



Mid Sussex District Council

Planning and Sustainable Economy
Oaklands Road
Haywards Heath
West Sussex
RH16 1SS

Date: 21 May 2026
Your Ref: DM/24/1609
Our Ref: BW/3986/001
Email: Bwilliams@epstrategies.co.uk

Discharge of Condition 4 for the proposed development at Wickenden Farm, Sharpthorne, East Grinstead, Mid Sussex, RH19 4JD.

This letter has been prepared with reference to planning application reference DM/24/1609 and is aimed at discharging planning condition 4 (herein referred to as 'Condition 4') for the proposed development at the above address. Condition 4 relates to the safe management of surface water runoff through the use of Sustainable Drainage Systems (SuDS) and in addition, requires a strategy to manage foul drainage.

The proposed development comprises the change of use to residential retreat to include conversion and extension of existing stables to guest accommodation, conversion of three-sided former agricultural building to workshop, kitchen and amenity space, conversion and extension of small stables to treatment rooms, erection of bin store and provision of car parking area

The details of Condition 4 are quoted below:

Planning Condition 4

"The development hereby permitted shall not commence unless and until details of the proposed foul and surface water drainage and means of disposal have been submitted to and approved in writing by the Local Planning Authority. No building shall be occupied until all the approved drainage works have been carried out in accordance with the approved details. The details shall include a timetable for its implementation and a management and maintenance plan for the lifetime of the development which shall include arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime. Maintenance and management during the lifetime of the development should be in accordance with the approved details."

Reason: To ensure that the proposal is satisfactorily drained and to accord with the NPPF requirements and Policy DP41 of the Mid Sussex District Plan."

National Policy for SuDS

In accordance with the National Planning Policy Framework (NPPF, 2025), SuDS should be included within the proposed development scheme where it is practicable to do so. The proposed development must also maintain, or ideally reduce, the rate at which runoff is discharged offsite. This is to ensure that the offsite risk of surface water flooding is not increased by the development.

The National Standards for SuDS specify criteria to ensure sustainable drainage is included within all new developments. It is, however, recognised that SuDS should be designed to ensure that the maintenance and operation requirements are economically proportionate.

In addition, the Mid-Sussex Council Local Plan advises that all proposed developments must show attempts to better on-site drainage, whilst using above ground SuDS and infiltration methods where possible.

Climate Change

The NPPF and supporting Planning Practice Guidance Suite (2025) state that residential development should be considered for a minimum of 100 years, but that the lifetime of a non-residential development depends on the characteristics of the development. Although the development that is the subject of this assessment is for commercial purposes, it will host guest residential services, and therefore a design life of 100 years has been assumed.

The Environment Agency (EA) provides guidance regarding the application of the climate change allowances relating to peak rainfall intensity and how they should be applied to the planning process. Recognising that the impact of climate change will vary across the UK, the allowances were updated in May 2022 to show the anticipated changes to peak rainfall across a series of management catchments. The proposed development site is located in the Ader and Ouse Management Catchment, as defined by the 'Peak Rainfall Allowance' maps, hosted by the Department for Environment, Food and Rural Affairs.

For this development, an increase of 45% has been applied to the hydraulic drainage model constructed to inform the drainage strategy. Where this allowance has been applied the abbreviation "+45%cc" has been used.

Existing Site Drainage

The existing drainage of the site is discussed within Section 3 of the associated preliminary 'Drainage Strategy' produced by Herrington Consulting (October 2024). The existing brownfield and accompanying greenfield discharge rates from the proposed area of development have been reproduced here in Table 1, for a range of rainfall events with varying return periods.

Return Period (years)	Existing Greenfield Runoff Rate (l/s)	Peak runoff from the Existing Site (l/s)
QBar	3.8	40.9
30	8.8	106.9
100	12.1	134.7

Table 1 - Summary of greenfield and brownfield peak runoff rates for the site.

For surface water, all runoff is collected on site and subsequently discharged to land drains located south and east of the site. The applicant has indicated that the land drains are connected to a watercourse approximately 20 metres below the elevation of the development site, which is understood to be a tributary of the Cockhaise Brook.

The wastewater is currently directed towards two packaged treatment plants located east and southeast of the site. The treated water (effluent) is subsequently discharged to land drains and onwards towards the Cockhaise Brook tributary watercourse.

The existing site is 33% impermeable and as the impermeable area of the proposed site will marginally increase to 38%, the discharge rates will also increase. As a consequence, it is recommended that SuDS are incorporated into the scheme to reduce the overall rate at which surface water runoff is discharged from the site, over the lifetime of the development. SuDS will need to be incorporated into the development to also ensure that the site complies with the National Standards for SuDS and local planning policy.

Drainage Hierarchy and Opportunities for Managing Surface Water Runoff

The National Standards for SuDS set out a hierarchy of preferred options for the discharge of surface water runoff from developments. This hierarchy prioritises managing surface water runoff at source, by either storing it for later **re-use** or allowing it to **infiltrate** into the ground. If this option is not viable, the next option of preference is for the runoff to be discharged into a **watercourse**. Water should only be conducted into a **public sewer** system if neither of these former options are possible, with a connection into a surface water sewer being preferred over the discharge into a combined sewer.

The following opportunities for managing the surface water runoff discharged from the development site are listed in order of preference:

Infiltration – British Geological Survey mapping shows that the bedrock geology of the site is made up of the Ashgate Formation (containing sandstone and siltstone interbedded), with no overlying superficial deposits. The above-mentioned stratum is considered permeable, capable of discharging surface water directly to the ground.

Site-specific ground investigations have been carried out at two locations on site. Two trial pits (at 2m depth) soakage tests were carried out in accordance with BRE 365 guidelines in the eastern area of the site. The trial pit locations were chosen by the applicant in areas that were verified as okay for soakaways to be implemented. The full investigative report and results of the infiltration testing are found within the enclosed documents. The results between the two trial pits varied, with one location (TP02) showing much stronger infiltration potential than the other (TP01). Therefore, the location of TP02 will be utilised as the proposed location of one single soakaway to manage the runoff from the entire proposed development.

Based on site investigations, infiltrating runoff into the ground is assessed as being a viable method of discharging the surface water runoff generated from the development and is therefore proposed as a part of the drainage system. An infiltration rate of 0.11412 m/hour (or 3.17×10^{-5} m/s) was found and used within the hydraulic model to size the required soakaway.

Discharge to Watercourses – There is a watercourse located southeast of the site with connectivity to a main river. However, a more sustainable solution for managing the surface water runoff from the proposed development is available. Therefore, continuing to discharge to the watercourse will not be required, reducing the risk of flooding offsite. As a result, the proposed development will provide an improvement on the existing scenario within the wider catchment, reducing the risk of flooding downstream.

Discharge to Public Sewer System – No public surface water sewers have been identified within the local area, and a more suitable solution for discharging surface water from the proposed development is available. Discharging surface water from the development into the public sewer system is therefore not considered to be a viable solution.

Proposed Surface Water Drainage System

A drainage layout plan has been included within the enclosed documents, along with the results of a hydraulic drainage model to demonstrate how the objectives set out in Condition 4 can be achieved. The following SuDS have been proposed:

Water Butts - Water butts are proposed to be located adjacent to the guest buildings within the open green spaces. These will take water from the roofs and will provide water for reuse in the open garden and green space areas. During a rainfall event, if the system becomes overwhelmed, water will overflow into the drainage network and subsequently into rain gardens, via an overflow pipe connected to the water butts. A conservative approach has been adopted and the additional storage provided by the empty water butts has been excluded from the storage calculations, to ensure that the overall drainage system is sized appropriately.

Rain Gardens – Surface water runoff from all roofs and hardstanding will first be drained towards and collected by rain gardens placed across the site, where runoff can be treated, filtering out pollutants. Two rain gardens are proposed as part of the development; one located adjacent to the proposed car park and the other east of the proposed main reception building. Surface water runoff from the entire development will pass through either both or one of the proposed rain gardens.

The rain gardens will act as a bio-retention feature. During low return period events, the planted areas will store runoff within the soil substrate. These areas will also contribute to reducing the volume of water discharged offsite via infiltration to the ground and evapotranspiration. An overflow pipe from the planted areas will need to be connected to the primary onsite drainage network.

Although the incorporation of planted SuDS devices will provide a benefit to the quality of water discharged from the site (reducing the risk of blockages further downstream within the drainage network), it is unlikely that they will provide sufficient stormwater storage under higher return period events. Consequently, other means of storage will need to be provided.

Soakaway – Runoff from the overflows of each rain garden will be directed via underground pipes into a singular soakaway, located east of the proposed development area (within applicant land-ownership). A piped connection from each rain garden will allow surface water to flow into the soakaway and subsequently infiltrate to the ground. The soakaway will be lined with permeable geotextile liner to permit infiltration. Although the rain gardens should provide sufficient treatment to filter out pollutants/contaminants from surface water runoff, silt traps/catchpits will be specified upstream of the soakaway to further prevent sediment/silt build up at the base of the soakaway. A summary of the Causeway Flow+ analysis for each soakaway is shown in Table 2 below.

Parameter	Design (1:100yr+45%cc event)
SuDS	Soakaway
Total area draining to soakaway, including overflow from other SuDS and a 10% allowance for urban creep	3,817 m ²
Dimensions	15 m x 13.5 m x 1.6 m
Infiltration rate	0.011412 m/hour
Porosity	95%
Required storage volume	303 m ³
Half drain time	10 hours
Critical storm duration	480 minutes

Table 2 – Summary of the proposed drainage system, test for the design event 1:100+ 45%cc.

It is evident that with the inclusion of the proposed SuDS, there is the potential to accommodate all of the surface water runoff from the site, up to and including, the design rainfall event. The strategy of combining rain gardens and a soakaway will provide sufficient storage to enable all of the surface water runoff from the site to infiltrate directly to the ground. The risk of any surface water flooding as a result of the proposed development has been appropriately mitigated with the inclusion of the SuDS scheme described above. An updated infiltration approach to manage the stormwater runoff within the development site will also significantly reduce the risk of flooding off-site, downstream within the local catchment.

Consequently, it is considered that this will be acceptable to the Local Planning Authority (LPA) and Lead Local Flood Authority (LLFA).

Water Quality and Simple Index Approach

The simple index approach analysis has been applied to the development site to verify that sufficient SuDS have been included within the proposed scheme to provide the appropriate mitigation for contaminant mobilisation.

The classification of the area draining to the proposed SuDS, according to the simple index approach, is labelled as 'Driveways, and low traffic areas, residential car parks, offices, schools etc'. The pollution indices of the

classification area have been compared to the treatment indices for the proposed drainage system. Both the pollution and treatment indices, in accordance with the Ciria C753 SuDS Manual, have been summarised in Table 3 below.

	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Pollution hazard indices (Driveways, low traffic areas and residential car parks)	0.5	0.4	0.4
Mitigation indices expected for rain gardens (bio-retention systems)	0.8	0.8	0.8
	Sufficient treatment	Sufficient treatment	Sufficient treatment

Table 3 – *Potential mitigating indices for the proposed development.*

Based on the analysis above, sufficient treatment has provided at the site to remove contaminants from surface water runoff before infiltration to the ground.

Design Exceedance

The proposed drainage system has been designed to accommodate surface water runoff generated under an extreme rainfall event, with a return period of 1 in 100 years, including a 45% increase in peak rainfall intensity (to account for the impacts of climate change). As such, this additional percentage increase complies with the EA's most contemporary guidance on climate change for the upper allowances.

Nonetheless, if a rainfall event was to occur which exceeds the design parameters or a blockage was found, surface water could fill up the drainage network and overflow. In this scenario, surface water would exit the soakaway first, as it is located at the lowest elevation.

Any water overflowing the system is likely to flow southeast, following the topography of the surrounding area, which shows steep falls to the watercourses south and east of the site. An overflow pipe will be incorporated into the design of the soakaway, allowing water to directly flow into existing land drains (shown in drainage survey, enclosed documents) in an exceedance/blockage situation. This would allow any excess floodwater generated to be safely conveyed away from the buildings on site, via the existing drainage channels and towards the receiving waterbodies, as in the current scenario.

Furthermore, it is recognised that the drainage proposals will incorporate a significant volume of additional storage for storm water, which is not currently provided on the existing site. As a result, when compared to the existing site, it is likely that the volume of water discharged from the site during an extreme rainfall will be reduced, thus minimising the potential impact of flooding to the surrounding area.

In summary, with the inclusion of the SuDS discussed within this strategy, the proposed surface water drainage solution will not increase the risk of flooding at the site, or within the surrounding area, during an exceedance event and is, therefore, considered appropriate.

Maintenance and Management

Typical maintenance schedules have been produced for the proposed SuDS systems and have been included within the enclosed documents. The SuDS at this site are communal and as such, the maintenance company that is responsible for maintaining the rest of the site, will be responsible for maintaining and inspecting the SuDS systems at this site. It should, however, be noted that it may be necessary to involve specialist contractors to undertake specific maintenance tasks that are required.

The details of the maintenance and management company are as follows:

Company Name: North Star Centre Ltd

Company Address: Wickenden Farm
Chilling Street
Sharpthorne
RH19 4JD

During the construction of the proposed development, it will be necessary to manage the surface water runoff from the development site. The soakaway will be constructed at an early stage of the development, allowing any surface water runoff generated during the construction phase to be directed to it. Appropriate pollution control measures will also need to be implemented during construction to treat runoff before discharging to the soakaway. This system is to be managed through a Construction and Environmental Management Plan, which will need to be in place to reduce the risk of surface water flooding to the surrounding area for this short period of time.

Prior to the decommissioning of the temporary drainage system, it will be necessary to ensure that the final proposed drainage is in place prior to the completion of the construction phase. This is to ensure that there is always a suitable method available for discharging surface water in a sustainable manner.

Management of Foul Water

A foul water management strategy has been presented within Section 5 of the associated drainage strategy, produced by Herrington Consulting (October 2024), and is summarised here. A detailed layout plan of the proposed foul water management strategy is found within the enclosed documents.

In general, there are two methods for draining effluent from proposed developments. The preferred solution is a connection to the public sewer network, which is controlled by the sewerage undertaker. Nonetheless, if there are no sewers located near to the development site, or if there are particular reasons why a connection to the public sewer system would not be possible, e.g. topography, cost, environmental concerns etc., then the use of package treatment systems or cesspits will be permitted.

In this case, there are no public foul sewers in close proximity to the proposed development and therefore, the use of package treatment systems is considered to be the most appropriate option for this development.

Foul water discharged from the development is proposed to be managed through the use of two existing package treatment plants (PTP). The location for these systems is shown within the enclosed drainage

plan. The treated effluent from the PTPs is currently discharged to the existing land drains, which connect to a watercourse downstream (tributary of the Cockhaise Brook). The current site uses PTPs effectively and the proposed strategy is to continue to use the existing system to manage the wastewater generated from the proposed development.

It is noted that the on-site foul water network and discharge system will remain unchanged, aside from connecting one single manhole to discharge the foul effluent from the extended amenity space located next to the guest lodgings. The addition of effluent flows from this extension are minor, and include only 3 wash basin/sinks and a single toilet W/C.

The peak discharge from the proposed development has been calculated to confirm that each PTP is sized accordingly and will remain effective. Calculations have been provided, following the guidance outlined in Flows and Loads Vol. 4.

The two PTPs that are currently in use on site are the Kingspan Klargestar IPS BA Biodisc and the Kingspan Klargestar BB Biodisc. The former will be used to manage the effluent flows from the maximum 6 overnight guests in the lodge cabins (classified as Mobile Home Type Caravans with full services), whilst the latter will be used to manage the remaining effluent flows from the amenity and leisure areas used by the 3 full time day staff and maximum of 15 day guests (classified as Non-residential with canteen cooking on site).

The Flows and Loads Vol. 4 calculations for each PTP are presented in Table 4 (IPS BA Biodisc) and Table 5 (BB Biodisc). It is noted that whilst specific dimensions of each existing package treatment plant are not available, the smallest unit sizes for each model have been assumed and used to measure against the incoming effluent flows.

	Daily Site-Specific		
	Volume	BOD	Ammonia
Effluent Flows			
(6 Mobile Home Type Caravans with full services)	0.9 m ³	0.36 kg	48 mg/l of nitrogen
PTP Capacity	1.2 m ³	0.36 kg	N/A
	Sufficient capacity	Sufficient capacity	N/A

Table 4 – Effluent flows capacity analysis for the Kingspan Klargestar IPS BA Biodisc.

	Daily Site-Specific		
	Volume	BOD	Ammonia
Effluent Flows (3 Full time day staff)	0.27 m ³	0.11 kg	15 mg/l of nitrogen
Effluent Flows (15 Non-residential with canteen cooking on site)	1.35 m ³	0.57 kg	75 mg/l of nitrogen
Total Effluent Flows	1.62 m ³	0.68 kg	90 mg/l of nitrogen
PTP Capacity	2.4 m ³	0.72 kg	N/A
	Sufficient capacity	Sufficient capacity	N/A

Table 5 – Effluent flows capacity analysis for the Kingspan Klargestar BB Biodisc.

Based on the analysis within Tables 4 and 5 above, even assuming standardised smallest unit sizes of each PTP, it is concluded that there is sufficient capacity within the existing foul system to treat and discharge all foul effluent from the proposed development. Finally, in accordance with the Design and Construction Guidance (DCG), the design peak flow rate for foul water discharged from the proposed development has been calculated as 24.9 Discharge Units, equivalent to 2.49 l/s (calculations within enclosed documents).

Summary

The opportunities for draining surface water runoff and foul effluent from the proposed development at Wickenden Farm, Sharpthorne have been assessed, with the aim of discharging Condition 4. The analysis has shown that discharging surface water runoff to the ground via infiltration, will present the most viable and sustainable solution for draining the site.

Various SuDS have been proposed to manage all of the runoff from the proposed development, such as water butts, rain gardens and a soakaway. The soakaway will provide sufficient storage on site to manage and infiltrate all surface water runoff from across the site for all rainfall events, up to and including the design event. This provides a betterment when compared to the existing drainage system, as all surface water runoff will be managed on site and discharged directly to the ground, thereby reducing the risk of flooding elsewhere.

A maintenance and management schedule for the various SuDS is enclosed and provides details on how the management company can maintain the drainage system, to ensure continued operation for the lifetime of the development.

The opportunities for discharging wastewater discharged from the site have also been considered and the appraisal demonstrates that the most viable solution is to use the existing packaged treatment plant, which has been shown to be suitable to accommodate the additional wastewater flows generated by the proposed development.



The information contained within this document provides details to demonstrate how surface water runoff and foul effluent will be managed on site and I trust that this information will be sufficient to enable Condition 4 to be discharged in full.

