MWP

INIS CEALTRA VISITOR EXPERIENCE PROJECT

CIVIL UTILITIES PLANNING REPORT

Clare County Council

November 2024

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Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
21760	21760-MWP-ZZ-ZZ-RP-C-6034	P01	31/07/2024	AO'D, SH & FF	D Cagney	I Brosnan	DRAFT
21760	21760-MWP-ZZ-ZZ-RP-C-6034	P02	22/11/2024	AO'D, SH, SM & FF	D Cagney	I Brosnan	Final

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1. Introduction

MWP were commissioned by Clare County Council to provide a design for the Civil Utilities, stormwater, foul water, water supply, and public lighting in connection with a planning application for a proposed development on the island of Inis Cealtra and in Mountshannon, Co. Clare and as part of the Inis Cealtra Visitor Experience Project. The Inis Cealtra Visitor Experience Project comprises of four elements/locations outlined as follows:

- Developing of Inis Cealtra with upgraded landing, paths, and pods.
- Village Car Park located north of Aistear Park
- Construction of a Visitor Centre on the grounds of the Rectory
- Reconfiguration of the Harbour Car Park

This report outlines the engineering design proposals for the elements described above relating to the planning application.

2. Site Location

Inis Cealtra is located in Lough Derg with the village of Mountshannon located approximately 2km north west of the island on the Lough Derg shoreline as shown indicatively in Figure 2-1. Lough Derg is a lake on the River Shannon.

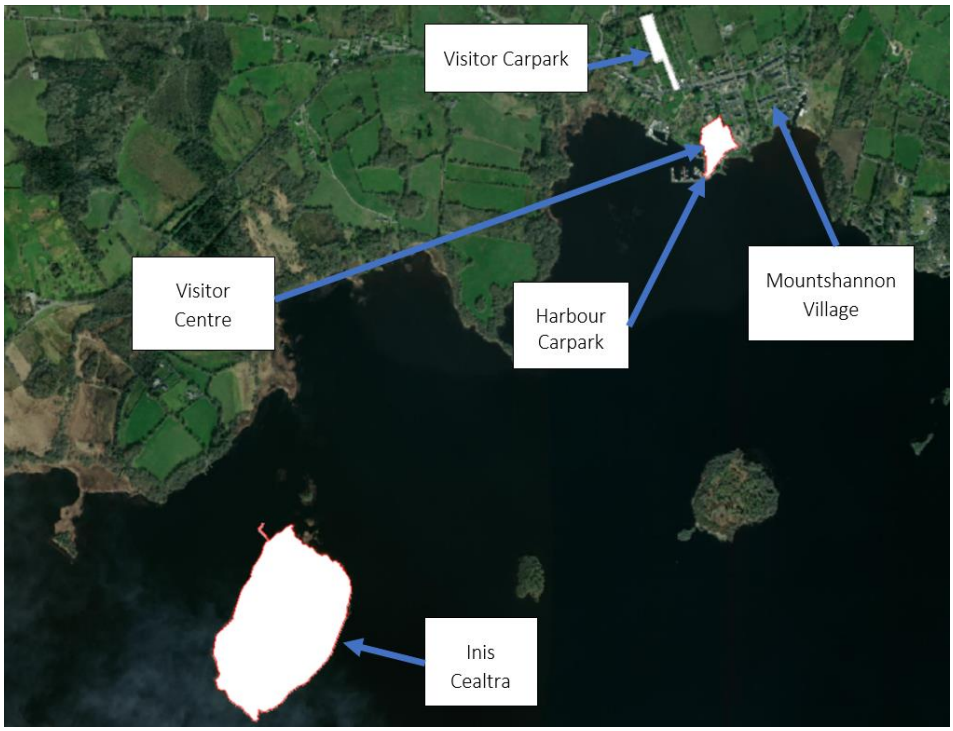


Figure 2-1: Aerial Image of Area (Openstreet)

3. Water Supply Proposals

3.1 Inis Cealtra

It is not reasonably participable to establish a direct water supply connection to the existing Uisce Éireann network to serve Inis Cealtra due to its inherent constraints being an island. In this instance, it is proposed to serve the island with a bottled potable water supply that will meet the needs of the staff on the island and the medical needs of visitors if it arises. Regular boat trips will be scheduled to transport sufficient potable water to meet the needs of staff and visitors. This method of water delivery will be carefully managed to maintain consistent availability and uphold health and safety standards.

3.2 Village Car Park

There is no intention to install a water supply to the Village Car Park.

3.3 Harbour Car Park Reconfiguration

It is envisaged that there is no requirement for a water connection to service the area.

3.4 Visitor Centre

An existing 150mm diameter water main is located on Harbour Road, south of the Visitor Centre. A 100mm diameter pipe will connect to this main via a T-junction that is installed at the site entrance. The T-junction is split into two branches: the western branch will be reserved for connecting to the Visitor Centre, pending planning approval, and the eastern branch will serve the Old Rectory. This is illustrated in Figure 3-1.

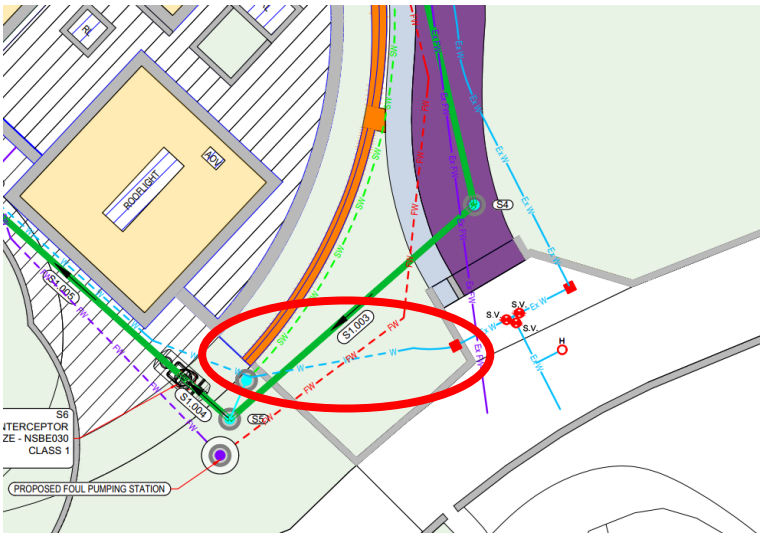


Figure 3-1: Water Supply Layout showing T-junction (Shown in Light Blue and circled)

The existing network is shown in the Confirmation of Feasibility shown in Appendix A where Uisce Éireann confirmed feasibility for this new connection.

Refer to calculations in Appendix B for further information on predicted flow rates based on the Code of Practice by Uisce Éireann. Detailed design will finalise these figures prior to construction. The proposed layout is shown in Appendix C.

4. Foul Water

4.1 Inis Cealtra

A dry toilet system will be implemented on Inis Cealtra to address the logistical challenges of removing solids and liquids. Deposited waste is separated into liquid and solid form. This waste is then stored in a holding container as part of the dry toilet set up. A contractor will be appointed to manage the maintenance of the foul system and waste removal from the island. The designated maintenance contractor will ensure that the waste is delivered to the appropriate Uisce Éireann treatment facility, where it will be processed in accordance with Uisce Éireann standards. Uisce Éireann advised that it is likely that effluent collected would likely be taken by an authorised and licenced tankered wastewater haulier to a WWTP such as Bunlicky Wastewater Treatment Plant in Limerick City.

4.2 Village Car Park

It is not a requirement for foul sewer system within the Village Car Park. Visitors will have access to toilet facilities within the Inis Cealtra Visitor Centre as well as the island of Inis Cealtra.

4.3 Harbour Car Park Reconfiguration

There is no requirement for a foul sewer system to be installed within the Harbour Car Park location.

4.4 Visitor Centre

The site is currently served by a wastewater/foul system that was installed as part of the redevelopment of the Old Rectory building which includes a treatment unit. This treatment unit reduces the biological load from the effluent prior to discharging into the public sewer on Harbour Road.

It is proposed that the foul water generated within the Visitor Centre will be treated by the existing on-site treatment unit prior to discharge by an existing connection to the foul sewer in Harbour Road.

Uisce Éireann have confirmed that this connection is feasible. The Confirmation of Feasibility is shown in Appendix A.

The proposed layout is shown in Appendix C.

Figure 4-1: Visitor Centre Foul Network

Calculations with predicted flow rates are shown in Appendix B using the Code of Practice by Irish Water. These figures will be finalised at detailed design prior to construction. Proposed layout is shown in Appendix C.

5. Storm Water

The stormwater management system has been designed using the following criteria:

- Pipes are designed to reach self-cleansing velocity in the one in 2-year event
- Sewers not surcharging in the 2-year event
- Sewers not flooding in the 100-year event with 20% Climate Change
- Class 1 Bypass Petrol Interceptors
- Sub-surface attenuation systems designed for storage of a 1 in 100-year storm plus 20% Climate Change factor
- The sites/elements are designed to attenuate the greenfield runoff rate for the 1-year, 30-year and 100-year return periods respectively. This is in compliance with Appendix E of the Greater Dublin Strategic Drainage Strategy. The aim of this is to mimic the existing hydrological regime existing on the site so to minimize the impact of the development. An emergency overflow will be provided also in the event of a blockage occurring at the hydrobrake.

5.1 Inis Cealtra

Stormwater generated on the island will be managed at its source by dispersing the runoff through the natural vegetation of Inis Cealtra and the use of permeable materials to maximise the use of SUDS measures where reasonably practicable. There are no plans to implement an underground sewer system.

5.2 Village Car Park

It is proposed to install a new stormwater sewer system within the proposed car park development. The proposed Village car park storm drainage management regime will be served by both hard and soft engineering solutions. It is proposed to integrate a traditional stormwater sewer system with a combination of SuDs measures to manage the stormwater runoff generated by the proposed site. SuDs features such as filter drains and bioretention rain gardens have been designed and integrated within the car park development while taking cognisance of the four main pillars of SuDs which are water quantity, water quality, amenity and biodiversity.

The stormwater management system will tie into a combined public sewer that is located on the R352 which runs east-west at the entrance to the proposed Village Car Park. Discharge from the site will be limited to Greenfield run-off rates. The proposed layout is shown in Appendix C.

It is proposed that reinforced Grasscrete paving will be utilised in the overflow car parking section of the Village Car Park as shown in Figure 5-1. This system allows for infiltration of rainfall in this area as it is recharged to the ground. Any overflow that would occur would be catered for by the proposed access road to car park area which has been sloped towards the east of the site where a filter drain has been positioned to allow surface runoff to infiltrate into the ground naturally. The discharge rates from the site will mimic greenfield runoff flows for the site. The design has been completed taking cognizance of the Greater Dublin Strategic Drainage Strategy and the Clare County Development Plan.

An underground stormwater system is proposed with the site divided into sub-catchments. The sub-catchments are designed so to attenuate the flows generated during storm events as early as practicable in the system. The route has been designed to minimize construction works. This design intent for splitting the site into sub-catchments has the following benefits:

- Minimize sewer sizes required with the scheme as flows are attenuated as early as practicable
- Reduces impact in the event of a flow control failing due to multiple flow controls in the system.
- Avoids the creation of a large single attenuation structure at the end of the scheme.
- Maximizes opportunities for infiltration where suitable ground conditions exist.

The storm drainage proposals incorporate the following elements:

- Pipes are designed to reach self-cleansing velocity in the one in 2-year event.
- Sewers not surcharging in the 2-year event
- Sewers not flooding in the 100-year event with 20% Climate Change.
- Class 1 Bypass Petrol Interceptors
- Sub-surface attenuation systems designed for storage of a 1 in 100-year storm plus 20% Climate Change
- The site is designed to attenuate the greenfield runoff rate for the 1-year, 30-year and 100-year return periods respectively. This is in compliance with Appendix E of the Greater Dublin Strategic Drainage Strategy. The aim of this is to mimic the existing hydrological regime existing on the site so to minimize the impact of the development. An emergency overflow will be provided also in the event of a blockage occurring at the hydrobrake.

The storm sewer system was designed using an iterative approach and the use of Microdrainage software to obtain a design that met these parameters and inputs. Several configurations were developed and the proposed is the option most suited to the site taking cognizance of the constraints including area and site gradients. The attenuation system has been conservatively designed assuming no infiltration so that the maximum volume and footprint area required is catered for within the proposed site layout. Soakaway testing will be completed as part of the site investigation campaign for detailed design post-planning to confirm site ground conditions. If this shows that the ground conditions are suitable, infiltration will be employed which will reduce the attenuation required as the stormwater collected will be recharging the ground water.

The attenuation system is proposed to be constructed using stormtech chamber system. This system was chosen to achieve the requirements of the design to cater for the volume of attenuation

The following SUDS measures will be employed where reasonably practicable in the design:

- Attenuating of flows to the greenfield runoff for the 1-year, 30-year and 100-year return periods respectively, so to mimic the existing hydrological regime existing on the site so to minimize the impact of the development.
- Treatment of stormwater through bypass separators before discharge into the existing storm sewer at greenfield runoff rates.
- Manholes immediately upstream and downstream of the attenuation structures will have catch pits so to prevent silt from passing downstream of the flow control and silt build-up within the attenuation structure. It will assist with ease of maintenance for the sewer system.
- In the event of ground conditions proving suitable, the attenuation structures will incorporate infiltration into their design which will assist with recharging the ground water.

Details of the storm drainage proposals are included in the planning drawings showing proposed site services in Appendix C and the design calculation report is present in Appendix D.

An indicative maintenance plan for the sewer system for this project is provided in Appendix E.

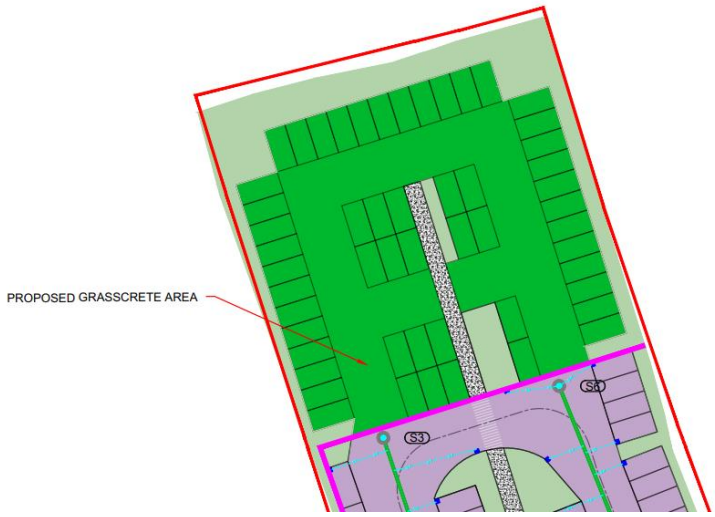


Figure 5-1: Drawing Showing Proposed Grasscrete Paving in Overflow Car-Park

5.3 Harbour Car Park Reconfiguration

The intent for this area is to not change the hydraulic regime that currently exists. The existing outfalls will be maintained.

5.4 Visitor Centre

It is proposed to install a new stormwater sewer system within the proposed Inis Cealtra Visitor Centre development.

The discharge rates from the site will mimic greenfield runoff flows for the site. The design has been completed taking cognizance of the Greater Dublin Strategic Drainage Strategy and the Clare County Development Plan.

The below parameters are utilised in the drainage design for the Inis Cealtra Visitor Centre

- Pipes are designed to reach self-cleansing velocity in the one in 2-year event.
- Sewers not surcharging in the 2-year event
- Sewers not flooding in the 100-year event with 20% Climate Change.
- Class 1 Bypass Petrol Interceptors
- Sub-surface attenuation systems designed for storage of a 1 in 100-year storm plus 20% Climate Change
- The site is designed to attenuate the greenfield runoff rate for the 1-year, 30-year and 100-year return periods respectively. This is in compliance with Appendix E of the Greater Dublin Strategic Drainage Strategy.

The attenuation system is proposed to be constructed using a cellular crate system. This system was chosen to achieve the requirements of the design to cater for the volume of attenuation

The following SUDS measures will be employed where reasonably practicable in the design:

- Attenuating of flows to the greenfield runoff for the 1-year, 30-year and 100-year return periods respectively, so to mimic the existing hydrological regime existing on the site so to minimize the impact of the development.
- Treatment of stormwater through bypass separators before discharge into the existing storm sewer at greenfield runoff rates.
- Manholes immediately upstream and downstream of the attenuation structures will have catch pits so to prevent silt from passing downstream of the flow control and silt build-up within the attenuation structure. It will assist with ease of maintenance for the sewer system.
- In the event of ground conditions proving suitable, the attenuation structures will incorporate infiltration into their design which will assist with recharging the ground water.

The stormwater runoff will connect into an existing stormwater drainage system before discharging through a nearby outfall into Lough Derg.

Details of the storm drainage proposals are included in the planning drawings showing proposed site services in Appendix C and the design calculation report is present in Appendix D.

An indicative maintenance plan for the sewer system for this project is provided in Appendix E.

6. Public Lighting

Lighting throughout the developments shall be in compliance with Clare County Councils Public Lighting Policy.

6.1 Inis Cealtra

On Inis Cealtra, electricity for the caretaker's pod and the WC's will be provided by Solar PV panels installed on the roofs of these units.

6.2 Village Car Park

LED Lanterns mounted on 6m Columns shall be installed. Each lantern shall be controlled via an individual photocell with the overall carpark lighting scheme controlled via an astronomical time clock which will allow the lights to be switched off when the carpark is not in use. Cognisant of the rural location, the light fittings proposed all provide downward light output only to ensure that there is no adverse light pollution on the surrounding environs. The lanterns specified are designed to operate at 3000K to minimise any unfavourable effects on the local wildlife and natural environment. The carpark shall be designed in accordance with CIBSE guidelines and IS EN 12464-2 for parking areas to a minimum lux level of 10 lux for medium traffic areas.

In the Village Car Park, there will be EV charging points. EV charging points shall be provided for 20% of the carparking spaces in the carpark with ducting for future EV charging brought to the remaining spaces. The existing overhead ESB lines traversing the village car park site will be undergrounded. MWP will liaise with ESB Networks at detailed design stage to agree the route of the underground cable and the location of any mini pillars that may be required to facilitate the undergrounding of the overhead cable.

An indicative public lighting layout for the Village Car Park is provided in Appendix F.

Power and data ducting and cabling shall also be provided to entry and exit access control barriers in the Village Carpark aswell as a ticket machine.

6.3 Harbour Car Park Reconfiguration

The LED lanterns in the Harbour Carpark shall be controlled via individual photocells. The lighting in the Harbour Carpark shall be designed in accordance with CIBSE guidelines and IS EN 12464-2 to a minimum lux level of 10 lux. All the lanterns specified are designed to operate at 3000K to minimise any unfavourable effects on the local wildlife and natural environment

In the Harbour Car Park, there will be EV charging points. EV charging points shall be provided for 20% of the carparking spaces in the carpark with ducting for future EV charging brought to the remaining spaces

6.4 Visitor Centre

Given the rural location of the Visitor Centre, the design philosophy is to provide sufficient lighting to guide people in the entrance and along either the driveway of or the pathway to the property and to provide enough lighting to allow safe access and egress from the building. Cognisant of the rural location, the light fittings proposed all provide downward light output only to ensure that there is no adverse light pollution on the surrounding environs. All the lanterns specified are designed to operate at 3000K to minimise any unfavourable effects on the local wildlife and natural environment. The LED bollard lights on the plaza at the entrance to the new Visitor Centre shall be controlled via photocell and astronomical time clock. The lighting in the Plaza area shall be designed in accordance with CIBSE guidelines and IS EN 12464-2 to a minimum lux level of 10 lux.

7. Road Geometry

The vertical alignment of the roads within the sites have been designed in accordance with the “DMURS” by the Department of Transport, Tourism and Sport and the Department of Housing, Planning and Local Government (2019).

7.1 Inis Cealtra

There are no existing road networks on Inis Cealtra and none are proposed as part of this project. New pathways are proposed which will serve to regularise pedestrian movements on the island and irregular paths on the island which includes connection with the upgraded mooring point on the island. An accessibility audit has been conducted in relation to the proposed paths.

The existing jetty on the northwest side of Inis Cealtra will be upgraded to accommodate the expected increase in visitors.

7.2 Village Car Park

The layout within the Village Car park has been designed in a manner which allows for the movement of tourist buses similar to the type shown in Figure 7-1 to traverse the site with minimal need for reversing movements. This layout has been subjected to a swept path analysis of using a model for a Van Hool TDX27 as seen in Figure 7-1.

Figure 7-1: Van Hool TDX27 (Van Hool website)

A two-way system is in place at the southern portion of the site. Buses will be able to circulate the site without the need for reversing. An area has been designed to allow for buses to traverse through the car park in the event that all the available spaces are occupied. The layout has been developed taking cognisance of the visitor management plan to minimize the extent of hard paving required on the site. It has been split into permanent and temporary cark parking. The temporary car parking is proposed to cater for overflow parking at the height of the tourist season which is envisaged to be during the summer months.

Traffic calming measures such as speedbumps will be installed at appropriate intervals to reduce the speed of motor traffic using the Village Car Park. This will assist with reducing speeds and increase driver awareness within the car park due to the vulnerable road users utilising it. A path is provided in the south of the site to allow pedestrians to traverse from the car park entrance around the site.

The sightlines at the entrance of the car park with the main street have been developed taking cognisance of the traffic calming measures, speed cushions, pedestrian crossings, carriageway narrowing etc., which have been installed on the Main Road in Mountshannon which is understood to reduce the design speed to 30km/hr.

7.3 Harbour Car Park Reconfiguration

The Harbour Cark Park has been reconfigured to improve the circulation around the Harbour area and to create a shared space. This shared space has been designed to allow for vulnerable road users to traverse between the Visitor Centre and Mountshannon Harbour. Traffic calming features will be implemented to reduce the risk to vulnerable road users. The speed limit in this area will be reduced to accommodate this development to 30km/hr.

The Harbour Car Park Reconfiguration has been subjected to a swept path analysis of a jeep and boat trailer. This is to verify that the difficulty of vehicles accessing the slip way to launch boats has not been negatively impacted by the proposed reconfiguration.

7.4 Visitor Centre

The existing access track serving the Rectory Centre will be realigned as a result of the proposed development to accommodate the Visitor Centre. This revised internal road layout of the Visitor Centre site has been subjected to a swept path analysis of a bin lorry and a fire engine. The new Visitor Centre will allow for pedestrian access directly to the shared space being created in the Harbour Car Park.

Appendix A

Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Daniel Cagney
Malachy Walsh & Partners
The Elm Suite
Loughmore Centre
Raheen Business Park
Limerick
V94R578

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

12 September 2024

Our Ref: CDS21001716 Pre-Connection Enquiry
Visitors Centre, The Rectory, Mountshannon, Clare

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Business Connection of 1 unit(s) at Visitors Centre, The Rectory, Mountshannon, Clare, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection**
  - Feasible without infrastructure upgrade by Uisce Éireann
  - There is capacity at the Mountshannon Water Treatment Plant to supply this development. The existing 150mm uPVC watermain on the local road serving this site can facilitate a new water connection.
- **Wastewater Connection**
  - Feasible without infrastructure upgrade by Uisce Éireann
  - The existing sewer (as shown on the enclosed map) on the local road serving this site can facilitate the wastewater connection from this development.

- Uisce Éireann have completed optimisation works at Mountshannon Wastewater Treatment Plant.

- The proposed development wastewater loadings will be assessed by UE to ensure there is adequate capacity at connection application stage.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Uisce Éireann's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Uisce Éireann's network(s). This is not a connection offer and capacity in Uisce Éireann's network(s) may only be secured by entering into a connection agreement with Uisce Éireann.

For any further information, visit **www.water.ie/connections**, **email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

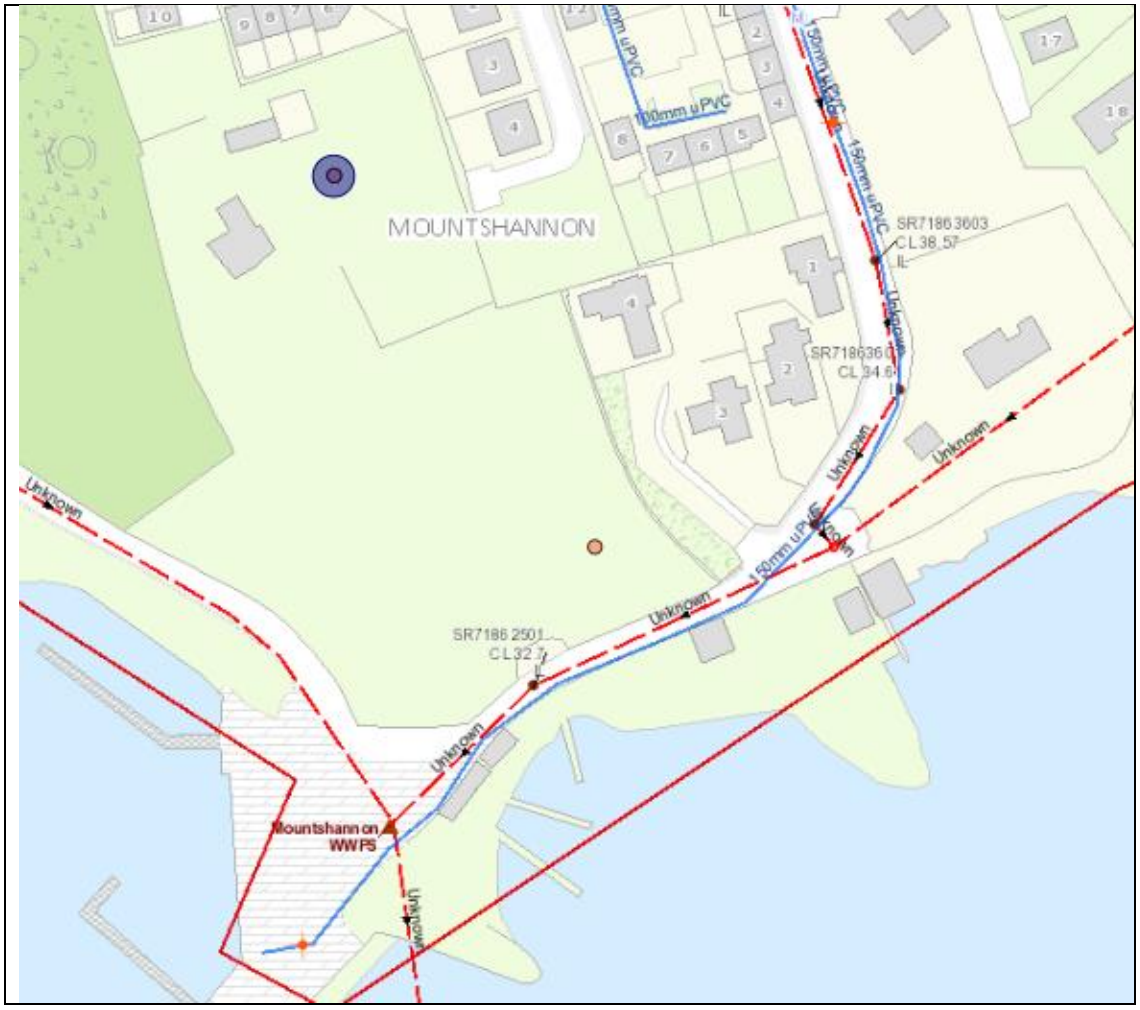
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s). • Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Uisce Éireann connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Uisce Éireann's network(s)?	• Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Uisce Éireann's Network(s)

The map included below outlines the current Uisce Éireann infrastructure adjacent the Development: To access Uisce Éireann Maps email datarequests@water.ie



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Note: The information provided on the included maps as to the position of Uisce Éireann's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Uisce Éireann.

Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Uisce Éireann's underground network(s). The

onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann’s underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

Appendix B

Water Mains and Foul Calculations for the site

12/08/2024

Irish Water Preconnection Application Form Calculations

Site Details

Address: Visitor Centre, Mountshannon, Co. Clare

Calculations based on current phase only.
Source: Irish Water Code of Practice for Water

Watermains - Visitors Centre

Predicted Figures for busiest day in Year 5 after opening.

Occupant	Number	Rate (l/d)	Total	
Staff	20	60	1200	
Visitors	484	10	4840	
Average Usage			6040	l/d
			0.168	l/s
Peak Demand			0.755	l/s

Assumed similar to day staff in a hotel
Assumed similar to a snack bar/ function room

10 hour day assumed
Peaking Factor of 4.5 as site under 4.5ha

Wastewater - Commercial Flows			
Average discharge (DWF)		0.185	l/s
Peak discharge		0.8305	l/s

Same assumptions as previous and that water in equals water out.
Includes 10% for Infiltration

Surface Water Allowance

Gross Site Area	0.8	ha
Catchment Area	0.016	ha
Intensity	8	mm/hr
Volumetric Runoff Coefficient Cv	0.9	-
	1.300	-
Flow	0.416	l/s

Assumed half the site contributing to runoff with remainder infiltration to ground.
2% of Gross Site Area
Slopes less than 2% present and 100% AEP event

Design Flow	1.247	l/s

12/08/2024

Irish Water Preconnection Application Form Calculations

Site Details

Address: Visitor Centre, Mountshannon, Co. Clare

Calculations based on current phase only.
Source: Irish Water Code of Practice for Water

Watermains - Visitors Centre

Predicted Figures for average day

Occupant	Number	Rate (l/d)	Total	
Staff	12	60	720	
Visitors	350	10	3500	
Average Usage			4220	l/d
			0.117	l/s
Peak Demand			0.528	l/s

Assumed similar to day staff in a hotel
Assumed similar to a snack bar/ function room

10 hour day assumed
Peaking Factor of 4.5 as site under 4.5ha

Wastewater - Commercial Flows			
Average discharge (DWF)		0.129	l/s
Peak discharge		0.58025	l/s

Same assumptions as previous and that water in equals water out.
Includes 10% for Infiltration

Surface Water Allowance

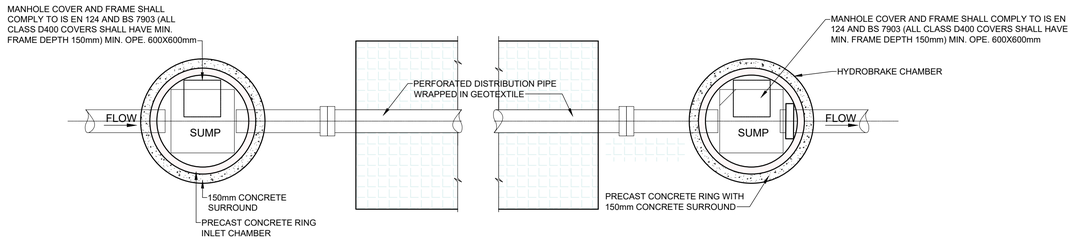
Gross Site Area	0.8	ha
Catchment Area	0.016	ha
Intensity	8	mm/hr
Volumetric Runoff Coefficient Cv	0.9	-
	1.300	-
Flow	0.416	l/s

Assumed half the site contributing to runoff with remainder infiltration to ground.
2% of Gross Site Area
Slopes less than 2% present and 100% AEP event

Design Flow	0.997	l/s

Appendix C

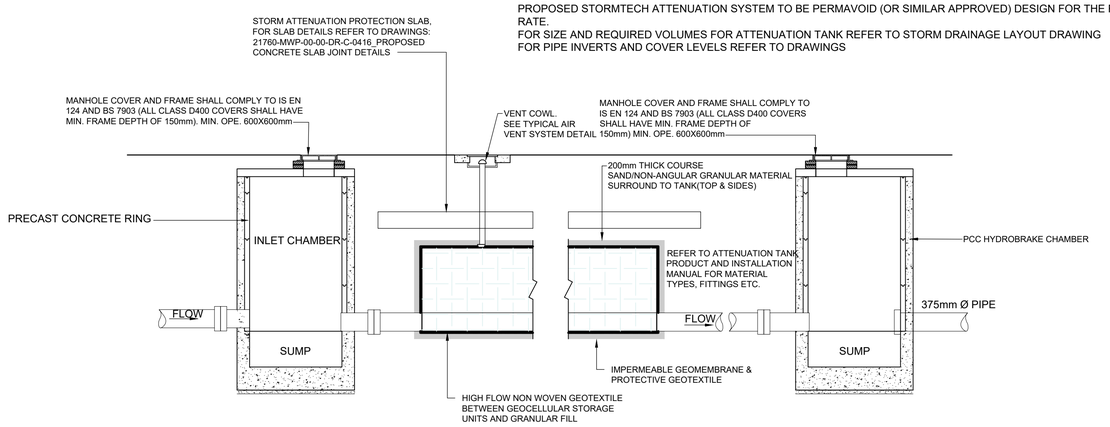
Proposed Storm, Foul and Watermain Layout



ATTENUATION TANK - DETAIL

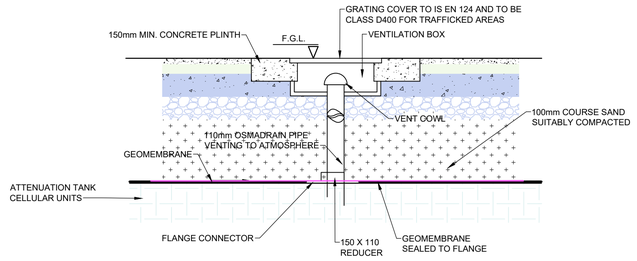
SCALE : 1:50

NOTE:
PROPOSED STORMTECH ATTENUATION SYSTEM TO BE PERMAVOID (OR SIMILAR APPROVED) DESIGN FOR THE RUN OFF RATE.
FOR SIZE AND REQUIRED VOLUMES FOR ATTENUATION TANK REFER TO STORM DRAINAGE LAYOUT DRAWING
FOR PIPE INVERTS AND COVER LEVELS REFER TO DRAWINGS



TYPICAL LONGITUDINAL SECTION THROUGH ATTENUATION SYSTEM

SCALE : 1:20



TYPICAL AIR VENT SYSTEM DETAIL

SCALE : 1:20

NOTE: VENTING DETAILS IN ACCORDANCE WITH MANUFACTURER'S DETAILS, REQUIREMENTS AND RECOMMENDATIONS

NOTES

1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, BILLS OF QUANTITIES, ARCHITECTURAL, SERVICES AND ENGINEERING DRAWINGS.
2. ALL LEVELS ARE IN METRES RELATED TO:
   DATUM: ORDNANCE DATUM MALIN HEAD
   REFERENCE SYSTEM: IRISH TRANSVERSE MERCATOR (ITM)
   GEOID: OSGM15
3. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
3. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
4. DRAWINGS ARE NOT TO BE SCALED.
5. AERIAL IMAGERY, WHEN USED, IS SOURCED FROM MICROSOFT BING MAPS THROUGH THE OPEN LICENSING AGREEMENT WITH AUTODESK.

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	I.B.

PROJECT:
INIS CEALTRA TOURISM EXPERIENCE, MOUNTSHANNON, CO. CLARE

TITLE:
PROPOSED ATTENUATION TANK DETAILS

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

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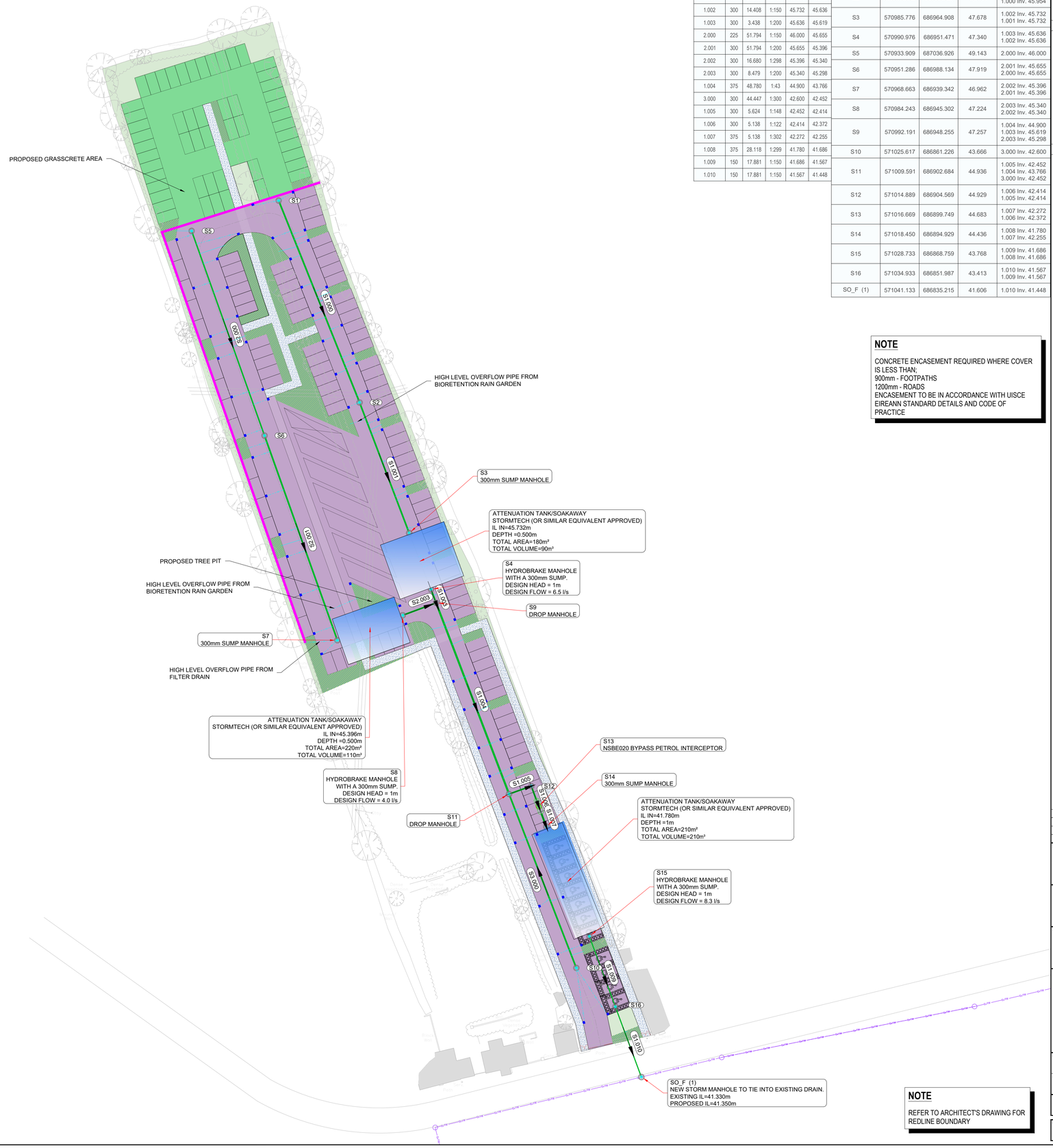
R.H	S.H.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	SEPTEMBER 2024	AS
STATUS DESCRIPTION: FOR INFORMATION		STATUS: S2

DRAWING NUMBER: 21760 - MWP - 00 - 00 - DR - C - 0412
REV: P01

North



STORM NETWORK

Pipe Name	Size	Length	Slope	US IL	DS IL
1.000	300	51.848	1:150	46.300	45.954
1.001	300	33.289	1:150	45.954	45.732
1.002	300	14.408	1:150	45.732	45.636
1.003	300	3.438	1:200	45.636	45.619
2.000	225	51.794	1:150	46.000	45.655
2.001	300	51.794	1:200	45.655	45.396
2.002	300	16.680	1:298	45.396	45.340
2.003	300	8.479	1:200	45.340	45.298
1.004	375	48.780	1:43	44.900	43.766
3.000	300	44.447	1:300	42.600	42.452
1.005	300	5.624	1:148	42.452	42.414
1.006	300	5.138	1:122	42.414	42.372
1.007	375	5.138	1:302	42.272	42.255
1.008	375	28.118	1:299	41.780	41.686
1.009	150	17.881	1:150	41.686	41.567
1.010	150	17.881	1:150	41.567	41.448

STORM STRUCTURE TABLE

Structure Name	Easting	Northing	Cover Level	Connected Pipes
S1	570954.663	687044.153	49.514	1.000 Inv. 46.300
S2	570973.952	686996.026	48.453	1.001 Inv. 45.954 1.000 Inv. 45.954
S3	570985.776	686964.908	47.678	1.002 Inv. 45.732 1.001 Inv. 45.732
S4	570990.976	686951.471	47.340	1.003 Inv. 45.636 1.002 Inv. 45.636
S5	570933.909	687036.926	49.143	2.000 Inv. 46.000
S6	570951.286	686988.134	47.919	2.001 Inv. 45.655 2.000 Inv. 45.655
S7	570968.663	686939.342	46.962	2.002 Inv. 45.396 2.001 Inv. 45.396
S8	570984.243	686945.302	47.224	2.003 Inv. 45.340 2.002 Inv. 45.340
S9	570992.191	686948.255	47.257	1.004 Inv. 44.900 1.003 Inv. 45.619 2.003 Inv. 45.298
S10	571025.617	686861.226	43.666	3.000 Inv. 42.600
S11	571009.591	686902.684	44.936	1.005 Inv. 42.452 1.004 Inv. 43.766 3.000 Inv. 42.452
S12	571014.889	686904.569	44.929	1.006 Inv. 42.414 1.005 Inv. 42.414
S13	571016.669	686899.749	44.683	1.007 Inv. 42.272 1.006 Inv. 42.372
S14	571018.450	686894.929	44.436	1.008 Inv. 41.780 1.007 Inv. 42.255
S15	571028.733	686868.759	43.768	1.009 Inv. 41.686 1.008 Inv. 41.686
S16	571034.933	686851.987	43.413	1.010 Inv. 41.567 1.009 Inv. 41.567
SO_F (1)	571041.133	686835.215	41.606	1.010 Inv. 41.448

NOTE

CONCRETE ENCASEMENT REQUIRED WHERE COVER IS LESS THAN:
900mm - FOOTPATHS
1200mm - ROADS
ENCASEMENT TO BE IN ACCORDANCE WITH UISCE EIREANN STANDARD DETAILS AND CODE OF PRACTICE

NOTE

REFER TO ARCHITECT'S DRAWING FOR REDLINE BOUNDARY

NOTES

1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, BILLS OF QUANTITIES, ARCHITECTURAL, SERVICES AND ENGINEERING DRAWINGS.
2. ALL LEVELS ARE IN METRES RELATED TO;
   DATUM: ORDNANCE DATUM MALIN HEAD
   REFERENCE SYSTEM: IRISH TRANSVERSE MERCATOR (ITM)
   GEOID: OSGM15
3. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
3. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
4. DRAWINGS ARE NOT TO BE SCALED.
5. AERIAL IMAGERY, WHEN USED, IS SOURCED FROM MICROSOFT BING MAPS THROUGH THE OPEN LICENSING AGREEMENT WITH AUTODESK.

LEGEND

- PROPOSED FILTER DRAIN
- PROPOSED STORM DRAIN
- PROPOSED STORM MANHOLE
- PROPOSED 110mm STORM DRAIN (SW)
- EXISTING COMBINED SEWER (Ex FW)
- PROPOSED ATTENUATION TANK
- PROPOSED PETROL INTERCEPTOR
- PROPOSED BIORETENTION GARDEN

REV	DATE	DESCRIPTION	BY	APP
P03	22.11.24	ISSUED FOR INFORMATION	RH	DC
P02	23.08.24	ISSUED FOR INFORMATION	RH	DC
P01	30.07.24	ISSUED FOR INFORMATION	RH	DC

PROJECT:
INIS CEALTRA TOURISM EXPERIENCE,
MOUNTSHANNON, CO. CLARE

TITLE:
PROPOSED CARPARK STORM DRAINAGE LAYOUT

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

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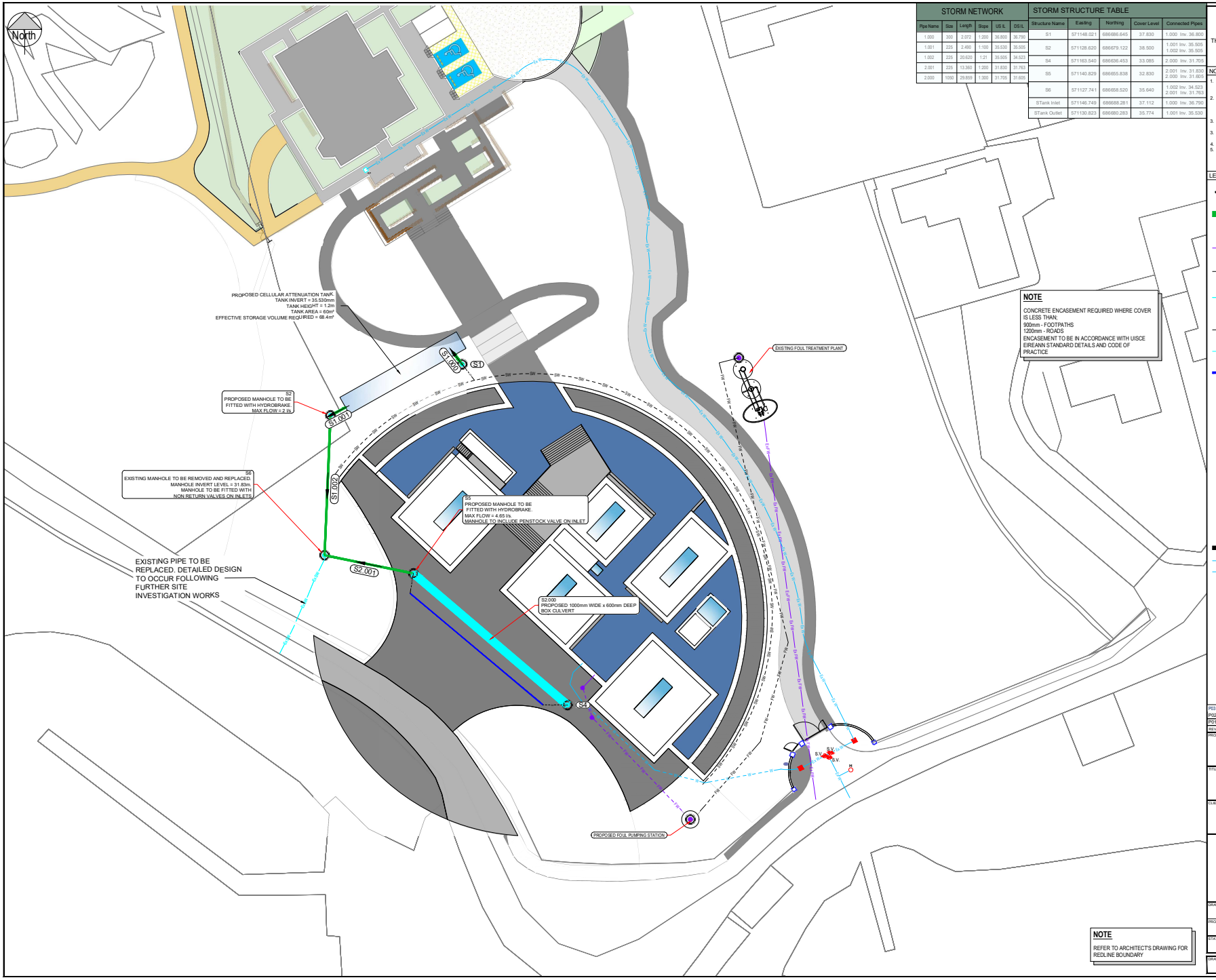
S.S	A.O'D.	D.C.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	AUG' 24	1:500
STATUS DESCRIPTION:		STATUS:
FOR INFORMATION		S2
DRAWING NUMBER:		REV:
21760 - MWP - 00 - 00 - DR - C - 2120		P03



STORM NETWORK

Pipe Name	Size	Length	Slope	US IL	DS IL
1.000	300	2.072	1.200	36.800	36.750
1.001	225	2.490	1.150	35.530	35.505
1.002	225	20.620	1.21	35.505	34.523
2.001	225	13.360	1.200	31.838	31.763
2.000	1050	29.859	1.300	31.705	31.605

STORM STRUCTURE TABLE

Structure Name	Easting	Northing	Cover Level	Connected Pipes
S1	571148.021	686686.645	37.830	1.000 Inv. 36.800
S2	571128.620	686679.122	38.500	1.001 Inv. 35.505 1.002 Inv. 35.505
S4	571163.540	686636.453	33.085	2.000 Inv. 31.705
S5	571140.829	686655.838	32.830	2.001 Inv. 31.838 2.000 Inv. 31.605
S6	571127.741	686658.520	35.640	1.002 Inv. 34.523 2.001 Inv. 31.763
STank Inlet	571146.749	686688.281	37.112	1.000 Inv. 36.790
STank Outlet	571130.823	686680.283	35.774	1.001 Inv. 35.530

NOTES

1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, BILLS OF QUANTITIES, ARCHITECTURAL, SERVICES AND ENGINEERING DRAWINGS.
2. ALL LEVELS ARE IN METRES RELATED TO;
   DATUM: ORDNANCE DATUM MALIN HEAD
   REFERENCE SYSTEM: IRISH TRANSVERSE MERCATOR (ITM)
   GEOID: OSGM15
3. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
4. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
5. DRAWINGS ARE NOT TO BE SCALED.
6. AERIAL IMAGERY, WHEN USED, IS SOURCED FROM MICROSOFT BING MAPS THROUGH THE OPEN LICENSING AGREEMENT WITH AUTODESK.

LEGEND

- SITE BOUNDARY
- PROPOSED STORM DRAINAGE PIPE. THE CONTRACTOR SHALL REFER TO WORKS REQUIREMENTS AND TII STANDARD CONSTRUCTION DETAILS REF:CC-SCD-00521
- PROPOSED FOUL DRAINAGE PIPES TO BE IN ACCORDANCE WITH IRISH WATER STANDARD DETAILS AND CODE OF PRACTICE
- PROPOSED 100MM DIA LAND DRAIN REFER TO DRAWING 22935-MWP-01-XX-DR-C-2405
- PROPOSED 150MM DIA HDPE STORM DRAINAGE CONNECTOR PIPE IN ACCORDANCE WITH TII STANDARD CONSTRUCTION DETAILS REF:CC-SCD-00521
- PROPOSED 80MM DIA FOUL RISING MAIN
- EXISTING STORM DRAIN TO BE RETAINED
- PROPOSED CHANNEL DRAIN
- PROPOSED PCC FOUL MANHOLE TO BE IN ACCORDANCE WITH IRISH WATER STANDARD DETAILS STD-WW-10
- PROPOSED FOUL ACCESS JUNCTION
- PROPOSED PCC STORM MANHOLE. MANHOLE CONSTRUCTION TO BE BUILT IN ACCORDANCE WITH TII STANDARD CONSTRUCTION DETAILS REF: CC-SCD-00504
- PROPOSED STORM ACCESS JUNCTION IN ACCORDANCE WITH TGD PART H AND I.S. EN 13598-2
- PROPOSED FOUL ACCESS JUNCTION IN ACCORDANCE WITH TGD PART H AND I.S. EN 13598-2
- PROPOSED CELLULAR ATTENUATION TANK
- PROPOSED CULVERT
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- PROPOSED HYDRANT
- PROPOSED SLUICE VALVE
- PROPOSED WATER METER

REV	DATE	DESCRIPTION	BY	APP
P03	26.11.24	ISSUED FOR TENDER	SM	DC
P02	23.08.24	ISSUED FOR INFORMATION	RH	DC
P01	30.07.24	ISSUED FOR INFORMATION	RH	DC

PROJECT:
INIS CEALTRA RECTORY,
MOUNTSHANNON, CO. CLARE

TITLE:
PROPOSED VISITOR CENTER
DRAINAGE LAYOUT

CLIENT:
CLARE COUNTY COUNCIL

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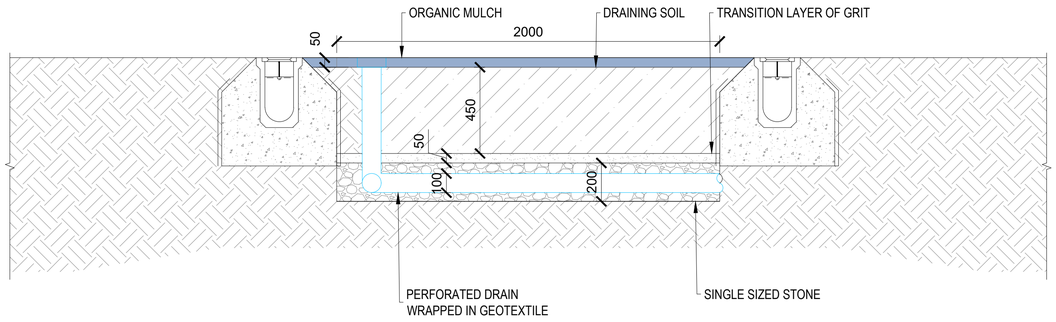
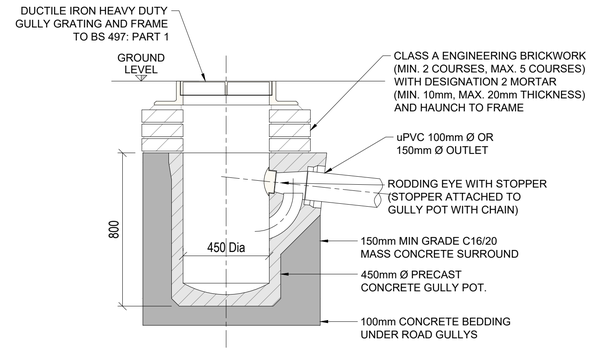
S.S	A.O'D.	D.C.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	AUG' 24	1:500
STATUS DESCRIPTION:		STATUS:
FOR INFORMATION		S2
DRAWING NUMBER:		REV:
21760 - MWP - 00 - 00 - DR - C - 2130		P03



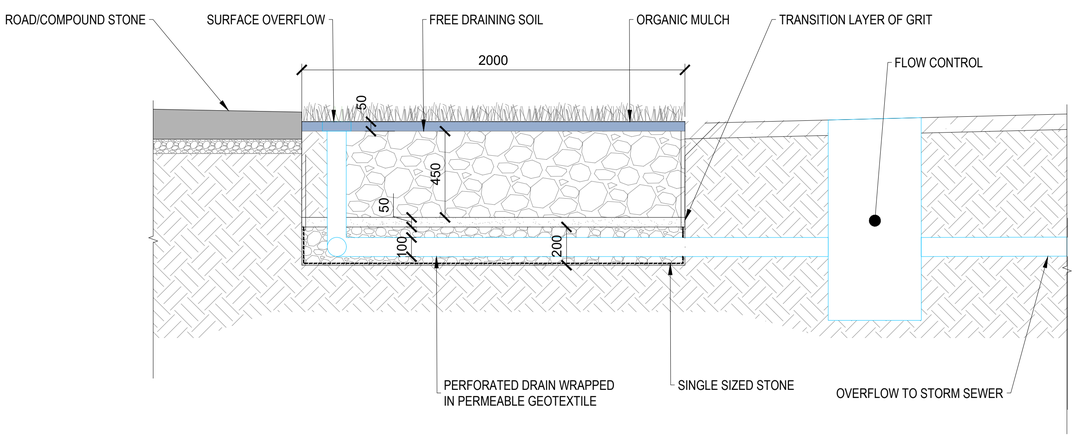
BIORETENTION GARDEN

SCALE: 1:20



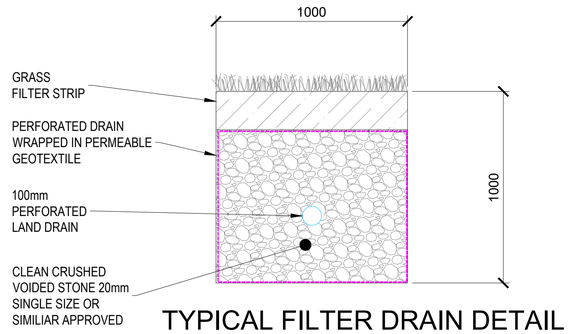
ROAD GULLY DETAIL

SCALE: 1:20



BIORETENTION RAIN GARDEN DETAIL FOR ROADS

SCALE: 1:20



TYPICAL FILTER DRAIN DETAIL

SCALE: 1:20

NOTES:

1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, BILLS OF QUANTITIES, ARCHITECTURAL, SERVICES AND ENGINEERING DRAWINGS.
2. ALL LEVELS ARE IN **METRES** RELATED TO ORDNANCE DATUM MALIN HEAD, OSGM15.
3. ALL COORDINATES ARE TO **ITM (m)**.
4. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
5. DRAWINGS ARE NOT TO BE SCALED.
6. ALL DIMENSIONS ARE IN **MILLIMETRES**, UNLESS NOTED OTHERWISE.

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	I.B.

PROJECT:
INIS CEALTRA RECTORY,
MOUNTSHANNON, CO. CLARE

TITLE:
SITE DRAINAGE DETAILS
SHEET 1

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

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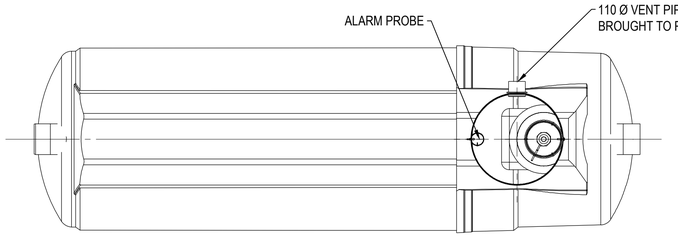
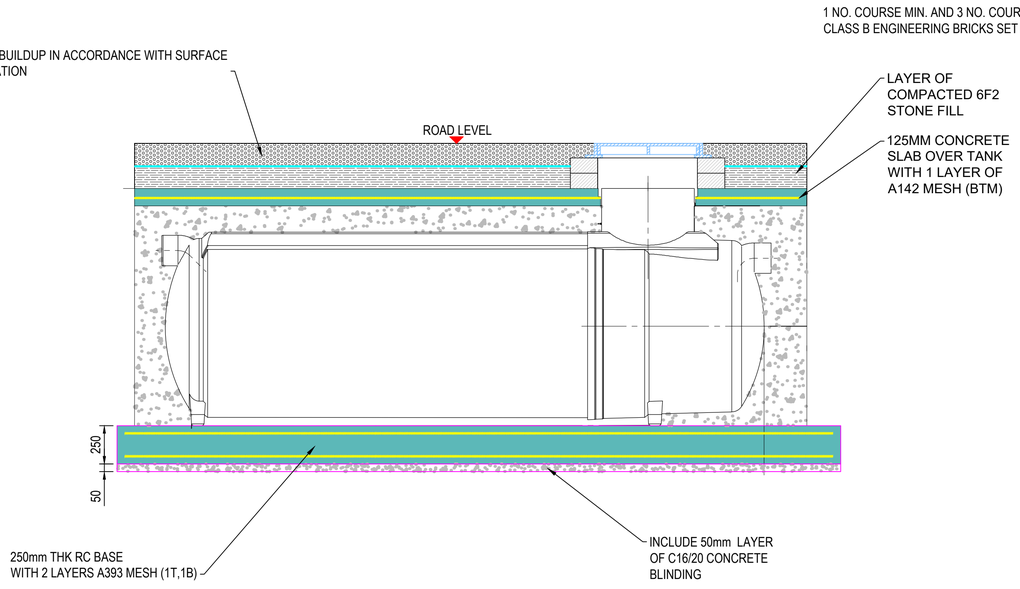
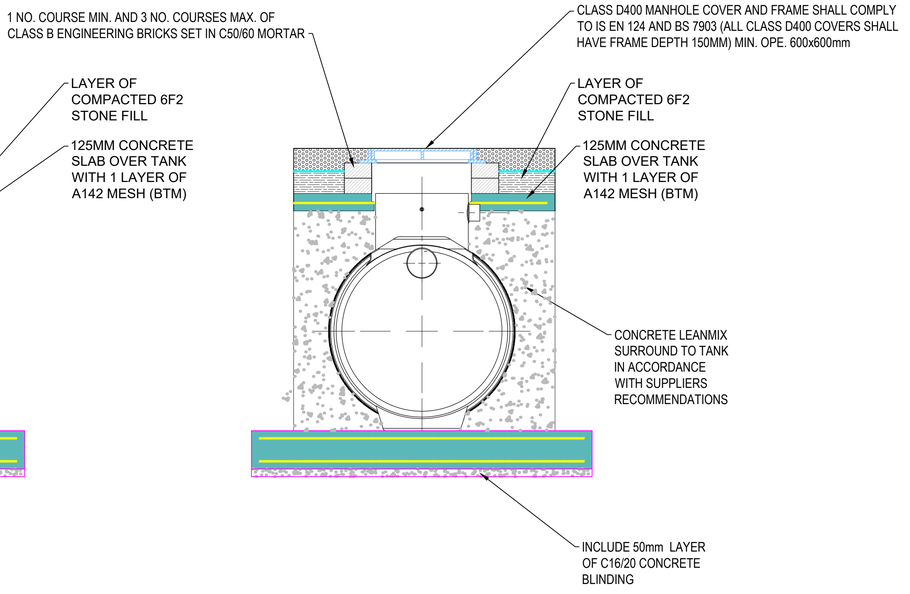
S.S.	S.H.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	NOV' 22	1:20
STATUS DESCRIPTION: FOR INFORMATION		STATUS: S2

DRAWING NUMBER: 21760 - MWP - 00 - 00 - DR - C - 0402
REV: P01

NOTE:
1. ALL CONSTRUCTION PRODUCTS COVERED BY A HARMONIZED EUROPEAN PRODUCT STANDARD SHALL HAVE DECLARATION OF PERFORMANCE AND A CE MARK IN COMPLIANCE WITH THE CONSTRUCTION PRODUCT REGULATION (EU) NO. 395/2011 CPR.
2. ALL EXTERNAL STEELWORK GALVANISED TO IS EN ISO 1461.
3. ALL COVERS, GRATINGS & FRAMES ARE TO BE A MINIMUM OF CLASS D400 DUCTILE IRON IN ACCORDANCE WITH BS EN 124
4. ALL WORK TO BE IN ACCORDANCE WITH EIRGRID FUNCTIONAL SPEC DOCUMENT: - XDS-GFS-13-001-R2







NOTE:
FINAL INTERCEPTOR SPECIFICATION TBC UPON RECEIPT OF SI REPORT

BYPASS INTERCEPTOR

SCALE 1:20

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	I.B.

