Appendix 12B

Surface Water Drainage Strategy

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Proposed Power Generating Plant, Tarbert, Co. Kerry

Drainage Infrastructure Report

SSE Generation Ireland Limited

Project number: 60695232
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Delivering a better world

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1. Introduction

1.1 Background Information

AECOM have been appointed on behalf of SSE Generation Ireland Limited to prepare a drainage infrastructure report in support of a planning application to Kerry County Council (KCC) for a proposed Bio-Fuel Power Generating Plant, within the existing site at Tarbert Island, Co. Kerry. This report will detail the pre-planning consultation, the existing and proposed surface water infrastructure, and SuDS measures for the proposed development.

Section 2 of the report outlines the potential flood risk associated with the development. The Stage 2 assessment has been prepared in support of the development and is in line with the requirements of “The Planning System & Flood Risk Management Guidelines of Planning Authorities” (Guidelines) as published in November 2009, and the requirements of a site-specific Flood Risk Assessment as outlined in Appendix A of the Technical Appendices to those Guidelines.

Section 2 of the report will outline the design calculations for the proposed drainage system, as well as the Q-bar calculations for the greenfield run-off for the site to demonstrate the KCC planning requirements in relation to surface water have been satisfied. Additionally, supplementary information on the technical specification of the proposed flow control devices and full retention separators will be provided. The development proposals are outlined in the drainage drawing contained within Appendix A of this report.

Section 4 of the report outlines the proposed sustainable urban drainage systems (SuDS) that are to be incorporated into the drainage design. The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) in accordance with the guidelines of the Kerry County Development Plan and the SuDS CIRIA Manual C753.

1.2 Existing Site

The subject site area is approximately 163,126 square meters (approximately 16.31 ha) and is located approximately 1.95 km north of Tarbert town centre, on Tarbert Island, adjacent the Shannon estuary. The existing 620 MW Power Station is comprised of two 60 MW and two 250 MW oil-fired turbines. The brownfield site is bounded to the north, east and west by the River Shannon, and to the south, by an existing greenfield. The new bio-fuel Open Cycle Gas Turbine (OCGT) Plant development will be located at the northwest section of the existing power station site. Figure 1-1 identifies the project location and extents. The Irish Grid Reference of the approximate centre of the site is R 07503 49553. The overall Tarbert Island Power Station site is defined by the red line boundary extents, with the planning boundary for the OCGT (approximately 2.05 ha) being defined by the purple line boundary.

Figure 1-1: Subject Site Location (Source: Bing Maps)

1.3 Site Topography

1.3.1 Topographical Online Mapping

The site itself is predominantly existing brownfield. The general topographical trend is gently sloping, with peak elevation of approximately 15 mOD, and lowest elevation at 0 mOD (sea level), refer to Figure 1-2 for an extract from the online topographic mapping tool (topographic-map.com). The site is extremely flat, with the terrain falling from the centre of the subject site, towards sea at the boundary.

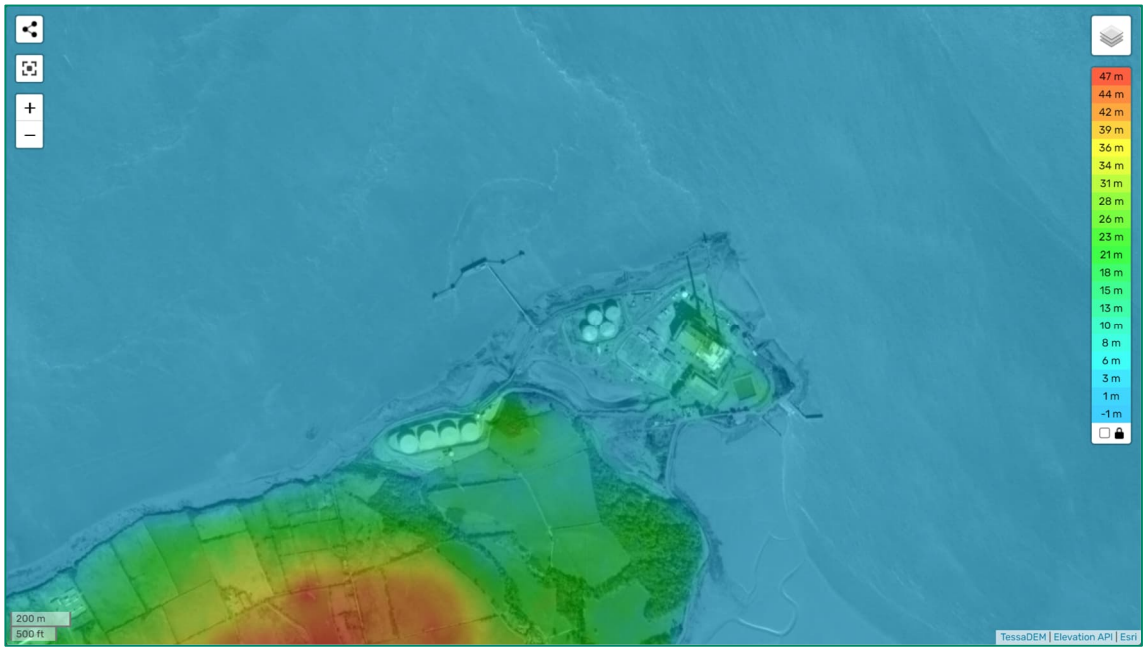


Figure 1-2: Topographical Map Showing Elevations. (Source: topographic-map.com)

1.3.2 Topographical Survey by Murphy's Geospatial

AECOM received a topographical survey from Murphy Geospatial on the 11th of August 2023. It must be noted that this survey does not cover the full extents of the development. The site is extremely flat and is understood that the proposed development site ground level currently ranges between +7.79m to +5.79m Ordnance Datum Poolbeg (ODP) and generally falls from south to north and east to west toward the Shannon Estuary. The topography of the OCGT development site generally follows the existing Tarbert Power Station, where the proposed generator / turbine platform and tank platform areas finished ground levels (FGL) are +6.40m ODP and +6.00m ODP respectively. Refer to Appendix B for the full survey extents.

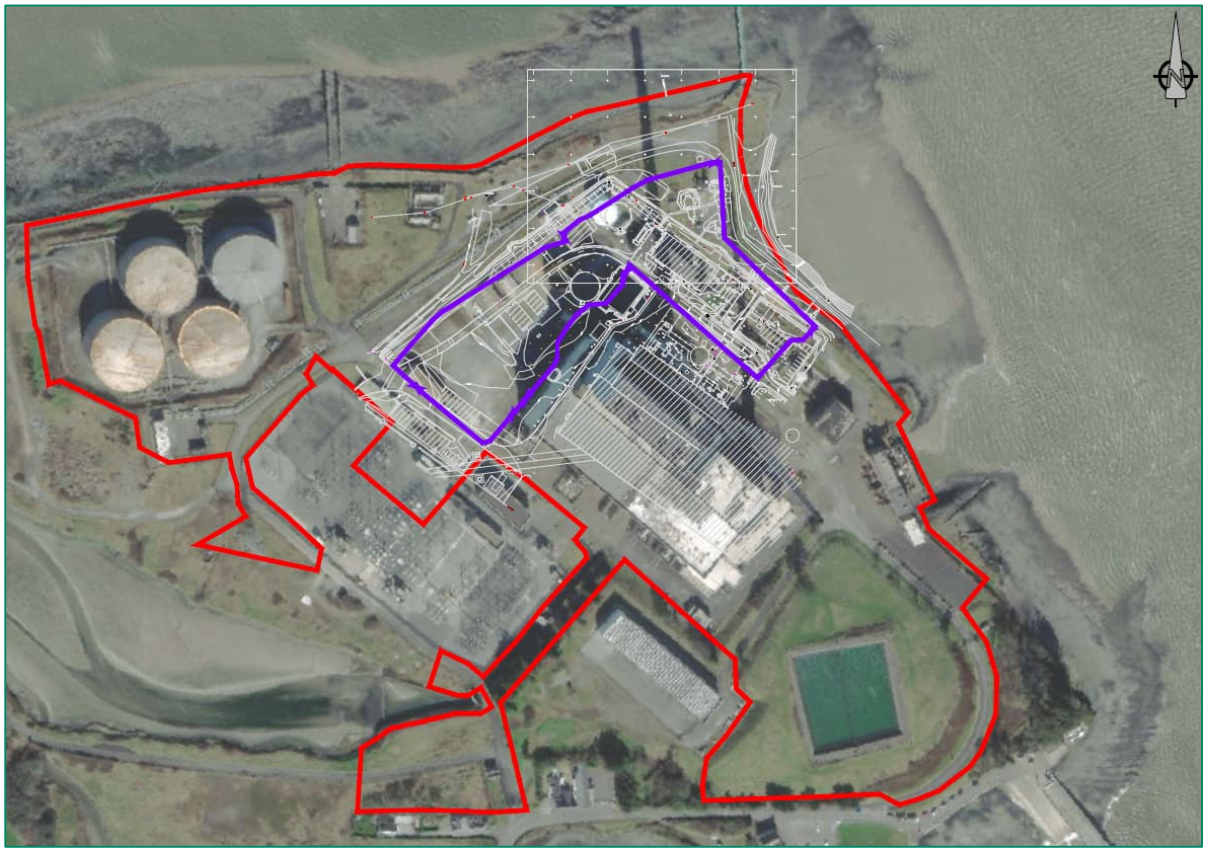


Figure 1-3: Topographical Survey (Source: Murphys Geospatial)

1.4 Proposed Development

The development will consist of:

- The construction of the proposed power generating plant consisting of the following:
  - 2 No. Bulk fuel storage tanks
  - 1 No. Day storage fuel tank
  - 1 No. Fuel polishing & transfer system
  - 1 No. Fire water module
  - 1 No. Raw water & fire water storage tank
  - 1 No. Demineralised water plant
  - 2 No. Demineralised water tanks
  - 1 No. Contaminant bund
  - 1 No. Neutralisation Sump
  - 1 No. Aqueous ammonia tank
  - 1 No. Wastewater treatment plant
  - 1 No. Backup propane tank
  - 1 No. Administration building & workshop
  - 1 No. Storage facility
  - 1 No. Power control module
  - 1 No. Emergency generator
  - 1 No. Biofuel power generating plant
- The development includes all site engineering works, drainage, water supply and SuDS works. Access to the development is via the existing roads.

Refer to Figure 1-4 for the current proposed development layout (drawing number: 60695232-TBT-DR-001) provided by AECOM. Refer to Appendix C for the full drawing.

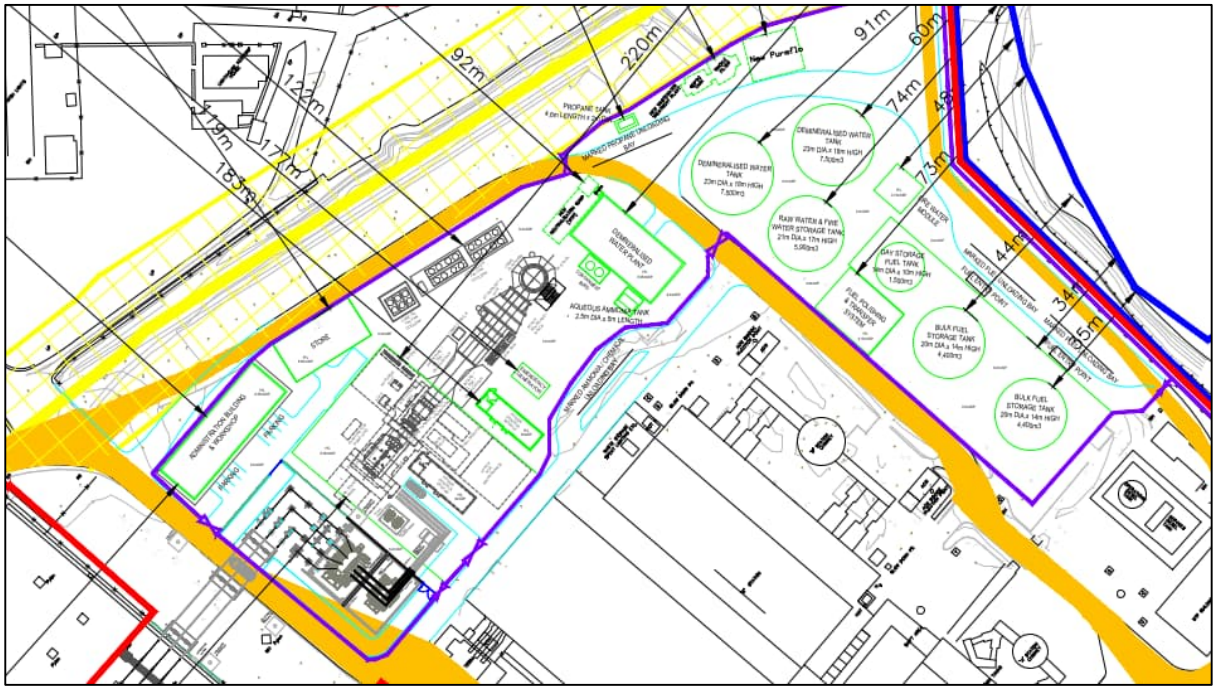


Figure 1-4: Site Location Plan (Source: AECOM Drawing: 60695232-TBT-DR-001

2. Flood Risk Assessment

2.1 The Planning System and Flood Risk Guidelines

2.1.1 2.1.1 The Planning System and Flood Risk Management Plan

In September 2008 “The Planning System and Flood Risk Management Guidelines for Planning Authorities” (Guidelines) were published by the Department of Environment, Heritage, and Local Government in Draft format. In November 2009, the adopted version of the document was published.

The Guidelines provide guidance on flood risk and development. A precautionary approach is recommended when considering flood risk management in the planning system. The core principle of the guidelines is to adopt a risk based sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding.

The objective of a site-specific Flood Risk Assessment (FRA) is to assess all types of flood risk to a development. The assessment should investigate potential sources of flood risk and include for the effects of climate change. The assessment is required to examine the impact of the development and the effectiveness of flood mitigation and management procedures proposed. It should also present the residual risks that remain after those measures are put in place.

This approach is based on the identification of flood zones for river and coastal flooding. “Flood Zones” are geographical areas used to identify areas at various levels of flood risk. It should be noted that these do not consider the presence of flood defences, as the risks remain of overtopping and breach of the defences. There are three flood zones defined (refer to Figure 2-1):

Flood Zone A (high probability of flooding) is for lands where the probability of flooding is greatest (greater than 1% or 1 in 100 for river flooding and 0.5% or 1 in 200 for coastal flooding).

Flood Zone B (moderate probability of flooding) refers to lands where the probability of flooding is moderate (between 0.1% or 1 in 1,000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 and 0.5% or 1 in 200 for coastal flooding).

Flood Zone C (low probability of flooding) refers to lands where the probability of flooding is low (less than 0.1% or 1 in 1000 for both river and coastal flooding).

Figure 2-1: Indicative Flood Zone Map (Extract from the Guidelines, Figure 2.3)

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for through the use of the Justification Test, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.

The Guidelines set out a stage approach to assessment. The stages of assessment are:

Flood Risk Identification (Stage 1) – Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment.

Initial Flood Risk Assessment (Stage 2) – Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures.

Detailed Flood Risk Assessment (Stage 3) – Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk to the development, impacts on flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements of a Stage 1 Site Specific Flood Risk Assessment. The potential risk to the proposed development associated with each of the following sources of flooding is investigated in this report are as follows:

- Coastal
- Fluvial
- Pluvial
- Groundwater

2.1.2 2.1.2 Kerry County Development Plan (2022 – 2028)

The Kerry County Development Plan (KCDP) was adopted on 4th of July 2022, and came into effect on 15th August 2022, and incorporates the Planning and Development (Kerry County Development Plan 2022-2028) Direction 2022, dated 5th December 2022. Of particular interest are Volume 1 and Volume 5 of the KCDP which outlines the core strategies and flood risk management in the Kerry County area respectively. Volume 5 is covered under Section 2.1.4 of this report.

Section 9.4 of the KCDP outlines the regions of economic significance. While economic development is supported throughout the County, the KCDP identifies the 'Shannon Estuary Coastal Network which incorporates the Tarbert/ Ballylongford Landbank. Refer to Figure 2-2 for further information on the extents of the Landbank, and Appendix D for the full map as provided by in Volume 4 of the KCDP.

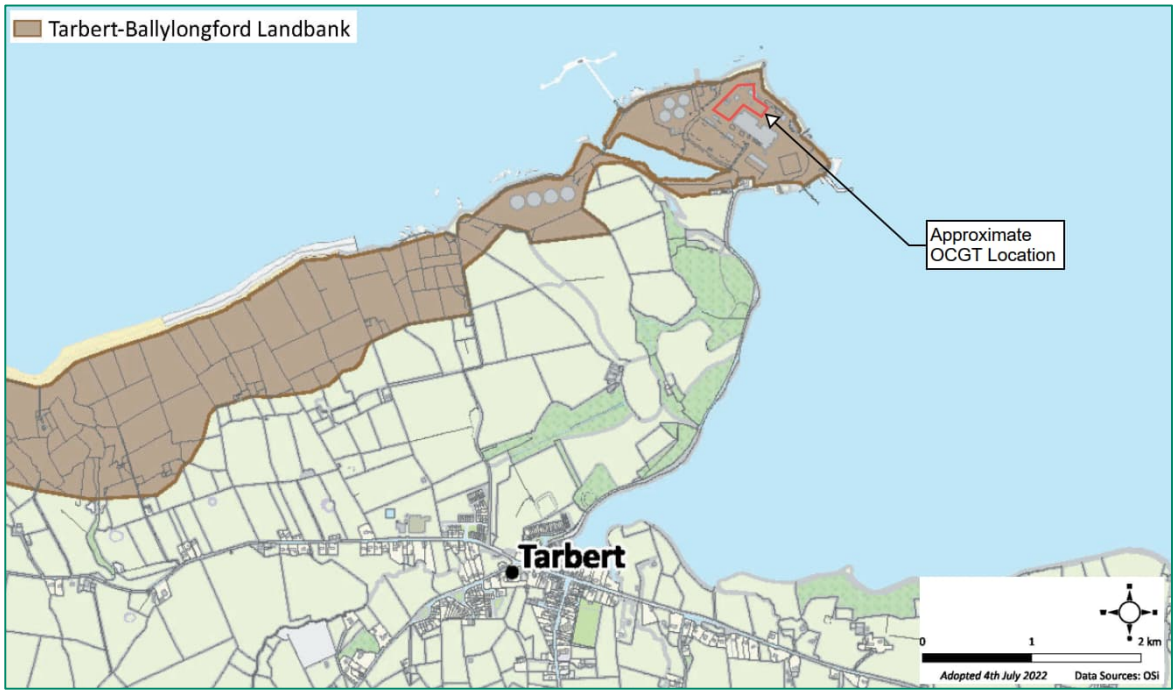


Figure 2-2: Tarbert-Ballylongford Landbank (Source: KCDP Volume 4)

The Tarbert-Ballylongford Landbank is an area which has been identified as a Strategic Development Location (SDL) under Section 9.6.1.1 of the KCDP. This is one of nine key SDls which have been identified in the Shannon Integrated Framework Plan (SIFP). The core objectives of the SIFP are discussed in the subsequent section of this report. Thus, this area is considered of vital importance for the economic growth for the County as a whole.

The Tarbert-Ballylongford Landbank has been classified as an area of important industrial development on both a regional and national level, specifically in relation to energy generation. Several objectives are outlined in Section 9.6.1.1 of the KCDP, in relation to the sustainable growth of the Tarbert-Ballylongford Landbank as an Energy Hub which have also considered the SIFP policies and objectives for the region.

- **KCDP 9-23:** *Support and promote the delivery of the Strategic Development Locations (SDLs) as set out in the SIFP for the Shannon Estuary subject to the implementation of mitigation measures outlined in the SEA and AA undertaken on SIFP and zoned in the Local Authority Development Plans.*
- **KCDP 9-24:** *Support the promotion, marketing and seeking of financial and expert support for the Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary and specific projects emerging from the plan. Projects shall be subject to the relevant environmental assessment requirements including SEA, EIA SFRA and AA as appropriate.*
- **KCDP 9-25:** *Promote and facilitate the sustainable development of the Tarbert-Ballylongford landbank for industry, utilising the presence of deep water, existing infrastructure, natural resources, and waterside location to harness the potential of this Strategic Location. Proposals for marine related industry, general industrial development, and particularly those industries creating a synergism with existing uses and contributing to the development of a strategic energy hub at this location will also be encouraged.*
- **KCDP 9-26:** *Safeguard the role and function of the Power Plant Hub at Tarbert, including the NORA Strategic Oil Reserves Plant, as a key driver of economic growth in the Region, encouraging its sustainable growth and diversification, in accordance with Regional and National Energy Objectives.*

Section 11.2.6 of the KCDP addresses the importance of sustainable development and protection of ecological corridors. The Tarbert-Ballylongford Landbank is considered to be an area of high conservation value. As such, development along this area should take cognisance of the existing wildlife and biodiversity while maintaining good ecological connectivity of the surrounding landscape.

Section 11.5.1 of the KCDP addresses potential areas of significant flood risk. Such areas have been identified through the use of CFRAM and ICPSS programmes. 15 areas for further assessment (AFA) were identified in the County, with Tarbert Station being one. Therefore, the subject site will require a Stage 2 FRA, to assess the vulnerability of flooding, determine the suitability of development for the proposed location, and to provide additional flood prevention measures where feasible. The flood risk assessment has been outlined in Section 2.2 and 2.3 of this report, and Section 2.4 which details the Sequential Approach and Justification Test.

2.1.3 2.1.3 Shannon Integrated Framework Plan (SIFP)

The Shannon Integration Framework Plan (SIFP) is a comprehensive strategy commissioned in 2011 by Clare County Council, Kerry County Council, Limerick City and County Councils, Shannon Group, and Shannon Foynes Port Company to address the complex nature of the Shannon Estuary and its surroundings. Encompassing both the estuary and surrounding hinterland, the SIFP recognises the estuary's significance in supporting several functions, including shipping, industry, fishing, tourism, energy generation. The SIFP aims to provide an integrated approach to balance economic and environmental objectives through the use of Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) to guide its development. The SIFP also aims to build on existing industry and existing infrastructure.

The overall objectives of the SIFP are as follows:

- *“Support the multi-functional nature of the Shannon Estuary, and identify opportunities to expand the existing economic base, including port related industry and other related activities”*
- *“Facilitate the diversification of the economy, through the promotion of commercial/industrial employment, environmentally friendly aqua culture, maritime, energy, transport, recreation and tourism industries in a sustainable manner”*
- *“Protect, manage and enhance the natural coastal environment along the Estuary, including its cultural, natural and built heritage”*
- *“Safeguard the Estuary’s sensitive environmental resources and natural heritage of national, European and International significance”*

- *"Establish an evidence-based approach to identifying areas for future development, to ensure proposals will work in harmony with the designated Natura 2000 sites."*

The SIFP has been adopted into the relevant County and City Development Plans and serves as a key tool for shaping policies and objectives, including those outlined in the KCDP.

2.1.4 2.1.4 Kerry Strategic Flood Risk Assessment (2022 – 2028)

Volume 4 of the KCDP outlines the Strategic Food Risk Assessment (SFRA) for the County. The SFRA has been produced to assess in detail, the flood risk associated with several key areas in the County (including the Tarbert-Ballylongford Landbank), providing recommendations in appropriate land-use zoning to assist in future planning development for the County. The SFRA uses existing data and information to inform land-use planning decisions, so as to ensure that any relevant flood risk management programmes and measures can be implemented. The SFRA outlines a number of core objectives which are to be considered for the proposed development:

- *To provide for an improved understanding of flood risk issues within the development plan and development management process, and to communicate this to a wide range of stakeholders;*
- *To produce an assessment of existing flood defence infrastructure and the consequences of failure of that infrastructure and also identification of areas of natural floodplain to be safeguarded;*
- *To produce a suitably detailed flood risk assessment, drawing on and extending existing data and information, leading to a suite of flood risk policies and objectives and, where appropriate, maps that support the application of the sequential approach, in key areas where there may be tension between development pressures and avoidance of flood risk;*
- *To inform, where necessary, the application of the Justification Test;*
- *To conclude whether measures to deal with flood risks to the area proposed for development can satisfactorily reduce the risks to an acceptable level while not increasing flood risk elsewhere, and*
- *To produce guidance on mitigation measures on how surface water should be managed and appropriate criteria to be used in the review of site specific flood risk assessments.*

As part of the SFRA, the KCDP has produced a summary of the identified potential flood risk sources associated with Tarbert-Ballylongford SDL, and Tarbert Island power station. Section 4.3 of the SFRA outlines the need for Stage 2 assessment requirements for fluvial and coastal sources.

2.2 2.2 Flood Risk Identification

In order to establish potential flood risk to the development, AECOM have carried out a review of available recorded information on flooding in and around the area of our proposed site. The following sources of information were used to identify flood risk, hazards, and past flooding events:

- Kerry Strategic Flood Risk Assessment (2022 – 2028)
- Kerry County Development Plan (2022 – 2028)
- Shannon Integrated Framework Plan (SIFP)
- Historic Flood Records (OPW and OSi)
- Catchment Flood Risk Assessment & Management (CFRAM)
- Geological Ground Conditions (GSI)

2.2.1 2.2.1 OPW Past Flood Events

The Office of Public Works (OPW) collates available reports of flooding from all sources (e.g., fluvial, pluvial, coastal, etc.) on a nationwide basis. The OPW's website (www.floodinfo.ie) was consulted to obtain reports of recorded flooding within and surrounding the site. Figure 2-3 is an extract from the mapping available on the OPW database website, which indicates there is no historic records of flooding in the immediate vicinity of the site. The proposed development is indicated by the red 'X'.

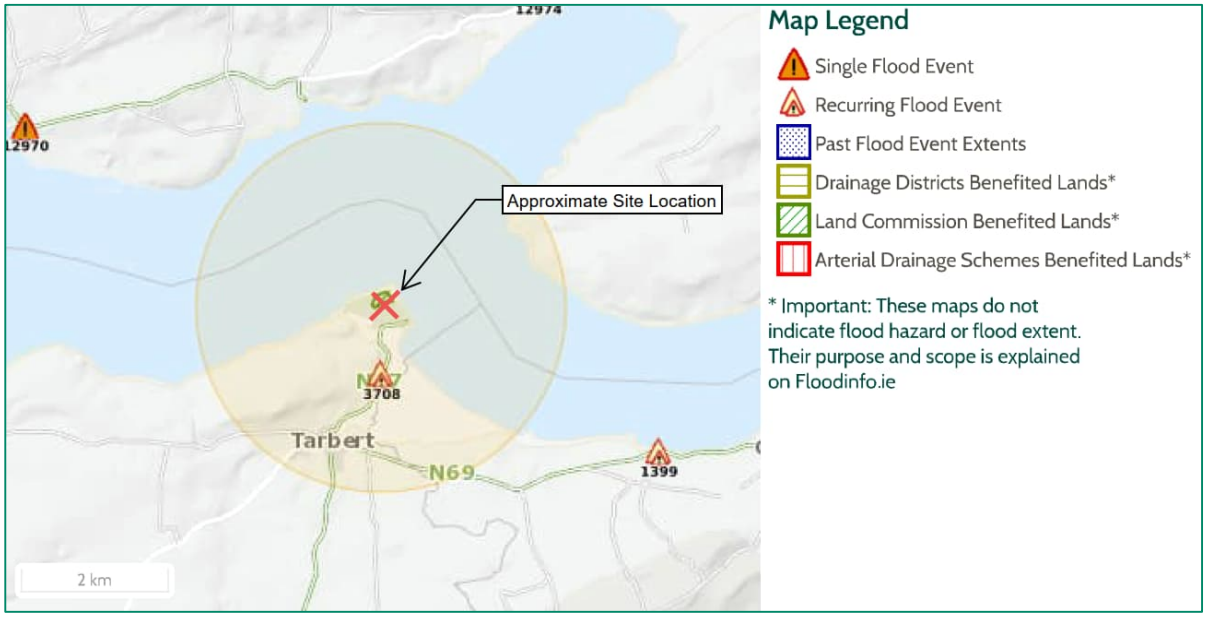


Figure 2-3: Extract from OPW displaying Historical Flood Events (Source: floodinfo.ie)

A flooding report, published on the 6th of December 2005, notes a reoccurring flooding event. The Ferry Road, which connects Tarbert ferry service to Tarbert town, is the primary road used to access Tarbert Power Station. This road is known to flood roughly twice per year, during high tidal events combined with rough wind/ waver. Sea water surpasses the existing sea wall and is dumped onto the road. It is noted that the flooding lasts no longer than 30 minutes. While the access to Tarbert Island, and Tarbert Power Station comes from this road, the flooding events do not directly impact the subject site itself. For the full report on the OPW Past Flood Event Local Area Summary Report, refer to Appendix E this document.

2.2.3 2.2.2 Catchment Flood Risk Assessment & Management (CFRAM)

The Shannon Catchment Flood Risk Assessment & Management (CFRAM) Study, which was developed by the OPW in partnership with other government bodies, is a nationwide implemented program which has been carried out in partnership and collaboration with the water framework directive (WFD) which has been designed to create a series of Preliminary Flood Risk Assessments (PFRA) for the nation as a whole. The CFRAM program main objective is to provide guidance in the reduction and mitigation of flood risk for Irish developments which is achieved in line with the EU Flood Directive 2007.

At the current date, November 2023, CFRAM coastal flood extent maps have been published by the OPW as part of the modelling done by CFRAM for the Shannon region, which covers Tarbert Island and the subject site. It is noted that no CFRAM mapping has been published for any fluvial events. Refer to Figure 2-4 for the site location with respect to the known CFRAM flood extent.

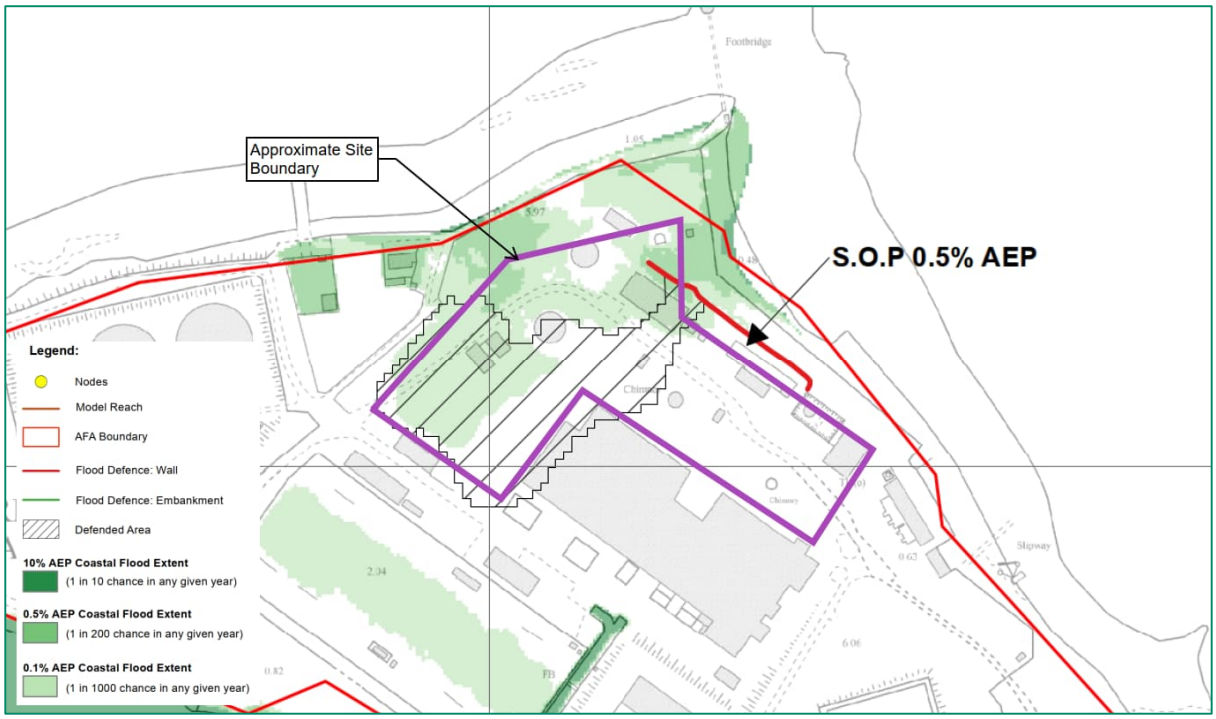


Figure 2-4: Coastal CFRAM Flood Maps Extract (Source: floodinfo.ie)

Coastal flooding results from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influence by the following three factors which often work in combination: high tide level, storm surges and wave action. The subject site is located adjacent the River Shannon. From the available present day CFRAM, and additional online data, sections of the subject site are located within Flood Zone B, hence, the Justification Test must be carried out to confirm there is no significant flood risk here. Refer to Appendix F for CFRAM Coastal Mapping.

2.2.4 2.2.3 Geological Soil Conditions

The Geological Survey of Ireland (GSI) published data has been used in this study to get an indication of the geological soil conditions, most notably, the subsoil permeability and any potential groundwater vulnerability based on GSI records. The Groundwater Vulnerability map (Groundwater Data Viewer) shows land areas where groundwater can be easily contaminated. It also shows areas where it is very well protected by the natural subsoil layers.

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause periods of flooding. Of particular note, subsoil permeability is useful in determining the filtration characteristics of the soil. AECOM have reviewed the mapping for the subsoil permeability within the site and Figure 2-5 is an extract from the GSI mapping which shows the site to have low permeability across the full extent of the subject site as well as the immediate surrounding area.

Figure 2-5: Subsoil Permeability (Source: GSI Groundwater Data Viewer)

2.3 2.3 Potential Sources of Flooding

When carrying out a flood risk assessment all potential flood risks and sources of flood water at the site should be considered. In general, the relevant flood risk sources are:

- **Coastal/Tidal:** flooding caused by sea levels which are higher than normal, resulting in sea water overflowing onto the land.
- **Fluvial:** flooding because of a river exceeding its capacity, with excess water spilling out onto the adjacent floodplain.
- **Pluvial:** flooding from rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall.
- **Groundwater:** flooding which occurs when the natural underground drainage system cannot drain rainfall away quick enough, causing the water table to rise above the ground surface.

2.3.1 2.3.1 Coastal/ Tidal Flooding

As discussed in Section 2.2.3, coastal flooding results from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influence by the following three factors which often work in combination: high tide level, storm surges and wave action. The subject site is located adjacent the River Shannon. From the available present day CFRAM, and additional online data, sections of the subject site are located within Flood Zone B, hence, the Justification Test must be carried out to confirm there is no significant flood risk here. Refer to Figure 2-4 and Appendix F for CFRAM Coastal Mapping.

2.3.1.1 2.3.1.1 Current Day

The predictive flood mapping for the current day situation indicates that the existing site would remain largely unaffected by a 0.5% AEP event. Based on the node level provided, a 0.5% AEP corresponds to a flood level of approximately 4.26mOD. Given the proposed development is located largely within the flood defence area, and the existing flood defence wall, there are flood barriers provided to prevent potential flooding from extending further towards the proposed development. While defences are in place for possible coastal flooding, the Justification Test must still be carried out to confirm that development in this area is suitable given that sections are located within Flood Zone B.

2.3.1.2 2.3.1.2 Possible Future Scenarios

The CFRAM study has also included a Mid-Range Future and High-End Future scenario modelling to show the impacts of climate change and a rise in sea levels, refer to Figure 2-6 and Figure 2-7 for these extents. Based on the two scenarios, which include three different events for each scenario (0.1%, 1%, and 10% AEP events), both the Mid-Range and High-End events, plus 20% climate change, and sea level rise of 0.5m predicts there will be some impact on the proposed development.

Figure 2-6: CFRAM Coastal Flood Extents – Mid Range Future Scenario (Source: floodinfo.ie)

Figure 2-7: CFRAM Coastal Flood Extents – High End Future Scenario (Source: floodinfo.ie)

2.3.2 2.3.2 Fluvial Flooding

Fluvial flooding is primarily caused by the flooding of rivers and streams. With the proposed subject site being located adjacent to the River Shannon along the north of the boundary, it is important to analyse this area in detail. In accordance with the KCDP 2022 – 2028, there has been no notable flooding events, other than the flooding which occurs along Ferry Road, as discussed in Section 2.2.1 of this report. The drainage network has been designed in order to carefully manage the surface water runoff from significant rainfall events including climate change.

2.3.3 2.3.3 Pluvial Flooding

Pluvial flooding is the result of rainfall generated overland flows which arise before runoff can enter any watercourse or sewer. Similarly, there have been no significant rainfall flood events recently recorded within the vicinity of the subject site. Hence, there is no indication that the proposed site is at risk to pluvial flooding, however, to mitigate any potential pluvial flooding, the drainage network has been designed in order to carefully manage the surface water runoff from significant rainfall events including climate change.

2.3.4 2.3.4 Groundwater Flood Risk

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause periods of flooding. The Groundwater Data Viewer (GSI) online maps were reviewed and noted that the subject site presents ‘Low’ class for subsoil permeability.

This indicates that the soil type provides low drainage of surface water runoff into the ground, hence, there is moderate risk of groundwater flooding within the site and around the site. As this information is indicative, groundwater monitoring is not planned to be carried out at this stage, but boreholes and trial pits undertaken as part of the ground investigation will be reviewed for any water strikes. Furthermore, there have been no recorded instances of groundwater flooding within the existing site, as part of the background material reviewed as part of this report.

2.4 2.4 Sequential Approach & Justification Test

Chapter three of the Planning System and Flood Risk Management Guidelines (DEHLG/ OPW, 2009) describes the key principles of a risk based Sequential Approach to manage flood risk. The Sequential Approach is aimed at directing development toward land that is at low risk of flooding. Figure 2-8 is extracted from the Guidelines and illustrates the sequence in which a site must be assessed from a flood risk standpoint. Specifically, the order in which planning authority must be satisfied from a flood risk perspective is to *Avoid* (locate in an area that is not flood prone), then *Substitute* (if in a flood prone zone, then substitute the type of development), *Justify* (if substitution does not reduce flood risk sufficiently, then preform Justification Test) and *Mitigate*. This section discusses the Sequential Approach in the Guidelines with regards to the proposed development.

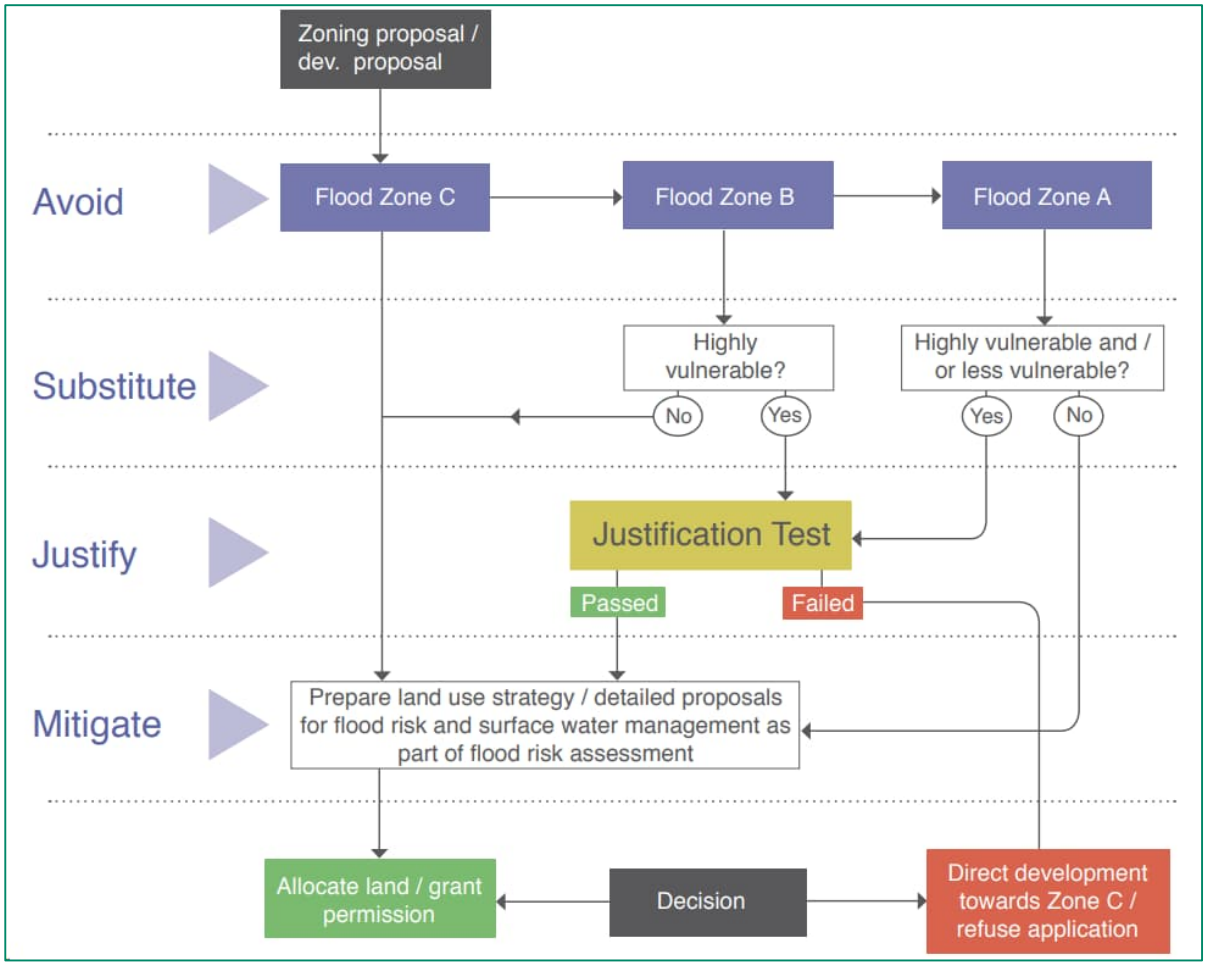


Figure 2-8: Sequential Approach Mechanism (Source: Extract from the Guidelines)

2.4.1 2.4.1 Sequential Approach

As seen in Figure 2-8, the first step in the Sequential Approach is to avoid development in flood risk areas where possible. Flood Zones associated with river and coastal flooding are identified as Flood Zones A, B and C as mentioned in Section 2.1.1 of this report. The planning implications for each of the flood zones which is found in Section 3.5 of the Planning System and Flood Risk Management Guidelines includes:

Zone A - High probability of flooding. *Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation, would be considered appropriate in this zone.*

Zone B - Moderate probability of flooding. *Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible*

development might be considered appropriate in this zone. In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone C and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will adequately be managed.

Zone C - Low probability of flooding. *Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.*

The proposed development falls under Zone B, hence, development is subject to the Justification Test. The second stage of the sequential approach is to substitute the type of development to one less vulnerable to flooding.

2.4.2 2.4.2 Vulnerability

Figure 2-9 taken from Section 3.5 (table 3.2) of the Planning System and Flood Risk Management Guidelines describes the vulnerability of developments relative to the identified Flood Zones and when the requirements of the Justification Test must be satisfied.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Figure 2-9: Vulnerability Matrix (Source: Extract from the Guidelines)

Figure 2-10 provides a classification of vulnerability of different types of developments, which outlines those that are required to carry out the Justification Test found in Section 3.5 (table 3.1) of the Planning System and Flood Risk Management Guidelines. Developments that do not meet the criteria of the Justification Test, or 'inappropriate developments' should not be considered.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits	

Figure 2-10: Vulnerability Classification (Source: Extract from the Guidelines)

The proposed land use for the development is classified under "Essential Infrastructure". Therefore, the development is classified as 'Highly Vulnerable' for the subject site. The full extents of the subject site were evaluated under Flood Zone B conditions, and concluded that a Justification Test is required, as outlined in the third stage of the sequential approach.

2.4.3 2.4.3 Justification Test

As outlined in Section 3.7 of the Planning System and Flood Risk Management Guidelines, The Justification Test is designed to "rigorously assess the appropriateness, or otherwise, of particular developments that, for the reasons outlined above, are being considered in areas of moderate or high flood risk". It recognises that existing urban structures continue to see urban growth and established cities and urban centres, which will continue to be at risk of flooding, will change over time. The Justification Test for development management is used during the planning application stage and must satisfy the following criteria before planning authorities can consider an application for a proposed development (refer to Figure 2-11).

Box 5.1 Justification Test for development management (to be submitted by the applicant)

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
   - (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;
   - (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;
   - (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
   - (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan.

Refer to section 5.28 in relation to minor and infill developments.

Figure 2-11: Justification Test for Development Management (Source: Extract from the Guidelines)

2.4.3.1 2.4.3.1 Justification Test – Part 1

As outlined in the KCDP and the SIFP, the proposed development is located within the Tarbert-Ballylongford strategic development land zone (refer to Appendix D for the full land zoning objectives mapping). Therefore, the proposed development satisfies the criteria outlined in Part 1 of the Justification Test.

2.4.3.2 2.4.3.2 Justification Test – Part 2 (i)

Section 2 Part 1 of the Justification Test requires that the proposed development does not result in an increase in flooding elsewhere. Based on the flood zone map extract from the OPW flooding report, flood risk occurs mainly along the northern section of the proposed development. There are existing flood defence schemes in place at Tarbert Island, including a flood defence wall situated along the northern boundary of the site in order to maintain existing flood levels, and prevent coastal flooding occurring caused by overspilling of excess water from the Shannon Estuary.

A standalone Tarbert Bio-Fuel Plant Review of Coastal Flood Defence Design report has been prepared by AECOM dated 6 November 2022 and the report is attached in Appendix G.

A supplementary Tarbert Flood Defence Re-alignment report has also been prepared by AECOM outlining a revised alignment of the coastal flood defence wall to support the latest planning application of the OCGT development site. The proposed flood defence wall is outlined in drawing nos.60695232-TBT-DR-019 and 020 with the supporting technical note 'Tarbert Flood Defence Re-Alignment 2023'.

The new proposed flood defence wall protects the new development only and extends along the northern estuary frontage and surrounding the gas turbine and tank platform areas. It is also assumed that the flood defence wall will prevent water ingress into the site from coastal flooding up to the 0.1% AEP (1 in 1000) design storm event.

2.4.3.3 2.4.3.3 Justification Test – Part 2 (ii)

Section 2 Part 2 of the Justification Test requires that the proposed development include measures to minimise and reduce of flood risk to people, property, the economy, and the environment. The combination of CFRAM mapping and available topographical survey data allows for the approximate extents of the Flood Zone boundary to be mapped. In respect to the flood defence wall crest level, an extract from the Tarbert Bio-Fuel Plant Review of the Coastal Flood Defence Design report indicated the crest level as below:

'Adding the freeboard and settlement allowance to the design still water level gives a design crest level for the new flood defence structures of +7.54m ODP or +4.84m Ordnance Datum Malin (ODM)'.

2.4.3.4 2.4.3.4 Justification Test – Part 2 (iii)

Section 2 Part 3 of the Justification Test requires that the development considers residual flood risk and future risk management. A standalone Tarbert Bio-Fuel Plant Review of Coastal Flood Defence Design report has been prepared by AECOM, which accounts for the proposed design life of the development. Access roads within the proposed development have been accounted for so that the potential flood risk is negligible.

2.4.3.5 2.4.3.5 Justification Test – Part 2 (iv)

Section 2 Part 4 of the Justification Test requires that the development is "compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant active streetscapes". The proposed development has been designed in line with the KCDP, SIFP, and The Planning System & Flood Risk Management Guidelines core objectives and policies.

3. Surface Water Drainage Design

3.1 3.1 Existing Surface Water Drainage

As-built drawings of the existing site drainage network, provided by the Client, have been reviewed as part of this assessment. These drawings indicate the surface water infrastructure currently servicing the site and surrounding areas. These have also been included in Appendix A of this report. Specifically, the utility and topographical surveys reference in this assessment were:

- Tarbert Power Station Topo Survey – Murphy Geospatial DRG no. MGS54284_T_ITM_Rev1_00
- Topographical and Buried Services Survey – Mott MacDonald DRG no. 257554/02C/002 Rev. P4; and
- Site drainage layout (Main Power Plant Area) – SSE DRG no. 845_0804_0003 Rev. 02

It is also assumed that suitable drains or outfalls are located adjacent to the proposed OCGT development site to allow disposal of surface water from the proposed OCGT development site. The proposed tie-in surface water outfall as SE3 / outfall 9 & 8 as shown in Figure 3-1. Existing Drainage Outfall Locations (Source: Extract from Site Drainage Layout (SSE DRG no. 845_0804_0003 Rev. 02)) below. It should be noted that any existing surface drainage outfalls servicing areas not part of the development scope (e.g. outfall PE2/PE3) will be protected, retained and further review is subject to detailed design stage.

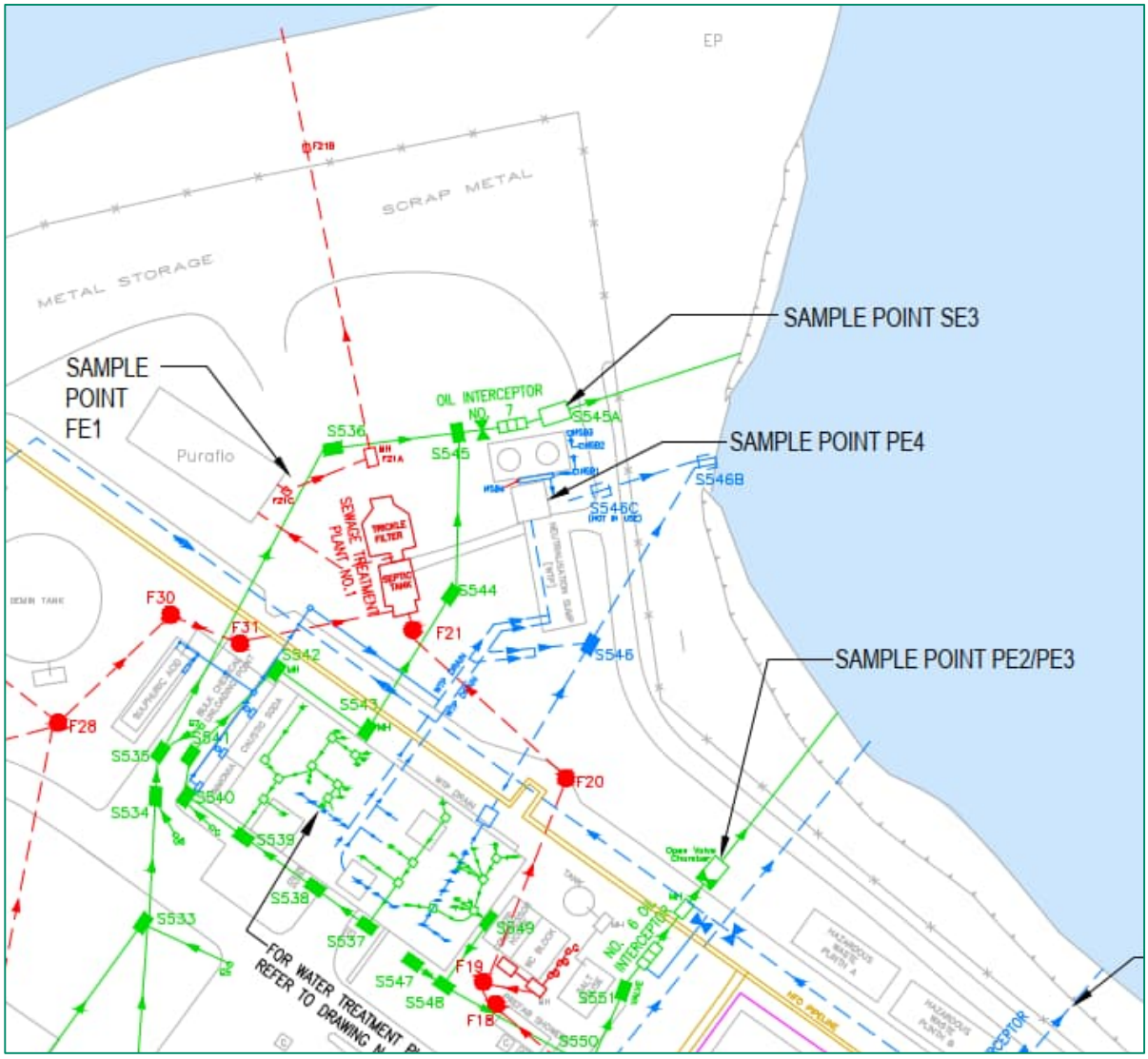


Figure 3-1: Existing Drainage Outfall Locations (Source: Extract from Site Drainage Layout (SSE DRG no. 845_0804_0003 Rev. 02))

A topographical survey was carried out in August 2023 to confirm the suggested tie-in outfall location, level, and diameter to advise on the existing system capacity. It is noted that tie-in existing manhole S545 was unable to be opened during the drainage survey, therefore further drainage investigation is required to be carried out to determine the tie-in level and outlet pipe diameter. An extract of the surveyed surface water outfall is shown in Figure 3-2.

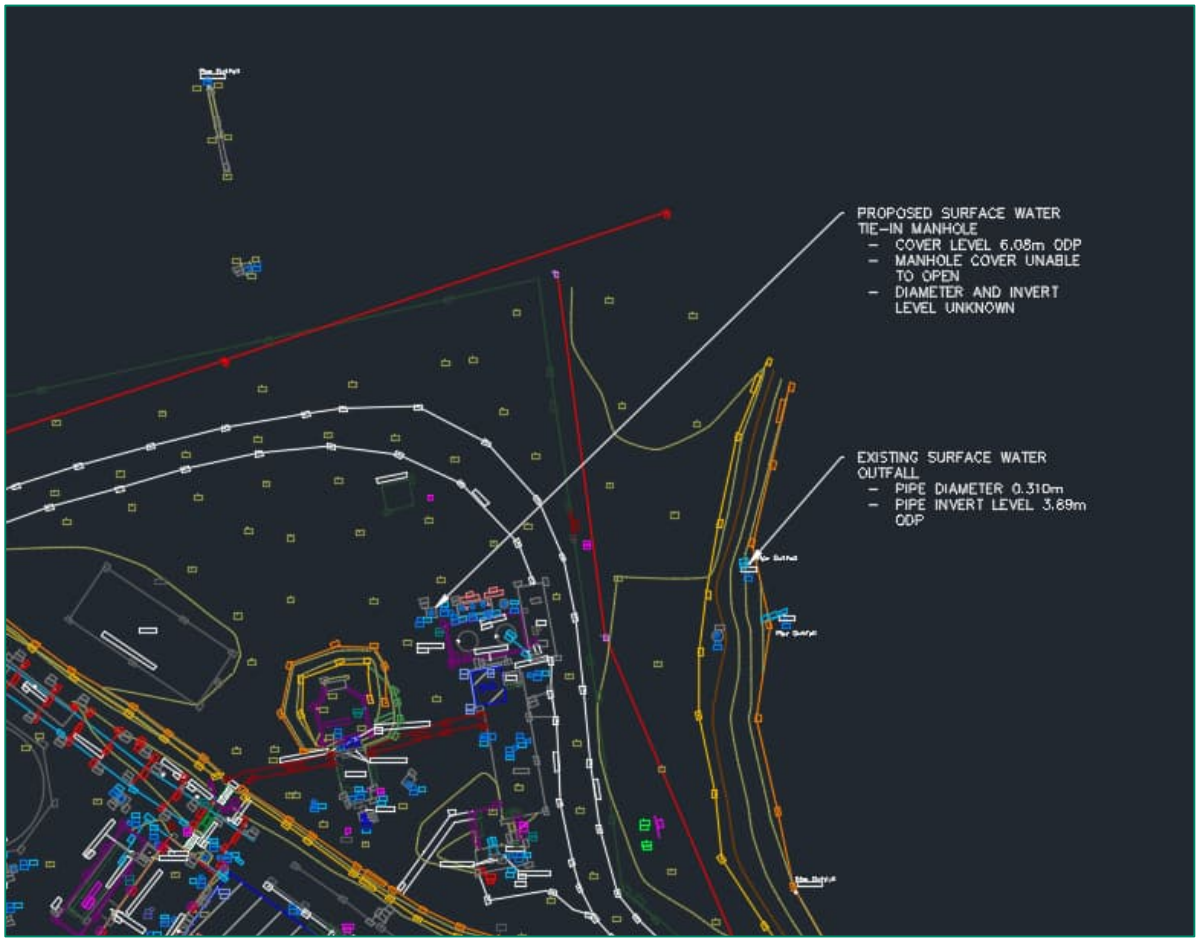


Figure 3-2: Existing Drainage Outfall Locations (Source: Extract from Murphy Geospatial Tarbert Power Station Topographical Survey (Murphy Geospatial DRG no. MGS54284_T_ITM_Rev1_01)

3.2 3.2 Proposed Surface Water Drainage

3.2.1 3.2.1 Point of Discharge

Existing drainage arrangements around Tarbert Power Station are based upon Site Drainage Layout record drawing 'Site drainage layout (Main Power Plant Area) – SSE DRG no. 845_0804_0003 Rev. 02'. It is assumed that a suitable existing surface water outfall SE3 / outfall 9 & 8 is located adjacent to the site to allow disposal of surface water from the proposed OCGT development site. For the location of outfalls refer to Figure 3-1 and Figure 3-2 on the previous section or Appendix A of this report.

It should be noted that it has been assumed that the existing outfall 9 & 8 only service and accept the surface water catchment within the proposed OCGT development site. Should there be any additional proposed connections to this drainage network, agreement with the asset owner shall be sought and a further drainage assessment is to be carried out to ensure no detriment to the proposed drainage system. Outfalls servicing areas not included or impacted by the development area have been excluded from this assessment.

This drainage assessment assumes all existing outfalls and drainage outlets have non-return flap valves or flood gates installed to prevent backflow during extreme events. Where this is not the case on site, it is required that non-return flap valves and flood gates are to be reinstated and operational on all the existing outfalls on site. Sealing or flood protection mitigation of all pipework, chambers, and ducts immediately outside of flood defence wall is to be considered at detailed design stage.

As mentioned in Section 3.1, a topographical survey was carried out by Murphy Geospatial in August 2023 to confirm the suggested tie-in outfall location, level, diameter and capacity. Any connection to existing networks will require agreement from the asset owner.

3.2.2 3.2.2 Design Estuary Water Level Estimate (2022)

An extract of extreme water level from the Irish Coastal Wave and Water level Modelling Study (ICWWS) (RPS, 2020) for Point S12 which is closest to the Tarbert Power Station via Tarbert Bio-Fuel Plant – Review of Coastal

Flood Defence Design report, recommended that any flood defences are designed for a still water flood level of at least +6.85 m ODP or +4.15 m ODM. An interpolation of 1.0% AEP (1 in 100) from section 8 based upon the extract of extreme water levels from the ICWWS report via Tarbert Bio-Fuel Plant – Review of Coastal Flood Defence Design report is indicated as +6.60 m ODP or +3.9 m ODM.

An assumption of constant still water flood levels of +6.85m ODP for 0.1% AEP and +6.60m ODP for 1% AEP are used on the surface water drainage modelling exercises up to a duration 4320 minutes (72 hours) to assess the outfall pipework during unrestricted submersible condition whilst both a critical rainfall storm event is concurrent with a tide water level rise adjacent to the OCGT development site. Further modelling exercises will be completed at detailed design stage considering a high tide level hydrograph.

3.2.3 3.2.3 Allowable Discharge

As advised by SSE, email dated 10th July 2023, the current consent from the Local Authority (LA) regarding the existing surface water discharge points from the Tarbert Power Station to the Shannon Estuary, especially outfall SE3 / Outfall 9 & 8 which proposed to be utilised for the proposed OCGT development site is currently with unrestricted discharge rates to the Shannon Estuary. For the SSE correspondence email refer to Appendix H.

Theoretical greenfield pre and post-development run-off rates have been calculated using the IP SuDs methodology. The existing and proposed surface water catchment areas are 0.712 hectare (ha) and 2.230 ha respectively with the 1 in 2 year run-off rate of 6.6 l/s/ha. It should be noted that external surface water catchment areas have been excluded for the purpose of this report as the site layout and flood emergency procedures have not been confirmed at the time of writing of this report. It is assumed that detailed drainage design will be undertaken at subsequent design stages which will consider external surface water catchment impacts. An extract of the existing and proposed surface drainage catchment areas from the drainage modelling layout is shown in Figure 3-3 and Figure 3-4, and the greenfield discharges are noted in Table 1. A copy of the calculations is included within Appendix I.

