DOSA

DENIS O'SULLIVAN & ASSOCIATES

CONSULTING ENGINEERS

RESIDENTIAL DEVELOPMENT, CARRIGANARRA, BALLINCOLLIG, CORK

INFRASTRUCTURE REPORT

DATE 28/06/2023

REVISION 1

JOB NO. 4208

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DOCUMENT CONTROL

PROJECT NAME: Residential Development, Carriganarra, Ballincollig, Cork

PROJECT NUMBER: 4208

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Contents

1 Introduction

Denis O'Sullivan & Associates were engaged as Consulting Engineers for the proposed Phase 3 Development at Heathfield, Carriganarra, Ballincollig, Co. Cork

The proposed development consists of the construction of 42 no. 3 bedroom semi-detached dwelling houses, 14 no. 3 bedroom townhouses, 14 no. 2 bedroom townhouses and all ancillary site works at Heathfield, Carriganarra, Carrigrohane, Ballincollig, Co. Cork.

The proposed development will be an extension to the residential development known as Heathfield and which is currently under construction with access provided via the junction from the Killumney Road and internal road network which was permitted by Cork County Council Governing Planning References 15/06813 & 17/04270.

The current proposal will comprise of the residential units and all ancillary service infrastructure. This report has been compiled to deal with the availability of services relating to the proposed development.

Denis O'Sullivan & Associates (DOSA) carried out a number of site investigations and their findings have been incorporated to deal with solutions to:

- Surface Water Drainage Network
- Foul Drainage Network
- Stormwater Management Plan - Storm Water Attenuation & Disposal
- Water Supply

The layout and design of the services also takes consideration of the parameters and design considerations as per the GDSDS Code of Practice.

1.1 Site Location

The subject site (currently greenfield) is located approximately 8.0km southeast of Cork City Centre in Carriganarra on the southern side of Ballincollig to the south of the Link Road. The site is a brownfield site characterised by its undulating topography and its even slope rising at the southern end. The Killumney Link Road runs along the site's northern edge, the Poulavone Link to the east and the existing residential Heathfield development to the west.

A snapshot of the application boundary is outlined in Figure 1 below.

Figure 1 – Context Map

1.2 Proposed Development

The proposed development consists of the construction of 42 no. 3 bedroom semi-detached dwelling houses, 12 no. 3 bedroom townhouses, 16 no. 2 bedroom townhouses and all ancillary site works at Heathfield, Carriganarra, Carrigrohane, Ballincollig, Co. Cork.

The proposed development will be an extension to the residential development known as Heathfield and which is currently under construction with access provided via the junction from the Killumney Road and internal road network which was permitted by Cork County Council Governing Planning References 15/06813 & 17/04270.

The current proposal will comprise of the residential units and all ancillary service infrastructure. This report has been compiled to deal with the availability of services relating to the proposed development.

2 *Surface Water Management*

2.1 Surface Water Design

In order to reduce the effects of the surface runoff on potential flooding, a Stormwater Management Plan will be applied to surface water discharges into sewers and adjacent watercourses. The Stormwater Management Plan can be applied to control the rate of runoff from new development.

The stormwater network on the adjacent Heathfield estate which bounds the site to the west is expected to provide suitable surface water discharge point for the proposed development.

The attenuation strategy for the site was the detention of flows in the form of underground tanks. These tanks have been granted permission in Phase 2 and these tanks haze been sized to cater for the loading from the Phase 3 development.

The proposed surface water drainage network will collect surface water runoff from the site via a piped network prior to discharging off site via attenuation tanks, flow control devices and separator arrangement as noted above. Surface water runoff from the site's road network will be directed to the proposed pipe network via conventional road gullies with additional surface water runoff from driveways and roofs also routed to the proposed surface water pipe network.

2.2 Compliance with GDSDS Surface Water Drainage Policy

The site's surface water management infrastructure has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). The GDSDS (Vol. 2, Chapter 6.3.4) requires that the following design criteria are applied to all sites:

Criterion 1: River Water Quality Protection

Satisfied by providing attenuation storage and treatment of run-off within the SUDS features. This is satisfied using, petrol interceptors and underground Stormtech storage systems.

Criterion 2: River Regime Protection

Satisfied by attenuating surface water run-off in association with flow control devices prior to discharge off site at Greenfield runoff rate. Site critical duration storm used to assess attenuation volume.

Criterion 3: Level of Service (Flooding) for the Site

Satisfied by reviewing available flood hazard information (e.g. Lee CFRAM Study as outlined in the Appendices) relating to the site's proximity to tidal and fluvial flood plains (up to 1 in 100-year flood event).

Criterion 4: River Flood Protection

Satisfied by attenuating surface water discharge to greenfield runoff rates, addressing flood risk associated with the 1 in 100-year storm and avoiding development in flood plains.

It should be noted that the underlying geology is of a karst nature and as a result concentrated areas of infiltration are to be avoided. As a result, many nature based Suds Recommendations are unsuitable for implementation in this site.

Following a comprehensive review of the design of the storm water drainage system we considered all options under the SuDS guidance policies referred to in the Greater Dublin Drainage Strategy. A preliminary feasibility of the applicable SuDS Techniques was carried out using the facility on the website of Irishsuds.ie (Guidance and Tools). The preliminary analysis indicated that the following techniques were possibly suitable Attenuation Tanks, Basins, Permeable Paving, Soakaways, Swales and Rainwater Harvesting.

Each proposal was examined and evaluated on its merits / suitability under site specific constraints for use in the proposed development site. Our design approach summary is as follows:

2.3 SuDS Appraisal

It is proposed to use a sustainable urban drainage system (SuDS) approach to stormwater management throughout the site. The overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes, and frequency, reducing pollutant concentrations in stormwater, contributing to amenity, aesthetics and biodiversity enhancement and allow for the maximum collection of rainwater for re-use where possible. In addition, SuDS features should aim to replicate the natural characteristics of rainfall runoff for any site by providing control of run-off at source. SuDS are a requirement of Council under their 'Regional Code of Practice for Drainage Works' and 'The Greater Dublin Strategic Drainage Study.' Additionally, these systems are recommended under the 2009 guidelines, 'The Planning System and Flood Risk Management'.

2.3.1 Swales (wet)

Broad, shallow drainage channels covered in grass which can treat, convey, and attenuate runoff, at source, and can infiltrate to the ground where the subgrade is suitable. Swales can also promote biodiversity. Deemed not suitable due to increased concentrated level of infiltration not being hydrologically recommended in karst areas.

2.3.2 Tree Pits

Trees can be planted within a range of infiltration SuDS components to improve their performance, as root growth and decomposition increase soil infiltration capacity. Alternatively, they can be used as standalone within soil-filled tree pits, tree planters or structural soils, collecting and storing runoff and providing treatment via filtration and phytoremediation. Tree pits and planters will be designed to collect and attenuate runoff by providing additional storage within the underlying structure. The soils around trees can also be used to filter out pollutants from runoff directly. Tree pits are proposed to be in green space areas to treat and control runoff, while at the same time providing amenity value to adjacent pedestrian, and residential zones. It is also proposed, where possible to fit tree pits along the estate road to drain and treat surface water runoff from the road network. This will allow for treatment of first flush and low flows while high flows will discharge into the surface water network during extreme rainfall events. Rain water gullies will still be provided downstream of any tree pit to drain runoff during an extreme rainfall event.

2.3.3 Filter Drain

Trenches filled with permeable material and a perforated collection pipe at the invert with an optional permeable 'sandy' topsoil at surface. These can treat, convey, and attenuate runoff at source, and can infiltrate to the ground where the subgrade is suitable. These systems will allow some form of storage for small rainfall events and can result in water evaporation and adsorption. Deemed not suitable due to increased concentrated level of infiltration not being hydrologically recommended in karst areas.

2.3.4 Attenuation Tanks

The proposed attenuation system attenuates surface water to restrict the outflow to the equivalent of the existing agricultural runoff. This ensures the development will not give rise to any impact downstream of the site. It is proposed to use Stormtech attenuation units used in the adjacent Heathfield estate. These are a proprietary modular arch structure with a maintenance/inspection tunnel for providing underground surface water attenuation storage. These systems will be impermeable (tanked) and no infiltration of the runoff to the ground is proposed. This will be reconsidered following site investigation prior to construction. These systems will be used under 3 no. large open spaces within the development. They will be enclosed with crushed angular rock and wrapped in a non-woven geotextile or specified liner which will prevent root invasion. The proposed systems have more than 1.2m cover with trees planted above chosen for their accommodating root depth. With adequate soil cover, trees can be planted and play equipment installed in these open spaces.

2.3.5 Flow Control Device

It is proposed to provide a hydrobrake, or similar approved, at the outfall of the surface water catchment to restrict the outflow of water from the subject site. The hydro-brakes will be fitted with a pull cord bypass and a penstock valve installed on the inlet to the manhole for maintenance purposes.

2.3.6 Petrol Interceptor

It is proposed to provide a petrol interceptor upstream of the attenuation tanks to ensure that any remaining hydro-carbons or pollutants within the runoff from trafficked areas are treated prior to outfall to the existing watercourse. It is proposed to provide a Conder Bypass Separator Types or similar approved.

In conclusion the water quality from this catchment should be of a high quality due to the above-mentioned measures, which are applied in a treatment train to treat the water before discharge at a restricted rate to the local network.

The above measures ensure a suitable management train is provided.

2.3.7 Management Train

The management train commences with source control through the provision of localised tree pits which will assist in reducing the peak runoff rate, placing less stress on the facilities downstream.

The second stage of the management train, site control, is provided by the introduction of the hydrocarbon interceptors, which provide a degree of treatment before discharging to the attenuation system.

The attenuation tanks offer a third stage of treatment, regional control, by slowing the storm water discharge down and removing additional silts which may remain in the storm water.

2.4 Maintenance Regime for SuDS Devices

The SuDS features proposed above for the site will require the following maintenance:

2.4.1 Hydrobrake Manhole:

Normally little maintenance is required as there are no moving parts within a hydrobrake, however, after installation, hydrobrakes should be inspected to ensure the hydrobrake orifice is not blocked on a monthly basis for three months and thereafter at six monthly intervals and hosed down if required. Remove rubbish or debris from hydrobrake if present. Hydro-Brake Flow Controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur.

2.4.2 Petrol Interceptor/ Attenuation Tanks

Systems should be visually inspected for every rainfall event for 30 days after installation and the amount of sediment measured to give the operator an idea of the expected rate of deposition. Systems should then be inspected every 6 months to verify the appropriate level of maintenance. Floating debris and solids should be removed and the sump cleaned with a conventional sump vacuum cleaner. Filter media should be replaced and sediments, oils and grease should be removed where required.

The permeable paving has a design life equivalent to standard block paving. The surface blocks require routine maintenance. There are four levels of cleaning that can be carried out on a paved area:

- General dirt should be removed by regular dry brushing.
- Where the paving has become dull, showing a loss of colour, a wet wash with a stiff bristle brush and garden hose can be adequate.
- For more stubborn areas a power washer can be used, taking care not to remove the jointing materials (sand or mortar). The washer should be on a medium pressure setting or lower, and should not be aimed directly at the paving surface, but at an angle of 30° approximately.

Cleaning detergents can be used; however, some detergents are acidic and overuse can damage some paving products. It is advisable to follow the manufacturer's instructions and rinse the areas fully. The resulting runoff should be carefully channelled to either drainage points or containers from where it can be safely disposed. Replace any washed-out jointing sand with new dried sand once the paving has dried.

