455	0.00	-1.99	30Yr+35% 960Min Winter	5.511	0.00	-0.66
1Yr 1440Min Summer	1.096	0.00	-3.11	30Yr+35% 1440Min Summer	3.944	0.00	-1.16
1Yr 1440Min Winter	1.096	0.00	-3.13	30Yr+35% 1440Min Winter	3.944	0.00	-0.95
10Yr+35% 15Min Summer	85.192	0.00	1.63	100Yr+45% 15Min Summer	148.603	0.00	3.31
10Yr+35% 15Min Winter	85.192	0.00	1.57	100Yr+45% 15Min Winter	148.603	0.00	3.25
10Yr+35% 30Min Summer	56.204	0.00	2.07	100Yr+45% 30Min Summer	99.595	0.00	3.86
10Yr+35% 30Min Winter	56.204	0.00	2.08	100Yr+45% 30Min Winter	99.595	0.00	3.84
10Yr+35% 60Min Summer	35.559	0.00	2.21	100Yr+45% 60Min Summer	63.976	0.00	4.76
10Yr+35% 60Min Winter	35.559	0.00	2.19	100Yr+45% 60Min Winter	63.976	0.00	4.66
10Yr+35% 120Min Winter	22.362	0.00	1.65	100Yr+45% 120Min Summer	38.349	0.00	2.99
10Yr+35% 120Min Summer	22.362	0.00	1.67	100Yr+45% 120Min Winter	38.349	0.00	2.95
10Yr+35% 180Min Summer	16.811	0.00	1.06	100Yr+45% 180Min Summer	28.108	0.00	1.83
10Yr+35% 180Min Winter	16.811	0.00	1.05	100Yr+45% 180Min Winter	28.108	0.00	1.72
10Yr+35% 240Min Summer	13.540	0.00	0.81	100Yr+45% 240Min Summer	22.587	0.00	1.29
10Yr+35% 240Min Winter	13.540	0.00	0.63	100Yr+45% 240Min Winter	22.587	0.00	1.26
10Yr+35% 360Min Summer	9.904	0.00	0.30	100Yr+45% 360Min Summer	16.413	0.00	0.57
10Yr+35% 360Min Winter	9.904	0.00	0.32	100Yr+45% 360Min Winter	16.413	0.00	0.56
10Yr+35% 480Min Summer	7.896	0.00	0.00	100Yr+45% 480Min Summer	13.030	0.00	0.40
10Yr+35% 480Min Winter	7.896	0.00	0.00	100Yr+45% 480Min Winter	13.030	0.00	0.18
10Yr+35% 600Min Winter	6.592	0.00	0.00	100Yr+45% 600Min Summer	10.871	0.00	0.38
10Yr+35% 600Min Summer	6.592	0.00	0.00	100Yr+45% 600Min Winter	10.871	0.00	0.50
10Yr+35% 720Min Summer	5.672	0.00	-0.17	100Yr+45% 720Min Summer	9.359	0.00	0.40
10Yr+35% 720Min Winter	5.672	0.00	-0.23	100Yr+45% 720Min Winter	9.359	0.00	0.38
10Yr+35% 960Min Summer	4.477	0.00	-0.52	100Yr+45% 960Min Summer	7.377	0.00	0.09
10Yr+35% 960Min Winter	4.477	0.00	-0.55	100Yr+45% 960Min Winter	7.377	0.00	0.35
10Yr+35% 1440Min Summer	3.220	0.00	-1.13	100Yr+45% 1440Min Winter	5.271	0.00	-0.27
10Yr+35% 1440Min Winter	3.220	0.00	-0.96	100Yr+45% 1440Min Summer	5.271	0.00	-0.36

Simulation Results

Return Period (yrs) + Climate Change (%):

1yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
RWP3	15 min Winter	0	12.460	0.000	0.000		OK
DUMMY2	15 min Summer	8	12.450	0.020	0.545		OK
RWP2	15 min Winter	0	12.460	0.000	0.000		OK
DUMMY1	15 min Summer	9	12.380	0.030	1.115		OK
RWP1	15 min Winter	0	12.460	0.000	0.000		OK
H1	15 min Summer	10	12.341	0.016	1.030		OK
S12-CP	15 min Summer	10	12.216	0.016	1.060		OK
S11-A	1440 min Summer	864	12.073	0.138	0.064		OK
S11	1440 min Summer	864	12.073	0.218	0.064		Surcharged
S13-RE	15 min Winter	0	12.530	0.000	0.000		OK
RWP7	15 min Winter	0	12.410	0.000	0.000		OK
S12	15 min Winter	0	12.340	0.000	0.000		OK
S6	15 min Winter	0	12.300	0.000	0.000		OK
RWP10	15 min Summer	9	12.413	0.003	0.000		OK
S8-RE	15 min Summer	8	12.413	0.033	1.464		OK
RWP8	15 min Winter	0	12.410	0.000	0.000		OK
S7	15 min Summer	9	12.314	0.034	1.417		OK
S5	15 min Summer	9	12.266	0.016	1.420		OK
S4	15 min Summer	9	12.099	0.024	1.417		OK
S10	1440 min Summer	864	12.073	0.233	0.144		Surcharged
S9	15 min Winter	0	12.000	0.300	0.468		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	RWP3	DUMMY2	0.010	0.000	0.000	0.000	OK
1.001	15 min Summer	8	DUMMY2	DUMMY1	0.025	0.222	0.532	0.017	OK
2.000	15 min Summer	9	RWP2	DUMMY1	0.015	0.000	0.000	0.000	OK
1.002	15 min Summer	9	DUMMY1	H1	0.023	0.557	1.132	0.037	OK
3.000	15 min Summer	10	RWP1	H1	0.008	0.000	0.000	0.000	OK
1.003	15 min Summer	10	H1	S12-CP	0.016	1.037	1.060	0.024	OK
1.004	1440 min Summer	856	S12-CP	S11-A	0.071	0.166	0.149	0.004	OK
1.005	1440 min Summer	864	S11-A	S11	0.144	0.027	0.141	0.006	OK
1.006	600 min Winter	615	S11	S10	0.150	0.006	0.098	0.006	Surcharged
4.000	15 min Winter	0	S13-RE	S12	0.000	0.000	0.000	0.000	OK
5.000	15 min Winter	0	RWP7	S12	0.000	0.000	0.000	0.000	OK
4.001	15 min Winter	0	S12	S6	0.000	0.000	0.000	0.000	OK
4.002	15 min Summer	9	S6	S5	0.008	0.000	0.000	0.000	OK
6.000	15 min Summer	9	RWP10	S8-RE	0.018	0.020	0.013	0.002	OK
6.001	15 min Summer	9	S8-RE	S7	0.033	0.616	1.417	0.233	OK
7.000	15 min Summer	9	RWP8	S7	0.017	0.000	0.000	0.000	OK
6.002	15 min Summer	9	S7	S5	0.025	0.938	1.420	0.208	OK
4.003	15 min Summer	9	S5	S4	0.020	1.039	1.417	0.025	OK
4.004	360 min Summer	189	S4	S10	0.082	0.055	0.497	0.020	OK
1.007	15 min Summer	1	S10	S9	0.150	0.027	0.468	0.032	Surcharged

Return Period (yrs) + Climate Change (%):