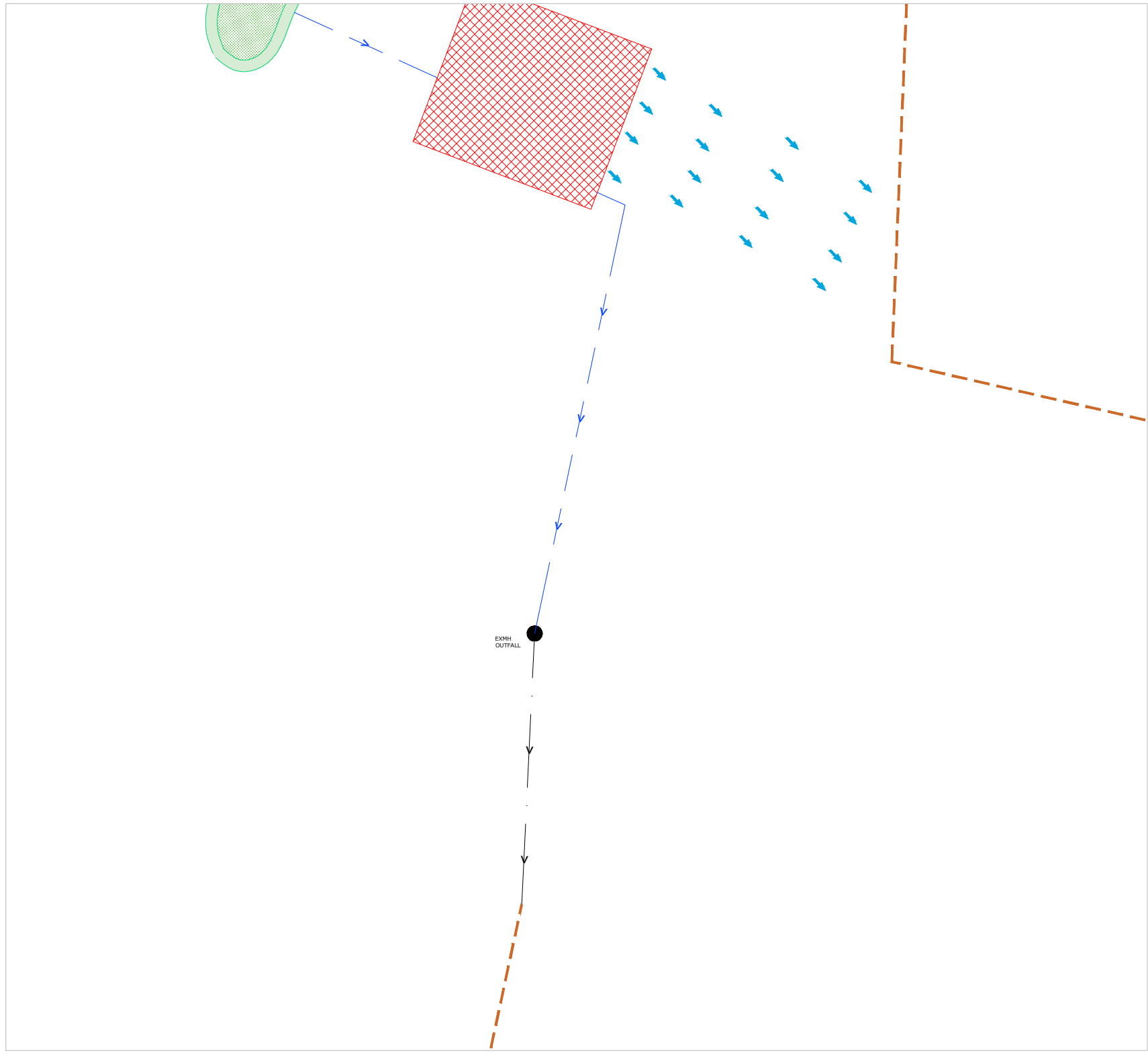
Yours faithfully,

Hamza Askari MPhys MPhil

Drainage Engineer

Enclosed documents:

- Drainage Layout Plan
- Drainage Standard Detail Drawings
- Causeway Flow+ Calculations
- Foul Water Design Peak Flow Analysis
- SuDS Maintenance and Management Plan
- Existing Drainage Survey
- Infiltration Testing Report



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KEY:

- MH — EXISTING SURFACE WATER SEWER
- EXISTING SURFACE WATER CHAMBER
- EXISTING SURFACE WATER DRAINAGE CHANNEL
- RWP EXISTING RAINWATER PIPE
- SURFACE WATER DRAIN
- MH SURFACE WATER MANHOLE
- PPIC SURFACE WATER PPIC
- RWP RAINWATER PIPE
- SURFACE WATER DRAINAGE CHANNEL
- RG ROAD GULLY
- RAIN GARDEN
- SOAKAWAY
- EXISTING LAND DRAIN
- FLOW ROUTE DURING EXCEEDANCE OR BLOCKAGE SCENARIO



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Rev	Description	Author	Checked	Date
P2	Third issue, for DoC	HA	EC	30/01/26
P1	Second issue	HA	SMB	03/11/25
P0	First issue	HA	SMB	30/09/24

CLIENT	North Star Centre Ltd
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PROJECT	Wickenden Farm, Sharpthorne
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SCALE	PROJ REF	ORIGINATOR	CHECKED BY
1:300	3986	HA	SMB

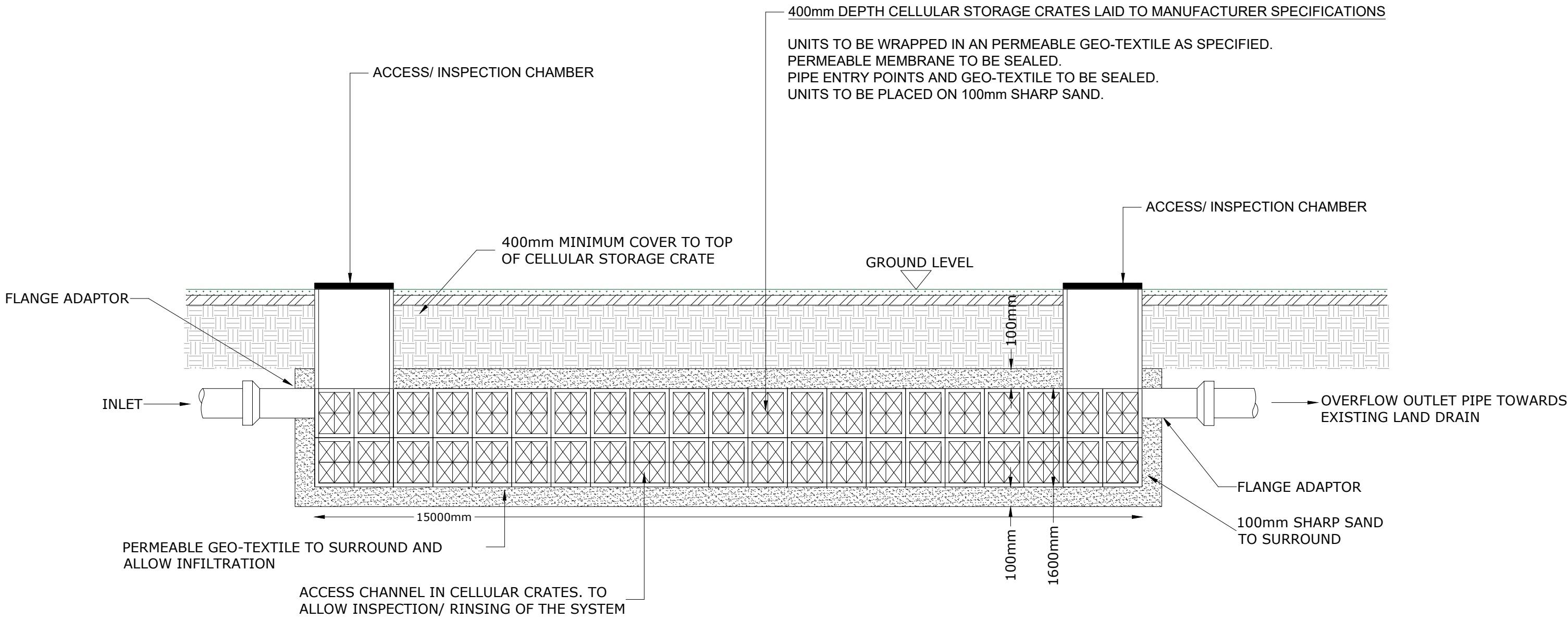
HC DWG REF.	3986_DWG_r2
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DWG TITLE	DWG No.
INDICATIVE SURFACE WATER DRAINAGE LAYOUT	EPS-3986-501



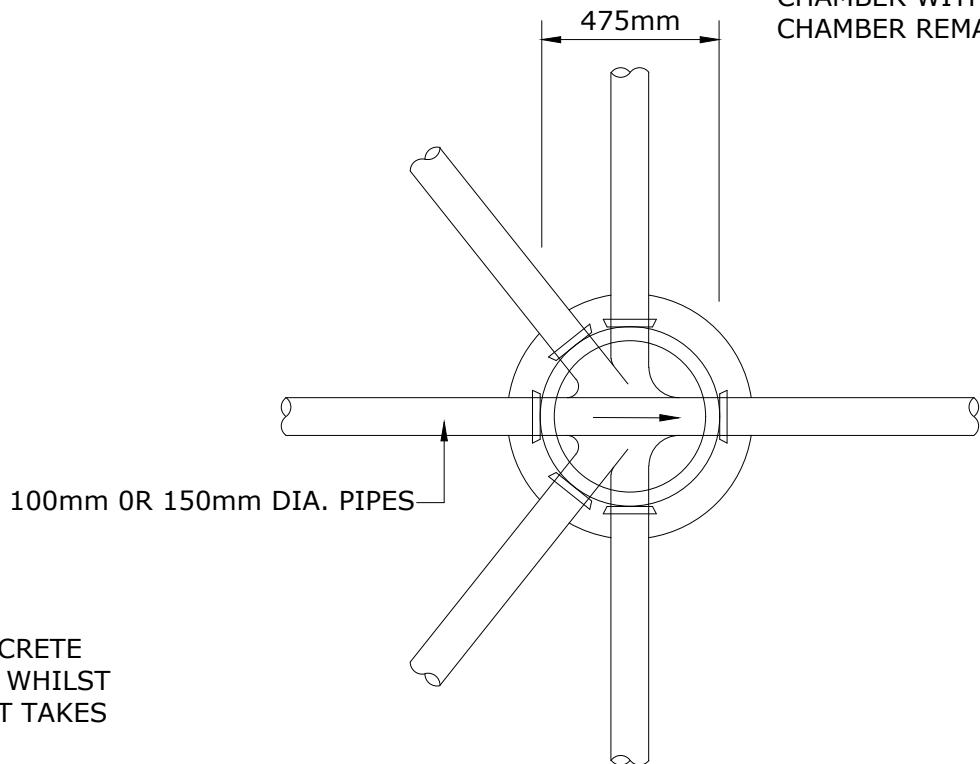
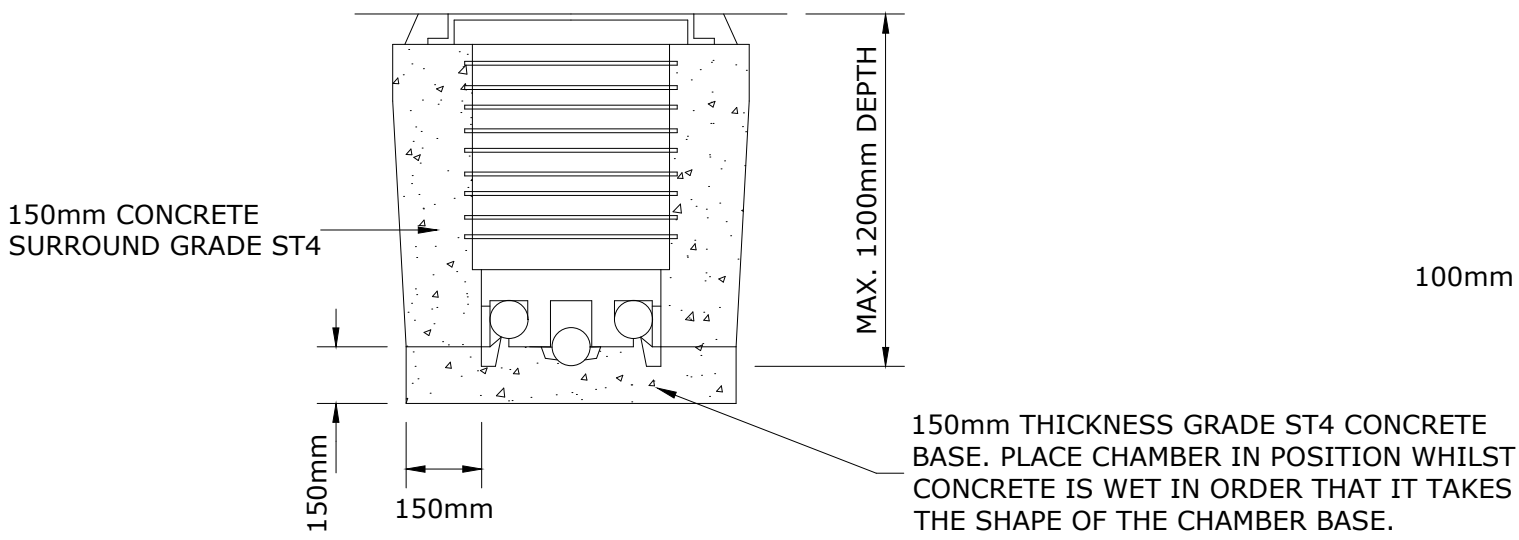
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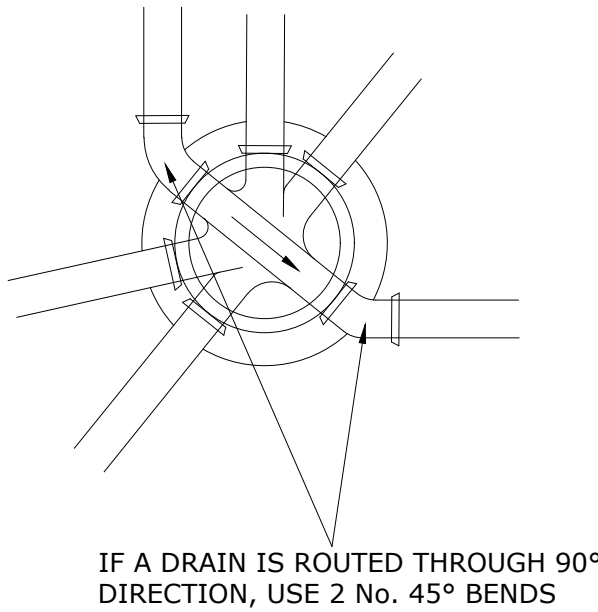


GEOCELLULAR SOAKAWAY DETAIL SHOWING INSPECTION HATCH
SCALE 1:20

APPROVED PPIC MANHOLE SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
INSPECTION CHAMBER COVER SET IN A PLASTIC FRAME ON A CONCRETE COLLAR.



PREFORMED POLYPROPYLENE INSPECTION CHAMBER WITH FACILITY FOR UP TO FIVE INLET CONNECTIONS. SURROUND CHAMBER WITH 150 min. CONCRETE GRADE ST4 ENSURING CHAMBER REMAINS LEVEL & RAISING PIECE UPRIGHT.



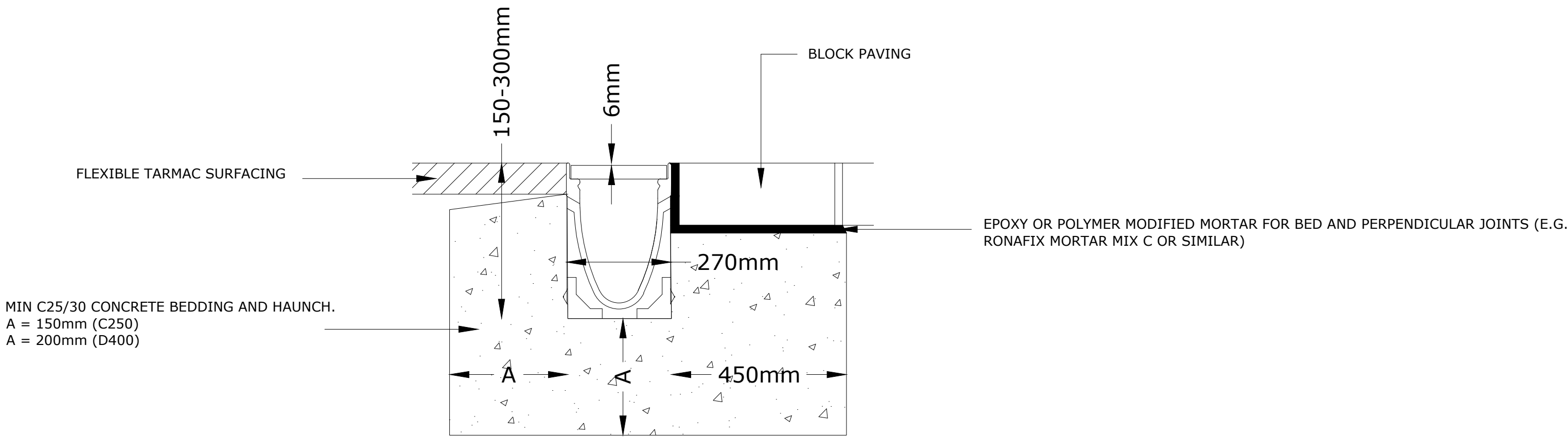
PROPRIETARY POLYPROPYLENE INSPECTION CHAMBER (PPIC)
FOR USE IN FOOTPATHS OR GRASSED AREAS. MAX. DEPTH COVER TO INVERT 1.2m
SCALE 1:20



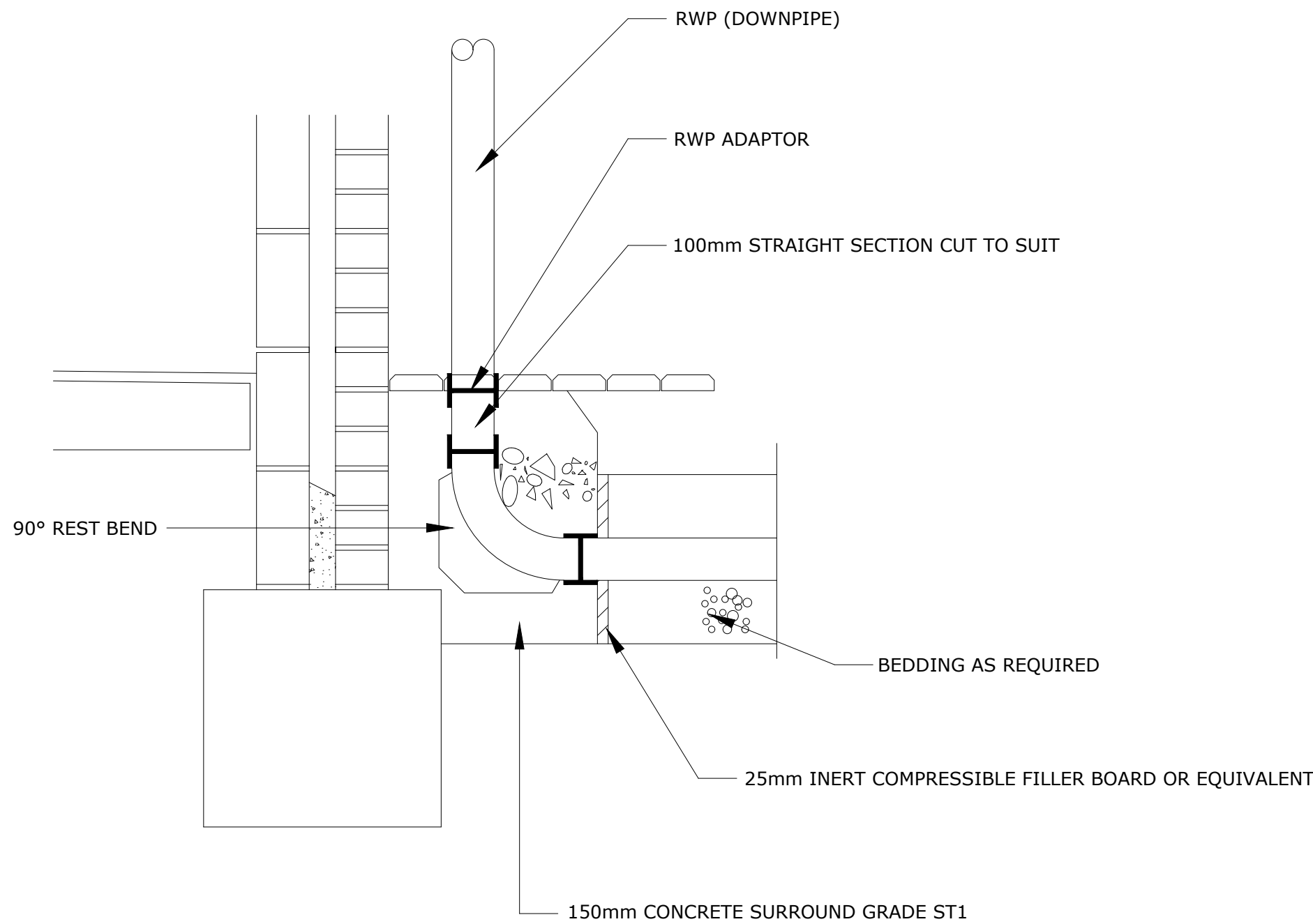
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P0	First issue	HA	EC	30/01/26
Rev	Description	Author	Checked	Date

CLIENT			
North Star Centre Ltd			
PROJECT			
Wickenden Farm, Sharpthorne			
SCALE	PROJ REF	ORIGINATOR	CHECKED BY
1:20	3986	HA	EC
HC DWG REF.			
3986_DWG_r2			
DWG TITLE			DWG No.
STANDARD SURFACE WATER DRAINAGE DETAILS			EPS-3986-502