PROJECT:
INIS CEALTRA TOURISM EXPERIENCE, MOUNTSHANNON, CO. CLARE

TITLE:
TYPICAL BYPASS INTERCEPTOR DETAILS

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
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RH	SH	DC
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	SEPTEMBER 2024	AS SHOWN
STATUS DESCRIPTION:		STATUS:
FOR INFORMATION		S2
DRAWING NUMBER:		REV:
21760 - MWP - 00 - 00 - DR - C - 2406		P01

Appendix D

Storm Water Design Report

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)	5	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	14.900	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.269	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	0	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	49.514	3.214	Open Manhole	1200	S1.000	46.300	300				
S2	48.453	2.499	Open Manhole	1200	S1.001	45.954	300	S1.000	45.954	300	
S3	47.678	1.946	Open Manhole	1200	S1.002	45.732	300	S1.001	45.732	300	
S4	47.340	1.704	Open Manhole	1200	S1.003	45.636	300	S1.002	45.636	300	
S5	49.143	3.143	Open Manhole	1200	S2.000	46.000	225				
S6	47.919	2.264	Open Manhole	1200	S2.001	45.655	300	S2.000	45.655	225	
S7	46.962	1.566	Open Manhole	1200	S2.002	45.396	300	S2.001	45.396	300	
S8	47.224	1.884	Open Manhole	1200	S2.003	45.340	300	S2.002	45.340	300	
S9	47.257	2.357	Open Manhole	1350	S1.004	44.900	375	S1.003	45.619	300	644
								S2.003	45.298	300	323
S10	43.666	1.066	Open Manhole	1200	S3.000	42.600	300				
S11	44.936	2.484	Open Manhole	1350	S1.005	42.452	300	S1.004	43.766	375	1389
								S3.000	42.452	300	
S12	44.929	2.515	Open Manhole	1350	S1.006	42.414	300	S1.005	42.414	300	
S13	44.683	2.411	Open Manhole	1350	S1.007	42.272	375	S1.006	42.372	300	25
S14	44.436	2.656	Open Manhole	1350	S1.008	41.780	375	S1.007	42.255	375	475
S15	43.768	2.082	Open Manhole	1350	S1.009	41.686	150	S1.008	41.686	375	
S16	43.413	1.846	Open Manhole	1200	S1.010	41.567	150	S1.009	41.567	150	
S	43.130	1.682	Open Manhole	0		OUTFALL		S1.010	41.448	150	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	570954.663	687044.153	570954.663	687044.153	Required	
S2	570973.952	686996.026	570973.785	686995.961	Required	
S3	570985.776	686964.908	570985.944	686964.973	Required	
S4	570990.976	686951.471	570991.144	686951.534	Required	
S5	570933.909	687036.926	570933.909	687036.926	Required	
S6	570951.286	686988.134	570951.117	686988.074	Required	
S7	570968.663	686939.342	570968.663	686939.342	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S8	570984.243	686945.302	570984.306	686945.134	Required	
S9	570992.191	686948.255	570992.191	686948.255	Required	
S10	571025.617	686861.226	571025.617	686861.226	Required	
S11	571009.591	686902.684	571009.591	686902.684	Required	
S12	571014.889	686904.569	571014.844	686904.474	Required	
S13	571016.669	686899.749	571016.536	686899.699	Required	
S14	571018.450	686894.929	571018.317	686894.877	Required	
S15	571028.733	686868.759	571028.600	686868.707	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S16	571034.933	686851.987	571034.835	686851.950	Required	
S	571041.133	686835.215			No Entry	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	300	S1	49.514	46.300	2.914	Open Manhole	1200
S1.001	o	300	S2	48.453	45.954	2.199	Open Manhole	1200
S1.002	o	300	S3	47.678	45.732	1.646	Open Manhole	1200
S1.003	o	300	S4	47.340	45.636	1.404	Open Manhole	1200
S2.000	o	225	S5	49.143	46.000	2.918	Open Manhole	1200
S2.001	o	300	S6	47.919	45.655	1.964	Open Manhole	1200
S2.002	o	300	S7	46.962	45.396	1.266	Open Manhole	1200
S2.003	o	300	S8	47.224	45.340	1.584	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	51.848	149.8	S2	48.453	45.954	2.199	Open Manhole	1200
S1.001	33.289	150.0	S3	47.678	45.732	1.646	Open Manhole	1200
S1.002	14.408	150.0	S4	47.340	45.636	1.404	Open Manhole	1200
S1.003	3.438	200.0	S9	47.257	45.619	1.338	Open Manhole	1350
S2.000	51.794	150.1	S6	47.919	45.655	2.039	Open Manhole	1200
S2.001	51.794	200.0	S7	46.962	45.396	1.266	Open Manhole	1200
S2.002	16.680	297.9	S8	47.224	45.340	1.584	Open Manhole	1200
S2.003	8.479	200.0	S9	47.257	45.298	1.659	Open Manhole	1350

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.004	o	375	S9	47.257	44.900	1.982	Open Manhole	1350
S3.000	o	300	S10	43.666	42.600	0.766	Open Manhole	1200
S1.005	o	300	S11	44.936	42.452	2.184	Open Manhole	1350
S1.006	o	300	S12	44.929	42.414	2.215	Open Manhole	1350
S1.007	o	375	S13	44.683	42.272	2.036	Open Manhole	1350
S1.008	o	375	S14	44.436	41.780	2.281	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.004	48.780	43.0	S11	44.936	43.766	0.795	Open Manhole	1350
S3.000	44.447	300.3	S11	44.936	42.452	2.184	Open Manhole	1350
S1.005	5.624	148.0	S12	44.929	42.414	2.215	Open Manhole	1350
S1.006	5.138	122.3	S13	44.683	42.372	2.011	Open Manhole	1350
S1.007	5.138	302.2	S14	44.436	42.255	1.806	Open Manhole	1350
S1.008	28.118	299.1	S15	43.768	41.686	1.707	Open Manhole	1350

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.009	o	150	S15	43.768	41.686	1.932	Open Manhole	1350
S1.010	o	150	S16	43.413	41.567	1.696	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.009	17.881	150.3	S16	43.413	41.567	1.696	Open Manhole	1200
S1.010	17.881	150.3	S	43.130	41.448	1.532	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	grass	20	0.062	0.012	0.012
	Classification	roads	100	0.005	0.005	0.018
	Classification	grass	20	0.009	0.002	0.019
	Classification	grass	20	0.013	0.003	0.022
	Classification	grass	20	0.009	0.002	0.024
	Classification	roads	100	0.174	0.174	0.198
	Classification	roads	100	0.078	0.078	0.276
1.001	Classification	grass	20	0.015	0.003	0.003
	Classification	roads	100	0.003	0.003	0.006
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
2.000	Classification	grass	20	0.066	0.013	0.013
	Classification	grass	20	0.011	0.002	0.015
	Classification	grass	20	0.007	0.001	0.017
	Classification	grass	20	0.004	0.001	0.018
	Classification	roads	100	0.080	0.080	0.097
2.001	Classification	grass	20	0.010	0.002	0.002
	Classification	roads	100	0.094	0.094	0.096
2.002	Classification	grass	20	0.008	0.002	0.002
	Classification	grass	20	0.001	0.000	0.002
	Classification	grass	20	0.002	0.000	0.002
	Classification	grass	20	0.004	0.001	0.003
	Classification	roads	100	0.033	0.033	0.036
2.003	-	-	100	0.000	0.000	0.000
1.004	Classification	grass	20	0.001	0.000	0.000
	Classification	grass	20	0.001	0.000	0.000
	Classification	grass	20	0.001	0.000	0.001

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	Classification	roads	100	0.061	0.061	0.062
3.000	Classification	grass	20	0.001	0.000	0.000
	Classification	grass	20	0.005	0.001	0.001
	Classification	roads	100	0.099	0.099	0.100
1.005	-	-	100	0.000	0.000	0.000
1.006	Classification	grass	20	0.001	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.858	0.674	0.674

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	300	2.199	2.914	Unclassified	1200	0	2.914	Unclassified
S1.001	S2	300	1.646	2.199	Unclassified	1200	0	2.199	Unclassified
S1.002	S3	300	1.404	1.646	Unclassified	1200	0	1.646	Unclassified
S1.003	S4	300	1.338	1.404	Unclassified	1200	0	1.404	Unclassified
S2.000	S5	225	2.039	2.918	Unclassified	1200	0	2.918	Unclassified
S2.001	S6	300	1.266	1.964	Unclassified	1200	0	1.964	Unclassified
S2.002	S7	300	1.266	1.584	Unclassified	1200	0	1.266	Unclassified
S2.003	S8	300	1.575	1.659	Unclassified	1200	0	1.584	Unclassified
S1.004	S9	375	0.795	1.982	Unclassified	1350	0	1.982	Unclassified
S3.000	S10	300	0.766	2.184	Unclassified	1200	0	0.766	Unclassified
S1.005	S11	300	2.147	2.215	Unclassified	1350	0	2.184	Unclassified
S1.006	S12	300	2.011	2.215	Unclassified	1350	0	2.215	Unclassified
S1.007	S13	375	1.806	2.036	Unclassified	1350	0	2.036	Unclassified
S1.008	S14	375	1.707	2.281	Unclassified	1350	0	2.281	Unclassified
S1.009	S15	150	1.696	1.932	Unclassified	1350	0	1.932	Unclassified
S1.010	S16	150	1.532	1.772	Unclassified	1200	0	1.696	Unclassified

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)
S1.010	S	43.130	41.448	41.330	0	0

Simulation Criteria for Storm

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

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 3	Number of Storage Structures 3	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	14.900	Cv (Summer)	0.750
Return Period (years)	5	Ratio R	0.269	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S4, DS/PN: S1.003, Volume (m³): 2.9

Unit Reference	MD-SHE-0119-6500-1000-6500	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	119
Design Flow (l/s)	6.5	Invert Level (m)	45.636
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	6.5	Kick-Flo®	0.649	5.3
Flush-Flo™	0.296	6.5	Mean Flow over Head Range	-	5.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.2	0.600	5.8	1.600	8.1	2.600	10.2	5.000	13.9	7.500	16.9
0.200	6.3	0.800	5.9	1.800	8.6	3.000	10.9	5.500	14.5	8.000	17.4
0.300	6.5	1.000	6.5	2.000	9.0	3.500	11.7	6.000	15.2	8.500	17.9
0.400	6.4	1.200	7.1	2.200	9.4	4.000	12.5	6.500	15.7	9.000	18.4
0.500	6.2	1.400	7.6	2.400	9.8	4.500	13.2	7.000	16.3	9.500	18.9

Hydro-Brake® Optimum Manhole: S8, DS/PN: S2.003, Volume (m³): 3.2

Unit Reference	MD-SHE-0095-4000-1000-4000	Sump Available	Yes
Design Head (m)	1.000	Diameter (mm)	95
Design Flow (l/s)	4.0	Invert Level (m)	45.340
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.0	Kick-Flo®	0.629	3.2
Flush-Flo™	0.294	4.0	Mean Flow over Head Range	-	3.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.0	0.600	3.4	1.600	5.0	2.600	6.2	5.000	8.5	7.500	10.3
0.200	3.9	0.800	3.6	1.800	5.3	3.000	6.7	5.500	8.9	8.000	10.6
0.300	4.0	1.000	4.0	2.000	5.5	3.500	7.2	6.000	9.3	8.500	10.9
0.400	3.9	1.200	4.3	2.200	5.8	4.000	7.6	6.500	9.6	9.000	11.2
0.500	3.8	1.400	4.7	2.400	6.0	4.500	8.1	7.000	10.0	9.500	11.5

Hydro-Brake® Optimum Manhole: S15, DS/PN: S1.009, Volume (m³): 5.9

Unit Reference	MD-SHE-0134-8300-1000-8300	Flush-Flo™	Calculated
Design Head (m)	1.000	Objective	Minimise upstream storage
Design Flow (l/s)	8.3	Application	Surface

Hydro-Brake® Optimum Manhole: S15, DS/PN: S1.009, Volume (m³): 5.9

Sump Available Yes Minimum Outlet Pipe Diameter (mm) 150
Diameter (mm) 134 Suggested Manhole Diameter (mm) 1200
Invert Level (m) 41.686

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.3	Kick-Flo®	0.664	6.9
Flush-Flo™	0.300	8.3	Mean Flow over Head Range	-	7.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	0.600	7.5	1.600	10.4	2.600	13.0	5.000	17.8	7.500	21.6
0.200	8.1	0.800	7.5	1.800	10.9	3.000	13.9	5.500	18.6	8.000	22.3
0.300	8.3	1.000	8.3	2.000	11.5	3.500	15.0	6.000	19.4	8.500	23.0
0.400	8.2	1.200	9.0	2.200	12.0	4.000	16.0	6.500	20.2	9.000	23.6
0.500	8.0	1.400	9.7	2.400	12.5	4.500	16.9	7.000	20.9	9.500	24.2

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: S1.003

Invert Level (m) 45.636 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.60
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	220.0	220.0	0.500	220.0	220.0	0.501	0.0	220.0

Cellular Storage Manhole: S8, DS/PN: S2.003

Invert Level (m) 45.340 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.60
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	180.0	180.0	0.500	180.0	180.0	0.501	0.0	180.0

Cellular Storage Manhole: S15, DS/PN: S1.009

Invert Level (m) 41.686 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.60
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	210.0	210.0	1.000	210.0	210.0	1.001	0.0	210.0

Areas for Storm

PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)
S1.000	0.062	20	0.012	570962.994	687047.995
				570953.396	687078.521
				570948.062	687076.847
				570946.566	687081.618
				570935.117	687078.023
				570946.197	687042.721
				570962.994	687047.995
S1.000	0.005	100	0.005	570944.355	687042.131
				570936.564	687066.948
				570938.411	687067.528
				570946.203	687042.723
				570944.351	687042.142
S1.000	0.009	20	0.002	570948.131	687036.568
				570950.297	687036.352
				570951.656	687035.929
				570953.006	687035.283
				570955.343	687032.512
				570957.184	687030.402
				570952.535	687028.562
				570958.053	687014.662
				570962.690	687016.449
				570963.424	687014.589
				570956.251	687011.758
				570948.131	687036.571
S1.000	0.013	20	0.003	570964.136	687012.719
				570956.910	687009.868
				570960.339	687000.042
				570953.730	686997.736
				570954.118	686996.661
				570973.763	686987.892
				570971.186	686994.501
				570966.534	686992.829
				570960.349	687008.934
				570964.853	687010.872
				570964.159	687012.728
S1.000	0.009	20	0.002	570957.631	687048.405
				570963.942	687050.377
				570967.708	687036.355
				570977.409	687010.751
				570982.139	686999.841
				570981.149	686999.366
				570978.038	687007.537
				570973.348	687005.751
				570972.659	687007.565
				570977.288	687009.391
				570971.809	687023.349
				570967.141	687021.533
				570966.403	687023.402
				570971.046	687025.225
				570966.490	687036.832
				570961.865	687035.032
				570961.219	687036.956
				570965.990	687038.454
				570962.995	687047.995

Areas for Storm

PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)
				570958.221	687046.496
S1.000	0.174	100	0.174	570944.360	687042.132
				570957.792	687001.272
				570959.685	687001.917
				570956.910	687009.868
				570964.159	687012.728
				570963.413	687014.584
				570956.251	687011.758
				570948.131	687036.568
				570950.297	687036.352
				570953.103	687035.162
				570957.184	687030.402
				570952.531	687028.572
				570958.122	687014.759
				570962.690	687016.449
				570964.886	687010.885
				570960.223	687009.081
				570966.549	686992.725
				570971.217	686994.516
				570973.763	686987.892
				570963.941	686992.276
				570978.365	686950.253
				570983.719	686947.869
				570998.665	686953.584
				570996.300	686959.769
				570991.641	686958.046
				570990.896	686959.911
				570995.540	686961.767
				570990.175	686975.769
				570985.560	686973.926
				570984.819	686975.859
				570989.439	686977.629
				570984.097	686991.649
				570979.475	686989.803
				570978.704	686991.821
				570983.352	686993.600
				570978.021	687007.530
				570973.347	687005.754
				570972.634	687007.666
				570977.305	687009.398
				570971.798	687023.345
				570967.260	687021.400
				570966.419	687023.382
				570971.046	687025.225
				570966.529	687036.643
				570961.931	687034.936
				570961.219	687036.956
				570965.990	687038.453
				570962.995	687047.995
				570944.356	687042.144
S1.000	0.078	100	0.078	570944.360	687042.132
				570962.998	687047.983
				570965.990	687038.453
				570961.243	687037.106

Areas for Storm

PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)	PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)
				570961.882	687034.991					570979.426	686989.870
				570966.529	687036.643					570984.098	686991.650
				570971.072	687025.236					570989.439	686977.629
				570966.453	687023.302					570984.824	686975.861
				570967.339	687021.384					570985.546	686974.006
				570971.798	687023.345					570990.175	686975.769
				570977.288	687009.391					570995.540	686961.766
				570972.660	687007.563					570990.868	686959.977
				570973.281	687005.931					570991.702	686958.011
				570978.020	687007.530					570996.300	686959.769
				570981.149	686999.366					571001.617	686945.885
				570966.534	686992.829					570997.006	686944.119
				570960.286	687009.024					570997.660	686942.230
				570964.902	687010.845					571004.601	686944.693
				570962.690	687016.449					570999.396	686958.937
				570957.994	687014.712					570994.505	686968.531
				570952.576	687028.557					570990.093	686979.990
				570957.193	687030.379					570984.913	686993.443
				570953.079	687035.193					570982.139	686999.841
				570950.297	687036.352	S1.001	0.003	100	0.003	570981.146	686999.364
				570948.131	687036.571					570971.083	686994.864
				570946.234	687036.445					570966.541	686992.746
				570944.445	687042.159					570971.208	686994.540
S1.001	0.015	20	0.003	570982.139	686999.841					570973.764	686987.892
				570981.149	686999.366					570963.941	686992.276
				570983.384	686993.518	S2.000	0.066	20	0.013	570920.330	687073.381
				570978.719	686991.731					570921.830	687068.611

Areas for Storm

PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)
				570917.057	687067.113
				570926.044	687038.488
				570930.818	687039.989
				570930.479	687037.787
				570944.292	687042.125
				570936.505	687066.930
				570938.412	687067.528
				570935.117	687078.023
				570920.330	687073.381
				570921.828	687068.611
				570917.057	687067.113
S2.000	0.011	20	0.002	570924.995	687038.447
				570930.818	687039.989
				570930.055	687035.034
				570927.977	687034.165
				570935.932	687010.605
				570938.298	687011.413
				570939.939	687006.708
				570937.579	687005.885
				570944.168	686987.001
				570946.528	686987.825
				570942.637	686986.438
				570924.995	687038.447
S2.000	0.007	20	0.001	570940.146	687030.595
				570940.098	687030.731
				570941.854	687033.787
				570943.498	687035.181
				570945.128	687035.987
				570946.120	687036.299
				570952.356	687016.851
				570945.745	687014.546
				570945.077	687016.519
				570949.780	687018.160
				570944.867	687032.243
				570940.190	687030.579
S2.000	0.004	20	0.001	570946.403	687012.655
				570953.015	687014.962
				570957.792	687001.272
				570955.903	687000.613
				570951.785	687012.415
				570947.061	687010.767
				570946.402	687012.655
S2.000	0.080	100	0.080	570946.123	687036.288
				570944.355	687042.131
				570930.479	687037.787
				570930.056	687035.035
				570927.743	687034.227
				570935.958	687010.660
				570938.298	687011.413
				570939.940	687006.708
				570937.631	687005.871
				570944.192	686987.153
				570946.528	686987.825
				570963.941	686992.276

Areas for Storm

PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)	PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)
				570954.118	686996.661					570954.765	686964.220
				570953.730	686997.736					570952.427	686963.382
				570960.339	687000.042					570945.863	686982.297
				570959.685	687001.917					570948.176	686983.104
				570955.903	687000.613					570946.497	686987.813
				570951.785	687012.415	S2.001	0.094	100	0.094	570946.528	686987.825
				570947.106	687010.750					570963.941	686992.276
				570946.402	687012.655					570978.443	686950.221
				570953.015	687014.962					570971.842	686952.967
				570952.356	687016.851					570974.854	686944.709
				570945.746	687014.544					570979.255	686946.278
				570945.085	687016.432					570960.649	686939.954
				570949.780	687018.160					570954.116	686958.654
				570944.867	687032.243					570956.426	686959.460
				570940.177	687030.541					570954.765	686964.220
				570940.098	687030.731					570952.428	686963.564
				570941.854	687033.787					570945.847	686982.226
				570943.498	687035.181					570948.176	686983.104
				570946.123	687036.288					570946.570	686987.839
S2.001	0.010	20	0.002	570946.528	686987.825	S2.002	0.008	20	0.002	570963.900	686938.067
				570942.617	686986.498					570960.595	686936.869
				570960.585	686936.898					570964.255	686926.407
				570963.900	686938.067					570975.893	686931.484
				570963.009	686940.619					570985.620	686935.730
				570960.640	686939.795					570975.294	686932.050
				570954.068	686958.682					570972.967	686938.721
				570956.412	686959.500					570971.753	686938.298

Areas for Storm

PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)
				570973.432	686933.588
				570966.359	686931.094
				570963.900	686938.067
S2.002	0.001	20	0.000	570974.806	686939.378
				570976.483	686934.676
				570977.649	686935.092
				570975.972	686939.802
				570974.803	686939.385
S2.002	0.002	20	0.000	570985.389	686943.158
				570987.068	686938.452
				570992.007	686940.214
				570991.141	686942.119
				570989.555	686943.433
				570987.085	686943.720
				570985.389	686943.158
S2.002	0.004	20	0.001	570983.719	686947.869
				570971.841	686953.163
				570974.854	686944.709
				570983.719	686947.869
S2.002	0.033	100	0.033	570963.009	686940.619
				570966.408	686931.085
				570973.432	686933.588
				570971.753	686938.297
				570975.969	686939.802
				570977.649	686935.091
				570987.068	686938.452
				570985.190	686942.950
				570987.085	686943.720
				570989.555	686943.433
				570991.336	686941.817
				570992.007	686940.214
				570997.639	686942.285
				570996.944	686944.099
				571001.605	686945.896
				570998.665	686953.584
				570974.774	686944.755
S1.004	0.001	20	0.000	571003.011	686942.227
				570998.304	686940.547
				570999.043	686938.637
				571003.702	686940.432
				571003.011	686942.227
S1.004	0.001	20	0.000	571009.071	686926.411
				571004.424	686924.740
				571005.175	686922.780
				571009.791	686924.538
				571009.085	686926.378
S1.004	0.001	20	0.000	571015.154	686910.535
				571010.488	686908.911
				571011.297	686906.918
				571015.970	686908.698
				571015.258	686910.567
S1.004	0.061	100	0.061	571005.023	686901.217
				570990.965	686937.928
				570990.321	686939.611

Areas for Storm

PN	C. Area (ha)	PIMP (%)	Imp. Area (ha)	X (m)	Y (m)
				571004.557	686944.813
				571019.001	686906.276
				571005.277	686901.304
				570990.966	686937.898
S3.000	0.001	20	0.000	571026.719	686866.346
				571032.298	686868.553
				571033.036	686866.626
				571027.468	686864.390
				571026.781	686866.370
S3.000	0.005	20	0.001	571032.961	686849.892
				571034.366	686843.355
				571041.394	686844.799
				571038.617	686852.051
				571032.961	686849.892
S3.000	0.099	100	0.099	571034.080	686843.293
				571026.749	686841.741
				571025.438	686847.868
				571005.023	686901.217
				571019.124	686906.032
				571043.396	686845.137
				571026.738	686841.746
S1.006	0.001	20	0.000	571016.551	686892.949
				571017.295	686890.958
				571022.927	686893.024
				571022.067	686894.978
				571016.749	686893.084

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 14.900 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.269 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 100.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status OFF

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)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.000	S1	15 Winter	1	+20%	100/15 Summer				46.430	-0.170	0.000	0.38		
S1.001	S2	15 Winter	1	+20%	100/15 Summer				46.085	-0.169	0.000	0.39		

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	32.5	OK	
S1.001	S2	32.5	OK	

1 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)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.002	S3	15 Winter	1	+20%	100/15 Summer				45.870	-0.162	0.000	0.43		
S1.003	S4	120 Winter	1	+20%	30/60 Summer				45.792	-0.144	0.000	0.11		64
S2.000	S5	15 Winter	1	+20%	100/120 Winter				46.083	-0.142	0.000	0.28		
S2.001	S6	15 Winter	1	+20%	100/120 Winter				45.764	-0.191	0.000	0.28		
S2.002	S7	15 Winter	1	+20%	30/60 Winter				45.534	-0.162	0.000	0.43		
S2.003	S8	120 Winter	1	+20%	30/60 Summer				45.502	-0.138	0.000	0.06		72
S1.004	S9	60 Winter	1	+20%					44.949	-0.326	0.000	0.04		
S3.000	S10	15 Winter	1	+20%	100/480 Winter				42.692	-0.208	0.000	0.20		
S1.005	S11	30 Winter	1	+20%	100/480 Winter				42.568	-0.184	0.000	0.32		
S1.006	S12	30 Winter	1	+20%	100/480 Winter				42.530	-0.184	0.000	0.32		
S1.007	S13	30 Winter	1	+20%	100/360 Winter				42.400	-0.247	0.000	0.26		
S1.008	S14	360 Winter	1	+20%	30/120 Summer				41.959	-0.196	0.000	0.12		
S1.009	S15	360 Winter	1	+20%	1/60 Summer				41.954	0.118	0.000	0.61		108
S1.010	S16	360 Winter	1	+20%					41.651	-0.066	0.000	0.61		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S3	32.7	OK	
S1.003	S4	5.7	OK	
S2.000	S5	11.4	OK	
S2.001	S6	20.4	OK	
S2.002	S7	23.6	OK	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S2.003	S8	3.8	OK	
S1.004	S9	11.7	OK	
S3.000	S10	11.7	OK	
S1.005	S11	19.5	OK	
S1.006	S12	19.5	OK	
S1.007	S13	19.5	OK	
S1.008	S14	12.0	OK	
S1.009	S15	8.2	SURCHARGED	
S1.010	S16	8.2	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 14.900 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.269 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 100.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status OFF

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) 1, 30, 100
Climate Change (%) 20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.000	S1	15 Winter	30	+20%	100/15 Summer				46.517	-0.083	0.000	0.84		
S1.001	S2	15 Winter	30	+20%	100/15 Summer				46.172	-0.082	0.000	0.86		

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	72.0	OK	
S1.001	S2	71.8	OK	

30 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)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.002	S3	180 Winter	30	+20%	100/15 Summer				46.024	-0.008	0.000	0.28		
S1.003	S4	180 Winter	30	+20%	30/60 Summer				46.018	0.082	0.000	0.13		105
S2.000	S5	15 Winter	30	+20%	100/120 Winter				46.132	-0.093	0.000	0.62		
S2.001	S6	15 Winter	30	+20%	100/120 Winter				45.842	-0.113	0.000	0.67		
S2.002	S7	180 Winter	30	+20%	30/60 Winter				45.750	0.054	0.000	0.31		
S2.003	S8	180 Winter	30	+20%	30/60 Summer				45.746	0.106	0.000	0.07		141
S1.004	S9	30 Summer	30	+20%					44.972	-0.303	0.000	0.08		
S3.000	S10	15 Winter	30	+20%	100/480 Winter				42.742	-0.158	0.000	0.43		
S1.005	S11	15 Winter	30	+20%	100/480 Winter				42.651	-0.101	0.000	0.77		
S1.006	S12	15 Winter	30	+20%	100/480 Winter				42.613	-0.101	0.000	0.77		
S1.007	S13	480 Winter	30	+20%	100/360 Winter				42.555	-0.092	0.000	0.22		
S1.008	S14	480 Winter	30	+20%	30/120 Summer				42.553	0.398	0.000	0.17		
S1.009	S15	480 Winter	30	+20%	1/60 Summer				42.548	0.712	0.000	0.61		216
S1.010	S16	60 Winter	30	+20%					41.652	-0.065	0.000	0.61		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S3	21.2	OK	
S1.003	S4	6.5	SURCHARGED	
S2.000	S5	25.2	OK	
S2.001	S6	49.5	OK	
S2.002	S7	16.8	SURCHARGED	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S2.003	S8	4.0	SURCHARGED	
S1.004	S9	23.0	OK	
S3.000	S10	25.9	OK	
S1.005	S11	47.0	OK	
S1.006	S12	47.4	OK	
S1.007	S13	16.9	OK	
S1.008	S14	16.8	SURCHARGED	
S1.009	S15	8.3	SURCHARGED	
S1.010	S16	8.3	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 14.900 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.269 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 100.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status OFF

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)	1, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.000	S1	15 Winter	100	+20%	100/15 Summer				46.671	0.071	0.000	1.08		
S1.001	S2	180 Winter	100	+20%	100/15 Summer				46.677	0.423	0.000	0.34		

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	92.0	SURCHARGED	
S1.001	S2	28.2	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)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)
S1.002	S3	120 Winter	100	+20%	100/15 Summer				46.689	0.657	0.000	0.46		
S1.003	S4	120 Winter	100	+20%	30/60 Summer				46.757	0.821	0.000	0.13		136
S2.000	S5	240 Winter	100	+20%	100/120 Winter				46.672	0.447	0.000	0.20		
S2.001	S6	240 Winter	100	+20%	100/120 Winter				46.666	0.711	0.000	0.21		
S2.002	S7	240 Winter	100	+20%	30/60 Winter				46.660	0.964	0.000	0.32		
S2.003	S8	240 Winter	100	+20%	30/60 Summer				46.656	1.016	0.000	0.08		212
S1.004	S9	15 Winter	100	+20%					44.981	-0.294	0.000	0.10		
S3.000	S10	600 Winter	100	+20%	100/480 Winter				43.316	0.416	0.000	0.07		
S1.005	S11	600 Winter	100	+20%	100/480 Winter				43.316	0.564	0.000	0.29		
S1.006	S12	600 Winter	100	+20%	100/480 Winter				43.312	0.598	0.000	0.29		
S1.007	S13	600 Winter	100	+20%	100/360 Winter				43.308	0.661	0.000	0.23		
S1.008	S14	600 Winter	100	+20%	30/120 Summer				43.305	1.150	0.000	0.17		
S1.009	S15	600 Winter	100	+20%	1/60 Summer				43.298	1.462	0.000	0.76		310
S1.010	S16	600 Winter	100	+20%					41.665	-0.052	0.000	0.76		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S1.002	S3	34.5	SURCHARGED	
S1.003	S4	6.5	SURCHARGED	
S2.000	S5	8.0	SURCHARGED	
S2.001	S6	15.8	SURCHARGED	
S2.002	S7	17.2	SURCHARGED	

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

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S2.003	S8	4.5	SURCHARGED	
S1.004	S9	28.1	OK	
S3.000	S10	4.4	SURCHARGED	
S1.005	S11	17.5	SURCHARGED	
S1.006	S12	17.6	SURCHARGED	
S1.007	S13	17.5	SURCHARGED	
S1.008	S14	17.4	SURCHARGED	
S1.009	S15	10.3	SURCHARGED	
S1.010	S16	10.3	OK	

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Phase	Company Address:		

Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
1.000	1	Tank	2.072	Pipe	200.00		0.6	300
1.001	Tank	2	2.490	Pipe	100.00		0.6	225
1.002	2	6	20.620	Pipe	21.00		0.6	225
2.001	5	6	13.360	Pipe	200.00		0.6	225
2.000	4	5	29.859	Box Culvert	300.00	0.013		1000

Name	Height (mm)	Corner Splay (mm)	Upstream Cover Elevation (m)	Upstream Invert Elevation (m)	Downstream Cover Elevation (m)	Downstream Invert Elevation (m)	Lock	Flow Restriction (L/s)
1.000			37.830	36.800	37.830	36.790	All	
1.001			37.830	35.530	38.500	35.505	All	
1.002			38.500	35.505	35.640	34.523	All	2.17
2.001			32.830	31.830	35.640	31.763	All	5.05
2.000	600	0	32.830	31.930	32.830	31.830	All	

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase	Company Address:		

Name	Cover Elevation (m) Invert Elevation (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
1	37.830 36.800	Diameter / Length: 1.200					Manhole
E:571148.021 N:686686.645	1.030		{a} 1.000	Pipe	36.800	Diam/Width:300	Not Applicable
2	38.500 35.505	Diameter / Length: 1.200	{1} 1.001	Pipe	35.505	Diam/Width:225	Manhole
E:571128.620 N:686679.122	2.995		{a} 1.002	Pipe	35.505	Diam/Width:225	Not Applicable
6	35.640 31.763	Diameter / Length: 1.200	{1} 1.002 {2} 2.001	Pipe Pipe	34.523 31.763	Diam/Width:225 Diam/Width:225	Manhole
E:571127.741 N:686658.520	3.877						Not Applicable
4	32.830 31.930	Diameter / Length: 1.200					Manhole
E:571163.540 N:686636.453	0.900		{a} 2.000	Box Culvert	31.930	Diam/Width:1000 Height:600	Not Applicable
5	32.830 31.830	Diameter / Length: 1.200	{1} 2.000	Box Culvert	31.830	Diam/Width:1000 Height:600	Manhole
E:571140.829 N:686655.838	1.000		{a} 2.001	Pipe	31.830	Diam/Width:225	Not Applicable

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase	Company Address:		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analyzed (ha)
Catchment Area	1		Time of Concentration	0.181	100	0	100	0.181
Catchment Area (1)	4		Time of Concentration	0.086	100	0	100	0.086
TOTAL		**0.0**		**0.267**				**0.267**

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Phase	Company Address:		

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimize Excavation
Design Level	Level Crowns
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Manhole Options

Apply Offset	☐

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

1

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 15 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	5.9	5.9	5.9	0.061	0.069	0.000	5.7
10	22.0	22.0	22.0	0.124	0.140	0.000	21.7
15	6.0	6.0	6.0	0.064	0.072	0.000	6.4
20	0.0	0.0	0.0	0.016	0.018	0.000	0.4
25	0.0	0.0	0.0	0.002	0.003	0.000	0.0
30	0.0	0.0	0.0	0.002	0.002	0.000	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	5.7
10	21.7
15	6.4
20	0.4
25	0.0
30	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

2

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 240 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.0	0.0	0.000	0.000	0.000	0.0
10	0.0	0.0	0.0	0.000	0.000	0.000	0.0
15	0.0	0.0	0.0	0.004	0.005	0.000	0.0
20	0.2	0.2	0.2	0.018	0.020	0.000	0.1
25	0.3	0.3	0.3	0.034	0.039	0.000	0.3
30	0.4	0.4	0.4	0.039	0.044	0.000	0.4
35	0.4	0.4	0.4	0.042	0.048	0.000	0.4
40	0.5	0.5	0.5	0.045	0.051	0.000	0.5
45	0.5	0.5	0.5	0.048	0.054	0.000	0.5
50	0.6	0.6	0.6	0.051	0.057	0.000	0.6
55	0.6	0.6	0.6	0.053	0.060	0.000	0.6
60	0.7	0.7	0.7	0.056	0.064	0.000	0.7
65	0.8	0.8	0.8	0.060	0.068	0.000	0.7
70	0.8	0.8	0.8	0.065	0.073	0.000	0.8
75	0.9	0.9	0.9	0.070	0.079	0.000	0.9
80	1.1	1.1	1.1	0.077	0.087	0.000	1.0
85	1.2	1.2	1.2	0.085	0.096	0.000	1.1
90	1.3	1.3	1.3	0.094	0.107	0.000	1.3
95	1.5	1.5	1.5	0.105	0.119	0.000	1.4
100	1.6	1.6	1.6	0.118	0.134	0.000	1.5
105	1.6	1.6	1.6	0.133	0.151	0.000	1.5
110	1.7	1.7	1.7	0.150	0.170	0.000	1.6
115	1.7	1.7	1.7	0.169	0.191	0.000	1.7
120	1.8	1.8	1.8	0.188	0.213	0.000	1.7
125	1.8	1.8	1.8	0.208	0.235	0.000	1.7
130	1.8	1.8	1.8	0.228	0.257	0.000	1.7
135	1.8	1.8	1.8	0.245	0.278	0.000	1.7
140	1.8	1.8	1.8	0.261	0.296	0.000	1.8
145	1.8	1.8	1.8	0.275	0.311	0.000	1.8
150	1.8	1.8	1.8	0.287	0.324	0.000	1.8
155	1.8	1.8	1.8	0.296	0.335	0.000	1.8
160	1.8	1.8	1.8	0.303	0.343	0.000	1.8
165	1.8	1.8	1.8	0.308	0.348	0.000	1.8
170	1.8	1.8	1.8	0.310	0.351	0.000	1.8
175	1.8	1.8	1.8	0.311	0.352	0.000	1.8
180	1.8	1.8	1.8	0.311	0.351	0.000	1.8
185	1.8	1.8	1.8	0.309	0.349	0.000	1.8
190	1.7	1.7	1.7	0.306	0.346	0.000	1.8
195	1.7	1.7	1.7	0.303	0.343	0.000	1.8
200	1.7	1.7	1.7	0.299	0.338	0.000	1.8
205	1.7	1.7	1.7	0.295	0.334	0.000	1.8
210	1.7	1.7	1.7	0.291	0.330	0.000	1.8
215	1.7	1.7	1.7	0.287	0.325	0.000	1.8
220	1.7	1.7	1.7	0.283	0.321	0.000	1.8
225	1.7	1.7	1.7	0.279	0.316	0.000	1.8
230	1.7	1.7	1.7	0.275	0.310	0.000	1.8
235	1.7	1.7	1.7	0.269	0.304	0.000	1.8
240	1.7	1.7	1.7	0.262	0.296	0.000	1.8
245	1.7	1.7	1.7	0.254	0.287	0.000	1.8
250	1.7	1.7	1.7	0.245	0.277	0.000	1.7
255	2.2	2.2	2.2	0.236	0.267	0.000	1.7
260	1.7	1.7	1.7	0.226	0.256	0.000	1.7
265	1.7	1.7	1.7	0.218	0.246	0.000	1.7
270	1.7	1.7	1.7	0.209	0.236	0.000	1.7
275	1.7	1.7	1.7	0.200	0.226	0.000	1.7
280	1.7	1.7	1.7	0.191	0.216	0.000	1.7

Time (mins)	Total Outflow (L/s)
0	0.0
5	0.0
10	0.0
15	0.0
20	0.1
25	0.3
30	0.4
35	0.4
40	0.5
45	0.5
50	0.6
55	0.6
60	0.7
65	0.7
70	0.8
75	0.9
80	1.0
85	1.1
90	1.3
95	1.4
100	1.5
105	1.5
110	1.6
115	1.7
120	1.7
125	1.7
130	1.7
135	1.7
140	1.8
145	1.8
150	1.8
155	1.8
160	1.8
165	1.8
170	1.8
175	1.8
180	1.8
185	1.8
190	1.8
195	1.8
200	1.8
205	1.8
210	1.8
215	1.8
220	1.8
225	1.8
230	1.8
235	1.8
240	1.8
245	1.8
250	1.7
255	1.7
260	1.7
265	1.7
270	1.7
275	1.7
280	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
285	1.6	1.6	1.6	0.182	0.206	0.000	1.7
290	1.6	1.6	1.6	0.174	0.197	0.000	1.7
295	1.6	1.6	1.6	0.165	0.187	0.000	1.6
300	1.6	1.6	1.6	0.157	0.178	0.000	1.6
305	1.6	1.6	1.6	0.149	0.168	0.000	1.6
310	1.5	1.5	1.5	0.141	0.159	0.000	1.6
315	1.5	1.5	1.5	0.132	0.150	0.000	1.5
320	1.5	1.5	1.5	0.125	0.141	0.000	1.5
325	1.5	1.5	1.5	0.117	0.132	0.000	1.5
330	1.4	1.4	1.4	0.109	0.124	0.000	1.4
335	1.3	1.3	1.3	0.102	0.115	0.000	1.4
340	1.3	1.3	1.3	0.095	0.107	0.000	1.3
345	1.2	1.2	1.2	0.089	0.100	0.000	1.2
350	1.1	1.1	1.1	0.082	0.093	0.000	1.1
355	1.0	1.0	1.0	0.077	0.087	0.000	1.0
360	0.9	0.9	0.9	0.072	0.081	0.000	0.9
365	0.8	0.8	0.8	0.067	0.076	0.000	0.9
370	0.8	0.8	0.8	0.063	0.071	0.000	0.8
375	0.7	0.7	0.7	0.059	0.066	0.000	0.7
380	0.6	0.6	0.6	0.055	0.062	0.000	0.6
385	0.6	0.6	0.6	0.052	0.059	0.000	0.6
390	0.5	0.5	0.5	0.049	0.055	0.000	0.5
395	0.5	0.5	0.5	0.046	0.052	0.000	0.5
400	0.4	0.4	0.4	0.044	0.049	0.000	0.4
405	0.4	0.4	0.4	0.041	0.047	0.000	0.4
410	0.4	0.4	0.4	0.039	0.044	0.000	0.4
415	0.3	0.3	0.3	0.037	0.042	0.000	0.3
420	0.3	0.3	0.3	0.035	0.040	0.000	0.3
425	0.3	0.3	0.3	0.034	0.038	0.000	0.3
430	0.2	0.2	0.2	0.031	0.035	0.000	0.2
435	0.2	0.2	0.2	0.027	0.031	0.000	0.2
440	0.1	0.1	0.1	0.024	0.027	0.000	0.1
445	0.1	0.1	0.1	0.022	0.025	0.000	0.1
450	0.1	0.1	0.1	0.021	0.023	0.000	0.1
455	0.1	0.1	0.1	0.020	0.022	0.000	0.1
460	0.1	0.1	0.1	0.019	0.021	0.000	0.1
465	0.1	0.1	0.1	0.018	0.020	0.000	0.1
470	0.1	0.1	0.1	0.017	0.019	0.000	0.1
475	0.1	0.1	0.1	0.017	0.019	0.000	0.1
480	0.1	0.1	0.1	0.016	0.018	0.000	0.1

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
285	1.7
290	1.7
295	1.6
300	1.6
305	1.6
310	1.6
315	1.5
320	1.5
325	1.5
330	1.4
335	1.4
340	1.3
345	1.2
350	1.1
355	1.0
360	0.9
365	0.9
370	0.8
375	0.7
380	0.6
385	0.6
390	0.5
395	0.5
400	0.4
405	0.4
410	0.4
415	0.3
420	0.3
425	0.3
430	0.2
435	0.2
440	0.1
445	0.1
450	0.1
455	0.1
460	0.1
465	0.1
470	0.1
475	0.1
480	0.1

6

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 30 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Inlet (1)(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)
0	0.0	0.0	0.0	0.0	0.000	0.000	0.000
5	0.0	0.0	0.0	0.0	0.000	0.000	0.000
10	0.7	0.5	0.2	0.7	0.004	0.000	0.000
15	3.1	1.3	1.8	3.1	0.020	0.000	0.000
20	5.3	1.6	3.7	5.3	0.033	0.000	0.000
25	5.7	1.7	4.0	5.7	0.035	0.000	0.000
30	5.2	1.7	3.5	5.2	0.031	0.000	0.000
35	4.4	1.7	2.7	4.4	0.025	0.000	0.000
40	3.5	1.7	1.8	3.5	0.017	0.000	0.000
45	2.8	1.7	1.1	2.8	0.010	0.000	0.000
50	2.4	1.7	0.7	2.4	0.006	0.000	0.000
55	2.1	1.7	0.5	2.1	0.004	0.000	0.000
60	2.0	1.7	0.3	2.0	0.002	0.000	0.000

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Free Discharge (L/s)	Total Outflow (L/s)
0	0.0	0.0
5	0.0	0.0
10	0.7	0.7
15	3.1	3.1
20	5.3	5.3
25	5.7	5.7
30	5.2	5.2
35	4.4	4.4
40	3.5	3.5
45	2.8	2.8
50	2.4	2.4
55	2.1	2.1
60	2.0	2.0

4

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 30 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	1.3	1.3	1.3	0.008	0.009	0.000	1.0
10	2.6	2.6	2.6	0.011	0.012	0.000	2.4
15	7.2	7.2	7.2	0.021	0.023	0.000	6.8
20	7.3	7.3	7.3	0.050	0.057	0.000	5.6
25	2.6	2.6	2.6	0.059	0.067	0.000	3.1
30	1.3	1.3	1.3	0.043	0.048	0.000	2.3
35	0.0	0.0	0.0	0.020	0.023	0.000	1.3
40	0.0	0.0	0.0	0.003	0.003	0.000	0.3
45	0.0	0.0	0.0	0.001	0.001	0.000	0.0
50	0.0	0.0	0.0	0.000	0.001	0.000	0.0
55	0.0	0.0	0.0	0.000	0.000	0.000	0.0
60	0.0	0.0	0.0	0.000	0.000	0.000	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	1.0
10	2.4
15	6.8
20	5.6
25	3.1
30	2.3
35	1.3
40	0.3
45	0.0
50	0.0
55	0.0
60	0.0

5

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 30 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet (1)(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	1.0	1.0	1.0	0.005	0.005	0.000	0.0
10	2.4	2.4	2.4	0.036	0.040	0.000	0.3
15	6.8	6.8	6.8	0.101	0.114	0.000	2.0
20	5.6	5.6	5.6	0.151	0.170	0.000	3.7
25	3.1	3.1	3.1	0.160	0.181	0.000	4.0
30	2.3	2.3	2.3	0.143	0.162	0.000	3.5
35	1.3	1.3	1.3	0.121	0.136	0.000	2.6
40	0.3	0.3	0.3	0.097	0.109	0.000	1.8
45	0.0	0.0	0.0	0.073	0.083	0.000	1.0
50	0.0	0.0	0.0	0.058	0.066	0.000	0.7
55	0.0	0.0	0.0	0.048	0.054	0.000	0.4
60	0.0	0.0	0.0	0.041	0.046	0.000	0.3

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

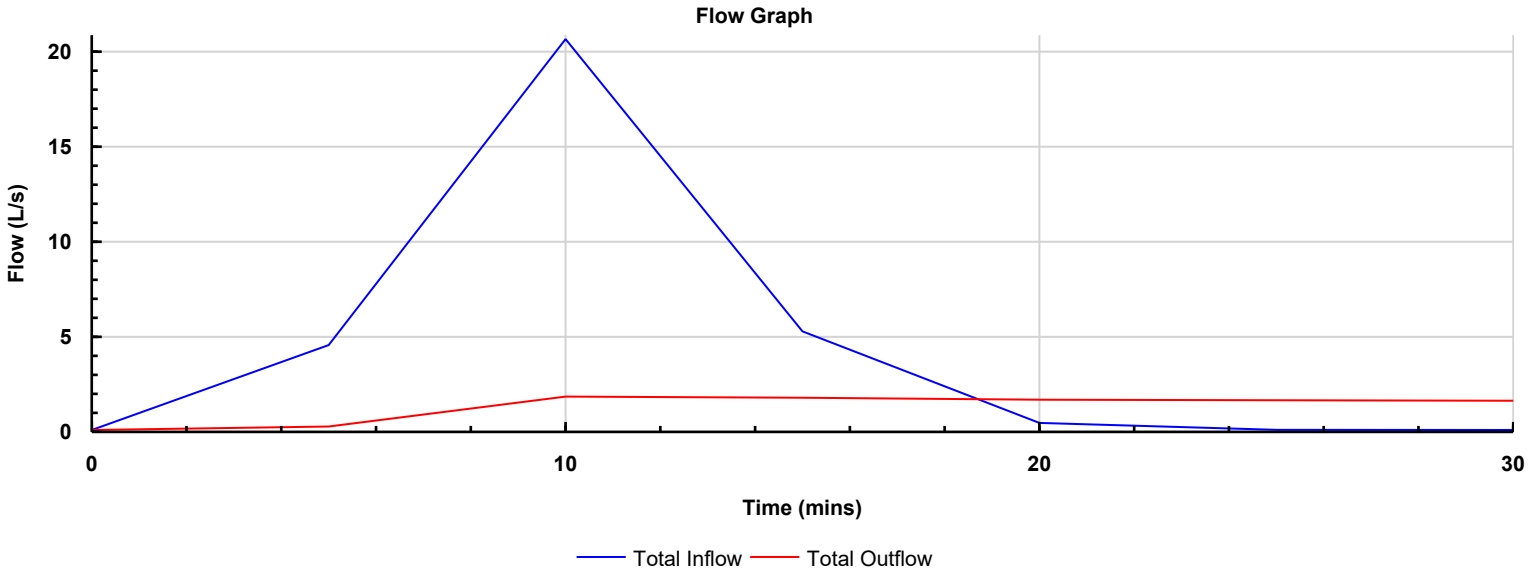
Time (mins)	Total Outflow (L/s)
0	0.0
5	0.0
10	0.3
15	2.0
20	3.7
25	4.0
30	3.5
35	2.6
40	1.8
45	1.0
50	0.7
55	0.4
60	0.3

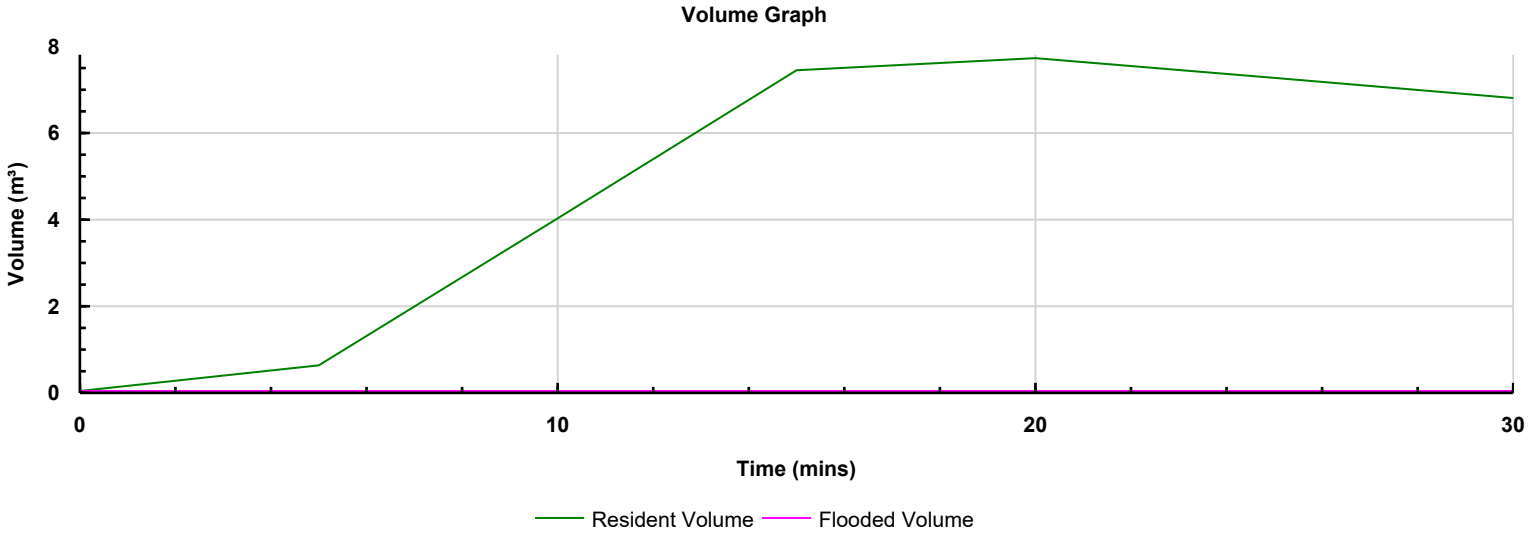
Tank
Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 15 mins: Summer

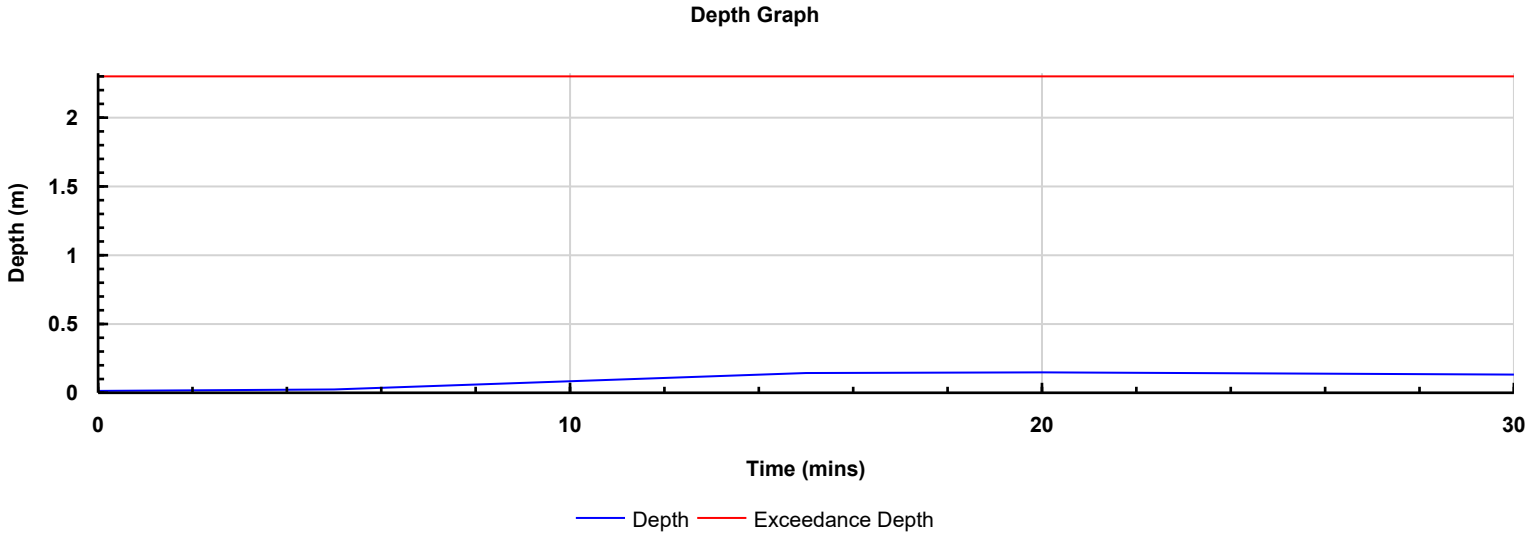
Type : Tank

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address:		

Graphs







1.000

Type : Pipe

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 15 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.058	5.7
10	0.116	21.7
15	0.061	6.4
20	0.015	0.4
25	0.001	0.0
30	0.001	0.0

1.001

Type : Pipe

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 180 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.000	0.0
10	0.002	0.0
15	0.009	0.1
20	0.022	0.3
25	0.028	0.4
30	0.032	0.5
35	0.036	0.5
40	0.040	0.6
45	0.044	0.7
50	0.049	0.8
55	0.055	0.9
60	0.064	1.1
65	0.074	1.2
70	0.088	1.4
75	0.104	1.6
80	0.123	1.7
85	0.145	1.7
90	0.170	1.8
95	0.195	1.8
100	0.220	1.8
105	0.225	1.8
110	0.225	1.8
115	0.225	1.8
120	0.225	1.8
125	0.225	1.8
130	0.225	1.8
135	0.225	1.8
140	0.225	1.8
145	0.225	1.8
150	0.225	1.7
155	0.225	1.7
160	0.225	1.7
165	0.225	1.7
170	0.225	1.7
175	0.225	1.7
180	0.225	1.7
185	0.225	1.7
190	0.225	1.7
195	0.225	1.7
200	0.225	2.2
205	0.225	1.8
210	0.219	1.7
215	0.210	1.7
220	0.201	1.7
225	0.192	1.7
230	0.184	1.7
235	0.175	1.6
240	0.166	1.6
245	0.158	1.6
250	0.149	1.6
255	0.141	1.6
260	0.133	1.5
265	0.125	1.5
270	0.117	1.5
275	0.109	1.5
280	0.101	1.4
285	0.094	1.4
290	0.087	1.3
295	0.080	1.2

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connection Results Storm Phase: Phase	Company Address:		

Time (mins)	Depth (m)	Flow (L/s)
300	0.074	1.1
305	0.068	1.1
310	0.062	1.0
315	0.058	0.9
320	0.053	0.8
325	0.049	0.7
330	0.045	0.7
335	0.042	0.6
340	0.039	0.5
345	0.036	0.5
350	0.033	0.4
355	0.031	0.4
360	0.029	0.4

1.002

Type : Pipe

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 60 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.000	0.0
10	0.004	0.0
15	0.010	0.5
20	0.013	0.7
25	0.016	1.2
30	0.018	1.5
35	0.019	1.7
40	0.019	1.7
45	0.019	1.8
50	0.019	1.8
55	0.019	1.8
60	0.019	1.8
65	0.019	1.8
70	0.019	1.8
75	0.019	1.7
80	0.019	1.7
85	0.019	1.7
90	0.019	1.7
95	0.019	1.7
100	0.019	1.7
105	0.019	1.7
110	0.019	1.7
115	0.019	1.7
120	0.019	1.7

2.001

Type : Pipe

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 30 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.000	0.0
10	0.009	0.2
15	0.028	1.8
20	0.041	3.7
25	0.043	4.0
30	0.040	3.5
35	0.034	2.7
40	0.027	1.8
45	0.019	1.1
50	0.015	0.7
55	0.012	0.5
60	0.010	0.3

2.000

Type : Box Culvert

Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +20: 15 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.013	2.5
10	0.068	9.8
15	0.099	2.7
20	0.081	1.2
25	0.057	1.1
30	0.041	0.1

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

1

Type : Manhole

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 15 mins: Winter

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	13.1	13.1	13.1	0.093	0.105	0.000	12.8
10	48.8	48.8	48.8	0.198	0.224	0.000	48.4
15	13.3	13.3	13.3	0.096	0.109	0.000	14.0
20	0.1	0.1	0.1	0.021	0.024	0.000	0.8
25	0.0	0.0	0.0	0.002	0.003	0.000	0.0
30	0.0	0.0	0.0	0.002	0.002	0.000	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	12.8
10	48.4
15	14.0
20	0.8
25	0.0
30	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

2

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 360 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.0	0.0	0.000	0.000	0.000	0.0
10	0.0	0.0	0.0	0.000	0.000	0.000	0.0
15	0.1	0.1	0.1	0.005	0.006	0.000	0.0
20	0.2	0.2	0.2	0.023	0.026	0.000	0.1
25	0.4	0.4	0.4	0.038	0.043	0.000	0.3
30	0.5	0.5	0.5	0.044	0.050	0.000	0.4
35	0.6	0.6	0.6	0.049	0.056	0.000	0.5
40	0.7	0.7	0.7	0.055	0.062	0.000	0.6
45	0.8	0.8	0.8	0.059	0.067	0.000	0.7
50	0.8	0.8	0.8	0.063	0.072	0.000	0.8
55	0.9	0.9	0.9	0.067	0.076	0.000	0.9
60	0.9	0.9	0.9	0.071	0.080	0.000	0.9
65	1.0	1.0	1.0	0.074	0.084	0.000	1.0
70	1.1	1.1	1.1	0.077	0.087	0.000	1.0
75	1.1	1.1	1.1	0.080	0.091	0.000	1.1
80	1.2	1.2	1.2	0.084	0.095	0.000	1.1
85	1.2	1.2	1.2	0.087	0.099	0.000	1.2
90	1.3	1.3	1.3	0.092	0.104	0.000	1.2
95	1.3	1.3	1.3	0.096	0.109	0.000	1.3
100	1.4	1.4	1.4	0.102	0.115	0.000	1.4
105	1.5	1.5	1.5	0.109	0.123	0.000	1.4
110	1.5	1.5	1.5	0.117	0.132	0.000	1.5
115	1.6	1.6	1.6	0.127	0.143	0.000	1.5
120	1.6	1.6	1.6	0.138	0.156	0.000	1.6
125	1.7	1.7	1.7	0.151	0.171	0.000	1.6
130	1.7	1.7	1.7	0.167	0.189	0.000	1.6
135	1.8	1.8	1.8	0.184	0.209	0.000	1.7
140	1.8	1.8	1.8	0.204	0.231	0.000	1.7
145	1.8	1.8	1.8	0.227	0.256	0.000	1.7
150	1.9	1.9	1.9	0.251	0.284	0.000	1.8
155	1.9	1.9	1.9	0.279	0.315	0.000	1.8
160	1.9	1.9	1.9	0.308	0.348	0.000	1.8
165	1.9	1.9	1.9	0.340	0.384	0.000	1.8
170	1.9	1.9	1.9	0.373	0.422	0.000	1.7
175	1.9	1.9	1.9	0.408	0.462	0.000	1.7
180	1.9	1.9	1.9	0.445	0.503	0.000	1.7
185	1.8	1.8	1.8	0.482	0.545	0.000	1.7
190	1.8	1.8	1.8	0.519	0.587	0.000	1.6
195	1.7	1.7	1.7	0.555	0.628	0.000	1.5
200	1.6	1.6	1.6	0.590	0.668	0.000	1.4
205	1.6	1.6	1.6	0.623	0.705	0.000	1.5
210	1.6	1.6	1.6	0.654	0.740	0.000	1.5
215	1.6	1.6	1.6	0.683	0.772	0.000	1.5
220	1.7	1.7	1.7	0.709	0.802	0.000	1.6
225	1.7	1.7	1.7	0.732	0.828	0.000	1.6
230	1.7	1.7	1.7	0.753	0.852	0.000	1.6
235	1.7	1.7	1.7	0.771	0.872	0.000	1.6
240	1.7	1.7	1.7	0.787	0.890	0.000	1.6
245	1.7	1.7	1.7	0.800	0.905	0.000	1.6
250	1.7	1.7	1.7	0.811	0.917	0.000	1.7
255	1.7	1.7	1.7	0.820	0.927	0.000	1.7
260	1.7	1.7	1.7	0.827	0.936	0.000	1.7
265	1.7	1.7	1.7	0.833	0.942	0.000	1.7
270	1.7	1.7	1.7	0.837	0.946	0.000	1.7
275	1.7	1.7	1.7	0.840	0.950	0.000	1.7
280	1.7	1.7	1.7	0.841	0.952	0.000	1.7