10yr+35%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
RWP3	15 min Summer	9	12.475	0.015	0.000		OK
DUMMY2	15 min Summer	9	12.475	0.045	2.876		OK
RWP2	15 min Summer	0	12.460	0.000	0.000		OK
DUMMY1	15 min Summer	9	12.416	0.066	6.075		OK
RWP1	15 min Summer	0	12.460	0.000	0.000		OK
H1	15 min Summer	9	12.364	0.039	6.113		OK
S12-CP	720 min Summer	495	12.357	0.157	0.153		Surcharged
S11-A	720 min Summer	495	12.357	0.422	0.158		Surcharged
S11	720 min Summer	496	12.357	0.502	0.130		Surcharged
S13-RE	15 min Summer	0	12.530	0.000	0.000		OK
RWP7	15 min Summer	0	12.410	0.000	0.000		OK
S12	720 min Summer	495	12.357	0.017	0.000		OK
S6	720 min Summer	492	12.357	0.057	0.012		OK
RWP10	15 min Summer	9	12.519	0.109	0.113		Surcharged
S8-RE	15 min Summer	9	12.519	0.139	7.629		Surcharged
RWP8	15 min Summer	0	12.410	0.000	0.000		OK
S7	15 min Summer	9	12.373	0.093	7.398		OK
S5	720 min Summer	496	12.357	0.107	0.180		OK
S4	720 min Summer	496	12.357	0.282	0.176		Flood Risk
S10	720 min Summer	496	12.357	0.517	0.312		Surcharged
S9	15 min Summer	0	12.000	0.300	0.571		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	10	RWP3	DUMMY2	0.030	0.062	0.089	0.013	OK
1.001	15 min Summer	9	DUMMY2	DUMMY1	0.056	0.379	2.892	0.090	OK
2.000	15 min Summer	9	RWP2	DUMMY1	0.033	0.000	0.000	0.000	OK
1.002	15 min Summer	9	DUMMY1	H1	0.053	0.880	6.113	0.200	OK
3.000	15 min Summer	9	RWP1	H1	0.020	0.000	0.000	0.000	OK
1.003	720 min Summer	497	H1	S12-CP	0.091	0.946	0.770	0.017	OK
1.004	600 min Summer	393	S12-CP	S11-A	0.150	0.436	0.894	0.022	Surcharged
1.005	30 min Winter	30	S11-A	S11	0.150	0.839	4.373	0.195	Surcharged
1.006	480 min Summer	284	S11	S10	0.150	0.046	0.812	0.050	Surcharged
4.000	720 min Summer	495	S13-RE	S12	0.009	0.000	0.000	0.000	OK
5.000	720 min Summer	495	RWP7	S12	0.009	0.000	0.000	0.000	OK
4.001	720 min Summer	581	S12	S6	0.037	0.015	0.022	0.003	OK
4.002	720 min Summer	635	S6	S5	0.082	0.006	0.031	0.001	OK
6.000	15 min Summer	11	RWP10	S8-RE	0.100	0.225	1.323	0.157	Surcharged
6.001	15 min Summer	9	S8-RE	S7	0.096	0.953	7.398	1.217	OK
7.000	15 min Summer	9	RWP8	S7	0.046	0.000	0.000	0.000	OK
6.002	720 min Summer	496	S7	S5	0.089	0.844	1.048	0.154	OK
4.003	720 min Summer	496	S5	S4	0.129	0.827	0.976	0.017	OK
4.004	240 min Summer	152	S4	S10	0.150	0.207	2.289	0.090	Surcharged
1.007	15 min Winter	1	S10	S9	0.150	0.027	0.468	0.032	Surcharged

Return Period (yrs) + Climate Change (%):

30yr+35%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
RWP3	15 min Summer	8	12.481	0.021	0.028		OK
DUMMY2	15 min Summer	8	12.481	0.051	3.836		OK
RWP2	15 min Summer	0	12.460	0.000	0.000		OK
DUMMY1	600 min Winter	467	12.431	0.081	0.158		OK
RWP1	15 min Summer	0	12.460	0.000	0.000		OK
H1	600 min Winter	470	12.431	0.106	0.156		OK
S12-CP	600 min Winter	469	12.431	0.231	0.160		Flood Risk
S11-A	600 min Winter	469	12.431	0.496	0.159		Surcharged
S11	600 min Winter	469	12.431	0.576	0.159		Surcharged
S13-RE	15 min Summer	0	12.530	0.000	0.000		OK
RWP7	600 min Winter	467	12.432	0.022	0.002		OK
S12	600 min Winter	467	12.432	0.092	0.003		OK
S6	600 min Winter	467	12.431	0.131	0.003		OK
RWP10	15 min Summer	10	12.628	0.218	0.000		Flood Risk
S8-RE	15 min Summer	10	12.628	0.248	8.500		Flood Risk
RWP8	600 min Winter	473	12.432	0.022	0.002		OK
S7	600 min Winter	468	12.431	0.151	0.215		Flood Risk
S5	600 min Winter	469	12.431	0.181	0.220		Surcharged
S4	600 min Winter	469	12.431	0.356	0.201		Flood Risk
S10	600 min Winter	469	12.431	0.591	0.350		Surcharged
S9	15 min Summer	0	12.000	0.300	0.457		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	11	RWP3	DUMMY2	0.036	0.095	0.146	0.022	OK
1.001	15 min Summer	8	DUMMY2	DUMMY1	0.063	0.409	3.752	0.117	OK
2.000	600 min Winter	467	RWP2	DUMMY1	0.041	0.000	0.000	0.000	OK
1.002	600 min Winter	467	DUMMY1	H1	0.094	0.461	0.706	0.023	OK
3.000	480 min Summer	335	RWP1	H1	0.050	0.000	0.000	0.000	OK
1.003	600 min Winter	470	H1	S12-CP	0.128	0.923	0.728	0.016	OK
1.004	180 min Summer	120	S12-CP	S11-A	0.150	0.669	2.775	0.068	Surcharged
1.005	15 min Winter	21	S11-A	S11	0.150	1.145	7.222	0.321	Surcharged
1.006	240 min Summer	138	S11	S10	0.150	0.087	1.545	0.095	Surcharged
4.000	600 min Winter	467	S13-RE	S12	0.046	0.000	0.000	0.000	OK
5.000	600 min Winter	580	RWP7	S12	0.057	0.014	0.043	0.003	OK
4.001	600 min Winter	558	S12	S6	0.096	0.010	0.055	0.008	OK
4.002	600 min Winter	590	S6	S5	0.156	0.008	0.075	0.002	OK
6.000	15 min Winter	12	RWP10	S8-RE	0.100	0.238	1.457	0.174	Surcharged
6.001	15 min Winter	9	S8-RE	S7	0.100	1.049	8.242	1.355	Surcharged
7.000	600 min Winter	562	RWP8	S7	0.061	0.008	0.032	0.002	OK
6.002	240 min Summer	159	S7	S5	0.100	1.131	2.879	0.422	Surcharged
4.003	360 min Summer	229	S5	S4	0.150	1.059	2.110	0.038	Surcharged
4.004	60 min Winter	55	S4	S10	0.150	0.409	4.943	0.195	Surcharged
1.007	15 min Winter	1	S10	S9	0.150	0.027	0.468	0.032	Surcharged

Return Period (yrs) + Climate Change (%):

100yr+45%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
RWP3	600 min Winter	485	12.518	0.058	0.000		OK
DUMMY2	600 min Winter	487	12.518	0.088	0.093		OK
RWP2	600 min Winter	493	12.517	0.057	0.015		OK
DUMMY1	600 min Winter	493	12.517	0.167	0.176		OK
RWP1	600 min Winter	488	12.517	0.057	0.000		OK
H1	600 min Winter	486	12.517	0.192	0.112		Surcharged
S12-CP	600 min Winter	490	12.517	0.317	0.165		Flood Risk
S11-A	600 min Winter	489	12.517	0.582	0.172		Flood Risk
S11	600 min Winter	502	12.517	0.662	0.200		Surcharged
S13-RE	15 min Summer	0	12.530	0.000	0.000		OK
RWP7	600 min Winter	484	12.517	0.107	0.011		Surcharged
S12	600 min Winter	495	12.517	0.177	0.009		Flood Risk
S6	600 min Winter	489	12.517	0.217	0.015		OK
RWP10	15 min Summer	10	12.823	0.413	0.000		Flood Risk
S8-RE	15 min Summer	10	12.822	0.442	11.160		Flood Risk
RWP8	600 min Winter	480	12.517	0.107	0.000		Surcharged
S7	600 min Winter	494	12.517	0.237	0.227		Flood Risk
S5	600 min Winter	487	12.517	0.267	0.217		Flood Risk
S4	600 min Winter	486	12.517	0.442	0.251		Flood Risk
S10	600 min Winter	489	12.517	0.677	0.384		Flood Risk
S9	15 min Summer	0	12.000	0.300	0.450		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	600 min Winter	576	RWP3	DUMMY2	0.073	0.027	0.043	0.006	OK
1.001	600 min Winter	491	DUMMY2	DUMMY1	0.127	0.216	0.444	0.014	OK
2.000	600 min Winter	619	RWP2	DUMMY1	0.079	0.007	0.038	0.003	OK
1.002	600 min Winter	491	DUMMY1	H1	0.180	0.504	0.968	0.032	OK
3.000	600 min Winter	647	RWP1	H1	0.079	0.008	0.040	0.003	OK
1.003	240 min Summer	162	H1	S12-CP	0.150	1.376	3.098	0.070	Surcharged
1.004	60 min Winter	42	S12-CP	S11-A	0.150	1.130	5.332	0.132	Surcharged
1.005	15 min Winter	12	S11-A	S11	0.150	1.154	9.688	0.431	Surcharged
1.006	180 min Summer	96	S11	S10	0.150	0.222	3.917	0.240	Surcharged
4.000	120 min Summer	88	S13-RE	S12	0.050	0.000	0.000	0.000	OK
5.000	720 min Winter	871	RWP7	S12	0.100	0.011	0.054	0.004	Surcharged
4.001	240 min Summer	408	S12	S6	0.100	0.015	0.115	0.017	Surcharged
4.002	600 min Winter	768	S6	S5	0.221	0.008	0.119	0.003	OK
6.000	15 min Winter	13	RWP10	S8-RE	0.100	0.399	2.025	0.241	Surcharged
6.001	15 min Winter	10	S8-RE	S7	0.100	1.342	10.543	1.734	Surcharged
7.000	480 min Winter	685	RWP8	S7	0.100	0.033	0.190	0.012	Surcharged
6.002	60 min Winter	45	S7	S5	0.100	1.357	6.665	0.977	Surcharged
4.003	60 min Winter	51	S5	S4	0.150	1.546	6.679	0.119	Surcharged
4.004	30 min Winter	25	S4	S10	0.150	0.669	8.855	0.349	Surcharged
1.007	30 min Winter	1	S10	S9	0.150	0.027	0.468	0.032	Surcharged

