Medworth EfW CHP Facility Order:
SI 2024 No.230

Operational Drainage Strategy: Work No.1,1A, 2A and 2B (EfW CHP Facility Site)

(Requirement 8: part discharge)

August 2025

Revision 2.0
Document ref. CP3_R08

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Contents

1. Introduction

1.1 Overview of Authorised Development

1.1.1 Medworth CHP Limited (the Developer) has secured a Development Consent Order (the Order)[1] to construct, operate and maintain an Energy from Waste (EfW) Combined Heat and Power (CHP) Facility on the industrial estate, Algores Way, Wisbech, Cambridgeshire. Together with associated Grid Connection, CHP Connection, Access Improvements, Water Connections, Temporary Construction Compound (TCC), and an Acoustic Fence, these works are the Authorised Development.

1.1.2 The Authorised Development will recover useful energy in the form of electricity and steam from over half a million tonnes of non-recyclable (residual), non-hazardous municipal, commercial and industrial waste each year. The Authorised Development has a generating capacity of over 50 megawatts and the electricity will be exported to the grid. The Authorised Development also has the capability to export steam and electricity to users on the surrounding industrial estate.

1.2 The Developer

1.2.1 The Developer is a wholly owned subsidiary of MVV Environment Limited (MVV). MVV is part of the MVV Energie AG group of companies. MVV Energie AG is one of Germany's leading energy companies, employing approximately 6,500 people with assets of around €5 billion and annual sales of around €4.1 billion. The Authorised Development represents an investment of over £450m.

1.2.2 The company has over 50 years of experience in constructing, operating, and maintaining EfW CHP facilities in Germany and the UK. MVV Energie's portfolio includes a 700,000 tonnes per annum residual EfW CHP facility in Mannheim, Germany.

1.2.3 MVV's largest operational project in the UK is the Devonport EfW CHP Facility in Plymouth. Since 2015, this modern and efficient facility has been using up to 275,000 tonnes of municipal, commercial and industrial residual waste per year to generate electricity and heat, notably for His Majesty's Naval Base Devonport in Plymouth, and exporting electricity to the grid.

1.2.4 In Dundee, MVV has taken over the existing Baldovie EfW Facility and has developed a new, modern facility alongside the existing facility. Operating in tandem since 2021, they use up to 220,000 tonnes of municipal, commercial and industrial waste each year as fuel for the generation of usable energy.

1.2.5 Biomass is another key focus of MVV's activities in the UK market. The biomass power plant at Ridham Dock, Kent, uses up to 195,000 tonnes of waste and non-recyclable wood per year to generate green electricity and is capable of exporting heat.

[1] Statutory Instrument 2024 No. 230 https://www.legislation.gov.uk/uksi/2024/230/schedule/1/made

1.3 EPC Contractor (Kanadevia Inova)

1.3.1 To construct the EfW CHP Facility (Work Nos. 1, 1A, 2A and 2B) the Developer has appointed Kanadevia Inova (KVI) as the EPC Contractor.

Kanadevia Inova is a global greentech company operating in Waste to Energy (WtE) and Renewable Gas. The company roots are in Switzerland which were established in 1933 as “L. von Roll Aktiengesellschaft”, later known as Von Roll Inova. Since 2010 the company has been part of the Kanadevia Corporation, one of Japan’s largest industrial and engineering firms and a longstanding partner and licensee of Von Roll Inova.

Kanadevia Inova have been building and maintaining plants for almost 90 years. Develop projects with our clients and drawing experience as a general engineering, procurement and construction contractor to deliver on their behalf complex turnkey plants and system solutions for thermal and biological WtE recovery, gas upgrading and power to gas. Kanadevia Inova have delivered ten WtE plants in the UK and have 5 more under construction.

1.4 The Authorised Development

1.4.1 The Authorised Development comprises the following key components:

- The EfW CHP Facility and Site (Work Nos.1/1A/1B/2A/2B);
- CHP Connection (Work Nos.3/3A/3B);
- Temporary Construction Compound (TCC) (Work No.5);
- Access Improvements (Work Nos.4A/4B);
- Water Connections (Work Nos.6A/6B);
- Grid Connection (Work Nos.7/8/9); and
- Acoustic fence (Work No.10).

1.4.2 A summary description of each Authorised Development element is provided below.

- EfW CHP Facility and Site: A site of approximately 5.3ha located south-west of Wisbech, located within the administrative areas of Fenland District Council and Cambridgeshire County Council. The main buildings of the EfW CHP Facility would be located in the area to the north of the Hundred of Wisbech Internal Drainage Board drain bisecting the site and would house many development elements including the tipping hall, waste bunkers, boiler house, turbine hall, air cooled condenser, air pollution control building and chimneys. The gatehouse, weighbridges, and laydown maintenance area would be located in the southern section of the EfW CHP Facility Site.
- CHP Connection: The EfW CHP Facility would be designed to allow the export of steam and electricity from the facility to surrounding business users via dedicated pipelines and private wire cables located along the disused March to

Wisbech railway. The pipeline and cables would be located on a raised, steel structure.

- TCC: Located adjacent to the EfW CHP Facility Site, the compound would be used to support the construction of the Authorised Development. The compound would be in place for the duration of construction.
- Access Improvements: includes access improvements on New Bridge Lane (road widening and site access) and Algores Way (relocation of site access 20m to the south).
- Water Connections: A new water main connecting the EfW CHP Facility into the local network will run underground from the EfW CHP Facility Site along New Bridge Lane before crossing underneath the A47 to join an existing Anglian Water main. An additional foul sewer connection is required to an existing pumping station operated by Anglian Water located to the northeast of the Algores Way site entrance and into the EfW CHP Facility Site.
- Grid Connection: This comprises a 132kV electrical connection using underground cables. The Grid Connection route begins at the EfW CHP Facility Site and runs underneath New Bridge Lane, before heading north within the verge of the A47 to the Walsoken Substation on Broadend Road. From this point the cable would be connected underground to the Walsoken DNO Substation.
- Acoustic fence: This comprises of a 3m high acoustic fence fronting a residential property at 10 New Bridge Lane, Wisbech.

1.5 Purpose of this document

1.5.1 This document is submitted to part discharge Order Requirement 8 for the operational drainage strategy for Work No.1, 1A, 2A, and 2B (the EfW CHP Facility Site).

1.5.2 Schedule 2 of the Order requires the Developer to comply with and or submit detailed information to implement the Authorised Development. Requirement 8 (Drainage Strategy) of Schedule 2 states:

> ***8.***—*(1) No part of Work No.* ***1,*** *1A,* ***1B, 2A, 2B****, 4A, 4B, 6A, 6B and 9* ***may commence until written details of the drainage strategy for that Work No. has been submitted to and approved by the relevant planning authority*** *[emphasis added].*
>
> *(2) The written details submitted for approval must be substantially in accordance with the outline drainage strategy.*
>
> *(3) The relevant planning authority must consult with Anglian Water in respect of any discharge to a public sewer before approving any drainage strategy submitted under sub-paragraph (1).*
>
> *(4) The relevant planning authority must consult with the Environment Agency before approving any drainage strategy submitted under sub-paragraph (1).*
>
> *(5) The drainage strategy must be implemented as approved under sub-paragraph (1).*

1.5.3 Submitted seperatly, details to discharge Requirement 8 for the construction phase of Work No.1, 1A, 2A, and 2B (the EfW CHP Facility Site) are included in **Appendix E (Water Management Plan)** of the **Construction Environmental Management Plan (CEMP), document referance CP3_R10/50246968, June 2025**.

1.5.4 Other Specific construction and operational drainage strategies will be prepared for the other Works No(s). and will be submitted prior to the commencement of development of that Work No(s).

Environment Agency request

1.5.5 This Operational Drainage Strategy is informed by the **Environmental Statement Chapter 12 Hydrology Appendix 12A: Flood Risk Assessment, Revision 1, (Volume 6.4) [APP-084],** hereafter referred to as the **Flood Risk Assessment** (**FRA**)). The **FRA** was scrutinised during the Examination phase of the Order; including consultation and agreement with the Environment Agency[2]. The modelling presented in the **FRA** remains robust, appropriate, and fit for purpose.

1.5.6 At the request of the Environment Agency, the following information from the **FRA** is appended to the operational Drainage Strategy, see **Appendix A**:

- *Executive Summary* – to summarise the **FRA** and its conclusions; and
- *Section 4*: *Detailed Tidal Flood Risk Assessment* - extent of flooding during the 0.5% AEP plus climate change event.

1.6 Structure of this document

- **Section 2.0** – the operational Drainage Strategy and accompanying drawings for the EfW CHP Facility Site, prepared by Doran Consulting, document reference 252016-DC-XX-XX-RP-C-001), Revision 6.
- **Appendix A** – Extracts from the **FRA**

[2]See Table 3.11(3) of the Statement of Common Ground between the Applicant and the Environment Agency, Revision 2, May 2023 [REP4-010] https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010110-001631-Applicant%20-%20Other-%20MVV%20Volume%209.7%20Statement%20of%20Common%20Ground%20between%20Medworth%20CHP%20Ltd%20and%20the%20Environment%20Agency%20(Final-signed).pdf – last accessed 05/08/2025

2. Operational Drainage Strategy for the EfW CHP Facility Site

MEDWORTH EFW CHP FACILITY

DRAINAGE STATEGY
(REF: 252016-DC-XX-XX-RP-C-001)

Kanadevia Inova AG

28 July 2025

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DRAINAGE STATEGY
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Kanadevia Inova AG

28 July 2025

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Doran Consulting Limited
Registered Office
Flax House
83 - 91 Adelaide Street
Belfast BT2 8FE

T 028 9033 3443
E mail@doran.co.uk
W www.doran.co.uk

NI Reg No. NI055181

CONTENTS

1.0 INTRODUCTION

Doran Consulting Limited (DCL) have been appointed by Kanadevia Inova AG (KVI) to complete a Drainage Strategy Report for the proposed Energy from Waste (EfW) Combined Heat and Power (CHP) Facility (the 'EfW CHP Facility Site'); Work Nos.1, 1A, 2A, and 2B of the Medworth EfW CHP Facility Order (the 'Order').

The design of the surface water and foul water drainage system for the EfW CHP Facility Site has been developed based upon Environmental Statement (ES) Appendix 12F:Outline Drainage Strategy (ODS) (Volume 6.4) [REP7_012]).

This report aims to summarise the drainage design strategy undertaken for the operational phase of the EfW CHP Facility and shall address the following main topics:

- Review of UK drainage planning policies and drainage design requirements
- Relevant Order Requirements
- Surface Water Drainage Strategy including assessment of appropriate surface water flow restrictions and associated attenuation requirements
- Foul Water Drainage Strategy
- Process and Spent Fire Water Drainage Strategy

2.0 Site Description

2.1 Site Location & Plan

The EfW CHP Facility is to be constructed on a site previously occupied (in part) by Mick George Ltd, and is located on Algores Way, Wisbech, Cambridgeshire, PE13 2TQ. The National Grid Reference for the site is X (Easting) 545581, Y (Northing) 307967 (Figure 2.1).

Figure 2.1 – Site Location Map (Google Maps)

The EfW CHP Facility comprises the following main components, tipping hall, waste bunker building, IBA storage bunker and loading areas, boiler house building, air pollution control building and silos, switchgear buildings, transformers, water treatment plant, air cooled condensers and turbine hall. A plan of the proposed site layout can be found in Appendix A.

2.2 Existing Site Arrangement

The EfW CHP Facility Site is currently occupied (in part) by Mick George Ltd and is used as a waste transfer station (WTS) and for external aggregate storage. The WTS building is located in the north east of the site, a weighbridge and several cabin type buildings are also located in this area.

Access to the waste transfer station is via Algores Way, which is located in the north east corner of the EfW CHP Facility Site.

The Hundred of Wisbech Internal Drainage Board (HWIDB) adopted watercourses (open drains) run adjacent to the EfW CHP Facility along the northern boundary (between nodes 34 and 47), the eastern boundary (between nodes 46 and 47, and nodes 48 and 49), and the southern boundary (between nodes 43 and 44). These are shown in Figure 2.2, which illustrates the HWIDB adopted watercourses, flow directions, node numbers, and the location of the separation dam near the EfW CHP Facility Site.

A short section of the watercourse between nodes 46 and 47, located at the north-east corner of the EfW CHP Facility Site, is culverted to allow vehicular access from Algores Way to the existing WTS site. Additionally, another HWIDB adopted watercourse (open drain) flows west to east between nodes 33 and 46, bisecting the EfW CHP Facility Site. In the western section of the site, this drain is also culverted for a short distance to provide vehicle access to the southern portion of the EfW CHP Facility Site. This drain incorporates a separation dam used to control water levels downstream.

During a consultation meeting held on 20 August 2020 (Appendix 12B: Stakeholder Engagement [Volume 6.4]), HWIDB highlighted the importance of this drain in conveying surface water flows from the Cromwell Road and Boleness Road sub-catchments (to the west and east of the EfW CHP Facility) into the IDB drainage network and ultimately discharging to the River Nene.

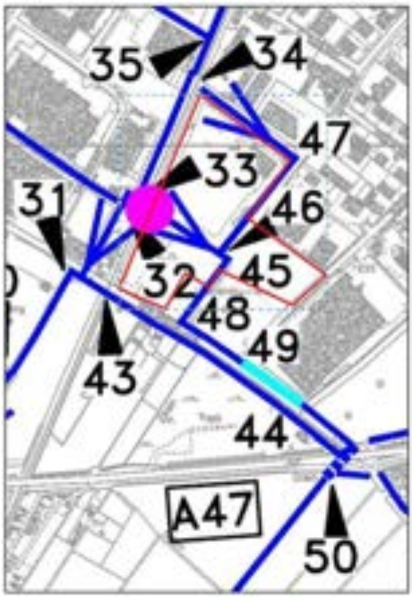

Figure 2.2 – Extract from the HWIDB's District Plan

2.3 Site Conditions (Topography)

The topography of the EfW CHP Facility Site is reasonably flat, varying between 2.4 and 1.7m AoD, and is generally falling towards the south west of the site. Large stock piles of stone and sand have created localised raised levels in certain areas of the site topography. Also several berms and open drains (see previous section)are located across the site creating localised raised levels.

3.0 Planning Policy & Drainage Design Requirements

Planning policy in relation to the design of surface water drainage systems for new developments is presented within the National Planning Policy Framework (NPPF), which encourages the incorporation of Sustainable Drainage Systems (SuDs) in the surface water drainage strategy for new developments. Furthermore, it stipulates that in areas at risk of flooding, the use of SuDS should be given priority. SuDs designs should conform with the Department for Environment, Food and Rural Affairs (DEFRA) 'Non-Statutory Technical Standards for Sustainable Drainage Systems' (March 2015). These documents all promote the approach that development should work towards replicating 'greenfield' conditions, wherever possible.

In line with local requirements, design works should also be undertaken in consideration to recommendations published in the

- Cambridgeshire Surface Water Management Plan (2014),
- Cambridgeshire Flood and Water Supplementary Planning Document (2016),
- Kings Lynn and West Norfolk Settlements Surface Water Management Plan (2010)
- Surface Water Drainage: Local Guidance for Planning Applications (Sequential Test and Exception Test) and Surface Water Drainage Guidance for Developers (2018).

Essentially the above legislation and associated guidance serve to promote sustainable development, incorporating sustainable design and construction principles, and high quality design, providing protection from pollution and flooding.

3.1 Drainage Design General Requirements

All proposed drainage arrangements have been designed in accordance with the current British Standards: BS EN 752 'Drain and Sewer Systems Outside Buildings' and BS EN 12056 'Gravity Drainage Systems inside Buildings.'

The design of the drainage systems has also been undertaken in accordance with all relevant local Building Regulations. Best practice guidelines have also been adhered to such as 'The CIRIA SuDS Manual', where applicable.

The designed sewerage systems will be constructed, where applicable, in line with the 'Civil Engineering Specification for the Water Industry' and Water UK 'Sewers for Adoption' guidance. Drainage has further been designed and shall be constructed in accordance with all Statutory Authority requirements or conditions.

All drainage to oil/chemical pipes

or delivery areas have been designed to adhere to the relevant EA Pollution Prevention Guidelines (PPGs). Although the guidelines are no longer current, they are deemed to represent best industry practice.

The proposed drainage scheme is illustrated on drawing number LD010-DOCO-11001401, presented within Appendix B.

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4.0 Surface Water Drainage Strategy

As noted in the ODS, although both the EfW CHP Facility Site and proposed SuDS are located in Flood Zone 3, the flood model data provided by the EA and assessed in ES Appendix 12A: Flood Risk Assessment (Volume 6.4) [APP-084] indicates that the area is not at risk of flooding during the design event (0.5% AEP overtopping of flood defences event plus climate change) due to the presence of flood defences along the River Nene.

The proposed drainage scheme is illustrated on drawings, presented within Appendix B.

4.1 Surface Water Flow Restrictions

The relevant planning policy, available drainage regulations/design guides, the ODS and finally the Order Requirements imposed upon the project, outline the drainage design parameters, particularly in relation to the surface water flow rate restrictions to be applied to the development.

The Non-Statutory Technical Standards for Sustainable Drainage Systems (Defra, March 2015) sections S3, S5 and S6, state the following in relation to brownfield development:

- **S3 –** For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.
- **S5**. Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.
- **S6**. Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

4.2 Greenfield Run-off Flow Assessment

In line with current best practice guidelines, the equivalent greenfield run-off rate for the site has been calculated using the methods outlined within the Institute of Hydrology Report no. 124 (IH124) ‘Flood Estimation for Small Catchments’. The results in relation to the relevant storm events is summarised as follows in Table 4-1:

Rainfall Event	Greenfield Runoff Rate (l/s)
Qbar	6.3
Q1	5.5
Q10	10.3
Q30	15.4
Q100	22.3

Table 4.1 – Greenfield Run-off Calculation

4.3 Surface Water Drainage Design Summary

The surface water drainage system for the site has been undertaken to align with the above calculated rate restrictions.

The general surface water system will collect surface run off from the roads and hardstandings via trapped road gullies, proprietary drainage channels and proprietary drainage kerbs as appropriate. Various forms of drainage channels (typically proprietary Marshalls Birco type channels or similar approved) will be adopted depending on the area in question. Where half-battered kerbs are required along the road boundaries, proprietary drainage kerbs (ACO Kerbdrain or equivalent) will be considered in lieu of additional channels.

Channels/drainage kerbs will be selected to be suitable for the load class and environment in which they are located. All channels and gullies shall be fitted with heavy duty gratings to allow trafficking by HGVs and other heavy vehicles (Minimum load class D400). Suitable access shall be provided for the maintenance and cleaning of the channels/drainage kerbs.

Water shall be drained from the building roofs via rainwater downpipes (RWP) having a minimum diameter of 110mm (subject to detail design by the architect or roofing specialist). RWP will generally be located internally within buildings. Where possible these connections shall discharge directly to external manholes. Where the RWP is located between external manholes, it shall discharge to polypropylene inspection chambers at ground level and in turn be connected to the site surface water drainage system, via branch connections. RWP from smaller roofs, where a lesser volume of water can be expected will discharge to rodable bottle gullies before connecting to the site wide surface water drainage system. Consideration may also be given to the potential use of siphonic drainage, where this has commercial, spatial or logistical benefits

In general, the surface water system will comprise a mixture of uPVC, polypropylene and concrete pipework, with precast concrete manholes located at changes in direction and gradient. Pipework sizes and gradients are selected to ensure that self-cleansing velocities are reached to avoid blockage of the pipes.

All roof and uncontaminated surface water will be directed to the proposed attenuation system via a newly installed storm water pumping station. The inclusion of the pump station allows for discharge at a level above the existing IDB ditch which is to be partially culverted. Overflow pipework has also been incorporated into the design to allow for discharge of water in the unlikely event of pump failure however, it should be noted that the pumps arrangement shall consist of both standby and duty pump sets which shall also be connected to an emergency secondary power supply to mitigate this risk.

Whilst the preference of the LLFA would be to install a clear span bridge as an alternative to culverting the existing watercourse, this would not be suitable due to the loading requirements for the main site entrance/exit route. Installation of the bridge would also prevent installation of the gravity overflow pipes provided to ensure the system remains functional in the event of pump failure.

Pumped flows will discharge to a new manhole to break the pressure from the proposed main which in turn discharges to the on site attenuation system via gravity.

While the ODS initially proposed the use of multiple underground geocellular attenuation tanks distributed across the EfW CHP Facility Site, this approach raised issues regarding buoyancy in areas with high groundwater levels. To address this issue and improve overall efficiency, the revised design proposes the use of large-diameter pipes in conjunction with a combined attenuation swale and basin system.

Whilst efforts have been made to keep vegetated sloped to within a maximum gradient of 1 in 3, localised sections have been steepened to cater for the required attenuation volume. Given space constraints, localised sections have been steepened to 1 in 2 however, these are largely areas that are finished in concrete to counteract buoyancy issues and therefore are not proposed as vegetated.

Where vegetated slopes exceed 1 in 3 (eastern bank of swale), topsoil shall be reinforced by way of geogrid to mitigate the risk of slippage prior to vegetation forming. Vegetation in these areas should be specified as low maintenance plants.

Safe access and egress points are to be provided for maintenance purposes in the form of integral steps and handrails. During the construction phase maintenance activities are to be undertaken by the contractor with the basin to be cleansed to design standards prior to handover with all sediment removed. A post-handover maintenance schedule will be provided for inclusion in the health and safety file at detailed design stage.

From the basin, water will discharge to the existing IDB drain (between nodes 33-45), located immediately south of the main building. The ODS proposed discharging to the existing IDB drain at 3 no. locations, discharging a rate of 5.5 l/s from the north, 2 l/s from the north-east and 2 l/s from the southern areas of the EfW CHP Facility Site, totalling 9.5l/s. However, considering the inclusion of the combined swale and basin, a revised strategy has been developed to consolidate flows into a single discharge point. This outflow will be regulated using appropriately sized vortex flow control devices, limiting discharge to the equivalent greenfield runoff rate of 6.3l/s (Qbar).

As the lifespan of the development is 50 years, surface water attenuation systems must accommodate the storage volume of surface water generated by a 1 in 100-year storm event. Climate change allowances of 35% in the 3.3% AEP storm event and 40% in the 1% AEP storm event have been integrated into the design as per the Nene management catchment peak rainfall allowances for developments with a lifetime between 2061 and 2125.

Consequently, the combined swale and basin will provide a storage capacity of 3,000 m³, while the large-diameter pipework will provide an additional capacity of 290 m³. For further details, please refer to the surface water attenuation calculations presented within Appendix C. The calculations reflect use of the FEH22 dataset as the most robust methodology.

It should be noted that the total attenuation volume presented in the ODS was 3,667 m³. The revised strategy provides a total attenuation volume of 3,290 m³ for the entire site, comprising the combined storage capacities of the swale, basin, and large-diameter pipe network. Although the overall volume has been reduced, the revised system has been designed to accommodate runoff from the full development area, in accordance with current design criteria. This reduction reflects an optimised approach to site-wide attenuation, incorporating above-ground features that offer improved hydraulic performance and resilience. The revised layout also aligns with the updated discharge strategy, which consolidates outfalls and eliminates the need for multiple underground attenuation tanks previously proposed in the ODS.

The pipework within the surface water drainage network is designed to accommodate a 1 in 5 year storm event. However, in accordance with current best practice, the drainage system is further designed to ensure that out of sewer flooding does not occur in any part of the site during a 1 in 30 year storm event (see supporting calculations within Appendix C).

Due to the operating nature of the site, it is also proposed to ensure minimal out of sewer flooding in a 1 in 100 storm event. The drainage design has also been undertaken with consideration of the design of site layout and levels to ensure that any flooding in extreme storm events will be retained onsite. Site levels have where possible been set to fall away from buildings and areas of access and egress. This ensures that any flood water, not contained within the drainage system, flows away from any critical areas and accumulates in sacrificial areas, along kerb lines and drainage valleys etc.

The drainage has been designed to ensure that no surface water will leave the site except via the formal discharge routes for all storm events with return periods up to and including the 1 in 100 year event plus 40% allowance for climate change. This ensures that the development does not contribute to an increase in flood risk to any adjacent properties.

It is noted that site constraints provide limited options for further implementation of a SuDS management train. SuDS items which operate groundwater infiltration methods have not been incorporated into the design for two reasons. Firstly, the high-water table observed within the EfW CHP Facility site render infiltration methods ineffective and result in negative impacts such as an increased risk of groundwater flooding in critical storm events. Secondly, the site use involves industrial processes and considerable heavy goods vehicle traffic, as well as fuel storage requirements. Infiltration methods in this case therefore present a risk of groundwater contamination which could impact on ecology and wildlife in the area and have been discounted.

Whilst traditional infiltration systems have been ruled out, during the construction phase the laydown/maintenance area to the east of the proposed swale is to be installed with temporary gravel surfacing to make it suitable for use. Subsequently, the top surface of the laydown/maintenance area will be replaced with a permeable cellular confinement system with neutral species rich grassland as described in the Landscape and Ecology Strategy (LES). Therefore, whilst infiltration into the water table will not be permitted, water shall be permitted to filter through the buildup to land drains at formation level (impermeable clay strata). Rodding points will be installed to the land drains to ensure access provisions for maintenance operations.

Whilst the area will remain positively drained, the act of filtering the water through the cellular confinement system buildup acts as natural treatment thus flows are deemed clean and shall be permitted to discharge to the attenuation system at an unrestricted rate. Softening of the naturally impermeable clay strata shall be considered at detailed design stage and it should be noted that an impermeable liner may be necessary to prevent softening and mitigate risk of settlement.

As discussed in section 2.2, an HWIDB adopted watercourse (open drain) flows west to east between nodes 33 and 46, bisecting the EfW CHP Facility site. To facilitate the EfW CHP Facility, it is proposed to partially infill and culvert this watercourse. The extent of this culvert is illustrated in the drainage layout (Appendix B).

4.4 Pollution Control Requirements

As part of the EfW CHP Facility Site's pollution prevention measures, the new surface water infrastructure will utilise catchpit manhole chambers within the design for the initial removal of sediment. All surface water runoff will pass through an appropriately sized Class 1 bypass oil separator to remove oil-based contaminants, for secondary treatment, prior to discharge to the land drainage infrastructure. Separators will require regular maintenance, inspection and removal of sediment /oil.

Additionally, to allow the drainage system to be isolated from the land drainage infrastructure, a pollution prevention valve shall also be provided at the outlet of the basin to prevent any un-intentional discharge of spent fire-fighting water to the watercourse. This valve shall be fully automated but also be able to be closed manually if required.

If a pollution event occurs, monitoring data shall be shared with the LLFA.

Description		Pollution hazard level	TSS	Metals	Hydrocarbons
Land use pollution hazard index	*Waste site*	*High*	*0.8*	*0.8*	*0.9*
SuDS component 1	Swale	-	0.5	0.6	0.6
SuDS component 2	Attenuation basin	-	0.5	0.5	0.6
Combined pollution mitigation indices*			**0.75**	**0.85**	**0.9**
Sufficient mitigation?			**Insufficient**	**Sufficient**	**Sufficient**
Sufficient mitigation with the inclusion of Class 1 Full Retention Interceptor?			**Sufficient**	**Sufficient**	**Sufficient**

Table 4.2 – Indicative SuDS components for EfW CHP Facility Site

**Calculated as Total SuDS mitigation index = mitigation index of SuDS component 1 + 0.5 (mitigation index of SuDS component 2)*

As described previously, the proposed SuDS components include a combined swale and basin for the Site. This design provides a total pollution mitigation index that equals or exceeds the pollution hazard indices for metal and hydrocarbons.

For the EfW CHP Facility Site, it will not be possible to meet the above requirements for TSS from traditional SuDS features due to site constraints and therefore the intention is that upstream treatment measures will be utilised in the form of catchpits with flows then discharging via a proprietary treatment system.

A Class 1 Full Retention Interceptor has been incorporated into the design to ensure compliance with the simple index approach. As per table 26.3 of CIRIA C753, proprietary treatment systems must be assessed to ensure compliance.

The proposed unit can fully treat flow rates up to 6.5mm/hr covering approximately 99% of all rainfall events and has been tested in accordance with EN:858-1:2002 Separator systems for light liquids (e.g. oil and petrol). Principles of product design, performance and testing, marking and quality control.

Datasheet for the proposed unit can be viewed in Appendix D.

4.5 Construction Phase Drainage

A dedicated construction phase drainage strategy will be implemented, utilising elements of the permanent drainage system where practicable to reduce the need for temporary infrastructure. Surface water quality will be regularly monitored on site throughout the construction period, and appropriate treatment measures, such as Siltbuster units or equivalent sediment control systems, will be implemented as necessary to ensure compliance with water quality standards and to prevent the discharge of sediment-laden or potentially contaminated runoff. Submitted pursuant to Order Requirement 9, Appendix [E] (Water Management Plan) of the Construction Environmental Management Plan provides full details of the construction phase drainage strategy at the EfW CHP Facility Site.

4.6 Rainwater harvesting

A dedicated rainwater harvesting system shall be provided within the EfW CHP Facility drainage system. The roof water shall be collected and made available for re-use within the facility.

4.7 Drainage to Oil/Ammonia Delivery Areas

Oil and ammonia storage tanks are to be sited externally. A dedicated delivery area shall be provided within the external area adjacent to the tanks. It is noted that these areas will be particularly sensitive and require an innovative drainage solution. The solution proposed consists of a dedicated drainage channel/gully system, which isolates the delivery area (tanker parking area) from the adjacent hardstanding drainage system. Surface water collected from this area shall drain through a valve chamber, whereby flows can be directed to a remote below-ground storage tank (7,000litre Tanks or 200 series tank by SPEL or similar approved), during periods of delivery. In the unlikely event that a spillage occurs during delivery, the contents of the spill will then be collected within the storage tank, which has sufficient capacity to accommodate the volume of a full tanker compartment. The tank can then be pumped out by a specialist tanker and disposed of offsite.

Articulated tanker trucks will vary in size and have a typical capacity no greater than 36,000 litres. Tankers are split into separate storage compartments, typically between 5-7no. compartments depending on the size of the tanker, with each compartment typically no greater than approximately 6000 litres. The proposed tank solution is therefore considered to provide sufficient capacity to cater for the loss of 1no. tanker compartment whilst also accommodating concurrent rainwater storage, in line with best conservative industry practice.

4.8 Drainage to External Bunds

Electrical oil filled transformers, the urea storage tank and the oil storage tank shall be installed within external reinforced concrete retention bunds. The structures will retain any contamination in the event of a leakage etc. Rainwater falling within the bunds shall also be collected and retained, until it is released via sump pumps to the adjacent surface water drainage systems. Oil detection sensors, will be provided where applicable (transformer and oil storage bunds only) which will prevent the pumps from operating in the event of an oil spill. This system aims to maintain the integrity of the fuel bund and prevents uncontrolled escape of oil. Rainwater released in this manner shall drain to the surface water drainage system and ultimately pass through an oil separator, prior to discharge to local surface waters. Float switch activated alarms within the bunds shall be provided to alert operators that a highwater level is present within the bund. However, the bund will be regularly inspected as part of the site management procedures. Water collected within the urea tank bund will need to be pumped manually from the bund, upon inspection. For the fuel oil tank bund and transformer bunds the water will be pumped automatically.

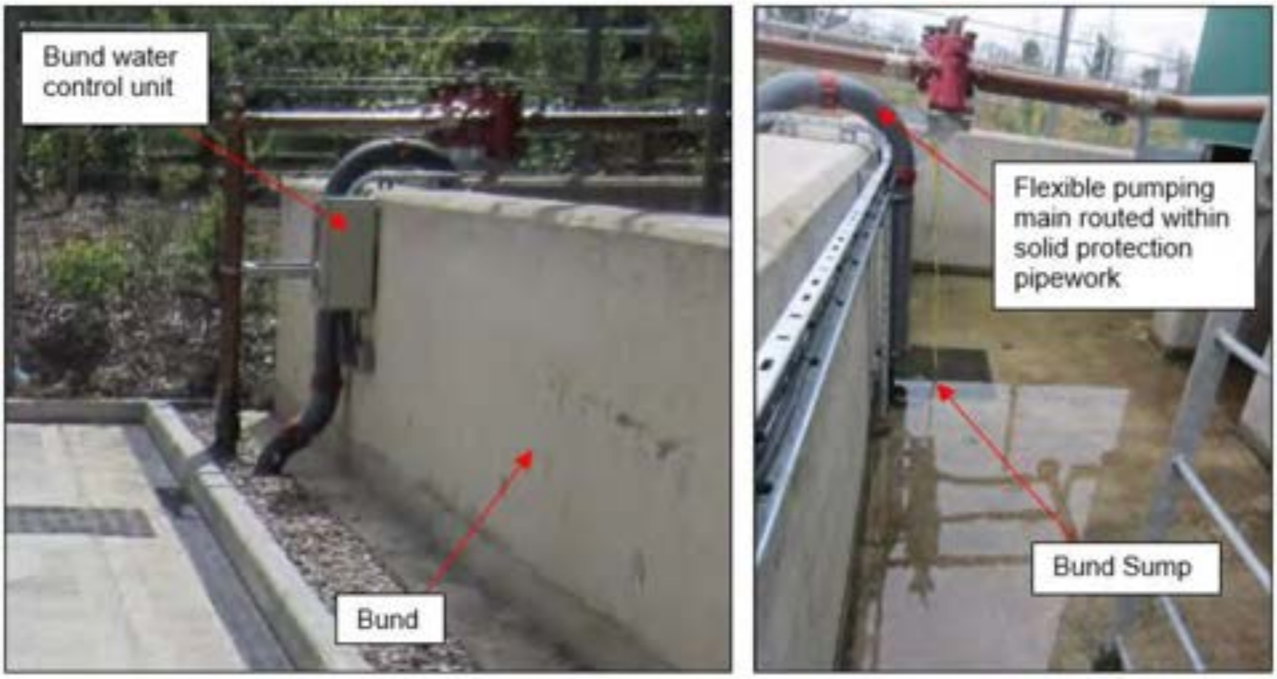


Figure 4.1 – Bund Dewatering Systems

5.0 Foul Water Drainage Strategy

Foul water from the EfW CHP Facility will be generated by a combination of industrial processes and by the welfare facilities serving the facility. A separate foul drainage strategy is proposed to cater for each.

