

DRAINAGE AND WATERMAIN DESIGN REPORT

Keeraun Social Housing Development, Galway

MGC0716-RPS-00-XX-RP-C-RP0004
Drainage and Watermain Design Report
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REPORT

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Prepared by:

RPS

Galway City Council

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1 INTRODUCTION

RPS are acting as Civil and Structural Consulting Engineers for Galway City Council's proposed social housing development at a greenfield site located in Keeraun, Ballymoneen Road, Galway City. Galway City Council (GCC) is the owner of the plot of residential zoned lands and intend to develop 71 housing units (mix of 1 – 4 bed housing units) and 8no. culturally appropriate traveller specific units on site.

New watermain, storm water and foul water networks will be constructed to service the proposed development. The storm water and foul water networks will outfall to Local Authority (LA) and Irish Water (IW) systems within the site. These existing systems are currently crossing the site and will be diverted to accommodate the works. The watermain, storm water and foul water drainage proposals are shown in **Appendix A**.

The maximum occupancy of the development is to be approximately 186 residents, the proposed maximum design population for the purposes of drainage is approximately 186 residents. This report addresses the following design streams:

- Foul flows which are dealt with in Section 2 of the report,
- Surface water flows, and attenuation are dealt with in Section 3 of the report, and
- Water supply to the site which is dealt with in Section 4 of the report.

This report should be read in conjunction with the following RPS drawings, being submitted with this planning application:

- MGC0716-RPS-00-XX-DR-C-DR0001 (01 & 02) – Storm Water Layout
- MGC0716-RPS-00-XX-DR-C-DR0002 (01 & 02) – Foul Water Layout
- MGC0716-RPS-00-XX-DR-C-DR0003 (01& 02) – Watermain Layout

1.1 Site Characteristics

The site is largely a greenfield site with a temporary access road bounding the southern edge of the site. The access navigates from the north western corner to the south east corner of the site.

The temporary access road was constructed on site to accommodate LA storm water and IW foul water drains which connect the north of Ballymoneen road to the Galway city network. Both pipes are directed toward the Clybaun road to the east.

The level of the site appears to have been lowered along the access road to suit cover and invert levels of manholes. The site is relatively flat along the access road. There is a variation in the levels across the remainder of the site with high and low points throughout. The site dips in the middle where an existing stream runs from south to the north through the site.

The site is bounded to the west by the Ballymoneen road. The site is bounded to the north by a masonry wall faced in natural stone of approximately 2m high. The site is bounded to the south by a post and wire fence and to the east by a combination of a post and wire fence and dry stone wall.

2 FOUL FLOWS

2.1 Site Background

2.1.1 Existing foul water services

A topographical and manhole survey was completed by NCW Surveys in October 2020. This survey verified the location of the existing services as determined by the equipment and methodology employed by the surveyor. The survey provides information on service locations, indicative depth, and the nature (type) of the underground service/utility. This information is used to assist with preparing the drainage design for the proposed development.

2.2 Foul Sewer Design Procedure

The proposed foul sewerage system was designed using the Wallingford Tables and Microdrainage design software. Wastewater loadings were based on EPA Guidance document, 'Treatment Systems for Small Communities, Business, Leisure Centres and Hotels'.

Drainage calculations submitted in **Appendix B** have been generated by 'Micro Drainage' flow modelling software, and the 'Hydraulic Design for Gravity Sewers' method to Irish Water Code of Practice for Wastewater Infrastructure. Gradients should be selected so that self-cleansing velocities can be maintained under normal operating conditions. The range of flow velocity within the sewers should be between 0.75m/s at low flow and 3m/s, when flowing full.

The proposed foul drainage network will be constructed in accordance with Irish Water Code of Practice for Wastewater Infrastructure, The Building Regulations 'Part H' & the Regional Code of Practice for Drainage Works. The sewers will be compliant with the requirements of the Irish Water Code or Practice for Wastewater Infrastructure and will be from 150mm to 225mm in diameter. Foul sewers within the building's plots may be as small as 100mm dia. In accordance with TGH H – Drainage specifications and with Irish Water Code of Practice.

Foul water will outfall to the southern corner of the proposed development. The proposed foul sewerage system will outfall to IW foul sewerage system via existing manhole EF05, See drawing **MGC0716-RPS-00-XX-DR-C-DR0002** for details.

2.3 Foul Services design parameters

The following parameters were used for the basis of design (refer to **Table 2-1**).

Table 2-1 Design Parameters

Parameters	Values	Reference
Flow Rates	Varies	As per EPA Wastewater Treatment Manual
Peak Flow	6.0 x Dry Weather Flow (DWF) (based on a 10hr working day)	Irish Water Guidelines
Min Velocity	0.75m/s at one-third design flow. Alternatively, as set out in Section B4 of Sewers for adoption.	Wastewater Code of Practice & Sewers for Adoption
Pipe Roughness	1.50mm	(Colebrook/White)
Pipe Cover	1.2m minimum without concrete encasement – light trafficked areas 0.6m minimum without concrete encasement – gardens	Site Development Works for Housing Areas

2.4 Pipe and manhole numbering

The manhole numbers define the structure of the network. The foul water manholes are labelled such that labels in the direction of flow are typically in increasing order. F01, F02, etc. is used for foul sewers located inside the site boundary of this development. Diverted manholes will be labelled FS01. Existing manholes will be labelled EF01 (refer to Drawing **MGC0716-RPS-10-XX-DR-C-DR002** in **Appendix A**).