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Size (mm)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S3-D	0.028	1000x500	Type E	12.444	11.970	0.374	493900.648	105832.028
S2	0.000	500	Unknown	12.600	11.600	0.900	493900.404	105829.137
S1	0.000	---	Type E	11.864	11.340	0.424	493893.257	105829.242

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (mm)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S3-D	11.970	S2	11.600	Circ	100	2.901	8	0.600	0.374	0.900
1.001	S2	11.600	S1	11.340	Circ	100	7.148	27	0.600	0.900	0.424

Permeable Paving Schedule

Permeable Paving	Assigned Manhole	Effective Storage Volume (m3)	CL (m)	IL (m)	Storage Infil Rate (m/hr)	Safety Factor	Easting (m)	Northing (m)
PP1	S3-D	26.606	12.444	11.964	0.00000000	2.00	493935.121	105842.432

Outfall Details

Outfall Manhole S1 : Surcharged (Constant Level)

Surcharged Constant

Water Elevation (m)	Water Depth (m)
11.560	0.220

Flow Control Details

Controls within Manhole S2

Orifice Control

Invert Offset (m)	Orifice Diameter (m)	Discharge Coeff
0.000	0.010	0.600

Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_493934_105827_v5_1_0.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (1, +0%), (10, +35%), (30, +35%), (100, +45%)

Manhole Flood Risk Freeboard: 0.300m

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Winter	15.653	0.00	0.00	30Yr+35% 15Min Summer	110.177	0.00	3.24
1Yr 15Min Summer	15.653	0.00	0.00	30Yr+35% 15Min Winter	110.177	0.00	3.27
1Yr 30Min Winter	10.370	0.00	0.00	30Yr+35% 30Min Summer	73.477	0.00	2.63
1Yr 30Min Summer	10.370	0.00	0.00	30Yr+35% 30Min Winter	73.477	0.00	2.62
1Yr 60Min Winter	6.643	0.00	0.00	30Yr+35% 60Min Summer	46.696	0.00	2.18
1Yr 60Min Summer	6.643	0.00	0.00	30Yr+35% 60Min Winter	46.696	0.00	2.18
1Yr 120Min Summer	5.343	0.00	0.00	30Yr+35% 120Min Summer	28.564	0.00	1.83
1Yr 120Min Winter	5.343	0.00	0.00	30Yr+35% 120Min Winter	28.564	0.00	1.83
1Yr 180Min Summer	4.504	0.00	0.00	30Yr+35% 180Min Summer	21.155	0.00	1.62
1Yr 180Min Winter	4.504	0.00	0.00	30Yr+35% 180Min Winter	21.155	0.00	1.62
1Yr 240Min Summer	3.726	0.00	0.00	30Yr+35% 240Min Summer	16.967	0.00	1.47
1Yr 240Min Winter	3.726	0.00	0.00	30Yr+35% 240Min Winter	16.967	0.00	1.47
1Yr 360Min Summer	2.902	0.00	0.00	30Yr+35% 360Min Summer	12.320	0.00	1.23
1Yr 360Min Winter	2.902	0.00	0.00	30Yr+35% 360Min Winter	12.320	0.00	1.23
1Yr 480Min Summer	2.418	0.00	0.00	30Yr+35% 480Min Summer	9.778	0.00	1.04
1Yr 480Min Winter	2.418	0.00	0.00	30Yr+35% 480Min Winter	9.778	0.00	1.04
1Yr 600Min Summer	2.065	0.00	0.00	30Yr+35% 600Min Summer	8.147	0.00	0.87
1Yr 600Min Winter	2.065	0.00	0.00	30Yr+35% 600Min Winter	8.147	0.00	0.87
1Yr 720Min Winter	1.802	0.00	0.00	30Yr+35% 720Min Summer	7.002	0.00	0.00
1Yr 720Min Summer	1.802	0.00	0.00	30Yr+35% 720Min Winter	7.002	0.00	0.00
1Yr 960Min Summer	1.455	0.00	0.00	30Yr+35% 960Min Summer	5.511	0.00	0.00
1Yr 960Min Winter	1.455	0.00	0.00	30Yr+35% 960Min Winter	5.511	0.00	0.00
1Yr 1440Min Summer	1.096	0.00	0.00	30Yr+35% 1440Min Summer	3.944	0.00	0.00
1Yr 1440Min Winter	1.096	0.00	0.00	30Yr+35% 1440Min Winter	3.944	0.00	0.00
10Yr+35% 15Min Summer	85.192	0.00	3.98	100Yr+45% 15Min Summer	148.603	0.00	2.63
10Yr+35% 15Min Winter	85.192	0.00	4.02	100Yr+45% 15Min Winter	148.603	0.00	2.65
10Yr+35% 30Min Summer	56.204	0.00	3.18	100Yr+45% 30Min Summer	99.595	0.00	2.19
10Yr+35% 30Min Winter	56.204	0.00	3.16	100Yr+45% 30Min Winter	99.595	0.00	2.18
10Yr+35% 60Min Summer	35.559	0.00	2.57	100Yr+45% 60Min Summer	63.976	0.00	1.86
10Yr+35% 60Min Winter	35.559	0.00	2.58	100Yr+45% 60Min Winter	63.976	0.00	1.86
10Yr+35% 120Min Winter	22.362	0.00	2.07	100Yr+45% 120Min Summer	38.349	0.00	1.61
10Yr+35% 120Min Summer	22.362	0.00	2.07	100Yr+45% 120Min Winter	38.349	0.00	1.61
10Yr+35% 180Min Summer	16.811	0.00	1.80	100Yr+45% 180Min Summer	28.108	0.00	1.46
10Yr+35% 180Min Winter	16.811	0.00	1.80	100Yr+45% 180Min Winter	28.108	0.00	1.46
10Yr+35% 240Min Summer	13.540	0.00	1.61	100Yr+45% 240Min Summer	22.587	0.00	1.33
10Yr+35% 240Min Winter	13.540	0.00	1.61	100Yr+45% 240Min Winter	22.587	0.00	1.34
10Yr+35% 360Min Summer	9.904	0.00	1.33	100Yr+45% 360Min Summer	16.413	0.00	1.14
10Yr+35% 360Min Winter	9.904	0.00	1.33	100Yr+45% 360Min Winter	16.413	0.00	1.14
10Yr+35% 480Min Summer	7.896	0.00	1.08	100Yr+45% 480Min Summer	13.030	0.00	0.98
10Yr+35% 480Min Winter	7.896	0.00	1.06	100Yr+45% 480Min Winter	13.030	0.00	0.98
10Yr+35% 600Min Winter	6.592	0.00	0.00	100Yr+45% 600Min Summer	10.871	0.00	0.84
10Yr+35% 600Min Summer	6.592	0.00	0.00	100Yr+45% 600Min Winter	10.871	0.00	0.84
10Yr+35% 720Min Summer	5.672	0.00	0.00	100Yr+45% 720Min Summer	9.359	0.00	0.72
10Yr+35% 720Min Winter	5.672	0.00	0.00	100Yr+45% 720Min Winter	9.359	0.00	0.72
10Yr+35% 960Min Summer	4.477	0.00	0.00	100Yr+45% 960Min Summer	7.377	0.00	0.00
10Yr+35% 960Min Winter	4.477	0.00	0.00	100Yr+45% 960Min Winter	7.377	0.00	0.00
10Yr+35% 1440Min Summer	3.220	0.00	0.00	100Yr+45% 1440Min Summer	5.271	0.00	0.00
10Yr+35% 1440Min Winter	3.220	0.00	0.00	100Yr+45% 1440Min Winter	5.271	0.00	0.00