ACO M100D DRAINAGE CHANNEL
SCALE 1:10



RWP OUTLET
SCALE 1:10

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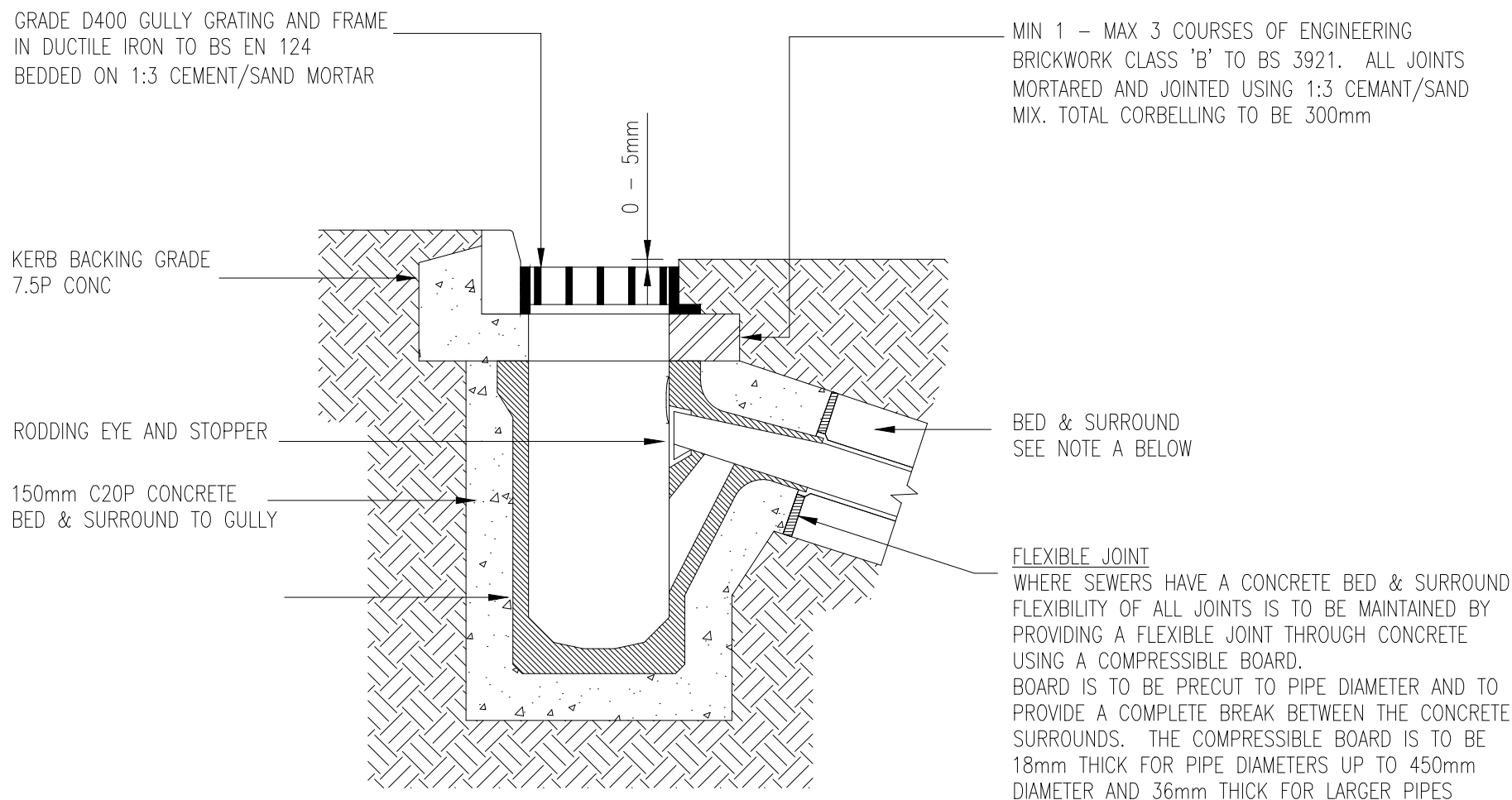
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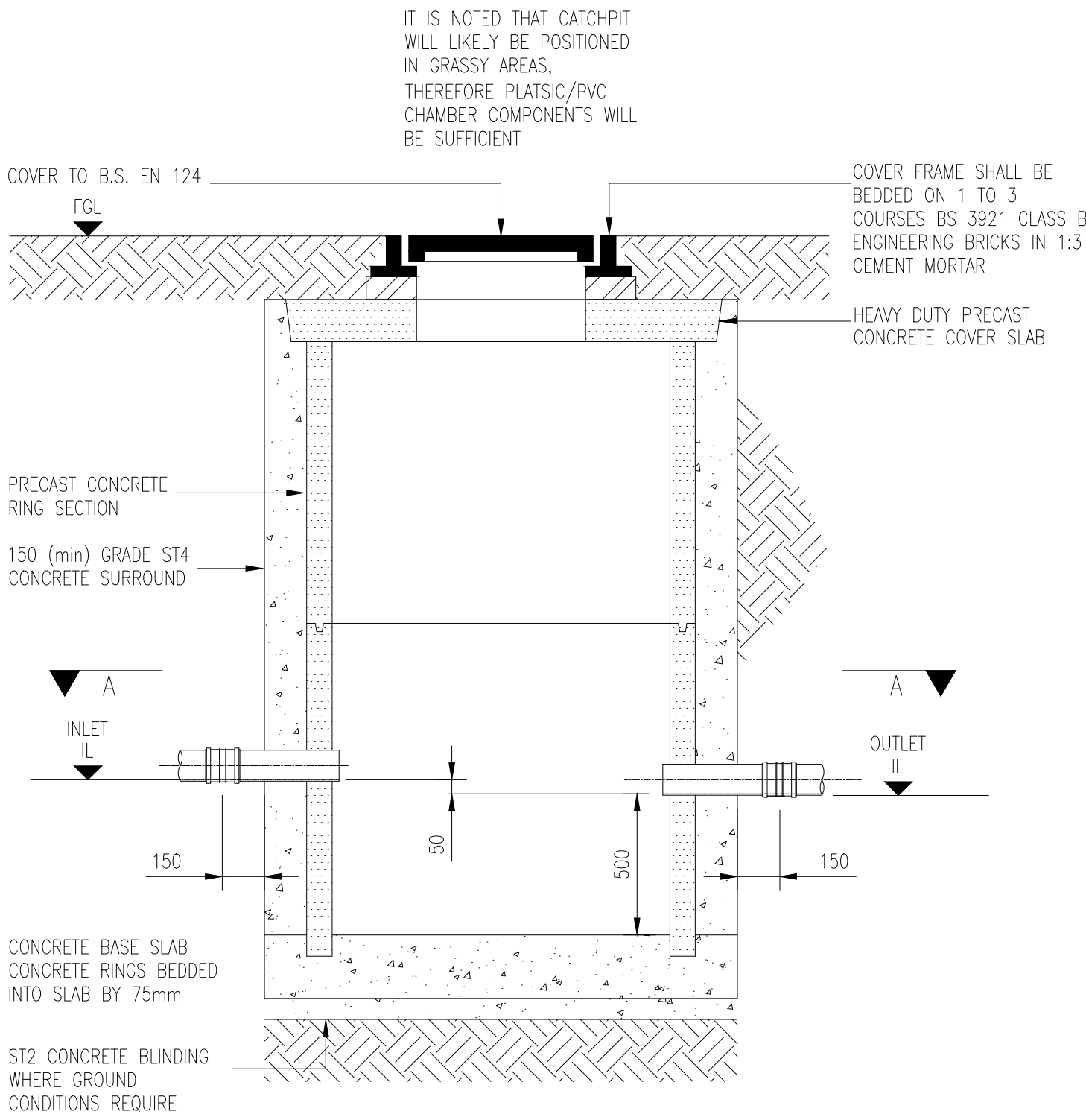
P0	First issue	HA	EC	30/01/26
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- CLIENT -				
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1:10	3986	HA	EC	
- HC DWG REF. -				
3986_DWG_r2				
DWG TITLE			DWG No.	
STANDARD SURFACE WATER DRAINAGE DETAILS			EPS-3986-503	



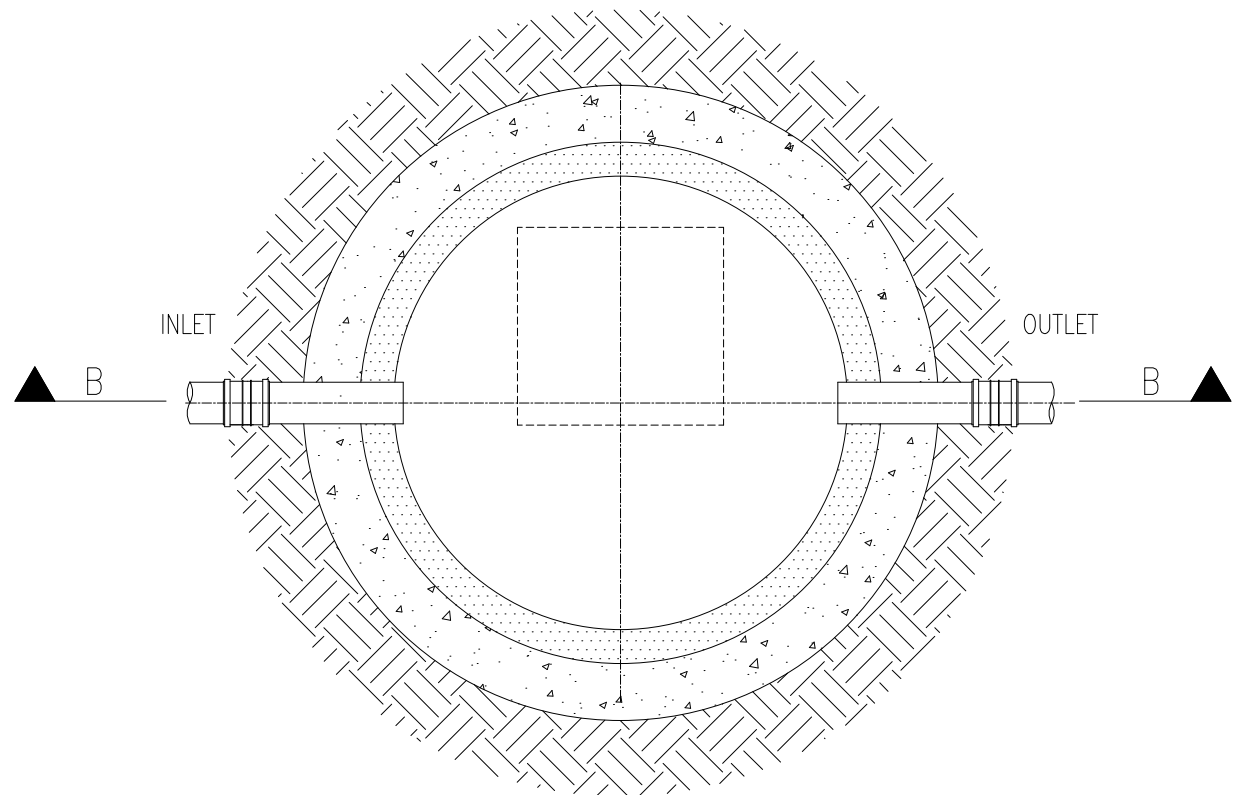
NOTE
A. UNLESS NOTED OTHERWISE ALL CONNECTIONS SHALL BE 150mmØ TO BS 65 VITRIFIED CLAY PIPES AND WHERE COVER IS LESS THAN 900mm 150mm THICK CONCRETE BED & SURROUND SHALL BE USED

TYPICAL DETAIL OF PC ROAD GULLY WITH 150mmØ OUTLET
SCALE 1:20

ROAD GULLY



SECTION B - B



SECTION A - A

TYPICAL DETAIL OF PC RING CATCH PIT
SCALE 1:20

CATCHPIT DETAIL

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GENERAL NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
- ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, EUROPEAN NORMS, CODES OF PRACTICE AND BUILDING PRACTICE.
- ALL DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR PRIOR TO STARTING THE WORKS ON SITE. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
- INFILTRATION FEATURES WILL BE SUBJECT TO SITE SPECIFIC INFILTRATION TESTING AND TRIAL HOLES.
- ALL DRAINAGE SYSTEMS WILL NEED TO BE INSTALLED AND DESIGNED FOR SUITABLE LOADING REQUIREMENTS.
- THE CONTRACTOR SHALL OBTAIN PRIOR APPROVAL AND ALL NECESSARY LICENCES FROM THE HIGHWAY AUTHORITY AND/OR SEWERAGE UNDERTAKER BEFORE CARRYING OUT ANY WORKS.
- THIS DRAWING WAS PRODUCED FOR USE IN CONJUNCTION WITH A PLANNING SUBMISSION AND SHOULD NOT BE USED FOR OTHER PURPOSES. A MORE DETAILED DESIGN INCLUDING PRODUCT SPECIFICATIONS WILL NEED TO BE PRODUCED PRIOR TO CONSTRUCTION.



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P0	First issue	HA	EC	30/01/26
Rev	Description	Author	Checked	Date

CLIENT
North Star Centre Ltd

PROJECT
Wickenden Farm, Sharpthorne

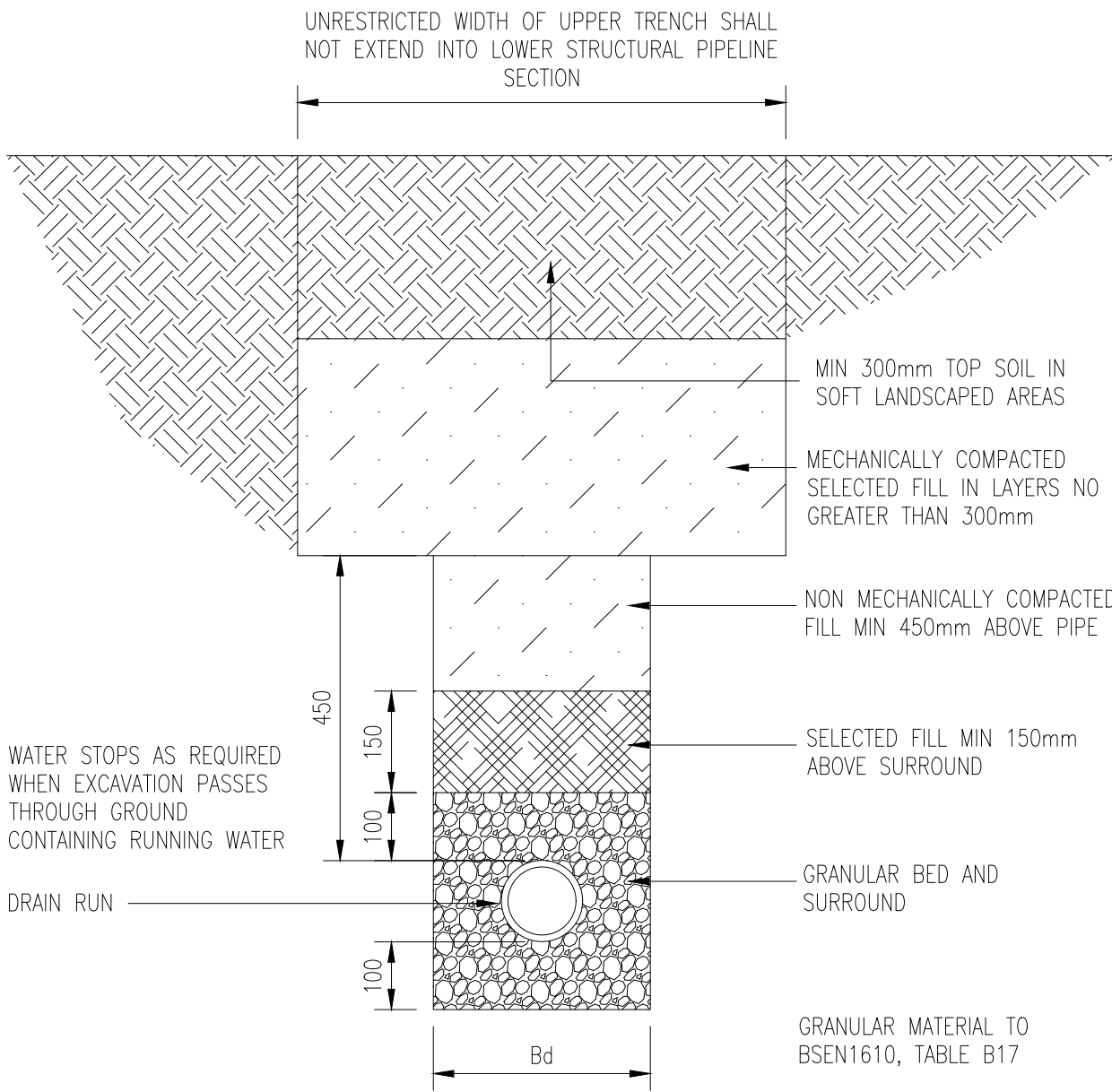
SCALE	PROJ REF	ORIGINATOR	CHECKED BY
VARIES	3986	HA	EC

HC DWG REF.
3986_DWG_r2

DWG TITLE	DWG No.
STANDARD SURFACE WATER DRAINAGE DETAILS	EPS-3986-504

GENERAL NOTES

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- ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, EUROPEAN NORMS, CODES OF PRACTICE AND BUILDING PRACTICE.
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- INFILTRATION FEATURES WILL BE SUBJECT TO SITE SPECIFIC INFILTRATION TESTING AND TRIAL HOLES.
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- THIS DRAWING WAS PRODUCED FOR USE IN CONJUNCTION WITH A PLANNING SUBMISSION AND SHOULD NOT BE USED FOR OTHER PURPOSES. A MORE DETAILED DESIGN INCLUDING PRODUCT SPECIFICATIONS WILL NEED TO BE PRODUCED PRIOR TO CONSTRUCTION.

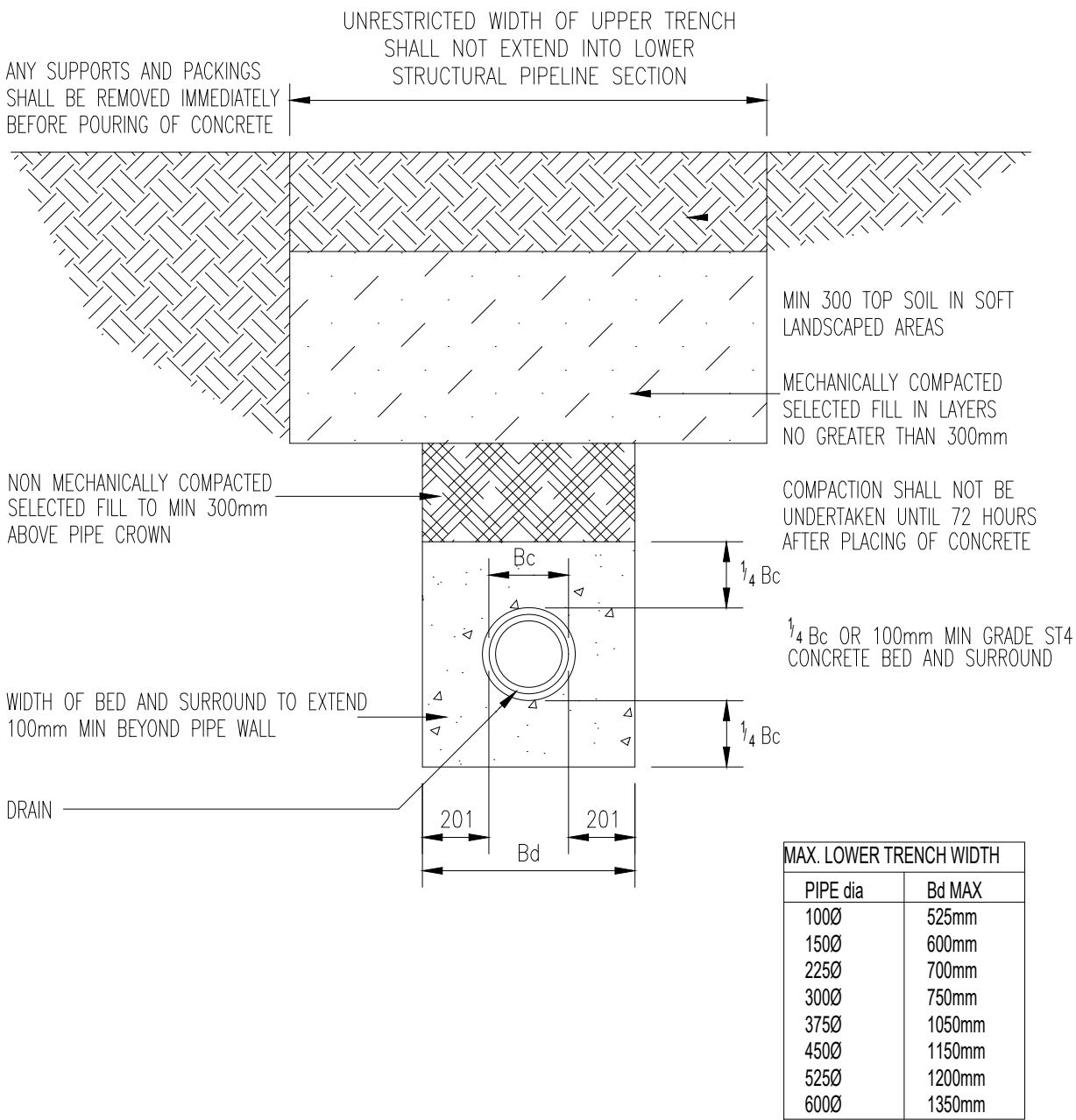


GRANULAR MATERIAL	
PIPE SIZE	AGGREGATE
100Ø	10mm SINGLE SIZE
150Ø	10mm OR 14mm SINGLE SIZE
225Ø - 525Ø	OR 14mm TO 5mm GRADED
	14mm OR 20mm SINGLE SIZE
	OR 20mm TO 5mm GRADED
OR 14mm TO 5mm GRADED	