The attenuation tanks will require regular maintenance to ensure continuing operation to design performance standards.

2.5 Flood Risk

A search for recorded flood events near the subject site was carried out using the OPW's website, www.floodmaps.ie and using a general internet search. The OPW floodmaps.ie website provides information on recorded flood events nationwide. Refer to Figure 2 below for an extract of the OPW www.floodmaps.ie recorded flood incidences for the area. A search of the subject site does not show any instances of historic flooding within the subject site but there is flooding in areas closer to the site. A copy of the relevant flood results for the area in question is included in Appendix B.

Figure 2– Floodmaps.ie Map

2.6 Existing Flood Studies

2.6.1 CFRAM Study

The OPW, as lead agency for flood risk management in Ireland, is producing Flood Risk Management Plans (FRMP), in line with National Flood Policy and the requirements of the EU Floods Directive. Draft FRMP's are currently being produced by the OPW under the CFRAM Study. The Draft FRMP's make use of the information provided through the flood maps that have previously been produced under the CFRAMS Programme and previous parallel projects. The Draft FRMP's set out a range of proposed measures and actions to manage and reduce flood risk within the catchments and coastal reaches covered by each Draft Plan, focusing on the 300 areas of potentially significant flood risk

around Ireland that were identified under the PFRA. The Flood Maps associated with the FRMP's are currently being finalised and will be made available online to view when the Draft Plans are published for consultation. The subject lands lie outside the CFRAM Mapping but are contained in the existing available Flood Mapping. Database.

Figure 3.0 below is an extract from the flood extent map highlighting the flood extent in the vicinity of the proposed development site. The map shows that the flood extent of the relevant watercourses does not extend to the proposed development site and demonstrates that the site lies outside of the 0.1% Fluvial AEP event and is therefore located within Flood Zone C.

The detailed topographical and level survey would also indicate that the natural levels of the proposed development site provide significant freeboard to protect the said lands from adjoining lands

Figure 3.0– Lee CFRAM Fluvial Map

2.6.2 Drainage Study for Maglin Urban Expansion Area

Cork City Council has commissioned a Drainage Study for the Maglin Urban Expansion Area. The findings of the Drainage Study indicate that the potential for flood risk in this area are nominally more pronounced than previously indicated when the lands were last surveyed as part of the Lee Catchment Flood Risk Assessment and Management Study in 2010. Figure 3.1 below is an extract from the final report with ethe subject site highlighted. As can be seen no development is proposed in any lands at risk of flooding.

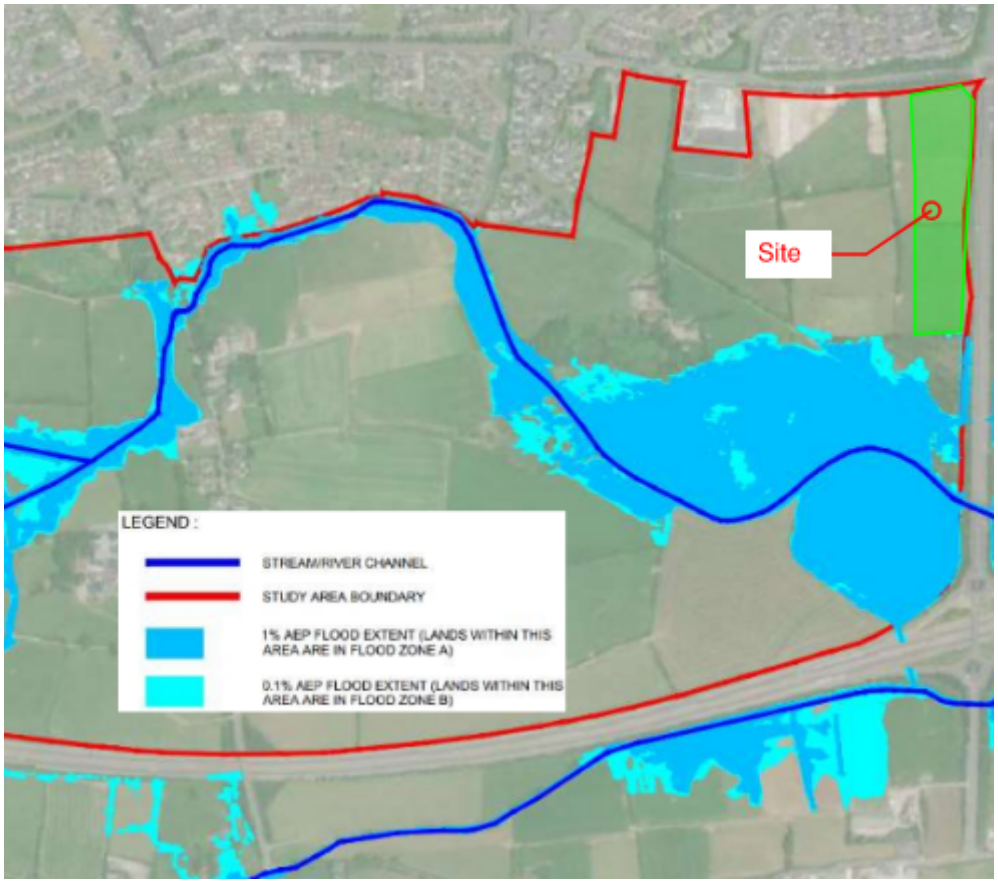


Figure 3.1: Extract from Drainage Study for Maglin Urban Expansion Area

2.7 Surface Water System

The existing stormwater infrastructure serving the adjoining phases bounds the site to the east. It is proposed to discharge the restricted stormwater flows from the development to this network as per engineering documentation. (Refer to DOSA Drawing No. 4208-0321).

In order to reduce the effects of the surface runoff on potential flooding, a Stormwater Management Plan will be applied to surface water discharges into adjacent watercourses. The Stormwater Management Plan can be applied to control the rate of runoff from new development. The maximum permitted surface water outflow from the new development is to be restricted to that of the existing Greenfield site by the usage of attenuation storage.

Control of runoff by attenuation methods requires a hydraulic control to restrict the magnitude of flows passing downstream, together with an upstream storage capacity to contain the volume of runoff held back by the hydraulic control. The flows are proposed to be attenuated in the surface water system by adopting a flood storage attenuation tanks along with restricted outlets as the control devise. The storage volume required has been designed using the computer aided design package Windes 10.4.

The attenuation strategy for the site is for the detention of flows in interlinked attenuation tanks.

2.8 Surface Water Drainage Network

The surface water drainage network for the proposed development was modelled using the Microdrainage software application. The surface water pipe lengths, slopes, contributing impermeable areas, upstream invert levels, upstream cover levels and pipe diameters were entered into the model using the drawings supplied. Appendices C, D & F show the proposed surface water drainage network layout, pipe and manhole numbering.

2.9 Design Criteria:

The proposed surface water drains have been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the Department of the Environment's Recommendations for Site Development Works for Housing Areas, the Department of the Environment's Building Regulations "Technical Guidance Document Part H Drainage and Waste Water Disposal" and BS EN 752: 2008 Drain and Sewer Systems Outside Buildings.

- Return period for pipe work design 2 years
- Return period for attenuation design 100 years
- Soil Type 2
- Allowable Outflow 10.20 l/sec
- Time of entry 5 minutes
- M5 – 60 18.80 mm
- Ratio "r" 0.25
- Pipe Friction (Ks) 0.6 mm
- Minimum Velocity (based on pipe flowing full) 1.0 m/s
- Rainfall Runoff from Roads and Footpaths 100%
- Rainfall Runoff from Roofs 80%
- Rainfall Runoff from Driveways 80%
- Rainfall Runoff from Green Areas 20%
- Rainfall Depth Factored for Climate Change (as per GDSDS) 20%

(in accordance with GDSDS Volume 2, Chapter 6, Table 6.2 – see below)

Climate Change Category	Characteristics
River flows	20% increase in flows for all return periods up to 100 years
Sea level	400+mm rise (see Climate Change policy document for sea levels as a function of return period)
Rainfall	10% increase in depth (factor all intensities by 1.1)
	Modify time series rainfall in accordance with the GDSDS climate change policy document

Table 6.2 Climate Change Factors to be Applied to Drainage Design

The global variables required for the model were the M5-60 and Rainfall Ratio. These two factors may be read from maps contained in the Wallingford procedure. They enable the program to calculate the intensity, duration and frequency characteristics of storms.

M5-60 is the rainfall depth based on a 60-minute storm of 5 years return period. Ratio R is the ratio of the 60-minute storm to the 2-day storm for the 5-year return period events. These values are as follows:

- M5-60 = 18.80mm
- Ratio R = 0.25

Microdrainage generates design storms using the principles set out in the Flood Studies Report (NERC 1975).

A summer rainfall profile was used for the design of the pipework and a winter rainfall profile was used for the design of the storm water attenuation to give the critical design. A summer profile gives higher rainfall intensities and results in higher runoff rates and is used to determine the required capacity of the pipework. A winter rainfall profile gives a flatter more sustained profile and results in higher runoff volumes and is used to determine the attenuation/storage requirements.

The surface water drainage network was assessed for compliance with maximum and minimum velocities, pipe length etc. The network was designed to ensure velocities in the network and pipe gradients did not exceed the maximum velocity of 4.0m/s. The minimum velocity allowed was 1.00m/s.

The design of the drainage network was assessed using events with a range of different durations to determine the critical event for each return period analysed as follows:

- 1 in 2-year return period events were used to ensure that the system did not surcharge;
- 1 in 100 year return period events were used to ensure that flooding did not occur.
- The layout of the proposed foul sewer network is shown on the Proposed Stormwater & Foul Sewer Layout Plans

The proposed network will connect into the surface water network for Phase 2 as granted planning under Planning Reg. No. 17/04270. There are a number of connection points.

The flood peak runoff from area was catered for in the catchment area of the original planning with an Stormwater Attenuation Strategy

2.10 Construction & Operational Stage Run-Off

Both construction and operational phase surface-water drainage from the proposed development site will ultimately discharge into the adjacent stormwater network in the adjoining Heathfield estate. Where surface-water run-off occurs at the site during the construction phase, it will be managed and controlled prior to discharge into the environment by implementing standard environmental controls. Temporary banks shall be in place to ensure that runoff is directed to a temporary detention pond which shall be provided to reduce the amount of silt in the run-off. The location of these banks and temporary detention ponds will be indicated and confirmed in a Construction Stage Construction & Environmental Management Plan. The development will also include the construction of a gravity surface-water drainage network throughout the site. The surface-water drainage network will include the connection to the upsized attenuation facilities upstream of proposed outfall to the public network, to attenuate discharges to the undeveloped

Greenfield run-off rates with the operation of proprietary hydrobrake flow-control devices. The attenuation facility is sized on the basis of a design storm with a 100-year return period and an additional 20% allowance for the effect of climate change.

The attenuation facilities will be in the form of a series of interlinked attenuation tanks. They will be an off-line component of the drainage network into which runoff is diverted once flows reach a specified threshold. The tanks have been accommodated in earlier phases downstream of this development

3 Foul Sewer System

3.1 Foul Sewer Design

A Pre-Connection Enquiry was submitted to Irish Water. The Irish Water Reference Number for this enquiry is CDS20004114. The response to this Enquiry confirms that the wastewater connection is feasible with infrastructure upgrade by Irish Water.