Simulation Results

Return Period (yrs) + Climate Change (%):

1yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S3-D	960 min Summer	609	11.996	0.026	0.130		OK
S2	960 min Summer	609	11.996	0.396	0.130		Surcharged
S1	15 min Winter	0	11.560	0.220	0.000		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	960 min Summer	609	S3-D	S2	0.063	0.243	0.295	0.014	OK
1.001	960 min Summer	609	S2	S1	0.054	0.030	0.130	0.011	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
PP1	960 min Summer	608	11.996	0.033	0.132			OK

Return Period (yrs) + Climate Change (%):

10yr+35%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S3-D	600 min Winter	584	12.134	0.164	0.013		Surcharged
S2	600 min Winter	571	12.134	0.534	0.125		Surcharged
S1	15 min Summer	0	11.560	0.220	0.000		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	120 min Summer	79	S3-D	S2	0.100	0.584	1.293	0.059	Surcharged
1.001	600 min Winter	570	S2	S1	0.054	0.035	0.151	0.013	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
PP1	600 min Winter	573	12.134	0.170	0.149			OK

Return Period (yrs) + Climate Change (%):

30yr+35%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S3-D	600 min Winter	578	12.185	0.215	0.119		Flood Risk
S2	600 min Winter	578	12.185	0.585	0.199		Surcharged
S1	15 min Summer	0	11.560	0.220	0.000		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	30 min Winter	31	S3-D	S2	0.100	0.988	2.048	0.094	Surcharged
1.001	600 min Winter	580	S2	S1	0.054	0.037	0.159	0.014	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
PP1	600 min Winter	576	12.185	0.222	0.174			OK

Return Period (yrs) + Climate Change (%):

100yr+45%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S3-D	720 min Winter	693	12.278	0.308	0.027		Flood Risk
S2	720 min Winter	694	12.279	0.679	0.155		Surcharged
S1	15 min Summer	0	11.560	0.220	0.000		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	30 min Summer	23	S3-D	S2	0.100	0.926	2.631	0.121	Surcharged
1.001	720 min Winter	693	S2	S1	0.054	0.039	0.171	0.015	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
PP1	720 min Winter	693	12.278	0.315	0.189			OK



Appendix D Maintenance Schedule



MANAGEMENT & MAINTENANCE SCHEDULE

LAND EAST OF NORTHFIELDS LANE, WESTERGATE PO20 3UH

Residential Development

2026-C109-MMS02

March 2026

Prepared on Behalf of Domusea Northfields Limited



1 MAINTENANCE

1.1 General Maintenance

- 1.1.1 In accordance with National Standards for SuDS (Standard 7), a Maintenance Plan, within an Operation and Maintenance Manual, is required to ensure that the proposed drainage system can be maintained safely. Chapter 32 of the SuDS Manual details good practice for operation and maintenance activities, and the below sets out the basis of measures to be incorporated in a detailed management plan as part of the detailed drainage design.
- 1.1.2 Maintenance of private features serving only one residential dwelling are the responsibility of the resident.
- 1.1.3 A maintenance regime should include tasks to be taken at regular intervals to keep the system in good working order (see SuDS Manual Table 32.1). General measures should include:

Drainage System feature	Proposed maintenance / remedial works	Required frequency of works
Inlet, Outfall	Inspection, vegetation clearance and additional clearing/cleansing of potential outfall blockages	At least once a year
	Desilting	Year 1, Year 3, then every 5 years
Catch pits, gully sumps and drains, flap valves	Inspection and additional cleansing as required.	Every 6 months
	Desilting	Year 1, Year 3, then every 5 years
Pipework	Jetting to clear blockages	As required

- 1.1.4 Chapters 11-23 of the CIRIA SuDS Manual set out specific maintenance for differing SuDS features, and this is detailed below for the proposed SuDS features.

1.2 Permeable Pavements & Diffuser Units

- 1.2.1 The areas of permeable paving are designed to allow surface water run-off to percolate through the joints in the block paving surface course and into the sub-base below. This provides a volume of attenuated storage (as it is proposed that the permeable paving will be tanked in view of site constraints) before collected run-off is discharged, at a control rate, to the receiving outfall(s).
- 1.2.2 As part of the permeable paving system, diffuser units are used to discharge surface water run-off from roof areas into the sub-base, as well as conveying runoff to the outfall from the permeable paving. These diffuser units are small heavy-duty cellular units which allow more efficient discharge of surface water into the sub-base base of the permeable paved areas.



- 1.2.3 The areas of permeable paving will require additional maintenance measures to ensure they operate as designed. Failure in carrying out this maintenance, could increase the risk of flooding. The additional measures are as follows:

Drainage System feature	Proposed maintenance / remedial works	Required frequency of works
Permeable Pavement	Surface sweeping to reduce silt and debris accumulation.	Every 8 to 12 weeks
	Replace broken slabs/blocks	As required
	Removal / management of weed growth	At least once a year
	Silt removal from permeable surfaces, possibly involving raking out of joints, redressing, removal and remedial works.	As required / to be specified by manufacturer
Diffuser units	Inspection and additional cleansing as required.	Annual
	Desilting.	Year 1, Year 3, then every 5 years

1.3 Flow Control Chambers

- 1.3.1 A flow control chamber (such as a HydroBrake) or device is self-activating, relying on upstream hydraulic head to generate an air-filled vortex within the centre of the casing. Once the vortex is initiated water drains down through a small opening in the back of the device at the designed restricted flow rate.
- 1.3.2 The flow control device includes a bypass valve for use should it become blocked. A valve is situated in the front of the unit which is operated from the surface by a release cable situated just under the chamber cover. The valve also provides access of rodding of the downstream pipework.
- 1.3.3 The flow control chamber will require the following maintenance:
- The sump within the flow control chamber should be monitored for build-up of silts and should be emptied as a minimum on the same regime as specified for catchpits previously within this document.
 - The drain down door located on the centre of the unit will require inspection, greasing and opening annually, to ensure it is operating as intended.
- 1.3.4 The flap valve chamber will require the following maintenance:
- The catchpit chamber should be monitored for build-up of silts and should be emptied as a minimum on the same regime as specified for catchpits previously within this document.
 - The hinged door located on the mounted concrete block will require inspection, greasing and opening annually, to ensure it is operating as intended.



Drainage System feature	Proposed maintenance / remedial works	Required frequency of works
Flow Control Chambers	Clean out chamber/sump	Monthly for first 3 months then twice annually
	Inspect flow control unit and remove debris	

1.4 Attenuation Storage Tanks

Drainage System feature	Proposed maintenance / remedial works	Required frequency of works
Upstream & Downstream catchpit chambers	Clean out chamber/sump.	Twice annually for the first 2 years of operation then annually
Inlets & Outlets	Inspection, vegetation clearance and additional clearing/cleansing of potential outfall blockages.	Annually and after large storms
Geocellular Units	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Post-construction, 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 the surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Monthly, or as required

1.5 Swales

- 1.5.1 The inlets and outlets to the swale corridors should be checked regularly for blockages to ensure free flowing conditions into and through the structure. Excessive silt, detritus and vegetation building should be removed and disposed of.
- 1.5.2 It is recommended that regular maintenance is undertaken in accordance with the following schedule:



Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass in and around structure	Monthly (during growing season) or as required
	Manage other vegetation and remove nuisance plants	Monthly at start and then as required
	Inspect inlets and outlets for blockages and clear as required	Monthly
	Inspect banks for damage and repair as required	Monthly
	Inspect inlets and structure surface for silt accumulation. Establish silt removal frequency	Monthly for first year then annually or as required
	Tidy all dead growth before start of growing season. Remove tree saplings.	Annually
	Remove sediment from inlets, outlets	Annually or as required
Occasional Maintenance	Reseed areas of poor growth	As required
	Trim overhanging trees and remove cuttings	Every 2 years
Remedial Actions	Repair erosion or other damage by reseedling or returfing	As required
	Repair inlets and outlets	As required
	Relevel uneven surfaces and reinstate design levels	As required

1.6 On-site & Boundary Ditches/Watercourses

- 1.6.1 The purpose of these features primarily is to convey water and provide an element of storage. It is the responsibility of the legal riparian for ensuring all ditches/watercourses are free flowing.
- 1.6.2 The inspection frequency and maintenance requirements are illustrated in the table below and may be affected by other seasonal ecology constraints i.e. bird nesting.