Time (mins)	Total Outflow (L/s)
0	0.0
5	0.0
10	0.0
15	0.0
20	0.1
25	0.3
30	0.4
35	0.5
40	0.6
45	0.7
50	0.8
55	0.9
60	0.9
65	1.0
70	1.0
75	1.1
80	1.1
85	1.2
90	1.2
95	1.3
100	1.4
105	1.4
110	1.5
115	1.5
120	1.6
125	1.6
130	1.6
135	1.7
140	1.7
145	1.7
150	1.8
155	1.8
160	1.8
165	1.8
170	1.7
175	1.7
180	1.7
185	1.7
190	1.6
195	1.5
200	1.4
205	1.5
210	1.5
215	1.5
220	1.6
225	1.6
230	1.6
235	1.6
240	1.6
245	1.6
250	1.7
255	1.7
260	1.7
265	1.7
270	1.7
275	1.7
280	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
285	1.7	1.7	1.7	0.842	0.953	0.000	1.7
290	1.7	1.7	1.7	0.843	0.953	0.000	1.7
295	1.7	1.7	1.7	0.843	0.953	0.000	1.7
300	1.7	1.7	1.7	0.842	0.953	0.000	1.7
305	1.7	1.7	1.7	0.842	0.952	0.000	1.7
310	1.7	1.7	1.7	0.841	0.951	0.000	1.7
315	1.7	1.7	1.7	0.841	0.951	0.000	1.7
320	1.7	1.7	1.7	0.840	0.950	0.000	1.7
325	1.7	1.7	1.7	0.839	0.949	0.000	1.7
330	1.7	1.7	1.7	0.839	0.949	0.000	1.7
335	1.7	1.7	1.7	0.838	0.948	0.000	1.7
340	1.7	1.7	1.7	0.836	0.946	0.000	1.7
345	1.7	1.7	1.7	0.834	0.944	0.000	1.7
350	1.7	1.7	1.7	0.831	0.940	0.000	1.7
355	1.6	1.6	1.6	0.827	0.935	0.000	1.7
360	1.6	1.6	1.6	0.821	0.928	0.000	1.7
365	1.6	1.6	1.6	0.813	0.919	0.000	1.7
370	1.6	1.6	1.6	0.804	0.910	0.000	1.6
375	1.0	1.0	1.0	0.796	0.900	0.000	1.6
380	1.8	1.8	1.8	0.784	0.887	0.000	1.6
385	1.8	1.8	1.8	0.778	0.880	0.000	1.6
390	1.7	1.7	1.7	0.770	0.871	0.000	1.6
395	1.5	1.5	1.5	0.763	0.863	0.000	1.6
400	2.3	2.3	2.3	0.750	0.848	0.000	1.6
405	1.8	1.8	1.8	0.744	0.842	0.000	1.6
410	1.7	1.7	1.7	0.735	0.832	0.000	1.6
415	2.1	2.1	2.1	0.724	0.818	0.000	1.6
420	1.6	1.6	1.6	0.719	0.813	0.000	1.6
425	1.6	1.6	1.6	0.711	0.804	0.000	1.6
430	1.7	1.7	1.7	0.703	0.795	0.000	1.5
435	1.2	1.2	1.2	0.694	0.785	0.000	1.5
440	1.2	1.2	1.3	0.686	0.776	0.000	1.5
445	1.4	1.4	1.4	0.679	0.768	0.000	1.5
450	-0.1	-0.1	0.1	0.669	0.756	0.000	1.5
455	2.4	2.4	2.4	0.661	0.747	0.000	1.5
460	2.1	2.1	2.1	0.658	0.744	0.000	1.5
465	1.4	1.4	1.4	0.648	0.733	0.000	1.5
470	2.2	2.2	2.2	0.639	0.723	0.000	1.5
475	0.3	0.3	0.3	0.632	0.715	0.000	1.5
480	1.4	1.4	1.4	0.622	0.704	0.000	1.5
485	2.1	2.1	2.1	0.616	0.697	0.000	1.5
490	1.6	1.6	1.6	0.610	0.690	0.000	1.5
495	1.5	1.5	1.5	0.602	0.681	0.000	1.4
500	2.2	2.2	2.2	0.592	0.670	0.000	1.4
505	1.9	1.9	1.9	0.587	0.664	0.000	1.5
510	1.7	1.7	1.7	0.582	0.658	0.000	1.5
515	1.3	1.3	1.3	0.575	0.650	0.000	1.5
520	-0.2	-0.2	0.0	0.567	0.641	0.000	1.5
525	1.4	1.4	1.4	0.560	0.633	0.000	1.5
530	3.5	3.5	3.5	0.543	0.614	0.000	1.6
535	1.4	1.4	1.4	0.542	0.614	0.000	1.6
540	1.5	1.5	1.5	0.535	0.605	0.000	1.6
545	2.5	2.5	2.5	0.522	0.590	0.000	1.6
550	0.6	0.6	0.6	0.516	0.583	0.000	1.6
555	1.1	1.1	1.1	0.509	0.576	0.000	1.6
560	2.2	2.2	2.2	0.502	0.568	0.000	1.6
565	2.9	2.9	2.9	0.493	0.557	0.000	1.7
570	3.6	3.6	3.6	0.483	0.547	0.000	1.7
575	1.9	1.9	1.9	0.475	0.537	0.000	1.7
580	3.1	3.1	3.1	0.466	0.528	0.000	1.7
585	0.2	0.2	0.2	0.455	0.514	0.000	1.7
590	2.1	2.1	2.1	0.448	0.507	0.000	1.7
595	3.2	3.2	3.2	0.433	0.490	0.000	1.7
600	1.9	1.9	1.9	0.431	0.488	0.000	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
285	1.7
290	1.7
295	1.7
300	1.7
305	1.7
310	1.7
315	1.7
320	1.7
325	1.7
330	1.7
335	1.7
340	1.7
345	1.7
350	1.7
355	1.7
360	1.7
365	1.7
370	1.6
375	1.6
380	1.6
385	1.6
390	1.6
395	1.6
400	1.6
405	1.6
410	1.6
415	1.6
420	1.6
425	1.6
430	1.5
435	1.5
440	1.5
445	1.5
450	1.5
455	1.5
460	1.5
465	1.5
470	1.5
475	1.5
480	1.5
485	1.5
490	1.5
495	1.4
500	1.4
505	1.5
510	1.5
515	1.5
520	1.5
525	1.5
530	1.6
535	1.6
540	1.6
545	1.6
550	1.6
555	1.6
560	1.6
565	1.7
570	1.7
575	1.7
580	1.7
585	1.7
590	1.7
595	1.7
600	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
605	1.0	1.0	1.0	0.421	0.476	0.000	1.7
610	2.0	2.0	2.0	0.412	0.466	0.000	1.7
615	2.2	2.2	2.2	0.400	0.452	0.000	1.7
620	1.6	1.6	1.6	0.395	0.446	0.000	1.7
625	1.6	1.6	1.6	0.386	0.436	0.000	1.7
630	1.5	1.5	1.5	0.377	0.426	0.000	1.7
635	1.4	1.4	1.4	0.368	0.416	0.000	1.8
640	2.9	2.9	2.9	0.356	0.402	0.000	1.8
645	2.2	2.2	2.2	0.350	0.395	0.000	1.8
650	1.6	1.6	1.6	0.339	0.384	0.000	1.8
655	1.6	1.6	1.6	0.329	0.373	0.000	1.8
660	0.4	0.4	0.7	0.320	0.362	0.000	1.8
665	0.9	0.9	0.9	0.309	0.349	0.000	1.8
670	-0.0	-0.0	0.0	0.301	0.340	0.000	1.8
675	1.2	1.2	1.2	0.292	0.330	0.000	1.8
680	1.7	1.7	1.7	0.283	0.320	0.000	1.8
685	0.3	0.3	0.3	0.274	0.310	0.000	1.8
690	2.4	2.4	2.4	0.265	0.300	0.000	1.8
695	1.7	1.7	1.7	0.254	0.288	0.000	1.8
700	4.1	4.1	4.1	0.249	0.282	0.000	1.7
705	1.6	1.6	1.6	0.236	0.267	0.000	1.7
710	1.7	1.7	1.7	0.227	0.257	0.000	1.7
715	1.7	1.7	1.7	0.218	0.246	0.000	1.7
720	1.7	1.7	1.7	0.209	0.236	0.000	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
605	1.7
610	1.7
615	1.7
620	1.7
625	1.7
630	1.7
635	1.8
640	1.8
645	1.8
650	1.8
655	1.8
660	1.8
665	1.8
670	1.8
675	1.8
680	1.8
685	1.8
690	1.8
695	1.8
700	1.7
705	1.7
710	1.7
715	1.7
720	1.7

6

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 240 mins: Summer

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Inlet (1)(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)
0	0.0	0.0	0.0	0.0	0.000	0.000	0.000
5	0.0	0.0	0.0	0.0	0.000	0.000	0.000
10	0.1	0.0	0.0	0.1	0.002	0.000	0.000
15	0.4	0.3	0.1	0.4	0.002	0.000	0.000
20	0.6	0.4	0.2	0.6	0.004	0.000	0.000
25	0.9	0.5	0.3	0.9	0.006	0.000	0.000
30	1.1	0.6	0.4	1.1	0.007	0.000	0.000
35	1.3	0.7	0.5	1.3	0.008	0.000	0.000
40	1.4	0.8	0.6	1.4	0.009	0.000	0.000
45	1.6	0.9	0.7	1.6	0.009	0.000	0.000
50	1.7	1.0	0.8	1.7	0.010	0.000	0.000
55	1.9	1.0	0.8	1.9	0.010	0.000	0.000
60	2.0	1.1	0.9	2.0	0.010	0.000	0.000
65	2.1	1.2	0.9	2.1	0.011	0.000	0.000
70	2.3	1.3	1.0	2.3	0.011	0.000	0.000
75	2.5	1.4	1.1	2.5	0.012	0.000	0.000
80	2.7	1.4	1.2	2.7	0.013	0.000	0.000
85	2.9	1.5	1.4	2.9	0.014	0.000	0.000
90	3.2	1.5	1.6	3.2	0.016	0.000	0.000
95	3.6	1.6	2.0	3.6	0.020	0.000	0.000
100	4.1	1.7	2.4	4.1	0.023	0.000	0.000
105	4.5	1.7	2.8	4.5	0.026	0.000	0.000
110	5.1	1.7	3.3	5.1	0.030	0.000	0.000
115	5.7	1.8	3.9	5.7	0.034	0.000	0.000
120	6.3	1.8	4.5	6.3	0.038	0.000	0.000
125	6.3	1.7	4.6	6.3	0.039	0.000	0.000
130	6.3	1.7	4.6	6.3	0.040	0.000	0.000
135	6.2	1.6	4.6	6.2	0.040	0.000	0.000
140	6.1	1.4	4.6	6.1	0.041	0.000	0.000
145	6.1	1.5	4.6	6.1	0.041	0.000	0.000
150	6.1	1.5	4.6	6.1	0.040	0.000	0.000
155	6.1	1.5	4.6	6.1	0.040	0.000	0.000
160	5.9	1.5	4.3	5.9	0.038	0.000	0.000
165	5.2	1.5	3.7	5.2	0.034	0.000	0.000
170	4.6	1.5	3.1	4.6	0.029	0.000	0.000
175	4.1	1.6	2.5	4.1	0.025	0.000	0.000
180	3.6	1.6	2.1	3.6	0.021	0.000	0.000
185	3.2	1.6	1.6	3.2	0.016	0.000	0.000
190	2.9	1.6	1.3	2.9	0.014	0.000	0.000
195	2.7	1.6	1.2	2.7	0.012	0.000	0.000
200	2.6	1.6	1.1	2.6	0.010	0.000	0.000
205	2.5	1.6	1.0	2.5	0.010	0.000	0.000
210	2.5	1.6	0.9	2.5	0.009	0.000	0.000
215	2.4	1.6	0.8	2.4	0.008	0.000	0.000
220	2.4	1.6	0.8	2.4	0.008	0.000	0.000
225	2.3	1.6	0.8	2.3	0.007	0.000	0.000
230	2.3	1.6	0.7	2.3	0.007	0.000	0.000
235	2.3	1.6	0.7	2.3	0.007	0.000	0.000
240	2.3	1.6	0.7	2.3	0.007	0.000	0.000
245	2.2	1.6	0.6	2.2	0.006	0.000	0.000
250	2.0	1.6	0.5	2.0	0.004	0.000	0.000
255	1.9	1.5	0.3	1.9	0.003	0.000	0.000
260	1.8	1.5	0.3	1.8	0.002	0.000	0.000
265	1.7	1.5	0.2	1.7	0.001	0.000	0.000
270	1.7	1.5	0.2	1.7	0.001	0.000	0.000
275	1.6	1.5	0.1	1.6	0.001	0.000	0.000
280	1.6	1.5	0.1	1.6	0.001	0.000	0.000

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Free Discharge (L/s)	Total Outflow (L/s)
0	0.0	0.0
5	0.0	0.0
10	0.1	0.1
15	0.4	0.4
20	0.6	0.6
25	0.9	0.9
30	1.1	1.1
35	1.3	1.3
40	1.4	1.4
45	1.6	1.6
50	1.7	1.7
55	1.9	1.9
60	2.0	2.0
65	2.1	2.1
70	2.3	2.3
75	2.5	2.5
80	2.7	2.7
85	2.9	2.9
90	3.2	3.2
95	3.6	3.6
100	4.1	4.1
105	4.5	4.5
110	5.1	5.1
115	5.7	5.7
120	6.3	6.3
125	6.3	6.3
130	6.3	6.3
135	6.2	6.2
140	6.1	6.1
145	6.1	6.1
150	6.1	6.1
155	6.1	6.1
160	5.9	5.9
165	5.2	5.2
170	4.6	4.6
175	4.1	4.1
180	3.6	3.6
185	3.2	3.2
190	2.9	2.9
195	2.7	2.7
200	2.6	2.6
205	2.5	2.5
210	2.5	2.5
215	2.4	2.4
220	2.4	2.4
225	2.3	2.3
230	2.3	2.3
235	2.3	2.3
240	2.3	2.3
245	2.2	2.2
250	2.0	2.0
255	1.9	1.9
260	1.8	1.8
265	1.7	1.7
270	1.7	1.7
275	1.6	1.6
280	1.6	1.6

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Inlet (1)(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)
285	1.6	1.5	0.1	1.6	0.000	0.000	0.000
290	1.6	1.5	0.1	1.6	0.000	0.000	0.000
295	1.6	1.5	0.1	1.6	0.000	0.000	0.000
300	1.5	1.5	0.1	1.5	0.000	0.000	0.000
305	1.5	1.5	0.1	1.5	0.000	0.000	0.000
310	1.5	1.5	0.0	1.5	0.000	0.000	0.000
315	1.5	1.5	0.0	1.5	0.000	0.000	0.000
320	1.5	1.4	0.0	1.5	0.000	0.000	0.000
325	1.5	1.4	0.0	1.5	0.000	0.000	0.000
330	1.5	1.5	0.0	1.5	0.000	0.000	0.000
335	1.5	1.5	0.0	1.5	0.000	0.000	0.000
340	1.5	1.5	0.0	1.5	0.000	0.000	0.000
345	1.5	1.5	0.0	1.5	0.000	0.000	0.000
350	1.6	1.5	0.0	1.6	0.000	0.000	0.000
355	1.6	1.6	0.0	1.6	0.000	0.000	0.000
360	1.6	1.6	0.0	1.6	0.000	0.000	0.000
365	1.6	1.6	0.0	1.6	0.000	0.000	0.000
370	1.6	1.6	0.0	1.6	0.000	0.000	0.000
375	1.6	1.6	0.0	1.6	0.000	0.000	0.000
380	1.6	1.6	0.0	1.6	0.000	0.000	0.000
385	1.7	1.6	0.0	1.7	0.000	0.000	0.000
390	1.7	1.7	0.0	1.7	0.000	0.000	0.000
395	1.7	1.7	0.0	1.7	0.000	0.000	0.000
400	1.7	1.7	0.0	1.7	0.000	0.000	0.000
405	1.7	1.7	0.0	1.7	0.000	0.000	0.000
410	1.7	1.7	0.0	1.7	0.000	0.000	0.000
415	1.7	1.7	0.0	1.7	0.000	0.000	0.000
420	1.7	1.7	0.0	1.7	0.000	0.000	0.000
425	1.7	1.7	0.0	1.7	0.000	0.000	0.000
430	1.7	1.7	0.0	1.7	0.000	0.000	0.000
435	1.7	1.7	0.0	1.7	0.000	0.000	0.000
440	1.7	1.7	0.0	1.7	0.000	0.000	0.000
445	1.7	1.7	0.0	1.7	0.000	0.000	0.000
450	1.8	1.7	0.0	1.8	0.000	0.000	0.000
455	1.8	1.7	0.0	1.8	0.000	0.000	0.000
460	1.8	1.7	0.0	1.8	0.000	0.000	0.000
465	1.8	1.8	0.0	1.8	0.000	0.000	0.000
470	1.8	1.8	0.0	1.8	0.000	0.000	0.000
475	1.8	1.8	0.0	1.8	0.000	0.000	0.000
480	1.8	1.8	0.0	1.8	0.000	0.000	0.000

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Free Discharge (L/s)	Total Outflow (L/s)
285	1.6	1.6
290	1.6	1.6
295	1.6	1.6
300	1.5	1.5
305	1.5	1.5
310	1.5	1.5
315	1.5	1.5
320	1.5	1.5
325	1.5	1.5
330	1.5	1.5
335	1.5	1.5
340	1.5	1.5
345	1.5	1.5
350	1.6	1.6
355	1.6	1.6
360	1.6	1.6
365	1.6	1.6
370	1.6	1.6
375	1.6	1.6
380	1.6	1.6
385	1.7	1.7
390	1.7	1.7
395	1.7	1.7
400	1.7	1.7
405	1.7	1.7
410	1.7	1.7
415	1.7	1.7
420	1.7	1.7
425	1.7	1.7
430	1.7	1.7
435	1.7	1.7
440	1.7	1.7
445	1.7	1.7
450	1.8	1.8
455	1.8	1.8
460	1.8	1.8
465	1.8	1.8
470	1.8	1.8
475	1.8	1.8
480	1.8	1.8

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

4

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 60 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	1.5	1.5	1.5	0.008	0.009	0.000	1.2
10	2.4	2.4	2.4	0.011	0.012	0.000	2.3
15	2.8	2.8	2.8	0.012	0.013	0.000	2.7
20	4.8	4.8	4.8	0.016	0.018	0.000	4.5
25	8.6	8.6	8.6	0.048	0.055	0.000	6.0
30	12.7	12.7	12.7	0.108	0.122	0.000	8.6
35	12.7	12.7	12.7	0.183	0.207	0.000	8.7
40	8.7	8.7	8.7	0.240	0.271	0.000	6.6
45	4.8	4.8	4.8	0.260	0.295	0.000	4.7
50	2.8	2.8	2.8	0.254	0.287	0.000	3.6
55	2.4	2.4	2.4	0.236	0.267	0.000	3.5
60	1.5	1.5	1.5	0.211	0.239	0.000	3.0
65	0.0	0.0	0.0	0.175	0.198	0.000	2.3
70	0.0	0.0	0.0	0.132	0.149	0.000	2.3
75	0.0	0.0	0.0	0.089	0.101	0.000	2.3
80	0.0	0.0	0.0	0.050	0.056	0.000	1.8
85	0.0	0.0	0.0	0.020	0.023	0.000	1.3
90	0.0	0.0	0.0	0.003	0.003	0.000	0.3
95	0.0	0.0	0.0	0.001	0.001	0.000	0.0
100	0.0	0.0	0.0	0.000	0.001	0.000	0.0
105	0.0	0.0	0.0	0.000	0.000	0.000	0.0
110	0.0	0.0	0.0	0.000	0.000	0.000	0.0
115	0.0	0.0	0.0	0.000	0.000	0.000	0.0
120	0.0	0.0	0.0	0.000	0.000	0.000	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	1.2
10	2.3
15	2.7
20	4.5
25	6.0
30	8.6
35	8.7
40	6.6
45	4.7
50	3.6
55	3.5
60	3.0
65	2.3
70	2.3
75	2.3
80	1.8
85	1.3
90	0.3
95	0.0
100	0.0
105	0.0
110	0.0
115	0.0
120	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

5

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 60 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet (1)(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	1.2	1.2	1.2	0.005	0.006	0.000	0.0
10	2.3	2.3	2.3	0.037	0.042	0.000	0.3
15	2.7	2.7	2.7	0.072	0.082	0.000	1.1
20	4.5	4.5	4.5	0.109	0.123	0.000	2.2
25	6.0	6.0	6.0	0.148	0.167	0.000	3.6
30	8.6	8.6	8.6	0.207	0.235	0.000	4.6
35	8.7	8.7	8.7	0.283	0.320	0.000	4.6
40	6.6	6.6	6.6	0.340	0.384	0.000	4.5
45	4.7	4.7	4.7	0.361	0.408	0.000	4.5
50	3.6	3.6	3.6	0.354	0.400	0.000	4.5
55	3.5	3.5	3.5	0.336	0.380	0.000	4.5
60	3.0	3.0	3.0	0.311	0.352	0.000	4.6
65	2.3	2.3	2.3	0.275	0.312	0.000	4.6
70	2.3	2.3	2.3	0.232	0.262	0.000	4.6
75	2.3	2.3	2.3	0.189	0.214	0.000	4.6
80	1.8	1.8	1.8	0.150	0.169	0.000	3.7
85	1.3	1.3	1.3	0.120	0.136	0.000	2.6
90	0.3	0.3	0.3	0.096	0.109	0.000	1.8
95	0.0	0.0	0.0	0.073	0.082	0.000	1.0
100	0.0	0.0	0.0	0.058	0.065	0.000	0.7
105	0.0	0.0	0.0	0.048	0.054	0.000	0.4
110	0.0	0.0	0.0	0.041	0.046	0.000	0.3
115	0.0	0.0	0.0	0.036	0.040	0.000	0.2
120	0.0	0.0	0.0	0.032	0.036	0.000	0.2

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	0.0
10	0.3
15	1.1
20	2.2
25	3.6
30	4.6
35	4.6
40	4.5
45	4.5
50	4.5
55	4.5
60	4.6
65	4.6
70	4.6
75	4.6
80	3.7
85	2.6
90	1.8
95	1.0
100	0.7
105	0.4
110	0.3
115	0.2
120	0.2

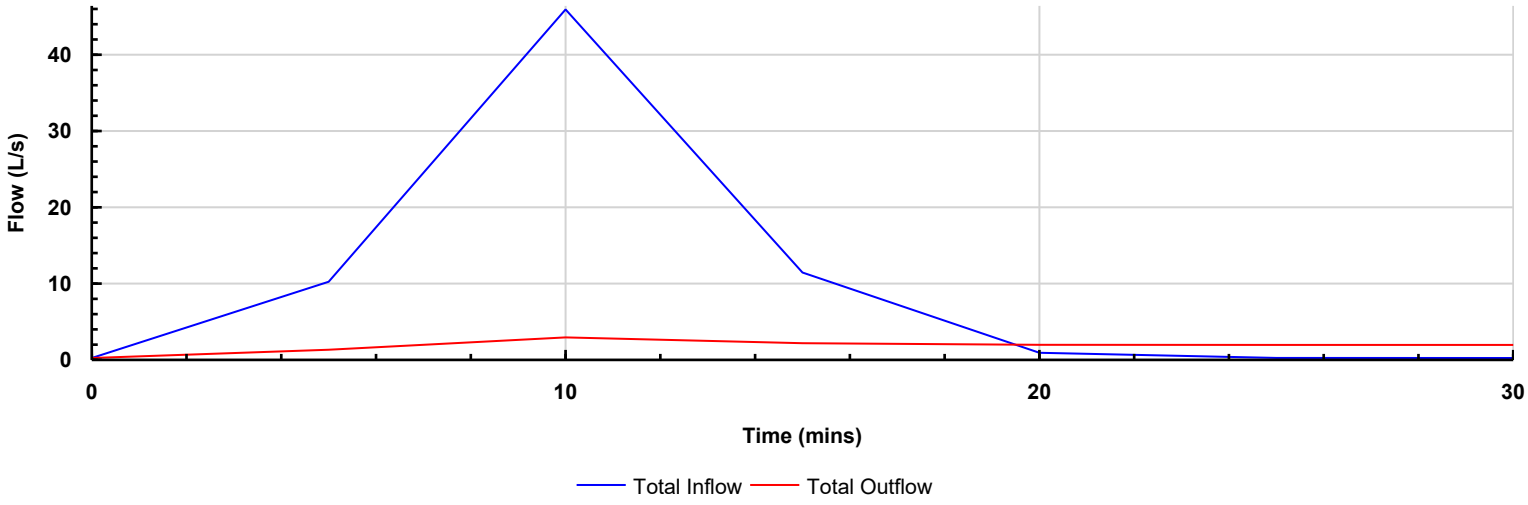
Tank
Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 15 mins: Summer

Type : Tank

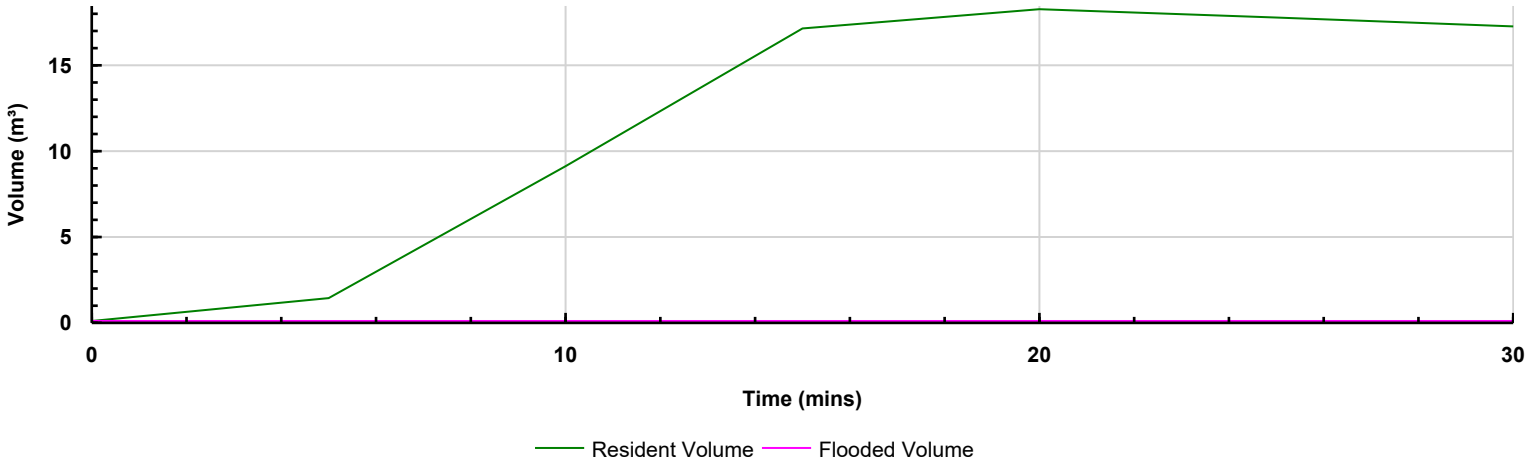
Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address:		

Graphs

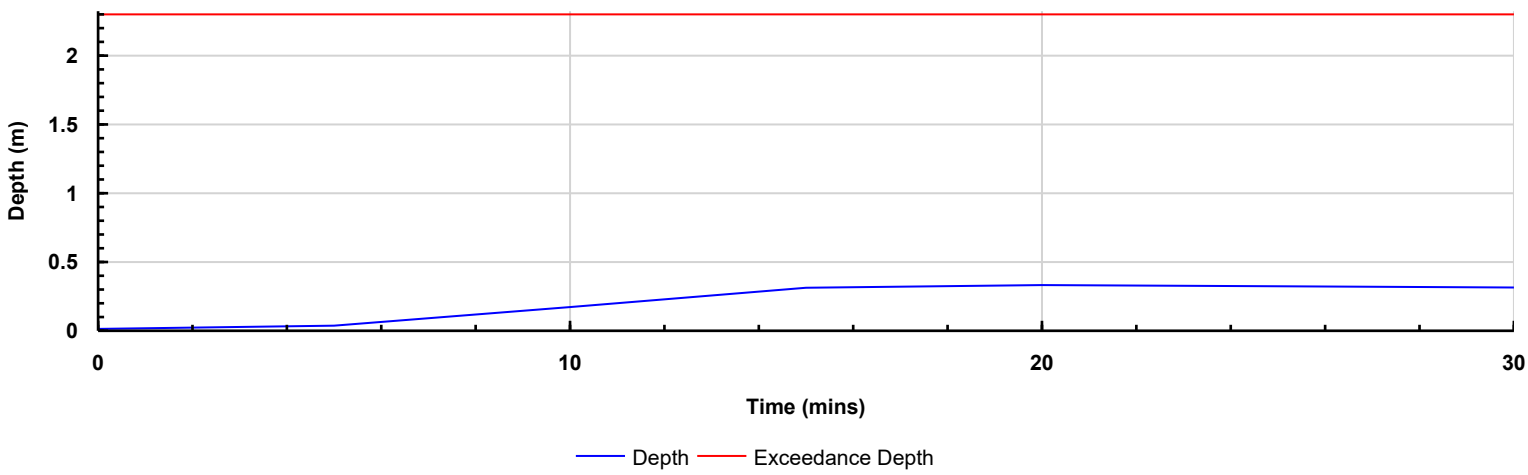
Flow Graph



Volume Graph



Depth Graph



1.000

Type : Pipe

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 15 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.088	12.8
10	0.184	48.4
15	0.091	14.0
20	0.021	0.8
25	0.001	0.0
30	0.001	0.0

1.001

Type : Pipe

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 480 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.000	0.0
10	0.001	0.0
15	0.003	0.0
20	0.009	0.1
25	0.019	0.2
30	0.026	0.3
35	0.030	0.4
40	0.034	0.5
45	0.038	0.6
50	0.041	0.6
55	0.045	0.7
60	0.048	0.8
65	0.051	0.8
70	0.053	0.8
75	0.055	0.9
80	0.057	0.9
85	0.059	1.0
90	0.061	1.0
95	0.063	1.0
100	0.065	1.0
105	0.067	1.1
110	0.069	1.1
115	0.072	1.1
120	0.074	1.2
125	0.078	1.2
130	0.081	1.3
135	0.085	1.3
140	0.090	1.4
145	0.096	1.5
150	0.102	1.5
155	0.110	1.5
160	0.118	1.6
165	0.128	1.6
170	0.139	1.7
175	0.151	1.7
180	0.165	1.7
185	0.180	1.8
190	0.196	1.8
195	0.214	1.8
200	0.225	1.8
205	0.225	1.8
210	0.225	1.8
215	0.225	1.9
220	0.225	1.9
225	0.225	1.9
230	0.225	1.8
235	0.225	1.8
240	0.225	1.8
245	0.225	1.8
250	0.225	1.8
255	0.225	1.7
260	0.225	1.6
265	0.225	1.6
270	0.225	1.6
275	0.225	1.6
280	0.225	1.6
285	0.225	1.6
290	0.225	1.6
295	0.225	1.6

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connection Results Storm Phase: Phase	Company Address:		

Time (mins)	Depth (m)	Flow (L/s)
300	0.225	1.7
305	0.225	1.7
310	0.225	1.7
315	0.225	1.7
320	0.225	1.7
325	0.225	1.7
330	0.225	1.7
335	0.225	1.7
340	0.225	1.7
345	0.225	1.7
350	0.225	1.7
355	0.225	1.7
360	0.225	1.7
365	0.225	1.7
370	0.225	1.7
375	0.225	1.7
380	0.225	1.7
385	0.225	1.7
390	0.225	1.7
395	0.225	1.7
400	0.225	1.7
405	0.225	1.7
410	0.225	1.7
415	0.225	1.7
420	0.225	1.7
425	0.225	1.7
430	0.225	1.7
435	0.225	1.7
440	0.225	1.6
445	0.225	1.6
450	0.225	1.6
455	0.225	1.6
460	0.225	1.6
465	0.225	1.6
470	0.225	1.6
475	0.225	1.6
480	0.225	1.6
485	0.225	1.6
490	0.225	1.5
495	0.225	2.2
500	0.225	1.9
505	0.225	1.6
510	0.225	0.8
515	0.225	6.8
520	0.225	1.7
525	0.225	1.1
530	0.225	0.8
535	0.225	1.9
540	0.225	1.4
545	0.225	1.7
550	0.225	1.1
555	0.225	1.6
560	0.225	1.3
565	0.225	2.3
570	0.225	1.8
575	0.225	1.5
580	0.225	1.4
585	0.225	1.6
590	0.225	-0.1
595	0.225	2.0
600	0.225	1.5
605	0.225	1.3
610	0.225	0.7
615	0.225	0.1
620	0.225	1.4
625	0.225	2.1
630	0.225	0.7
635	0.225	0.9

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connection Results Storm Phase: Phase	Company Address:		

Time (mins)	Depth (m)	Flow (L/s)
640	0.225	1.8
645	0.225	1.7
650	0.225	1.1
655	0.225	2.3
660	0.225	0.8
665	0.225	1.6
670	0.225	2.2
675	0.225	1.3
680	0.225	1.9
685	0.225	1.6
690	0.225	1.8
695	0.225	1.7
700	0.225	2.7
705	0.225	2.4
710	0.225	6.1
715	0.225	1.3
720	0.225	2.1
725	0.225	0.3
730	0.225	0.6
735	0.225	0.9
740	0.225	1.6
745	0.225	0.5
750	0.225	0.8
755	0.225	0.6
760	0.225	2.5
765	0.225	1.9
770	0.225	1.7
775	0.225	2.0
780	0.225	2.4
785	0.225	1.6
790	0.225	2.3
795	0.225	2.0
800	0.225	1.4
805	0.224	1.5
810	0.215	1.7
815	0.206	1.7
820	0.197	1.7
825	0.188	1.7
830	0.179	1.7
835	0.171	1.6
840	0.162	1.6
845	0.153	1.6
850	0.145	1.6
855	0.137	1.6
860	0.129	1.5
865	0.121	1.5
870	0.113	1.5
875	0.105	1.5
880	0.097	1.4
885	0.090	1.4
890	0.083	1.3
895	0.077	1.2
900	0.071	1.1
905	0.065	1.0
910	0.060	0.9
915	0.055	0.8
920	0.051	0.8
925	0.047	0.7
930	0.043	0.6
935	0.040	0.6
940	0.037	0.5
945	0.034	0.5
950	0.032	0.4
955	0.030	0.4
960	0.028	0.4

1.002

Type : Pipe

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 15 mins: Summer

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.006	0.2
10	0.019	1.7
15	0.019	1.8
20	0.019	1.8
25	0.019	1.8
30	0.019	1.8

2.001

Type : Pipe

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 120 mins: Summer

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.000	0.0
10	0.005	0.1
15	0.010	0.3
20	0.015	0.6
25	0.018	0.8
30	0.021	1.1
35	0.023	1.3
40	0.025	1.6
45	0.029	2.1
50	0.035	2.7
55	0.041	3.7
60	0.047	4.6
65	0.047	4.7
70	0.047	4.6
75	0.048	4.6
80	0.048	4.6
85	0.048	4.6
90	0.048	4.6
95	0.048	4.6
100	0.048	4.6
105	0.046	4.4
110	0.041	3.6
115	0.036	2.9
120	0.032	2.4
125	0.026	1.7
130	0.019	1.0
135	0.015	0.6
140	0.012	0.4
145	0.010	0.3
150	0.009	0.2
155	0.008	0.2
160	0.007	0.2
165	0.006	0.1
170	0.006	0.1
175	0.005	0.1
180	0.005	0.1
185	0.005	0.1
190	0.004	0.1
195	0.004	0.1
200	0.004	0.0
205	0.004	0.0
210	0.004	0.0
215	0.003	0.0
220	0.003	0.0
225	0.003	0.0
230	0.003	0.0
235	0.003	0.0
240	0.003	0.0

2.000

Type : Box Culvert

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +20: 15 mins: Summer

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.022	4.4
10	0.130	15.6
15	0.214	5.5
20	0.194	1.7
25	0.150	2.1
30	0.109	2.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

1

Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 15 mins: Winter

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	17.0	17.0	17.0	0.107	0.121	0.000	16.6
10	63.1	63.1	63.1	0.231	0.262	0.000	62.5
15	17.2	17.2	17.2	0.110	0.125	0.000	18.0
20	0.1	0.1	0.1	0.023	0.026	0.000	1.0
25	0.0	0.0	0.0	0.002	0.003	0.000	0.0
30	0.0	0.0	0.0	0.002	0.002	0.000	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	16.6
10	62.5
15	18.0
20	1.0
25	0.0
30	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

2

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 360 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.0	0.0	0.000	0.000	0.000	0.0
10	0.0	0.0	0.0	0.001	0.001	0.000	0.0
15	0.1	0.1	0.1	0.009	0.010	0.000	0.0
20	0.4	0.4	0.4	0.034	0.038	0.000	0.3
25	0.5	0.5	0.5	0.043	0.048	0.000	0.4
30	0.6	0.6	0.6	0.050	0.056	0.000	0.6
35	0.7	0.7	0.7	0.057	0.064	0.000	0.7
40	0.8	0.8	0.8	0.063	0.072	0.000	0.8
45	0.9	0.9	0.9	0.069	0.078	0.000	0.9
50	1.0	1.0	1.0	0.075	0.085	0.000	1.0
55	1.1	1.1	1.1	0.080	0.090	0.000	1.1
60	1.2	1.2	1.2	0.085	0.096	0.000	1.1
65	1.2	1.2	1.2	0.089	0.100	0.000	1.2
70	1.3	1.3	1.3	0.093	0.105	0.000	1.3
75	1.3	1.3	1.3	0.097	0.110	0.000	1.3
80	1.4	1.4	1.4	0.102	0.115	0.000	1.4
85	1.4	1.4	1.4	0.107	0.121	0.000	1.4
90	1.5	1.5	1.5	0.113	0.127	0.000	1.5
95	1.5	1.5	1.5	0.120	0.135	0.000	1.5
100	1.6	1.6	1.6	0.128	0.145	0.000	1.5
105	1.6	1.6	1.6	0.138	0.156	0.000	1.6
110	1.7	1.7	1.7	0.149	0.169	0.000	1.6
115	1.7	1.7	1.7	0.163	0.184	0.000	1.6
120	1.8	1.8	1.8	0.179	0.203	0.000	1.7
125	1.8	1.8	1.8	0.198	0.224	0.000	1.7
130	1.8	1.8	1.8	0.219	0.248	0.000	1.7
135	1.8	1.8	1.8	0.244	0.276	0.000	1.7
140	1.9	1.9	1.9	0.271	0.307	0.000	1.8
145	1.9	1.9	1.9	0.302	0.341	0.000	1.8
150	1.9	1.9	1.9	0.336	0.380	0.000	1.8
155	1.9	1.9	1.9	0.373	0.422	0.000	1.7
160	1.9	1.9	1.9	0.413	0.467	0.000	1.7
165	1.9	1.9	1.9	0.456	0.515	0.000	1.7
170	1.8	1.8	1.8	0.501	0.567	0.000	1.6
175	1.7	1.7	1.7	0.549	0.621	0.000	1.6
180	1.6	1.6	1.6	0.599	0.678	0.000	1.4
185	1.7	1.7	1.7	0.650	0.735	0.000	1.5
190	1.7	1.7	1.7	0.700	0.792	0.000	1.5
195	1.8	1.8	1.8	0.748	0.846	0.000	1.6
200	1.8	1.8	1.8	0.794	0.898	0.000	1.6
205	1.8	1.8	1.8	0.838	0.947	0.000	1.7
210	1.9	1.9	1.9	0.878	0.993	0.000	1.7
215	1.9	1.9	1.9	0.915	1.035	0.000	1.7
220	1.9	1.9	1.9	0.949	1.073	0.000	1.8
225	1.9	1.9	1.9	0.980	1.108	0.000	1.8
230	1.9	1.9	1.9	1.007	1.139	0.000	1.8
235	1.9	1.9	1.9	1.031	1.167	0.000	1.8
240	1.9	1.9	1.9	1.052	1.190	0.000	1.9
245	1.9	1.9	1.9	1.070	1.211	0.000	1.9
250	1.9	1.9	1.9	1.086	1.228	0.000	1.9
255	1.9	1.9	1.9	1.098	1.242	0.000	1.9
260	1.9	1.9	1.9	1.108	1.253	0.000	1.9
265	1.9	1.9	1.9	1.116	1.263	0.000	1.9
270	1.9	1.9	1.9	1.123	1.270	0.000	1.9
275	1.9	1.9	1.9	1.127	1.275	0.000	1.9
280	1.9	1.9	1.9	1.131	1.279	0.000	1.9

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	0.0
10	0.0
15	0.0
20	0.3
25	0.4
30	0.6
35	0.7
40	0.8
45	0.9
50	1.0
55	1.1
60	1.1
65	1.2
70	1.3
75	1.3
80	1.4
85	1.4
90	1.5
95	1.5
100	1.5
105	1.6
110	1.6
115	1.6
120	1.7
125	1.7
130	1.7
135	1.7
140	1.8
145	1.8
150	1.8
155	1.7
160	1.7
165	1.7
170	1.6
175	1.6
180	1.4
185	1.5
190	1.5
195	1.6
200	1.6
205	1.7
210	1.7
215	1.7
220	1.8
225	1.8
230	1.8
235	1.8
240	1.9
245	1.9
250	1.9
255	1.9
260	1.9
265	1.9
270	1.9
275	1.9
280	1.9

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
285	1.9	1.9	1.9	1.133	1.282	0.000	1.9
290	1.9	1.9	1.9	1.135	1.283	0.000	1.9
295	1.9	1.9	1.9	1.136	1.285	0.000	1.9
300	1.9	1.9	1.9	1.136	1.285	0.000	1.9
305	1.9	1.9	1.9	1.137	1.286	0.000	1.9
310	1.9	1.9	1.9	1.137	1.286	0.000	1.9
315	1.9	1.9	1.9	1.138	1.287	0.000	1.9
320	1.9	1.9	1.9	1.138	1.287	0.000	1.9
325	1.9	1.9	1.9	1.138	1.287	0.000	1.9
330	1.9	1.9	1.9	1.138	1.288	0.000	1.9
335	1.9	1.9	1.9	1.138	1.287	0.000	1.9
340	1.9	1.9	1.9	1.138	1.287	0.000	1.9
345	1.9	1.9	1.9	1.136	1.285	0.000	1.9
350	1.9	1.9	1.9	1.133	1.282	0.000	1.9
355	1.9	1.9	1.9	1.129	1.276	0.000	1.9
360	1.9	1.9	1.9	1.122	1.269	0.000	1.9
365	1.9	1.9	1.9	1.113	1.258	0.000	1.9
370	1.9	1.9	1.9	1.103	1.247	0.000	1.9
375	1.1	1.1	1.1	1.089	1.232	0.000	1.9
380	0.0	0.0	0.1	1.084	1.226	0.000	1.9
385	2.8	2.8	2.8	1.072	1.213	0.000	1.9
390	3.1	3.1	3.1	1.057	1.196	0.000	1.9
395	1.7	1.7	1.7	1.056	1.194	0.000	1.9
400	2.0	2.0	2.0	1.043	1.180	0.000	1.9
405	2.4	2.4	2.4	1.037	1.173	0.000	1.8
410	0.9	0.9	0.9	1.024	1.158	0.000	1.8
415	2.7	2.7	2.7	1.016	1.149	0.000	1.8
420	2.0	2.0	2.0	1.009	1.141	0.000	1.8
425	3.8	3.8	3.8	1.003	1.135	0.000	1.8
430	2.1	2.1	2.1	0.990	1.120	0.000	1.8
435	2.0	2.0	2.0	0.981	1.109	0.000	1.8
440	1.6	1.6	1.6	0.971	1.098	0.000	1.8
445	1.8	1.8	1.8	0.960	1.086	0.000	1.8
450	1.9	1.9	1.9	0.949	1.073	0.000	1.8
455	2.1	2.1	2.1	0.938	1.061	0.000	1.8
460	2.2	2.2	2.2	0.928	1.049	0.000	1.8
465	2.4	2.4	2.4	0.918	1.038	0.000	1.7
470	2.5	2.5	2.5	0.908	1.027	0.000	1.7
475	3.9	3.9	3.9	0.900	1.018	0.000	1.7
480	0.5	0.5	0.6	0.894	1.012	0.000	1.7
485	4.3	4.3	4.3	0.873	0.987	0.000	1.7
490	1.5	1.5	1.5	0.870	0.984	0.000	1.7
495	1.7	1.7	1.7	0.860	0.973	0.000	1.7
500	1.8	1.8	1.8	0.852	0.963	0.000	1.7
505	1.6	1.6	1.6	0.843	0.953	0.000	1.7
510	3.7	3.7	3.7	0.828	0.937	0.000	1.7
515	1.7	1.7	1.7	0.826	0.934	0.000	1.7
520	1.7	1.7	1.7	0.819	0.926	0.000	1.7
525	1.0	1.0	1.0	0.806	0.912	0.000	1.6
530	2.1	2.1	2.1	0.800	0.904	0.000	1.6
535	1.7	1.7	1.7	0.792	0.896	0.000	1.6
540	2.8	2.8	2.8	0.785	0.888	0.000	1.6
545	1.4	1.4	1.4	0.773	0.874	0.000	1.6
550	1.8	1.8	1.8	0.766	0.867	0.000	1.6
555	2.0	2.0	2.0	0.755	0.854	0.000	1.6
560	0.7	0.7	0.8	0.748	0.846	0.000	1.6
565	1.5	1.5	1.5	0.739	0.836	0.000	1.6
570	-0.0	-0.0	0.0	0.730	0.826	0.000	1.6
575	2.1	2.1	2.1	0.721	0.815	0.000	1.6
580	1.9	1.9	1.9	0.715	0.808	0.000	1.6
585	1.6	1.6	1.6	0.706	0.798	0.000	1.6
590	1.4	1.4	1.4	0.698	0.789	0.000	1.5
595	2.9	2.9	2.9	0.691	0.782	0.000	1.5
600	1.3	1.3	1.3	0.684	0.774	0.000	1.5

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
285	1.9
290	1.9
295	1.9
300	1.9
305	1.9
310	1.9
315	1.9
320	1.9
325	1.9
330	1.9
335	1.9
340	1.9
345	1.9
350	1.9
355	1.9
360	1.9
365	1.9
370	1.9
375	1.9
380	1.9
385	1.9
390	1.9
395	1.9
400	1.9
405	1.8
410	1.8
415	1.8
420	1.8
425	1.8
430	1.8
435	1.8
440	1.8
445	1.8
450	1.8
455	1.8
460	1.8
465	1.7
470	1.7
475	1.7
480	1.7
485	1.7
490	1.7
495	1.7
500	1.7
505	1.7
510	1.7
515	1.7
520	1.7
525	1.6
530	1.6
535	1.6
540	1.6
545	1.6
550	1.6
555	1.6
560	1.6
565	1.6
570	1.6
575	1.6
580	1.6
585	1.6
590	1.5
595	1.5
600	1.5

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
605	0.1	0.1	0.1	0.667	0.754	0.000	1.5
610	1.4	1.4	1.4	0.667	0.754	0.000	1.5
615	2.0	2.0	2.0	0.658	0.745	0.000	1.5
620	3.0	3.0	3.0	0.652	0.737	0.000	1.5
625	1.9	1.9	1.9	0.644	0.728	0.000	1.5
630	1.3	1.3	1.3	0.636	0.719	0.000	1.5
635	0.5	0.5	0.5	0.628	0.711	0.000	1.5
640	0.2	0.2	0.2	0.620	0.701	0.000	1.5
645	1.9	1.9	1.9	0.611	0.691	0.000	1.5
650	1.4	1.4	1.4	0.607	0.686	0.000	1.5
655	1.7	1.7	1.7	0.598	0.677	0.000	1.4
660	1.3	1.3	1.3	0.592	0.669	0.000	1.4
665	0.7	0.7	0.7	0.585	0.662	0.000	1.5
670	0.1	0.1	0.1	0.578	0.654	0.000	1.5
675	1.2	1.2	1.2	0.568	0.643	0.000	1.5
680	0.3	0.3	0.3	0.567	0.641	0.000	1.5
685	1.1	1.1	1.1	0.556	0.629	0.000	1.5
690	2.5	2.5	2.5	0.549	0.621	0.000	1.6
695	1.3	1.3	1.3	0.539	0.610	0.000	1.6
700	1.5	1.5	1.5	0.531	0.600	0.000	1.6
705	1.6	1.6	1.6	0.522	0.590	0.000	1.6
710	1.8	1.8	1.8	0.514	0.581	0.000	1.6
715	2.5	2.5	2.5	0.503	0.569	0.000	1.6
720	2.2	2.2	2.2	0.496	0.561	0.000	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
605	1.5
610	1.5
615	1.5
620	1.5
625	1.5
630	1.5
635	1.5
640	1.5
645	1.5
650	1.5
655	1.4
660	1.4
665	1.5
670	1.5
675	1.5
680	1.5
685	1.5
690	1.6
695	1.6
700	1.6
705	1.6
710	1.6
715	1.6
720	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

6

Type : Manhole

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 30 mins: Summer

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Inlet (1)(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)
0	0.0	0.0	0.0	0.0	0.000	0.000	0.000
5	0.1	0.0	0.0	0.1	0.003	0.000	0.000
10	2.5	1.1	1.4	2.5	0.016	0.000	0.000
15	6.3	1.7	4.5	6.3	0.039	0.000	0.000
20	6.3	1.7	4.6	6.3	0.039	0.000	0.000
25	5.9	1.6	4.4	5.9	0.039	0.000	0.000
30	5.8	1.4	4.4	5.8	0.039	0.000	0.000
35	5.9	1.4	4.4	5.9	0.040	0.000	0.000
40	6.0	1.4	4.5	6.0	0.040	0.000	0.000
45	6.0	1.4	4.6	6.0	0.041	0.000	0.000
50	6.1	1.5	4.6	6.1	0.041	0.000	0.000
55	6.1	1.5	4.6	6.1	0.041	0.000	0.000
60	6.0	1.5	4.5	6.0	0.039	0.000	0.000

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Free Discharge (L/s)	Total Outflow (L/s)
0	0.0	0.0
5	0.1	0.1
10	2.5	2.5
15	6.3	6.3
20	6.3	6.3
25	5.9	5.9
30	5.8	5.8
35	5.9	5.9
40	6.0	6.0
45	6.0	6.0
50	6.1	6.1
55	6.1	6.1
60	6.0	6.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

4

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 60 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	1.9	1.9	1.9	0.009	0.011	0.000	1.7
10	3.2	3.2	3.2	0.013	0.014	0.000	3.0
15	3.6	3.6	3.6	0.014	0.016	0.000	3.6
20	6.2	6.2	6.2	0.028	0.032	0.000	5.1
25	11.3	11.3	11.3	0.076	0.086	0.000	8.0
30	16.5	16.5	16.5	0.162	0.184	0.000	10.6
35	16.5	16.5	16.5	0.274	0.310	0.000	10.5
40	11.3	11.3	11.3	0.363	0.411	0.000	7.7
45	6.3	6.3	6.3	0.407	0.461	0.000	5.2
50	3.6	3.6	3.6	0.415	0.469	0.000	3.9
55	3.2	3.2	3.2	0.408	0.462	0.000	3.6
60	2.0	2.0	2.0	0.394	0.446	0.000	3.0
65	0.0	0.0	0.0	0.366	0.414	0.000	2.1
70	0.0	0.0	0.0	0.327	0.369	0.000	2.2
75	0.0	0.0	0.0	0.285	0.323	0.000	2.2
80	0.0	0.0	0.0	0.243	0.275	0.000	2.3
85	0.0	0.0	0.0	0.201	0.227	0.000	2.3
90	0.0	0.0	0.0	0.158	0.178	0.000	2.3
95	0.0	0.0	0.0	0.114	0.129	0.000	2.3
100	0.0	0.0	0.0	0.072	0.081	0.000	2.2
105	0.0	0.0	0.0	0.036	0.041	0.000	1.6
110	0.0	0.0	0.0	0.011	0.012	0.000	1.1
115	0.0	0.0	0.0	0.002	0.002	0.000	0.1
120	0.0	0.0	0.0	0.001	0.001	0.000	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	1.7
10	3.0
15	3.6
20	5.1
25	8.0
30	10.6
35	10.5
40	7.7
45	5.2
50	3.9
55	3.6
60	3.0
65	2.1
70	2.2
75	2.2
80	2.3
85	2.3
90	2.3
95	2.3
100	2.2
105	1.6
110	1.1
115	0.1
120	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

5

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 60 mins: Winter

Type : Manhole

Tables

Time (mins)	Total Approach Flow (L/s)	Inlet (1)(L/s)	Total Inflow (L/s)	Depth (m)	Volume (m³)	Flooded Volume (m³)	Outlet(L/s)
0	0.0	0.0	0.0	0.000	0.000	0.000	0.0
5	1.7	1.7	1.7	0.008	0.009	0.000	0.0
10	3.0	3.0	3.0	0.049	0.055	0.000	0.5
15	3.6	3.6	3.6	0.091	0.103	0.000	1.6
20	5.1	5.1	5.1	0.127	0.143	0.000	2.9
25	8.0	8.0	8.0	0.175	0.198	0.000	4.5
30	10.6	10.6	10.6	0.262	0.296	0.000	4.6
35	10.5	10.5	10.5	0.374	0.422	0.000	4.5
40	7.7	7.7	7.7	0.463	0.524	0.000	4.1
45	5.2	5.2	5.2	0.507	0.574	0.000	4.1
50	3.9	3.9	3.9	0.515	0.583	0.000	4.1
55	3.6	3.6	3.6	0.508	0.575	0.000	4.1
60	3.0	3.0	3.0	0.494	0.559	0.000	4.0
65	2.1	2.1	2.1	0.466	0.527	0.000	4.1
70	2.2	2.2	2.2	0.426	0.482	0.000	4.3
75	2.2	2.2	2.2	0.385	0.436	0.000	4.5
80	2.3	2.3	2.3	0.343	0.388	0.000	4.5
85	2.3	2.3	2.3	0.301	0.340	0.000	4.6
90	2.3	2.3	2.3	0.258	0.291	0.000	4.6
95	2.3	2.3	2.3	0.214	0.242	0.000	4.6
100	2.2	2.2	2.2	0.172	0.194	0.000	4.4
105	1.6	1.6	1.6	0.136	0.154	0.000	3.2
110	1.1	1.1	1.1	0.111	0.125	0.000	2.3
115	0.1	0.1	0.1	0.085	0.096	0.000	1.4
120	0.0	0.0	0.0	0.066	0.074	0.000	0.8

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Junction Results Storm Phase: Phase	Company Address:		

Time (mins)	Total Outflow (L/s)
0	0.0
5	0.0
10	0.5
15	1.6
20	2.9
25	4.5
30	4.6
35	4.5
40	4.1
45	4.1
50	4.1
55	4.1
60	4.0
65	4.1
70	4.3
75	4.5
80	4.5
85	4.6
90	4.6
95	4.6
100	4.4
105	3.2
110	2.3
115	1.4
120	0.8

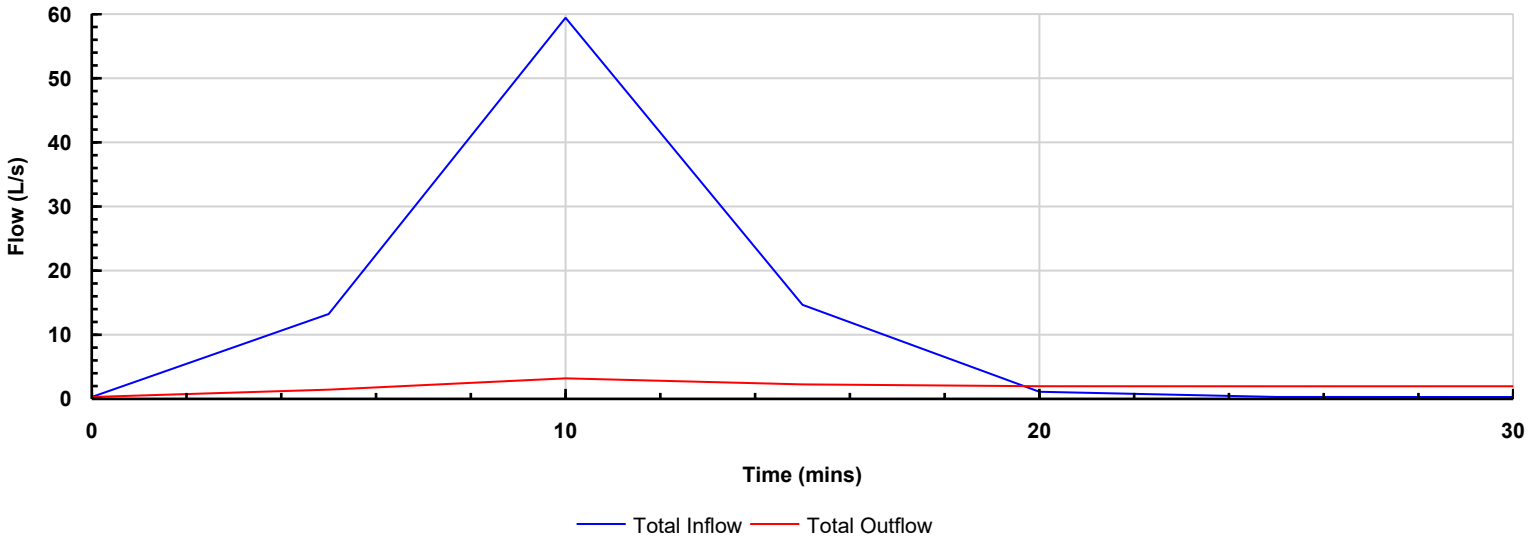
Tank
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 15 mins: Summer

Type : Tank

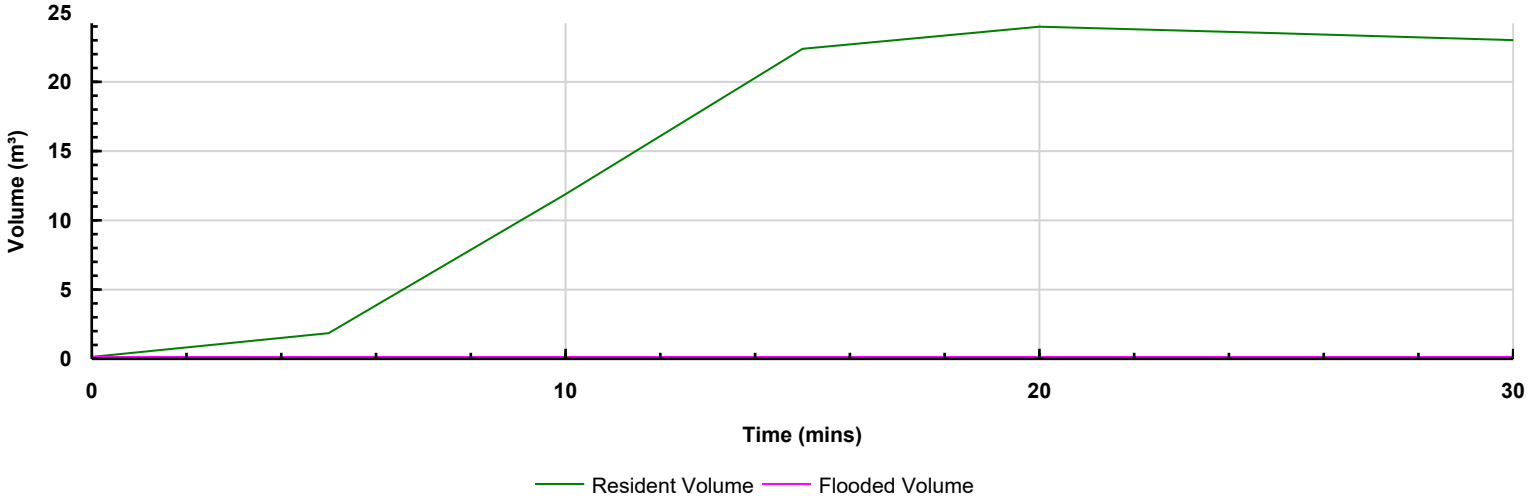
Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address:		

Graphs

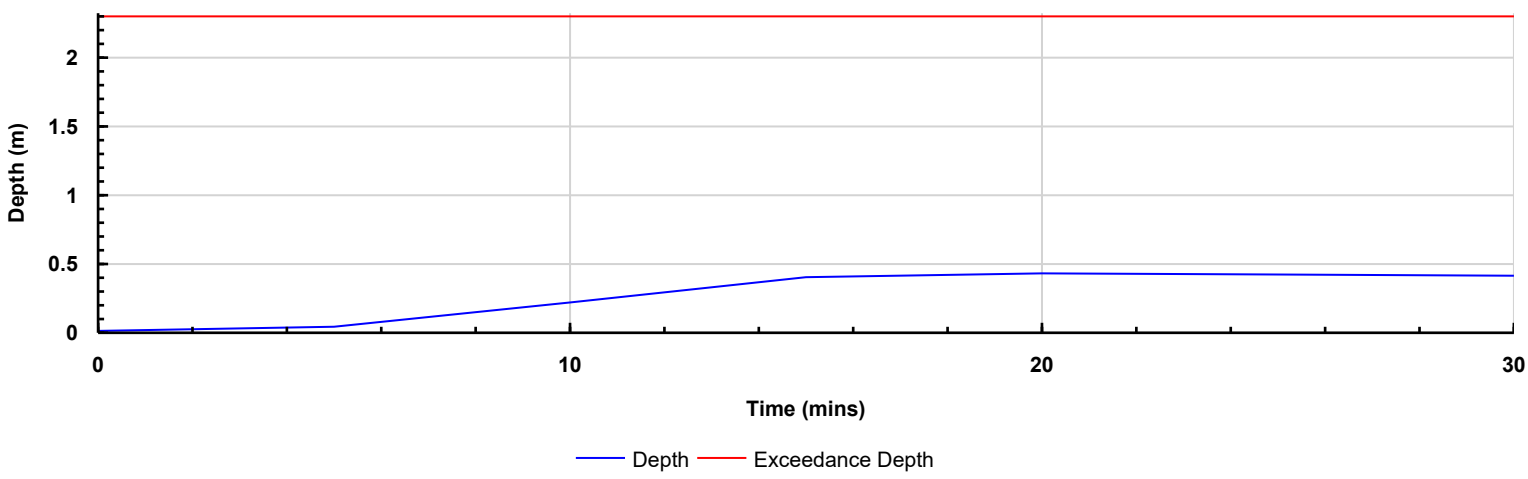
Flow Graph



Volume Graph



Depth Graph



1.000

Type : Pipe

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 15 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.100	16.6
10	0.213	62.5
15	0.104	18.0
20	0.023	1.0
25	0.001	0.0
30	0.001	0.0