5.1 Foul Water Strategy - Welfare Facilities

A new administration and control building section is to be constructed, where most welfare facilities will be located. Foul water flows generated from this area of the development are proposed to be collected and drained via gravity to a small pumping station. These flows would then be pumped to a chamber close to the site boundary before discharging via gravity to the existing Anglian Water sewer network.

Foul water generated from the weighbridge and stores will be discharge into the admin block foul water system and onwards to the Anglian Water sewer network.

The foul sewerage system has been designed to the relevant British Standards for the appropriate flow from the various buildings and will comply with the appropriate local Building Regulations. The sewerage system is designed to convey peak flows from these facilities.

Where provided, gravity sewers will be at gradients sufficient to give self-cleansing velocities within the pipes during times of peak flows. This will help reduce maintenance and prevent blockages within the network. Manholes will typically be constructed using precast concrete rings with 675x675mm access covers. Smaller brick-built chambers and polypropylene inspection chambers may be required in areas where space is limited.

5.2 Foul Water Strategy - Industrial Processes

The proposed site activities will generate effluent, process water, washdown water, and potentially contaminated surface water. These flows will be managed by dedicated drainage systems that are separate from the site's general surface water and foul water drainage networks. The systems will include floor drains and gullies to collect process water. Drainage systems will be installed in the following areas:

- Boiler house building
- Turbine hall
- Air pollution control building and silos
- IBA storage bunker and loading areas

Process water and non-domestic foul effluent will be collected and directed to process water pits. The storage capacity of these pits will be based on projected water usage and Kanadevia Inova sizing standards. Industrial wastewater, such as washdown water from the boiler house and air pollution control areas, as well as runoff from the IBA storage and loading areas (where ash siltation is expected), will also be collected in the process water pits. The turbine hall will follow the same approach.

All water collected in the process water pits is intended to be recirculated for reuse, such as for ash quenching. Effluent from the water treatment building or boiler drains may be discharged to the foul drainage system. A schematic layout of the proposed process drainage is shown below and will be further developed during the detailed design stage.

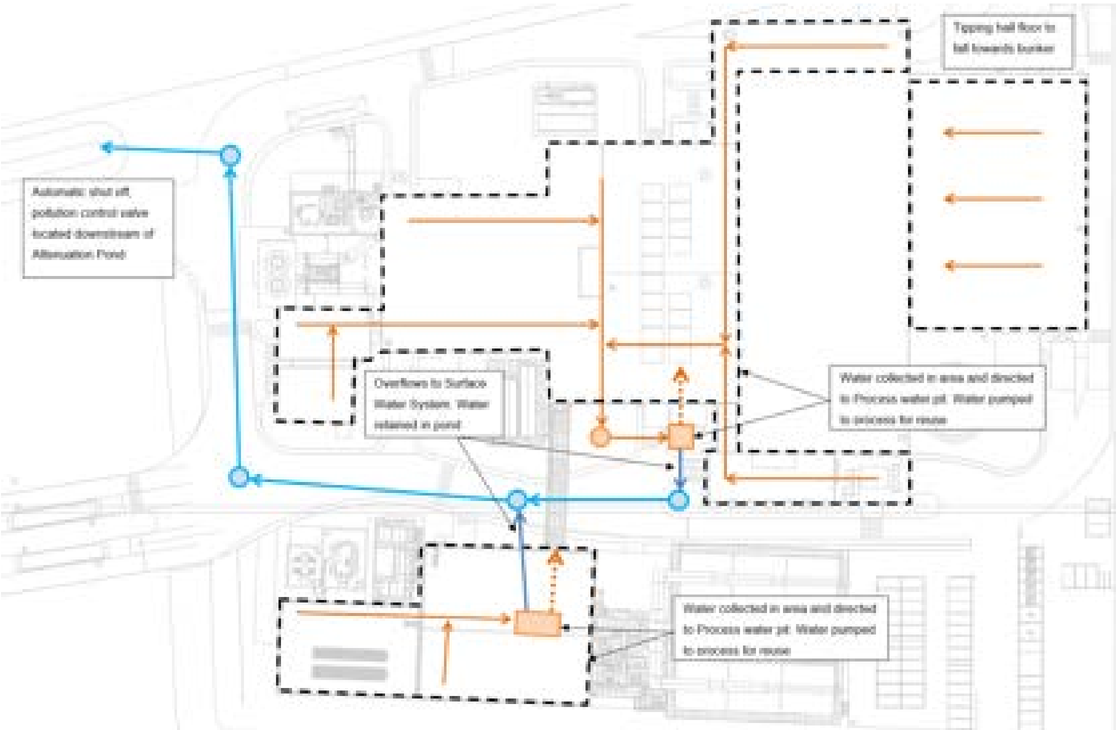


Figure 5.1 – Preliminary Process Water Systems

5.3 Spent Fire-Fighting Water Drainage

In the event of activation of fire-fighting systems, spent water shall be drained from the buildings via the process water drainage systems, discussed above.

As the process water pit has a limited capacity, an overflow facility from the pit will be provided to allow discharge from the building when the pit reaches capacity. The overflow facility shall convey excess water to the surface water system. A dedicated direct overflow connection facility from the turbine hall to the surface water system will also be provided.

A series of automated gate valves shall be installed to operate and control the overflow facilities. A automated pollution prevention valve shall also be provided at the outlet of the attenuation pond to prevent any un-intentional discharge of spent fire-fighting water to the IDB drain. The pollution prevention valve shall activate in the event of a fire alarm.

Fire-fighting water deployed on the outside of the building envelope shall also drain, via the site surface water system, to the attenuation pond.

The drainage has been designed to ensure that no surface water will leave the site except via the formal discharge routes for all storm events. Spent firefighting water collected in the attenuation pond shall be held until collected and transported for treatment offsite by road tankers etc.

In the event of fire-fighting event the process water pit and overflow facility will be fully emptied and cleaned prior to any reuse and before the valve from the containment area is reopened.

6.0 Conclusion

Doran Consulting Ltd has undertaken a review of the existing and proposed drainage provisions for Medworth EfW CHP Facility; in accordance with the relevant planning policy, Order Requirements and legislative requirements.

A review of the existing site has identified a range of existing hardstanding areas and drainage system in relation to the site's previous brownfield use. All existing drainage systems within the extent of the development site shall be abandoned and removed.

Appropriate restricted surface water discharge rates have been applied to the EfW CHP Facility drainage scheme, to ensure that there is no increase to the equivalent greenfield flow conditions from the site, up to and including the 1 in 100 year storm event (+ 40% climate change allowance). This ensures that the proposed drainage scheme will not only comply with the current planning policy, but shall also achieve considerable overall betterment, when compared to the pre-development drainage arrangements.

The surface water attenuation is intended to accommodate the proposed flow restrictions, resulting in the requirement for approximately 3,000m^3 storage capacity. Flows discharging from the surface water system shall be controlled via the provision of a vortex flow control at greenfield rates. The system shall also be fitted with an emergency pollution prevention shut-off valve.

A proposed surface water drainage scheme has been set out on the drawings provided at Appendix B.

A drainage system to accommodate the domestic foul has also been proposed in line with best practice and is shown on the enclosed drawings.

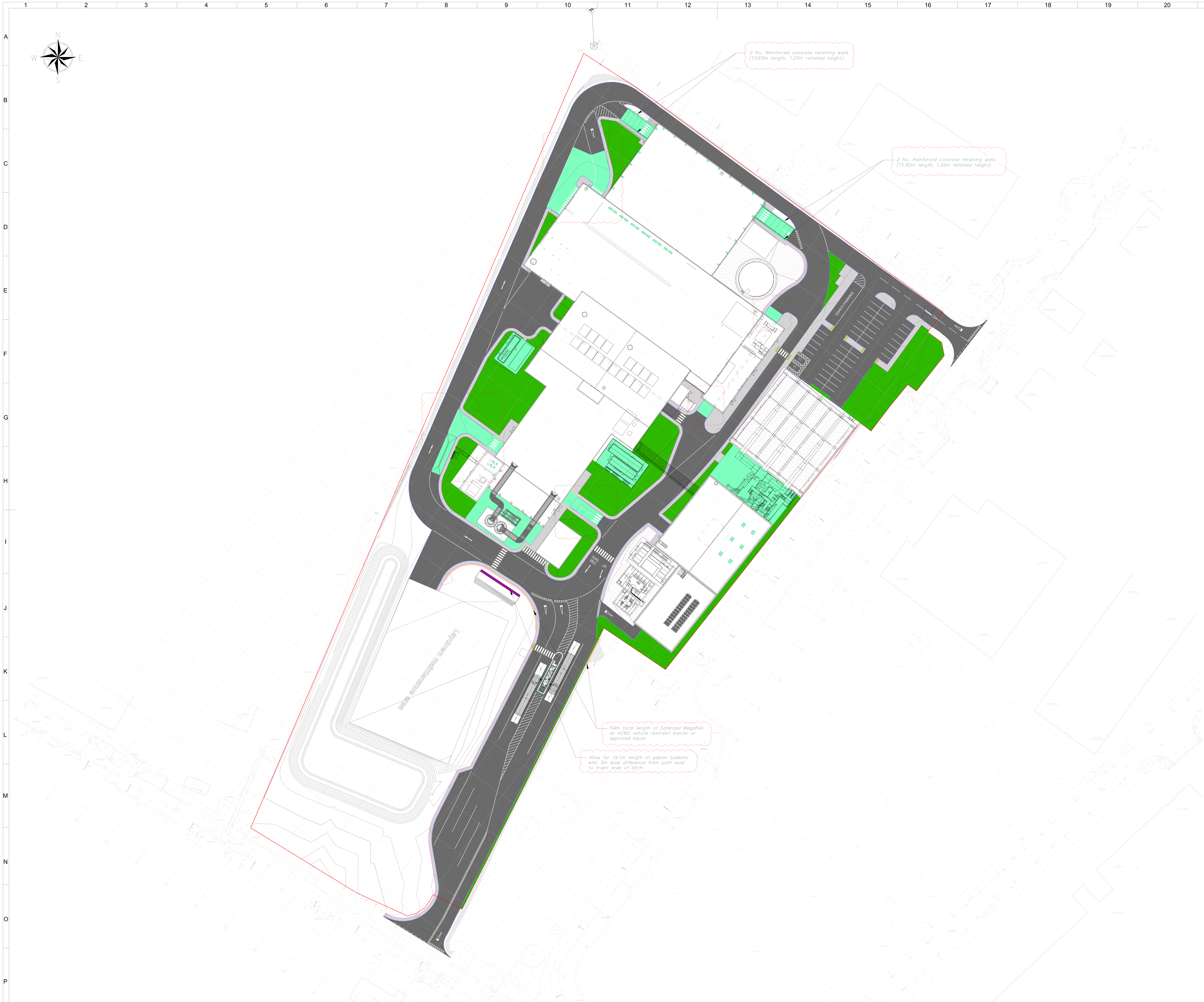
Process water from within the buildings shall drain to process water pits and shall be made available for re-use.

Provisions have also been made for the collection of spent fire-fighting water across the EfW CHP Facility Site. During a fire event and upon activation of the fire protection systems, a series of automatic valves shall control/direct water from the various sections of the facility to the surface water system, where it can be safely contained. The surface water system shall store the spent fire-fighting water in a safe and environmentally responsible manner until such time that it can be emptied via road going tankers and disposal of the water is undertaken in an appropriate manner.

Dedicated drainage solutions have also been designed to accommodate a series of external reinforced concrete storage bunds and transformer installations

APPENDICES

APPENDIX A – Site Plan



Key Plan

1:2500

Legend

- Proposed Road Construction
- Proposed Thermoplastic White lining
- Proposed Footpath Construction
- Proposed Gravel Yard Construction
- Proposed Concrete Slab Construction
- Proposed Landscaping
- Proposed 255x125mm Half Battered kerb (125mm show.)
- Proposed 255x125mm Bull Nose kerb (6mm show.)
- Proposed 150x75mm Edging (Pin.) kerb (laid flush.)
- Proposed 415x380mm Trief kerb (325mm show.)
- Proposed ACO Kerbdrain
- Vehicle Restraint Barrier
- RC Retaining Wall
- Gabion Retaining Wall
- Site Boundary

0m 5 10 20 30 40 50

Scale 1:500

Rev	Date	Modification	Drawn	Checked	Approved
4.0	15.08.2025	Layout amended. Notes added.	TOH	AC	PGK
3.0	03.06.2025	Weighbridge arrangement & north west road updated	HJD	AC	PGK
2.0	27.05.2025	Main entrance road & north west building entrance roads updated	HJD	AC	PGK
1.0	09.05.2025	Staff & Visitors car park arrangement updated, footpath and crossings removed	HJD	AC	PGK
0.0	02.05.2025	First Issue CD1-INFO PRELIMINARY	HJD	AC	PGK

Contractor:
Kanadevia INOVA
Kanadevia Inova AG
Hardturmstrasse 127
8005 Zürich | Switzerland

Subcontractor:
Doran CONSULTING
FLAX HOUSE
83-91 Adelaide Street,
Belfast, BT2 8FE

Medworth EfW CHP Facility
Algores Way
Wisbech
Cambridgeshire
PE13 2TQ

A (Approved) R (Reviewed) I (For Information)

Building Section: BS00 SITE WIDE

Project-No.: P-3538
Project-Name.: MEDWORTH
Description: BS00 SITE WIDE

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Weight	---
Scale	1:500
Status	PRELIMINARY CD1-INFO
Size	A0

Title: Proposed Layout General Arrangement

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Replaced for:

Sheet	Doc Type	Supplier	Drawing No.	Revision
	LD010	DOCO	11004101	4.0

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APPENDIX B – Drainage Drawings

Notes:

1. This drawing should be read in conjunction with all relevant Architectural and Engineering drawings.
2. All gullies to be trapped. Road gully grills to be heavy duty ductile iron (Load Class D400).
3. Refer to Architect's drawings for exact locations of all rainwater downpipes.
4. Refer to relevant Architect's and M&E Engineering drawings for exact locations of builder's upstands/ SVPs etc.
5. Contractor to ensure that all conditions surface water and foul drainage discharges are met. All discharge arrangements to be confirmed.
6. All pipework with diameter of 300mm or less to be uPVC pipes unless otherwise stated. All pipes with diameter greater than 300mm to be class H concrete (or HDPE twin wall for storm only).
7. All pipes with cover exceeding 1.2m in trafficked areas and 0.9m in non-trafficked areas to have class S bedding. All pipes with cover less than 1.2m in trafficked areas and 0.9m in non-trafficked areas to have class Z bedding.
8. Contractor to confirm the location and level of any existing obstructions/structures etc., uncovered during the works.
9. Contractor to confirm the location and level of any existing sewers prior to the commencement of any works. Any discrepancies are to be notified to the engineer immediately.
10. Contractor to confirm the location of all existing services, buried and overhead, prior to the commencement of the works.
11. All door thresholds to be Marshalls Birco 100 or approved similar. All external drainage channels to be Marshalls Birco 200 or approved similar. All required fixtures and fittings to be specified by drainage channel manufacturer. D400 gratings to be used in vehicle areas.
12. All drainage to be constructed in accordance with, 'WRc Sewers for Adoption'
13. All setting out shall be in accordance with available Architecture drawings. This drawing shall not be used for setting out purposes.
14. All interceptors to be constructed in strict accordance with manufacturer's guidelines. All vents to be provided in agreed locations. All interceptors to be fitted with high level oil and silt alarms.
15. All works to comply with current British Standards, Codes of Practice, and Building Regulations. The Contractor shall verify all information on site and report any discrepancies immediately to the Architect/Engineer.
16. Pipework serving gullies or channels etc to be 150mmØ.
17. All storm chambers upstream of full retention separator to have minimum 500mm silt pit.

Legend

- Surface Water Sewer
- Perforated Land Drain Pipe
- Foul Sewer
- Concrete Manhole
- PPIC
- Pumping Main
- Marshalls Birco 200 10/0 external drainage channel
- Marshalls Birco 150 5/0 external drainage channel
- Marshalls Birco 100 threshold drainage channel
- Mini Beany KerbDrain (or equal approved)
- Pump sump
- G — Gully
- S — Drainage channel sump unit
- RWP — Rain Water Gravity Pipe
- SRWP — Syphonic Water Gravity Pipe
- Headwall

Rev	Date	Modification	Drawn	Checked	Approved
6.0	14.08.2025	Layout amended.	TOH	AC	PGK
5.0	28.07.2025	Pumping main linetype amended. Layout amended.	TOH	AC	PGK
4.0	25.07.2025	layout amended.	TOH	AC	PGK
3.0	25.06.2025	Layout updated. Notes amended	JPS	AC	PGK
2.0	02.06.2025	Layout updated	JPS	AC	PGK
1.0	18.04.2025	Pond extent updated. Headwall positions altered to suit	JPS	AC	PGK
0.0	11.04.2025	First Issue CD1-INFO PRELIMINARY	JPS	AC	PGK

Contractor:
Kanadevia INOVA
Kanadevia Inova AG
Hardturmstrasse 127
8005 Zürich | Switzerland

Subcontractor:
Doran CONSULTING
FLAX HOUSE
83-91 Adelaide Street,
Belfast, BT2 8FE

Medworth EfW CHP Facility
Algores Way
Wisbech
Cambridgeshire
PE13 2TQ

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Building Section: BS00 SITE WIDE

Project-No.: P-3538
Project-Name.: MEDWORTH
Description: BS00 SITE WIDE
Title: Site Wide Drainage Layout

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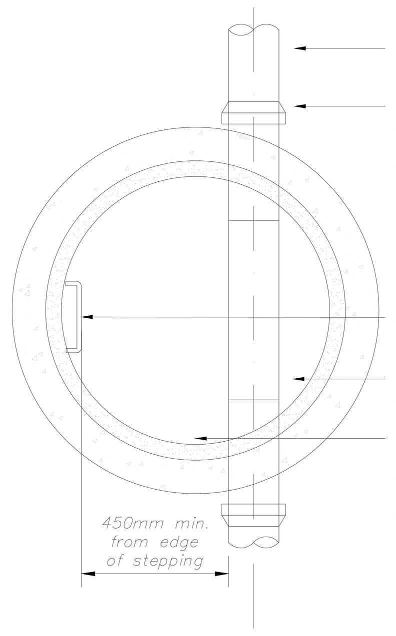
Scale	1:500
Status	PRELIMINARY CD1-INFO
Size	A0

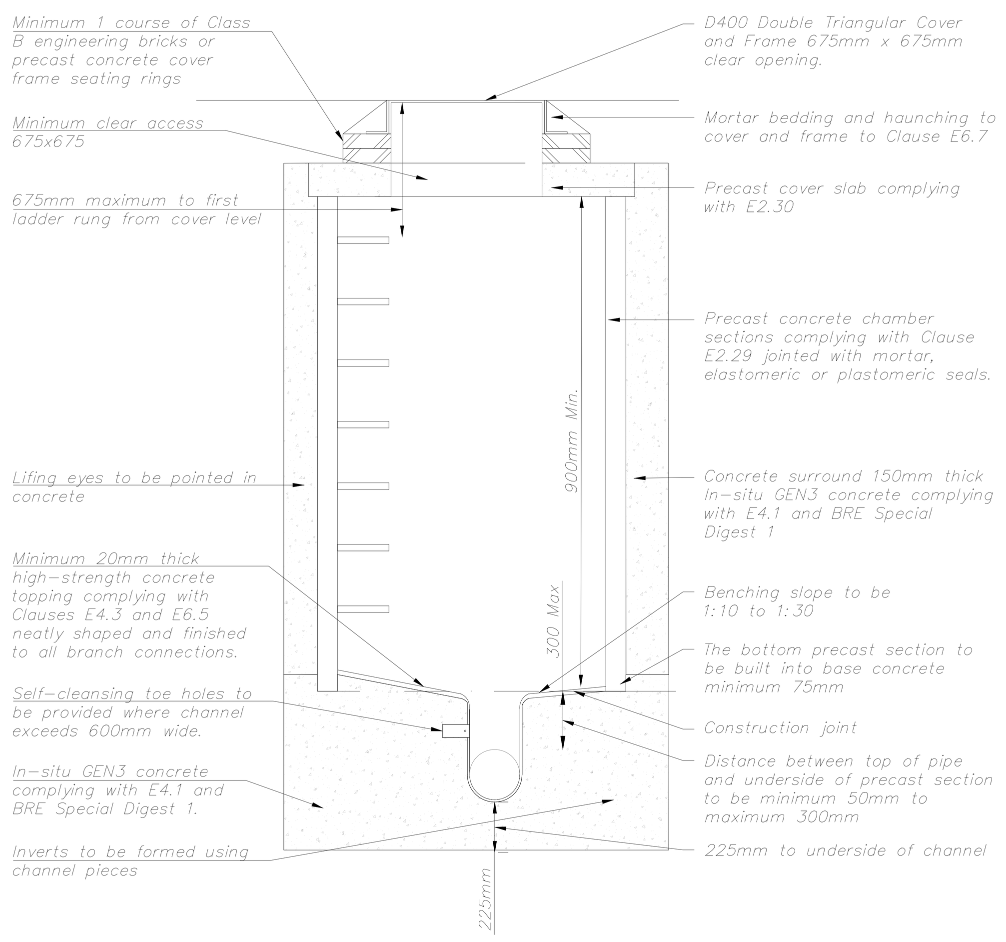
Replaced by:
Replaced for:

Sheet	Doc Type	Supplier	Drawing No.	Revision
	LD010	DOCO	11001401	6.0

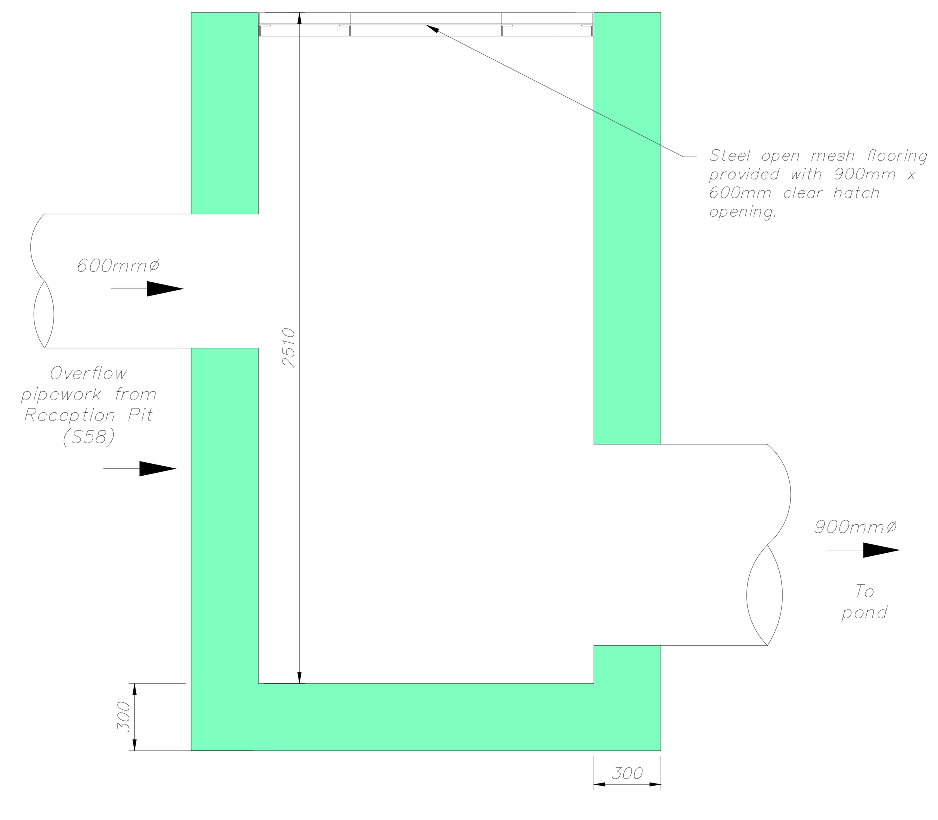
Note: All clause references related to Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code")



Typical Type B Sectional Plan (Benched)
1:20
Depth from cover level to soffit of pipe 1.5m to 3.0m
Rigid Material Construction without concrete surround



Typical Manhole Detail – Type B (Benched)
1:20
Depth from cover level to soffit of pipe 1.5m to 3.0m with ladder
Rigid Material Construction with concrete surround



Reception Pit Section (S55)
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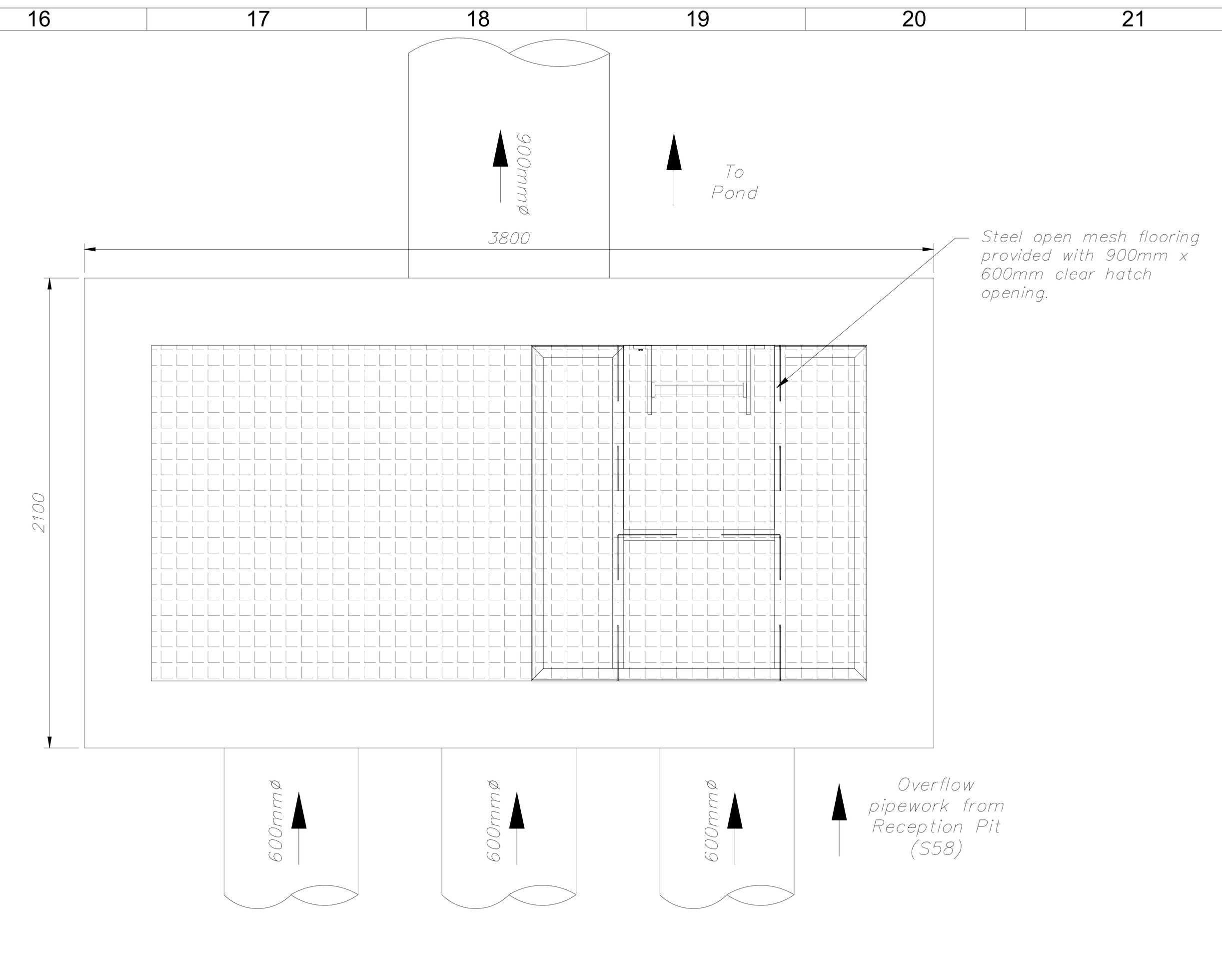

Reception Pit Plan (S55)
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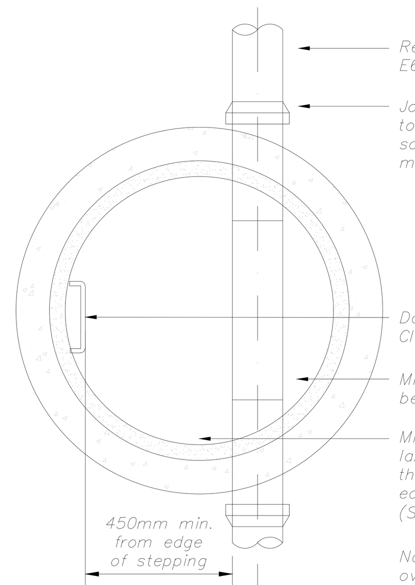

Typical Type B Silt Pit Sectional Plan
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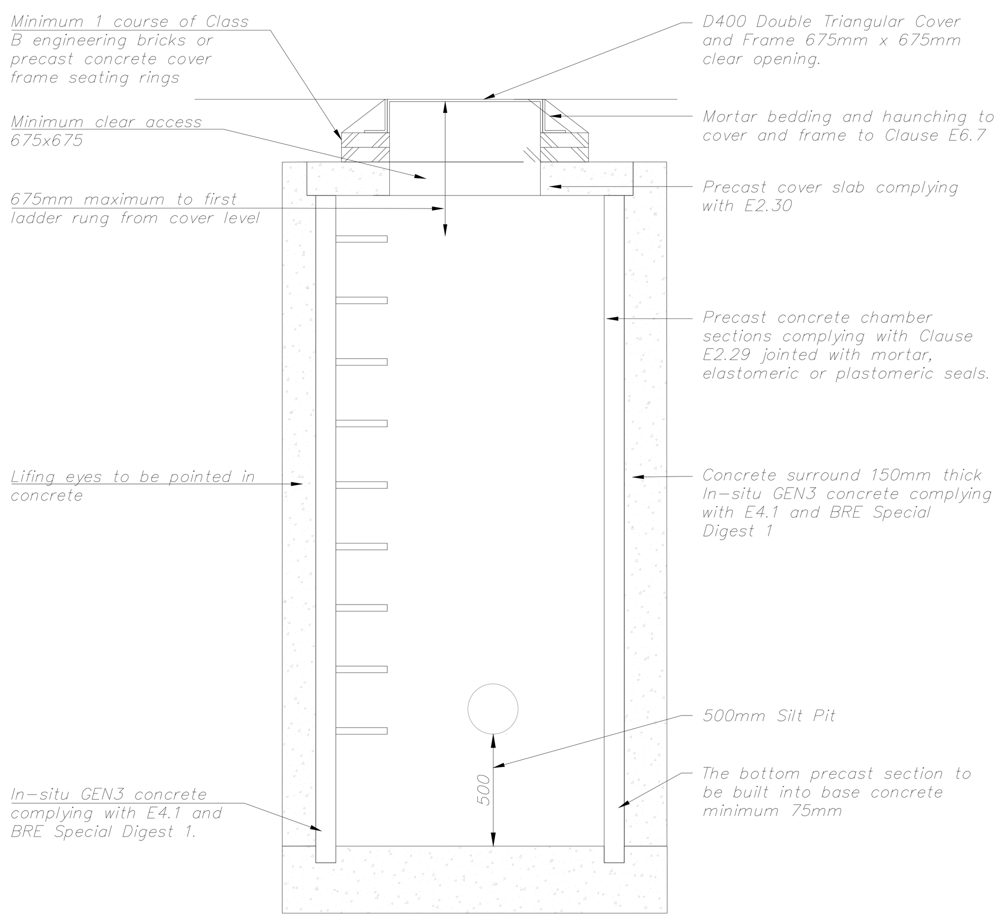
Depth from cover level to soffit of pipe 1.5m to 3.0m
Rigid Material Construction without concrete surround