Maintenance	Required Action	Required frequency of works
Regular Maintenance	Remove litter/debris	Monthly, or as required
	Cut grass – may be to suit design parameters	Monthly, or as required
	Manage and/or cut back vegetation	Monthly, or as required
	Inspect inlets/outlets (i.e. culvert at upstream and downstream headwalls)	Monthly
	Inspect base for silt and remove as required	Twice annually
Occasional Maintenance	Reseed areas of poor grass coverage and/or vegetation growth	As required
Remedial Actions	Repair erosion or other damage	As required
	Remove silt from base	As required
	Re-level uneven surfaces to existing/design surface profile	As required
	Remove and dispose of oils, petrols and/or other pollutants and dispose to licenced tip as required	As required

1.7 Remedial Maintenance

- 1.7.1 As well as the frequencies set out in the above tables, inspections should be undertaken after significant storm events to establish any remedial maintenance may be required, as there may be damage to the drainage system that could cause adverse impacts in a future storm event if not identified.

1.8 Accidental Spillages

- 1.8.1 In the event of a serious spillage, either by volume or of unknown or toxic compounds, the spillage should be isolated with the use of soil, turf or fabric with outlet pipes from chambers downstream of the spillage blocked with a bung/bungs.
- 1.8.2 Minor spillages of fuels and oils from motor vehicles will be dealt with by the permachannel, filter gully & catchpits collecting the hydrocarbons.
- 1.8.3 In the event of a spillage, the responsibility lies with the private resident to clear up any spillage before it enters the drainage network. The primary method of dealing with any spillage of hydrocarbons should be using sand (or equivalent) to soak up the leak and mitigate pollution migration. Any contaminated waste shall be disposed of by a licensed contractor, & SmartSponge replacement (inserted within filter gully) should be made in accordance with the manufacturer's instructions.
- 1.8.4 The Environment Agency should then be contacted immediately on their incident hotline; 0800 807060.



1.9 Construction & Operation (Maintenance) Considerations

1.9.1 In addition to the regular, occasional and remedial maintenance measures set out above, the following considerations are to be taken:

- i. The Construction Management Plan needs to include management of surface water runoff during construction to prevent pollution. In addition, it is recommended that construction phasing ensures SuDs are completed prior to the construction of buildings and hardstanding areas where possible to provide treatment during construction. These features will need a complete inspection upon completion with necessary remedial maintenance taken.
- ii. Any future changes to the proposed development will need assessment by the designer to determine impacts on and/or changes required to the proposed drainage system.