1.001

Type : Pipe

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 180 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.001	0.0
10	0.009	0.1
15	0.031	0.5
20	0.045	0.7
25	0.057	1.0
30	0.069	1.1
35	0.079	1.3
40	0.090	1.4
45	0.103	1.5
50	0.119	1.6
55	0.139	1.7
60	0.166	1.8
65	0.202	1.9
70	0.225	2.0
75	0.225	2.0
80	0.225	2.0
85	0.225	2.0
90	0.225	1.9
95	0.225	1.8
100	0.225	1.9
105	0.225	1.9
110	0.225	1.9
115	0.225	1.9
120	0.225	1.9
125	0.225	1.9
130	0.225	1.9
135	0.225	1.9
140	0.225	1.9
145	0.225	1.9
150	0.225	1.9
155	0.225	1.9
160	0.225	1.9
165	0.225	1.9
170	0.225	1.9
175	0.225	1.9
180	0.225	1.9
185	0.225	1.8
190	0.225	1.8
195	0.225	2.7
200	0.225	3.0
205	0.225	3.4
210	0.225	3.7
215	0.225	2.1
220	0.225	0.5
225	0.225	0.1
230	0.225	0.1
235	0.225	0.9
240	0.225	1.8
245	0.225	2.5
250	0.225	2.5
255	0.225	2.4
260	0.225	2.4
265	0.225	2.4
270	0.225	3.0
275	0.225	4.5
280	0.225	2.2
285	0.225	1.8
290	0.225	1.7
295	0.225	1.7

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connection Results Storm Phase: Phase	Company Address:		

Time (mins)	Depth (m)	Flow (L/s)
300	0.225	2.6
305	0.225	4.7
310	0.225	0.9
315	0.225	2.1
320	0.225	1.6
325	0.225	2.2
330	0.225	1.6
335	0.225	0.9
340	0.225	2.0
345	0.225	1.9
350	0.225	2.6
355	0.225	1.5
360	0.225	1.5

1.002

Type : Pipe

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 360 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.000	0.0
10	0.000	0.0
15	0.002	0.0
20	0.008	0.2
25	0.010	0.4
30	0.011	0.5
35	0.012	0.7
40	0.013	0.8
45	0.014	0.9
50	0.015	1.0
55	0.015	1.1
60	0.016	1.1
65	0.016	1.2
70	0.017	1.3
75	0.017	1.3
80	0.017	1.4
85	0.018	1.4
90	0.018	1.5
95	0.018	1.5
100	0.018	1.5
105	0.018	1.6
110	0.019	1.6
115	0.019	1.6
120	0.019	1.7
125	0.019	1.7
130	0.019	1.7
135	0.019	1.7
140	0.019	1.8
145	0.019	1.8
150	0.019	1.8
155	0.019	1.7
160	0.019	1.7
165	0.019	1.7
170	0.019	1.6
175	0.018	1.6
180	0.018	1.4
185	0.018	1.5
190	0.018	1.5
195	0.019	1.6
200	0.019	1.6
205	0.019	1.7
210	0.019	1.7
215	0.019	1.7
220	0.020	1.8
225	0.020	1.8
230	0.020	1.8
235	0.020	1.8
240	0.020	1.9
245	0.020	1.9
250	0.020	1.9
255	0.020	1.9
260	0.020	1.9
265	0.020	1.9
270	0.020	1.9
275	0.020	1.9
280	0.020	1.9
285	0.020	1.9
290	0.020	1.9
295	0.020	1.9

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connection Results Storm Phase: Phase	Company Address:		

Time (mins)	Depth (m)	Flow (L/s)
300	0.020	1.9
305	0.020	1.9
310	0.020	1.9
315	0.020	1.9
320	0.020	1.9
325	0.020	1.9
330	0.020	1.9
335	0.020	1.9
340	0.020	1.9
345	0.020	1.9
350	0.020	1.9
355	0.020	1.9
360	0.020	1.9
365	0.020	1.9
370	0.020	1.9
375	0.020	1.9
380	0.020	1.9
385	0.020	1.9
390	0.020	1.9
395	0.020	1.9
400	0.020	1.9
405	0.020	1.8
410	0.020	1.8
415	0.020	1.8
420	0.020	1.8
425	0.020	1.8
430	0.020	1.8
435	0.020	1.8
440	0.020	1.8
445	0.020	1.8
450	0.020	1.8
455	0.020	1.8
460	0.019	1.8
465	0.019	1.8
470	0.019	1.7
475	0.019	1.7
480	0.019	1.7
485	0.019	1.7
490	0.019	1.7
495	0.019	1.7
500	0.019	1.7
505	0.019	1.7
510	0.019	1.7
515	0.019	1.7
520	0.019	1.7
525	0.019	1.7
530	0.019	1.6
535	0.019	1.6
540	0.019	1.6
545	0.019	1.6
550	0.019	1.6
555	0.019	1.6
560	0.019	1.6
565	0.019	1.6
570	0.019	1.6
575	0.018	1.6
580	0.018	1.6
585	0.018	1.6
590	0.018	1.5
595	0.018	1.5
600	0.018	1.5
605	0.018	1.5
610	0.018	1.5
615	0.018	1.5
620	0.018	1.5
625	0.018	1.5
630	0.018	1.5
635	0.018	1.5

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connection Results Storm Phase: Phase	Company Address:		

Time (mins)	Depth (m)	Flow (L/s)
640	0.018	1.5
645	0.018	1.5
650	0.018	1.5
655	0.018	1.4
660	0.018	1.4
665	0.018	1.5
670	0.018	1.5
675	0.018	1.5
680	0.018	1.5
685	0.018	1.5
690	0.018	1.6
695	0.019	1.6
700	0.019	1.6
705	0.019	1.6
710	0.019	1.6
715	0.019	1.6
720	0.019	1.7

2.001

Type : Pipe

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 120 mins: Summer

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.000	0.0
10	0.007	0.1
15	0.014	0.5
20	0.018	0.9
25	0.022	1.2
30	0.024	1.5
35	0.027	1.8
40	0.030	2.1
45	0.033	2.6
50	0.039	3.3
55	0.046	4.5
60	0.047	4.7
65	0.047	4.6
70	0.047	4.4
75	0.046	4.3
80	0.045	4.3
85	0.046	4.3
90	0.046	4.4
95	0.046	4.4
100	0.047	4.5
105	0.047	4.5
110	0.047	4.6
115	0.047	4.6
120	0.047	4.6
125	0.047	4.6
130	0.046	4.5
135	0.039	3.4
140	0.032	2.4
145	0.024	1.5
150	0.018	0.9
155	0.014	0.6
160	0.011	0.4
165	0.009	0.3
170	0.008	0.2
175	0.007	0.2
180	0.007	0.1
185	0.006	0.1
190	0.006	0.1
195	0.005	0.1
200	0.005	0.1
205	0.005	0.1
210	0.004	0.1
215	0.004	0.1
220	0.004	0.0
225	0.004	0.0
230	0.004	0.0
235	0.003	0.0
240	0.003	0.0

Project:	Date: 18/07/2024		
	Designed by: smoriarty	Checked by:	Approved By:
Report Details: Type: Connection Results Storm Phase: Phase	Company Address:		

2.000

Type : Box Culvert

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +20: 15 mins: Winter

Tables

Time (mins)	Depth (m)	Flow (L/s)
0	0.000	0.0
5	0.036	7.3
10	0.186	19.2
15	0.323	7.4
20	0.320	1.7
25	0.277	2.2
30	0.234	2.3

Appendix E

Maintenance Plan and Schedule for Storm Drainage Infrastructure

MWP

Inis Cealtra Visitor Experience

Maintenance Plan and Schedule for Storm Drainage Infrastructure

Clare County Council

November 2024

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1.1 Location and Proposed Development 1
2. Recommended Maintenance 2
2.1 Storm Drains 2
2.2 Kingspan Klargester Bypass Separators 2
2.3 Operation & Maintenance requirements for attenuation storage tanks as per CIRIA C753 – SuDS Manual 2015 & Wavin Aquacell O&M Manual 2
2.4 Operation & Maintenance requirements for silt traps as per CIRIA C753 – SuDS Manual 2015 3
2.5 Operation & Maintenance requirements for hydro brakes as per CIRIA C753 – SuDS Manual 2015 .. 3
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Figures

Figure 1-1: Aerial Image of Site (Open Street) 1

Appendices

Appendix 1 – Proposed Maintenance and Inspection Schedule Record Sheet

Appendix 2 – Product Data Sheets

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
21760	21760-MWP-ZZ-ZZ-RP-C-6007	P01	22/11/2024	AOD	DC	IB	Final

MWP, Engineering and Environmental Consultants
Address: Park House, Bessboro Road, Blackrock, Cork, T12 X251, Ireland

www.mwp.ie

1. Introduction

MWP were commissioned by Clare County Council to provide a design for the civil utilities serving the site namely, stormwater, foul water, public lighting, and water supply in connection with a planning application for proposed Inis Cealtra Visitor Experience. The document outlines the design intent for the plan and schedule for the future maintenance of the site drainage infrastructure to mitigate against the risk of flooding on the public road and the site in the interest of amenity and traffic safety.

1.1 Location and Proposed Development

Inis Cealtra is located in Lough Derg with the village of Mountshannon located approximately 2km north west of the island on the Lough Derg shoreline as shown indicatively in Figure 1-1. The Inis Cealtra Visitor Experience Project comprises of four elements which are outlined as follows:

- Developing of Inis Cealtra with upgraded landing, paths and pods.
- Village Car Park located north of Aistear Park
- Construction of a Visitor Centre on the grounds of the Rectory
- Reconfiguration of the Harbour Car Park

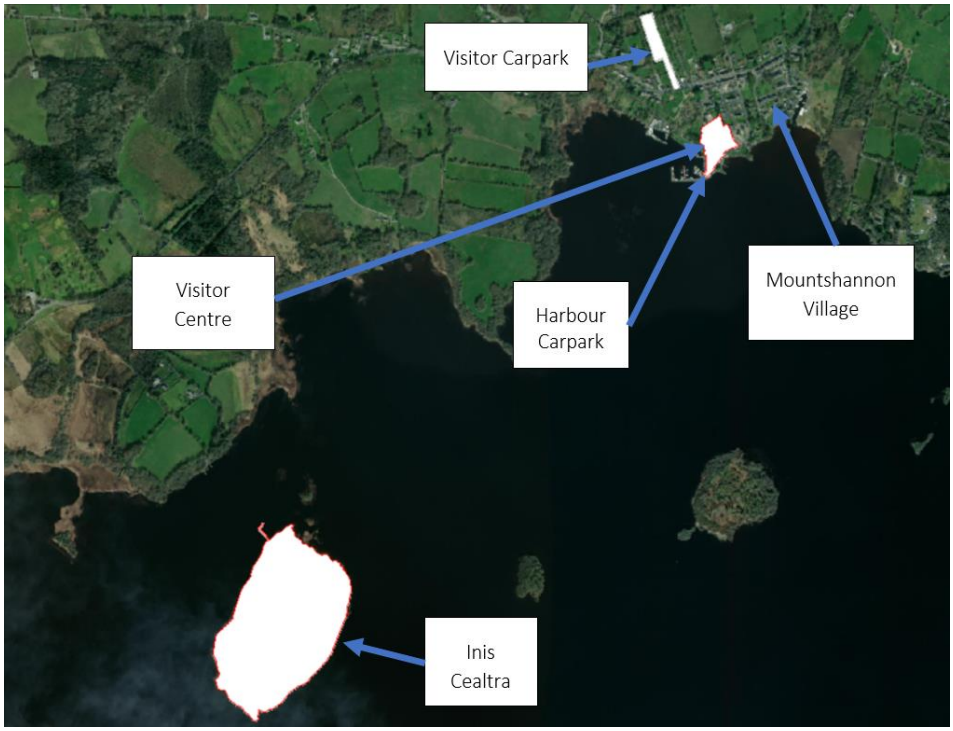


Figure 1-1: Aerial Image of Site (Open Street)

2. Recommended Maintenance

All elements of the drainage system should be inspected following a major storm event. Maintenance should be carrying out in tandem with the specification outlined by the manufacturer and be conducted to whichever is the most onerous. When carrying out maintenance, it is essential that a record of inspection and maintenance on all elements is kept and updated when required. A proposed template to record the maintenance and inspections conducted on the site can be found in Appendix A. Product sheets for the critical elements for the storm sewer are provided in Appendix B.

2.1 Storm Drains

It is recommended all storm drains are cleaned every 6 months. Further recommendation is shown below:

Maintenance Schedule	Required Action	Typical Frequency
Routine Maintenance	Inspection	Monthly
	Litter/debris removal	Monthly or as required
Occasional Maintenance	Sediment removal – silt build-up should be removed	Every 6 months
Remedial Maintenance	Repair (as a result of damage or vandalism)	As required

2.2 Kingspan Klargester Bypass Separators

Kingspan Klargester recommends checking the oil levels after the first 3 months. This will give an indication on when the separators should be maintained.

2.3 Operation & Maintenance requirements for attenuation storage tanks as per CIRIA C753 – SuDS Manual 2015 & Wavin Aquacell O&M Manual

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. Take action where required	Monthly for 3 months. Yearly thereafter.
	Remove debris from catchment surface. (where it may cause risk to performance.)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures, isolation rows, and/ or internal forebays	Annually, or as required
Remedial Maintenance	Repair/rehabilitate inlets, outlet, overflows and vents	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually & following large storms
	Survey inside of system for sediment build-up and remove if necessary	Every 6 months or as required.

2.4 Operation & Maintenance requirements for silt traps as per CIRIA C753 – SuDS Manual 2015

Maintenance Schedule	Required Action	Typical Frequency
Routine Maintenance	Inspection	Monthly
	Litter/debris removal	Monthly or as required
Occasional Maintenance	Sediment removal – silt stores should be emptied	Every 6 months
Remedial Maintenance	Repair (as a result of damage or vandalism)	As required

2.5 Operation & Maintenance requirements for hydro brakes as per CIRIA C753 – SuDS Manual 2015

Maintenance should be carrying out in tandem with the specification outlined by the manufacturer. As a general guide, the following requirements should be met:

Maintenance Schedule	Required Action	Typical Frequency
Routine Maintenance	Inspection	Monthly
	Litter/debris removal	Monthly or as required
Occasional Maintenance	Sediment removal – silt stores should be emptied	Every 6 months
Remedial Maintenance	Repair (as a result of damage or vandalism)	As required

2.6 External drainage system - Drainage adjacent to road including soakaways, swales, tree pits, rain gardens etc.

The drainage system should be inspected regularly to coincide with the aforementioned specification. A general guideline is shown below:

Maintenance Schedule	Required Action	Typical Frequency
Routine Maintenance	Inspection	Monthly
	Litter/debris removal	Monthly or as required
	Vegetation management	Monthly or as required
Occasional Maintenance	Sediment removal – silt stores should be emptied	Every 6 months
Remedial Maintenance	Repair (as a result of damage or vandalism)	As required

Appendix 1

Proposed Maintenance and Inspection Schedule Record Sheet

Date	Item Inspected/ Maintained	Inspection/ Maintenance Type	Comment on condition of Item prior to the Works and detail of what works were performed	Inspected/Maintained by:

Appendix 2

Product Data Sheets

Grasscrete

the environmental paving solution

GrassConcrete

the original ...the best, that's the Grasscrete World

Our history

Grass Concrete Limited is a UK based company founded upon the principles of establishing environmental awareness in construction. Since our establishment in 1970 many of our aspirations that were then 'alternative' have now become part of mainstream policy adopted by governments and planners around the world.

Barely an issue in those days, the company set out to change traditional thinking towards paving technology. The company's credentials have grown with that of its original product, the unique Grasscrete paving system. Alongside this original invention further paving systems have been introduced as well as a range of earth retaining walls and green roofing solutions.

Why Grasscrete?

With architects and engineers now embracing environmental technology, the relevance of Grasscrete has never been greater. A product ahead of its time has found its era.

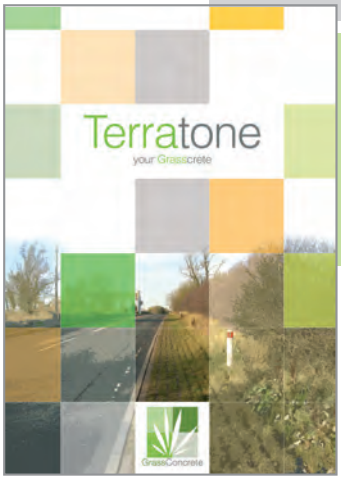
As probably the world's only supplier of a complete range of grass reinforcement products, we are able to say that Grasscrete stands alone in its unique capabilities. Though often thought of as a generic reference for grass reinforcement, it's much more than that and, indeed, shouldn't be confused with other types of grass paving.

The lightweight Grasscrete void former can be easily and cost effectively shipped throughout the World. Availability is enhanced by an extensive network of International Licensees.

applications

- Vehicle parking
- Access roads
- Fire and emergency access
- Laybys / pull ins
- Highway verges
- Abnormal load diversions
- SUDS (sustainable urban drainage system)
- Helipads
- Military installations
- Slope protection
- Drainage channels
- Flood prevention
- Swales
- Spillways

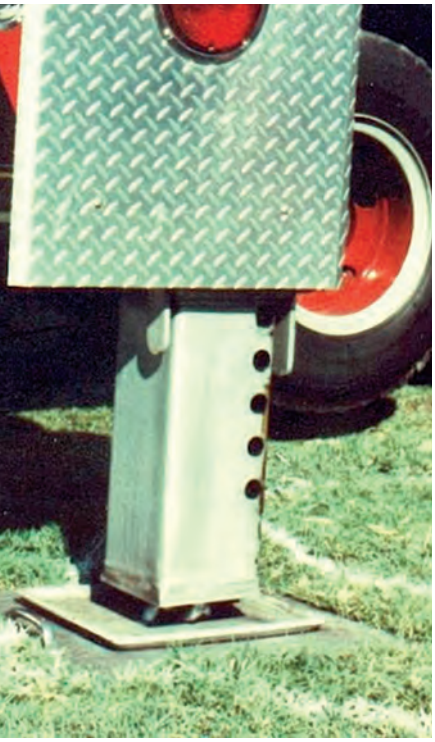
Grasscrete is available in soil tone concrete. Please ask for further details of Terratone



structural performance

Grasscrete combines the environmental appeal of natural grass with the engineering principles of reinforced concrete.

This unique cellular structure is created using the Grasscrete void former; vacuum formed with a patented anti-static coating to prevent concrete adhesion as well as enabling easy packing and separation.



Key benefits

Resists differential settlement

Modular, pre-cast concrete or plastic systems rely significantly on grass for stability by forming a composite tensile matrix. Under constant trafficking the combination of load and vibration can loosen root anchorage, leaving the surface prone to settlement in a syndrome known as 'elephant tracking'.

By contrast Grasscrete isn't structurally influenced by grass and can therefore be trafficked before grass establishment. The reinforced structure resists differential settlement and the flat, upper surface and pocket shape minimises vibration.

Ground heave

Grasscrete's unique pocket profile enables the release of frost heave and hydro-static pressure. These benefits enable the system to be used over frost influenced ground and in demanding slope protection works.

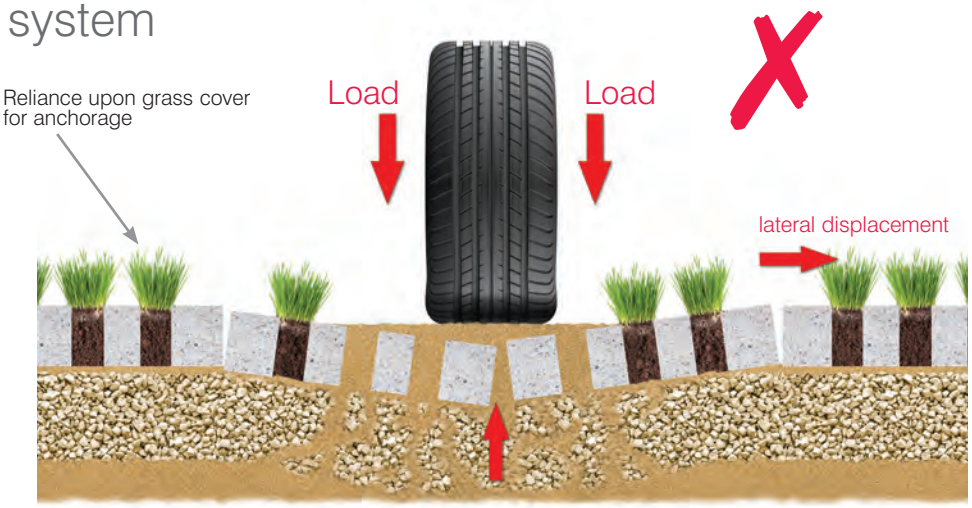
Sub-base depth

With an allowable ground-bearing requirement of just 45kN/m^2, Grasscrete can be installed over slimmer sub-bases than required for pre-cast or plastic types.

Edge details

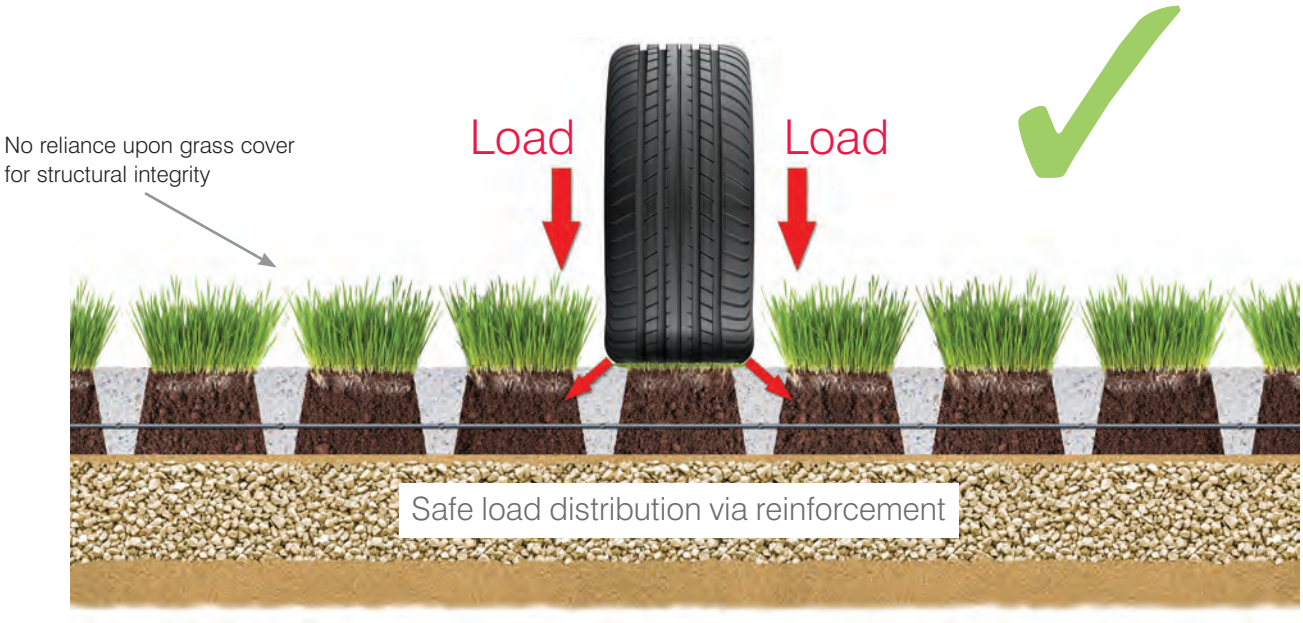
Modular pre-cast concrete or plastic systems require edge restraints or kerbs. For larger projects intermediate shear anchors may also be needed. Grasscrete however, requires no such details, enabling it to blend naturally with adjacent finishes with subtle delineation created by a monolithically cast solid concrete edge margin.

Pre-cast system



Sub-base deforms causing sub-grade to pump to surface

Grasscrete



key environmental benefits

Permeability

- Permeation rate up to 90% that of original ground
- Helps to reduce shrinkage in underlying clays
- Reduces on and offsite drainage requirements
- Works with BREEAM, LEED and BASIX environmental systems

Filtration

- Natural bio-filter created by organic/granular layers

Flood prevention and control

- Reduces surface water run-off
- Highly effective armouring layer for fast flowing water movement and storage
- Gives a hard engineering solution a soft landscape feel

Greenspace

- Promotes a feeling of greenspace well-being
- Helps to reduce the Urban Heat Island Effect
- Digests CO_2 at ground level emission source

Recycling

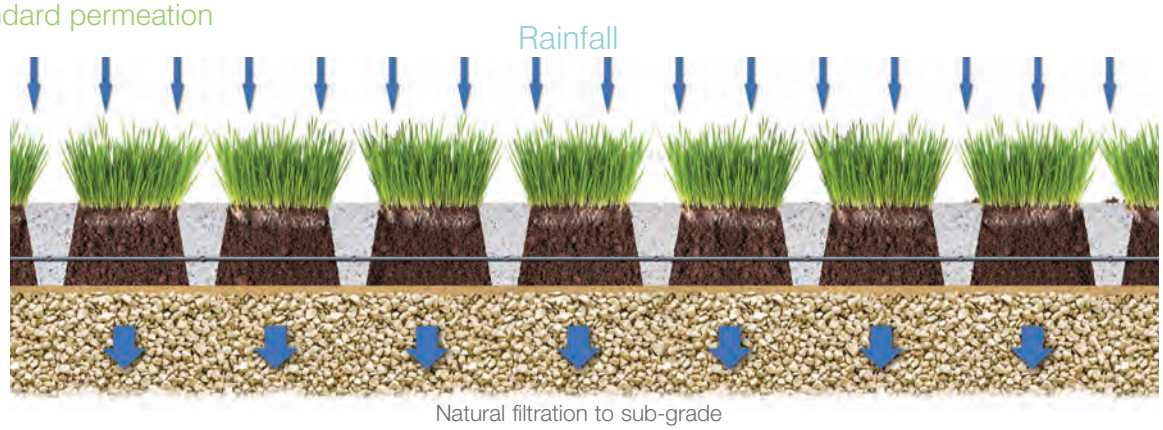
- Significant re-cycled content in void former manufacture
- Promotes re-use and re-cycling of topsoils and aggregates in construction

Carbon mileage

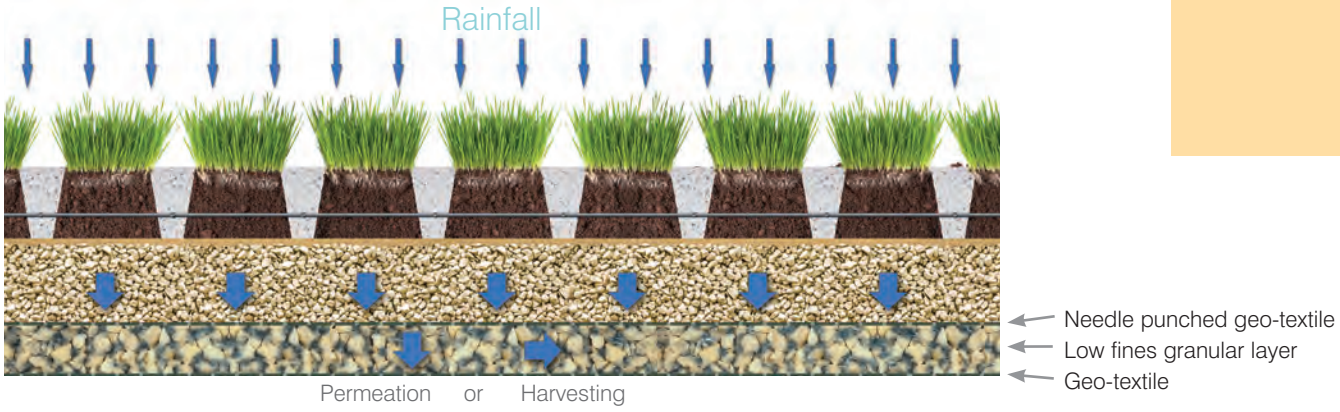
- Lightweight formers and patented nesting reduces transported volume
- Combines with locally sourced materials for construction

sustainable drainage technology(SUDS)

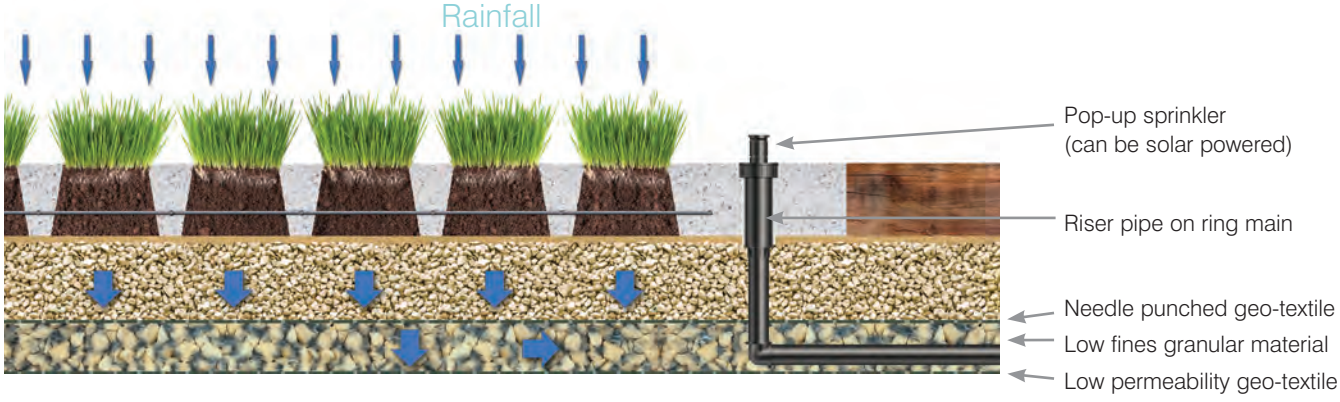
Standard permeation



Advanced attenuation/rainwater harvesting



Rainwater harvesting with irrigation



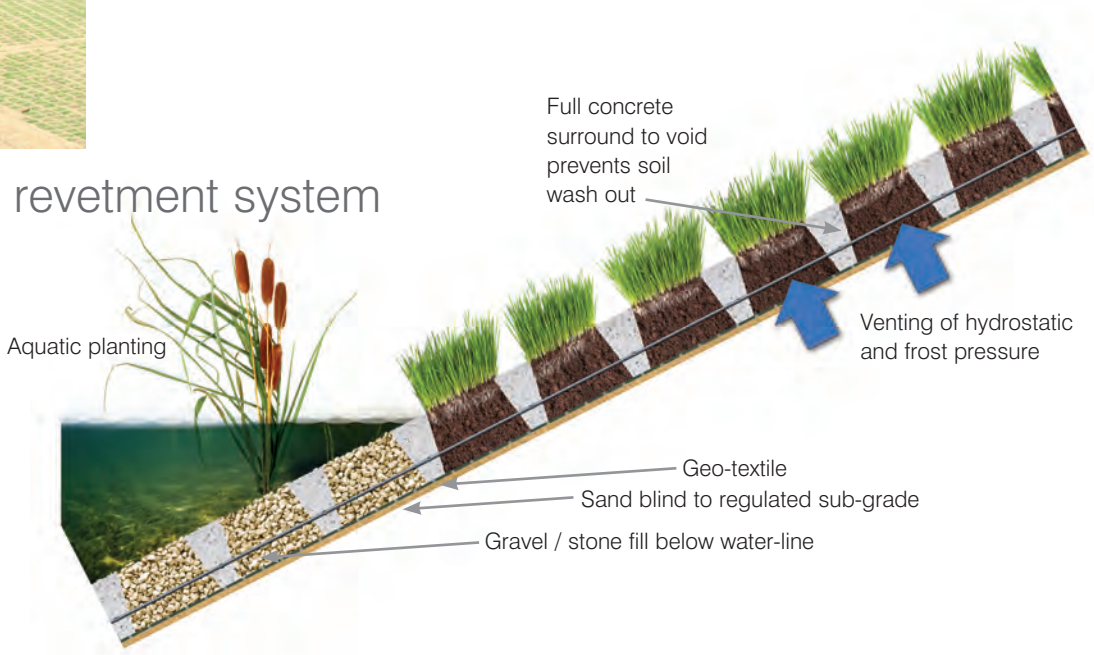
slope protection

Grasscrete has been flow tested to rates in excess of 8 metres per second, enabling it to be used in exacting locations.

The Grasscrete construction phase also holds a number of key advantages for contractors when compared with pre-cast systems:

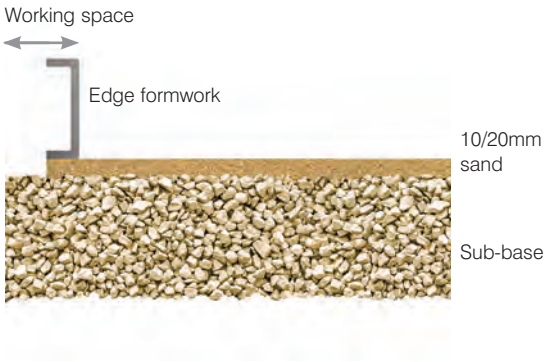
- The cast insitu process enables bays to be cast in varying locations and sequences safe in the knowledge that they will all eventually come together. This compares to the need to follow a strict linear process for installing pre-cast blocks to ensure that bonding is maintained.
- Site storage and handling requirements are minimised with one 12 metre long container of Grasscrete formers being able to cover the same area as forty 12 metre long loads of pre-cast blocks.
- In addition to normal topsoil and grass infill the Grasscrete pockets can also be filled with 20-5mm graded gravel for below water-line locations.
- The “at risk” period during the temporary works is much less for Grasscrete as it will perform without grass growth. This compares to pre-cast block types where grass growth is essential to maintaining stability.

The natural revetment system

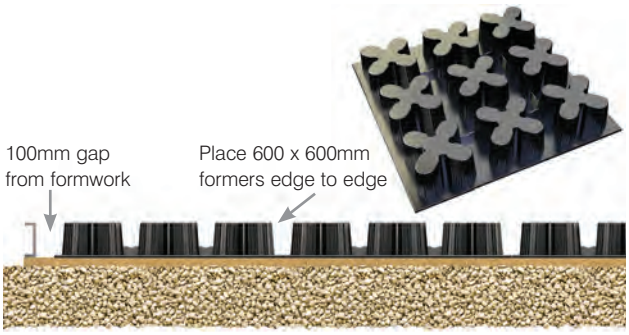


installation

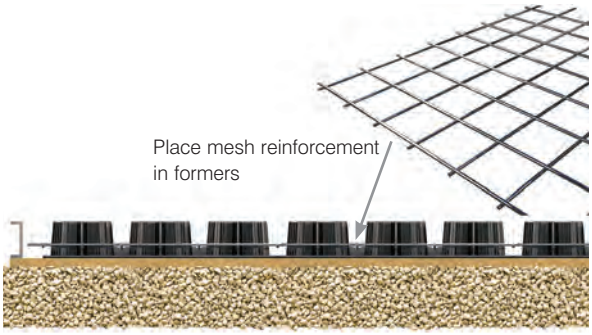
1. Preparation



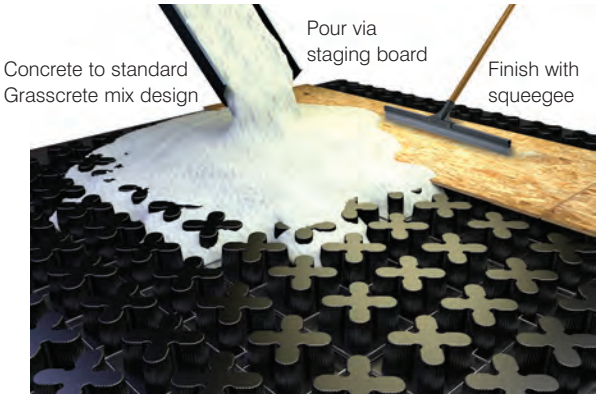
2. Lay formers



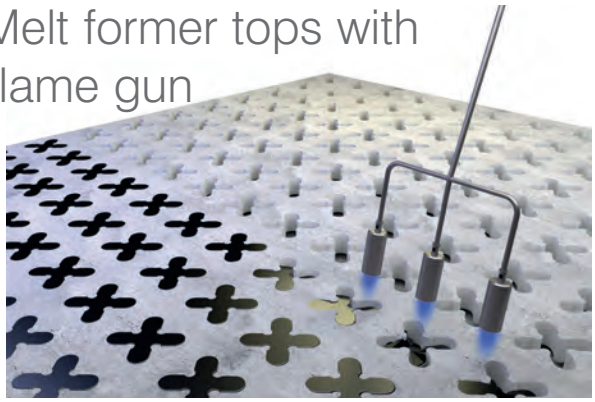
3. Mesh reinforcement



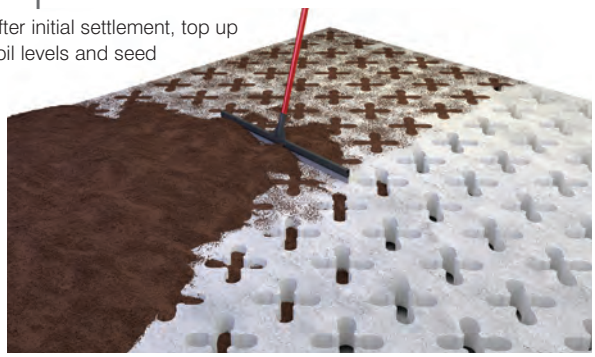
4. Concrete



5. Melt former tops with flame gun

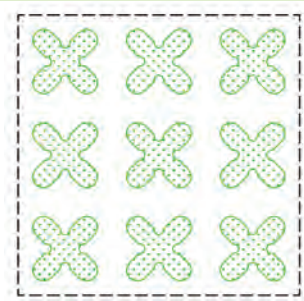


6. Top soil and seed



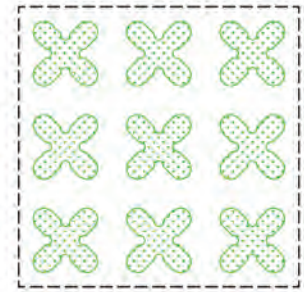
Types

GC3



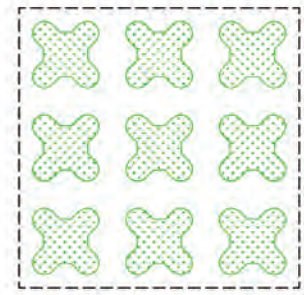
Void former size:	600 x 600 x 76mm
Paving depth:	76mm
Mesh reinforcement:	BS4483 Ref. A142 or A193 (200 x 200 x 6mm dia. or 200 x 200 x 7mm dia.)
Concrete coverage:	22m²/m³
Topsoil coverage:	24m²/m³

GC1



Void former size:	600 x 600 x 100mm
Paving depth:	100mm
Mesh reinforcement:	BS4483 Ref. A193 or A252 (200 x 200 x 7mm dia. or 200 x 200 x 8mm dia.)
Concrete coverage:	15.50m²/m³
Topsoil coverage:	18m²/m³

GC2



Void former size:	600 x 600 x 150mm
Paving depth:	150mm
Mesh reinforcement:	BS4483 Ref. A252 or A393 (200 x 200 x 8mm dia. or 200 x 200 x 10mm dia.)
Concrete coverage:	11.50m²/m³
Topsoil coverage:	12m²/m³

Specification

Grasscrete cast on site reinforced cellular paving.

Grasscrete formers type GC.....*, ...*mm deep laid on a consolidated sub-base with a 10/20mm blinding layer of sand. Steel mesh reinforcement to BS4483 reference .....*, weighing .....*kg/m². Concrete 30MN/m2 at 28 days with air entrainment of 3%. 10mm maximum aggregate and a .....*mm slump placed around formers and mesh and levelled to tops of formers. *(Where coloured concrete is required please suffix the GC former type reference with "Terratone" eg "GC3/Terratone".)* After 48 hours melt exposed tops of formers and fill with soil. Following settlement sow Grassmix No.....* at a rate of 50g/m² and top up with fine friable topsoil, apply fertiliser as necessary.

Expansion joints shall be incorporated at maximum 10 x 10m centres and shall consist of 25mm wide pre-soaked softwood filler.

Or for GC2 with A393 mesh only, and normally only when used for heavy load transference:

Expansion joints shall be incorporated at maximum 10 x 10m centres and shall consist of 25mm wide foamboard filler with 20mm diameter x 300mm long sawn mild steel dowels at 400mm centres with cap and debond to one side. Joint shall be sealed with cold applied sealant.

**Refer to data in Grasscrete Types table and Specification Guide for items to be completed.*

Specification guide

Vehicular use

Maximum vehicle weight	Grasscrete type	Depth	Reinforcement	Minimum Sub-base depth*	Sub-base type
0 - 3.4 tonnes	GC3	76mm	A142	100mm	(UK) Specification for Highway Works Clause 803 Type 1 sub-base (International) 40mm down crushed stone granular sub-base
3.4 - 4.3 tonnes	GC3	76mm	A193	150mm	
4.3 - 10.8 tonnes	GC1	100mm	A193	150mm	
10.8 - 13.3 tonnes	GC1	100mm	A252	150mm	
13.3 - 30.0 tonnes	GC2	150mm	A252	150mm	
30.0 - 40.0 tonnes	GC2	150mm	A393	200mm	

**Assumes a free draining allowable ground bearing of 45kN/m² which should also be sufficient to enable construction plant/delivery access.*

Water environment

Water flow rate	Grasscrete type	Depth	Reinforcement	Preparation (all types)
Up to 4.5 metres / second	GC3	76mm	A142	Trimmed earth sub-grade Sand blind Suitable geo-textile Fine protective cover of sand
Up to 6.0 metres / second	GC1	100mm	A193	
Up to 9.0 metres / second	GC2	150mm	A252	

Seed specification

Mix	Sowing rate	*Specification (temperate European)	Application
No. 1	35gms/m²	50% perennial ryegrass 20% slender creeping red fescue 25% strong creeping red fescue 5% browntop bent	Vehicular parking, amenity areas
No. 2	30gms/m²	20% chewings fescue 20% slender creeping red fescue 30% strong creeping red fescue 25% hard fescue 5% browntop bent	Fire paths, shaded low maintenance areas
No. 3	20gms/m²	25% perennial ryegrass 20% strong creeping red fescue 30% hard fescue 10% smooth stalked meadow grass 10% browntop bent 5% white clover	Slopes, road verges *For other climate types please contact us

Further specification information can also be found under NBS reference Q21-125

Please contact us for further information and advice relating to special mixes for applications such as water courses and spillways.

Grass Concrete Limited

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info@grasscrete.com

Please note that information is given in good faith, without warranty and subject to alteration without prior notice.

A full range of brochures and technical guides are available upon request

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@grasscreteworld

www.grasscrete.com

Water Management Solutions

Separators Product Brochure

Fully compliant range of Separators for a variety of commercial and industrial applications

kingspan.me/water

Kingspan

Fuel/Oil Separators for Commercial and Industrial Applications

Contact our expert local separators team for technical advice on your project requirements.

Email **Water-ME@kingspan.com** and a member of our team will be in touch.

Surface water drains typically discharge to a watercourse or indirectly into underground waters (groundwater) via a soakaway. Contamination of surface water by oil, chemicals or suspended solids can cause these discharges to have a serious impact on the receiving water.

UK environment regulators, the Environment Agency; the Scottish Environment Protection Agency (SEPA); and the Department of Environment (DOE); have all published guidance on surface water disposal, which includes dealing with pollution both at source and at the point of discharge from site (so-called 'end of pipe' treatment). These techniques are known as 'Sustainable Drainage Systems' (SuDS).

Where run-off is draining from relatively low risk areas such as car parks and non-operational areas, a source control approach - such as permeable surfaces or infiltration trenches - may offer a suitable means of treatment, removing the need for a separator.

Oil separators are installed on surface water drainage systems to protect receiving waters from pollution by oil, which may be present due to minor leaks from vehicles or from across the plant, or from more major events like accidental spillage.

Effluent from industrial processes and vehicle washing should normally be discharged to the foul sewer (subject to the approval of the sewerage undertaker) for further treatment at a municipal treatment works.

Separator Standards and Types
The UK has adopted a two-part European Standard (BS EN 858-1:2002 and BS EN 858-2:2003; Reference 5) for the design, use, selection, installation, operation and maintenance of prefabricated oil separators.New prefabricated separators should comply with the standard.

Separator Classes
The standard refers to two 'classes' of separator, based on performance under standard test conditions.

Class I
Designed to achieve a concentration of less than 5mg/l of oil under standard test conditions, a Class I separator should be used when the separator is required to remove very small oil droplets. Class 1 separators always discharge to a watercourse.

Class II
Designed to achieve a concentration of less than 100mg/l oil under standard test conditions, Class II separators are suitable for dealing with discharges where a lower quality requirement applies. Class II separators discharge effluent to a foul sewer.

Bypass separators
Bypass separators fully treat all flows generated by rainfall rates of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, for example where the risk of a large spillage and heavy rainfall occurring at the same time is small.

Full retention separators
Full retention separators treat the full flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

On large sites, some short term flooding may be an acceptable means of limiting the flow rate and hence the size of full retention systems.

Forecourt separators
Forecourt separators are full retention separators specified to retain on site the maximum spillage likely to occur on a petrol filling station. They are required for both safety and environmental reasons and will treat spillages occurring during vehicle refuelling and road tanker delivery. The size of the separator is increased in order to retain the possible loss of the contents of one compartment of a road tanker, which may be up to 7,600 litres.

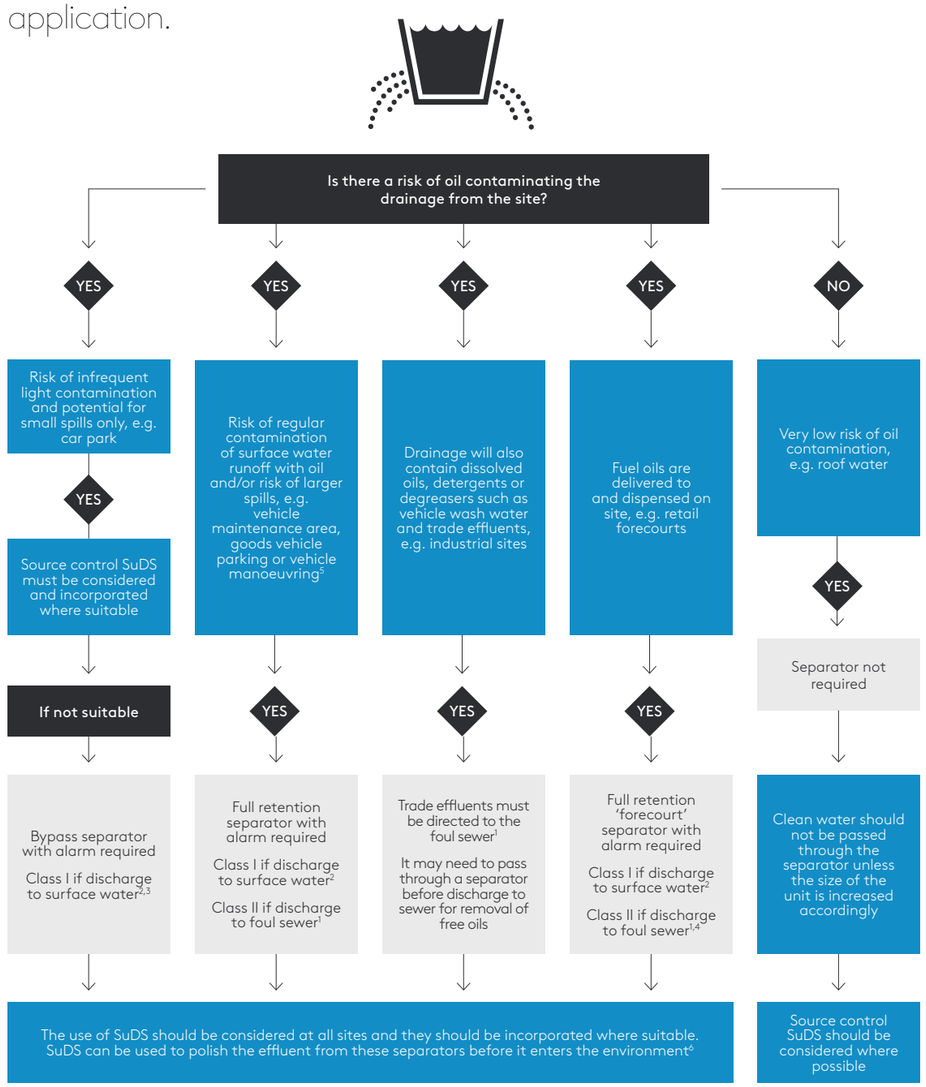
Selecting the right separator
The chart on the following page gives guidance to aid selection of the appropriate type of fuel/oil separator for use in surface water drainage systems which discharge into rivers and soakaways. For further detailed information, please consult your local Water/Environmental Agency.

Kingspan has a specialist team who provide technical assistance in selecting the appropriate separator for your application.

Choosing the Right Separator

Kingspan has a specialist team who provide expert technical assistance in selecting the appropriate separator for your application.

The chart below gives guidance to aid selection of the appropriate type of fuel/oil separator for use in surface water drainage systems which discharge into rivers and soakaways.



1 You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.

2 You must seek prior permission from the relevant environmental body before you decide which separator to install.

3 In this case, if it is considered that there is a low risk of pollution a source control SuDS scheme may be appropriate.

4 In certain circumstances, the sewer provider may require a Class 1 separator for discharges to sewer to prevent explosive atmospheres from being generated.

5 Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.

6 In certain circumstances, a separator may be one of the devices used in the SuDS scheme. Ask us for advice.

Bypass Separators

NSB RANGE

Kingspan NSB range achieved on average <1mg/l under EN 858-1 testing conditions

Performance
Kingspan was one of the first UK manufacturers to have separators tested to BS EN 858-1. In 2006, we introduced the NSB range of bypass separators. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan bypass separators, and certified their performance in relation to their flow and process performance, assessing the effluent qualities to the requirements of BS EN 858-1. Kingspan bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:
- Oil separation capacity
- Oil storage volume
- Silt storage capacity
- Coalescer (Class 1 units only).

The unit is designed to treat the first 10% of peak flow ('first flush principle'). The calculated drainage areas served by each separator are indicated according to the formula NSB = 0.0018A(m^2). Flows generated by higher rainfall rates will pass through part of the separator, bypassing the separation chamber.

Class I separators are designed to achieve a concentration of 5mg/litre of oil under standard test conditions.

Features
Light and easy to install.
- Inclusive of silt storage volume
- Fitted inlet/outlet connectors
- Vent points within necks
- Oil alarm system available (required by BS EN 858-1)
- Extension access shafts for deep inverts
- Maintenance from ground level
- GRP or rotomoulded construction (subject to model).

To specify a nominal size bypass separator, the following information is needed:

- The calculated flow rate for the drainage area served. Our designs are based on the assumptions that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the flow is not pumped
- The drain invert inlet depth
- Pipework type, size and orientation.

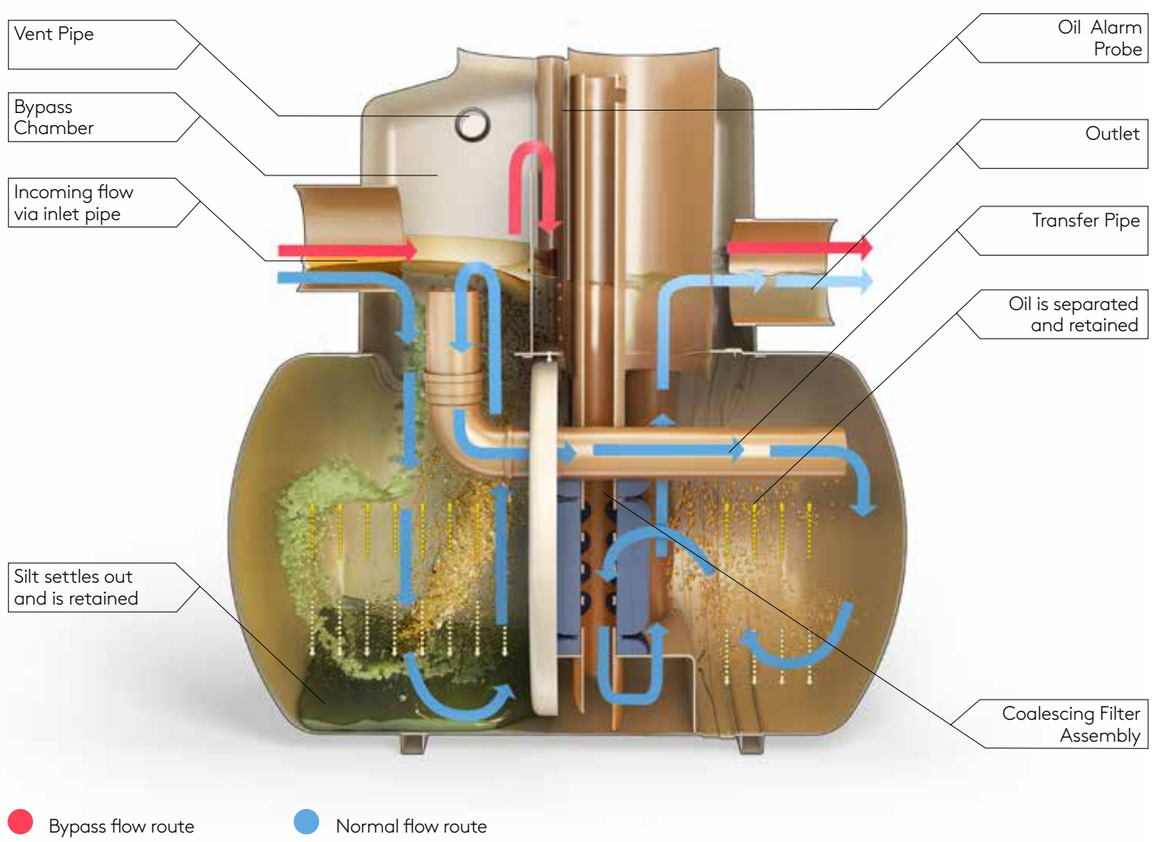
Technical Specifications

Model Reference	Flow (l/s)	Peak Flow Rate (l/s)	Drainage Area(M^2) Based on UK rainwater flow	Storage Capacity (Ltrs)		Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)**
				Silt	Oil								
Polyethylene Chamber Construction													
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
GRP Chamber Construction													
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

** Systems to cater for larger flow rates are available on request. Email water-ME@kingspan.com for further information.*
** Some units have more than one access shaft – diameter of largest shown | ** Larger pipework available on request.*

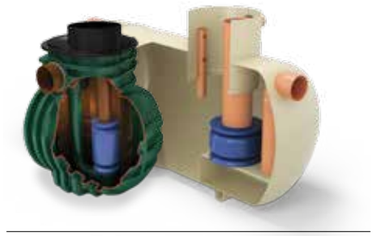
Applications
Kingspan's range of bypass separators are typically used for the following applications:

Surface Car Park
Roadways
Lightly Contaminated Areas
Airports
Ports
Railways



Full Retention Separators

NSF RANGE



Kingspan NSF range achieved on average <1mg/l under EN 858-1 testing conditions

Performance
Kingspan were the first UK manufacturer to have the required range (3-30 l sec) certified to BS EN 858-1 in the UK. The NSF number denotes the flow at which the separator operates. The British Standards Institute (BSI) have witnessed the performance tests of the required range of separators and have certified their performance, in relation to their flow and process performance to ensure that they meet the effluent quality requirements of BS EN 858-1. Larger separator designs have been determined using the formulas extrapolated from the test range.

Each full retention separator design includes the necessary volume requirements for:

- Oil separation capacity
- Oil storage volume
- Silt storage capacity
- Coalescer (Class I units only)
- Automatic closure device.

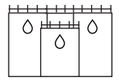
Kingspan full retention separators treat the whole of the specified flow.

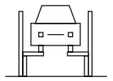
Features
- Light and easy to install
- 3-30 l/sec range independently tested and performance sampled, certified by the BSI
- Inclusive of silt storage volume
- Fitted inlet/outlet connectors
- Oil alarm system available
- Vent points within necks
- Extension access shafts for deep inverts
- Maintenance from ground level
- GRP or rotomoulded construction (subject to model)

To specify a nominal size full retention separator, the following information is needed:

- The calculated flow rate for the drainage area served. Our designs are based on the assumptions that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the influent is not pumped
- The required discharge standard
- The drain invert inlet depth
- Pipework type, size and orientation.

Applications
Full retention separators are used in high risk spillage areas such as:


Fuel Distribution Depots


Vehicle Workshops


Scrap Yards


Airports

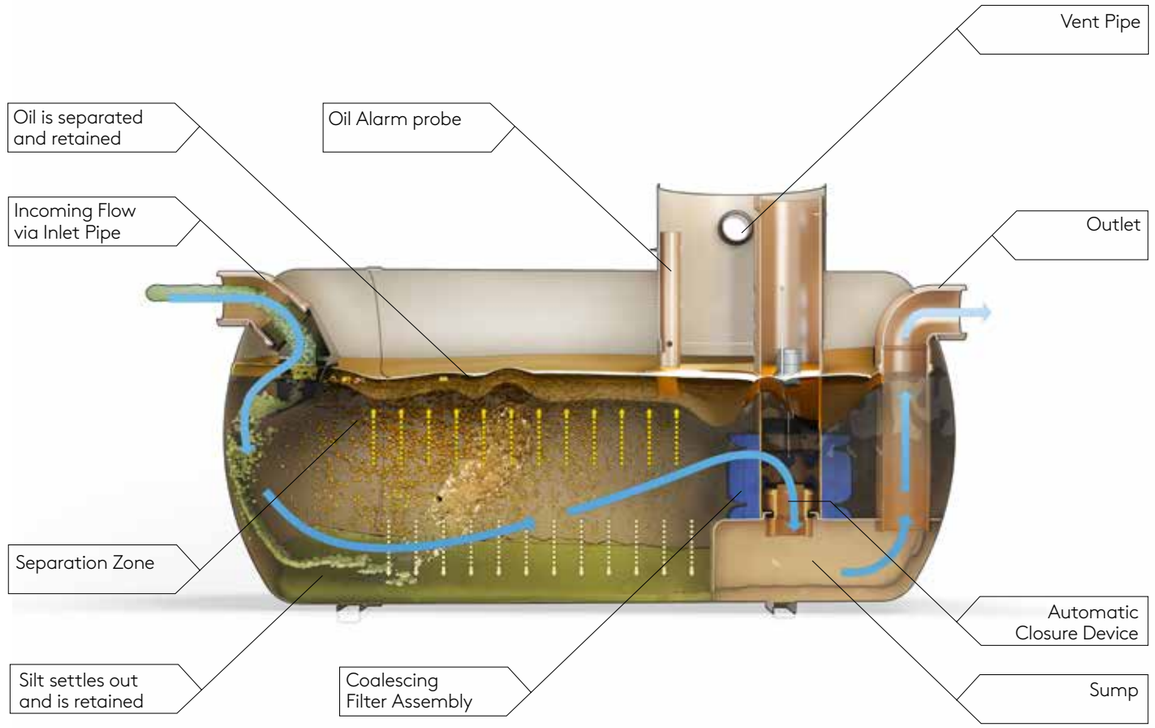

Ports


Railways

Technical Specifications

Model Reference	Flow (l/s)	Drainage Area (m2) PPG-3 (0.018)	Storage Capacity (Ltrs)		Length (mm)	Diameter (mm)	Manhole Cover Dimensions (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)
			Silt	Oil							
Polyethylene Chamber Construction											
NSFP003	3	170	300	30	1700	1350	600	1410	1335	550	160
NSFP006	6	335	600	60	1700	1350	600	1410	1335	550	160
GRP Chamber Construction											
NSFA010	10	555	1000	100	2610	1225	600	1050	1000	500	200
NSFA015	15	835	1500	150	3910	1225	600	1050	1000	1000	200
NSFA020	20	1115	2000	200	3200	2010	600	1810	1760	1000	315
NSFA030	30	1670	3000	300	3915	2010	600	1810	1760	1000	315
NSFA040	40	2225	4000	400	4640	2010	600	1810	1760	1000	315
NSFA050	50	2780	5000	500	5425	2010	600	1810	1760	1000	315
NSFA065	65	3160	6500	650	6850	2010	600	1810	1760	1000	315
NSFA080	80	4445	8000	800	5744	2820	600	2500	2450	1000	315
NSFA100	100	5560	10000	1000	6200	2820	600	2500	2450	1000	400
NSFA125	125	6945	12500	1250	7365	2820	600	2500	2450	1000	450
NSFA150	150	8335	15000	1500	8675	2820	600	2500	2450	1000	525
NSFA175	175	9725	17500	1750	9975	2820	600	2500	2450	1000	525
NSFA200	200	11110	20000	2000	11,280	2820	600	2500	2450	1000	600

** Systems to cater for larger flow rates are available on request. Email water-ME@kingspan.com for further information*
** Some units have more than one access shaft – diameter of largest shown.*



Forecourt Separators

Compliance
Operation ensures that the flow cannot exit the unit without first passing through the coalescer assembly.