Typical Silt Pit Manhole Detail – Type B
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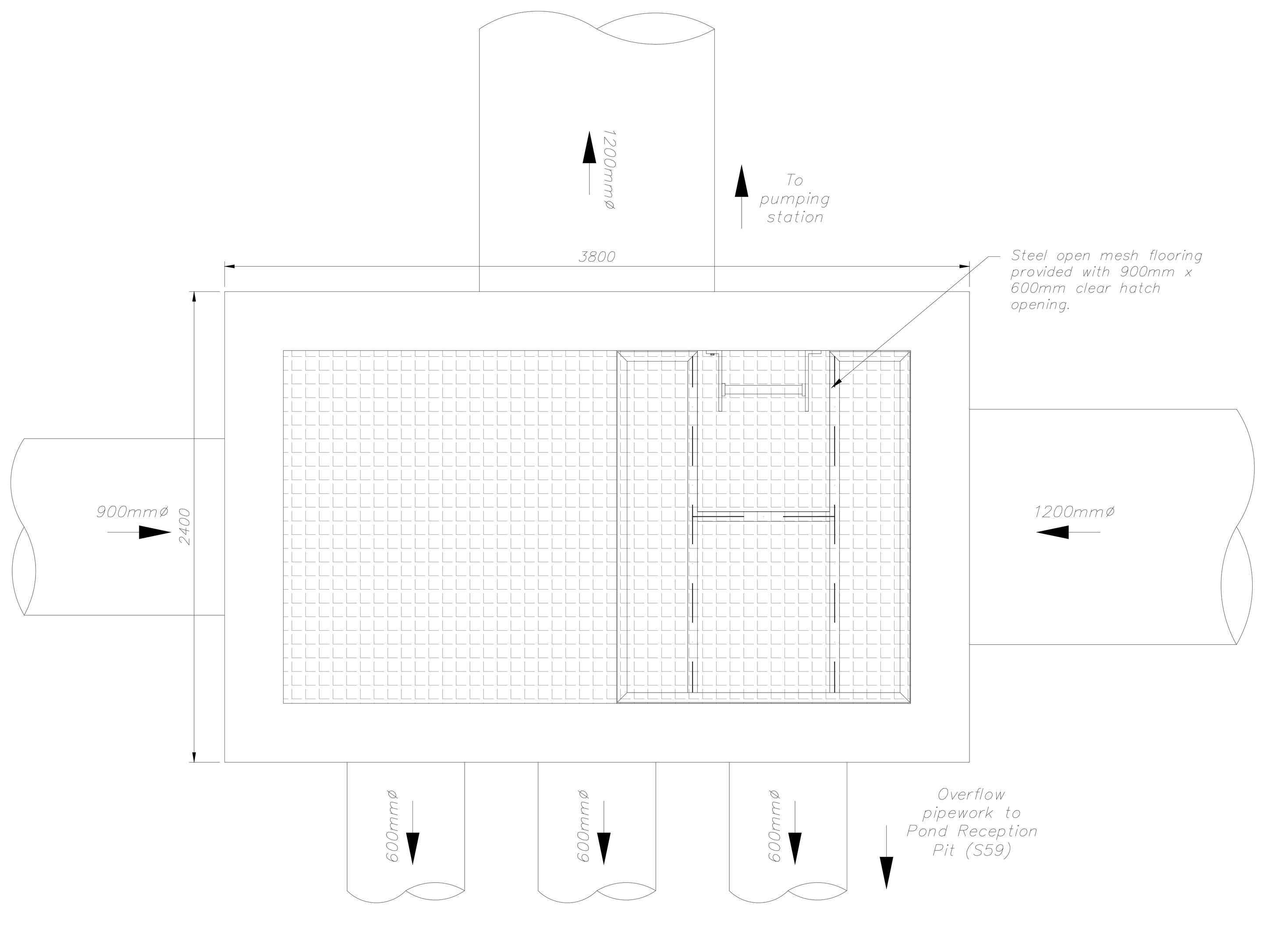
Depth from cover level to soffit of pipe 1.5m to 3.0m with ladder
Rigid Material Construction with concrete surround



Reception Pit Plan (S52)
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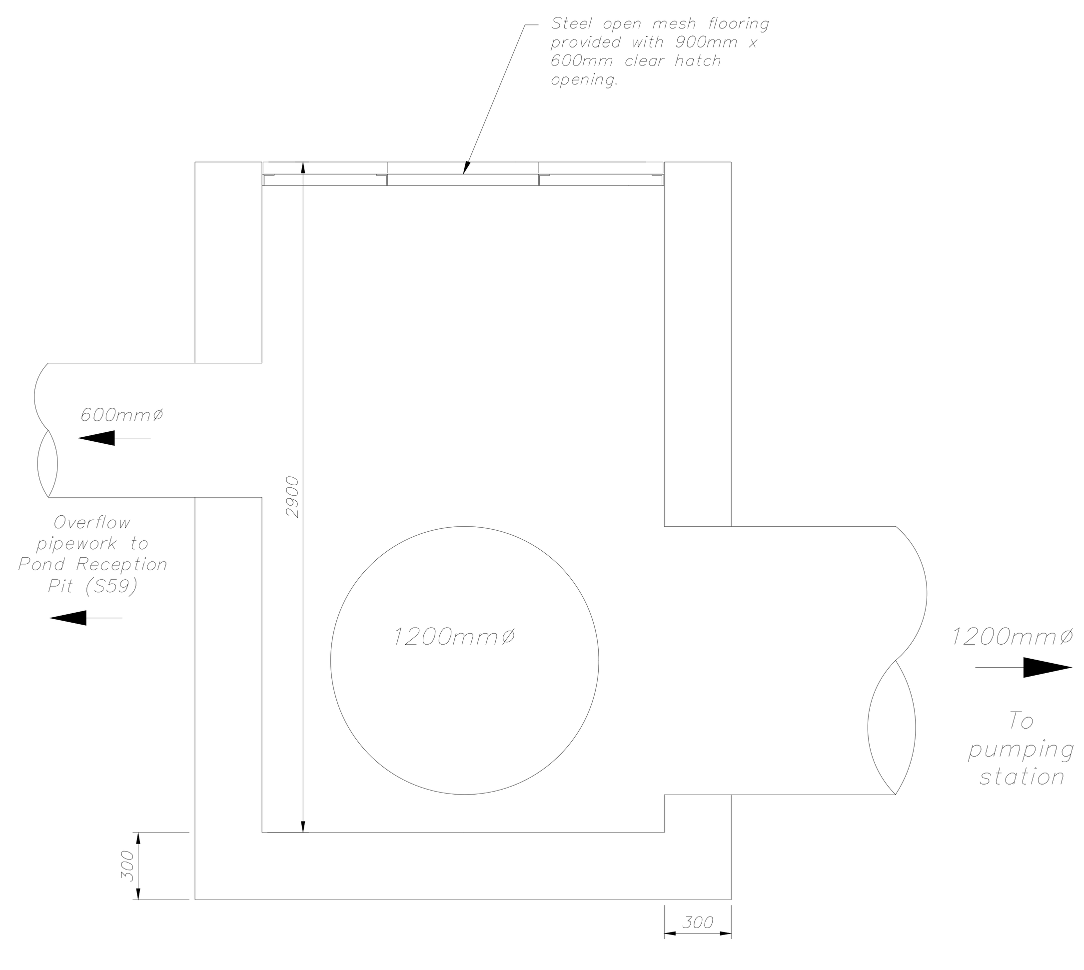

Reception Pit Section (S52)
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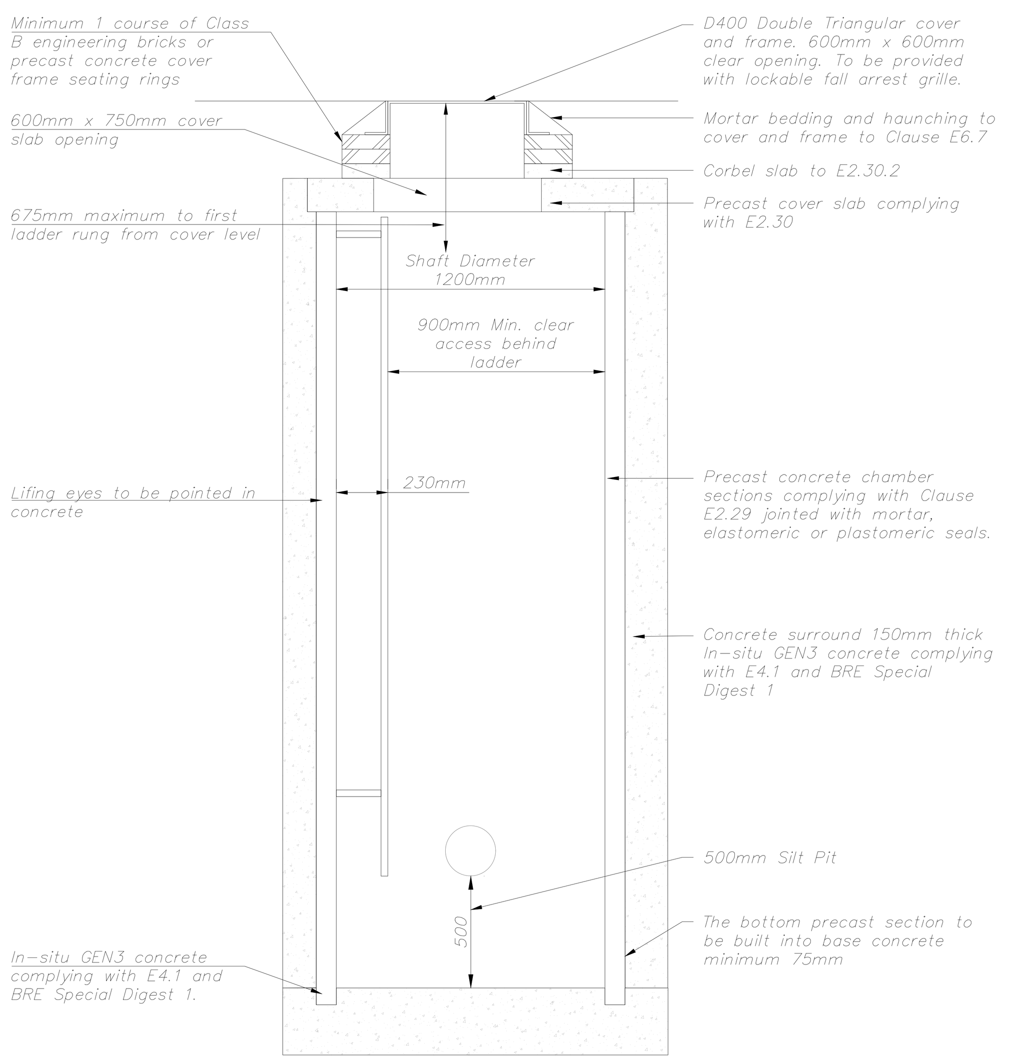

Typical Silt Pit Manhole Detail – Type A
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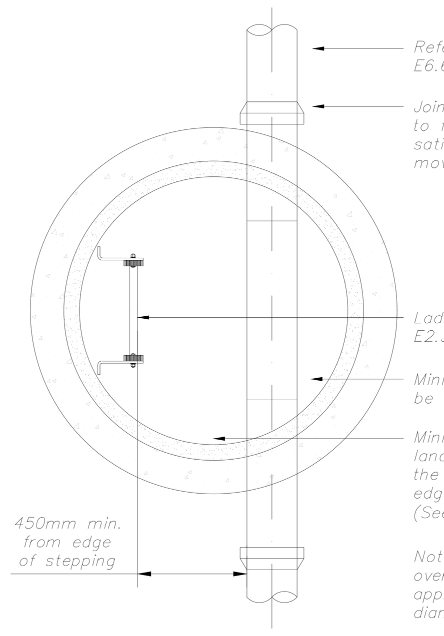
Depth from cover level to soffit of pipe 3.0m to 6.0m with ladder
Rigid Material Construction with concrete surround



Typical Type A Sectional Plan
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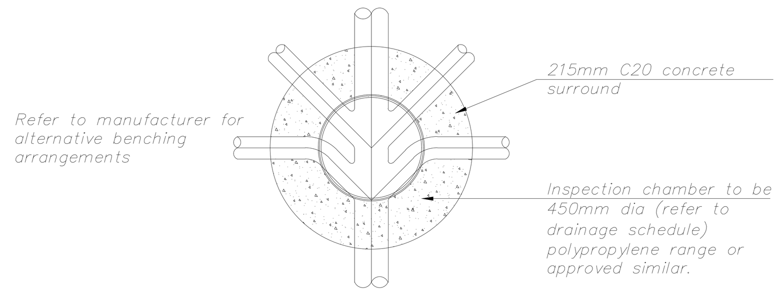
Depth from cover level to soffit of pipe 3.0m to 6.0m with ladder
Rigid Material Construction with concrete surround



Typical Plan – Polypropylene Inspection Chamber Detail
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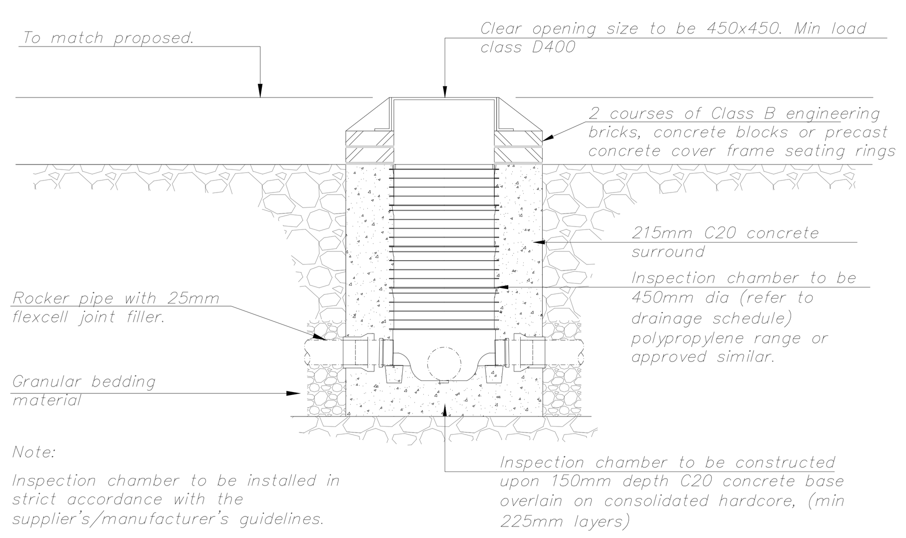

Typical Section – Polypropylene Inspection Chamber Detail – Type D1
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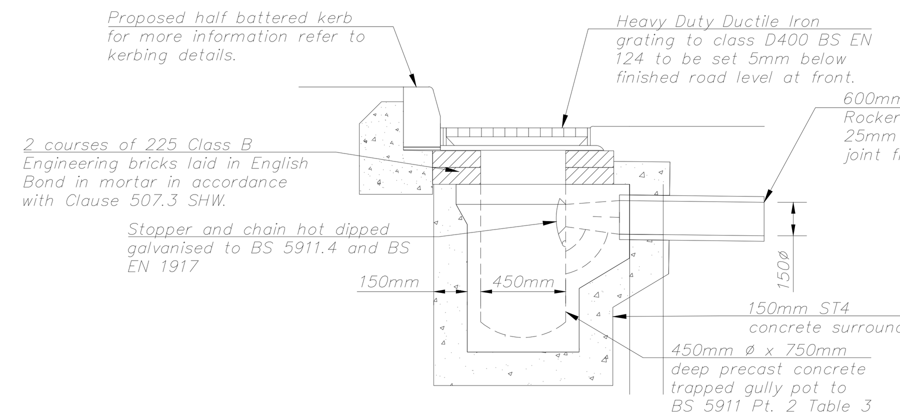

Proposed Road Gully
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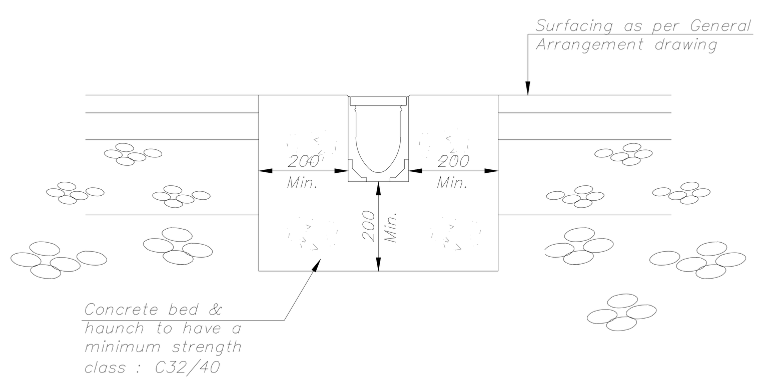
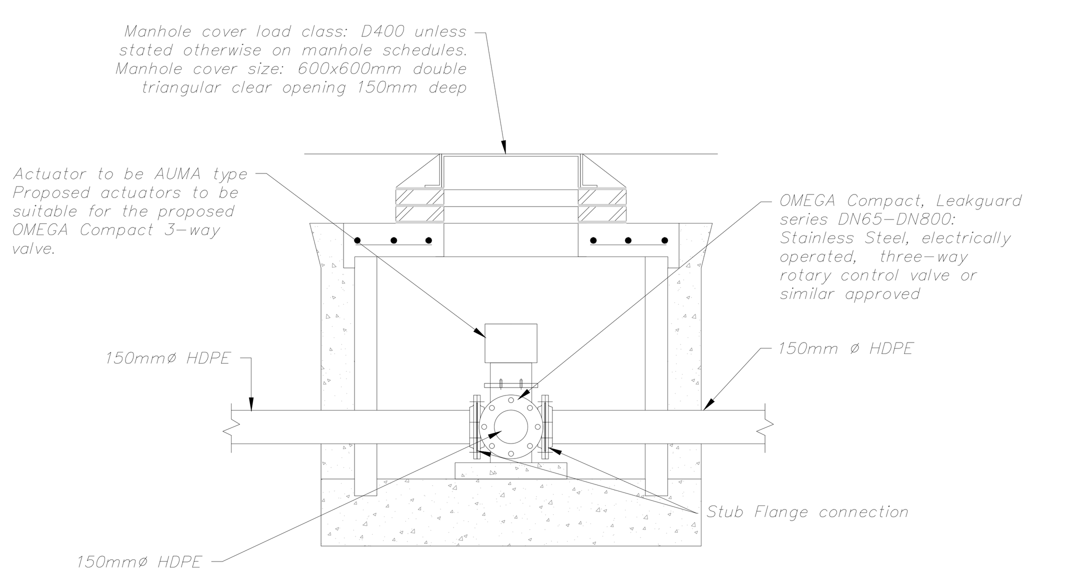


Proposed Birco Drainage Channel
Scale 1:10
(Refer to manufacturers specifications for details)



3-Way Valve Chamber 1
1:20

All levels in m referring to Finished Floor Level (FFL) ±00.00m
Plant Origin X=0mm Y=0mm Z=±00.00m
Corresponding to site coordinates
E=545537120m N=308088500m U=+3.00m AOD

Rev	Date	Modification	Drawn	Checked	Approved
2.0	14.08.2025	Details ameded to match latest layout	TOH	AC	PGK
1.0	25.07.2025	Details ameded to match latest layout (Reception Pit S52)	JPS	AC	PGK
0.0	11.04.2025	First Issue CD1-INFO PRELIMINARY	JPS	AC	PGK

Contractor:
Kanadevia INOVA
Kanadevia Inova AG
Hardturmstrasse 127
8005 Zürich | Switzerland

Subcontractor:
Doran CONSULTING
FLAX HOUSE
83-91 Adelaide Street,
Belfast, BT2 8FE

Medworth EfW CHP Facility
Algores Way
Wisbech
Cambridgeshire
PE13 2TQ

A (Approved) R (Reviewed) I (For Information)

Building Section: BS00 SITE WIDE

Project-No.: P-3538
Project-Name.: MEDWORTH
Description: BS00 SITE WIDE
Title: External Drainage Details Sheet 1

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Sheet	Doc Type	Supplier	Drawing No.	Revision
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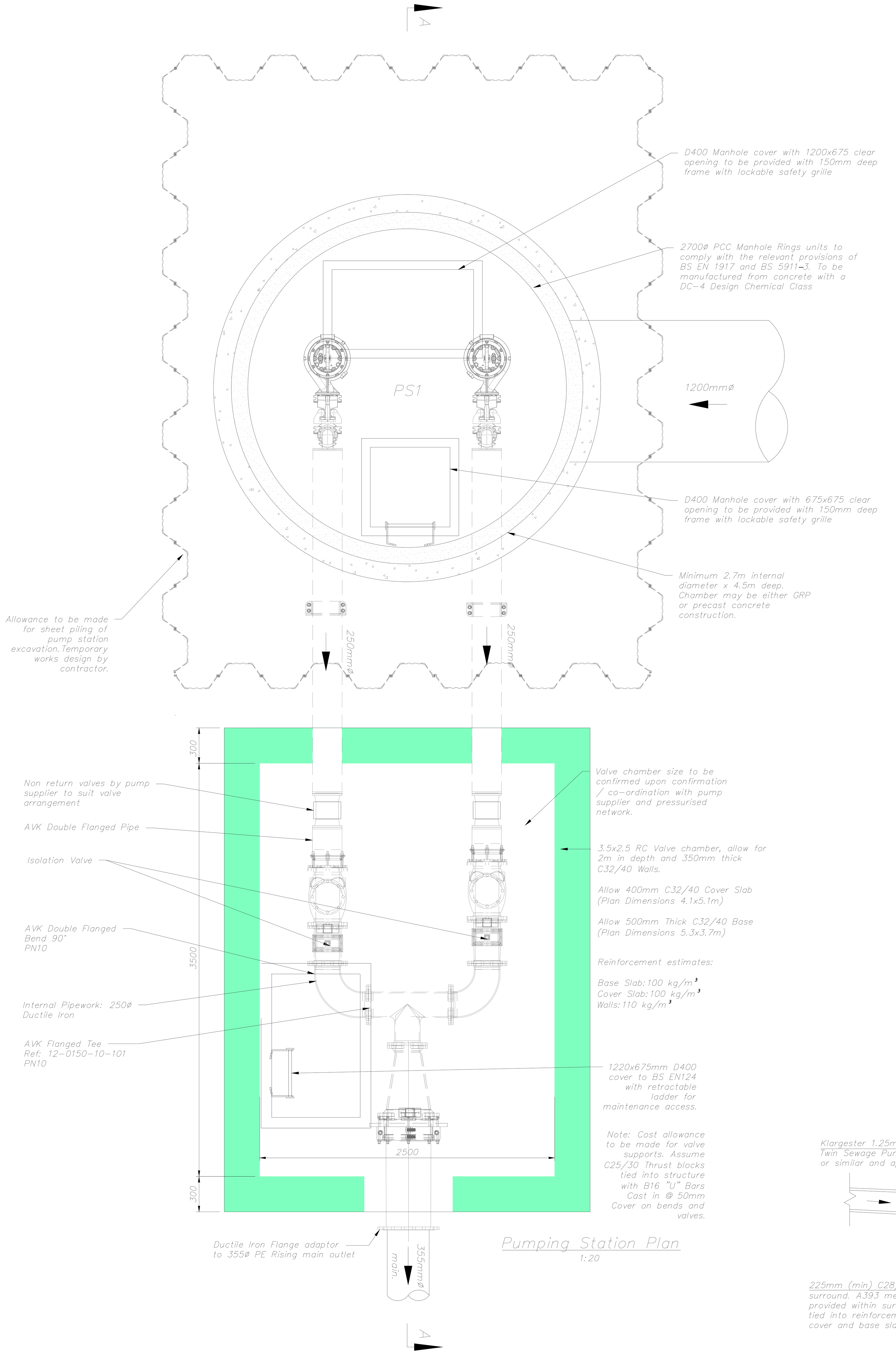

Pumping Station Plan
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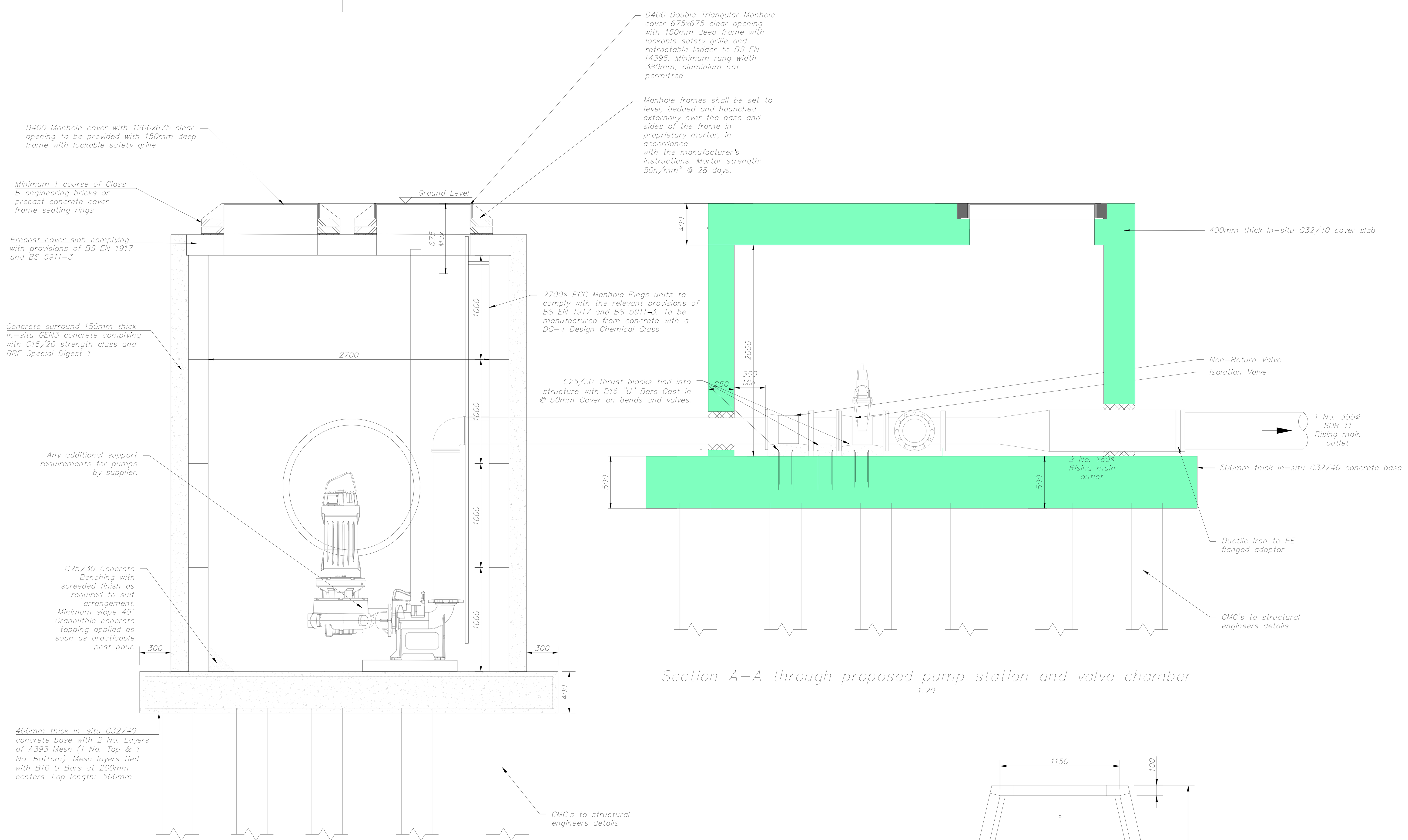
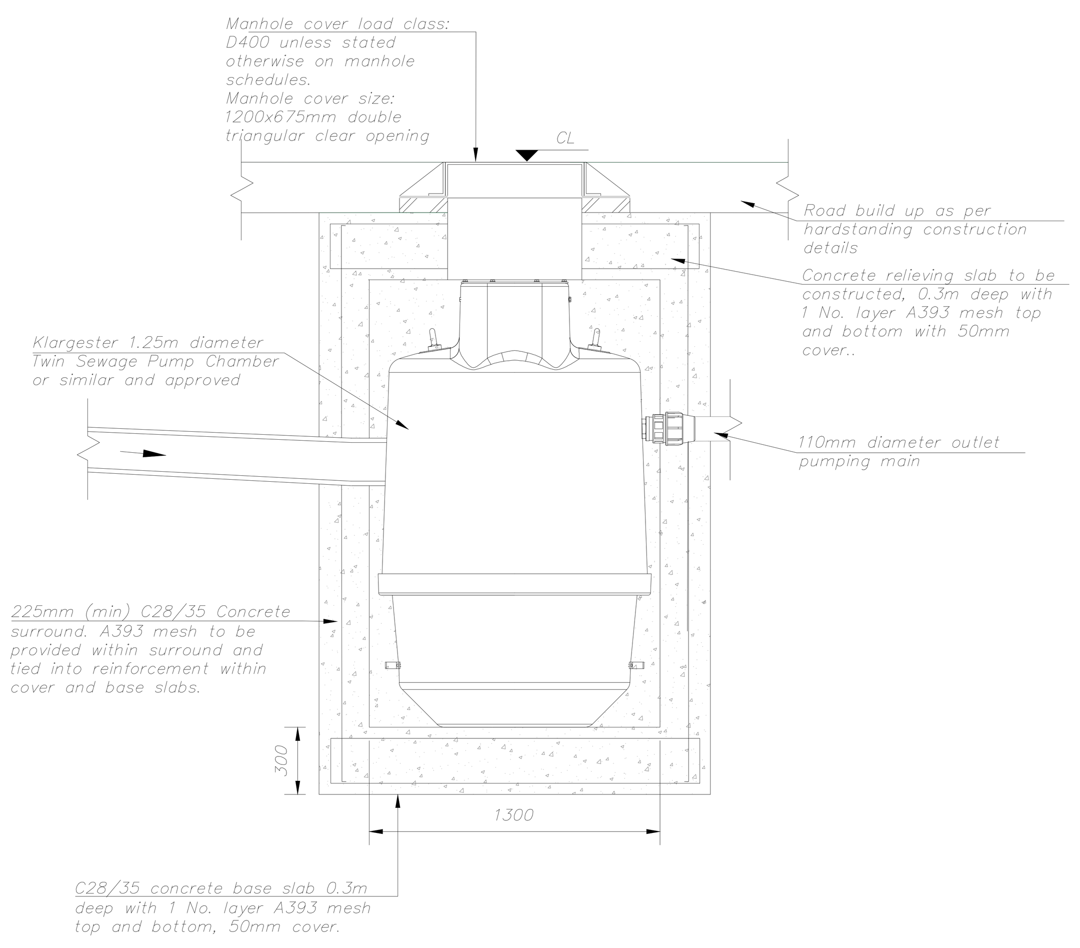
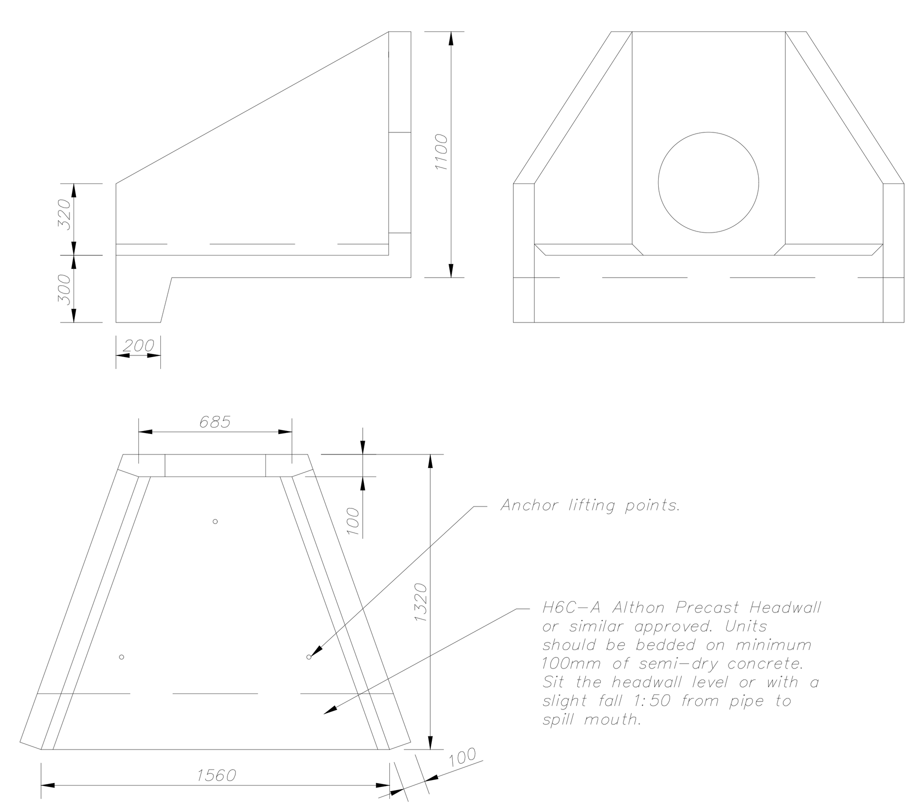