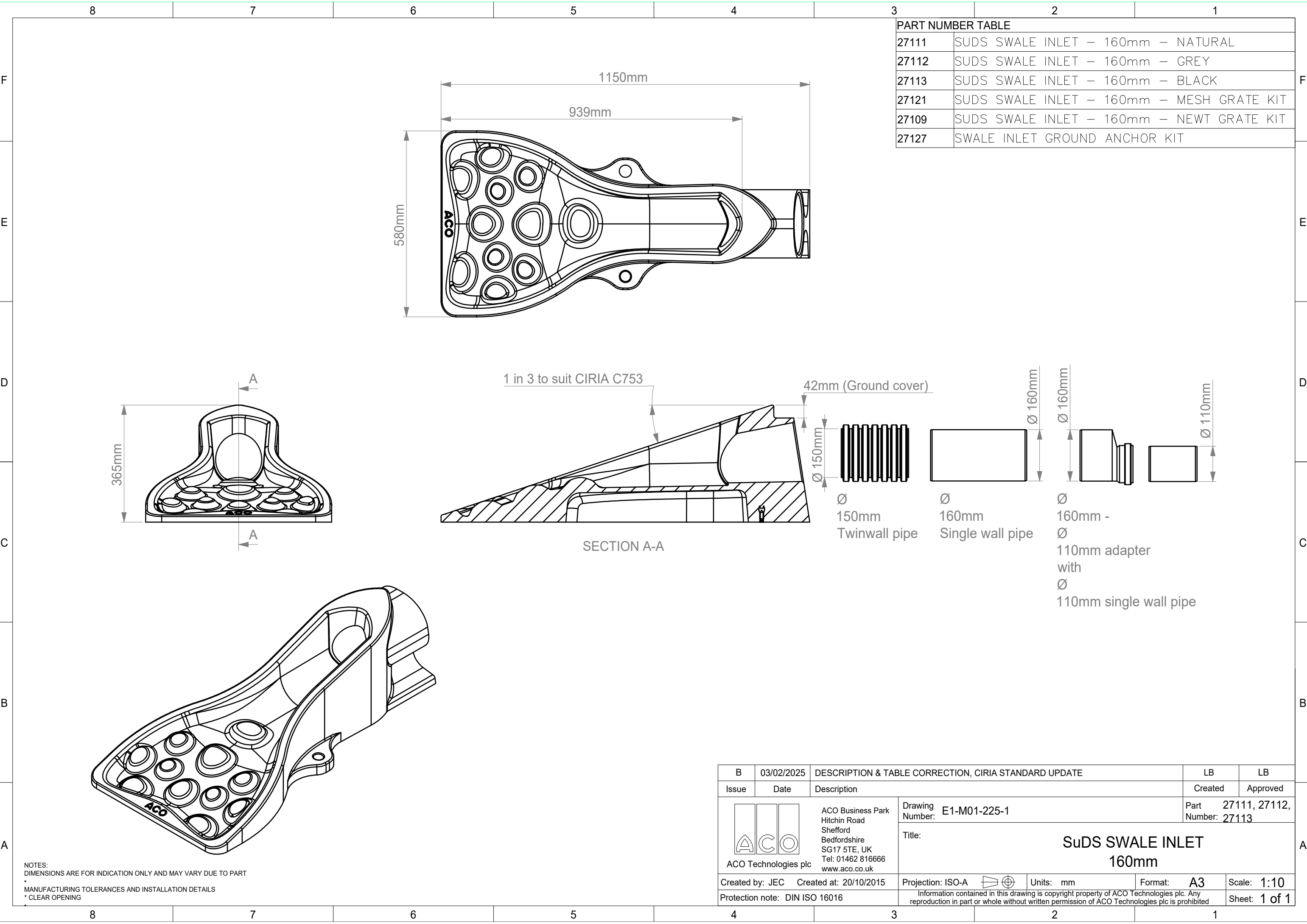


Appendix E Groundwater Monitoring Results



Appendix F

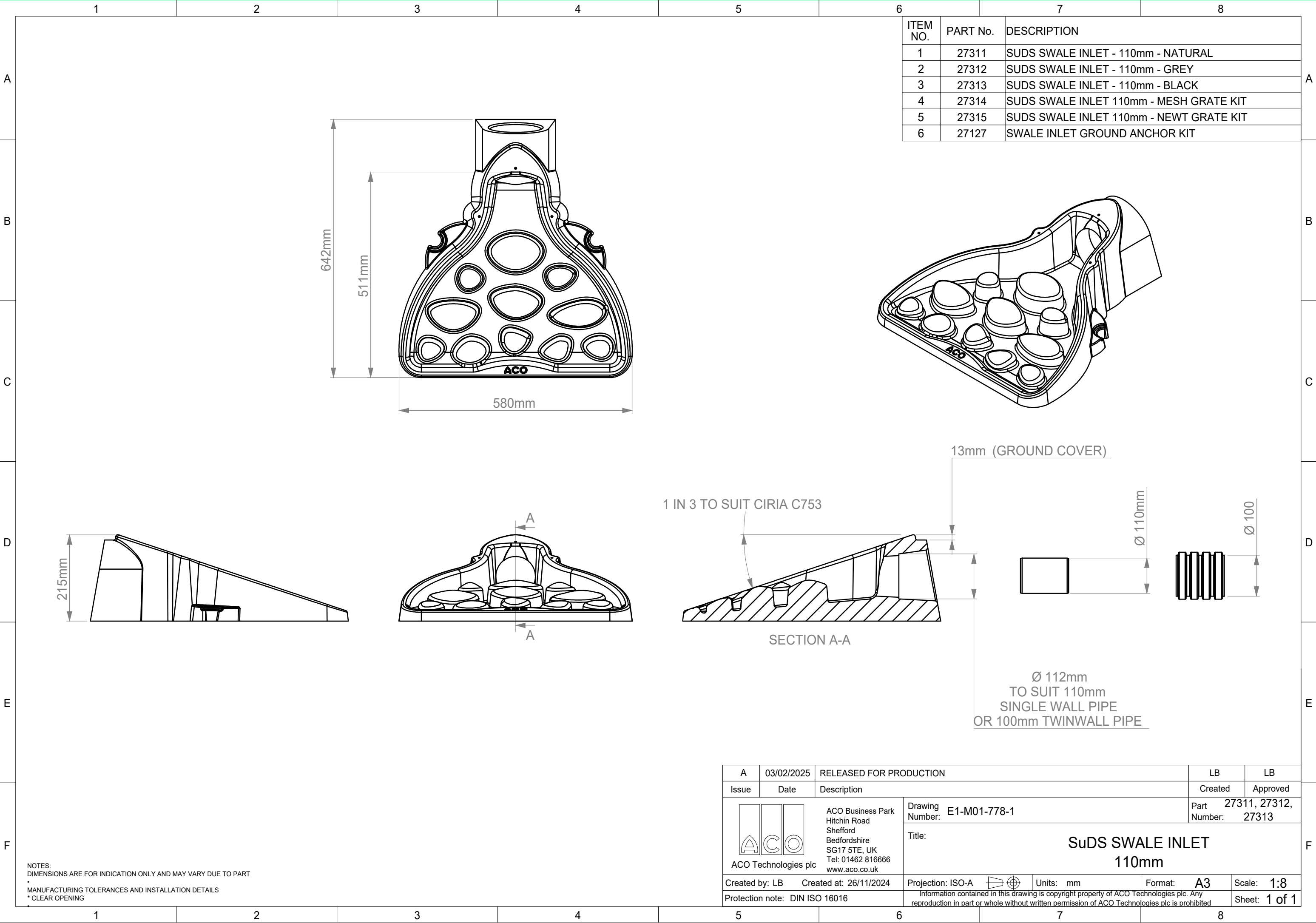
ACO SuDS Swale Inlet Detail



PART NUMBER TABLE	
27111	SUDS SWALE INLET – 160mm – NATURAL
27112	SUDS SWALE INLET – 160mm – GREY
27113	SUDS SWALE INLET – 160mm – BLACK
27121	SUDS SWALE INLET – 160mm – MESH GRATE KIT
27109	SUDS SWALE INLET – 160mm – NEWT GRATE KIT
27127	SWALE INLET GROUND ANCHOR KIT

NOTES:
DIMENSIONS ARE FOR INDICATION ONLY AND MAY VARY DUE TO PART
•
MANUFACTURING TOLERANCES AND INSTALLATION DETAILS
* CLEAR OPENING

B	03/02/2025	DESCRIPTION & TABLE CORRECTION, CIRIA STANDARD UPDATE		LB	LB
Issue	Date	Description		Created	Approved
 ACO Technologies plc		ACO Business Park Hitchin Road Shefford Bedfordshire SG17 5TE, UK Tel: 01462 816666 www.aco.co.uk		Drawing Number: E1-M01-225-1	
		Title: SuDS SWALE INLET 160mm		Part Number: 27111, 27112, 27113	
Created by: JEC		Created at: 20/10/2015		Projection: ISO-A	Units: mm
Protection note: DIN ISO 16016		Information contained in this drawing is copyright property of ACO Technologies plc. Any reproduction in part or whole without written permission of ACO Technologies plc is prohibited		Format: A3	Scale: 1:10
				Sheet: 1 of 1	





Appendix G

Sudsstore Controflow Universal Flow Control Detail

Contents:

Product Code	Description	Page
SUDS01001	Controflow Micro	3
SUDS01101	Controflow Domestic	7
SUDS02005	Controflow Universal	9
SUDS02008	Controflow Housing	13
SUDS03001	Controflow Commercial	15
SUDS08001	Controflow SuDS Basket	17

Controflow Product Selector:

	Application	Product Code	Description	Comments
Flow Control Chambers	Permeable Pavement Level Invert	SUDS01001	Controflow Micro	For shallow applications only, max 600mm cover to invert
		SUDS02005	Controflow Universal	Max depth 1.2m
	Permeable Pavement Stepped Invert	SUDS02008	Controflow Housing	Typically Housing, 110mm Ø pipe connections
		SUDS03001	Controflow Commercial	Typically Commercial, 160mm Ø pipe connections
	Swale	SUDS02005	Controflow Universal	Max depth 1.2m
	Skeletank On-Plot Attenuation Tanks	SUDS01101	Controflow Domestic	Prescribed flow rate of 0.2 l/s
	Plastic Crate On-Plot Attenuation Tanks	SUDS01101	Controflow Domestic	If overall depth of tank < 900mm, prescribed flow rate of 0.2 l/s
		SUDS02005	Controflow Universal	Max depth 1.2m
	General Drainage / Site Outfall	SUDS02005	Controflow Universal	Max depth 1.2m

Swale	Swale Inlet / Outlet	SUDS08001	Stainless Steel Mesh Basket and Pipe Guard
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Description

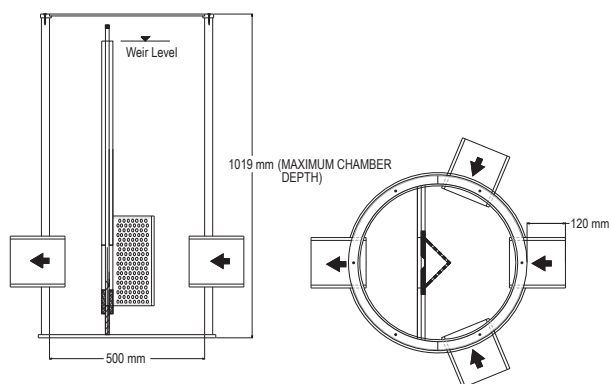
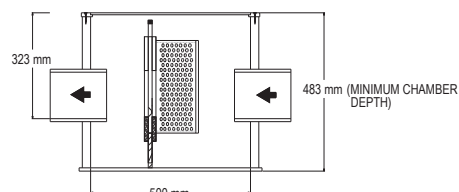
A flexible universal flow control chamber, with level inverts, suitable for any SuDS technique. The slide-out centre plate acts as an overflow weir and contains a circular orifice (to specified diameter), protected by an upstream filter guard. The slide-out centre plate can be temporarily removed to gain access to rod the connections, during regular maintenance services. The Controflow 500 Series Universal Level Invert is available with either 160mm or 110mm diameter connection stubs which offer a flexible layout and is available in depths ranging from 483mm to 925mm. An optional foul air trap is available when connected to the combined sewer. Chambers are supplied with a temporary protective site cover (permanent cover and frame available upon request).