In normal operation, the forecourt separator has sufficient capacity to provide storage for separated pollutants within the main chamber, but is also able to contain up to 7,600 litres of pollutant arising from the spillage of a fuel delivery tanker compartment on the petrol forecourt. The separator has been designed to ensure that oil cannot exit the separator in the event of a major spillage, therefore the separator should be emptied immediately.

Features
- Light and easy to install
- Inclusive of silt storage volume
- Fitted inlet/outlet connectors
- Vent points within necks
- Extension access shafts for deep inverts
- Maintenance from ground level
- Class I and Class II design
- Oil storage volume
- Coalescer (Class I unit only)
- Automatic closure device
- Oil alarm system available

Installation
The unit should be installed on a suitable concrete base slab and surrounded with concrete or pea gravel backfill.

If the separator is to be installed within a trafficked area, then a suitable cover slab must be designed to ensure that loads are not transmitted to the unit.

The separator should be installed and vented in accordance with local Health and Safety guidelines.

Technical Specifications

Separator Class	Backfill Type	Total Capacity (Ltrs)	Drainage Area (m^2)	Peak Flow Rate (L/s)	Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)	Empty Weight (kg)
I/II	Concrete	10000	835	15	3915	2020	600	2180	2130	50	600	160	620
I/II	Concrete	10000	1115	20	3915	2020	600	2180	2130	50	600	200	620

Local and remote separator monitoring solutions

Kingspan offer both local oil level alarm systems and remote monitoring solutions, specifically designed to help you manage your separator system(s).

SmartServ Remote Monitoring Solution
Kingspan's intelligent fuel/oil separator monitoring system ('SmartServ') is a cost effective solution designed to offer greater control over your separator system. SmartServ is also fully compliant with British European Standard EN 858-1.

Benefits
- Helps avoid costly overflows
- Saves money
- Greater control over assets

Oil Level Alarm System
British European Standard EN 858-1 requires that all separators are to be fitted with an oil level alarm system and that it should be installed and calibrated by a suitably qualified technician so that it will respond to an alarm condition when the separator requires emptying.

Benefits
- Easily fitted to existing tanks
- Excellent operational range
- Visual and audible alarm

Washdown and Silt Units

Performance
Vehicle wash down facilities must not be allowed to discharge directly into surface water. Instead, their discharge must be directed to a foul connection leading to a municipal treatment works as it is likely to contain emulsifiers, soaps and detergents, which can dissolve and disperse the oils.

Features
- Light and easy to install
- Inclusive of silt storage volume
- Fitted inlet/outlet connectors
- Vent points within necks
- Extension access shafts for deep inverts

Applications


Car Wash


Tool Hire Depots


Truck Cleansing


Construction compounds cleansing points

Technical Specifications

Model Ref	Total Capacity (Ltrs)	Max.rec. Silt (Ltrs)	Max. Flow Rate (L/s)	Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base To Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)	Approx. Empty (Kg)
W1/010	1000	500	3	1123	1225	460	1150	1100	50	500	160	60
W1/020	2000	1000	5	2074	1225	460	1150	1100	50	500	160	120
W1/030	3000	1500	8	2952	1225	460	1150	1100	50	500	160	150
W1/040	4000	2000	11	3898	1225	460	1150	1100	50	500	160	180
W1/060	6000	3000	16	4530	1440	600	1360	1310	50	500	160	320
W1/080	8000	4000	22	3200	2020	600	2005	1955	50	500	160	585
W1/100	10000	5000	27	3915	2020	600	2005	1955	50	500	160	680
W1/120	12000	6000	33	4640	2020	600	2005	1955	50	500	160	770
W1/150	15000	7500	41	5435	2075	600	1940	1890	50	500	160	965
W1/190	19000	9500	52	6865	2075	600	1940	1890	50	500	160	1200

Car Wash Silt Trap

Features
- FACTA Class B covers
- Light and easy to install
- Maintenance from ground level

Technical Specifications

Model Ref	Total Capacity (Ltrs)	Max.rec. Silt (Ltrs)	Max. Flow Rate (L/s)	Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base To Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)	Approx. Empty (Kg)
W1/080	8000	4000	22	3200	2020	600	2005	1955	50	500	160	585
W1/100	10000	5000	27	3915	2020	600	2005	1955	50	500	160	680
W1/120	12000	6000	33	4640	2020	600	2005	1955	50	500	160	770
W1/150	15000	7500	41	5435	2075	600	1940	1890	50	500	160	965
W1/190	19000	9500	52	6865	2075	600	1940	1890	50	500	160	1200

Middle Eastern Installations

Kingspan operate in over 85 countries worldwide, with currently over 5 million water management system installations. Take a look at a selection of our case studies below.

Experience

OVER 60 YEARS

QA

Hamad International Airport
Qatar
Fuel/Oil Separators

EAU

Jumeirah Lake Towers
Dubai
Fuel/Oil Separators

EAU

Four Seasons Hotel
Abu Dhabi
Fuel/Oil Separators and Grease Separators

OM

Sohar Labour Camp
Oman
Forecourt Separators and Sewage Treatment Plants

KW

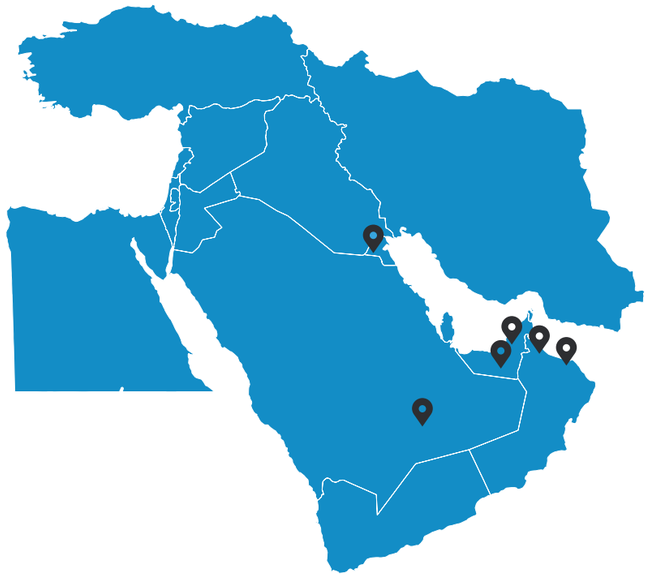
AZ-Zour Desalination Plant
Kuwait City
Fuel/Oil Separators and Package Pumping Stations

OM

Muscat Airport
Oman
Fuel/Oil Separators

SA

Haramain 'Western Railway' High Speed Rail Project
Saudi Arabia
Fuel/Oil Separators



Other Water Management Solutions from Kingspan

Expert Advice Available

Kingspan offer a full range of commercial, domestic and industrial wastewater treatment solutions. To find out more information on any of our products featured, email water-ME@kingspan.com or visit our website at kingspan.me/water

Domestic Sewage Treatment Plants

Commercial Sewage Treatment Plants

Domestic and Commercial Pumping Stations

Rainwater Harvesting Systems

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Toll Free: – 1300 736 562
E: sales.au@kingspan.com

PRODUCT INFORMATION SHEET

AquaCell Plus-R

Description

Plus has been designed primarily for use in applications where inspectability is required, and is suitable for use in all applications from landscaped areas to heavily trafficked areas

Technical specification

Cat code	6LB250	**Void ratio**	95%
Colour	Black	**Material**	Recycled PP
Dimensions	1m x 0.5m x 0.4m	**Vertical loading**	70.2 tonnes/m^2 (702 kN/m^2)
Weight	12.7kg	**Lateral loading**	15.1 tonnes/m^2 (151 kN/m^2)
Storage volume	190 litres		

Maximum installation depths

Typical soil type	**Maximum depth of installation – to base of units (m)[1]**				
	Soil weight kN/m^3	**Angle of internal friction φ (degrees)[2, 3]**	**Landscaped areas**	**Vehicle mass <9 tonnes[4, 5]**	**Vehicle mass <44 tonnes**
Over consolidated stiff clay	20	24	4.67	4.42	4.17
Silty sandy clay	19	26	5.03	4.78	4.53
Loose sand and gravel	18	30	5.86	5.61	5.36
Medium dense sand and gravel	19	34	6.87	6.62	6.37
Dense sand and gravel	20	38	7.82	7.57	7.30

Minimum cover depths

	Landscaped areas	**Car parks with vehicle mass <3 tonnes[5]**	**Car parks with vehicle mass <9 tonnes**	**Car parks with vehicle mass <12 tonnes**	**Low speed roads with vehicle mass <60 tonnes**
Minimum cover depth (m)	0.30	0.50	0.69	0.81	1.30

1. Without groundwater present below base of units – AquaCell Plus-R may be used where groundwater is present, contact Wavin for technical advice.
2. Loosening of dense sand or softening of clay by water can occur during installation. The designer should allow for any such likely effects when choosing an appropriate value of φ.
3. The design is very sensitive to small changes in the assumed value of φ, therefore, it should be confirmed by a chartered geotechnical engineer. In clay soils, it may be possible to utilise cohesion in some cases.
4. Applicable for car parks or other areas trafficked only by cars or occasional refuse collection trucks or similar vehicles (typically one per week).
5. This category should be used when considering landscaped areas that may be trafficked by ride on mowers.

Assumptions made:
- Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil

Orders
0844 856 5152

Technical Advice
0844 856 5165

Email
technical.design@wavin.co.uk

Website
aquacell.wavin.co.uk

Hydro International Ltd
Shearwater House
Clevedon Hall Estate
Victoria Road
Clevedon
Somerset BS21 7RD

Tel: 01275 878371 (general enquiries)
Tel: 01275 337937 (Hydro-Brake sales/support)
Fax: 01275 874979

e-mail: enquiries@hydro-int.com
website: www.hydro-int.com

Agrément Certificate

08/4596

Product Sheet 1

HYDRO INTERNATIONAL HYDRO-BRAKE FLOW CONTROLS

S-RANGE HYDRO-BRAKE OPTIMUM FLOW CONTROLS

This Agrément Certificate Product Sheet(1) relates to S-Range Hydro-Brake Optimum Flow Controls(2), a range of units to control the discharge outlet flow in surface/storm water management systems.

(1) Hereinafter referred to as 'Certificate'.
(2) Hydro-Brake, Hydro-Brake Optimum, Flush-Flo and Kick-Flo are trademarks of Hydro International Ltd.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Flow characteristics — the performance characteristics of the flow controls have been assessed (see section 6).

Strength — the ability of the flow controls to withstand characteristic loads has been assessed (see section 8).

Durability — under normal service conditions, the flow controls will have a service life in excess of 60 years (see section 10).

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

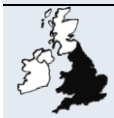
Date of Fifth issue: 25 May 2021

Originally certificated on 18 October 2008

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, S-Range Hydro-Brake Optimum Flow Controls, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	**H3(3)**	**Rainwater drainage**
Comment:		The products can be used in a construction to satisfy this Requirement. See section 6 of this Certificate.
Requirement:	**7(1)**	**Materials and workmanship**
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The products are acceptable. See sections 9 and 10 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	3.6(a)(b)	Surface water drainage
Comment:		The products can be used in a construction to satisfy this Standard, with reference to clauses 3.6.1(1)(2) to 3.6.5(1)(2). See section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		All comments given for the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	**23(a)(i)(iii)(b)**	**Fitness of materials and workmanship**
Comment:		The products are acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	**82**	**Rain-water drainage**
Comment:		The products can be used in a construction to satisfy this Regulation. See section 6 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.3) and 12 *General* (12.1) of this Certificate.

Technical Specification

1 Description

1.1 S-Range Hydro-Brake Optimum Flow Controls are vortex flow controls manufactured from 3, 5 or 8 mm thick grade 1.4301/1.4307 stainless steel to BS EN 10088-4 : 2009. Alternative material thicknesses and grades are available depending on the application, but are outside the scope of this Certificate. The Certificate holder should be contacted for further details.

1.2 Each unit is designed and manufactured to meet specific hydraulic requirements (see section 7). The configuration of the inlet, volute and outlet is varied to achieve the required discharge control characteristics. The units may be fitted with a fixed inlet or an adjustable inlet gate to allow for post-installation adjustment of the discharge flow rate by up to 20% (see Figure 1).

Figure 1 Fixed and adjustable inlet arrangements

1.3 The units are available in a range of sizes to give design flow rates from 0.7 to 250 $l \cdot s^{-1}$, suitable for use in surface/stormwater management applications. A summary of technical information is given in Table 1.

Table 1 Summary of technical information

Characteristic (unit)	Typical range of values
Design flow rate ($l \cdot s^{-1}$)	0.7 to 250
Design head (m)	0.4 to 4
Maximum lateral dimension (mm)	
Lug mounted units	180 to 2000
Backplate mounted units	Dependent on discharge pipe size
Push-fit units	180 to 2000
Mass (kg) excluding packaging	
Lug mounted units	6 to 680
Backplate mounted units	Dependent on discharge pipe size
Push-fit units	6 to 680

1.4 Each unit is supplied fully assembled including:

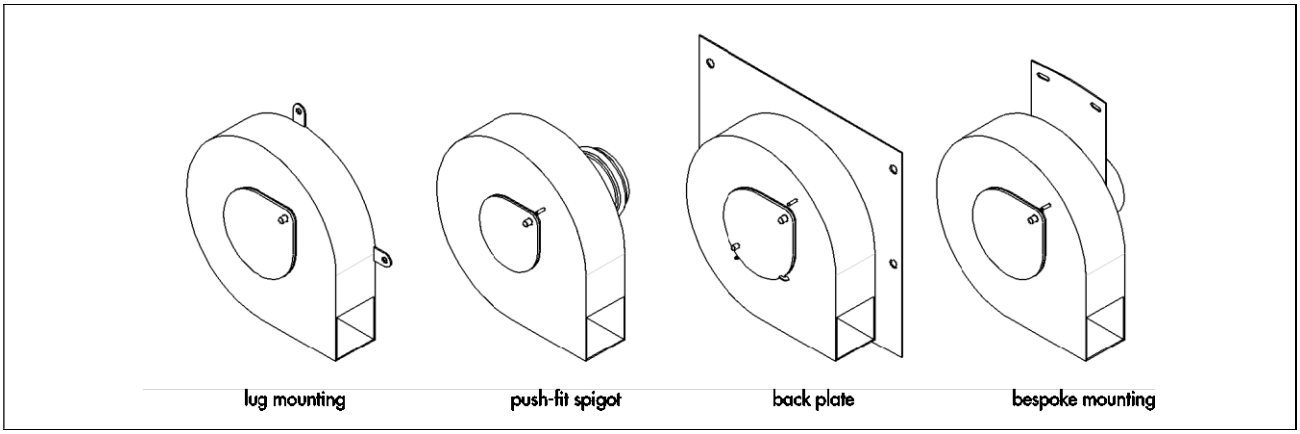
- an S-Range Hydro-Brake Optimum Flow Control with integral bypass door on the front face of the unit, outlet pipe location spigot and mounting face gasket or push-fit sealing rings

- wire rope to allow remote operation of the pivoting bypass door (3 mm diameter rope consisting of 7 x 7 strand elements of 0.018 mm diameter) and stainless steel wire rope attachment brackets
- mounting anchor bolts (A4 316 stainless steel). The performance and suitability of the mounting bolts is outside the scope of this Certificate; the Certificate holder should be contacted for advice on the most appropriate fixings for individual projects.

1.5 The flow controls are available with various types of mounting arrangement (see Figure 2):

- lug mounting — lugs are provided at points around the perimeter of the flow control mounting face. This is appropriate for the majority of applications where the outlet diameter of the installation structure is approximately 0.5 times the flow control body diameter or less
- push-fit spigot — a push-fit spigot with rubber sealing rings is provided. A single lug may also be provided on the outside perimeter of the mounting face to prevent rotation of the flow control in service. Precise specification of the outlet pipe is essential for push-fit mounting, in order to ensure a watertight seal
- backplate mounting — a rectangular mounting plate is provided to allow fixing to the outlet of the installation structure where lug mounting is not appropriate. If a flat surface is not available, the mounting plate may also be provided curved to the same radius as the chamber in which it is to be fitted.

Figure 2 Standard mounting arrangements



1.6 The units may be supplied for installation in purpose-built or existing structural housings on site. These must have adequate strength to resist the loads imposed by the unit. The design of these structures is outside the scope of this Certificate but the performance and durability of the flow control will be unaffected, provided it is installed in accordance with the recommendations of this Certificate.

1.7 The units may also be supplied ready-fitted to purpose-built reinforced concrete or plastic manhole chambers ready for installation into the ground. The performance of these chambers is outside the scope of this Certificate.

2 Manufacture

2.1 The products are manufactured from austenitic stainless steel sheet which is cut, rolled and welded to the required dimensions.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Hydro International Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by Lloyd's Register Quality Assurance Limited (Certificate LRQ 4002211).

3 Delivery and site handling

3.1 S-Range Hydro-Brake Optimum Flow Controls are supplied wrapped in polythene and plywood packaging for small units and on a pallet for large units. They should be handled and stored appropriately to avoid being dropped or receiving impacts, eg from construction plant.

3.2 Each unit is stamped with the Certificate holder's unique project reference number and carries a label bearing the Certificate holder's contact information and advice on orientation. The packaging also bears details of the package weight and client details.

3.3 Care should be taken handling the units and when lowering into position for installation. Where appropriate, larger units should be lifted via the fitted lugs using mechanical lifting/lowering equipment.

Assessment and Technical Investigations

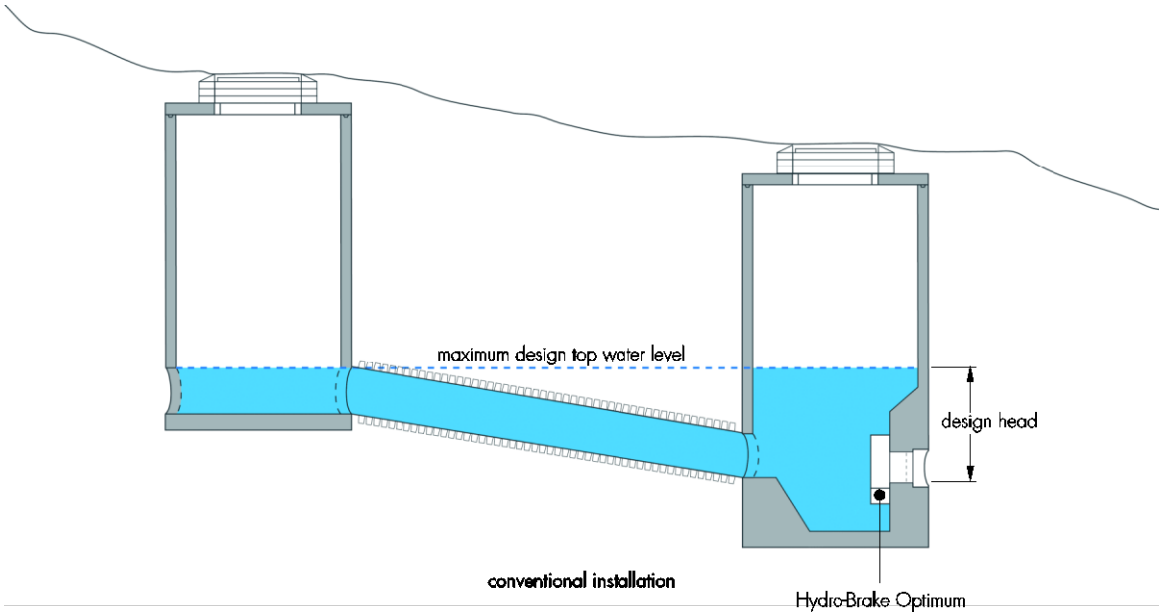
The following is a summary of the assessment and technical investigations carried out on S-Range Hydro-Brake Optimum Flow Controls.

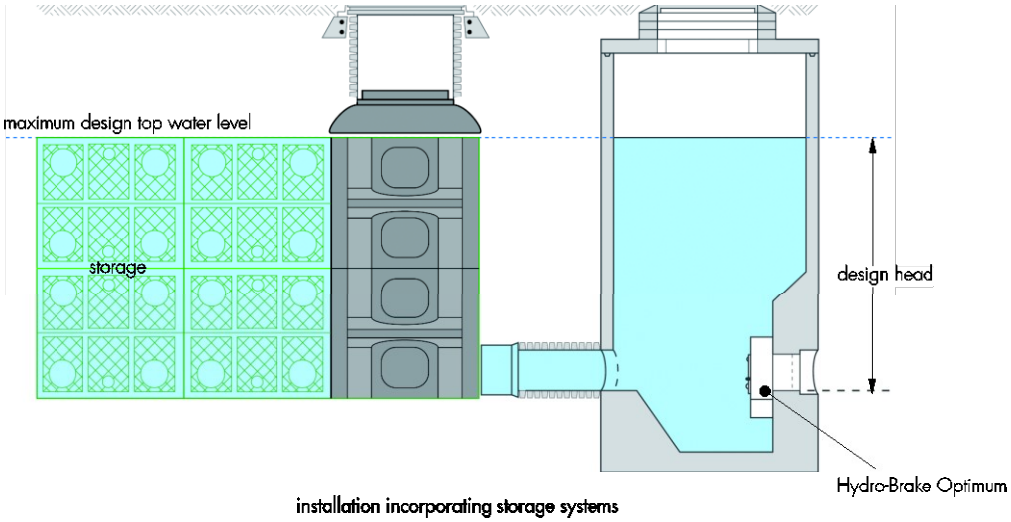
Design Considerations

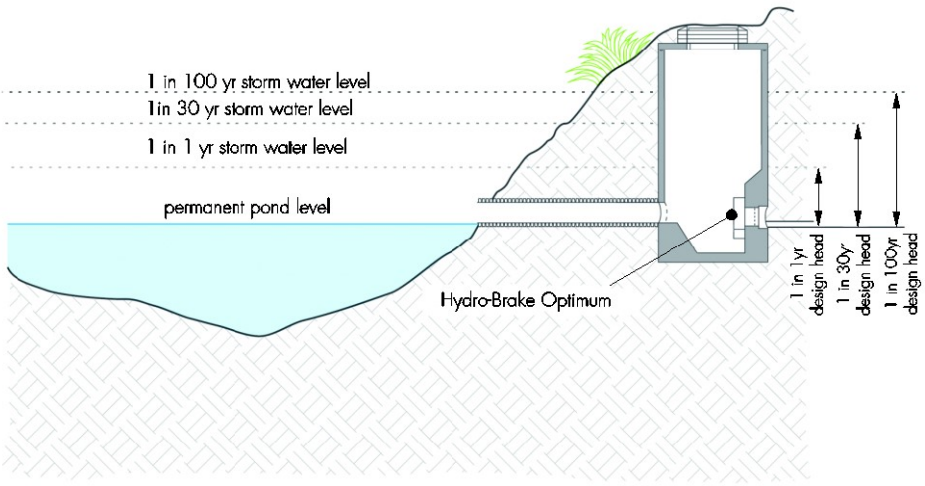
4 Use

4.1 S-Range Hydro-Brake Optimum Flow Controls are intended to restrict the outlet flow from a surface/storm water management system by increasing back pressure, achieved by inducing a vortex flow pattern in the water passing through the device. In these applications, the units are often used in conjunction with storage facilities, including geocellular storage systems, concrete tanks, oversized pipes and ponds. The performance of these items is outside the scope of this Certificate. Guidance on design of sustainable drainage systems is given in Flood risk and coastal change Guidance and CIRIA C753 : 2015. Typical installation details are shown in Figure 3.

Figure 3 Typical applications and design head







4.2 The units are self-activating without any moving parts and do not, therefore, require external power.

4.3 As a matter of good design practice, measures should be taken to remove silt sediment and debris from the surface water at an early stage to prevent problems further downstream.

4.4 It is recommended to maintain a minimum clear opening of 75 mm in a surface water drainage system. In some cases, it may be necessary to use a flow control with a smaller minimum opening. In which case, the installation of screens or debris removal systems upstream of the device is recommended.

5 Practicability of installation

The products are designed to be installed by a competent contractor, experienced with these types of products.

6 Flow characteristics

6.1 Owing to the 'S'-shaped head-flow characteristic, the units are able to pass greater volume flow rates at lower heads, whilst still limiting the flow at the duty/design point to an acceptable level. A typical head versus flow characteristic for the units is given in Figures 4, 5 and 6.

6.2 The units have a hydraulic characteristic, comprising three distinct stages corresponding to different phases of operation (see Figures 4, 5 and 6):

- pre-initiation phase — at low heads, the flow control provides similar performance to an orifice plate with equivalent size to its outlet(1). Flow rate accuracy of ±5% of the ultimate duty/design flow is typically achievable in this region
- vortex initiation phase — as the head increases, vortex motion will start to develop inside the unit, starting to restrict the flow(1). Flow rate accuracy of –5% of flow to +5% of phase peak is typically achievable in this region
- post-initiation/design phase — following vortex initiation, the flow control characteristic stabilises, providing hydraulic performance equivalent to a substantially smaller orifice plate than the unit's outlet. The units can be specified to give a duty/design point in any part of this region, though in most practical cases specification will be at flow rates above the initiation phase peak (corresponding to the Flush-Flo point). Flow rate accuracy of ±5% of flow is typically achievable in this region.

As the water level subsides and water in the device drains, the energy within the flow reduces and the vortex collapses. Air is drawn into the volute and the unit returns to operating in a similar manner to an orifice of the same cross sectional area. This drains the system quickly so that the upstream network is ready for the next event.

(1) Although a flow control would not usually be selected with the duty/design point in this region, this part of the characteristic will have implications to overall drainage system operation.

Figure 4 Pre-initiation phase

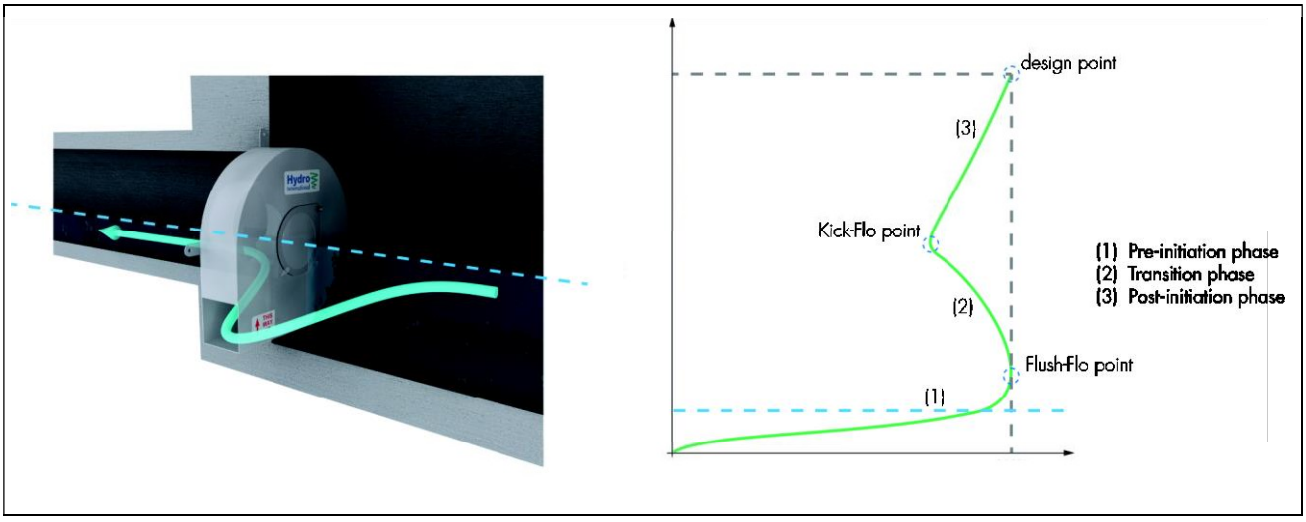


Figure 5 Vortex initiation phase

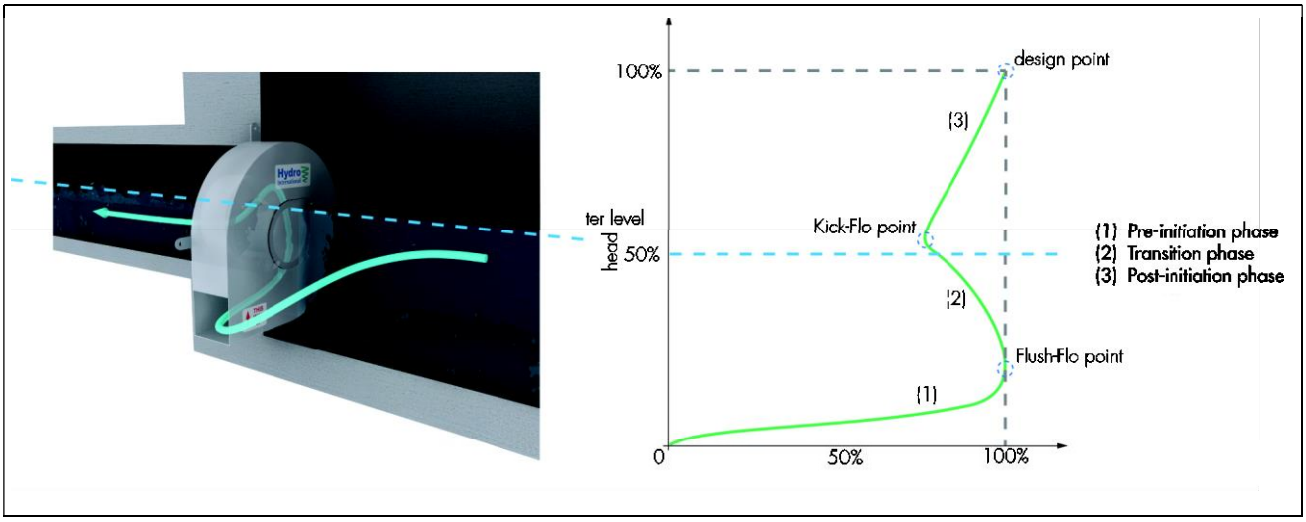
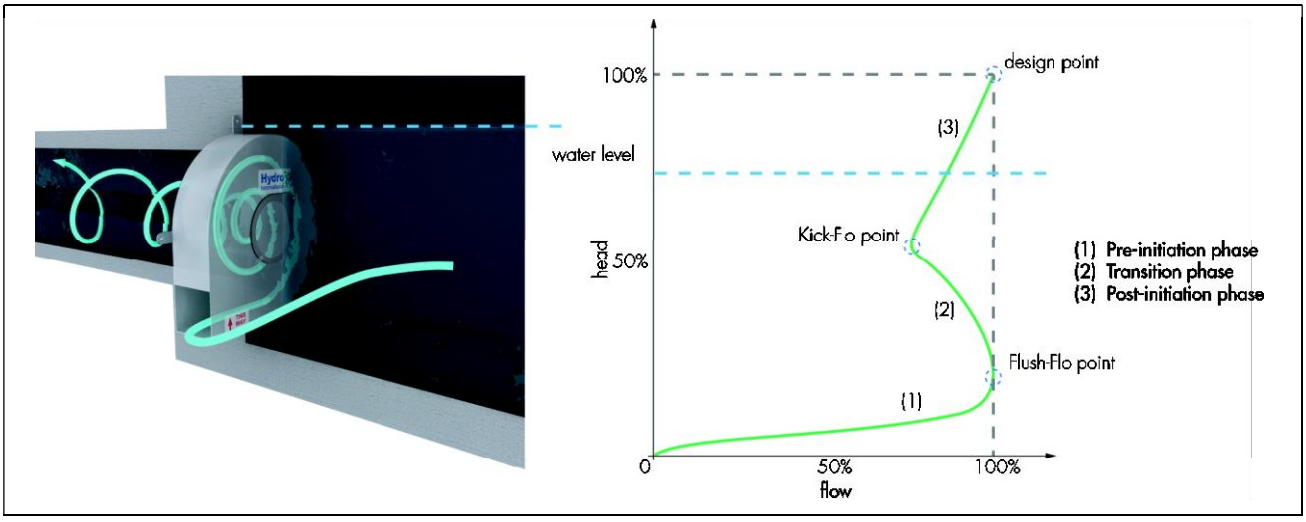


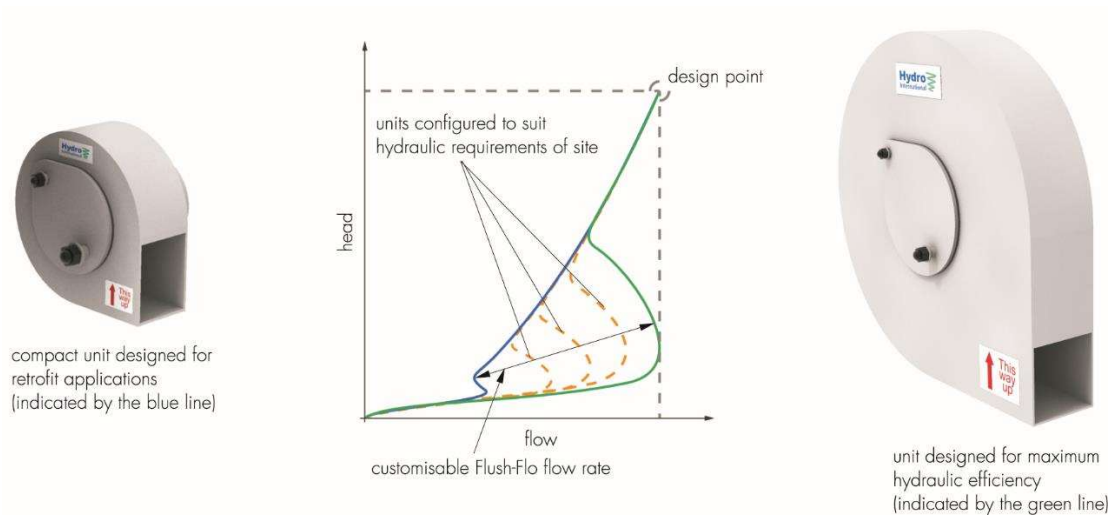
Figure 6 Post-initiation phase



6.3 S-Range Hydro-Brake Optimum Flow Controls allow the inlet, volute and outlet to be individually configured to suit the application, enabling the system to be designed to provide the appropriate hydraulic performance or to suit constant discharge, multi-stage discharge or risk-based network designs (see Figure 7). Individual configuration of the inlet, volute and outlet also allows the system designer to adjust the physical dimensions of the unit in order to:

- maximise the internal clearances
- comply with minimum outlet guidelines
- retrofit to existing infrastructure.

Figure 7 Application-based design



6.4 The units are specified and supplied to meet individual application requirements. Though the characteristics are incorporated into a number of commercially available hydraulic modelling packages, the Certificate holder should be contacted directly for advice on correct selection. The following information should be provided:

- operating head — depth from the unit's outlet invert to the design water level(s) (see Figure 3)
- flow — required discharge at the given head(s)
- manhole details or control chamber proposals, including outlet size
- information on any 'special' conditions, for example if the unit is expected to be subjected to downstream surcharging or possible siphoning effects.

6.5 In most cases the downstream drainage system will be designed to allow the unit a free discharge. However, this is not always possible and in certain cases it will be necessary to design the flow control to surcharge conditions. Surcharge of the flow control will affect the hydraulic performance, and advice should be sought from the Certificate holder. Installations where the outlet is surcharged are outside the scope of this Certificate.

6.6 Where a drainage system has been designed and hydraulically modelled based on the use of a S-Range Hydro-Brake Optimum Flow Control, it is essential to ensure that the same flow control, or a flow control that has been confirmed to provide an equivalent hydraulic performance across the whole design head range, is used in the final installation.

7 Hydraulic design

7.1 The units are typically used to control flows across a site or to limit the rate of discharge from a site. Where used to limit the rate of discharge from a site, the allowable discharge rate to an appropriate outfall will generally be set by the Environmental Regulator, local Planning Authorities or the Sewer Undertaker.

7.2 The allowable discharge rate will often be calculated in respect of the greenfield equivalent run-off rate for the undeveloped site. Advice on calculating the greenfield equivalent run-off rate can be found in the *Interim Code of Practice for Sustainable Drainage Systems*. Where a site is being redeveloped, the allowable discharge rate may be determined based on the discharge rate prior to the redevelopment. The design head acting on the upstream side of the S-Range Hydro-Brake Optimum Flow Control will generally be determined by the maximum design top water level within the storage volume. The design head is illustrated in Figure 3.

8 Strength

8.1 The units are manufactured from stainless steel of a sufficient strength and thickness to ensure that the products remain fit for purpose throughout their design life.

8.2 Under normal operation, the units will deflect by no more than the thickness of the material used for manufacture. This ensures that the volume of the unit available for water flow is not compromised during operation and therefore the hydraulic operation of the unit is not adversely affected by deformation of the unit.

9 Maintenance

9.1 Access should be allowed for clearing debris from the chamber housing the flow control. In the event that the inlet to the unit becomes blocked, the pivoting bypass door may be operated by pulling the wire rope attached upwards to drain down the chamber and provide access for maintenance. The pivoting bypass door must be returned to the closed position following drain down of the chamber and clearance of the blockage.

9.2 Regular inspections should be carried out to ensure that debris that may obstruct the inlet to the flow control is not present in the chamber. The frequency of inspection will depend on the location of the unit but must be at least once per year.

9.3 The units can be jetted from downstream, in accordance with standard sewer jetting procedures without affecting the hydraulic performance of the system.

10 Durability

The units are made from materials that will not be adversely affected by contaminants likely to be found in surface water systems in the UK. In the opinion of the BBA, the units will have a service life in excess of 60 years when installed in surface water systems.

11 Reuse and recyclability

The units consist of stainless steel which is readily recyclable.

Installation

12 General

12.1 S-Range Hydro-Brake Optimum Flow Controls must be installed in accordance with the Certificate holder's instructions. In many cases the installation will be in a confined space and all appropriate measures must be taken to ensure the safety of operatives working in such areas.

12.2 Dimensioned drawings for each installation are provided by the Certificate holder. It is important that the flow control chamber is constructed to the drawing. Other than where a curved backplate is supplied, this should incorporate a flat mounting surface on the inside face of the chamber wall at the outlet pipe. Ensure that the sump has sufficient width and depth below the invert of the outlet pipe to accommodate the unit.

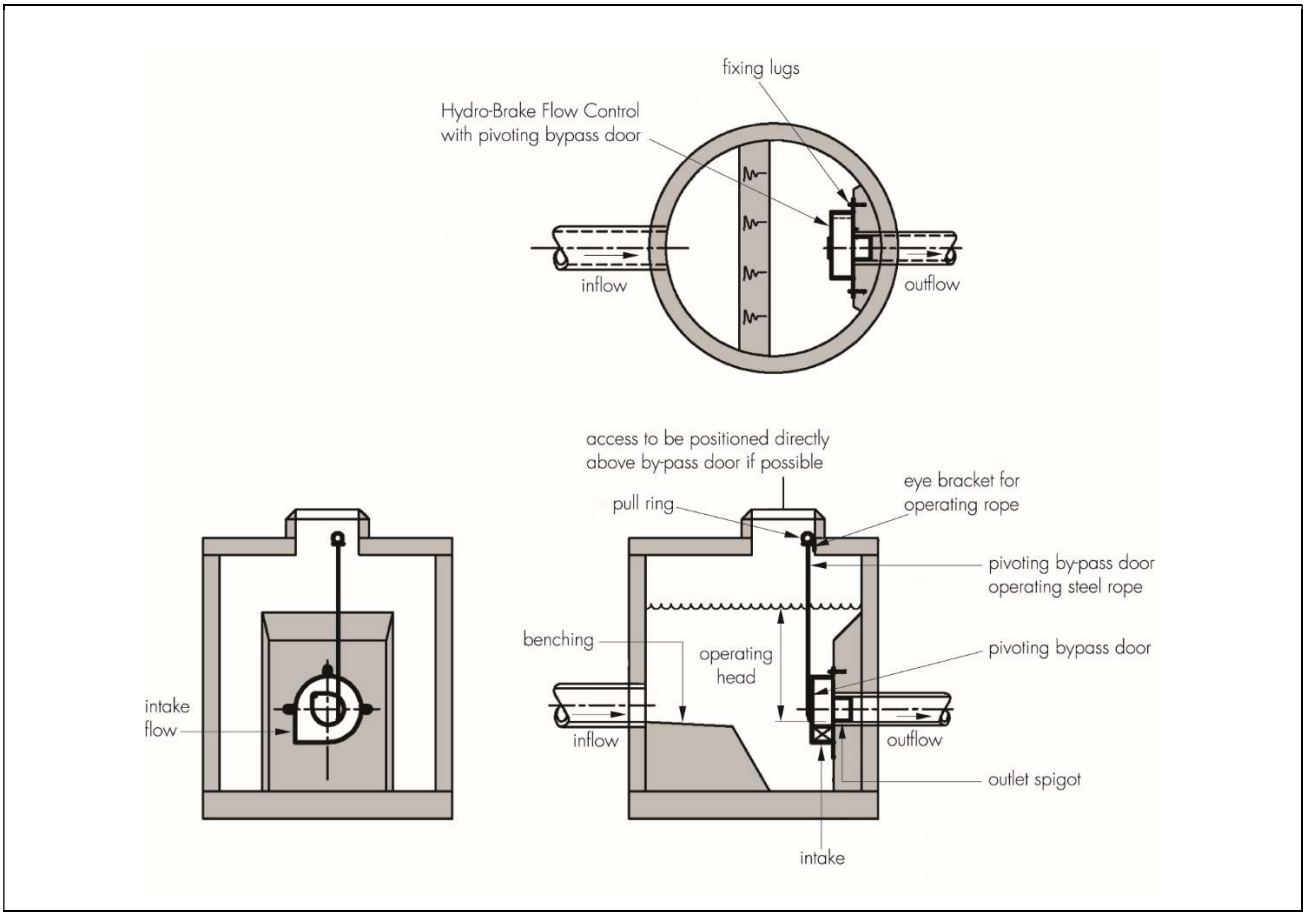
12.3 The benching must be formed as indicated on the installation drawing.

12.4 Where an adjustable inlet gate is provided, the factory set position must not be adjusted without prior consultation with the Certificate holder.

13 Procedure

13.1 The unit is offered up to the chamber outlet wall until the spigot projects into the outlet pipe with its invert seated to the outlet pipe invert and with the unit in the correct orientation (see Figure 8).

Figure 8 Typical installation details



13.2 With the unit in position, the position of the required number of bolt holes is marked and drilled through the fixing lugs or plate mount (depending on specification).

13.3 Ensuring that the supplied rubber gasket is suitably positioned over the outlet spigot of the flow control, the fixings are inserted and tightened until moderate compression of the gasket is achieved.

13.4 The supplied eye brackets on the pivoting bypass door operating rope are fixed to the soffit of the roof slab using masonry bolts, to achieve a direct vertical line of pull from over the chamber access cover to the pivoting bypass door. It should be arranged that the rope is taut when held in the upper eye bracket. Where it is not possible to attain a direct vertical line of pull, additional eye brackets can be used to account for the change of direction.

13.5 The rope stop should be positioned to ensure that, when the pivoting bypass door is open, the rope stop can be clipped to the uppermost bracket. Once positioned, the stop attachment grub screws should be tightened.

Technical Investigations

14 Tests

Tests were carried out and the results assessed to determine:

- dimensional accuracy of the units
- the hydraulic performance of the units.

15 Investigations

15.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

15.2 A site visit was made to assess the practicability and ease of installation.

15.3 An assessment of computational fluid dynamic (CFD) modelling used to predict the hydraulic performance of the units was made.

15.4 An assessment of the Certificate holder's predicted characteristics was made against the results of hydraulic performance tests.

15.5 An assessment was made of the structural adequacy of the units under loads that they are expected to resist.

15.6 An evaluation of existing data was made to assess durability.

Bibliography

BS EN 10088-4 : 2009 *Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

CIRIA C753 : 2015 *The SUDS manual*

Flood risk and coastal change Guidance - National Planning Policy Framework

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

16.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

16.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

16.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

16.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

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Appendix F

Proposed Public Lighting Layout

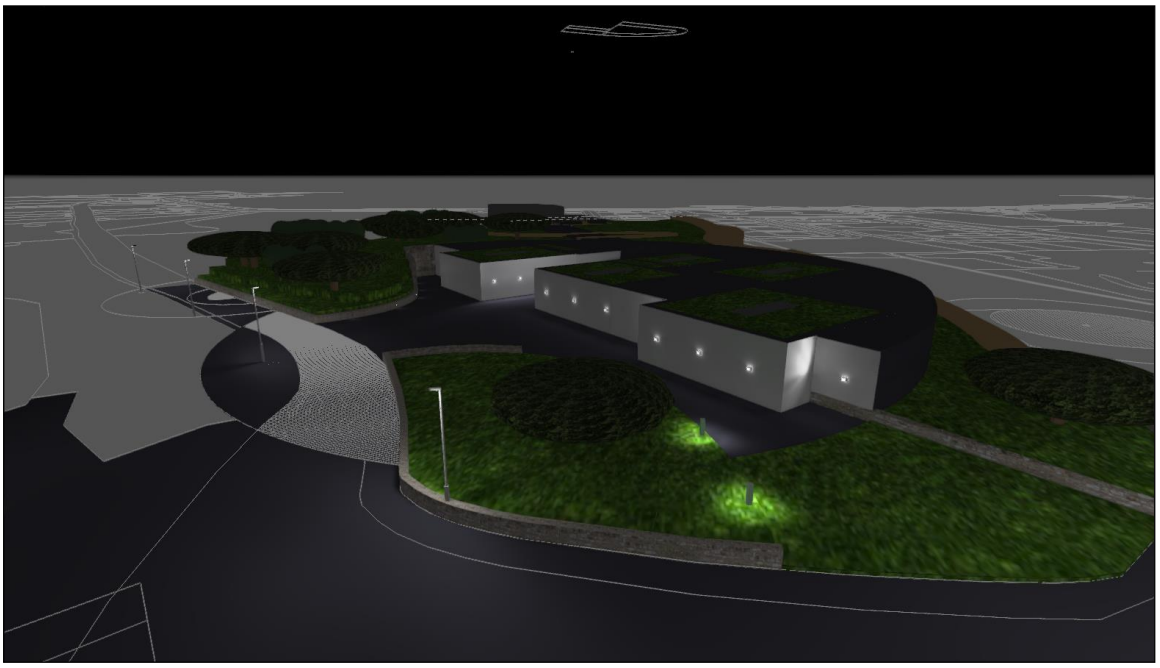
Date:
12/09/2024

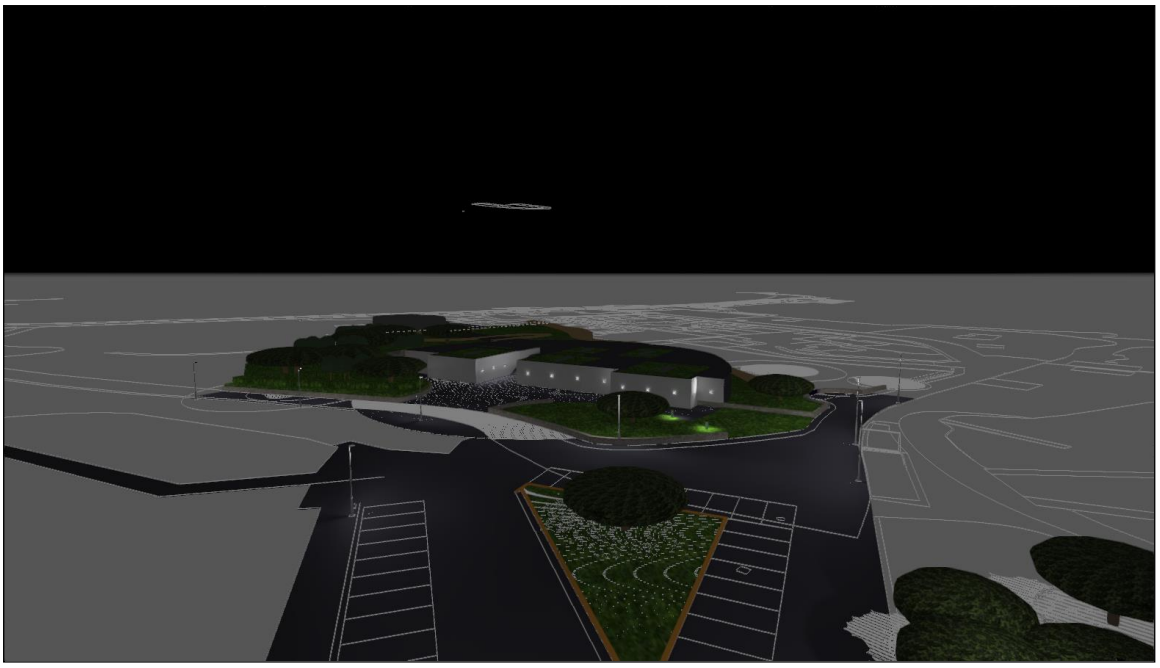
Mountshannon Visitor Centre

External General Lighting Design

108-24

R1





Content

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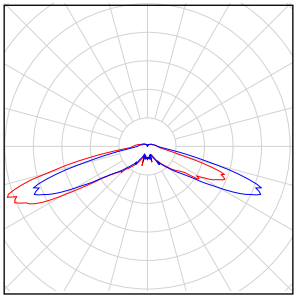
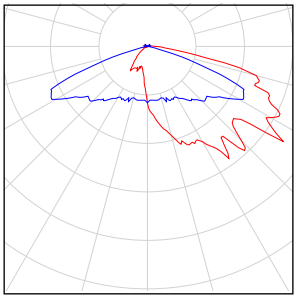
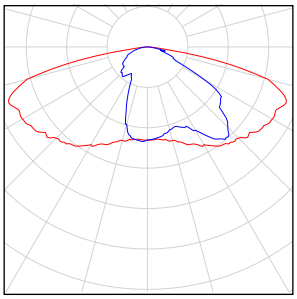
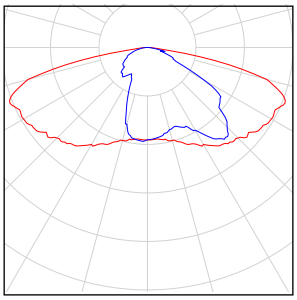
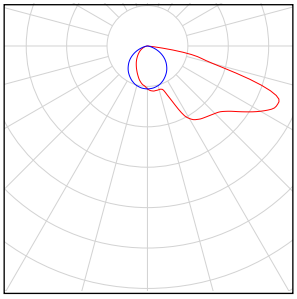
Calculation surfaces 19
Car park area / Perpendicular illuminance 20
Main road / Perpendicular illuminance 24
Pedestrian area / Perpendicular illuminance 27
Plaza area / Perpendicular illuminance 30
Bike parking area / Perpendicular illuminance 33

Mountshannon Visitor Centre

Quantity	Luminaire (Luminous emittance)		
2	HOLOPHANE EUROPE LIMITED - DEB.L024.PAY.TR DENVER ELITE BOLLARD Luminous emittance 1 Fitting: 1xLED C.2000LM - 4000K Absolute photometry Luminaire luminous flux: 1780 lm Power: 23.0 W Luminous efficacy: 77.4 lm/W Colorimetric data 1x: CCT 3000 K, CRI 100	See our luminaire catalog for an image of the luminaire.	
13	HOLOPHANE EUROPE LIMITED - DEW.LA024.AY.CGL Denver Elite Wall Luminous emittance 1 Fitting: 1xLED C.2000LM - 4000K Absolute photometry Luminaire luminous flux: 2490 lm Power: 23.2 W Luminous efficacy: 107.3 lm/W Colorimetric data 1x: CCT 3000 K, CRI 100	See our luminaire catalog for an image of the luminaire.	
5	HOLOPHANE EUROPE LIMITED - SLI.2.LA054.R2.W037 S-LINE Streetlighting luminaire with a Type III - Medium distribution Luminous emittance 1 Fitting: 1xLED C.5000 Lumens Absolute photometry Luminaire luminous flux: 4820 lm Power: 37.0 W Luminous efficacy: 130.3 lm/W Colorimetric data 1x: CCT 3000 K, CRI 100	See our luminaire catalog for an image of the luminaire.	
6	HOLOPHANE EUROPE LIMITED - SLI.2.LA083.R2.W059 S-LINE Streetlighting luminaire with a Type III - Medium distribution Luminous emittance 1 Fitting: 1xLED C.8000 Lumens Absolute photometry Luminaire luminous flux: 7972 lm Power: 59.0 W Luminous efficacy: 135.1 lm/W Colorimetric data 1x: CCT 3000 K, CRI 100	See our luminaire catalog for an image of the luminaire.	
8	Platek s.r.l. - 5004169 SPY Large Vetro Nero LED (8W - 4000K) Asymmetric 220-240V 50/60Hz Luminous emittance 1 Fitting: 1xLED Light output ratio: 100% Lamp luminous flux: 150 lm Luminaire luminous flux: 150 lm Power: 8.0 W Luminous efficacy: 18.8 lm/W Colorimetric data 1x: CCT 3000 K, CRI 100	See our luminaire catalog for an image of the luminaire.	