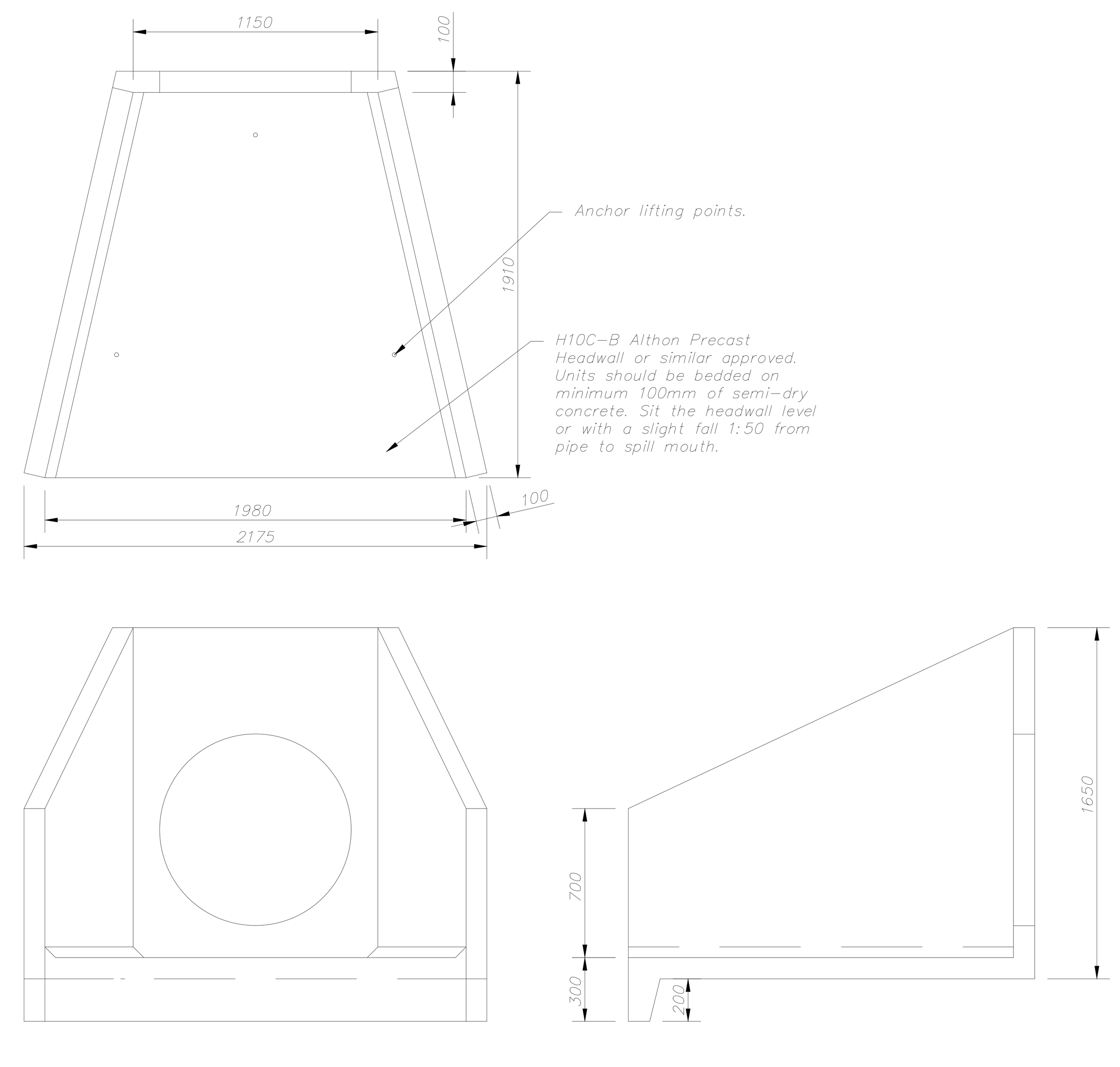
Section A-A through proposed pump station and valve chamber
1:20



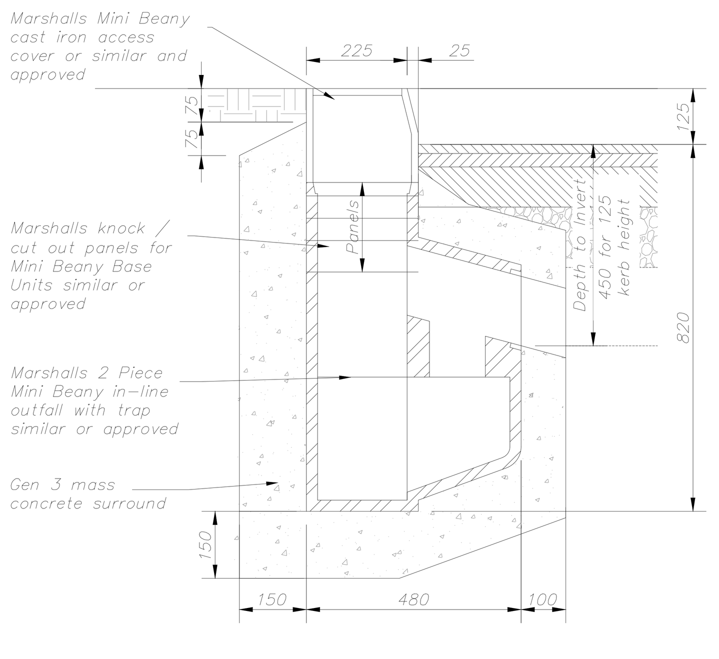
Foul Pumping Chamber
1:20



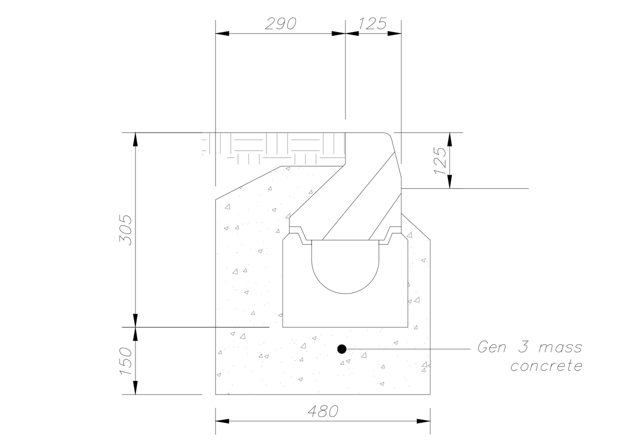
Precast Headwall Detail - HW2,HW3 & HW4
1:20



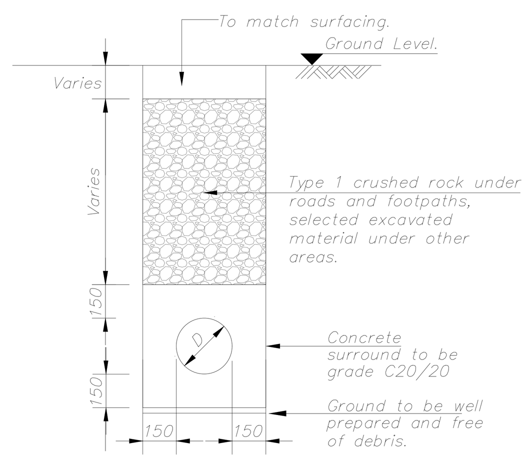
Precast Headwall Detail - HW1
1:20



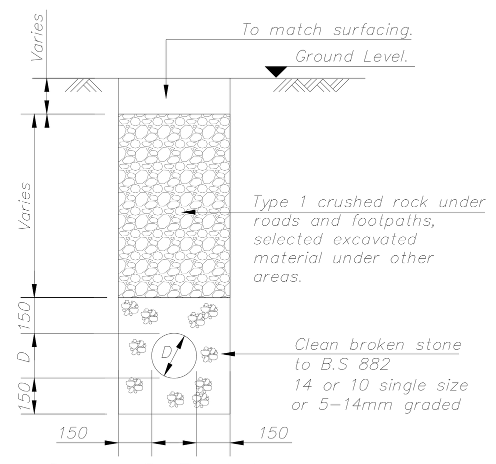
Mini Beany Half Battered drainage kerb sump unit (SMA road construction)
1:10



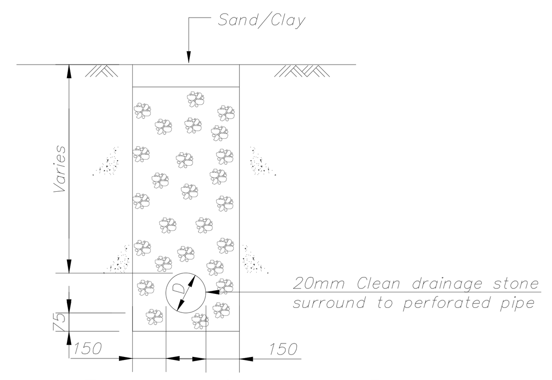
Mini Beany Half Battered drainage kerb
1:10



Class Z Bedding
(Under Roads < 1.2m Cover)
(Under Paths/Other areas < 0.9m Cover)
1:20



Class S Bedding.
1:20



Class X Bedding for Land Drains.
1:20

All levels in m referring to Finished Floor Level (FFL) ±00.00m
Plant Origin X=0mm Y=0mm Z=±00.00m
Corresponding to site coordinates
E=545537120m N=308088500m U=+3.00m AOD

Rev	Date	Modification	Drawn	Checked	Approved
3.0	14.08.2025	Details ameded to match latest layout	TOH	AC	PGK
2.0	25.07.2025	Details amended to match latest layout	TOH	AC	PGK
1.0	04.06.2025	Updated with Headwall Details	IG	AC	PGK
0.0	11.04.2025	First Issue CD1-INFO PRELIMINARY	JPS	AC	PGK

Contractor:
Kanadevia Inova AG
Hardturmstrasse 127
8005 Zürich | Switzerland

Subcontractor:
Doran CONSULTING
FLAX HOUSE
83-91 Adelaide Street,
Belfast, BT2 8FE

Medworth EfW CHP Facility
Algores Way
Wisbech
Cambridgeshire
PE13 2TQ

A (Approved) R (Reviewed) I (For Information)

Building Section: BS00 SITE WIDE

Project-No.: P-3538
Project-Name.: MEDWORTH
Description: BS00 SITE WIDE

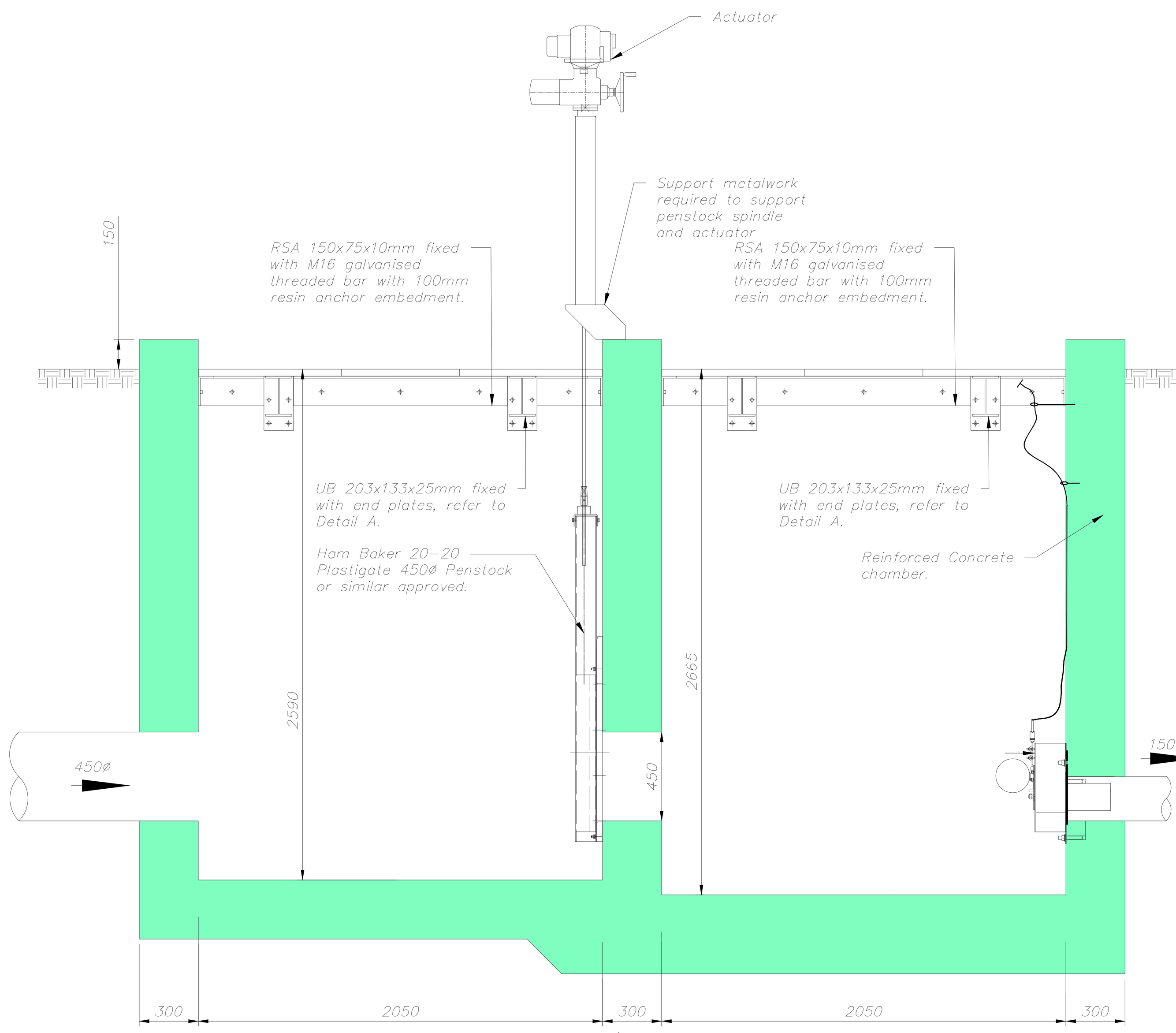
AIC: 19AAG1
Weight: ---
Scale: As Shown
Status: PRELIMINARY CD1-INFO
Size: A0

Title: External Drainage Details Sheet 2

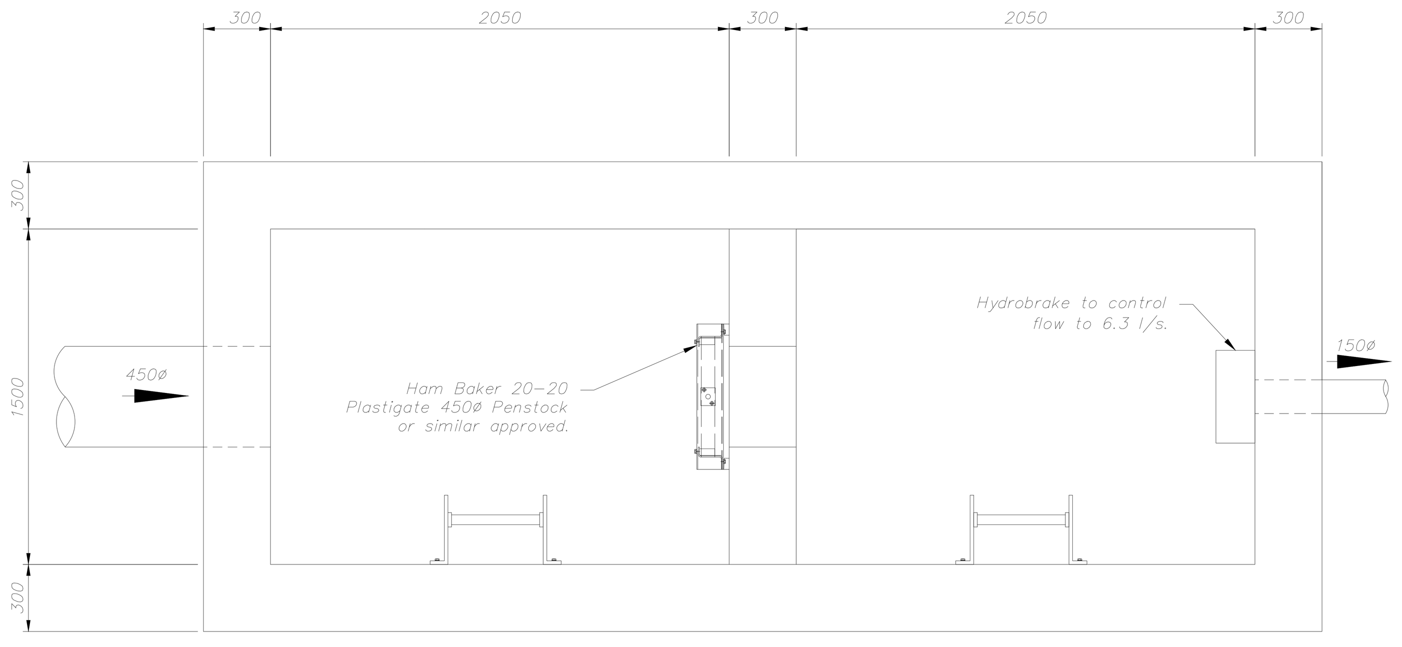
Replaced by:
Replaced for:

Sheet	Doc Type	Supplier	Drawing No.	Revision
	LD020	DOCO	11001422	3.0

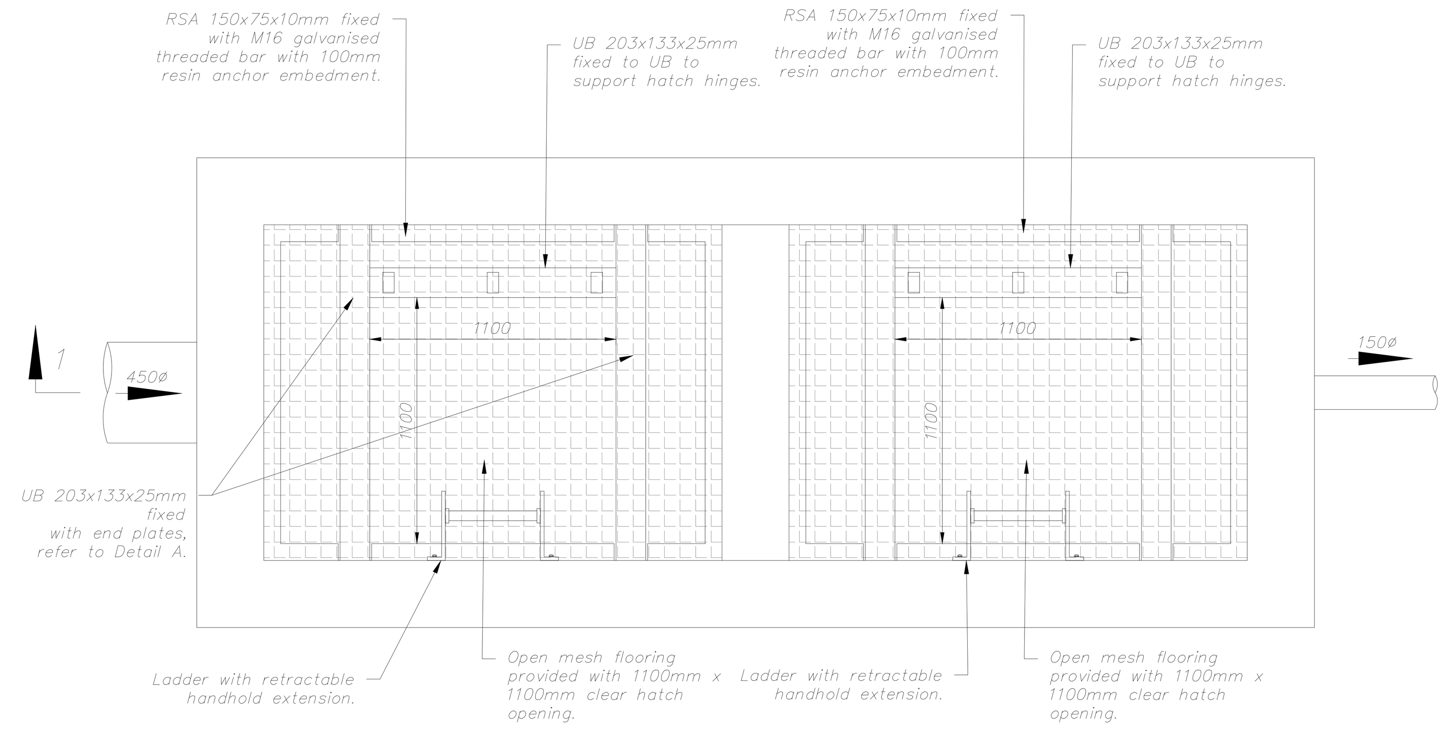
Pond Plan
1:500



Typical Valve/Flow Control Chamber
Section 1-1 (S57)
1:20



Typical Valve/Flow Control Chamber Plan (S57)
1:20



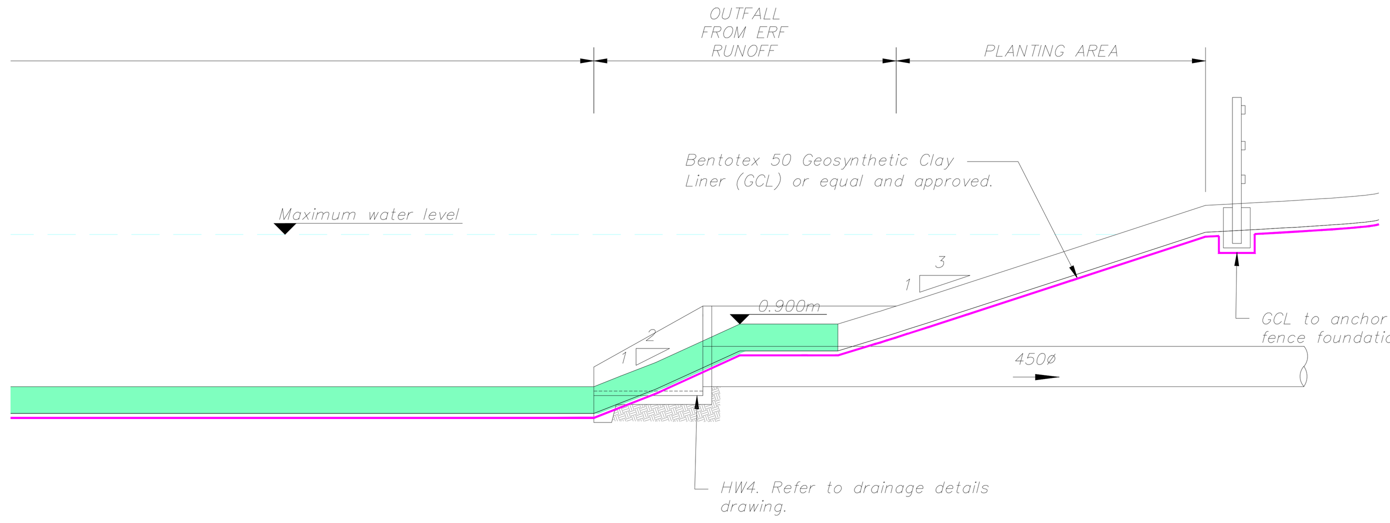
Typical Valve/Flow Control Chamber
Flooring Plan (S57)
1:20

Site Plan
1:2500

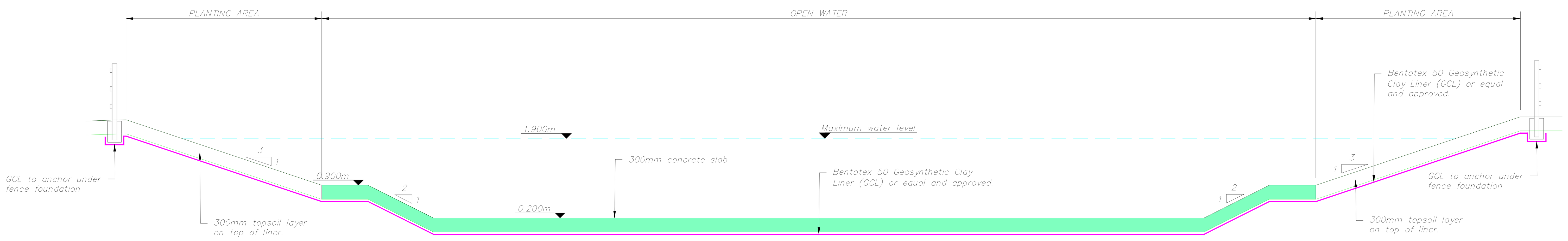
Pond Cut Summary

Name	Cut
Pond Excavation	3505 Cu. M.

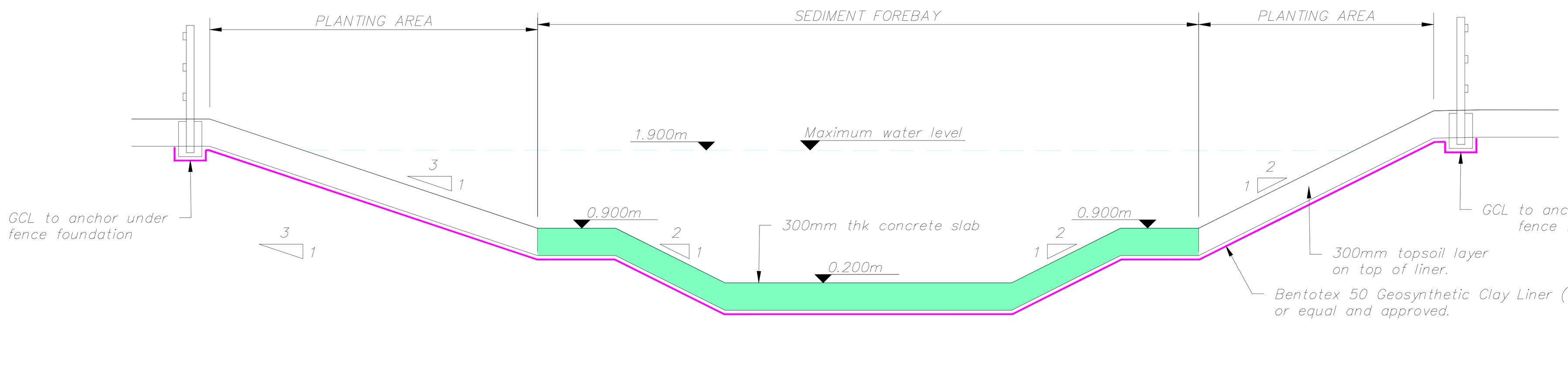
Pond Section 1-1
1:50



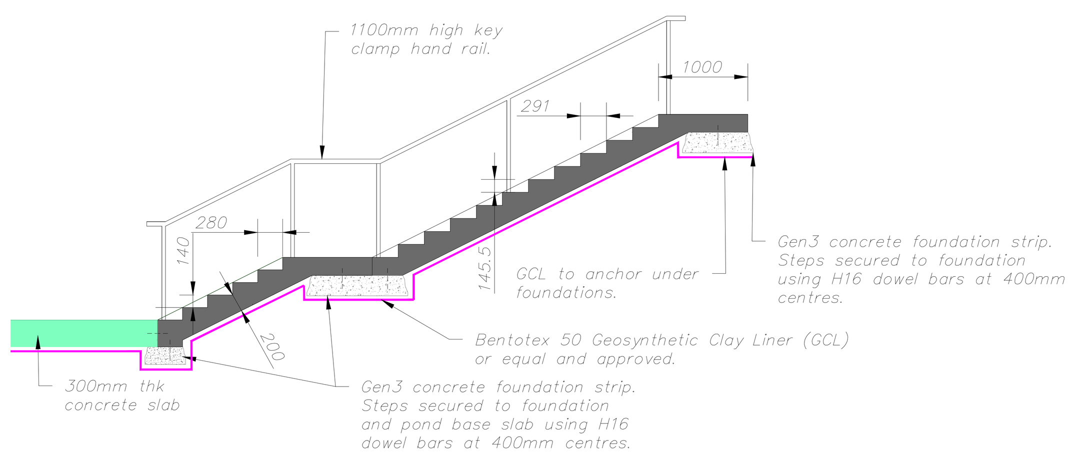
Pond Section 1-1
1:50



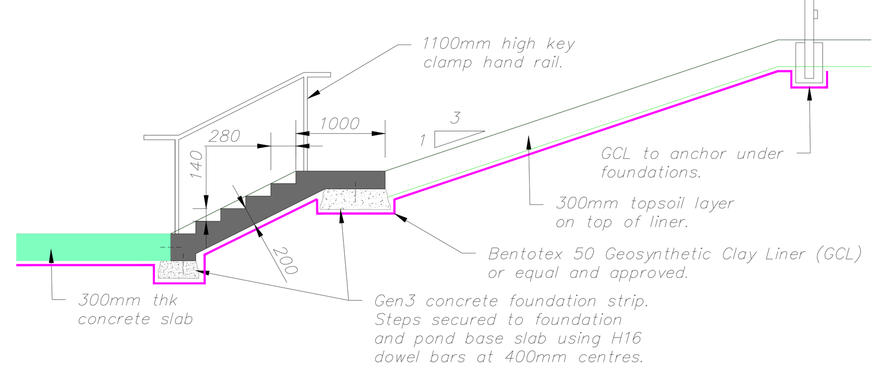
Pond Section 3-3
1:50



Pond Section 2-2
1:50



Typical Precast Concrete Steps
Detail A
1:50



Typical Precast Concrete Steps
Detail B
1:50

All levels in m referring to Finished Floor Level (FFL) ±00.00m
Plant Origin X=0mm Y=0mm Z=±00.00m
Corresponding to site coordinates
E=545537120m N=308088500m U=+3.00m AOD

Rev	Date	Modification	Drawn	Checked	Approved
4.0	14.08.2025	Amended to match latest drainage layout	TOH	AC	PGK
3.0	28.07.2025	Pumping main line type amended	TOH	AC	PGK
2.0	25.07.2025	Slopes added to sections. Steps included for access to pond base	TOH	AC	PGK
1.0	04.06.2025	Updated for Drainage Layout & Pond Arrangement	TOH	AC	PGK
0.0	11.04.2025	First Issue CD1-INFO PRELIMINARY	JPS	AC	PGK

Contractor: Kanadevia INOVA
Kanadevia Inova AG
Hardturmstrasse 127
8005 Zürich | Switzerland

Subcontractor: Doran CONSULTING
FLAX HOUSE
83-91 Adelaide Street,
Belfast, BT2 8FE

Medworth EfW CHP Facility
Algores Way
Wisbech
Cambridgeshire
PE13 2TQ

A (Approved) | R (Reviewed) | I (For Information)

Building Section: BS00 SITE WIDE

Project-No.: P-3538
Project-Name.: MEDWORTH
Description: BS00 SITE WIDE

AIC: 19AAG1
Weight: ---
Scale: As Shown
Status: PRELIMINARY CD1-INFO
Size: A0

Title: Attenuation Pond Arrangement and Details Sheet 1

Replaced by:
Replaced for:

Sheet	Doc Type	Supplier	Drawing No.	Revision
	LD020	DOCO	11001431	4.0

APPENDIX C – Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.000
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	550.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.065	5.00	2.611	1500		545643.505	307950.654	1.800
2			2.734	1500		545625.196	307963.996	1.962
3	0.088	5.00	2.572	1500		545668.279	307960.484	1.800
4			2.637	1500		545637.893	307981.653	1.988
5	0.156	5.00	3.737	1350		545612.227	308024.924	2.178
6	0.074	5.00	2.875	1350		545614.765	308000.477	1.530
7	0.052	5.00	2.749	1350		545646.461	307996.101	1.363
8	0.063	5.00	2.741	1800		545634.614	308003.260	2.180
9	0.106	5.00	2.936	1350		545614.523	307978.129	1.523
10			2.714	1800		545628.586	307983.525	2.397
11	0.040	5.00	2.793	2100		545609.728	307956.675	2.660
12	0.097	5.00	3.000	1200		545598.649	307929.286	1.647
13			2.784	2100		545590.871	307929.826	2.834
14	0.073	5.00	3.000	1350		545577.443	307943.363	1.449
15	0.062	5.00	2.958	1350		545582.957	307939.374	1.575
16	0.050	5.00	2.889	1350		545576.074	307933.914	1.650
17			2.700	2100		545579.796	307921.102	2.764
18	0.071	5.00	3.000	1350		545595.017	307908.270	1.575
19	0.003	5.00	2.886	1350		545584.206	307914.568	1.847
20	0.061	5.00	2.988	1350		545567.772	307925.227	1.407
21	0.126	5.00	2.758	2100		545572.583	307914.856	2.832
22	0.053	5.00	2.987	1350		545528.018	307902.421	1.600
23	0.024	5.00	2.987	1350		545550.393	307903.950	1.670
24	0.095	5.00	2.938	1200		545566.209	307892.559	1.621
25	0.052	5.00	2.779	2100		545557.299	307897.583	2.876
26	0.023	5.00	2.719	1200		545522.985	307872.130	1.425
27	0.021	5.00	2.984	1200		545533.114	307892.349	1.350
28	0.014	5.00	2.877	1200		545532.298	307883.541	1.670
29	0.074	5.00	2.616	2100		545540.147	307878.200	2.739
30	0.020	5.00	2.890	1200		545551.147	307849.988	1.549
31			2.489	2100		545525.727	307864.950	2.632
32	0.059	5.00	2.393	2100		545504.072	307878.344	2.561
34	0.152	5.00	3.957	1350		545565.616	308058.275	1.912
35			2.707	1350		545548.511	308070.475	1.798
36	0.106	5.00	2.935	1350		545539.232	308032.940	1.575
37	0.052	5.00	2.600	1350		545535.776	308055.053	1.575
38	0.039	5.00	2.487	1800		545530.820	308060.275	2.166
39	0.035	5.00	2.692	1800		545515.943	308026.072	2.410
40	0.037	5.00	2.796	1800		545503.646	307997.798	2.546
41	0.114	5.00	2.963	1350		545518.487	307983.896	1.510
42	0.067	5.00	2.973	1350		545512.404	307967.778	1.575
43			2.916	1350		545506.091	307971.966	1.615

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
44	0.040	5.00	2.586	1800		545494.588	307976.973	2.360
45	0.063	5.00	2.976	1200		545502.438	307953.702	1.425
46			2.959	1200		545493.060	307940.794	1.548
47	0.024	5.00	2.929	1200		545487.704	307919.225	1.425
48	0.060	5.00	2.913	1200		545493.609	307928.506	1.474
49	0.036	5.00	2.604	1800		545478.219	307940.092	2.420
50	0.038	5.00	2.607	1800		545472.327	307924.467	2.441
51	0.073	5.00	2.513	1800		545464.228	307902.988	2.371
52			2.567	2100	3800	545480.610	307898.740	2.766
PS1			2.785	2700		545483.247	307903.242	2.989
55			2.328	2100	3800	545458.123	307887.095	2.128
HW1	0.249		1.900			545454.222	307877.853	1.720
61	0.063	5.00	2.404	1350		545528.220	307830.944	1.411
62			2.312	1350		545513.621	307802.786	1.603
63		5.00	2.320	1350		545517.330	307844.007	1.590
64	0.073	5.00	2.320	1350		545499.130	307809.425	1.720
65			2.300	1350		545493.680	307797.911	1.742
66		5.00	2.410	1200		545473.448	307733.782	1.425
67	0.051	5.00	2.700	1200		545480.577	307753.353	1.838
68	0.152	5.00	2.600	1350		545473.565	307756.783	2.199
69			2.270	1350		545425.148	307780.446	2.036
HW3			1.900			545428.511	307788.342	1.700
HW4		5.00	1.900			545464.849	307791.777	1.700
57			2.399	4100	2100	545491.822	307811.931	2.283
PI			3.505	1200		545495.795	307819.692	3.548
58			2.464	1200		545508.302	307844.415	2.692
59			2.392	1200		545501.812	307857.187	2.716
HW5			1.500	150		545504.223	307861.281	1.856
71	0.187	5.00	2.399	1350		545463.574	307868.090	1.275
HW2			1.900			545435.645	307803.635	1.700

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)
1.000	1	2	22.655	0.600	0.811	0.772	0.039	580.9	600	5.38	52.4
1.001	2	4	21.748	0.600	0.772	0.734	0.038	572.3	600	5.74	50.9
2.000	3	4	37.033	0.600	0.772	0.649	0.123	300.0	600	5.44	52.2
1.002	4	10	9.493	0.600	0.649	0.617	0.032	300.0	600	5.85	50.5
3.000	5	8	31.153	0.600	1.559	1.166	0.393	79.3	375	5.25	52.9
4.000	6	8	20.043	0.600	1.345	1.086	0.259	77.3	375	5.16	53.3

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)
1.000	1.003	283.6	12.4	1.200	1.362	0.065	0.0	84	0.511
1.001	1.011	285.7	12.0	1.362	1.303	0.065	0.0	83	0.510
2.000	1.400	396.0	16.6	1.200	1.388	0.088	0.0	82	0.706
1.002	1.400	396.0	27.9	1.388	1.497	0.153	0.0	106	0.822
3.000	2.036	224.9	29.9	1.803	1.200	0.156	0.0	92	1.433
4.000	2.062	227.7	14.2	1.155	1.280	0.074	0.0	63	1.163

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)
5.000	7	8	13.842	0.600	1.386	1.011	0.375	36.9	450	5.07	53.7
3.001	8	10	20.635	0.600	0.561	0.539	0.022	938.0	900	5.59	51.5
6.000	9	10	15.063	0.600	1.413	1.064	0.349	43.2	450	5.08	53.7
1.003	10	11	32.811	0.600	0.317	0.283	0.034	965.0	900	6.39	48.4
1.004	11	13	32.809	0.600	0.133	0.100	0.033	994.2	1050	6.90	46.5
7.000	12	13	7.797	0.600	1.353	1.307	0.046	169.5	225	5.13	53.5
1.005	13	17	14.098	0.600	-0.050	-0.064	0.014	1007.0	1200	7.10	45.8
8.000	14	15	6.806	0.600	1.551	1.383	0.168	40.5	375	5.04	53.8
8.001	15	17	18.543	0.600	1.383	1.125	0.258	71.9	375	5.18	53.2
9.000	16	17	13.342	0.600	1.239	1.050	0.189	70.6	450	5.09	53.6
1.006	17	21	9.541	0.600	-0.064	-0.074	0.010	954.1	1200	7.23	45.4
10.000	18	19	12.512	0.600	1.425	1.039	0.386	32.4	375	5.07	53.7
10.001	19	21	11.627	0.600	1.039	1.003	0.036	323.0	375	5.26	52.9
11.000	20	21	11.433	0.600	1.581	1.108	0.473	24.2	450	5.05	53.8
1.007	21	25	23.064	0.600	-0.074	-0.097	0.023	1002.8	1200	7.56	44.3
12.000	22	23	22.427	0.600	1.387	1.317	0.070	320.4	375	5.37	52.5
12.001	23	25	9.393	0.600	1.317	1.204	0.113	83.1	375	5.45	52.1
13.000	24	25	10.229	0.600	1.317	1.256	0.061	167.7	225	5.17	53.3
1.008	25	29	25.882	0.600	-0.097	-0.123	0.026	995.5	1200	7.93	43.2
14.000	26	28	14.729	0.600	1.294	1.207	0.087	169.3	225	5.25	53.0
15.000	27	28	8.846	0.600	1.634	1.527	0.107	82.7	150	5.13	53.4
14.001	28	29	9.494	0.600	1.207	1.151	0.056	169.5	225	5.40	52.3
1.009	29	31	19.583	0.600	-0.123	-0.143	0.020	979.2	1200	8.20	42.4
16.000	30	31	29.496	0.600	1.341	1.048	0.293	100.7	150	5.49	52.0

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)
5.000	3.355	533.6	10.0	0.913	1.280	0.052	0.0	42	1.327
3.001	1.015	645.4	64.1	1.280	1.275	0.344	0.0	189	0.659
6.000	3.101	493.2	20.6	1.073	1.200	0.106	0.0	62	1.565
1.003	1.000	636.2	105.6	1.497	1.610	0.604	0.0	246	0.750
1.004	1.084	938.8	108.2	1.610	1.634	0.644	0.0	238	0.735
7.000	1.001	39.8	18.8	1.422	1.252	0.097	0.0	109	0.986
1.005	1.170	1323.5	122.7	1.634	1.564	0.741	0.0	243	0.748
8.000	2.854	315.2	14.1	1.074	1.200	0.073	0.0	54	1.471
8.001	2.139	236.3	25.8	1.200	1.200	0.134	0.0	83	1.423
9.000	2.422	385.2	9.8	1.200	1.200	0.050	0.0	49	1.054
1.006	1.203	1360.0	151.9	1.564	1.632	0.926	0.0	267	0.809
10.000	3.194	352.7	13.8	1.200	1.472	0.071	0.0	50	1.578
10.001	1.002	110.7	14.2	1.472	1.380	0.074	0.0	90	0.697
11.000	4.148	659.7	11.9	0.957	1.200	0.061	0.0	42	1.643
1.007	1.173	1326.3	190.3	1.632	1.676	1.188	0.0	304	0.847
12.000	1.007	111.2	10.1	1.225	1.295	0.053	0.0	76	0.633
12.001	1.988	219.6	14.5	1.295	1.200	0.077	0.0	65	1.144
13.000	1.007	40.0	18.3	1.396	1.298	0.095	0.0	107	0.985
1.008	1.177	1331.2	220.3	1.676	1.539	1.412	0.0	327	0.883
14.000	1.002	39.8	4.4	1.200	1.445	0.023	0.0	51	0.665
15.000	1.106	19.5	4.1	1.200	1.200	0.021	0.0	47	0.877
14.001	1.001	39.8	11.0	1.445	1.240	0.058	0.0	80	0.857
1.009	1.187	1342.3	236.6	1.539	1.432	1.544	0.0	338	0.907
16.000	1.001	17.7	3.7	1.399	1.291	0.020	0.0	47	0.794

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)
1.010	31	32	25.462	0.600	-0.143	-0.168	0.025	1018.5	1200	8.57	41.4
1.011	32	52	31.088	0.600	-0.168	-0.199	0.031	1002.8	1200	9.01	40.2
17.000	34	35	21.010	0.600	2.045	0.909	1.136	18.5	375	5.08	53.7
17.001	35	38	20.421	0.600	0.909	0.846	0.063	324.1	375	5.42	52.2
18.000	36	37	22.381	0.600	1.360	1.025	0.335	66.8	375	5.17	53.3
18.001	37	38	7.199	0.600	1.025	0.912	0.113	63.7	375	5.22	53.1
17.002	38	39	37.298	0.600	0.321	0.282	0.039	956.4	900	6.04	49.7
17.003	39	40	30.832	0.600	0.282	0.250	0.032	963.5	900	6.56	47.8
17.004	40	44	22.710	0.600	0.250	0.226	0.024	946.2	900	6.93	46.4
19.000	41	43	17.204	0.600	1.453	1.301	0.152	113.4	375	5.17	53.3
20.000	42	43	7.576	0.600	1.398	1.301	0.097	78.3	375	5.06	53.7
19.001	43	44	12.553	0.600	1.301	1.011	0.290	43.2	375	5.24	53.0
17.005	44	49	40.350	0.600	0.226	0.184	0.042	960.7	900	7.60	44.2
21.000	45	46	15.955	0.600	1.551	1.411	0.140	114.0	225	5.22	53.1
21.001	46	49	14.858	0.600	1.411	1.179	0.232	64.0	225	5.37	52.5
22.000	47	48	11.000	0.600	1.504	1.439	0.065	169.2	225	5.18	53.2
22.001	48	49	19.264	0.600	1.439	1.179	0.260	74.1	225	5.39	52.4
17.006	49	50	16.699	0.600	0.184	0.166	0.018	927.7	900	7.87	43.3
17.007	50	51	22.955	0.600	0.166	0.142	0.024	956.5	900	8.25	42.2
17.008	51	52	16.924	0.600	0.142	0.124	0.018	940.2	900	8.53	41.5
1.012	52	PS1	5.217	0.600	-0.199	-0.204	0.005	1043.5	1200	9.08	40.0
23.000	52	55	27.136	0.600	1.200	1.149	0.051	532.1	600	5.43	52.2
1.013	PS1	55	44.580	0.600	-0.204	0.745	-0.949	-47.0	355	30.00	47.8
1.014	55	HW1	10.032	0.600	0.200	0.180	0.020	500.0	900	30.00	18.8

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)
1.010	1.164	1315.9	234.0	1.432	1.361	1.564	0.0	339	0.890
1.011	1.173	1326.2	235.8	1.361	1.566	1.623	0.0	339	0.897
17.000	4.230	467.2	29.5	1.537	1.423	0.152	0.0	63	2.407
17.001	1.001	110.5	28.7	1.423	1.266	0.152	0.0	130	0.845
18.000	2.219	245.1	20.5	1.200	1.200	0.106	0.0	73	1.368
18.001	2.273	251.0	30.4	1.200	1.200	0.159	0.0	88	1.556
17.002	1.005	639.1	62.7	1.266	1.510	0.349	0.0	189	0.651
17.003	1.001	636.7	66.4	1.510	1.646	0.384	0.0	194	0.659
17.004	1.010	642.6	70.6	1.646	1.460	0.421	0.0	199	0.675
19.000	1.701	187.8	21.9	1.135	1.240	0.114	0.0	86	1.152
20.000	2.049	226.3	13.0	1.200	1.240	0.067	0.0	60	1.131
19.001	2.761	305.0	34.6	1.240	1.200	0.181	0.0	85	1.856
17.005	1.002	637.6	102.5	1.460	1.520	0.641	0.0	242	0.746
21.000	1.223	48.6	12.0	1.200	1.323	0.063	0.0	76	1.018
21.001	1.637	65.1	11.9	1.323	1.200	0.063	0.0	65	1.250
22.000	1.002	39.8	4.7	1.200	1.249	0.024	0.0	52	0.678
22.001	1.521	60.5	16.0	1.249	1.200	0.084	0.0	79	1.288
17.006	1.020	649.0	129.2	1.520	1.541	0.825	0.0	270	0.804
17.007	1.005	639.1	131.7	1.541	1.471	0.863	0.0	276	0.800
17.008	1.013	644.6	140.3	1.471	1.543	0.935	0.0	283	0.819
1.012	1.149	1299.9	370.0	1.566	1.789	2.558	0.0	436	0.998
23.000	1.048	889.3	0.0	0.767	0.579	0.000	0.0	0	0.000
1.013	0.013	1.3	442.0	2.634	1.228	2.558	0.0	355	0.000
1.014	1.394	886.9	173.8	1.228	0.820	2.558	0.0	268	1.094

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)
24.000	61	62	31.718	0.600	0.993	0.709	0.284	111.6	375	5.31	52.7
24.001	62	65	20.528	0.600	0.709	0.561	0.148	138.7	375	5.53	51.8
25.000	63	64	39.079	0.600	0.730	0.600	0.130	300.0	375	5.63	51.4
25.001	64	65	12.739	0.600	0.600	0.558	0.042	300.0	375	5.83	50.6
24.002	65	68	45.783	0.600	0.558	0.401	0.157	291.6	375	6.55	47.8
26.000	66	67	20.829	0.600	0.985	0.862	0.123	169.3	225	5.35	52.6
26.001	67	68	7.806	0.600	0.862	0.597	0.265	29.5	225	5.40	52.3
24.003	68	69	53.890	0.600	0.401	0.234	0.167	322.7	375	7.45	44.7
24.004	69	HW3	8.582	0.600	0.234	0.205	0.029	300.0	375	7.59	44.3
27.000	HW4	57	34.083	0.600	0.200	0.116	0.084	405.8	450	5.57	51.6
27.001	57	PI	8.719	0.600	0.116	0.058	0.058	150.0	150	5.74	50.9
27.002	PI	58	27.709	0.600	-0.043	-0.228	0.185	150.0	150	6.31	48.7
27.003	58	59	14.328	0.600	-0.228	-0.324	0.096	150.0	150	6.60	47.6
27.004	59	HW5	4.753	0.600	-0.324	-0.356	0.032	148.5	150	6.70	47.2
28.000	71	HW2	70.246	0.600	1.124	0.200	0.924	76.0	375	5.56	51.7

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)
24.000	1.714	189.3	12.0	1.036	1.228	0.063	0.0	63	0.972
24.001	1.536	169.7	11.8	1.228	1.364	0.063	0.0	66	0.895
25.000	1.041	114.9	0.0	1.215	1.345	0.000	0.0	0	0.000
25.001	1.041	114.9	13.3	1.345	1.367	0.073	0.0	85	0.700
24.002	1.056	116.6	23.4	1.367	1.824	0.136	0.0	113	0.830
26.000	1.002	39.8	0.0	1.200	1.613	0.000	0.0	0	0.000
26.001	2.419	96.2	9.7	1.613	1.778	0.051	0.0	48	1.562
24.003	1.003	110.8	54.6	1.824	1.661	0.338	0.0	186	0.999
24.004	1.041	114.9	54.1	1.661	1.320	0.338	0.0	181	1.026
27.000	1.003	159.5	0.0	1.250	1.833	0.000	0.0	0	0.000
27.001	0.818	14.5	0.0	2.133	3.297	0.000	0.0	0	0.000
27.002	0.818	14.5	0.0	3.398	2.542	0.000	0.0	0	0.000
27.003	0.818	14.5	0.0	2.542	2.566	0.000	0.0	0	0.000
27.004	0.822	14.5	0.0	2.566	1.706	0.000	0.0	0	0.000
28.000	2.080	229.7	35.0	0.900	1.325	0.187	0.0	99	1.520

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)
1.000	22.655	580.9	600	Storm	2.611	0.811	1.200	2.734	0.772	1.362
1.001	21.748	572.3	600	Storm	2.734	0.772	1.362	2.637	0.734	1.303
2.000	37.033	300.0	600	Storm	2.572	0.772	1.200	2.637	0.649	1.388
1.002	9.493	300.0	600	Storm	2.637	0.649	1.388	2.714	0.617	1.497
3.000	31.153	79.3	375	Storm	3.737	1.559	1.803	2.741	1.166	1.200

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	1	1500		Manhole	Type B Storm	2	1500		Manhole	Type B Storm
1.001	2	1500		Manhole	Type B Storm	4	1500		Manhole	Type B Storm
2.000	3	1500		Manhole	Type B Storm	4	1500		Manhole	Type B Storm
1.002	4	1500		Manhole	Type B Storm	10	1800		Manhole	Type B Storm
3.000	5	1350		Manhole	Type B Storm	8	1800		Manhole	Type B Storm

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)
4.000	20.043	77.3	375	Storm	2.875	1.345	1.155	2.741	1.086	1.280
5.000	13.842	36.9	450	Storm	2.749	1.386	0.913	2.741	1.011	1.280
3.001	20.635	938.0	900	Storm	2.741	0.561	1.280	2.714	0.539	1.275
6.000	15.063	43.2	450	Storm	2.936	1.413	1.073	2.714	1.064	1.200
1.003	32.811	965.0	900	Storm	2.714	0.317	1.497	2.793	0.283	1.610
1.004	32.809	994.2	1050	Storm	2.793	0.133	1.610	2.784	0.100	1.634
7.000	7.797	169.5	225	Storm	3.000	1.353	1.422	2.784	1.307	1.252
1.005	14.098	1007.0	1200	Storm	2.784	-0.050	1.634	2.700	-0.064	1.564
8.000	6.806	40.5	375	Storm	3.000	1.551	1.074	2.958	1.383	1.200
8.001	18.543	71.9	375	Storm	2.958	1.383	1.200	2.700	1.125	1.200
9.000	13.342	70.6	450	Storm	2.889	1.239	1.200	2.700	1.050	1.200
1.006	9.541	954.1	1200	Storm	2.700	-0.064	1.564	2.758	-0.074	1.632
10.000	12.512	32.4	375	Storm	3.000	1.425	1.200	2.886	1.039	1.472
10.001	11.627	323.0	375	Storm	2.886	1.039	1.472	2.758	1.003	1.380
11.000	11.433	24.2	450	Storm	2.988	1.581	0.957	2.758	1.108	1.200
1.007	23.064	1002.8	1200	Storm	2.758	-0.074	1.632	2.779	-0.097	1.676
12.000	22.427	320.4	375	Storm	2.987	1.387	1.225	2.987	1.317	1.295
12.001	9.393	83.1	375	Storm	2.987	1.317	1.295	2.779	1.204	1.200
13.000	10.229	167.7	225	Storm	2.938	1.317	1.396	2.779	1.256	1.298
1.008	25.882	995.5	1200	Storm	2.779	-0.097	1.676	2.616	-0.123	1.539
14.000	14.729	169.3	225	Storm	2.719	1.294	1.200	2.877	1.207	1.445
15.000	8.846	82.7	150	Storm	2.984	1.634	1.200	2.877	1.527	1.200
14.001	9.494	169.5	225	Storm	2.877	1.207	1.445	2.616	1.151	1.240
1.009	19.583	979.2	1200	Storm	2.616	-0.123	1.539	2.489	-0.143	1.432
16.000	29.496	100.7	150	Storm	2.890	1.341	1.399	2.489	1.048	1.291

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
4.000	6	1350		Manhole	Type B Storm	8	1800		Manhole	Type B Storm
5.000	7	1350		Manhole	Type B Storm	8	1800		Manhole	Type B Storm
3.001	8	1800		Manhole	Type B Storm	10	1800		Manhole	Type B Storm
6.000	9	1350		Manhole	Type B Storm	10	1800		Manhole	Type B Storm
1.003	10	1800		Manhole	Type B Storm	11	2100		Manhole	Type B Storm
1.004	11	2100		Manhole	Type B Storm	13	2100		Manhole	Type B Storm
7.000	12	1200		Manhole	Type B Storm	13	2100		Manhole	Type B Storm
1.005	13	2100		Manhole	Type B Storm	17	2100		Manhole	Type B Storm
8.000	14	1350		Manhole	Type B Storm	15	1350		Manhole	Type B Storm
8.001	15	1350		Manhole	Type B Storm	17	2100		Manhole	Type B Storm
9.000	16	1350		Manhole	Type B Storm	17	2100		Manhole	Type B Storm
1.006	17	2100		Manhole	Type B Storm	21	2100		Manhole	Type B Storm
10.000	18	1350		Manhole	Type B Storm	19	1350		Manhole	Type B Storm
10.001	19	1350		Manhole	Type B Storm	21	2100		Manhole	Type B Storm
11.000	20	1350		Manhole	Type B Storm	21	2100		Manhole	Type B Storm
1.007	21	2100		Manhole	Type B Storm	25	2100		Manhole	Type B Storm
12.000	22	1350		Manhole	Type B Storm	23	1350		Manhole	Type B Storm
12.001	23	1350		Manhole	Type B Storm	25	2100		Manhole	Type B Storm
13.000	24	1200		Manhole	Type B Storm	25	2100		Manhole	Type B Storm
1.008	25	2100		Manhole	Type B Storm	29	2100		Manhole	Type B Storm
14.000	26	1200		Manhole	Type B Storm	28	1200		Manhole	Type B Storm
15.000	27	1200		Manhole	Type B Storm	28	1200		Manhole	Type B Storm
14.001	28	1200		Manhole	Type B Storm	29	2100		Manhole	Type B Storm
1.009	29	2100		Manhole	Type B Storm	31	2100		Manhole	Type B Storm
16.000	30	1200		Manhole	Type B Storm	31	2100		Manhole	Type B Storm

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)
1.010	25.462	1018.5	1200	Storm	2.489	-0.143	1.432	2.393	-0.168	1.361
1.011	31.088	1002.8	1200	Storm	2.393	-0.168	1.361	2.567	-0.199	1.566
17.000	21.010	18.5	375	Storm	3.957	2.045	1.537	2.707	0.909	1.423
17.001	20.421	324.1	375	Storm	2.707	0.909	1.423	2.487	0.846	1.266
18.000	22.381	66.8	375	Storm	2.935	1.360	1.200	2.600	1.025	1.200
18.001	7.199	63.7	375	Storm	2.600	1.025	1.200	2.487	0.912	1.200
17.002	37.298	956.4	900	Storm	2.487	0.321	1.266	2.692	0.282	1.510
17.003	30.832	963.5	900	Storm	2.692	0.282	1.510	2.796	0.250	1.646
17.004	22.710	946.2	900	Storm	2.796	0.250	1.646	2.586	0.226	1.460
19.000	17.204	113.4	375	Storm	2.963	1.453	1.135	2.916	1.301	1.240
20.000	7.576	78.3	375	Storm	2.973	1.398	1.200	2.916	1.301	1.240
19.001	12.553	43.2	375	Storm	2.916	1.301	1.240	2.586	1.011	1.200
17.005	40.350	960.7	900	Storm	2.586	0.226	1.460	2.604	0.184	1.520
21.000	15.955	114.0	225	Storm	2.976	1.551	1.200	2.959	1.411	1.323
21.001	14.858	64.0	225	Storm	2.959	1.411	1.323	2.604	1.179	1.200
22.000	11.000	169.2	225	Storm	2.929	1.504	1.200	2.913	1.439	1.249
22.001	19.264	74.1	225	Storm	2.913	1.439	1.249	2.604	1.179	1.200
17.006	16.699	927.7	900	Storm	2.604	0.184	1.520	2.607	0.166	1.541
17.007	22.955	956.5	900	Storm	2.607	0.166	1.541	2.513	0.142	1.471
17.008	16.924	940.2	900	Storm	2.513	0.142	1.471	2.567	0.124	1.543
1.012	5.217	1043.5	1200	Storm	2.567	-0.199	1.566	2.785	-0.204	1.789
23.000	27.136	532.1	600	Barrel	2.567	1.200	0.767	2.328	1.149	0.579
1.013	44.580	-47.0	355	Storm	2.785	-0.204	2.634	2.328	0.745	1.228
1.014	10.032	500.0	900	Storm	2.328	0.200	1.228	1.900	0.180	0.820
24.000	31.718	111.6	375	Storm	2.404	0.993	1.036	2.312	0.709	1.228

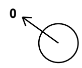
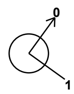
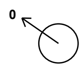
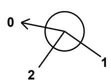
Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.010	31	2100		Manhole	Type B Storm	32	2100		Manhole	Type B Storm
1.011	32	2100		Manhole	Type B Storm	52	2100	3800	Manhole	Type B Storm
17.000	34	1350		Manhole	Type B Storm	35	1350		Manhole	Type B Storm
17.001	35	1350		Manhole	Type B Storm	38	1800		Manhole	Type B Storm
18.000	36	1350		Manhole	Type B Storm	37	1350		Manhole	Type B Storm
18.001	37	1350		Manhole	Type B Storm	38	1800		Manhole	Type B Storm
17.002	38	1800		Manhole	Type B Storm	39	1800		Manhole	Type B Storm
17.003	39	1800		Manhole	Type B Storm	40	1800		Manhole	Type B Storm
17.004	40	1800		Manhole	Type B Storm	44	1800		Manhole	Type B Storm
19.000	41	1350		Manhole	Type B Storm	43	1350		Manhole	Type B Storm
20.000	42	1350		Manhole	Type B Storm	43	1350		Manhole	Type B Storm
19.001	43	1350		Manhole	Type B Storm	44	1800		Manhole	Type B Storm
17.005	44	1800		Manhole	Type B Storm	49	1800		Manhole	Type B Storm
21.000	45	1200		Manhole	Type B Storm	46	1200		Manhole	Type B Storm
21.001	46	1200		Manhole	Type B Storm	49	1800		Manhole	Type B Storm
22.000	47	1200		Manhole	Type B Storm	48	1200		Manhole	Type B Storm
22.001	48	1200		Manhole	Type B Storm	49	1800		Manhole	Type B Storm
17.006	49	1800		Manhole	Type B Storm	50	1800		Manhole	Type B Storm
17.007	50	1800		Manhole	Type B Storm	51	1800		Manhole	Type B Storm
17.008	51	1800		Manhole	Type B Storm	52	2100	3800	Manhole	Type B Storm
1.012	52	2100	3800	Manhole	Type B Storm	PS1	2700		Manhole	Type B Storm
23.000	52	2100	3800	Manhole	Type B Storm	55	2100	3800	Manhole	Type B Storm
1.013	PS1	2700		Manhole	Type B Storm	55	2100	3800	Manhole	Type B Storm
1.014	55	2100	3800	Manhole	Type B Storm	HW1			Junction	
24.000	61	1350		Manhole	Type B Storm	62	1350		Manhole	Type B Storm

Pipeline Schedule

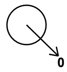
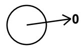
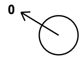
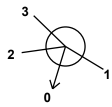
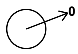
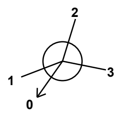
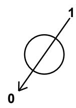
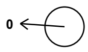
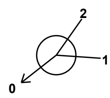
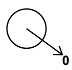
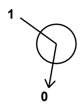
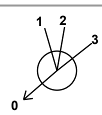
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
24.001	20.528	138.7	375	Storm	2.312	0.709	1.228	2.300	0.561	1.364
25.000	39.079	300.0	375	Storm	2.320	0.730	1.215	2.320	0.600	1.345
25.001	12.739	300.0	375	Storm	2.320	0.600	1.345	2.300	0.558	1.367
24.002	45.783	291.6	375	Storm	2.300	0.558	1.367	2.600	0.401	1.824
26.000	20.829	169.3	225	Storm	2.410	0.985	1.200	2.700	0.862	1.613
26.001	7.806	29.5	225	Storm	2.700	0.862	1.613	2.600	0.597	1.778
24.003	53.890	322.7	375	Storm	2.600	0.401	1.824	2.270	0.234	1.661
24.004	8.582	300.0	375	Storm	2.270	0.234	1.661	1.900	0.205	1.320
27.000	34.083	405.8	450	Storm	1.900	0.200	1.250	2.399	0.116	1.833
27.001	8.719	150.0	150	Storm	2.399	0.116	2.133	3.505	0.058	3.297
27.002	27.709	150.0	150	Storm	3.505	-0.043	3.398	2.464	-0.228	2.542
27.003	14.328	150.0	150	Storm	2.464	-0.228	2.542	2.392	-0.324	2.566
27.004	4.753	148.5	150	Storm	2.392	-0.324	2.566	1.500	-0.356	1.706
28.000	70.246	76.0	375	Storm	2.399	1.124	0.900	1.900	0.200	1.325

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
24.001	62	1350		Manhole	Type B Storm	65	1350		Manhole	Type B Storm
25.000	63	1350		Manhole	Type B Storm	64	1350		Manhole	Type B Storm
25.001	64	1350		Manhole	Type B Storm	65	1350		Manhole	Type B Storm
24.002	65	1350		Manhole	Type B Storm	68	1350		Manhole	Type B Storm
26.000	66	1200		Manhole	Type B Storm	67	1200		Manhole	Type B Storm
26.001	67	1200		Manhole	Type B Storm	68	1350		Manhole	Type B Storm
24.003	68	1350		Manhole	Type B Storm	69	1350		Manhole	Type B Storm
24.004	69	1350		Manhole	Type B Storm	HW3			Junction	
27.000	HW4			Junction		57	4100	2100	Manhole	Type B Storm
27.001	57	4100	2100	Manhole	Type B Storm	PI	1200		Manhole	Type B Storm
27.002	PI	1200		Manhole	Type B Storm	58	1200		Manhole	Type B Storm
27.003	58	1200		Manhole	Type B Storm	59	1200		Manhole	Type B Storm
27.004	59	1200		Manhole	Type B Storm	HW5	150		Manhole	Junction Storm
28.000	71	1350		Manhole	Type B Storm	HW2			Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections		Link	IL (m)	Dia (mm)
1	545643.505	307950.654	2.611	1.800	1500			0	1.000	0.811	600
2	545625.196	307963.996	2.734	1.962	1500			1	1.000	0.772	600
								0	1.001	0.772	600
3	545668.279	307960.484	2.572	1.800	1500			0	2.000	0.772	600
4	545637.893	307981.653	2.637	1.988	1500			1	2.000	0.649	600
								2	1.001	0.734	600
								0	1.002	0.649	600