PIPE dia	Bd MAX
100Ø	525mm
150Ø	600mm
225Ø	700mm
300Ø	750mm
375Ø	1050mm
450Ø	1150mm
525Ø	1200mm

CLASS S BED AND SURROUND
UNIFORM SOIL TRENCH BED (NOT IN ROCK)

SCALE 1:20



MAX LOWER TRENCH WIDTH	
PIPE dia	Bd MAX
100Ø	525mm
150Ø	600mm
225Ø	700mm
300Ø	750mm
375Ø	1050mm
450Ø	1150mm
525Ø	1200mm
600Ø	1350mm

UNREINFORCED CONCRETE BED AND SURROUND

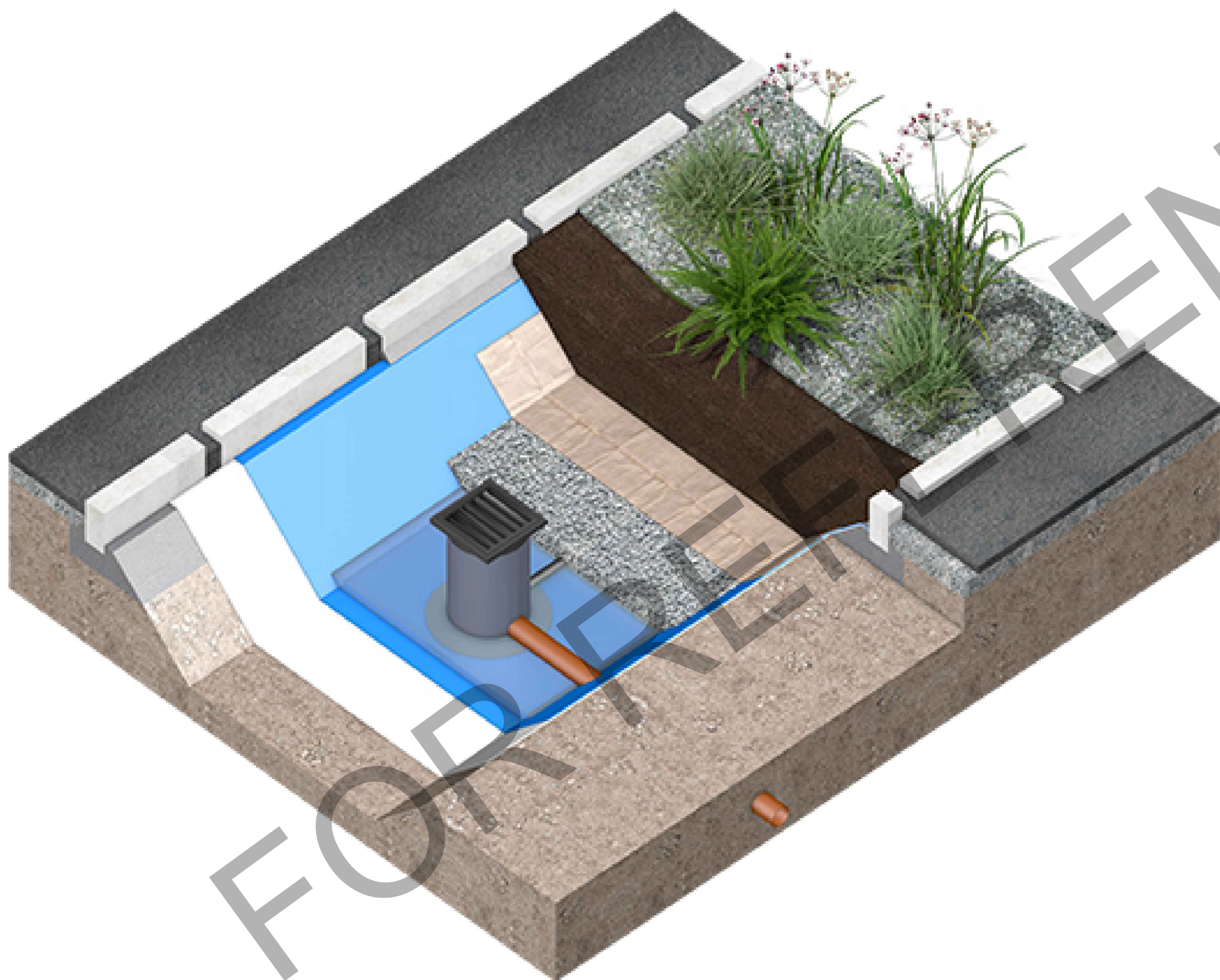
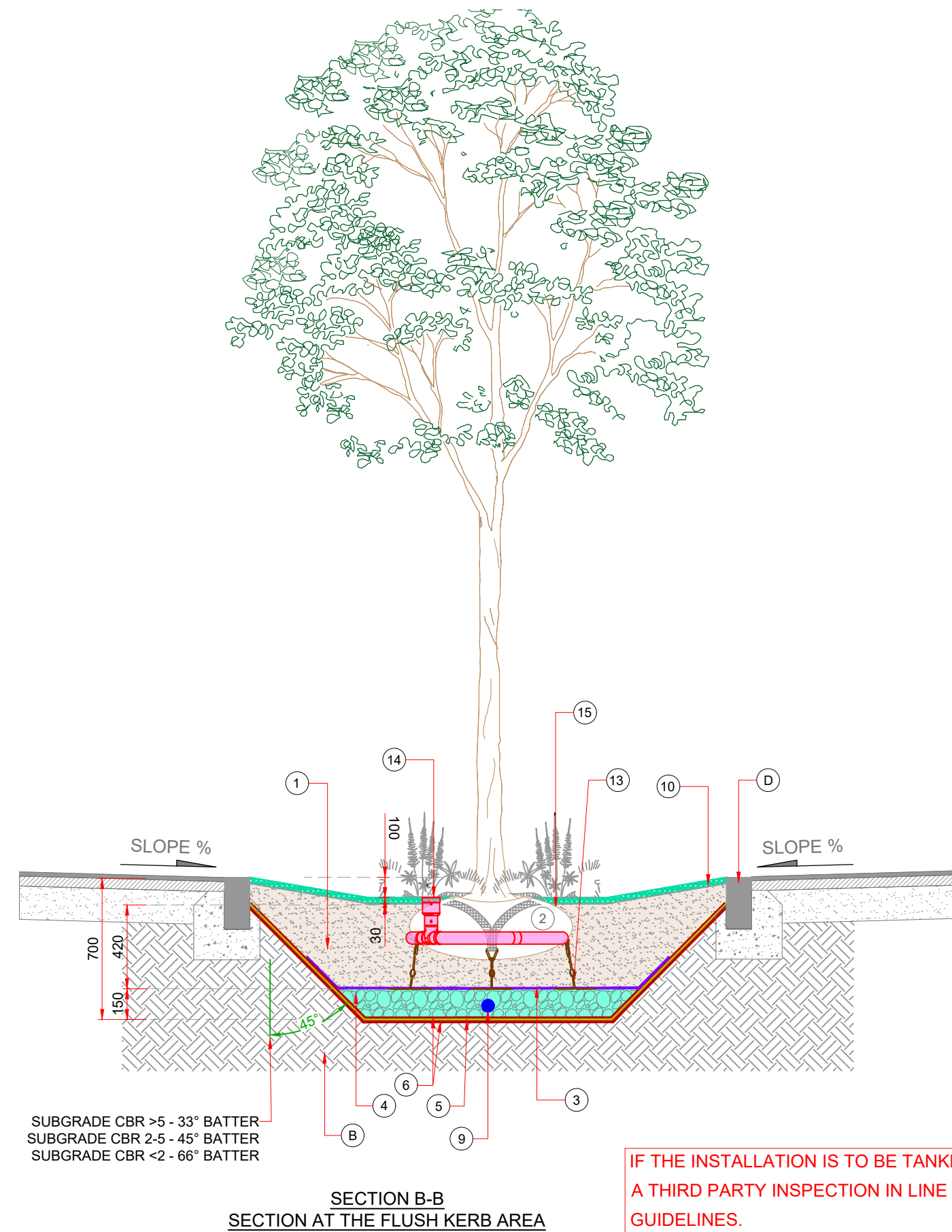
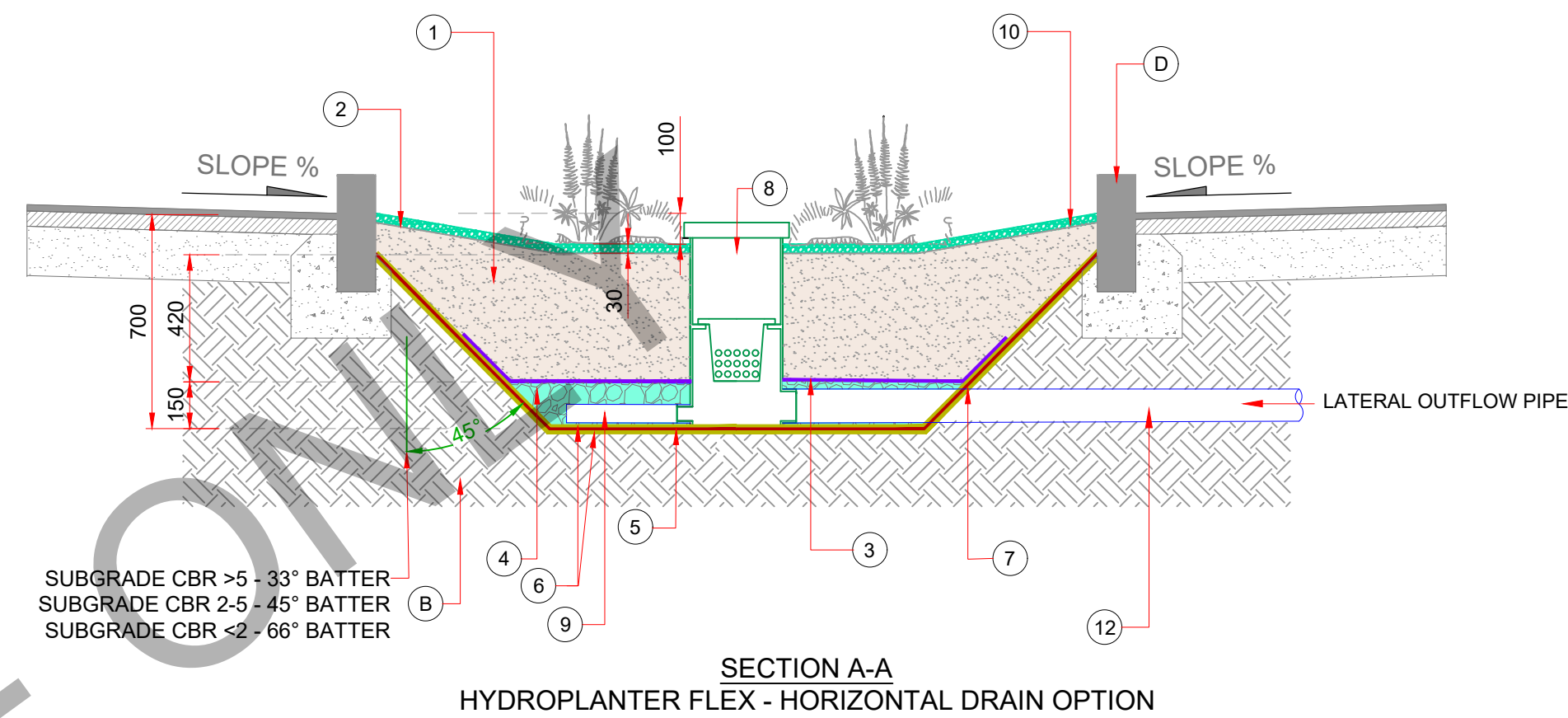
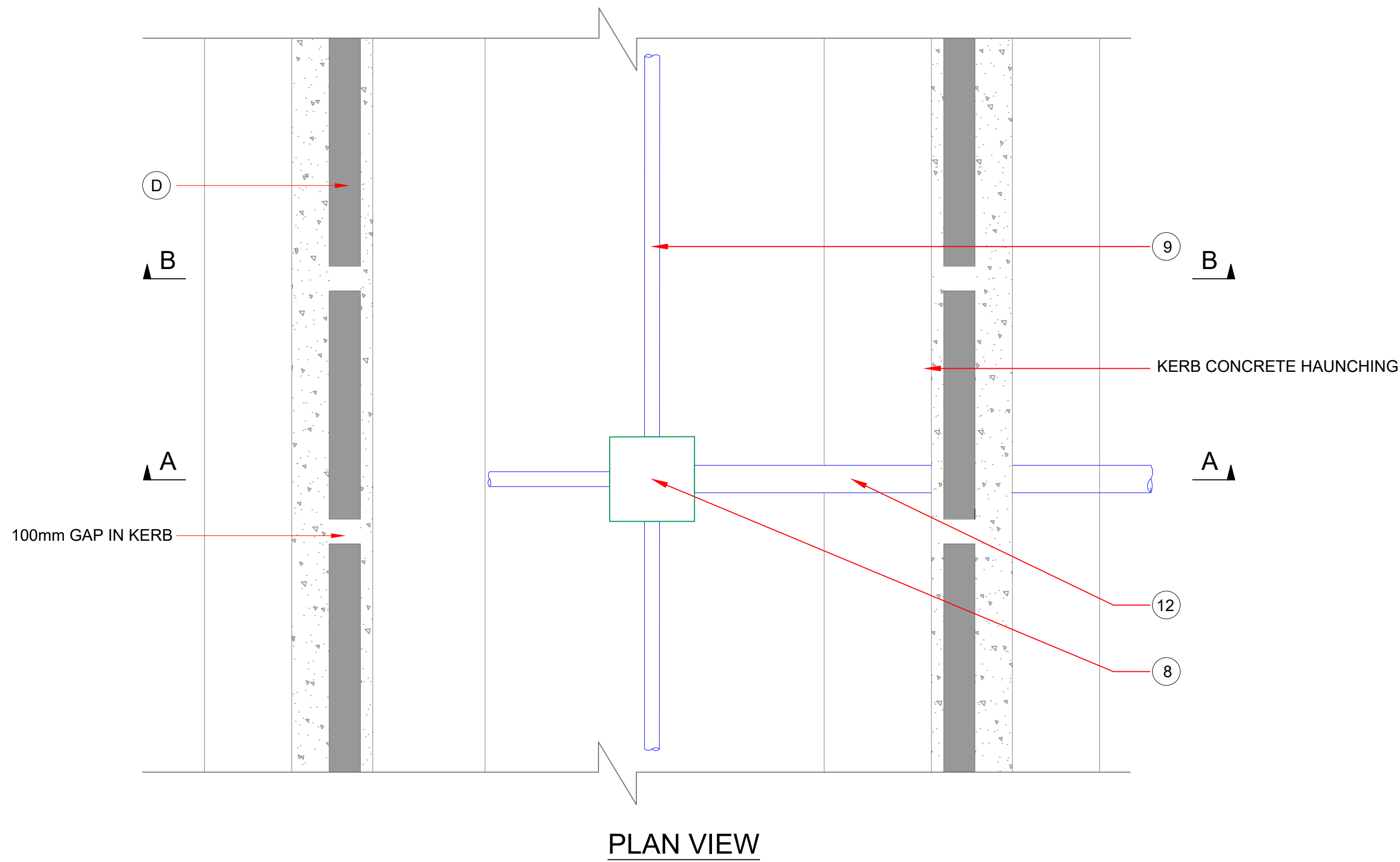
SCALE 1:20

BEDDING DETAILS



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P0	First issue	HA	EC	30/01/26
Rev	Description	Author	Checked	Date
CLIENT				
North Star Centre Ltd				
PROJECT				
Wickenden Farm, Sharpthorne				
SCALE		PROJ REF	ORIGINATOR	CHECKED BY
VARIES		3986	HA	EC
HC DWG REF.				
3986_DWG_r2				
DWG TITLE			DWG No.	
STANDARD SURFACE WATER DRAINAGE DETAILS			EPS-3986-505	



- NOTES**
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
 2. GROUND INVESTIGATION SHOULD BE UNDERTAKEN PRIOR TO CONSTRUCTION STAGE. INFILTRATION TESTING TO BE UNDERTAKEN TO BRE365 STANDARDS AND MONITORING OF GROUND WATER LEVEL TO BE UNDERTAKEN TO ASSESS THE MAXIMUM WATER LEVEL.
 3. GREENBLUE PRODUCTS SHOWN IN THE COLORS ARE INDICATIVE ONLY ORIGINAL COLOR VARIES
 4. SOIL VOLUME ASSUMED SUFFICIENT AS PER TREE SPECIES SOIL VOLUME GUIDE.

PACKAGE INCLUDES THE FOLLOWING GREENBLUE URBAN PRODUCTS PER TREE:

- 1 ARBORSOIL HYDRO MAX BIORETENTION SOIL FOR USE WITHIN SUDS APPLICATIONS - ASH-MAX
NBS: Pr_45_31_89_50, Q28/330, Pr_45_31_89_51
- 2 ROOTSTART PROFESSIONAL MYCORRHIZA FUNGI ALLOW 200g PER TREE - RSPMF2.5LA
NBS: Pr_45_31_89_58
- 3 HESSIAN SEPARATION MEMBRANE WITHIN SUDS APPLICATIONS - GBUHESA
- 4 20-40MM CLEAN ANGULAR DRAINAGE AGGREGATE - GBUDRSC
- 5 EPDM Rubber Liner GBUIMMA
- 6 PROTECTIVE FLEECE - HPFFP
- 7 GREENBLUE URBAN INVERSE TOP HAT SEALING UNIT FOR USE AROUND OUTLET POINT - HPFOS
- 8 GREENBLUE URBAN RAIN GARDEN OVERFLOW / INSPECTION CHAMBER AND HINGED LID - 300mm DIAMETER AND HEIGHT TO SUIT INSTALLATION - HPFCC
- 9 60mm PERFORATED PIPE
- 10 SLATE MULCH - HPFSM
- 11 90° ELBOW - HPF110/90N
- 12 HYDROPLANTER FLEX 160MM DRAINAGE PIPE, 3M LENGTH - HPF160DP
- 13 ARBORGUY ANCHORPLATE STRAPPED ANCHOR SYSTEM - SASAP06A
NBS: Pr_45_63_64_72, Q31/526
- 14 ROOTRAIN URBAN IRRIGATION SYSTEM - RRURB1A
NBS: Pr_70_55_42_90, Q31/512, S14/110, Ss_55_70_42_60
- 15 ROOTSTART PROFESSIONAL MYCORRHIZA FUNGI ALLOW 200g PER TREE - RSPMF2.5LA

NOTES:

- A 20% ADDITIONAL FOR WITH THE GEOTEXTILE AND REINFORCING GEOGRID TO ALLOW FOR OVERLAP AND CUTTING REQUIREMENTS
- B EXISTING GROUND / FORMATION LEVEL
- C POSITIVE DRAINAGE PIPE (100 mm SOLID PIPE)
- D KERB (AS PER STANDARD)

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd
D	MAY2024	Draft (Amended Keys, cleaned drawings)				

DRAWING STATUS

DRAFT

CLIENT

SCHEME TITLE

**HYDROPLANTER FLEX
FLEXIBLE RAINGARDERN SYSTEM**

DRAWING TITLE

**HYDROPLANTER FLEX
INSTALLATION**

DRAWING UNITS U.N.O.
ALL DIMENSIONS IN MILLIMETERS
UNLESS STATED OTHERWISE

SCALE AT A1 (841x594mm)
1:20@ A1

DRAWING No.