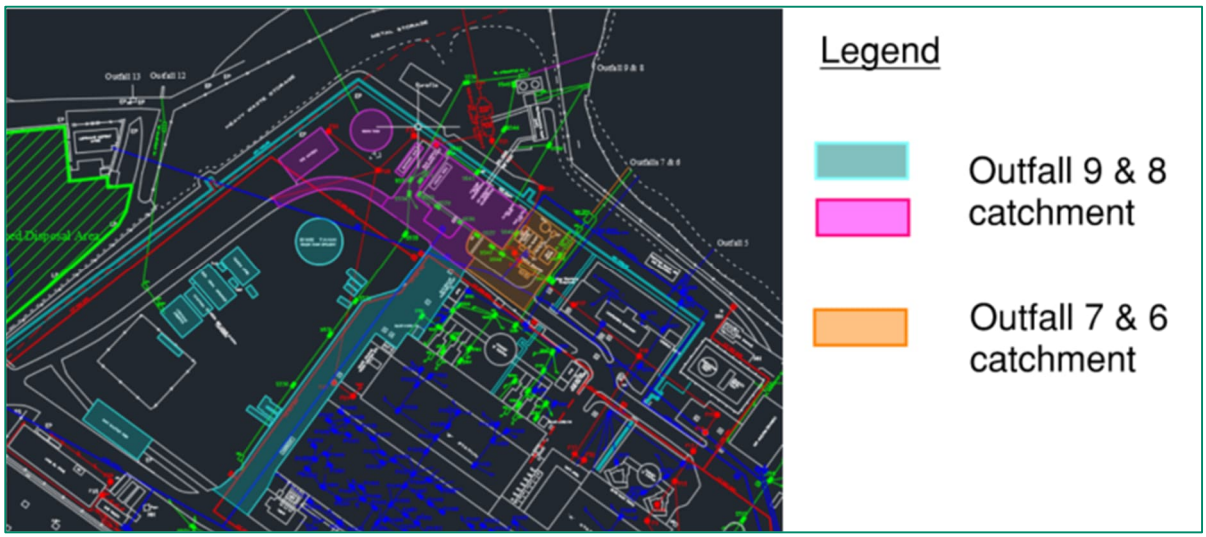


Figure 3-3: An extract of pre surface water drainage catchment areas (Source: Microdrainage)

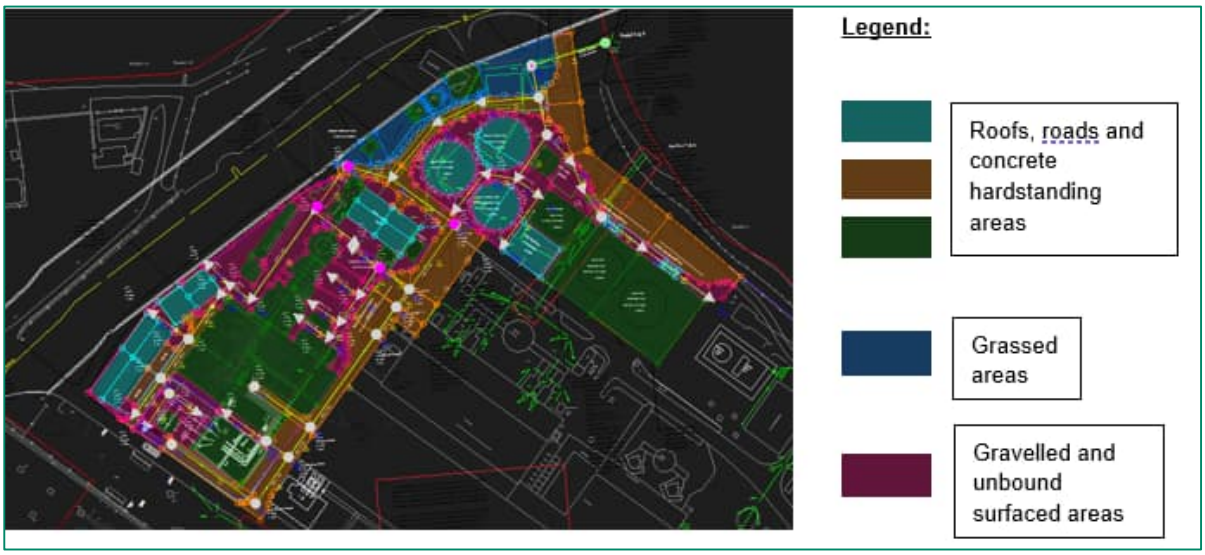


Figure 3-4: An extract of post surface water drainage catchment areas (Source: Microdrainage)

Table 1. Allowable Discharge Rates

Return Period	Impermeable area (ha)	Runoff (l/s/ha)	Runoff (l/s)
Pre-development (IP SuDS)	0.712	6.6	4.70
1 in 2 Year (IP SuDS)	2.230	6.6	14.72
1 in 100 Year (IP SuDS)	2.230	12.7	28.32
CIRIA C753 SuDS Manual	2.230	2.0	4.46

Considering the range of discharge rates above, the CIRIA C753 SuDS Manual with 2 l/s/ha return period provide a marginally similar overall run-off rate between the pre and post development of 1 in 2 Year event discharge rates.

The surface water discharge from the site currently modelled as unrestricted flow discharge pending on final agreement with Kerry County Council (KCC). On the basis that the tidal estuary is immediately adjacent to the site boundary, it is therefore proposed to continue with unrestricted discharge via an existing outfall SE3 / outfall 9 & 8. However, additional attenuation volume is required during extreme storm events and variable sea levels coinciding which is outline in the following sub-section.

The final allowable discharge rate will require to be agreed following consultation with KCC or relevant authority as required.

3.2.4 3.2.4 Attenuation

Preliminary modelling works have been undertaken to generate indicative storage requirements for a range of return periods and discharge rates. For clarity, all discharge rates and volumes are expressed on a per hectare basis and can be pro-rated following confirmation of the development area and degree of hardstanding.

Climate change factors have been taken from ‘OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (2009)’ via ‘Flood Risk Assessment and Management Plan for the Meath CDP 2020-2026 SFRA Report (December 2019)’. Two climate change scenarios have been considered. These are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a ‘likely’ future scenario based on the wide range of future predictions available for climate change for +20% to be added to design rainfall. The HEFS represents a more ‘extreme’ future scenario at the upper boundaries of future projections available for climate change for +30% to be added to design rainfall.

The attenuation required for a range of return periods and discharge rates under worst case restriction of 2l/s/ha or 4.26l/s (CIRIA C753 SuDS Manual) and unrestricted flow are summarised in Table 2.

Based on the Tarbert Bio-Fuel Plant Review of Coastal Flood Defence Design report (2022), the expected still water level for the estuary is +6.85m ODP for a 0.1% AEP and +6.60m ODP for a 1% AEP storm event. This is evidently higher than the existing SE3 / outfall 9 & 8 surface water pipe outfall levels currently at +3.89m ODP

which will be submerged during major storm events and therefore prevent free discharge of surface water into the estuary. Attenuation or underground of surface water drainage will be required to prevent localised flooding within the site.

A copy of the preliminary outline attenuation volume and unrestricted flow rate under free discharge and surcharge condition is included within Appendix J.

Table 2. Outline Attenuation Requirements

Catchment Area	Runoff Rate (l/s/ha)	Peak Discharge (l/s)	Return Period & Outline Attenuation (m^3)	
			100yr+20%cc	100yr+30%cc
Proposed Development Area (*assume area is 100% impermeable – subject to detailed design)	2.0 (Assumed worst case restricted)	4.46	1635	1800
	Unrestricted flow (Best case unrestricted)	^241.60 (1 in 100 + 20%CC) / ^244.90 (1 in 100 + 30%CC)	337	372

Notes:

- **Current Drainage design is based upon unrestricted flow at outfall SE3 / outfall 9 & 8 with 100% capacity from the OGCT development site.**
- *Storage volumes calculated based on a standard 1 ha catchment area of 100% impermeable area.
- ^The peak discharge rates are based upon drainage modelling output from the Micro Drainage. The unrestricted flow peak discharge rate varies pending on the rainfall events, pipe gradient and pipe diameter.
- The flows and attenuation volumes shown in table above are representative of free-flowing outfall conditions (surcharged outfall has not been accounted for, this will amend above figures refer to table 4)

The current outfall within the drainage network is subject to tidal flows and surcharge conditions as outlined earlier in this report. Therefore, the outfall will be submerged, and the existing / proposed flap valve will be closed. During this time, surface water within the development will have to be contained within the underground drainage system until such time as the outfall becomes free-flowing and is no longer under surcharge conditions. The preliminary total underground attenuation achieved within the development area is circa 1045m^3 within the proposed platform gravelled voids, filter drains, and geocellular tanks. In order to accommodate further underground attenuation storage, a further review is required at detailed design stage to accommodate maximised on-site underground attenuation where possible to contain surface water during these events.

A preliminary source control simulation model has been run in the event that with an assumption of no water can discharge from the system during a 1 in 100 year + 20% CC and 1 in 100 + 30% CC. The summarised of the attenuation volume is populated in Table 3.

Table 3. Outline Attenuation Details

Catchment Area	Runoff Rate (l/s/ha)	Peak Discharge (l/s)	Return Period & Outline Attenuation (m^3)	
			100yr+20%cc	100yr+30%cc
Underground - platform gravelled voids, geocellular storage and filter drains	Unrestricted flow	^241.60 (1 in 100 + 20%CC) / ^244.90 (1 in 100 + 30%CC)	337 < 990 therefore during free-flowing outfall conditions the attenuation is adequate	372< 990 therefore during free-flowing outfall conditions the attenuation is adequate
	Unrestricted flow (Outfall flap valve closed)	0.00	3071 > 990 therefore during restricted/closed outfall conditions the attenuation below ground is not adequate. Above ground storage required during high storm events	3327 > 990 therefore during restricted/closed outfall conditions the attenuation below ground is not adequate. Above ground storage required during high storm events

Notes:

- ^The peak discharge rates are based upon drainage modelling output from the Micro Drainage. The unrestricted flow peak discharge rate varies depending on the rainfall events, pipe gradient and pipe diameter.
- Initial above ground storage volume calculated to be circa 1410m^3, this figure will require some refinement at detailed design stage along with detailed modelling of ground surface areas and potential amendments to ground surface areas to accommodate final above ground storage volumes.

As mentioned above, based upon the preliminary Micro Drainage source control modelled exercise, in terms of attenuation storage, the total volume estimated to be 3071m^3 to be provided on site (for worst case storm duration 1 in 100 + 20%CC). However, due to the space constraints on site, a maximised total attenuation storage volume circa of 990m^3 is provided below ground with an additional circa 1410m^3 above ground storage, broadly in the lowest areas / ground within the development site. Therefore, this leaves residual attenuation storage of circa 670m^3 storage which will be included in additional mitigation measures.

Both formal and informal attenuation storage volumes shall be considered further at the detailed design stage. Typical mitigation measures require to be considered through design development in consultation with the Client / lead designer, including (not exhaustive):

- Further detailed assessment of the outfall conditions and associated hydraulic performance, potentially including positive discharge criteria under surcharge conditions.
- The site design levels for, platforms, buildings and associated infrastructure fully worked through and in relation to the existing topography.
- A rationalised approach to informal / above ground storage arrangements reviewed in combination with more formal underground storage measures and a fully integrated drainage design. This may include a review of the proposed site level to accommodate additional above ground storage.

Final attenuation storage volume will be confirmed following confirmation of allowable discharge rate, development layout, assumption of still water level at the Shannon Estuary and discharge locations.

3.2.5 3.2.5 Surface Water Modelling Package

The drainage model for the site was constructed using the industry standard Micro Drainage Windes Program by XP Solutions.

The model was constructed to assess the proposed network against varying storm intensities to determine performance under extreme storm event conditions.

The purpose of the drainage model is to validate the proposed design.

3.2.6 3.2.6 Rainfall Inputs Assumptions

Rainfall inputs were extracted from the Flood Studies Report (FSR) mapping via Micro Drainage.

- UK Rainfall
- Region: Scotland and Ireland
- M6 - 60 (mm): 16.500
- Ratio R: 0.300

3.2.7 3.2.7 Network Analysis – Model Construction

The drainage model was constructed using the Micro Drainage 'DrawNet' modelling package.

Factors such as attenuation storage and either surcharge or submersible outfall conditions were then incorporated into the model using the Micro Drainage 'Simulation' package.

Details include:

- Storage tanks representing the runoff storage achieved in the voids within the gravelled area or geocellular cell, and;
- Orifice plate flow restriction representing the flow control devices.

3.2.8 3.2.8 Drainage Modelling Assumptions

Assumptions made in the modelling of the drainage design are noted below:

- Assumption of no infiltration is allowed within the proposed development site.
- Assumption of discharge rate from the site is unrestricted flow with a suitability of an existing outfall.
- Assumption of the tie-in existing outfall of 0.310m only allow / accept the current proposed surface water drainage catchment boundary indicated on surface water layout.
- The proposed tie-in pipe outfall diameter of SE3 / outfall 9 & 8 as 0.310m with outlet level of +3.89m ODP. The upstream tie-in outfall invert level is unknown with the assumption of invert level of +4.58m ODP pending on further drainage investigation during detailed design stage.
- Assumption of only OCGT development site is discharged to the tie-in outfall SE3 / outfall 9 & 8 and no external surface water run-off out with the development area is contributed to the outfall SE3 / outfall 9 & 8.
- Assumption of site finished ground level (FGL) of +6.00m ODP at the tanks platform area and +6.40m ODP throughout the generator / turbine platform area.
- A minimum diameter of 75mm of orifice plates is require if to be used to prevent blockages on any throttle devices within the upstream network.
- The outfall is to be modelled under unrestricted flow free discharge with further assessment of submersible outfall conditions with an assumption of a constant still water flood levels of +6.85m ODP for 0.1% AEP and +6.60m ODP for 1% AEP. The figures are used on the surface water drainage modelling exercises up to duration of assuming 4320 minutes (72 hours).
- The assumption of backflow storage is required to be provided to compensate localise development surface water flooding issue during both critical storm and tide water rise where it is occurred simultaneously on site.
- Rainfall intensity of 50mm/hr.

- Pipe roughness k value of 0.6mm.
- PIMP (Percentage Impervious)
  - Roads and concrete hardstanding areas = 100%
  - Gravelled and unbound surfaced areas = 95%
  - Grassed areas = 30%
- The assumption of typical filter drains storage width as 1.20m wide.
- The assumption of typical platform gravelled storage depth as 0.45m deep.
- A void percentage of 30% and 20% have been assumed in the modelling for the filter drains and type 3 gravelled surfaced areas within the platform respectively.
- A void percentage of 95% has been assumed in the modelling of the geocellular attenuation cell.

3.2.9 3.2.9 Network Simulation

The following table identifies the design parameters relating to the network simulations undertaken through the Micro Drainage modelling packages. These modelled a series of winter and summer rainfall events ranging in duration from some 15 min – 10880 min.

The simulation criteria are outline in Table 4 below with the modelling result in Appendix K.

Table 4. Network Simulation Criteria

Return Period (Years)	Climate Change	Simulation Outputs
100	20	No flooding permitted under free discharged condition
1000	0	A check of flood depth under free discharged condition to ensure major equipment does not get affected by the flood water / level

3.3 3.3 Flood Resilience

As mentioned at Section 3.2.8, the finished ground levels at +6.40m ODP within generator / turbine platform area and at +6.00m ODP within the tank platform area. Under Section 5 of this report, a coastal flood defence wall is being designed within the perimeter of the Tarbert sub-station site with flood defence wall crest level is at +7.54m ODP to prevent coastal flooding into the OCGT development site or via versa which will prevent the surface water flood flow path from the OCGT development site channelled into the Shannon Estuary during critical storm events.

From the preliminary drainage modelling exercises, whilst the outfall SE3 / outfall 9 & 8 is under unrestricted free discharge condition with only platform gravelled act as attenuation volume, the OCGT development site is not affected by fluvial flooding during 1% AEP (1 in 100) + 20% CC. However, during 0.1% AEP (1 in 1000), the site is marginally affected by the fluvial flooding by the total surface water flood volume of circa 60.50m^3 which is negligible across the proposed development area of 2.230ha with flood depth of circa 0.003m.

Further surface water drainage network assessment had been carried out to assess if during extreme rainfall events coinciding with the estuary tide rises, which the outfall SE3 / outfall 9 & 8 is under unrestricted submersible discharge condition whilst it is preventing the surface water run-off discharge freely into the estuary.

From the preliminary drainage modelling exercises with the current proposed additional underground filter drains and geocellular attenuation tanks within the OCGT development site, the site is affected by the fluvial flooding during 1% AEP (1 in 100) + 20% climate change (CC) and 0.1% AEP (1 in 1000).

As discussed above, the external proposed finished ground level will be designed to fall away from the generator / turbine platform area to ensure overland flows are routed away from the critical infrastructures during extreme rainfall event with intensity in excess of the drainage system where coincide as the estuary tide rises.

In the previous section, it is indicated a preliminary coastal flood defence wall is proposed around the perimeter of the proposed OCGT development site. Therefore, it suggested that any fluvial flooding from the development site will be channelled to the lowest ground, and it shall be contained within the site either with additional underground

storage or informal / formal above ground storage where the coastal flood defence wall is preventing the surface water flood flow path channelled out-with the development site.

The assumption of the lowest ground level within the OCGT development site is within the proposed tank platform area plus northern area which is estimated as +6.00m ODP. It should be noted that based on surface water modelling for the current site arrangement, there will be localised flooding or above ground storage within the site. The surface water flood depth during 1% AEP (1 in 100) + 20% CC and 0.1% AEP (1 in 1000) are circa as 250mm and circa 345mm respectively with the circa 4700m2 storage area which had been excluded the bunded / tank areas. Further drainage modelling / studies with the above mitigation measure is required to be carried out at detailed design stage to confirm permissible and safe surface level flood storage and depth in line with the site's proposed emergency strategy. The preliminary outlined of the surface water flood extent indicated in yellow hatching / area is shown in Figure 3-5.

Figure 3-5: Preliminary floods extend with assumption of at +6.00m ODP ground level.

3.4 3.4 Maintenance Plan

The ongoing management and maintenance of the proposed surface water drainage systems will fall under the responsibility of the Site owner. Best practice maintenance information is provided within the CIRIA SUDS Manual, excerpts of which have been included below.

3.4.1 3.4.1 Piped Drainage & Manhole Chambers Maintenance Schedule

Drainage infrastructure covered in this section includes all privately-owned manholes, manhole fittings and surrounding pipework, gullies and drainage channels. Correct operation of this drainage infrastructure allows collection and transportation of water but requires regular maintenance as described in Table 5.

Table 5. Piped Drainage and Manhole Chambers Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Before Start up	Removal of any inappropriate material from within the chamber and dispose off-site to a suitable licenced site.	At Start
	All pipelines to be flushed with water to remove silt and check for blockages	At Start
Regular Maintenance	Removal of debris (which could include leaves, rubbish, branches) from areas served by drainage (where it may cause risk to performance)	Monthly
Remedial Actions	For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock.	As required
	For pipe blockages, rod or jet clean between access points to unblock	As required
Monitoring	Lift covers and inspect chambers. Inspect covers, surrounding gullies and drainage channels for signs of damage and incorrect operation. If required, undertake remedial action.	As required

Source: CIRIA C753 SuDS Manual

3.4.2 3.4.2 Filter Drains

Filter Drains attenuate and convey surface water runoff from hardstanding areas including platforms and parking bays. Table 6 shows a typical maintenance schedule for filter drains.

Table 6. Filter Drain Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Before Start up	Removal of any inappropriate material from within the chamber and dispose off-site to a suitable licenced site.	At Start
	All pipelines to be flushed with water to remove silt and check for blockages	At Start
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockage, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Remedial Actions	For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock.	As required
	For pipe blockages, rod or jet clean between access points to unblock	As required
Monitoring	Lift covers and inspect chambers. Inspect covers, surrounding gullies and drainage channels for signs of damage and incorrect operation. If required, undertake remedial action.	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required

Source: CIRIA C753 SuDS Manual

3.4.3 3.4.3 Geocellular Storage

Geocellular storage attenuate surface water runoff from hardstanding areas including roads and parking. Table 7 shows a typical maintenance schedule for geocellular storage.

Table 7. Geocellular Storage Maintenance Schedule

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

Source: CIRIA C753 SuDS Manual

3.4.4 3.4.4 Oil Separators

Oil separators are drains and tanks which separate oil from water, trapping the oil and preventing contaminated water from entering waterway and the soil.

Flooding, or separator blockages can lead to pollution. To avoid this, it is imperative that a regular maintenance and cleaning schedule is implemented, which mitigates the risks of an environmental incident.

Fuel and oil separator installation and maintenance is regulated by the European standard EN858-2. The regulation requires inspections and separator maintenance to be conducted every 6 months. The following maintenance should be carried out during separator cleaning and servicing:

- Inspect the integrity of the separator and all mechanical parts,
- Inspect all filters and replace or repair as required,
- Assess the amount of collected contaminants (oil and fuel) and silt,
- Service any electrical systems including volume alarms and any interceptor management systems,
- Inspect the coalescing device if installed, and replace if required,
- Conduct safe silt/contaminant removal in accordance with waste transit and disposal regulations.

4. Proposed Sustainable Urban Drainage Systems (SuDS)

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) in accordance with the guidelines of the SuDS CIRIA Manual C753. The aim of the proposed drainage system is to replicate the natural characteristics of rainfall run-off, minimising the environmental impact from rainfall events by reducing the run-off leaving the site for small rainfall events.

SuDS are designed to manage water quantity reducing/preventing the likelihood of flooding from the proposed development and to maximise the opportunities and benefits from surface water management.

Based on the existing site topography and the proposed site layout, the following SuDS measures have been provided to treat the surface water runoff, to replicate the natural characteristics of the greenfield runoff and minimise the environmental impact.

- **Gravel Filter Bed** – Provides treatment to roof and hardstanding areas.
- **Proprietary treatment system** – Provides treatment to non-residential carparking infrequent change i.e., < 300 traffic movements/day
- **Oil Separator**
- **Filter Drain**

4.1 4.1 Gravel Bed Filter & Proprietary Treatment System

The CIRIA SuDS Manual (C753) outlines an approach to SuDS selection. The guidance suggests a risk based approach based on land use type and specific contaminants. The design is therefore developed based on a Simple Index Approach (SIA), The SIA assigns a pollution hazard index to runoff from a proposed land use type, and a mitigation index to a proposed SuDS feature. Where the mitigation index is greater or equal to the pollution hazard index, compliance with the guidance is achieved. Where more than one SuDS feature is utilised the following calculation is used to calculate the mitigation index:

Total SuDS mitigation index = mitigation index$_1$ + 0.5 (mitigation index$_2$)

The proposed scheme therefore looks to implement the following SuDS components:

- **Gravel Filter Bed** – Provides treatment to roof and hardstanding areas.
- **Proprietary treatment system** – Provides treatment to non-residential carparking infrequent change i.e., < 300 traffic movements/day

Performance with reference to the guidance using the SIA is demonstrated in Table 8.

Table 8. SIA for Proposed SuDS Feature

Area	Proposed SUDS	Indices	TSS	Metals	Liquid Hydrocarbons
Roof/Hardstanding	Gravel filter bed	Pollution	0.3	0.2	0.05
		Mitigation	0.4	0.4	0.4
Non-residential car parking with infrequent change	Gravel filter bed	Pollution	0.5	0.4	0.4
		Mitigation	0.4	0.4	0.4
	Proprietary treatment system	Mitigation	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Table 8 demonstrated that the pollution hazard associated with areas of the scheme can be sufficiently mitigated by the either with proposed SuDS features or combination of SuDS features with proprietary treatment system within the scheme. Drainage to access and parking areas and fuels refuelling areas will be subject to further review as the design develops and may require additional treatment following confirmation of anticipated frequency of use, drainage pathways and surface water disposal arrangements.

4.2 4.2 Oil Separator

In general, the OCGT development site is using the source control SuDS such as platforms and filter drains gravelled media to treat the surface water runoff from the generator / turbine and the tank platform areas prior discharging to the Shannon Estuary. In additional to the SuDS source control, there are proposed 3 nos. of oil separators within the OCGT development site to treat surface water runoff primarily from the access road, oil fuelling loading bays and car parking bays.

The gradients of the pavements in the oil fuelling areas will fall towards a linear channel drain, which will then be directed into an oil separator. The proposed oil separator within the fuelling bays adjacent to fuel tanks will be FS010 forecourt separator by Klargester or equal approved. The assumption of providing one no. of forecourt separator with the forecourt separator oil capacity of 10,000L is based upon 1 no. of oil tanker in the event of a compartment leaking with the maximum loss of per compartment, which is assuming would be 7,200L could be captured by the proposed forecourt separator.

There are proposed 2 nos. of bypass oil separators at downstream of the car parking bay and at upstream of the final tie-in manhole to treat the overall OCGT development site prior discharging the surface water runoff to the Shannon Estuary. The proposed bypass oil separators will be NSBP003 and NSBE010 respectively by Klargester or equal approved. The assumption of the proposed bypass oil separators is based upon the car parking bay including a section of access road adjacent to the car parking bay and main access road. The surface water drained areas which are 510m^2 and 3445m^3 respectively. An extract of the surface water drained area is shown in Figure 4-1.

Figure 4-1: An extract of surface water drained area for the proposed bypass oil separators

Location and detail of the oil separators have been shown for planning approval purposes only. Final configuration is subject to detailed design changes and supplier's requirements. Any associated controls or warning systems need to be considered at later design stages.

4.3 4.3 Filter Drains

Filter drains can help to reduce pollutant levels in runoff by filtering out fine sediments, metals, hydrocarbons and other pollutants.

Filter drains are generally 1-2m deep, with a minimum depth of filter beneath any inflow distribution pipework and outfall collection systems of 0.5m to ensure reasonable levels of pollutant removal. Filter drains have been provided adjacent to the impermeable roads wherever possible. Refer to Figure 4-2 below for typical filter drain. The filter drains for the development will be lined with an impermeable flexible membrane as infiltration is not possible throughout the site.

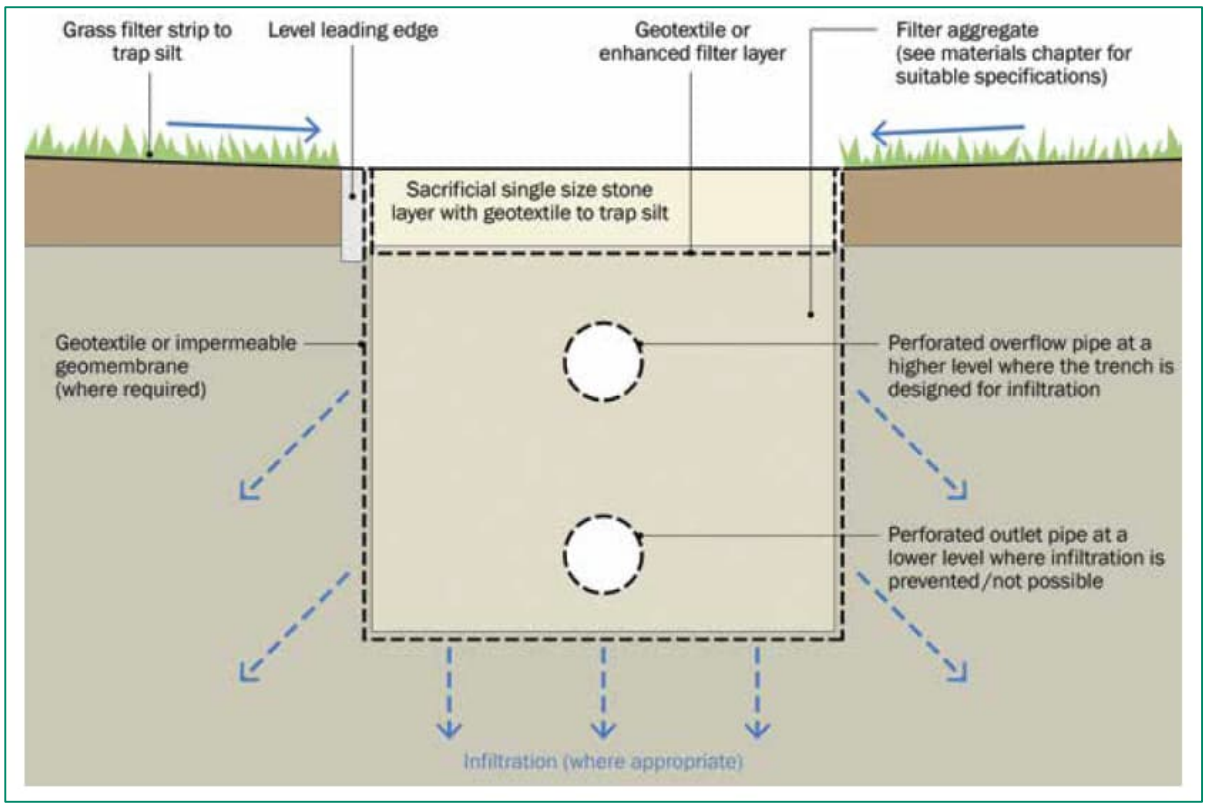


Figure 4-2: Typical Filter Drain System (Source: Extract from CIRIA C753)

5. Conclusion

Section 2 of this report was prepared for the purposes of assessing the flood risk to the proposed development and noted the following conclusions:

- Based on the information reviewed, AECOM have concluded that coastal or tidal flooding was considered to be of potential risk to the development. Sections of the proposed development are located within Flood Zone B. Given that the sequential approach was followed appropriately and all sections within the Justification Test were satisfied, the proposed development is deemed to be suitable for construction in accordance with the Kerry County Development Plan, and the Shannon Integrated Framework Plan. A supplementary Tarbert Flood Defence Re Alignment report has also been prepared by AECOM outlining a revised alignment of the coastal flood defence wall to support the latest planning application of the OCGT development site, which includes a new proposed flood defence wall, which mitigates potential coastal flooding.

- Based on the information reviewed, AECOM have concluded that fluvial flooding can be considered as negligible risk to the existing site. AECOM have reviewed the CFRAM Flood Maps available and noted that no maps were developed for the Fluvial Flood Risk. OPW historical flooding records detail reports of coastal

flood event sonly. The proposed development drainage plan has been developed to mitigate fluvial flood risk, through the combination of conventional drainage systems and Sustainable Urban Drainage Systems.

- The CFRAM maps did not develop a study for the subject area for pluvial flooding, only showing the Dublin City area, with the available information showing the site is not at risk to pluvial flooding. There is no recorded pluvial flooding data for the subject site or surrounding vicinity. In accordance with The Planning System & Flood Risk Guidelines, the proposed drainage network has been designed to cater for suitable surface water runoff during significant rainfall events. To further mitigate against pluvial flood risk, an effective surface water strategy will be developed for the site which includes a 20% increase for Climate Change.

Section 2.4 of this report was prepared for the purposes of carrying out the Sequential Approach & Justification test in line with Planning System & Flood Risk Management Guidelines. This section noted the following conclusions:

- The Sequential Approach concluded that based on sections of the site being contained within Flood Zone B and the development being classified as “Highly Vulnerable”, the Justification Test was necessary in order to satisfy development in this area. The Justification Test criteria and results are summarized below:

1) The subject site and surroundinl development have been zoned appropriately in accordance with the Kerry County Development Plan, and the Shannon Integrated Framework Plan. The proposed development is located within the Tarbert-Ballylongford strategic development land zone.

2) i) The run-off generated within the site boundary will be attenuated and discharged at a rate of Qbar of 6.6 l/s/ha. A standalone Tarbert Bio-Fuel Plant Review of Coastal Flood Defence Design report has been prepared by AECOM which details the specific proposed flood defence schemes for the Tarbert Power Station

   ii) An extract from the Tarbert Bio-Fuel Plant Review of the Coastal Flood Defence Design concludes that *‘Adding the freeboard and settlement allowance to the design still water level gives a design crest level for the new flood defence structures of +7.54m ODP or +4.84m Ordnance Datum Malin (ODM)’.*

   iii) Access roads within the proposed development have been accounted for so that the potential flood risk is negligible, to allow for activity along these roads to be mainatined should flooding occur.

   iv) The proposed development has been designed in line with the KCDP, SIFP, and The Planning System & Flood Risk Management Guidelines core objectives and policies to promote urban design benefits.

Section 3.2 of this report was prepared for the purposes of assessing the surface water modelling and calculations for the proposed development and noted the following conclusions:

- The drainage strategy has been developed with reference to current good practice and to provide separate foul and surface water drainage networks within the OCGT development site.
- The surface water discharge from the site currently modelled as unrestricted flow discharge pending on final agreement with KCC.
- The current outfall within the drainage network is subject to tidal flows and surcharge condition. Combination of onsite underground attenuation storage with formal / informal above ground attenuation storage will be required to attenuate additional flows during coastal flood event.
- Flood resilient construction can be defined as either raise the finished ground level, as constructing a concrete plinth above the flood water level plus freeboard for the critical equipment / infrastructure or constructing a building in such a way as to prevent surface water flood water entering the building and prevent damaging its equipment, but also reduce the impact of surface water flood waters should they enter a building.
- Based upon the preliminary Micro Drainage source control modelled exercise, in terms of attenuation storage, the total volume estimated to be 3071m^3 to be provided on site (for worst case storm duration 1 in 100 + 20%CC). However, due to the space constraints on site, a maximised total attenuation storage volume circa of 990m^3 is provided below ground with an additional circa 1410m^3 above ground storage, broadly in the lowest areas / ground within the development site. Therefore, this leaves residual attenuation storage of circa 670m^3 storage which will be included in additional mitigation measures.
- Both formal and informal attenuation storage volumes shall be considered further at the detailed design stage. Typical mitigation measures require to be considered through design development in consultation with the Client / lead designer, including (not exhaustive): -

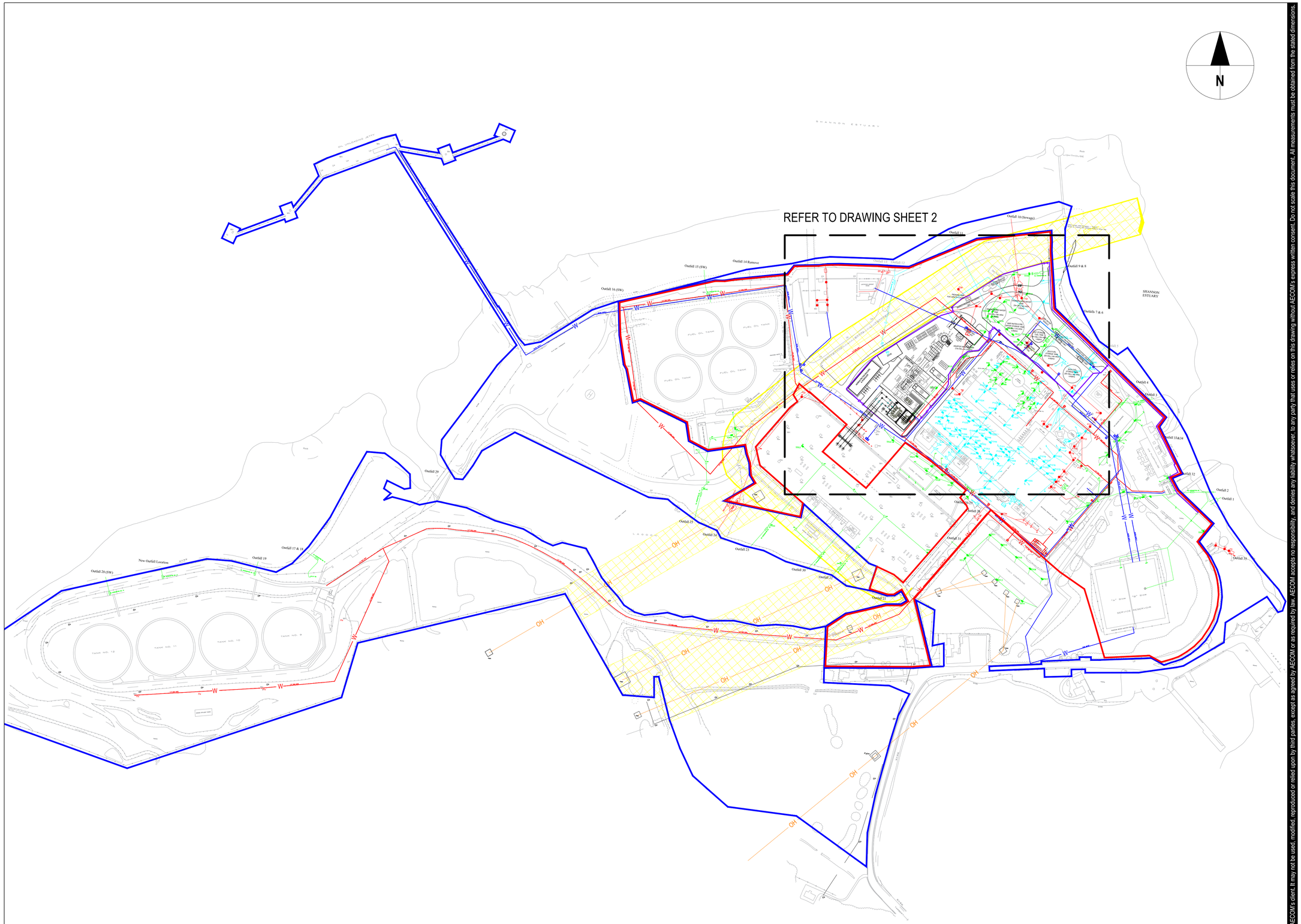
  - Further detailed assessment of the outfall conditions and associated hydraulic performance, potentially including positive discharge criteria under surcharge conditions.
  - The site design levels for, platforms, buildings and associated infrastructure fully worked through and in relation to the existing topography.
  - A rationalised approach to informal / above ground storage arrangements reviewed in combination with more formal underground storage measures and a fully integrated drainage design. This may include a review of the proposed site level to accommodate additional above ground storage.

- Final attenuation storage volume will be confirmed following confirmation of allowable discharge rate, development layout, assumption of still water level at the Shannon Estuary and discharge locations.
- It is proposed that SuDS treatment is provided by a gravelled filter media or combination of gravelled filter media and proprietary treatment system. SuDS arrangements and suitability will be confirmed as the design progresses.
- All either existing or proposed outfalls and drainage outlets require flap valves or flood gates to prevent backflow during extreme events. Sealing or flood protection mitigation of all pipework, chambers and ducts or sealed manhole covers immediately outside of flood defence wall to be considered at detailed design stage.
- Existing drainage arrangements are subject to further survey to confirm location, level and capacity. Any connection to existing networks will require agreement from the asset owner.

Section 4 outlined the SuDS measures being proposed across the development and how they will positively impact the surface water runoff and water quality, satisfying the Kerry County Council's planning requirements.

Appendix A – Proposed Drainage Layout

Please refer to drawing 60695232-TBT-DR-DR-005.



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	PROPOSED PLANT AND ROADS
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OH	OVERHEAD ELECTRICAL CABLE
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D	EXISTING PROCESS WATER DRAINAGE
FW	EXISTING FOUL WATER DRAINAGE
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EXISTING COMBINED UTILITIES PLAN
SHEET 1 OF 8

DOCUMENT NUMBER

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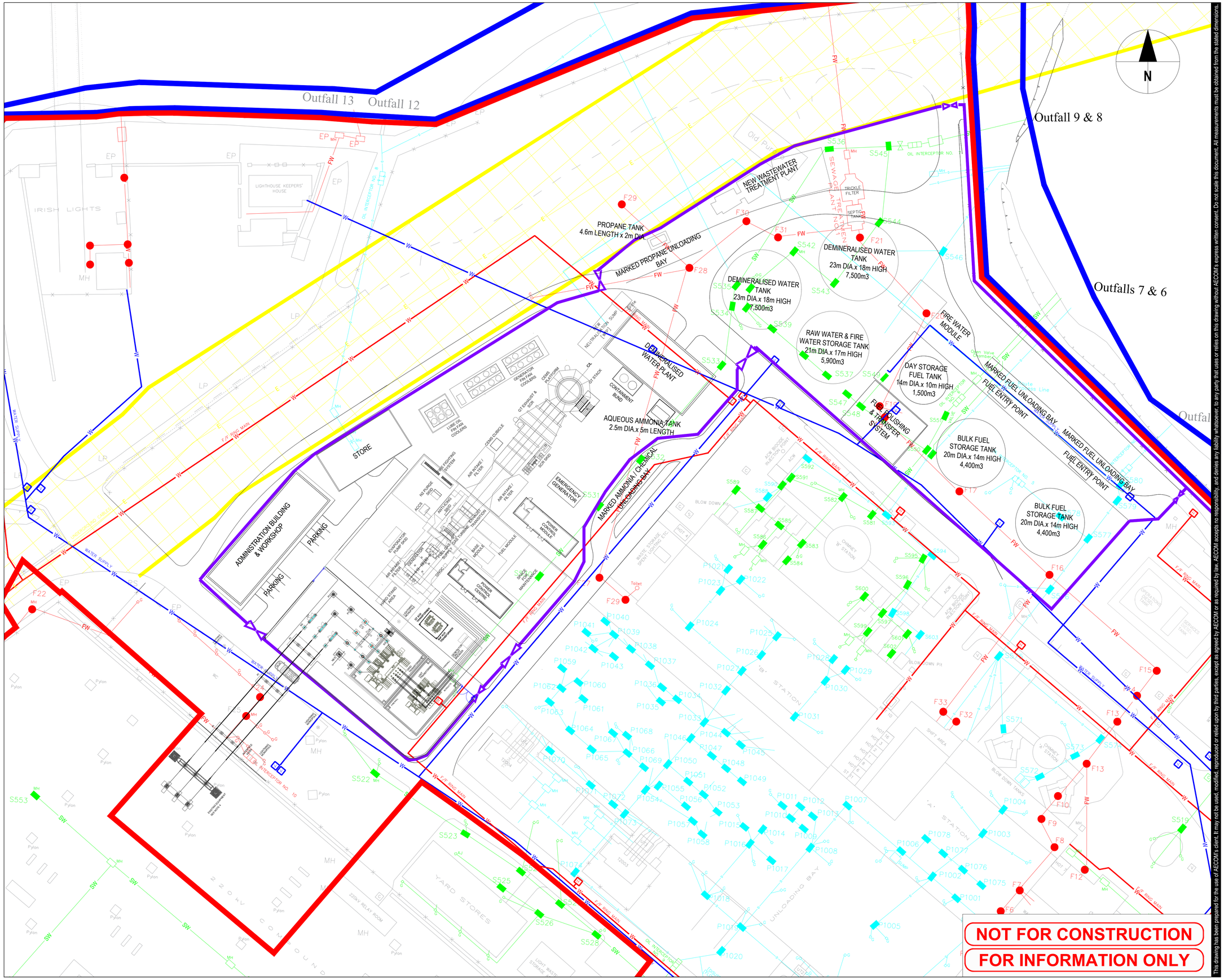

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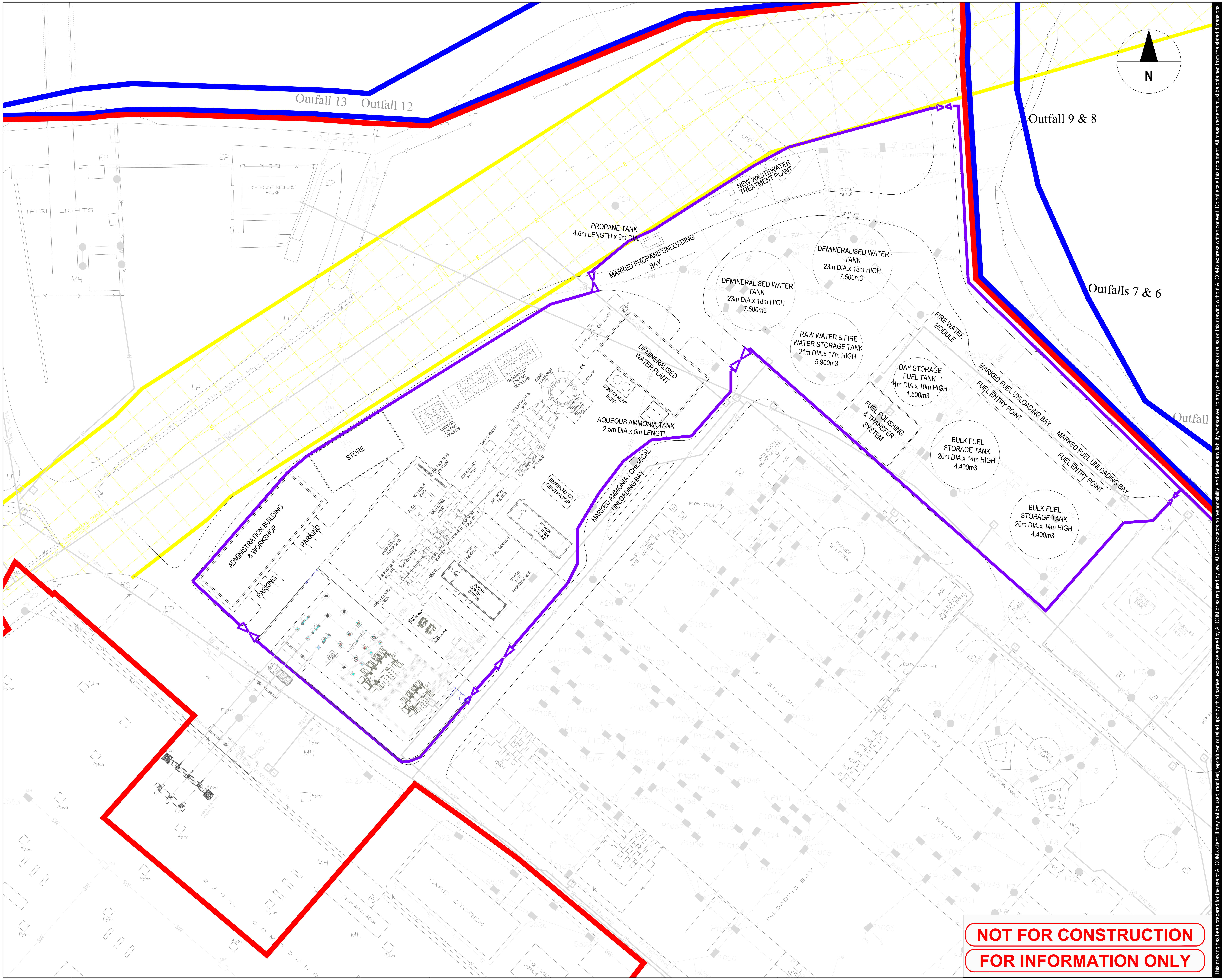

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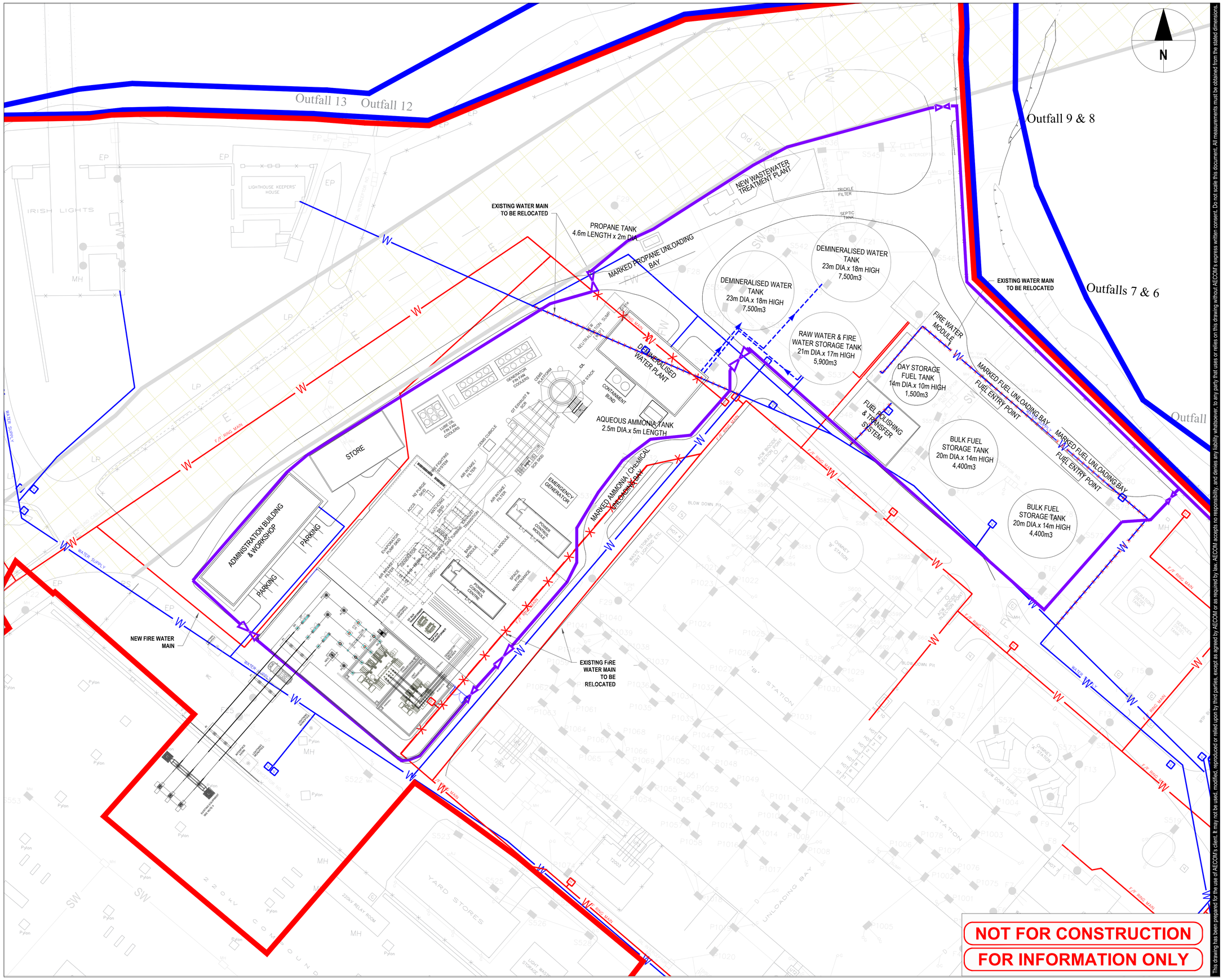

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	EXISTING SURFACE & PROCESS WATER MANHOLES
	EXISTING FOUL WATER MANHOLES
G	EXISTING GULLY
AJ	EXISTING ARMSTRONG
H	EXISTING FIRE HYDRANT
	PROPOSED DEMIN WATER PIPELINE

NOTES

1. UTILITIES SHOWN ARE INDICATIVE FOR PLANNING APPROVAL PURPOSES ONLY AND MAY BE SUBJECT TO CHANGE UPON FURTHER SITE SURVEY
2. EXISTING UTILITIES TO BE POSITIVELY IDENTIFIED ON SITE PRIOR TO ANY SITE WORKS
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4. TO BE PRINTED AT A1.

0 12.5 25 m
1:500

DRAWN BY

CONOR COONEY

ISSUE/REVISION

B	22/11/2023	FOR PLANNING
A	09/10/2023	FOR COMMENT
I/R	DATE	DESCRIPTION

PROJECT NUMBER

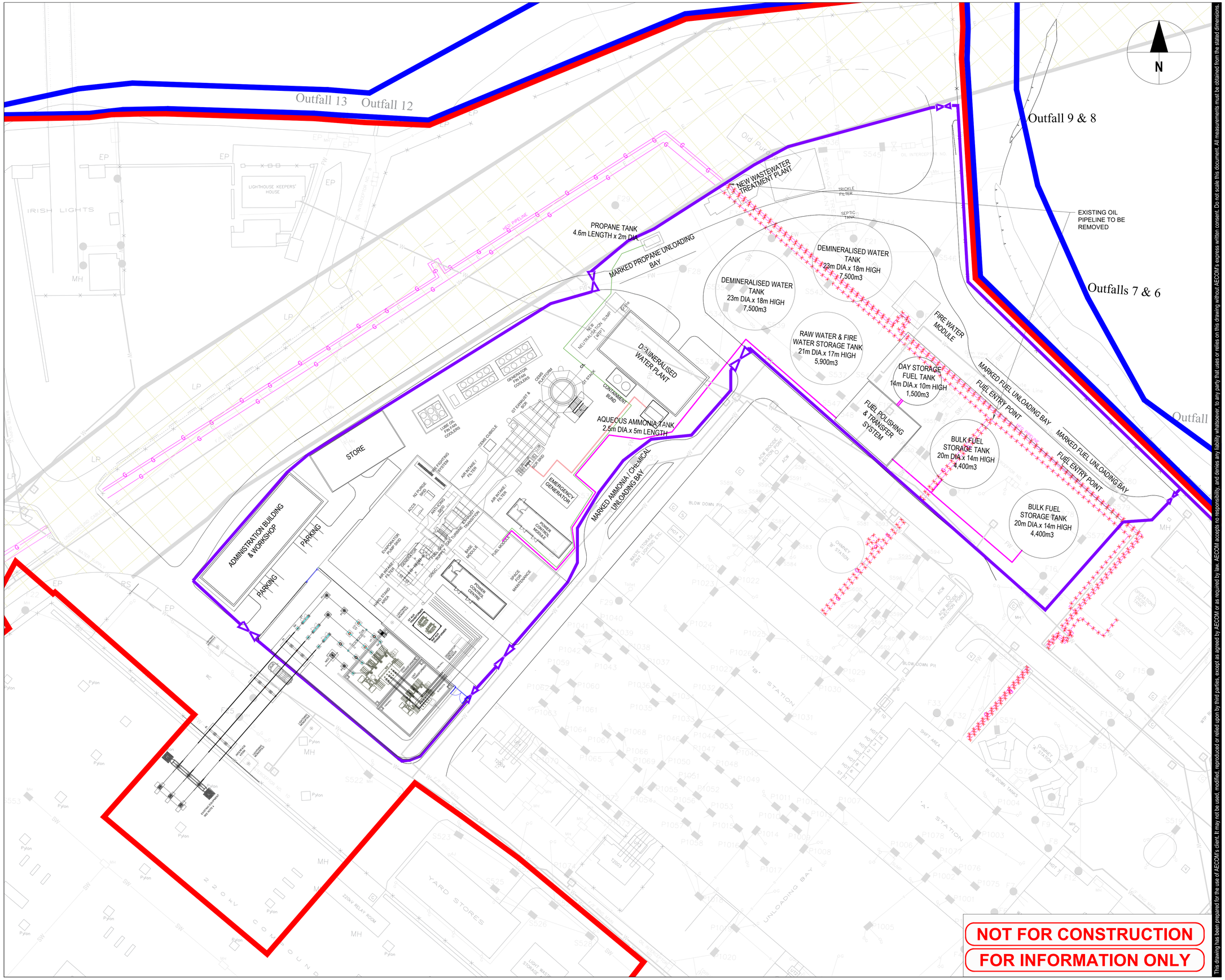
60695232

SHEET TITLE

EXISTING AND PROPOSED WATER MAINS AND DEMIN WATER LINES SHEET 4 OF 8

DOCUMENT NUMBER

60695232-TBT-DR-005



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PROJECT

TARBERT NEXT GENERATION POWER STATION

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CONSULTANT

AECOM
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+44 (0) 141 202 0500
www.AECOM.com

LEGEND

	PROPOSED DEVELOPMENT SITE
	ADJOINING OR ADJACENT LAND TO THE RED LINE BOUNDARY UNDER CONTROL OF THE APPLICANT
	PROPOSED FLOOD DEFENCE
	PROPOSED PLANT AND ROADS
	ELECTRICAL CABLE EASEMENT
E	EXISTING 220kV ELECTRICAL CABLE
OH	OVERHEAD ELECTRICAL CABLE
SW	EXISTING SURFACE WATER DRAINAGE
D	EXISTING PROCESS WATER DRAINAGE
FW	EXISTING FOUL WATER DRAINAGE
W	EXISTING WATER MAINS
G	EXISTING OIL/DIESEL PIPELINE
	PROPOSED FUEL PIPELINE
W	EXISTING FIRE WATER RING MAIN
	PROPOSED AMMONIA LINE
XXXX	EXISTING UTILITY FOR REMOVAL
C	EXISTING CABLE MANHOLES
P	EXISTING PIPE MANHOLES
V	EXISTING VALVE MANHOLES
S	EXISTING SUMP MANHOLES
	EXISTING SURFACE & PROCESS WATER MANHOLES
	EXISTING FOUL WATER MANHOLES
C	EXISTING GULLY
AJ	EXISTING ARMSTRONG
H	EXISTING FIRE HYDRANT
	PROPOSED PROPANE PIPELINE

NOTES

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I/R	DATE	DESCRIPTION
B	22/11/2023	FOR PLANNING
A	09/10/2023	FOR COMMENT

PROJECT NUMBER

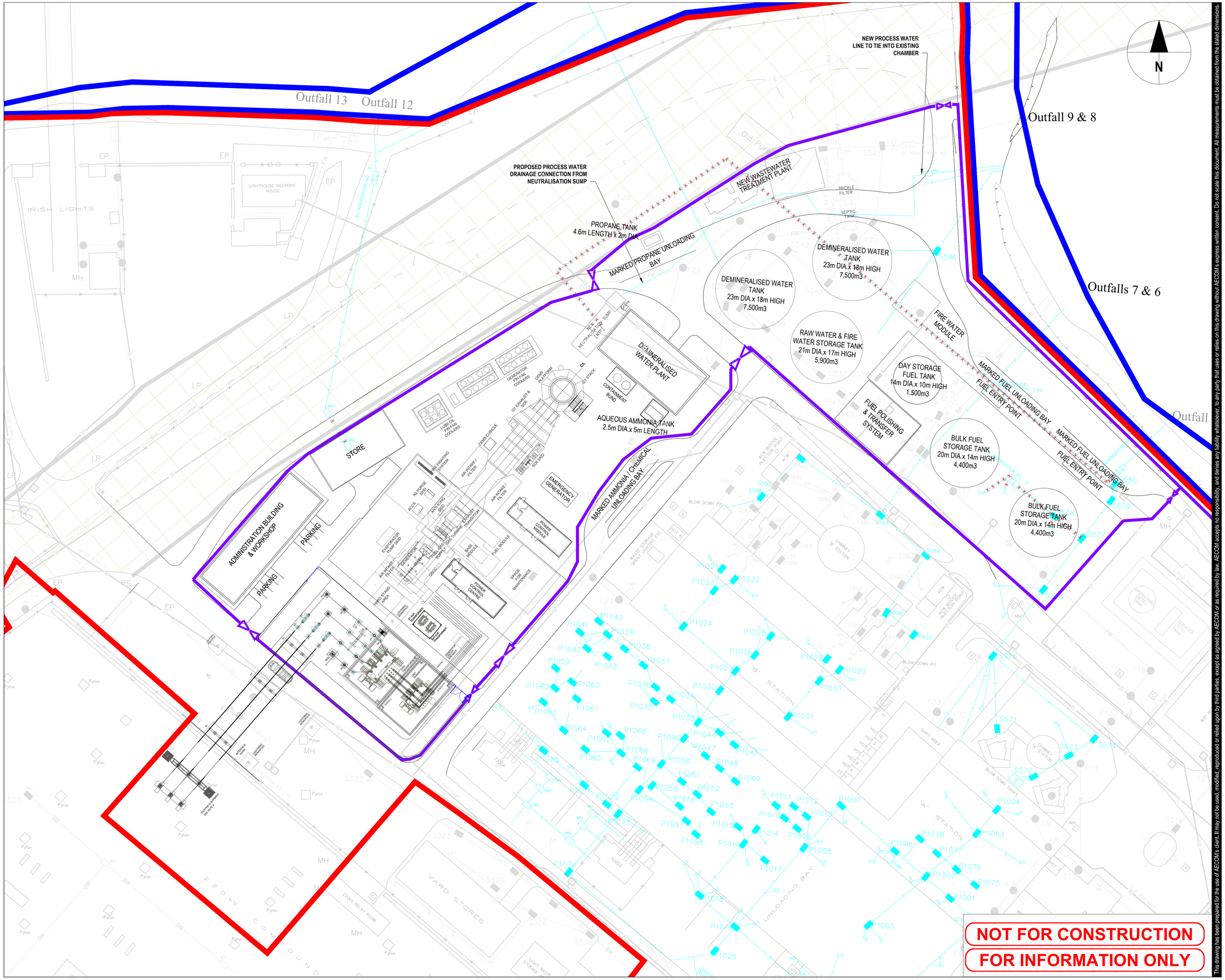
60695232

SHEET TITLE

EXISTING AND PROPOSED PROCESS UTILITIES
SHEET 5 OF 8

DOCUMENT NUMBER

60695232-TBT-DR-005



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LEGEND

	PROPOSED DEVELOPMENT SITE
	ADJOINING OR ADJACENT LAND TO THE RED LINE BOUNDARY UNDER CONTROL OF THE APPLICANT
	PROPOSED FLOOD DEFENCE
	PROPOSED PLANT AND ROADS
	ELECTRICAL CABLE EASEMENT
E	EXISTING 220kV ELECTRICAL CABLE
OH	OVERHEAD ELECTRICAL CABLE
SW	EXISTING SURFACE WATER DRAINAGE
D	EXISTING PROCESS WATER DRAINAGE
	PROPOSED PROCESS WATER LINE
FW	EXISTING FOUL WATER DRAINAGE
W	EXISTING WATER MAINS
G	EXISTING OIL/DIESEL PIPELINE
W	EXISTING FIRE WATER RING MAIN
XXXX	EXISTING UTILITY FOR REMOVAL
C	EXISTING CABLE MANHOLES
P	EXISTING PIPE MANHOLES
V	EXISTING VALVE MANHOLES
S	EXISTING SUMP MANHOLES
	EXISTING SURFACE & PROCESS WATER MANHOLES
	EXISTING FOUL WATER MANHOLES
G	EXISTING GULLY
AJ	EXISTING ARMSTRONG
H	EXISTING FIRE HYDRANT
EP.	EXISTING ELECTRIC CABLE POLE
LP.	EXISTING LIGHTING POLE