Packaging Details

Element	Value	Unit
Packaging unit dimension	773 x 773 x 1032 (LxWxD)	mm
Packaging unit weight	TBC	kg
Number of units per pallet	8	nr
Pallet dimensions	1200 x 1200 x 150 (LxWxD)	mm
Pallet weight	TBC	kg

*packaging dimensions based on maximum chamber depth



Specification

Element	Value	Unit
Maximum depth of chamber	1019	mm
Minimum depth of chamber	483	mm
Overall width	753	mm
Spigot O.D. ∅	160 or 110	mm
Orifice type	Fixed plate	
Unit weight	TBC	kg
Material	HDPE	

Information Check List

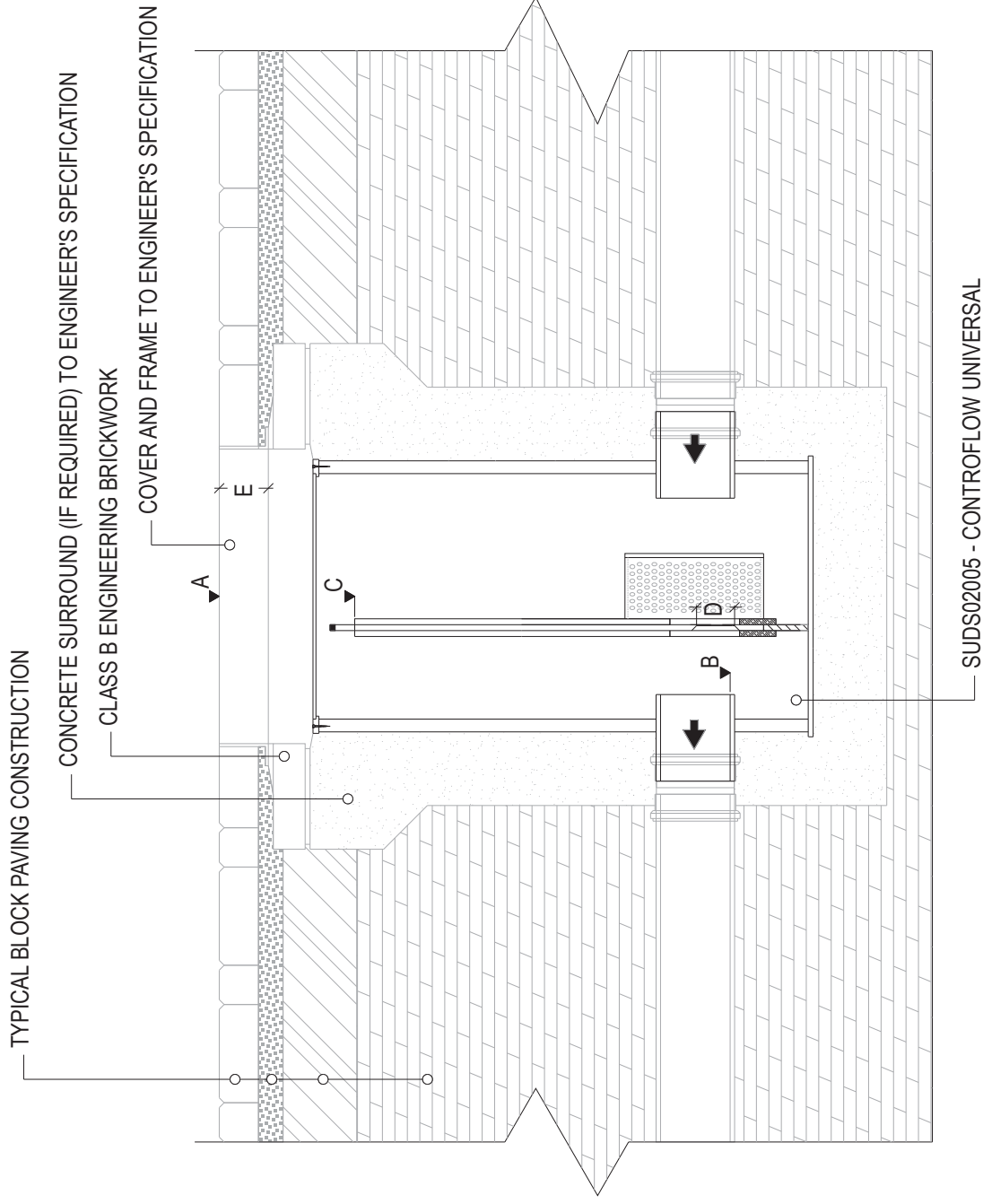
(required prior to order being processed)

Element	Value	Unit
Cover level		m (A.O.D)
Pipe invert level		m (A.O.D)
Weir Level		m (A.O.D)
Orifice diameter		mm
Depth of cover and frame to be used		mm
Spigot Diameter		mm
Number of inlet spigots		nr.

A.O.D - Above Ordinance Datum

Controflow Universal - Level Invert Protected Orifice General Application

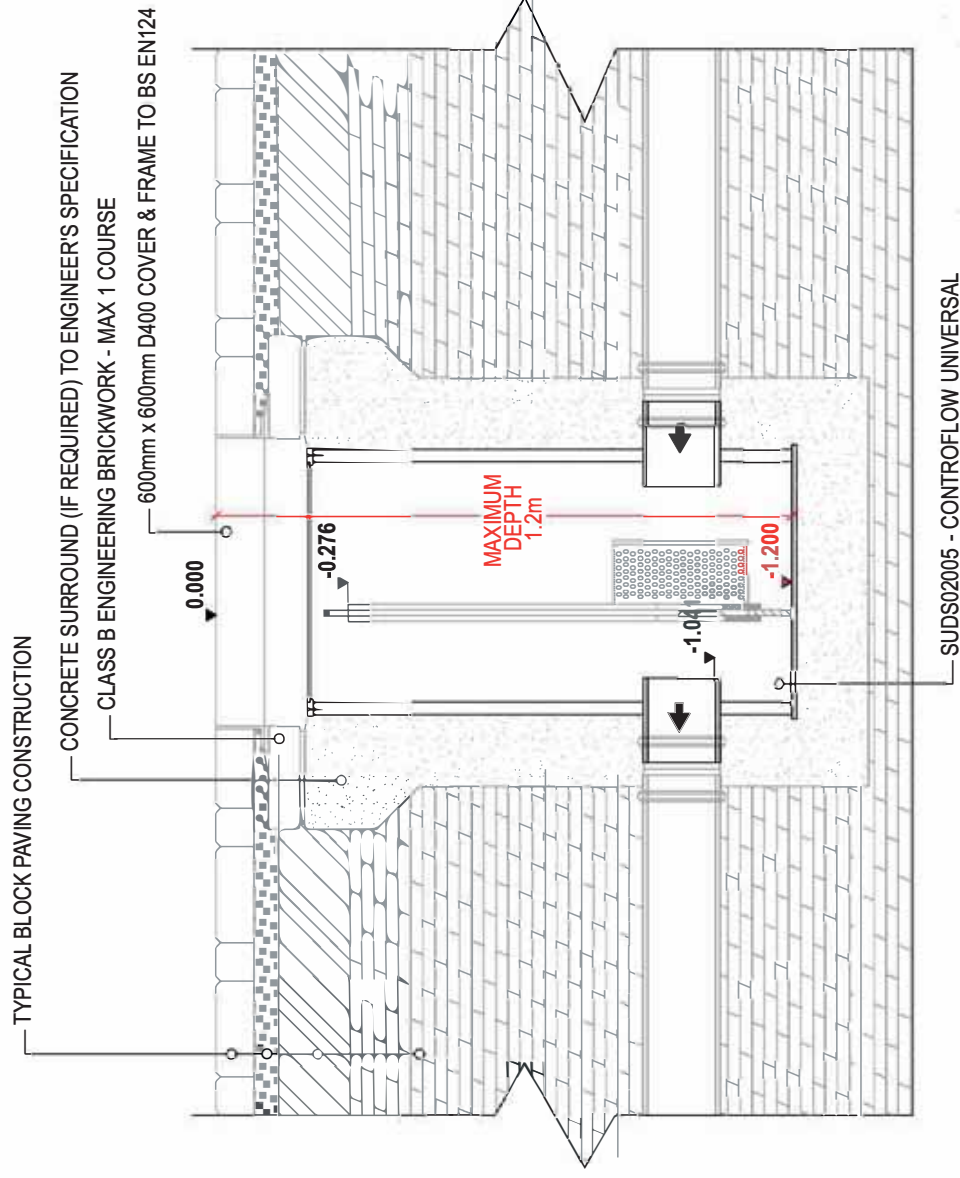
SUDS02005



- A - COVER LEVEL (m AOD)
- B - PIPE INVERT LEVEL (m AOD)
- C - WEIR LEVEL (m AOD)
- D - ORIFICE DIAMETER (mm)
- E - DEPTH OF COVER AND FRAME TO BE USED (mm)