GBU-STANDARD-3220

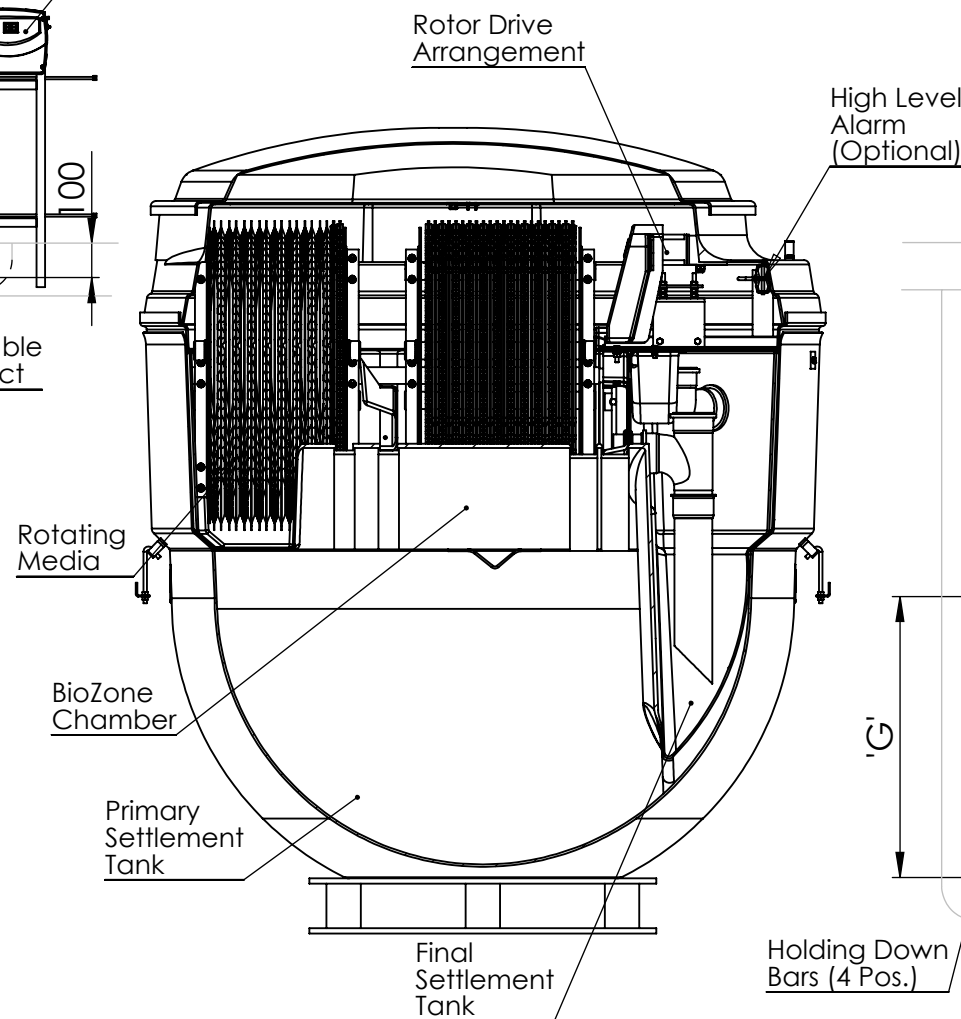
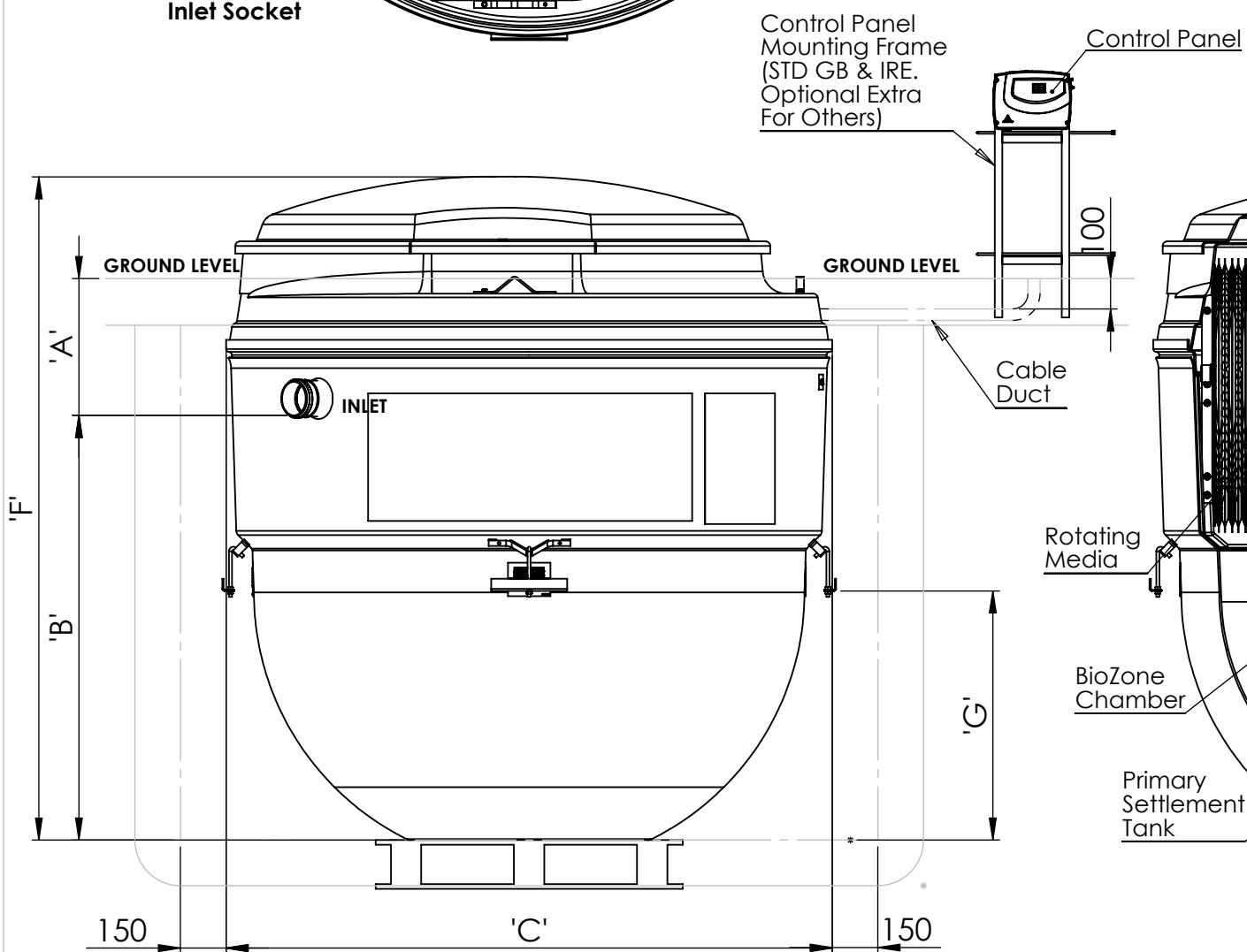
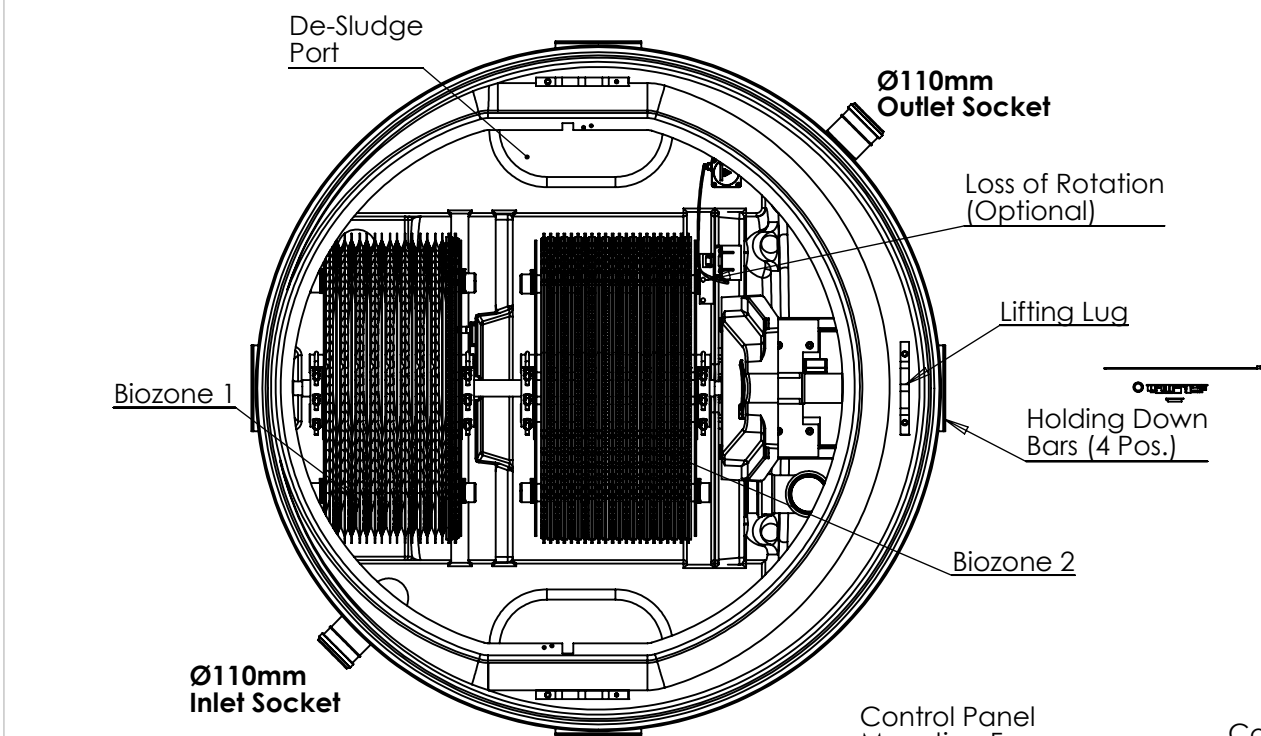
REV.

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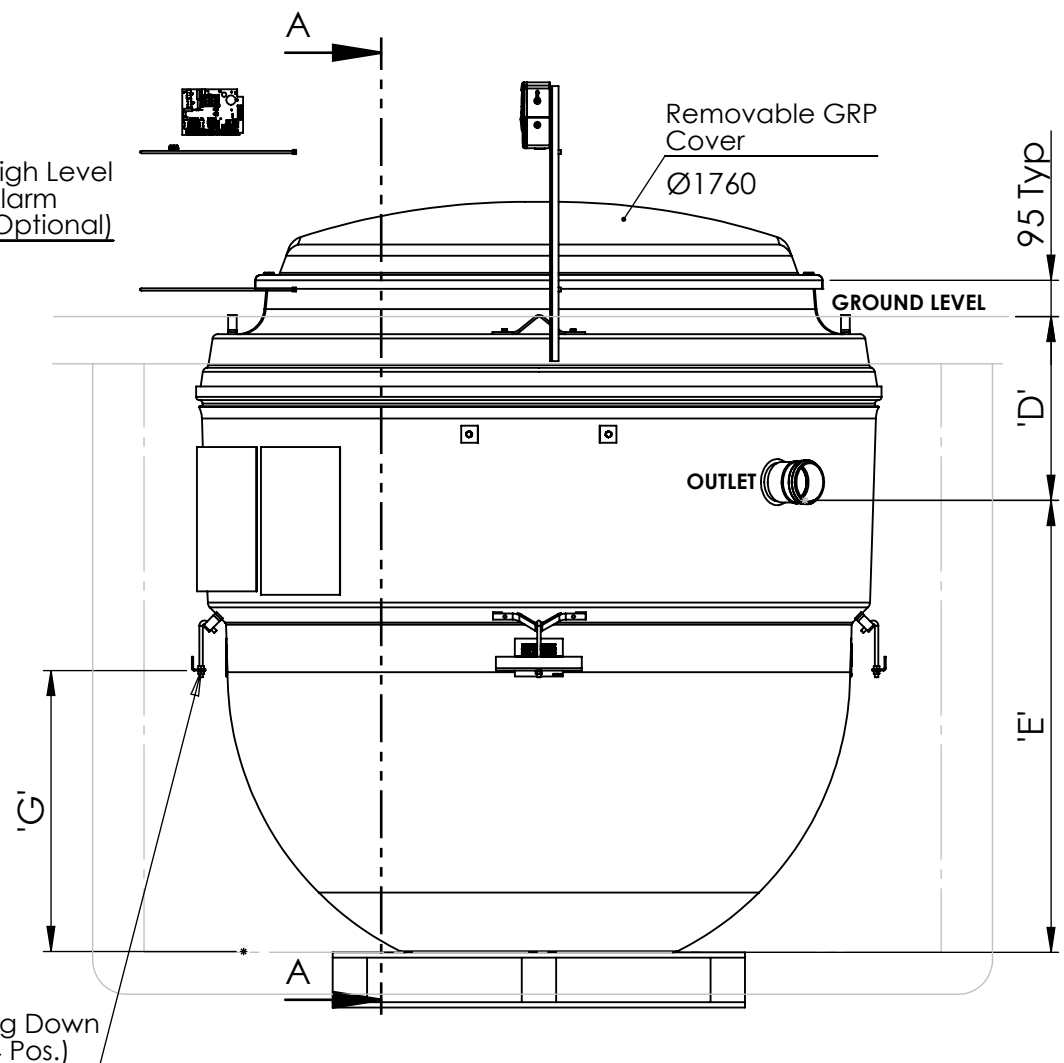
GreenBlue
URBAN

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Website: www.greenblueurban.com

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SECTION A-A



Notes:

1. This drawing is for 'Dimensional Information Only'. It is essential that this drawing is read in conjunction with the 'Installation Guidelines' supplied with the unit. (Copies available from our sales department).
2. BioDisc Tank & Cover are manufactured glass reinforced polyester (GRP). Cover is finished in Green to BS4800 Tint 18.B.25
3. For desludging procedure see Maintenance Handbook.
4. Electrical Supply - 240Volts, 2 Amps, Single Phase, Control Panel Supplied.
5. BioDisc must only be lifted by 3 lugs provided.
6. 3 no. Inlet Inverts available - 450mm , 750mm, 1250mm.
7. For Installation, Maintenance & Desludging details refer to 013103 (GL0010P) & 015098 (GL0011P).
8. Cable Duct hole diameter in case to suit conduit to be used.

Please check with Kingspan Water & Energy for the latest Issue of the drawing				
Issue	Date	Drawn By	Approved By	Description
06	19/12/2022	TGY		ECN 1641 - Access Size Added
05	30/10/2015	L.Steward		CC1241 - 1.0m Invert Option Included For Europe/ ROW

LN Number :
Finish :
Weight : 567.24 Kg
Modelled By : Name

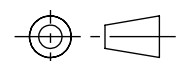
Tolerance (unless stated) :
Thickness : n/a
Surface Area : m²
Material : Various

Drawing : DS1146P

Page 1 of 3

All Dimensions In mm

Scale: Do Not Scale



Third Angle Projection

A:\Wastewater\Engineering\Drawing Data\02 - Sales Drawings\DS\DS - 11\DS1146P

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BA Gravity BioDisc Dimension & Weight Chart (**All Markets**)

Unit Dimension Chart (Gravity Systems).								
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dim 'G' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
450	1400	1995	535	1315	2160	820	310	3290
750	1400	1995	835	1315	2460	820	325	3305
1250	1400	1995	1335	1315	2960	820	380	3360

BAX & BB Gravity BioDisc Dimension & Weight Chart (**All Markets Except France**)

Unit Dimension Chart (Gravity Systems).								
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dim 'G' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
450	1400	1995	535	1315	2160	820	335	3315
750	1400	1995	835	1315	2460	820	350	3330
1250	1400	1995	1335	1315	2960	820	405	3385

BB Gravity BioDisc Dimension & Weight Chart (**France Only**)

Unit Dimension Chart (Gravity Systems).								
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dim 'G' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
450	1650	1995	535	1565	2410	1070	355	3335
750	1650	1995	835	1565	2710	1070	370	3350
1250	1650	1995	1335	1565	3210	1070	425	3405

LN Number :

Finish :

Weight :

Modelled By :

Tolerance (unless stated) :

Thickness :

Surface Area : m²

Material :

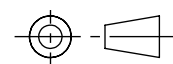
Drawing : DS1146P

Page 2 of 3

BA BioDisc General Assembly

All Dimensions In mm

Scale: Do Not Scale



Third Angle Projection

A:\Wastewater\Engineering\Drawing Data\02 - Sales Drawings\DS\DS - 11\DS1146P

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BA Gravity BioDisc 1.0m Invert Dimension & Weight Chart (Europe & ROW Only**)**

Unit Dimension Chart (Gravity Systems).								
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dim 'G' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
1000	1400	1995	1085	1315	2730	820	345	3325

BB Gravity BioDisc 1.0m Invert Dimension & Weight Chart (Europe & ROW Only**)**

Unit Dimension Chart (Gravity Systems).								
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dim 'G' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
1000	1400	1995	1085	1315	2730	820	373	3350

BB Gravity BioDisc 1.0m Invert Dimension & Weight Chart (France Only**)**

Unit Dimension Chart (Gravity Systems).								
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dim 'G' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
1000	1650	1995	1085	1565	2980	820	373	3350

LN Number :

Finish :

Weight :

Modelled By :

Tolerance (unless stated) :

Thickness :

Surface Area : m²

Material :

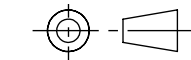
Drawing : DS1146P

Page 3 of 3

BA BioDisc General Assembly

All Dimensions In mm

Scale: Do Not Scale

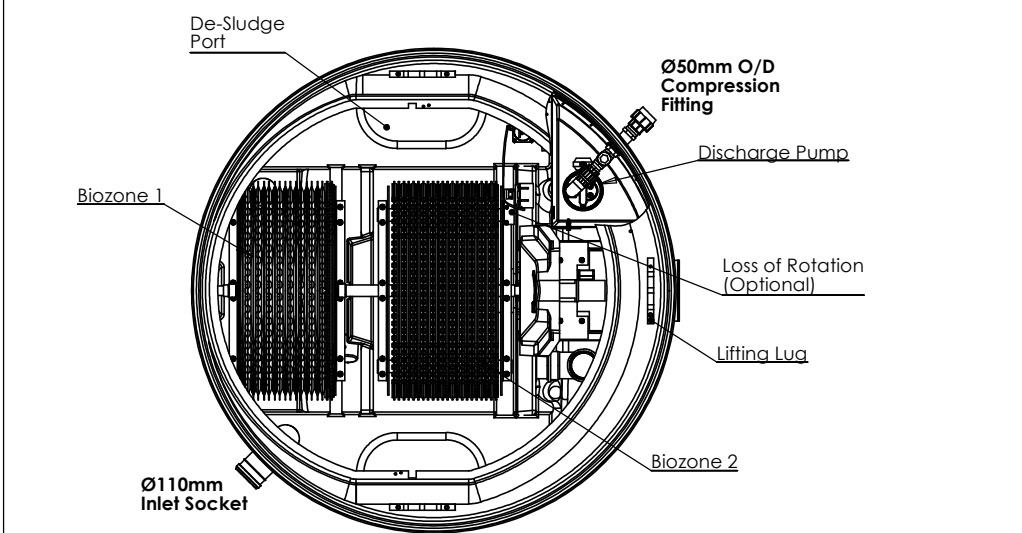


Third Angle Projection

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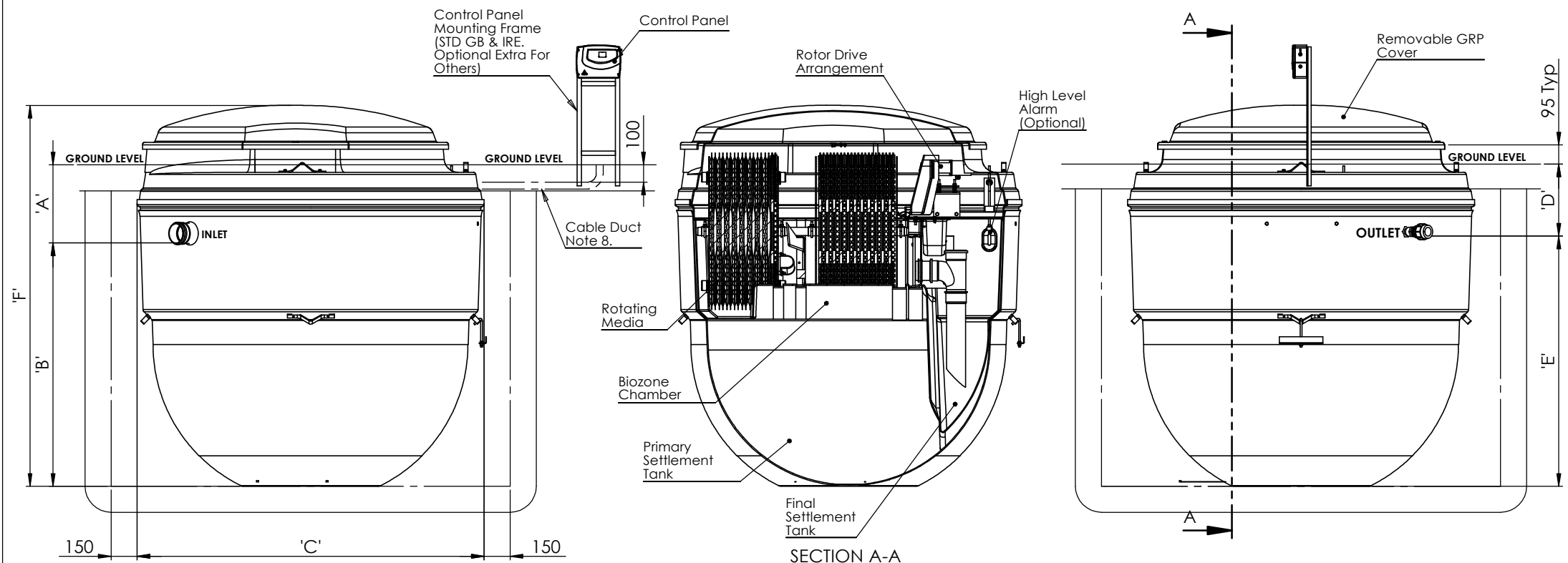
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Notes:

1. This drawing is for 'Dimensional Information Only'. It is essential that this drawing is read in conjunction with the 'Installation Guidelines' supplied with the unit. (Copies available from our sales department).
2. BioDisc Tank & Cover are manufactured glass reinforced polyester (GRP). Cover is finished in Green to BS4800 Tint 18.B.25
3. For desludging procedure see Maintenance Handbook.
4. Electrical Supply - 240Volts, 2 Amps, Single Phase, Control Panel Supplied.
5. BioDisc must only be lifted by 3 lugs provided.
6. 3 no. Inlet Inverts available - 450mm, 750mm, 1250mm.
7. For Installation, Maintenance & Desludging details refer to GL0010P & GL0011P.
8. Cable Duct hole diameter in case to suit conduit to be used.