The foul sewer has been designed using the System 1 and Simulation Modules of the Micro-drainage package. The foul network design addresses present day design issues and can view velocities at Full Bore, Proportional Depth and 1/3 flow.

A model of the proposed foul drainage network was built using the micro-drainage software applications. The model was analysed and amended until the results met with the design criteria specified. The network has been designed to achieve self-cleansing velocities at 1/3 flow whilst maintaining minimum gradients.

The details for all sewers will comply with the Irish Water Code of Practice for Wastewater Infrastructure & the Irish Water Wastewater Infrastructure Standard Details Document Number: IW-CDS-5030-01.

3.1.1 Development Breakdown

70 No. Dwellings

Section 3.6 of The Irish Water Code of Practice Wastewater Infrastructure states that for the gravity sewers shall be designed to carry a minimum wastewater volume of 6 times the dry weather flow (6DWF) which is to be taken as 446 litres per dwelling

Loading = (70) (446) / (24) (60) (60) = 0.361 litres/second

6 DWF = 2.166 litres/second

Preplanning discussions have been conducted with Mr. Michael Galvin, Senior Design Engineer, Connections & Developer Services, Southern Region, Irish Water in relation to the proposed development. The pre-connection enquiry response is included in Appendix A.

Permission for Phase 1 & 2 was granted with an independent pumping station. Phase 3 will be served by gravity as highlighted on the relevant service drawings. There are several proposed connection locations to the network granted permission in Phase 2. Refer to the Proposed Stormwater & Foul Sewer Layout Plans

All works will be in accordance with Irish Water specifications and requirements.

All works will be in accordance with Irish Water Code of Practice for Wastewater Supply & the Wastewater Infrastructure Standard Details Document Number: CDS20004114.

4 Water Supply

As with the drainage network, a Pre-Connection Enquiry was submitted to Irish Water under Reference No. CDS20004114. Irish Water have also confirmed that the water connection is feasible with infrastructure upgrade by Irish Water.

It is proposed to provide a number of new 100mm (internal diameter) HDPE connections to the watermain in the adjoining Heathfield estate with associated valves and metering requirements. Internally within the development it is proposed to have a series of 100mm Ø branches and loops with associated hydrants, valves and metering requirements.

Water distribution supply to each building will be sized to cater for the requirements of those particular uses. Metered connections will be made to the main in accordance with Irish Water specifications and details.

The layout of the proposed watermain network is shown on the Proposed Watermain Layout Plans

Preplanning discussions have been conducted with Mr. Michael Galvin, Senior Design Engineer, Connections & Developer Services, Southern Region, Irish Water in relation to the proposed development. The pre-connection Enquiry response is included in Appendix A.

All works will be in accordance with Irish Water Code of Practice for Water Supply & the Water Infrastructure Standard Details Document Number: IW-CDS-5020-01.

Appendix A –Irish Water Confirmation of Feasibility

Stephen O' Grady

Joyce House
Barrack Square
Ballincollig
Co. Cork
P31KP84

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

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

28 June 2023

Re: CDS20004114 pre-connection enquiry - Subject to contract | Contract denied

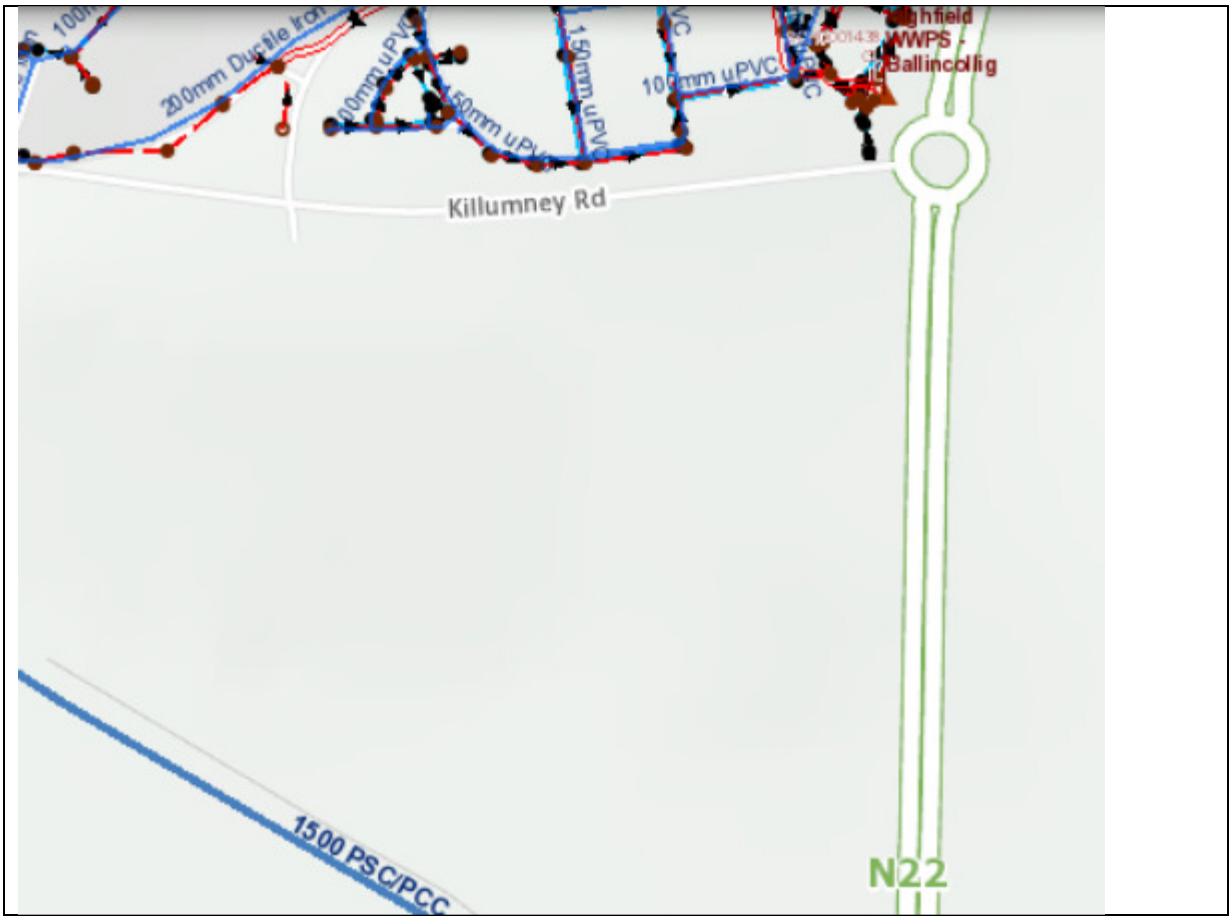
Connection for Housing Development of 70 unit(s) at Carriganarra, Ballincollig, Co. Cork

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Carriganarra, Ballincollig, Co. Cork (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	The drinking water connection shall be made to the water mains in the previous phases of the Carriganarra development.
Wastewater Connection	The wastewater connection shall be made to the sewers in the previous phases of the Carriganarra development.
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

The map included below outlines the current Irish Water infrastructure adjacent to your site:



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network 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.

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/

5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Brian O'Mahony from the design team on 022 52205 or email bomahony@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services

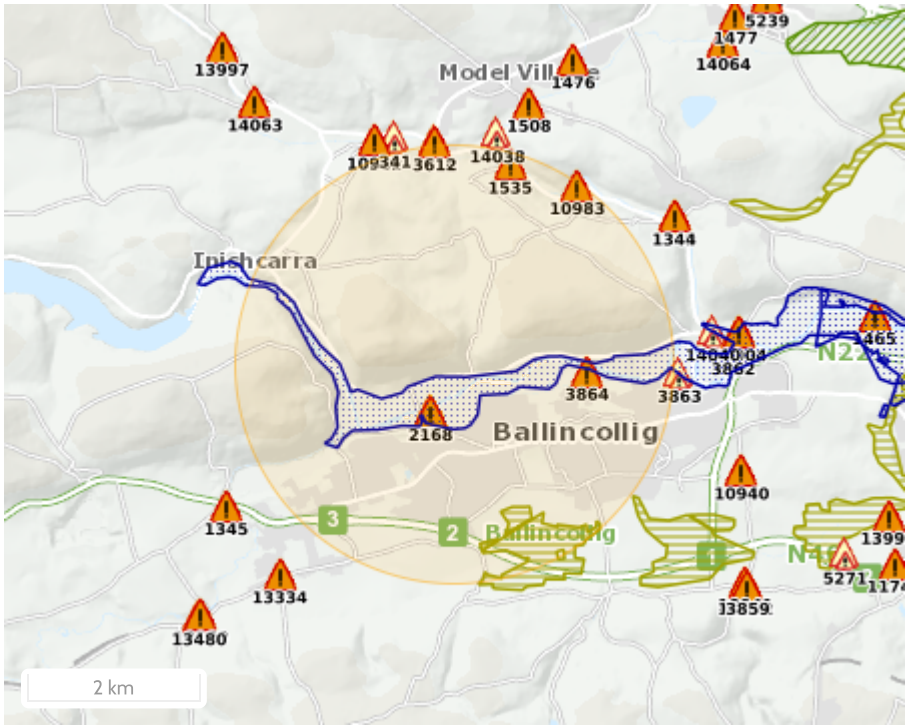
Appendix B – Floodinfo.ie Extract

Past Flood Event Local Area Summary Report

Report Produced: **26/10/2022 10:08**

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

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



Map Legend

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

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

13 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Lee Inniscarra to Cork City Aug 1986 (ID-492) **Additional Information:** Reports (8) Press Archive (3)	04/08/1986	Area
2.	Lee Oct 1975 (ID-2168) **Additional Information:** Reports (2) Press Archive (1)	21/10/1975	Approximate Point
3.	Lee Dec 1978 (ID-2170) **Additional Information:** Reports (3) Press Archive (2)	01/12/1978	Approximate Point
4.	Lee Oct Nov 1980 (ID-2172) **Additional Information:** Reports (2) Press Archive (0)	31/10/1980	Approximate Point
5.	Lee Inniscarra Bridge November 2000 (ID-1469) **Additional Information:** Reports (2) Press Archive (0)	28/11/2000	Approximate Point
6.	Lee Sept 1957 (ID-122) **Additional Information:** Reports (2) Press Archive (0)	21/09/1957	Approximate Point

	Name (Flood_ID)	Start Date	Event Location
7.	Lee Feb 1966 (ID-123)	03/02/1966	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
8.	Lee Dec 1964 (ID-136)	11/12/1964	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
9.	Ballincollig Regional Park, Co. Cork Recurring (ID-3865)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
10.	Lee Inniscarra Bridge Nov 1997 (ID-1464)	18/11/1997	Approximate Point
	Additional Information: Reports (3) Press Archive (0)		
11.	Pauleens Cross Roads, Blarney, Feb 1990 (ID-1535)	06/02/1990	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
12.	Army Barracks Ballincollig Co. Cork undated (ID-3864)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
13.	Lee Feb 1997 (ID-124)	16/02/1997	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		

Appendix C – 1 in 2 Year Design Sheets

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 1 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.236	4-8	0.288	8-12	0.012