NOTES

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A	09/10/2023	FOR COMMENT

PROJECT NUMBER

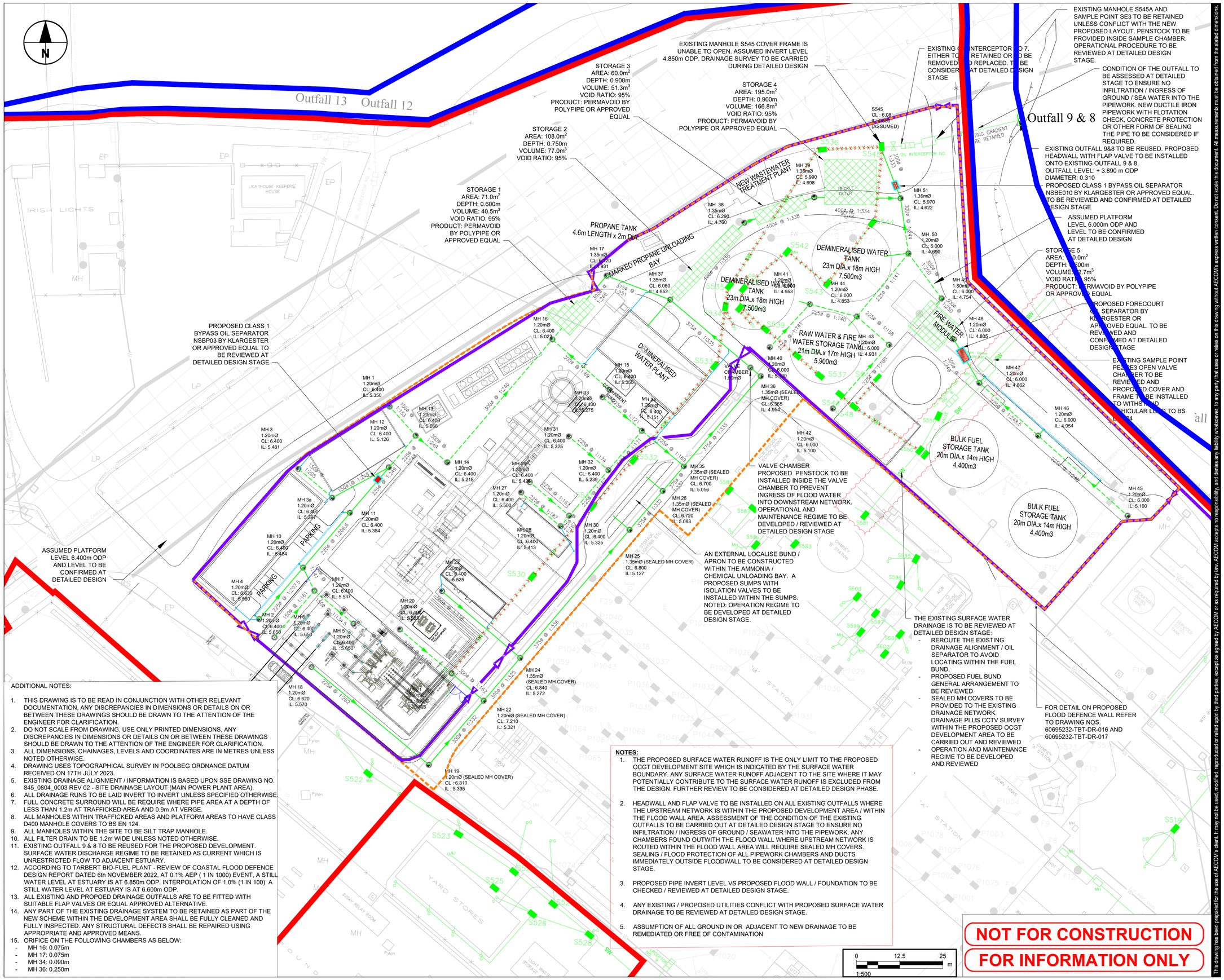
60695232

SHEET TITLE

EXISTING AND PROPOSED PROCESS WATER DRAINAGE SHEET 6 OF 8

DOCUMENT NUMBER

60695232-TBT-DR-005



ADDITIONAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELEVANT DOCUMENTATION, ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN THESE DRAWINGS SHOULD BE DRAWN TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION.
2. DO NOT SCALE FROM DRAWING, USE ONLY PRINTED DIMENSIONS, ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN THESE DRAWINGS SHOULD BE DRAWN TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION.
3. ALL DIMENSIONS, CHAINAGES, LEVELS AND COORDINATES ARE IN METRES UNLESS NOTED OTHERWISE.
4. DRAWING USES TOPOGRAPHICAL SURVEY IN POOLBEG ORDNANCE DATUM RECEIVED ON 17TH JULY 2023.
5. EXISTING DRAINAGE ALIGNMENT / INFORMATION IS BASED UPON SSE DRAWING NO. 845_0804_0003 REV 02 - SITE DRAINAGE LAYOUT (MAIN POWER PLANT AREA).
6. ALL DRAINAGE RUNS TO BE LAID INVERT TO INVERT UNLESS SPECIFIED OTHERWISE.
7. FULL CONCRETE SURROUND WILL BE REQUIRE WHERE PIPE AREA AT A DEPTH OF LESS THAN 1.2m AT TRAFFICKED AREA AND 0.9m AT VERGE.
8. ALL MANHOLES WITHIN TRAFFICKED AREAS AND PLATFORM AREAS TO HAVE CLASS D400 MANHOLE COVERS TO BS EN 124.
9. ALL MANHOLES WITHIN THE SITE TO BE SILT TRAP MANHOLE.
10. ALL FILTER DRAIN TO BE 1.2m WIDE UNLESS NOTED OTHERWISE.
11. EXISTING OUTFALL 9 & 8 TO BE REUSED FOR THE PROPOSED DEVELOPMENT. SURFACE WATER DISCHARGE REGIME TO BE RETAINED AS CURRENT WHICH IS UNRESTRICTED FLOW TO ADJACENT ESTUARY.
12. ACCORDING TO TARBERT BIO-FUEL PLANT - REVIEW OF COASTAL FLOOD DEFENCE DESIGN REPORT DATED 6th NOVEMBER 2022, AT 0.1% AEP (1 IN 1000) EVENT, A STILL WATER LEVEL AT ESTUARY IS AT 6.850m ODP. INTERPOLATION OF 1.0% (1 IN 100) A STILL WATER LEVEL AT ESTUARY IS AT 6.600m ODP.
13. ALL EXISTING AND PROPOED DRAINAGE OUTFALLS ARE TO BE FITTED WITH SUITABLE FLAP VALVES OR EQUAL APPROVED ALTERNATIVE.
14. ANY PART OF THE EXISTING DRAINAGE SYSTEM TO BE RETAINED AS PART OF THE NEW SCHEME WITHIN THE DEVELOPMENT AREA SHALL BE FULLY CLEANED AND FULLY INSPECTED. ANY STRUCTURAL DEFECTS SHALL BE REPAIRED USING APPROPRIATE AND APPROVED MEANS.
15. ORIFICE ON THE FOLLOWING CHAMBERS AS BELOW:
- MH 16: 0.075m
- MH 17: 0.075m
- MH 34: 0.090m
- MH 36: 0.250m

NOTES:

1. THE PROPOSED SURFACE WATER RUNOFF IS THE ONLY LIMIT TO THE PROPOSED OCGT DEVELOPMENT SITE WHICH IS INDICATED BY THE SURFACE WATER BOUNDARY. ANY SURFACE WATER RUNOFF ADJACENT TO THE SITE WHERE IT MAY POTENTIALLY CONTRIBUTE TO THE SURFACE WATER RUNOFF IS EXCLUDED FROM THE DESIGN. FURTHER REVIEW TO BE CONSIDERED AT DETAILED DESIGN PHASE.
2. HEADWALL AND FLAP VALVE TO BE INSTALLED ON ALL EXISTING OUTFALLS WHERE THE UPSTREAM NETWORK IS WITHIN THE PROPOSED DEVELOPMENT AREA / WITHIN THE FLOOD WALL AREA. ASSESSMENT OF THE CONDITION OF THE EXISTING OUTFALLS TO BE CARRIED OUT AT DETAILED DESIGN STAGE TO ENSURE NO INFILTRATION / INGRESS OF GROUND / SEAWATER INTO THE PIPEWORK. ANY CHAMBERS FOUND OUTWITH THE FLOOD WALL WHERE UPSTREAM NETWORK IS ROUTED WITHIN THE FLOOD WALL AREA WILL REQUIRE SEALED MH COVERS. SEALING / FLOOD PROTECTION OF ALL PIPEWORK CHAMBERS AND DUCTS IMMEDIATELY OUTSIDE FLOODWALL TO BE CONSIDERED AT DETAILED DESIGN STAGE.
3. PROPOSED PIPE INVERT LEVEL VS PROPOSED FLOOD WALL / FOUNDATION TO BE CHECKED / REVIEWED AT DETAILED DESIGN STAGE.
4. ANY EXISTING / PROPOSED UTILITIES CONFLICT WITH PROPOSED SURFACE WATER DRAINAGE TO BE REVIEWED AT DETAILED DESIGN STAGE.
5. ASSUMPTION OF ALL GROUND IN OR ADJACENT TO NEW DRAINAGE TO BE REMEDIATED OR FREE OF CONTAMINATION

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LEGEND

	PROPOSED DEVELOPMENT SITE
	ADJOINING OR ADJACENT LAND TO THE RED LINE BOUNDARY UNDER CONTROL OF THE APPLICANT
	DRAINAGE CATCHMENT BOUNDARY
	PROPOSED FLOOD DEFENCE
	PROPOSED PLANT AND ROADS
	ELECTRICAL CABLE EASEMENT
E	EXISTING 220kV ELECTRICAL CABLE
OH	OVERHEAD ELECTRICAL CABLE
SW	EXISTING SURFACE WATER DRAINAGE
	PROPOSED SURFACE WATER CARRIER PIPE
	PROPOSED SURFACE WATER, FILTER DRAIN WITH PERFORATED PIPE
D	EXISTING PROCESS WATER DRAINAGE
FW	EXISTING FOUL WATER DRAINAGE
W	EXISTING WATER MAINS
G	EXISTING OIL/DIESEL PIPELINE
W	EXISTING FIRE WATER RING MAIN
XXXX	EXISTING UTILITY FOR REMOVAL
C	EXISTING CABLE MANHOLES
P	EXISTING PIPE MANHOLES
V	EXISTING VALVE MANHOLES
S	EXISTING SUMP MANHOLES
	EXISTING SURFACE WATER MANHOLES
	EXISTING FOUL WATER MANHOLES
	PROPOSED SURFACE WATER MANHOLES
	PROPOSED GEOCELLULAR STORAGE
	PROPOSED OIL SEPARATOR
	PROPOSED LINEAR DRAINAGE AND SUMP
G	EXISTING GULLY
AJ	EXISTING ARMSTRONG
H	EXISTING FIRE HYDRANT

NOTES

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B	22/11/2023	FOR PLANNING
A	09/10/2023	FOR COMMENT
I/R	DATE	DESCRIPTION

PROJECT NUMBER

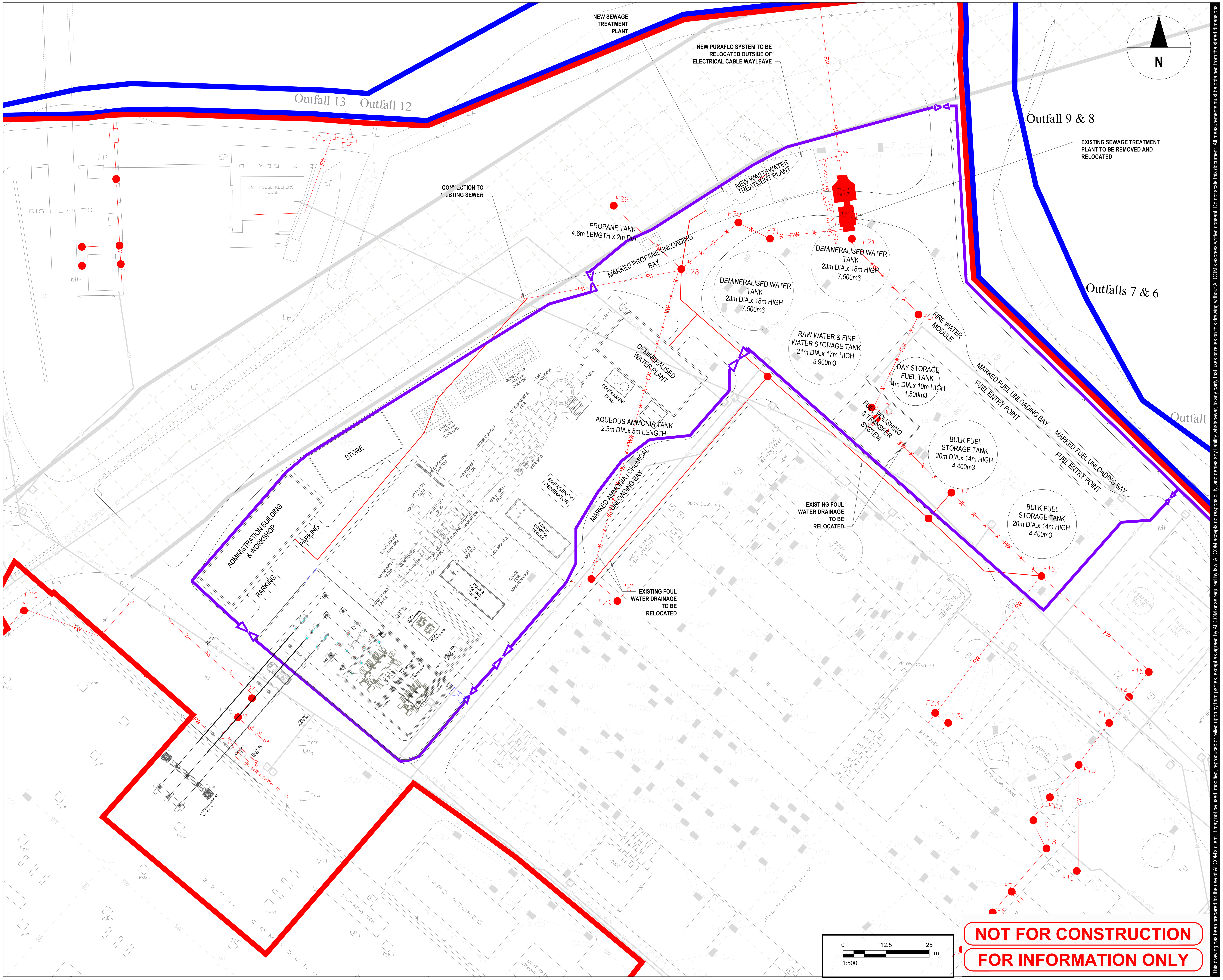
60695232

SHEET TITLE

EXISTING AND PROPOSED SURFACE WATER DRAINAGE SHEET 7 OF 8

DOCUMENT NUMBER

60695232-TBT-DR-005



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	PROPOSED FLOOD DEFENCE
	PROPOSED PLANT AND ROADS
	ELECTRICAL CABLE EASEMENT
E	EXISTING 220kV ELECTRICAL CABLE
OH	OVERHEAD ELECTRICAL CABLE
SW	EXISTING SURFACE WATER DRAINAGE
D	EXISTING PROCESS WATER DRAINAGE
FW	EXISTING FOUL WATER DRAINAGE
	PROPOSED FOUL WATER DRAINAGE
W	EXISTING WATER MAINS
G	EXISTING OIL/DIESEL PIPELINE
W	EXISTING FIRE WATER RING MAIN
XXXX	EXISTING UTILITY FOR REMOVAL
C	EXISTING CABLE MANHOLES
P	EXISTING PIPE MANHOLES
V	EXISTING VALVE MANHOLES
S	EXISTING SUMP MANHOLES
	EXISTING SURFACE & PROCESS WATER MANHOLES
	EXISTING FOUL WATER MANHOLES
G	EXISTING GULLY
AJ	EXISTING ARMSTRONG
H	EXISTING FIRE HYDRANT

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I/R	DATE	DESCRIPTION
B	22/11/2023	FOR PLANNING
A	09/10/2023	FOR COMMENT

PROJECT NUMBER

60695232

SHEET TITLE

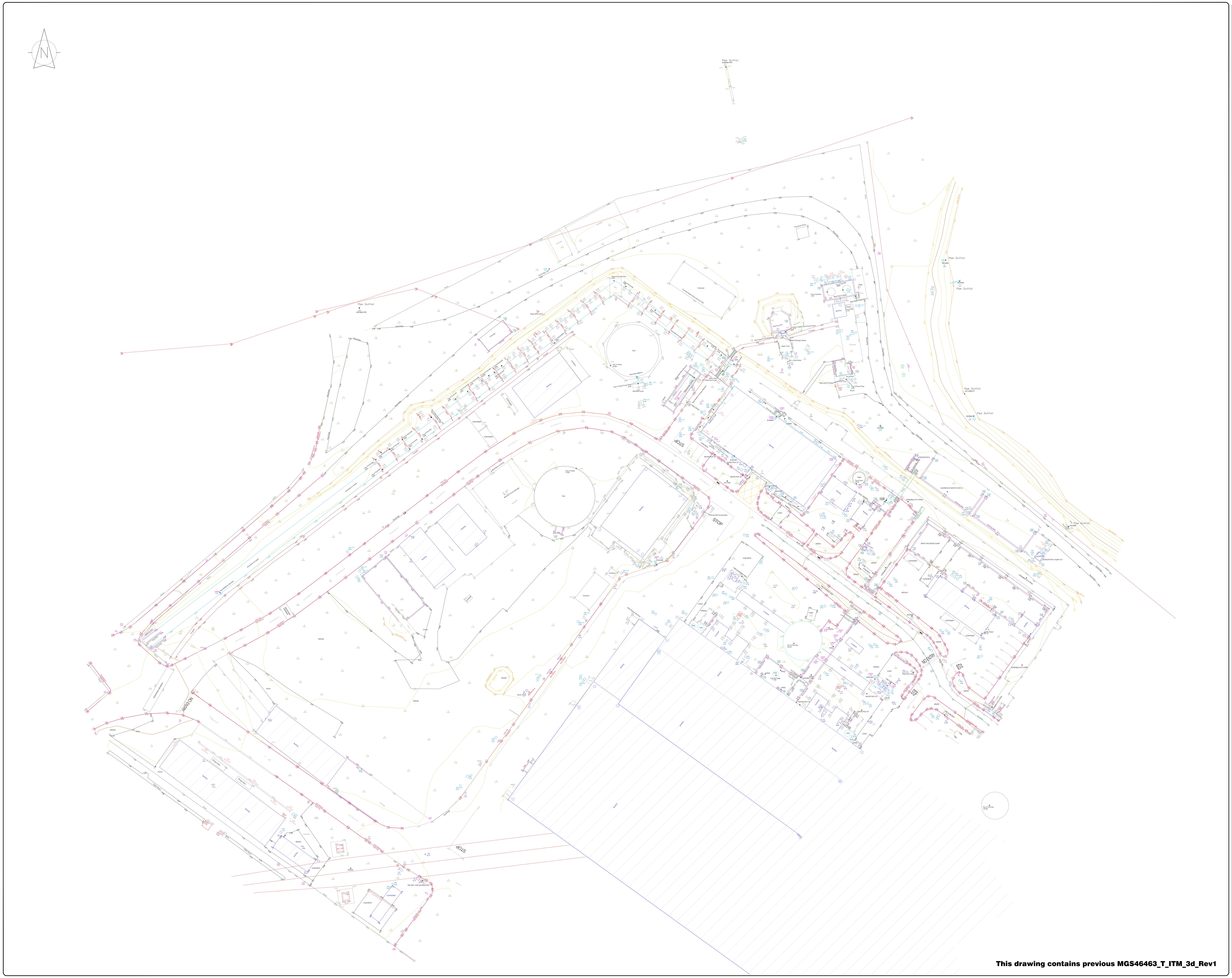
EXISTING AND PROPOSED FOUL WATER DRAINAGE (SEWAGE) SHEET 8 OF 8

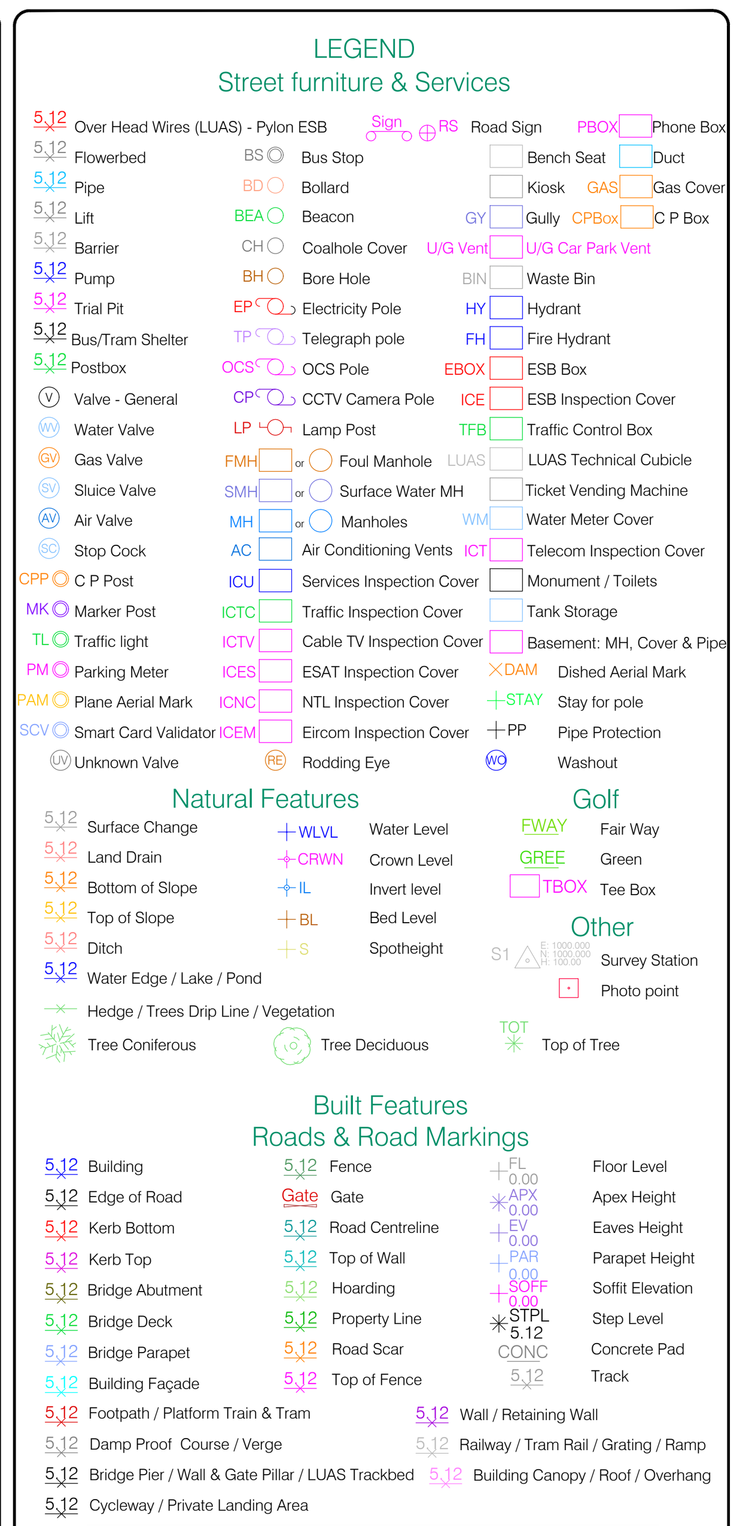
DOCUMENT NUMBER

60695232-TBT-DR-005

Appendix B – Topographical Survey Provided by Murphys Geospatial

Please refer to drawing 60695232-TBT-DR-DR-003.





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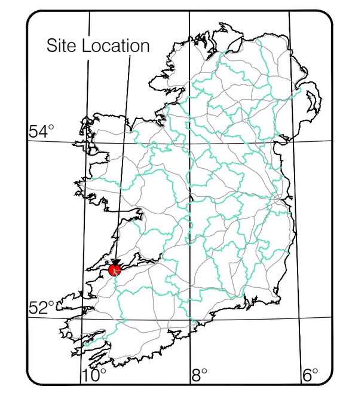
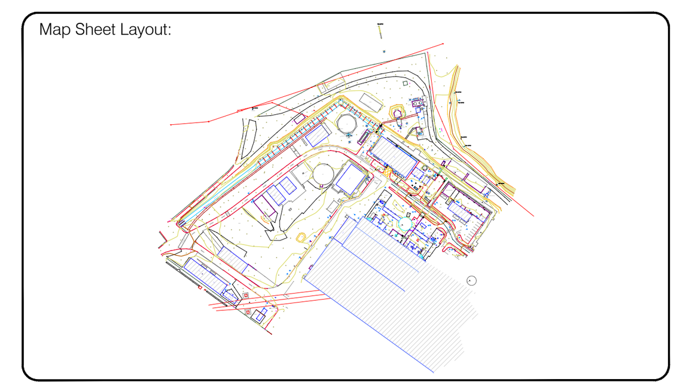
North





Surveyed by : KM, DZ — Date: 31.07-01.08.2023 — Datum: Poolbeg Lighthouse
Drawn by : LC — Date: 09.08.2023 — Grid System:
Checked by : SD — Date: 11.08.2023 — Irish National Grid ☐ ITM ☒

Revisions

No.	Date	Description
0	11.08.2023	First Drawing
1	17.08.2023	Model moved to Poolbeg Lighthouse Datum (as 2.7m below Malin Head Datum)

Murphy GEOSPATIAL

Topographic surveys, Measured Building Surveys, Setting-Out, As-Built Surveys, Hydrographic Surveys, Legal Mapping, Pipeline Surveys, Services Location, Ground Penetrating Radar, Laser Scanning, Rectified Photography

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Email: info@murphysurveys.ie

Client : AECOM Dublin

Project : Tarbert Power Station Topo survey

Date : 11.08.2023 **Scale :** NTS@A1

Description : Topographical Survey

Drawing Number : MGS54284_T_ITM_Rev1_00

LEGEND

Street furniture & Services

- Over Head Wires (LUAS) - Pylon ESB
- Flowerbed
- Pipe
- Lift
- Barrier
- Pump
- Trial Pit
- Bus/Tram Shelter
- Postbox
- Valve - General
- Water Valve
- Gas Valve
- Sluice Valve
- Air Valve
- Stop Cock
- C P Post
- Marker Post
- Traffic light
- Parking Meter
- Plane Aerial Mark
- Smart Card Validator
- Unknown Valve
- Bus Stop
- Bollard
- Beacon
- Coalhole Cover
- Bore Hole
- Electricity Pole
- Telegraph pole
- OCS Pole
- CCTV Camera Pole
- Lamp Post
- Foul Manhole
- Surface Water MH
- Manholes
- Air Conditioning Vents
- Services Inspection Cover
- Traffic Inspection Cover
- Cable TV Inspection Cover
- ESAT Inspection Cover
- NTL Inspection Cover
- Eircom Inspection Cover
- Rodding Eye
- Road Sign
- Bench Seat
- Kiosk
- Gully
- Waste Bin
- Hydrant
- Fire Hydrant
- ESB Box
- ESB Inspection Cover
- Traffic Control Box
- LUAS Technical Cubicle
- Ticket Vending Machine
- Water Meter Cover
- Telecom Inspection Cover
- Monument / Toilets
- Tank Storage
- Basement: MH, Cover & Pipes
- Dished Aerial Mark
- Stay for pole
- Pipe Protection
- Washout
- Phone Box
- Duct
- Gas Cover
- C P Box
- U/G Car Park Vent

Natural Features

- Surface Change
- Land Drain
- Bottom of Slope
- Top of Slope
- Ditch
- Water Edge / Lake / Pond
- Hedge / Trees Drip Line / Vegetation
- Tree Coniferous
- Water Level
- Crown Level
- Invert level
- Bed Level
- Spotheight
- Tree Deciduous

Golf

- Fair Way
- Green
- Tee Box

Other

- Survey Station
- Photo point
- Top of Tree

Built Features

Roads & Road Markings

- Building
- Edge of Road
- Kerb Bottom
- Kerb Top
- Bridge Abutment
- Bridge Deck
- Bridge Parapet
- Building Façade
- Footpath / Platform Train & Tram
- Damp Proof Course / Verge
- Bridge Pier / Wall & Gate Pillar / LUAS Trackbed
- Cycleway / Private Landing Area
- Fence
- Gate
- Road Centreline
- Top of Wall
- Hoarding
- Property Line
- Road Scar
- Top of Fence
- Wall / Retaining Wall
- Railway / Tram Rail / Grating / Ramp
- Building Canopy / Roof / Overhang
- Floor Level
- Apex Height
- Eaves Height
- Parapet Height
- Soffit Elevation
- Step Level
- Concrete Pad
- Track

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North

Site Location

Map Sheet Layout:

Surveyed by: KM, DZ	Date: 31.07-01.08.2023	Datum: Poolbeg Lighthouse
Drawn by: LC	Date: 09.08.2023	Grid System:
Checked by: SD	Date: 11.08.2023	Irish National Grid ☐ ITM ☒

Revisions

No.	Date	Description
0	11.08.2023	First Drawing
1	17.08.2023	Model moved to Poolbeg Lighthouse Datum (as 2.7m below Malin Head Datum)

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Phone: (+353) 045 484040
Fax: (+353) 045 484004
Email: info@murphysurveys.ie

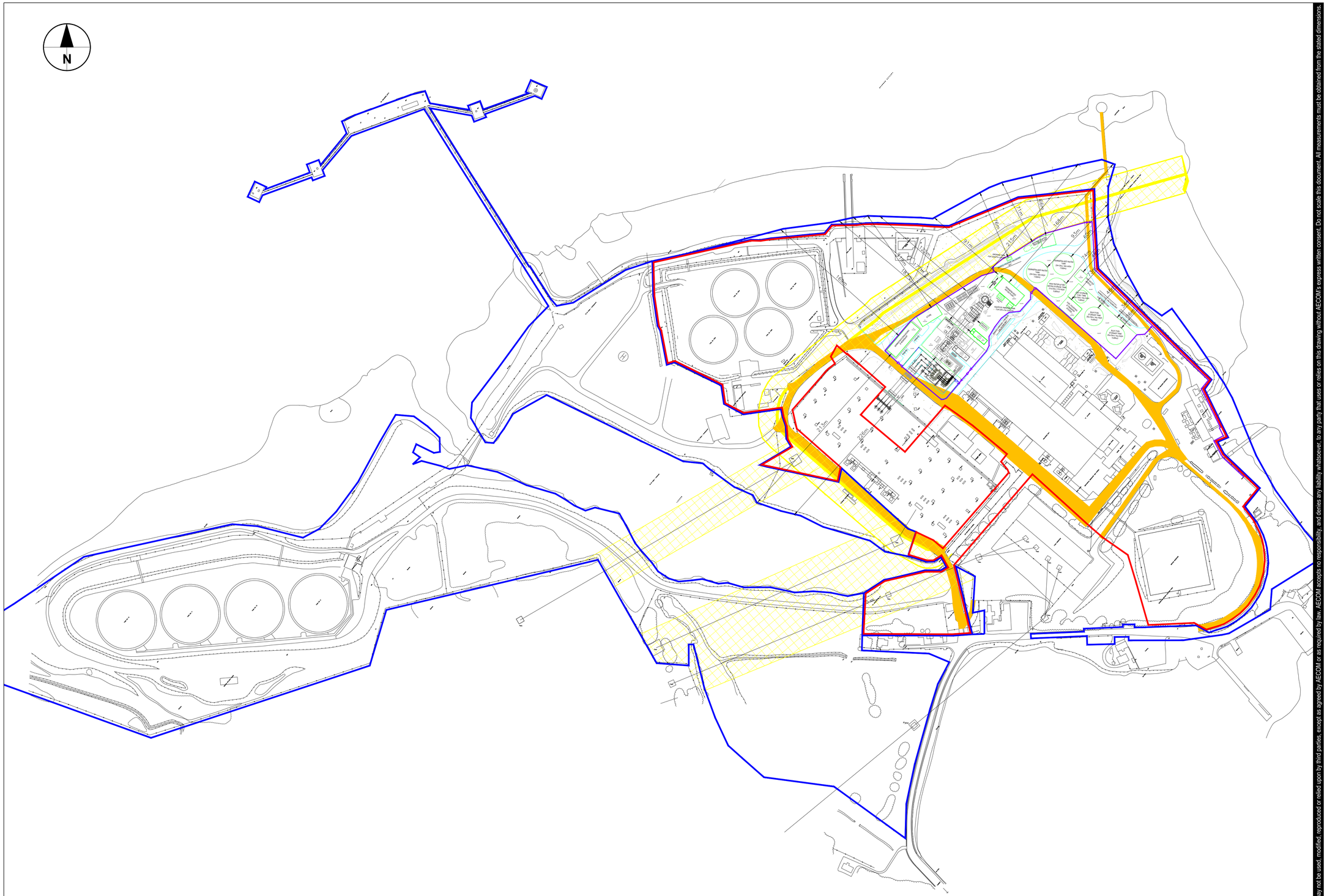
Client :	AECOM Dublin
Project :	Tarbert Power Station Topo survey
Date : 11.08.2023	Scale : 1:250@A1
Description :	Topographical Survey
Drawing Number :	MGS54284_T_ITM_Rev1_01

This drawing contains previous MGS46463_T_ITM_3d_Rev1

HAZARDOUS WASTE PLINTH A

Appendix C – Proposed Development

Please refer to drawing 60695232-TBT-DR-DR-001.



AECOM

PROJECT

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LEGEND

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- ADJOINING OR ADJACENT LAND TO THE RED LINE BOUNDARY UNDER CONTROL OF THE APPLICANT
- FLOOD DEFENCE
- FLOOD GATE
- NEW ROAD
- NEW BUILDING
- NEW UNDERGROUND STRUCTURE
- ELECTRICAL CABLE EASEMENT
- PROPOSED GAS TURBINE LAYOUT
- PROPOSED PLANT
- EXISTING WAYLEAVE/ RIGHT OF WAY
- PALISADE FENCE

NOTES

1. TO BE PRINTED AT A1
2. REFER TO 1:1000 AND 1:500 LAYOUT PLANS FOR DETAIL
3. GROUND LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM POOLBEG (ODP)
4. LIGHTNING PROTECTION LAYOUT IS INDICATIVE. LIGHTNING PROTECTION STUDY TO BE COMPLETED AT DETAILED DESIGN STAGE

0 50 100 m
1:2000

DRAWN BY

CONOR COONEY

ISSUE/REVISION

B	22/11/2023	FOR PLANNING
A	03/10/2023	FOR COMMENT
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60695232

SHEET TITLE

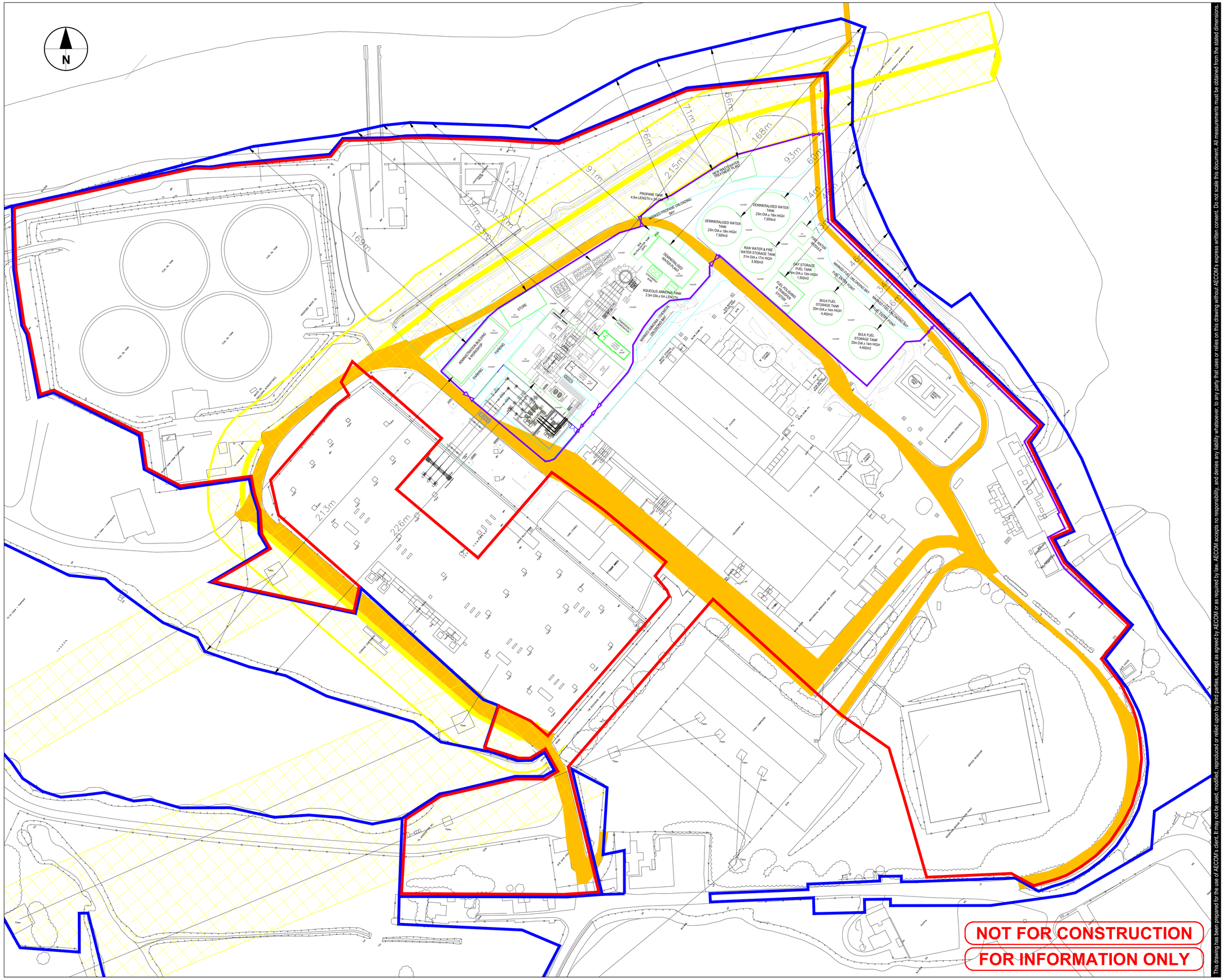
Proposed Overall Site Plan
1:2000
Sheet 1 of 3

SHEET NUMBER

60695232-TBT-DR-001

NOT FOR CONSTRUCTION

FOR INFORMATION ONLY



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CLIENT

SSE GENERATION IRELAND LTD

CONSULTANT

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GLASGOW G2 7ER
+44 (0) 141 202 0500
www.AECOM.com

LEGEND

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- FLOOD DEFENCE
- FLOOD GATE
- NEW ROAD
- NEW BUILDING
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4. LIGHTNING PROTECTION LAYOUT IS INDICATIVE. LIGHTNING PROTECTION STUDY TO BE COMPLETED AT DETAILED DESIGN STAGE

0 25 50 m
1:1000

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I/R	DATE	DESCRIPTION

PROJECT NUMBER

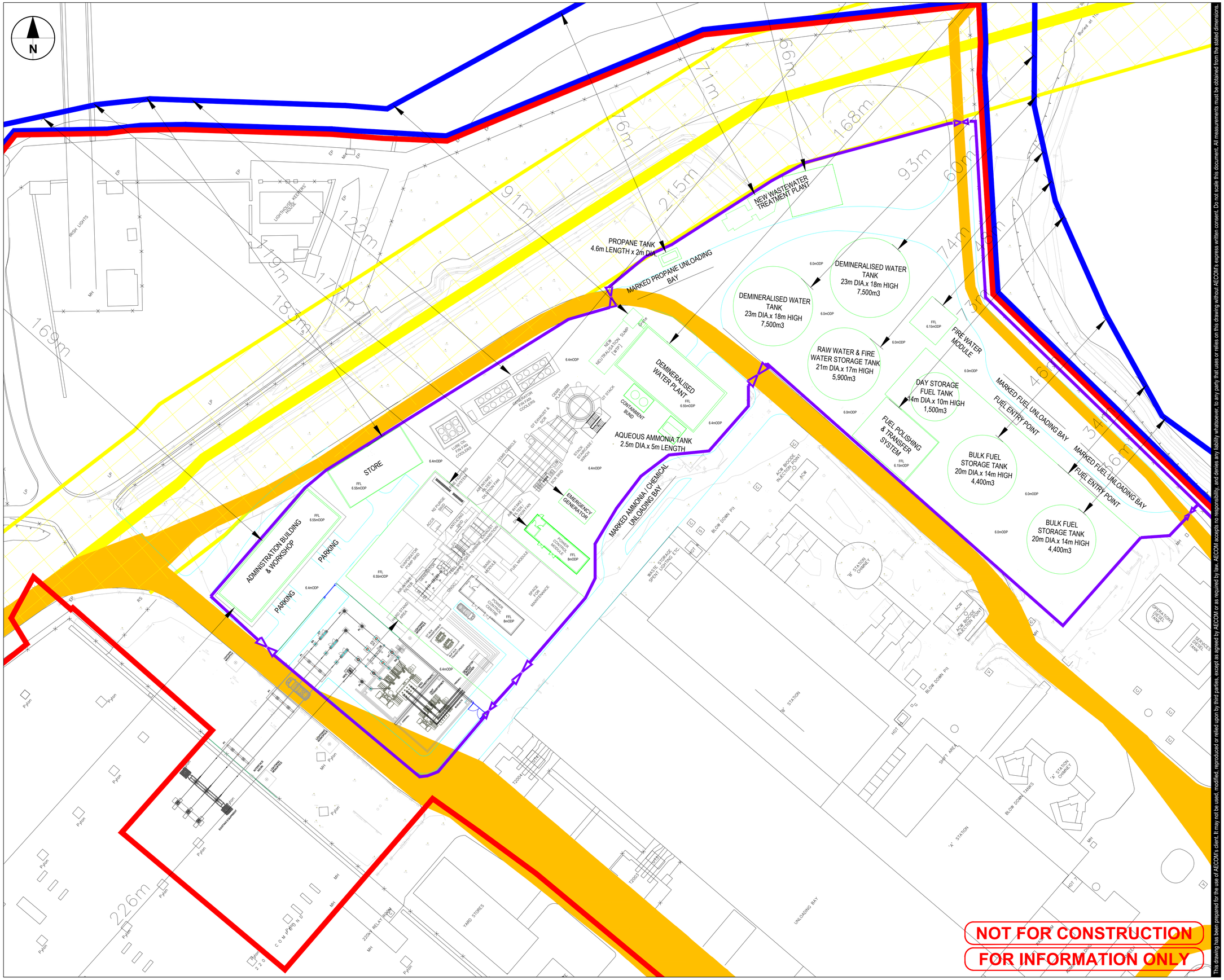
60695232

SHEET TITLE

Proposed Overall Site Plan
1:1000
Sheet 2 of 3

SHEET NUMBER

60695232-TBT-DR-001



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3. LIGHTNING PROTECTION LAYOUT IS INDICATIVE. LIGHTNING PROTECTION STUDY TO BE COMPLETED AT DETAILED DESIGN STAGE

0 12.5 25 m
1:500

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A	03/10/2023	FOR COMMENT
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60695232

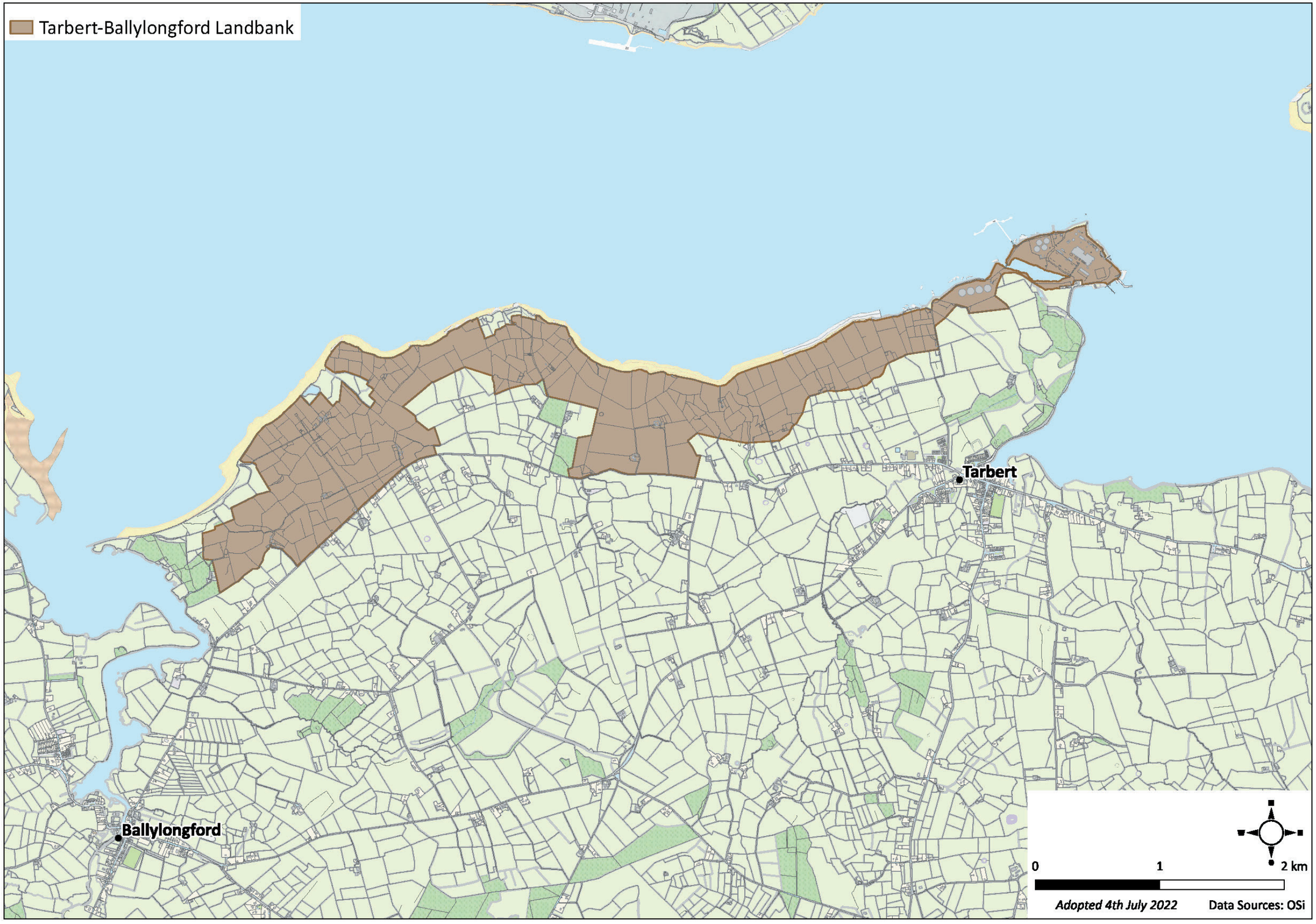
SHEET TITLE

Proposed Overall Site Plan
1:500
Sheet 3 of 3

SHEET NUMBER

60695232-TBT-DR-001

Appendix D – Tarbert-Ballylongford Landbank


Tarbert-Ballylongford Landbank
Tarbert
Ballylongford
0
1
2 km
Adopted 4th July 2022
Data Sources: OSi

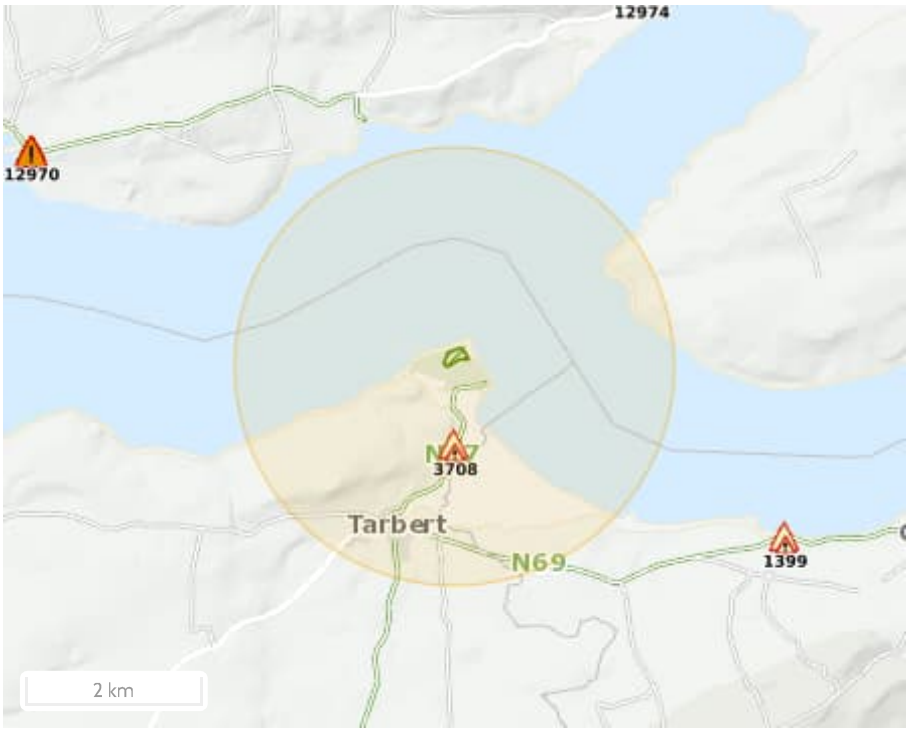
Appendix E – OPW Past Flood Events Summary Report

Past Flood Event Local Area Summary Report

Report Produced: **17/11/2023 12:37**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

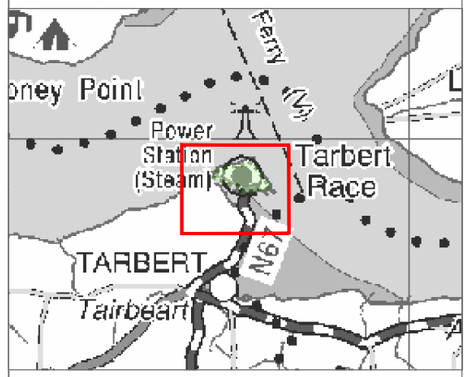
1 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Ferry Road - Tarbert recurring (ID-3708)	n/a	Approximate Point

Additional Information: Reports (2) Press Archive (0)

Appendix F – CFRAM Coastal Mapping

Location Plan:



Legend:

- Nodes
- Model Reach
- AFA Boundary
- Flood Defence: Wall
- Flood Defence: Embankment
- Defended Area

10% AEP Coastal Flood Extent
(1 in 10 chance in any given year)

0.5% AEP Coastal Flood Extent
(1 in 200 chance in any given year)

0.1% AEP Coastal Flood Extent
(1 in 1000 chance in any given year)

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath
C15 NX36

Merrion House
Merrion Road
Dublin 4
D04 R2C5

Project:	SHANNON CFRAM STUDY
Map Type:	EXTENT
Source:	COASTAL-TIDAL
Area:	**TARBERT POWER STATION**
Scenario:	EXISTING
Drawn by: EF	Date: JUNE 2016
Checked by: AC	Date: JUNE 2016
Reviewed by: MC	Date: JUNE 2016
Approved by: PS	Date: JUNE 2016
Map Number:	S24TPS_EXCCD_F1_01
Sheet: 1 of 1	Revision: 0
Map Scale: 1: 5000	Plot Scale: 1:1 @ A3

Appendix G - Tarbert Bio-Fuel Plant Review of Coastal Flood Defence Design

Tarbert Bio-Fuel Plant

Review of Coastal Flood Defence Design

6 November 2022

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
Paul Norton	Sreeraj Menon	Peter Neville-Jones	Peter Neville-Jones
Technical Director	Senior Engineer	Technical Director	Technical Director

Revision History

Revision	Revision date	Details	Authorized	Name	Position
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1.0	27/10/2022	Issued	PNJ	Peter Neville-Jones	TD
2.0	06/11/2022	Draft	PNJ	Peter Neville-Jones	TD

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1. Background

SSE is intending to develop a new BioFuel power station on the site of the existing Tarbert Island power station located on the south bank of the Shannon Estuary. The site currently has no formal flood defences and needs to be protected from coastal flooding during extreme storm conditions during the proposed 25 year design life for the new facility. According to the flood risk management plan for the Shannon Estuary [1], there is understood to be no fluvial flood risk to the site.

This note provides a review of preliminary design work for proposed flood defences that was carried out in 2009 to support the previously submitted (and approved) planning application. Details of technical requirements need to be provided as part of the tender documentation. It is therefore necessary to confirm whether the previous design can be used as a basis for subsequent design work or alternatively if this needs to be revised in view of the latest guidance on extreme water levels.

A summary of the latest information used to define key design input parameters is provided which are used to confirm requirements for the coastal flood defences.

2. Extreme Flood Level Analysis

A previous study[2] undertaken to support the earlier planning application included detailed flood inundation modelling for the Tarbert Island power station site. Large areas of the site were shown to be susceptible to flooding under the 0.5% and 0.1% AEP extreme water level, even before accounting for the influence of climate change. Figure 1 shows predicted peak flood depths for two extreme cases which allow areas of the site vulnerable to flooding to be identified.

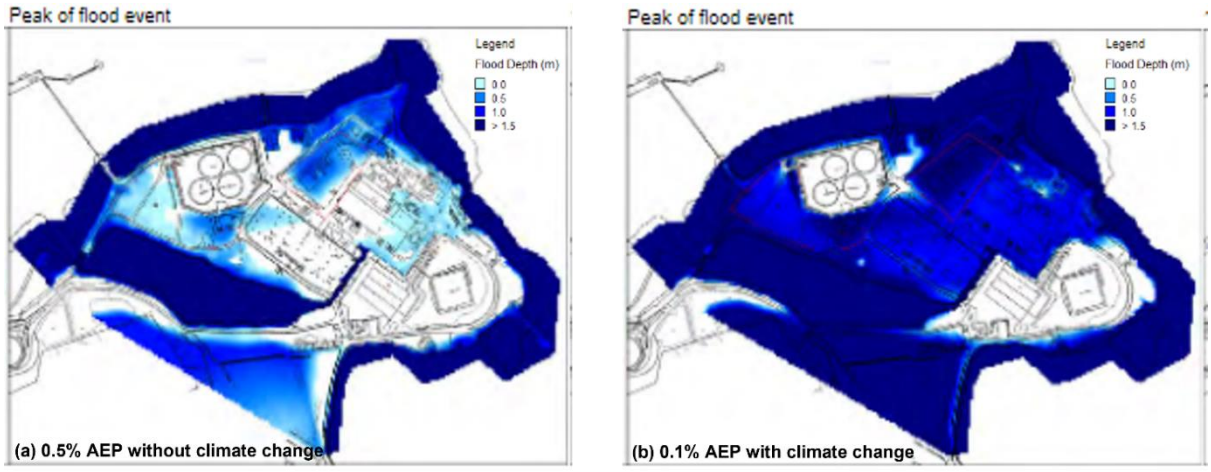


Figure 1. Flood inundation maps for extreme cases; source: Mott MacDonald (2010)

The water levels applied in the flood inundation modelling were derived from the analysis of a long-term record of measured water levels (i.e. including both astronomical conditions and storm surge). The corresponding extreme water levels for the site are summarised in Table 1 in which the levels for the 2100 future scenario are based on a 500mm increase in mean sea level for the Mid-Range Future Scenario (MRFS), as provided in Table 2.

[1] Flood Risk Management Plan. River Basin (24) Shannon Estuary South. OPW (2018).
[2] Tarbert Power Plant. Updated Detailed Coastal FRA. Mott MacDonald (2010).

Table 1. Extreme Water Levels; source: Mott MacDonald (2010)

Scenario	Level (m ODP)	Level (m ODM)
0.5% AEP (present day)	6.74	4.04
0.5% AEP (2100[1])	7.24	4.54
0.1% AEP (present day)	7.35	4.65
0.1% AEP (2100[1])	7.85	5.15

Table 2. Allowances in Flood Parameters for Climate Change Scenarios; source: OPW (2018)[3]

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+ 20%	+ 30%
Peak Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Land Movement	- 0.5 mm / year[1]	- 0.5 mm / year[1]
Urbanisation	*No General Allowance – Review on Case-by-Case Basis*	*No General Allowance – Review on Case-by-Case Basis*
Forestation	- 1/6 Tp[2]	- 1/3 Tp[2] + 10% SPR[3]

Note 1: Applicable to the southern part of the country only (Dublin – Galway and south of this)

The reported water levels are provided relative to Ordnance Datum Poolbeg (ODP) and have been converted to Ordnance Datum Malin (ODM), as used in more recent flood studies, by applying a -2.7m correction[4].

3. Design Water Level Estimate (2010)

Previous analysis of alternative flooding mechanisms for the Tarbert Island site confirmed flooding due to a high extreme still water level as the critical design condition, as summarised in the following extract from Section 8.1 of the report[1]:

> From the findings of this Updated Detailed Coastal FRA the critical joint probability scenario that had to be considered in any design was the defence of a low probability extreme still water level with a high probability wave condition. Therefore defence against a high extreme still water level was a key factor rather than prevention of major wave overtopping.

The proposed design water level considers the 25 year design life for the new development into consideration together with results from the analysis of extreme water levels, as summarised in Section 8.1 of the report:

> As the development has a design life of 25 years, then a robust allowance for the requirements of sea-level rise for 30 years hence was decided to be included in design development. Such a scenario considers an additional 150mm of sea level rise to be allowed for in design. Therefore the final 1,000 year event design level with climate change event for design was set at +7.50mODP.

The +7.50m ODP (+4.80m ODM) level was therefore obtained by adding 0.15m sea level rise to the 0.1% AEP flood level for the present day (i.e. +7.35m ODP).

4. Design Water Level Estimate (2022)

Since the previous design flood level was derived, two more recent studies referred to below have been undertaken involving the modelling of storm surge propagation for locations around the coast of Ireland:

[3] Flood Risk Management Plan, Shannon Estuary South. OPW (2018)
[4] https://osi.ie/resources/reference-information-2/irish-grid-reference-system/

- Irish Coastal Protection Strategy Study[5] (ICPSS)
- Irish Coastal Wave and Water Level Modelling Study[6] (ICWWS)

The ICWWS study is effectively an update of the ICPSS study which importantly makes use of enhanced bathymetric datasets and more recent storm data as measured using the national tide gauge network. The assessment of extreme water levels has therefore been undertaken using the most recent information from the ICWWS study to assess the validity of the previously proposed design water levels. The assessment of a design water level requires consideration of the following factors:

- Astronomic tides
- Storm surge
- Seiching / local wind and wave set-up
- Sea level rise
- Land movement

Additional factors to be taken into consideration include the design life of the development and the required standard of protection to be provided. Additional allowances may also be applied during design, for example a freeboard allowance is typically applied in coastal settings dependent on the level of confidence associated with the design water level.

The ICWWS study provides the most recent assessment of extreme water levels for use in both planning and design studies which is not expected to be updated within the next 5 years. The location of available extreme water level prediction points in the Shannon Estuary from the ICWWS study are shown in Figure 2 which identifies the point labelled 'S12' (red circle) as closest to Tarbert Island. This is therefore chosen as the most suitable point for the assessment of extreme water levels to be used in the design of flood defences for the proposed power station development at this location.

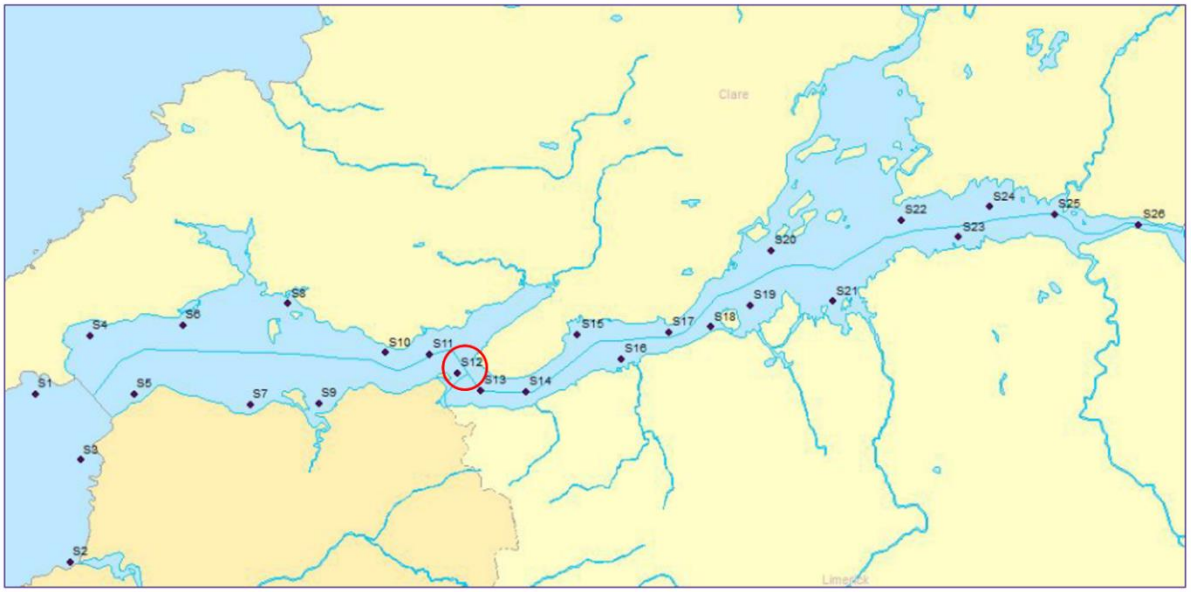


Figure 2. Location of Shannon Estuary estimation points; source: RPS (2020)

Extreme water levels from the ICWWS study are provided for present day and four climate change scenarios. The 'Mid range' and 'High end future' scenarios are the same as applied in previous studies[3], as provided in Table 2.

[5] Irish Coastal Protection Strategy Study, Phase 4 - Shannon Estuary. OPW (2013).
[6] Irish Coastal Wave and Water Level Modelling Study. OPW (2020).

Table 3. Extreme water levels for Point S12; source: OPW (2020)[6]

Scenario / Water Level[1,2]	0.5% AEP (m ODM)	0.1% AEP (m ODM)
Present day	3.43	3.61
Mid range (MRFS)	3.93	4.11
High end future (HEFS)	4.43	4.61
High+ end future	4.93	5.11
High++ end future	5.43	5.61

1. Values include a +0.1m allowance for seiching / wind set-up.
2. Relevant extract from report provided at the end of this note.