Please check with Kingspan Environmental that this drawing is the latest issue				
Issue	Date	Drawn by	Approved by	Description
04	04/11/15	L.Steward		CC1241 - Introduction Of 1.0m Invert For Europe/ ROW
03	19.08.15	T.Kelly		CC1259 - Control Panel Mounting Frame Options Updated

Material : Various	Tolerance :
Finish :	Thickness : n/a
Weight : See Sheet 2	Surface Area :

Drawing : DS1147P	Page 1 of 3
BA-BB-BAX BioDisc IPS Sales Drawing	

All dimensions in mm	Scale: Not to scale
T:\Luke S\Drawings\CC1241\DS1147P	

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BA IPS BioDisc Dimension & Weight Chart

Unit Dimension Chart (IPS Systems).							
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
450	1400	1995	425	1425	2160	310	3290
750	1400	1995	425	1725	2460	325	3305
1250	1400	1995	425	2225	2960	380	3360

BAX & BB IPS BioDisc Dimension & Weight Chart

Unit Dimension Chart (IPS Systems).							
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
450	1400	1995	425	1425	2160	335	3315
750	1400	1995	425	1725	2460	350	3330
1250	1400	1995	425	2225	2960	405	3385

Material :	Tolerance (unless stated) :	Drawing : DS1147P BA-BB-BAX BioDisc IPS Sales Drawing	Page 2 of 3
Finish :	Thickness :		
Weight :	Surface Area : m²		
Modelled By :			
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BA IPS BioDisc Dimension & Weight Chart (Europe & ROW Only)

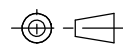
Unit Dimension Chart (IPS Systems).							
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
1000	1400	1995	425	1975	2747	353	3333

BB IPS BioDisc Dimension & Weight Chart (Europe & ROW Only)

Unit Dimension Chart (IPS Systems).							
Dim 'A' (mm)	Dim 'B' (mm)	Dim 'C' (mm)	Dim 'D' (mm)	Dim 'E' (mm)	Dim 'F' (mm)	Dry Weight (Incl. Pallet) (Kgs)	Full Weight (Exclud. Pallet) (Kgs)
1000	1400	1995	425	1975	2747	378	3358

Material :	Tolerance (unless stated) :	Drawing : DS1147P BA-BB-BAX BioDisc IPS Sales Drawing
Finish :	Thickness :	
Weight :	Surface Area : m²	
Modelled By :		

All Dimensions In mm Scale: Do Not Scale



Third Angle Projection

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EPS Ltd
Three Tuns House
109 Borough High Street
London, SE1 1NL

File: 3986_proposed_r1.pfd
Network: Storm Network
Hamza Askari
03/02/2026

Page 1
Wickenden Farm, Sharpthorne
Discharge of Conditions
Proposed Surface Water Drainage

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.500
Time of Entry (mins)	4.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	200.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Soakaway	0.150		125.164		64.202	-35.918	2.000	123.164
G1	0.011	4.00	131.978	1200	18.341	87.244	0.600	131.378
G2	0.006	4.00	131.887	1200	33.657	88.200	0.600	131.287
SMH1			131.852	1200	29.301	78.081	0.675	131.177
SMH2			131.841	1200	30.650	67.393	0.857	130.984
J1a	0.068	4.00	131.852		45.008	79.719	0.300	131.552
J1b			131.821		45.065	71.287	0.300	131.521
SMH4	0.005	4.00	129.856	1200	-5.149	31.734	0.650	129.206
SMH5	0.011	4.00	129.137	1200	22.036	32.248	0.631	128.506
SMH6			128.541	1200	19.811	-10.264	0.650	127.891
Rain Garden 2			127.606	1200	17.633	-39.386	1.500	126.106
Rain Garden 1			131.699	1200	19.641	56.967	1.200	130.499
G4	0.005	4.00	128.915	1200	5.100	6.789	0.600	128.315
G3	0.005	4.00	129.455	1200	-16.284	6.673	0.650	128.805
SMH7			128.026	1200	-8.832	-38.386	1.812	126.214
SMH8			129.002	1200	-18.361	-31.109	0.650	128.352
SMH9			129.212	1200	-21.415	-13.231	0.650	128.562
EXSMH3	0.009	4.00	128.416	1200	-38.858	-44.337	0.897	127.519
EXSMH2	0.009	4.00	128.536	1200	-75.623	-43.874	0.750	127.786
EXSMH1			128.936	1200	-97.463	-30.353	0.710	128.226
G5	0.010	4.00	128.937	1200	-86.351	-21.084	0.647	128.290
J3			129.408		-41.507	-13.123	0.300	129.108
J4	0.026	4.00	129.605		-56.943	-12.856	0.300	129.305
SMH3			129.912	1200	32.063	57.915	1.000	128.912
J1	0.002	4.00	129.809		-108.985	-9.410	0.300	129.509
J2			129.774		-95.127	-9.410	0.300	129.474
J5	0.015	4.00	130.074		-114.468	19.112	0.300	129.774
J6			130.074		-100.609	18.570	0.330	129.744
J7	0.015	4.00	132.132		-116.491	46.592	0.300	131.832
J8			132.132		-104.417	46.939	0.330	131.802
J10			130.074		-127.788	2.693	0.650	129.424
J11			129.809		-121.271	-23.559	0.654	129.155
J9			132.132		-129.047	33.755	0.650	131.482
SMH3A			129.465	1200	38.249	55.921	0.662	128.803



Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
8.000	J1a	J1b	16.200	0.600	131.552	131.521	0.031	522.6	300	4.40	165.0
6.000	G1	SMH1	15.883	0.600	131.378	131.177	0.201	79.0	100	4.31	165.0
7.000	G2	SMH1	11.035	0.600	131.287	131.177	0.110	100.0	100	4.24	165.0
8.001	J1b	SMH2	9.801	0.600	131.521	130.984	0.537	18.3	150	4.47	165.0
6.001	SMH1	SMH2	19.282	0.600	131.177	130.984	0.193	100.0	150	4.63	165.0
6.002	SMH2	Rain Garden 1	6.391	0.600	130.984	130.499	0.485	13.2	225	4.65	165.0
6.003	Rain Garden 1	SMH3	24.059	0.600	130.499	128.912	1.587	15.2	225	4.77	165.0
9.000	SMH4	SMH5	16.305	0.600	129.206	128.506	0.700	23.3	150	4.13	165.0
6.006	SMH5	SMH6	20.904	0.600	128.506	127.891	0.615	34.0	225	5.45	160.8
6.007	SMH6	Rain Garden 2	4.665	0.600	127.891	126.106	1.785	2.6	225	5.46	160.7
1.009	Rain Garden 2	Soakaway	12.371	0.600	126.106	123.164	2.942	4.2	225	5.49	160.4
1.008	SMH7	Rain Garden 2	10.780	0.600	126.214	126.106	0.108	100.0	300	5.38	161.5
10.000	G3	G4	10.916	0.600	128.805	128.315	0.490	22.3	150	4.08	165.0
10.001	G4	SMH6	11.226	0.600	128.315	127.891	0.424	26.5	150	4.18	165.0
5.000	J4	J3	16.539	0.600	129.305	129.108	0.197	84.0	300	4.16	165.0
5.001	J3	SMH9	7.905	0.600	129.108	128.562	0.546	14.5	150	4.21	165.0
5.002	SMH9	SMH8	12.557	0.600	128.562	128.352	0.210	59.8	150	4.37	165.0
5.003	SMH8	SMH7	7.632	0.600	128.352	126.214	2.138	3.6	150	4.39	165.0
1.006	EXSMH2	EXSMH3	16.000	0.600	127.786	127.519	0.267	59.9	150	5.19	163.2
1.007	EXSMH3	SMH7	18.356	0.600	127.519	126.214	1.305	14.1	300	5.26	162.5
1.005	EXSMH1	EXSMH2	10.000	0.600	128.226	127.786	0.440	22.7	150	4.99	165.0
4.000	G5	EXSMH1	2.000	0.600	128.290	128.226	0.064	31.3	150	4.02	165.0
3.000	J1	J2	3.500	0.600	129.509	129.474	0.035	100.0	300	4.04	165.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
8.000	0.681	48.1	58.8	0.000	0.000	0.068	0.0	300	0.690
6.000	0.866	6.8	9.5	0.500	0.575	0.011	0.0	100	0.890
7.000	0.769	6.0	4.8	0.500	0.575	0.006	0.0	67	0.851
8.001	2.368	41.9	58.8	0.150	0.707	0.068	0.0	150	2.413
6.001	1.005	17.8	14.3	0.525	0.707	0.017	0.0	102	1.116
6.002	3.623	144.1	73.1	0.632	0.975	0.085	0.0	114	3.641
6.003	3.377	134.3	73.1	0.975	0.775	0.085	0.0	118	3.445
9.000	2.095	37.0	4.7	0.500	0.481	0.005	0.0	36	1.442
6.006	2.251	89.5	84.8	0.406	0.425	0.101	0.0	175	2.549
6.007	8.153	324.2	93.2	0.425	1.275	0.111	0.0	82	7.066
1.009	6.425	255.4	165.4	1.275	1.775	0.197	0.0	132	6.824
1.008	1.572	111.1	72.9	1.512	1.200	0.086	0.0	178	1.674
10.000	2.143	37.9	4.3	0.500	0.450	0.005	0.0	34	1.433
10.001	1.964	34.7	8.6	0.450	0.500	0.010	0.0	51	1.631
5.000	1.717	121.4	22.5	0.000	0.000	0.026	0.0	87	1.321
5.001	2.661	47.0	22.5	0.150	0.500	0.026	0.0	73	2.630
5.002	1.303	23.0	22.5	0.500	0.500	0.026	0.0	120	1.480
5.003	5.372	94.9	22.5	0.500	1.662	0.026	0.0	50	4.411
1.006	1.301	23.0	43.8	0.600	0.747	0.051	0.0	150	1.326
1.007	4.213	297.8	51.3	0.597	1.512	0.060	0.0	83	3.175
1.005	2.121	37.5	36.5	0.560	0.600	0.042	0.0	120	2.409
4.000	1.807	31.9	8.6	0.497	0.560	0.010	0.0	53	1.536
3.000	1.572	111.1	2.1	0.000	0.000	0.002	0.0	28	0.619



Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
2.000	J5	J6	3.000	0.600	129.774	129.744	0.030	100.0	300	4.03	165.0
1.000	J7	J8	3.000	0.600	131.832	131.802	0.030	100.0	300	4.03	165.0
1.002	J9	J10	31.087	0.600	131.482	129.424	2.058	15.1	150	4.25	165.0
1.003	J10	J11	27.049	0.600	129.424	129.155	0.269	100.6	150	4.70	165.0
1.004	J11	EXSMH1	24.758	0.600	129.155	128.226	0.929	26.7	150	4.91	165.0
1.001	J8	J9	3.000	0.600	131.802	131.482	0.320	9.4	150	4.05	165.0
2.001	J6	J10	3.000	0.600	129.744	129.424	0.320	9.4	150	4.05	165.0
3.001	J2	J11	3.000	0.600	129.474	129.155	0.319	9.4	150	4.05	165.0
6.004	SMH3	SMH3A	10.883	0.600	128.912	128.803	0.109	100.0	225	4.91	165.0
6.005	SMH3A	SMH5	29.687	0.600	128.803	128.506	0.297	100.0	225	5.29	162.3

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.000	1.572	111.1	13.2	0.000	0.030	0.015	0.0	69	1.067
1.000	1.572	111.1	12.5	0.000	0.030	0.015	0.0	68	1.052
1.002	2.605	46.0	12.5	0.500	0.500	0.015	0.0	54	2.227
1.003	1.002	17.7	25.8	0.500	0.504	0.030	0.0	150	1.021
1.004	1.958	34.6	27.8	0.504	0.560	0.032	0.0	102	2.173
1.001	3.310	58.5	12.5	0.180	0.500	0.015	0.0	47	2.648
2.001	3.310	58.5	13.2	0.180	0.500	0.015	0.0	48	2.683
3.001	3.305	58.4	2.1	0.150	0.504	0.002	0.0	19	1.545
6.004	1.307	52.0	73.1	0.775	0.437	0.085	0.0	225	1.331
6.005	1.307	52.0	71.9	0.437	0.406	0.085	0.0	225	1.331

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
8.000	16.200	522.6	300	Circular	131.852	131.552	0.000	131.821	131.521	0.000
6.000	15.883	79.0	100	Circular	131.978	131.378	0.500	131.852	131.177	0.575
7.000	11.035	100.0	100	Circular	131.887	131.287	0.500	131.852	131.177	0.575
8.001	9.801	18.3	150	Circular	131.821	131.521	0.150	131.841	130.984	0.707
6.001	19.282	100.0	150	Circular	131.852	131.177	0.525	131.841	130.984	0.707
6.002	6.391	13.2	225	Circular	131.841	130.984	0.632	131.699	130.499	0.975
6.003	24.059	15.2	225	Circular	131.699	130.499	0.975	129.912	128.912	0.775
9.000	16.305	23.3	150	Circular	129.856	129.206	0.500	129.137	128.506	0.481
6.006	20.904	34.0	225	Circular	129.137	128.506	0.406	128.541	127.891	0.425

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
8.000	J1a		Junction		J1b		Junction	
6.000	G1	1200	Manhole	Adoptable	SMH1	1200	Manhole	Adoptable
7.000	G2	1200	Manhole	Adoptable	SMH1	1200	Manhole	Adoptable
8.001	J1b		Junction		SMH2	1200	Manhole	Adoptable
6.001	SMH1	1200	Manhole	Adoptable	SMH2	1200	Manhole	Adoptable
6.002	SMH2	1200	Manhole	Adoptable	Rain Garden 1	1200	Manhole	Adoptable
6.003	Rain Garden 1	1200	Manhole	Adoptable	SMH3	1200	Manhole	Adoptable
9.000	SMH4	1200	Manhole	Adoptable	SMH5	1200	Manhole	Adoptable
6.006	SMH5	1200	Manhole	Adoptable	SMH6	1200	Manhole	Adoptable



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.007	4.665	2.6	225	Circular	128.541	127.891	0.425	127.606	126.106	1.275
1.009	12.371	4.2	225	Circular	127.606	126.106	1.275	125.164	123.164	1.775
1.008	10.780	100.0	300	Circular	128.026	126.214	1.512	127.606	126.106	1.200
10.000	10.916	22.3	150	Circular	129.455	128.805	0.500	128.915	128.315	0.450
10.001	11.226	26.5	150	Circular	128.915	128.315	0.450	128.541	127.891	0.500
5.000	16.539	84.0	300	Circular	129.605	129.305	0.000	129.408	129.108	0.000
5.001	7.905	14.5	150	Circular	129.408	129.108	0.150	129.212	128.562	0.500
5.002	12.557	59.8	150	Circular	129.212	128.562	0.500	129.002	128.352	0.500
5.003	7.632	3.6	150	Circular	129.002	128.352	0.500	128.026	126.214	1.662
1.006	16.000	59.9	150	Circular	128.536	127.786	0.600	128.416	127.519	0.747
1.007	18.356	14.1	300	Circular	128.416	127.519	0.597	128.026	126.214	1.512
1.005	10.000	22.7	150	Circular	128.936	128.226	0.560	128.536	127.786	0.600
4.000	2.000	31.3	150	Circular	128.937	128.290	0.497	128.936	128.226	0.560
3.000	3.500	100.0	300	Circular	129.809	129.509	0.000	129.774	129.474	0.000
2.000	3.000	100.0	300	Circular	130.074	129.774	0.000	130.074	129.744	0.030
1.000	3.000	100.0	300	Circular	132.132	131.832	0.000	132.132	131.802	0.030
1.002	31.087	15.1	150	Circular	132.132	131.482	0.500	130.074	129.424	0.500
1.003	27.049	100.6	150	Circular	130.074	129.424	0.500	129.809	129.155	0.504
1.004	24.758	26.7	150	Circular	129.809	129.155	0.504	128.936	128.226	0.560
1.001	3.000	9.4	150	Circular	132.132	131.802	0.180	132.132	131.482	0.500
2.001	3.000	9.4	150	Circular	130.074	129.744	0.180	130.074	129.424	0.500
3.001	3.000	9.4	150	Circular	129.774	129.474	0.150	129.809	129.155	0.504
6.004	10.883	100.0	225	Circular	129.912	128.912	0.775	129.465	128.803	0.437

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
6.007	SMH6	1200	Manhole	Adoptable	Rain Garden 2	1200	Manhole	Adoptable
1.009	Rain Garden 2	1200	Manhole	Adoptable	Soakaway		Junction	
1.008	SMH7	1200	Manhole	Adoptable	Rain Garden 2	1200	Manhole	Adoptable
10.000	G3	1200	Manhole	Adoptable	G4	1200	Manhole	Adoptable
10.001	G4	1200	Manhole	Adoptable	SMH6	1200	Manhole	Adoptable
5.000	J4		Junction		J3		Junction	
5.001	J3		Junction		SMH9	1200	Manhole	Adoptable
5.002	SMH9	1200	Manhole	Adoptable	SMH8	1200	Manhole	Adoptable
5.003	SMH8	1200	Manhole	Adoptable	SMH7	1200	Manhole	Adoptable
1.006	EXSMH2	1200	Manhole	Adoptable	EXSMH3	1200	Manhole	Adoptable
1.007	EXSMH3	1200	Manhole	Adoptable	SMH7	1200	Manhole	Adoptable
1.005	EXSMH1	1200	Manhole	Adoptable	EXSMH2	1200	Manhole	Adoptable
4.000	G5	1200	Manhole	Adoptable	EXSMH1	1200	Manhole	Adoptable
3.000	J1		Junction		J2		Junction	
2.000	J5		Junction		J6		Junction	
1.000	J7		Junction		J8		Junction	
1.002	J9		Junction		J10		Junction	
1.003	J10		Junction		J11		Junction	
1.004	J11		Junction		EXSMH1	1200	Manhole	Adoptable
1.001	J8		Junction		J9		Junction	
2.001	J6		Junction		J10		Junction	
3.001	J2		Junction		J11		Junction	
6.004	SMH3	1200	Manhole	Adoptable	SMH3A	1200	Manhole	Adoptable

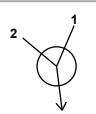
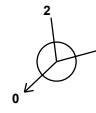
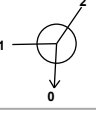


Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
6.005	29.687	100.0	225	Circular	129.465	128.803	0.437	129.137	128.506	0.406

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
6.005	SMH3A	1200	Manhole	Adoptable	SMH5	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Soakaway	64.202	-35.918	125.164	2.000			1	1.009	123.164	225
G1	18.341	87.244	131.978	0.600	1200		0	6.000	131.378	100
G2	33.657	88.200	131.887	0.600	1200		0	7.000	131.287	100
SMH1	29.301	78.081	131.852	0.675	1200		1 2	7.000 6.000	131.177 131.177	100 100
SMH2	30.650	67.393	131.841	0.857	1200		1 2	8.001 6.001	130.984 130.984	150 150
J1a	45.008	79.719	131.852	0.300			0	8.000	131.552	300
J1b	45.065	71.287	131.821	0.300			1	8.000	131.521	300
SMH4	-5.149	31.734	129.856	0.650	1200		0	8.001	131.521	150
SMH5	22.036	32.248	129.137	0.631	1200		1 2	9.000 6.005	129.206 128.506	150 225
SMH6	19.811	-10.264	128.541	0.650	1200		1 2	10.001 6.006	127.891 127.891	150 225
							0	6.007	127.891	225

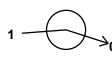
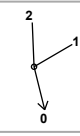


Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Rain Garden 2	17.633	-39.386	127.606	1.500	1200		1	6.007	126.106	225
							2	1.008	126.106	300
							0	1.009	126.106	225
Rain Garden 1	19.641	56.967	131.699	1.200	1200		1	6.002	130.499	225
							0	6.003	130.499	225
G4	5.100	6.789	128.915	0.600	1200		1	10.000	128.315	150
							0	10.001	128.315	150
G3	-16.284	6.673	129.455	0.650	1200		0	10.000	128.805	150
							1	5.003	126.214	150
SMH7	-8.832	-38.386	128.026	1.812	1200		2	1.007	126.214	300
							0	1.008	126.214	300
							1	5.002	128.352	150
SMH8	-18.361	-31.109	129.002	0.650	1200		0	5.003	128.352	150
							1	5.001	128.562	150
SMH9	-21.415	-13.231	129.212	0.650	1200		1	5.001	128.562	150
							0	5.002	128.562	150
EXSMH3	-38.858	-44.337	128.416	0.897	1200		1	1.006	127.519	150
							0	1.007	127.519	300
EXSMH2	-75.623	-43.874	128.536	0.750	1200		1	1.005	127.786	150
							0	1.006	127.786	150
EXSMH1	-97.463	-30.353	128.936	0.710	1200		1	4.000	128.226	150
							2	1.004	128.226	150
							0	1.005	128.226	150
G5	-86.351	-21.084	128.937	0.647	1200		0	4.000	128.290	150
							1	5.000	129.108	300
J3	-41.507	-13.123	129.408	0.300			0	5.001	129.108	150
J4	-56.943	-12.856	129.605	0.300			0	5.000	129.305	300
							0	5.000	129.305	300



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SMH3	32.063	57.915	129.912	1.000	1200		1 6.003	128.912	225
						0	6.004	128.912	225
J1	-108.985	-9.410	129.809	0.300			0 3.000	129.509	300
J2	-95.127	-9.410	129.774	0.300			1 3.000	129.474	300
						0	3.001	129.474	150
J5	-114.468	19.112	130.074	0.300			0 2.000	129.774	300
J6	-100.609	18.570	130.074	0.330			1 2.000	129.744	300
						0	2.001	129.744	150
J7	-116.491	46.592	132.132	0.300			0 1.000	131.832	300
J8	-104.417	46.939	132.132	0.330			1 1.000	131.802	300
						0	1.001	131.802	150
J10	-127.788	2.693	130.074	0.650			1 2.001	129.424	150
						2	1.002	129.424	150
						0	1.003	129.424	150
J11	-121.271	-23.559	129.809	0.654			1 3.001	129.155	150
						2	1.003	129.155	150
						0	1.004	129.155	150
J9	-129.047	33.755	132.132	0.650			1 1.001	131.482	150
						0	1.002	131.482	150
SMH3A	38.249	55.921	129.465	0.662	1200		1 6.004	128.803	225
						0	6.005	128.803	225

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	6.8
Rainfall Events	Singular	Drain Down Time (mins)	1440	30 year (l/s)	17.6
Summer CV	1.000	Additional Storage (m³/ha)	20.0	100 year (l/s)	21.7
Winter CV	1.000	Starting Level (m)		Check Discharge Volume	✓
Analysis Speed	Normal	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	



Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	10	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Time of Concentration (mins)	5.00
Brownfield Method	MRM	Betterment (%)	0
Contributing Area (ha)	0.459	Q 2 year (l/s)	6.8
PIMP (%)	100	Q 30 year (l/s)	17.6
CV	1.000	Q 100 year (l/s)	21.7

Pre-development Discharge Volume

Site Makeup	Brownfield	CV	1.000	Betterment (%)	0
Brownfield Method	MRM	Return Period (years)	100	PR	1.000
Contributing Area (ha)	0.459	Climate Change (%)	0	Runoff Volume (m³)	301
PIMP (%)	100	Storm Duration (mins)	360		

Node Soakaway Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.11412	Invert Level (m)	123.164	Depth (m)	1.600
Side Inf Coefficient (m/hr)	0.11412	Time to half empty (mins)	652	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	15.000	Number Required	1
Porosity	0.95	Pit Length (m)	13.500		



Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	Soakaway	248	123.422	0.258	17.2	49.9870	0.0000	OK
15 minute summer	G1	10	131.418	0.040	2.2	0.0592	0.0000	OK
15 minute summer	G2	10	131.316	0.029	1.1	0.0378	0.0000	OK
15 minute summer	SMH1	10	131.220	0.043	3.3	0.0486	0.0000	OK
15 minute summer	SMH2	10	131.040	0.056	16.9	0.0637	0.0000	OK
15 minute summer	J1a	10	131.648	0.096	13.7	0.4330	0.0000	OK
15 minute summer	J1b	10	131.583	0.062	13.7	0.0000	0.0000	OK
15 minute summer	SMH4	10	129.224	0.018	1.1	0.0231	0.0000	OK
15 minute summer	SMH5	11	128.588	0.082	19.6	0.1209	0.0000	OK
15 minute summer	SMH6	11	127.930	0.039	21.4	0.0441	0.0000	OK
15 minute summer	Rain Garden 2	10	126.165	0.059	38.1	0.0662	0.0000	OK
15 minute summer	Rain Garden 1	10	130.553	0.054	16.9	0.0606	0.0000	OK
15 minute summer	G4	10	128.340	0.024	2.0	0.0317	0.0000	OK
15 minute summer	G3	10	128.822	0.017	1.0	0.0217	0.0000	OK
15 minute summer	SMH7	11	126.298	0.084	16.6	0.0955	0.0000	OK
15 minute summer	SMH8	10	128.376	0.024	5.2	0.0268	0.0000	OK
15 minute summer	SMH9	10	128.618	0.056	5.2	0.0628	0.0000	OK
15 minute summer	EXSMH3	11	127.559	0.040	11.6	0.0533	0.0000	OK
15 minute summer	EXSMH2	11	127.863	0.077	10.0	0.1057	0.0000	OK
15 minute summer	EXSMH1	10	128.274	0.048	8.4	0.0541	0.0000	OK
15 minute summer	G5	10	128.318	0.028	2.0	0.0400	0.0000	OK
15 minute summer	J3	10	129.142	0.034	5.2	0.0000	0.0000	OK
15 minute summer	J4	10	129.348	0.043	5.2	0.0751	0.0000	OK
15 minute summer	SMH3	11	129.006	0.094	16.8	0.1061	0.0000	OK
15 minute summer	J1	10	129.524	0.015	0.5	0.0024	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
360 minute summer	Soakaway	Infiltration		3.4			
15 minute summer	G1	6.000	SMH1	2.2	0.726	0.324	0.0484
15 minute summer	G2	7.000	SMH1	1.1	0.438	0.181	0.0280
15 minute summer	SMH1	6.001	SMH2	3.2	0.634	0.180	0.0984
15 minute summer	SMH2	6.002	Rain Garden 1	16.9	2.254	0.117	0.0479
15 minute summer	J1a	8.000	J1b	13.7	0.932	0.285	0.2409
15 minute summer	J1b	8.001	SMH2	13.7	2.129	0.328	0.0632
15 minute summer	SMH4	9.000	SMH5	1.1	0.342	0.030	0.0893
15 minute summer	SMH5	6.006	SMH6	19.7	2.290	0.220	0.1849
15 minute summer	SMH6	6.007	Rain Garden 2	21.4	3.408	0.066	0.0296
15 minute summer	Rain Garden 2	1.009	Soakaway	38.1	4.653	0.149	0.1489
15 minute summer	Rain Garden 1	6.003	SMH3	16.8	1.488	0.125	0.2751
15 minute summer	G4	10.001	SMH6	2.0	0.856	0.057	0.0299
15 minute summer	G3	10.000	G4	1.0	0.685	0.026	0.0161
15 minute summer	SMH7	1.008	Rain Garden 2	16.7	1.302	0.150	0.1391
15 minute summer	SMH8	5.003	SMH7	5.2	0.937	0.055	0.0455
15 minute summer	SMH9	5.002	SMH8	5.2	1.400	0.226	0.0483
15 minute summer	EXSMH3	1.007	SMH7	11.5	1.094	0.039	0.2001
15 minute summer	EXSMH2	1.006	EXSMH3	9.9	1.551	0.429	0.1030
15 minute summer	EXSMH1	1.005	EXSMH2	8.2	1.187	0.219	0.0697
15 minute summer	G5	4.000	EXSMH1	2.0	0.659	0.062	0.0071
15 minute summer	J3	5.001	SMH9	5.2	1.186	0.111	0.0351
15 minute summer	J4	5.000	J3	5.2	0.988	0.043	0.0875
15 minute summer	SMH3	6.004	SMH3A	16.7	1.086	0.320	0.1672
15 minute summer	J1	3.000	J2	0.5	0.510	0.005	0.0035



Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	J2	10	129.484	0.010	0.5	0.0000	0.0000	OK
15 minute summer	J5	10	129.808	0.034	3.1	0.0350	0.0000	OK
15 minute summer	J6	10	129.768	0.024	3.1	0.0000	0.0000	OK
15 minute summer	J7	10	131.865	0.033	2.9	0.0322	0.0000	OK
15 minute summer	J8	10	131.825	0.023	2.9	0.0000	0.0000	OK
15 minute summer	J10	10	129.486	0.062	6.0	0.0000	0.0000	OK
15 minute summer	J11	10	129.199	0.044	6.5	0.0000	0.0000	OK
15 minute summer	J9	10	131.508	0.026	2.9	0.0000	0.0000	OK
15 minute summer	SMH3A	11	128.894	0.091	16.7	0.1031	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	J2	3.001	J11	0.5	0.244	0.009	0.0071
15 minute summer	J5	2.000	J6	3.1	0.898	0.028	0.0105
15 minute summer	J6	2.001	J10	3.1	1.049	0.053	0.0130
15 minute summer	J7	1.000	J8	2.9	0.881	0.026	0.0100
15 minute summer	J8	1.001	J9	2.9	1.582	0.050	0.0055
15 minute summer	J10	1.003	J11	6.0	1.071	0.336	0.1511
15 minute summer	J11	1.004	EXSMH1	6.4	1.403	0.184	0.1123
15 minute summer	J9	1.002	J10	2.9	0.682	0.063	0.1386
15 minute summer	SMH3A	6.005	SMH5	16.9	1.197	0.324	0.4184



Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	Soakaway	232	123.840	0.676	30.7	131.0600	0.0000	OK
15 minute summer	G1	10	131.452	0.074	5.8	0.1111	0.0000	OK
15 minute summer	G2	10	131.336	0.049	2.9	0.0641	0.0000	OK
15 minute summer	SMH1	10	131.252	0.074	8.7	0.0842	0.0000	OK
15 minute summer	SMH2	10	131.083	0.099	44.4	0.1119	0.0000	OK
15 minute summer	J1a	10	131.707	0.155	35.8	0.7026	0.0000	OK
15 minute summer	J1b	10	131.639	0.118	35.8	0.0000	0.0000	OK
15 minute summer	SMH4	10	129.234	0.028	2.8	0.0363	0.0000	OK
15 minute summer	SMH5	11	128.651	0.145	51.2	0.2138	0.0000	OK
15 minute summer	SMH6	11	127.958	0.067	56.2	0.0759	0.0000	OK
15 minute summer	Rain Garden 2	11	126.202	0.095	97.8	0.1080	0.0000	OK
15 minute summer	Rain Garden 1	10	130.588	0.089	44.3	0.1001	0.0000	OK
15 minute summer	G4	10	128.354	0.039	5.2	0.0510	0.0000	OK
15 minute summer	G3	10	128.832	0.027	2.6	0.0343	0.0000	OK
15 minute summer	SMH7	11	126.353	0.138	41.2	0.1566	0.0000	OK
15 minute summer	SMH8	10	128.390	0.038	13.7	0.0433	0.0000	OK
15 minute summer	SMH9	10	128.660	0.098	13.7	0.1111	0.0000	OK
15 minute summer	EXSMH3	11	127.581	0.062	28.4	0.0828	0.0000	OK
15 minute summer	EXSMH2	11	128.071	0.285	26.1	0.3911	0.0000	SURCHARGED
15 minute summer	EXSMH1	11	128.322	0.096	22.2	0.1082	0.0000	OK
15 minute summer	G5	10	128.341	0.051	5.3	0.0737	0.0000	OK
15 minute summer	J3	10	129.164	0.055	13.7	0.0000	0.0000	OK
15 minute summer	J4	10	129.374	0.069	13.7	0.1193	0.0000	OK
15 minute summer	SMH3	10	129.093	0.181	44.3	0.2050	0.0000	OK
15 minute summer	J1	10	129.532	0.023	1.3	0.0037	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
240 minute winter	Soakaway	Infiltration		3.8			
15 minute summer	G1	6.000	SMH1	5.8	0.928	0.851	0.0991
15 minute summer	G2	7.000	SMH1	2.9	0.579	0.479	0.0554
15 minute summer	SMH1	6.001	SMH2	8.6	0.814	0.483	0.2030
15 minute summer	SMH2	6.002	Rain Garden 1	44.3	2.836	0.308	0.1000
15 minute summer	J1a	8.000	J1b	35.8	1.149	0.744	0.5051
15 minute summer	J1b	8.001	SMH2	35.8	2.627	0.855	0.1331
15 minute summer	SMH4	9.000	SMH5	2.8	0.457	0.076	0.1592
15 minute summer	SMH5	6.006	SMH6	51.6	2.800	0.577	0.3873
15 minute summer	SMH6	6.007	Rain Garden 2	56.3	4.361	0.174	0.0605
15 minute summer	Rain Garden 2	1.009	Soakaway	97.9	4.797	0.383	0.3368
15 minute summer	Rain Garden 1	6.003	SMH3	44.3	1.807	0.330	0.5866
15 minute summer	G4	10.001	SMH6	5.2	1.097	0.150	0.0621
15 minute summer	G3	10.000	G4	2.6	0.908	0.069	0.0316
15 minute summer	SMH7	1.008	Rain Garden 2	41.4	1.630	0.373	0.2751
15 minute summer	SMH8	5.003	SMH7	13.7	1.276	0.144	0.0781
15 minute summer	SMH9	5.002	SMH8	13.7	1.759	0.595	0.0989
15 minute summer	EXSMH3	1.007	SMH7	28.4	1.381	0.095	0.3882
15 minute summer	EXSMH2	1.006	EXSMH3	24.5	1.804	1.064	0.1960
15 minute summer	EXSMH1	1.005	EXSMH2	21.4	1.385	0.570	0.1473
15 minute summer	G5	4.000	EXSMH1	5.4	0.786	0.169	0.0164
15 minute summer	J3	5.001	SMH9	13.7	1.516	0.291	0.0717
15 minute summer	J4	5.000	J3	13.7	1.301	0.113	0.1747
15 minute summer	SMH3	6.004	SMH3A	43.6	1.326	0.839	0.3576
15 minute summer	J1	3.000	J2	1.3	0.687	0.012	0.0068



Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	J2	10	129.490	0.016	1.3	0.0000	0.0000	OK
15 minute summer	J5	10	129.828	0.054	8.1	0.0555	0.0000	OK
15 minute summer	J6	10	129.782	0.038	8.1	0.0000	0.0000	OK
15 minute summer	J7	10	131.885	0.053	7.6	0.0510	0.0000	OK
15 minute summer	J8	10	131.839	0.037	7.6	0.0000	0.0000	OK
15 minute summer	J10	10	129.537	0.113	15.7	0.0000	0.0000	OK
15 minute summer	J11	10	129.229	0.074	16.9	0.0000	0.0000	OK
15 minute summer	J9	10	131.523	0.041	7.6	0.0000	0.0000	OK
15 minute summer	SMH3A	11	128.971	0.168	43.6	0.1902	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	J2	3.001	J11	1.3	0.306	0.022	0.0144
15 minute summer	J5	2.000	J6	8.1	1.186	0.073	0.0207
15 minute summer	J6	2.001	J10	8.1	1.215	0.138	0.0265
15 minute summer	J7	1.000	J8	7.6	1.163	0.068	0.0198
15 minute summer	J8	1.001	J9	7.6	2.098	0.130	0.0109
15 minute summer	J10	1.003	J11	15.6	1.360	0.884	0.3087
15 minute summer	J11	1.004	EXSMH1	16.9	1.749	0.487	0.2495
15 minute summer	J9	1.002	J10	7.6	0.855	0.165	0.2817
15 minute summer	SMH3A	6.005	SMH5	44.0	1.491	0.847	0.8752



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	Soakaway	344	124.188	1.024	31.6	198.4420	0.0000	OK
15 minute summer	G1	11	131.517	0.139	8.1	0.2083	0.0000	SURCHARGED
15 minute summer	G2	10	131.347	0.060	4.1	0.0792	0.0000	OK
15 minute summer	SMH1	10	131.267	0.090	11.4	0.1015	0.0000	OK
15 minute summer	SMH2	11	131.096	0.112	53.8	0.1270	0.0000	OK
15 minute summer	J1a	11	131.838	0.286	50.2	1.2980	0.0000	OK
15 minute summer	J1b	11	131.815	0.294	43.4	0.0000	0.0000	FLOOD RISK
15 minute summer	SMH4	10	129.239	0.033	4.0	0.0432	0.0000	OK
15 minute summer	SMH5	11	128.673	0.167	62.6	0.2457	0.0000	OK
15 minute summer	SMH6	11	127.967	0.076	68.9	0.0855	0.0000	OK
15 minute summer	Rain Garden 2	11	126.214	0.108	121.4	0.1221	0.0000	OK
15 minute summer	Rain Garden 1	11	130.598	0.099	54.0	0.1117	0.0000	OK
15 minute summer	G4	10	128.362	0.047	7.4	0.0611	0.0000	OK
15 minute summer	G3	10	128.837	0.032	3.7	0.0408	0.0000	OK
15 minute summer	SMH7	10	126.375	0.161	53.3	0.1818	0.0000	OK
15 minute summer	SMH8	10	128.397	0.045	19.2	0.0514	0.0000	OK
15 minute summer	SMH9	10	128.689	0.127	19.2	0.1441	0.0000	OK
15 minute summer	EXSMH3	11	127.587	0.068	34.3	0.0910	0.0000	OK
15 minute summer	EXSMH2	12	128.252	0.466	31.1	0.6393	0.0000	FLOOD RISK
15 minute summer	EXSMH1	12	128.517	0.291	27.6	0.3288	0.0000	SURCHARGED
15 minute summer	G5	12	128.519	0.229	7.4	0.3303	0.0000	SURCHARGED
15 minute summer	J3	10	129.175	0.067	19.2	0.0000	0.0000	OK
15 minute summer	J4	10	129.386	0.081	19.2	0.1408	0.0000	OK
15 minute summer	SMH3	11	129.171	0.259	54.0	0.2928	0.0000	SURCHARGED
15 minute summer	J1	10	129.536	0.027	1.8	0.0043	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
360 minute winter	Soakaway	Infiltration		4.1			
15 minute summer	G1	6.000	SMH1	7.4	0.972	1.088	0.1210
15 minute summer	G2	7.000	SMH1	4.1	0.650	0.678	0.0681
15 minute summer	SMH1	6.001	SMH2	11.3	0.901	0.635	0.2409
15 minute summer	SMH2	6.002	Rain Garden 1	54.0	2.957	0.375	0.1168
15 minute summer	J1a	8.000	J1b	43.4	1.152	0.903	1.1291
15 minute summer	J1b	8.001	SMH2	42.6	2.608	1.018	0.1556
15 minute summer	SMH4	9.000	SMH5	4.0	0.499	0.108	0.1672
15 minute summer	SMH5	6.006	SMH6	62.5	2.870	0.698	0.4529
15 minute summer	SMH6	6.007	Rain Garden 2	68.9	4.532	0.213	0.0712
15 minute summer	Rain Garden 2	1.009	Soakaway	121.5	4.972	0.476	0.3623
15 minute summer	Rain Garden 1	6.003	SMH3	54.0	1.853	0.402	0.6800
15 minute summer	G4	10.001	SMH6	7.4	1.162	0.213	0.0759
15 minute summer	G3	10.000	G4	3.7	1.005	0.098	0.0406
15 minute summer	SMH7	1.008	Rain Garden 2	53.1	1.742	0.478	0.3295
15 minute summer	SMH8	5.003	SMH7	19.2	1.488	0.202	0.0843
15 minute summer	SMH9	5.002	SMH8	19.2	1.835	0.834	0.1283
15 minute summer	EXSMH3	1.007	SMH7	34.3	1.489	0.115	0.4626
15 minute summer	EXSMH2	1.006	EXSMH3	29.0	1.987	1.260	0.2032
15 minute summer	EXSMH1	1.005	EXSMH2	25.0	1.442	0.667	0.1760
15 minute summer	G5	4.000	EXSMH1	7.3	0.832	0.229	0.0352
15 minute summer	J3	5.001	SMH9	19.2	1.621	0.408	0.0930
15 minute summer	J4	5.000	J3	19.2	1.424	0.158	0.2235
15 minute summer	SMH3	6.004	SMH3A	53.3	1.341	1.025	0.4239
15 minute summer	J1	3.000	J2	1.8	0.759	0.016	0.0084