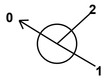
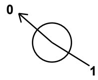
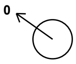
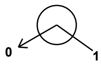
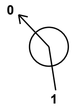
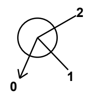
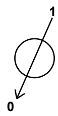
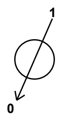
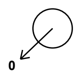
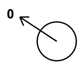
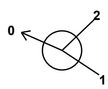
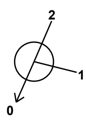
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections		Link	IL (m)	Dia (mm)
5	545612.227	308024.924	3.737	2.178	1350			0	3.000	1.559	375
6	545614.765	308000.477	2.875	1.530	1350			0	4.000	1.345	375
7	545646.461	307996.101	2.749	1.363	1350			0	5.000	1.386	450
8	545634.614	308003.260	2.741	2.180	1800			1	5.000	1.011	450
								2	4.000	1.086	375
								3	3.000	1.166	375
								0	3.001	0.561	900
9	545614.523	307978.129	2.936	1.523	1350			0	6.000	1.413	450
10	545628.586	307983.525	2.714	2.397	1800			1	6.000	1.064	450
								2	3.001	0.539	900
								3	1.002	0.617	600
								0	1.003	0.317	900
11	545609.728	307956.675	2.793	2.660	2100			1	1.003	0.283	900
								0	1.004	0.133	1050
12	545598.649	307929.286	3.000	1.647	1200			0	7.000	1.353	225
13	545590.871	307929.826	2.784	2.834	2100			1	7.000	1.307	225
								2	1.004	0.100	1050
								0	1.005	-0.050	1200
14	545577.443	307943.363	3.000	1.449	1350			0	8.000	1.551	375
15	545582.957	307939.374	2.958	1.575	1350			1	8.000	1.383	375
								0	8.001	1.383	375
16	545576.074	307933.914	2.889	1.650	1350			0	9.000	1.239	450
17	545579.796	307921.102	2.700	2.764	2100			1	9.000	1.050	450
								2	8.001	1.125	375
								3	1.005	-0.064	1200
								0	1.006	-0.064	1200

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
18	545595.017	307908.270	3.000	1.575	1350		0	10.000	1.425	375
19	545584.206	307914.568	2.886	1.847	1350		1	10.000	1.039	375
							0	10.001	1.039	375
20	545567.772	307925.227	2.988	1.407	1350		0	11.000	1.581	450
21	545572.583	307914.856	2.758	2.832	2100		1	11.000	1.108	450
							2	10.001	1.003	375
							3	1.006	-0.074	1200
							0	1.007	-0.074	1200
22	545528.018	307902.421	2.987	1.600	1350		0	12.000	1.387	375
23	545550.393	307903.950	2.987	1.670	1350		1	12.000	1.317	375
							0	12.001	1.317	375
24	545566.209	307892.559	2.938	1.621	1200		0	13.000	1.317	225
25	545557.299	307897.583	2.779	2.876	2100		1	13.000	1.256	225
							2	12.001	1.204	375
							3	1.007	-0.097	1200
							0	1.008	-0.097	1200
26	545522.985	307872.130	2.719	1.425	1200		0	14.000	1.294	225
27	545533.114	307892.349	2.984	1.350	1200		0	15.000	1.634	150
28	545532.298	307883.541	2.877	1.670	1200		1	15.000	1.527	150
							2	14.000	1.207	225
							0	14.001	1.207	225
29	545540.147	307878.200	2.616	2.739	2100		1	14.001	1.151	225
							2	1.008	-0.123	1200
							0	1.009	-0.123	1200
30	545551.147	307849.988	2.890	1.549	1200		0	16.000	1.341	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections		Link	IL (m)	Dia (mm)
31	545525.727	307864.950	2.489	2.632	2100			1	16.000	1.048	150
								2	1.009	-0.143	1200
								0	1.010	-0.143	1200
32	545504.072	307878.344	2.393	2.561	2100			1	1.010	-0.168	1200
								0	1.011	-0.168	1200
34	545565.616	308058.275	3.957	1.912	1350			0	17.000	2.045	375
35	545548.511	308070.475	2.707	1.798	1350			1	17.000	0.909	375
								0	17.001	0.909	375
36	545539.232	308032.940	2.935	1.575	1350			0	18.000	1.360	375
37	545535.776	308055.053	2.600	1.575	1350			1	18.000	1.025	375
								0	18.001	1.025	375
38	545530.820	308060.275	2.487	2.166	1800			1	18.001	0.912	375
								2	17.001	0.846	375
								0	17.002	0.321	900
39	545515.943	308026.072	2.692	2.410	1800			1	17.002	0.282	900
								0	17.003	0.282	900
40	545503.646	307997.798	2.796	2.546	1800			1	17.003	0.250	900
								0	17.004	0.250	900
41	545518.487	307983.896	2.963	1.510	1350			0	19.000	1.453	375
42	545512.404	307967.778	2.973	1.575	1350			0	20.000	1.398	375
43	545506.091	307971.966	2.916	1.615	1350			1	20.000	1.301	375
								2	19.000	1.301	375
								0	19.001	1.301	375
44	545494.588	307976.973	2.586	2.360	1800			1	19.001	1.011	375
								2	17.004	0.226	900
								0	17.005	0.226	900

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
45	545502.438	307953.702	2.976	1.425	1200		0	21.000	1.551	225
46	545493.060	307940.794	2.959	1.548	1200		1	21.000	1.411	225
							0	21.001	1.411	225
47	545487.704	307919.225	2.929	1.425	1200		0	22.000	1.504	225
48	545493.609	307928.506	2.913	1.474	1200		1	22.000	1.439	225
							0	22.001	1.439	225
49	545478.219	307940.092	2.604	2.420	1800		1	22.001	1.179	225
							2	21.001	1.179	225
							3	17.005	0.184	900
							0	17.006	0.184	900
50	545472.327	307924.467	2.607	2.441	1800		1	17.006	0.166	900
							0	17.007	0.166	900
51	545464.228	307902.988	2.513	2.371	1800		1	17.007	0.142	900
							0	17.008	0.142	900
52	545480.610	307898.740	2.567	2.766	2100	3800	1	17.008	0.124	900
							2	1.011	-0.199	1200
							0-1	1.012	-0.199	1200
							0-2	23.000	1.200	600
PS1	545483.247	307903.242	2.785	2.989	2700		1	1.012	-0.204	1200
							0	1.013	-0.204	355
55	545458.123	307887.095	2.328	2.128	2100	3800	1	23.000	1.149	600
							2	1.013	0.745	355
							0	1.014	0.200	900
HW1	545454.222	307877.853	1.900	1.720			1	1.014	0.180	900
61	545528.220	307830.944	2.404	1.411	1350		0	24.000	0.993	375
62	545513.621	307802.786	2.312	1.603	1350		1	24.000	0.709	375
							0	24.001	0.709	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
63	545517.330	307844.007	2.320	1.590	1350		0	25.000	0.730	375
64	545499.130	307809.425	2.320	1.720	1350		1	25.000	0.600	375
							0	25.001	0.600	375
65	545493.680	307797.911	2.300	1.742	1350		1	25.001	0.558	375
							2	24.001	0.561	375
							0	24.002	0.558	375
66	545473.448	307733.782	2.410	1.425	1200		0	26.000	0.985	225
67	545480.577	307753.353	2.700	1.838	1200		1	26.000	0.862	225
							0	26.001	0.862	225
68	545473.565	307756.783	2.600	2.199	1350		1	26.001	0.597	225
							2	24.002	0.401	375
							0	24.003	0.401	375
69	545425.148	307780.446	2.270	2.036	1350		1	24.003	0.234	375
							0	24.004	0.234	375
HW3	545428.511	307788.342	1.900	1.700			1	24.004	0.205	375
HW4	545464.849	307791.777	1.900	1.700			0	27.000	0.200	450
57	545491.822	307811.931	2.399	2.283	4100	2100	1	27.000	0.116	450
							0	27.001	0.116	150
PI	545495.795	307819.692	3.505	3.548	1200		1	27.001	0.058	150
							0	27.002	-0.043	150
58	545508.302	307844.415	2.464	2.692	1200		1	27.002	-0.228	150
							0	27.003	-0.228	150
59	545501.812	307857.187	2.392	2.716	1200		1	27.003	-0.324	150
							0	27.004	-0.324	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
HW5	545504.223	307861.281	1.500	1.856	150		1	27.004	-0.356	150
71	545463.574	307868.090	2.399	1.275	1350		0	28.000	1.124	375
HW2	545435.645	307803.635	1.900	1.700			1	28.000	0.200	375

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	✓
Winter CV	1.000	Additional Storage (m³/ha)	0.0	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	35	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node PS1 Online Pump Control

Flap Valve	✓	Design Depth (m)	2.800	Switch off depth (m)	0.000
Replaces Downstream Link	✓	Design Flow (l/s)	170.0		
Invert Level (m)	-0.204	Switch on depth (m)	0.001		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	170.000	0.600	170.000	1.200	170.000	1.800	170.000	2.000	170.000	2.600	170.000
0.200	170.000	0.800	170.000	1.400	170.000	1.850	170.000	2.200	170.000	2.800	170.000
0.400	170.000	1.000	170.000	1.600	170.000	1.851	170.000	2.400	170.000		

Node 57 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	0.116	Product Number	CTL-SHE-0110-6300-1500-6300
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.3	Min Node Diameter (mm)	1200

Node HW4 Pond Storage Structure

Invert Level (m)	0.200	Time to half empty (mins)	Analyse flow through structure	x

Inlets

HW1	HW3	HW2

Depth (m)	Area (m^2)
0.000	2485.4

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.44%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	0.893	0.082	11.2	0.1453	0.0000	OK
15 minute summer	2	11	0.852	0.080	11.0	0.1420	0.0000	OK
15 minute summer	3	10	0.850	0.078	15.0	0.1369	0.0000	OK
15 minute summer	4	11	0.756	0.107	25.2	0.1898	0.0000	OK
15 minute summer	5	10	1.648	0.089	26.7	0.1270	0.0000	OK
15 minute summer	6	10	1.406	0.061	12.6	0.0873	0.0000	OK
15 minute summer	7	10	1.427	0.041	8.8	0.0587	0.0000	OK
15 minute summer	8	10	0.731	0.170	58.2	0.4328	0.0000	OK
15 minute summer	9	10	1.474	0.061	18.2	0.0872	0.0000	OK
120 minute summer	10	80	0.633	0.316	50.3	0.8045	0.0000	OK
120 minute summer	11	80	0.632	0.499	50.8	1.7294	0.0000	OK
15 minute summer	12	10	1.463	0.110	16.6	0.1239	0.0000	OK
120 minute summer	13	80	0.633	0.683	48.1	2.3644	0.0000	OK
15 minute summer	14	10	1.603	0.052	12.4	0.0741	0.0000	OK
15 minute summer	15	10	1.465	0.082	22.8	0.1167	0.0000	OK
15 minute summer	16	10	1.287	0.048	8.6	0.0680	0.0000	OK
120 minute summer	17	80	0.632	0.696	51.9	2.4125	0.0000	OK
15 minute summer	18	10	1.472	0.047	12.1	0.0673	0.0000	OK
15 minute summer	19	10	1.127	0.088	12.6	0.1259	0.0000	OK
15 minute summer	20	10	1.622	0.041	10.5	0.0582	0.0000	OK
120 minute summer	21	80	0.632	0.706	66.3	2.4463	0.0000	OK
15 minute summer	22	10	1.461	0.074	9.1	0.1053	0.0000	OK
15 minute summer	23	10	1.382	0.065	13.0	0.0932	0.0000	OK
15 minute summer	24	10	1.423	0.106	16.2	0.1203	0.0000	OK
120 minute summer	25	80	0.631	0.728	76.4	2.5225	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	11.0	0.503	0.039	0.5107	
15 minute summer	2	1.001	4	10.7	0.561	0.037	0.4154	
15 minute summer	3	2.000	4	14.7	0.591	0.037	1.0217	
15 minute summer	4	1.002	10	24.7	0.774	0.062	0.3042	
15 minute summer	5	3.000	8	26.2	1.355	0.117	0.6034	
15 minute summer	6	4.000	8	12.4	1.097	0.055	0.2268	
15 minute summer	7	5.000	8	8.7	1.251	0.016	0.0965	
15 minute summer	8	3.001	10	57.9	0.816	0.090	1.4684	
15 minute summer	9	6.000	10	18.0	1.459	0.037	0.1863	
120 minute summer	10	1.003	11	47.4	0.710	0.075	6.9855	
120 minute summer	11	1.004	13	40.1	0.543	0.043	13.8407	
15 minute summer	12	7.000	13	16.4	0.910	0.413	0.1409	
120 minute summer	13	1.005	17	37.2	0.245	0.028	9.4472	
15 minute summer	14	8.000	15	12.3	0.936	0.039	0.0911	
15 minute summer	15	8.001	17	22.6	1.329	0.096	0.3152	
15 minute summer	16	9.000	17	8.5	0.983	0.022	0.1153	
120 minute summer	17	1.006	21	45.6	0.273	0.034	6.5268	
15 minute summer	18	10.000	19	12.0	0.898	0.034	0.1726	
15 minute summer	19	10.001	21	12.4	0.684	0.112	0.2113	
15 minute summer	20	11.000	21	10.4	1.525	0.016	0.0782	
120 minute summer	21	1.007	25	59.0	0.319	0.045	16.2081	
15 minute summer	22	12.000	23	8.9	0.639	0.080	0.3137	
15 minute summer	23	12.001	25	12.9	1.058	0.059	0.1144	
15 minute summer	24	13.000	25	16.0	0.915	0.401	0.1794	
120 minute summer	25	1.008	29	67.2	0.344	0.050	18.9051	

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.44%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	26	10	1.341	0.047	3.9	0.0530	0.0000	OK
15 minute summer	27	10	1.680	0.046	3.7	0.0520	0.0000	OK
15 minute summer	28	10	1.287	0.080	9.9	0.0907	0.0000	OK
120 minute summer	29	80	0.631	0.754	77.5	2.6106	0.0000	OK
15 minute summer	30	11	1.385	0.044	3.4	0.0501	0.0000	OK
120 minute summer	31	80	0.630	0.773	67.8	2.6794	0.0000	OK
120 minute summer	32	78	0.631	0.799	62.0	2.7681	0.0000	OK
15 minute summer	34	10	2.104	0.059	26.0	0.0850	0.0000	OK
15 minute summer	35	11	1.035	0.126	25.9	0.1809	0.0000	OK
15 minute summer	36	10	1.428	0.068	18.2	0.0975	0.0000	OK
15 minute summer	37	10	1.117	0.092	26.9	0.1312	0.0000	OK
120 minute summer	38	80	0.633	0.312	29.1	0.7938	0.0000	OK
120 minute summer	39	80	0.633	0.351	30.0	0.8933	0.0000	OK
120 minute summer	40	80	0.632	0.382	27.4	0.9723	0.0000	OK
15 minute summer	41	10	1.537	0.084	19.4	0.1206	0.0000	OK
15 minute summer	42	10	1.459	0.061	11.4	0.0878	0.0000	OK
15 minute summer	43	10	1.386	0.085	30.6	0.1219	0.0000	OK
120 minute summer	44	82	0.631	0.406	39.8	1.0322	0.0000	OK
15 minute summer	45	10	1.626	0.075	10.7	0.0848	0.0000	OK
15 minute summer	46	10	1.475	0.064	10.6	0.0719	0.0000	OK
15 minute summer	47	10	1.553	0.049	4.2	0.0551	0.0000	OK
15 minute summer	48	10	1.516	0.077	14.3	0.0872	0.0000	OK
120 minute summer	49	82	0.632	0.448	47.8	1.1404	0.0000	OK
120 minute summer	50	80	0.632	0.466	42.6	1.1857	0.0000	OK
120 minute summer	51	80	0.631	0.490	42.2	1.2459	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	26	14.000	28	3.8	0.418	0.096	0.1374	
15 minute summer	27	15.000	28	3.6	0.824	0.186	0.0391	
15 minute summer	28	14.001	29	9.7	0.802	0.244	0.1149	
120 minute summer	29	1.009	31	66.2	0.356	0.049	14.8174	
15 minute summer	30	16.000	31	3.3	0.764	0.185	0.1267	
120 minute summer	31	1.010	32	57.5	0.343	0.044	19.9228	
120 minute summer	32	1.011	52	55.0	0.260	0.041	25.3224	
15 minute summer	34	17.000	35	25.9	1.242	0.055	0.4598	
15 minute summer	35	17.001	38	25.5	0.836	0.230	0.6223	
15 minute summer	36	18.000	37	18.1	1.054	0.074	0.3855	
15 minute summer	37	18.001	38	26.7	1.387	0.106	0.1384	
120 minute summer	38	17.002	39	27.1	0.445	0.042	7.9024	
120 minute summer	39	17.003	40	24.3	0.388	0.038	7.4765	
120 minute summer	40	17.004	44	23.5	0.335	0.037	6.0522	
15 minute summer	41	19.000	43	19.2	1.033	0.102	0.3205	
15 minute summer	42	20.000	43	11.3	0.749	0.050	0.1154	
15 minute summer	43	19.001	44	30.3	1.702	0.099	0.2234	
120 minute summer	44	17.005	49	34.2	0.429	0.054	11.9503	
15 minute summer	45	21.000	46	10.6	1.024	0.218	0.1655	
15 minute summer	46	21.001	49	10.5	1.177	0.161	0.1322	
15 minute summer	47	22.000	48	4.2	0.459	0.104	0.1008	
15 minute summer	48	22.001	49	14.1	1.216	0.234	0.2242	
120 minute summer	49	17.006	50	39.7	0.502	0.061	5.3883	
120 minute summer	50	17.007	51	37.4	0.515	0.058	7.8460	
120 minute summer	51	17.008	52	36.4	0.651	0.057	6.0907	

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.44%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	52	78	0.631	0.830	78.7	6.6264	0.0000	OK
1440 minute summer	PS1	900	-0.200	0.004	38.3	0.0203	0.0000	OK
720 minute winter	55	705	0.502	0.302	36.9	2.4078	0.0000	OK
720 minute winter	HW1	705	0.502	0.322	39.2	0.0000	0.0000	OK
15 minute summer	61	10	1.054	0.061	10.8	0.0872	0.0000	OK
15 minute summer	62	11	0.772	0.063	10.7	0.0898	0.0000	OK
15 minute summer	63	1	0.730	0.000	0.0	0.0000	0.0000	OK
15 minute summer	64	11	0.688	0.088	12.4	0.1256	0.0000	OK
15 minute summer	65	11	0.667	0.109	22.5	0.1555	0.0000	OK
15 minute summer	66	1	0.985	0.000	0.0	0.0000	0.0000	OK
15 minute summer	67	10	0.910	0.048	8.7	0.0545	0.0000	OK
15 minute summer	68	11	0.592	0.191	55.1	0.2739	0.0000	OK
720 minute winter	69	720	0.497	0.263	5.4	0.3768	0.0000	OK
720 minute winter	HW3	720	0.497	0.297	10.0	0.0000	0.0000	OK
720 minute winter	HW4	705	0.497	0.297	29.0	741.0884	0.0000	OK
720 minute winter	57	705	0.497	0.381	6.2	3.2785	0.0000	SURCHARGED
720 minute winter	PI	720	0.026	0.069	6.1	0.0785	0.0000	OK
720 minute winter	58	720	-0.157	0.071	6.1	0.0804	0.0000	OK
720 minute winter	59	720	-0.250	0.074	6.1	0.0838	0.0000	OK
720 minute winter	HW5	720	-0.288	0.068	6.1	0.0000	0.0000	OK
15 minute summer	71	10	1.238	0.114	32.0	0.1627	0.0000	OK
720 minute winter	HW2	735	0.497	0.297	10.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	52	1.012	PS1	77.9	0.528	0.060	2.1706	
120 minute summer	52	23.000	55	0.0	0.000	0.000	0.0001	
1440 minute summer	PS1	Pump	55	42.2				
720 minute winter	55	1.014	HW1	35.8	0.678	0.040	1.9547	
15 minute summer	61	24.000	62	10.7	0.910	0.056	0.3727	
15 minute summer	62	24.001	65	10.6	0.594	0.062	0.3852	
15 minute summer	63	25.000	64	0.0	0.000	0.000	0.3824	
15 minute summer	64	25.001	65	11.9	0.554	0.104	0.2930	
15 minute summer	65	24.002	68	22.0	0.541	0.189	1.8993	
15 minute summer	66	26.000	67	0.0	0.000	0.000	0.0648	
15 minute summer	67	26.001	68	8.6	1.446	0.090	0.0465	
15 minute summer	68	24.003	69	54.3	0.999	0.490	2.9279	
720 minute winter	69	24.004	HW3	5.2	0.401	0.046	0.7504	
720 minute winter	HW4	27.000	57	6.2	0.158	0.039	4.3283	
720 minute winter	57	27.001	PI	6.1	0.759	0.425	0.0705	
720 minute winter	PI	27.002	58	6.1	0.759	0.425	0.2242	
720 minute winter	58	27.003	59	6.1	0.727	0.425	0.1209	
720 minute winter	59	27.004	HW5	6.1	0.749	0.423	0.0389	253.7
15 minute summer	71	28.000	HW2	31.5	2.720	0.137	1.0083	

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.45%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	20	2.012	1.201	45.5	2.1226	0.0000	SURCHARGED
30 minute summer	2	20	1.828	1.056	61.5	1.8657	0.0000	SURCHARGED
30 minute winter	3	20	1.693	0.921	105.2	1.6272	0.0000	SURCHARGED
30 minute summer	4	20	1.735	1.086	142.8	1.9188	0.0000	SURCHARGED
15 minute summer	5	10	1.730	0.171	87.3	0.2445	0.0000	OK
60 minute summer	6	35	1.638	0.293	26.6	0.4198	0.0000	OK
15 minute summer	7	14	1.610	0.224	28.9	0.3209	0.0000	OK
30 minute summer	8	21	1.675	1.114	224.5	2.8355	0.0000	SURCHARGED
30 minute summer	9	21	1.676	0.263	52.6	0.3771	0.0000	OK
30 minute summer	10	20	1.685	1.368	386.3	3.4813	0.0000	SURCHARGED
30 minute summer	11	21	1.682	1.549	293.4	5.3643	0.0000	SURCHARGED
30 minute summer	12	21	1.656	0.303	48.0	0.3425	0.0000	SURCHARGED
30 minute summer	13	21	1.688	1.738	313.4	6.0198	0.0000	SURCHARGED
30 minute summer	14	21	1.663	0.112	35.9	0.1610	0.0000	OK
30 minute summer	15	21	1.645	0.262	66.3	0.3754	0.0000	OK
30 minute summer	16	21	1.611	0.372	45.7	0.5324	0.0000	OK
30 minute summer	17	21	1.652	1.716	381.8	5.9437	0.0000	SURCHARGED
30 minute winter	18	21	1.607	0.182	28.3	0.2601	0.0000	OK
60 minute summer	19	36	1.631	0.593	36.1	0.8479	0.0000	SURCHARGED
15 minute summer	20	10	1.655	0.074	34.3	0.1059	0.0000	OK
30 minute summer	21	21	1.617	1.691	482.9	5.8583	0.0000	SURCHARGED
30 minute summer	22	21	1.665	0.278	26.2	0.3983	0.0000	OK
60 minute summer	23	36	1.583	0.266	40.4	0.3800	0.0000	OK
30 minute summer	24	21	1.626	0.309	46.9	0.3491	0.0000	SURCHARGED
30 minute summer	25	21	1.594	1.691	533.3	5.8572	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	1	1.000	2	61.5	0.661	0.217	6.3814	
30 minute summer	2	1.001	4	70.3	0.724	0.246	6.1259	
30 minute winter	3	2.000	4	-79.8	0.676	-0.201	10.4314	
30 minute summer	4	1.002	10	169.9	0.938	0.429	2.6740	
15 minute summer	5	3.000	8	86.4	1.853	0.384	1.9212	
60 minute summer	6	4.000	8	56.9	1.358	0.250	2.0319	
15 minute summer	7	5.000	8	37.4	1.749	0.070	1.6424	
30 minute summer	8	3.001	10	156.1	1.034	0.242	13.0779	
30 minute summer	9	6.000	10	61.8	1.953	0.125	1.9197	
30 minute summer	10	1.003	11	282.7	0.944	0.444	20.7948	
30 minute summer	11	1.004	13	300.6	0.750	0.320	28.3022	
30 minute summer	12	7.000	13	48.0	1.226	1.206	0.3101	
30 minute summer	13	1.005	17	311.3	0.378	0.235	15.8843	
30 minute summer	14	8.000	15	49.6	1.165	0.157	0.3746	
30 minute summer	15	8.001	17	66.3	1.764	0.281	1.7862	
30 minute summer	16	9.000	17	35.3	1.332	0.092	1.9919	
30 minute summer	17	1.006	21	389.6	0.445	0.286	10.7499	
30 minute winter	18	10.000	19	28.3	1.125	0.080	1.0212	
60 minute summer	19	10.001	21	39.9	0.831	0.360	1.2824	
15 minute summer	20	11.000	21	34.1	2.119	0.052	0.8156	
30 minute summer	21	1.007	25	492.4	0.550	0.371	25.9864	
30 minute summer	22	12.000	23	31.2	0.839	0.281	1.8092	
60 minute summer	23	12.001	25	50.9	1.296	0.232	0.8890	
30 minute summer	24	13.000	25	46.9	1.201	1.172	0.4068	
30 minute summer	25	1.008	29	485.4	0.607	0.365	29.1615	

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.45%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	26	21	1.595	0.301	11.3	0.3401	0.0000	SURCHARGED
15 minute summer	27	10	1.726	0.092	12.0	0.1044	0.0000	OK
30 minute summer	28	21	1.615	0.408	28.7	0.4612	0.0000	SURCHARGED
30 minute summer	29	21	1.573	1.696	550.8	5.8761	0.0000	SURCHARGED
30 minute summer	30	21	1.669	0.328	9.7	0.3706	0.0000	SURCHARGED
30 minute summer	31	21	1.531	1.674	684.2	5.8004	0.0000	SURCHARGED
60 minute summer	32	36	1.511	1.679	471.0	5.8172	0.0000	SURCHARGED
15 minute summer	34	10	2.152	0.107	85.0	0.1531	0.0000	OK
15 minute winter	35	13	1.620	0.711	79.6	1.0178	0.0000	SURCHARGED
30 minute summer	36	22	1.667	0.307	52.6	0.4392	0.0000	OK
15 minute summer	37	13	1.633	0.608	88.4	0.8696	0.0000	SURCHARGED
15 minute winter	38	13	1.595	1.274	180.0	3.2430	0.0000	SURCHARGED
30 minute summer	39	22	1.590	1.308	138.8	3.3290	0.0000	SURCHARGED
30 minute summer	40	22	1.588	1.339	225.6	3.4065	0.0000	SURCHARGED
15 minute summer	41	10	1.618	0.165	63.7	0.2360	0.0000	OK
30 minute winter	42	22	1.616	0.218	26.6	0.3121	0.0000	OK
30 minute summer	43	22	1.574	0.273	89.2	0.3902	0.0000	OK
30 minute summer	44	22	1.566	1.341	313.2	3.4124	0.0000	SURCHARGED
15 minute summer	45	10	1.703	0.152	35.1	0.1717	0.0000	OK
30 minute summer	46	22	1.579	0.168	30.9	0.1898	0.0000	OK
15 minute summer	47	10	1.611	0.107	13.7	0.1209	0.0000	OK
15 minute summer	48	10	1.600	0.161	47.0	0.1824	0.0000	OK
30 minute summer	49	22	1.568	1.385	383.2	3.5242	0.0000	SURCHARGED
60 minute summer	50	37	1.546	1.380	355.4	3.5132	0.0000	SURCHARGED
30 minute summer	51	21	1.551	1.409	429.1	3.5862	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	26	14.000	28	11.3	0.537	0.283	0.5858	
15 minute summer	27	15.000	28	11.9	1.103	0.608	0.0953	
30 minute summer	28	14.001	29	34.9	1.037	0.878	0.3776	
30 minute summer	29	1.009	31	674.6	0.668	0.503	22.0643	
30 minute summer	30	16.000	31	9.7	1.011	0.547	0.5193	
30 minute summer	31	1.010	32	541.1	0.582	0.411	28.6883	
60 minute summer	32	1.011	52	527.6	0.708	0.398	35.0271	
15 minute summer	34	17.000	35	84.8	1.643	0.182	1.3267	
15 minute winter	35	17.001	38	77.6	1.146	0.702	2.2524	
30 minute summer	36	18.000	37	72.5	1.333	0.296	2.3148	
15 minute summer	37	18.001	38	87.7	1.855	0.349	0.7940	
15 minute winter	38	17.002	39	162.8	0.683	0.255	23.6385	
30 minute summer	39	17.003	40	212.4	0.460	0.334	19.5405	
30 minute summer	40	17.004	44	215.2	0.365	0.335	14.3930	
15 minute summer	41	19.000	43	63.3	1.340	0.337	0.8128	
30 minute winter	42	20.000	43	26.6	0.935	0.118	0.5583	
30 minute summer	43	19.001	44	89.2	2.229	0.292	1.2311	
30 minute summer	44	17.005	49	311.0	0.529	0.488	25.5728	
15 minute summer	45	21.000	46	34.8	1.350	0.716	0.4109	
30 minute summer	46	21.001	49	30.9	1.547	0.475	0.5314	
15 minute summer	47	22.000	48	13.5	0.552	0.338	0.2697	
15 minute summer	48	22.001	49	46.3	1.608	0.767	0.5584	
30 minute summer	49	17.006	50	401.1	0.651	0.618	10.5834	
60 minute summer	50	17.007	51	246.0	0.569	0.385	14.5483	
30 minute summer	51	17.008	52	381.2	0.846	0.591	10.7260	