The 'High end future' levels represent a potential future scenario which is not significantly outside the currently projected allowances and it is therefore recommended that this is selected as a 'credible maximum scenario'. The water levels for the High^{+} and High^{++} scenarios, also provided in Table 3, are not considered to represent realistic projections applicable within the 25 year design life of the development.

From Table 3 it is noted that the present day extreme water levels are much lower than the values presented in Table 1, most likely due to the very different approaches used in each case. As acknowledged in the earlier report[2], the approach applied in the ICWWS study is considered to be more rigorous and is therefore expected to provide the most reliable estimate of extreme water levels.

Developments in the coastal region are generally required to withstand a 0.5% AEP event with the recommendation that a higher standard is applied for essential infrastructure[7], such as a power stations, or where the consequences of flooding could be significant. Given that the site is intended to be used for the development of a new power station, it is recommended that flood defences for the site are designed to provide a standard of protection based on the 0.1% AEP extreme water level.

The components used to estimate an extreme design water level for the Tarbert Island site are summarised in Table 4. The estimated sea level rise assumes a constant rate over the 80yr period from an assumed baseline year of 2020 up to 2100 (i.e. 1000/80 = 12.mm/yr). This average rate is expected to be a conservative estimate since the actual rate within the first half of the epoch (i.e. 2020 to 2060) can be expected to be lower than the average rate over the full 80 year period. Both sea level rise and land movement are calculated for a 30 year period based on the advised 25 year design life of the development followed by a 5 year decommissioning period.

Table 4. Design Water Level Estimate for Tarbert Island

Description	Level / allowance
Tide + storm surge	+3.51m ODM
Seiche / wind set-up	+0.1m
Sea level rise	+0.375m
Land movement	+0.015m
Modelling error[1]	+0.15m
Total	+4.15m ODM

Note 1. As advised in OPW (2020)

[7] The Planning System and Flood Risk Management – Guidelines for Planning Authorities. OPW (2009).

By comparing the contributions used to estimate the design water level with those previously assumed, the largest discrepancy is found between the tide + storm surge levels with the value from the most recent study being approximately 1m lower. This can be explained by the very different methods used in each case and it is acknowledged in the earlier study report[2] that more reliable estimates would be obtained using a detailed modelling approach to simulate tidal and storm surge propagation.

For the ICWWS study, a tolerance for the predicted water levels of ±150mm was applied during model validation. On this basis an additional 'Modelling error' factor of the same magnitude has been applied in assessment of the design water level.

Based on the latest available information it is therefore recommended that the flood defences are designed for a still water flood level of at least +4.15m ODM (or +6.85m ODP).

5. Design Considerations

A long list of alternative flood protection structures were evaluated as part of option appraisal process leading to the selection of the following for different sections of the site frontage:

(a) Concrete flood wall
(b) Earth bund

For both of the above options, the drawings provided in the Updated Detailed Coastal FRA Report[1] show a crest level of +4.80m ODM (or +7.50m ODP) which is equal to the design flood level provided in the same report.

The concrete flood wall is proposed for sections of the frontage facing the estuary, as well as a short section on the landward side, as shown on Figure 3. The earth bund is proposed along the north side of the tidal lagoon identified on Figure 3, where wave action will be minimal.

The proposed design for the coastal sections of the concrete wall provides no freeboard allowance, usually included to allow for other unaccounted factors that may affect water levels such as wave activity, vessel wash and wave set-up. It is therefore recommended that an additional 600mm (or 0.6m) freeboard allowance is included in the design for the coastal sections of the concrete flood wall.

It is also recommended that a suitable allowance is provided for the settlement of structures which is typically in the range 1–3 mm/yr for estuarine settings with the range dependent on the strength of the soil / depth to solid rock. In the absence of detailed geotechnical information, the upper limit of 3mm/yr is assumed over a 30 year period giving a total settlement of 0.09m.

Adding the freeboard and settlement allowances to the design still water level gives a design crest level for the new flood defence structures of +4.84m ODM (+7.54m ODP).

Based on the analysis presented in this note, two very different approaches have resulted in a very similar design level for the main section of the coastal flood defences (i.e. within ±0.05m). On this basis it is therefore recommended that the design, as proposed during planning, is not modified at this stage. It may be acceptable to consider lowering the level of the earth bund and the adjacent section of flood wall but this would need to be confirmed through more detailed investigation during subsequent stages of design.

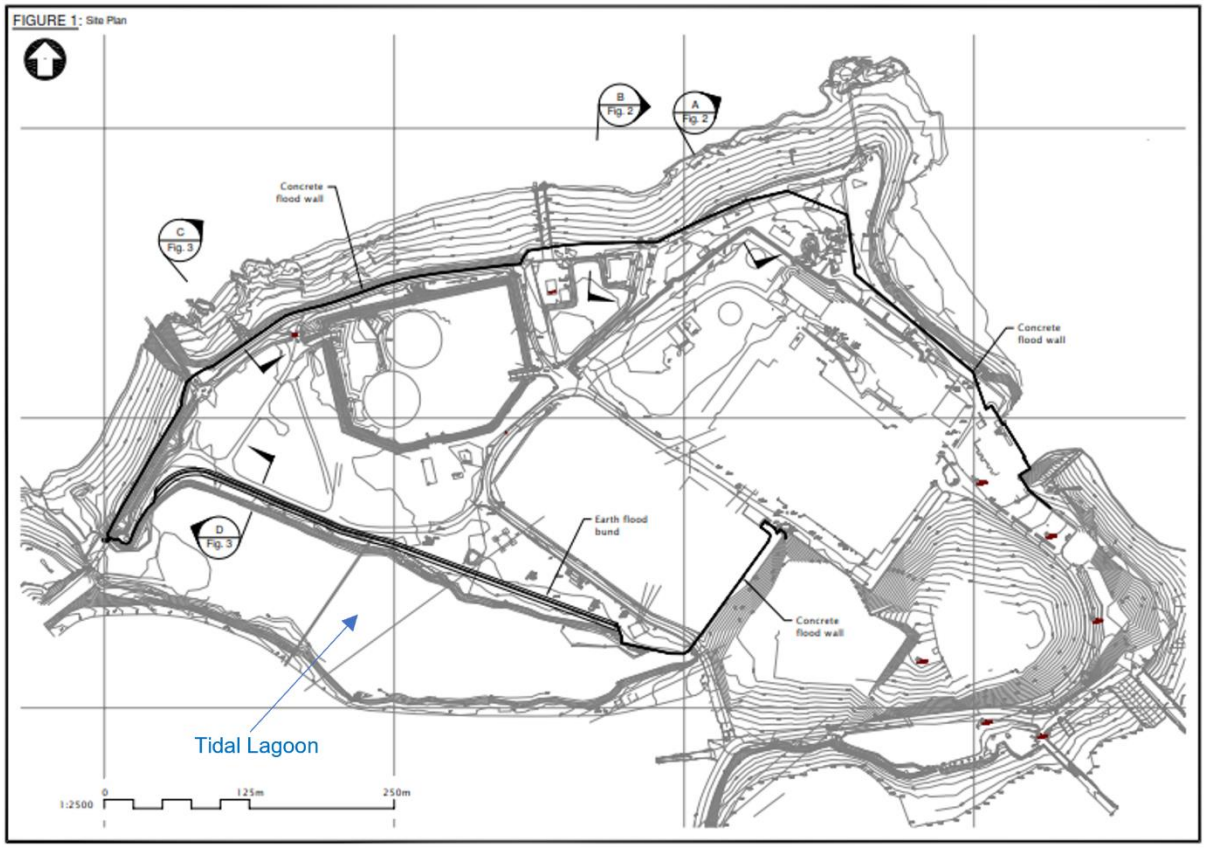


Figure 3. Proposed extent of alternative flood defence options

6. Additional Design Recommendations

The cantilevered concrete flood wall will require adequate toe protection to ensure that the base of the structure is not undermined due to scour process resulting from the action of tidal currents and waves.

The design should consider the potential requirement to raise the crest level of the flood wall in the future. Climate change projections are regularly updated to help understand the latest trajectory of future trends which will be influenced by actions taken over previous years. However, previous projections have consistently shown an upward trend which, unless efforts to reduce global emissions, this trend is likely to continue.

It is therefore recommended that the final design of the flood defences should consider incorporating options that would enable them to be adapted (i.e. crest level raised) in the future. This would most likely be required if an extension to the 25 year design life is considered in the future.

It is worth noting that coastal flood defences typically have a design life of 50 years which would maintain the value of the site post-decommissioning. However, extending the design life a further 20 years beyond the 30 year period considered would involve raising the design crest level by a further 0.32m based on the estimated changes due to contributions from sea level rise, structure settlement and land movement.

7. Conclusion

Based on a review of available information, the type and extent of flood defences for the Tarbert Island site, proposed during the planning stage, are still considered to be suitable.

Using the latest advised extreme water levels and climate change projections and applying suitable settlement and freeboard allowances has confirmed that the previously advised design still water level (+4.80mODM) is within ±0.05m of the currently recommended design crest level (+4.84mODM) for flood defence structures.

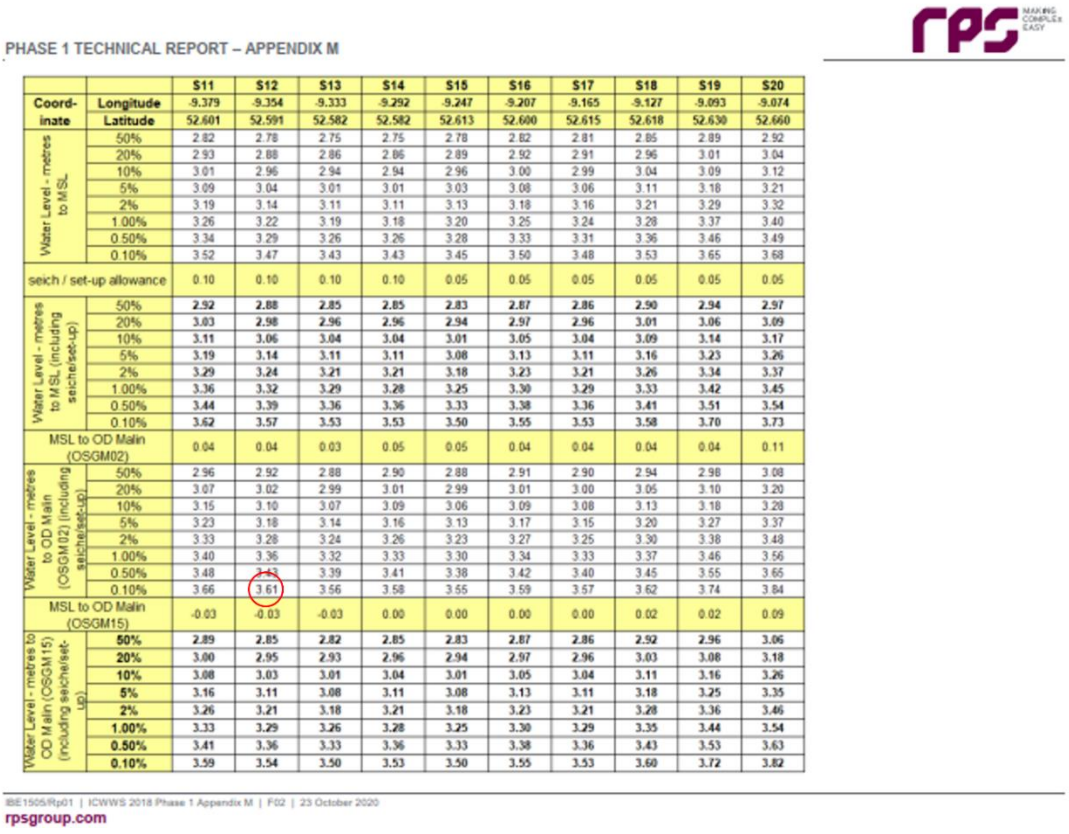
Extending the proposed design life to 50 years would require the design crest level to be raised by at least a further 0.32m.

The following technical requirements shall be allowed for in the design of flood defences for protection of the power station site:

1. The newly constructed flood defences shall provide a standard of protection based on the 0.1% AEP extreme still water level.
2. Climate change effects (primarily sea level rise) shall be accounted in the design based on a 30 year period covering the 25 year design life of the development and allowing a further 5 years for decommissioning.
3. Sections of the flood defences exposed to wave action will be required to include an appropriate freeboard allowance of 0.6m.
4. All sections of the flood defences need to include a suitable allowance for settlement of 0.09m, subject to geotechnical re-appraisal.
5. Suitable protection needs to be provided where there is potential for the action of waves and currents to cause localised scouring around the base of the flood defences.
6. The crest level of flood defences shall be kept the same for the whole site with any reductions to be supported by numerical modelling and subject to approval of the Client.
7. All outfalls and drainage outlets require non- return valves or flood gates to prevent reverse flow flooding
8. Jetty and other access points below flood level require flood gates.

8. Data Extract from ICWWS Report

An extract from the ICWWS report (OPW, 2020) for 'Present Day' extreme water levels at Point S12 in the Shannon Estuary is provided in Figure 4 below for reference. Note that the value used in the extreme water level assessment is based on the 0.1% AEP value given to OD Malin (i.e., +3.61 ODM, circled in red) with the 0.1m allowance for seiche / wind set-up removed.



PHASE 1 TECHNICAL REPORT – APPENDIX M

		S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Coord-inate	Longitude	-9.379	-9.354	-9.333	-9.292	-9.247	-9.207	-9.165	-9.127	-9.093	-9.074
	Latitude	52.601	52.591	52.582	52.582	52.613	52.600	52.615	52.618	52.630	52.660
Water Level - metres to MSL	50%	2.82	2.78	2.75	2.75	2.78	2.82	2.81	2.85	2.89	2.92
	20%	2.93	2.88	2.86	2.86	2.89	2.92	2.91	2.96	3.01	3.04
	10%	3.01	2.96	2.94	2.94	2.96	3.00	2.99	3.04	3.09	3.12
	5%	3.09	3.04	3.01	3.01	3.03	3.08	3.06	3.11	3.18	3.21
	2%	3.19	3.14	3.11	3.11	3.13	3.18	3.16	3.21	3.29	3.32
	1.00%	3.26	3.22	3.19	3.18	3.20	3.25	3.24	3.28	3.37	3.40
	0.50%	3.34	3.29	3.26	3.26	3.28	3.33	3.31	3.36	3.46	3.49
	0.10%	3.52	3.47	3.43	3.43	3.45	3.50	3.48	3.53	3.65	3.68
seich / set-up allowance		0.10	0.10	0.10	0.10	0.05	0.05	0.05	0.05	0.05	0.05
Water Level - metres to MSL (including seiche/set-up)	50%	2.92	2.88	2.85	2.85	2.83	2.87	2.86	2.90	2.94	2.97
	20%	3.03	2.98	2.96	2.96	2.94	2.97	2.96	3.01	3.06	3.09
	10%	3.11	3.06	3.04	3.04	3.01	3.05	3.04	3.09	3.14	3.17
	5%	3.19	3.14	3.11	3.11	3.08	3.13	3.11	3.16	3.23	3.26
	2%	3.29	3.24	3.21	3.21	3.18	3.23	3.21	3.26	3.34	3.37
	1.00%	3.36	3.32	3.29	3.28	3.25	3.30	3.29	3.33	3.42	3.45
	0.50%	3.44	3.39	3.36	3.36	3.33	3.38	3.36	3.41	3.51	3.54
	0.10%	3.62	3.57	3.53	3.53	3.50	3.55	3.53	3.58	3.70	3.73
MSL to OD Malin (OSGM02)		0.04	0.04	0.03	0.05	0.05	0.04	0.04	0.04	0.04	0.11
Water Level - metres to OD Malin (OSGM 02) (including seiche/set-up)	50%	2.96	2.92	2.88	2.90	2.88	2.91	2.90	2.94	2.98	3.08
	20%	3.07	3.02	2.99	3.01	2.99	3.01	3.00	3.05	3.10	3.20
	10%	3.15	3.10	3.07	3.09	3.06	3.09	3.08	3.13	3.18	3.28
	5%	3.23	3.18	3.14	3.16	3.13	3.17	3.15	3.20	3.27	3.37
	2%	3.33	3.28	3.24	3.26	3.23	3.27	3.25	3.30	3.38	3.48
	1.00%	3.40	3.36	3.32	3.33	3.30	3.34	3.33	3.37	3.46	3.56
	0.50%	3.48	3.43	3.39	3.41	3.38	3.42	3.40	3.45	3.55	3.65
	0.10%	3.66	3.61	3.56	3.58	3.55	3.59	3.57	3.62	3.74	3.84
MSL to OD Malin (OSGM15)		-0.03	-0.03	-0.03	0.00	0.00	0.00	0.00	0.02	0.02	0.09
Water Level - metres to OD Malin (OSGM15) (including seiche/set-up)	50%	2.89	2.85	2.82	2.85	2.83	2.87	2.86	2.92	2.96	3.06
	20%	3.00	2.95	2.93	2.96	2.94	2.97	2.96	3.03	3.08	3.18
	10%	3.08	3.03	3.01	3.04	3.01	3.05	3.04	3.11	3.16	3.26
	5%	3.16	3.11	3.08	3.11	3.08	3.13	3.11	3.18	3.25	3.35
	2%	3.26	3.21	3.18	3.21	3.18	3.23	3.21	3.28	3.36	3.46
	1.00%	3.33	3.29	3.26	3.28	3.25	3.30	3.29	3.35	3.44	3.54
	0.50%	3.41	3.36	3.33	3.36	3.33	3.38	3.36	3.43	3.53	3.63
	0.10%	3.59	3.54	3.50	3.53	3.50	3.55	3.53	3.60	3.72	3.82

Figure 4. Extract of extreme water levels from the ICWWS report

A.1 Appendix A – Coastal Flood Defense Requirements for OJEU Statement

Specific requirements for the coastal flood defences are provided below:

a) A reinforced concrete flood wall is to be constructed along the River Shannon frontage with an approximate length of 1,500m.
b) An earth flood embankment or other suitable flood defence with an impermeable core is to be constructed landside along a 500m section of the site boundary.
c) The flood defences are required to prevent flooding of the site from the 0.1% AEP extreme still water level event for a design life of 25 years.
d) Suitable allowances for sea level rise, structure settlement and freeboard shall be incorporated into the design of the flood defences.
e) The minimum crest level is +7.5mODP. The Contractor to verify and confirm the design crest level.
f) All drainage outfalls are to be fitted with suitable non-return valves.
g) Special measures are required to ensure continuity of the flood defences at structural intersections and crossing points.
h) Flood and sluice gates shall be provided where necessary including at:
    i. Intakes and Outfalls
    ii. Jetty access,
    iii. Road and other access points
i) Gates shall be designed for rapid closure when flooding is anticipated
j) The design shall provide for post flooding drainage of the site in the extreme case of site inundation.
k) The flood defences shall not interfere with the operation of rainwater drainage system.
l) The design and works shall be undertaken to the relevant European and if required approved International Standards
m) The Contractor shall a provide an Operations and Maintenance Manual covering routine maintenance and emergency flood response procedure

A.2 Appendix B – Coastal Flood Defense Budget Estimate

Assumptions

1. For the basis of this Order of Cost Estimate the exchange rate is set to €1.15 Euros to £1 GBP.
2. This estimate has been priced at October 2022 price levels and includes for Construction Inflation to an assumed mid-point of construction. As a programme is not yet available, no allowance has been made for any Tender Inflation beyond October 2022.
3. Main Contractor Preliminaries (including management, site accommodation, welfare, rubbish removal, plant, craneage, testing, temporary services, site investigations, insurance etc) have been benchmarked against similar projects and included at 40%.
4. Main Contractor Overheads and Profit allowance is included at a rate of 10%.
5. A risk allowance of 20% has been included within the estimate.
6. The measures and rates identified within the detailed Cost Plans included in Appendix A are based upon the following assumptions:
    - It is assumed that there would be no abnormal restrictions in terms of access to the site, working hours, noise restrictions and the like.
    - It has been assumed that the site holds no historic value. No allowance has been made for any archaeological investigations nor any costs associated with the discovery of any antiquities or the like. Nor any environmental impacts.
    - No allowance has been made for removal of any further toxic or hazardous material from the existing structures or ground.
    - It has been assumed that there is no ground contamination within the site area. No allowance has been made for any land remediation or removal of invasive plants.
    - It has been assumed the flood protection measures can be constructed within the existing basin. No allowance has been made for dredging.
    - It has been assumed that all excavated materials can be re-distributed within coastal area.
    - It has been assumed that all plant and materials will be locally sourced.

Exclusions:

The list is intended only as a guide and cannot be relied upon to be exhaustive

1. Value Added Tax.
2. Client Contingency other than the allowances identified.
3. Tender Price Inflation beyond current base date in October 2022.
4. Development costs including legal fees, air rights, rights to light (or any other third-party compensation settlements), over sailing licences, sale or letting fees & costs and finance costs.
5. Planning contributions including Section 106 agreements and any additional Section 278 contributions and Affordable Housing contribution / CIL.
6. Capital allowances or other incentives / grants.
7. Charges including adoption charges and maintenance costs for highways and statutory undertakers.
8. Employer's Insurances including existing buildings works insurance and IPT (the Preliminaries section includes allowances for Main Contractor's insurance only).
9. Fees and charges associated with archaeological and specialist fieldwork.
10. Monitoring of adjacent buildings.
11. Effects of working condition restrictions, including noise restrictions affecting methodology / hours of work.
12. Intake and Outfall structures cost is presumed to be taken up by others
13. Off-site storage.
14. Phasing costs - temporary services, access WCs etc.
15. Out of hours working.
16. Any works beyond the red line boundary of the site.
17. Any necessary off-site reinforcement of services infrastructure.
18. Diversion of services outside the site.
19. Works associated with discovery of UXOs.
20. Fluctuations in foreign exchange rate and labour costs.
21. Works to; existing shingle beach, existing fence line, existing concrete wall, existing rock armour, existing access road or light rubble embankment.
22. Relocation of species.
23. Environmental impacts.

24. The Bio-Fuel Power Station cooling water Intakes and outfall are not included as these are assumed to be covered by the power plant designer
25. Design Fees.

Order of Cost Estimate

Budget Estimate for Flood Defence Covered by OJEU Description

The order of cost estimate presented for Flood Defence covered by OJEU Description in Appendix A.1 is based on the available data present with AECOM as shared by SSE, and exclude the Power Plant cooling water Intake and Outfall. These estimates need to be refined based on the actual design requirements.

Table 8-1 Order of Cost Estimate for Flood Defence with concrete wall of 1500m length and a bund structure for 500m length

Item	Item Description	Total Price (in EUR excluding Taxes)
1	**General**	**1,708,500.00**
1.1	Reinforced concrete flood wall	1,242,000.00
1.2	Revetment	316,500.00
1.3	E/O mobilization for revetment fill material	100,000.00
1.4	E/o 1nr flood gate	50,000.00
2	**On-costs**	**1,449,000.00**
2.1	Main Contractor Prelims @ 40%	684,000.00
2.2	Overheads and Profits @ 10%	239,000.00
2.3	Risk Allowance @ 20%	526,000.00
3	**Contingencies 30%**	**947,000.00**
Total		**4,104,500.00**

Order of Cost Estimates at 2021 prices are given for Flood Defence system is **EUR 4.15 million.**

aecom.com

Appendix H - SSE Confirmation of Discharge rate

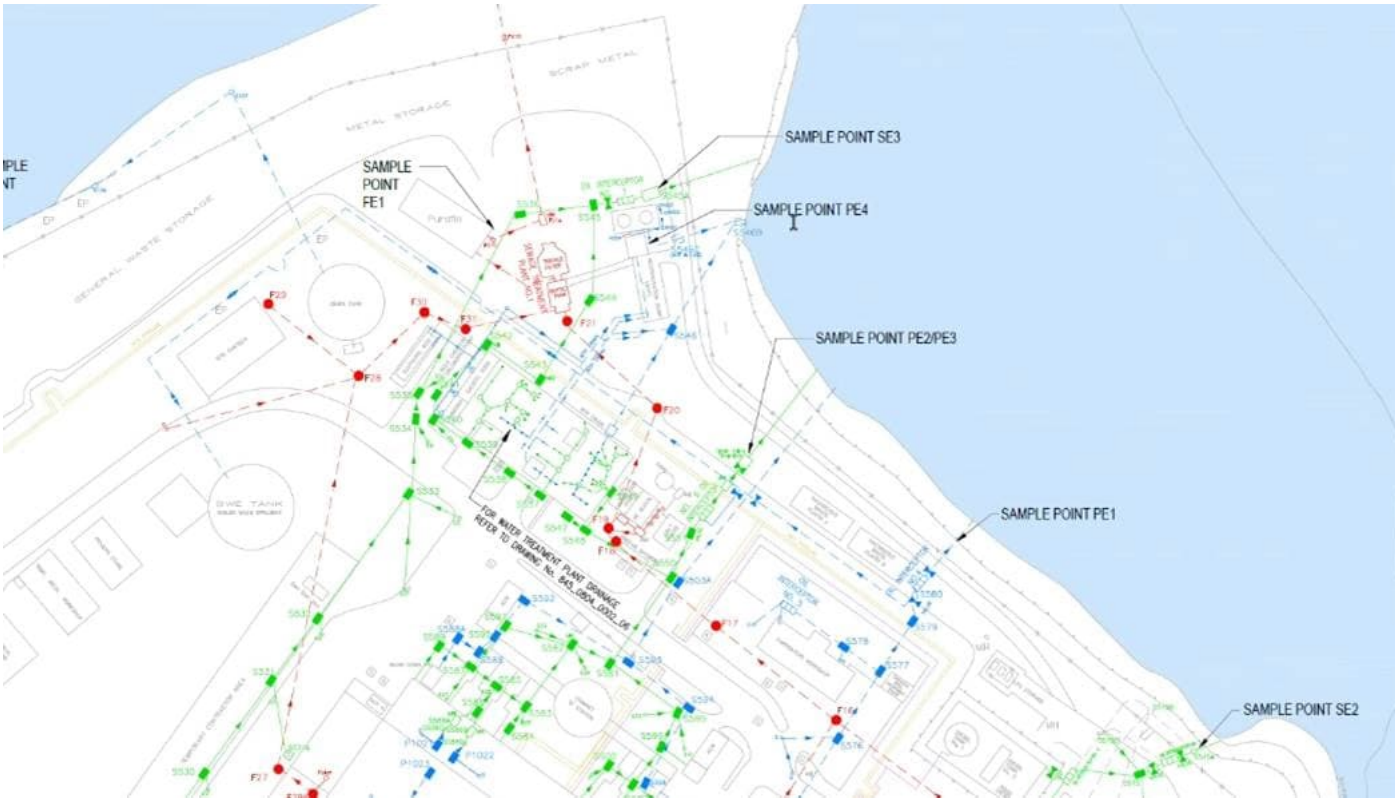
Low, Eva

From: Colston, David <david.colston@sse.com>
Sent: 10 July 2023 14:48
To: Chan, Jeffrey; Cooney, Conor; Crawford, Reece; Low, Eva
Cc: Shortt, David; Norris, Nicholas; Booth, Marie-Jo
Subject: RE: Tarbert Site Development Discussion (Drainage)

Hi Jeff/Eva

Caught up with Caroline O'Connell. Quick notes:

See extract below. Recommendation is point S3 for main site surface drains, PE4 for new Water Treatment plant (monitor separately), PE2/PE3 for surface drains. No flow restriction on S3 or PE2/PE3. PE4 rate will be updated as part of licence application. Not sure on levels, will need survey. She will investigate and advise on diameters. Manholes shown on this extract. Will get you the full drawing.



Regards

David Colston || Lead Design Development Engineer

SSE Thermal
1 Waterloo Street, Glasgow, G2 6UY

T: +44 (0) 1738 741222
M: 07850 992846

ssethermal.com

-----Original Appointment-----
From: Chan, Jeffrey <Jeffrey.H.Chan@aecom.com>
Sent: 06 July 2023 16:34
To: Chan, Jeffrey; Colston, David; Cooney, Conor; Crawford, Reece; Low, Eva
Subject: Tarbert Site Development Discussion
When: 12 July 2023 14:30-15:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Hi All,

Setting up a weekly meeting to go through any design queries and to provide updates on site elements.

Happy to reschedule to suit everyone's availability.

Kind Regards,
Jeff

Microsoft Teams meeting

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Appendix I - Greenfield Runoff Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.450
Area (ha)	1.000	Urban	0.000
SAAR (mm)	1027	Region Number	Ireland National

Results l/s

QBAR Rural	6.9
QBAR Urban	6.9
Q2 years	6.6
Q1 year	5.8
Q30 years	10.9
Q100 years	12.7

Appendix J - Preliminary Outline Attenuation Calculations

Summary of Results for 100 year Return Period (+20%)

Outflow is too low. Design is unsatisfactory.

Storm Event	Max Level (m)	Max Depth (m)	Max Volume (m³)	Status
15 min Summer	8.924	0.124	372.5	O K
30 min Summer	8.969	0.169	508.0	O K
60 min Summer	9.017	0.217	650.6	O K
120 min Summer	9.070	0.270	811.0	O K
180 min Summer	9.105	0.305	914.8	O K
240 min Summer	9.132	0.332	994.6	O K
360 min Summer	9.172	0.372	1115.9	O K
480 min Summer	9.203	0.403	1209.2	O K
600 min Summer	9.229	0.429	1286.1	O K
720 min Summer	9.251	0.451	1352.2	O K
960 min Summer	9.288	0.488	1462.8	O K
1440 min Summer	9.344	0.544	1633.5	O K
2160 min Summer	9.408	0.608	1823.8	O K
2880 min Summer	9.457	0.657	1970.9	O K
4320 min Summer	9.532	0.732	2195.8	O K
5760 min Summer	9.590	0.790	2368.8	O K
7200 min Summer	9.637	0.837	2511.5	O K
8640 min Summer	9.678	0.878	2633.9	O K
10080 min Summer	9.714	0.914	2741.7	Flood Risk
15 min Winter	8.939	0.139	417.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	89.088	0.0	27
30 min Summer	60.746	0.0	42
60 min Summer	38.900	0.0	72
120 min Summer	24.244	0.0	132
180 min Summer	18.233	0.0	192
240 min Summer	14.867	0.0	252
360 min Summer	11.120	0.0	372
480 min Summer	9.037	0.0	492
600 min Summer	7.690	0.0	612
720 min Summer	6.737	0.0	732
960 min Summer	5.466	0.0	972
1440 min Summer	4.069	0.0	1452
2160 min Summer	3.029	0.0	2172
2880 min Summer	2.455	0.0	2892
4320 min Summer	1.823	0.0	4332
5760 min Summer	1.475	0.0	5776
7200 min Summer	1.251	0.0	7216
8640 min Summer	1.094	0.0	8656
10080 min Summer	0.976	0.0	10096
15 min Winter	89.088	0.0	27

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Volume (m³)	Status
30 min Winter	8.990	0.190	568.9	O K
60 min Winter	9.043	0.243	728.7	O K
120 min Winter	9.103	0.303	908.3	O K
180 min Winter	9.142	0.342	1024.6	O K
240 min Winter	9.171	0.371	1114.0	O K
360 min Winter	9.217	0.417	1249.8	O K
480 min Winter	9.251	0.451	1354.3	O K
600 min Winter	9.280	0.480	1440.5	O K
720 min Winter	9.305	0.505	1514.5	O K
960 min Winter	9.346	0.546	1638.4	O K
1440 min Winter	9.410	0.610	1829.5	O K
2160 min Winter	9.481	0.681	2042.7	O K
2880 min Winter	9.536	0.736	2207.4	O K
4320 min Winter	9.620	0.820	2459.3	O K
5760 min Winter	9.684	0.884	2653.1	O K
7200 min Winter	9.738	0.938	2812.9	Flood Risk
8640 min Winter	9.783	0.983	2949.9	Flood Risk
10080 min Winter	9.824	1.024	3070.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	60.746	0.0	42
60 min Winter	38.900	0.0	72
120 min Winter	24.244	0.0	132
180 min Winter	18.233	0.0	192
240 min Winter	14.867	0.0	252
360 min Winter	11.120	0.0	372
480 min Winter	9.037	0.0	492
600 min Winter	7.690	0.0	612
720 min Winter	6.737	0.0	732
960 min Winter	5.466	0.0	972
1440 min Winter	4.069	0.0	1452
2160 min Winter	3.029	0.0	2172
2880 min Winter	2.455	0.0	2892
4320 min Winter	1.823	0.0	4332
5760 min Winter	1.475	0.0	5776
7200 min Winter	1.251	0.0	7216
8640 min Winter	1.094	0.0	8656
10080 min Winter	0.976	0.0	10096

Summary of Results for 100 year Return Period (+30%)

Outflow is too low. Design is unsatisfactory.

Storm Event	Max Level (m)	Max Depth (m)	Max Volume (m³)	Status
15 min Summer	8.926	0.126	403.5	O K
30 min Summer	8.972	0.172	550.3	O K
60 min Summer	9.020	0.220	704.8	O K
120 min Summer	9.075	0.275	878.5	O K
180 min Summer	9.110	0.310	991.1	O K
240 min Summer	9.137	0.337	1077.5	O K
360 min Summer	9.178	0.378	1208.9	O K
480 min Summer	9.209	0.409	1309.9	O K
600 min Summer	9.235	0.435	1393.3	O K
720 min Summer	9.258	0.458	1464.9	O K
960 min Summer	9.295	0.495	1584.7	O K
1440 min Summer	9.353	0.553	1769.6	O K
2160 min Summer	9.417	0.617	1975.8	O K
2880 min Summer	9.467	0.667	2135.1	O K
4320 min Summer	9.543	0.743	2378.7	O K
5760 min Summer	9.602	0.802	2566.3	O K
7200 min Summer	9.650	0.850	2720.8	O K
8640 min Summer	9.692	0.892	2853.4	O K
10080 min Summer	9.728	0.928	2970.2	Flood Risk
15 min Winter	8.941	0.141	452.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	96.512	0.0	27
30 min Summer	65.808	0.0	42
60 min Summer	42.142	0.0	72
120 min Summer	26.264	0.0	132
180 min Summer	19.752	0.0	192
240 min Summer	16.106	0.0	252
360 min Summer	12.046	0.0	372
480 min Summer	9.790	0.0	492
600 min Summer	8.331	0.0	612
720 min Summer	7.299	0.0	732
960 min Summer	5.922	0.0	972
1440 min Summer	4.409	0.0	1452
2160 min Summer	3.282	0.0	2172
2880 min Summer	2.660	0.0	2892
4320 min Summer	1.975	0.0	4332
5760 min Summer	1.598	0.0	5776
7200 min Summer	1.356	0.0	7216
8640 min Summer	1.185	0.0	8656
10080 min Summer	1.057	0.0	10096
15 min Winter	96.512	0.0	27

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Volume (m³)	Status
30 min Winter	8.993	0.193	616.4	O K
60 min Winter	9.047	0.247	789.4	O K
120 min Winter	9.107	0.307	984.0	O K
180 min Winter	9.147	0.347	1110.0	O K
240 min Winter	9.177	0.377	1206.8	O K
360 min Winter	9.223	0.423	1353.9	O K
480 min Winter	9.258	0.458	1467.1	O K
600 min Winter	9.288	0.488	1560.5	O K
720 min Winter	9.313	0.513	1640.7	O K
960 min Winter	9.355	0.555	1774.9	O K
1440 min Winter	9.419	0.619	1982.0	O K
2160 min Winter	9.492	0.692	2212.9	O K
2880 min Winter	9.547	0.747	2391.4	O K
4320 min Winter	9.633	0.833	2664.2	O K
5760 min Winter	9.698	0.898	2874.2	O K
7200 min Winter	9.752	0.952	3047.3	Flood Risk
8640 min Winter	9.799	0.999	3195.8	Flood Risk
10080 min Winter	9.840	1.040	3326.6	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	65.808	0.0	42
60 min Winter	42.142	0.0	72
120 min Winter	26.264	0.0	132
180 min Winter	19.752	0.0	192
240 min Winter	16.106	0.0	252
360 min Winter	12.046	0.0	372
480 min Winter	9.790	0.0	492
600 min Winter	8.331	0.0	612
720 min Winter	7.299	0.0	732
960 min Winter	5.922	0.0	972
1440 min Winter	4.409	0.0	1452
2160 min Winter	3.282	0.0	2172
2880 min Winter	2.660	0.0	2892
4320 min Winter	1.975	0.0	4332
5760 min Winter	1.598	0.0	5776
7200 min Winter	1.356	0.0	7216
8640 min Winter	1.185	0.0	8656
10080 min Winter	1.057	0.0	10096

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	8.984	0.184	4.4	368.6	O K
30 min Summer	9.051	0.251	4.5	501.4	O K
60 min Summer	9.119	0.319	4.5	638.6	O K
120 min Summer	9.194	0.394	4.5	788.2	O K
180 min Summer	9.240	0.440	4.5	881.0	O K
240 min Summer	9.275	0.475	4.5	949.5	O K
360 min Summer	9.324	0.524	4.5	1048.4	O K
480 min Summer	9.360	0.560	4.5	1119.9	O K
600 min Summer	9.388	0.588	4.5	1175.6	O K
720 min Summer	9.410	0.610	4.5	1220.2	O K
960 min Summer	9.443	0.643	4.5	1285.8	O K
1440 min Summer	9.481	0.681	4.5	1362.9	O K
2160 min Summer	9.505	0.705	4.5	1410.7	O K
2880 min Summer	9.509	0.709	4.5	1418.2	O K
4320 min Summer	9.504	0.704	4.5	1407.3	O K
5760 min Summer	9.490	0.690	4.5	1380.7	O K
7200 min Summer	9.473	0.673	4.5	1346.7	O K
8640 min Summer	9.454	0.654	4.5	1308.2	O K
10080 min Summer	9.433	0.633	4.5	1266.7	O K
15 min Winter	9.007	0.207	4.4	413.1	O K
30 min Winter	9.081	0.281	4.5	562.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	89.088	0.0	269.3	27
30 min Summer	60.746	0.0	347.4	41
60 min Summer	38.900	0.0	571.4	72
120 min Summer	24.244	0.0	686.8	130
180 min Summer	18.233	0.0	731.4	190
240 min Summer	14.867	0.0	739.4	250
360 min Summer	11.120	0.0	727.9	370
480 min Summer	9.037	0.0	708.9	488
600 min Summer	7.690	0.0	687.3	608
720 min Summer	6.737	0.0	667.8	728
960 min Summer	5.466	0.0	638.8	966
1440 min Summer	4.069	0.0	602.9	1444
2160 min Summer	3.029	0.0	1308.5	2160
2880 min Summer	2.455	0.0	1256.3	2688
4320 min Summer	1.823	0.0	1163.7	3416
5760 min Summer	1.475	0.0	2304.7	4168
7200 min Summer	1.251	0.0	2389.1	5040
8640 min Summer	1.094	0.0	2341.1	5880
10080 min Summer	0.976	0.0	2228.5	6672
15 min Winter	89.088	0.0	299.4	27
30 min Winter	60.746	0.0	367.6	41

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.158	0.358	4.5	716.5	O K
120 min Winter	9.243	0.443	4.5	885.0	O K
180 min Winter	9.295	0.495	4.5	990.2	O K
240 min Winter	9.334	0.534	4.5	1068.5	O K
360 min Winter	9.391	0.591	4.5	1182.8	O K
480 min Winter	9.433	0.633	4.5	1265.3	O K
600 min Winter	9.464	0.664	4.5	1328.4	O K
720 min Winter	9.489	0.689	4.5	1378.8	O K
960 min Winter	9.527	0.727	4.5	1454.8	O K
1440 min Winter	9.574	0.774	4.5	1548.4	O K
2160 min Winter	9.607	0.807	4.5	1614.9	O K
2880 min Winter	9.618	0.818	4.5	1635.1	O K
4320 min Winter	9.606	0.806	4.5	1612.1	O K
5760 min Winter	9.589	0.789	4.5	1577.4	O K
7200 min Winter	9.564	0.764	4.5	1528.0	O K
8640 min Winter	9.535	0.735	4.5	1470.2	O K
10080 min Winter	9.504	0.704	4.5	1407.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	38.900	0.0	632.8	70
120 min Winter	24.244	0.0	733.0	128
180 min Winter	18.233	0.0	744.7	188
240 min Winter	14.867	0.0	736.6	246
360 min Winter	11.120	0.0	707.8	364
480 min Winter	9.037	0.0	682.3	482
600 min Winter	7.690	0.0	664.6	598
720 min Winter	6.737	0.0	651.6	716
960 min Winter	5.466	0.0	634.8	950
1440 min Winter	4.069	0.0	626.8	1412
2160 min Winter	3.029	0.0	1316.8	2092
2880 min Winter	2.455	0.0	1279.3	2744
4320 min Winter	1.823	0.0	1229.8	3588
5760 min Winter	1.475	0.0	2541.8	4440
7200 min Winter	1.251	0.0	2530.5	5400
8640 min Winter	1.094	0.0	2422.5	6312
10080 min Winter	0.976	0.0	2304.3	7264

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.000	0.200	4.4	399.5	O K
30 min Summer	9.072	0.272	4.5	543.6	O K
60 min Summer	9.146	0.346	4.5	692.7	O K
120 min Summer	9.228	0.428	4.5	855.5	O K
180 min Summer	9.278	0.478	4.5	956.8	O K
240 min Summer	9.316	0.516	4.5	1032.2	O K
360 min Summer	9.371	0.571	4.5	1141.8	O K
480 min Summer	9.411	0.611	4.5	1221.5	O K
600 min Summer	9.441	0.641	4.5	1282.5	O K
720 min Summer	9.465	0.665	4.5	1330.8	O K
960 min Summer	9.501	0.701	4.5	1403.0	O K
1440 min Summer	9.545	0.745	4.5	1490.0	O K
2160 min Summer	9.574	0.774	4.5	1547.7	O K
2880 min Summer	9.580	0.780	4.5	1560.1	O K
4320 min Summer	9.576	0.776	4.5	1552.5	O K
5760 min Summer	9.564	0.764	4.5	1528.3	O K
7200 min Summer	9.548	0.748	4.5	1496.6	O K
8640 min Summer	9.530	0.730	4.5	1460.4	O K
10080 min Summer	9.511	0.711	4.5	1421.5	O K
15 min Winter	9.024	0.224	4.5	447.7	O K
30 min Winter	9.105	0.305	4.5	609.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	96.512	0.0	290.6	27
30 min Summer	65.808	0.0	362.6	41
60 min Summer	42.142	0.0	614.6	72
120 min Summer	26.264	0.0	721.7	130
180 min Summer	19.752	0.0	743.4	190
240 min Summer	16.106	0.0	738.4	250
360 min Summer	12.046	0.0	715.3	370
480 min Summer	9.790	0.0	688.1	488
600 min Summer	8.331	0.0	668.0	608
720 min Summer	7.299	0.0	653.0	728
960 min Summer	5.922	0.0	632.2	966
1440 min Summer	4.409	0.0	614.8	1444
2160 min Summer	3.282	0.0	1310.7	2160
2880 min Summer	2.660	0.0	1267.9	2748
4320 min Summer	1.975	0.0	1202.8	3460
5760 min Summer	1.598	0.0	2472.3	4224
7200 min Summer	1.356	0.0	2489.0	5048
8640 min Summer	1.185	0.0	2372.8	5880
10080 min Summer	1.057	0.0	2242.6	6760
15 min Winter	96.512	0.0	320.4	27
30 min Winter	65.808	0.0	375.7	41

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.189	0.389	4.5	777.1	O K
120 min Winter	9.280	0.480	4.5	960.5	O K
180 min Winter	9.338	0.538	4.5	1075.5	O K
240 min Winter	9.381	0.581	4.5	1161.6	O K
360 min Winter	9.443	0.643	4.5	1286.7	O K
480 min Winter	9.488	0.688	4.5	1376.5	O K
600 min Winter	9.523	0.723	4.5	1445.8	O K
720 min Winter	9.551	0.751	4.5	1501.5	O K
960 min Winter	9.593	0.793	4.5	1586.0	O K
1440 min Winter	9.646	0.846	4.5	1692.1	O K
2160 min Winter	9.685	0.885	4.5	1770.7	O K
2880 min Winter	9.699	0.899	4.5	1798.7	O K
4320 min Winter	9.691	0.891	4.5	1783.0	O K
5760 min Winter	9.675	0.875	4.5	1750.7	O K
7200 min Winter	9.652	0.852	4.5	1704.9	O K
8640 min Winter	9.625	0.825	4.5	1649.9	O K
10080 min Winter	9.595	0.795	4.5	1590.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	42.142	0.0	675.4	70
120 min Winter	26.264	0.0	747.7	128
180 min Winter	19.752	0.0	740.5	188
240 min Winter	16.106	0.0	722.5	246
360 min Winter	12.046	0.0	688.7	364
480 min Winter	9.790	0.0	668.9	482
600 min Winter	8.331	0.0	656.4	600
720 min Winter	7.299	0.0	648.8	716
960 min Winter	5.922	0.0	644.6	950
1440 min Winter	4.409	0.0	650.8	1414
2160 min Winter	3.282	0.0	1330.4	2096
2880 min Winter	2.660	0.0	1308.4	2748
4320 min Winter	1.975	0.0	1280.2	3936
5760 min Winter	1.598	0.0	2660.9	4488
7200 min Winter	1.356	0.0	2575.3	5408
8640 min Winter	1.185	0.0	2468.0	6328
10080 min Winter	1.057	0.0	2359.9	7264

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.302	0.502	231.6	251.2	O K
30 min Summer	9.404	0.604	238.9	301.8	O K
60 min Summer	9.434	0.634	240.1	316.9	O K
120 min Summer	9.372	0.572	237.3	285.9	O K
180 min Summer	9.303	0.503	231.9	251.5	O K
240 min Summer	9.260	0.460	207.6	230.2	O K
360 min Summer	9.202	0.402	170.1	200.9	O K
480 min Summer	9.163	0.363	144.9	181.5	O K
600 min Summer	9.135	0.335	127.0	167.5	O K
720 min Summer	9.113	0.313	113.6	156.5	O K
960 min Summer	9.081	0.281	94.3	140.6	O K
1440 min Summer	9.041	0.241	71.8	120.7	O K
2160 min Summer	9.007	0.207	54.4	103.6	O K
2880 min Summer	8.986	0.186	44.4	92.8	O K
4320 min Summer	8.959	0.159	33.1	79.4	O K
5760 min Summer	8.942	0.142	26.9	71.0	O K
7200 min Summer	8.931	0.131	22.9	65.3	O K
8640 min Summer	8.922	0.122	19.9	60.8	O K
10080 min Summer	8.915	0.115	17.8	57.3	O K
15 min Winter	9.356	0.556	236.3	278.1	O K
30 min Winter	9.473	0.673	241.0	336.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	89.088	0.0	370.5	20
30 min Summer	60.746	0.0	505.9	28
60 min Summer	38.900	0.0	649.6	44
120 min Summer	24.244	0.0	809.9	76
180 min Summer	18.233	0.0	913.8	104
240 min Summer	14.867	0.0	993.5	134
360 min Summer	11.120	0.0	1114.7	194
480 min Summer	9.037	0.0	1208.0	256
600 min Summer	7.690	0.0	1284.9	316
720 min Summer	6.737	0.0	1350.9	376
960 min Summer	5.466	0.0	1461.4	496
1440 min Summer	4.069	0.0	1631.6	738
2160 min Summer	3.029	0.0	1823.1	1104
2880 min Summer	2.455	0.0	1969.9	1468
4320 min Summer	1.823	0.0	2193.9	2204
5760 min Summer	1.475	0.0	2368.4	2936
7200 min Summer	1.251	0.0	2510.8	3672
8640 min Summer	1.094	0.0	2632.9	4368
10080 min Summer	0.976	0.0	2739.9	5104
15 min Winter	89.088	0.0	415.1	20
30 min Winter	60.746	0.0	566.9	30

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.474	0.674	241.0	337.0	O K
120 min Winter	9.345	0.545	235.6	272.7	O K
180 min Winter	9.263	0.463	209.4	231.5	O K
240 min Winter	9.215	0.415	178.5	207.5	O K
360 min Winter	9.154	0.354	139.1	176.8	O K
480 min Winter	9.115	0.315	114.8	157.8	O K
600 min Winter	9.089	0.289	98.7	144.4	O K
720 min Winter	9.069	0.269	87.0	134.3	O K
960 min Winter	9.040	0.240	71.0	119.9	O K
1440 min Winter	9.005	0.205	53.2	102.3	O K
2160 min Winter	8.975	0.175	39.8	87.5	O K
2880 min Winter	8.957	0.157	32.3	78.3	O K
4320 min Winter	8.934	0.134	24.1	67.0	O K
5760 min Winter	8.920	0.120	19.5	60.0	O K
7200 min Winter	8.910	0.110	16.5	55.0	O K
8640 min Winter	8.903	0.103	14.4	51.3	O K
10080 min Winter	8.897	0.097	12.9	48.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	38.900	0.0	727.7	46
120 min Winter	24.244	0.0	907.2	78
180 min Winter	18.233	0.0	1023.5	106
240 min Winter	14.867	0.0	1112.9	136
360 min Winter	11.120	0.0	1248.6	198
480 min Winter	9.037	0.0	1353.1	258
600 min Winter	7.690	0.0	1439.2	318
720 min Winter	6.737	0.0	1513.2	378
960 min Winter	5.466	0.0	1636.9	500
1440 min Winter	4.069	0.0	1827.6	740
2160 min Winter	3.029	0.0	2041.9	1104
2880 min Winter	2.455	0.0	2206.4	1468
4320 min Winter	1.823	0.0	2457.5	2188
5760 min Winter	1.475	0.0	2652.6	2896
7200 min Winter	1.251	0.0	2812.2	3616
8640 min Winter	1.094	0.0	2949.0	4400
10080 min Winter	0.976	0.0	3069.1	5096

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.342	0.542	238.2	270.8	O K
30 min Summer	9.458	0.658	244.0	329.0	O K
60 min Summer	9.492	0.692	244.7	346.2	O K
120 min Summer	9.425	0.625	242.9	312.6	O K
180 min Summer	9.341	0.541	238.2	270.5	O K
240 min Summer	9.287	0.487	224.7	243.5	O K
360 min Summer	9.223	0.423	185.0	211.5	O K
480 min Summer	9.181	0.381	157.7	190.6	O K
600 min Summer	9.151	0.351	138.2	175.5	O K
720 min Summer	9.128	0.328	123.2	163.9	O K
960 min Summer	9.094	0.294	102.2	147.0	O K
1440 min Summer	9.052	0.252	78.1	126.1	O K
2160 min Summer	9.016	0.216	59.1	108.0	O K
2880 min Summer	8.994	0.194	48.2	96.8	O K
4320 min Summer	8.966	0.166	36.0	82.8	O K
5760 min Summer	8.948	0.148	29.2	74.0	O K
7200 min Summer	8.936	0.136	24.7	67.9	O K
8640 min Summer	8.927	0.127	21.6	63.3	O K
10080 min Summer	8.919	0.119	19.2	59.6	O K
15 min Winter	9.404	0.604	242.0	301.9	O K
30 min Winter	9.539	0.739	244.9	369.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	96.512	0.0	401.5	20
30 min Summer	65.808	0.0	548.3	29
60 min Summer	42.142	0.0	703.8	44
120 min Summer	26.264	0.0	877.5	76
180 min Summer	19.752	0.0	990.0	106
240 min Summer	16.106	0.0	1076.4	134
360 min Summer	12.046	0.0	1207.7	194
480 min Summer	9.790	0.0	1308.8	256
600 min Summer	8.331	0.0	1392.1	316
720 min Summer	7.299	0.0	1463.6	376
960 min Summer	5.922	0.0	1583.3	496
1440 min Summer	4.409	0.0	1767.7	738
2160 min Summer	3.282	0.0	1975.0	1104
2880 min Summer	2.660	0.0	2134.2	1468
4320 min Summer	1.975	0.0	2376.9	2200
5760 min Summer	1.598	0.0	2565.8	2928
7200 min Summer	1.356	0.0	2720.1	3672
8640 min Summer	1.185	0.0	2852.4	4392
10080 min Summer	1.057	0.0	2968.4	5136
15 min Winter	96.512	0.0	449.9	20
30 min Winter	65.808	0.0	614.3	30

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.543	0.743	244.9	371.5	O K
120 min Winter	9.398	0.598	241.7	299.1	O K
180 min Winter	9.290	0.490	226.4	244.9	O K
240 min Winter	9.237	0.437	193.9	218.4	O K
360 min Winter	9.171	0.371	150.9	185.4	O K
480 min Winter	9.130	0.330	124.8	165.0	O K
600 min Winter	9.102	0.302	107.0	150.9	O K
720 min Winter	9.081	0.281	94.4	140.3	O K
960 min Winter	9.050	0.250	77.0	125.1	O K
1440 min Winter	9.013	0.213	57.6	106.7	O K
2160 min Winter	8.982	0.182	43.0	91.1	O K
2880 min Winter	8.963	0.163	35.0	81.5	O K
4320 min Winter	8.940	0.140	26.1	69.8	O K
5760 min Winter	8.925	0.125	21.1	62.5	O K
7200 min Winter	8.915	0.115	17.9	57.3	O K
8640 min Winter	8.907	0.107	15.7	53.5	O K
10080 min Winter	8.901	0.101	13.9	50.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	42.142	0.0	788.4	48
120 min Winter	26.264	0.0	982.9	78
180 min Winter	19.752	0.0	1108.9	106
240 min Winter	16.106	0.0	1205.7	136
360 min Winter	12.046	0.0	1352.8	198
480 min Winter	9.790	0.0	1466.0	258
600 min Winter	8.331	0.0	1559.3	318
720 min Winter	7.299	0.0	1639.4	378
960 min Winter	5.922	0.0	1773.4	500
1440 min Winter	4.409	0.0	1980.1	742
2160 min Winter	3.282	0.0	2212.2	1104
2880 min Winter	2.660	0.0	2390.4	1468
4320 min Winter	1.975	0.0	2662.4	2192
5760 min Winter	1.598	0.0	2873.7	2920
7200 min Winter	1.356	0.0	3046.7	3640
8640 min Winter	1.185	0.0	3194.9	4336
10080 min Winter	1.057	0.0	3324.9	5136

Appendix K - Preliminary Drainage Modelling Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	0
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.589	4-8	1.353	8-12	0.186

Total Area Contributing (ha) = 2.129

Total Pipe Volume (m³) = 66.568

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	12.837	0.084	152.8	0.044	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	19.879	0.097	204.9	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	19.921	0.096	207.5	0.062	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.26	5.350	0.044	0.0	0.0	0.0	0.81	14.3	5.9
2.000	50.00	5.47	5.481	0.043	0.0	0.0	0.0	0.70	12.3	5.9
3.000	50.00	5.37	5.580	0.062	0.0	0.0	0.0	0.90	35.9	8.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	15.200	0.113	134.5	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	18.190	0.113	161.0	0.045	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	7.495	0.053	141.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	20.658	0.100	206.6	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	23.027	0.093	248.0	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	6.251	0.025	247.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	11.939	0.048	248.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	47.125	0.196	240.4	0.119	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	22.768	0.328	69.4	0.032	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	24.187	0.091	265.8	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	19.807	0.079	250.7	0.042	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	44.145	0.175	252.3	0.027	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	24.589	0.074	332.3	0.056	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	5.29	5.650	0.026	0.0	0.0	0.0	0.86	15.3	3.5
5.000	50.00	5.38	5.650	0.045	0.0	0.0	0.0	0.79	13.9	6.1
4.001	50.00	5.53	5.537	0.071	0.0	0.0	0.0	0.84	14.9	9.6
3.001	50.00	5.91	5.484	0.201	0.0	0.0	0.0	0.91	36.0	27.2
2.001	50.00	6.38	5.384	0.305	0.0	0.0	0.0	0.83	32.8«	41.3
2.002	50.00	6.50	5.291	0.318	0.0	0.0	0.0	0.83	32.9«	43.1
1.001	50.00	6.70	5.266	0.362	0.0	0.0	0.0	0.99	70.1	49.0
1.002	50.00	7.48	5.218	0.480	0.0	0.0	0.0	1.01	71.4	65.1
6.000	50.00	5.20	5.350	0.032	0.0	0.0	0.0	1.89	133.6	4.4
1.003	50.00	7.90	5.022	0.542	0.0	0.0	0.0	0.96	67.8«	73.4
1.004	50.00	8.19	4.931	0.585	0.0	0.0	0.0	1.14	125.9	79.2
7.000	50.00	5.90	5.570	0.027	0.0	0.0	0.0	0.82	32.5	3.7
7.001	50.00	6.38	5.395	0.083	0.0	0.0	0.0	0.86	60.6	11.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
8.000	21.784	0.130	167.6	0.061	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	11.983	0.074	161.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.002	15.941	0.049	325.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	29.833	0.253	117.9	0.060	5.00	0.0	0.600	o	300	Pipe/Conduit	
7.003	49.097	0.146	336.3	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.004	14.621	0.044	332.3	0.031	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.005	9.426	0.028	336.6	0.025	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.000	16.281	0.087	187.1	0.096	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	8.239	0.089	92.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.000	15.000	0.100	150.0	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	14.341	0.086	166.8	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.000	15.000	0.086	174.4	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	15.000	0.088	170.5	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.000	50.00	5.36	5.525	0.061	0.0	0.0	0.0	1.01	40.0	8.2
8.001	50.00	5.52	5.395	0.061	0.0	0.0	0.0	1.23	87.1	8.2
7.002	50.00	6.68	5.321	0.143	0.0	0.0	0.0	0.87	61.2	19.4
9.000	50.00	5.34	5.525	0.060	0.0	0.0	0.0	1.45	102.3	8.2
7.003	50.00	7.52	5.272	0.255	0.0	0.0	0.0	0.98	108.5	34.6
7.004	50.00	7.76	5.127	0.287	0.0	0.0	0.0	0.99	109.2	38.8
7.005	50.00	7.92	5.083	0.312	0.0	0.0	0.0	0.98	108.4	42.2
10.000	50.00	5.28	5.500	0.096	0.0	0.0	0.0	0.95	37.9	13.1
10.001	50.00	5.39	5.413	0.096	0.0	0.0	0.0	1.36	54.0	13.1
11.000	50.00	5.23	5.425	0.035	0.0	0.0	0.0	1.07	42.4	4.8
10.002	50.00	5.62	5.325	0.141	0.0	0.0	0.0	1.01	40.1	19.0
12.000	50.00	5.25	5.325	0.031	0.0	0.0	0.0	0.99	39.2	4.2
10.003	50.00	5.87	5.239	0.180	0.0	0.0	0.0	1.00	39.7	24.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	15.000	0.124	121.0	0.051	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.004	15.979	0.095	168.2	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.006	34.244	0.102	335.7	0.064	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.007	34.147	0.102	334.8	0.037	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	30.844	0.092	335.3	0.027	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.006	20.928	0.062	337.5	0.044	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.007	25.403	0.076	334.3	0.042	0.00	0.0	0.600	o	400	Pipe/Conduit	
14.000	20.720	0.147	141.0	0.113	5.00	0.0	0.600	o	225	Pipe/Conduit	
14.001	14.016	0.100	140.2	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.000	26.960	0.169	159.5	0.080	5.00	0.0	0.600	o	225	Pipe/Conduit	
15.001	12.288	0.078	157.5	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
14.002	23.238	0.165	140.8	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.000	36.167	0.146	247.7	0.197	5.00	0.0	0.600	o	225	Pipe/Conduit	
16.001	22.866	0.092	248.5	0.139	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	5.21	5.275	0.051	0.0	0.0	0.0	1.19	47.2	6.9
10.004	50.00	6.14	5.151	0.251	0.0	0.0	0.0	1.01	40.0	33.9
7.006	50.00	8.50	5.056	0.626	0.0	0.0	0.0	0.98	108.6	84.8
7.007	50.00	9.08	4.954	0.663	0.0	0.0	0.0	0.98	108.8	89.8
1.005	50.00	9.58	4.852	1.275	0.0	0.0	0.0	1.03	128.8«	172.6
1.006	50.00	9.92	4.760	1.318	0.0	0.0	0.0	1.02	128.4«	178.5
1.007	50.00	10.34	4.698	1.360	0.0	0.0	0.0	1.03	129.0«	184.2
14.000	50.00	5.31	5.100	0.113	0.0	0.0	0.0	1.10	43.7	15.3
14.001	50.00	5.53	4.953	0.135	0.0	0.0	0.0	1.10	43.8	18.3
15.000	50.00	5.44	5.100	0.080	0.0	0.0	0.0	1.03	41.1	10.9
15.001	50.00	5.63	4.931	0.117	0.0	0.0	0.0	1.04	41.3	15.8
14.002	50.00	5.98	4.853	0.304	0.0	0.0	0.0	1.10	43.7	41.2
16.000	50.00	5.73	5.100	0.197	0.0	0.0	0.0	0.83	32.9	26.7
16.001	50.00	6.11	4.954	0.336	0.0	0.0	0.0	0.99	70.2	45.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
16.002	14.217	0.057	249.4	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.003	12.746	0.051	249.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.004	15.976	0.064	249.6	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.003	16.562	0.068	243.6	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	13.966	0.042	332.5	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	33.345	0.690	48.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
16.002	50.00	6.35	4.862	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.003	50.00	6.57	4.805	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.004	50.00	6.84	4.754	0.409	0.0	0.0	0.0	0.99	70.0	55.4
14.003	50.00	7.11	4.690	0.738	0.0	0.0	0.0	1.00	70.9«	100.0
1.008	50.00	10.61	4.622	2.129	0.0	0.0	0.0	0.86	60.6«	288.3
1.009	50.00	10.85	4.580	2.129	0.0	0.0	0.0	2.27	160.3«	288.3