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	J2	10	129.492	0.018	1.8	0.0000	0.0000	OK
15 minute summer	J5	10	129.838	0.064	11.3	0.0653	0.0000	OK
15 minute summer	J6	10	129.789	0.045	11.3	0.0000	0.0000	OK
15 minute summer	J7	10	131.894	0.062	10.7	0.0603	0.0000	OK
15 minute summer	J8	10	131.846	0.043	10.7	0.0000	0.0000	OK
15 minute summer	J10	11	129.663	0.239	22.0	0.0000	0.0000	SURCHARGED
15 minute summer	J11	11	129.242	0.087	21.9	0.0000	0.0000	OK
15 minute summer	J9	10	131.531	0.049	10.7	0.0000	0.0000	OK
15 minute summer	SMH3A	12	129.009	0.206	53.3	0.2331	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	J2	3.001	J11	1.8	0.342	0.031	0.0175
15 minute summer	J5	2.000	J6	11.3	1.301	0.102	0.0263
15 minute summer	J6	2.001	J10	11.3	1.419	0.193	0.0330
15 minute summer	J7	1.000	J8	10.7	1.283	0.096	0.0253
15 minute summer	J8	1.001	J9	10.7	2.315	0.183	0.0139
15 minute summer	J10	1.003	J11	20.3	1.388	1.147	0.3811
15 minute summer	J11	1.004	EXSMH1	22.0	1.716	0.636	0.3488
15 minute summer	J9	1.002	J10	10.7	0.906	0.232	0.3518
15 minute summer	SMH3A	6.005	SMH5	53.2	1.551	1.024	1.0323



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	Soakaway	236	124.043	0.879	38.2	170.4182	0.0000	OK
15 minute summer	G1	10	131.478	0.099	7.3	0.1490	0.0000	OK
15 minute summer	G2	10	131.344	0.056	3.7	0.0742	0.0000	OK
15 minute summer	SMH1	10	131.263	0.086	10.6	0.0974	0.0000	OK
15 minute summer	SMH2	11	131.091	0.107	50.3	0.1214	0.0000	OK
15 minute summer	J1a	11	131.764	0.212	45.2	0.9608	0.0000	OK
15 minute summer	J1b	11	131.736	0.215	42.3	0.0000	0.0000	FLOOD RISK
15 minute summer	SMH4	10	129.238	0.032	3.6	0.0410	0.0000	OK
15 minute summer	SMH5	11	128.666	0.160	59.1	0.2352	0.0000	OK
15 minute summer	SMH6	10	127.964	0.073	65.2	0.0828	0.0000	OK
15 minute summer	Rain Garden 2	10	126.210	0.104	114.5	0.1178	0.0000	OK
15 minute summer	Rain Garden 1	11	130.594	0.095	50.5	0.1077	0.0000	OK
15 minute summer	G4	10	128.359	0.044	6.6	0.0576	0.0000	OK
15 minute summer	G3	10	128.835	0.030	3.3	0.0385	0.0000	OK
15 minute summer	SMH7	10	126.368	0.154	50.0	0.1746	0.0000	OK
15 minute summer	SMH8	10	128.395	0.043	17.3	0.0487	0.0000	OK
15 minute summer	SMH9	10	128.678	0.116	17.3	0.1315	0.0000	OK
15 minute summer	EXSMH3	10	127.586	0.067	32.9	0.0889	0.0000	OK
15 minute summer	EXSMH2	11	128.190	0.404	29.4	0.5537	0.0000	SURCHARGED
15 minute summer	EXSMH1	11	128.419	0.192	26.0	0.2177	0.0000	SURCHARGED
15 minute summer	G5	11	128.421	0.131	6.6	0.1888	0.0000	OK
15 minute summer	J3	10	129.171	0.063	17.3	0.0000	0.0000	OK
15 minute summer	J4	10	129.382	0.077	17.3	0.1337	0.0000	OK
15 minute summer	SMH3	11	129.135	0.223	50.6	0.2517	0.0000	OK
15 minute summer	J1	10	129.534	0.025	1.6	0.0041	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
240 minute winter	Soakaway	Infiltration		4.0			
15 minute summer	G1	6.000	SMH1	6.9	0.958	1.020	0.1190
15 minute summer	G2	7.000	SMH1	3.7	0.626	0.612	0.0647
15 minute summer	SMH1	6.001	SMH2	10.6	0.885	0.596	0.2302
15 minute summer	SMH2	6.002	Rain Garden 1	50.5	2.914	0.350	0.1107
15 minute summer	J1a	8.000	J1b	42.3	1.136	0.880	0.8692
15 minute summer	J1b	8.001	SMH2	40.3	2.652	0.963	0.1524
15 minute summer	SMH4	9.000	SMH5	3.6	0.470	0.097	0.1655
15 minute summer	SMH5	6.006	SMH6	59.0	2.849	0.660	0.4319
15 minute summer	SMH6	6.007	Rain Garden 2	65.1	4.484	0.201	0.0680
15 minute summer	Rain Garden 2	1.009	Soakaway	114.3	4.927	0.447	0.3570
15 minute summer	Rain Garden 1	6.003	SMH3	50.6	1.847	0.377	0.6693
15 minute summer	G4	10.001	SMH6	6.6	1.142	0.190	0.0723
15 minute summer	G3	10.000	G4	3.3	0.973	0.087	0.0374
15 minute summer	SMH7	1.008	Rain Garden 2	49.4	1.706	0.445	0.3139
15 minute summer	SMH8	5.003	SMH7	17.3	1.408	0.182	0.0831
15 minute summer	SMH9	5.002	SMH8	17.3	1.821	0.752	0.1182
15 minute summer	EXSMH3	1.007	SMH7	32.7	1.471	0.110	0.4419
15 minute summer	EXSMH2	1.006	EXSMH3	27.6	1.896	1.198	0.2014
15 minute summer	EXSMH1	1.005	EXSMH2	23.4	1.400	0.623	0.1760
15 minute summer	G5	4.000	EXSMH1	6.5	0.813	0.204	0.0339
15 minute summer	J3	5.001	SMH9	17.3	1.592	0.368	0.0856
15 minute summer	J4	5.000	J3	17.3	1.385	0.143	0.2071
15 minute summer	SMH3	6.004	SMH3A	50.2	1.345	0.965	0.4109
15 minute summer	J1	3.000	J2	1.6	0.732	0.014	0.0078



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	J2	10	129.491	0.017	1.6	0.0000	0.0000	OK
15 minute summer	J5	10	129.835	0.061	10.2	0.0621	0.0000	OK
15 minute summer	J6	10	129.786	0.042	10.2	0.0000	0.0000	OK
15 minute summer	J7	10	131.891	0.059	9.6	0.0572	0.0000	OK
15 minute summer	J8	10	131.843	0.041	9.6	0.0000	0.0000	OK

15 minute summer	J10	11	129.570	0.146	19.8	0.0000	0.0000	OK
15 minute summer	J11	10	129.239	0.084	20.8	0.0000	0.0000	OK
15 minute summer	J9	10	131.529	0.047	9.6	0.0000	0.0000	OK

15 minute summer	SMH3A	11	128.993	0.190	50.2	0.2153	0.0000	OK
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Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	J2	3.001	J11	1.6	0.323	0.027	0.0168
15 minute summer	J5	2.000	J6	10.2	1.265	0.092	0.0244
15 minute summer	J6	2.001	J10	10.2	1.372	0.174	0.0323
15 minute summer	J7	1.000	J8	9.6	1.243	0.086	0.0234
15 minute summer	J8	1.001	J9	9.6	2.245	0.164	0.0129
15 minute summer	J10	1.003	J11	19.2	1.371	1.082	0.3725
15 minute summer	J11	1.004	EXSMH1	20.7	1.753	0.599	0.3387
15 minute summer	J9	1.002	J10	9.6	0.891	0.209	0.3436
15 minute summer	SMH3A	6.005	SMH5	49.9	1.533	0.961	0.9802



Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.88%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	Soakaway	464	124.730	1.566	35.7	303.8730	0.0000	OK
15 minute summer	G1	11	131.764	0.386	11.6	0.5919	0.0000	FLOOD RISK
15 minute summer	G2	11	131.377	0.090	5.8	0.1197	0.0000	OK
15 minute summer	SMH1	11	131.287	0.110	14.9	0.1243	0.0000	OK
15 minute summer	SMH2	11	131.118	0.134	69.9	0.1516	0.0000	OK
15 minute summer	J1a	9	131.852	0.300	72.0	3.7587	0.0000	FLOOD RISK
15 minute summer	J1b	9	131.821	0.300	55.8	0.0000	0.0000	FLOOD RISK
15 minute summer	SMH4	10	129.246	0.040	5.7	0.0523	0.0000	OK
15 minute summer	SMH5	12	128.709	0.203	77.0	0.3054	0.0000	OK
15 minute summer	SMH6	11	127.977	0.086	85.4	0.0974	0.0000	OK
15 minute summer	Rain Garden 2	11	126.230	0.124	153.6	0.1403	0.0000	OK
15 minute summer	Rain Garden 1	12	130.615	0.116	69.8	0.1308	0.0000	OK
15 minute summer	G4	10	128.372	0.057	10.6	0.0748	0.0000	OK
15 minute summer	G3	10	128.843	0.038	5.3	0.0494	0.0000	OK
15 minute summer	SMH7	11	126.401	0.187	68.2	0.2116	0.0000	OK
15 minute summer	SMH8	11	128.405	0.053	25.9	0.0601	0.0000	OK
15 minute summer	SMH9	11	128.885	0.322	27.2	0.3647	0.0000	SURCHARGED
15 minute summer	EXSMH3	11	127.595	0.076	42.3	0.1025	0.0000	OK
15 minute summer	EXSMH2	12	128.524	0.738	36.9	1.0297	0.0000	FLOOD RISK
15 minute summer	EXSMH1	12	128.904	0.678	32.4	0.7663	0.0000	FLOOD RISK
15 minute summer	G5	12	128.908	0.618	10.6	0.9084	0.0000	FLOOD RISK
15 minute summer	J3	10	129.199	0.091	27.5	0.0000	0.0000	OK
15 minute summer	J4	9	129.402	0.097	27.5	0.1848	0.0000	OK
15 minute summer	SMH3	12	129.526	0.614	69.7	0.6945	0.0000	SURCHARGED
15 minute summer	J1	10	129.540	0.031	2.5	0.0055	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
480 minute winter	Soakaway	Infiltration		4.6			
15 minute summer	G1	6.000	SMH1	9.7	1.234	1.419	0.1243
15 minute summer	G2	7.000	SMH1	5.5	0.727	0.904	0.0840
15 minute summer	SMH1	6.001	SMH2	14.9	0.971	0.838	0.2934
15 minute summer	SMH2	6.002	Rain Garden 1	69.8	3.107	0.484	0.1435
15 minute summer	J1a	8.000	J1b	55.8	1.126	1.160	1.1408
15 minute summer	J1b	8.001	SMH2	55.0	3.129	1.315	0.1677
15 minute summer	SMH4	9.000	SMH5	5.7	0.524	0.154	0.1740
15 minute summer	SMH5	6.006	SMH6	76.3	2.905	0.852	0.5392
15 minute summer	SMH6	6.007	Rain Garden 2	85.3	4.759	0.263	0.0849
15 minute summer	Rain Garden 2	1.009	Soakaway	153.6	5.196	0.601	0.3848
15 minute summer	Rain Garden 1	6.003	SMH3	69.7	2.033	0.519	0.7256
15 minute summer	G4	10.001	SMH6	10.6	1.327	0.305	0.0911
15 minute summer	G3	10.000	G4	5.3	1.110	0.140	0.0525
15 minute summer	SMH7	1.008	Rain Garden 2	68.3	1.851	0.615	0.3972
15 minute summer	SMH8	5.003	SMH7	25.9	1.889	0.273	0.0885
15 minute summer	SMH9	5.002	SMH8	25.9	1.885	1.123	0.1455
15 minute summer	EXSMH3	1.007	SMH7	42.2	1.594	0.142	0.5521
15 minute summer	EXSMH2	1.006	EXSMH3	34.9	2.324	1.519	0.2123
15 minute summer	EXSMH1	1.005	EXSMH2	29.9	1.700	0.798	0.1760
15 minute summer	G5	4.000	EXSMH1	8.2	0.923	0.258	0.0352
15 minute summer	J3	5.001	SMH9	27.2	1.714	0.578	0.1139
15 minute summer	J4	5.000	J3	27.5	1.543	0.227	0.3116
15 minute summer	SMH3	6.004	SMH3A	67.5	1.698	1.299	0.4328
15 minute summer	J1	3.000	J2	2.5	0.845	0.022	0.0105



Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.88%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	J2	10	129.495	0.021	2.5	0.0000	0.0000	OK
15 minute summer	J5	11	129.973	0.199	16.2	0.2235	0.0000	OK
15 minute summer	J6	11	129.978	0.234	16.0	0.0000	0.0000	FLOOD RISK
15 minute summer	J7	10	131.907	0.075	15.4	0.0795	0.0000	OK
15 minute summer	J8	10	131.855	0.053	15.4	0.0000	0.0000	OK
15 minute summer	J10	11	129.961	0.537	29.7	0.0000	0.0000	FLOOD RISK
15 minute summer	J11	12	129.446	0.291	28.4	0.0000	0.0000	SURCHARGED
15 minute summer	J9	10	131.542	0.060	15.4	0.0000	0.0000	OK
15 minute summer	SMH3A	12	129.260	0.457	67.5	0.5167	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	J2	3.001	J11	2.5	0.391	0.043	0.0285
15 minute summer	J5	2.000	J6	16.0	1.354	0.144	0.1629
15 minute summer	J6	2.001	J10	14.8	1.506	0.253	0.0528
15 minute summer	J7	1.000	J8	15.4	1.414	0.139	0.0329
15 minute summer	J8	1.001	J9	15.4	2.560	0.263	0.0181
15 minute summer	J10	1.003	J11	25.9	1.514	1.462	0.4762
15 minute summer	J11	1.004	EXSMH1	26.9	1.735	0.778	0.4359
15 minute summer	J9	1.002	J10	15.4	1.088	0.335	0.3754
15 minute summer	SMH3A	6.005	SMH5	67.0	1.685	1.289	1.1505

Appliance	System I	System II	FMH1	DU	EXFMH1	DU	EXFMH3	DU		System III	System IV
	DU l/s	DU l/s								DU l/s	DU l/s
Wash basin, bidet	0,5	0,3	2	0,6	6	1,8	3	0,9		0,3	0,3
Shower without plug	0,6	0,4								0,4	0,4
Shower with plug	0,8	0,5								1,3	0,5
Single urinal with cistern	0,8	0,5								0,4	0,5
Urinal with flushing valve	0,5	0,3								-	0,3
Slab urinal	0,2	0,2*								0,2	0,2*
Bath	0,8	0,6								1,3	0,5
Kitchen sink	0,8	0,6					5	3		1,3	0,5
Dishwasher (household)	0,8	0,6					1	0,6		0,2	0,5
Washing machine up to 6 kg	0,8	0,6								0,6	0,5
Washing machine up to 12 kg	1,5	1,2								1,2	1,0
WC with 4,0 l cistern	**	1,8	1	1,8	6	10,8	3	5,4		**	**
WC with 6,0 l cistern	2,0	1,8								1,2 to 1,7***	2,0
WC with 7,5 l cistern	2,0	1,8								1,4 to 1,8***	2,0
WC with 9,0 l cistern	2,5	2,0								1,6 to 2,0***	2,5
Floor gully DN 50	0,8	0,9								-	0,6
Floor gully DN 70	1,5	0,9								-	1,0
Floor gully DN 100	2,0	1,2								-	1,3
Total				2,4		12,6		9,9			
Overall Total	24,9										

* Per person.

** Not permitted.

Depending upon type (valid for WC's with siphon flush cistern only).

- Not used or no data.

From BS EN 12056-2

Assume worst case K value (table 3) =

0,5

Q_{WW} (l/s)

2,49

Ideally DN100 - SCV 1.1l/s



Project: 3986 – Wickenden Farm, Sharpthorne,
East Grinstead, Mid Sussex

Date: 03 February 2026
Revision: 001

1. Background Information

- 1.1 This maintenance and management plan has been prepared to support the maintenance and inspection program to ensure that the drainage system at the above site is adequately maintained throughout its lifetime.
- 1.2 For this site, the management company responsible for maintaining the rest of the site will be tasked with the inspection and maintenance of the drainage system, including SuDS. It should, however, be noted that it may be necessary to involve specialist contractors to undertake specific maintenance tasks that are required.
- 1.3 The following sections provide a summary of the maintenance requirements for each element of the drainage system, including any manufacturer specific requirements.
- 1.4 The maintenance and management of the proposed drainage network will be the responsibility of a designated management company. The details of the maintenance and management company are as follows:

Company Name:	North Star Centre Ltd
Company Address:	Wickenden Farm
	Chilling Street
	Sharpthorne
	RH19 4JD

2. Maintenance and Operation

2.1 Storm water pipes and manholes

- 2.1.1 Pipes and manholes should be inspected regularly to ensure sediment does not restrict hydraulic capacity.
- 2.1.2 Cleaning of sewers involving jetting/vacuuming, should be carried out as necessary to remove sediment or debris build-up.
- 2.1.3 Sediment should be removed in consultation with the environmental regulator to confirm appropriate protocols.

2.2 Geo-cellular Soakaway

- 2.2.1 Geo-cellular soakaway systems should be inspected monthly for the initial three months following installation, and annually thereafter. During this inspection, all inlets, outlets, vents, and overflows should be inspected to ensure that they are in good condition and operating as designed.
- 2.2.2 Debris and sediment should be removed from the catchment surface and from pre-treatment structures, as required based on regular inspection.
- 2.2.3 Repairs to inlets, outlets, overflow pipes, and vent mechanisms should be carried out as required, based on regular inspections.
- 2.2.4 Replacement of tanks or geotextile should be carried out, as required, if significant damage is observed.
- 2.2.5 A survey of inside the tanks, and any sediment trap mechanisms should be carried out every 5 years (or as required if regular monitoring should demonstrate high siltation rates) to remove sediment as necessary.

2.3 Water Butts

- 2.3.1 Inspection and cleaning of debris and sedimentation at the base of the tank. At least once per year and following any noticeable deterioration in performance (e.g. observation of sediment entrained within water).
- 2.3.2 Cleaning out of house guttering. As frequently as advised by maintenance plan for the property. Must be cleaned as soon as possible if blockage of guttering occurs.
- 2.3.3 Inspection and repair of areas receiving overflow from the tank in the event of erosion. Inspected at least once every 3 months for the first year following installation, reduced inspection frequencies thereafter, at least once per year.
- 2.3.4 inspection and repair of the inlet, outlet and overflows. Inspected at least once every 3 months for the first year following installation, reduced inspection frequencies thereafter, at least once per year.
- 2.3.5 cleaning of the tank, inlets, outlets, filters (if present) and removal of debris. Inspected at least once every 3 months for the first year following installation, reduced inspection frequencies thereafter, at least once per year.
- 2.3.6 Repairing of any erosive damage or damage to the tank. As required, whenever damage leaks or erosion is detected.
- 2.3.7 Inspection of the tank for debris, leaks or other damage and repair where necessary. As required, whenever damage leaks or erosion is detected.
- 2.3.8 Inspection of area receiving overflow from the tank in the event of erosion. As required, whenever damage leaks or erosion is detected.

2.3.9 Replacement of any filters.

2.4 Rain Gardens/Bioretention Systems

- 2.4.1 Inspect infiltration surfaces for any silting or ponding and record the dewatering time of the raingarden or bioretention system. Look for any areas of standing water. Inspect any hidden elements of the drainage for the feature e.g. underdrains, overflows etc. If standing water or damage is discovered instigate remedial maintenance. This should be conducted as quarterly inspections, system to be artificially filled with water or inspections to directly follow periods of heavy rainfall.
- 2.4.2 Check operation of underdrains by inspection of flows after rainfall annually.
- 2.4.3 Assess planting for disease infection poor growth invasive species etc. and replace as necessary. This should be done quarterly (more frequent inspection may be required depending on plants used and during growing season).
- 2.4.4 Inspect inlets and outlets for blockage or damage to any scour protection. This should be done quarterly, or whenever standing water is observed for significant periods of time following rainfall events.
- 2.4.5 Remove litter and surface debris. Weed area to remove nuisance plants. Quarterly (or more frequently for tidiness and aesthetic reasons).
- 2.4.6 Replace any plants to maintain planting density. As required, care should be taken to select replacement plants that are suitable for the soil substrate used within the bioretention system.
- 2.4.7 Remove sediment, litter, and debris build-up from around any inlets, downpipes, and forebay. Quarterly to biannually (adjust based on observed accumulation frequencies).
- 2.4.8 Infill any holes or scour in the filter medium, improve erosion protection if required. As required following routine inspection or observations of damage / poor operation.
- 2.4.9 Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch. As required following routine inspection or observations of damage / poor operation.
- 2.4.10 Remove and replace filter medium and vegetation above. As required following routine inspection however is unlikely to be required more frequently than every ~20 years.
- 2.4.11 Replace scour protection if dislodged or damaged. As required following routine inspection or observations of damage / poor operation.
- 2.4.12 Note: Raingardens and bioretention systems are often designed in conjunction with site landscaping, as a result bespoke maintenance requirements are frequently

required. Maintenance for any raingardens or bioretention systems should take into consideration any bespoke maintenance requirements that are specific to the final design.