Total lamp luminous flux: 109062 lm, Total luminaire luminous flux: 109062 lm, Total Load: 950.6 W, Luminous efficacy: 114.7 lm/W

Mountshannon Visitor Centre

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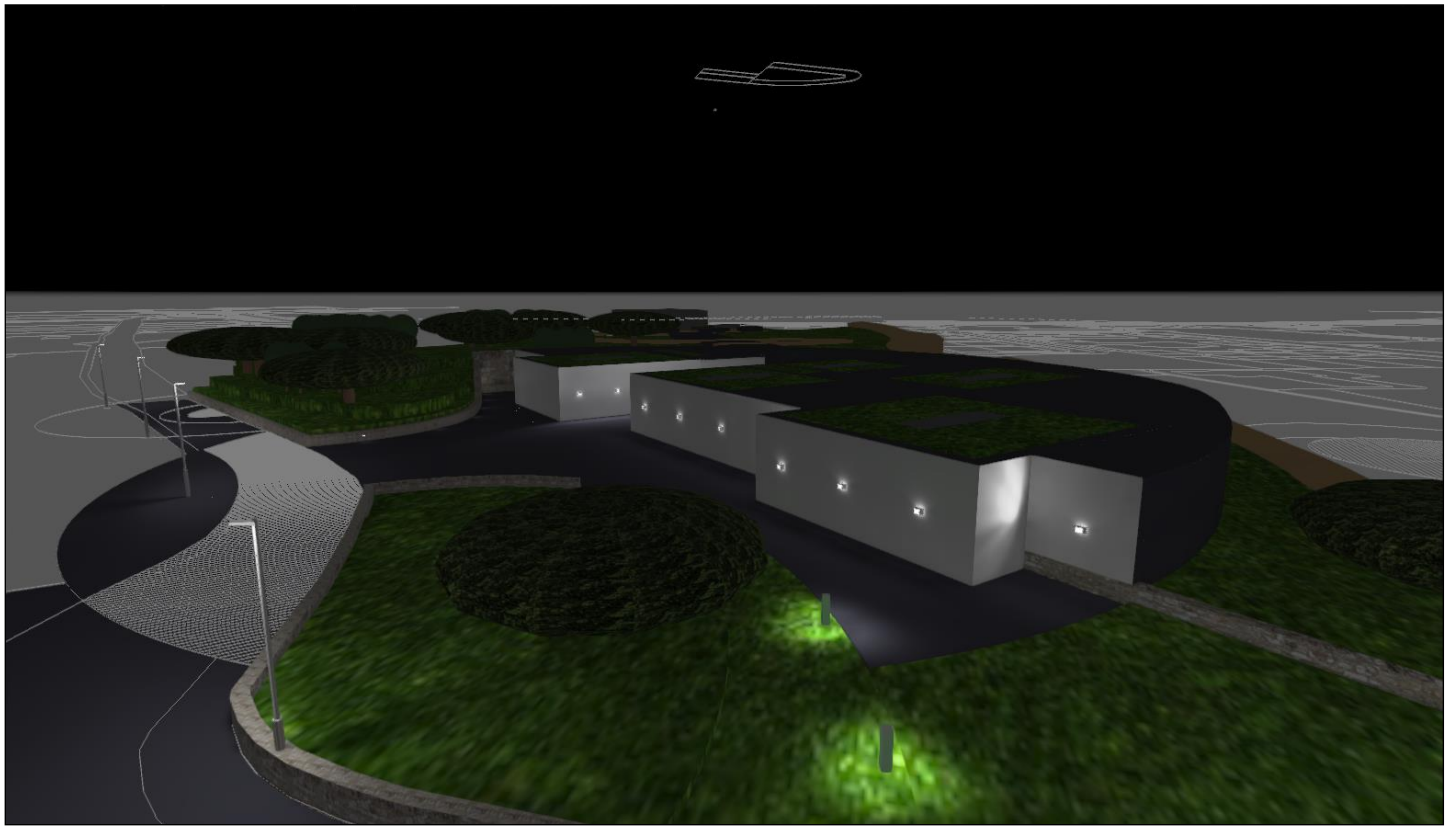

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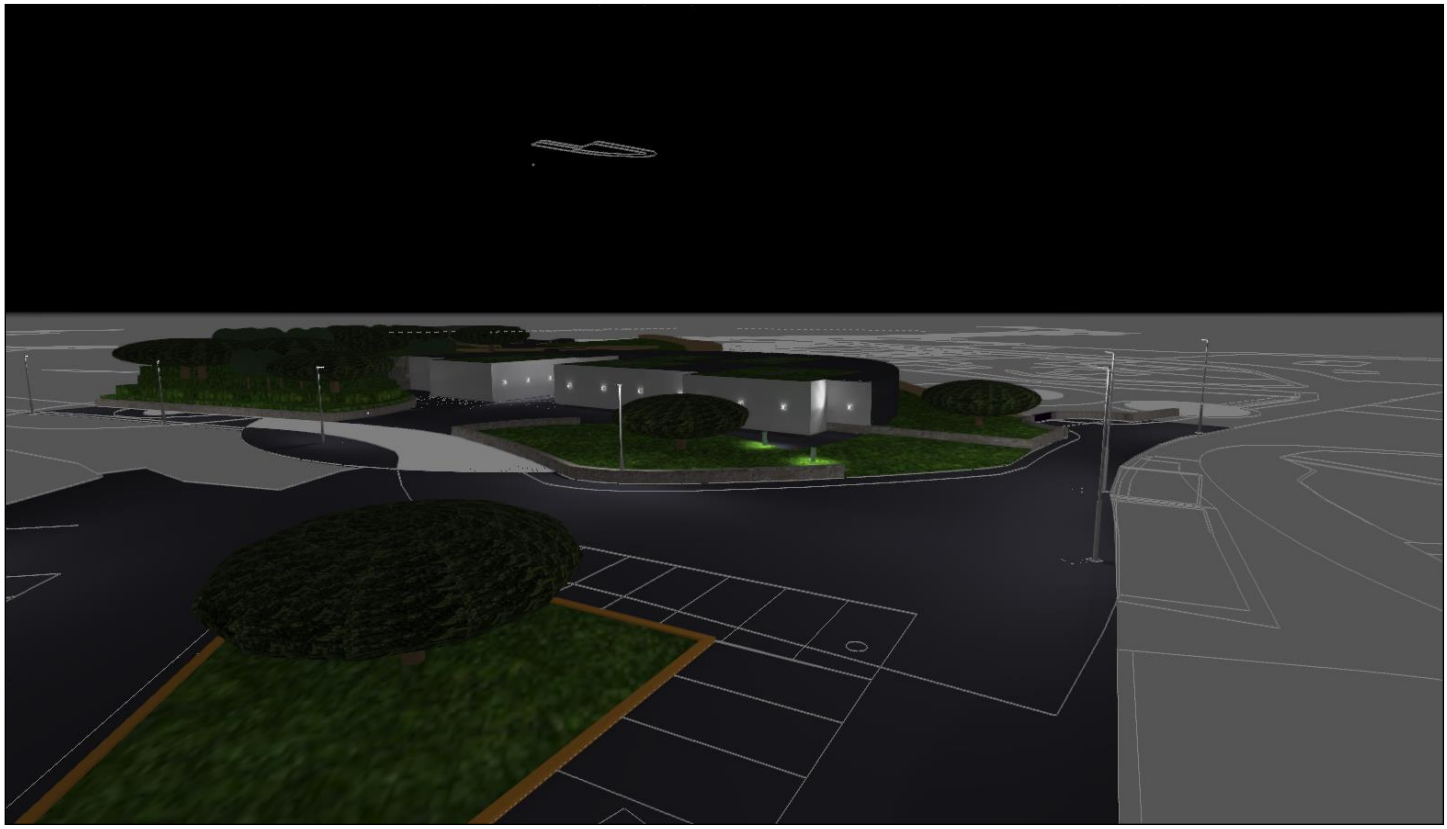
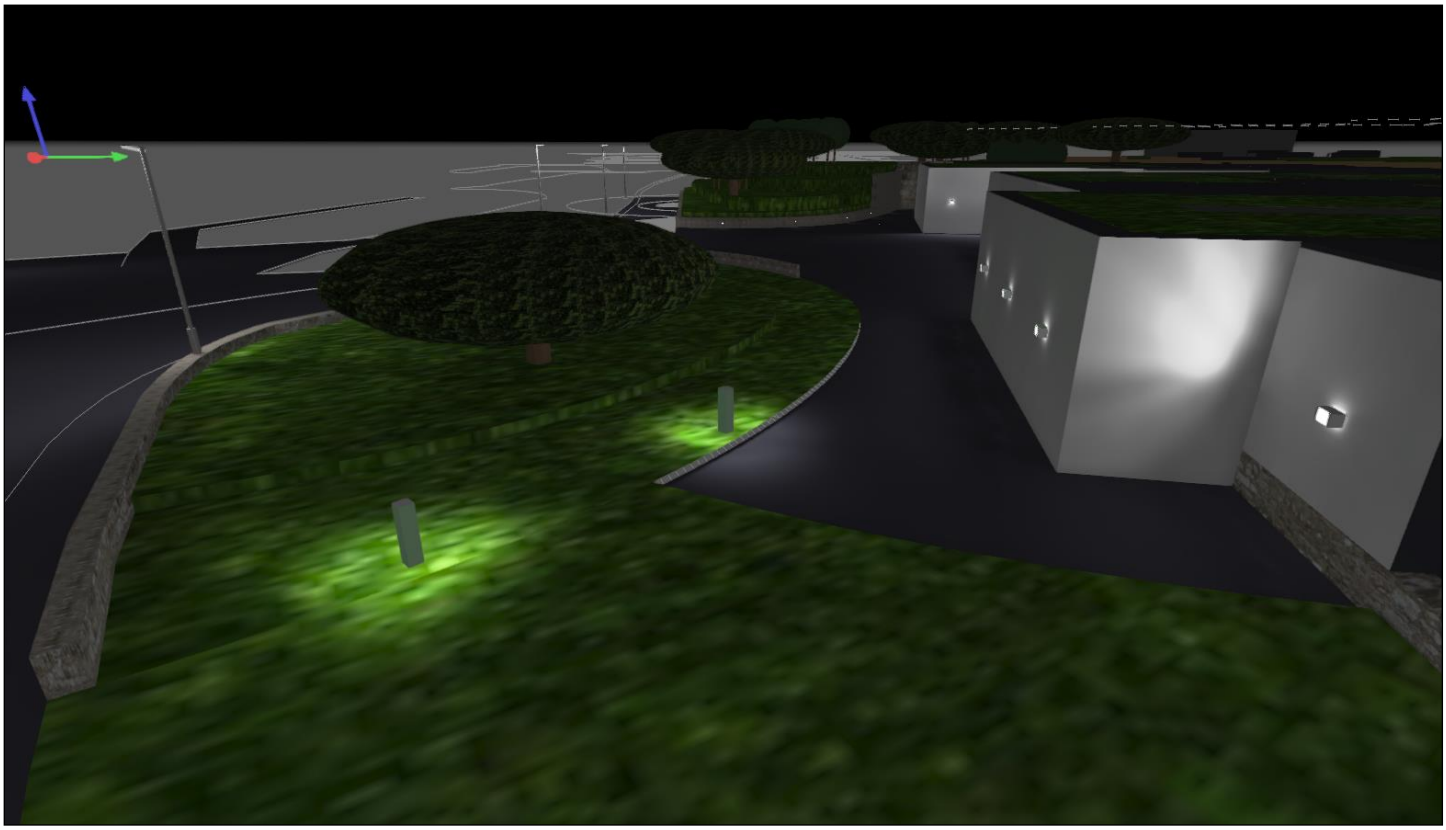
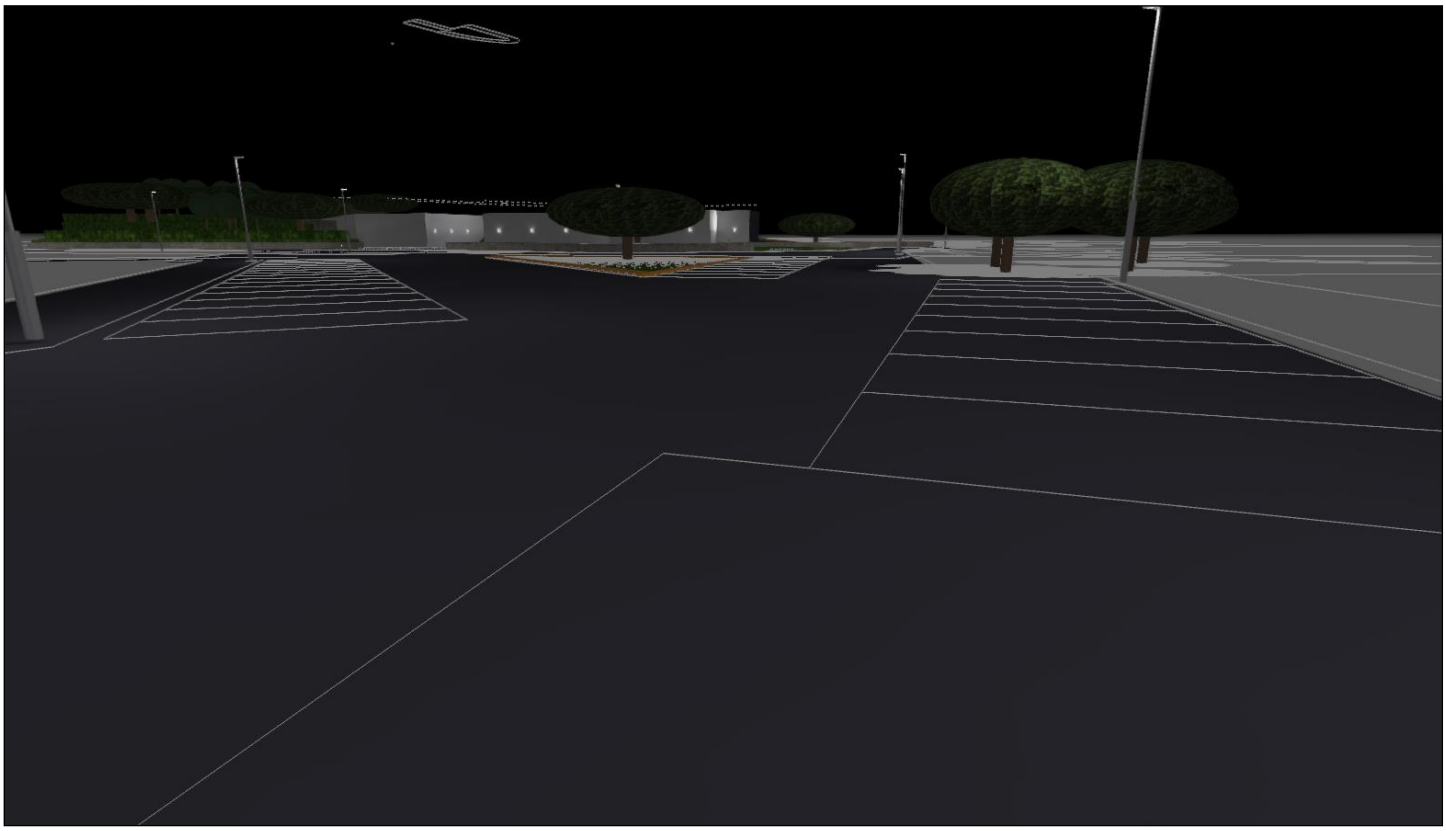