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.037	0.036	0.044
2.000	User	-	100	0.015	0.015	0.015
	User	-	95	0.014	0.013	0.029
	User	-	100	0.015	0.015	0.043
3.000	User	-	100	0.019	0.019	0.019
	User	-	100	0.021	0.021	0.040
	User	-	100	0.014	0.014	0.054
	User	-	95	0.008	0.008	0.062
4.000	User	-	95	0.027	0.026	0.026
5.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.029	0.028	0.036
	User	-	95	0.009	0.009	0.045
4.001	-	-	100	0.000	0.000	0.000
3.001	User	-	100	0.017	0.017	0.017
	User	-	100	0.039	0.039	0.057
	User	-	100	0.011	0.011	0.068
2.001	User	-	100	0.011	0.011	0.011
	User	-	100	0.049	0.049	0.061
2.002	User	-	100	0.008	0.008	0.008
	User	-	95	0.005	0.004	0.013
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	100	0.007	0.007	0.007
	User	-	100	0.035	0.035	0.042
	User	-	100	0.016	0.016	0.058
	User	-	100	0.005	0.005	0.063
	User	-	95	0.059	0.056	0.119
6.000	User	-	100	0.012	0.012	0.012
	User	-	100	0.021	0.021	0.032
1.003	User	-	95	0.009	0.009	0.009
	User	-	95	0.022	0.021	0.030
1.004	User	-	100	0.015	0.015	0.015
	User	-	100	0.010	0.010	0.025
	User	-	100	0.013	0.013	0.038
	User	-	30	0.016	0.005	0.042
7.000	User	-	100	0.027	0.027	0.027
7.001	User	-	100	0.056	0.056	0.056
8.000	User	-	100	0.051	0.051	0.051
	User	-	95	0.010	0.010	0.061
8.001	-	-	100	0.000	0.000	0.000
7.002	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.032	0.032	0.032
	User	-	100	0.028	0.028	0.060
7.003	User	-	100	0.052	0.052	0.052
7.004	User	-	100	0.025	0.025	0.025
	User	-	100	0.006	0.006	0.031
7.005	User	-	100	0.025	0.025	0.025
10.000	User	-	100	0.061	0.061	0.061
	User	-	100	0.015	0.015	0.076
	User	-	95	0.021	0.020	0.096

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
10.001	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.016	0.016	0.016
	User	-	100	0.005	0.005	0.021
	User	-	95	0.015	0.014	0.035
10.002	User	-	95	0.009	0.009	0.009
12.000	User	-	100	0.011	0.011	0.011
	User	-	95	0.021	0.020	0.031
10.003	User	-	95	0.009	0.009	0.009
13.000	User	-	100	0.009	0.009	0.009
	User	-	95	0.017	0.016	0.025
	User	-	95	0.028	0.026	0.051
10.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.004	0.004	0.008
	User	-	100	0.011	0.011	0.019
7.006	User	-	100	0.064	0.064	0.064
7.007	User	-	100	0.027	0.027	0.027
	User	-	100	0.010	0.010	0.037
1.005	User	-	100	0.017	0.017	0.017
	User	-	100	0.002	0.002	0.019
	User	-	30	0.026	0.008	0.027
1.006	User	-	100	0.014	0.014	0.014
	User	-	100	0.009	0.009	0.023
	User	-	100	0.018	0.018	0.041
	User	-	30	0.011	0.003	0.044
1.007	User	-	100	0.023	0.023	0.023
	User	-	30	0.063	0.019	0.042
14.000	User	-	100	0.045	0.045	0.045
	User	-	100	0.021	0.021	0.066
	User	-	95	0.049	0.047	0.113
14.001	User	-	100	0.013	0.013	0.013
	User	-	100	0.009	0.009	0.022
15.000	User	-	100	0.017	0.017	0.017
	User	-	95	0.035	0.033	0.050
	User	-	100	0.030	0.030	0.080
15.001	User	-	100	0.036	0.036	0.036
14.002	User	-	100	0.031	0.031	0.031
	User	-	95	0.022	0.021	0.053
16.000	User	-	100	0.053	0.053	0.053
	User	-	95	0.022	0.021	0.074
	User	-	100	0.002	0.002	0.076
	User	-	100	0.121	0.121	0.197
16.001	User	-	100	0.040	0.040	0.040
	User	-	95	0.009	0.009	0.049
	User	-	100	0.002	0.002	0.051
	User	-	100	0.088	0.088	0.139
16.002	User	-	100	0.003	0.003	0.003
	User	-	100	0.026	0.026	0.028
16.003	-	-	100	0.000	0.000	0.000
16.004	User	-	95	0.009	0.008	0.008
	User	-	100	0.010	0.010	0.018

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	95	0.028	0.027	0.045
14.003	User	-	100	0.025	0.025	0.025
1.008	User	-	100	0.030	0.030	0.030
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.236	2.129	2.129

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	Outfall 9 & 8	4.210	3.890	3.890	300	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	22
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.300		

Online Controls for Storm

Orifice Manhole: MH16, DS/PN: 1.003, Volume (m³): 6.3

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.022

Orifice Manhole: MH17, DS/PN: 1.004, Volume (m³): 3.3

Diameter (m) 0.090 Discharge Coefficient 0.600 Invert Level (m) 4.931

Orifice Manhole: MH34, DS/PN: 10.004, Volume (m³): 2.5

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.151

Orifice Manhole: MH36, DS/PN: 7.007, Volume (m³): 5.7

Diameter (m) 0.275 Discharge Coefficient 0.600 Invert Level (m) 4.954

Non Return Valve Manhole: MH52, DS/PN: 1.009, Volume (m³): 2.6

Storage Structures for Storm

Tank or Pond Manhole: MH1, DS/PN: 1.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	74.0	0.450	74.0	0.451	0.0

Tank or Pond Manhole: MH3, DS/PN: 2.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	28.0	0.450	28.0	0.451	0.0

Tank or Pond Manhole: MH4, DS/PN: 3.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	16.0	0.450	16.0	0.451	0.0

Tank or Pond Manhole: MH5, DS/PN: 4.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	54.0	0.450	54.0	0.451	0.0

Tank or Pond Manhole: MH6, DS/PN: 5.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	76.0	0.450	76.0	0.451	0.0

Tank or Pond Manhole: MH12, DS/PN: 2.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10.0	0.450	10.0	0.451	0.0

Tank or Pond Manhole: MH14, DS/PN: 1.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	118.0	0.450	118.0	0.451	0.0

Tank or Pond Manhole: MH15, DS/PN: 6.000

Invert Level (m) 5.350

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	42.0	0.450	42.0	0.451	0.0

Complex Manhole: MH16, DS/PN: 1.003

Tank or Pond

Invert Level (m) 5.022

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	62.0	0.450	62.0	0.451	0.0

Tank or Pond Manhole: MH20, DS/PN: 8.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	0.450	20.0	0.451	0.0

Tank or Pond Manhole: MH27, DS/PN: 10.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	42.0	0.450	42.0	0.451	0.0

Tank or Pond Manhole: MH29, DS/PN: 11.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	30.0	0.450	30.0	0.451	0.0

Tank or Pond Manhole: MH30, DS/PN: 10.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	18.0	0.450	18.0	0.451	0.0

Tank or Pond Manhole: MH31, DS/PN: 12.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	42.0	0.450	42.0	0.451	0.0

Tank or Pond Manhole: MH33, DS/PN: 13.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	90.0	0.450	90.0	0.451	0.0

Tank or Pond Manhole: MH40, DS/PN: 14.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	98.0	0.450	98.0	0.451	0.0

Tank or Pond Manhole: MH41, DS/PN: 14.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	18.0	0.450	18.0	0.451	0.0

Tank or Pond Manhole: MH42, DS/PN: 15.000

Invert Level (m) 5.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	70.0	0.450	70.0	0.451	0.0

Tank or Pond Manhole: MH44, DS/PN: 14.002

Invert Level (m) 5.550

Tank or Pond Manhole: MH44, DS/PN: 14.002

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	44.0	0.450	44.0	0.451	0.0

Tank or Pond Manhole: MH45, DS/PN: 16.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	44.0	0.450	44.0	0.451	0.0

Tank or Pond Manhole: MH46, DS/PN: 16.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	18.0	0.450	18.0	0.451	0.0

Tank or Pond Manhole: MH49, DS/PN: 16.004

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	74.0	0.450	74.0	0.451	0.0

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	22
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100, 1000
Climate Change (%)	20, 0

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	MH1	180 Winter	100	+20%	100/15 Summer	1000/120 Winter		
2.000	MH3	180 Winter	100	+20%	100/15 Summer	1000/120 Winter		
3.000	MH4	240 Winter	100	+20%	100/15 Summer			
4.000	MH5	180 Winter	100	+20%	100/15 Summer	1000/180 Winter		
5.000	MH6	180 Winter	100	+20%	100/15 Summer	1000/180 Winter		
4.001	MH7	180 Winter	100	+20%	100/15 Summer	1000/180 Winter		
3.001	MH10	240 Winter	100	+20%	100/15 Summer	1000/120 Winter		
2.001	MH11	240 Winter	100	+20%	100/15 Summer	1000/120 Winter		
2.002	MH12	180 Winter	100	+20%	100/15 Summer	1000/120 Winter		
1.001	MH13	180 Winter	100	+20%	100/15 Summer	1000/180 Winter		
1.002	MH14	180 Winter	100	+20%	100/15 Summer			
6.000	MH15	180 Winter	100	+20%	100/15 Summer			
1.003	MH16	180 Winter	100	+20%	100/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	MH1	6.229	0.729	0.000	0.24			3.1	FLOOD RISK	3
2.000	MH3	6.246	0.615	0.000	0.24			2.8	FLOOD RISK	4
3.000	MH4	6.247	0.442	0.000	0.11			3.5	SURCHARGED	
4.000	MH5	6.246	0.446	0.000	0.12			1.6	FLOOD RISK	4
5.000	MH6	6.247	0.447	0.000	0.23			2.9	FLOOD RISK	4
4.001	MH7	6.244	0.557	0.000	0.30			3.8	FLOOD RISK	3
3.001	MH10	6.244	0.535	0.000	0.29			9.6	FLOOD RISK	4
2.001	MH11	6.240	0.631	0.000	0.49			14.9	FLOOD RISK	4
2.002	MH12	6.231	0.715	0.000	0.77			19.5	FLOOD RISK	3
1.001	MH13	6.227	0.661	0.000	0.39			22.0	FLOOD RISK	1
1.002	MH14	6.223	0.705	0.000	0.45			29.9	FLOOD RISK	
6.000	MH15	6.213	0.563	0.000	0.05			5.9	FLOOD RISK	
1.003	MH16	6.212	0.890	0.000	0.16			9.7	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.004	MH17	60 Winter	100	+20%	100/15 Summer	1000/15 Winter		
7.000	MH18	30 Winter	100	+20%	100/15 Summer			
7.001	MH19	30 Winter	100	+20%	100/15 Summer			
8.000	MH20	30 Winter	100	+20%	100/15 Summer	1000/15 Winter		
8.001	MH21	30 Winter	100	+20%	100/15 Summer	1000/15 Winter		
7.002	MH22	30 Winter	100	+20%	100/15 Summer			
9.000	MH23	30 Winter	100	+20%	100/15 Summer	1000/15 Winter		
7.003	MH24	30 Winter	100	+20%	100/15 Summer			
7.004	MH25	30 Winter	100	+20%	100/15 Summer			
7.005	MH26	30 Winter	100	+20%	100/15 Summer			
10.000	MH27	60 Winter	100	+20%	100/15 Summer			
10.001	MH28	120 Winter	100	+20%	100/15 Summer			
11.000	MH29	60 Winter	100	+20%	100/15 Summer			
10.002	MH30	120 Winter	100	+20%	100/15 Summer			
12.000	MH31	60 Winter	100	+20%	100/15 Summer			
10.003	MH32	60 Winter	100	+20%	100/15 Summer			
13.000	MH33	60 Winter	100	+20%	100/15 Summer			
10.004	MH34	120 Winter	100	+20%	100/15 Summer			
7.006	MH35	30 Winter	100	+20%	100/15 Summer			
7.007	MH36	30 Winter	100	+20%	100/15 Summer			
1.005	MH37	30 Winter	100	+20%	100/15 Summer			
1.006	MH38	30 Winter	100	+20%	100/15 Summer			
1.007	MH39	30 Winter	100	+20%	100/15 Summer			
14.000	MH40	30 Winter	100	+20%	100/15 Summer			
14.001	MH41	30 Winter	100	+20%	100/15 Summer			
15.000	MH42	30 Winter	100	+20%	100/15 Summer			
15.001	MH43	30 Winter	100	+20%	100/15 Summer			
14.002	MH44	30 Winter	100	+20%	100/15 Summer			
16.000	MH45	30 Winter	100	+20%	100/15 Summer	1000/15 Summer		
16.001	MH46	30 Winter	100	+20%	100/15 Summer	1000/30 Summer		
16.002	MH47	30 Winter	100	+20%	100/15 Summer			
16.003	MH48	30 Winter	100	+20%	100/15 Summer			
16.004	MH49	30 Winter	100	+20%	100/15 Summer			
14.003	MH50	30 Winter	100	+20%	100/15 Summer			
1.008	MH51	30 Winter	100	+20%	100/15 Summer			
1.009	MH52	30 Winter	100	+20%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	MH17	6.027	0.721	0.000	0.09			9.9	FLOOD RISK	7
7.000	MH18	6.258	0.463	0.000	0.22			6.7	SURCHARGED	
7.001	MH19	6.237	0.542	0.000	0.34			18.5	SURCHARGED	
8.000	MH20	6.229	0.479	0.000	0.46			16.8	FLOOD RISK	5
8.001	MH21	6.212	0.517	0.000	0.26			17.5	FLOOD RISK	5

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.002	MH22	6.214	0.593	0.000	0.47			23.9	SURCHARGED	
9.000	MH23	6.228	0.403	0.000	0.16			15.3	FLOOD RISK	3
7.003	MH24	6.207	0.560	0.000	0.39			39.6	SURCHARGED	
7.004	MH25	6.114	0.612	0.000	0.53			43.7	SURCHARGED	
7.005	MH26	6.089	0.631	0.000	0.64			47.6	SURCHARGED	
10.000	MH27	6.184	0.459	0.000	0.29			9.9	FLOOD RISK	
10.001	MH28	6.174	0.536	0.000	0.17			7.2	FLOOD RISK	
11.000	MH29	6.175	0.525	0.000	0.04			1.5	FLOOD RISK	
10.002	MH30	6.169	0.619	0.000	0.27			9.4	FLOOD RISK	
12.000	MH31	6.149	0.599	0.000	0.06			2.0	FLOOD RISK	
10.003	MH32	6.180	0.716	0.000	0.22			7.8	FLOOD RISK	
13.000	MH33	6.139	0.639	0.000	0.10			3.9	FLOOD RISK	
10.004	MH34	6.169	0.793	0.000	0.29			10.4	FLOOD RISK	
7.006	MH35	6.062	0.631	0.000	0.65			62.8	SURCHARGED	
7.007	MH36	5.978	0.649	0.000	0.74			71.8	SURCHARGED	
1.005	MH37	5.763	0.511	0.000	0.75			84.9	FLOOD RISK	
1.006	MH38	5.682	0.522	0.000	0.87			93.5	SURCHARGED	
1.007	MH39	5.608	0.510	0.000	0.93			102.5	SURCHARGED	
14.000	MH40	5.672	0.347	0.000	0.57			22.6	SURCHARGED	
14.001	MH41	5.654	0.476	0.000	0.64			24.5	SURCHARGED	
15.000	MH42	5.664	0.339	0.000	0.50			19.1	SURCHARGED	
15.001	MH43	5.651	0.495	0.000	0.55			19.7	SURCHARGED	
14.002	MH44	5.640	0.562	0.000	1.10			44.1	SURCHARGED	
16.000	MH45	5.963	0.638	0.000	0.87			27.0	FLOOD RISK	8
16.001	MH46	5.880	0.626	0.000	0.77			47.6	FLOOD RISK	4
16.002	MH47	5.798	0.636	0.000	0.92			53.7	FLOOD RISK	
16.003	MH48	5.720	0.615	0.000	0.90			51.2	FLOOD RISK	
16.004	MH49	5.646	0.592	0.000	0.97			57.6	SURCHARGED	
14.003	MH50	5.596	0.606	0.000	1.71			103.2	SURCHARGED	
1.008	MH51	5.509	0.587	0.000	3.48			165.9	SURCHARGED	
1.009	MH52	5.078	0.198	0.000	1.12			165.0	SURCHARGED	

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	22
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100, 1000
Climate Change (%)	20, 0

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	MH1	180 Winter	1000	+0%	100/15 Summer	1000/120 Winter		
2.000	MH3	120 Winter	1000	+0%	100/15 Summer	1000/120 Winter		
3.000	MH4	180 Winter	1000	+0%	100/15 Summer			
4.000	MH5	240 Winter	1000	+0%	100/15 Summer	1000/180 Winter		
5.000	MH6	240 Winter	1000	+0%	100/15 Summer	1000/180 Winter		
4.001	MH7	240 Winter	1000	+0%	100/15 Summer	1000/180 Winter		
3.001	MH10	180 Winter	1000	+0%	100/15 Summer	1000/120 Winter		
2.001	MH11	180 Winter	1000	+0%	100/15 Summer	1000/120 Winter		
2.002	MH12	180 Winter	1000	+0%	100/15 Summer	1000/120 Winter		
1.001	MH13	180 Winter	1000	+0%	100/15 Summer	1000/180 Winter		
1.002	MH14	180 Winter	1000	+0%	100/15 Summer			
6.000	MH15	120 Winter	1000	+0%	100/15 Summer			
1.003	MH16	120 Winter	1000	+0%	100/15 Summer			

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	MH1	6.406	0.906	0.142	0.24			3.1	FLOOD	3
2.000	MH3	6.413	0.782	0.686	0.26			3.0	FLOOD	4
3.000	MH4	6.410	0.605	0.000	0.17			5.5	FLOOD RISK	
4.000	MH5	6.407	0.607	0.202	0.16			2.3	FLOOD	4
5.000	MH6	6.409	0.609	0.309	0.19			2.4	FLOOD	4
4.001	MH7	6.406	0.719	6.396	0.50			6.4	FLOOD	3
3.001	MH10	6.407	0.698	7.497	0.38			12.5	FLOOD	4
2.001	MH11	6.405	0.796	5.195	0.64			19.4	FLOOD	4
2.002	MH12	6.402	0.886	0.005	0.78			19.7	FLOOD	3
1.001	MH13	6.400	0.834	0.195	0.39			22.1	FLOOD	1
1.002	MH14	6.400	0.882	0.000	0.46			30.6	FLOOD RISK	
6.000	MH15	6.395	0.745	0.000	0.06			6.9	FLOOD RISK	
1.003	MH16	6.392	1.070	0.000	0.17			10.4	FLOOD RISK	

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.004	MH17	60 Winter	1000	+0%	100/15 Summer	1000/15 Winter		
7.000	MH18	30 Summer	1000	+0%	100/15 Summer			
7.001	MH19	30 Summer	1000	+0%	100/15 Summer			
8.000	MH20	30 Winter	1000	+0%	100/15 Summer	1000/15 Winter		
8.001	MH21	30 Winter	1000	+0%	100/15 Summer	1000/15 Winter		
7.002	MH22	30 Winter	1000	+0%	100/15 Summer			
9.000	MH23	30 Winter	1000	+0%	100/15 Summer	1000/15 Winter		
7.003	MH24	30 Winter	1000	+0%	100/15 Summer			
7.004	MH25	30 Winter	1000	+0%	100/15 Summer			
7.005	MH26	30 Winter	1000	+0%	100/15 Summer			
10.000	MH27	60 Winter	1000	+0%	100/15 Summer			
10.001	MH28	60 Winter	1000	+0%	100/15 Summer			
11.000	MH29	60 Winter	1000	+0%	100/15 Summer			
10.002	MH30	60 Winter	1000	+0%	100/15 Summer			
12.000	MH31	60 Winter	1000	+0%	100/15 Summer			
10.003	MH32	120 Winter	1000	+0%	100/15 Summer			
13.000	MH33	60 Winter	1000	+0%	100/15 Summer			
10.004	MH34	120 Winter	1000	+0%	100/15 Summer			
7.006	MH35	30 Winter	1000	+0%	100/15 Summer			
7.007	MH36	30 Winter	1000	+0%	100/15 Summer			
1.005	MH37	30 Winter	1000	+0%	100/15 Summer			
1.006	MH38	30 Winter	1000	+0%	100/15 Summer			
1.007	MH39	30 Winter	1000	+0%	100/15 Summer			
14.000	MH40	60 Winter	1000	+0%	100/15 Summer			
14.001	MH41	30 Winter	1000	+0%	100/15 Summer			
15.000	MH42	60 Winter	1000	+0%	100/15 Summer			
15.001	MH43	30 Winter	1000	+0%	100/15 Summer			
14.002	MH44	30 Winter	1000	+0%	100/15 Summer			
16.000	MH45	30 Winter	1000	+0%	100/15 Summer	1000/15 Summer		
16.001	MH46	30 Winter	1000	+0%	100/15 Summer	1000/30 Summer		
16.002	MH47	30 Winter	1000	+0%	100/15 Summer			
16.003	MH48	30 Winter	1000	+0%	100/15 Summer			
16.004	MH49	30 Winter	1000	+0%	100/15 Summer			
14.003	MH50	30 Winter	1000	+0%	100/15 Summer			
1.008	MH51	30 Winter	1000	+0%	100/15 Summer			
1.009	MH52	60 Winter	1000	+0%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	MH17	6.123	0.817	2.995	0.12			12.2	FLOOD	7
7.000	MH18	6.559	0.764	0.000	0.34			10.4	FLOOD RISK	
7.001	MH19	6.517	0.822	0.000	0.55			29.6	FLOOD RISK	
8.000	MH20	6.425	0.675	2.788	0.63			23.0	FLOOD	5
8.001	MH21	6.405	0.710	5.023	0.36			24.5	FLOOD	5

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.002	MH22	6.447	0.826	0.000	0.58			30.0	SURCHARGED	
9.000	MH23	6.407	0.582	7.614	0.34			31.7	FLOOD	3
7.003	MH24	6.439	0.792	0.000	0.64			64.0	SURCHARGED	
7.004	MH25	6.413	0.911	0.000	0.79			65.6	SURCHARGED	
7.005	MH26	6.394	0.936	0.000	0.90			67.2	SURCHARGED	
10.000	MH27	6.331	0.606	0.000	0.39			13.1	FLOOD RISK	
10.001	MH28	6.321	0.683	0.000	0.30			12.7	FLOOD RISK	
11.000	MH29	6.323	0.673	0.000	0.05			1.9	FLOOD RISK	
10.002	MH30	6.316	0.766	0.000	0.30			10.5	FLOOD RISK	
12.000	MH31	6.299	0.749	0.000	0.06			2.1	FLOOD RISK	
10.003	MH32	6.346	0.882	0.000	0.23			8.1	FLOOD RISK	
13.000	MH33	6.288	0.788	0.000	0.10			4.2	FLOOD RISK	
10.004	MH34	6.346	0.970	0.000	0.32			11.3	FLOOD RISK	
7.006	MH35	6.379	0.948	0.000	0.79			76.6	SURCHARGED	
7.007	MH36	6.330	1.001	0.000	0.90			88.1	FLOOD RISK	
1.005	MH37	5.959	0.707	0.000	0.93			104.8	FLOOD RISK	
1.006	MH38	5.871	0.711	0.000	1.12			120.5	SURCHARGED	
1.007	MH39	5.784	0.686	0.000	1.21			134.4	FLOOD RISK	
14.000	MH40	5.807	0.482	0.000	0.61			24.3	FLOOD RISK	
14.001	MH41	5.789	0.611	0.000	0.69			26.6	FLOOD RISK	
15.000	MH42	5.805	0.480	0.000	0.50			19.1	FLOOD RISK	
15.001	MH43	5.796	0.640	0.000	0.53			18.8	FLOOD RISK	
14.002	MH44	5.787	0.709	0.000	1.14			45.5	FLOOD RISK	
16.000	MH45	6.062	0.737	18.613	0.97			30.2	FLOOD	8
16.001	MH46	6.024	0.770	2.762	0.96			59.6	FLOOD	4
16.002	MH47	5.979	0.817	0.000	1.19			69.5	FLOOD RISK	
16.003	MH48	5.902	0.797	0.000	1.20			68.4	FLOOD RISK	
16.004	MH49	5.831	0.777	0.000	1.02			60.7	FLOOD RISK	
14.003	MH50	5.776	0.786	0.000	1.71			102.9	FLOOD RISK	
1.008	MH51	5.695	0.773	0.000	3.70			176.4	FLOOD RISK	
1.009	MH52	5.180	0.300	0.000	1.19			174.3	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	0
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.589	4-8	1.353	8-12	0.186

Total Area Contributing (ha) = 2.129

Total Pipe Volume (m³) = 66.568

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	12.837	0.084	152.8	0.044	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	19.879	0.097	204.9	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	19.921	0.096	207.5	0.062	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.26	5.350	0.044	0.0	0.0	0.0	0.81	14.3	5.9
2.000	50.00	5.47	5.481	0.043	0.0	0.0	0.0	0.70	12.3	5.9
3.000	50.00	5.37	5.580	0.062	0.0	0.0	0.0	0.90	35.9	8.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	15.200	0.113	134.5	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	18.190	0.113	161.0	0.045	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	7.495	0.053	141.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	20.658	0.100	206.6	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	23.027	0.093	248.0	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	6.251	0.025	247.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	11.939	0.048	248.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	47.125	0.196	240.4	0.119	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	22.768	0.328	69.4	0.032	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	24.187	0.091	265.8	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	19.807	0.079	250.7	0.042	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	44.145	0.175	252.3	0.027	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	24.589	0.074	332.3	0.056	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	5.29	5.650	0.026	0.0	0.0	0.0	0.86	15.3	3.5
5.000	50.00	5.38	5.650	0.045	0.0	0.0	0.0	0.79	13.9	6.1
4.001	50.00	5.53	5.537	0.071	0.0	0.0	0.0	0.84	14.9	9.6
3.001	50.00	5.91	5.484	0.201	0.0	0.0	0.0	0.91	36.0	27.2
2.001	50.00	6.38	5.384	0.305	0.0	0.0	0.0	0.83	32.8«	41.3
2.002	50.00	6.50	5.291	0.318	0.0	0.0	0.0	0.83	32.9«	43.1
1.001	50.00	6.70	5.266	0.362	0.0	0.0	0.0	0.99	70.1	49.0
1.002	50.00	7.48	5.218	0.480	0.0	0.0	0.0	1.01	71.4	65.1
6.000	50.00	5.20	5.350	0.032	0.0	0.0	0.0	1.89	133.6	4.4
1.003	50.00	7.90	5.022	0.542	0.0	0.0	0.0	0.96	67.8«	73.4
1.004	50.00	8.19	4.931	0.585	0.0	0.0	0.0	1.14	125.9	79.2
7.000	50.00	5.90	5.570	0.027	0.0	0.0	0.0	0.82	32.5	3.7
7.001	50.00	6.38	5.395	0.083	0.0	0.0	0.0	0.86	60.6	11.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
8.000	21.784	0.130	167.6	0.061	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	11.983	0.074	161.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.002	15.941	0.049	325.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	29.833	0.253	117.9	0.060	5.00	0.0	0.600	o	300	Pipe/Conduit	
7.003	49.097	0.146	336.3	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.004	14.621	0.044	332.3	0.031	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.005	9.426	0.028	336.6	0.025	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.000	16.281	0.087	187.1	0.096	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	8.239	0.089	92.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.000	15.000	0.100	150.0	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	14.341	0.086	166.8	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.000	15.000	0.086	174.4	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	15.000	0.088	170.5	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.000	50.00	5.36	5.525	0.061	0.0	0.0	0.0	1.01	40.0	8.2
8.001	50.00	5.52	5.395	0.061	0.0	0.0	0.0	1.23	87.1	8.2
7.002	50.00	6.68	5.321	0.143	0.0	0.0	0.0	0.87	61.2	19.4
9.000	50.00	5.34	5.525	0.060	0.0	0.0	0.0	1.45	102.3	8.2
7.003	50.00	7.52	5.272	0.255	0.0	0.0	0.0	0.98	108.5	34.6
7.004	50.00	7.76	5.127	0.287	0.0	0.0	0.0	0.99	109.2	38.8
7.005	50.00	7.92	5.083	0.312	0.0	0.0	0.0	0.98	108.4	42.2
10.000	50.00	5.28	5.500	0.096	0.0	0.0	0.0	0.95	37.9	13.1
10.001	50.00	5.39	5.413	0.096	0.0	0.0	0.0	1.36	54.0	13.1
11.000	50.00	5.23	5.425	0.035	0.0	0.0	0.0	1.07	42.4	4.8
10.002	50.00	5.62	5.325	0.141	0.0	0.0	0.0	1.01	40.1	19.0
12.000	50.00	5.25	5.325	0.031	0.0	0.0	0.0	0.99	39.2	4.2
10.003	50.00	5.87	5.239	0.180	0.0	0.0	0.0	1.00	39.7	24.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	15.000	0.124	121.0	0.051	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.004	15.979	0.095	168.2	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.006	34.244	0.102	335.7	0.064	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.007	34.147	0.102	334.8	0.037	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	30.844	0.092	335.3	0.027	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.006	20.928	0.062	337.5	0.044	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.007	25.403	0.076	334.3	0.042	0.00	0.0	0.600	o	400	Pipe/Conduit	
14.000	20.720	0.147	141.0	0.113	5.00	0.0	0.600	o	225	Pipe/Conduit	
14.001	14.016	0.100	140.2	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.000	26.960	0.169	159.5	0.080	5.00	0.0	0.600	o	225	Pipe/Conduit	
15.001	12.288	0.078	157.5	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
14.002	23.238	0.165	140.8	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.000	36.167	0.146	247.7	0.197	5.00	0.0	0.600	o	225	Pipe/Conduit	
16.001	22.866	0.092	248.5	0.139	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	5.21	5.275	0.051	0.0	0.0	0.0	1.19	47.2	6.9
10.004	50.00	6.14	5.151	0.251	0.0	0.0	0.0	1.01	40.0	33.9
7.006	50.00	8.50	5.056	0.626	0.0	0.0	0.0	0.98	108.6	84.8
7.007	50.00	9.08	4.954	0.663	0.0	0.0	0.0	0.98	108.8	89.8
1.005	50.00	9.58	4.852	1.275	0.0	0.0	0.0	1.03	128.8«	172.6
1.006	50.00	9.92	4.760	1.318	0.0	0.0	0.0	1.02	128.4«	178.5
1.007	50.00	10.34	4.698	1.360	0.0	0.0	0.0	1.03	129.0«	184.2
14.000	50.00	5.31	5.100	0.113	0.0	0.0	0.0	1.10	43.7	15.3
14.001	50.00	5.53	4.953	0.135	0.0	0.0	0.0	1.10	43.8	18.3
15.000	50.00	5.44	5.100	0.080	0.0	0.0	0.0	1.03	41.1	10.9
15.001	50.00	5.63	4.931	0.117	0.0	0.0	0.0	1.04	41.3	15.8
14.002	50.00	5.98	4.853	0.304	0.0	0.0	0.0	1.10	43.7	41.2
16.000	50.00	5.73	5.100	0.197	0.0	0.0	0.0	0.83	32.9	26.7
16.001	50.00	6.11	4.954	0.336	0.0	0.0	0.0	0.99	70.2	45.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
16.002	14.217	0.057	249.4	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.003	12.746	0.051	249.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.004	15.976	0.064	249.6	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.003	16.562	0.068	243.6	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	13.966	0.042	332.5	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	33.345	0.690	48.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
16.002	50.00	6.35	4.862	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.003	50.00	6.57	4.805	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.004	50.00	6.84	4.754	0.409	0.0	0.0	0.0	0.99	70.0	55.4
14.003	50.00	7.11	4.690	0.738	0.0	0.0	0.0	1.00	70.9«	100.0
1.008	50.00	10.61	4.622	2.129	0.0	0.0	0.0	0.86	60.6«	288.3
1.009	50.00	10.85	4.580	2.129	0.0	0.0	0.0	2.27	160.3«	288.3

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.037	0.036	0.044
2.000	User	-	100	0.015	0.015	0.015
	User	-	95	0.014	0.013	0.029
	User	-	100	0.015	0.015	0.043
3.000	User	-	100	0.019	0.019	0.019
	User	-	100	0.021	0.021	0.040
	User	-	100	0.014	0.014	0.054
	User	-	95	0.008	0.008	0.062
4.000	User	-	95	0.027	0.026	0.026
5.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.029	0.028	0.036
	User	-	95	0.009	0.009	0.045
4.001	-	-	100	0.000	0.000	0.000
3.001	User	-	100	0.017	0.017	0.017
	User	-	100	0.039	0.039	0.057
	User	-	100	0.011	0.011	0.068
2.001	User	-	100	0.011	0.011	0.011
	User	-	100	0.049	0.049	0.061
2.002	User	-	100	0.008	0.008	0.008
	User	-	95	0.005	0.004	0.013
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	100	0.007	0.007	0.007
	User	-	100	0.035	0.035	0.042
	User	-	100	0.016	0.016	0.058
	User	-	100	0.005	0.005	0.063
	User	-	95	0.059	0.056	0.119
6.000	User	-	100	0.012	0.012	0.012
	User	-	100	0.021	0.021	0.032
1.003	User	-	95	0.009	0.009	0.009
	User	-	95	0.022	0.021	0.030
1.004	User	-	100	0.015	0.015	0.015
	User	-	100	0.010	0.010	0.025
	User	-	100	0.013	0.013	0.038
	User	-	30	0.016	0.005	0.042
7.000	User	-	100	0.027	0.027	0.027
7.001	User	-	100	0.056	0.056	0.056
8.000	User	-	100	0.051	0.051	0.051
	User	-	95	0.010	0.010	0.061
8.001	-	-	100	0.000	0.000	0.000
7.002	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.032	0.032	0.032
	User	-	100	0.028	0.028	0.060
7.003	User	-	100	0.052	0.052	0.052
7.004	User	-	100	0.025	0.025	0.025
	User	-	100	0.006	0.006	0.031
7.005	User	-	100	0.025	0.025	0.025
10.000	User	-	100	0.061	0.061	0.061
	User	-	100	0.015	0.015	0.076
	User	-	95	0.021	0.020	0.096

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
10.001	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.016	0.016	0.016
	User	-	100	0.005	0.005	0.021
	User	-	95	0.015	0.014	0.035
10.002	User	-	95	0.009	0.009	0.009
12.000	User	-	100	0.011	0.011	0.011
	User	-	95	0.021	0.020	0.031
10.003	User	-	95	0.009	0.009	0.009
13.000	User	-	100	0.009	0.009	0.009
	User	-	95	0.017	0.016	0.025
	User	-	95	0.028	0.026	0.051
10.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.004	0.004	0.008
	User	-	100	0.011	0.011	0.019
7.006	User	-	100	0.064	0.064	0.064
7.007	User	-	100	0.027	0.027	0.027
	User	-	100	0.010	0.010	0.037
1.005	User	-	100	0.017	0.017	0.017
	User	-	100	0.002	0.002	0.019
	User	-	30	0.026	0.008	0.027
1.006	User	-	100	0.014	0.014	0.014
	User	-	100	0.009	0.009	0.023
	User	-	100	0.018	0.018	0.041
	User	-	30	0.011	0.003	0.044
1.007	User	-	100	0.023	0.023	0.023
	User	-	30	0.063	0.019	0.042
14.000	User	-	100	0.045	0.045	0.045
	User	-	100	0.021	0.021	0.066
	User	-	95	0.049	0.047	0.113
14.001	User	-	100	0.013	0.013	0.013
	User	-	100	0.009	0.009	0.022
15.000	User	-	100	0.017	0.017	0.017
	User	-	95	0.035	0.033	0.050
	User	-	100	0.030	0.030	0.080
15.001	User	-	100	0.036	0.036	0.036
14.002	User	-	100	0.031	0.031	0.031
	User	-	95	0.022	0.021	0.053
16.000	User	-	100	0.053	0.053	0.053
	User	-	95	0.022	0.021	0.074
	User	-	100	0.002	0.002	0.076
	User	-	100	0.121	0.121	0.197
16.001	User	-	100	0.040	0.040	0.040
	User	-	95	0.009	0.009	0.049
	User	-	100	0.002	0.002	0.051
	User	-	100	0.088	0.088	0.139
16.002	User	-	100	0.003	0.003	0.003
	User	-	100	0.026	0.026	0.028
16.003	-	-	100	0.000	0.000	0.000
16.004	User	-	95	0.009	0.008	0.008
	User	-	100	0.010	0.010	0.018

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	95	0.028	0.027	0.045
14.003	User	-	100	0.025	0.025	0.025
1.008	User	-	100	0.030	0.030	0.030
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.236	2.129	2.129

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	Outfall 9 & 8	4.210	3.890	3.890	300	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	30
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.300		

Online Controls for Storm

Orifice Manhole: MH16, DS/PN: 1.003, Volume (m³): 6.3

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.022

Orifice Manhole: MH17, DS/PN: 1.004, Volume (m³): 3.3

Diameter (m) 0.090 Discharge Coefficient 0.600 Invert Level (m) 4.931

Orifice Manhole: MH34, DS/PN: 10.004, Volume (m³): 2.5

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.151

Orifice Manhole: MH36, DS/PN: 7.007, Volume (m³): 5.7

Diameter (m) 0.275 Discharge Coefficient 0.600 Invert Level (m) 4.954

Non Return Valve Manhole: MH52, DS/PN: 1.009, Volume (m³): 2.6

Storage Structures for Storm

Tank or Pond Manhole: MH1, DS/PN: 1.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	80.4	0.450	80.4	0.451	0.0

Tank or Pond Manhole: MH3, DS/PN: 2.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	37.6	0.450	37.6	0.451	0.0

Tank or Pond Manhole: MH4, DS/PN: 3.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	23.9	0.450	23.9	0.451	0.0

Tank or Pond Manhole: MH5, DS/PN: 4.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	58.1	0.450	58.1	0.451	0.0

Tank or Pond Manhole: MH6, DS/PN: 5.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	79.7	0.450	79.7	0.451	0.0

Tank or Pond Manhole: MH12, DS/PN: 2.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	12.7	0.450	12.7	0.451	0.0

Tank or Pond Manhole: MH13, DS/PN: 1.001

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	6.2	0.450	6.2	0.451	0.0

Tank or Pond Manhole: MH14, DS/PN: 1.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	147.0	0.450	147.0	0.451	0.0

Tank or Pond Manhole: MH15, DS/PN: 6.000

Invert Level (m) 5.350

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	54.8	0.450	54.8	0.451	0.0

Complex Manhole: MH16, DS/PN: 1.003

Cellular Storage

Invert Level (m) 5.022 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	71.0	0.0	0.600	71.0	0.0

Tank or Pond

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	76.9	0.450	76.9	0.451	0.0

Tank or Pond Manhole: MH20, DS/PN: 8.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	27.9	0.450	27.9	0.451	0.0

Tank or Pond Manhole: MH27, DS/PN: 10.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	47.9	0.450	47.9	0.451	0.0

Tank or Pond Manhole: MH28, DS/PN: 10.001

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3.6	0.450	3.6	0.451	0.0

Tank or Pond Manhole: MH29, DS/PN: 11.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	36.5	0.450	36.5	0.451	0.0

Tank or Pond Manhole: MH30, DS/PN: 10.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	25.2	0.450	25.2	0.451	0.0

Tank or Pond Manhole: MH31, DS/PN: 12.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	49.6	0.450	49.6	0.451	0.0

Tank or Pond Manhole: MH32, DS/PN: 10.003

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.6	0.450	8.6	0.451	0.0

Tank or Pond Manhole: MH33, DS/PN: 13.000

Invert Level (m) 5.950

Tank or Pond Manhole: MH33, DS/PN: 13.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	98.4	0.450	98.4	0.451	0.0

Cellular Storage Manhole: MH37, DS/PN: 1.005

Invert Level (m) 4.852 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	108.0	0.0	0.750	108.0	0.0

Cellular Storage Manhole: MH38, DS/PN: 1.006

Invert Level (m) 4.760 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	0.0	0.900	60.0	0.0

Cellular Storage Manhole: MH39, DS/PN: 1.007

Invert Level (m) 4.698 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	195.0	0.0	0.900	195.0	0.0

Tank or Pond Manhole: MH40, DS/PN: 14.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	106.1	0.450	106.1	0.451	0.0

Tank or Pond Manhole: MH41, DS/PN: 14.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	24.8	0.450	24.8	0.451	0.0

Tank or Pond Manhole: MH42, DS/PN: 15.000

Invert Level (m) 5.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	80.8	0.450	80.8	0.451	0.0

Tank or Pond Manhole: MH43, DS/PN: 15.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	6.1	0.450	6.1	0.451	0.0

Tank or Pond Manhole: MH44, DS/PN: 14.002

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	57.8	0.450	57.8	0.451	0.0

Tank or Pond Manhole: MH45, DS/PN: 16.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	58.1	0.450	58.1	0.451	0.0

Tank or Pond Manhole: MH46, DS/PN: 16.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	28.6	0.450	28.6	0.451	0.0

Cellular Storage Manhole: MH48, DS/PN: 16.003

Invert Level (m) 4.805 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	110.0	0.0	0.600	110.0	0.0

Tank or Pond Manhole: MH49, DS/PN: 16.004

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	83.8	0.450	83.8	0.451	0.0

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	30
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100, 1000
Climate Change (%)	20, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	MH1	240 Winter	100	+20%	100/15 Summer				6.075
2.000	MH3	30 Winter	100	+20%	100/15 Summer				6.100
3.000	MH4	30 Winter	100	+20%	100/15 Summer				6.148
4.000	MH5	240 Winter	100	+20%	100/15 Summer				6.100
5.000	MH6	240 Winter	100	+20%	100/15 Summer				6.102
4.001	MH7	240 Winter	100	+20%	100/15 Summer				6.099
3.001	MH10	30 Winter	100	+20%	100/15 Summer				6.125
2.001	MH11	240 Winter	100	+20%	100/15 Summer				6.088
2.002	MH12	240 Winter	100	+20%	100/15 Summer				6.077
1.001	MH13	240 Winter	100	+20%	100/15 Summer				6.072
1.002	MH14	240 Winter	100	+20%	100/15 Summer				6.068
6.000	MH15	240 Winter	100	+20%	100/15 Summer				6.057
1.003	MH16	240 Winter	100	+20%	100/15 Summer				6.057
1.004	MH17	120 Winter	100	+20%	100/15 Summer				5.650
7.000	MH18	30 Winter	100	+20%	100/15 Summer				5.986
7.001	MH19	30 Winter	100	+20%	100/15 Summer				5.968

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	MH1	0.575	0.000	0.28			3.7	SURCHARGED	
2.000	MH3	0.469	0.000	0.62			7.3	FLOOD RISK	
3.000	MH4	0.343	0.000	0.41			13.5	SURCHARGED	
4.000	MH5	0.300	0.000	0.15			2.2	FLOOD RISK	
5.000	MH6	0.302	0.000	0.29			3.8	FLOOD RISK	
4.001	MH7	0.412	0.000	0.39			5.0	SURCHARGED	
3.001	MH10	0.416	0.000	0.76			24.9	FLOOD RISK	
2.001	MH11	0.479	0.000	0.65			19.5	SURCHARGED	
2.002	MH12	0.561	0.000	0.80			20.1	SURCHARGED	
1.001	MH13	0.506	0.000	0.40			22.9	SURCHARGED	
1.002	MH14	0.550	0.000	0.47			31.8	SURCHARGED	
6.000	MH15	0.407	0.000	0.03			3.3	SURCHARGED	
1.003	MH16	0.735	0.000	0.16			9.6	SURCHARGED	
1.004	MH17	0.344	0.000	0.10			11.0	SURCHARGED	
7.000	MH18	0.191	0.000	0.23			7.2	SURCHARGED	
7.001	MH19	0.273	0.000	0.37			20.0	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
8.000	MH20	30 Winter	100	+20%	100/15 Summer				5.974
8.001	MH21	30 Winter	100	+20%	100/15 Summer				5.954
7.002	MH22	30 Winter	100	+20%	100/15 Summer				5.947
9.000	MH23	30 Winter	100	+20%	100/15 Winter				5.898
7.003	MH24	30 Winter	100	+20%	100/15 Summer				5.881
7.004	MH25	30 Winter	100	+20%	100/15 Summer				5.794
7.005	MH26	30 Winter	100	+20%	100/15 Summer				5.761
10.000	MH27	60 Winter	100	+20%	100/15 Summer				6.134
10.001	MH28	60 Winter	100	+20%	100/15 Summer				6.122
11.000	MH29	60 Winter	100	+20%	100/15 Summer				6.119
10.002	MH30	60 Winter	100	+20%	100/15 Summer				6.116
12.000	MH31	60 Winter	100	+20%	100/15 Summer				6.106
10.003	MH32	60 Winter	100	+20%	100/15 Summer				6.110
13.000	MH33	60 Winter	100	+20%	100/15 Summer				6.084
10.004	MH34	60 Winter	100	+20%	100/15 Summer				6.114
7.006	MH35	30 Winter	100	+20%	100/15 Summer				5.736
7.007	MH36	30 Winter	100	+20%	100/15 Summer				5.651
1.005	MH37	120 Winter	100	+20%	100/60 Winter				5.272
1.006	MH38	120 Winter	100	+20%	100/60 Summer				5.187
1.007	MH39	120 Winter	100	+20%	100/60 Winter				5.128
14.000	MH40	15 Winter	100	+20%	100/15 Summer				5.599
14.001	MH41	15 Winter	100	+20%	100/15 Summer				5.551
15.000	MH42	15 Winter	100	+20%	100/15 Summer				5.558
15.001	MH43	15 Winter	100	+20%	100/15 Summer				5.537
14.002	MH44	15 Winter	100	+20%	100/15 Summer				5.497
16.000	MH45	15 Winter	100	+20%	100/15 Summer				5.692
16.001	MH46	60 Winter	100	+20%	100/15 Summer				5.500
16.002	MH47	60 Winter	100	+20%	100/15 Summer				5.417
16.003	MH48	60 Winter	100	+20%	100/15 Summer				5.338
16.004	MH49	60 Winter	100	+20%	100/15 Summer				5.294
14.003	MH50	60 Winter	100	+20%	100/15 Summer				5.213
1.008	MH51	60 Winter	100	+20%	100/15 Summer				5.093
1.009	MH52	120 Winter	100	+20%					4.783

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
8.000	MH20	0.224	0.000	0.48			17.4	SURCHARGED	
8.001	MH21	0.259	0.000	0.28			18.8	SURCHARGED	
7.002	MH22	0.326	0.000	0.66			33.8	SURCHARGED	
9.000	MH23	0.073	0.000	0.19			17.2	SURCHARGED	
7.003	MH24	0.234	0.000	0.57			57.3	SURCHARGED	
7.004	MH25	0.292	0.000	0.78			64.4	SURCHARGED	
7.005	MH26	0.303	0.000	0.94			69.9	SURCHARGED	
10.000	MH27	0.409	0.000	0.33			11.0	FLOOD RISK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
10.001	MH28	0.484	0.000	0.24			10.3	FLOOD RISK	
11.000	MH29	0.469	0.000	0.04			1.7	FLOOD RISK	
10.002	MH30	0.566	0.000	0.26			9.1	FLOOD RISK	
12.000	MH31	0.556	0.000	0.06			2.1	FLOOD RISK	
10.003	MH32	0.646	0.000	0.27			9.5	FLOOD RISK	
13.000	MH33	0.584	0.000	0.10			4.2	SURCHARGED	
10.004	MH34	0.738	0.000	0.29			10.2	FLOOD RISK	
7.006	MH35	0.305	0.000	0.92			89.2	SURCHARGED	
7.007	MH36	0.322	0.000	0.99			96.2	SURCHARGED	
1.005	MH37	0.020	0.000	0.53		46	60.0	SURCHARGED	
1.006	MH38	0.027	0.000	0.55		61	58.9	SURCHARGED	
1.007	MH39	0.030	0.000	0.52		88	58.0	SURCHARGED	
14.000	MH40	0.274	0.000	0.66			26.1	SURCHARGED	
14.001	MH41	0.373	0.000	0.71			27.3	SURCHARGED	
15.000	MH42	0.233	0.000	0.57			21.7	SURCHARGED	
15.001	MH43	0.381	0.000	0.68			24.1	SURCHARGED	
14.002	MH44	0.419	0.000	1.61			64.6	SURCHARGED	
16.000	MH45	0.367	0.000	1.50			46.5	SURCHARGED	
16.001	MH46	0.246	0.000	1.06			66.1	SURCHARGED	
16.002	MH47	0.255	0.000	1.21			70.6	SURCHARGED	
16.003	MH48	0.233	0.000	0.64		34	36.8	SURCHARGED	
16.004	MH49	0.240	0.000	0.70			41.4	SURCHARGED	
14.003	MH50	0.223	0.000	1.52			91.8	SURCHARGED	
1.008	MH51	0.171	0.000	2.43			116.0	SURCHARGED	
1.009	MH52	-0.097	0.000	0.79			116.4	OK	

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	30
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100, 1000
Climate Change (%)	20, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	MH1	240 Winter	1000	+0%	100/15 Summer				6.210
2.000	MH3	30 Winter	1000	+0%	100/15 Summer				6.241
3.000	MH4	30 Winter	1000	+0%	100/15 Summer				6.317
4.000	MH5	240 Winter	1000	+0%	100/15 Summer				6.237
5.000	MH6	240 Winter	1000	+0%	100/15 Summer				6.238
4.001	MH7	240 Winter	1000	+0%	100/15 Summer				6.235
3.001	MH10	30 Winter	1000	+0%	100/15 Summer				6.283
2.001	MH11	30 Winter	1000	+0%	100/15 Summer				6.232
2.002	MH12	240 Winter	1000	+0%	100/15 Summer				6.213
1.001	MH13	240 Winter	1000	+0%	100/15 Summer				6.208
1.002	MH14	240 Winter	1000	+0%	100/15 Summer				6.203
6.000	MH15	240 Winter	1000	+0%	100/15 Summer				6.191
1.003	MH16	240 Winter	1000	+0%	100/15 Summer				6.191
1.004	MH17	30 Summer	1000	+0%	100/15 Summer				5.859
7.000	MH18	30 Winter	1000	+0%	100/15 Summer				6.316
7.001	MH19	30 Winter	1000	+0%	100/15 Summer				6.287

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	MH1	0.710	0.000	0.32			4.2	FLOOD RISK	
2.000	MH3	0.610	0.000	0.70			8.1	FLOOD RISK	
3.000	MH4	0.512	0.000	0.56			18.2	SURCHARGED	
4.000	MH5	0.437	0.000	0.11			1.5	FLOOD RISK	
5.000	MH6	0.438	0.000	0.21			2.8	FLOOD RISK	
4.001	MH7	0.548	0.000	0.29			3.8	FLOOD RISK	
3.001	MH10	0.574	0.000	0.76			25.0	FLOOD RISK	
2.001	MH11	0.623	0.000	1.38			41.5	FLOOD RISK	
2.002	MH12	0.697	0.000	0.85			21.4	FLOOD RISK	
1.001	MH13	0.642	0.000	0.43			24.5	FLOOD RISK	
1.002	MH14	0.685	0.000	0.51			34.4	FLOOD RISK	
6.000	MH15	0.541	0.000	0.03			3.5	FLOOD RISK	
1.003	MH16	0.869	0.000	0.16			9.8	FLOOD RISK	
1.004	MH17	0.553	0.000	0.13			13.7	FLOOD RISK	
7.000	MH18	0.521	0.000	0.32			9.9	SURCHARGED	
7.001	MH19	0.592	0.000	0.56			30.0	SURCHARGED	

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
8.000	MH20	30 Winter	1000	+0%	100/15 Summer				6.249
8.001	MH21	30 Winter	1000	+0%	100/15 Summer				6.226
7.002	MH22	30 Winter	1000	+0%	100/15 Summer				6.219
9.000	MH23	15 Winter	1000	+0%	100/15 Winter				6.257
7.003	MH24	30 Summer	1000	+0%	100/15 Summer				6.198
7.004	MH25	30 Summer	1000	+0%	100/15 Summer				6.114
7.005	MH26	30 Summer	1000	+0%	100/15 Summer				6.075
10.000	MH27	60 Winter	1000	+0%	100/15 Summer				6.241
10.001	MH28	60 Winter	1000	+0%	100/15 Summer				6.230
11.000	MH29	60 Winter	1000	+0%	100/15 Summer				6.227
10.002	MH30	60 Winter	1000	+0%	100/15 Summer				6.225
12.000	MH31	60 Winter	1000	+0%	100/15 Summer				6.214
10.003	MH32	60 Winter	1000	+0%	100/15 Summer				6.218
13.000	MH33	120 Winter	1000	+0%	100/15 Summer				6.191
10.004	MH34	60 Winter	1000	+0%	100/15 Summer				6.220
7.006	MH35	30 Summer	1000	+0%	100/15 Summer				6.044
7.007	MH36	30 Summer	1000	+0%	100/15 Summer				5.917
1.005	MH37	120 Winter	1000	+0%	100/60 Winter				5.378
1.006	MH38	120 Winter	1000	+0%	100/60 Summer				5.311
1.007	MH39	120 Winter	1000	+0%	100/60 Winter				5.266
14.000	MH40	30 Winter	1000	+0%	100/15 Summer				5.672
14.001	MH41	30 Winter	1000	+0%	100/15 Summer				5.625
15.000	MH42	30 Winter	1000	+0%	100/15 Summer				5.648
15.001	MH43	30 Winter	1000	+0%	100/15 Summer				5.614
14.002	MH44	30 Winter	1000	+0%	100/15 Summer				5.553
16.000	MH45	30 Winter	1000	+0%	100/15 Summer				5.876
16.001	MH46	60 Winter	1000	+0%	100/15 Summer				5.648
16.002	MH47	60 Winter	1000	+0%	100/15 Summer				5.566
16.003	MH48	60 Winter	1000	+0%	100/15 Summer				5.488
16.004	MH49	60 Winter	1000	+0%	100/15 Summer				5.435
14.003	MH50	60 Winter	1000	+0%	100/15 Summer				5.354
1.008	MH51	120 Winter	1000	+0%	100/15 Summer				5.223
1.009	MH52	120 Winter	1000	+0%					4.820

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
8.000	MH20	0.499	0.000	0.72			26.4	FLOOD RISK	
8.001	MH21	0.531	0.000	0.40			27.1	FLOOD RISK	
7.002	MH22	0.598	0.000	0.83			42.4	SURCHARGED	
9.000	MH23	0.432	0.000	0.29			27.3	FLOOD RISK	
7.003	MH24	0.551	0.000	0.63			63.6	SURCHARGED	
7.004	MH25	0.612	0.000	0.90			74.1	SURCHARGED	
7.005	MH26	0.617	0.000	1.11			82.9	SURCHARGED	
10.000	MH27	0.516	0.000	0.44			14.8	FLOOD RISK	

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
10.001	MH28	0.592	0.000	0.32			13.6	FLOOD RISK	
11.000	MH29	0.577	0.000	0.05			1.9	FLOOD RISK	
10.002	MH30	0.675	0.000	0.31			11.0	FLOOD RISK	
12.000	MH31	0.664	0.000	0.06			2.1	FLOOD RISK	
10.003	MH32	0.754	0.000	0.29			10.1	FLOOD RISK	
13.000	MH33	0.691	0.000	0.11			4.5	FLOOD RISK	
10.004	MH34	0.844	0.000	0.29			10.3	FLOOD RISK	
7.006	MH35	0.613	0.000	1.10			107.1	SURCHARGED	
7.007	MH36	0.588	0.000	1.23			119.6	SURCHARGED	
1.005	MH37	0.126	0.000	0.73		75	82.8	SURCHARGED	
1.006	MH38	0.151	0.000	0.71		79	76.0	SURCHARGED	
1.007	MH39	0.168	0.000	0.63		91	69.8	SURCHARGED	
14.000	MH40	0.347	0.000	0.58			23.2	SURCHARGED	
14.001	MH41	0.447	0.000	0.65			24.9	SURCHARGED	
15.000	MH42	0.323	0.000	0.50			18.9	SURCHARGED	
15.001	MH43	0.458	0.000	0.58			20.5	SURCHARGED	
14.002	MH44	0.475	0.000	1.55			62.2	SURCHARGED	
16.000	MH45	0.551	0.000	1.37			42.4	FLOOD RISK	
16.001	MH46	0.394	0.000	1.19			73.7	SURCHARGED	
16.002	MH47	0.404	0.000	1.39			81.2	SURCHARGED	
16.003	MH48	0.383	0.000	0.75		36	42.7	SURCHARGED	
16.004	MH49	0.381	0.000	0.83			48.9	SURCHARGED	
14.003	MH50	0.364	0.000	1.68			101.3	SURCHARGED	
1.008	MH51	0.301	0.000	3.07			146.7	SURCHARGED	
1.009	MH52	-0.060	0.000	1.00			146.7	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	0
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.589	4-8	1.353	8-12	0.186

Total Area Contributing (ha) = 2.129

Total Pipe Volume (m³) = 66.568

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	12.837	0.084	152.8	0.044	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	19.879	0.097	204.9	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	19.921	0.096	207.5	0.062	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.26	5.350	0.044	0.0	0.0	0.0	0.81	14.3	5.9
2.000	50.00	5.47	5.481	0.043	0.0	0.0	0.0	0.70	12.3	5.9
3.000	50.00	5.37	5.580	0.062	0.0	0.0	0.0	0.90	35.9	8.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	15.200	0.113	134.5	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	18.190	0.113	161.0	0.045	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	7.495	0.053	141.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	20.658	0.100	206.6	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	23.027	0.093	248.0	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	6.251	0.025	247.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	11.939	0.048	248.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	47.125	0.196	240.4	0.119	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	22.768	0.328	69.4	0.032	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	24.187	0.091	265.8	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	19.807	0.079	250.7	0.042	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	44.145	0.175	252.3	0.027	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	24.589	0.074	332.3	0.056	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	5.29	5.650	0.026	0.0	0.0	0.0	0.86	15.3	3.5
5.000	50.00	5.38	5.650	0.045	0.0	0.0	0.0	0.79	13.9	6.1
4.001	50.00	5.53	5.537	0.071	0.0	0.0	0.0	0.84	14.9	9.6
3.001	50.00	5.91	5.484	0.201	0.0	0.0	0.0	0.91	36.0	27.2
2.001	50.00	6.38	5.384	0.305	0.0	0.0	0.0	0.83	32.8«	41.3
2.002	50.00	6.50	5.291	0.318	0.0	0.0	0.0	0.83	32.9«	43.1
1.001	50.00	6.70	5.266	0.362	0.0	0.0	0.0	0.99	70.1	49.0
1.002	50.00	7.48	5.218	0.480	0.0	0.0	0.0	1.01	71.4	65.1
6.000	50.00	5.20	5.350	0.032	0.0	0.0	0.0	1.89	133.6	4.4
1.003	50.00	7.90	5.022	0.542	0.0	0.0	0.0	0.96	67.8«	73.4
1.004	50.00	8.19	4.931	0.585	0.0	0.0	0.0	1.14	125.9	79.2
7.000	50.00	5.90	5.570	0.027	0.0	0.0	0.0	0.82	32.5	3.7
7.001	50.00	6.38	5.395	0.083	0.0	0.0	0.0	0.86	60.6	11.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
8.000	21.784	0.130	167.6	0.061	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	11.983	0.074	161.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.002	15.941	0.049	325.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	29.833	0.253	117.9	0.060	5.00	0.0	0.600	o	300	Pipe/Conduit	
7.003	49.097	0.146	336.3	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.004	14.621	0.044	332.3	0.031	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.005	9.426	0.028	336.6	0.025	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.000	16.281	0.087	187.1	0.096	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	8.239	0.089	92.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.000	15.000	0.100	150.0	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	14.341	0.086	166.8	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.000	15.000	0.086	174.4	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	15.000	0.088	170.5	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.000	50.00	5.36	5.525	0.061	0.0	0.0	0.0	1.01	40.0	8.2
8.001	50.00	5.52	5.395	0.061	0.0	0.0	0.0	1.23	87.1	8.2
7.002	50.00	6.68	5.321	0.143	0.0	0.0	0.0	0.87	61.2	19.4
9.000	50.00	5.34	5.525	0.060	0.0	0.0	0.0	1.45	102.3	8.2
7.003	50.00	7.52	5.272	0.255	0.0	0.0	0.0	0.98	108.5	34.6
7.004	50.00	7.76	5.127	0.287	0.0	0.0	0.0	0.99	109.2	38.8
7.005	50.00	7.92	5.083	0.312	0.0	0.0	0.0	0.98	108.4	42.2
10.000	50.00	5.28	5.500	0.096	0.0	0.0	0.0	0.95	37.9	13.1
10.001	50.00	5.39	5.413	0.096	0.0	0.0	0.0	1.36	54.0	13.1
11.000	50.00	5.23	5.425	0.035	0.0	0.0	0.0	1.07	42.4	4.8
10.002	50.00	5.62	5.325	0.141	0.0	0.0	0.0	1.01	40.1	19.0
12.000	50.00	5.25	5.325	0.031	0.0	0.0	0.0	0.99	39.2	4.2
10.003	50.00	5.87	5.239	0.180	0.0	0.0	0.0	1.00	39.7	24.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	15.000	0.124	121.0	0.051	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.004	15.979	0.095	168.2	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.006	34.244	0.102	335.7	0.064	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.007	34.147	0.102	334.8	0.037	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	30.844	0.092	335.3	0.027	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.006	20.928	0.062	337.5	0.044	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.007	25.403	0.076	334.3	0.042	0.00	0.0	0.600	o	400	Pipe/Conduit	
14.000	20.720	0.147	141.0	0.113	5.00	0.0	0.600	o	225	Pipe/Conduit	
14.001	14.016	0.100	140.2	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.000	26.960	0.169	159.5	0.080	5.00	0.0	0.600	o	225	Pipe/Conduit	
15.001	12.288	0.078	157.5	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
14.002	23.238	0.165	140.8	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.000	36.167	0.146	247.7	0.197	5.00	0.0	0.600	o	225	Pipe/Conduit	
16.001	22.866	0.092	248.5	0.139	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	5.21	5.275	0.051	0.0	0.0	0.0	1.19	47.2	6.9
10.004	50.00	6.14	5.151	0.251	0.0	0.0	0.0	1.01	40.0	33.9
7.006	50.00	8.50	5.056	0.626	0.0	0.0	0.0	0.98	108.6	84.8
7.007	50.00	9.08	4.954	0.663	0.0	0.0	0.0	0.98	108.8	89.8
1.005	50.00	9.58	4.852	1.275	0.0	0.0	0.0	1.03	128.8«	172.6
1.006	50.00	9.92	4.760	1.318	0.0	0.0	0.0	1.02	128.4«	178.5
1.007	50.00	10.34	4.698	1.360	0.0	0.0	0.0	1.03	129.0«	184.2
14.000	50.00	5.31	5.100	0.113	0.0	0.0	0.0	1.10	43.7	15.3
14.001	50.00	5.53	4.953	0.135	0.0	0.0	0.0	1.10	43.8	18.3
15.000	50.00	5.44	5.100	0.080	0.0	0.0	0.0	1.03	41.1	10.9
15.001	50.00	5.63	4.931	0.117	0.0	0.0	0.0	1.04	41.3	15.8
14.002	50.00	5.98	4.853	0.304	0.0	0.0	0.0	1.10	43.7	41.2
16.000	50.00	5.73	5.100	0.197	0.0	0.0	0.0	0.83	32.9	26.7
16.001	50.00	6.11	4.954	0.336	0.0	0.0	0.0	0.99	70.2	45.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
16.002	14.217	0.057	249.4	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.003	12.746	0.051	249.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.004	15.976	0.064	249.6	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.003	16.562	0.068	243.6	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	13.966	0.042	332.5	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	33.345	0.690	48.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
16.002	50.00	6.35	4.862	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.003	50.00	6.57	4.805	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.004	50.00	6.84	4.754	0.409	0.0	0.0	0.0	0.99	70.0	55.4
14.003	50.00	7.11	4.690	0.738	0.0	0.0	0.0	1.00	70.9«	100.0
1.008	50.00	10.61	4.622	2.129	0.0	0.0	0.0	0.86	60.6«	288.3
1.009	50.00	10.85	4.580	2.129	0.0	0.0	0.0	2.27	160.3«	288.3