Total Area Contributing (ha) = 0.537

Total Pipe Volume (m^3) = 14.883

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	28.530	0.975	29.3	0.071	5.00	0.0	0.600	o	225
S1.001	41.757	0.201	207.7	0.116	0.00	0.0	0.600	o	225
S1.002	19.890	0.080	250.0	0.053	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.20	26.350	0.071	0.0	0.0	0.0	2.43	96.5	9.6
S1.001	50.00	5.97	25.375	0.187	0.0	0.0	0.0	0.90	35.9	25.3
S1.002	50.00	6.37	25.174	0.240	0.0	0.0	0.0	0.82	32.7	32.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.003	9.175	0.037	250.0	0.000	0.00	0.0	0.600	o	225
S1.004	16.865	0.067	250.0	0.000	0.00	0.0	0.600	o	225
S1.005	41.520	0.166	250.0	0.000	0.00	0.0	0.600	o	225
S1.006	36.650	0.147	250.0	0.040	0.00	0.0	0.600	o	300
S2.000	49.215	1.000	49.2	0.097	5.00	0.0	0.600	o	225
S2.001	32.710	0.674	48.5	0.060	0.00	0.0	0.600	o	225
S2.002	11.905	0.048	250.0	0.020	0.00	0.0	0.600	o	225
S1.007	9.880	0.040	250.0	0.040	0.00	0.0	0.600	o	300
S1.008	15.390	0.077	200.0	0.040	0.00	0.0	0.600	o	300
S1.009	7.125	0.036	200.0	0.000	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.003	50.00	6.56	25.094	0.240	0.0	0.0	0.0	0.82	32.7	32.5
S1.004	50.00	6.90	25.058	0.240	0.0	0.0	0.0	0.82	32.7	32.5
S1.005	50.00	7.74	24.990	0.240	0.0	0.0	0.0	0.82	32.7	32.5
S1.006	50.00	8.36	24.824	0.280	0.0	0.0	0.0	0.99	70.0	37.9
S2.000	50.00	5.44	26.400	0.097	0.0	0.0	0.0	1.87	74.3	13.1
S2.001	50.00	5.73	25.400	0.157	0.0	0.0	0.0	1.88	74.8	21.3
S2.002	50.00	5.97	24.726	0.177	0.0	0.0	0.0	0.82	32.7	24.0
S1.007	50.00	8.52	24.678	0.497	0.0	0.0	0.0	0.99	70.0	67.3
S1.008	50.00	8.75	24.638	0.537	0.0	0.0	0.0	1.11	78.3	72.7
S1.009	50.00	8.86	24.561	0.537	0.0	0.0	0.0	1.11	78.3	72.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS3.010	27.850	1.500	1050	S1.000	26.350	225				
SS3.009	26.850	1.475	1050	S1.001	25.375	225	S1.000	25.375	225	
SS3.008	26.200	1.026	1050	S1.002	25.174	225	S1.001	25.174	225	
SS3.007	26.000	0.906	1050	S1.003	25.094	225	S1.002	25.094	225	
SS3.006	26.000	0.942	1050	S1.004	25.058	225	S1.003	25.058	225	
SS3.005	25.900	0.910	1050	S1.005	24.990	225	S1.004	24.990	225	
SS3.004	25.650	0.826	1050	S1.006	24.824	300	S1.005	24.824	225	
SS3.013	27.900	1.500	1050	S2.000	26.400	225				
SS3.012	26.900	1.500	1050	S2.001	25.400	225	S2.000	25.400	225	
SS3.010	25.800	1.074	1050	S2.002	24.726	225	S2.001	24.726	225	
SS3.003	25.550	0.872	1050	S1.007	24.678	300	S1.006	24.678	300	
							S2.002	24.678	225	
SS3.002	25.650	1.012	1050	S1.008	24.638	300	S1.007	24.638	300	
SS3.001	25.900	1.339	1050	S1.009	24.561	300	S1.008	24.561	300	
SS2.028	26.000	1.474	0		OUTFALL		S1.009	24.526	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.010	27.850	26.350	1.275	1050
S1.001	o	225	SS3.009	26.850	25.375	1.250	1050
S1.002	o	225	SS3.008	26.200	25.174	0.801	1050
S1.003	o	225	SS3.007	26.000	25.094	0.681	1050
S1.004	o	225	SS3.006	26.000	25.058	0.717	1050
S1.005	o	225	SS3.005	25.900	24.990	0.685	1050
S1.006	o	300	SS3.004	25.650	24.824	0.526	1050
S2.000	o	225	SS3.013	27.900	26.400	1.275	1050
S2.001	o	225	SS3.012	26.900	25.400	1.275	1050
S2.002	o	225	SS3.010	25.800	24.726	0.849	1050
S1.007	o	300	SS3.003	25.550	24.678	0.572	1050
S1.008	o	300	SS3.002	25.650	24.638	0.712	1050
S1.009	o	300	SS3.001	25.900	24.561	1.039	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	28.530	29.3	SS3.009	26.850	25.375	1.250	1050
S1.001	41.757	207.7	SS3.008	26.200	25.174	0.801	1050
S1.002	19.890	250.0	SS3.007	26.000	25.094	0.681	1050
S1.003	9.175	250.0	SS3.006	26.000	25.058	0.717	1050
S1.004	16.865	250.0	SS3.005	25.900	24.990	0.685	1050
S1.005	41.520	250.0	SS3.004	25.650	24.824	0.601	1050
S1.006	36.650	250.0	SS3.003	25.550	24.678	0.572	1050
S2.000	49.215	49.2	SS3.012	26.900	25.400	1.275	1050
S2.001	32.710	48.5	SS3.010	25.800	24.726	0.849	1050
S2.002	11.905	250.0	SS3.003	25.550	24.678	0.647	1050
S1.007	9.880	250.0	SS3.002	25.650	24.638	0.712	1050
S1.008	15.390	200.0	SS3.001	25.900	24.561	1.039	1050
S1.009	7.125	200.0	SS2.028	26.000	24.526	1.174	0

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)
S1.009	SS2.028	26.000	24.526	24.525	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	2	0%					
S1.001	15 Winter	2	0%					
S1.002	15 Winter	2	0%					
S1.003	15 Winter	2	0%					
S1.004	15 Winter	2	0%					
S1.005	15 Winter	2	0%					
S1.006	30 Winter	2	0%					
S2.000	15 Winter	2	0%					
S2.001	15 Winter	2	0%					
S2.002	15 Winter	2	0%					
S1.007	15 Winter	2	0%					
S1.008	15 Winter	2	0%					
S1.009	15 Winter	2	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.010	26.402	-0.173	0.000	0.12	0.0	10.7	OK
S1.001	SS3.009	25.521	-0.079	0.000	0.73	0.0	24.8	OK
S1.002	SS3.008	25.389	-0.010	0.000	0.97	0.0	28.7	OK
S1.003	SS3.007	25.319	0.000	0.000	1.03	0.0	27.6	OK
S1.004	SS3.006	25.231	-0.052	0.000	0.94	0.0	27.4	OK
S1.005	SS3.005	25.154	-0.061	0.000	0.87	0.0	27.1	OK
S1.006	SS3.004	24.970	-0.154	0.000	0.47	0.0	30.1	OK
S2.000	SS3.013	26.469	-0.156	0.000	0.20	0.0	14.3	OK
S2.001	SS3.012	25.487	-0.138	0.000	0.31	0.0	22.0	OK
S2.002	SS3.010	24.936	-0.015	0.000	0.84	0.0	23.6	OK
S1.007	SS3.003	24.907	-0.071	0.000	0.93	0.0	50.9	OK
S1.008	SS3.002	24.849	-0.089	0.000	0.83	0.0	54.7	OK
S1.009	SS3.001	24.794	-0.067	0.000	0.96	0.0	54.7	OK

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 2 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.117	4-8	0.021

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m^3) = 1.840

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	19.530	0.650	30.0	0.069	5.00	0.0	0.600	o	225
S1.001	26.735	1.125	23.8	0.069	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.14	27.500	0.069	0.0	0.0	0.0	2.40	95.3	9.3
S1.001	50.00	5.30	26.850	0.138	0.0	0.0	0.0	2.70	107.2	18.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS3.015	29.000	1.500	1050	S1.000	27.500	225				
SS3.014	28.350	1.500	1050	S1.001	26.850	225	S1.000	26.850	225	
SS2.029	27.725	2.000	0		OUTFALL		S1.001	25.725	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.015	29.000	27.500	1.275	1050
S1.001	o	225	SS3.014	28.350	26.850	1.275	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	19.530	30.0	SS3.014	28.350	26.850	1.275	1050
S1.001	26.735	23.8	SS2.029	27.725	25.725	1.775	0

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)
S1.001	SS2.029	27.725	25.725	25.725	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	2	0%					
S1.001	15 Winter	2	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.015	27.552	-0.173	0.000	0.12	0.0	10.3	OK
S1.001	SS3.014	26.917	-0.158	0.000	0.19	0.0	18.9	OK

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 3 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.097	4-8	0.035

Total Area Contributing (ha) = 0.132

Total Pipe Volume (m^3) = 2.523

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	27.765	0.400	69.4	0.066	5.00	0.0	0.600	o	225
S2.000	15.640	0.078	200.0	0.031	5.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.29	26.200	0.066	0.0	0.0	0.0	1.57	62.5	8.9
S2.000	50.00	5.28	25.053	0.031	0.0	0.0	0.0	0.92	36.6	4.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.001	20.040	0.100	200.0	0.035	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.001	50.00	5.66	24.975	0.132	0.0	0.0	0.0	0.92	36.6	17.9

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS3.018	27.700	1.500	1050	S1.000	26.200	225				
SS3.017	26.550	1.497	1050	S2.000	25.053	225				
SS3.016	27.300	2.325	1200	S1.001	24.975	225	S1.000	25.800	225	825
							S2.000	24.975	225	
SS2.049	27.000	2.125	0		OUTFALL		S1.001	24.875	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.018	27.700	26.200	1.275	1050
S2.000	o	225	SS3.017	26.550	25.053	1.272	1050
S1.001	o	225	SS3.016	27.300	24.975	2.100	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	27.765	69.4	SS3.016	27.300	25.800	1.275	1200
S2.000	15.640	200.0	SS3.016	27.300	24.975	2.100	1200
S1.001	20.040	200.0	SS2.049	27.000	24.875	1.900	0

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)
S1.001	SS2.049	27.000	24.875	24.875	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model FSR Return Period (years) 100

Synthetic Rainfall Details

Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	18.800	Cv (Winter)	0.840
Ratio R	0.250	Storm Duration (mins)	30
Profile Type	Summer		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	2	0%					
S2.000	15 Winter	2	0%					
S1.001	15 Winter	2	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.018	26.263	-0.162	0.000	0.17	0.0	9.8	OK
S2.000	SS3.017	25.121	-0.157	0.000	0.14	0.0	4.5	OK
S1.001	SS3.016	25.097	-0.103	0.000	0.57	0.0	18.8	OK

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 4 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.172	4-8	0.053

Total Area Contributing (ha) = 0.225

Total Pipe Volume (m^3) = 3.109

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	25.810	0.150	172.1	0.085	5.00	0.0	0.600	o	225
S1.001	8.780	0.100	87.8	0.020	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.43	23.250	0.085	0.0	0.0	0.0	0.99	39.5	11.5
S1.001	50.00	5.54	23.100	0.105	0.0	0.0	0.0	1.40	55.5	14.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2.000	23.985	1.150	20.9	0.085	5.00	0.0	0.600	o	225
S1.002	19.625	0.580	33.8	0.035	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.000	50.00	5.14	24.150	0.085	0.0	0.0	0.0	2.88	114.4	11.5
S1.002	50.00	5.68	23.000	0.225	0.0	0.0	0.0	2.26	89.7	30.5