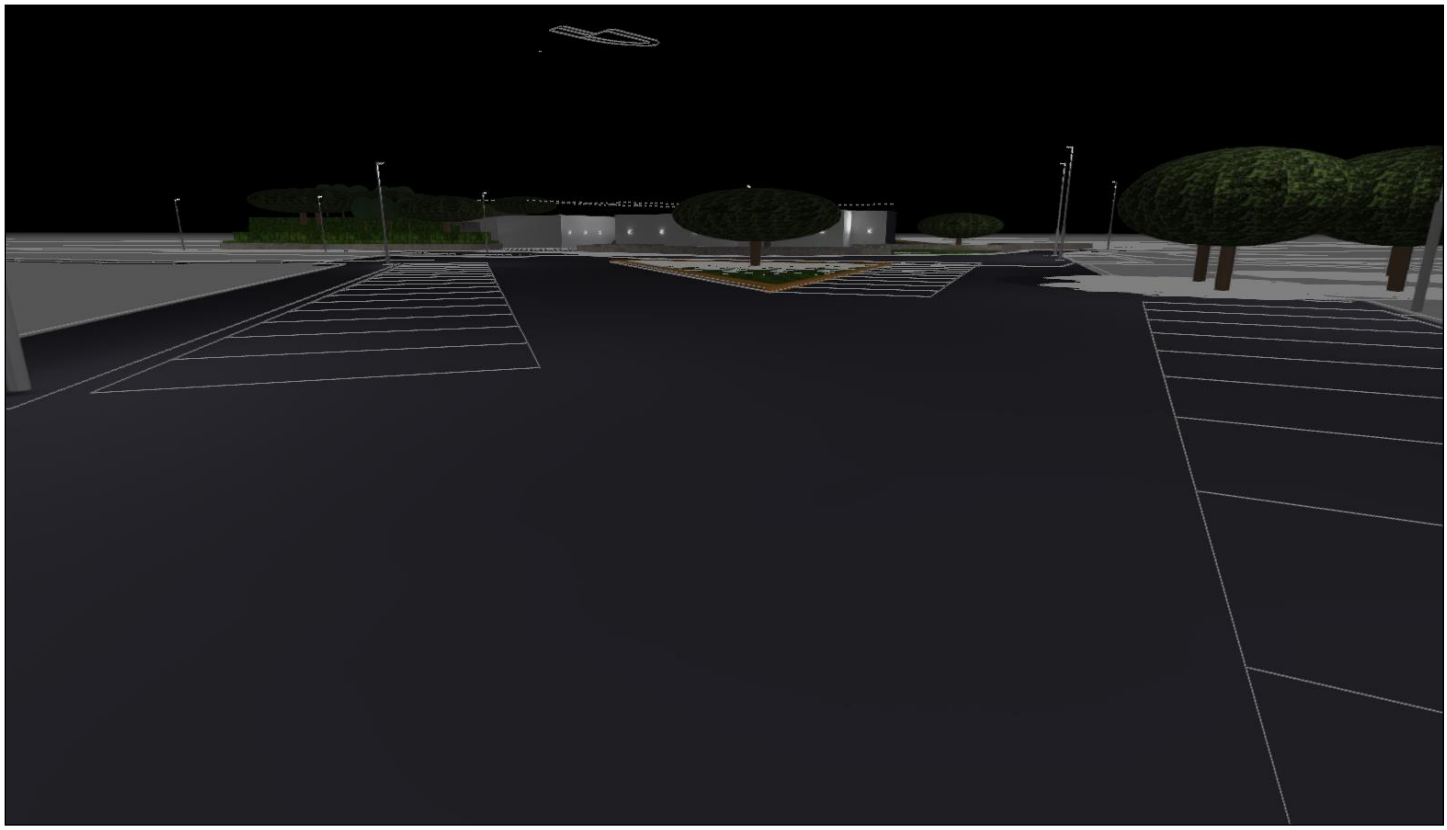
Render 1-3



Render view 1



Render view 2



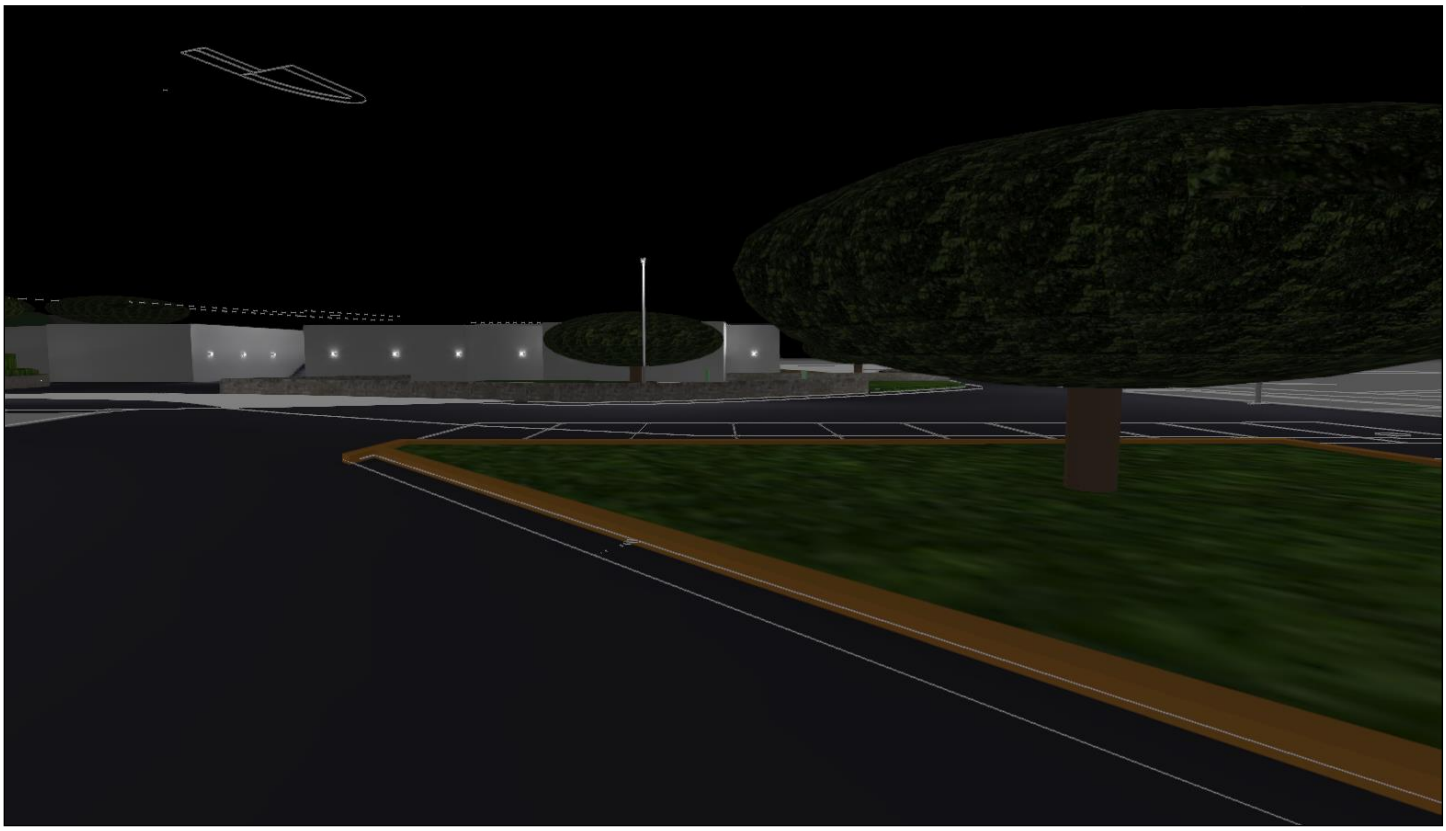
Render view 3

Render view 4

Render view 5

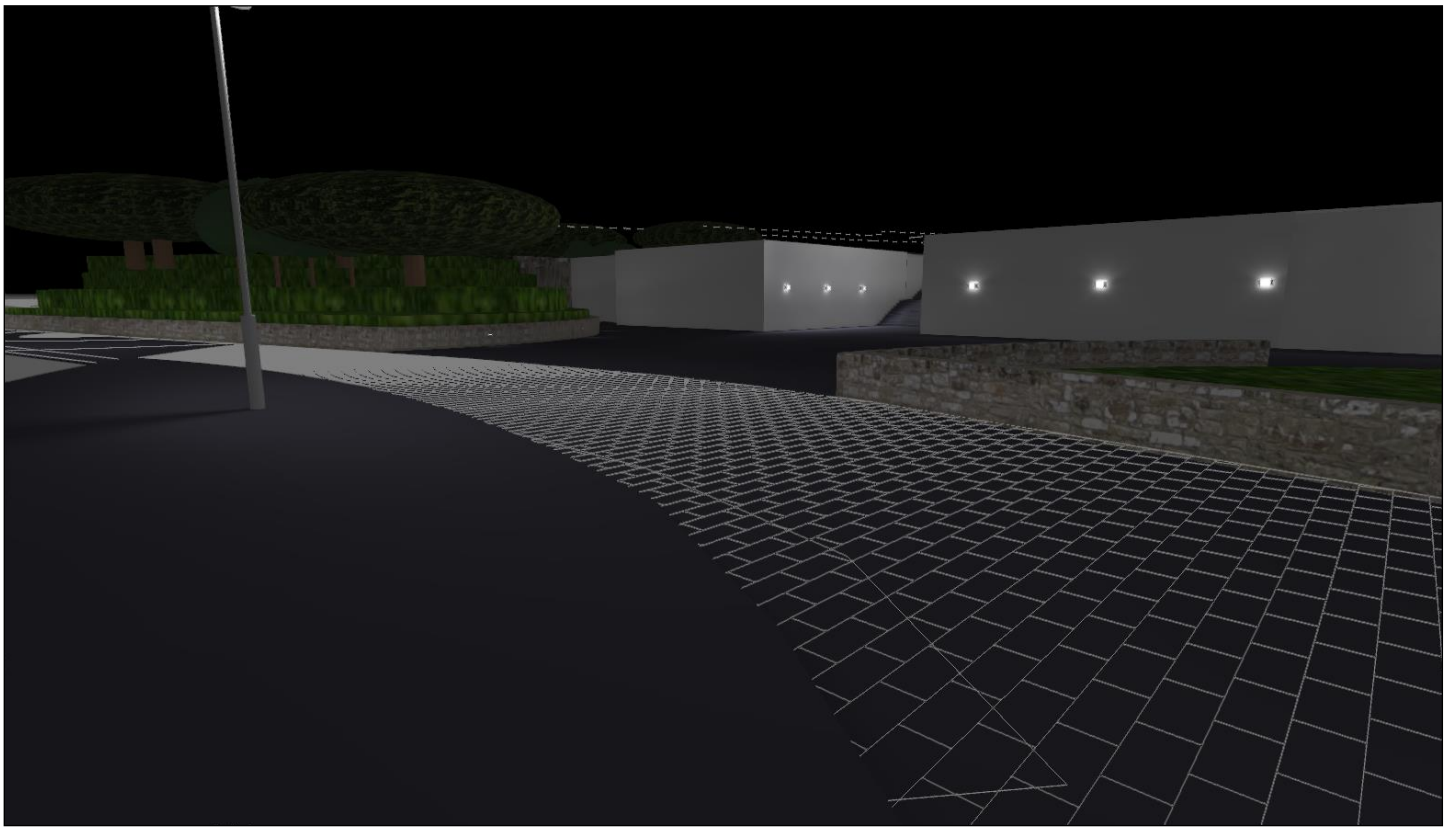
Render view 6

Render view 7

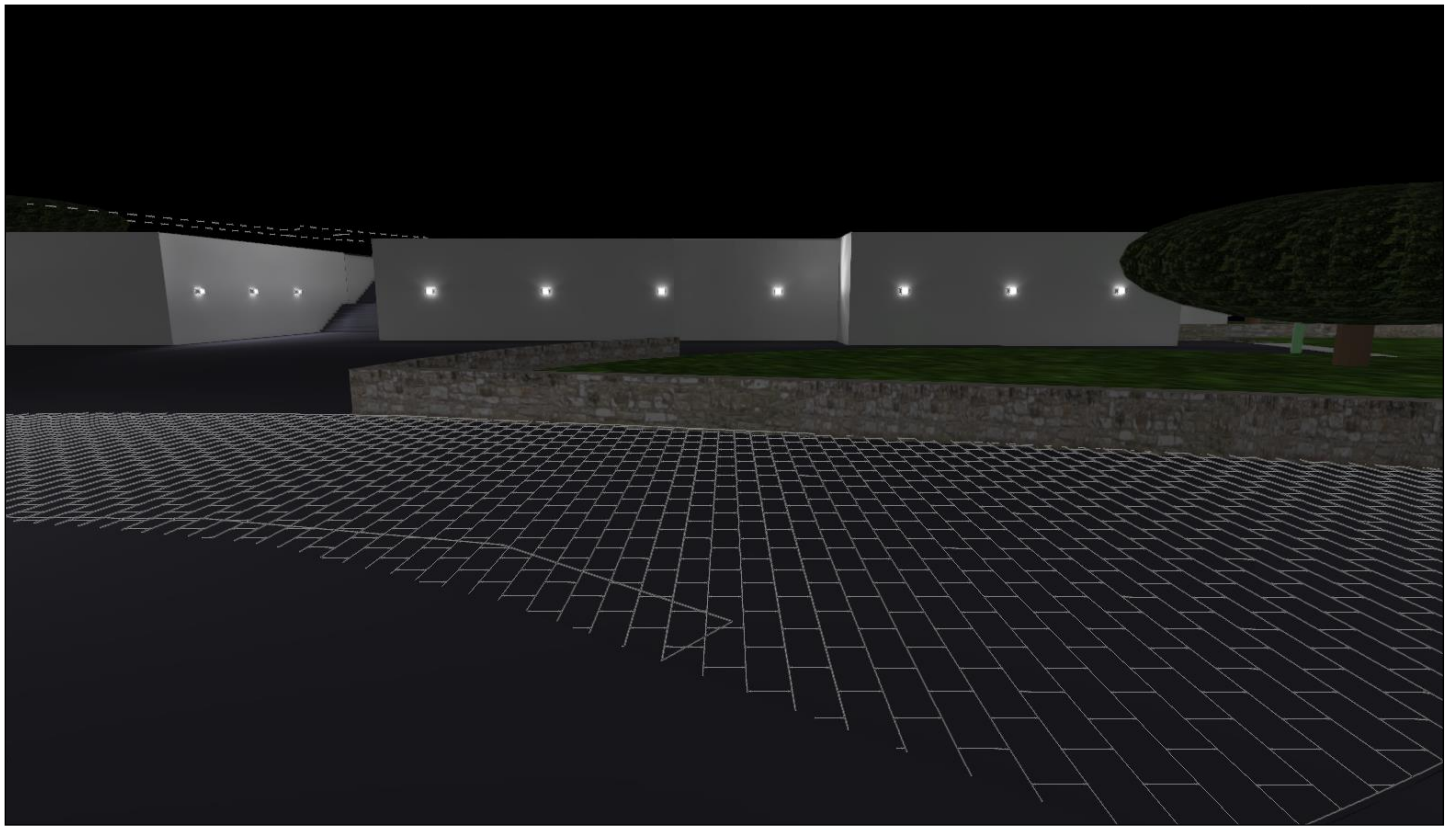


Render view 8

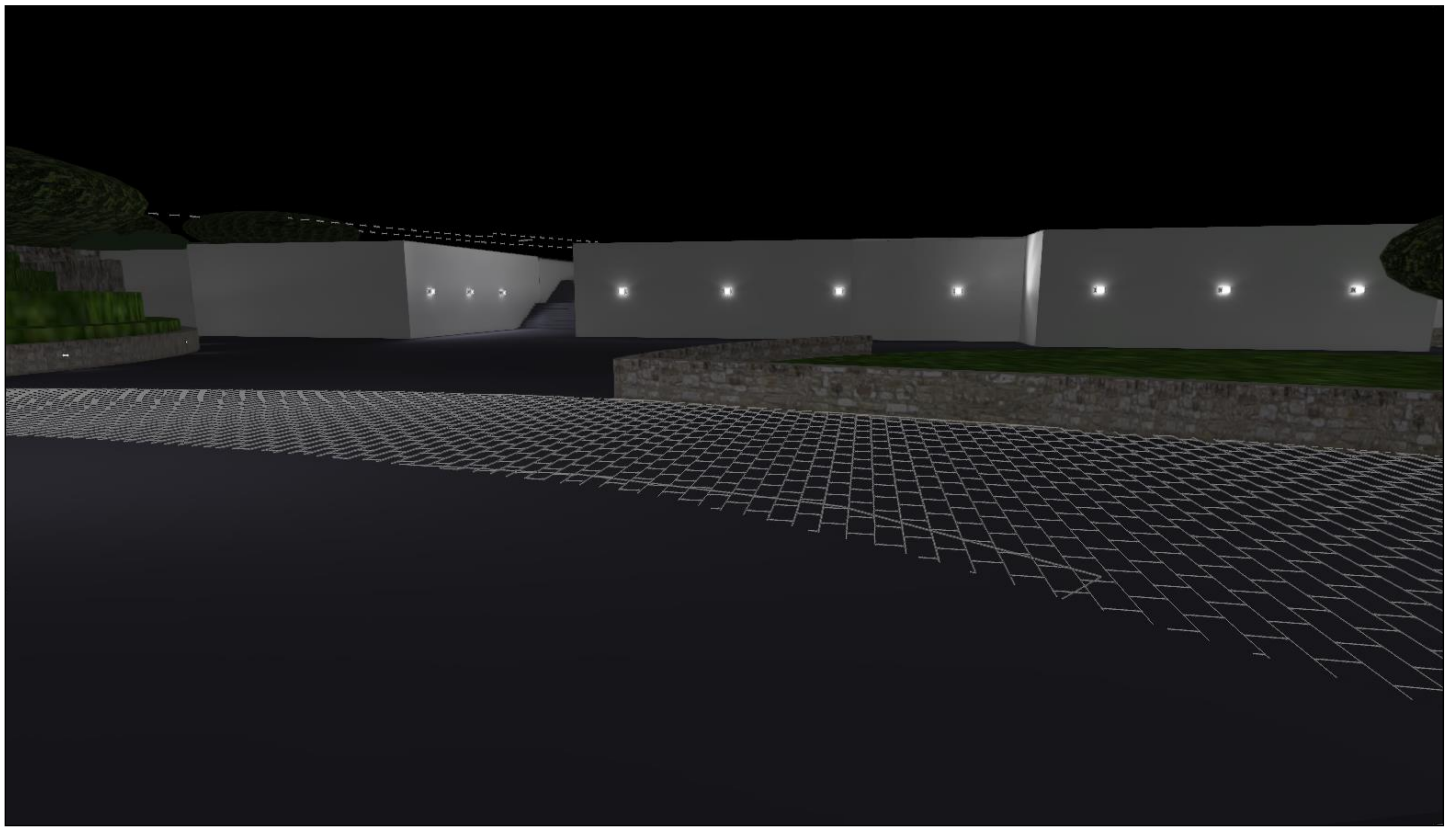
Render view 9



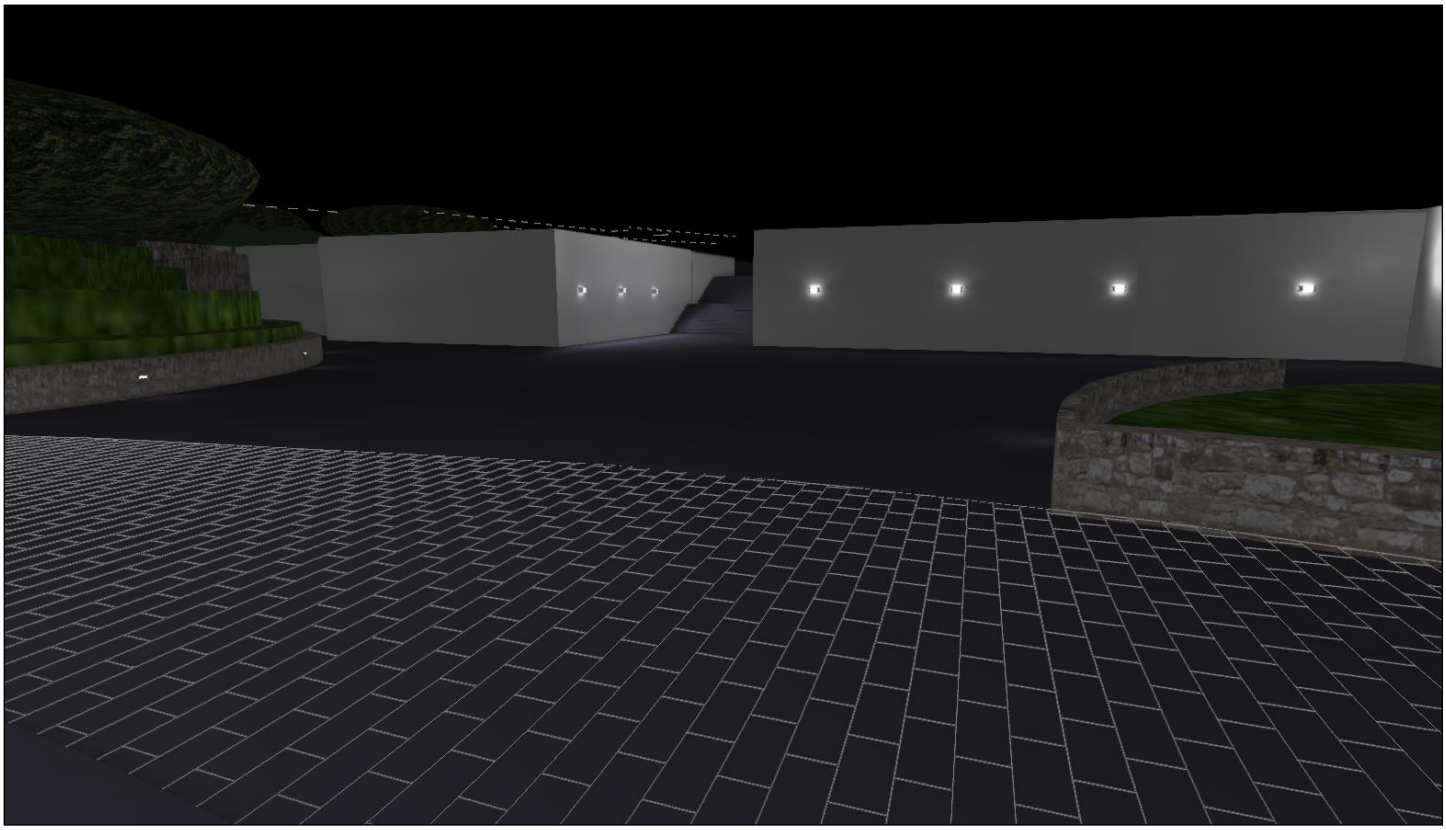
Render view 10



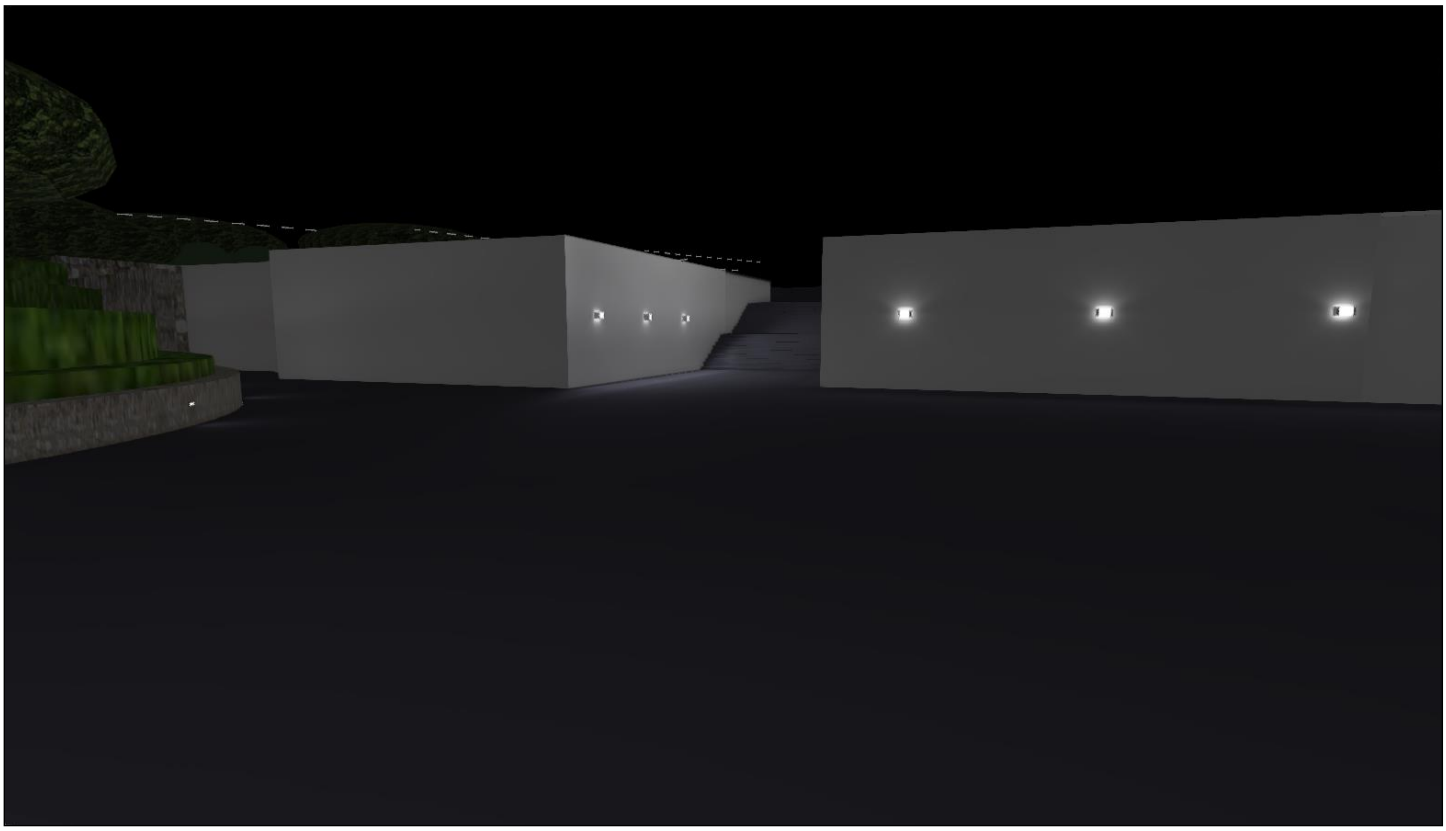
Render view 11



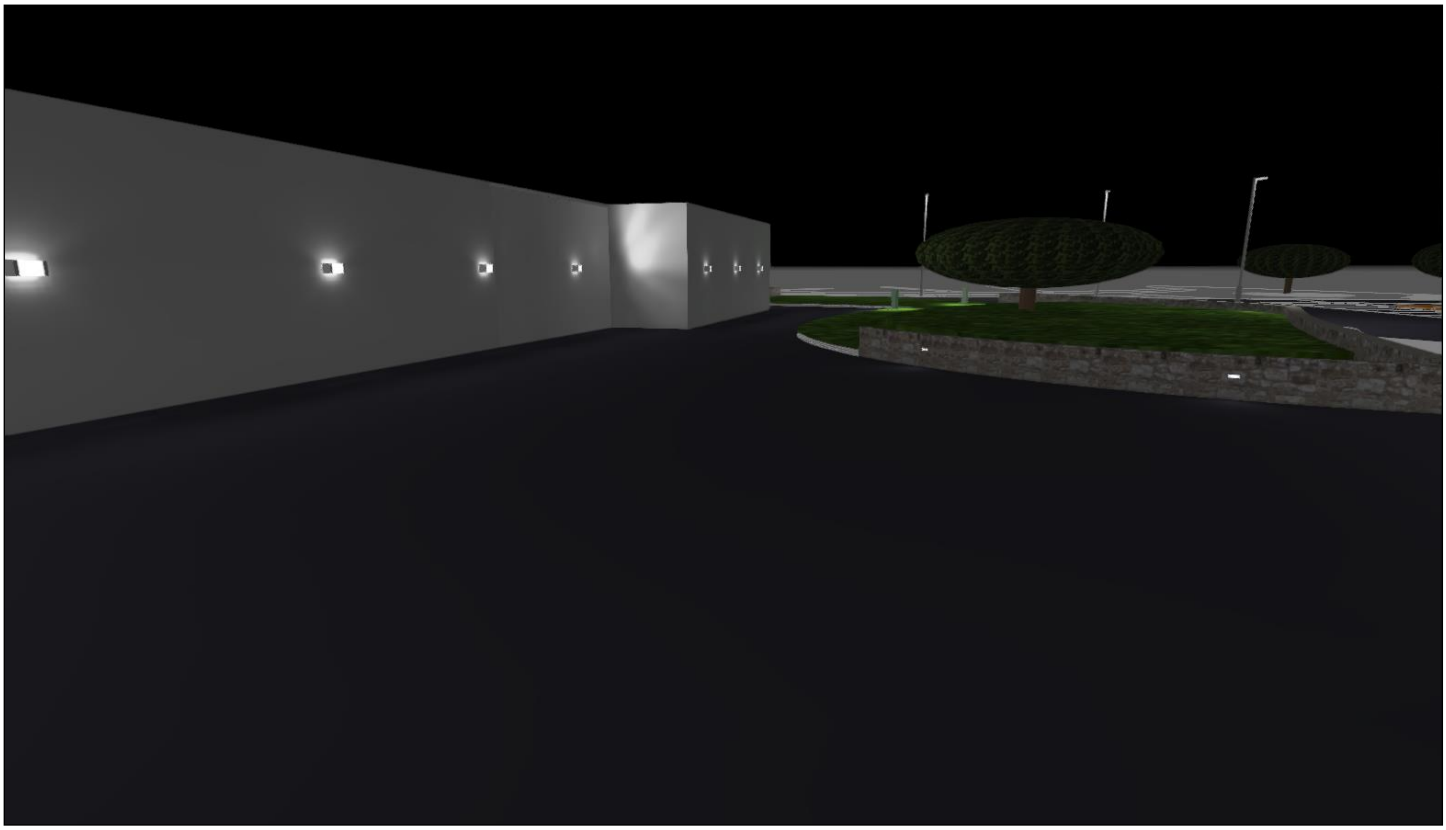
Render view 12



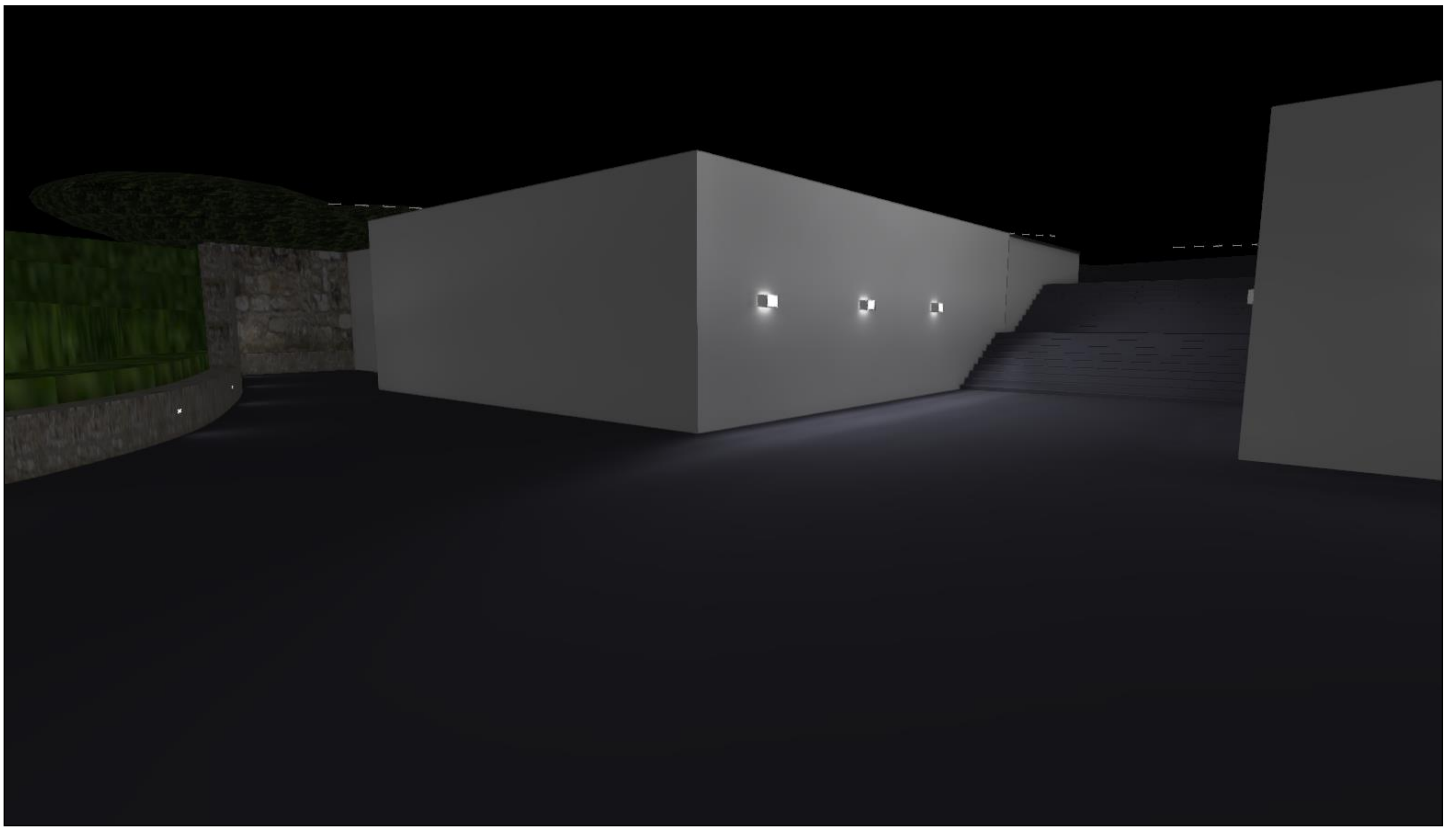
Render view 13



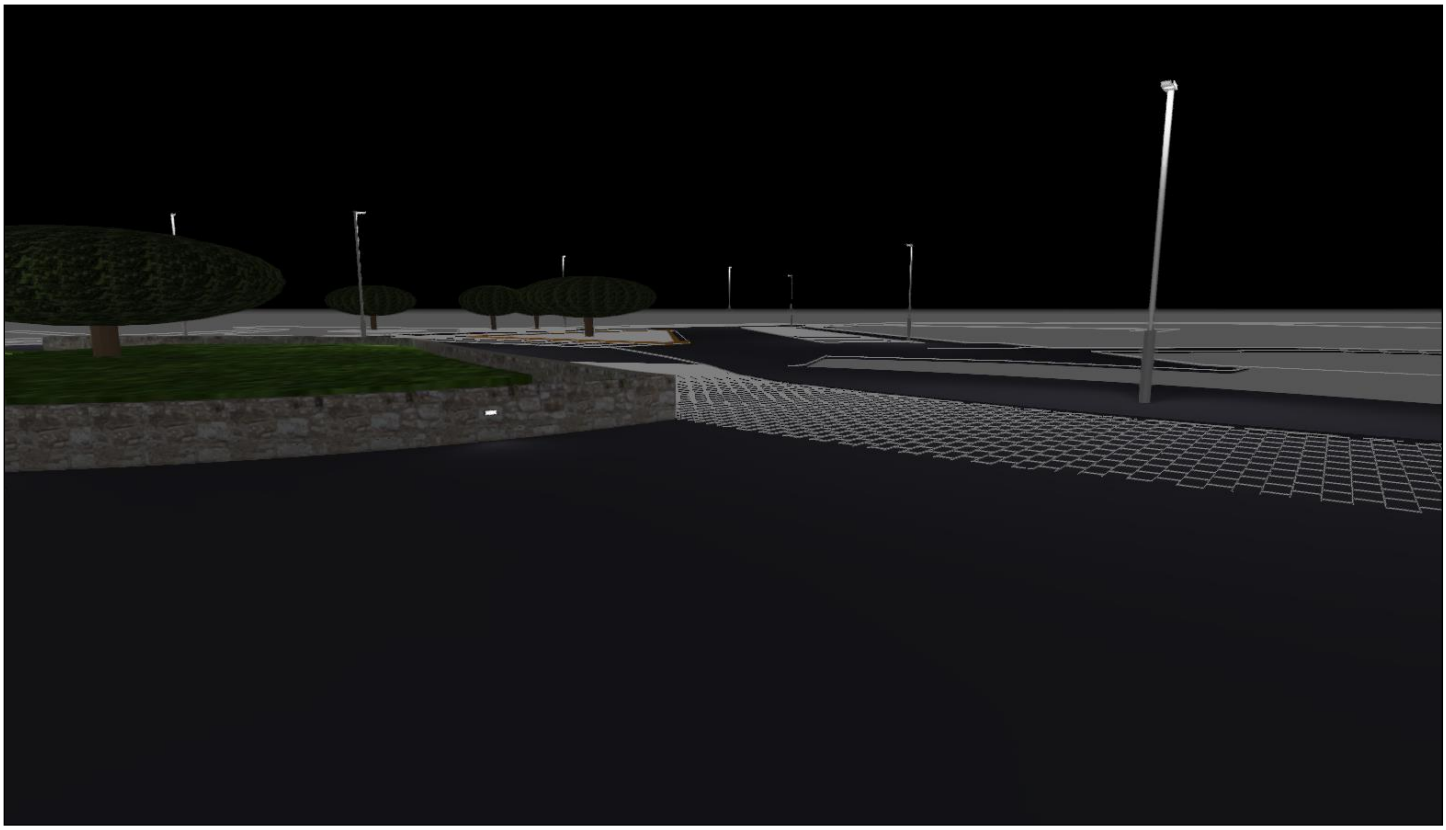
Render view 14



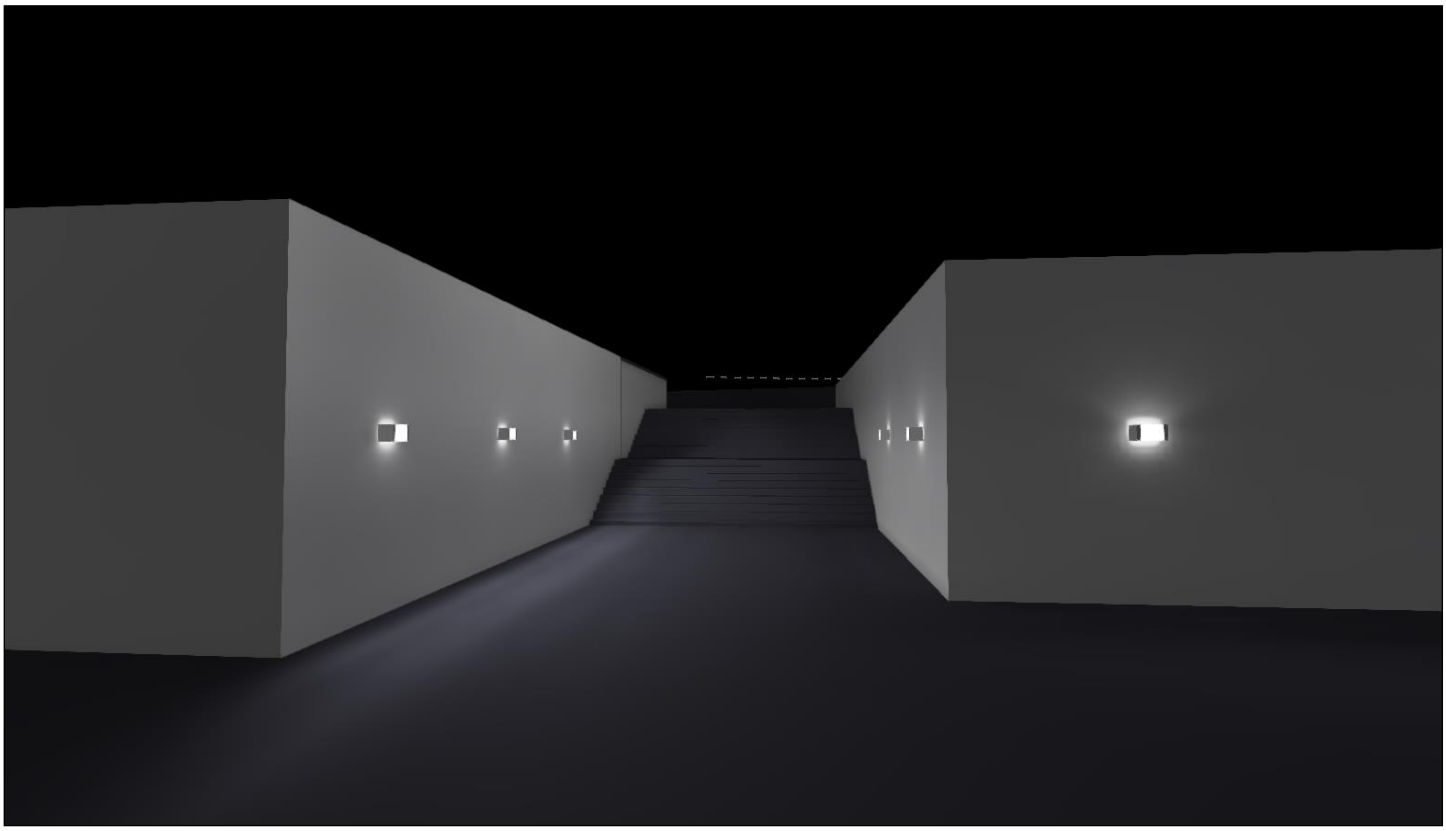
Render view 15



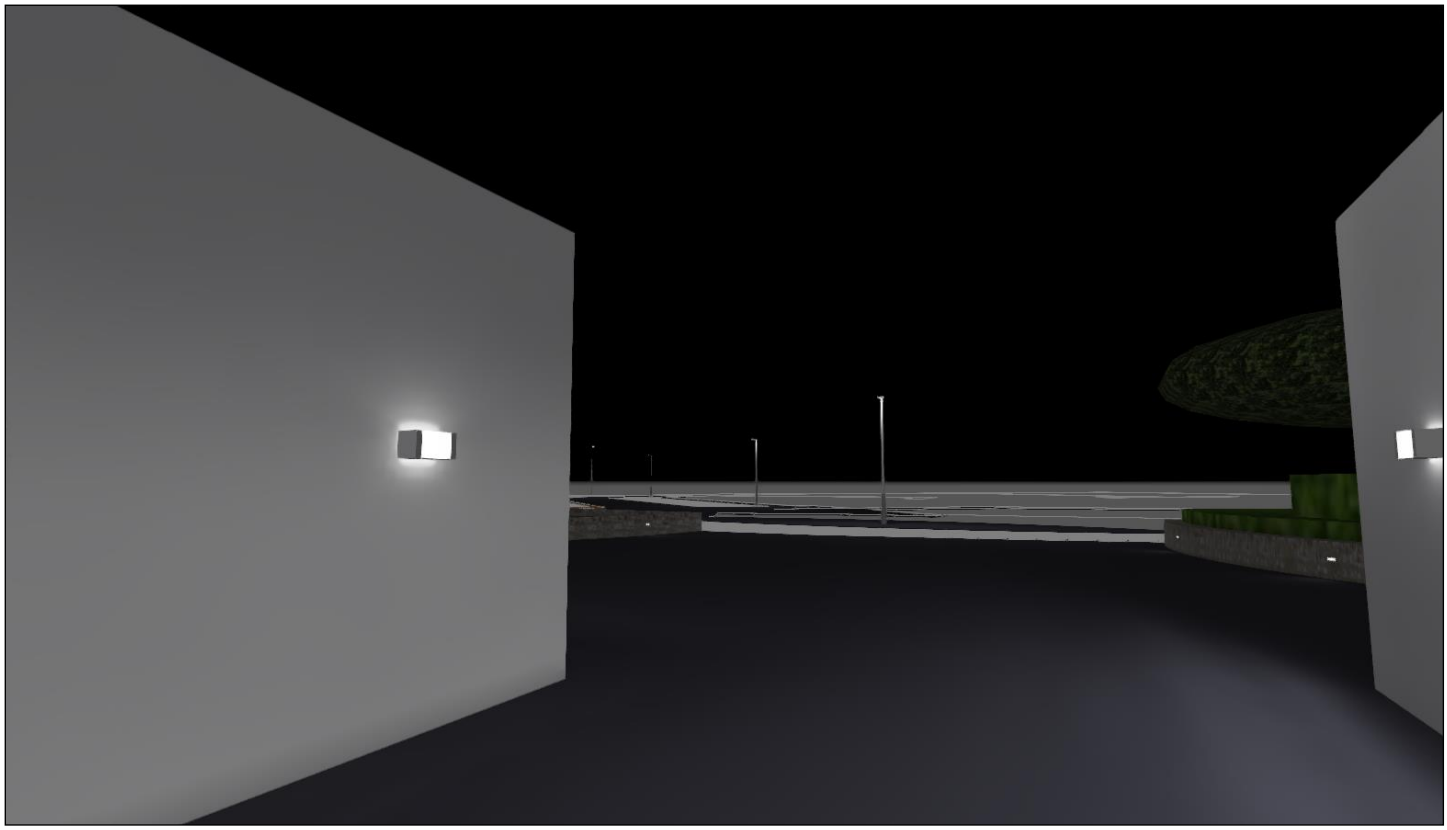
Render view 16



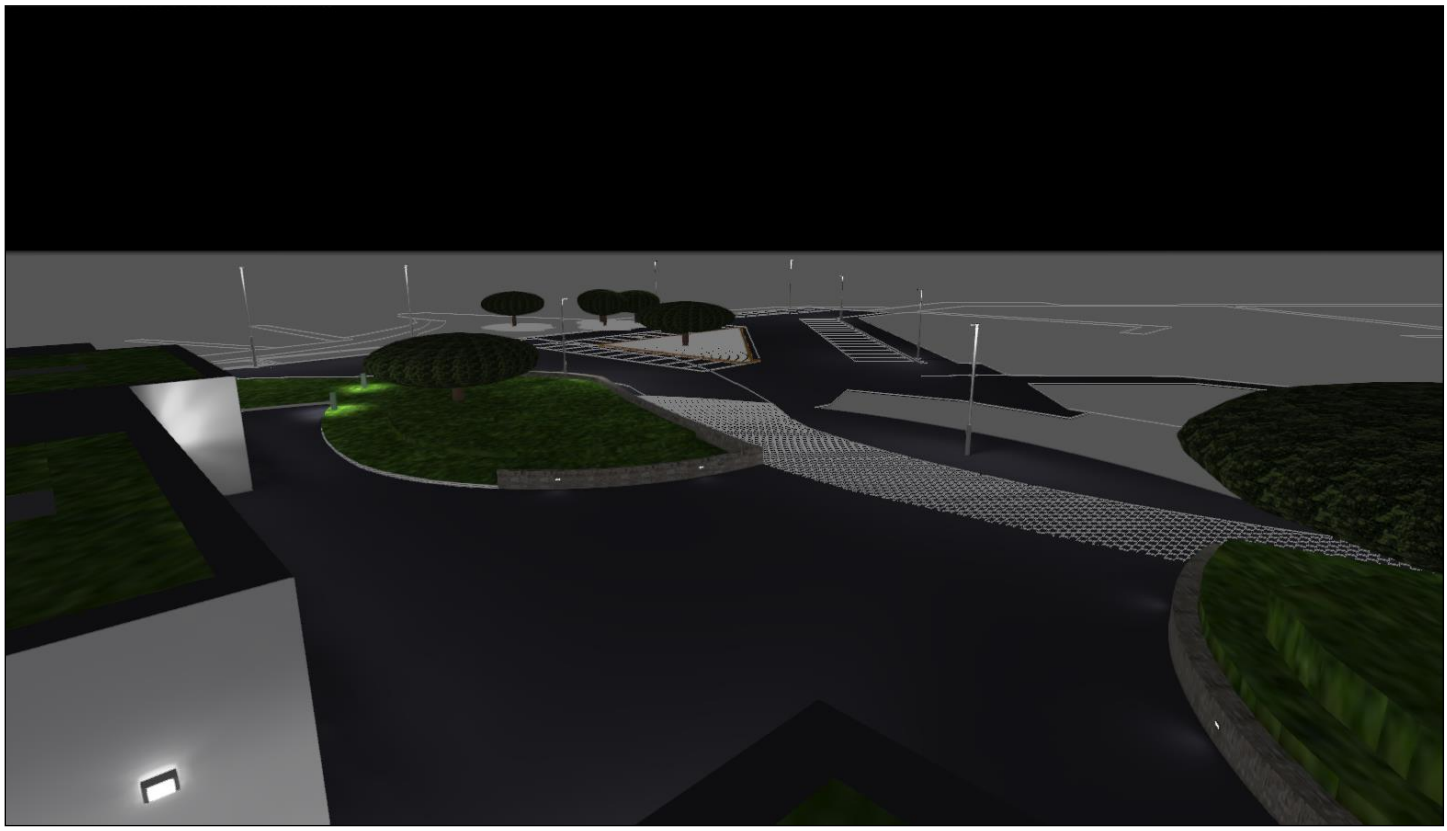
Render view 17



Render view 18

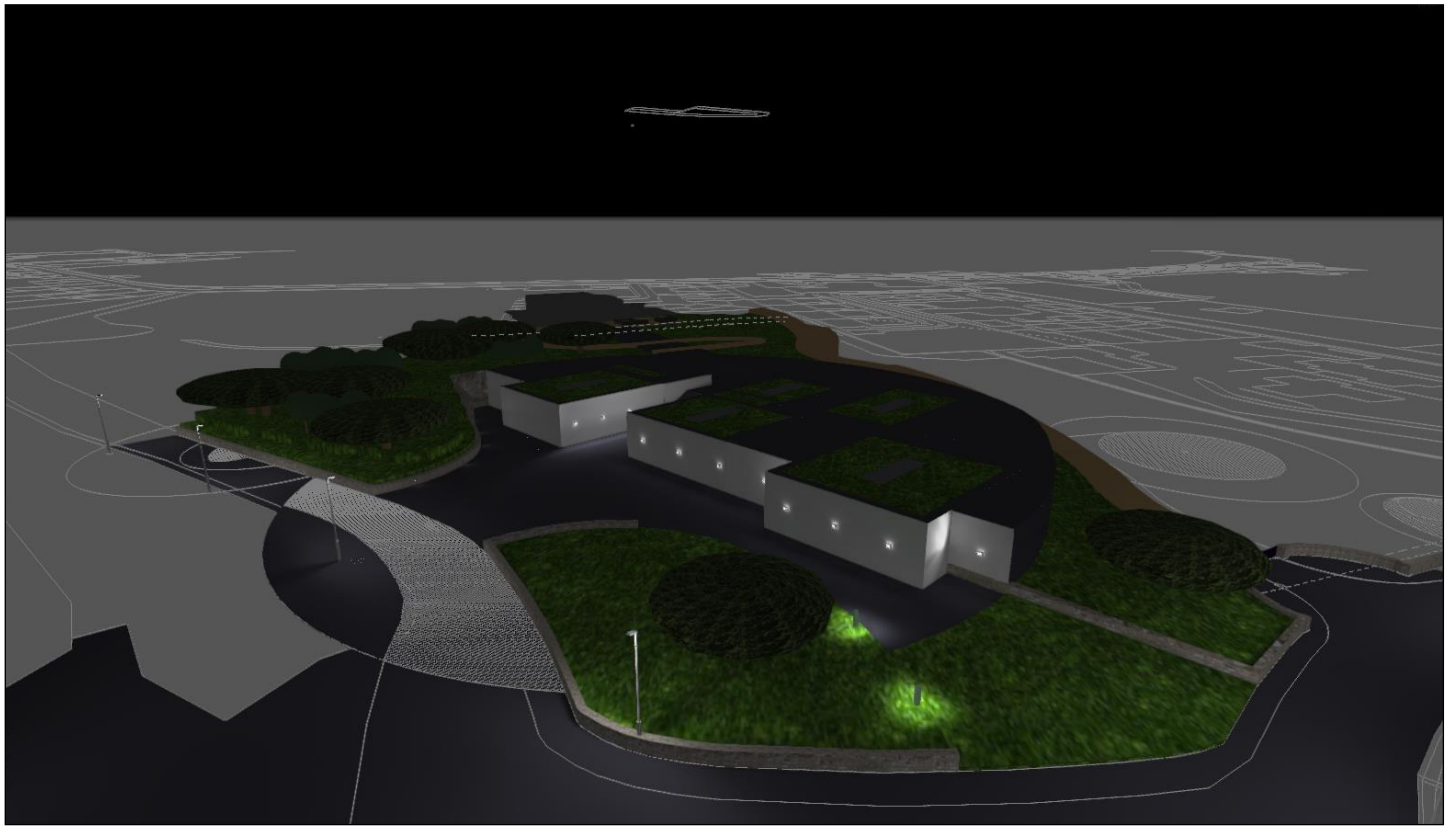


Render view 19

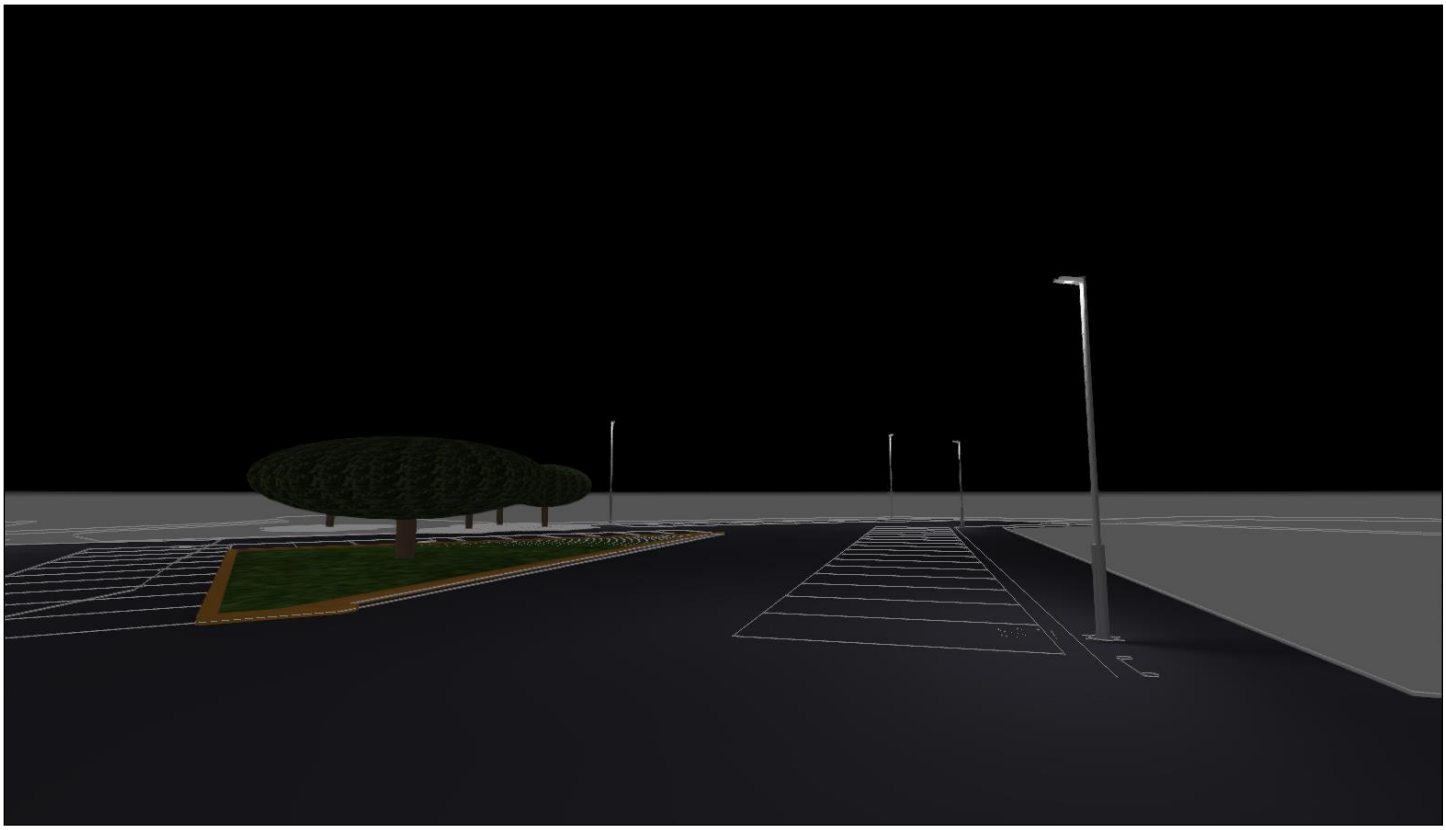


Render view 20

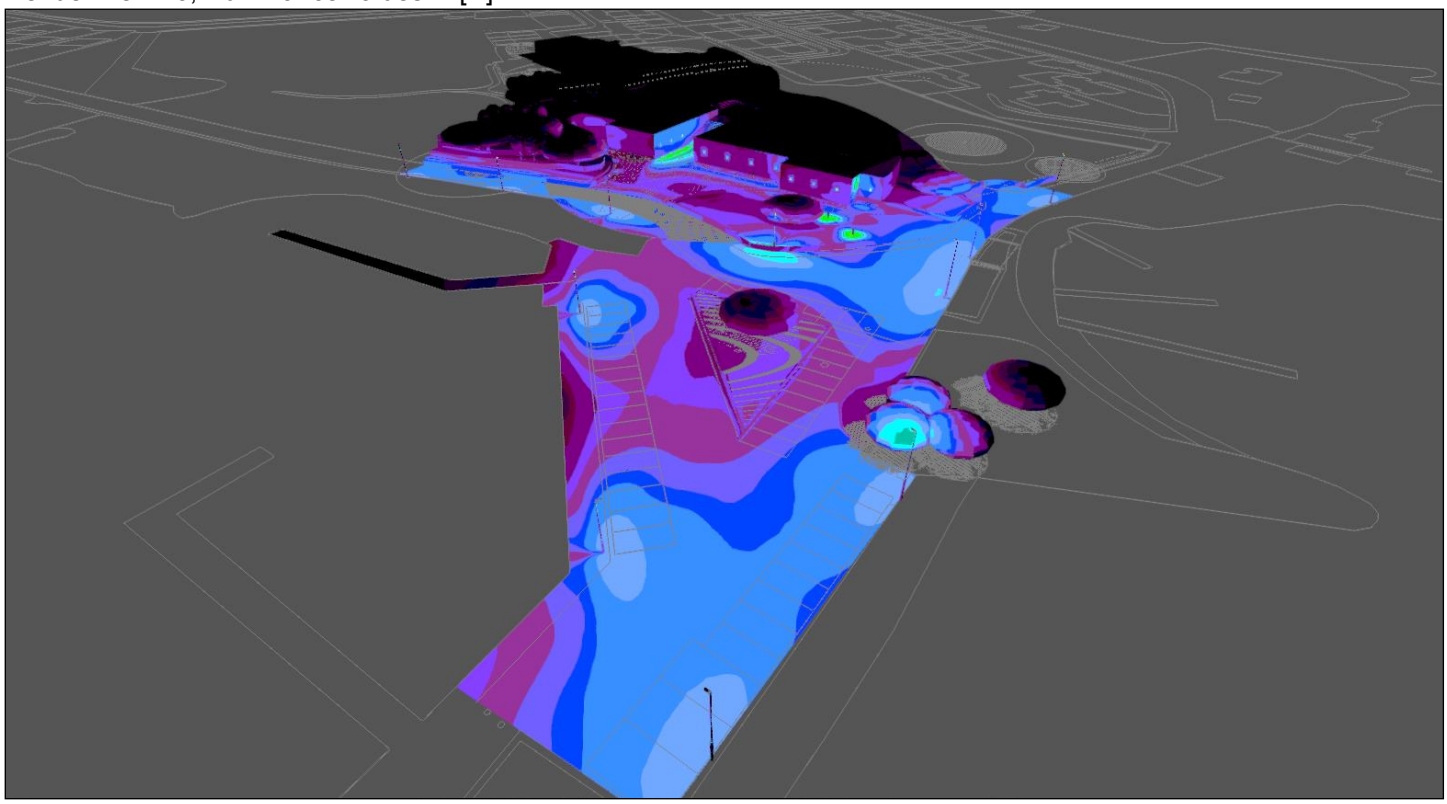
Render view 21

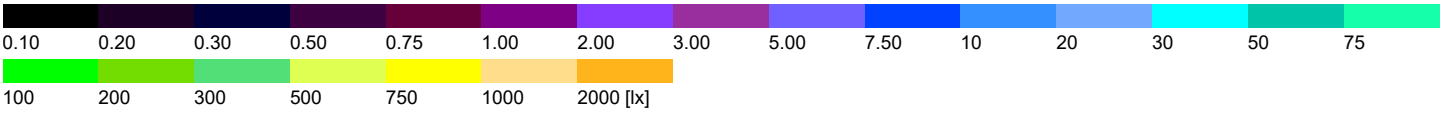


Render view 22

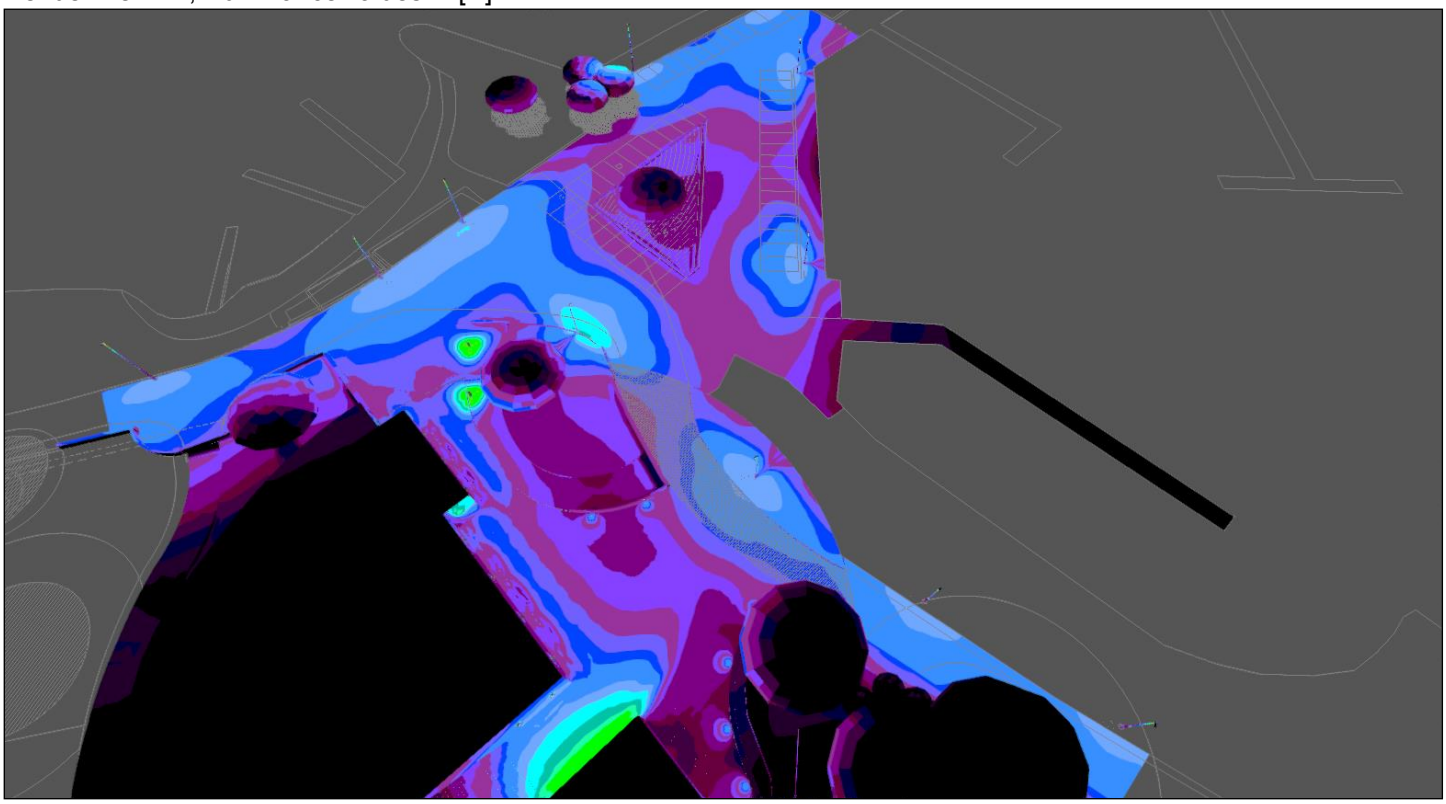


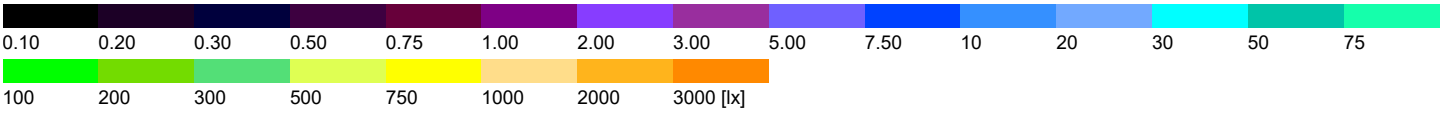
Render view 23, Illuminance values in [lx]





Render view 24, Illuminance values in [lx]





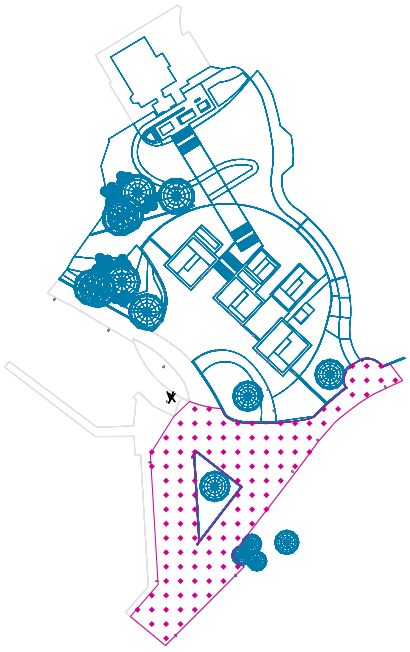
Site 1

Light loss factor: 0.80

General

	Surface	Result	Average (Target)	Min	Max	Min/average	Min/max
1	Car park area	Perpendicular illuminance [lx] Height: 0.000 m	10.6	0.62	39.6	0.058	0.016
2	Main road	Perpendicular illuminance [lx] Height: 0.050 m	12.0	4.17	25.3	0.35	0.16
3	Pedestrian area	Perpendicular illuminance [lx] Height: 0.150 m	12.6	3.10	27.7	0.25	0.11
4	Plaza area	Perpendicular illuminance [lx] Height: 0.150 m	8.37	0.54	97.6	0.065	0.006
5	Bike parking area	Perpendicular illuminance [lx] Height: 0.210 m	34.7	0.000	200	0.00	0.00

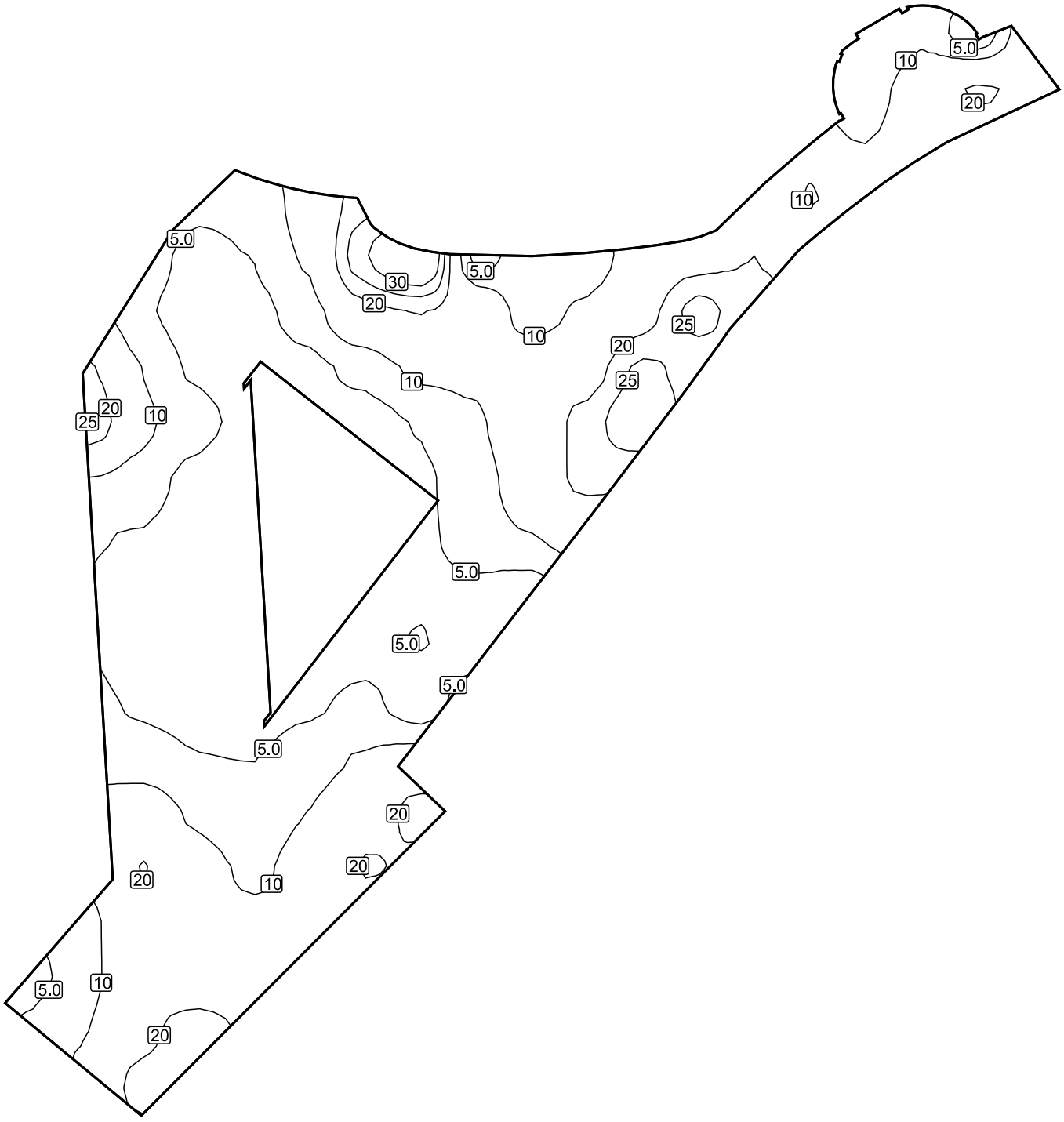
Car park area / Perpendicular illuminance



Light loss factor: 0.80

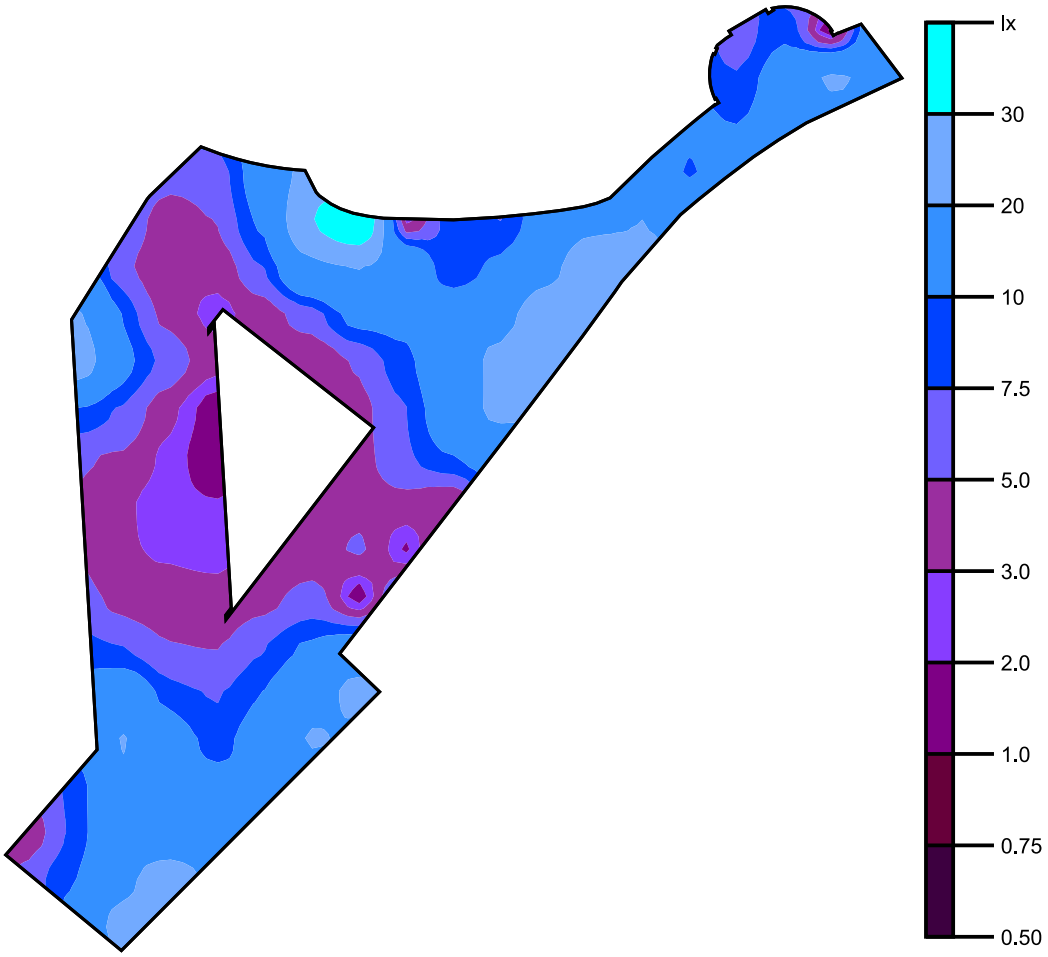
Car park area: Perpendicular illuminance (Grid)
Light scene: Light scene 1
Average: 10.6 lx, Min: 0.62 lx, Max: 39.6 lx, Min/average: 0.058, Min/max: 0.016
Height: 0.000 m

Isolines [lx]



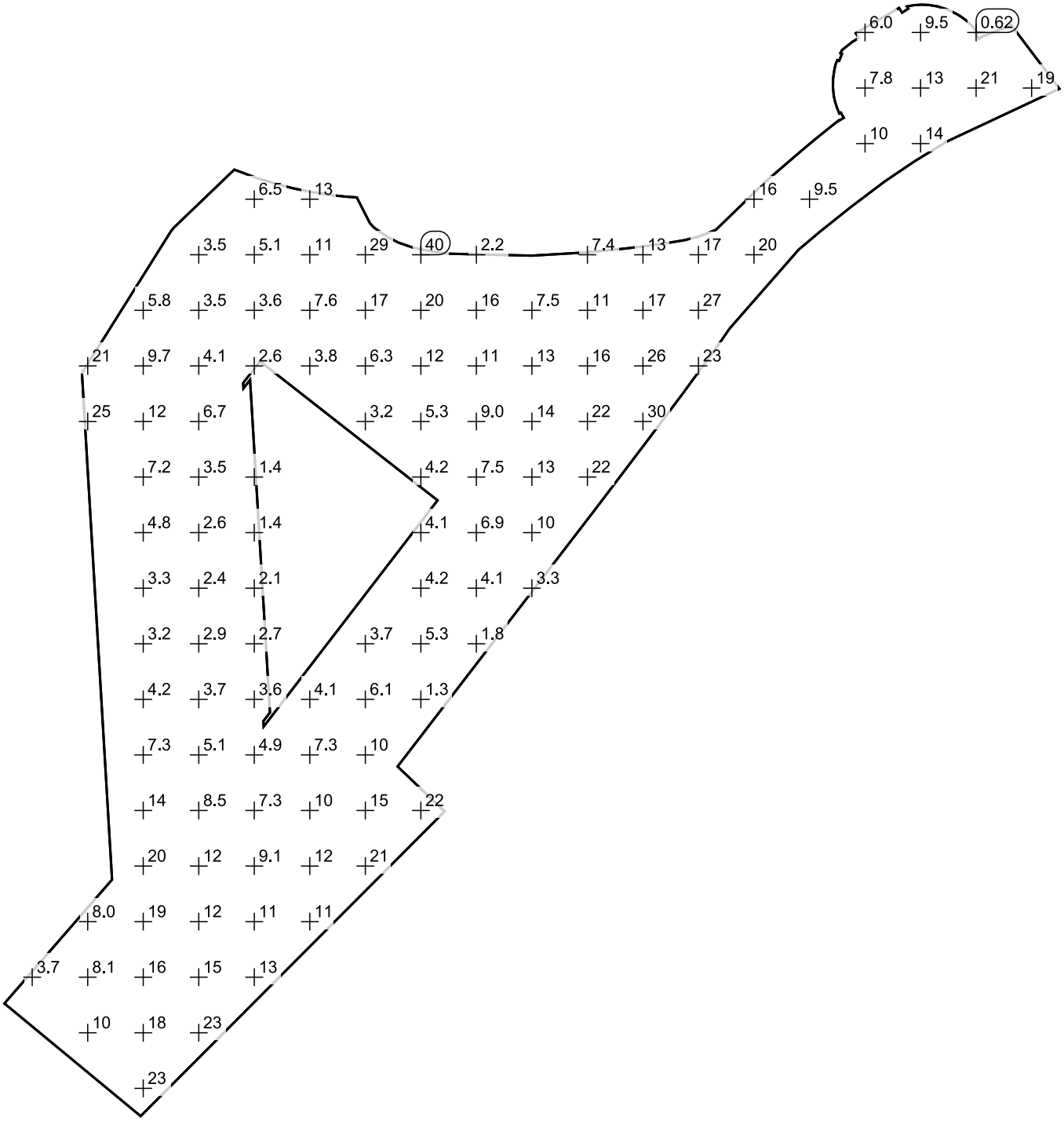
Scale: 1 : 500

False colors [lx]



Scale: 1 : 750

Value grid [lx]



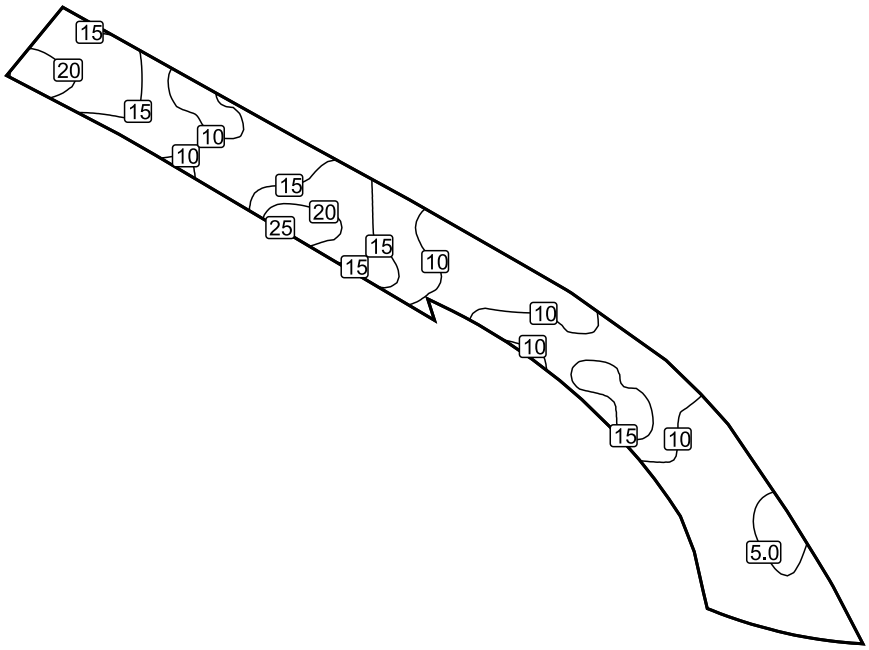
Scale: 1 : 500

Main road / Perpendicular illuminance

Light loss factor: 0.80

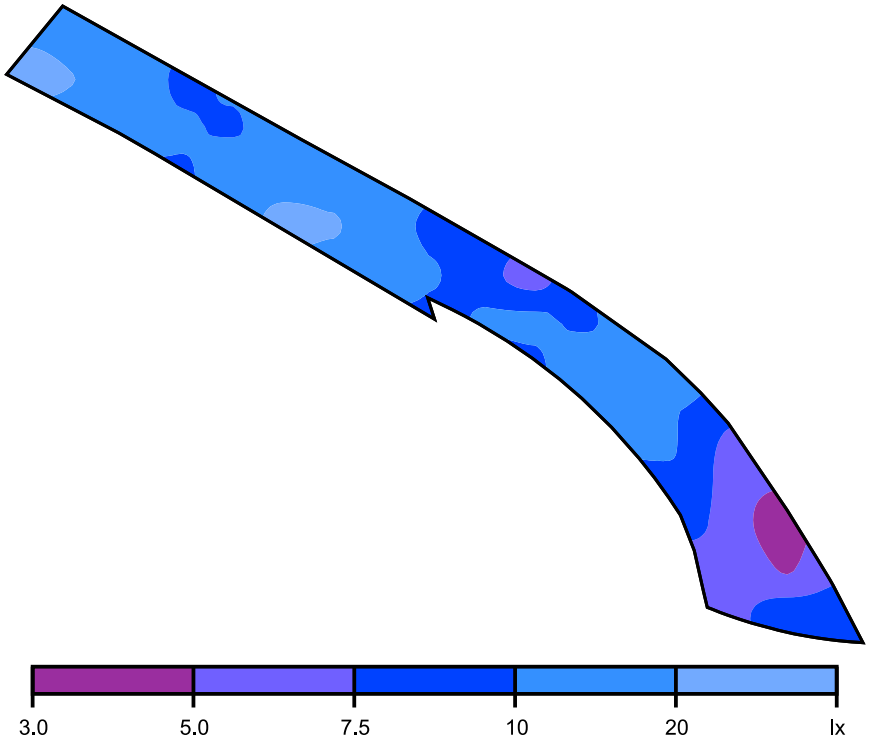
Main road: Perpendicular illuminance (Grid)
Light scene: Light scene 1
Average: 12.0 lx, Min: 4.17 lx, Max: 25.3 lx, Min/average: 0.35, Min/max: 0.16
Height: 0.050 m

Isolines [lx]



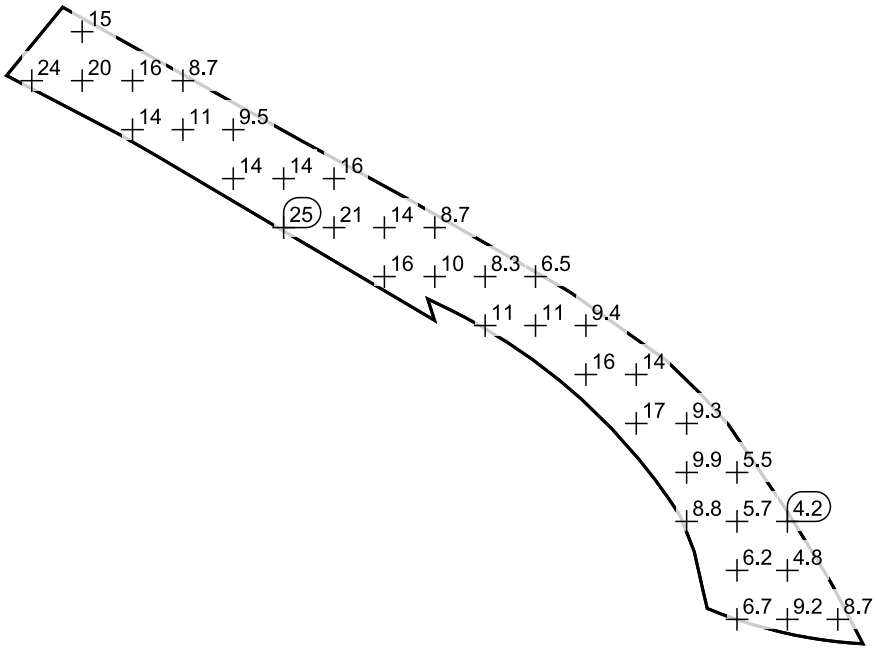
Scale: 1 : 500

False colors [lx]



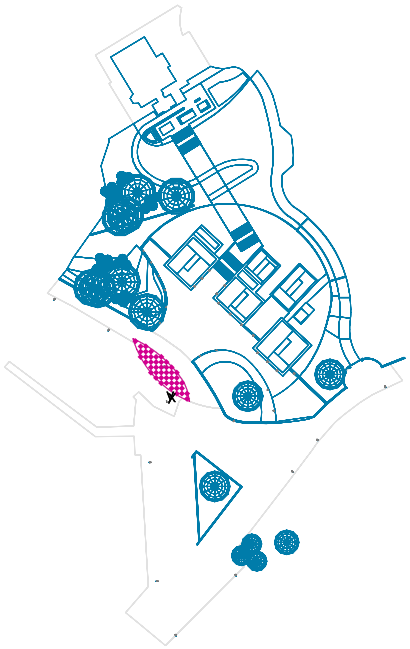
Scale: 1 : 500

Value grid [lx]



Scale: 1 : 500

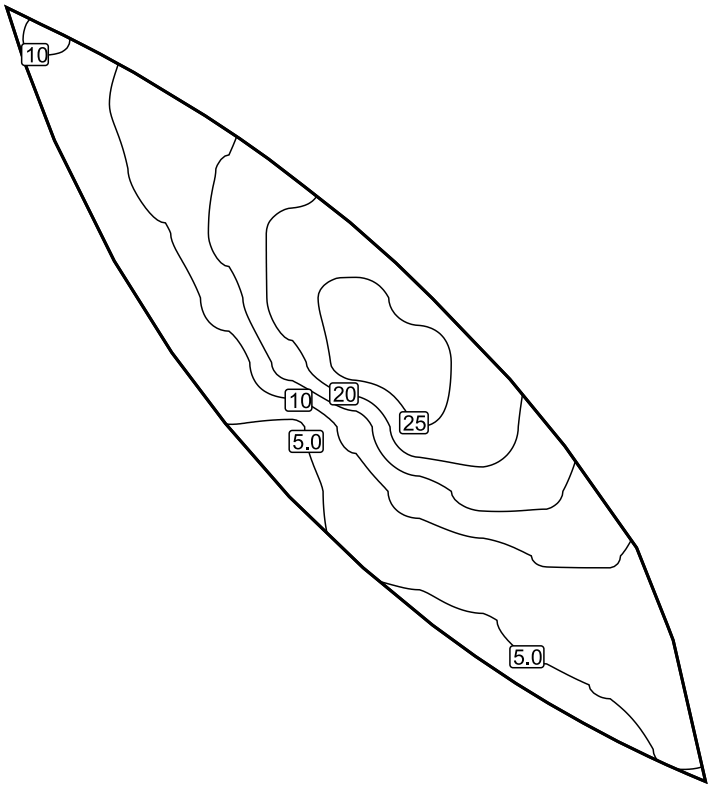
Pedestrian area / Perpendicular illuminance



Light loss factor: 0.80

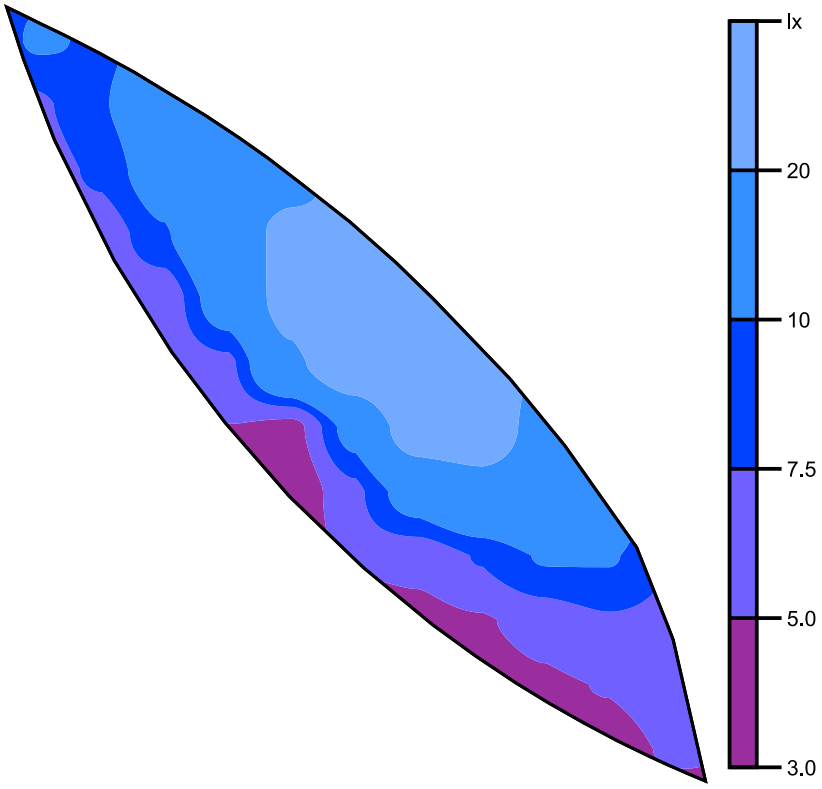
Pedestrian area: Perpendicular illuminance (Grid)
Light scene: Light scene 1
Average: 12.6 lx, Min: 3.10 lx, Max: 27.7 lx, Min/average: 0.25, Min/max: 0.11
Height: 0.150 m

Isolines [lx]



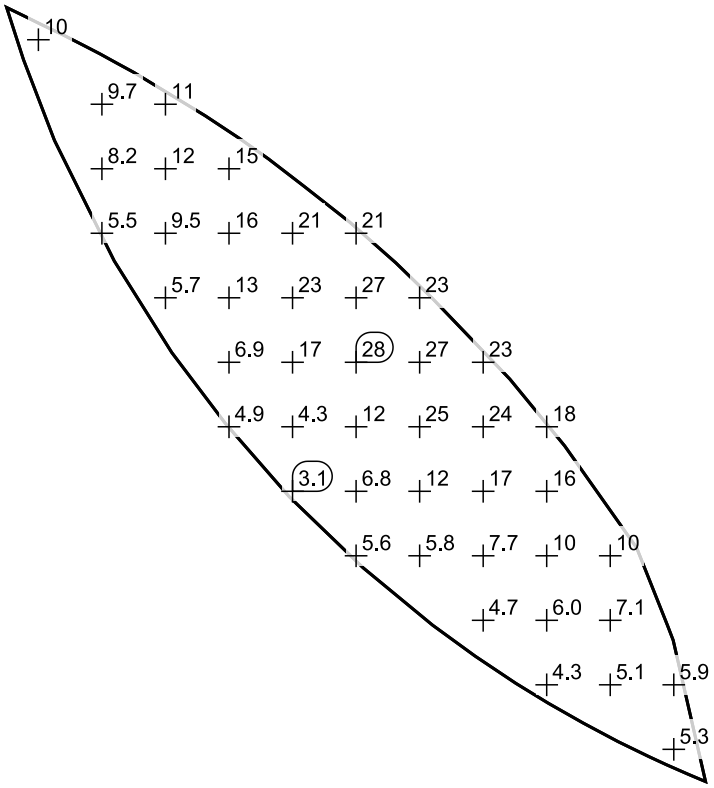
Scale: 1 : 200

False colors [lx]



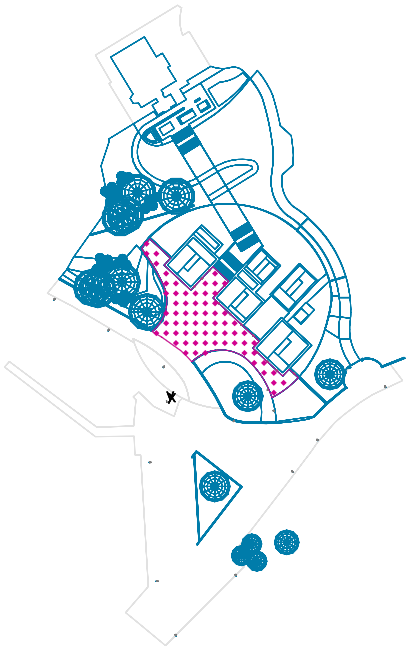
Scale: 1 : 200

Value grid [lx]



Scale: 1 : 200

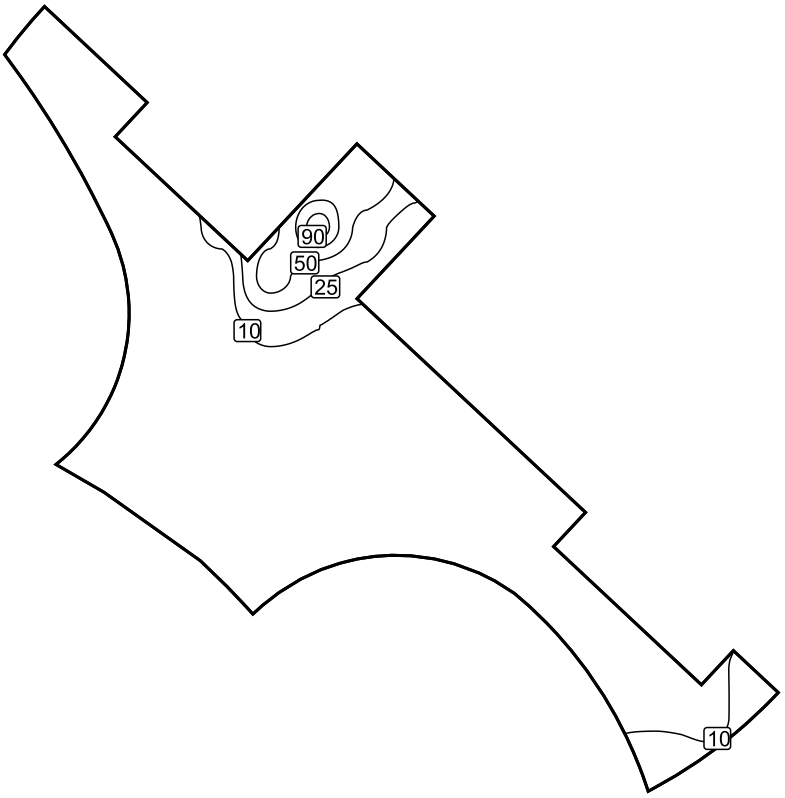
Plaza area / Perpendicular illuminance



Light loss factor: 0.80

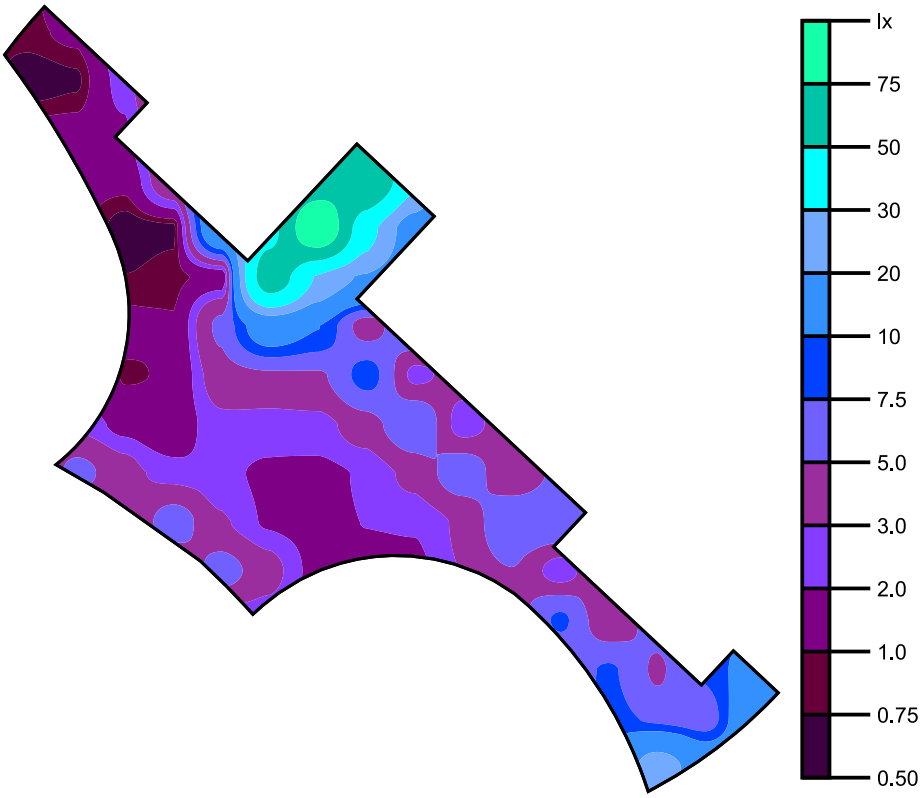
Plaza area: Perpendicular illuminance (Grid)
Light scene: Light scene 1
Average: 8.37 lx, Min: 0.54 lx, Max: 97.6 lx, Min/average: 0.065, Min/max: 0.006
Height: 0.150 m

Isolines [lx]



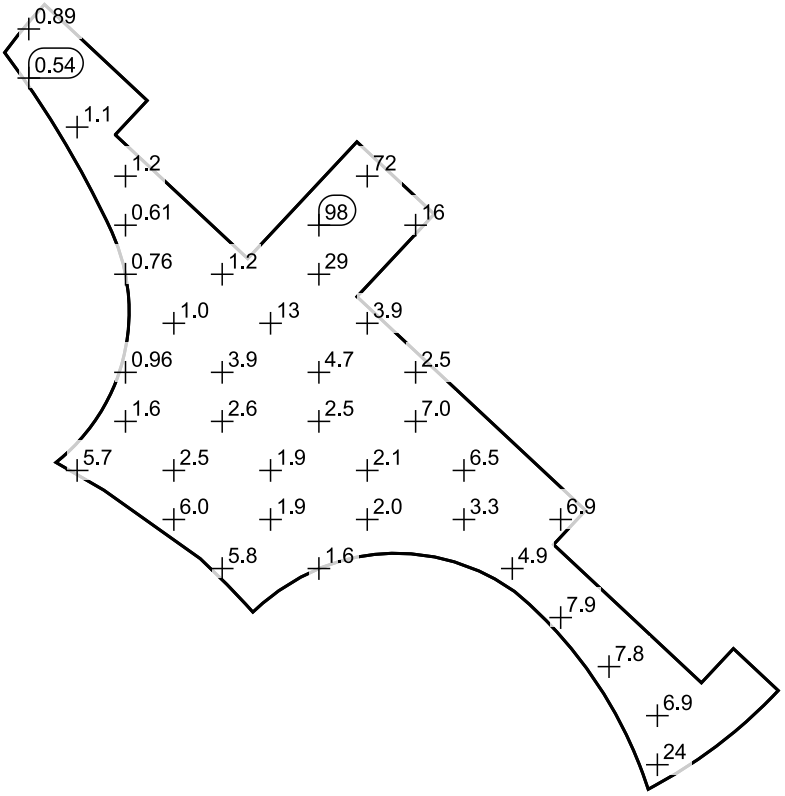
Scale: 1 : 500

False colors [lx]



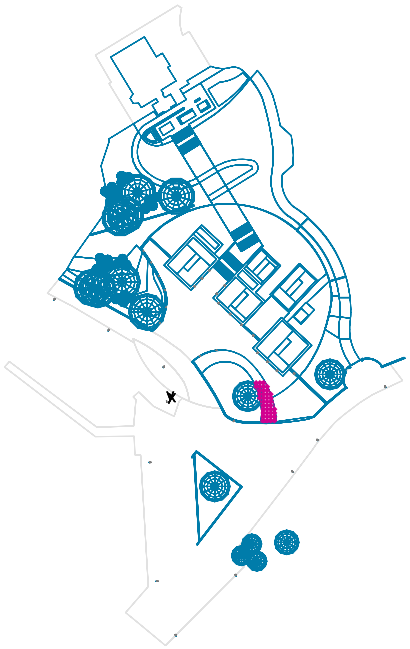
Scale: 1 : 500

Value grid [lx]



Scale: 1 : 500

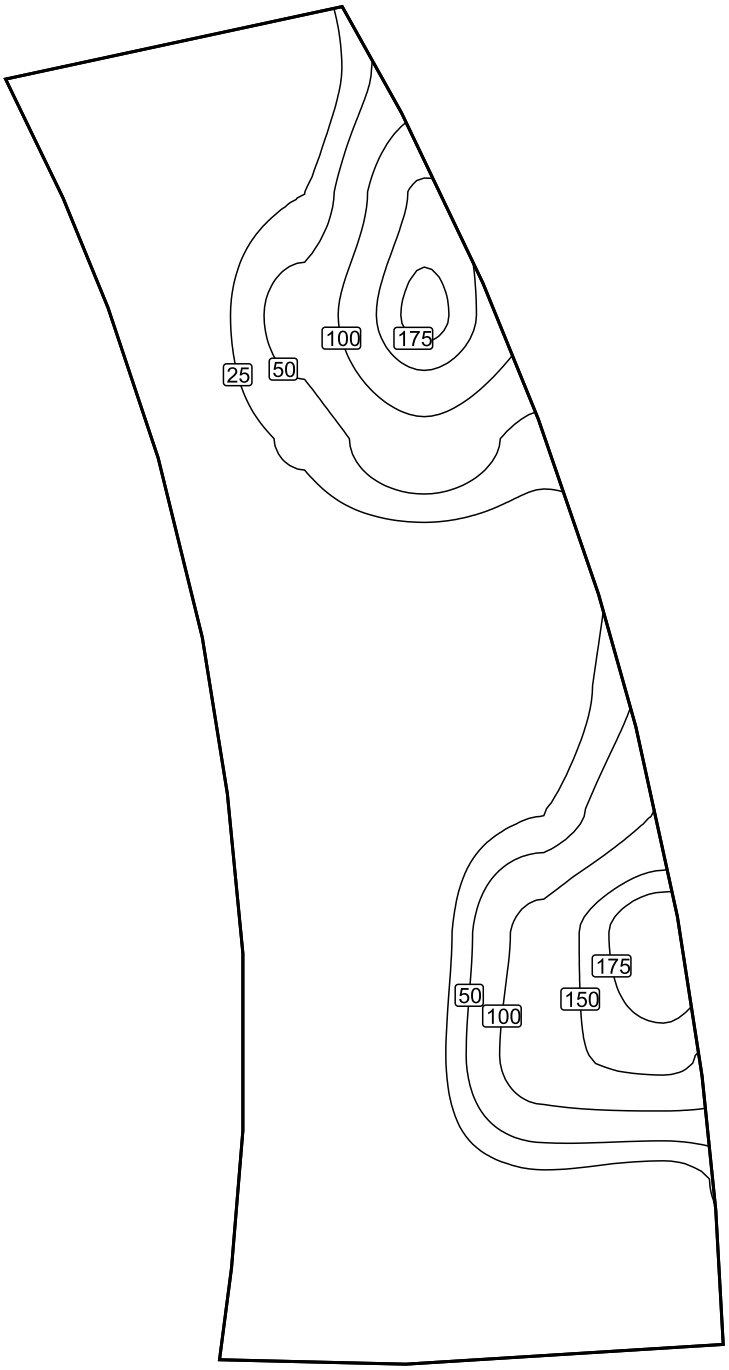
Bike parking area / Perpendicular illuminance



Light loss factor: 0.80

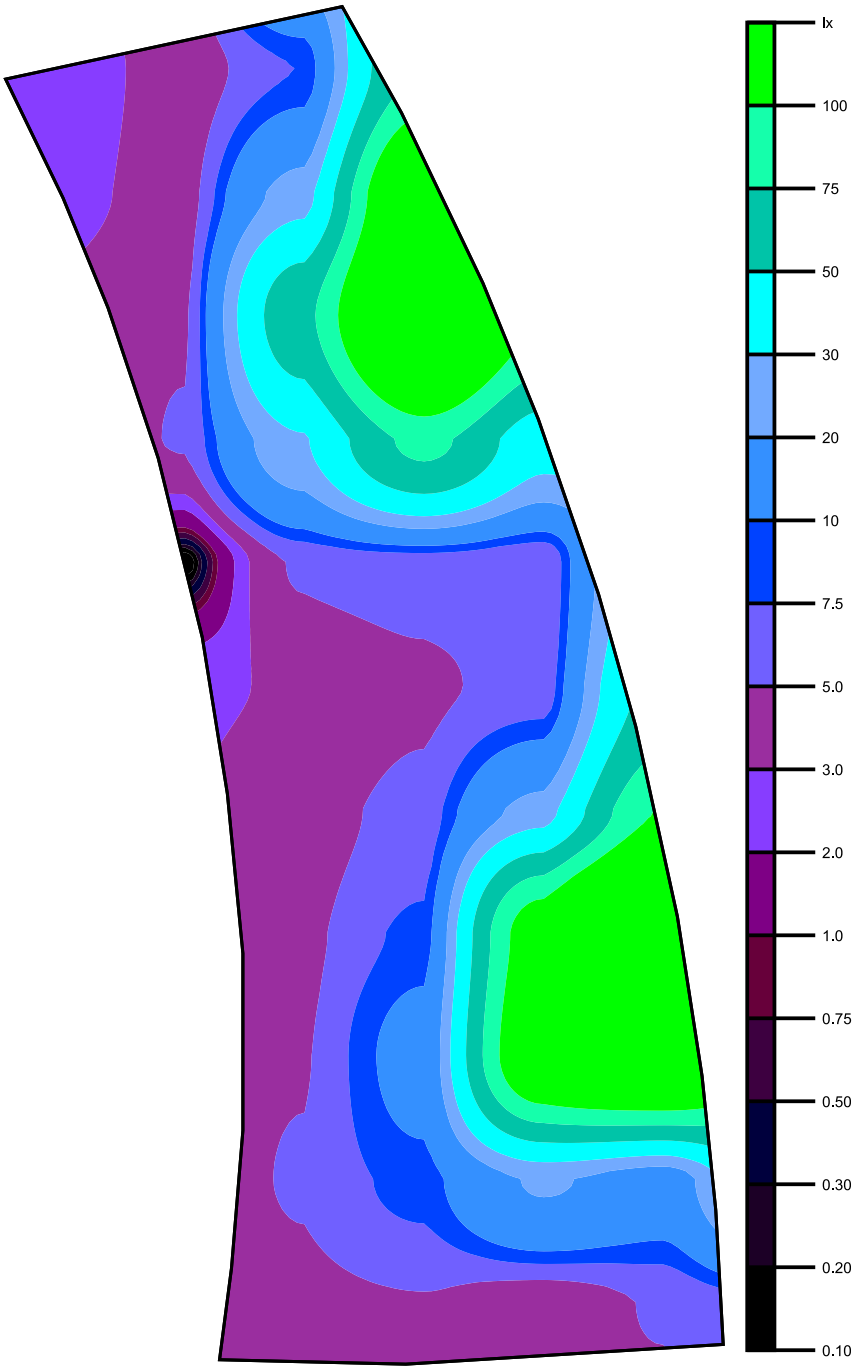
Bike parking area: Perpendicular illuminance (Grid)
Light scene: Light scene 1
Average: 34.7 lx, Min: 0.000 lx, Max: 200 lx, Min/average: 0.00, Min/max: 0.00
Height: 0.210 m

Isolines [lx]



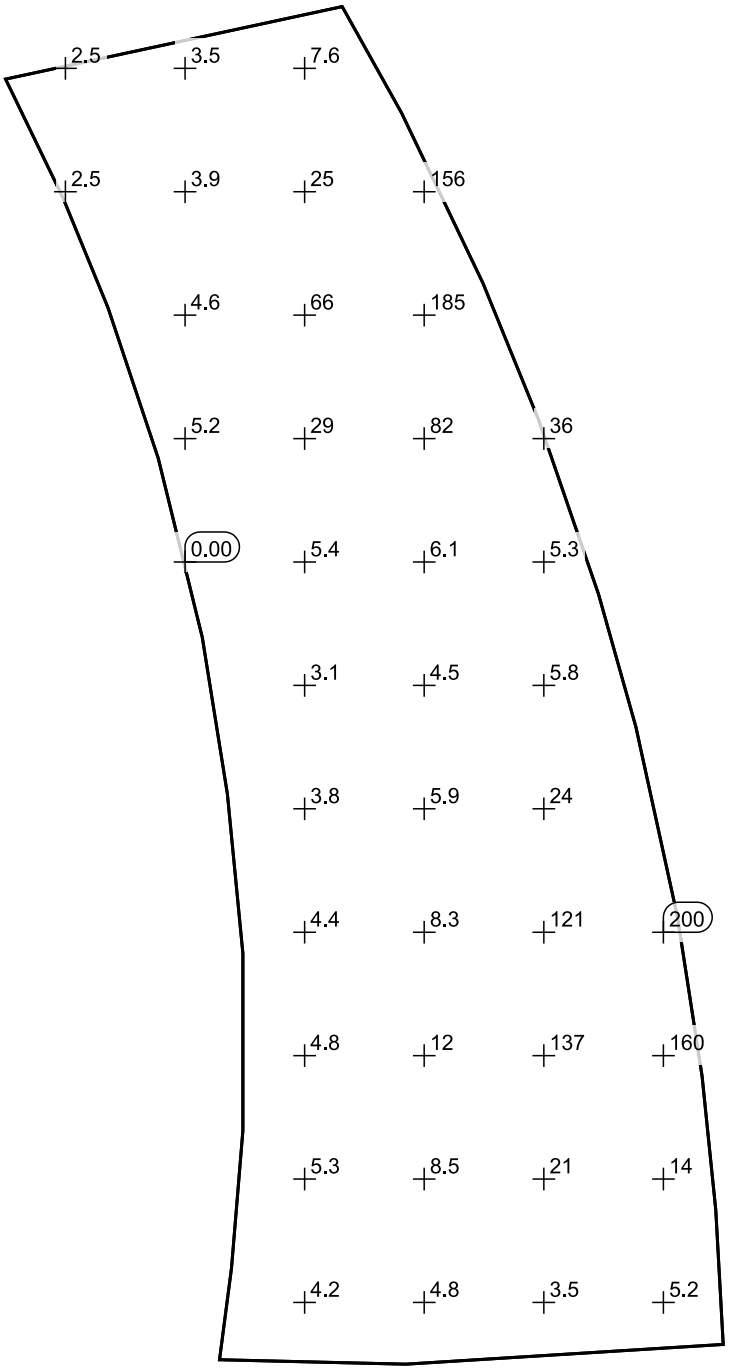
Scale: 1 : 75

False colors [lx]



Scale: 1 : 75

Value grid [lx]



Scale: 1 : 75

LIGHTING LEGEND:

1 HOLOPHANE EUROPE LIMITED - DEB.L024.AY.CGL, DENVER ELITE WALL, Luminous emittance 1, Fitting: 1xLED C.2000LM - 4000K, Absolute photometry, Luminaire luminous flux: 2490 lm, Power: 23.2 W

2 HOLOPHANE EUROPE LIMITED - SLI.2.LA054.R2. W037 S-LINE Streetlighting luminaire with a Type III - Medium distribution, Luminous emittance 1, Fitting: 1xLED C.5000 Lumens, Absolute photometry, Luminaire luminous flux: 4820 lm, Power: 37.0 W, Luminous efficacy: 130.3 lm/W, Mounted on 6m octagonal columns.

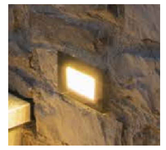
3 HOLOPHANE EUROPE LIMITED - SLI.2.LA083.R2.W059 S-LINE Streetlighting luminaire with a Type III - Medium distribution, Luminous emittance 1, Fitting: 1xLED C.8000 Lumens Absolute photometry, Luminaire luminous flux: 7972 lm, Power: 59.0 W, Luminous efficacy: 135.1 lm/W, Mounted on 8m octagonal columns.

4 PLATEK S.R.L - SPY Large Vetro Nero LED (8W - 4000K) Asymmetric 220-240V 50/60Hz, 5004169, Fitting: 1xLED, luminous flux: 150 lm, Power: 8.0 W

5 HOLOPHANE EUROPE LIMITED - DEB.L024.PAY.TR, DENVER ELITE BOLLARD, Luminous emittance 1, Fitting: 1xLED C.2000LM - 4000K, Absolute photometry, Luminaire luminous flux: 1780 lm, Power: 23.0 W, Luminous efficacy: 77.4 lm/W, Height of bollard is 1m

TYPE 1

TYPE 2 & 3



TYPE 4

TYPE 5

REV	DATE	DESCRIPTION	BY	APP
P02	07/11/24	ISSUED FOR PLANNING	S.C.	F.F.
P01	13/09/24	ISSUED FOR PLANNING	S.C.	F.F.

PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

TITLE:
PROPOSED VISITORS CENTRE
LIGHTING LAYOUT FOR PLANNING

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

MWP
ENGINEERING AND ENVIRONMENTAL CONSULTANTS
CORK | TRALEE | LONDON | LIMERICK
mwp.ie

DRAWN:	CHECKED:	APPROVED:
S.C	F.F	F.F
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	13/09/2024	1:250
STATUS DESCRIPTION: FOR INFORMATION		STATUS: S2
DRAWING NUMBER: 21760 - MWP - ZZ - ZZ - DR - E - 9101		REV: P02

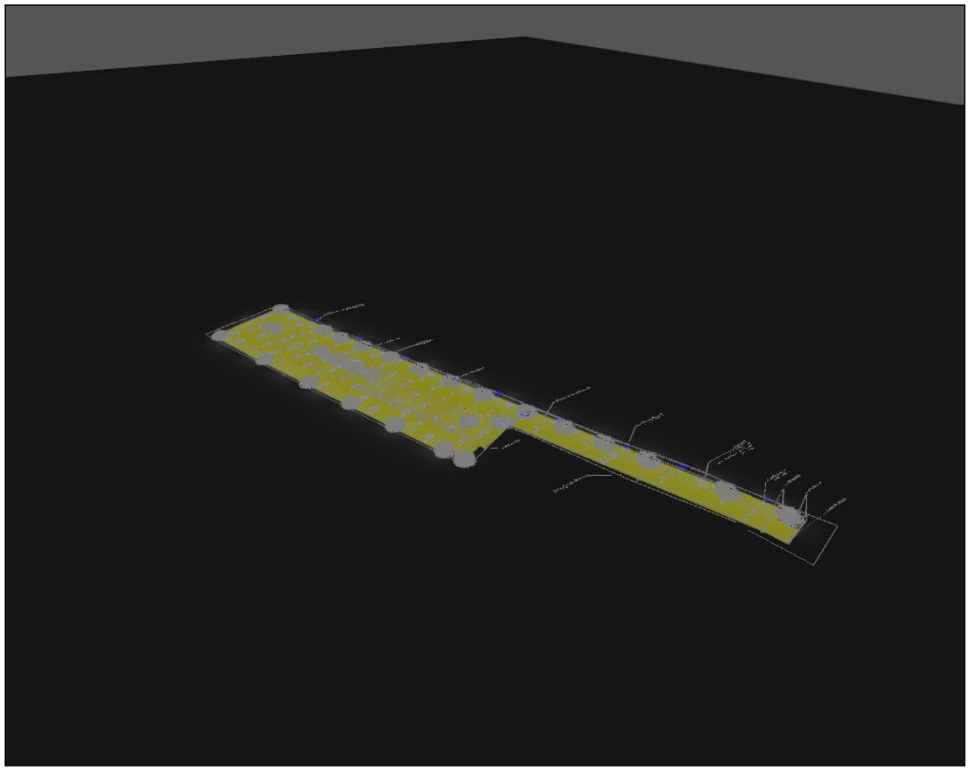
Date:
24/07/2024

Inis Cealtra

Visitors Experiance
External Lighting Design

R2

085-24



Content

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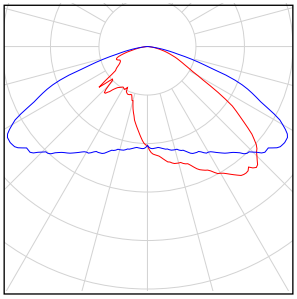
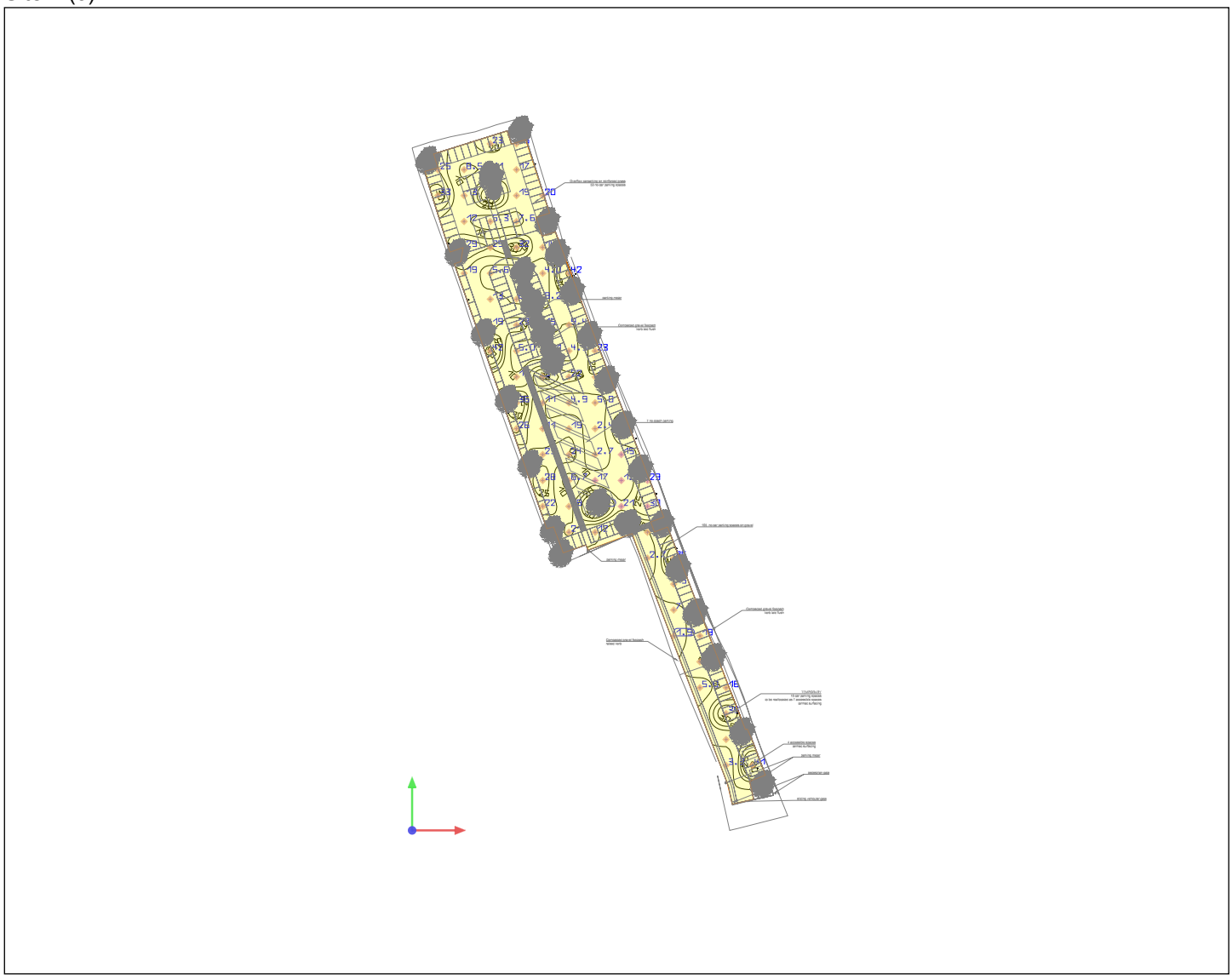
Inis Cealtra

Quantity	Luminaire (Luminous emittance)		
29	Garrabridge - SLI.2.LA093.2S.W068 S-LINE Streetlighting luminaire Luminous emittance 1 Fitting: 1xLED C.9000 Lumens Absolute photometry Luminaire luminous flux: 7809 lm Power: 68.0 W Luminous efficacy: 114.8 lm/W Colourimetric data 1x: CCT 3000 K, CRI 100	See our luminaire catalog for an image of the luminaire.	