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.037	0.036	0.044
2.000	User	-	100	0.015	0.015	0.015
	User	-	95	0.014	0.013	0.029
	User	-	100	0.015	0.015	0.043
3.000	User	-	100	0.019	0.019	0.019
	User	-	100	0.021	0.021	0.040
	User	-	100	0.014	0.014	0.054
	User	-	95	0.008	0.008	0.062
4.000	User	-	95	0.027	0.026	0.026
5.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.029	0.028	0.036
	User	-	95	0.009	0.009	0.045
4.001	-	-	100	0.000	0.000	0.000
3.001	User	-	100	0.017	0.017	0.017
	User	-	100	0.039	0.039	0.057
	User	-	100	0.011	0.011	0.068
2.001	User	-	100	0.011	0.011	0.011
	User	-	100	0.049	0.049	0.061
2.002	User	-	100	0.008	0.008	0.008
	User	-	95	0.005	0.004	0.013
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	100	0.007	0.007	0.007
	User	-	100	0.035	0.035	0.042
	User	-	100	0.016	0.016	0.058
	User	-	100	0.005	0.005	0.063
	User	-	95	0.059	0.056	0.119
6.000	User	-	100	0.012	0.012	0.012
	User	-	100	0.021	0.021	0.032
1.003	User	-	95	0.009	0.009	0.009
	User	-	95	0.022	0.021	0.030
1.004	User	-	100	0.015	0.015	0.015
	User	-	100	0.010	0.010	0.025
	User	-	100	0.013	0.013	0.038
	User	-	30	0.016	0.005	0.042
7.000	User	-	100	0.027	0.027	0.027
7.001	User	-	100	0.056	0.056	0.056
8.000	User	-	100	0.051	0.051	0.051
	User	-	95	0.010	0.010	0.061
8.001	-	-	100	0.000	0.000	0.000
7.002	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.032	0.032	0.032
	User	-	100	0.028	0.028	0.060
7.003	User	-	100	0.052	0.052	0.052
7.004	User	-	100	0.025	0.025	0.025
	User	-	100	0.006	0.006	0.031
7.005	User	-	100	0.025	0.025	0.025
10.000	User	-	100	0.061	0.061	0.061
	User	-	100	0.015	0.015	0.076
	User	-	95	0.021	0.020	0.096

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
10.001	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.016	0.016	0.016
	User	-	100	0.005	0.005	0.021
	User	-	95	0.015	0.014	0.035
10.002	User	-	95	0.009	0.009	0.009
12.000	User	-	100	0.011	0.011	0.011
	User	-	95	0.021	0.020	0.031
10.003	User	-	95	0.009	0.009	0.009
13.000	User	-	100	0.009	0.009	0.009
	User	-	95	0.017	0.016	0.025
	User	-	95	0.028	0.026	0.051
10.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.004	0.004	0.008
	User	-	100	0.011	0.011	0.019
7.006	User	-	100	0.064	0.064	0.064
7.007	User	-	100	0.027	0.027	0.027
	User	-	100	0.010	0.010	0.037
1.005	User	-	100	0.017	0.017	0.017
	User	-	100	0.002	0.002	0.019
	User	-	30	0.026	0.008	0.027
1.006	User	-	100	0.014	0.014	0.014
	User	-	100	0.009	0.009	0.023
	User	-	100	0.018	0.018	0.041
	User	-	30	0.011	0.003	0.044
1.007	User	-	100	0.023	0.023	0.023
	User	-	30	0.063	0.019	0.042
14.000	User	-	100	0.045	0.045	0.045
	User	-	100	0.021	0.021	0.066
	User	-	95	0.049	0.047	0.113
14.001	User	-	100	0.013	0.013	0.013
	User	-	100	0.009	0.009	0.022
15.000	User	-	100	0.017	0.017	0.017
	User	-	95	0.035	0.033	0.050
	User	-	100	0.030	0.030	0.080
15.001	User	-	100	0.036	0.036	0.036
14.002	User	-	100	0.031	0.031	0.031
	User	-	95	0.022	0.021	0.053
16.000	User	-	100	0.053	0.053	0.053
	User	-	95	0.022	0.021	0.074
	User	-	100	0.002	0.002	0.076
	User	-	100	0.121	0.121	0.197
16.001	User	-	100	0.040	0.040	0.040
	User	-	95	0.009	0.009	0.049
	User	-	100	0.002	0.002	0.051
	User	-	100	0.088	0.088	0.139
16.002	User	-	100	0.003	0.003	0.003
	User	-	100	0.026	0.026	0.028
16.003	-	-	100	0.000	0.000	0.000
16.004	User	-	95	0.009	0.008	0.008
	User	-	100	0.010	0.010	0.018

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	95	0.028	0.027	0.045
14.003	User	-	100	0.025	0.025	0.025
1.008	User	-	100	0.030	0.030	0.030
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.236	2.129	2.129

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	Outfall 9 & 8	4.210	3.890	3.890	300	0

Datum (m) 3.890 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	2.710	29	2.710	57	2.710	85	2.710	113	2.710	141	2.710	169	2.710
2	2.710	30	2.710	58	2.710	86	2.710	114	2.710	142	2.710	170	2.710
3	2.710	31	2.710	59	2.710	87	2.710	115	2.710	143	2.710	171	2.710
4	2.710	32	2.710	60	2.710	88	2.710	116	2.710	144	2.710	172	2.710
5	2.710	33	2.710	61	2.710	89	2.710	117	2.710	145	2.710	173	2.710
6	2.710	34	2.710	62	2.710	90	2.710	118	2.710	146	2.710	174	2.710
7	2.710	35	2.710	63	2.710	91	2.710	119	2.710	147	2.710	175	2.710
8	2.710	36	2.710	64	2.710	92	2.710	120	2.710	148	2.710	176	2.710
9	2.710	37	2.710	65	2.710	93	2.710	121	2.710	149	2.710	177	2.710
10	2.710	38	2.710	66	2.710	94	2.710	122	2.710	150	2.710	178	2.710
11	2.710	39	2.710	67	2.710	95	2.710	123	2.710	151	2.710	179	2.710
12	2.710	40	2.710	68	2.710	96	2.710	124	2.710	152	2.710	180	2.710
13	2.710	41	2.710	69	2.710	97	2.710	125	2.710	153	2.710	181	2.710
14	2.710	42	2.710	70	2.710	98	2.710	126	2.710	154	2.710	182	2.710
15	2.710	43	2.710	71	2.710	99	2.710	127	2.710	155	2.710	183	2.710
16	2.710	44	2.710	72	2.710	100	2.710	128	2.710	156	2.710	184	2.710
17	2.710	45	2.710	73	2.710	101	2.710	129	2.710	157	2.710	185	2.710
18	2.710	46	2.710	74	2.710	102	2.710	130	2.710	158	2.710	186	2.710
19	2.710	47	2.710	75	2.710	103	2.710	131	2.710	159	2.710	187	2.710
20	2.710	48	2.710	76	2.710	104	2.710	132	2.710	160	2.710	188	2.710
21	2.710	49	2.710	77	2.710	105	2.710	133	2.710	161	2.710	189	2.710
22	2.710	50	2.710	78	2.710	106	2.710	134	2.710	162	2.710	190	2.710
23	2.710	51	2.710	79	2.710	107	2.710	135	2.710	163	2.710	191	2.710
24	2.710	52	2.710	80	2.710	108	2.710	136	2.710	164	2.710	192	2.710
25	2.710	53	2.710	81	2.710	109	2.710	137	2.710	165	2.710	193	2.710
26	2.710	54	2.710	82	2.710	110	2.710	138	2.710	166	2.710	194	2.710
27	2.710	55	2.710	83	2.710	111	2.710	139	2.710	167	2.710	195	2.710
28	2.710	56	2.710	84	2.710	112	2.710	140	2.710	168	2.710	196	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
197	2.710	246	2.710	295	2.710	344	2.710	393	2.710	442	2.710	491	2.710
198	2.710	247	2.710	296	2.710	345	2.710	394	2.710	443	2.710	492	2.710
199	2.710	248	2.710	297	2.710	346	2.710	395	2.710	444	2.710	493	2.710
200	2.710	249	2.710	298	2.710	347	2.710	396	2.710	445	2.710	494	2.710
201	2.710	250	2.710	299	2.710	348	2.710	397	2.710	446	2.710	495	2.710
202	2.710	251	2.710	300	2.710	349	2.710	398	2.710	447	2.710	496	2.710
203	2.710	252	2.710	301	2.710	350	2.710	399	2.710	448	2.710	497	2.710
204	2.710	253	2.710	302	2.710	351	2.710	400	2.710	449	2.710	498	2.710
205	2.710	254	2.710	303	2.710	352	2.710	401	2.710	450	2.710	499	2.710
206	2.710	255	2.710	304	2.710	353	2.710	402	2.710	451	2.710	500	2.710
207	2.710	256	2.710	305	2.710	354	2.710	403	2.710	452	2.710	501	2.710
208	2.710	257	2.710	306	2.710	355	2.710	404	2.710	453	2.710	502	2.710
209	2.710	258	2.710	307	2.710	356	2.710	405	2.710	454	2.710	503	2.710
210	2.710	259	2.710	308	2.710	357	2.710	406	2.710	455	2.710	504	2.710
211	2.710	260	2.710	309	2.710	358	2.710	407	2.710	456	2.710	505	2.710
212	2.710	261	2.710	310	2.710	359	2.710	408	2.710	457	2.710	506	2.710
213	2.710	262	2.710	311	2.710	360	2.710	409	2.710	458	2.710	507	2.710
214	2.710	263	2.710	312	2.710	361	2.710	410	2.710	459	2.710	508	2.710
215	2.710	264	2.710	313	2.710	362	2.710	411	2.710	460	2.710	509	2.710
216	2.710	265	2.710	314	2.710	363	2.710	412	2.710	461	2.710	510	2.710
217	2.710	266	2.710	315	2.710	364	2.710	413	2.710	462	2.710	511	2.710
218	2.710	267	2.710	316	2.710	365	2.710	414	2.710	463	2.710	512	2.710
219	2.710	268	2.710	317	2.710	366	2.710	415	2.710	464	2.710	513	2.710
220	2.710	269	2.710	318	2.710	367	2.710	416	2.710	465	2.710	514	2.710
221	2.710	270	2.710	319	2.710	368	2.710	417	2.710	466	2.710	515	2.710
222	2.710	271	2.710	320	2.710	369	2.710	418	2.710	467	2.710	516	2.710
223	2.710	272	2.710	321	2.710	370	2.710	419	2.710	468	2.710	517	2.710
224	2.710	273	2.710	322	2.710	371	2.710	420	2.710	469	2.710	518	2.710
225	2.710	274	2.710	323	2.710	372	2.710	421	2.710	470	2.710	519	2.710
226	2.710	275	2.710	324	2.710	373	2.710	422	2.710	471	2.710	520	2.710
227	2.710	276	2.710	325	2.710	374	2.710	423	2.710	472	2.710	521	2.710
228	2.710	277	2.710	326	2.710	375	2.710	424	2.710	473	2.710	522	2.710
229	2.710	278	2.710	327	2.710	376	2.710	425	2.710	474	2.710	523	2.710
230	2.710	279	2.710	328	2.710	377	2.710	426	2.710	475	2.710	524	2.710
231	2.710	280	2.710	329	2.710	378	2.710	427	2.710	476	2.710	525	2.710
232	2.710	281	2.710	330	2.710	379	2.710	428	2.710	477	2.710	526	2.710
233	2.710	282	2.710	331	2.710	380	2.710	429	2.710	478	2.710	527	2.710
234	2.710	283	2.710	332	2.710	381	2.710	430	2.710	479	2.710	528	2.710
235	2.710	284	2.710	333	2.710	382	2.710	431	2.710	480	2.710	529	2.710
236	2.710	285	2.710	334	2.710	383	2.710	432	2.710	481	2.710	530	2.710
237	2.710	286	2.710	335	2.710	384	2.710	433	2.710	482	2.710	531	2.710
238	2.710	287	2.710	336	2.710	385	2.710	434	2.710	483	2.710	532	2.710
239	2.710	288	2.710	337	2.710	386	2.710	435	2.710	484	2.710	533	2.710
240	2.710	289	2.710	338	2.710	387	2.710	436	2.710	485	2.710	534	2.710
241	2.710	290	2.710	339	2.710	388	2.710	437	2.710	486	2.710	535	2.710
242	2.710	291	2.710	340	2.710	389	2.710	438	2.710	487	2.710	536	2.710
243	2.710	292	2.710	341	2.710	390	2.710	439	2.710	488	2.710	537	2.710
244	2.710	293	2.710	342	2.710	391	2.710	440	2.710	489	2.710	538	2.710
245	2.710	294	2.710	343	2.710	392	2.710	441	2.710	490	2.710	539	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
540	2.710	589	2.710	638	2.710	687	2.710	736	2.710	785	2.710	834	2.710
541	2.710	590	2.710	639	2.710	688	2.710	737	2.710	786	2.710	835	2.710
542	2.710	591	2.710	640	2.710	689	2.710	738	2.710	787	2.710	836	2.710
543	2.710	592	2.710	641	2.710	690	2.710	739	2.710	788	2.710	837	2.710
544	2.710	593	2.710	642	2.710	691	2.710	740	2.710	789	2.710	838	2.710
545	2.710	594	2.710	643	2.710	692	2.710	741	2.710	790	2.710	839	2.710
546	2.710	595	2.710	644	2.710	693	2.710	742	2.710	791	2.710	840	2.710
547	2.710	596	2.710	645	2.710	694	2.710	743	2.710	792	2.710	841	2.710
548	2.710	597	2.710	646	2.710	695	2.710	744	2.710	793	2.710	842	2.710
549	2.710	598	2.710	647	2.710	696	2.710	745	2.710	794	2.710	843	2.710
550	2.710	599	2.710	648	2.710	697	2.710	746	2.710	795	2.710	844	2.710
551	2.710	600	2.710	649	2.710	698	2.710	747	2.710	796	2.710	845	2.710
552	2.710	601	2.710	650	2.710	699	2.710	748	2.710	797	2.710	846	2.710
553	2.710	602	2.710	651	2.710	700	2.710	749	2.710	798	2.710	847	2.710
554	2.710	603	2.710	652	2.710	701	2.710	750	2.710	799	2.710	848	2.710
555	2.710	604	2.710	653	2.710	702	2.710	751	2.710	800	2.710	849	2.710
556	2.710	605	2.710	654	2.710	703	2.710	752	2.710	801	2.710	850	2.710
557	2.710	606	2.710	655	2.710	704	2.710	753	2.710	802	2.710	851	2.710
558	2.710	607	2.710	656	2.710	705	2.710	754	2.710	803	2.710	852	2.710
559	2.710	608	2.710	657	2.710	706	2.710	755	2.710	804	2.710	853	2.710
560	2.710	609	2.710	658	2.710	707	2.710	756	2.710	805	2.710	854	2.710
561	2.710	610	2.710	659	2.710	708	2.710	757	2.710	806	2.710	855	2.710
562	2.710	611	2.710	660	2.710	709	2.710	758	2.710	807	2.710	856	2.710
563	2.710	612	2.710	661	2.710	710	2.710	759	2.710	808	2.710	857	2.710
564	2.710	613	2.710	662	2.710	711	2.710	760	2.710	809	2.710	858	2.710
565	2.710	614	2.710	663	2.710	712	2.710	761	2.710	810	2.710	859	2.710
566	2.710	615	2.710	664	2.710	713	2.710	762	2.710	811	2.710	860	2.710
567	2.710	616	2.710	665	2.710	714	2.710	763	2.710	812	2.710	861	2.710
568	2.710	617	2.710	666	2.710	715	2.710	764	2.710	813	2.710	862	2.710
569	2.710	618	2.710	667	2.710	716	2.710	765	2.710	814	2.710	863	2.710
570	2.710	619	2.710	668	2.710	717	2.710	766	2.710	815	2.710	864	2.710
571	2.710	620	2.710	669	2.710	718	2.710	767	2.710	816	2.710	865	2.710
572	2.710	621	2.710	670	2.710	719	2.710	768	2.710	817	2.710	866	2.710
573	2.710	622	2.710	671	2.710	720	2.710	769	2.710	818	2.710	867	2.710
574	2.710	623	2.710	672	2.710	721	2.710	770	2.710	819	2.710	868	2.710
575	2.710	624	2.710	673	2.710	722	2.710	771	2.710	820	2.710	869	2.710
576	2.710	625	2.710	674	2.710	723	2.710	772	2.710	821	2.710	870	2.710
577	2.710	626	2.710	675	2.710	724	2.710	773	2.710	822	2.710	871	2.710
578	2.710	627	2.710	676	2.710	725	2.710	774	2.710	823	2.710	872	2.710
579	2.710	628	2.710	677	2.710	726	2.710	775	2.710	824	2.710	873	2.710
580	2.710	629	2.710	678	2.710	727	2.710	776	2.710	825	2.710	874	2.710
581	2.710	630	2.710	679	2.710	728	2.710	777	2.710	826	2.710	875	2.710
582	2.710	631	2.710	680	2.710	729	2.710	778	2.710	827	2.710	876	2.710
583	2.710	632	2.710	681	2.710	730	2.710	779	2.710	828	2.710	877	2.710
584	2.710	633	2.710	682	2.710	731	2.710	780	2.710	829	2.710	878	2.710
585	2.710	634	2.710	683	2.710	732	2.710	781	2.710	830	2.710	879	2.710
586	2.710	635	2.710	684	2.710	733	2.710	782	2.710	831	2.710	880	2.710
587	2.710	636	2.710	685	2.710	734	2.710	783	2.710	832	2.710	881	2.710
588	2.710	637	2.710	686	2.710	735	2.710	784	2.710	833	2.710	882	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
883	2.710	932	2.710	981	2.710	1030	2.710	1079	2.710	1128	2.710	1177	2.710
884	2.710	933	2.710	982	2.710	1031	2.710	1080	2.710	1129	2.710	1178	2.710
885	2.710	934	2.710	983	2.710	1032	2.710	1081	2.710	1130	2.710	1179	2.710
886	2.710	935	2.710	984	2.710	1033	2.710	1082	2.710	1131	2.710	1180	2.710
887	2.710	936	2.710	985	2.710	1034	2.710	1083	2.710	1132	2.710	1181	2.710
888	2.710	937	2.710	986	2.710	1035	2.710	1084	2.710	1133	2.710	1182	2.710
889	2.710	938	2.710	987	2.710	1036	2.710	1085	2.710	1134	2.710	1183	2.710
890	2.710	939	2.710	988	2.710	1037	2.710	1086	2.710	1135	2.710	1184	2.710
891	2.710	940	2.710	989	2.710	1038	2.710	1087	2.710	1136	2.710	1185	2.710
892	2.710	941	2.710	990	2.710	1039	2.710	1088	2.710	1137	2.710	1186	2.710
893	2.710	942	2.710	991	2.710	1040	2.710	1089	2.710	1138	2.710	1187	2.710
894	2.710	943	2.710	992	2.710	1041	2.710	1090	2.710	1139	2.710	1188	2.710
895	2.710	944	2.710	993	2.710	1042	2.710	1091	2.710	1140	2.710	1189	2.710
896	2.710	945	2.710	994	2.710	1043	2.710	1092	2.710	1141	2.710	1190	2.710
897	2.710	946	2.710	995	2.710	1044	2.710	1093	2.710	1142	2.710	1191	2.710
898	2.710	947	2.710	996	2.710	1045	2.710	1094	2.710	1143	2.710	1192	2.710
899	2.710	948	2.710	997	2.710	1046	2.710	1095	2.710	1144	2.710	1193	2.710
900	2.710	949	2.710	998	2.710	1047	2.710	1096	2.710	1145	2.710	1194	2.710
901	2.710	950	2.710	999	2.710	1048	2.710	1097	2.710	1146	2.710	1195	2.710
902	2.710	951	2.710	1000	2.710	1049	2.710	1098	2.710	1147	2.710	1196	2.710
903	2.710	952	2.710	1001	2.710	1050	2.710	1099	2.710	1148	2.710	1197	2.710
904	2.710	953	2.710	1002	2.710	1051	2.710	1100	2.710	1149	2.710	1198	2.710
905	2.710	954	2.710	1003	2.710	1052	2.710	1101	2.710	1150	2.710	1199	2.710
906	2.710	955	2.710	1004	2.710	1053	2.710	1102	2.710	1151	2.710	1200	2.710
907	2.710	956	2.710	1005	2.710	1054	2.710	1103	2.710	1152	2.710	1201	2.710
908	2.710	957	2.710	1006	2.710	1055	2.710	1104	2.710	1153	2.710	1202	2.710
909	2.710	958	2.710	1007	2.710	1056	2.710	1105	2.710	1154	2.710	1203	2.710
910	2.710	959	2.710	1008	2.710	1057	2.710	1106	2.710	1155	2.710	1204	2.710
911	2.710	960	2.710	1009	2.710	1058	2.710	1107	2.710	1156	2.710	1205	2.710
912	2.710	961	2.710	1010	2.710	1059	2.710	1108	2.710	1157	2.710	1206	2.710
913	2.710	962	2.710	1011	2.710	1060	2.710	1109	2.710	1158	2.710	1207	2.710
914	2.710	963	2.710	1012	2.710	1061	2.710	1110	2.710	1159	2.710	1208	2.710
915	2.710	964	2.710	1013	2.710	1062	2.710	1111	2.710	1160	2.710	1209	2.710
916	2.710	965	2.710	1014	2.710	1063	2.710	1112	2.710	1161	2.710	1210	2.710
917	2.710	966	2.710	1015	2.710	1064	2.710	1113	2.710	1162	2.710	1211	2.710
918	2.710	967	2.710	1016	2.710	1065	2.710	1114	2.710	1163	2.710	1212	2.710
919	2.710	968	2.710	1017	2.710	1066	2.710	1115	2.710	1164	2.710	1213	2.710
920	2.710	969	2.710	1018	2.710	1067	2.710	1116	2.710	1165	2.710	1214	2.710
921	2.710	970	2.710	1019	2.710	1068	2.710	1117	2.710	1166	2.710	1215	2.710
922	2.710	971	2.710	1020	2.710	1069	2.710	1118	2.710	1167	2.710	1216	2.710
923	2.710	972	2.710	1021	2.710	1070	2.710	1119	2.710	1168	2.710	1217	2.710
924	2.710	973	2.710	1022	2.710	1071	2.710	1120	2.710	1169	2.710	1218	2.710
925	2.710	974	2.710	1023	2.710	1072	2.710	1121	2.710	1170	2.710	1219	2.710
926	2.710	975	2.710	1024	2.710	1073	2.710	1122	2.710	1171	2.710	1220	2.710
927	2.710	976	2.710	1025	2.710	1074	2.710	1123	2.710	1172	2.710	1221	2.710
928	2.710	977	2.710	1026	2.710	1075	2.710	1124	2.710	1173	2.710	1222	2.710
929	2.710	978	2.710	1027	2.710	1076	2.710	1125	2.710	1174	2.710	1223	2.710
930	2.710	979	2.710	1028	2.710	1077	2.710	1126	2.710	1175	2.710	1224	2.710
931	2.710	980	2.710	1029	2.710	1078	2.710	1127	2.710	1176	2.710	1225	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1226	2.710	1275	2.710	1324	2.710	1373	2.710	1422	2.710	1471	2.710	1520	2.710
1227	2.710	1276	2.710	1325	2.710	1374	2.710	1423	2.710	1472	2.710	1521	2.710
1228	2.710	1277	2.710	1326	2.710	1375	2.710	1424	2.710	1473	2.710	1522	2.710
1229	2.710	1278	2.710	1327	2.710	1376	2.710	1425	2.710	1474	2.710	1523	2.710
1230	2.710	1279	2.710	1328	2.710	1377	2.710	1426	2.710	1475	2.710	1524	2.710
1231	2.710	1280	2.710	1329	2.710	1378	2.710	1427	2.710	1476	2.710	1525	2.710
1232	2.710	1281	2.710	1330	2.710	1379	2.710	1428	2.710	1477	2.710	1526	2.710
1233	2.710	1282	2.710	1331	2.710	1380	2.710	1429	2.710	1478	2.710	1527	2.710
1234	2.710	1283	2.710	1332	2.710	1381	2.710	1430	2.710	1479	2.710	1528	2.710
1235	2.710	1284	2.710	1333	2.710	1382	2.710	1431	2.710	1480	2.710	1529	2.710
1236	2.710	1285	2.710	1334	2.710	1383	2.710	1432	2.710	1481	2.710	1530	2.710
1237	2.710	1286	2.710	1335	2.710	1384	2.710	1433	2.710	1482	2.710	1531	2.710
1238	2.710	1287	2.710	1336	2.710	1385	2.710	1434	2.710	1483	2.710	1532	2.710
1239	2.710	1288	2.710	1337	2.710	1386	2.710	1435	2.710	1484	2.710	1533	2.710
1240	2.710	1289	2.710	1338	2.710	1387	2.710	1436	2.710	1485	2.710	1534	2.710
1241	2.710	1290	2.710	1339	2.710	1388	2.710	1437	2.710	1486	2.710	1535	2.710
1242	2.710	1291	2.710	1340	2.710	1389	2.710	1438	2.710	1487	2.710	1536	2.710
1243	2.710	1292	2.710	1341	2.710	1390	2.710	1439	2.710	1488	2.710	1537	2.710
1244	2.710	1293	2.710	1342	2.710	1391	2.710	1440	2.710	1489	2.710	1538	2.710
1245	2.710	1294	2.710	1343	2.710	1392	2.710	1441	2.710	1490	2.710	1539	2.710
1246	2.710	1295	2.710	1344	2.710	1393	2.710	1442	2.710	1491	2.710	1540	2.710
1247	2.710	1296	2.710	1345	2.710	1394	2.710	1443	2.710	1492	2.710	1541	2.710
1248	2.710	1297	2.710	1346	2.710	1395	2.710	1444	2.710	1493	2.710	1542	2.710
1249	2.710	1298	2.710	1347	2.710	1396	2.710	1445	2.710	1494	2.710	1543	2.710
1250	2.710	1299	2.710	1348	2.710	1397	2.710	1446	2.710	1495	2.710	1544	2.710
1251	2.710	1300	2.710	1349	2.710	1398	2.710	1447	2.710	1496	2.710	1545	2.710
1252	2.710	1301	2.710	1350	2.710	1399	2.710	1448	2.710	1497	2.710	1546	2.710
1253	2.710	1302	2.710	1351	2.710	1400	2.710	1449	2.710	1498	2.710	1547	2.710
1254	2.710	1303	2.710	1352	2.710	1401	2.710	1450	2.710	1499	2.710	1548	2.710
1255	2.710	1304	2.710	1353	2.710	1402	2.710	1451	2.710	1500	2.710	1549	2.710
1256	2.710	1305	2.710	1354	2.710	1403	2.710	1452	2.710	1501	2.710	1550	2.710
1257	2.710	1306	2.710	1355	2.710	1404	2.710	1453	2.710	1502	2.710	1551	2.710
1258	2.710	1307	2.710	1356	2.710	1405	2.710	1454	2.710	1503	2.710	1552	2.710
1259	2.710	1308	2.710	1357	2.710	1406	2.710	1455	2.710	1504	2.710	1553	2.710
1260	2.710	1309	2.710	1358	2.710	1407	2.710	1456	2.710	1505	2.710	1554	2.710
1261	2.710	1310	2.710	1359	2.710	1408	2.710	1457	2.710	1506	2.710	1555	2.710
1262	2.710	1311	2.710	1360	2.710	1409	2.710	1458	2.710	1507	2.710	1556	2.710
1263	2.710	1312	2.710	1361	2.710	1410	2.710	1459	2.710	1508	2.710	1557	2.710
1264	2.710	1313	2.710	1362	2.710	1411	2.710	1460	2.710	1509	2.710	1558	2.710
1265	2.710	1314	2.710	1363	2.710	1412	2.710	1461	2.710	1510	2.710	1559	2.710
1266	2.710	1315	2.710	1364	2.710	1413	2.710	1462	2.710	1511	2.710	1560	2.710
1267	2.710	1316	2.710	1365	2.710	1414	2.710	1463	2.710	1512	2.710	1561	2.710
1268	2.710	1317	2.710	1366	2.710	1415	2.710	1464	2.710	1513	2.710	1562	2.710
1269	2.710	1318	2.710	1367	2.710	1416	2.710	1465	2.710	1514	2.710	1563	2.710
1270	2.710	1319	2.710	1368	2.710	1417	2.710	1466	2.710	1515	2.710	1564	2.710
1271	2.710	1320	2.710	1369	2.710	1418	2.710	1467	2.710	1516	2.710	1565	2.710
1272	2.710	1321	2.710	1370	2.710	1419	2.710	1468	2.710	1517	2.710	1566	2.710
1273	2.710	1322	2.710	1371	2.710	1420	2.710	1469	2.710	1518	2.710	1567	2.710
1274	2.710	1323	2.710	1372	2.710	1421	2.710	1470	2.710	1519	2.710	1568	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1569	2.710	1618	2.710	1667	2.710	1716	2.710	1765	2.710	1814	2.710	1863	2.710
1570	2.710	1619	2.710	1668	2.710	1717	2.710	1766	2.710	1815	2.710	1864	2.710
1571	2.710	1620	2.710	1669	2.710	1718	2.710	1767	2.710	1816	2.710	1865	2.710
1572	2.710	1621	2.710	1670	2.710	1719	2.710	1768	2.710	1817	2.710	1866	2.710
1573	2.710	1622	2.710	1671	2.710	1720	2.710	1769	2.710	1818	2.710	1867	2.710
1574	2.710	1623	2.710	1672	2.710	1721	2.710	1770	2.710	1819	2.710	1868	2.710
1575	2.710	1624	2.710	1673	2.710	1722	2.710	1771	2.710	1820	2.710	1869	2.710
1576	2.710	1625	2.710	1674	2.710	1723	2.710	1772	2.710	1821	2.710	1870	2.710
1577	2.710	1626	2.710	1675	2.710	1724	2.710	1773	2.710	1822	2.710	1871	2.710
1578	2.710	1627	2.710	1676	2.710	1725	2.710	1774	2.710	1823	2.710	1872	2.710
1579	2.710	1628	2.710	1677	2.710	1726	2.710	1775	2.710	1824	2.710	1873	2.710
1580	2.710	1629	2.710	1678	2.710	1727	2.710	1776	2.710	1825	2.710	1874	2.710
1581	2.710	1630	2.710	1679	2.710	1728	2.710	1777	2.710	1826	2.710	1875	2.710
1582	2.710	1631	2.710	1680	2.710	1729	2.710	1778	2.710	1827	2.710	1876	2.710
1583	2.710	1632	2.710	1681	2.710	1730	2.710	1779	2.710	1828	2.710	1877	2.710
1584	2.710	1633	2.710	1682	2.710	1731	2.710	1780	2.710	1829	2.710	1878	2.710
1585	2.710	1634	2.710	1683	2.710	1732	2.710	1781	2.710	1830	2.710	1879	2.710
1586	2.710	1635	2.710	1684	2.710	1733	2.710	1782	2.710	1831	2.710	1880	2.710
1587	2.710	1636	2.710	1685	2.710	1734	2.710	1783	2.710	1832	2.710	1881	2.710
1588	2.710	1637	2.710	1686	2.710	1735	2.710	1784	2.710	1833	2.710	1882	2.710
1589	2.710	1638	2.710	1687	2.710	1736	2.710	1785	2.710	1834	2.710	1883	2.710
1590	2.710	1639	2.710	1688	2.710	1737	2.710	1786	2.710	1835	2.710	1884	2.710
1591	2.710	1640	2.710	1689	2.710	1738	2.710	1787	2.710	1836	2.710	1885	2.710
1592	2.710	1641	2.710	1690	2.710	1739	2.710	1788	2.710	1837	2.710	1886	2.710
1593	2.710	1642	2.710	1691	2.710	1740	2.710	1789	2.710	1838	2.710	1887	2.710
1594	2.710	1643	2.710	1692	2.710	1741	2.710	1790	2.710	1839	2.710	1888	2.710
1595	2.710	1644	2.710	1693	2.710	1742	2.710	1791	2.710	1840	2.710	1889	2.710
1596	2.710	1645	2.710	1694	2.710	1743	2.710	1792	2.710	1841	2.710	1890	2.710
1597	2.710	1646	2.710	1695	2.710	1744	2.710	1793	2.710	1842	2.710	1891	2.710
1598	2.710	1647	2.710	1696	2.710	1745	2.710	1794	2.710	1843	2.710	1892	2.710
1599	2.710	1648	2.710	1697	2.710	1746	2.710	1795	2.710	1844	2.710	1893	2.710
1600	2.710	1649	2.710	1698	2.710	1747	2.710	1796	2.710	1845	2.710	1894	2.710
1601	2.710	1650	2.710	1699	2.710	1748	2.710	1797	2.710	1846	2.710	1895	2.710
1602	2.710	1651	2.710	1700	2.710	1749	2.710	1798	2.710	1847	2.710	1896	2.710
1603	2.710	1652	2.710	1701	2.710	1750	2.710	1799	2.710	1848	2.710	1897	2.710
1604	2.710	1653	2.710	1702	2.710	1751	2.710	1800	2.710	1849	2.710	1898	2.710
1605	2.710	1654	2.710	1703	2.710	1752	2.710	1801	2.710	1850	2.710	1899	2.710
1606	2.710	1655	2.710	1704	2.710	1753	2.710	1802	2.710	1851	2.710	1900	2.710
1607	2.710	1656	2.710	1705	2.710	1754	2.710	1803	2.710	1852	2.710	1901	2.710
1608	2.710	1657	2.710	1706	2.710	1755	2.710	1804	2.710	1853	2.710	1902	2.710
1609	2.710	1658	2.710	1707	2.710	1756	2.710	1805	2.710	1854	2.710	1903	2.710
1610	2.710	1659	2.710	1708	2.710	1757	2.710	1806	2.710	1855	2.710	1904	2.710
1611	2.710	1660	2.710	1709	2.710	1758	2.710	1807	2.710	1856	2.710	1905	2.710
1612	2.710	1661	2.710	1710	2.710	1759	2.710	1808	2.710	1857	2.710	1906	2.710
1613	2.710	1662	2.710	1711	2.710	1760	2.710	1809	2.710	1858	2.710	1907	2.710
1614	2.710	1663	2.710	1712	2.710	1761	2.710	1810	2.710	1859	2.710	1908	2.710
1615	2.710	1664	2.710	1713	2.710	1762	2.710	1811	2.710	1860	2.710	1909	2.710
1616	2.710	1665	2.710	1714	2.710	1763	2.710	1812	2.710	1861	2.710	1910	2.710
1617	2.710	1666	2.710	1715	2.710	1764	2.710	1813	2.710	1862	2.710	1911	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1912	2.710	1961	2.710	2010	2.710	2059	2.710	2108	2.710	2157	2.710	2206	2.710
1913	2.710	1962	2.710	2011	2.710	2060	2.710	2109	2.710	2158	2.710	2207	2.710
1914	2.710	1963	2.710	2012	2.710	2061	2.710	2110	2.710	2159	2.710	2208	2.710
1915	2.710	1964	2.710	2013	2.710	2062	2.710	2111	2.710	2160	2.710	2209	2.710
1916	2.710	1965	2.710	2014	2.710	2063	2.710	2112	2.710	2161	2.710	2210	2.710
1917	2.710	1966	2.710	2015	2.710	2064	2.710	2113	2.710	2162	2.710	2211	2.710
1918	2.710	1967	2.710	2016	2.710	2065	2.710	2114	2.710	2163	2.710	2212	2.710
1919	2.710	1968	2.710	2017	2.710	2066	2.710	2115	2.710	2164	2.710	2213	2.710
1920	2.710	1969	2.710	2018	2.710	2067	2.710	2116	2.710	2165	2.710	2214	2.710
1921	2.710	1970	2.710	2019	2.710	2068	2.710	2117	2.710	2166	2.710	2215	2.710
1922	2.710	1971	2.710	2020	2.710	2069	2.710	2118	2.710	2167	2.710	2216	2.710
1923	2.710	1972	2.710	2021	2.710	2070	2.710	2119	2.710	2168	2.710	2217	2.710
1924	2.710	1973	2.710	2022	2.710	2071	2.710	2120	2.710	2169	2.710	2218	2.710
1925	2.710	1974	2.710	2023	2.710	2072	2.710	2121	2.710	2170	2.710	2219	2.710
1926	2.710	1975	2.710	2024	2.710	2073	2.710	2122	2.710	2171	2.710	2220	2.710
1927	2.710	1976	2.710	2025	2.710	2074	2.710	2123	2.710	2172	2.710	2221	2.710
1928	2.710	1977	2.710	2026	2.710	2075	2.710	2124	2.710	2173	2.710	2222	2.710
1929	2.710	1978	2.710	2027	2.710	2076	2.710	2125	2.710	2174	2.710	2223	2.710
1930	2.710	1979	2.710	2028	2.710	2077	2.710	2126	2.710	2175	2.710	2224	2.710
1931	2.710	1980	2.710	2029	2.710	2078	2.710	2127	2.710	2176	2.710	2225	2.710
1932	2.710	1981	2.710	2030	2.710	2079	2.710	2128	2.710	2177	2.710	2226	2.710
1933	2.710	1982	2.710	2031	2.710	2080	2.710	2129	2.710	2178	2.710	2227	2.710
1934	2.710	1983	2.710	2032	2.710	2081	2.710	2130	2.710	2179	2.710	2228	2.710
1935	2.710	1984	2.710	2033	2.710	2082	2.710	2131	2.710	2180	2.710	2229	2.710
1936	2.710	1985	2.710	2034	2.710	2083	2.710	2132	2.710	2181	2.710	2230	2.710
1937	2.710	1986	2.710	2035	2.710	2084	2.710	2133	2.710	2182	2.710	2231	2.710
1938	2.710	1987	2.710	2036	2.710	2085	2.710	2134	2.710	2183	2.710	2232	2.710
1939	2.710	1988	2.710	2037	2.710	2086	2.710	2135	2.710	2184	2.710	2233	2.710
1940	2.710	1989	2.710	2038	2.710	2087	2.710	2136	2.710	2185	2.710	2234	2.710
1941	2.710	1990	2.710	2039	2.710	2088	2.710	2137	2.710	2186	2.710	2235	2.710
1942	2.710	1991	2.710	2040	2.710	2089	2.710	2138	2.710	2187	2.710	2236	2.710
1943	2.710	1992	2.710	2041	2.710	2090	2.710	2139	2.710	2188	2.710	2237	2.710
1944	2.710	1993	2.710	2042	2.710	2091	2.710	2140	2.710	2189	2.710	2238	2.710
1945	2.710	1994	2.710	2043	2.710	2092	2.710	2141	2.710	2190	2.710	2239	2.710
1946	2.710	1995	2.710	2044	2.710	2093	2.710	2142	2.710	2191	2.710	2240	2.710
1947	2.710	1996	2.710	2045	2.710	2094	2.710	2143	2.710	2192	2.710	2241	2.710
1948	2.710	1997	2.710	2046	2.710	2095	2.710	2144	2.710	2193	2.710	2242	2.710
1949	2.710	1998	2.710	2047	2.710	2096	2.710	2145	2.710	2194	2.710	2243	2.710
1950	2.710	1999	2.710	2048	2.710	2097	2.710	2146	2.710	2195	2.710	2244	2.710
1951	2.710	2000	2.710	2049	2.710	2098	2.710	2147	2.710	2196	2.710	2245	2.710
1952	2.710	2001	2.710	2050	2.710	2099	2.710	2148	2.710	2197	2.710	2246	2.710
1953	2.710	2002	2.710	2051	2.710	2100	2.710	2149	2.710	2198	2.710	2247	2.710
1954	2.710	2003	2.710	2052	2.710	2101	2.710	2150	2.710	2199	2.710	2248	2.710
1955	2.710	2004	2.710	2053	2.710	2102	2.710	2151	2.710	2200	2.710	2249	2.710
1956	2.710	2005	2.710	2054	2.710	2103	2.710	2152	2.710	2201	2.710	2250	2.710
1957	2.710	2006	2.710	2055	2.710	2104	2.710	2153	2.710	2202	2.710	2251	2.710
1958	2.710	2007	2.710	2056	2.710	2105	2.710	2154	2.710	2203	2.710	2252	2.710
1959	2.710	2008	2.710	2057	2.710	2106	2.710	2155	2.710	2204	2.710	2253	2.710
1960	2.710	2009	2.710	2058	2.710	2107	2.710	2156	2.710	2205	2.710	2254	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2255	2.710	2304	2.710	2353	2.710	2402	2.710	2451	2.710	2500	2.710	2549	2.710
2256	2.710	2305	2.710	2354	2.710	2403	2.710	2452	2.710	2501	2.710	2550	2.710
2257	2.710	2306	2.710	2355	2.710	2404	2.710	2453	2.710	2502	2.710	2551	2.710
2258	2.710	2307	2.710	2356	2.710	2405	2.710	2454	2.710	2503	2.710	2552	2.710
2259	2.710	2308	2.710	2357	2.710	2406	2.710	2455	2.710	2504	2.710	2553	2.710
2260	2.710	2309	2.710	2358	2.710	2407	2.710	2456	2.710	2505	2.710	2554	2.710
2261	2.710	2310	2.710	2359	2.710	2408	2.710	2457	2.710	2506	2.710	2555	2.710
2262	2.710	2311	2.710	2360	2.710	2409	2.710	2458	2.710	2507	2.710	2556	2.710
2263	2.710	2312	2.710	2361	2.710	2410	2.710	2459	2.710	2508	2.710	2557	2.710
2264	2.710	2313	2.710	2362	2.710	2411	2.710	2460	2.710	2509	2.710	2558	2.710
2265	2.710	2314	2.710	2363	2.710	2412	2.710	2461	2.710	2510	2.710	2559	2.710
2266	2.710	2315	2.710	2364	2.710	2413	2.710	2462	2.710	2511	2.710	2560	2.710
2267	2.710	2316	2.710	2365	2.710	2414	2.710	2463	2.710	2512	2.710	2561	2.710
2268	2.710	2317	2.710	2366	2.710	2415	2.710	2464	2.710	2513	2.710	2562	2.710
2269	2.710	2318	2.710	2367	2.710	2416	2.710	2465	2.710	2514	2.710	2563	2.710
2270	2.710	2319	2.710	2368	2.710	2417	2.710	2466	2.710	2515	2.710	2564	2.710
2271	2.710	2320	2.710	2369	2.710	2418	2.710	2467	2.710	2516	2.710	2565	2.710
2272	2.710	2321	2.710	2370	2.710	2419	2.710	2468	2.710	2517	2.710	2566	2.710
2273	2.710	2322	2.710	2371	2.710	2420	2.710	2469	2.710	2518	2.710	2567	2.710
2274	2.710	2323	2.710	2372	2.710	2421	2.710	2470	2.710	2519	2.710	2568	2.710
2275	2.710	2324	2.710	2373	2.710	2422	2.710	2471	2.710	2520	2.710	2569	2.710
2276	2.710	2325	2.710	2374	2.710	2423	2.710	2472	2.710	2521	2.710	2570	2.710
2277	2.710	2326	2.710	2375	2.710	2424	2.710	2473	2.710	2522	2.710	2571	2.710
2278	2.710	2327	2.710	2376	2.710	2425	2.710	2474	2.710	2523	2.710	2572	2.710
2279	2.710	2328	2.710	2377	2.710	2426	2.710	2475	2.710	2524	2.710	2573	2.710
2280	2.710	2329	2.710	2378	2.710	2427	2.710	2476	2.710	2525	2.710	2574	2.710
2281	2.710	2330	2.710	2379	2.710	2428	2.710	2477	2.710	2526	2.710	2575	2.710
2282	2.710	2331	2.710	2380	2.710	2429	2.710	2478	2.710	2527	2.710	2576	2.710
2283	2.710	2332	2.710	2381	2.710	2430	2.710	2479	2.710	2528	2.710	2577	2.710
2284	2.710	2333	2.710	2382	2.710	2431	2.710	2480	2.710	2529	2.710	2578	2.710
2285	2.710	2334	2.710	2383	2.710	2432	2.710	2481	2.710	2530	2.710	2579	2.710
2286	2.710	2335	2.710	2384	2.710	2433	2.710	2482	2.710	2531	2.710	2580	2.710
2287	2.710	2336	2.710	2385	2.710	2434	2.710	2483	2.710	2532	2.710	2581	2.710
2288	2.710	2337	2.710	2386	2.710	2435	2.710	2484	2.710	2533	2.710	2582	2.710
2289	2.710	2338	2.710	2387	2.710	2436	2.710	2485	2.710	2534	2.710	2583	2.710
2290	2.710	2339	2.710	2388	2.710	2437	2.710	2486	2.710	2535	2.710	2584	2.710
2291	2.710	2340	2.710	2389	2.710	2438	2.710	2487	2.710	2536	2.710	2585	2.710
2292	2.710	2341	2.710	2390	2.710	2439	2.710	2488	2.710	2537	2.710	2586	2.710
2293	2.710	2342	2.710	2391	2.710	2440	2.710	2489	2.710	2538	2.710	2587	2.710
2294	2.710	2343	2.710	2392	2.710	2441	2.710	2490	2.710	2539	2.710	2588	2.710
2295	2.710	2344	2.710	2393	2.710	2442	2.710	2491	2.710	2540	2.710	2589	2.710
2296	2.710	2345	2.710	2394	2.710	2443	2.710	2492	2.710	2541	2.710	2590	2.710
2297	2.710	2346	2.710	2395	2.710	2444	2.710	2493	2.710	2542	2.710	2591	2.710
2298	2.710	2347	2.710	2396	2.710	2445	2.710	2494	2.710	2543	2.710	2592	2.710
2299	2.710	2348	2.710	2397	2.710	2446	2.710	2495	2.710	2544	2.710	2593	2.710
2300	2.710	2349	2.710	2398	2.710	2447	2.710	2496	2.710	2545	2.710	2594	2.710
2301	2.710	2350	2.710	2399	2.710	2448	2.710	2497	2.710	2546	2.710	2595	2.710
2302	2.710	2351	2.710	2400	2.710	2449	2.710	2498	2.710	2547	2.710	2596	2.710
2303	2.710	2352	2.710	2401	2.710	2450	2.710	2499	2.710	2548	2.710	2597	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2598	2.710	2647	2.710	2696	2.710	2745	2.710	2794	2.710	2843	2.710	2892	2.710
2599	2.710	2648	2.710	2697	2.710	2746	2.710	2795	2.710	2844	2.710	2893	2.710
2600	2.710	2649	2.710	2698	2.710	2747	2.710	2796	2.710	2845	2.710	2894	2.710
2601	2.710	2650	2.710	2699	2.710	2748	2.710	2797	2.710	2846	2.710	2895	2.710
2602	2.710	2651	2.710	2700	2.710	2749	2.710	2798	2.710	2847	2.710	2896	2.710
2603	2.710	2652	2.710	2701	2.710	2750	2.710	2799	2.710	2848	2.710	2897	2.710
2604	2.710	2653	2.710	2702	2.710	2751	2.710	2800	2.710	2849	2.710	2898	2.710
2605	2.710	2654	2.710	2703	2.710	2752	2.710	2801	2.710	2850	2.710	2899	2.710
2606	2.710	2655	2.710	2704	2.710	2753	2.710	2802	2.710	2851	2.710	2900	2.710
2607	2.710	2656	2.710	2705	2.710	2754	2.710	2803	2.710	2852	2.710	2901	2.710
2608	2.710	2657	2.710	2706	2.710	2755	2.710	2804	2.710	2853	2.710	2902	2.710
2609	2.710	2658	2.710	2707	2.710	2756	2.710	2805	2.710	2854	2.710	2903	2.710
2610	2.710	2659	2.710	2708	2.710	2757	2.710	2806	2.710	2855	2.710	2904	2.710
2611	2.710	2660	2.710	2709	2.710	2758	2.710	2807	2.710	2856	2.710	2905	2.710
2612	2.710	2661	2.710	2710	2.710	2759	2.710	2808	2.710	2857	2.710	2906	2.710
2613	2.710	2662	2.710	2711	2.710	2760	2.710	2809	2.710	2858	2.710	2907	2.710
2614	2.710	2663	2.710	2712	2.710	2761	2.710	2810	2.710	2859	2.710	2908	2.710
2615	2.710	2664	2.710	2713	2.710	2762	2.710	2811	2.710	2860	2.710	2909	2.710
2616	2.710	2665	2.710	2714	2.710	2763	2.710	2812	2.710	2861	2.710	2910	2.710
2617	2.710	2666	2.710	2715	2.710	2764	2.710	2813	2.710	2862	2.710	2911	2.710
2618	2.710	2667	2.710	2716	2.710	2765	2.710	2814	2.710	2863	2.710	2912	2.710
2619	2.710	2668	2.710	2717	2.710	2766	2.710	2815	2.710	2864	2.710	2913	2.710
2620	2.710	2669	2.710	2718	2.710	2767	2.710	2816	2.710	2865	2.710	2914	2.710
2621	2.710	2670	2.710	2719	2.710	2768	2.710	2817	2.710	2866	2.710	2915	2.710
2622	2.710	2671	2.710	2720	2.710	2769	2.710	2818	2.710	2867	2.710	2916	2.710
2623	2.710	2672	2.710	2721	2.710	2770	2.710	2819	2.710	2868	2.710	2917	2.710
2624	2.710	2673	2.710	2722	2.710	2771	2.710	2820	2.710	2869	2.710	2918	2.710
2625	2.710	2674	2.710	2723	2.710	2772	2.710	2821	2.710	2870	2.710	2919	2.710
2626	2.710	2675	2.710	2724	2.710	2773	2.710	2822	2.710	2871	2.710	2920	2.710
2627	2.710	2676	2.710	2725	2.710	2774	2.710	2823	2.710	2872	2.710	2921	2.710
2628	2.710	2677	2.710	2726	2.710	2775	2.710	2824	2.710	2873	2.710	2922	2.710
2629	2.710	2678	2.710	2727	2.710	2776	2.710	2825	2.710	2874	2.710	2923	2.710
2630	2.710	2679	2.710	2728	2.710	2777	2.710	2826	2.710	2875	2.710	2924	2.710
2631	2.710	2680	2.710	2729	2.710	2778	2.710	2827	2.710	2876	2.710	2925	2.710
2632	2.710	2681	2.710	2730	2.710	2779	2.710	2828	2.710	2877	2.710	2926	2.710
2633	2.710	2682	2.710	2731	2.710	2780	2.710	2829	2.710	2878	2.710	2927	2.710
2634	2.710	2683	2.710	2732	2.710	2781	2.710	2830	2.710	2879	2.710	2928	2.710
2635	2.710	2684	2.710	2733	2.710	2782	2.710	2831	2.710	2880	2.710	2929	2.710
2636	2.710	2685	2.710	2734	2.710	2783	2.710	2832	2.710	2881	2.710	2930	2.710
2637	2.710	2686	2.710	2735	2.710	2784	2.710	2833	2.710	2882	2.710	2931	2.710
2638	2.710	2687	2.710	2736	2.710	2785	2.710	2834	2.710	2883	2.710	2932	2.710
2639	2.710	2688	2.710	2737	2.710	2786	2.710	2835	2.710	2884	2.710	2933	2.710
2640	2.710	2689	2.710	2738	2.710	2787	2.710	2836	2.710	2885	2.710	2934	2.710
2641	2.710	2690	2.710	2739	2.710	2788	2.710	2837	2.710	2886	2.710	2935	2.710
2642	2.710	2691	2.710	2740	2.710	2789	2.710	2838	2.710	2887	2.710	2936	2.710
2643	2.710	2692	2.710	2741	2.710	2790	2.710	2839	2.710	2888	2.710	2937	2.710
2644	2.710	2693	2.710	2742	2.710	2791	2.710	2840	2.710	2889	2.710	2938	2.710
2645	2.710	2694	2.710	2743	2.710	2792	2.710	2841	2.710	2890	2.710	2939	2.710
2646	2.710	2695	2.710	2744	2.710	2793	2.710	2842	2.710	2891	2.710	2940	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2941	2.710	2990	2.710	3039	2.710	3088	2.710	3137	2.710	3186	2.710	3235	2.710
2942	2.710	2991	2.710	3040	2.710	3089	2.710	3138	2.710	3187	2.710	3236	2.710
2943	2.710	2992	2.710	3041	2.710	3090	2.710	3139	2.710	3188	2.710	3237	2.710
2944	2.710	2993	2.710	3042	2.710	3091	2.710	3140	2.710	3189	2.710	3238	2.710
2945	2.710	2994	2.710	3043	2.710	3092	2.710	3141	2.710	3190	2.710	3239	2.710
2946	2.710	2995	2.710	3044	2.710	3093	2.710	3142	2.710	3191	2.710	3240	2.710
2947	2.710	2996	2.710	3045	2.710	3094	2.710	3143	2.710	3192	2.710	3241	2.710
2948	2.710	2997	2.710	3046	2.710	3095	2.710	3144	2.710	3193	2.710	3242	2.710
2949	2.710	2998	2.710	3047	2.710	3096	2.710	3145	2.710	3194	2.710	3243	2.710
2950	2.710	2999	2.710	3048	2.710	3097	2.710	3146	2.710	3195	2.710	3244	2.710
2951	2.710	3000	2.710	3049	2.710	3098	2.710	3147	2.710	3196	2.710	3245	2.710
2952	2.710	3001	2.710	3050	2.710	3099	2.710	3148	2.710	3197	2.710	3246	2.710
2953	2.710	3002	2.710	3051	2.710	3100	2.710	3149	2.710	3198	2.710	3247	2.710
2954	2.710	3003	2.710	3052	2.710	3101	2.710	3150	2.710	3199	2.710	3248	2.710
2955	2.710	3004	2.710	3053	2.710	3102	2.710	3151	2.710	3200	2.710	3249	2.710
2956	2.710	3005	2.710	3054	2.710	3103	2.710	3152	2.710	3201	2.710	3250	2.710
2957	2.710	3006	2.710	3055	2.710	3104	2.710	3153	2.710	3202	2.710	3251	2.710
2958	2.710	3007	2.710	3056	2.710	3105	2.710	3154	2.710	3203	2.710	3252	2.710
2959	2.710	3008	2.710	3057	2.710	3106	2.710	3155	2.710	3204	2.710	3253	2.710
2960	2.710	3009	2.710	3058	2.710	3107	2.710	3156	2.710	3205	2.710	3254	2.710
2961	2.710	3010	2.710	3059	2.710	3108	2.710	3157	2.710	3206	2.710	3255	2.710
2962	2.710	3011	2.710	3060	2.710	3109	2.710	3158	2.710	3207	2.710	3256	2.710
2963	2.710	3012	2.710	3061	2.710	3110	2.710	3159	2.710	3208	2.710	3257	2.710
2964	2.710	3013	2.710	3062	2.710	3111	2.710	3160	2.710	3209	2.710	3258	2.710
2965	2.710	3014	2.710	3063	2.710	3112	2.710	3161	2.710	3210	2.710	3259	2.710
2966	2.710	3015	2.710	3064	2.710	3113	2.710	3162	2.710	3211	2.710	3260	2.710
2967	2.710	3016	2.710	3065	2.710	3114	2.710	3163	2.710	3212	2.710	3261	2.710
2968	2.710	3017	2.710	3066	2.710	3115	2.710	3164	2.710	3213	2.710	3262	2.710
2969	2.710	3018	2.710	3067	2.710	3116	2.710	3165	2.710	3214	2.710	3263	2.710
2970	2.710	3019	2.710	3068	2.710	3117	2.710	3166	2.710	3215	2.710	3264	2.710
2971	2.710	3020	2.710	3069	2.710	3118	2.710	3167	2.710	3216	2.710	3265	2.710
2972	2.710	3021	2.710	3070	2.710	3119	2.710	3168	2.710	3217	2.710	3266	2.710
2973	2.710	3022	2.710	3071	2.710	3120	2.710	3169	2.710	3218	2.710	3267	2.710
2974	2.710	3023	2.710	3072	2.710	3121	2.710	3170	2.710	3219	2.710	3268	2.710
2975	2.710	3024	2.710	3073	2.710	3122	2.710	3171	2.710	3220	2.710	3269	2.710
2976	2.710	3025	2.710	3074	2.710	3123	2.710	3172	2.710	3221	2.710	3270	2.710
2977	2.710	3026	2.710	3075	2.710	3124	2.710	3173	2.710	3222	2.710	3271	2.710
2978	2.710	3027	2.710	3076	2.710	3125	2.710	3174	2.710	3223	2.710	3272	2.710
2979	2.710	3028	2.710	3077	2.710	3126	2.710	3175	2.710	3224	2.710	3273	2.710
2980	2.710	3029	2.710	3078	2.710	3127	2.710	3176	2.710	3225	2.710	3274	2.710
2981	2.710	3030	2.710	3079	2.710	3128	2.710	3177	2.710	3226	2.710	3275	2.710
2982	2.710	3031	2.710	3080	2.710	3129	2.710	3178	2.710	3227	2.710	3276	2.710
2983	2.710	3032	2.710	3081	2.710	3130	2.710	3179	2.710	3228	2.710	3277	2.710
2984	2.710	3033	2.710	3082	2.710	3131	2.710	3180	2.710	3229	2.710	3278	2.710
2985	2.710	3034	2.710	3083	2.710	3132	2.710	3181	2.710	3230	2.710	3279	2.710
2986	2.710	3035	2.710	3084	2.710	3133	2.710	3182	2.710	3231	2.710	3280	2.710
2987	2.710	3036	2.710	3085	2.710	3134	2.710	3183	2.710	3232	2.710	3281	2.710
2988	2.710	3037	2.710	3086	2.710	3135	2.710	3184	2.710	3233	2.710	3282	2.710
2989	2.710	3038	2.710	3087	2.710	3136	2.710	3185	2.710	3234	2.710	3283	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
3284	2.710	3333	2.710	3382	2.710	3431	2.710	3480	2.710	3529	2.710	3578	2.710
3285	2.710	3334	2.710	3383	2.710	3432	2.710	3481	2.710	3530	2.710	3579	2.710
3286	2.710	3335	2.710	3384	2.710	3433	2.710	3482	2.710	3531	2.710	3580	2.710
3287	2.710	3336	2.710	3385	2.710	3434	2.710	3483	2.710	3532	2.710	3581	2.710
3288	2.710	3337	2.710	3386	2.710	3435	2.710	3484	2.710	3533	2.710	3582	2.710
3289	2.710	3338	2.710	3387	2.710	3436	2.710	3485	2.710	3534	2.710	3583	2.710
3290	2.710	3339	2.710	3388	2.710	3437	2.710	3486	2.710	3535	2.710	3584	2.710
3291	2.710	3340	2.710	3389	2.710	3438	2.710	3487	2.710	3536	2.710	3585	2.710
3292	2.710	3341	2.710	3390	2.710	3439	2.710	3488	2.710	3537	2.710	3586	2.710
3293	2.710	3342	2.710	3391	2.710	3440	2.710	3489	2.710	3538	2.710	3587	2.710
3294	2.710	3343	2.710	3392	2.710	3441	2.710	3490	2.710	3539	2.710	3588	2.710
3295	2.710	3344	2.710	3393	2.710	3442	2.710	3491	2.710	3540	2.710	3589	2.710
3296	2.710	3345	2.710	3394	2.710	3443	2.710	3492	2.710	3541	2.710	3590	2.710
3297	2.710	3346	2.710	3395	2.710	3444	2.710	3493	2.710	3542	2.710	3591	2.710
3298	2.710	3347	2.710	3396	2.710	3445	2.710	3494	2.710	3543	2.710	3592	2.710
3299	2.710	3348	2.710	3397	2.710	3446	2.710	3495	2.710	3544	2.710	3593	2.710
3300	2.710	3349	2.710	3398	2.710	3447	2.710	3496	2.710	3545	2.710	3594	2.710
3301	2.710	3350	2.710	3399	2.710	3448	2.710	3497	2.710	3546	2.710	3595	2.710
3302	2.710	3351	2.710	3400	2.710	3449	2.710	3498	2.710	3547	2.710	3596	2.710
3303	2.710	3352	2.710	3401	2.710	3450	2.710	3499	2.710	3548	2.710	3597	2.710
3304	2.710	3353	2.710	3402	2.710	3451	2.710	3500	2.710	3549	2.710	3598	2.710
3305	2.710	3354	2.710	3403	2.710	3452	2.710	3501	2.710	3550	2.710	3599	2.710
3306	2.710	3355	2.710	3404	2.710	3453	2.710	3502	2.710	3551	2.710	3600	2.710
3307	2.710	3356	2.710	3405	2.710	3454	2.710	3503	2.710	3552	2.710	3601	2.710
3308	2.710	3357	2.710	3406	2.710	3455	2.710	3504	2.710	3553	2.710	3602	2.710
3309	2.710	3358	2.710	3407	2.710	3456	2.710	3505	2.710	3554	2.710	3603	2.710
3310	2.710	3359	2.710	3408	2.710	3457	2.710	3506	2.710	3555	2.710	3604	2.710
3311	2.710	3360	2.710	3409	2.710	3458	2.710	3507	2.710	3556	2.710	3605	2.710
3312	2.710	3361	2.710	3410	2.710	3459	2.710	3508	2.710	3557	2.710	3606	2.710
3313	2.710	3362	2.710	3411	2.710	3460	2.710	3509	2.710	3558	2.710	3607	2.710
3314	2.710	3363	2.710	3412	2.710	3461	2.710	3510	2.710	3559	2.710	3608	2.710
3315	2.710	3364	2.710	3413	2.710	3462	2.710	3511	2.710	3560	2.710	3609	2.710
3316	2.710	3365	2.710	3414	2.710	3463	2.710	3512	2.710	3561	2.710	3610	2.710
3317	2.710	3366	2.710	3415	2.710	3464	2.710	3513	2.710	3562	2.710	3611	2.710
3318	2.710	3367	2.710	3416	2.710	3465	2.710	3514	2.710	3563	2.710	3612	2.710
3319	2.710	3368	2.710	3417	2.710	3466	2.710	3515	2.710	3564	2.710	3613	2.710
3320	2.710	3369	2.710	3418	2.710	3467	2.710	3516	2.710	3565	2.710	3614	2.710
3321	2.710	3370	2.710	3419	2.710	3468	2.710	3517	2.710	3566	2.710	3615	2.710
3322	2.710	3371	2.710	3420	2.710	3469	2.710	3518	2.710	3567	2.710	3616	2.710
3323	2.710	3372	2.710	3421	2.710	3470	2.710	3519	2.710	3568	2.710	3617	2.710
3324	2.710	3373	2.710	3422	2.710	3471	2.710	3520	2.710	3569	2.710	3618	2.710
3325	2.710	3374	2.710	3423	2.710	3472	2.710	3521	2.710	3570	2.710	3619	2.710
3326	2.710	3375	2.710	3424	2.710	3473	2.710	3522	2.710	3571	2.710	3620	2.710
3327	2.710	3376	2.710	3425	2.710	3474	2.710	3523	2.710	3572	2.710	3621	2.710
3328	2.710	3377	2.710	3426	2.710	3475	2.710	3524	2.710	3573	2.710	3622	2.710
3329	2.710	3378	2.710	3427	2.710	3476	2.710	3525	2.710	3574	2.710	3623	2.710
3330	2.710	3379	2.710	3428	2.710	3477	2.710	3526	2.710	3575	2.710	3624	2.710
3331	2.710	3380	2.710	3429	2.710	3478	2.710	3527	2.710	3576	2.710	3625	2.710
3332	2.710	3381	2.710	3430	2.710	3479	2.710	3528	2.710	3577	2.710	3626	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
3627	2.710	3676	2.710	3725	2.710	3774	2.710	3823	2.710	3872	2.710	3921	2.710
3628	2.710	3677	2.710	3726	2.710	3775	2.710	3824	2.710	3873	2.710	3922	2.710
3629	2.710	3678	2.710	3727	2.710	3776	2.710	3825	2.710	3874	2.710	3923	2.710
3630	2.710	3679	2.710	3728	2.710	3777	2.710	3826	2.710	3875	2.710	3924	2.710
3631	2.710	3680	2.710	3729	2.710	3778	2.710	3827	2.710	3876	2.710	3925	2.710
3632	2.710	3681	2.710	3730	2.710	3779	2.710	3828	2.710	3877	2.710	3926	2.710
3633	2.710	3682	2.710	3731	2.710	3780	2.710	3829	2.710	3878	2.710	3927	2.710
3634	2.710	3683	2.710	3732	2.710	3781	2.710	3830	2.710	3879	2.710	3928	2.710
3635	2.710	3684	2.710	3733	2.710	3782	2.710	3831	2.710	3880	2.710	3929	2.710
3636	2.710	3685	2.710	3734	2.710	3783	2.710	3832	2.710	3881	2.710	3930	2.710
3637	2.710	3686	2.710	3735	2.710	3784	2.710	3833	2.710	3882	2.710	3931	2.710
3638	2.710	3687	2.710	3736	2.710	3785	2.710	3834	2.710	3883	2.710	3932	2.710
3639	2.710	3688	2.710	3737	2.710	3786	2.710	3835	2.710	3884	2.710	3933	2.710
3640	2.710	3689	2.710	3738	2.710	3787	2.710	3836	2.710	3885	2.710	3934	2.710
3641	2.710	3690	2.710	3739	2.710	3788	2.710	3837	2.710	3886	2.710	3935	2.710
3642	2.710	3691	2.710	3740	2.710	3789	2.710	3838	2.710	3887	2.710	3936	2.710
3643	2.710	3692	2.710	3741	2.710	3790	2.710	3839	2.710	3888	2.710	3937	2.710
3644	2.710	3693	2.710	3742	2.710	3791	2.710	3840	2.710	3889	2.710	3938	2.710
3645	2.710	3694	2.710	3743	2.710	3792	2.710	3841	2.710	3890	2.710	3939	2.710
3646	2.710	3695	2.710	3744	2.710	3793	2.710	3842	2.710	3891	2.710	3940	2.710
3647	2.710	3696	2.710	3745	2.710	3794	2.710	3843	2.710	3892	2.710	3941	2.710
3648	2.710	3697	2.710	3746	2.710	3795	2.710	3844	2.710	3893	2.710	3942	2.710
3649	2.710	3698	2.710	3747	2.710	3796	2.710	3845	2.710	3894	2.710	3943	2.710
3650	2.710	3699	2.710	3748	2.710	3797	2.710	3846	2.710	3895	2.710	3944	2.710
3651	2.710	3700	2.710	3749	2.710	3798	2.710	3847	2.710	3896	2.710	3945	2.710
3652	2.710	3701	2.710	3750	2.710	3799	2.710	3848	2.710	3897	2.710	3946	2.710
3653	2.710	3702	2.710	3751	2.710	3800	2.710	3849	2.710	3898	2.710	3947	2.710
3654	2.710	3703	2.710	3752	2.710	3801	2.710	3850	2.710	3899	2.710	3948	2.710
3655	2.710	3704	2.710	3753	2.710	3802	2.710	3851	2.710	3900	2.710	3949	2.710
3656	2.710	3705	2.710	3754	2.710	3803	2.710	3852	2.710	3901	2.710	3950	2.710
3657	2.710	3706	2.710	3755	2.710	3804	2.710	3853	2.710	3902	2.710	3951	2.710
3658	2.710	3707	2.710	3756	2.710	3805	2.710	3854	2.710	3903	2.710	3952	2.710
3659	2.710	3708	2.710	3757	2.710	3806	2.710	3855	2.710	3904	2.710	3953	2.710
3660	2.710	3709	2.710	3758	2.710	3807	2.710	3856	2.710	3905	2.710	3954	2.710
3661	2.710	3710	2.710	3759	2.710	3808	2.710	3857	2.710	3906	2.710	3955	2.710
3662	2.710	3711	2.710	3760	2.710	3809	2.710	3858	2.710	3907	2.710	3956	2.710
3663	2.710	3712	2.710	3761	2.710	3810	2.710	3859	2.710	3908	2.710	3957	2.710
3664	2.710	3713	2.710	3762	2.710	3811	2.710	3860	2.710	3909	2.710	3958	2.710
3665	2.710	3714	2.710	3763	2.710	3812	2.710	3861	2.710	3910	2.710	3959	2.710
3666	2.710	3715	2.710	3764	2.710	3813	2.710	3862	2.710	3911	2.710	3960	2.710
3667	2.710	3716	2.710	3765	2.710	3814	2.710	3863	2.710	3912	2.710	3961	2.710
3668	2.710	3717	2.710	3766	2.710	3815	2.710	3864	2.710	3913	2.710	3962	2.710
3669	2.710	3718	2.710	3767	2.710	3816	2.710	3865	2.710	3914	2.710	3963	2.710
3670	2.710	3719	2.710	3768	2.710	3817	2.710	3866	2.710	3915	2.710	3964	2.710
3671	2.710	3720	2.710	3769	2.710	3818	2.710	3867	2.710	3916	2.710	3965	2.710
3672	2.710	3721	2.710	3770	2.710	3819	2.710	3868	2.710	3917	2.710	3966	2.710
3673	2.710	3722	2.710	3771	2.710	3820	2.710	3869	2.710	3918	2.710	3967	2.710
3674	2.710	3723	2.710	3772	2.710	3821	2.710	3870	2.710	3919	2.710	3968	2.710
3675	2.710	3724	2.710	3773	2.710	3822	2.710	3871	2.710	3920	2.710	3969	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
3970	2.710	4019	2.710	4068	2.710	4117	2.710	4166	2.710	4215	2.710	4264	2.710
3971	2.710	4020	2.710	4069	2.710	4118	2.710	4167	2.710	4216	2.710	4265	2.710
3972	2.710	4021	2.710	4070	2.710	4119	2.710	4168	2.710	4217	2.710	4266	2.710
3973	2.710	4022	2.710	4071	2.710	4120	2.710	4169	2.710	4218	2.710	4267	2.710
3974	2.710	4023	2.710	4072	2.710	4121	2.710	4170	2.710	4219	2.710	4268	2.710
3975	2.710	4024	2.710	4073	2.710	4122	2.710	4171	2.710	4220	2.710	4269	2.710
3976	2.710	4025	2.710	4074	2.710	4123	2.710	4172	2.710	4221	2.710	4270	2.710
3977	2.710	4026	2.710	4075	2.710	4124	2.710	4173	2.710	4222	2.710	4271	2.710
3978	2.710	4027	2.710	4076	2.710	4125	2.710	4174	2.710	4223	2.710	4272	2.710
3979	2.710	4028	2.710	4077	2.710	4126	2.710	4175	2.710	4224	2.710	4273	2.710
3980	2.710	4029	2.710	4078	2.710	4127	2.710	4176	2.710	4225	2.710	4274	2.710
3981	2.710	4030	2.710	4079	2.710	4128	2.710	4177	2.710	4226	2.710	4275	2.710
3982	2.710	4031	2.710	4080	2.710	4129	2.710	4178	2.710	4227	2.710	4276	2.710
3983	2.710	4032	2.710	4081	2.710	4130	2.710	4179	2.710	4228	2.710	4277	2.710
3984	2.710	4033	2.710	4082	2.710	4131	2.710	4180	2.710	4229	2.710	4278	2.710
3985	2.710	4034	2.710	4083	2.710	4132	2.710	4181	2.710	4230	2.710	4279	2.710
3986	2.710	4035	2.710	4084	2.710	4133	2.710	4182	2.710	4231	2.710	4280	2.710
3987	2.710	4036	2.710	4085	2.710	4134	2.710	4183	2.710	4232	2.710	4281	2.710
3988	2.710	4037	2.710	4086	2.710	4135	2.710	4184	2.710	4233	2.710	4282	2.710
3989	2.710	4038	2.710	4087	2.710	4136	2.710	4185	2.710	4234	2.710	4283	2.710
3990	2.710	4039	2.710	4088	2.710	4137	2.710	4186	2.710	4235	2.710	4284	2.710
3991	2.710	4040	2.710	4089	2.710	4138	2.710	4187	2.710	4236	2.710	4285	2.710
3992	2.710	4041	2.710	4090	2.710	4139	2.710	4188	2.710	4237	2.710	4286	2.710
3993	2.710	4042	2.710	4091	2.710	4140	2.710	4189	2.710	4238	2.710	4287	2.710
3994	2.710	4043	2.710	4092	2.710	4141	2.710	4190	2.710	4239	2.710	4288	2.710
3995	2.710	4044	2.710	4093	2.710	4142	2.710	4191	2.710	4240	2.710	4289	2.710
3996	2.710	4045	2.710	4094	2.710	4143	2.710	4192	2.710	4241	2.710	4290	2.710
3997	2.710	4046	2.710	4095	2.710	4144	2.710	4193	2.710	4242	2.710	4291	2.710
3998	2.710	4047	2.710	4096	2.710	4145	2.710	4194	2.710	4243	2.710	4292	2.710
3999	2.710	4048	2.710	4097	2.710	4146	2.710	4195	2.710	4244	2.710	4293	2.710
4000	2.710	4049	2.710	4098	2.710	4147	2.710	4196	2.710	4245	2.710	4294	2.710
4001	2.710	4050	2.710	4099	2.710	4148	2.710	4197	2.710	4246	2.710	4295	2.710
4002	2.710	4051	2.710	4100	2.710	4149	2.710	4198	2.710	4247	2.710	4296	2.710
4003	2.710	4052	2.710	4101	2.710	4150	2.710	4199	2.710	4248	2.710	4297	2.710
4004	2.710	4053	2.710	4102	2.710	4151	2.710	4200	2.710	4249	2.710	4298	2.710
4005	2.710	4054	2.710	4103	2.710	4152	2.710	4201	2.710	4250	2.710	4299	2.710
4006	2.710	4055	2.710	4104	2.710	4153	2.710	4202	2.710	4251	2.710	4300	2.710
4007	2.710	4056	2.710	4105	2.710	4154	2.710	4203	2.710	4252	2.710	4301	2.710
4008	2.710	4057	2.710	4106	2.710	4155	2.710	4204	2.710	4253	2.710	4302	2.710
4009	2.710	4058	2.710	4107	2.710	4156	2.710	4205	2.710	4254	2.710	4303	2.710
4010	2.710	4059	2.710	4108	2.710	4157	2.710	4206	2.710	4255	2.710	4304	2.710
4011	2.710	4060	2.710	4109	2.710	4158	2.710	4207	2.710	4256	2.710	4305	2.710
4012	2.710	4061	2.710	4110	2.710	4159	2.710	4208	2.710	4257	2.710	4306	2.710
4013	2.710	4062	2.710	4111	2.710	4160	2.710	4209	2.710	4258	2.710	4307	2.710
4014	2.710	4063	2.710	4112	2.710	4161	2.710	4210	2.710	4259	2.710	4308	2.710
4015	2.710	4064	2.710	4113	2.710	4162	2.710	4211	2.710	4260	2.710	4309	2.710
4016	2.710	4065	2.710	4114	2.710	4163	2.710	4212	2.710	4261	2.710	4310	2.710
4017	2.710	4066	2.710	4115	2.710	4164	2.710	4213	2.710	4262	2.710	4311	2.710
4018	2.710	4067	2.710	4116	2.710	4165	2.710	4214	2.710	4263	2.710	4312	2.710