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	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)
SS3.021	24.750	1.500	1050	S1.000	23.250	225				
SS3.020	24.600	1.500	1050	S1.001	23.100	225	S1.000	23.100	225	
SS3.022	25.650	1.500	1050	S2.000	24.150	225				
SS3.019	24.500	1.500	1050	S1.002	23.000	225	S1.001	23.000	225	
							S2.000	23.000	225	
SS2.050	24.000	1.580	0		OUTFALL		S1.002	22.420	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.021	24.750	23.250	1.275	1050
S1.001	o	225	SS3.020	24.600	23.100	1.275	1050
S2.000	o	225	SS3.022	25.650	24.150	1.275	1050
S1.002	o	225	SS3.019	24.500	23.000	1.275	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	25.810	172.1	SS3.020	24.600	23.100	1.275	1050
S1.001	8.780	87.8	SS3.019	24.500	23.000	1.275	1050
S2.000	23.985	20.9	SS3.019	24.500	23.000	1.275	1050
S1.002	19.625	33.8	SS2.050	24.000	22.420	1.355	0

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)
S1.002	SS2.050	24.000	22.420	22.420	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Simulation Criteria for Storm

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	2	0%					
S1.001	15 Winter	2	0%					
S2.000	15 Winter	2	0%					
S1.002	15 Winter	2	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.021	23.342	-0.133	0.000	0.34	0.0	12.6	OK
S1.001	SS3.020	23.191	-0.134	0.000	0.34	0.0	15.2	OK
S2.000	SS3.022	24.202	-0.173	0.000	0.12	0.0	12.7	OK
S1.002	SS3.019	23.099	-0.126	0.000	0.40	0.0	32.2	OK

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 5 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.077	4-8	0.027

Total Area Contributing (ha) = 0.104

Total Pipe Volume (m^3) = 2.220

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	36.780	0.350	105.1	0.069	5.00	0.0	0.600	o	225
S1.001	19.050	0.150	127.0	0.035	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.48	20.500	0.069	0.0	0.0	0.0	1.28	50.7	9.3
S1.001	50.00	5.75	20.150	0.104	0.0	0.0	0.0	1.16	46.1	14.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS3.024	22.000	1.500	1050	S1.000	20.500	225				
SS3.023	21.650	1.500	1050	S1.001	20.150	225	S1.000	20.150	225	
SS2.053	21.500	1.500	0		OUTFALL		S1.001	20.000	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.024	22.000	20.500	1.275	1050
S1.001	o	225	SS3.023	21.650	20.150	1.275	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	36.780	105.1	SS3.023	21.650	20.150	1.275	1050
S1.001	19.050	127.0	SS2.053	21.500	20.000	1.275	0

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)
S1.001	SS2.053	21.500	20.000	20.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	2	0%					
S1.001	15 Winter	2	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.024	20.571	-0.154	0.000	0.21	0.0	10.2	OK
S1.001	SS3.023	20.243	-0.132	0.000	0.35	0.0	14.7	OK

Appendix D – 1 in 100 Year Design Sheets

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 1 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.236	4-8	0.288	8-12	0.012

Total Area Contributing (ha) = 0.537

Total Pipe Volume (m^3) = 14.883

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	28.530	0.975	29.3	0.071	5.00	0.0	0.600	o	225
S1.001	41.757	0.201	207.7	0.116	0.00	0.0	0.600	o	225
S1.002	19.890	0.080	250.0	0.053	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.20	26.350	0.071	0.0	0.0	0.0	2.43	96.5	9.6
S1.001	50.00	5.97	25.375	0.187	0.0	0.0	0.0	0.90	35.9	25.3
S1.002	50.00	6.37	25.174	0.240	0.0	0.0	0.0	0.82	32.7	32.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.003	9.175	0.037	250.0	0.000	0.00	0.0	0.600	o	225
S1.004	16.865	0.067	250.0	0.000	0.00	0.0	0.600	o	225
S1.005	41.520	0.166	250.0	0.000	0.00	0.0	0.600	o	225
S1.006	36.650	0.147	250.0	0.040	0.00	0.0	0.600	o	300
S2.000	49.215	1.000	49.2	0.097	5.00	0.0	0.600	o	225
S2.001	32.710	0.674	48.5	0.060	0.00	0.0	0.600	o	225
S2.002	11.905	0.048	250.0	0.020	0.00	0.0	0.600	o	225
S1.007	9.880	0.040	250.0	0.040	0.00	0.0	0.600	o	300
S1.008	15.390	0.077	200.0	0.040	0.00	0.0	0.600	o	300
S1.009	7.125	0.036	200.0	0.000	0.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.003	50.00	6.56	25.094	0.240	0.0	0.0	0.0	0.82	32.7	32.5
S1.004	50.00	6.90	25.058	0.240	0.0	0.0	0.0	0.82	32.7	32.5
S1.005	50.00	7.74	24.990	0.240	0.0	0.0	0.0	0.82	32.7	32.5
S1.006	50.00	8.36	24.824	0.280	0.0	0.0	0.0	0.99	70.0	37.9
S2.000	50.00	5.44	26.400	0.097	0.0	0.0	0.0	1.87	74.3	13.1
S2.001	50.00	5.73	25.400	0.157	0.0	0.0	0.0	1.88	74.8	21.3
S2.002	50.00	5.97	24.726	0.177	0.0	0.0	0.0	0.82	32.7	24.0
S1.007	50.00	8.52	24.678	0.497	0.0	0.0	0.0	0.99	70.0	67.3
S1.008	50.00	8.75	24.638	0.537	0.0	0.0	0.0	1.11	78.3	72.7
S1.009	50.00	8.86	24.561	0.537	0.0	0.0	0.0	1.11	78.3	72.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS3.010	27.850	1.500	1050	S1.000	26.350	225				
SS3.009	26.850	1.475	1050	S1.001	25.375	225	S1.000	25.375	225	
SS3.008	26.200	1.026	1050	S1.002	25.174	225	S1.001	25.174	225	
SS3.007	26.000	0.906	1050	S1.003	25.094	225	S1.002	25.094	225	
SS3.006	26.000	0.942	1050	S1.004	25.058	225	S1.003	25.058	225	
SS3.005	25.900	0.910	1050	S1.005	24.990	225	S1.004	24.990	225	
SS3.004	25.650	0.826	1050	S1.006	24.824	300	S1.005	24.824	225	
SS3.013	27.900	1.500	1050	S2.000	26.400	225				
SS3.012	26.900	1.500	1050	S2.001	25.400	225	S2.000	25.400	225	
SS3.010	25.800	1.074	1050	S2.002	24.726	225	S2.001	24.726	225	
SS3.003	25.550	0.872	1050	S1.007	24.678	300	S1.006	24.678	300	
							S2.002	24.678	225	
SS3.002	25.650	1.012	1050	S1.008	24.638	300	S1.007	24.638	300	
SS3.001	25.900	1.339	1050	S1.009	24.561	300	S1.008	24.561	300	
SS2.028	26.000	1.474	0		OUTFALL		S1.009	24.526	300	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.010	27.850	26.350	1.275	1050
S1.001	o	225	SS3.009	26.850	25.375	1.250	1050
S1.002	o	225	SS3.008	26.200	25.174	0.801	1050
S1.003	o	225	SS3.007	26.000	25.094	0.681	1050
S1.004	o	225	SS3.006	26.000	25.058	0.717	1050
S1.005	o	225	SS3.005	25.900	24.990	0.685	1050
S1.006	o	300	SS3.004	25.650	24.824	0.526	1050
S2.000	o	225	SS3.013	27.900	26.400	1.275	1050
S2.001	o	225	SS3.012	26.900	25.400	1.275	1050
S2.002	o	225	SS3.010	25.800	24.726	0.849	1050
S1.007	o	300	SS3.003	25.550	24.678	0.572	1050
S1.008	o	300	SS3.002	25.650	24.638	0.712	1050
S1.009	o	300	SS3.001	25.900	24.561	1.039	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	28.530	29.3	SS3.009	26.850	25.375	1.250	1050
S1.001	41.757	207.7	SS3.008	26.200	25.174	0.801	1050
S1.002	19.890	250.0	SS3.007	26.000	25.094	0.681	1050
S1.003	9.175	250.0	SS3.006	26.000	25.058	0.717	1050
S1.004	16.865	250.0	SS3.005	25.900	24.990	0.685	1050
S1.005	41.520	250.0	SS3.004	25.650	24.824	0.601	1050
S1.006	36.650	250.0	SS3.003	25.550	24.678	0.572	1050
S2.000	49.215	49.2	SS3.012	26.900	25.400	1.275	1050
S2.001	32.710	48.5	SS3.010	25.800	24.726	0.849	1050
S2.002	11.905	250.0	SS3.003	25.550	24.678	0.647	1050
S1.007	9.880	250.0	SS3.002	25.650	24.638	0.712	1050
S1.008	15.390	200.0	SS3.001	25.900	24.561	1.039	1050
S1.009	7.125	200.0	SS2.028	26.000	24.526	1.174	0

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)
S1.009	SS2.028	26.000	24.526	24.525	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	0%	100/15 Summer				
S1.001	15 Winter	100	0%	100/15 Summer				
S1.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
S1.003	30 Winter	100	0%	100/15 Summer				
S1.004	15 Winter	100	0%	100/15 Summer				
S1.005	15 Winter	100	0%	100/15 Summer				
S1.006	15 Winter	100	0%	100/15 Summer				
S2.000	15 Winter	100	0%					
S2.001	15 Winter	100	0%	100/15 Summer				
S2.002	15 Winter	100	0%	100/15 Summer				
S1.007	15 Winter	100	0%	100/15 Summer				
S1.008	15 Winter	100	0%	100/15 Summer				
S1.009	15 Winter	100	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.010	26.743	0.168	0.000	0.26	0.0	23.5	SURCHARGED
S1.001	SS3.009	26.692	1.092	0.000	1.48	0.0	50.6	SURCHARGED
S1.002	SS3.008	26.203	0.804	0.000	1.76	0.0	52.1	SURCHARGED
S1.003	SS3.007	25.998	0.679	0.000	1.89	0.0	50.9	SURCHARGED
S1.004	SS3.006	25.920	0.637	0.000	1.77	0.0	51.5	SURCHARGED
S1.005	SS3.005	25.795	0.579	0.000	1.65	0.0	51.4	SURCHARGED
S1.006	SS3.004	25.524	0.400	0.000	0.84	0.0	54.1	SURCHARGED
S2.000	SS3.013	26.512	-0.113	0.000	0.48	0.0	34.2	OK
S2.001	SS3.012	25.863	0.238	0.000	0.69	0.0	48.6	SURCHARGED
S2.002	SS3.010	25.589	0.638	0.000	1.80	0.0	50.4	SURCHARGED
S1.007	SS3.003	25.440	0.463	0.000	1.93	0.0	105.5	SURCHARGED
S1.008	SS3.002	25.259	0.321	0.000	1.72	0.0	113.5	SURCHARGED
S1.009	SS3.001	25.022	0.161	0.000	2.00	0.0	114.0	SURCHARGED

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 2 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.117	4-8	0.021