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.45%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	52	21	1.530	1.729	730.5	13.7951	0.0000	SURCHARGED
30 minute summer	PS1	21	1.530	1.734	200.2	9.9307	0.0000	SURCHARGED
960 minute winter	55	960	0.992	0.792	80.4	6.3163	0.0000	OK
960 minute winter	HW1	960	0.992	0.812	79.1	0.0000	0.0000	OK
15 minute summer	61	10	1.105	0.112	35.3	0.1607	0.0000	OK
960 minute winter	62	990	0.984	0.275	1.9	0.3940	0.0000	OK
960 minute winter	63	990	0.984	0.254	0.2	0.3639	0.0000	OK
960 minute winter	64	990	0.984	0.384	2.2	0.5500	0.0000	SURCHARGED
960 minute winter	65	990	0.984	0.426	4.1	0.6101	0.0000	SURCHARGED
15 minute summer	66	1	0.985	0.000	0.0	0.0000	0.0000	OK
960 minute winter	67	990	0.984	0.122	1.5	0.1385	0.0000	OK
960 minute winter	68	990	0.984	0.583	10.1	0.8348	0.0000	SURCHARGED
960 minute winter	69	990	0.984	0.750	9.5	1.0737	0.0000	SURCHARGED
960 minute winter	HW3	990	0.984	0.784	21.3	0.0000	0.0000	OK
960 minute winter	HW4	960	0.985	0.785	57.0	1953.8600	0.0000	SURCHARGED
960 minute winter	57	960	0.985	0.869	6.7	7.4828	0.0000	SURCHARGED
60 minute winter	PI	89	0.027	0.070	6.3	0.0797	0.0000	OK
60 minute winter	58	91	-0.156	0.072	6.3	0.0816	0.0000	OK
60 minute summer	59	91	-0.249	0.075	6.3	0.0851	0.0000	OK
60 minute summer	HW5	91	-0.287	0.069	6.3	0.0000	0.0000	OK
15 minute summer	71	10	1.333	0.209	104.8	0.2987	0.0000	OK
960 minute winter	HW2	990	0.984	0.784	21.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	52	1.012	PS1	-220.9	1.412	-0.170	5.8780	
30 minute summer	52	23.000	55	505.2	1.252	0.568	11.1084	
30 minute summer	PS1	Pump	55	170.0				
960 minute winter	55	1.014	HW1	71.8	0.835	0.081	5.9828	
15 minute summer	61	24.000	62	35.0	1.242	0.185	1.4830	
960 minute winter	62	24.001	65	1.9	0.352	0.011	2.0224	
960 minute winter	63	25.000	64	-0.2	-0.014	-0.002	3.7097	
960 minute winter	64	25.001	65	2.2	0.332	0.019	1.4051	
960 minute winter	65	24.002	68	4.1	0.340	0.035	5.0497	
15 minute summer	66	26.000	67	0.0	0.000	0.000	0.1488	
960 minute winter	67	26.001	68	1.5	0.883	0.016	0.2414	
960 minute winter	68	24.003	69	9.5	0.413	0.086	5.9439	
960 minute winter	69	24.004	HW3	9.1	0.420	0.080	0.9466	
960 minute winter	HW4	27.000	57	6.7	0.187	0.042	5.4002	
960 minute winter	57	27.001	PI	6.3	0.764	0.435	0.0718	
60 minute winter	PI	27.002	58	6.3	0.763	0.435	0.2285	
60 minute winter	58	27.003	59	6.3	0.732	0.435	0.1233	
60 minute summer	59	27.004	HW5	6.3	0.754	0.433	0.0397	99.7
15 minute summer	71	28.000	HW2	104.1	3.487	0.453	3.3518	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 97.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	2.048	1.237	117.7	2.1861	0.0000	SURCHARGED
30 minute summer	2	19	2.040	1.268	186.1	2.2406	0.0000	SURCHARGED
30 minute summer	3	19	2.097	1.325	58.6	2.3406	0.0000	SURCHARGED
30 minute summer	4	19	2.046	1.397	208.2	2.4677	0.0000	SURCHARGED
30 minute summer	5	20	1.990	0.431	104.1	0.6169	0.0000	SURCHARGED
30 minute summer	6	19	2.022	0.677	49.2	0.9682	0.0000	SURCHARGED
30 minute summer	7	19	2.070	0.684	40.7	0.9790	0.0000	SURCHARGED
30 minute summer	8	19	2.019	1.459	225.8	3.7123	0.0000	SURCHARGED
30 minute summer	9	19	1.987	0.574	71.0	0.8216	0.0000	SURCHARGED
30 minute summer	10	19	1.999	1.682	359.1	4.2807	0.0000	SURCHARGED
30 minute summer	11	19	1.946	1.813	379.9	6.2785	0.0000	SURCHARGED
30 minute summer	12	19	2.142	0.789	64.8	0.8927	0.0000	SURCHARGED
30 minute summer	13	19	2.002	2.052	463.1	7.1078	0.0000	SURCHARGED
30 minute summer	14	19	2.065	0.514	48.5	0.7348	0.0000	SURCHARGED
30 minute summer	15	19	2.166	0.783	103.2	1.1201	0.0000	SURCHARGED
30 minute summer	16	19	2.091	0.852	42.7	1.2197	0.0000	SURCHARGED
30 minute summer	17	19	1.999	2.063	568.6	7.1456	0.0000	SURCHARGED
30 minute summer	18	20	1.970	0.545	47.2	0.7794	0.0000	SURCHARGED
30 minute summer	19	19	1.924	0.886	49.6	1.2674	0.0000	SURCHARGED
30 minute summer	20	19	1.903	0.322	40.8	0.4602	0.0000	OK
30 minute summer	21	19	1.962	2.036	705.7	7.0511	0.0000	SURCHARGED
30 minute summer	22	19	2.149	0.762	35.4	1.0906	0.0000	SURCHARGED
30 minute summer	23	19	1.987	0.670	71.5	0.9593	0.0000	SURCHARGED
30 minute summer	24	19	2.122	0.805	63.4	0.9103	0.0000	SURCHARGED
30 minute summer	25	19	1.931	2.028	883.7	7.0255	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	-78.9	0.730	-0.278	6.3814	
30 minute summer	2	1.001	4	-186.1	0.687	-0.651	6.1259	
30 minute summer	3	2.000	4	63.0	0.731	0.159	10.4314	
30 minute summer	4	1.002	10	-172.6	0.938	-0.436	2.6740	
30 minute summer	5	3.000	8	112.3	1.922	0.499	3.4361	
30 minute summer	6	4.000	8	52.7	1.583	0.231	2.2107	
30 minute summer	7	5.000	8	35.6	1.829	0.067	2.1932	
30 minute summer	8	3.001	10	221.1	1.036	0.343	13.0779	
30 minute summer	9	6.000	10	70.1	2.096	0.142	2.3866	
30 minute summer	10	1.003	11	355.6	0.908	0.559	20.7948	
30 minute summer	11	1.004	13	413.2	0.783	0.440	28.3022	
30 minute summer	12	7.000	13	63.9	1.608	1.605	0.3101	
30 minute summer	13	1.005	17	482.4	0.428	0.364	15.8843	
30 minute summer	14	8.000	15	65.8	1.229	0.209	0.7507	
30 minute summer	15	8.001	17	110.0	1.879	0.466	2.0452	
30 minute summer	16	9.000	17	33.1	1.433	0.086	2.1140	
30 minute summer	17	1.006	21	565.2	0.502	0.416	10.7499	
30 minute summer	18	10.000	19	47.3	1.275	0.134	1.3800	
30 minute summer	19	10.001	21	47.9	0.984	0.432	1.2824	
30 minute summer	20	11.000	21	46.6	2.214	0.071	1.5986	
30 minute summer	21	1.007	25	695.5	0.617	0.524	25.9864	
30 minute summer	22	12.000	23	57.0	0.894	0.513	2.4736	
30 minute summer	23	12.001	25	106.8	1.437	0.486	1.0360	
30 minute summer	24	13.000	25	63.3	1.593	1.581	0.4068	
30 minute summer	25	1.008	29	926.1	0.822	0.696	29.1615	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 97.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	26	19	1.913	0.619	15.3	0.7004	0.0000	SURCHARGED
30 minute summer	27	20	1.951	0.317	14.3	0.3589	0.0000	SURCHARGED
30 minute summer	28	20	1.894	0.687	37.7	0.7768	0.0000	SURCHARGED
30 minute summer	29	19	1.925	2.048	982.9	7.0926	0.0000	SURCHARGED
30 minute summer	30	20	1.952	0.611	13.2	0.6909	0.0000	SURCHARGED
30 minute summer	31	19	1.885	2.028	944.7	7.0261	0.0000	SURCHARGED
30 minute summer	32	20	1.810	1.978	946.3	6.8509	0.0000	SURCHARGED
15 minute summer	34	10	2.170	0.125	114.8	0.1789	0.0000	OK
30 minute summer	35	20	1.989	1.081	101.4	1.5464	0.0000	SURCHARGED
30 minute summer	36	20	1.977	0.617	71.0	0.8834	0.0000	SURCHARGED
30 minute summer	37	20	1.974	0.949	131.4	1.3577	0.0000	SURCHARGED
30 minute summer	38	20	1.946	1.625	276.4	4.1368	0.0000	SURCHARGED
30 minute summer	39	20	1.926	1.645	314.5	4.1859	0.0000	SURCHARGED
30 minute summer	40	20	1.890	1.640	366.0	4.1735	0.0000	SURCHARGED
15 minute winter	41	12	1.973	0.520	80.8	0.7439	0.0000	SURCHARGED
15 minute summer	42	12	1.986	0.588	50.5	0.8414	0.0000	SURCHARGED
30 minute summer	43	20	1.927	0.625	119.0	0.8949	0.0000	SURCHARGED
30 minute summer	44	20	1.890	1.665	357.4	4.2368	0.0000	SURCHARGED
30 minute summer	45	20	2.007	0.456	41.8	0.5159	0.0000	SURCHARGED
30 minute summer	46	20	1.928	0.517	42.0	0.5845	0.0000	SURCHARGED
30 minute summer	47	20	2.028	0.524	16.4	0.5926	0.0000	SURCHARGED
30 minute summer	48	20	2.014	0.575	55.6	0.6502	0.0000	SURCHARGED
30 minute summer	49	20	1.859	1.675	439.5	4.2641	0.0000	SURCHARGED
30 minute summer	50	20	1.829	1.664	444.2	4.2337	0.0000	SURCHARGED
30 minute summer	51	20	1.801	1.659	506.6	4.2228	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	26	14.000	28	14.5	0.547	0.364	0.5858	
30 minute summer	27	15.000	28	14.3	1.146	0.732	0.1557	
30 minute summer	28	14.001	29	36.5	1.103	0.917	0.3776	
30 minute summer	29	1.009	31	939.3	0.834	0.700	22.0643	
30 minute summer	30	16.000	31	13.2	1.028	0.744	0.5193	
30 minute summer	31	1.010	32	917.5	0.814	0.697	28.6883	
30 minute summer	32	1.011	52	939.4	0.834	0.708	35.0271	
15 minute summer	34	17.000	35	114.6	1.750	0.245	1.4860	
30 minute summer	35	17.001	38	112.5	1.154	1.018	2.2524	
30 minute summer	36	18.000	37	96.7	1.381	0.394	2.4686	
30 minute summer	37	18.001	38	138.1	1.862	0.550	0.7940	
30 minute summer	38	17.002	39	291.1	0.577	0.455	23.6385	
30 minute summer	39	17.003	40	341.6	0.539	0.536	19.5405	
30 minute summer	40	17.004	44	309.1	0.488	0.481	14.3930	
15 minute winter	41	19.000	43	82.7	1.400	0.440	1.8976	
15 minute summer	42	20.000	43	61.0	0.981	0.270	0.8356	
30 minute summer	43	19.001	44	117.0	2.335	0.384	1.3846	
30 minute summer	44	17.005	49	356.8	0.563	0.560	25.5728	
30 minute summer	45	21.000	46	42.0	1.392	0.863	0.6345	
30 minute summer	46	21.001	49	40.2	1.629	0.618	0.5909	
30 minute summer	47	22.000	48	15.6	0.548	0.392	0.4375	
30 minute summer	48	22.001	49	54.0	1.634	0.893	0.7661	
30 minute summer	49	17.006	50	421.1	0.664	0.649	10.5834	
30 minute summer	50	17.007	51	458.2	0.723	0.717	14.5483	
30 minute summer	51	17.008	52	607.9	0.959	0.943	10.7260	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 97.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	52	20	1.765	1.964	1409.0	15.6705	0.0000	SURCHARGED
30 minute summer	PS1	20	1.763	1.967	213.6	11.2628	0.0000	SURCHARGED
1440 minute winter	55	1440	1.288	1.088	53.0	8.6804	0.0000	SURCHARGED
1440 minute winter	HW1	1440	1.288	1.108	77.3	0.0000	0.0000	OK
15 minute summer	61	12	1.425	0.432	47.7	0.6178	0.0000	SURCHARGED
15 minute summer	62	12	1.438	0.730	47.4	1.0441	0.0000	SURCHARGED
15 minute summer	63	12	1.402	0.672	28.6	0.9611	0.0000	SURCHARGED
15 minute summer	64	12	1.397	0.797	56.2	1.1407	0.0000	SURCHARGED
15 minute summer	65	12	1.405	0.847	84.4	1.2122	0.0000	SURCHARGED
15 minute summer	66	12	1.316	0.331	17.0	0.3745	0.0000	SURCHARGED
15 minute summer	67	12	1.352	0.490	38.7	0.5539	0.0000	SURCHARGED
15 minute summer	68	12	1.314	0.913	201.0	1.3072	0.0000	SURCHARGED
1440 minute winter	69	1440	1.282	1.048	8.6	1.5003	0.0000	SURCHARGED
1440 minute winter	HW3	1440	1.282	1.082	20.8	0.0000	0.0000	OK
1440 minute winter	HW4	1440	1.282	1.082	56.2	2692.4060	0.0000	SURCHARGED
1440 minute winter	57	1440	1.282	1.166	6.6	10.0367	0.0000	SURCHARGED
120 minute summer	PI	76	0.027	0.070	6.3	0.0797	0.0000	OK
480 minute winter	58	256	-0.156	0.072	6.3	0.0816	0.0000	OK
600 minute winter	59	315	-0.249	0.075	6.3	0.0851	0.0000	OK
600 minute winter	HW5	315	-0.287	0.069	6.3	0.0000	0.0000	OK
15 minute summer	71	10	1.372	0.248	141.5	0.3552	0.0000	OK
1440 minute winter	HW2	1470	1.281	1.081	21.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	52	1.012	PS1	213.6	1.085	0.164	5.8780	
30 minute summer	52	23.000	55	1242.7	1.670	1.397	19.8329	
30 minute summer	PS1	Pump	55	170.0				
1440 minute winter	55	1.014	HW1	70.4	0.764	0.079	6.3580	
15 minute summer	61	24.000	62	47.4	1.276	0.250	3.4984	
15 minute summer	62	24.001	65	52.0	0.756	0.307	2.2642	
15 minute summer	63	25.000	64	-28.6	-0.421	-0.249	4.3103	
15 minute summer	64	25.001	65	49.1	0.655	0.428	1.4051	
15 minute summer	65	24.002	68	94.3	0.855	0.809	5.0497	
15 minute summer	66	26.000	67	-17.0	-0.427	-0.427	0.8284	
15 minute summer	67	26.001	68	34.5	1.721	0.358	0.3105	
15 minute summer	68	24.003	69	199.1	1.805	1.797	5.9439	
1440 minute winter	69	24.004	HW3	8.4	0.414	0.073	0.9466	
1440 minute winter	HW4	27.000	57	6.6	0.190	0.041	5.4002	
1440 minute winter	57	27.001	PI	6.3	0.764	0.435	0.0718	
120 minute summer	PI	27.002	58	6.3	0.763	0.435	0.2285	
480 minute winter	58	27.003	59	6.3	0.732	0.435	0.1233	
600 minute winter	59	27.004	HW5	6.3	0.754	0.433	0.0397	236.9
15 minute summer	71	28.000	HW2	140.6	3.647	0.612	3.8759	

Results for 100 year Critical Storm Duration. Lowest mass balance: 97.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	19	2.153	1.342	72.2	2.3705	0.0000	SURCHARGED
30 minute summer	2	19	2.013	1.241	201.1	2.1931	0.0000	SURCHARGED
15 minute summer	3	13	2.099	1.327	134.3	2.3442	0.0000	SURCHARGED
30 minute winter	4	19	1.939	1.290	316.9	2.2793	0.0000	SURCHARGED
30 minute summer	5	19	2.188	0.629	100.9	0.9005	0.0000	SURCHARGED
15 minute summer	6	12	2.136	0.791	53.7	1.1324	0.0000	SURCHARGED
15 minute winter	7	12	1.954	0.568	35.3	0.8127	0.0000	SURCHARGED
15 minute summer	8	12	1.956	1.395	248.7	3.5512	0.0000	SURCHARGED
15 minute summer	9	12	1.995	0.582	77.4	0.8328	0.0000	SURCHARGED
30 minute summer	10	19	1.915	1.598	391.8	4.0674	0.0000	SURCHARGED
30 minute summer	11	19	2.010	1.877	411.2	6.5023	0.0000	SURCHARGED
30 minute summer	12	19	2.030	0.677	62.8	0.7656	0.0000	SURCHARGED
30 minute summer	13	19	1.908	1.958	452.0	6.7834	0.0000	SURCHARGED
30 minute summer	14	19	2.097	0.546	47.4	0.7816	0.0000	SURCHARGED
30 minute summer	15	19	2.164	0.781	86.9	1.1178	0.0000	SURCHARGED
30 minute winter	16	20	1.867	0.628	26.7	0.8992	0.0000	SURCHARGED
30 minute summer	17	19	1.885	1.949	578.1	6.7505	0.0000	SURCHARGED
30 minute summer	18	19	1.934	0.509	45.8	0.7282	0.0000	SURCHARGED
30 minute summer	19	19	1.963	0.925	59.0	1.3233	0.0000	SURCHARGED
30 minute summer	20	19	1.972	0.391	39.6	0.5592	0.0000	OK
30 minute summer	21	19	1.880	1.954	718.6	6.7673	0.0000	SURCHARGED
30 minute summer	22	19	2.146	0.759	34.3	1.0857	0.0000	SURCHARGED
30 minute summer	23	19	2.004	0.687	71.1	0.9832	0.0000	SURCHARGED
30 minute summer	24	19	2.010	0.693	61.5	0.7837	0.0000	SURCHARGED
30 minute summer	25	19	1.847	1.944	797.2	6.7338	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	1	1.000	2	41.7	0.694	0.147	6.3814	
30 minute summer	2	1.001	4	-201.1	-0.732	-0.704	6.1259	
15 minute summer	3	2.000	4	166.4	0.798	0.420	10.4314	
30 minute winter	4	1.002	10	-316.9	-1.125	-0.800	2.6740	
30 minute summer	5	3.000	8	171.8	1.907	0.764	3.4361	
15 minute summer	6	4.000	8	67.2	1.626	0.295	2.2107	
15 minute winter	7	5.000	8	121.8	1.845	0.228	2.1932	
15 minute summer	8	3.001	10	226.1	1.186	0.350	13.0779	
15 minute summer	9	6.000	10	85.6	2.149	0.174	2.3866	
30 minute summer	10	1.003	11	392.2	0.923	0.617	20.7948	
30 minute summer	11	1.004	13	404.7	0.777	0.431	28.3022	
30 minute summer	12	7.000	13	62.8	1.580	1.578	0.3101	
30 minute summer	13	1.005	17	460.8	0.409	0.348	15.8843	
30 minute summer	14	8.000	15	47.4	1.202	0.151	0.7507	
30 minute summer	15	8.001	17	88.0	1.865	0.373	2.0452	
30 minute winter	16	9.000	17	71.1	1.320	0.185	2.1140	
30 minute summer	17	1.006	21	580.9	0.516	0.427	10.7499	
30 minute summer	18	10.000	19	57.0	1.267	0.162	1.3800	
30 minute summer	19	10.001	21	86.8	0.975	0.784	1.2824	
30 minute summer	20	11.000	21	90.5	2.196	0.137	1.7388	
30 minute summer	21	1.007	25	673.7	0.598	0.508	25.9864	
30 minute summer	22	12.000	23	55.1	0.887	0.495	2.4736	
30 minute summer	23	12.001	25	52.4	1.484	0.238	1.0360	
30 minute summer	24	13.000	25	62.1	1.562	1.552	0.4068	
30 minute summer	25	1.008	29	785.3	0.697	0.590	29.1615	

Results for 100 year Critical Storm Duration. Lowest mass balance: 97.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	26	20	1.870	0.576	14.8	0.6519	0.0000	SURCHARGED
30 minute summer	27	20	1.930	0.296	13.9	0.3350	0.0000	SURCHARGED
30 minute summer	28	20	1.859	0.652	36.5	0.7380	0.0000	SURCHARGED
30 minute summer	29	19	1.818	1.941	857.7	6.7236	0.0000	SURCHARGED
30 minute summer	30	20	1.923	0.582	12.8	0.6580	0.0000	SURCHARGED
30 minute summer	31	19	1.769	1.912	863.8	6.6239	0.0000	SURCHARGED
30 minute summer	32	20	1.754	1.922	901.1	6.6569	0.0000	SURCHARGED
15 minute summer	34	10	2.168	0.123	110.6	0.1754	0.0000	OK
30 minute summer	35	20	1.922	1.014	98.3	1.4506	0.0000	SURCHARGED
30 minute summer	36	18	2.045	0.685	68.8	0.9798	0.0000	SURCHARGED
30 minute summer	37	20	1.883	0.858	101.6	1.2284	0.0000	SURCHARGED
30 minute summer	38	20	1.871	1.550	275.0	3.9446	0.0000	SURCHARGED
30 minute summer	39	20	1.876	1.594	274.8	4.0574	0.0000	SURCHARGED
30 minute summer	40	20	1.863	1.614	253.9	4.1068	0.0000	SURCHARGED
15 minute summer	41	12	2.057	0.604	82.8	0.8649	0.0000	SURCHARGED
30 minute summer	42	20	1.921	0.523	43.2	0.7478	0.0000	SURCHARGED
30 minute summer	43	20	1.919	0.618	119.4	0.8847	0.0000	SURCHARGED
30 minute summer	44	20	1.869	1.643	375.0	4.1811	0.0000	SURCHARGED
30 minute summer	45	20	1.946	0.395	40.5	0.4464	0.0000	SURCHARGED
30 minute summer	46	20	1.888	0.477	40.5	0.5397	0.0000	SURCHARGED
30 minute summer	47	20	1.964	0.460	15.8	0.5202	0.0000	SURCHARGED
30 minute summer	48	20	1.961	0.522	53.9	0.5901	0.0000	SURCHARGED
30 minute summer	49	20	1.817	1.633	550.4	4.1565	0.0000	SURCHARGED
30 minute summer	50	20	1.788	1.622	475.5	4.1276	0.0000	SURCHARGED
30 minute summer	51	20	1.770	1.628	520.4	4.1436	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	26	14.000	28	14.2	0.541	0.357	0.5858	
30 minute summer	27	15.000	28	14.0	1.140	0.719	0.1557	
30 minute summer	28	14.001	29	37.2	1.093	0.934	0.3776	
30 minute summer	29	1.009	31	852.3	0.757	0.635	22.0643	
30 minute summer	30	16.000	31	12.6	1.085	0.712	0.5193	
30 minute summer	31	1.010	32	873.0	0.775	0.663	28.6883	
30 minute summer	32	1.011	52	917.3	0.814	0.692	35.0271	
15 minute summer	34	17.000	35	110.4	1.737	0.236	1.4375	
30 minute summer	35	17.001	38	143.3	1.299	1.296	2.2524	
30 minute summer	36	18.000	37	68.0	1.395	0.277	2.4686	
30 minute summer	37	18.001	38	106.5	1.848	0.424	0.7940	
30 minute summer	38	17.002	39	252.1	0.580	0.395	23.6385	
30 minute summer	39	17.003	40	230.2	0.477	0.361	19.5405	
30 minute summer	40	17.004	44	230.9	0.379	0.359	14.3930	
15 minute summer	41	19.000	43	82.4	1.407	0.439	1.8976	
30 minute summer	42	20.000	43	45.6	0.959	0.202	0.8356	
30 minute summer	43	19.001	44	120.6	2.347	0.396	1.3846	
30 minute summer	44	17.005	49	364.6	0.575	0.572	25.5728	
30 minute summer	45	21.000	46	40.5	1.386	0.833	0.6345	
30 minute summer	46	21.001	49	39.0	1.622	0.599	0.5909	
30 minute summer	47	22.000	48	15.2	0.545	0.381	0.4375	
30 minute summer	48	22.001	49	52.4	1.630	0.867	0.7661	
30 minute summer	49	17.006	50	453.0	0.715	0.698	10.5834	
30 minute summer	50	17.007	51	477.6	0.754	0.747	14.5483	
30 minute summer	51	17.008	52	498.6	0.879	0.773	10.7260	

Results for 100 year Critical Storm Duration. Lowest mass balance: 97.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	52	20	1.744	1.943	1329.5	15.5057	0.0000	SURCHARGED
30 minute summer	PS1	20	1.743	1.947	193.3	11.1467	0.0000	SURCHARGED
1440 minute winter	55	1440	1.278	1.078	63.1	8.6033	0.0000	SURCHARGED
1440 minute winter	HW1	1440	1.278	1.098	75.5	0.0000	0.0000	OK
15 minute summer	61	12	1.296	0.303	45.9	0.4341	0.0000	OK
15 minute summer	62	12	1.296	0.587	45.7	0.8404	0.0000	SURCHARGED
15 minute summer	63	12	1.351	0.621	22.3	0.8892	0.0000	SURCHARGED
15 minute summer	64	12	1.316	0.716	59.8	1.0248	0.0000	SURCHARGED
15 minute summer	65	12	1.289	0.731	83.7	1.0461	0.0000	SURCHARGED
2160 minute summer	66	2220	1.273	0.288	0.1	0.3261	0.0000	SURCHARGED
2160 minute summer	67	2220	1.273	0.411	1.4	0.4651	0.0000	SURCHARGED
2160 minute summer	68	2220	1.273	0.872	9.1	1.2483	0.0000	SURCHARGED
2160 minute summer	69	2220	1.273	1.039	8.6	1.4874	0.0000	SURCHARGED
2160 minute summer	HW3	2220	1.273	1.073	20.5	0.0000	0.0000	OK
2160 minute summer	HW4	2220	1.272	1.072	55.1	2669.0100	0.0000	SURCHARGED
2160 minute summer	57	2220	1.272	1.156	6.5	9.9529	0.0000	SURCHARGED
120 minute winter	PI	82	0.027	0.070	6.3	0.0797	0.0000	OK
30 minute winter	58	58	-0.156	0.072	6.3	0.0816	0.0000	OK
30 minute summer	59	60	-0.249	0.075	6.3	0.0851	0.0000	OK
30 minute summer	HW5	60	-0.287	0.069	6.3	0.0000	0.0000	OK
15 minute summer	71	10	1.367	0.243	136.3	0.3473	0.0000	OK
2160 minute summer	HW2	2220	1.272	1.072	20.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	52	1.012	PS1	193.3	1.961	0.149	5.8780	
30 minute summer	52	23.000	55	1186.5	1.642	1.334	19.3449	
30 minute summer	PS1	Pump	55	170.0				
1440 minute winter	55	1.014	HW1	68.9	0.760	0.078	6.3580	
15 minute summer	61	24.000	62	45.7	1.299	0.242	3.2643	
15 minute summer	62	24.001	65	52.2	0.764	0.308	2.2642	
15 minute summer	63	25.000	64	-22.3	-0.365	-0.194	4.3103	
15 minute summer	64	25.001	65	47.8	0.670	0.416	1.4051	
15 minute summer	65	24.002	68	93.7	0.857	0.803	5.0497	
2160 minute summer	66	26.000	67	-0.1	-0.003	-0.001	0.8284	
2160 minute summer	67	26.001	68	1.4	0.801	0.015	0.3105	
2160 minute summer	68	24.003	69	8.6	0.329	0.078	5.9439	
2160 minute summer	69	24.004	HW3	8.4	0.347	0.073	0.9466	
2160 minute summer	HW4	27.000	57	6.5	0.137	0.041	5.4002	
2160 minute summer	57	27.001	PI	6.3	0.764	0.435	0.0718	
120 minute winter	PI	27.002	58	6.3	0.763	0.435	0.2285	
30 minute winter	58	27.003	59	6.3	0.732	0.435	0.1233	
30 minute summer	59	27.004	HW5	6.3	0.754	0.433	0.0397	93.5
15 minute summer	71	28.000	HW2	135.5	3.631	0.590	3.8757	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	2.604	1.793	158.7	3.1685	0.0000	FLOOD RISK
30 minute summer	2	18	2.430	1.658	85.8	2.9290	0.0000	SURCHARGED
30 minute summer	3	18	2.459	1.687	84.4	2.9817	0.0000	FLOOD RISK
15 minute summer	4	12	2.475	1.826	446.9	3.2262	0.0000	FLOOD RISK
30 minute summer	5	18	2.711	1.152	141.3	1.6480	0.0000	SURCHARGED
30 minute summer	6	17	2.569	1.224	66.8	1.7515	0.0000	SURCHARGED
15 minute summer	7	12	2.456	1.070	52.6	1.5313	0.0000	FLOOD RISK
15 minute summer	8	12	2.469	1.909	363.5	4.8571	0.0000	FLOOD RISK
30 minute summer	9	19	2.416	1.003	96.4	1.4346	0.0000	SURCHARGED
15 minute summer	10	12	2.455	2.138	552.1	5.4421	0.0000	FLOOD RISK
15 minute summer	11	12	2.404	2.271	588.8	7.8665	0.0000	SURCHARGED
15 minute summer	12	12	2.656	1.303	99.0	1.4731	0.0000	SURCHARGED
15 minute summer	13	12	2.377	2.427	675.4	8.4055	0.0000	SURCHARGED
15 minute summer	14	12	2.437	0.886	74.0	1.2683	0.0000	SURCHARGED
15 minute summer	15	11	2.476	1.093	136.8	1.5644	0.0000	SURCHARGED
30 minute summer	16	19	2.358	1.119	45.6	1.6015	0.0000	SURCHARGED
15 minute summer	17	12	2.355	2.419	805.2	8.3796	0.0000	SURCHARGED
15 minute summer	18	12	2.368	0.943	72.2	1.3489	0.0000	SURCHARGED
15 minute summer	19	12	2.351	1.312	71.1	1.8778	0.0000	SURCHARGED
30 minute summer	20	19	2.346	0.765	55.5	1.0951	0.0000	SURCHARGED
15 minute summer	21	12	2.331	2.405	1026.4	8.3322	0.0000	SURCHARGED
15 minute summer	22	11	2.469	1.082	54.1	1.5489	0.0000	SURCHARGED
15 minute summer	23	11	2.342	1.025	77.2	1.4665	0.0000	SURCHARGED
30 minute summer	24	18	2.650	1.333	86.0	1.5071	0.0000	FLOOD RISK
30 minute summer	25	19	2.286	2.383	1195.0	8.2558	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	-92.3	0.776	-0.325	6.3814	
30 minute summer	2	1.001	4	75.3	0.687	0.264	6.1259	
30 minute summer	3	2.000	4	73.1	0.724	0.185	10.4314	
15 minute summer	4	1.002	10	-446.9	-1.587	-1.129	2.6740	
30 minute summer	5	3.000	8	153.9	1.989	0.684	3.4361	
30 minute summer	6	4.000	8	75.8	1.653	0.333	2.2107	
15 minute summer	7	5.000	8	58.3	2.010	0.109	2.1932	
15 minute summer	8	3.001	10	343.3	1.175	0.532	13.0779	
30 minute summer	9	6.000	10	102.7	2.192	0.208	2.3866	
15 minute summer	10	1.003	11	556.7	1.274	0.875	20.7948	
15 minute summer	11	1.004	13	597.5	0.906	0.636	28.3022	
15 minute summer	12	7.000	13	98.2	2.471	2.468	0.3101	
15 minute summer	13	1.005	17	655.3	0.582	0.495	15.8843	
15 minute summer	14	8.000	15	74.0	1.262	0.235	0.7507	
15 minute summer	15	8.001	17	134.5	2.028	0.569	2.0452	
30 minute summer	16	9.000	17	62.3	1.408	0.162	2.1140	
15 minute summer	17	1.006	21	819.0	0.727	0.602	10.7499	
15 minute summer	18	10.000	19	67.9	1.380	0.192	1.3800	
15 minute summer	19	10.001	21	108.3	1.086	0.978	1.2824	
30 minute summer	20	11.000	21	71.5	2.187	0.108	1.8115	
15 minute summer	21	1.007	25	1039.9	0.923	0.784	25.9864	
15 minute summer	22	12.000	23	52.9	0.966	0.476	2.4736	
15 minute summer	23	12.001	25	82.9	1.622	0.377	1.0360	
30 minute summer	24	13.000	25	83.6	2.102	2.089	0.4068	
30 minute summer	25	1.008	29	1208.0	1.072	0.907	29.1615	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	26	12	2.399	1.105	23.4	1.2493	0.0000	SURCHARGED
15 minute summer	27	12	2.513	0.879	21.9	0.9945	0.0000	SURCHARGED
30 minute summer	28	19	2.371	1.164	49.0	1.3170	0.0000	SURCHARGED
30 minute summer	29	19	2.245	2.368	1322.0	8.2025	0.0000	SURCHARGED
30 minute summer	30	19	2.471	1.130	17.9	1.2776	0.0000	SURCHARGED
30 minute summer	31	19	2.198	2.341	1339.3	8.1093	0.0000	FLOOD RISK
30 minute summer	32	19	2.143	2.311	1378.6	8.0062	0.0000	FLOOD RISK
30 minute summer	34	19	2.600	0.555	137.6	0.7935	0.0000	SURCHARGED
30 minute summer	35	19	2.480	1.571	131.8	2.2485	0.0000	FLOOD RISK
30 minute summer	36	19	2.503	1.143	96.4	1.6350	0.0000	SURCHARGED
30 minute summer	37	19	2.438	1.413	143.4	2.0217	0.0000	FLOOD RISK
30 minute summer	38	19	2.365	2.044	300.9	5.2016	0.0000	FLOOD RISK
30 minute summer	39	19	2.350	2.069	341.5	5.2645	0.0000	SURCHARGED
30 minute summer	40	19	2.333	2.083	374.8	5.3012	0.0000	SURCHARGED
30 minute summer	41	19	2.493	1.040	103.0	1.4889	0.0000	SURCHARGED
30 minute summer	42	19	2.451	1.053	60.5	1.5075	0.0000	SURCHARGED
30 minute summer	43	19	2.436	1.135	176.0	1.6242	0.0000	SURCHARGED
30 minute summer	44	19	2.316	2.090	564.8	5.3193	0.0000	FLOOD RISK
30 minute summer	45	19	2.652	1.101	56.7	1.2457	0.0000	SURCHARGED
30 minute summer	46	19	2.454	1.043	50.7	1.1793	0.0000	SURCHARGED
30 minute summer	47	19	2.707	1.203	22.1	1.3608	0.0000	FLOOD RISK
30 minute summer	48	19	2.685	1.246	69.5	1.4093	0.0000	FLOOD RISK
30 minute summer	49	19	2.268	2.084	694.4	5.3035	0.0000	SURCHARGED
30 minute summer	50	19	2.215	2.049	726.8	5.2145	0.0000	SURCHARGED
30 minute summer	51	19	2.144	2.003	787.2	5.0971	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	26	14.000	28	19.8	0.551	0.498	0.5858	
15 minute summer	27	15.000	28	21.4	1.218	1.096	0.1557	
30 minute summer	28	14.001	29	50.4	1.268	1.267	0.3776	
30 minute summer	29	1.009	31	1323.5	1.175	0.986	22.0643	
30 minute summer	30	16.000	31	16.2	1.035	0.915	0.5193	
30 minute summer	31	1.010	32	1329.8	1.180	1.011	28.6883	
30 minute summer	32	1.011	52	1366.0	1.213	1.030	35.0271	
30 minute summer	34	17.000	35	131.8	1.746	0.282	2.3173	
30 minute summer	35	17.001	38	133.6	1.211	1.209	2.2524	
30 minute summer	36	18.000	37	96.4	1.394	0.393	2.4686	
30 minute summer	37	18.001	38	135.3	1.886	0.539	0.7940	
30 minute summer	38	17.002	39	309.8	0.585	0.485	23.6385	
30 minute summer	39	17.003	40	341.8	0.539	0.537	19.5405	
30 minute summer	40	17.004	44	369.6	0.583	0.575	14.3930	
30 minute summer	41	19.000	43	101.6	1.372	0.541	1.8976	
30 minute summer	42	20.000	43	74.4	0.965	0.329	0.8356	
30 minute summer	43	19.001	44	159.4	2.310	0.522	1.3846	
30 minute summer	44	17.005	49	547.0	0.863	0.858	25.5728	
30 minute summer	45	21.000	46	50.7	1.403	1.042	0.6345	
30 minute summer	46	21.001	49	50.9	1.590	0.783	0.5909	
30 minute summer	47	22.000	48	21.4	0.547	0.536	0.4375	
30 minute summer	48	22.001	49	67.6	1.701	1.118	0.7661	
30 minute summer	49	17.006	50	695.4	1.097	1.071	10.5834	
30 minute summer	50	17.007	51	727.3	1.148	1.138	14.5483	
30 minute summer	51	17.008	52	800.0	1.262	1.241	10.7260	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	52	19	2.074	2.273	2153.3	18.1423	0.0000	SURCHARGED
30 minute summer	PS1	19	2.076	2.280	268.5	13.0527	0.0000	SURCHARGED
2160 minute winter	55	2100	1.581	1.381	170.0	11.0187	0.0000	SURCHARGED
2160 minute winter	HW1	2100	1.581	1.401	75.5	0.0000	0.0000	OK
15 minute summer	61	12	2.306	1.313	64.3	1.8784	0.0000	FLOOD RISK
15 minute summer	62	12	2.289	1.580	71.1	2.2615	0.0000	FLOOD RISK
15 minute summer	63	12	2.313	1.583	50.6	2.2649	0.0000	FLOOD RISK
15 minute summer	64	12	2.299	1.699	87.4	2.4320	0.0000	FLOOD RISK
15 minute summer	65	12	2.279	1.721	114.9	2.4628	0.0000	FLOOD RISK
15 minute summer	66	12	2.180	1.195	6.3	1.3510	0.0000	FLOOD RISK
15 minute summer	67	12	2.176	1.314	52.1	1.4863	0.0000	SURCHARGED
15 minute summer	68	12	2.083	1.682	280.2	2.4064	0.0000	SURCHARGED
2160 minute winter	69	2160	1.576	1.342	8.2	1.9211	0.0000	SURCHARGED
2160 minute winter	HW3	2160	1.577	1.377	20.6	0.0000	0.0000	OK
2160 minute winter	HW4	2160	1.575	1.375	54.7	3421.8950	0.0000	SURCHARGED
2160 minute winter	57	2160	1.575	1.459	6.5	12.5579	0.0000	SURCHARGED
15 minute summer	PI	14	0.028	0.071	6.3	0.0798	0.0000	OK
480 minute winter	58	232	-0.156	0.072	6.3	0.0816	0.0000	OK
5760 minute summer	59	2640	-0.249	0.075	6.3	0.0851	0.0000	OK
1440 minute winter	HW5	630	-0.287	0.069	6.3	0.0000	0.0000	OK
2160 minute winter	71	2160	1.575	0.451	5.1	0.6457	0.0000	SURCHARGED
2160 minute winter	HW2	2160	1.575	1.375	20.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	52	1.012	PS1	268.5	0.995	0.207	5.8780	
30 minute summer	52	23.000	55	1990.3	2.361	2.238	22.0965	
30 minute summer	PS1	Pump	55	170.0				
2160 minute winter	55	1.014	HW1	68.8	0.691	0.078	6.3580	
15 minute summer	61	24.000	62	71.1	1.376	0.375	3.4984	
15 minute summer	62	24.001	65	79.9	0.757	0.471	2.2642	
15 minute summer	63	25.000	64	-50.6	-0.459	-0.440	4.3103	
15 minute summer	64	25.001	65	59.0	0.684	0.513	1.4051	
15 minute summer	65	24.002	68	125.7	1.140	1.079	5.0497	
15 minute summer	66	26.000	67	9.9	0.395	0.248	0.8284	
15 minute summer	67	26.001	68	45.2	1.661	0.470	0.3105	
15 minute summer	68	24.003	69	282.7	2.563	2.552	5.9439	
2160 minute winter	69	24.004	HW3	8.2	0.401	0.071	0.9466	
2160 minute winter	HW4	27.000	57	6.5	0.150	0.041	5.4002	
2160 minute winter	57	27.001	PI	6.3	0.764	0.435	0.0718	
15 minute summer	PI	27.002	58	6.3	0.854	0.435	0.2285	
480 minute winter	58	27.003	59	6.3	0.732	0.435	0.1233	
5760 minute summer	59	27.004	HW5	6.3	0.754	0.433	0.0397	1793.0
2160 minute winter	71	28.000	HW2	5.1	0.721	0.022	7.7479	