Controflow Universal - Level Invert Protected Orifice Maximum Depth Application

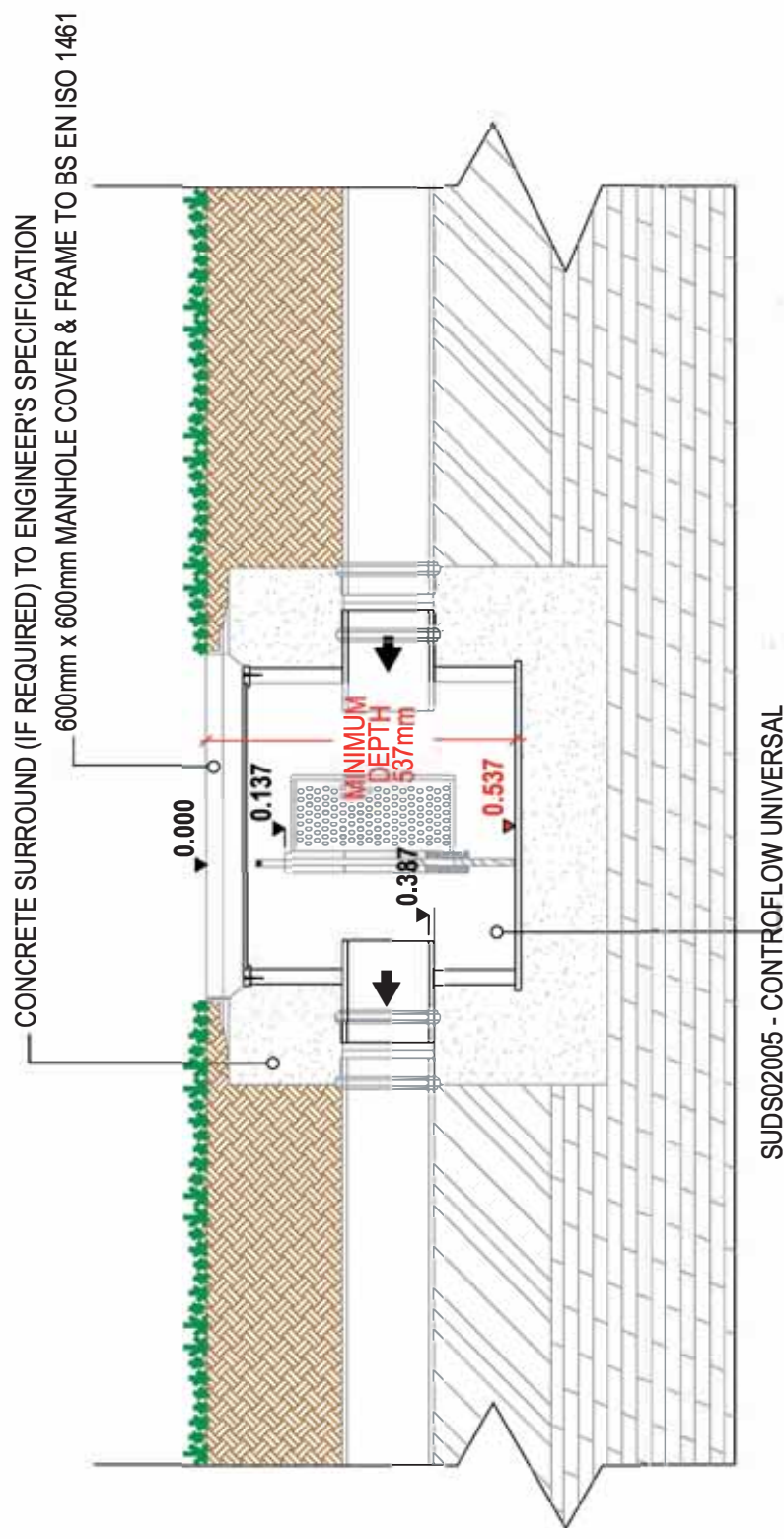
SUDS02005



NOTE: IN ACCORDANCE WITH BUILDING REGULATIONS H1, CLEARANCE OF BLOCKAGES, TABLE 11. SHOULD THE DEPTH OF THE CHAMBER FROM INVERT LEVEL, TO THE TOP OF THE SPECIFIED COVER EXCEED 1.2 METRES, A RESTRICTED ACCESS COVER NO GREATER THAN 350mm MUST BE USED FOR HEALTH AND SAFETY REASONS TO DETER ENTRY.

Controflow Universal - Level Invert Protected Orifice Minimum Depth Application

SUDS02005



NOTE: IN ACCORDANCE WITH BUILDING REGULATIONS H1, CLEARANCE OF BLOCKAGES, TABLE 11. SHOULD THE DEPTH OF THE CHAMBER FROM INVERT LEVEL, TO THE TOP OF THE SPECIFIED COVER EXCEED 1.2 METRES, A RESTRICTED ACCESS COVER NO GREATER THAN 350mm MUST BE USED FOR HEALTH AND SAFETY REASONS TO DETER ENTRY.



Appendix H Arun Byelaws Discharge Consent



Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Tel: 01903 737819

12th January 2026

Mr D Lytton
Harbourstone Design Limited
87 Redwing Road
Clanfield
Waterlooville PO8 0LX

Please ask for:

Paul Cann
Engineering Services
37819
e-mail: paul.cann@arun.gov.uk

Your Ref:

Our Ref: LDB/ARU/2026/001

Dear Dan

Arun District Council Land Drainage Byelaws 2004
Land Drainage Works at Development East of Northfields Lane, Aldingbourne

Thank you for your application for consent to undertake works under our Land Drainage Byelaws.

I confirm that your proposals for the permanent / ~~temporary~~* works are acceptable. I enclose consent number LDB/ARU/2026/001 giving approval to the proposals.

Please notify this authority no less than seven days before commencement and upon completion of the works via one of the methods of contact above, quoting the above consent number for reference. Please note that inspections will be carried out as deemed necessary.

The applicant must provide photographs of the works during construction and on completion, and forward digital copies to this office. **Please note the 'Conditions' attached to this approval.**

Yours sincerely

Mr Paul Cann
Principal Drainage Engineer



Land Drainage Byelaws Consent

Arun District Council Land Drainage Byelaws 2004

Name:

Domusea Northfields Limited

Consent applying to:

Land East of Northfields Lane, Aldingbourne

Connections to watercourse

Consent Number LDB/ARU/2026/001

**Effective from
12th January 2026**

Land Drainage Byelaws 2004

Control of works affecting ordinary watercourses

Consent number LDB/ARU/2026/001

To: Domusea Northfields Limited

Arun District Council in exercise of its powers under our Land Drainage Byelaws 2004 and subject to the conditions attached, hereby grants its consent in relation to the works or operations described in this Consent.

Watercourse: Not named

Location: Land east of Northfields Lane and north of The Haven

Map reference: SU 93895 05835 & 93968 05805

Description of works: Connection to watercourse on western boundary via 100mm diameter pipe and headwall & connection to watercourse on eastern boundary via 150mm diameter pipe, flap valve and headwall.

Drg no's. 24005 01 Rev A, 2025-C109-001 Rev B, 2025-C109-004 Rev B, 2025-C109-006 Rev A

In supporting documentation;

Arun District Council does not accept any responsibility for the design and construction of the works referred hereto and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

This Consent shall come into effect on 12th January 2026

Signed on behalf of Arun District Council



Mr Paul Cann
Principal Drainage Engineer

Date of signing

12th January 2026

Conditions

This consent is granted with the following conditions:

General

N/A

Timing

Works to be completed within 3 years of the date of this consent or else the consent will be deemed to have expired. This period can be extended upon written agreement.

Temporary Works

Method statements for associated construction and/or temporary works to be submitted and approved before commencing works.

Site Specific

No part of headwalls to encroach into the ditch profile.

Banks to be suitably profiled to suit the prefabricated headwalls.

Other Information

This Consent does not remove from the applicant the necessity to obtain other licences, consents, approvals or permissions (including planning permission) which may be required in law or in order to comply with any duties or responsibilities for conservation or protection of the environment.

It is the applicants responsibility to ensure that he obtains the consent / permission of any owners and occupiers affected by the works.

This Consent does not confer any rights of entry or rights over property.

Works should be arranged to ensure there is no increase in flood risk to third parties.

Arun District Council does not accept any responsibility for the design and construction of the works that are the subject of this Consent and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

The works must be undertaken in accordance with the approved plans, drawings, calculations, specifications and other relevant documents.

All reasonable precautions must be taken during the undertaking of the works so as not to obstruct, impede or interfere with the flow of water in, into or out of the watercourse and not to damage the banks or bed or any drainage works without the approval of the Arun District Council.