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m^3) = 1.840

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	19.530	0.650	30.0	0.069	5.00	0.0	0.600	o	225
S1.001	26.735	1.125	23.8	0.069	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.14	27.500	0.069	0.0	0.0	0.0	2.40	95.3	9.3
S1.001	50.00	5.30	26.850	0.138	0.0	0.0	0.0	2.70	107.2	18.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS3.015	29.000	1.500	1050	S1.000	27.500	225				
SS3.014	28.350	1.500	1050	S1.001	26.850	225	S1.000	26.850	225	
SS2.029	27.725	2.000	0		OUTFALL		S1.001	25.725	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.015	29.000	27.500	1.275	1050
S1.001	o	225	SS3.014	28.350	26.850	1.275	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	19.530	30.0	SS3.014	28.350	26.850	1.275	1050
S1.001	26.735	23.8	SS2.029	27.725	25.725	1.775	0

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)
S1.001	SS2.029	27.725	25.725	25.725	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	0%					
S1.001	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.015	27.583	-0.142	0.000	0.29	0.0	24.8	OK
S1.001	SS3.014	26.965	-0.110	0.000	0.51	0.0	51.0	OK

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Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 3 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.097	4-8	0.035

Total Area Contributing (ha) = 0.132

Total Pipe Volume (m^3) = 2.523

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	27.765	0.400	69.4	0.066	5.00	0.0	0.600	o	225
S2.000	15.640	0.078	200.0	0.031	5.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.29	26.200	0.066	0.0	0.0	0.0	1.57	62.5	8.9
S2.000	50.00	5.28	25.053	0.031	0.0	0.0	0.0	0.92	36.6	4.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.001	20.040	0.100	200.0	0.035	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.001	50.00	5.66	24.975	0.132	0.0	0.0	0.0	0.92	36.6	17.9

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	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)
SS3.018	27.700	1.500	1050	S1.000	26.200	225				
SS3.017	26.550	1.497	1050	S2.000	25.053	225				
SS3.016	27.300	2.325	1200	S1.001	24.975	225	S1.000	25.800	225	825
							S2.000	24.975	225	
SS2.049	27.000	2.125	0		OUTFALL		S1.001	24.875	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.018	27.700	26.200	1.275	1050
S2.000	o	225	SS3.017	26.550	25.053	1.272	1050
S1.001	o	225	SS3.016	27.300	24.975	2.100	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	27.765	69.4	SS3.016	27.300	25.800	1.275	1200
S2.000	15.640	200.0	SS3.016	27.300	24.975	2.100	1200
S1.001	20.040	200.0	SS2.049	27.000	24.875	1.900	0

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)
S1.001	SS2.049	27.000	24.875	24.875	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model FSR Return Period (years) 100

Synthetic Rainfall Details

Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	18.800	Cv (Winter)	0.840
Ratio R	0.250	Storm Duration (mins)	30
Profile Type	Summer		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	0%					
S2.000	15 Winter	100	0%	100/15 Summer				
S1.001	15 Winter	100	0%	100/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.018	26.301	-0.124	0.000	0.41	0.0	23.5	OK
S2.000	SS3.017	25.316	0.038	0.000	0.34	0.0	11.0	SURCHARGED
S1.001	SS3.016	25.296	0.096	0.000	1.41	0.0	46.6	SURCHARGED

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 4 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.172	4-8	0.053

Total Area Contributing (ha) = 0.225

Total Pipe Volume (m^3) = 3.109

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	25.810	0.150	172.1	0.085	5.00	0.0	0.600	o	225
S1.001	8.780	0.100	87.8	0.020	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.43	23.250	0.085	0.0	0.0	0.0	0.99	39.5	11.5
S1.001	50.00	5.54	23.100	0.105	0.0	0.0	0.0	1.40	55.5	14.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S2.000	23.985	1.150	20.9	0.085	5.00	0.0	0.600	o	225
S1.002	19.625	0.580	33.8	0.035	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.000	50.00	5.14	24.150	0.085	0.0	0.0	0.0	2.88	114.4	11.5
S1.002	50.00	5.68	23.000	0.225	0.0	0.0	0.0	2.26	89.7	30.5

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SS3.021	24.750	1.500	1050	S1.000	23.250	225				
SS3.020	24.600	1.500	1050	S1.001	23.100	225	S1.000	23.100	225	
SS3.022	25.650	1.500	1050	S2.000	24.150	225				
SS3.019	24.500	1.500	1050	S1.002	23.000	225	S1.001	23.000	225	
							S2.000	23.000	225	
SS2.050	24.000	1.580	0		OUTFALL		S1.002	22.420	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.021	24.750	23.250	1.275	1050
S1.001	o	225	SS3.020	24.600	23.100	1.275	1050
S2.000	o	225	SS3.022	25.650	24.150	1.275	1050
S1.002	o	225	SS3.019	24.500	23.000	1.275	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	25.810	172.1	SS3.020	24.600	23.100	1.275	1050
S1.001	8.780	87.8	SS3.019	24.500	23.000	1.275	1050
S2.000	23.985	20.9	SS3.019	24.500	23.000	1.275	1050
S1.002	19.625	33.8	SS2.050	24.000	22.420	1.355	0

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)
S1.002	SS2.050	24.000	22.420	22.420	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Simulation Criteria for Storm

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

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

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 0

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	100	0%					
S1.001	15 Winter	100	0%					
S2.000	15 Winter	100	0%					
S1.002	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.021	23.410	-0.065	0.000	0.82	0.0	30.1	OK
S1.001	SS3.020	23.261	-0.064	0.000	0.84	0.0	37.4	OK
S2.000	SS3.022	24.233	-0.142	0.000	0.29	0.0	30.7	OK
S1.002	SS3.019	23.188	-0.037	0.000	0.99	0.0	79.9	OK

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 5 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	0.200
Ratio R	0.250	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.077	4-8	0.027

Total Area Contributing (ha) = 0.104

Total Pipe Volume (m^3) = 2.220

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
S1.000	36.780	0.350	105.1	0.069	5.00	0.0	0.600	o	225
S1.001	19.050	0.150	127.0	0.035	0.00	0.0	0.600	o	225

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.48	20.500	0.069	0.0	0.0	0.0	1.28	50.7	9.3
S1.001	50.00	5.75	20.150	0.104	0.0	0.0	0.0	1.16	46.1	14.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	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)
SS3.024	22.000	1.500	1050	S1.000	20.500	225				
SS3.023	21.650	1.500	1050	S1.001	20.150	225	S1.000	20.150	225	
SS2.053	21.500	1.500	0		OUTFALL		S1.001	20.000	225	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	o	225	SS3.024	22.000	20.500	1.275	1050
S1.001	o	225	SS3.023	21.650	20.150	1.275	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
S1.000	36.780	105.1	SS3.023	21.650	20.150	1.275	1050
S1.001	19.050	127.0	SS2.053	21.500	20.000	1.275	0

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)
S1.001	SS2.053	21.500	20.000	20.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.250		

Summary of Results for 30 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	SS3.024	20.609	-0.116	0.000	0.47	0.0	22.7	OK
S1.001	SS3.023	20.308	-0.067	0.000	0.83	0.0	34.4	OK

Appendix E – Foul Sewer Design Sheets

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	446.00	Maximum Backdrop Height (m)	1.500
Persons per House	1.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	28.900	0.482	60.0	0.000	4	0.0	1.500	o	150
F1.001	41.325	0.474	87.2	0.000	6	0.0	1.500	o	150
F1.002	19.835	0.099	200.0	0.000	7	0.0	1.500	o	225
F1.003	10.335	0.052	200.0	0.000	0	0.0	1.500	o	225
F1.004	16.860	0.084	200.0	0.000	0	0.0	1.500	o	225
F1.005	42.660	0.213	200.0	0.000	4	0.0	1.500	o	225
F1.006	39.885	0.199	200.0	0.000	1	0.0	1.500	o	225
F2.000	49.105	0.900	54.6	0.000	7	0.0	1.500	o	150
F2.001	29.725	1.200	24.8	0.000	4	0.0	1.500	o	150

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	26.000	0.000	0.0	4	0.0	9	0.30	1.13	20.0	0.1
F1.001	25.518	0.000	0.0	10	0.0	15	0.35	0.94	16.6	0.3
F1.002	25.044	0.000	0.0	17	0.0	20	0.30	0.81	32.2	0.5
F1.003	24.945	0.000	0.0	17	0.0	20	0.30	0.81	32.2	0.5
F1.004	24.893	0.000	0.0	17	0.0	20	0.30	0.81	32.2	0.5
F1.005	24.809	0.000	0.0	21	0.0	22	0.32	0.81	32.2	0.7
F1.006	24.596	0.000	0.0	22	0.0	23	0.32	0.81	32.2	0.7
F2.000	26.550	0.000	0.0	7	0.0	11	0.37	1.19	21.0	0.2
F2.001	25.650	0.000	0.0	11	0.0	11	0.56	1.77	31.2	0.3

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F2.002	8.155	0.054	150.0	0.000	1	0.0	1.500	o	150
F1.007	7.485	0.037	200.0	0.000	3	0.0	1.500	o	225
F1.008	15.255	0.076	200.0	0.000	0	0.0	1.500	o	225
F1.009	6.925	0.035	197.9	0.000	0	0.0	1.500	o	225

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F2.002	24.450	0.000	0.0	12	0.0	18	0.31	0.71	12.6	0.4
F1.007	24.396	0.000	0.0	37	0.0	29	0.38	0.81	32.2	1.1
F1.008	24.358	0.000	0.0	37	0.0	29	0.38	0.81	32.2	1.1
F1.009	24.282	0.000	0.0	37	0.0	29	0.38	0.81	32.4	1.1

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
FF3.010	27.800	1.800	1200	F1.000	26.000	150				
FF3.009	26.850	1.332	1050	F1.001	25.518	150	F1.000	25.518	150	
FF3.008	26.200	1.156	1050	F1.002	25.044	225	F1.001	25.044	150	
FF3.007	26.000	1.055	1050	F1.003	24.945	225	F1.002	24.945	225	
FF3.006	25.900	1.007	1050	F1.004	24.893	225	F1.003	24.893	225	
FF3.005	25.650	0.841	1050	F1.005	24.809	225	F1.004	24.809	225	
FF3.004	25.500	0.904	1050	F1.006	24.596	225	F1.005	24.596	225	
FF3.013	27.900	1.350	1050	F2.000	26.550	150				
FF3.012	27.000	1.350	1050	F2.001	25.650	150	F2.000	25.650	150	
FF3.011	25.850	1.400	1050	F2.002	24.450	150	F2.001	24.450	150	
FF3.003	25.550	1.154	1050	F1.007	24.396	225	F1.006	24.396	225	1
							F2.002	24.396	150	
FF3.002	25.650	1.292	1050	F1.008	24.358	225	F1.007	24.358	225	
FF3.001	25.900	1.618	1050	F1.009	24.282	225	F1.008	24.282	225	
FF2.027	26.000	1.753	0		OUTFALL		F1.009	24.247	225	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	o	150	FF3.010	27.800	26.000	1.650	1200
F1.001	o	150	FF3.009	26.850	25.518	1.182	1050
F1.002	o	225	FF3.008	26.200	25.044	0.931	1050
F1.003	o	225	FF3.007	26.000	24.945	0.830	1050
F1.004	o	225	FF3.006	25.900	24.893	0.782	1050
F1.005	o	225	FF3.005	25.650	24.809	0.616	1050
F1.006	o	225	FF3.004	25.500	24.596	0.679	1050
F2.000	o	150	FF3.013	27.900	26.550	1.200	1050
F2.001	o	150	FF3.012	27.000	25.650	1.200	1050
F2.002	o	150	FF3.011	25.850	24.450	1.250	1050
F1.007	o	225	FF3.003	25.550	24.396	0.929	1050
F1.008	o	225	FF3.002	25.650	24.358	1.067	1050
F1.009	o	225	FF3.001	25.900	24.282	1.393	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	28.900	60.0	FF3.009	26.850	25.518	1.182	1050
F1.001	41.325	87.2	FF3.008	26.200	25.044	1.006	1050
F1.002	19.835	200.0	FF3.007	26.000	24.945	0.830	1050
F1.003	10.335	200.0	FF3.006	25.900	24.893	0.782	1050
F1.004	16.860	200.0	FF3.005	25.650	24.809	0.616	1050
F1.005	42.660	200.0	FF3.004	25.500	24.596	0.679	1050
F1.006	39.885	200.0	FF3.003	25.550	24.396	0.929	1050
F2.000	49.105	54.6	FF3.012	27.000	25.650	1.200	1050
F2.001	29.725	24.8	FF3.011	25.850	24.450	1.250	1050
F2.002	8.155	150.0	FF3.003	25.550	24.396	1.004	1050
F1.007	7.485	200.0	FF3.002	25.650	24.358	1.067	1050
F1.008	15.255	200.0	FF3.001	25.900	24.282	1.393	1050
F1.009	6.925	197.9	FF2.027	26.000	24.247	1.528	0