APPENDIX D – Treatment System Data Sheet

Water Management Solutions

Klargester AquaOil Bypass MDPE and GRP / Full retention MDPE and GRP separator range

Proactive pollution prevention with SmartServ Pro (available as optional extra). Ask our team for details.

170 – 69,444m²
Available to cover flow rates up to 285 litres per second

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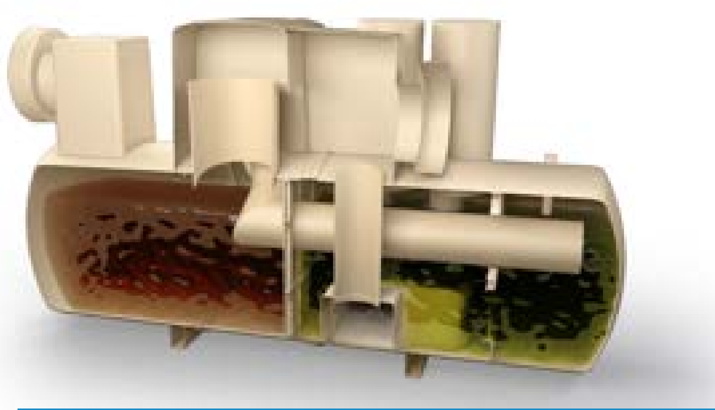
Why choose an AquaOil fuel and oil separator?

- Total peace of mind offered through SmartServ Pro remote monitoring system, for early fault detection and in line with Kingspan's Planet Passionate programme
- EN 858-1 approved
- Total flexibility, with deep invert options available
- Range tested against full flow
- Easily utilised as part of SuDS Management Train
- Full range of bypass and full retention separators available



Our range has been tested against full flow - why is this important?
Our units have been tested at their maximum flow rate (10l/s), unlike some products which have been tested based on bypass and therefore only 10% of the flow. This ensures total accuracy of our silt retention results, by replicating the full effect of the silt wash through.

As part of our Planet Passionate programme, Kingspan are dedicated to delivering innovative surface water management technologies, developed on the back of 65 years' experience.

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Kingspan

PLANET PASSIONATE

Product Code	Flow (l/s)	Drainage Area (m^2)	Silt Capacity (ltrs)	Oil Capacity (ltrs)	Length (mm)	Diameter (mm)	Manhole Cover Dimensions (mm)	Base to Inlet Invert (mm)	Base to Inlet Invert (mm)	Min. Inlet Invert (mm)	Std Pipework Diameter (mm)
Polyethylene Chamber Construction											
NSFP003	3	170	300	30	1700	1350	600	1410	1335	550	160
NSFP006	6	335	600	60	1700	1350	600	1410	1335	550	160
GRP Chamber Construction											
NSFA010	10	555	1000	100	2610	1225	600	1050	1000	500	200
NSFA015	15	835	1500	150	3910	1225	600	1050	1000	500	200
NSFA020	20	1115	2000	200	3230	2010	600	1810	1760	1000	315
NSFA030	30	1670	3000	300	3960	2010	600	1810	1760	1000	315
NSFA040	40	2225	4000	400	4750	2010	600	1810	1760	1000	315
NSFA050	50	2780	5000	500	5790	2010	600	1810	1760	1000	315
NSFA065	65	3160	6500	650	7360	2010	600	1810	1760	1000	315
NSFA080	80	4445	8000	800	5744	2820	600	2500	2450	1000	315
NSFA100	100	5560	10000	1000	6200	2820	600	2500	2450	1000	400
NSFA125	125	6945	12500	1250	7365	2820	600	2500	2450	1000	450
NSFA150	150	8335	15000	1500	8675	2820	600	2550	2450	1000	525
NSFA175	175	9725	17500	1750	9975	2820	600	2550	2450	1000	525
NSFA200	200	11110	20000	2000	11280	2820	600	2550	2450	1000	600
NSFA210	210	11667	21000	2100	11994	2820	600	2550	2450	1000	600
NSFA225	225	12500	22500	2250	12766	2820	600	2550	2450	1000	600
NSFA240	240	13333	24000	2400	13528	2820	600	2550	2450	1000	600
NSFA255	255	14167	25500	2550	14300	2820	600	2550	2450	1000	600
NSFA270	270	15000	27000	2700	15071	2820	600	2550	2450	1000	600
NSFA285	285	15833	28500	2850	15833	2820	600	2550	2450	1000	600

Forecourt Separator Range Technical Specifications

Sepaator Class	Backfill Type	Total Capacity (Ltrs)	Darinage Area (m^2)	Peak Flow Rate (l/s)	Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)
1	Concrete	10000	720	15	3915	2020	600	2180	2130	50
1	Concrete	10000	115	20	3915	2020	600	2180	2130	50

Bypass Separator Range Technical Specifications

Model Reference	Flow (l/s)	Peak Flow Rate (l/s)	Drainage Area (m^2) Based on UK rainwater flow	Storage Capacity (Ltrs)		Length (mm)	Diameter (mm)	Access Shaft Diameter* (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)**
				Silt	Oil								
Polyethylene Chamber Construction													
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
GRP Chamber Construction													
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5941	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

*Some units have more than one access shaft - diameter of largest shown | **Large pipework available on request.

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4360-gb-02/2022-v3

Appendix A Extracts from the Flood Risk Assessment

HYPERLINK TO THE FULL FLOOD RISK ASSESSMENT:
https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010110-000504-MVV%20Volume%206.4%20ES%20Chapter%2012%20Hydrology%20Appendix%2012A%20FRA.pdf

Medworth Energy from Waste
Combined Heat and Power Facility

PINS ref. EN010110
Document Reference: Vol 6.4
Revision 1.0
June 2022

Environmental Statement Chapter 12 Hydrology Appendix 12A: Flood Risk Assessment

Regulation reference: The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(e)

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Executive summary

This Flood Risk Assessment (FRA) accompanies the Environmental Statement (ES) for the proposed Energy from Waste (EfW) Combined Heat and Power (CHP) Facility (the 'EfW CHP Facility'). The EfW CHP Facility is located on the industrial estate, Algores Way, Wisbech, Cambridgeshire.

The Proposed Development comprises the EfW CHP Facility, CHP Connection, Access Improvements, Grid Connection and associated Temporary Construction Compound (TCC). At the PEIR stage two options for the Grid Connection were considered: connection to Walpole Substation (Option 1) and connection to Walsoken Substation (Option 2), both using a mixture of underground cables and overhead lines. Option 2 was effectively part of Option 1, with a minor extension along Broadend Road. Following statutory consultation, a single Grid Connection was chosen. This extends to a new Walsoken Substation located immediately to the south of the Walsoken DNO Substation and the Grid Connection is composed of an underground cable only.

All potential sources of flooding have been considered in this assessment. Tidal flooding from the River Nene (which is located approximately 0.6km to the west of the Order limits boundary) represents the greatest potential flood risk posed to the Proposed Development. This is associated with large swathes of the Proposed Development, as it is located in Flood Zone 3a, including the entirety of the EfW CHP Facility Site.

Detailed tidal flooding information provided by the Environment Agency indicates that the Proposed Development would remain dry during the design flood event (0.5% AEP plus climate change), as it benefits from the protection offered by the raised tidal defences along the banks of the River Nene. The Proposed Development is also predicted to remain dry during the 0.1% Annual Exceedance Probability (AEP) tidal overtopping plus climate change event. As the entire Proposed Development is predicted to remain dry during the design tidal flood event, there is no potential for the development to increase tidal flood risk elsewhere.

Parts of the Proposed Development are however potentially at residual risk of tidal flooding during 'breach' events, i.e., failure of the raised tidal defences protecting the area. This includes part of the EfW CHP Facility Site, CHP Connection Corridor, TCC, Water Connections and Grid Connection and the entirety of the Access Improvements Sites. Flood risk management measures are proposed to address this residual risk to the site, as summarised below.

Other potential flood risks identified include: the potential to impact flow conveyance in the Internal Drainage Board (IDB) drains, in and around the site, as a result of permanent and/or temporary watercourse crossings, the potential for increase in surface water run-off rates and volumes, and groundwater flooding of excavations and groundwater uplift forces in the waste bunker for the operational site.

Suitable flood risk management measures have been identified to address the potential risks identified, including residual risks. These include the preparation of an **Outline Flood Emergency Plan (Volume 7.9)**, minimum finished floor levels for the EfW CHP Facility, stand-off distances from IDB drains, an **Outline Drainage Strategy** (**Appendix 12F** of **ES Chapter 12: Hydrology Volume 6.4**) for the operational development to ensure run-off is

limited to greenfield rates and the preparation of a Water Management Plan for the construction phase (with an Outline Water Management Plan forming part of the **Outline Construction Environmental Management Plan (CEMP) (Volume 7.12)**). Risks during decommissioning would be similar to those encountered during construction and would be mitigated in a similar manner. The specification of future mitigation measures for the decommissioning phase would need to take account of the changes in the flood hazard baseline relating to climate change, land use change, and the planning and regulatory requirements prevailing at the time. The flood risk management measures would be secured by a combination of consents from the IDBs (**List of Other Consents and Licences** (**Volume 5.4**)), **Outline CEMP** (**Volume 7.12**), Development Consent Order (DCO) Requirements (**Draft DCO** (**Volume 3.1**)) and Decommissioning Plan (secured by a DCO Requirement (**Draft DCO** (**Volume 3.2**)).

In addition, the Essential Infrastructure elements of the proposals would remain operational (whilst waste and consumables are available on site) and safe in times of flood. The **Outline Flood Emergency Plan (Volume 7.9)** will safely take the EfW CHP Facility offline, if required, until access is restored. The development proposals are appropriate for the flood zone classifications, and, on this basis, the Exception Test is deemed to have been passed.

Evidence is provided to demonstrate that the Sequential Test has been passed, and a sequential approach has been applied in the selection process and will be applied as the development proposals are taken forward into further detail following granting of the DCO.

In conclusion, this FRA demonstrates that the requirements of EN-1, EN-3 and EN-5, and the National Planning Policy Framework (NPPF) and its associated Planning Practice Guidance (PPG) with respect to flood risk have been met, and the flood risk management measures identified would be secured through appropriate requirements of the DCO if approved.

4. Detailed Tidal Flood Risk Assessment

4.1 Introduction

4.1.1 This section provides a detailed assessment of tidal flood risk for the Proposed Development. The proposed approach to the assessment of flood risk is set out in **Section 4.2** followed by a description of the Environment Agency tidal flood data used as the basis for the assessment in **Section 4.3.** The assessment of tidal flood risk is provided in **Section 4.4** for the construction and operational phases and in **Section 4.5** for the decommissioning phase. Tidal flood risk is considered firstly for the EfW CHP Facility Site, CHP Connection Corridor, Access Improvements, TCC and Water Connections then for the Grid Connection.

4.2 Approach

4.2.1 As identified in **Table 3.1 Screening of all potential sources of flood risk** above, tidal flooding from the River Nene represents the greatest potential flood risk posed to the Proposed Development. This is associated with large swathes of the Proposed Development being located in Flood Zone 3a, including all of the EfW CHP Facility Site (see **Figure 3.1i: Environment Agency Flood Map for Planning (Overview) and 3.1ii: Environment Agency Flood Map for Planning (EfW CHP Facility Site and surroundings)**). Whilst the Environment Agency's Flood Map for Planning provides the locations of flood defences (also shown in **Figure 3.1i: Environment Agency Flood Map for Planning (Overview)**), the Flood Zones do not account for the presence of any flood defences (or any allowance for climate change). The assessment of flood risk should take into account the benefit provided by the defences, as well as the anticipated effects of climate change over the lifetime of the Proposed Development, as discussed further below.

4.2.2 The Environment Agency were consulted on and agreed with the proposed approach to the assessment of flood risk undertaken in this FRA. This is discussed below.

Functional floodplain

4.2.3 The Wisbech Level 1 and Level 2 SFRAs and Borough Council of King's Lynn and West Norfolk Level 2 SFRA indicate that the majority of the Proposed Development is located within Flood Zone 3a. The Proposed Development has no-interaction with the functional floodplain (Flood Zone 3b), which is confined to the channel of the River Nene through the presence of flood defences.

Design flood

4.2.4 In order to meet the requirements of the Exception Test, it will be necessary to demonstrate that the development will be safe for its lifetime (taking into account the vulnerability of its users), without increasing flood risk elsewhere, and where possible, will reduce flood risk overall. The NPPF PPG advises that the suitability of the proposed development should be assessed, and mitigation measures designed (if any) against the 'design flood'[13]. For tidal risk, the design flood is the 0.5% AEP event. It is this event (including an allowance for climate change, and accounting for the benefit provided by the flood defences), against which the assessment of flood risk (and determination of suitable mitigation measures) will be based.

4.2.5 Essential Infrastructure in Flood Zone 3a is subject to an additional Exception Test requirement, which requires that the development should be designed and constructed to remain operational and safe in times of flood. In this case, operational is considered to be the ability to continue to produce electricity, heat and power during the design flood event. The PPG provides advice on what is required to demonstrate that the development will be safe, which includes that people will not be exposed to hazardous flooding from any source and that any residual risk can be overcome. Exposure to hazardous flooding includes access and egress to the site, including the free movement of people during the design flood, as well as the potential to evacuate before a more extreme flood, throughout the lifetime of the development. Where it is not possible to provide access routes above design flood levels, limited depths of flooding may be acceptable, provided that the proposed access is designed with appropriate signage etc to make it safe. Residual risk is discussed further below.

Residual Risk

4.2.6 As identified above, the PPG advises that, for a development to be considered safe, it is necessary to demonstrate that any residual risk can be overcome. Residual flood risk is defined in the PPG as those risks which remain after applying the sequential approach to the location of development and taking mitigating actions. Examples include:

- a breach of a raised flood defence; and
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence.

4.2.7 The PPG also provides advice on how residual risk should be assessed. It advises that where the residual risk is relatively uniform, such as within a large area protected by embanked flood defences, the SFRA should indicate the nature and severity of the risk remaining and provide guidance for residual risk issues to be covered in site-specific flood risk assessments. This FRA has sourced the same residual risk data from the Environment Agency as used in the Level 2 SFRA for Wisbech, as explained further below.

4.2.8 The Environment Agency were consulted on and agreed with the proposed approach to the assessment of flood risk undertaken in this FRA. However, they also advised that for Essential Infrastructure in Wisbech, they would like to see residual risk considered up to the 0.1% AEP plus climate change breach event. It is acknowledged that this is beyond the requirements set out in the national PPG

[13] Ministry of Housing, Communities & Local Government, 2014. Planning Practice Guidance: Flood Risk and Coastal Change

but is reflective of internal Environment Agency guidance for assessing risks to Essential Infrastructure in the local area. The 0.1% AEP has therefore been included in the assessment of residual risks below.

4.3 Environment Agency tidal flood data

Overview

4.3.1 Detailed tidal flooding information has been provided by the Environment Agency to support this assessment, including their 'Product 4' output, which is included in **Annex B: Detailed tidal flooding information provided by the Environment Agency**. This included the following information relating to the initial red line boundary for the Proposed Development:

- Information on historical floods (described in **Section 3.3**);
- Tidal flood defence information (described in **Section 4.4**);
- Extreme modelled water levels (discussed below); and
- Tidal flood hazard model results from the Tidal Nene Hazard Mapping Study (2011) (discussed in **Section 4.4**).

4.3.2 Tidal hazard mapping has been provided for two timeframes, 2011 and 2115 (representing a climate change model run).

Extreme tidal water levels and climate change

4.3.3 Extreme tidal levels at Wisbech were provided by the Environment Agency (East Coast and Wash: Immingham to the West Lighthouse). Climate change allowances for the Anglian River Basin District for increase in sea level, as per Environment Agency guidance[14], have been added to these peak water levels. These are summarised in **Table 4.1 Extreme tidal levels at Wisbech (m AOD)**.

Table 4.1 Extreme tidal levels at Wisbech (m AOD)

		Extreme tidal levels at Wisbech (m AOD)				
Year		**2006**	**2066**	**2066**	**2115**	**2115**
Climate change allowance		**Base data**	**Higher central**	**Upper end**	**Higher central**	**Upper end**
AEP Event	0.5% AEP	5.78 (+0mm)	6.22 (+441mm)	6.34 (+558mm)	6.82 (+1,037mm)	7.16 (+1,378mm)

Notes: Base data obtained from Environment Agency Product 4 for Wisbech at NGR: 546110, 309940. The base year is 2006. The levels are still water levels. Base data water levels for the 0.1% AEP event were not provided/available.
Climate change allowances are provided in backets after the extreme water levels. A higher central allowance is based on the 70th percentile, which is exceeded by 30% of the projections in the range. The Upper end allowance is based on the 95th percentile which is exceeded by 5% of the projections in the range.

[14] Environment Agency, 2016. Guidance: Flood risk assessments: climate change allowances. Last updated on 22 July 2020

4.3.4 This FRA is required to assess flood risks for the lifetime of the development, which is proposed to have a lifetime of 40 years, i.e., operational to 2066. These are increases in peak water level of 441 mm (approximately 0.44 m) and 558 mm (approximately 0.56 m) for the higher central and upper end allowances respectively. This in turn translates into extreme water levels in the River Nene at Wisbech (in the channel) of approximately 6.22 m AOD and 6.34 m AOD for the 0.5% AEP event in 2066.

4.3.5 The existing tidal hazard modelling provided by the Environment Agency, (included in **Annex B: Detailed tidal flooding information provided by the Environment Agency**) only considered two timeframes, a base year of 2011 and a climate change scenario of 2115. As indicated in **Table 4.1 Extreme tidal levels at Wisbech (m AOD)** increases in peak water level of 1,037mm (approximately 1.0m) and 1,378mm (approximately 1.4m) apply for the higher central and upper end allowances in 2115 respectively. These in turn translate into extreme water levels in the River Nene at Wisbech (in the channel) of approximately 6.82m AOD and 7.16m AOD for the 0.5% AEP event in 2115. These in-channel water levels in 2115 are 600mm (higher central) and 820mm (upper end) higher than the water levels required to be considered for this assessment. It is therefore considered to be a very precautionary approach to use the 2115 peak water levels and model results in this assessment, as they effectively include approximately 600mm of freeboard in the peak in-channel water level itself.

4.4 Risks during Construction and Operation

EfW CHP Facility Site, CHP Connection Corridor, TCC, Access Improvements and Water Connections

Tidal flood defences

4.4.1 Large swathes of Fenland District are reliant on tidal flood defences (and pumped drainage) to manage flood risk. The Environment Agency has advised (**Appendix 12B: Stakeholder engagement (Volume 6.4)** of **Chapter 12: Hydrology** of the ES) that the tidal defences along the River Nene, protecting the EfW CHP Facility Site, CHP Connection Corridor, TCC, Access Improvements and Water Connections consist of earth embankments and concrete floodwalls. The defences are in fair condition and provide a level of protection of 0.5% AEP in the present day. The Environment Agency inspect these defences routinely to ensure potential defects are identified and, if required, rectified.

Flood hazard mapping

4.4.2 The flood hazard mapping in **Annex B: Detailed tidal flooding information provided by the Environment Agency** provides flood depths, hazard rating and velocity of floodwater in the floodplain in and around Wisbech. The mapping indicates that:

- **Design flood (overtopping only)**: there is very little overtopping of defences predicted near the EfW CHP Facility Site for any of the modelled events. The existing tidal defences nearby would not be overtopped during the 0.5% AEP event (present day and climate change in 2115) and therefore the EfW CHP Facility Site, CHP Connection Corridor, TCC, Access Improvements and Water Connections would remain dry[15]. There is also no flood risk to the Site during the 0.1% AEP overtopping event in 2115. In accordance with the PPG, the **design flood** is defined as the 0.5% AEP overtopping event plus climate change to 2066 tidal flood, so for the design flood, the EfW CHP Facility Site, CHP Connection Corridor, Access Improvements, TCC and Water Connections are not at risk of flooding from overtopping of defences.

- **Residual risk (breach)**: areas of the EfW CHP Facility Site, CHP Connection Corridor and TCC and the entirety of the Access Improvements are at **residual** tidal flood risk if the tidal defences were breached during the 0.5% and 0.1% AEP events for both the present day and in 2115. The flood mapping indicates that flood water during the breach event is likely to propagate via the IDB drain bisecting the EfW CHP Facility Site.
- **Residual risk (a severe flood event):** as reflected by its location in Flood Zone 3a, the EfW CHP Facility Site and CHP Connection Corridor and large areas of the Access Improvements and TCC could be at **residual** tidal flood risk during an event that exceeds the flood management design standard and particularly during an event that exceeds those modelled by the Environment Agency, for example a flood of a magnitude greater than the 0.1% AEP event and/or catastrophic widespread failure of the flood defences (not just a localised breach).

4.4.3 Upon request (following review of the Product 4 information), the Environment Agency provided GIS files of the flood modelling to enable these to be interrogated further. Flood depth grids were provided, but no flood levels (to m AOD), hazard, velocity or ground level grids were supplied. Selected flood depth results have been presented in **Figure 4.1i: Residual risk (EfW CHP Facility Site and surroundings): 0.5% AEP (1:200) breach flood depth** and **Figure 4.1ii: Residual risk (EfW CHP Facility Site and surroundings): 0.1% AEP (1:1000) breach flood depths** across the Proposed Development. A number of floodplain locations have been identified in **Figure 4.1i: Residual risk (EfW CHP Facility Site and surroundings): 0.5% AEP (1:200) breach flood depth** and **Figure 4.1ii: Residual risk (EfW CHP Facility Site and surroundings): 0.1% AEP (1:1000) breach flood depths** to enable flood depths to be presented in **Table 4.2: Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.5% AEP event in 2115 (Environment Agency Product 4 data)** and **Table 4.3: Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.1% AEP event in 2115 (Environment Agency Product 4 data)** below.

4.4.4 In the absence of flood water levels to m AOD, or the elevation grid used for the modelling (against which the flood depths would have been determined), it was necessary to estimate peak floodplain water levels using alternative sources of

15 A small pocket of flooding is predicted approximately 500m to the north-west of the EfW CHP Facility Site, associated with minor overtopping of the defences site during the 0.5% and 0.1% AEP events in 2115, but this is only for a very short section of the defence and presumably only for a short period of time judging by the limited extent of flooding, of which there is none in the vicinity of the EfW CHP Facility Site.

elevation data, such as LiDAR and the topographic survey of the EfW CHP Facility Site. It was found that the flood extents correlated well with the Environment Agency's open-source LiDAR (sourced separately), and therefore the LiDAR information was used to determine water levels in preference to the topographic survey of the EfW CHP Facility Site (which itself is included in **Annex A: Topographic survey for the EfW CHP Facility Site.** This allowed estimated water levels at each of the floodplain locations indicated in **Figure 4.1i: Residual risk (EfW CHP Facility Site and surroundings): 0.5% AEP (1:200) breach flood depth** and **Figure 4.1ii: Residual risk (EfW CHP Facility Site and surroundings): 0.1% AEP (1:1000) breach flood depths** to be estimated, as presented in **Table 4.2 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.5% AEP event in 2115 (Environment Agency Product 4 data)** and **Table 4.3 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.1% AEP event in 2115 (Environment Agency Product 4 data)** below.

Table 4.2 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.5% AEP event in 2115 (Environment Agency Product 4 data)

Floodplain location ID on Figures 4.1i and 4.1ii	Existing ground elevation from LiDAR (m AOD)	Modelled flood level and depth in 0.5% AEP plus climate change to 2115 event			
		Design flood (overtopping of defences)		Residual risk (breach of defences) *	
		Flood depth (m)	Flood level (m AOD)	Flood depth (m)	Flood level (m AOD)
EfW CHP Facility Site					
1	2.40	0.0	0.0	0.06	2.47
2	2.53	0.0	0.0	0.00	2.53
3	2.48	0.0	0.0	0.06	2.55
4	1.93	0.0	0.0	0.60	2.53
5	1.97	0.0	0.0	0.57	2.54
TCC					
6	1.88	0.0	0.0	0.54	2.42
7	2.17	0.0	0.0	0.36	2.53
Access Improvements site					
8	2.09	0.0	0.0	0.66	2.74
9	2.09	0.0	0.0	0.06	2.15

Notes: * The flood model considers the consequences of a breach only and does not consider the likelihood of breaches occurring. The model assessed the impact of multiple breach durations individually but assumed that breaches do not occur simultaneously. Results from individual breach scenarios were overlaid results in order to find the maximum flood depths. Values in this table have been rounded to 2 decimal places.

Table 4.3 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.1% AEP event in 2115 (Environment Agency Product 4 data)

Floodplain location ID on Figures 4.1i and 4.1ii	Existing ground elevation from LiDAR (m AOD)	Modelled flood level and depth in 0.1% AEP plus climate change to 2115 event			
		Design flood (overtopping of defences)		Residual risk (breach of defences) *	
		Flood depth (m)	Flood level (m AOD)	Flood depth (m)	Flood level (m AOD)
EfW CHP Facility Site					
1	2.40	0.00	0.00	0.09	2.49
2	2.53	0.00	0.00	0.00	2.53
3	2.48	0.00	0.00	0.08	2.56
4	1.93	0.00	0.00	0.62	2.55
5	1.97	0.00	0.00	0.59	2.57
TCC					
6	1.88	0.00	0.00	0.56	2.44
7	2.17	0.00	0.00	0.37	2.55
Access Improvement Site					
8	2.09	0.00	0.00	0.68	2.76
9	2.09	0.00	0.00	0.08	2.17

Notes: * The flood model considers the consequences of a breach only and does not consider the likelihood of breaches occurring. The model assumes that breaches do not occur simultaneously and overlaid results in order to find the maximum values. Values in this table have been rounded to 2 decimal places.

Tidal risk assessment

4.4.5 **Table 4.2 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.5% AEP event in 2115 (Environment Agency Product 4 data)** and **Table 4.3 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.1% AEP event in 2115 (Environment Agency Product 4 data)** confirm that the EfW CHP Facility Site, CHP Connection Corridor, TCC and Access Improvements remain dry during the design flood event (0.5% AEP overtopping event plus climate change). As set out in the PPG, it is the design flood against which the development should be assessed, and mitigation measures (if any) designed[16]. It also remains dry during the 0.1% AEP overtopping event (plus climate change). As the site is not affected by flooding for either 0.5% or 0.1% plus climate changes scenarios, there is therefore no potential for changes in ground levels associated with the Proposed Development to increase flood risk elsewhere. This is due to the lack of pathways between the source (tidal floodwater) and the potential Receptors (off-site third parties in the vicinity of the EfW CHP Facility Site). As such, there is no potential for loss of floodplain storage, floodplain compartmentalisation or impacts on floodplain (or in-channel) conveyance during the design flood event as a result of the Proposed Development.

4.4.6 **Table 4.2 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.5% AEP event in 2115 (Environment Agency Product 4 data)** and **Table 4.3 Maximum flood depths and estimated water levels in the floodplain at EfW CHP Facility Site for the 0.1% AEP event in 2115 (Environment Agency Product 4 data)** also confirm that the EfW CHP Facility Site is at residual risk of flooding during a breach event (0.5% and 0.1% AEP breach event plus climate change). Maximum flood depths in the part of the EfW CHP Facility Site where the majority of the infrastructure would be located (the area to the north of the IDB drain which bisects the Site) range between zero (dry) and 0.1m. This is associated with a peak water level estimated to be around 2.6m AOD for the 0.1% AEP breach event in 2115 (floodplain location IDs 1 to 3), and 2.5m AOD for the 0.5% AEP breach event in 2115. Owing to the Site gently sloping to the south, maximum flood depths would be greater in the southern part of the Site, with depths up to 0.7m identified (also associated with a peak water level in the region of 2.6m AOD for the 0.1% AEP breach event in 2115 (floodplain location IDs 4 and 5). Similar maximum depths and water levels were identified at the TCC and Access Improvements site[17].

4.4.7 Potential Receptors who could be at residual flood risk include construction workers and activities, the operational site (including workers and visitors), maintenance activities and decommissioning works. Flood risk management measures to address the residual risk associated with the flood depths identified above during the residual risk event are set out in **Section 6**.

OPERATIONAL DRAIANGE STRATEGY: WORK NO.1, 1A, 2A AND 2B (EFW CHP FACILITY SITE)