Total lamp luminous flux: 226461 lm, Total luminaire luminous flux: 226461 lm, Total Load: 1972.0 W, Luminous efficacy: 114.8 lm/W

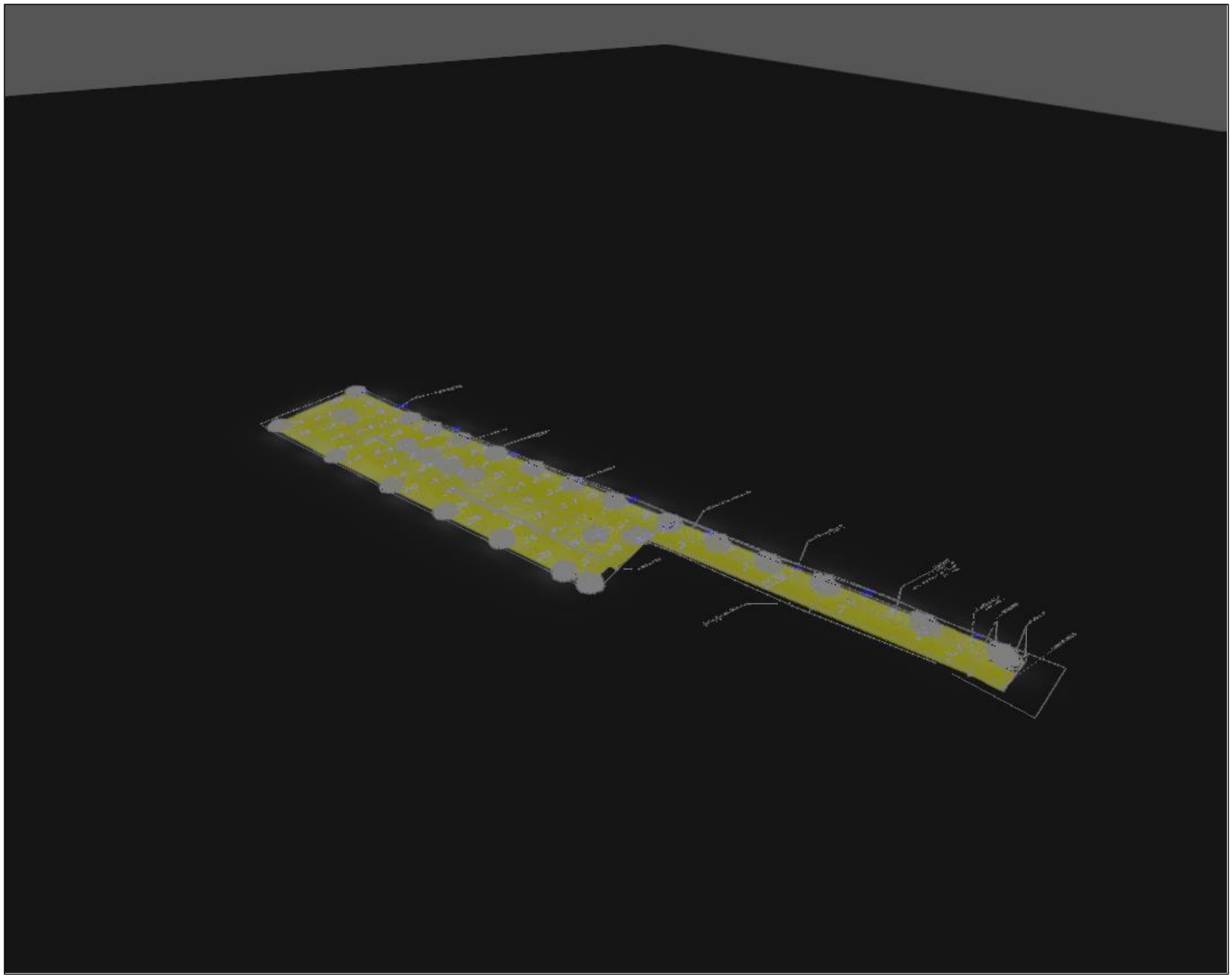
Site 1

Site 1 (9)

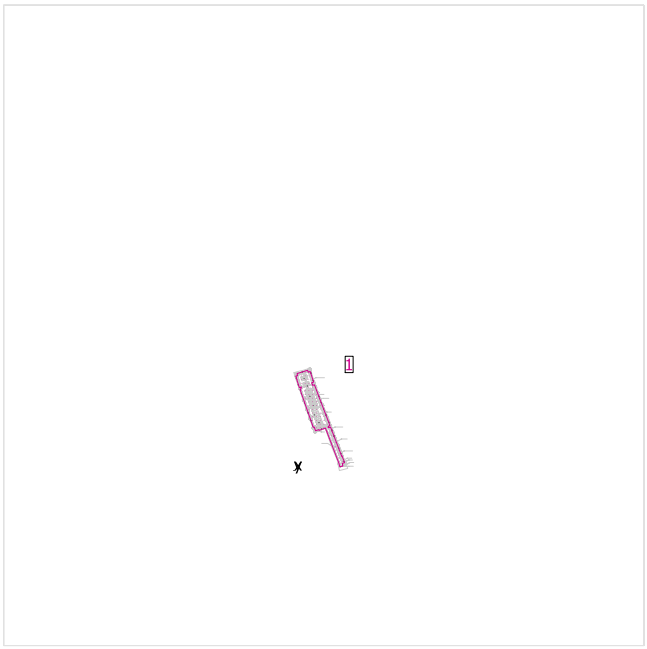


Scale: 1 : 2294

Render



Site 1

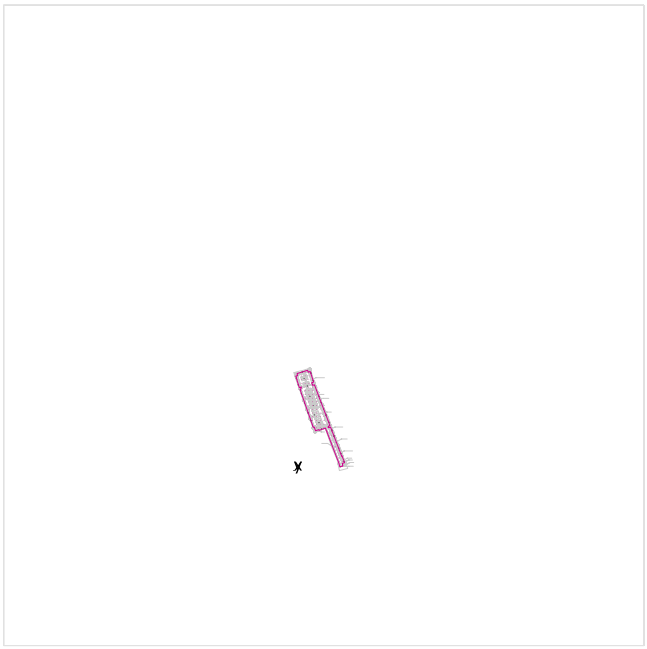


Maintenance factor: 0.80

General

	Surface	Result	Average	Min	Max	Min/average	Min/max
1	Calculation surface 1	Perpendicular illuminance [lx] Height: 0.000 m	19.3	1.87	47.3	0.097	0.040

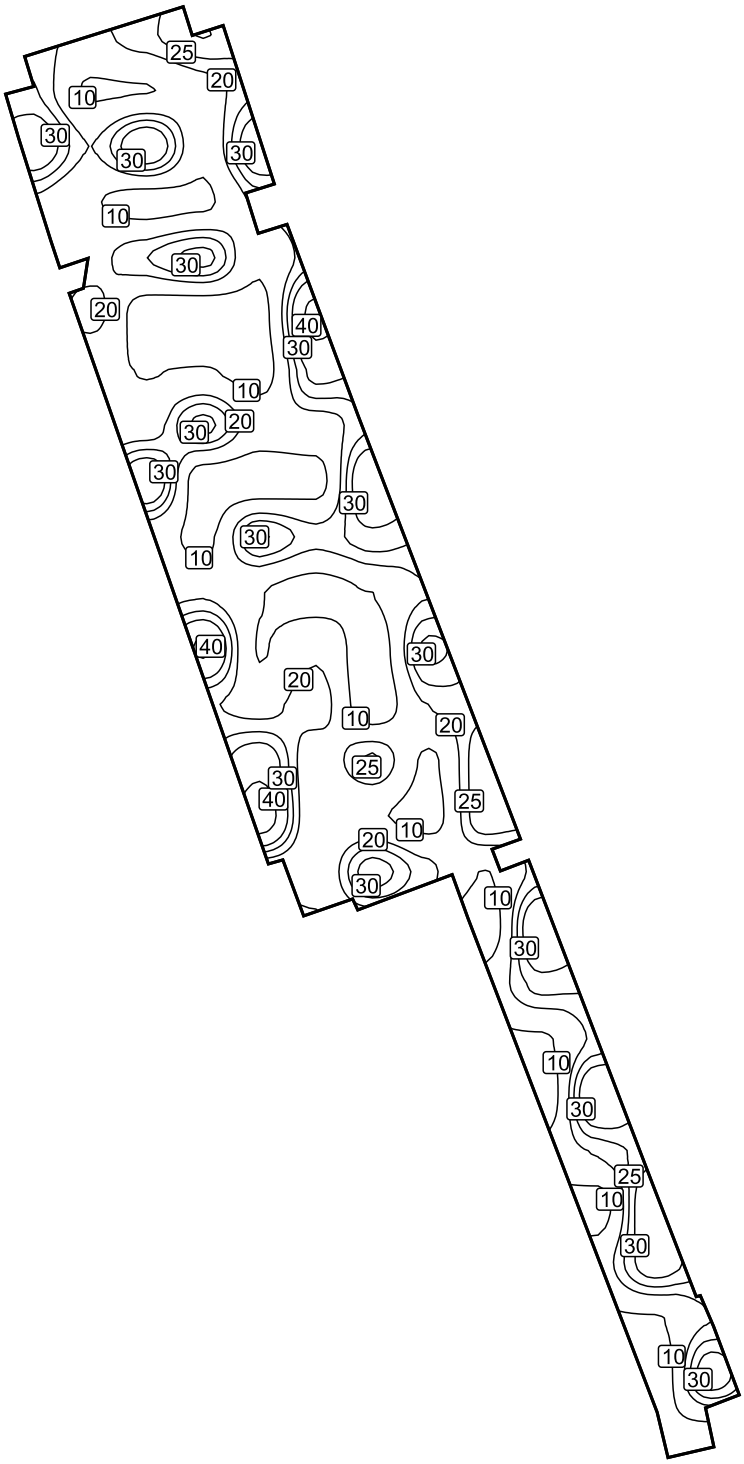
Calculation surface 1 / Perpendicular illuminance



Maintenance factor: 0.80

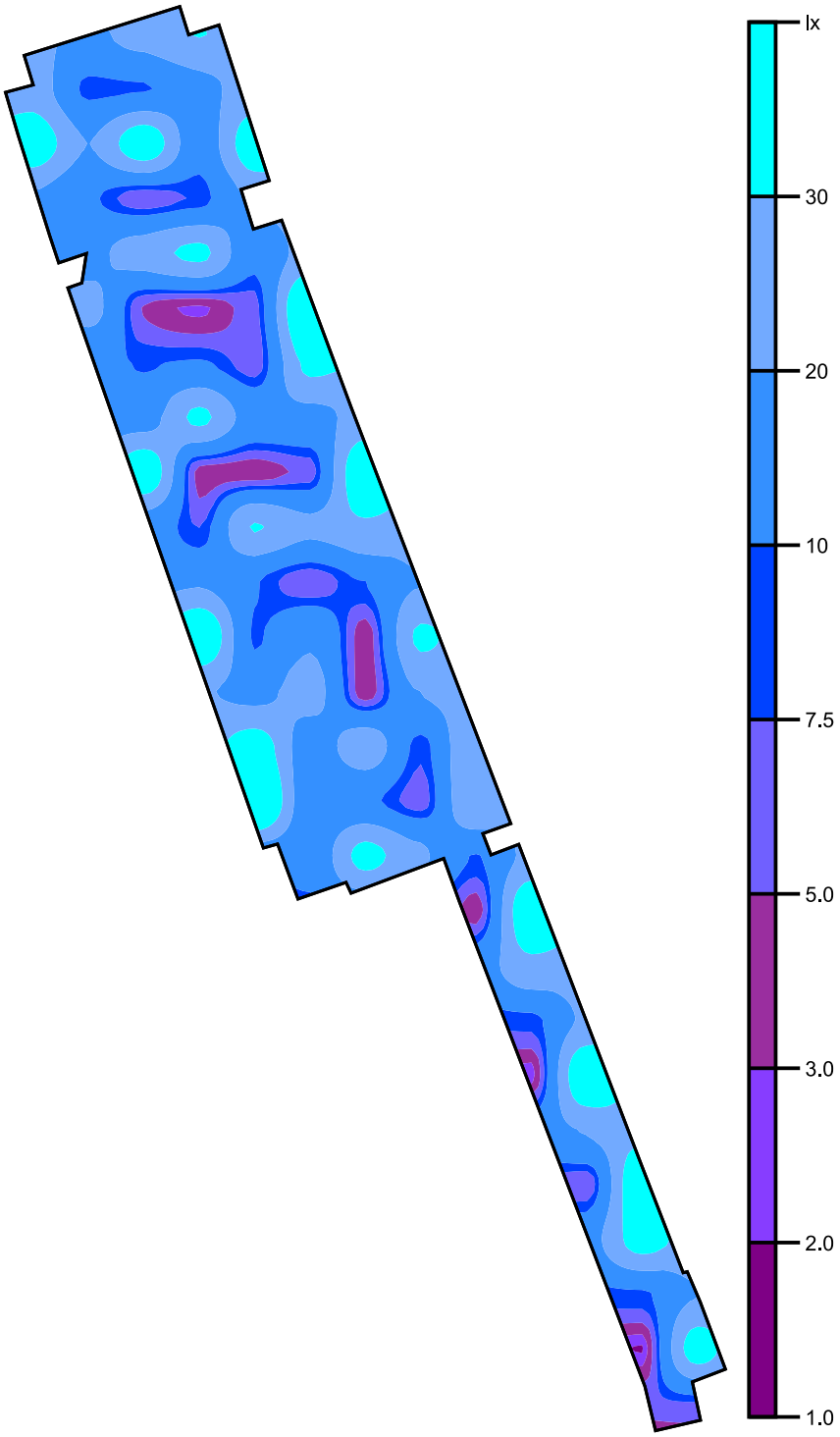
Calculation surface 1: Perpendicular illuminance (Grid)
Light scene: Light scene 1
Average: 19.3 lx, Min: 1.87 lx, Max: 47.3 lx, Min/average: 0.097, Min/max: 0.040
Height: 0.000 m

Isolines [lx]



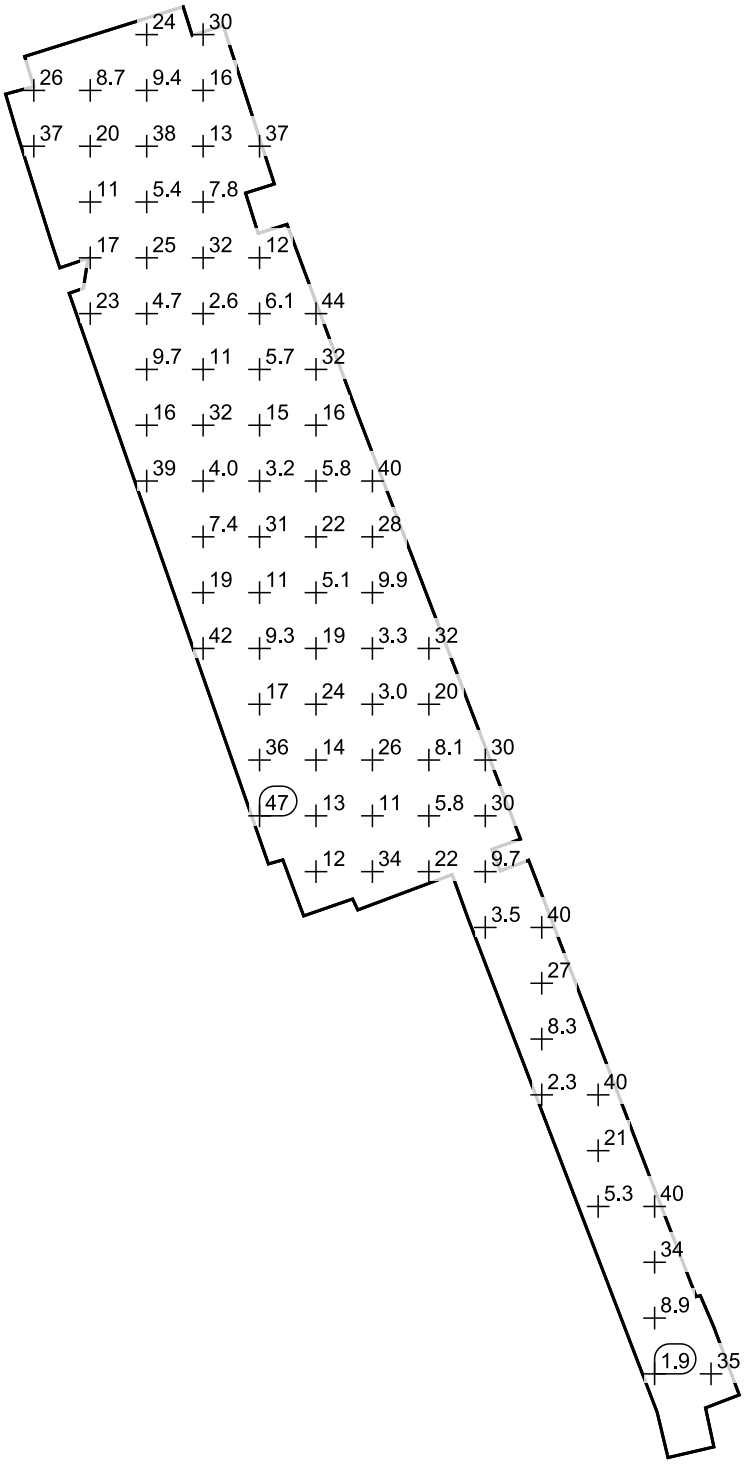
Scale: 1 : 1250

False colours [lx]



Scale: 1 : 1250

Value grid [lx]



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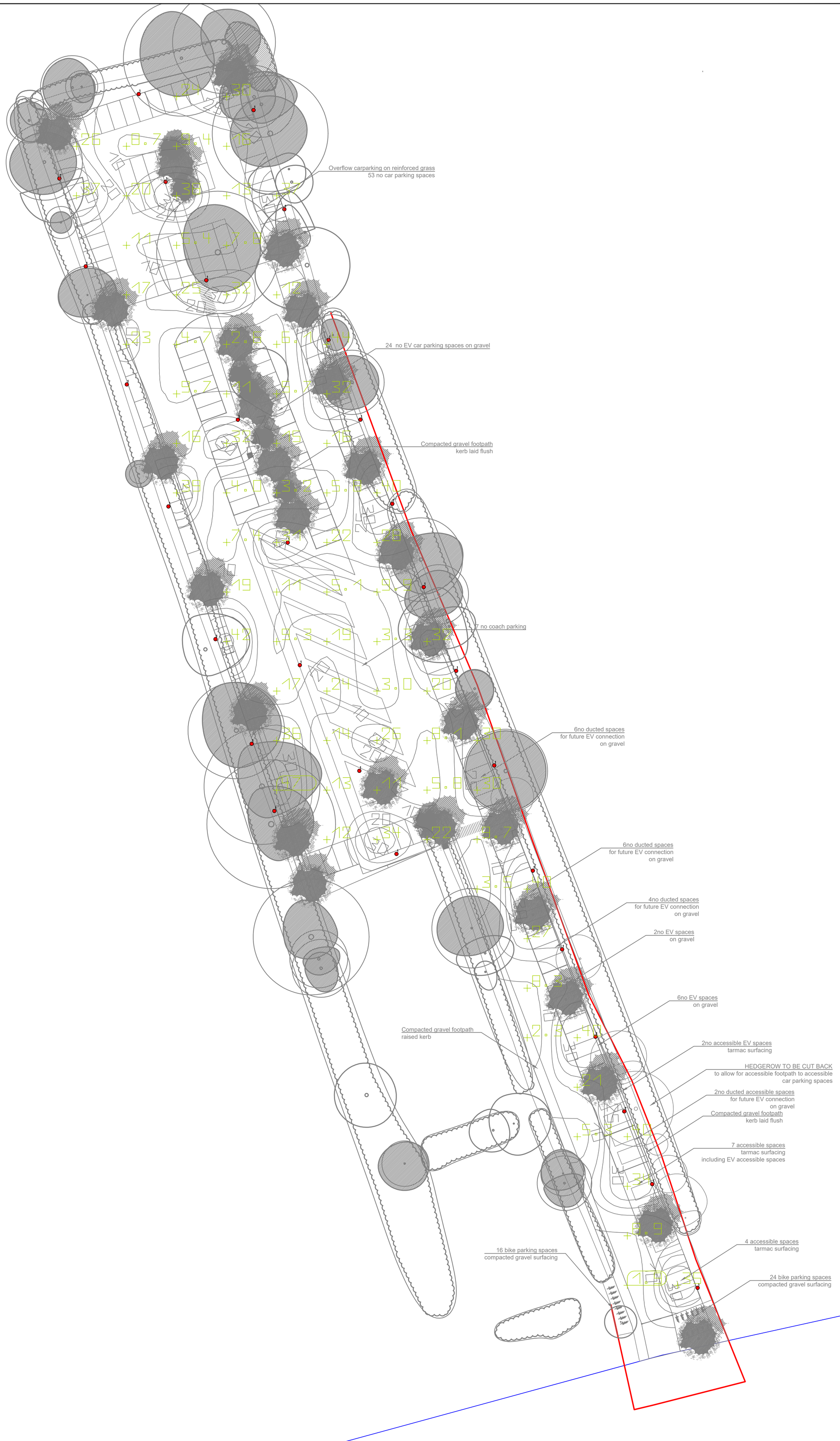

PUBLIC LIGHTING

1

Garrabridge - SLI.2.LA093.2S.W068 S-LINE
Streetlighting luminaire mounted on 6m columns.
Luminous emittance 1
Fitting: 1 x LED C.9000 Lumens
Absolute photometry
Luminaire luminous flux: 7809 lm
Power: 68.0W
Luminous efficacy: 114.8 lm/W
Colourimetric data:
1x: CCT 3000 K, CRI 100

Garrabridge - SLI.2

REV	DATE	DESCRIPTION	BY	APP
P03	13.09.24	ISSUED FOR PLANNING	SC	FF
P02	31.07.24	ISSUED FOR PLANNING	SC	FF
P01	22.07.24	ISSUED FOR PLANNING	SC	FF

PROJECT:
MOUNTSHANNON CARPARK

TITLE:
SITE LIGHTING LAYOUT

CLIENT:
CLARE COUNTY COUNCIL

MWP
ENGINEERING AND ENVIRONMENTAL CONSULTANTS
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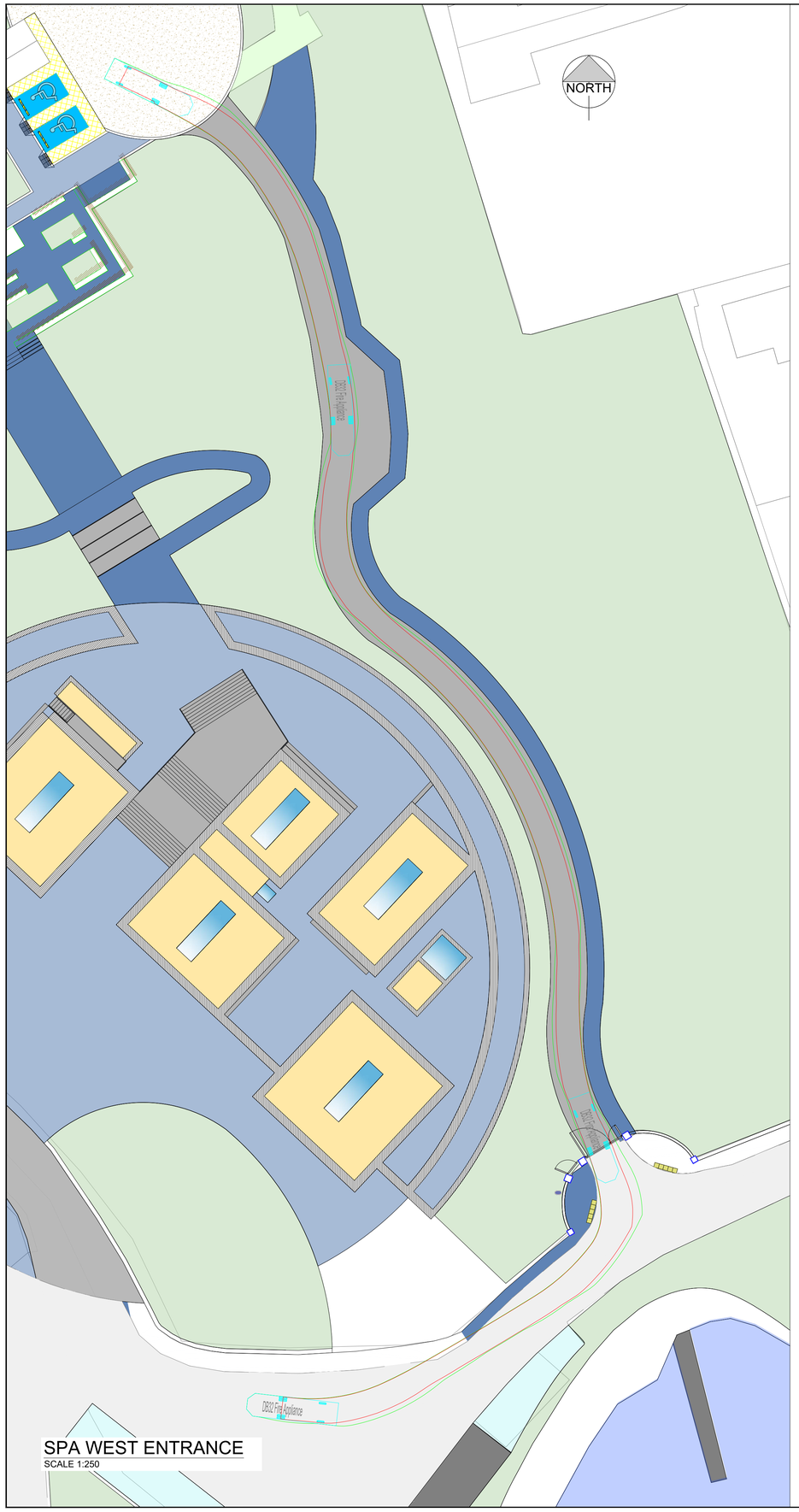
DRAWN:	CHECKED:	APPROVED:
SC	FF	FF
PROJECT NUMBER: 21760	DATE: 22.07.2024	SCALE @ A1: 1:350
STATUS DESCRIPTION: FOR INFORMATION		STATUS: S2

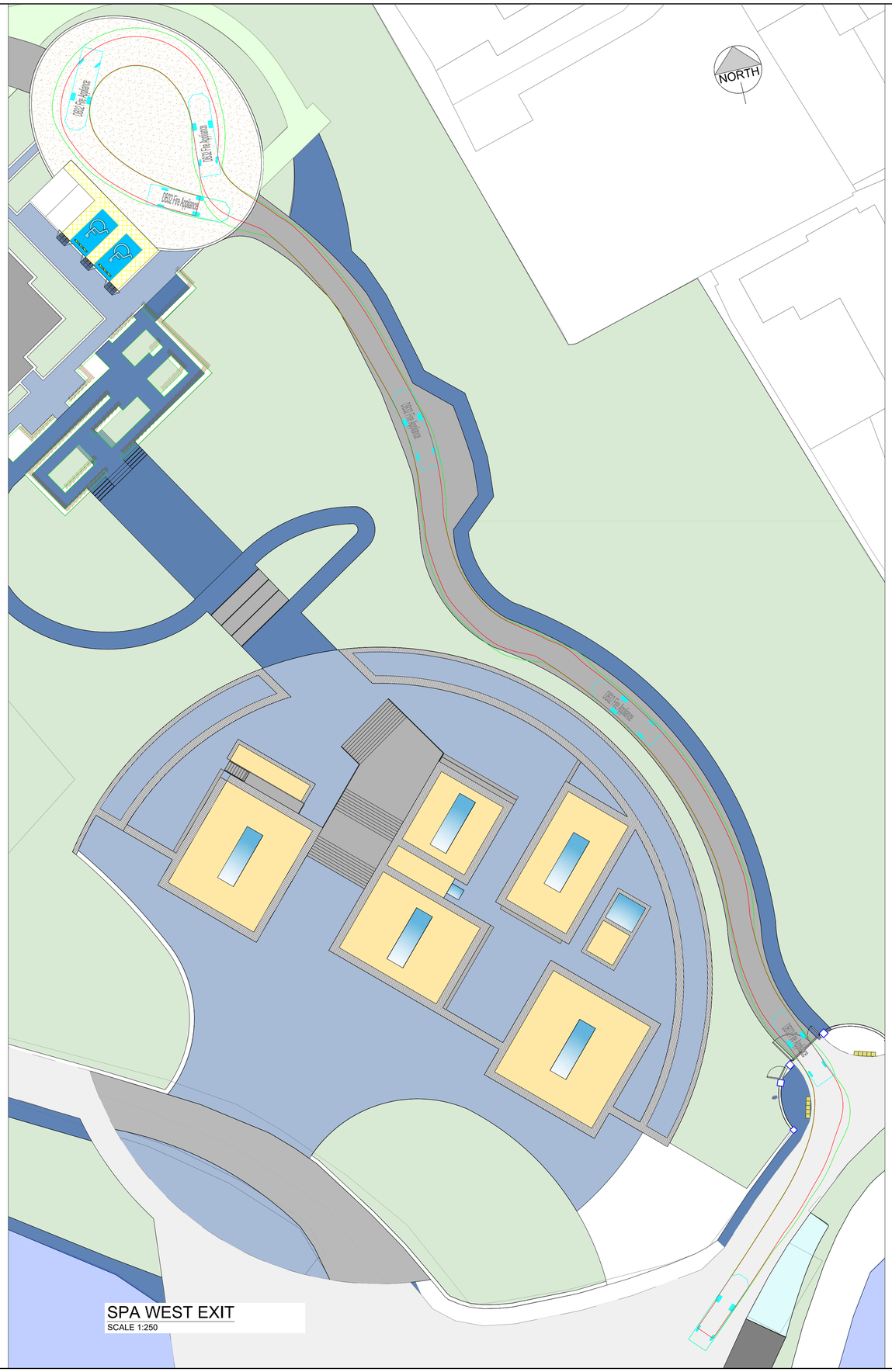
DRAWING NUMBER: 21760 - MWP - ZZ - ZZ - DR - E - 9100
REV: P02

Appendix G

Swept Path Analysis



SPA WEST ENTRANCE
SCALE 1:250



SPA WEST EXIT
SCALE 1:250

NOTES:

1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, BILLS OF QUANTITIES, ARCHITECTURAL, SERVICES AND ENGINEERING DRAWINGS.
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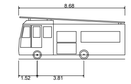
3. ALL DIMENSIONS ARE IN **MILIMETRES**, UNLESS NOTED OTHERWISE.
4. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
5. DRAWINGS ARE NOT TO BE SCALED.
6. AERIAL IMAGERY, WHEN USED, IS SOURCE FROM MICROSOFT MAPS THROUGH THE OPEN LICENSING AGREEMENT WITH AUTODESK

TRACKED VEHICLE



DB32 Fire Appliance	
Overall Length	8.680m
Overall Width	2.180m
Overall Body Height	3.452m
Min Body Ground Clearance	0.357m
Max Track Width	2.121m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	7.910m

GENERAL LEGEND

- PROPOSED ROAD
- EXISTING ROAD
- PROPOSED GRASS
- PROPOSED FOOTPATH
- PROPOSED CAR PARK
- PROPOSED BUILDING

SWEPT PATH ANALYSIS (SPA) LEGEND

- EXTENT OF BODY OUTLINE
- EXTENT OF WHEELBASE FOOTPRINT
- EXTENT OF VEHICLE OUTLINE

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	D.C.

PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

TITLE:
PROPOSED VISITORS CENTRE
FIRE TRUCK SWEPT PATH ANALYSIS
WESTERN APPROACH

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

MWP
ENGINEERING AND ENVIRONMENTAL CONSULTANTS
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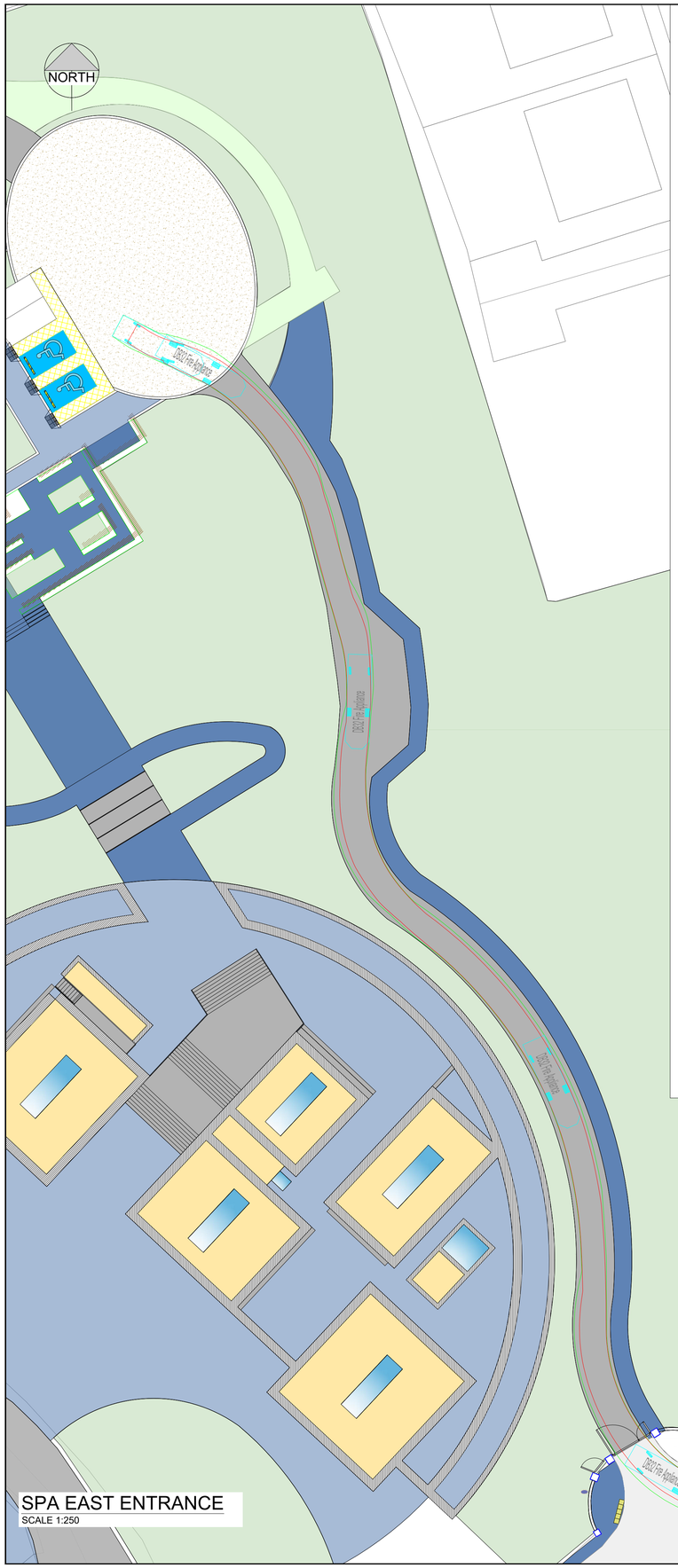
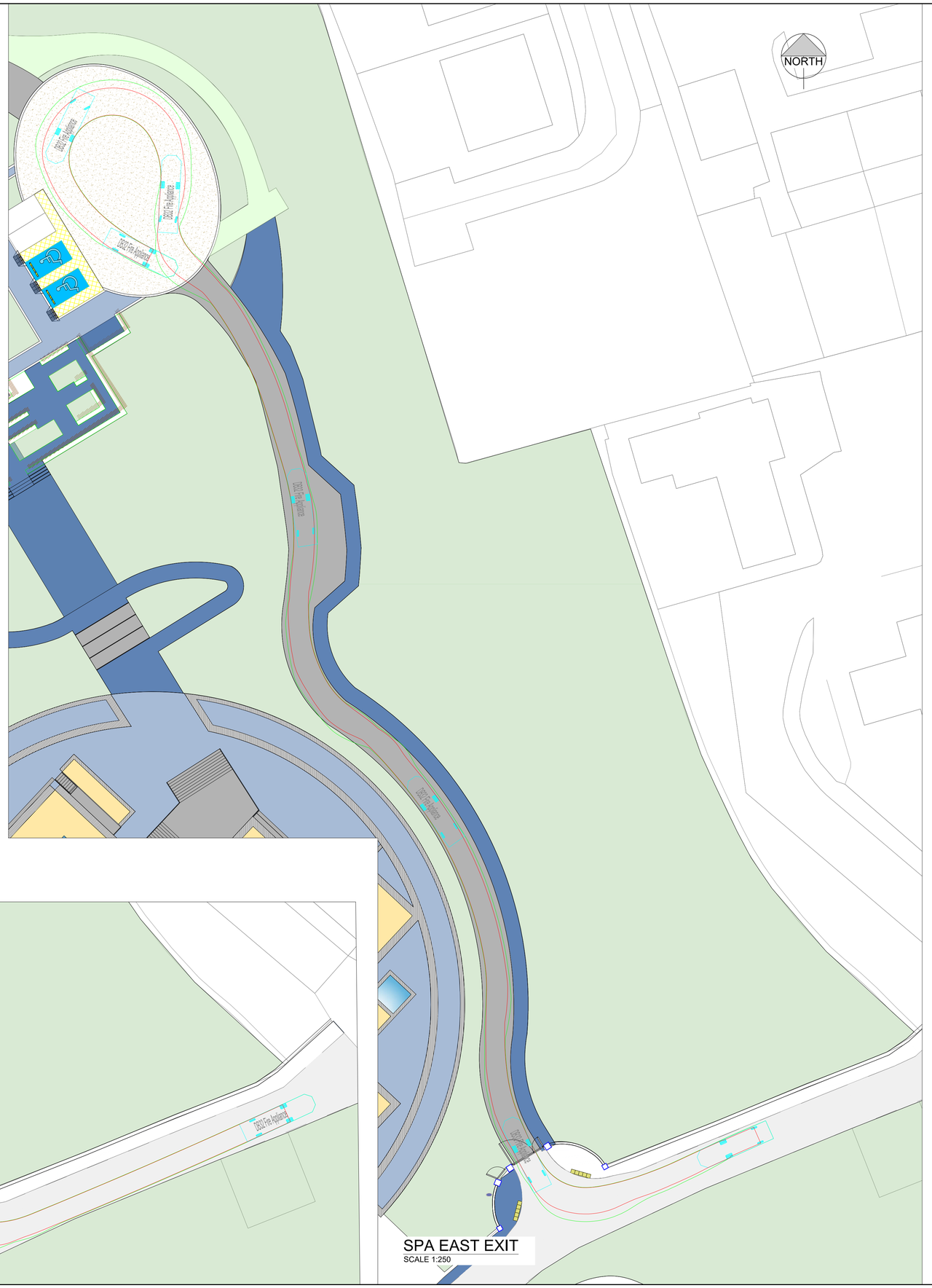
mwp.ie

DRAWN:	CHECKED:	APPROVED:
S.S.	D.C.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	SEP 24	1:250
STATUS DESCRIPTION:		STATUS:
FOR INFORMATION		S2
DRAWING NUMBER:		REV:
21760 - MWP - 00 - 00 - DR - C - 0150		P01



SPA EAST ENTRANCE
SCALE 1:250



SPA EAST EXIT
SCALE 1:250

DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS IN ALL CASES. VERIFY DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES TO THE DESIGNERS IMMEDIATELY.
THIS DRAWING TO BE READ IN CONJUNCTION WITH THE DESIGNERS SPECIFICATION.

NOTES:

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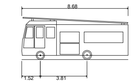
TRACKED VEHICLE



DB32 Fire Appliance	
Overall Length	8.680m
Overall Width	2.180m
Overall Body Height	3.452m
Min Body Ground Clearance	0.337m
Max Track Width	2.121m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	7.910m

GENERAL LEGEND

- PROPOSED ROAD
- EXISTING ROAD
- PROPOSED GRASS
- PROPOSED FOOTPATH
- PROPOSED CAR PARK
- PROPOSED BUILDING

SWEPT PATH ANALYSIS (SPA) LEGEND

- EXTENT OF BODY OUTLINE
- EXTENT OF WHEELBASE FOOTPRINT
- EXTENT OF VEHICLE OUTLINE

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	D.C.

PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

TITLE:
PROPOSED VISITORS CENTRE
FIRE TRUCK SWEPT PATH ANALYSIS
EASTERN APPROACH

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

MWP
ENGINEERING AND ENVIRONMENTAL CONSULTANTS
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mwp.ie

DRAWN:	CHECKED:	APPROVED:
S.S.	D.C.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	SEP 24	1:250
STATUS DESCRIPTION		STATUS:
FOR INFORMATION		S2
DRAWING NUMBER:		REV:
21760 - MWP - 00 - 00 - DR - C - 0151		P01

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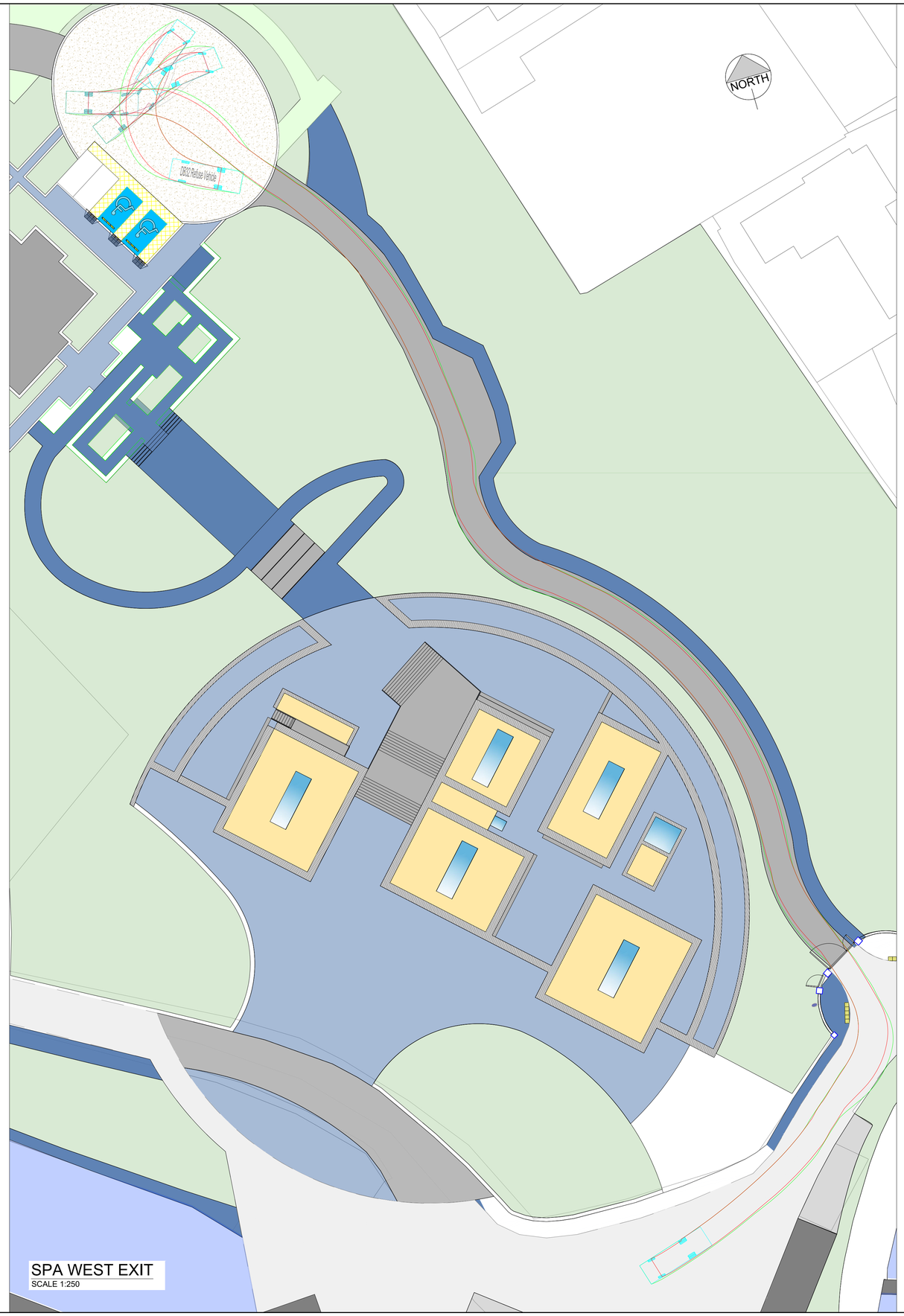
SCALE 1:250



SPA WEST EXIT
SCALE 1:250

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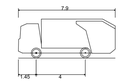
TRACKED VEHICLE



DB32 Refuse Vehicle	
Overall Length	7.900m
Overall Width	2.400m
Overall Body Height	3.183m
Min Body Ground Clearance	0.388m
Max Track Width	2.400m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	9.625m

GENERAL LEGEND

- PROPOSED ROAD
- EXISTING ROAD
- PROPOSED GRASS
- PROPOSED FOOTPATH
- PROPOSED CAR PARK

SWEPT PATH ANALYSIS (SPA) LEGEND

- EXTENT OF BODY OUTLINE
- EXTENT OF WHEELBASE FOOTPRINT
- EXTENT OF VEHICLE OUTLINE

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	D.C.

PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

TITLE:
PROPOSED VISITORS CENTRE
REFUSE TRUCK SWEPT PATH ANALYSIS
- WESTERN APPROACH

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

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S.S.	D.C.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	SEP 24	1:250
STATUS DESCRIPTION:		STATUS:
FOR INFORMATION		S2
DRAWING NUMBER:		REV:
21760 - MWP - 00 - 00 - DR-C - 0155		P01

NOTES:

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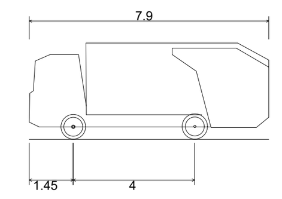
7. REPRODUCED FROM THE ORDNANCE SURVEY BY PERMISSION OF THE GOVERNMENT. LICENSE No. EN 0015717.

TRACKED VEHICLE



DB32 Refuse Vehicle	
Overall Length	7.900m
Overall Width	2.400m
Overall Body Height	3.183m
Min Body Ground Clearance	0.388m
Max Track Width	2.400m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	9.625m

GENERAL LEGEND

- PROPOSED ROAD
- EXISTING ROAD
- PROPOSED GRASS
- PROPOSED FOOTPATH
- PROPOSED CAR PARK

SWEPT PATH ANALYSIS (SPA) LEGEND

- EXTENT OF BODY OUTLINE
- EXTENT OF WHEELBASE FOOTPRINT
- EXTENT OF VEHICLE OUTLINE

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	D.C.

PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

TITLE:
PROPOSED VISITORS CENTRE
REFUSE TRUCK SWEPT PATH ANALYSIS
EASTERN APPROACH

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

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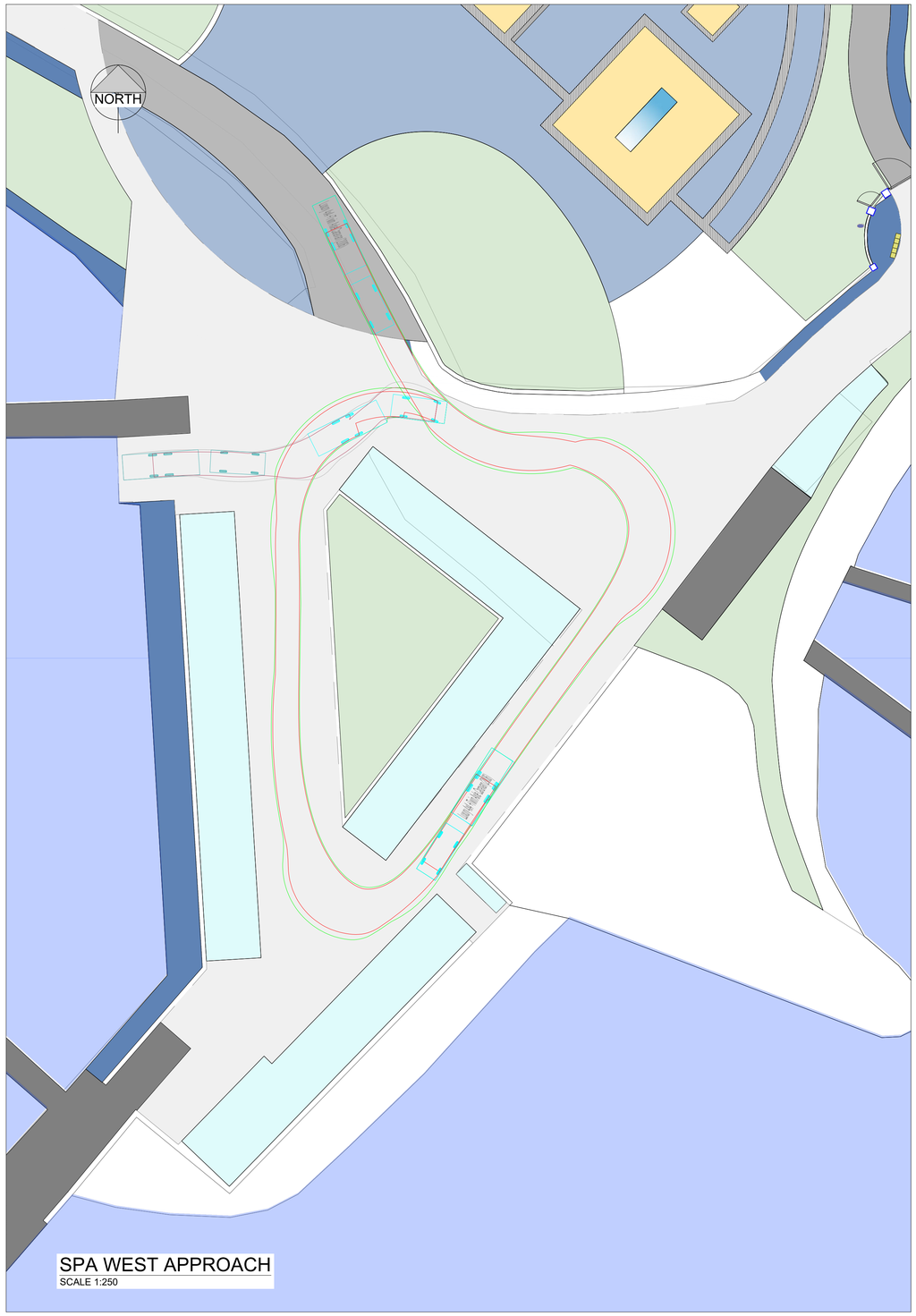
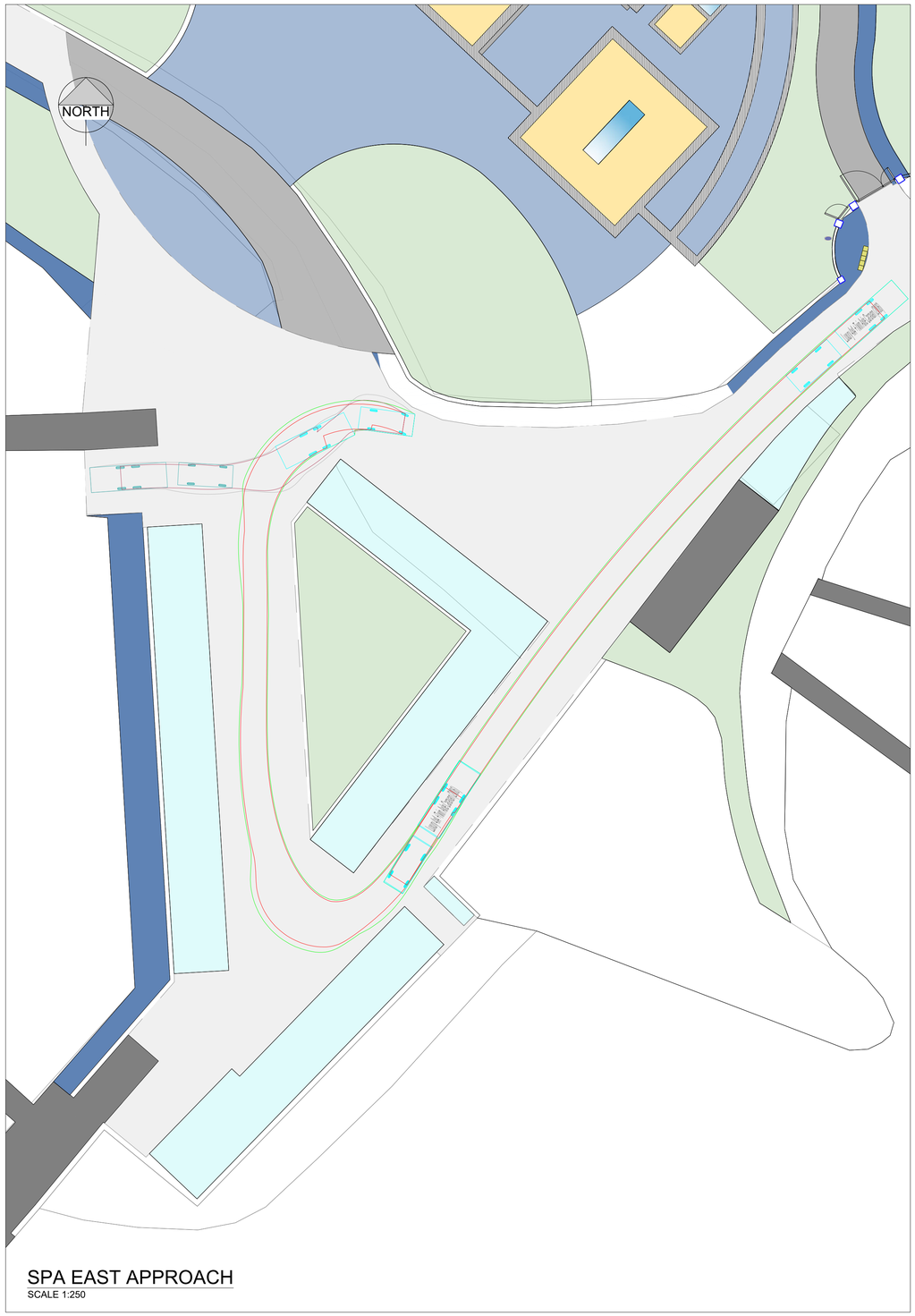
DRAWN:	CHECKED:	APPROVED:
S.S.	D.C.	I.B.
PROJECT NUMBER: 21760	DATE: SEP 24	SCALE @ A1: 1:250

STATUS DESCRIPTION: FOR INFORMATION — STATUS: S2

DRAWING NUMBER: 21760 - MWP - 00 - 00 -DR-C- 0156 — REV: P01



SPA WEST APPROACH
SCALE 1:250



SPA EAST APPROACH
SCALE 1:250

NOTES:

1. DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS IN ALL CASES.
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4. © THIS DRAWING IS COPYRIGHT AND MAY ONLY BE REPRODUCED WITH THE DESIGNERS PERMISSION.
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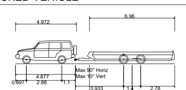
TRACKED VEHICLE



Luxury 4x4 +Twin Axle Trailer (2006)	
Overall Length	12.990m
Overall Width	2.286m
Overall Body Height	2.524m
Min Body Ground Clearance	0.251m
Max Track Width	2.130m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.800m

GENERAL LEGEND

- PROPOSED ROAD
- EXISTING ROAD
- PROPOSED GRASS
- PROPOSED FOOTPATH
- PROPOSED CAR PARK

SWEPT PATH ANALYSIS (SPA) LEGEND

- EXTENT OF BODY OUTLINE
- EXTENT OF WHEELBASE FOOTPRINT
- EXTENT OF VEHICLE OUTLINE

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	D.C.

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PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

TITLE:
HARBOUR PARK RECONFIGURATION
SWEPT PATH ANALYSIS

DRAWN:	CHECKED:	APPROVED:
S.S.	D.C.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A1:
21760	SEP 24	AS SHOWN

STATUS DESCRIPTION: FOR INFORMATION — STATUS: S2

DRAWING NUMBER: 21760 - MWP - 00 -HC-DR-C- 0152 — REV: P01

NORTH

Mountshannon

Baile Uí

Bheoláin

NOTE:
REFER TO ARCHITECTS DRAWINGS
FOR REDLINE BOUNDARY

NOTES

GENERAL NOTES

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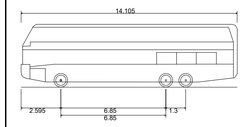
3. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE
4. ALL LEVELS ARE IN METRES RELATED TO ORDNANCE DATUM.
5. DRAWINGS ARE NOT TO BE SCALED

LEGEND



Van Hool TDX27	
Overall Length	14.105m
Overall Width	2.550m
Overall Body Height	4.104m
Min Body Ground Clearance	0.343m
Track Width	2.550m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	11.950m

GENERAL LEGEND

- PROPOSED ROAD
- EXISTING ROAD
- PROPOSED GRASS
- PROPOSED FOOTPATH
- PROPOSED CAR PARK

SWEPT PATH ANALYSIS (SPA) LEGEND

- EXTENT OF BODY OUTLINE
- EXTENT OF WHEELBASE FOOTPRINT
- EXTENT OF VEHICLE OUTLINE

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	I.B.

PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

TITLE:
VILLAGE CAR PARK
BUS SWEPT PATH ANALYSIS
EASTERN APPROACH

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

MWP
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S.S.	D.C.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A0:
21760	SEP 24	1:500
STATUS DESCRIPTION:		STATUS:
FOR INFORMATION		S2
DRAWING NUMBER:		REV:
21760 - MWP - 00 -VC-DR-C- 0153		P01

NORTH

Mountshannon

Baile Uí

Bheoláin

NOTE:
REFER TO ARCHITECTS DRAWINGS
FOR REDLINE BOUNDARY

NOTES

GENERAL NOTES

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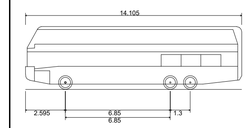
5. DRAWINGS ARE NOT TO BE SCALED

LEGEND



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GENERAL LEGEND

- PROPOSED ROAD
- EXISTING ROAD
- PROPOSED GRASS
- PROPOSED FOOTPATH
- PROPOSED CAR PARK

SWEPT PATH ANALYSIS (SPA) LEGEND

- EXTENT OF BODY OUTLINE
- EXTENT OF WHEELBASE FOOTPRINT
- EXTENT OF VEHICLE OUTLINE

REV	DATE	DESCRIPTION	BY	APP
P01	22/11/24	ISSUED FOR INFORMATION	S.S.	D.C.

PROJECT:
INIS CEALTRA VISITOR TOURISM EXPERIENCE PROJECT

TITLE:
VILLAGE CAR PARK
BUS SWEPT PATH ANALYSIS
WESTERN APPROACH

CLIENT:
COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

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DRAWN:	CHECKED:	APPROVED:
S.S.	D.C.	I.B.
PROJECT NUMBER:	DATE:	SCALE @ A0:
21760	SEP' 24	1:500

STATUS DESCRIPTION: FOR INFORMATION
STATUS: S2

DRAWING NUMBER: 21760 - MWP - 00 -VC-DR-C- 0154
REV: P01