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
4313	2.710	4315	2.710	4317	2.710	4319	2.710						
4314	2.710	4316	2.710	4318	2.710	4320	2.710						

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	30
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.300		

Online Controls for Storm

Orifice Manhole: MH16, DS/PN: 1.003, Volume (m³): 6.3

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.022

Orifice Manhole: MH17, DS/PN: 1.004, Volume (m³): 3.3

Diameter (m) 0.090 Discharge Coefficient 0.600 Invert Level (m) 4.931

Orifice Manhole: MH34, DS/PN: 10.004, Volume (m³): 2.5

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.151

Orifice Manhole: MH36, DS/PN: 7.007, Volume (m³): 5.7

Diameter (m) 0.275 Discharge Coefficient 0.600 Invert Level (m) 4.954

Non Return Valve Manhole: MH52, DS/PN: 1.009, Volume (m³): 2.6

Storage Structures for Storm

Tank or Pond Manhole: MH1, DS/PN: 1.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	80.4	0.450	80.4	0.451	0.0

Tank or Pond Manhole: MH3, DS/PN: 2.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	37.6	0.450	37.6	0.451	0.0

Tank or Pond Manhole: MH4, DS/PN: 3.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	23.9	0.450	23.9	0.451	0.0

Tank or Pond Manhole: MH5, DS/PN: 4.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	58.1	0.450	58.1	0.451	0.0

Tank or Pond Manhole: MH6, DS/PN: 5.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	79.7	0.450	79.7	0.451	0.0

Tank or Pond Manhole: MH12, DS/PN: 2.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	12.7	0.450	12.7	0.451	0.0

Tank or Pond Manhole: MH13, DS/PN: 1.001

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	6.2	0.450	6.2	0.451	0.0

Tank or Pond Manhole: MH14, DS/PN: 1.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	147.0	0.450	147.0	0.451	0.0

Tank or Pond Manhole: MH15, DS/PN: 6.000

Invert Level (m) 5.350

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	54.8	0.450	54.8	0.451	0.0

Complex Manhole: MH16, DS/PN: 1.003

Cellular Storage

Invert Level (m) 5.022 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	71.0	0.0	0.600	71.0	0.0

Tank or Pond

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	76.9	0.450	76.9	0.451	0.0

Tank or Pond Manhole: MH20, DS/PN: 8.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	27.9	0.450	27.9	0.451	0.0

Tank or Pond Manhole: MH27, DS/PN: 10.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	47.9	0.450	47.9	0.451	0.0

Tank or Pond Manhole: MH28, DS/PN: 10.001

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3.6	0.450	3.6	0.451	0.0

Tank or Pond Manhole: MH29, DS/PN: 11.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	36.5	0.450	36.5	0.451	0.0

Tank or Pond Manhole: MH30, DS/PN: 10.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	25.2	0.450	25.2	0.451	0.0

Tank or Pond Manhole: MH31, DS/PN: 12.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	49.6	0.450	49.6	0.451	0.0

Tank or Pond Manhole: MH32, DS/PN: 10.003

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.6	0.450	8.6	0.451	0.0

Tank or Pond Manhole: MH33, DS/PN: 13.000

Invert Level (m) 5.950

Tank or Pond Manhole: MH33, DS/PN: 13.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	98.4	0.450	98.4	0.451	0.0

Cellular Storage Manhole: MH37, DS/PN: 1.005

Invert Level (m) 4.852 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	108.0	0.0	0.750	108.0	0.0

Cellular Storage Manhole: MH38, DS/PN: 1.006

Invert Level (m) 4.760 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	0.0	0.900	60.0	0.0

Cellular Storage Manhole: MH39, DS/PN: 1.007

Invert Level (m) 4.698 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	195.0	0.0	0.900	195.0	0.0

Tank or Pond Manhole: MH40, DS/PN: 14.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	106.1	0.450	106.1	0.451	0.0

Tank or Pond Manhole: MH41, DS/PN: 14.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	24.8	0.450	24.8	0.451	0.0

Tank or Pond Manhole: MH42, DS/PN: 15.000

Invert Level (m) 5.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	80.8	0.450	80.8	0.451	0.0

Tank or Pond Manhole: MH43, DS/PN: 15.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	6.1	0.450	6.1	0.451	0.0

Tank or Pond Manhole: MH44, DS/PN: 14.002

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	57.8	0.450	57.8	0.451	0.0

Tank or Pond Manhole: MH45, DS/PN: 16.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	58.1	0.450	58.1	0.451	0.0

Tank or Pond Manhole: MH46, DS/PN: 16.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	28.6	0.450	28.6	0.451	0.0

Cellular Storage Manhole: MH48, DS/PN: 16.003

Invert Level (m) 4.805 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	110.0	0.0	0.600	110.0	0.0

Tank or Pond Manhole: MH49, DS/PN: 16.004

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	83.8	0.450	83.8	0.451	0.0

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	30
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	MH1	2880 Winter	100	+20%	100/15 Summer			
2.000	MH3	2880 Winter	100	+20%	100/15 Summer			
3.000	MH4	2880 Winter	100	+20%	100/15 Summer			
4.000	MH5	2880 Winter	100	+20%	100/15 Summer			
5.000	MH6	2880 Winter	100	+20%	100/15 Summer			
4.001	MH7	2880 Winter	100	+20%	100/15 Summer			
3.001	MH10	2880 Winter	100	+20%	100/15 Summer			
2.001	MH11	2880 Winter	100	+20%	100/15 Summer			
2.002	MH12	2880 Winter	100	+20%	100/15 Summer			
1.001	MH13	2880 Winter	100	+20%	100/15 Summer			
1.002	MH14	2880 Winter	100	+20%	100/15 Summer			
6.000	MH15	2880 Winter	100	+20%	100/15 Summer			
1.003	MH16	2880 Winter	100	+20%	100/15 Summer			
1.004	MH17	5760 Winter	100	+20%	100/15 Summer	100/960 Winter		
7.000	MH18	4320 Winter	100	+20%	100/15 Summer			
7.001	MH19	4320 Winter	100	+20%	100/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	MH1	6.234	0.734	0.000	0.16			2.1	FLOOD RISK	
2.000	MH3	6.241	0.610	0.000	0.10			1.2	FLOOD RISK	
3.000	MH4	6.243	0.438	0.000	0.03			1.0	SURCHARGED	
4.000	MH5	6.244	0.444	0.000	0.14			2.0	FLOOD RISK	
5.000	MH6	6.244	0.444	0.000	0.26			3.4	FLOOD RISK	
4.001	MH7	6.243	0.556	0.000	0.36			4.6	FLOOD RISK	
3.001	MH10	6.242	0.533	0.000	0.15			4.9	FLOOD RISK	
2.001	MH11	6.239	0.630	0.000	0.17			5.0	FLOOD RISK	
2.002	MH12	6.235	0.719	0.000	0.20			5.1	FLOOD RISK	
1.001	MH13	6.233	0.667	0.000	0.11			6.1	FLOOD RISK	
1.002	MH14	6.232	0.714	0.000	0.11			7.2	FLOOD RISK	
6.000	MH15	6.228	0.578	0.000	0.03			3.4	FLOOD RISK	
1.003	MH16	6.228	0.906	0.000	0.15		2664	9.1	FLOOD RISK	
1.004	MH17	6.152	0.846	31.745	0.11			11.2	FLOOD	11
7.000	MH18	6.118	0.323	0.000	0.01			0.3	SURCHARGED	
7.001	MH19	6.118	0.423	0.000	0.02			0.9	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
8.000	MH20	5760 Winter	100	+20%	100/15 Summer			
8.001	MH21	5760 Winter	100	+20%	100/15 Summer			
7.002	MH22	4320 Winter	100	+20%	100/15 Summer			
9.000	MH23	5760 Winter	100	+20%	100/15 Winter			
7.003	MH24	5760 Winter	100	+20%	100/15 Summer			
7.004	MH25	5760 Winter	100	+20%	100/15 Summer			
7.005	MH26	4320 Winter	100	+20%	100/15 Summer			
10.000	MH27	2160 Winter	100	+20%	100/15 Summer			
10.001	MH28	2160 Winter	100	+20%	100/15 Summer			
11.000	MH29	2160 Winter	100	+20%	100/15 Summer			
10.002	MH30	2160 Winter	100	+20%	100/15 Summer			
12.000	MH31	2880 Winter	100	+20%	100/15 Summer			
10.003	MH32	2160 Winter	100	+20%	100/15 Summer			
13.000	MH33	2880 Winter	100	+20%	100/15 Summer			
10.004	MH34	2880 Winter	100	+20%	100/15 Summer			
7.006	MH35	4320 Winter	100	+20%	100/15 Summer			
7.007	MH36	4320 Winter	100	+20%	100/15 Summer			
1.005	MH37	4320 Winter	100	+20%	100/15 Summer	100/960 Winter		
1.006	MH38	4320 Winter	100	+20%	100/15 Summer			
1.007	MH39	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
14.000	MH40	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
14.001	MH41	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
15.000	MH42	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
15.001	MH43	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
14.002	MH44	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
16.000	MH45	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
16.001	MH46	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
16.002	MH47	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
16.003	MH48	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
16.004	MH49	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
14.003	MH50	4320 Winter	100	+20%	100/15 Summer	100/360 Winter		
1.008	MH51	4320 Winter	100	+20%	100/15 Summer	100/60 Winter		
1.009	MH52	4320 Winter	100	+20%	100/15 Summer	100/60 Winter		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
8.000	MH20	6.118	0.368	0.000	0.08			2.7	FLOOD RISK	
8.001	MH21	6.118	0.423	0.000	0.04			2.8	FLOOD RISK	
7.002	MH22	6.118	0.497	0.000	0.06			3.1	SURCHARGED	
9.000	MH23	6.118	0.293	0.000	0.01			0.5	FLOOD RISK	
7.003	MH24	6.118	0.471	0.000	0.04			4.1	SURCHARGED	
7.004	MH25	6.118	0.616	0.000	0.07			5.8	SURCHARGED	
7.005	MH26	6.118	0.660	0.000	0.15			11.1	SURCHARGED	
10.000	MH27	6.151	0.426	0.000	0.04			1.3	FLOOD RISK	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
10.001	MH28	6.149	0.511	0.000	0.03			1.3	FLOOD RISK	
11.000	MH29	6.149	0.499	0.000	0.01			0.5	FLOOD RISK	
10.002	MH30	6.148	0.598	0.000	0.05			1.8	FLOOD RISK	
12.000	MH31	6.147	0.597	0.000	0.08			2.7	FLOOD RISK	
10.003	MH32	6.147	0.683	0.000	0.07			2.3	FLOOD RISK	
13.000	MH33	6.144	0.644	0.000	0.08			3.3	FLOOD RISK	
10.004	MH34	6.148	0.772	0.000	0.21			7.5	FLOOD RISK	
7.006	MH35	6.118	0.687	0.000	0.12			11.4	SURCHARGED	
7.007	MH36	6.118	0.789	0.000	0.12			11.8	FLOOD RISK	
1.005	MH37	6.116	0.864	56.163	0.26		213	29.0	FLOOD	13
1.006	MH38	6.115	0.955	0.000	0.35		219	37.3	FLOOD RISK	
1.007	MH39	6.114	1.016	124.329	0.66		101	73.2	FLOOD	23
14.000	MH40	6.106	0.781	55.195	0.57			22.7	FLOOD	23
14.001	MH41	6.107	0.929	55.607	0.70			26.9	FLOOD	23
15.000	MH42	6.106	0.781	56.039	0.64			24.4	FLOOD	23
15.001	MH43	6.107	0.951	55.566	0.73			25.9	FLOOD	23
14.002	MH44	6.108	1.030	56.574	1.41			56.7	FLOOD	23
16.000	MH45	6.109	0.784	57.579	1.44			44.8	FLOOD	23
16.001	MH46	6.109	0.855	57.579	0.91			56.7	FLOOD	23
16.002	MH47	6.109	0.947	108.580	0.98			56.9	FLOOD	23
16.003	MH48	6.109	1.004	109.081	1.32		126	75.4	FLOOD	23
16.004	MH49	6.110	1.056	58.811	1.28			75.7	FLOOD	23
14.003	MH50	6.111	1.121	110.794	1.86			112.0	FLOOD	23
1.008	MH51	6.113	1.191	143.481	3.84			183.3	FLOOD	33
1.009	MH52	6.113	1.233	33.491	1.65			241.6	FLOOD	33

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	0
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.589	4-8	1.353	8-12	0.186

Total Area Contributing (ha) = 2.129

Total Pipe Volume (m³) = 66.568

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	12.837	0.084	152.8	0.044	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	19.879	0.097	204.9	0.043	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	19.921	0.096	207.5	0.062	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.26	5.350	0.044	0.0	0.0	0.0	0.81	14.3	5.9
2.000	50.00	5.47	5.481	0.043	0.0	0.0	0.0	0.70	12.3	5.9
3.000	50.00	5.37	5.580	0.062	0.0	0.0	0.0	0.90	35.9	8.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	15.200	0.113	134.5	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	18.190	0.113	161.0	0.045	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	7.495	0.053	141.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	20.658	0.100	206.6	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	23.027	0.093	248.0	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	6.251	0.025	247.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	11.939	0.048	248.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	47.125	0.196	240.4	0.119	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.000	22.768	0.328	69.4	0.032	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	24.187	0.091	265.8	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	19.807	0.079	250.7	0.042	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	44.145	0.175	252.3	0.027	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	24.589	0.074	332.3	0.056	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	5.29	5.650	0.026	0.0	0.0	0.0	0.86	15.3	3.5
5.000	50.00	5.38	5.650	0.045	0.0	0.0	0.0	0.79	13.9	6.1
4.001	50.00	5.53	5.537	0.071	0.0	0.0	0.0	0.84	14.9	9.6
3.001	50.00	5.91	5.484	0.201	0.0	0.0	0.0	0.91	36.0	27.2
2.001	50.00	6.38	5.384	0.305	0.0	0.0	0.0	0.83	32.8«	41.3
2.002	50.00	6.50	5.291	0.318	0.0	0.0	0.0	0.83	32.9«	43.1
1.001	50.00	6.70	5.266	0.362	0.0	0.0	0.0	0.99	70.1	49.0
1.002	50.00	7.48	5.218	0.480	0.0	0.0	0.0	1.01	71.4	65.1
6.000	50.00	5.20	5.350	0.032	0.0	0.0	0.0	1.89	133.6	4.4
1.003	50.00	7.90	5.022	0.542	0.0	0.0	0.0	0.96	67.8«	73.4
1.004	50.00	8.19	4.931	0.585	0.0	0.0	0.0	1.14	125.9	79.2
7.000	50.00	5.90	5.570	0.027	0.0	0.0	0.0	0.82	32.5	3.7
7.001	50.00	6.38	5.395	0.083	0.0	0.0	0.0	0.86	60.6	11.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
8.000	21.784	0.130	167.6	0.061	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	11.983	0.074	161.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.002	15.941	0.049	325.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	29.833	0.253	117.9	0.060	5.00	0.0	0.600	o	300	Pipe/Conduit	
7.003	49.097	0.146	336.3	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.004	14.621	0.044	332.3	0.031	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.005	9.426	0.028	336.6	0.025	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.000	16.281	0.087	187.1	0.096	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	8.239	0.089	92.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.000	15.000	0.100	150.0	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	14.341	0.086	166.8	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.000	15.000	0.086	174.4	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	15.000	0.088	170.5	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.000	50.00	5.36	5.525	0.061	0.0	0.0	0.0	1.01	40.0	8.2
8.001	50.00	5.52	5.395	0.061	0.0	0.0	0.0	1.23	87.1	8.2
7.002	50.00	6.68	5.321	0.143	0.0	0.0	0.0	0.87	61.2	19.4
9.000	50.00	5.34	5.525	0.060	0.0	0.0	0.0	1.45	102.3	8.2
7.003	50.00	7.52	5.272	0.255	0.0	0.0	0.0	0.98	108.5	34.6
7.004	50.00	7.76	5.127	0.287	0.0	0.0	0.0	0.99	109.2	38.8
7.005	50.00	7.92	5.083	0.312	0.0	0.0	0.0	0.98	108.4	42.2
10.000	50.00	5.28	5.500	0.096	0.0	0.0	0.0	0.95	37.9	13.1
10.001	50.00	5.39	5.413	0.096	0.0	0.0	0.0	1.36	54.0	13.1
11.000	50.00	5.23	5.425	0.035	0.0	0.0	0.0	1.07	42.4	4.8
10.002	50.00	5.62	5.325	0.141	0.0	0.0	0.0	1.01	40.1	19.0
12.000	50.00	5.25	5.325	0.031	0.0	0.0	0.0	0.99	39.2	4.2
10.003	50.00	5.87	5.239	0.180	0.0	0.0	0.0	1.00	39.7	24.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	15.000	0.124	121.0	0.051	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.004	15.979	0.095	168.2	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.006	34.244	0.102	335.7	0.064	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.007	34.147	0.102	334.8	0.037	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	30.844	0.092	335.3	0.027	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.006	20.928	0.062	337.5	0.044	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.007	25.403	0.076	334.3	0.042	0.00	0.0	0.600	o	400	Pipe/Conduit	
14.000	20.720	0.147	141.0	0.113	5.00	0.0	0.600	o	225	Pipe/Conduit	
14.001	14.016	0.100	140.2	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.000	26.960	0.169	159.5	0.080	5.00	0.0	0.600	o	225	Pipe/Conduit	
15.001	12.288	0.078	157.5	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
14.002	23.238	0.165	140.8	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.000	36.167	0.146	247.7	0.197	5.00	0.0	0.600	o	225	Pipe/Conduit	
16.001	22.866	0.092	248.5	0.139	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	5.21	5.275	0.051	0.0	0.0	0.0	1.19	47.2	6.9
10.004	50.00	6.14	5.151	0.251	0.0	0.0	0.0	1.01	40.0	33.9
7.006	50.00	8.50	5.056	0.626	0.0	0.0	0.0	0.98	108.6	84.8
7.007	50.00	9.08	4.954	0.663	0.0	0.0	0.0	0.98	108.8	89.8
1.005	50.00	9.58	4.852	1.275	0.0	0.0	0.0	1.03	128.8«	172.6
1.006	50.00	9.92	4.760	1.318	0.0	0.0	0.0	1.02	128.4«	178.5
1.007	50.00	10.34	4.698	1.360	0.0	0.0	0.0	1.03	129.0«	184.2
14.000	50.00	5.31	5.100	0.113	0.0	0.0	0.0	1.10	43.7	15.3
14.001	50.00	5.53	4.953	0.135	0.0	0.0	0.0	1.10	43.8	18.3
15.000	50.00	5.44	5.100	0.080	0.0	0.0	0.0	1.03	41.1	10.9
15.001	50.00	5.63	4.931	0.117	0.0	0.0	0.0	1.04	41.3	15.8
14.002	50.00	5.98	4.853	0.304	0.0	0.0	0.0	1.10	43.7	41.2
16.000	50.00	5.73	5.100	0.197	0.0	0.0	0.0	0.83	32.9	26.7
16.001	50.00	6.11	4.954	0.336	0.0	0.0	0.0	0.99	70.2	45.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
16.002	14.217	0.057	249.4	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.003	12.746	0.051	249.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.004	15.976	0.064	249.6	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.003	16.562	0.068	243.6	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	13.966	0.042	332.5	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	33.345	0.690	48.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
16.002	50.00	6.35	4.862	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.003	50.00	6.57	4.805	0.364	0.0	0.0	0.0	0.99	70.0	49.3
16.004	50.00	6.84	4.754	0.409	0.0	0.0	0.0	0.99	70.0	55.4
14.003	50.00	7.11	4.690	0.738	0.0	0.0	0.0	1.00	70.9«	100.0
1.008	50.00	10.61	4.622	2.129	0.0	0.0	0.0	0.86	60.6«	288.3
1.009	50.00	10.85	4.580	2.129	0.0	0.0	0.0	2.27	160.3«	288.3

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.037	0.036	0.044
2.000	User	-	100	0.015	0.015	0.015
	User	-	95	0.014	0.013	0.029
	User	-	100	0.015	0.015	0.043
3.000	User	-	100	0.019	0.019	0.019
	User	-	100	0.021	0.021	0.040
	User	-	100	0.014	0.014	0.054
	User	-	95	0.008	0.008	0.062
4.000	User	-	95	0.027	0.026	0.026
5.000	User	-	100	0.008	0.008	0.008
	User	-	95	0.029	0.028	0.036
	User	-	95	0.009	0.009	0.045
4.001	-	-	100	0.000	0.000	0.000
3.001	User	-	100	0.017	0.017	0.017
	User	-	100	0.039	0.039	0.057
	User	-	100	0.011	0.011	0.068
2.001	User	-	100	0.011	0.011	0.011
	User	-	100	0.049	0.049	0.061
2.002	User	-	100	0.008	0.008	0.008
	User	-	95	0.005	0.004	0.013
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	100	0.007	0.007	0.007
	User	-	100	0.035	0.035	0.042
	User	-	100	0.016	0.016	0.058
	User	-	100	0.005	0.005	0.063
	User	-	95	0.059	0.056	0.119
6.000	User	-	100	0.012	0.012	0.012
	User	-	100	0.021	0.021	0.032
1.003	User	-	95	0.009	0.009	0.009
	User	-	95	0.022	0.021	0.030
1.004	User	-	100	0.015	0.015	0.015
	User	-	100	0.010	0.010	0.025
	User	-	100	0.013	0.013	0.038
	User	-	30	0.016	0.005	0.042
7.000	User	-	100	0.027	0.027	0.027
7.001	User	-	100	0.056	0.056	0.056
8.000	User	-	100	0.051	0.051	0.051
	User	-	95	0.010	0.010	0.061
8.001	-	-	100	0.000	0.000	0.000
7.002	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.032	0.032	0.032
	User	-	100	0.028	0.028	0.060
7.003	User	-	100	0.052	0.052	0.052
7.004	User	-	100	0.025	0.025	0.025
	User	-	100	0.006	0.006	0.031
7.005	User	-	100	0.025	0.025	0.025
10.000	User	-	100	0.061	0.061	0.061
	User	-	100	0.015	0.015	0.076
	User	-	95	0.021	0.020	0.096

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
10.001	-	-	100	0.000	0.000	0.000
11.000	User	-	100	0.016	0.016	0.016
	User	-	100	0.005	0.005	0.021
	User	-	95	0.015	0.014	0.035
10.002	User	-	95	0.009	0.009	0.009
12.000	User	-	100	0.011	0.011	0.011
	User	-	95	0.021	0.020	0.031
10.003	User	-	95	0.009	0.009	0.009
13.000	User	-	100	0.009	0.009	0.009
	User	-	95	0.017	0.016	0.025
	User	-	95	0.028	0.026	0.051
10.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.004	0.004	0.008
	User	-	100	0.011	0.011	0.019
7.006	User	-	100	0.064	0.064	0.064
7.007	User	-	100	0.027	0.027	0.027
	User	-	100	0.010	0.010	0.037
1.005	User	-	100	0.017	0.017	0.017
	User	-	100	0.002	0.002	0.019
	User	-	30	0.026	0.008	0.027
1.006	User	-	100	0.014	0.014	0.014
	User	-	100	0.009	0.009	0.023
	User	-	100	0.018	0.018	0.041
	User	-	30	0.011	0.003	0.044
1.007	User	-	100	0.023	0.023	0.023
	User	-	30	0.063	0.019	0.042
14.000	User	-	100	0.045	0.045	0.045
	User	-	100	0.021	0.021	0.066
	User	-	95	0.049	0.047	0.113
14.001	User	-	100	0.013	0.013	0.013
	User	-	100	0.009	0.009	0.022
15.000	User	-	100	0.017	0.017	0.017
	User	-	95	0.035	0.033	0.050
	User	-	100	0.030	0.030	0.080
15.001	User	-	100	0.036	0.036	0.036
14.002	User	-	100	0.031	0.031	0.031
	User	-	95	0.022	0.021	0.053
16.000	User	-	100	0.053	0.053	0.053
	User	-	95	0.022	0.021	0.074
	User	-	100	0.002	0.002	0.076
	User	-	100	0.121	0.121	0.197
16.001	User	-	100	0.040	0.040	0.040
	User	-	95	0.009	0.009	0.049
	User	-	100	0.002	0.002	0.051
	User	-	100	0.088	0.088	0.139
16.002	User	-	100	0.003	0.003	0.003
	User	-	100	0.026	0.026	0.028
16.003	-	-	100	0.000	0.000	0.000
16.004	User	-	95	0.009	0.008	0.008
	User	-	100	0.010	0.010	0.018

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	95	0.028	0.027	0.045
14.003	User	-	100	0.025	0.025	0.025
1.008	User	-	100	0.030	0.030	0.030
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.236	2.129	2.129

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	Outfall 9 & 8	4.210	3.890	3.890	300	0