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.009	FF2.027	26.000	24.247	24.248	0	0

Simulation Criteria for Foul - Main

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	446.00	Maximum Backdrop Height (m)	1.500
Persons per House	1.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	21.505	0.650	33.1	0.000	4	0.0	1.500	o	150
F1.001	28.845	0.970	29.7	0.000	2	0.0	1.500	o	150

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	27.150	0.000	0.0	4	0.0	8	0.36	1.53	27.0	0.1
F1.001	26.500	0.000	0.0	6	0.0	9	0.43	1.61	28.5	0.2

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
FF3.015	29.000	1.850	1200	F1.000	27.150	150				
FF3.014	28.350	1.850	1200	F1.001	26.500	150	F1.000	26.500	150	
FF2.028	27.725	2.195	0		OUTFALL		F1.001	25.530	150	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	o	150	FF3.015	29.000	27.150	1.700	1200
F1.001	o	150	FF3.014	28.350	26.500	1.700	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	21.505	33.1	FF3.014	28.350	26.500	1.700	1200
F1.001	28.845	29.7	FF2.028	27.725	25.530	2.045	0

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.001	FF2.028	27.725	25.530	25.530	0	0

Simulation Criteria for Foul - Main

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	446.00	Maximum Backdrop Height (m)	1.500
Persons per House	1.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	27.725	0.462	60.0	0.000	4	0.0	1.500	o	150
F2.000	18.405	0.307	60.0	0.000	2	0.0	1.500	o	150
F1.001	20.420	0.268	76.2	0.000	2	0.0	1.500	o	150

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	25.350	0.000	0.0	4	0.0	9	0.30	1.13	20.0	0.1
F2.000	25.150	0.000	0.0	2	0.0	6	0.24	1.13	20.0	0.1
F1.001	24.843	0.000	0.0	8	0.0	13	0.34	1.00	17.7	0.2

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	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)
FF3.018	27.700	2.350	1200	F1.000	25.350	150				
FF3.017	26.500	1.350	1050	F2.000	25.150	150				
FF3.016	27.300	2.457	1200	F1.001	24.843	150	F1.000	24.888	150	45
							F2.000	24.843	150	
FF2.067	27.000	2.425	0		OUTFALL		F1.001	24.575	150	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	o	150	FF3.018	27.700	25.350	2.200	1200
F2.000	o	150	FF3.017	26.500	25.150	1.200	1050
F1.001	o	150	FF3.016	27.300	24.843	2.307	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	27.725	60.0	FF3.016	27.300	24.888	2.262	1200
F2.000	18.405	60.0	FF3.016	27.300	24.843	2.307	1200
F1.001	20.420	76.2	FF2.067	27.000	24.575	2.275	0

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.001	FF2.067	27.000	24.575	24.575	0	0

Simulation Criteria for Foul - Main

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	446.00	Maximum Backdrop Height (m)	1.500
Persons per House	1.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	22.590	0.377	60.0	0.000	5	0.0	1.500	o	150
F1.001	11.815	0.197	60.0	0.000	1	0.0	1.500	o	150
F2.000	20.920	1.418	14.8	0.000	4	0.0	1.500	o	150
F1.002	18.215	0.232	78.5	0.000	2	0.0	1.500	o	150

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	22.955	0.000	0.0	5	0.0	10	0.32	1.13	20.0	0.2
F1.001	22.579	0.000	0.0	6	0.0	11	0.34	1.13	20.0	0.2
F2.000	23.800	0.000	0.0	4	0.0	6	0.48	2.29	40.4	0.1
F1.002	22.382	0.000	0.0	12	0.0	15	0.39	0.99	17.5	0.4

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	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)
FF3.022	24.750	1.795	1200	F1.000	22.955	150				
FF3.021	24.600	2.022	1200	F1.001	22.579	150	F1.000	22.579	150	
FF3.020	25.650	1.850	1200	F2.000	23.800	150				
FF3.019	24.500	2.118	1200	F1.002	22.382	150	F1.001	22.382	150	
							F2.000	22.382	150	
FF2.068	24.000	1.850	0		OUTFALL		F1.002	22.150	150	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	o	150	FF3.022	24.750	22.955	1.645	1200
F1.001	o	150	FF3.021	24.600	22.579	1.872	1200
F2.000	o	150	FF3.020	25.650	23.800	1.700	1200
F1.002	o	150	FF3.019	24.500	22.382	1.968	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	22.590	60.0	FF3.021	24.600	22.579	1.872	1200
F1.001	11.815	60.0	FF3.019	24.500	22.382	1.968	1200
F2.000	20.920	14.8	FF3.019	24.500	22.382	1.968	1200
F1.002	18.215	78.5	FF2.068	24.000	22.150	1.700	0

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
F1.002	FF2.068	24.000	22.150	22.150	0	0

Simulation Criteria for Foul - Main

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	446.00	Maximum Backdrop Height (m)	1.500
Persons per House	1.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	DWF (l/s)	k (mm)	HYD SECT	DIA (mm)
F1.000	36.783	0.613	60.0	0.000	6	0.0	1.500	o	150
F1.001	19.689	0.131	150.0	0.000	4	0.0	1.500	o	150

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ DWF (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	20.744	0.000	0.0	6	0.0	11	0.34	1.13	20.0	0.2
F1.001	20.131	0.000	0.0	10	0.0	17	0.29	0.71	12.6	0.3

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
FF3.024	22.000	1.256	1050	F1.000	20.744	150				
FF3.023	21.650	1.519	1050	F1.001	20.131	150	F1.000	20.131	150	
FF2.075	21.500	1.500	0		OUTFALL		F1.001	20.000	150	

PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	o	150	FF3.024	22.000	20.744	1.106	1050
F1.001	o	150	FF3.023	21.650	20.131	1.369	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH DIAM., L*W (mm)
F1.000	36.783	60.0	FF3.023	21.650	20.131	1.369	1050
F1.001	19.689	150.0	FF2.075	21.500	20.000	1.350	0

Appendix F – Storm Water Longitudinal Sections

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 1 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

MH Name	SS3.007	SS3.008	SS3.009	SS3.010	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000					
PN		S1.002	S1.001	S1.000	
Dia (mm)		225	225	225	
Slope (1:X)		250.0	207.7	29.3	
Cover Level (m)	26.000	26.200	26.850	27.850	
Invert Level (m)		25.094	25.174 25.174	25.375 25.375	26.350
Length (m)		19.890	41.757	28.530	

MH Name	SS3.004	SS3.005	SS3.006		
Hor Scale 1000 Ver Scale 500 Datum (m) 16.000					
PN		S1.005	S1.004		
Dia (mm)		225	225		
Slope (1:X)		250.0	250.0		
Cover Level (m)	25.650	25.900	26.000	26.000	
Invert Level (m)		24.824	24.990 24.990	25.058 25.058	25.094
Length (m)		41.520	16.865		

MH Name	SS2.028		SS3.002		SS3.004	
Hor Scale 1000 Ver Scale 500 Datum (m) 16.000				2.002		
PN			S1.008		S1.006	
Dia (mm)			300		300	
Slope (1:X)			200.0		250.0	
Cover Level (m)	26.000	25.900	25.650	25.550	25.650	
Invert Level (m)		24.561	24.561 24.638	24.638 24.678	24.678 24.824	
Length (m)			15.390		36.650	

MH Name	SS3.003		SS3.012	SS3.013	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000		1.006			
PN			S2.001	S2.000	
Dia (mm)			225	225	
Slope (1:X)			48.5	49.2	
Cover Level (m)	25.550	25.800	26.900	27.900	
Invert Level (m)		24.678 24.726	24.726 25.400	25.400 26.400	
Length (m)			32.710	49.215	

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 2 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

MH Name	SS2.029	SS3.014	SS3.015	
Hor Scale 1000 Ver Scale 500 Datum (m) 18.000				
PN		S1.001	S1.000	
Dia (mm)		225	225	
Slope (1:X)		23.8	30.0	
Cover Level (m)	27.725	28.350	29.000	
Invert Level (m)		25.725 26.850	26.850 27.500	
Length (m)		26.735	19.530	

Denis O'Sullivan & Associates		Page 1
Unit 5, Joyce House Barrack Square Ballincollig, Co. Cork	Catchment Area No. 3 Phase 3, Heathfield Ballincollig, Cork	
Date 28/06/2023 File SW Model - Catchm...	Designed By S.O.'Grady Checked By	
Micro Drainage	Network W.12.4	

MH Name	SS2.049	SS3.016	SS3.018	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000			2.000	
PN		S1.001	S1.000	
Dia (mm)		225	225	
Slope (1:X)		200.0	69.4	
Cover Level (m)	27.000	27.300	27.700	
Invert Level (m)		24.875 24.975	25.800 26.200	
Length (m)		20.040	27.765	

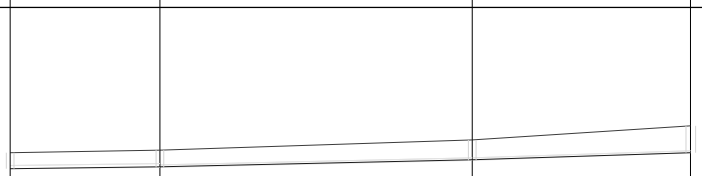
MH Name	SS3.016	SS3.017	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000		1.000	
PN		S2.000	
Dia (mm)		225	
Slope (1:X)		200.0	
Cover Level (m)	27.300	26.550	
Invert Level (m)		24.975 25.053	
Length (m)		15.640	

MH Name	SS2.050	SS3.019		SS3.021	
Hor Scale 1000 Ver Scale 500 Datum (m) 14.000			2.000		
PN		S1.002		S1.000	
Dia (mm)		225		225	
Slope (1:X)		33.8		172.1	
Cover Level (m)	24.000	24.500	24.600	24.750	
Invert Level (m)		22.420	23.000 23.000 23.100	23.100	23.250
Length (m)		19.625		25.810	

MH Name	SS3.019	SS3.022	
Hor Scale 1000 Ver Scale 500 Datum (m) 15.000		1.001	
PN		S2.000	
Dia (mm)		225	
Slope (1:X)		20.9	
Cover Level (m)	24.500	25.650	
Invert Level (m)		23.000	24.150
Length (m)		23.985	

MH Name	SS2.053	SS3.023	SS3.024	
Hor Scale 1000 Ver Scale 500 Datum (m) 12.000				
PN		S1.001	S1.000	
Dia (mm)		225	225	
Slope (1:X)		127.0	105.1	
Cover Level (m)	21.500	21.650	22.000	
Invert Level (m)		20.000 20.150	20.150 20.500	
Length (m)		19.050	36.780	

Appendix J – Foul Sewer Longitudinal Sections

MH Name	FF3.007	FF3.008	FF3.009	FF3.010	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000					
PN		F1.002	F1.001	F1.000	
Dia (mm)		225	150	150	
Slope (1:X)		200.0	87.2	60.0	
Cover Level (m)	26.000	26.200	26.850	27.800	
Invert Level (m)		24.945	25.044 / 25.044	25.518 / 25.518	26.000
Length (m)		19.835	41.325	28.900	

MH Name	FF3.004	FF3.005	FF3.006		
Hor Scale 1000 Ver Scale 500 Datum (m) 16.000					
PN		F1.005	F1.004		
Dia (mm)		225	225		
Slope (1:X)		200.0	200.0		
Cover Level (m)	25.500	25.650	25.900	26.000	
Invert Level (m)		24.596	24.809 / 24.809	24.893 / 24.893	24.945
Length (m)		42.660	16.860		

MH Name	FF2.027		FF3.002		FF3.004	
Hor Scale 1000 Ver Scale 500 Datum (m) 16.000			2.002			
PN			F1.008		F1.006	
Dia (mm)			225		225	
Slope (1:X)			200.0		200.0	
Cover Level (m)	26.000	25.900	25.650	25.550	25.500	
Invert Level (m)		24.282	24.282 24.358	24.358 24.396	24.396 24.596	
Length (m)			15.255		39.885	

MH Name	FF3.003		FF3.012	FF3.013	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000		1.006			
PN			F2.001	F2.000	
Dia (mm)			150	150	
Slope (1:X)			24.8	54.6	
Cover Level (m)	25.550	25.850	27.000	27.900	
Invert Level (m)		24.396 24.450	24.450 25.650	25.650 26.550	
Length (m)			29.725	49.105	

MH Name	FF2.028	FF3.014	FF3.015	
Hor Scale 1000 Ver Scale 500 Datum (m) 18.000				
PN		F1.001	F1.000	
Dia (mm)		150	150	
Slope (1:X)		29.7	33.1	
Cover Level (m)	27.725	28.350	29.000	
Invert Level (m)		25.530 26.500	26.500 27.150	
Length (m)		28.845	21.505	

MH Name	FF2.067	FF3.016	FF3.018	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000			2.000	
PN		F1.001	F1.000	
Dia (mm)		150	150	
Slope (1:X)		76.2	60.0	
Cover Level (m)	27.000	27.300	27.700	
Invert Level (m)		24.575 24.843	24.888 25.350	
Length (m)		20.420	27.725	

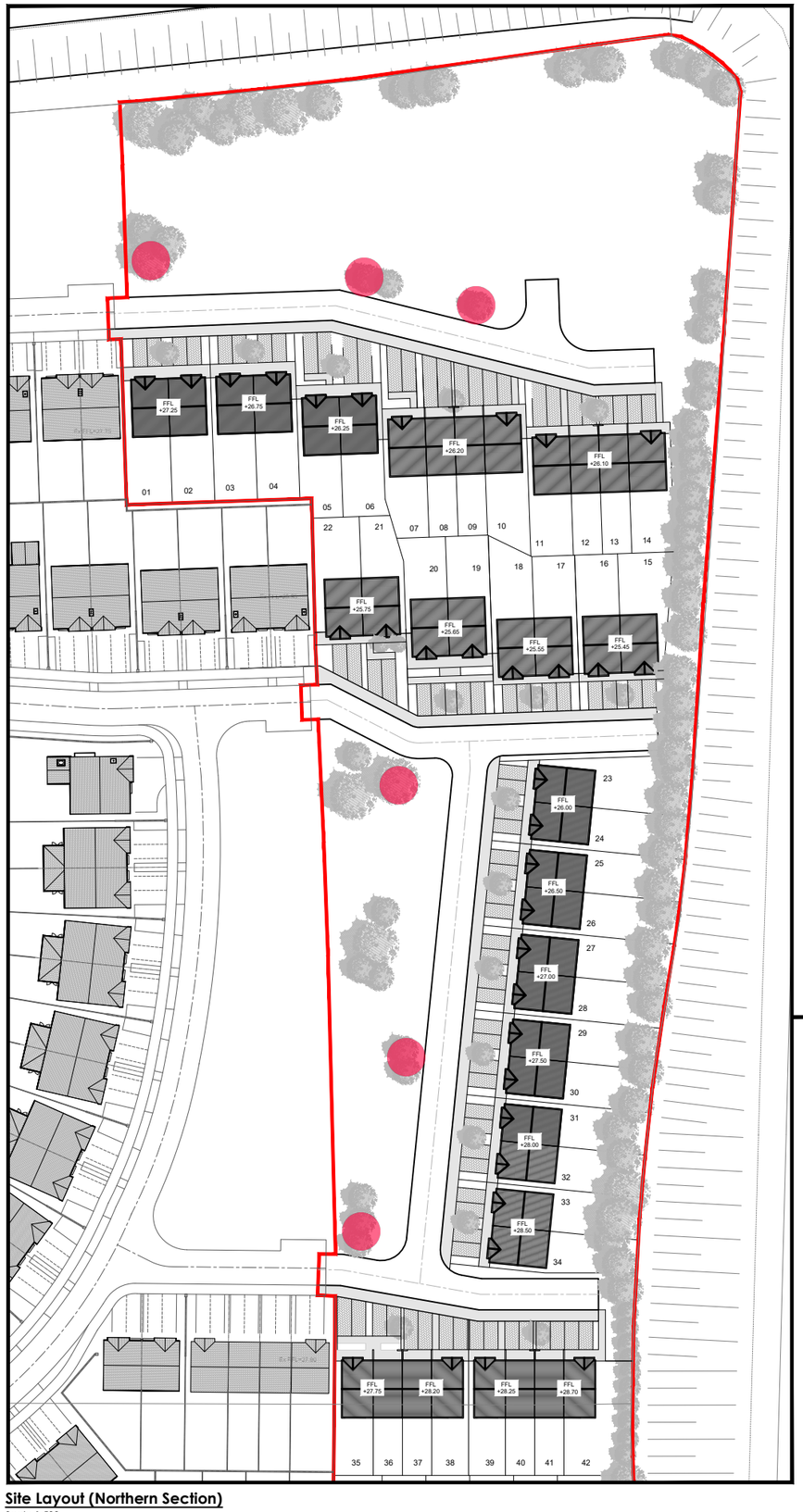
MH Name	FF3.016	FF3.017	
Hor Scale 1000 Ver Scale 500 Datum (m) 17.000		1.000	
PN		F2.000	
Dia (mm)		150	
Slope (1:X)		60.0	
Cover Level (m)	27.300	26.500	
Invert Level (m)		24.843 25.150	
Length (m)		18.405	

MH Name	FF2.068	FF3.019		FF3.022	
Hor Scale 1000 Ver Scale 500 Datum (m)	14.000		2.000		
PN		F1.002		F1.000	
Dia (mm)		150		150	
Slope (1:X)		78.5		60.0	
Cover Level (m)	24.000	24.500	24.600	24.750	
Invert Level (m)		22.150 22.382	22.382 22.579	22.579 22.955	
Length (m)		18.215		22.590	

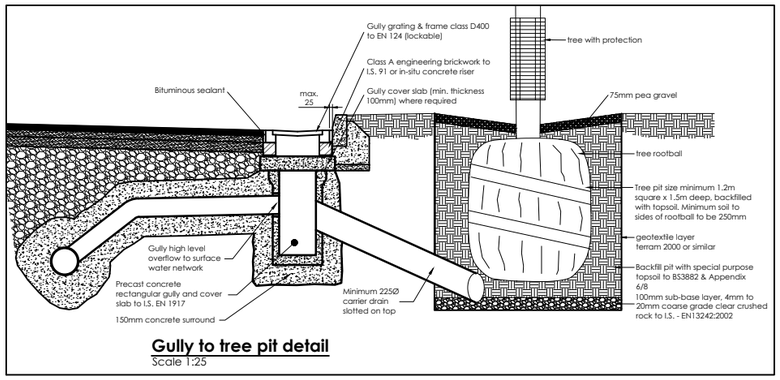
MH Name	FF3.019	FF3.020	
Hor Scale 1000 Ver Scale 500 Datum (m)	15.000	1.001	
PN		F2.000	
Dia (mm)		150	
Slope (1:X)		14.8	
Cover Level (m)	24.500	25.650	
Invert Level (m)		22.382 23.800	
Length (m)		20.920	

MH Name	FF2.075	FF3.023	FF3.024	
Hor Scale 1000 Ver Scale 500 Datum (m) 12.000				
PN		F1.001	F1.000	
Dia (mm)		150	150	
Slope (1:X)		150.0	60.0	
Cover Level (m)	21.500	21.650	22.000	
Invert Level (m)		20.000 20.131	20.131 20.744	
Length (m)		19.689	36.783	

Appendix H – SuDS Proposal



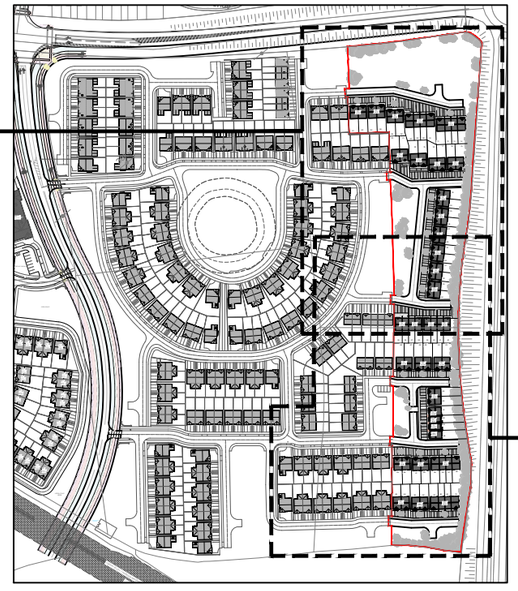
Site Layout (Northern Section)
Scale 1:500



Gully to tree pit detail
Scale 1:25

Legend:

Tree Pit



Key Plan
Scale 1:2500

Site Layout (Southern Section)
Scale 1:500

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REV.	DRAWN	CHKD	APPRVD	DATE	DETAILS
B	K.M.	S.O'G.	L.O'T.	05.07.'23	Issued for Information

CLIENT: MOS Homes Ltd.

PROJECT: Residential Development at Carriganarra, Ballincollig.

DRAWING TITLE: Schematic SUDS Layout Plan

SHEET: A1

SCALE: 1:500

PROJECT NO.	PHASE	DRAWING NO.	STATUS/ISSUE
4208	PH03	0326	B