Datum (m) 3.890 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	2.960	29	2.960	57	2.960	85	2.960	113	2.960	141	2.960	169	2.960
2	2.960	30	2.960	58	2.960	86	2.960	114	2.960	142	2.960	170	2.960
3	2.960	31	2.960	59	2.960	87	2.960	115	2.960	143	2.960	171	2.960
4	2.960	32	2.960	60	2.960	88	2.960	116	2.960	144	2.960	172	2.960
5	2.960	33	2.960	61	2.960	89	2.960	117	2.960	145	2.960	173	2.960
6	2.960	34	2.960	62	2.960	90	2.960	118	2.960	146	2.960	174	2.960
7	2.960	35	2.960	63	2.960	91	2.960	119	2.960	147	2.960	175	2.960
8	2.960	36	2.960	64	2.960	92	2.960	120	2.960	148	2.960	176	2.960
9	2.960	37	2.960	65	2.960	93	2.960	121	2.960	149	2.960	177	2.960
10	2.960	38	2.960	66	2.960	94	2.960	122	2.960	150	2.960	178	2.960
11	2.960	39	2.960	67	2.960	95	2.960	123	2.960	151	2.960	179	2.960
12	2.960	40	2.960	68	2.960	96	2.960	124	2.960	152	2.960	180	2.960
13	2.960	41	2.960	69	2.960	97	2.960	125	2.960	153	2.960	181	2.960
14	2.960	42	2.960	70	2.960	98	2.960	126	2.960	154	2.960	182	2.960
15	2.960	43	2.960	71	2.960	99	2.960	127	2.960	155	2.960	183	2.960
16	2.960	44	2.960	72	2.960	100	2.960	128	2.960	156	2.960	184	2.960
17	2.960	45	2.960	73	2.960	101	2.960	129	2.960	157	2.960	185	2.960
18	2.960	46	2.960	74	2.960	102	2.960	130	2.960	158	2.960	186	2.960
19	2.960	47	2.960	75	2.960	103	2.960	131	2.960	159	2.960	187	2.960
20	2.960	48	2.960	76	2.960	104	2.960	132	2.960	160	2.960	188	2.960
21	2.960	49	2.960	77	2.960	105	2.960	133	2.960	161	2.960	189	2.960
22	2.960	50	2.960	78	2.960	106	2.960	134	2.960	162	2.960	190	2.960
23	2.960	51	2.960	79	2.960	107	2.960	135	2.960	163	2.960	191	2.960
24	2.960	52	2.960	80	2.960	108	2.960	136	2.960	164	2.960	192	2.960
25	2.960	53	2.960	81	2.960	109	2.960	137	2.960	165	2.960	193	2.960
26	2.960	54	2.960	82	2.960	110	2.960	138	2.960	166	2.960	194	2.960
27	2.960	55	2.960	83	2.960	111	2.960	139	2.960	167	2.960	195	2.960
28	2.960	56	2.960	84	2.960	112	2.960	140	2.960	168	2.960	196	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
197	2.960	246	2.960	295	2.960	344	2.960	393	2.960	442	2.960	491	2.960
198	2.960	247	2.960	296	2.960	345	2.960	394	2.960	443	2.960	492	2.960
199	2.960	248	2.960	297	2.960	346	2.960	395	2.960	444	2.960	493	2.960
200	2.960	249	2.960	298	2.960	347	2.960	396	2.960	445	2.960	494	2.960
201	2.960	250	2.960	299	2.960	348	2.960	397	2.960	446	2.960	495	2.960
202	2.960	251	2.960	300	2.960	349	2.960	398	2.960	447	2.960	496	2.960
203	2.960	252	2.960	301	2.960	350	2.960	399	2.960	448	2.960	497	2.960
204	2.960	253	2.960	302	2.960	351	2.960	400	2.960	449	2.960	498	2.960
205	2.960	254	2.960	303	2.960	352	2.960	401	2.960	450	2.960	499	2.960
206	2.960	255	2.960	304	2.960	353	2.960	402	2.960	451	2.960	500	2.960
207	2.960	256	2.960	305	2.960	354	2.960	403	2.960	452	2.960	501	2.960
208	2.960	257	2.960	306	2.960	355	2.960	404	2.960	453	2.960	502	2.960
209	2.960	258	2.960	307	2.960	356	2.960	405	2.960	454	2.960	503	2.960
210	2.960	259	2.960	308	2.960	357	2.960	406	2.960	455	2.960	504	2.960
211	2.960	260	2.960	309	2.960	358	2.960	407	2.960	456	2.960	505	2.960
212	2.960	261	2.960	310	2.960	359	2.960	408	2.960	457	2.960	506	2.960
213	2.960	262	2.960	311	2.960	360	2.960	409	2.960	458	2.960	507	2.960
214	2.960	263	2.960	312	2.960	361	2.960	410	2.960	459	2.960	508	2.960
215	2.960	264	2.960	313	2.960	362	2.960	411	2.960	460	2.960	509	2.960
216	2.960	265	2.960	314	2.960	363	2.960	412	2.960	461	2.960	510	2.960
217	2.960	266	2.960	315	2.960	364	2.960	413	2.960	462	2.960	511	2.960
218	2.960	267	2.960	316	2.960	365	2.960	414	2.960	463	2.960	512	2.960
219	2.960	268	2.960	317	2.960	366	2.960	415	2.960	464	2.960	513	2.960
220	2.960	269	2.960	318	2.960	367	2.960	416	2.960	465	2.960	514	2.960
221	2.960	270	2.960	319	2.960	368	2.960	417	2.960	466	2.960	515	2.960
222	2.960	271	2.960	320	2.960	369	2.960	418	2.960	467	2.960	516	2.960
223	2.960	272	2.960	321	2.960	370	2.960	419	2.960	468	2.960	517	2.960
224	2.960	273	2.960	322	2.960	371	2.960	420	2.960	469	2.960	518	2.960
225	2.960	274	2.960	323	2.960	372	2.960	421	2.960	470	2.960	519	2.960
226	2.960	275	2.960	324	2.960	373	2.960	422	2.960	471	2.960	520	2.960
227	2.960	276	2.960	325	2.960	374	2.960	423	2.960	472	2.960	521	2.960
228	2.960	277	2.960	326	2.960	375	2.960	424	2.960	473	2.960	522	2.960
229	2.960	278	2.960	327	2.960	376	2.960	425	2.960	474	2.960	523	2.960
230	2.960	279	2.960	328	2.960	377	2.960	426	2.960	475	2.960	524	2.960
231	2.960	280	2.960	329	2.960	378	2.960	427	2.960	476	2.960	525	2.960
232	2.960	281	2.960	330	2.960	379	2.960	428	2.960	477	2.960	526	2.960
233	2.960	282	2.960	331	2.960	380	2.960	429	2.960	478	2.960	527	2.960
234	2.960	283	2.960	332	2.960	381	2.960	430	2.960	479	2.960	528	2.960
235	2.960	284	2.960	333	2.960	382	2.960	431	2.960	480	2.960	529	2.960
236	2.960	285	2.960	334	2.960	383	2.960	432	2.960	481	2.960	530	2.960
237	2.960	286	2.960	335	2.960	384	2.960	433	2.960	482	2.960	531	2.960
238	2.960	287	2.960	336	2.960	385	2.960	434	2.960	483	2.960	532	2.960
239	2.960	288	2.960	337	2.960	386	2.960	435	2.960	484	2.960	533	2.960
240	2.960	289	2.960	338	2.960	387	2.960	436	2.960	485	2.960	534	2.960
241	2.960	290	2.960	339	2.960	388	2.960	437	2.960	486	2.960	535	2.960
242	2.960	291	2.960	340	2.960	389	2.960	438	2.960	487	2.960	536	2.960
243	2.960	292	2.960	341	2.960	390	2.960	439	2.960	488	2.960	537	2.960
244	2.960	293	2.960	342	2.960	391	2.960	440	2.960	489	2.960	538	2.960
245	2.960	294	2.960	343	2.960	392	2.960	441	2.960	490	2.960	539	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
540	2.960	589	2.960	638	2.960	687	2.960	736	2.960	785	2.960	834	2.960
541	2.960	590	2.960	639	2.960	688	2.960	737	2.960	786	2.960	835	2.960
542	2.960	591	2.960	640	2.960	689	2.960	738	2.960	787	2.960	836	2.960
543	2.960	592	2.960	641	2.960	690	2.960	739	2.960	788	2.960	837	2.960
544	2.960	593	2.960	642	2.960	691	2.960	740	2.960	789	2.960	838	2.960
545	2.960	594	2.960	643	2.960	692	2.960	741	2.960	790	2.960	839	2.960
546	2.960	595	2.960	644	2.960	693	2.960	742	2.960	791	2.960	840	2.960
547	2.960	596	2.960	645	2.960	694	2.960	743	2.960	792	2.960	841	2.960
548	2.960	597	2.960	646	2.960	695	2.960	744	2.960	793	2.960	842	2.960
549	2.960	598	2.960	647	2.960	696	2.960	745	2.960	794	2.960	843	2.960
550	2.960	599	2.960	648	2.960	697	2.960	746	2.960	795	2.960	844	2.960
551	2.960	600	2.960	649	2.960	698	2.960	747	2.960	796	2.960	845	2.960
552	2.960	601	2.960	650	2.960	699	2.960	748	2.960	797	2.960	846	2.960
553	2.960	602	2.960	651	2.960	700	2.960	749	2.960	798	2.960	847	2.960
554	2.960	603	2.960	652	2.960	701	2.960	750	2.960	799	2.960	848	2.960
555	2.960	604	2.960	653	2.960	702	2.960	751	2.960	800	2.960	849	2.960
556	2.960	605	2.960	654	2.960	703	2.960	752	2.960	801	2.960	850	2.960
557	2.960	606	2.960	655	2.960	704	2.960	753	2.960	802	2.960	851	2.960
558	2.960	607	2.960	656	2.960	705	2.960	754	2.960	803	2.960	852	2.960
559	2.960	608	2.960	657	2.960	706	2.960	755	2.960	804	2.960	853	2.960
560	2.960	609	2.960	658	2.960	707	2.960	756	2.960	805	2.960	854	2.960
561	2.960	610	2.960	659	2.960	708	2.960	757	2.960	806	2.960	855	2.960
562	2.960	611	2.960	660	2.960	709	2.960	758	2.960	807	2.960	856	2.960
563	2.960	612	2.960	661	2.960	710	2.960	759	2.960	808	2.960	857	2.960
564	2.960	613	2.960	662	2.960	711	2.960	760	2.960	809	2.960	858	2.960
565	2.960	614	2.960	663	2.960	712	2.960	761	2.960	810	2.960	859	2.960
566	2.960	615	2.960	664	2.960	713	2.960	762	2.960	811	2.960	860	2.960
567	2.960	616	2.960	665	2.960	714	2.960	763	2.960	812	2.960	861	2.960
568	2.960	617	2.960	666	2.960	715	2.960	764	2.960	813	2.960	862	2.960
569	2.960	618	2.960	667	2.960	716	2.960	765	2.960	814	2.960	863	2.960
570	2.960	619	2.960	668	2.960	717	2.960	766	2.960	815	2.960	864	2.960
571	2.960	620	2.960	669	2.960	718	2.960	767	2.960	816	2.960	865	2.960
572	2.960	621	2.960	670	2.960	719	2.960	768	2.960	817	2.960	866	2.960
573	2.960	622	2.960	671	2.960	720	2.960	769	2.960	818	2.960	867	2.960
574	2.960	623	2.960	672	2.960	721	2.960	770	2.960	819	2.960	868	2.960
575	2.960	624	2.960	673	2.960	722	2.960	771	2.960	820	2.960	869	2.960
576	2.960	625	2.960	674	2.960	723	2.960	772	2.960	821	2.960	870	2.960
577	2.960	626	2.960	675	2.960	724	2.960	773	2.960	822	2.960	871	2.960
578	2.960	627	2.960	676	2.960	725	2.960	774	2.960	823	2.960	872	2.960
579	2.960	628	2.960	677	2.960	726	2.960	775	2.960	824	2.960	873	2.960
580	2.960	629	2.960	678	2.960	727	2.960	776	2.960	825	2.960	874	2.960
581	2.960	630	2.960	679	2.960	728	2.960	777	2.960	826	2.960	875	2.960
582	2.960	631	2.960	680	2.960	729	2.960	778	2.960	827	2.960	876	2.960
583	2.960	632	2.960	681	2.960	730	2.960	779	2.960	828	2.960	877	2.960
584	2.960	633	2.960	682	2.960	731	2.960	780	2.960	829	2.960	878	2.960
585	2.960	634	2.960	683	2.960	732	2.960	781	2.960	830	2.960	879	2.960
586	2.960	635	2.960	684	2.960	733	2.960	782	2.960	831	2.960	880	2.960
587	2.960	636	2.960	685	2.960	734	2.960	783	2.960	832	2.960	881	2.960
588	2.960	637	2.960	686	2.960	735	2.960	784	2.960	833	2.960	882	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
883	2.960	932	2.960	981	2.960	1030	2.960	1079	2.960	1128	2.960	1177	2.960
884	2.960	933	2.960	982	2.960	1031	2.960	1080	2.960	1129	2.960	1178	2.960
885	2.960	934	2.960	983	2.960	1032	2.960	1081	2.960	1130	2.960	1179	2.960
886	2.960	935	2.960	984	2.960	1033	2.960	1082	2.960	1131	2.960	1180	2.960
887	2.960	936	2.960	985	2.960	1034	2.960	1083	2.960	1132	2.960	1181	2.960
888	2.960	937	2.960	986	2.960	1035	2.960	1084	2.960	1133	2.960	1182	2.960
889	2.960	938	2.960	987	2.960	1036	2.960	1085	2.960	1134	2.960	1183	2.960
890	2.960	939	2.960	988	2.960	1037	2.960	1086	2.960	1135	2.960	1184	2.960
891	2.960	940	2.960	989	2.960	1038	2.960	1087	2.960	1136	2.960	1185	2.960
892	2.960	941	2.960	990	2.960	1039	2.960	1088	2.960	1137	2.960	1186	2.960
893	2.960	942	2.960	991	2.960	1040	2.960	1089	2.960	1138	2.960	1187	2.960
894	2.960	943	2.960	992	2.960	1041	2.960	1090	2.960	1139	2.960	1188	2.960
895	2.960	944	2.960	993	2.960	1042	2.960	1091	2.960	1140	2.960	1189	2.960
896	2.960	945	2.960	994	2.960	1043	2.960	1092	2.960	1141	2.960	1190	2.960
897	2.960	946	2.960	995	2.960	1044	2.960	1093	2.960	1142	2.960	1191	2.960
898	2.960	947	2.960	996	2.960	1045	2.960	1094	2.960	1143	2.960	1192	2.960
899	2.960	948	2.960	997	2.960	1046	2.960	1095	2.960	1144	2.960	1193	2.960
900	2.960	949	2.960	998	2.960	1047	2.960	1096	2.960	1145	2.960	1194	2.960
901	2.960	950	2.960	999	2.960	1048	2.960	1097	2.960	1146	2.960	1195	2.960
902	2.960	951	2.960	1000	2.960	1049	2.960	1098	2.960	1147	2.960	1196	2.960
903	2.960	952	2.960	1001	2.960	1050	2.960	1099	2.960	1148	2.960	1197	2.960
904	2.960	953	2.960	1002	2.960	1051	2.960	1100	2.960	1149	2.960	1198	2.960
905	2.960	954	2.960	1003	2.960	1052	2.960	1101	2.960	1150	2.960	1199	2.960
906	2.960	955	2.960	1004	2.960	1053	2.960	1102	2.960	1151	2.960	1200	2.960
907	2.960	956	2.960	1005	2.960	1054	2.960	1103	2.960	1152	2.960	1201	2.960
908	2.960	957	2.960	1006	2.960	1055	2.960	1104	2.960	1153	2.960	1202	2.960
909	2.960	958	2.960	1007	2.960	1056	2.960	1105	2.960	1154	2.960	1203	2.960
910	2.960	959	2.960	1008	2.960	1057	2.960	1106	2.960	1155	2.960	1204	2.960
911	2.960	960	2.960	1009	2.960	1058	2.960	1107	2.960	1156	2.960	1205	2.960
912	2.960	961	2.960	1010	2.960	1059	2.960	1108	2.960	1157	2.960	1206	2.960
913	2.960	962	2.960	1011	2.960	1060	2.960	1109	2.960	1158	2.960	1207	2.960
914	2.960	963	2.960	1012	2.960	1061	2.960	1110	2.960	1159	2.960	1208	2.960
915	2.960	964	2.960	1013	2.960	1062	2.960	1111	2.960	1160	2.960	1209	2.960
916	2.960	965	2.960	1014	2.960	1063	2.960	1112	2.960	1161	2.960	1210	2.960
917	2.960	966	2.960	1015	2.960	1064	2.960	1113	2.960	1162	2.960	1211	2.960
918	2.960	967	2.960	1016	2.960	1065	2.960	1114	2.960	1163	2.960	1212	2.960
919	2.960	968	2.960	1017	2.960	1066	2.960	1115	2.960	1164	2.960	1213	2.960
920	2.960	969	2.960	1018	2.960	1067	2.960	1116	2.960	1165	2.960	1214	2.960
921	2.960	970	2.960	1019	2.960	1068	2.960	1117	2.960	1166	2.960	1215	2.960
922	2.960	971	2.960	1020	2.960	1069	2.960	1118	2.960	1167	2.960	1216	2.960
923	2.960	972	2.960	1021	2.960	1070	2.960	1119	2.960	1168	2.960	1217	2.960
924	2.960	973	2.960	1022	2.960	1071	2.960	1120	2.960	1169	2.960	1218	2.960
925	2.960	974	2.960	1023	2.960	1072	2.960	1121	2.960	1170	2.960	1219	2.960
926	2.960	975	2.960	1024	2.960	1073	2.960	1122	2.960	1171	2.960	1220	2.960
927	2.960	976	2.960	1025	2.960	1074	2.960	1123	2.960	1172	2.960	1221	2.960
928	2.960	977	2.960	1026	2.960	1075	2.960	1124	2.960	1173	2.960	1222	2.960
929	2.960	978	2.960	1027	2.960	1076	2.960	1125	2.960	1174	2.960	1223	2.960
930	2.960	979	2.960	1028	2.960	1077	2.960	1126	2.960	1175	2.960	1224	2.960
931	2.960	980	2.960	1029	2.960	1078	2.960	1127	2.960	1176	2.960	1225	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1226	2.960	1275	2.960	1324	2.960	1373	2.960	1422	2.960	1471	2.960	1520	2.960
1227	2.960	1276	2.960	1325	2.960	1374	2.960	1423	2.960	1472	2.960	1521	2.960
1228	2.960	1277	2.960	1326	2.960	1375	2.960	1424	2.960	1473	2.960	1522	2.960
1229	2.960	1278	2.960	1327	2.960	1376	2.960	1425	2.960	1474	2.960	1523	2.960
1230	2.960	1279	2.960	1328	2.960	1377	2.960	1426	2.960	1475	2.960	1524	2.960
1231	2.960	1280	2.960	1329	2.960	1378	2.960	1427	2.960	1476	2.960	1525	2.960
1232	2.960	1281	2.960	1330	2.960	1379	2.960	1428	2.960	1477	2.960	1526	2.960
1233	2.960	1282	2.960	1331	2.960	1380	2.960	1429	2.960	1478	2.960	1527	2.960
1234	2.960	1283	2.960	1332	2.960	1381	2.960	1430	2.960	1479	2.960	1528	2.960
1235	2.960	1284	2.960	1333	2.960	1382	2.960	1431	2.960	1480	2.960	1529	2.960
1236	2.960	1285	2.960	1334	2.960	1383	2.960	1432	2.960	1481	2.960	1530	2.960
1237	2.960	1286	2.960	1335	2.960	1384	2.960	1433	2.960	1482	2.960	1531	2.960
1238	2.960	1287	2.960	1336	2.960	1385	2.960	1434	2.960	1483	2.960	1532	2.960
1239	2.960	1288	2.960	1337	2.960	1386	2.960	1435	2.960	1484	2.960	1533	2.960
1240	2.960	1289	2.960	1338	2.960	1387	2.960	1436	2.960	1485	2.960	1534	2.960
1241	2.960	1290	2.960	1339	2.960	1388	2.960	1437	2.960	1486	2.960	1535	2.960
1242	2.960	1291	2.960	1340	2.960	1389	2.960	1438	2.960	1487	2.960	1536	2.960
1243	2.960	1292	2.960	1341	2.960	1390	2.960	1439	2.960	1488	2.960	1537	2.960
1244	2.960	1293	2.960	1342	2.960	1391	2.960	1440	2.960	1489	2.960	1538	2.960
1245	2.960	1294	2.960	1343	2.960	1392	2.960	1441	2.960	1490	2.960	1539	2.960
1246	2.960	1295	2.960	1344	2.960	1393	2.960	1442	2.960	1491	2.960	1540	2.960
1247	2.960	1296	2.960	1345	2.960	1394	2.960	1443	2.960	1492	2.960	1541	2.960
1248	2.960	1297	2.960	1346	2.960	1395	2.960	1444	2.960	1493	2.960	1542	2.960
1249	2.960	1298	2.960	1347	2.960	1396	2.960	1445	2.960	1494	2.960	1543	2.960
1250	2.960	1299	2.960	1348	2.960	1397	2.960	1446	2.960	1495	2.960	1544	2.960
1251	2.960	1300	2.960	1349	2.960	1398	2.960	1447	2.960	1496	2.960	1545	2.960
1252	2.960	1301	2.960	1350	2.960	1399	2.960	1448	2.960	1497	2.960	1546	2.960
1253	2.960	1302	2.960	1351	2.960	1400	2.960	1449	2.960	1498	2.960	1547	2.960
1254	2.960	1303	2.960	1352	2.960	1401	2.960	1450	2.960	1499	2.960	1548	2.960
1255	2.960	1304	2.960	1353	2.960	1402	2.960	1451	2.960	1500	2.960	1549	2.960
1256	2.960	1305	2.960	1354	2.960	1403	2.960	1452	2.960	1501	2.960	1550	2.960
1257	2.960	1306	2.960	1355	2.960	1404	2.960	1453	2.960	1502	2.960	1551	2.960
1258	2.960	1307	2.960	1356	2.960	1405	2.960	1454	2.960	1503	2.960	1552	2.960
1259	2.960	1308	2.960	1357	2.960	1406	2.960	1455	2.960	1504	2.960	1553	2.960
1260	2.960	1309	2.960	1358	2.960	1407	2.960	1456	2.960	1505	2.960	1554	2.960
1261	2.960	1310	2.960	1359	2.960	1408	2.960	1457	2.960	1506	2.960	1555	2.960
1262	2.960	1311	2.960	1360	2.960	1409	2.960	1458	2.960	1507	2.960	1556	2.960
1263	2.960	1312	2.960	1361	2.960	1410	2.960	1459	2.960	1508	2.960	1557	2.960
1264	2.960	1313	2.960	1362	2.960	1411	2.960	1460	2.960	1509	2.960	1558	2.960
1265	2.960	1314	2.960	1363	2.960	1412	2.960	1461	2.960	1510	2.960	1559	2.960
1266	2.960	1315	2.960	1364	2.960	1413	2.960	1462	2.960	1511	2.960	1560	2.960
1267	2.960	1316	2.960	1365	2.960	1414	2.960	1463	2.960	1512	2.960	1561	2.960
1268	2.960	1317	2.960	1366	2.960	1415	2.960	1464	2.960	1513	2.960	1562	2.960
1269	2.960	1318	2.960	1367	2.960	1416	2.960	1465	2.960	1514	2.960	1563	2.960
1270	2.960	1319	2.960	1368	2.960	1417	2.960	1466	2.960	1515	2.960	1564	2.960
1271	2.960	1320	2.960	1369	2.960	1418	2.960	1467	2.960	1516	2.960	1565	2.960
1272	2.960	1321	2.960	1370	2.960	1419	2.960	1468	2.960	1517	2.960	1566	2.960
1273	2.960	1322	2.960	1371	2.960	1420	2.960	1469	2.960	1518	2.960	1567	2.960
1274	2.960	1323	2.960	1372	2.960	1421	2.960	1470	2.960	1519	2.960	1568	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1569	2.960	1618	2.960	1667	2.960	1716	2.960	1765	2.960	1814	2.960	1863	2.960
1570	2.960	1619	2.960	1668	2.960	1717	2.960	1766	2.960	1815	2.960	1864	2.960
1571	2.960	1620	2.960	1669	2.960	1718	2.960	1767	2.960	1816	2.960	1865	2.960
1572	2.960	1621	2.960	1670	2.960	1719	2.960	1768	2.960	1817	2.960	1866	2.960
1573	2.960	1622	2.960	1671	2.960	1720	2.960	1769	2.960	1818	2.960	1867	2.960
1574	2.960	1623	2.960	1672	2.960	1721	2.960	1770	2.960	1819	2.960	1868	2.960
1575	2.960	1624	2.960	1673	2.960	1722	2.960	1771	2.960	1820	2.960	1869	2.960
1576	2.960	1625	2.960	1674	2.960	1723	2.960	1772	2.960	1821	2.960	1870	2.960
1577	2.960	1626	2.960	1675	2.960	1724	2.960	1773	2.960	1822	2.960	1871	2.960
1578	2.960	1627	2.960	1676	2.960	1725	2.960	1774	2.960	1823	2.960	1872	2.960
1579	2.960	1628	2.960	1677	2.960	1726	2.960	1775	2.960	1824	2.960	1873	2.960
1580	2.960	1629	2.960	1678	2.960	1727	2.960	1776	2.960	1825	2.960	1874	2.960
1581	2.960	1630	2.960	1679	2.960	1728	2.960	1777	2.960	1826	2.960	1875	2.960
1582	2.960	1631	2.960	1680	2.960	1729	2.960	1778	2.960	1827	2.960	1876	2.960
1583	2.960	1632	2.960	1681	2.960	1730	2.960	1779	2.960	1828	2.960	1877	2.960
1584	2.960	1633	2.960	1682	2.960	1731	2.960	1780	2.960	1829	2.960	1878	2.960
1585	2.960	1634	2.960	1683	2.960	1732	2.960	1781	2.960	1830	2.960	1879	2.960
1586	2.960	1635	2.960	1684	2.960	1733	2.960	1782	2.960	1831	2.960	1880	2.960
1587	2.960	1636	2.960	1685	2.960	1734	2.960	1783	2.960	1832	2.960	1881	2.960
1588	2.960	1637	2.960	1686	2.960	1735	2.960	1784	2.960	1833	2.960	1882	2.960
1589	2.960	1638	2.960	1687	2.960	1736	2.960	1785	2.960	1834	2.960	1883	2.960
1590	2.960	1639	2.960	1688	2.960	1737	2.960	1786	2.960	1835	2.960	1884	2.960
1591	2.960	1640	2.960	1689	2.960	1738	2.960	1787	2.960	1836	2.960	1885	2.960
1592	2.960	1641	2.960	1690	2.960	1739	2.960	1788	2.960	1837	2.960	1886	2.960
1593	2.960	1642	2.960	1691	2.960	1740	2.960	1789	2.960	1838	2.960	1887	2.960
1594	2.960	1643	2.960	1692	2.960	1741	2.960	1790	2.960	1839	2.960	1888	2.960
1595	2.960	1644	2.960	1693	2.960	1742	2.960	1791	2.960	1840	2.960	1889	2.960
1596	2.960	1645	2.960	1694	2.960	1743	2.960	1792	2.960	1841	2.960	1890	2.960
1597	2.960	1646	2.960	1695	2.960	1744	2.960	1793	2.960	1842	2.960	1891	2.960
1598	2.960	1647	2.960	1696	2.960	1745	2.960	1794	2.960	1843	2.960	1892	2.960
1599	2.960	1648	2.960	1697	2.960	1746	2.960	1795	2.960	1844	2.960	1893	2.960
1600	2.960	1649	2.960	1698	2.960	1747	2.960	1796	2.960	1845	2.960	1894	2.960
1601	2.960	1650	2.960	1699	2.960	1748	2.960	1797	2.960	1846	2.960	1895	2.960
1602	2.960	1651	2.960	1700	2.960	1749	2.960	1798	2.960	1847	2.960	1896	2.960
1603	2.960	1652	2.960	1701	2.960	1750	2.960	1799	2.960	1848	2.960	1897	2.960
1604	2.960	1653	2.960	1702	2.960	1751	2.960	1800	2.960	1849	2.960	1898	2.960
1605	2.960	1654	2.960	1703	2.960	1752	2.960	1801	2.960	1850	2.960	1899	2.960
1606	2.960	1655	2.960	1704	2.960	1753	2.960	1802	2.960	1851	2.960	1900	2.960
1607	2.960	1656	2.960	1705	2.960	1754	2.960	1803	2.960	1852	2.960	1901	2.960
1608	2.960	1657	2.960	1706	2.960	1755	2.960	1804	2.960	1853	2.960	1902	2.960
1609	2.960	1658	2.960	1707	2.960	1756	2.960	1805	2.960	1854	2.960	1903	2.960
1610	2.960	1659	2.960	1708	2.960	1757	2.960	1806	2.960	1855	2.960	1904	2.960
1611	2.960	1660	2.960	1709	2.960	1758	2.960	1807	2.960	1856	2.960	1905	2.960
1612	2.960	1661	2.960	1710	2.960	1759	2.960	1808	2.960	1857	2.960	1906	2.960
1613	2.960	1662	2.960	1711	2.960	1760	2.960	1809	2.960	1858	2.960	1907	2.960
1614	2.960	1663	2.960	1712	2.960	1761	2.960	1810	2.960	1859	2.960	1908	2.960
1615	2.960	1664	2.960	1713	2.960	1762	2.960	1811	2.960	1860	2.960	1909	2.960
1616	2.960	1665	2.960	1714	2.960	1763	2.960	1812	2.960	1861	2.960	1910	2.960
1617	2.960	1666	2.960	1715	2.960	1764	2.960	1813	2.960	1862	2.960	1911	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1912	2.960	1961	2.960	2010	2.960	2059	2.960	2108	2.960	2157	2.960	2206	2.960
1913	2.960	1962	2.960	2011	2.960	2060	2.960	2109	2.960	2158	2.960	2207	2.960
1914	2.960	1963	2.960	2012	2.960	2061	2.960	2110	2.960	2159	2.960	2208	2.960
1915	2.960	1964	2.960	2013	2.960	2062	2.960	2111	2.960	2160	2.960	2209	2.960
1916	2.960	1965	2.960	2014	2.960	2063	2.960	2112	2.960	2161	2.960	2210	2.960
1917	2.960	1966	2.960	2015	2.960	2064	2.960	2113	2.960	2162	2.960	2211	2.960
1918	2.960	1967	2.960	2016	2.960	2065	2.960	2114	2.960	2163	2.960	2212	2.960
1919	2.960	1968	2.960	2017	2.960	2066	2.960	2115	2.960	2164	2.960	2213	2.960
1920	2.960	1969	2.960	2018	2.960	2067	2.960	2116	2.960	2165	2.960	2214	2.960
1921	2.960	1970	2.960	2019	2.960	2068	2.960	2117	2.960	2166	2.960	2215	2.960
1922	2.960	1971	2.960	2020	2.960	2069	2.960	2118	2.960	2167	2.960	2216	2.960
1923	2.960	1972	2.960	2021	2.960	2070	2.960	2119	2.960	2168	2.960	2217	2.960
1924	2.960	1973	2.960	2022	2.960	2071	2.960	2120	2.960	2169	2.960	2218	2.960
1925	2.960	1974	2.960	2023	2.960	2072	2.960	2121	2.960	2170	2.960	2219	2.960
1926	2.960	1975	2.960	2024	2.960	2073	2.960	2122	2.960	2171	2.960	2220	2.960
1927	2.960	1976	2.960	2025	2.960	2074	2.960	2123	2.960	2172	2.960	2221	2.960
1928	2.960	1977	2.960	2026	2.960	2075	2.960	2124	2.960	2173	2.960	2222	2.960
1929	2.960	1978	2.960	2027	2.960	2076	2.960	2125	2.960	2174	2.960	2223	2.960
1930	2.960	1979	2.960	2028	2.960	2077	2.960	2126	2.960	2175	2.960	2224	2.960
1931	2.960	1980	2.960	2029	2.960	2078	2.960	2127	2.960	2176	2.960	2225	2.960
1932	2.960	1981	2.960	2030	2.960	2079	2.960	2128	2.960	2177	2.960	2226	2.960
1933	2.960	1982	2.960	2031	2.960	2080	2.960	2129	2.960	2178	2.960	2227	2.960
1934	2.960	1983	2.960	2032	2.960	2081	2.960	2130	2.960	2179	2.960	2228	2.960
1935	2.960	1984	2.960	2033	2.960	2082	2.960	2131	2.960	2180	2.960	2229	2.960
1936	2.960	1985	2.960	2034	2.960	2083	2.960	2132	2.960	2181	2.960	2230	2.960
1937	2.960	1986	2.960	2035	2.960	2084	2.960	2133	2.960	2182	2.960	2231	2.960
1938	2.960	1987	2.960	2036	2.960	2085	2.960	2134	2.960	2183	2.960	2232	2.960
1939	2.960	1988	2.960	2037	2.960	2086	2.960	2135	2.960	2184	2.960	2233	2.960
1940	2.960	1989	2.960	2038	2.960	2087	2.960	2136	2.960	2185	2.960	2234	2.960
1941	2.960	1990	2.960	2039	2.960	2088	2.960	2137	2.960	2186	2.960	2235	2.960
1942	2.960	1991	2.960	2040	2.960	2089	2.960	2138	2.960	2187	2.960	2236	2.960
1943	2.960	1992	2.960	2041	2.960	2090	2.960	2139	2.960	2188	2.960	2237	2.960
1944	2.960	1993	2.960	2042	2.960	2091	2.960	2140	2.960	2189	2.960	2238	2.960
1945	2.960	1994	2.960	2043	2.960	2092	2.960	2141	2.960	2190	2.960	2239	2.960
1946	2.960	1995	2.960	2044	2.960	2093	2.960	2142	2.960	2191	2.960	2240	2.960
1947	2.960	1996	2.960	2045	2.960	2094	2.960	2143	2.960	2192	2.960	2241	2.960
1948	2.960	1997	2.960	2046	2.960	2095	2.960	2144	2.960	2193	2.960	2242	2.960
1949	2.960	1998	2.960	2047	2.960	2096	2.960	2145	2.960	2194	2.960	2243	2.960
1950	2.960	1999	2.960	2048	2.960	2097	2.960	2146	2.960	2195	2.960	2244	2.960
1951	2.960	2000	2.960	2049	2.960	2098	2.960	2147	2.960	2196	2.960	2245	2.960
1952	2.960	2001	2.960	2050	2.960	2099	2.960	2148	2.960	2197	2.960	2246	2.960
1953	2.960	2002	2.960	2051	2.960	2100	2.960	2149	2.960	2198	2.960	2247	2.960
1954	2.960	2003	2.960	2052	2.960	2101	2.960	2150	2.960	2199	2.960	2248	2.960
1955	2.960	2004	2.960	2053	2.960	2102	2.960	2151	2.960	2200	2.960	2249	2.960
1956	2.960	2005	2.960	2054	2.960	2103	2.960	2152	2.960	2201	2.960	2250	2.960
1957	2.960	2006	2.960	2055	2.960	2104	2.960	2153	2.960	2202	2.960	2251	2.960
1958	2.960	2007	2.960	2056	2.960	2105	2.960	2154	2.960	2203	2.960	2252	2.960
1959	2.960	2008	2.960	2057	2.960	2106	2.960	2155	2.960	2204	2.960	2253	2.960
1960	2.960	2009	2.960	2058	2.960	2107	2.960	2156	2.960	2205	2.960	2254	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2255	2.960	2304	2.960	2353	2.960	2402	2.960	2451	2.960	2500	2.960	2549	2.960
2256	2.960	2305	2.960	2354	2.960	2403	2.960	2452	2.960	2501	2.960	2550	2.960
2257	2.960	2306	2.960	2355	2.960	2404	2.960	2453	2.960	2502	2.960	2551	2.960
2258	2.960	2307	2.960	2356	2.960	2405	2.960	2454	2.960	2503	2.960	2552	2.960
2259	2.960	2308	2.960	2357	2.960	2406	2.960	2455	2.960	2504	2.960	2553	2.960
2260	2.960	2309	2.960	2358	2.960	2407	2.960	2456	2.960	2505	2.960	2554	2.960
2261	2.960	2310	2.960	2359	2.960	2408	2.960	2457	2.960	2506	2.960	2555	2.960
2262	2.960	2311	2.960	2360	2.960	2409	2.960	2458	2.960	2507	2.960	2556	2.960
2263	2.960	2312	2.960	2361	2.960	2410	2.960	2459	2.960	2508	2.960	2557	2.960
2264	2.960	2313	2.960	2362	2.960	2411	2.960	2460	2.960	2509	2.960	2558	2.960
2265	2.960	2314	2.960	2363	2.960	2412	2.960	2461	2.960	2510	2.960	2559	2.960
2266	2.960	2315	2.960	2364	2.960	2413	2.960	2462	2.960	2511	2.960	2560	2.960
2267	2.960	2316	2.960	2365	2.960	2414	2.960	2463	2.960	2512	2.960	2561	2.960
2268	2.960	2317	2.960	2366	2.960	2415	2.960	2464	2.960	2513	2.960	2562	2.960
2269	2.960	2318	2.960	2367	2.960	2416	2.960	2465	2.960	2514	2.960	2563	2.960
2270	2.960	2319	2.960	2368	2.960	2417	2.960	2466	2.960	2515	2.960	2564	2.960
2271	2.960	2320	2.960	2369	2.960	2418	2.960	2467	2.960	2516	2.960	2565	2.960
2272	2.960	2321	2.960	2370	2.960	2419	2.960	2468	2.960	2517	2.960	2566	2.960
2273	2.960	2322	2.960	2371	2.960	2420	2.960	2469	2.960	2518	2.960	2567	2.960
2274	2.960	2323	2.960	2372	2.960	2421	2.960	2470	2.960	2519	2.960	2568	2.960
2275	2.960	2324	2.960	2373	2.960	2422	2.960	2471	2.960	2520	2.960	2569	2.960
2276	2.960	2325	2.960	2374	2.960	2423	2.960	2472	2.960	2521	2.960	2570	2.960
2277	2.960	2326	2.960	2375	2.960	2424	2.960	2473	2.960	2522	2.960	2571	2.960
2278	2.960	2327	2.960	2376	2.960	2425	2.960	2474	2.960	2523	2.960	2572	2.960
2279	2.960	2328	2.960	2377	2.960	2426	2.960	2475	2.960	2524	2.960	2573	2.960
2280	2.960	2329	2.960	2378	2.960	2427	2.960	2476	2.960	2525	2.960	2574	2.960
2281	2.960	2330	2.960	2379	2.960	2428	2.960	2477	2.960	2526	2.960	2575	2.960
2282	2.960	2331	2.960	2380	2.960	2429	2.960	2478	2.960	2527	2.960	2576	2.960
2283	2.960	2332	2.960	2381	2.960	2430	2.960	2479	2.960	2528	2.960	2577	2.960
2284	2.960	2333	2.960	2382	2.960	2431	2.960	2480	2.960	2529	2.960	2578	2.960
2285	2.960	2334	2.960	2383	2.960	2432	2.960	2481	2.960	2530	2.960	2579	2.960
2286	2.960	2335	2.960	2384	2.960	2433	2.960	2482	2.960	2531	2.960	2580	2.960
2287	2.960	2336	2.960	2385	2.960	2434	2.960	2483	2.960	2532	2.960	2581	2.960
2288	2.960	2337	2.960	2386	2.960	2435	2.960	2484	2.960	2533	2.960	2582	2.960
2289	2.960	2338	2.960	2387	2.960	2436	2.960	2485	2.960	2534	2.960	2583	2.960
2290	2.960	2339	2.960	2388	2.960	2437	2.960	2486	2.960	2535	2.960	2584	2.960
2291	2.960	2340	2.960	2389	2.960	2438	2.960	2487	2.960	2536	2.960	2585	2.960
2292	2.960	2341	2.960	2390	2.960	2439	2.960	2488	2.960	2537	2.960	2586	2.960
2293	2.960	2342	2.960	2391	2.960	2440	2.960	2489	2.960	2538	2.960	2587	2.960
2294	2.960	2343	2.960	2392	2.960	2441	2.960	2490	2.960	2539	2.960	2588	2.960
2295	2.960	2344	2.960	2393	2.960	2442	2.960	2491	2.960	2540	2.960	2589	2.960
2296	2.960	2345	2.960	2394	2.960	2443	2.960	2492	2.960	2541	2.960	2590	2.960
2297	2.960	2346	2.960	2395	2.960	2444	2.960	2493	2.960	2542	2.960	2591	2.960
2298	2.960	2347	2.960	2396	2.960	2445	2.960	2494	2.960	2543	2.960	2592	2.960
2299	2.960	2348	2.960	2397	2.960	2446	2.960	2495	2.960	2544	2.960	2593	2.960
2300	2.960	2349	2.960	2398	2.960	2447	2.960	2496	2.960	2545	2.960	2594	2.960
2301	2.960	2350	2.960	2399	2.960	2448	2.960	2497	2.960	2546	2.960	2595	2.960
2302	2.960	2351	2.960	2400	2.960	2449	2.960	2498	2.960	2547	2.960	2596	2.960
2303	2.960	2352	2.960	2401	2.960	2450	2.960	2499	2.960	2548	2.960	2597	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2598	2.960	2647	2.960	2696	2.960	2745	2.960	2794	2.960	2843	2.960	2892	2.960
2599	2.960	2648	2.960	2697	2.960	2746	2.960	2795	2.960	2844	2.960	2893	2.960
2600	2.960	2649	2.960	2698	2.960	2747	2.960	2796	2.960	2845	2.960	2894	2.960
2601	2.960	2650	2.960	2699	2.960	2748	2.960	2797	2.960	2846	2.960	2895	2.960
2602	2.960	2651	2.960	2700	2.960	2749	2.960	2798	2.960	2847	2.960	2896	2.960
2603	2.960	2652	2.960	2701	2.960	2750	2.960	2799	2.960	2848	2.960	2897	2.960
2604	2.960	2653	2.960	2702	2.960	2751	2.960	2800	2.960	2849	2.960	2898	2.960
2605	2.960	2654	2.960	2703	2.960	2752	2.960	2801	2.960	2850	2.960	2899	2.960
2606	2.960	2655	2.960	2704	2.960	2753	2.960	2802	2.960	2851	2.960	2900	2.960
2607	2.960	2656	2.960	2705	2.960	2754	2.960	2803	2.960	2852	2.960	2901	2.960
2608	2.960	2657	2.960	2706	2.960	2755	2.960	2804	2.960	2853	2.960	2902	2.960
2609	2.960	2658	2.960	2707	2.960	2756	2.960	2805	2.960	2854	2.960	2903	2.960
2610	2.960	2659	2.960	2708	2.960	2757	2.960	2806	2.960	2855	2.960	2904	2.960
2611	2.960	2660	2.960	2709	2.960	2758	2.960	2807	2.960	2856	2.960	2905	2.960
2612	2.960	2661	2.960	2710	2.960	2759	2.960	2808	2.960	2857	2.960	2906	2.960
2613	2.960	2662	2.960	2711	2.960	2760	2.960	2809	2.960	2858	2.960	2907	2.960
2614	2.960	2663	2.960	2712	2.960	2761	2.960	2810	2.960	2859	2.960	2908	2.960
2615	2.960	2664	2.960	2713	2.960	2762	2.960	2811	2.960	2860	2.960	2909	2.960
2616	2.960	2665	2.960	2714	2.960	2763	2.960	2812	2.960	2861	2.960	2910	2.960
2617	2.960	2666	2.960	2715	2.960	2764	2.960	2813	2.960	2862	2.960	2911	2.960
2618	2.960	2667	2.960	2716	2.960	2765	2.960	2814	2.960	2863	2.960	2912	2.960
2619	2.960	2668	2.960	2717	2.960	2766	2.960	2815	2.960	2864	2.960	2913	2.960
2620	2.960	2669	2.960	2718	2.960	2767	2.960	2816	2.960	2865	2.960	2914	2.960
2621	2.960	2670	2.960	2719	2.960	2768	2.960	2817	2.960	2866	2.960	2915	2.960
2622	2.960	2671	2.960	2720	2.960	2769	2.960	2818	2.960	2867	2.960	2916	2.960
2623	2.960	2672	2.960	2721	2.960	2770	2.960	2819	2.960	2868	2.960	2917	2.960
2624	2.960	2673	2.960	2722	2.960	2771	2.960	2820	2.960	2869	2.960	2918	2.960
2625	2.960	2674	2.960	2723	2.960	2772	2.960	2821	2.960	2870	2.960	2919	2.960
2626	2.960	2675	2.960	2724	2.960	2773	2.960	2822	2.960	2871	2.960	2920	2.960
2627	2.960	2676	2.960	2725	2.960	2774	2.960	2823	2.960	2872	2.960	2921	2.960
2628	2.960	2677	2.960	2726	2.960	2775	2.960	2824	2.960	2873	2.960	2922	2.960
2629	2.960	2678	2.960	2727	2.960	2776	2.960	2825	2.960	2874	2.960	2923	2.960
2630	2.960	2679	2.960	2728	2.960	2777	2.960	2826	2.960	2875	2.960	2924	2.960
2631	2.960	2680	2.960	2729	2.960	2778	2.960	2827	2.960	2876	2.960	2925	2.960
2632	2.960	2681	2.960	2730	2.960	2779	2.960	2828	2.960	2877	2.960	2926	2.960
2633	2.960	2682	2.960	2731	2.960	2780	2.960	2829	2.960	2878	2.960	2927	2.960
2634	2.960	2683	2.960	2732	2.960	2781	2.960	2830	2.960	2879	2.960	2928	2.960
2635	2.960	2684	2.960	2733	2.960	2782	2.960	2831	2.960	2880	2.960	2929	2.960
2636	2.960	2685	2.960	2734	2.960	2783	2.960	2832	2.960	2881	2.960	2930	2.960
2637	2.960	2686	2.960	2735	2.960	2784	2.960	2833	2.960	2882	2.960	2931	2.960
2638	2.960	2687	2.960	2736	2.960	2785	2.960	2834	2.960	2883	2.960	2932	2.960
2639	2.960	2688	2.960	2737	2.960	2786	2.960	2835	2.960	2884	2.960	2933	2.960
2640	2.960	2689	2.960	2738	2.960	2787	2.960	2836	2.960	2885	2.960	2934	2.960
2641	2.960	2690	2.960	2739	2.960	2788	2.960	2837	2.960	2886	2.960	2935	2.960
2642	2.960	2691	2.960	2740	2.960	2789	2.960	2838	2.960	2887	2.960	2936	2.960
2643	2.960	2692	2.960	2741	2.960	2790	2.960	2839	2.960	2888	2.960	2937	2.960
2644	2.960	2693	2.960	2742	2.960	2791	2.960	2840	2.960	2889	2.960	2938	2.960
2645	2.960	2694	2.960	2743	2.960	2792	2.960	2841	2.960	2890	2.960	2939	2.960
2646	2.960	2695	2.960	2744	2.960	2793	2.960	2842	2.960	2891	2.960	2940	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2941	2.960	2990	2.960	3039	2.960	3088	2.960	3137	2.960	3186	2.960	3235	2.960
2942	2.960	2991	2.960	3040	2.960	3089	2.960	3138	2.960	3187	2.960	3236	2.960
2943	2.960	2992	2.960	3041	2.960	3090	2.960	3139	2.960	3188	2.960	3237	2.960
2944	2.960	2993	2.960	3042	2.960	3091	2.960	3140	2.960	3189	2.960	3238	2.960
2945	2.960	2994	2.960	3043	2.960	3092	2.960	3141	2.960	3190	2.960	3239	2.960
2946	2.960	2995	2.960	3044	2.960	3093	2.960	3142	2.960	3191	2.960	3240	2.960
2947	2.960	2996	2.960	3045	2.960	3094	2.960	3143	2.960	3192	2.960	3241	2.960
2948	2.960	2997	2.960	3046	2.960	3095	2.960	3144	2.960	3193	2.960	3242	2.960
2949	2.960	2998	2.960	3047	2.960	3096	2.960	3145	2.960	3194	2.960	3243	2.960
2950	2.960	2999	2.960	3048	2.960	3097	2.960	3146	2.960	3195	2.960	3244	2.960
2951	2.960	3000	2.960	3049	2.960	3098	2.960	3147	2.960	3196	2.960	3245	2.960
2952	2.960	3001	2.960	3050	2.960	3099	2.960	3148	2.960	3197	2.960	3246	2.960
2953	2.960	3002	2.960	3051	2.960	3100	2.960	3149	2.960	3198	2.960	3247	2.960
2954	2.960	3003	2.960	3052	2.960	3101	2.960	3150	2.960	3199	2.960	3248	2.960
2955	2.960	3004	2.960	3053	2.960	3102	2.960	3151	2.960	3200	2.960	3249	2.960
2956	2.960	3005	2.960	3054	2.960	3103	2.960	3152	2.960	3201	2.960	3250	2.960
2957	2.960	3006	2.960	3055	2.960	3104	2.960	3153	2.960	3202	2.960	3251	2.960
2958	2.960	3007	2.960	3056	2.960	3105	2.960	3154	2.960	3203	2.960	3252	2.960
2959	2.960	3008	2.960	3057	2.960	3106	2.960	3155	2.960	3204	2.960	3253	2.960
2960	2.960	3009	2.960	3058	2.960	3107	2.960	3156	2.960	3205	2.960	3254	2.960
2961	2.960	3010	2.960	3059	2.960	3108	2.960	3157	2.960	3206	2.960	3255	2.960
2962	2.960	3011	2.960	3060	2.960	3109	2.960	3158	2.960	3207	2.960	3256	2.960
2963	2.960	3012	2.960	3061	2.960	3110	2.960	3159	2.960	3208	2.960	3257	2.960
2964	2.960	3013	2.960	3062	2.960	3111	2.960	3160	2.960	3209	2.960	3258	2.960
2965	2.960	3014	2.960	3063	2.960	3112	2.960	3161	2.960	3210	2.960	3259	2.960
2966	2.960	3015	2.960	3064	2.960	3113	2.960	3162	2.960	3211	2.960	3260	2.960
2967	2.960	3016	2.960	3065	2.960	3114	2.960	3163	2.960	3212	2.960	3261	2.960
2968	2.960	3017	2.960	3066	2.960	3115	2.960	3164	2.960	3213	2.960	3262	2.960
2969	2.960	3018	2.960	3067	2.960	3116	2.960	3165	2.960	3214	2.960	3263	2.960
2970	2.960	3019	2.960	3068	2.960	3117	2.960	3166	2.960	3215	2.960	3264	2.960
2971	2.960	3020	2.960	3069	2.960	3118	2.960	3167	2.960	3216	2.960	3265	2.960
2972	2.960	3021	2.960	3070	2.960	3119	2.960	3168	2.960	3217	2.960	3266	2.960
2973	2.960	3022	2.960	3071	2.960	3120	2.960	3169	2.960	3218	2.960	3267	2.960
2974	2.960	3023	2.960	3072	2.960	3121	2.960	3170	2.960	3219	2.960	3268	2.960
2975	2.960	3024	2.960	3073	2.960	3122	2.960	3171	2.960	3220	2.960	3269	2.960
2976	2.960	3025	2.960	3074	2.960	3123	2.960	3172	2.960	3221	2.960	3270	2.960
2977	2.960	3026	2.960	3075	2.960	3124	2.960	3173	2.960	3222	2.960	3271	2.960
2978	2.960	3027	2.960	3076	2.960	3125	2.960	3174	2.960	3223	2.960	3272	2.960
2979	2.960	3028	2.960	3077	2.960	3126	2.960	3175	2.960	3224	2.960	3273	2.960
2980	2.960	3029	2.960	3078	2.960	3127	2.960	3176	2.960	3225	2.960	3274	2.960
2981	2.960	3030	2.960	3079	2.960	3128	2.960	3177	2.960	3226	2.960	3275	2.960
2982	2.960	3031	2.960	3080	2.960	3129	2.960	3178	2.960	3227	2.960	3276	2.960
2983	2.960	3032	2.960	3081	2.960	3130	2.960	3179	2.960	3228	2.960	3277	2.960
2984	2.960	3033	2.960	3082	2.960	3131	2.960	3180	2.960	3229	2.960	3278	2.960
2985	2.960	3034	2.960	3083	2.960	3132	2.960	3181	2.960	3230	2.960	3279	2.960
2986	2.960	3035	2.960	3084	2.960	3133	2.960	3182	2.960	3231	2.960	3280	2.960
2987	2.960	3036	2.960	3085	2.960	3134	2.960	3183	2.960	3232	2.960	3281	2.960
2988	2.960	3037	2.960	3086	2.960	3135	2.960	3184	2.960	3233	2.960	3282	2.960
2989	2.960	3038	2.960	3087	2.960	3136	2.960	3185	2.960	3234	2.960	3283	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
3284	2.960	3333	2.960	3382	2.960	3431	2.960	3480	2.960	3529	2.960	3578	2.960
3285	2.960	3334	2.960	3383	2.960	3432	2.960	3481	2.960	3530	2.960	3579	2.960
3286	2.960	3335	2.960	3384	2.960	3433	2.960	3482	2.960	3531	2.960	3580	2.960
3287	2.960	3336	2.960	3385	2.960	3434	2.960	3483	2.960	3532	2.960	3581	2.960
3288	2.960	3337	2.960	3386	2.960	3435	2.960	3484	2.960	3533	2.960	3582	2.960
3289	2.960	3338	2.960	3387	2.960	3436	2.960	3485	2.960	3534	2.960	3583	2.960
3290	2.960	3339	2.960	3388	2.960	3437	2.960	3486	2.960	3535	2.960	3584	2.960
3291	2.960	3340	2.960	3389	2.960	3438	2.960	3487	2.960	3536	2.960	3585	2.960
3292	2.960	3341	2.960	3390	2.960	3439	2.960	3488	2.960	3537	2.960	3586	2.960
3293	2.960	3342	2.960	3391	2.960	3440	2.960	3489	2.960	3538	2.960	3587	2.960
3294	2.960	3343	2.960	3392	2.960	3441	2.960	3490	2.960	3539	2.960	3588	2.960
3295	2.960	3344	2.960	3393	2.960	3442	2.960	3491	2.960	3540	2.960	3589	2.960
3296	2.960	3345	2.960	3394	2.960	3443	2.960	3492	2.960	3541	2.960	3590	2.960
3297	2.960	3346	2.960	3395	2.960	3444	2.960	3493	2.960	3542	2.960	3591	2.960
3298	2.960	3347	2.960	3396	2.960	3445	2.960	3494	2.960	3543	2.960	3592	2.960
3299	2.960	3348	2.960	3397	2.960	3446	2.960	3495	2.960	3544	2.960	3593	2.960
3300	2.960	3349	2.960	3398	2.960	3447	2.960	3496	2.960	3545	2.960	3594	2.960
3301	2.960	3350	2.960	3399	2.960	3448	2.960	3497	2.960	3546	2.960	3595	2.960
3302	2.960	3351	2.960	3400	2.960	3449	2.960	3498	2.960	3547	2.960	3596	2.960
3303	2.960	3352	2.960	3401	2.960	3450	2.960	3499	2.960	3548	2.960	3597	2.960
3304	2.960	3353	2.960	3402	2.960	3451	2.960	3500	2.960	3549	2.960	3598	2.960
3305	2.960	3354	2.960	3403	2.960	3452	2.960	3501	2.960	3550	2.960	3599	2.960
3306	2.960	3355	2.960	3404	2.960	3453	2.960	3502	2.960	3551	2.960	3600	2.960
3307	2.960	3356	2.960	3405	2.960	3454	2.960	3503	2.960	3552	2.960	3601	2.960
3308	2.960	3357	2.960	3406	2.960	3455	2.960	3504	2.960	3553	2.960	3602	2.960
3309	2.960	3358	2.960	3407	2.960	3456	2.960	3505	2.960	3554	2.960	3603	2.960
3310	2.960	3359	2.960	3408	2.960	3457	2.960	3506	2.960	3555	2.960	3604	2.960
3311	2.960	3360	2.960	3409	2.960	3458	2.960	3507	2.960	3556	2.960	3605	2.960
3312	2.960	3361	2.960	3410	2.960	3459	2.960	3508	2.960	3557	2.960	3606	2.960
3313	2.960	3362	2.960	3411	2.960	3460	2.960	3509	2.960	3558	2.960	3607	2.960
3314	2.960	3363	2.960	3412	2.960	3461	2.960	3510	2.960	3559	2.960	3608	2.960
3315	2.960	3364	2.960	3413	2.960	3462	2.960	3511	2.960	3560	2.960	3609	2.960
3316	2.960	3365	2.960	3414	2.960	3463	2.960	3512	2.960	3561	2.960	3610	2.960
3317	2.960	3366	2.960	3415	2.960	3464	2.960	3513	2.960	3562	2.960	3611	2.960
3318	2.960	3367	2.960	3416	2.960	3465	2.960	3514	2.960	3563	2.960	3612	2.960
3319	2.960	3368	2.960	3417	2.960	3466	2.960	3515	2.960	3564	2.960	3613	2.960
3320	2.960	3369	2.960	3418	2.960	3467	2.960	3516	2.960	3565	2.960	3614	2.960
3321	2.960	3370	2.960	3419	2.960	3468	2.960	3517	2.960	3566	2.960	3615	2.960
3322	2.960	3371	2.960	3420	2.960	3469	2.960	3518	2.960	3567	2.960	3616	2.960
3323	2.960	3372	2.960	3421	2.960	3470	2.960	3519	2.960	3568	2.960	3617	2.960
3324	2.960	3373	2.960	3422	2.960	3471	2.960	3520	2.960	3569	2.960	3618	2.960
3325	2.960	3374	2.960	3423	2.960	3472	2.960	3521	2.960	3570	2.960	3619	2.960
3326	2.960	3375	2.960	3424	2.960	3473	2.960	3522	2.960	3571	2.960	3620	2.960
3327	2.960	3376	2.960	3425	2.960	3474	2.960	3523	2.960	3572	2.960	3621	2.960
3328	2.960	3377	2.960	3426	2.960	3475	2.960	3524	2.960	3573	2.960	3622	2.960
3329	2.960	3378	2.960	3427	2.960	3476	2.960	3525	2.960	3574	2.960	3623	2.960
3330	2.960	3379	2.960	3428	2.960	3477	2.960	3526	2.960	3575	2.960	3624	2.960
3331	2.960	3380	2.960	3429	2.960	3478	2.960	3527	2.960	3576	2.960	3625	2.960
3332	2.960	3381	2.960	3430	2.960	3479	2.960	3528	2.960	3577	2.960	3626	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
3627	2.960	3676	2.960	3725	2.960	3774	2.960	3823	2.960	3872	2.960	3921	2.960
3628	2.960	3677	2.960	3726	2.960	3775	2.960	3824	2.960	3873	2.960	3922	2.960
3629	2.960	3678	2.960	3727	2.960	3776	2.960	3825	2.960	3874	2.960	3923	2.960
3630	2.960	3679	2.960	3728	2.960	3777	2.960	3826	2.960	3875	2.960	3924	2.960
3631	2.960	3680	2.960	3729	2.960	3778	2.960	3827	2.960	3876	2.960	3925	2.960
3632	2.960	3681	2.960	3730	2.960	3779	2.960	3828	2.960	3877	2.960	3926	2.960
3633	2.960	3682	2.960	3731	2.960	3780	2.960	3829	2.960	3878	2.960	3927	2.960
3634	2.960	3683	2.960	3732	2.960	3781	2.960	3830	2.960	3879	2.960	3928	2.960
3635	2.960	3684	2.960	3733	2.960	3782	2.960	3831	2.960	3880	2.960	3929	2.960
3636	2.960	3685	2.960	3734	2.960	3783	2.960	3832	2.960	3881	2.960	3930	2.960
3637	2.960	3686	2.960	3735	2.960	3784	2.960	3833	2.960	3882	2.960	3931	2.960
3638	2.960	3687	2.960	3736	2.960	3785	2.960	3834	2.960	3883	2.960	3932	2.960
3639	2.960	3688	2.960	3737	2.960	3786	2.960	3835	2.960	3884	2.960	3933	2.960
3640	2.960	3689	2.960	3738	2.960	3787	2.960	3836	2.960	3885	2.960	3934	2.960
3641	2.960	3690	2.960	3739	2.960	3788	2.960	3837	2.960	3886	2.960	3935	2.960
3642	2.960	3691	2.960	3740	2.960	3789	2.960	3838	2.960	3887	2.960	3936	2.960
3643	2.960	3692	2.960	3741	2.960	3790	2.960	3839	2.960	3888	2.960	3937	2.960
3644	2.960	3693	2.960	3742	2.960	3791	2.960	3840	2.960	3889	2.960	3938	2.960
3645	2.960	3694	2.960	3743	2.960	3792	2.960	3841	2.960	3890	2.960	3939	2.960
3646	2.960	3695	2.960	3744	2.960	3793	2.960	3842	2.960	3891	2.960	3940	2.960
3647	2.960	3696	2.960	3745	2.960	3794	2.960	3843	2.960	3892	2.960	3941	2.960
3648	2.960	3697	2.960	3746	2.960	3795	2.960	3844	2.960	3893	2.960	3942	2.960
3649	2.960	3698	2.960	3747	2.960	3796	2.960	3845	2.960	3894	2.960	3943	2.960
3650	2.960	3699	2.960	3748	2.960	3797	2.960	3846	2.960	3895	2.960	3944	2.960
3651	2.960	3700	2.960	3749	2.960	3798	2.960	3847	2.960	3896	2.960	3945	2.960
3652	2.960	3701	2.960	3750	2.960	3799	2.960	3848	2.960	3897	2.960	3946	2.960
3653	2.960	3702	2.960	3751	2.960	3800	2.960	3849	2.960	3898	2.960	3947	2.960
3654	2.960	3703	2.960	3752	2.960	3801	2.960	3850	2.960	3899	2.960	3948	2.960
3655	2.960	3704	2.960	3753	2.960	3802	2.960	3851	2.960	3900	2.960	3949	2.960
3656	2.960	3705	2.960	3754	2.960	3803	2.960	3852	2.960	3901	2.960	3950	2.960
3657	2.960	3706	2.960	3755	2.960	3804	2.960	3853	2.960	3902	2.960	3951	2.960
3658	2.960	3707	2.960	3756	2.960	3805	2.960	3854	2.960	3903	2.960	3952	2.960
3659	2.960	3708	2.960	3757	2.960	3806	2.960	3855	2.960	3904	2.960	3953	2.960
3660	2.960	3709	2.960	3758	2.960	3807	2.960	3856	2.960	3905	2.960	3954	2.960
3661	2.960	3710	2.960	3759	2.960	3808	2.960	3857	2.960	3906	2.960	3955	2.960
3662	2.960	3711	2.960	3760	2.960	3809	2.960	3858	2.960	3907	2.960	3956	2.960
3663	2.960	3712	2.960	3761	2.960	3810	2.960	3859	2.960	3908	2.960	3957	2.960
3664	2.960	3713	2.960	3762	2.960	3811	2.960	3860	2.960	3909	2.960	3958	2.960
3665	2.960	3714	2.960	3763	2.960	3812	2.960	3861	2.960	3910	2.960	3959	2.960
3666	2.960	3715	2.960	3764	2.960	3813	2.960	3862	2.960	3911	2.960	3960	2.960
3667	2.960	3716	2.960	3765	2.960	3814	2.960	3863	2.960	3912	2.960	3961	2.960
3668	2.960	3717	2.960	3766	2.960	3815	2.960	3864	2.960	3913	2.960	3962	2.960
3669	2.960	3718	2.960	3767	2.960	3816	2.960	3865	2.960	3914	2.960	3963	2.960
3670	2.960	3719	2.960	3768	2.960	3817	2.960	3866	2.960	3915	2.960	3964	2.960
3671	2.960	3720	2.960	3769	2.960	3818	2.960	3867	2.960	3916	2.960	3965	2.960
3672	2.960	3721	2.960	3770	2.960	3819	2.960	3868	2.960	3917	2.960	3966	2.960
3673	2.960	3722	2.960	3771	2.960	3820	2.960	3869	2.960	3918	2.960	3967	2.960
3674	2.960	3723	2.960	3772	2.960	3821	2.960	3870	2.960	3919	2.960	3968	2.960
3675	2.960	3724	2.960	3773	2.960	3822	2.960	3871	2.960	3920	2.960	3969	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
3970	2.960	4019	2.960	4068	2.960	4117	2.960	4166	2.960	4215	2.960	4264	2.960
3971	2.960	4020	2.960	4069	2.960	4118	2.960	4167	2.960	4216	2.960	4265	2.960
3972	2.960	4021	2.960	4070	2.960	4119	2.960	4168	2.960	4217	2.960	4266	2.960
3973	2.960	4022	2.960	4071	2.960	4120	2.960	4169	2.960	4218	2.960	4267	2.960
3974	2.960	4023	2.960	4072	2.960	4121	2.960	4170	2.960	4219	2.960	4268	2.960
3975	2.960	4024	2.960	4073	2.960	4122	2.960	4171	2.960	4220	2.960	4269	2.960
3976	2.960	4025	2.960	4074	2.960	4123	2.960	4172	2.960	4221	2.960	4270	2.960
3977	2.960	4026	2.960	4075	2.960	4124	2.960	4173	2.960	4222	2.960	4271	2.960
3978	2.960	4027	2.960	4076	2.960	4125	2.960	4174	2.960	4223	2.960	4272	2.960
3979	2.960	4028	2.960	4077	2.960	4126	2.960	4175	2.960	4224	2.960	4273	2.960
3980	2.960	4029	2.960	4078	2.960	4127	2.960	4176	2.960	4225	2.960	4274	2.960
3981	2.960	4030	2.960	4079	2.960	4128	2.960	4177	2.960	4226	2.960	4275	2.960
3982	2.960	4031	2.960	4080	2.960	4129	2.960	4178	2.960	4227	2.960	4276	2.960
3983	2.960	4032	2.960	4081	2.960	4130	2.960	4179	2.960	4228	2.960	4277	2.960
3984	2.960	4033	2.960	4082	2.960	4131	2.960	4180	2.960	4229	2.960	4278	2.960
3985	2.960	4034	2.960	4083	2.960	4132	2.960	4181	2.960	4230	2.960	4279	2.960
3986	2.960	4035	2.960	4084	2.960	4133	2.960	4182	2.960	4231	2.960	4280	2.960
3987	2.960	4036	2.960	4085	2.960	4134	2.960	4183	2.960	4232	2.960	4281	2.960
3988	2.960	4037	2.960	4086	2.960	4135	2.960	4184	2.960	4233	2.960	4282	2.960
3989	2.960	4038	2.960	4087	2.960	4136	2.960	4185	2.960	4234	2.960	4283	2.960
3990	2.960	4039	2.960	4088	2.960	4137	2.960	4186	2.960	4235	2.960	4284	2.960
3991	2.960	4040	2.960	4089	2.960	4138	2.960	4187	2.960	4236	2.960	4285	2.960
3992	2.960	4041	2.960	4090	2.960	4139	2.960	4188	2.960	4237	2.960	4286	2.960
3993	2.960	4042	2.960	4091	2.960	4140	2.960	4189	2.960	4238	2.960	4287	2.960
3994	2.960	4043	2.960	4092	2.960	4141	2.960	4190	2.960	4239	2.960	4288	2.960
3995	2.960	4044	2.960	4093	2.960	4142	2.960	4191	2.960	4240	2.960	4289	2.960
3996	2.960	4045	2.960	4094	2.960	4143	2.960	4192	2.960	4241	2.960	4290	2.960
3997	2.960	4046	2.960	4095	2.960	4144	2.960	4193	2.960	4242	2.960	4291	2.960
3998	2.960	4047	2.960	4096	2.960	4145	2.960	4194	2.960	4243	2.960	4292	2.960
3999	2.960	4048	2.960	4097	2.960	4146	2.960	4195	2.960	4244	2.960	4293	2.960
4000	2.960	4049	2.960	4098	2.960	4147	2.960	4196	2.960	4245	2.960	4294	2.960
4001	2.960	4050	2.960	4099	2.960	4148	2.960	4197	2.960	4246	2.960	4295	2.960
4002	2.960	4051	2.960	4100	2.960	4149	2.960	4198	2.960	4247	2.960	4296	2.960
4003	2.960	4052	2.960	4101	2.960	4150	2.960	4199	2.960	4248	2.960	4297	2.960
4004	2.960	4053	2.960	4102	2.960	4151	2.960	4200	2.960	4249	2.960	4298	2.960
4005	2.960	4054	2.960	4103	2.960	4152	2.960	4201	2.960	4250	2.960	4299	2.960
4006	2.960	4055	2.960	4104	2.960	4153	2.960	4202	2.960	4251	2.960	4300	2.960
4007	2.960	4056	2.960	4105	2.960	4154	2.960	4203	2.960	4252	2.960	4301	2.960
4008	2.960	4057	2.960	4106	2.960	4155	2.960	4204	2.960	4253	2.960	4302	2.960
4009	2.960	4058	2.960	4107	2.960	4156	2.960	4205	2.960	4254	2.960	4303	2.960
4010	2.960	4059	2.960	4108	2.960	4157	2.960	4206	2.960	4255	2.960	4304	2.960
4011	2.960	4060	2.960	4109	2.960	4158	2.960	4207	2.960	4256	2.960	4305	2.960
4012	2.960	4061	2.960	4110	2.960	4159	2.960	4208	2.960	4257	2.960	4306	2.960
4013	2.960	4062	2.960	4111	2.960	4160	2.960	4209	2.960	4258	2.960	4307	2.960
4014	2.960	4063	2.960	4112	2.960	4161	2.960	4210	2.960	4259	2.960	4308	2.960
4015	2.960	4064	2.960	4113	2.960	4162	2.960	4211	2.960	4260	2.960	4309	2.960
4016	2.960	4065	2.960	4114	2.960	4163	2.960	4212	2.960	4261	2.960	4310	2.960
4017	2.960	4066	2.960	4115	2.960	4164	2.960	4213	2.960	4262	2.960	4311	2.960
4018	2.960	4067	2.960	4116	2.960	4165	2.960	4214	2.960	4263	2.960	4312	2.960

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
4313	2.960	4315	2.960	4317	2.960	4319	2.960						
4314	2.960	4316	2.960	4318	2.960	4320	2.960						

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	30
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.300		

Online Controls for Storm

Orifice Manhole: MH16, DS/PN: 1.003, Volume (m³): 6.3

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.022

Orifice Manhole: MH17, DS/PN: 1.004, Volume (m³): 3.3

Diameter (m) 0.090 Discharge Coefficient 0.600 Invert Level (m) 4.931

Orifice Manhole: MH34, DS/PN: 10.004, Volume (m³): 2.5

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 5.151

Orifice Manhole: MH36, DS/PN: 7.007, Volume (m³): 5.7

Diameter (m) 0.275 Discharge Coefficient 0.600 Invert Level (m) 4.954

Non Return Valve Manhole: MH52, DS/PN: 1.009, Volume (m³): 2.6

Storage Structures for Storm

Tank or Pond Manhole: MH1, DS/PN: 1.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	80.4	0.450	80.4	0.451	0.0

Tank or Pond Manhole: MH3, DS/PN: 2.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	37.6	0.450	37.6	0.451	0.0

Tank or Pond Manhole: MH4, DS/PN: 3.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	23.9	0.450	23.9	0.451	0.0

Tank or Pond Manhole: MH5, DS/PN: 4.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	58.1	0.450	58.1	0.451	0.0

Tank or Pond Manhole: MH6, DS/PN: 5.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	79.7	0.450	79.7	0.451	0.0

Tank or Pond Manhole: MH12, DS/PN: 2.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	12.7	0.450	12.7	0.451	0.0

Tank or Pond Manhole: MH13, DS/PN: 1.001

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	6.2	0.450	6.2	0.451	0.0

Tank or Pond Manhole: MH14, DS/PN: 1.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	147.0	0.450	147.0	0.451	0.0

Tank or Pond Manhole: MH15, DS/PN: 6.000

Invert Level (m) 5.350

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	54.8	0.450	54.8	0.451	0.0

Complex Manhole: MH16, DS/PN: 1.003

Cellular Storage

Invert Level (m) 5.022 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	71.0	0.0	0.600	71.0	0.0

Tank or Pond

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	76.9	0.450	76.9	0.451	0.0

Tank or Pond Manhole: MH20, DS/PN: 8.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	27.9	0.450	27.9	0.451	0.0

Tank or Pond Manhole: MH27, DS/PN: 10.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	47.9	0.450	47.9	0.451	0.0

Tank or Pond Manhole: MH28, DS/PN: 10.001

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3.6	0.450	3.6	0.451	0.0

Tank or Pond Manhole: MH29, DS/PN: 11.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	36.5	0.450	36.5	0.451	0.0

Tank or Pond Manhole: MH30, DS/PN: 10.002

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	25.2	0.450	25.2	0.451	0.0

Tank or Pond Manhole: MH31, DS/PN: 12.000

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	49.6	0.450	49.6	0.451	0.0

Tank or Pond Manhole: MH32, DS/PN: 10.003

Invert Level (m) 5.950

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.6	0.450	8.6	0.451	0.0

Tank or Pond Manhole: MH33, DS/PN: 13.000

Invert Level (m) 5.950

Tank or Pond Manhole: MH33, DS/PN: 13.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	98.4	0.450	98.4	0.451	0.0

Cellular Storage Manhole: MH37, DS/PN: 1.005

Invert Level (m) 4.852 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	108.0	0.0	0.750	108.0	0.0

Cellular Storage Manhole: MH38, DS/PN: 1.006

Invert Level (m) 4.760 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	0.0	0.900	60.0	0.0

Cellular Storage Manhole: MH39, DS/PN: 1.007

Invert Level (m) 4.698 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	195.0	0.0	0.900	195.0	0.0

Tank or Pond Manhole: MH40, DS/PN: 14.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	106.1	0.450	106.1	0.451	0.0

Tank or Pond Manhole: MH41, DS/PN: 14.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	24.8	0.450	24.8	0.451	0.0

Tank or Pond Manhole: MH42, DS/PN: 15.000

Invert Level (m) 5.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	80.8	0.450	80.8	0.451	0.0

Tank or Pond Manhole: MH43, DS/PN: 15.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	6.1	0.450	6.1	0.451	0.0

Tank or Pond Manhole: MH44, DS/PN: 14.002

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	57.8	0.450	57.8	0.451	0.0

Tank or Pond Manhole: MH45, DS/PN: 16.000

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	58.1	0.450	58.1	0.451	0.0

Tank or Pond Manhole: MH46, DS/PN: 16.001

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	28.6	0.450	28.6	0.451	0.0

Cellular Storage Manhole: MH48, DS/PN: 16.003

Invert Level (m) 4.805 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	110.0	0.0	0.600	110.0	0.0

Tank or Pond Manhole: MH49, DS/PN: 16.004

Invert Level (m) 5.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	83.8	0.450	83.8	0.451	0.0

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	30
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1000
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	MH1	1440 Winter	1000	+0%	1000/15 Summer			
2.000	MH3	1440 Winter	1000	+0%	1000/15 Summer			
3.000	MH4	1440 Winter	1000	+0%	1000/15 Summer			
4.000	MH5	1440 Winter	1000	+0%	1000/15 Summer			
5.000	MH6	1440 Winter	1000	+0%	1000/15 Summer			
4.001	MH7	1440 Winter	1000	+0%	1000/15 Summer			
3.001	MH10	1440 Winter	1000	+0%	1000/15 Summer			
2.001	MH11	1440 Winter	1000	+0%	1000/15 Summer			
2.002	MH12	1440 Winter	1000	+0%	1000/15 Summer			
1.001	MH13	1440 Winter	1000	+0%	1000/15 Summer			
1.002	MH14	1440 Winter	1000	+0%	1000/15 Summer			
6.000	MH15	1440 Winter	1000	+0%	1000/15 Summer			
1.003	MH16	1440 Winter	1000	+0%	1000/15 Summer			
1.004	MH17	4320 Winter	1000	+0%	1000/15 Summer	1000/240 Winter		
7.000	MH18	30 Winter	1000	+0%	1000/15 Summer			
7.001	MH19	30 Winter	1000	+0%	1000/15 Summer			

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	MH1	6.330	0.830	0.000	0.07			0.9	FLOOD RISK	
2.000	MH3	6.339	0.708	0.000	0.07			0.8	FLOOD RISK	
3.000	MH4	6.342	0.537	0.000	0.04			1.2	FLOOD RISK	
4.000	MH5	6.344	0.544	0.000	0.03			0.5	FLOOD RISK	
5.000	MH6	6.345	0.545	0.000	0.06			0.8	FLOOD RISK	
4.001	MH7	6.343	0.656	0.000	0.09			1.2	FLOOD RISK	
3.001	MH10	6.341	0.632	0.000	0.11			3.7	FLOOD RISK	
2.001	MH11	6.337	0.728	0.000	0.19			5.6	FLOOD RISK	
2.002	MH12	6.331	0.815	0.000	0.23			5.8	FLOOD RISK	
1.001	MH13	6.329	0.763	0.000	0.12			6.5	FLOOD RISK	
1.002	MH14	6.327	0.809	0.000	0.13			8.9	FLOOD RISK	
6.000	MH15	6.320	0.670	0.000	0.01			0.9	FLOOD RISK	
1.003	MH16	6.320	0.998	0.000	0.08			4.7	FLOOD RISK	
1.004	MH17	6.190	0.884	70.154	0.12			12.2	FLOOD	24
7.000	MH18	6.316	0.521	0.000	0.32			9.9	SURCHARGED	
7.001	MH19	6.288	0.593	0.000	0.56			30.0	SURCHARGED	

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
8.000	MH20	30 Winter	1000	+0%	1000/15 Summer			
8.001	MH21	30 Winter	1000	+0%	1000/15 Summer			
7.002	MH22	30 Winter	1000	+0%	1000/15 Summer			
9.000	MH23	15 Winter	1000	+0%	1000/15 Summer			
7.003	MH24	30 Summer	1000	+0%	1000/15 Summer			
7.004	MH25	4320 Winter	1000	+0%	1000/15 Summer			
7.005	MH26	4320 Winter	1000	+0%	1000/15 Summer			
10.000	MH27	360 Winter	1000	+0%	1000/15 Summer			
10.001	MH28	360 Winter	1000	+0%	1000/15 Summer			
11.000	MH29	360 Winter	1000	+0%	1000/15 Summer			
10.002	MH30	360 Winter	1000	+0%	1000/15 Summer			
12.000	MH31	360 Winter	1000	+0%	1000/15 Summer			
10.003	MH32	360 Winter	1000	+0%	1000/15 Summer			
13.000	MH33	360 Winter	1000	+0%	1000/15 Summer			
10.004	MH34	360 Winter	1000	+0%	1000/15 Summer			
7.006	MH35	4320 Winter	1000	+0%	1000/15 Summer			
7.007	MH36	4320 Winter	1000	+0%	1000/15 Summer			
1.005	MH37	4320 Winter	1000	+0%	1000/15 Summer	1000/360 Winter		
1.006	MH38	4320 Winter	1000	+0%	1000/15 Summer			
1.007	MH39	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Summer		
14.000	MH40	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
14.001	MH41	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
15.000	MH42	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
15.001	MH43	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
14.002	MH44	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
16.000	MH45	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
16.001	MH46	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
16.002	MH47	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
16.003	MH48	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
16.004	MH49	4320 Winter	1000	+0%	1000/15 Summer	1000/180 Winter		
14.003	MH50	4320 Winter	1000	+0%	1000/15 Summer	1000/60 Winter		
1.008	MH51	4320 Winter	1000	+0%	1000/15 Summer	1000/30 Summer		
1.009	MH52	4320 Winter	1000	+0%	1000/15 Summer	1000/30 Summer		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
8.000	MH20	6.250	0.500	0.000	0.62			22.7	FLOOD RISK	
8.001	MH21	6.226	0.531	0.000	0.34			23.3	FLOOD RISK	
7.002	MH22	6.219	0.598	0.000	0.82			42.3	SURCHARGED	
9.000	MH23	6.257	0.432	0.000	0.29			27.3	FLOOD RISK	
7.003	MH24	6.198	0.551	0.000	0.63			63.5	SURCHARGED	
7.004	MH25	6.149	0.647	0.000	0.10			8.3	SURCHARGED	
7.005	MH26	6.149	0.691	0.000	0.14			10.7	SURCHARGED	
10.000	MH27	6.265	0.540	0.000	0.15			5.2	FLOOD RISK	

1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
10.001	MH28	6.262	0.624	0.000	0.12			4.9	FLOOD RISK	
11.000	MH29	6.261	0.611	0.000	0.03			1.2	FLOOD RISK	
10.002	MH30	6.260	0.710	0.000	0.15			5.2	FLOOD RISK	
12.000	MH31	6.255	0.705	0.000	0.04			1.5	FLOOD RISK	
10.003	MH32	6.259	0.795	0.000	0.18			6.2	FLOOD RISK	
13.000	MH33	6.249	0.749	0.000	0.07			3.0	FLOOD RISK	
10.004	MH34	6.263	0.887	0.000	0.24			8.4	FLOOD RISK	
7.006	MH35	6.149	0.718	0.000	0.11			10.9	SURCHARGED	
7.007	MH36	6.148	0.819	0.000	0.12			11.4	FLOOD RISK	
1.005	MH37	6.146	0.894	85.638	0.26		215	29.0	FLOOD	21
1.006	MH38	6.144	0.984	0.000	0.34		257	36.0	FLOOD RISK	
1.007	MH39	6.143	1.045	153.298	0.67		109	73.8	FLOOD	29
14.000	MH40	6.133	0.808	81.820	0.59			23.4	FLOOD	28
14.001	MH41	6.133	0.955	82.383	0.74			28.2	FLOOD	28
15.000	MH42	6.133	0.808	82.685	0.66			25.2	FLOOD	28
15.001	MH43	6.133	0.977	82.374	0.77			27.2	FLOOD	28
14.002	MH44	6.135	1.057	83.652	1.44			57.6	FLOOD	28
16.000	MH45	6.136	0.811	85.131	1.63			50.5	FLOOD	28
16.001	MH46	6.136	0.882	85.131	1.00			62.1	FLOOD	28
16.002	MH47	6.136	0.974	136.184	1.07			62.3	FLOOD	28
16.003	MH48	6.137	1.032	136.774	1.37		149	78.4	FLOOD	28
16.004	MH49	6.138	1.084	86.638	1.33			78.7	FLOOD	28
14.003	MH50	6.139	1.149	138.835	1.93			116.2	FLOOD	31
1.008	MH51	6.142	1.220	172.232	3.98			189.8	FLOOD	35
1.009	MH52	6.142	1.262	62.242	1.68			246.0	FLOOD	35