2.5 Foul loadings from proposed development

Foul loadings from the proposed development are shown below. The maximum foul flow from the proposed development has been calculated as 1.92 litres/sec. This value is based on a peak factor of 6:

- 446l/day per residential unit (based on 2.7 persons per unit x 150l/person/day, + a 10% increase factor).
- 446l/day/unit x 71 units = 31,666 l/day = 31.66 m³/day;
- 0.366 l/sec Average flow (1 DWF);
- 2.19 l/sec Peak Flow (6 DWF – Population between 0 and 750)

The minimum capacity of any sewer in the proposed design is **37.2 litres/sec** as such the design can cater for the proposed developments flow. For detailed output from the foul sewer design refer to **Appendix B**.

2.6 Diversion of Existing Foul Network

The existing IW network crossing the site will have to be diverted to accommodate the proposed dwellings along the southern boundary of the site. RPS contacted IW Diversion team on the 28th September 2020 to outline our proposals. IW Diversions team stated that they were happy in principle with RPS proposals. IW have asked RPS to complete a diversion application form for the development which can be completed following grant of planning.

The new design/proposal for the diversion route is to comply with IW Standards and Code of Practices. Details of this can be seen in the drawing **MGC0716-RPS-00-XX-DR-C-DR0002**.

3 SURFACE WATER FLOWS

3.1 Site Background

3.1.1 Existing Storm Water Services

IW database shows a 300mm Ø storm water pipe network and a 300mm Ø foul water pipe network mapped on the site. NCW survey has shown that both pipes are 225mm Ø pipes. The pipes cross the site along the existing access road. There are several manholes within the site and the manholes to the east can facilitate both storm water and foul water connections.

There is an existing drainage ditch traversing the site. The depth of the drain varies from 0.5m to 1.0m.

3.2 Storm Water Design Procedure

The site is 2ha has a hardstanding area of 1.039ha with a total impermeable area of 0.838ha which is to be drained to the new proposed surface water system. Storm flows will be attenuated and restricted to a specified and agreed discharge rate.

All proposed developments must ensure that SUDS are incorporated into the development. SUDS requires that post development run-off rates be maintained at the equivalent to, or lower than, the pre-development run-off levels. Thus, the development must be able to retain, within its boundaries, storm water volumes from extreme storm events up to and including a design for a 1 in 100 year storm event, more commonly expressed as a 1.0% AEP (Annual Exceedance Probability), while also allowing for climate change factors (+CC).

Any new development must have physical capacity to retain storm water volumes as directed under the Greater Dublin Strategic Drainage Study and, if necessary, release this attenuated surface water runoff before it enters a natural watercourse or into a public sewer, which ultimately discharges to a water body. This is to ensure the highest possible standard of storm water quality.

The new surface water sewerage system was designed using Innovyze MicroDrainage software which is based on the Wallingford Tables and the Modified Rational Method of storm flow modelling. The rainfall and climate data used in all designs was extracted directly from maps built into the program. The M5-60, R, SAAR, soil infiltration values etc were all derived for the site. Such data is given on the appropriate appendices of this report of MicroDrainage outputs for the surface water network.

3.3 Surface Water Impact Assessment

The management of surface water for the proposed development has been designed to comply with the policies and guidelines outlined in the Greater Dublin Strategic Drainage Study (GDSDS) and with the requirements of Galway City Council. The guidelines require the following 4 main criteria to be provided by the design:

3.3.1 Criterion 1: River Water Quality Protection:

Interception storage of at least 5mm, and preferably 10mm, of rainfall where runoff to the receiving water can be prevented. It is proposed that the overall drainage system, serving this development, will contain a range of surface water treatment methods

- interception storage and treatment within the site
- all road gullies to be trapped
- intensive landscaping where possible
- fuel separator and silt trap prior to entering attenuation area.

3.3.2 Criterion 2: River Regime Protection

Surface water discharge from the overall development will be restricted to the greenfield equivalent rural runoff rate of 4.0 l/s/ha, as per the Galway County Council Development Plan and the GDSDS. This will be achieved with the provision of a flow restrictor (Hydro-Brake Optimum, by Hydro-International, or similar approved) upstream of the outfall manhole.

3.3.3 Criterion 3: Level of Service (flooding) for the site.

There are four sub-criteria for the required level of service, for a new development; as set out in the GDSDS Volume 2, Section 6.3.4 (Table 6.3):

- No flooding on site except where planned (30-year high intensity rainfall event);
- No internal property flooding (100-year high intensity rainfall event);
- No internal property flooding (100-year river event and critical duration for site) and;
- No flood routing off site except where specifically planned. (100-year high intensity rainfall event).

3.3.3.1 Sub-Criteria 3.1

The surface water drainage system, serving the proposed development, has been designed to accommodate the 100-year return period rainfall event (including an allowance of 20% increase in rainfall intensity for climate change) without flooding. Therefore, the system has capacity for the 30-year return period rainfall event without flooding. The performance of the proposed drainage system has been analysed for design rainfall events up to, and including, the 1% AEP event (incl. 20% climate change allowance) using the MicroDrainage Network Design Software, by Innovyze Inc. Refer to Appendix B for details of design criteria, calculations, and results. The analyses indicate that no flooding will occur for design rainfall events up to, and including, the 1% AEP.

3.3.3.2 Sub Criteria 3.2

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 100-year return period rainfall event (including an allowance of 20% increase in rainfall intensity for climate change) without flooding. The performance of the proposed drainage system in 100-year return period storm events (incl. 20% climate change allowance) has been analysed – Refer

Appendix B for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

3.3.3.3 Sub Criteria 3.3

Details of the potential flood risk associated with the proposed development is outlined in a Site Specific Flood Risk Assessment, which is submitted under separate cover, as part of this application. The assessment indicates that there is no apparent risk of internal property flooding.

3.3.3.4 Sub Criteria 3.4

The surface water drainage systems, serving the proposed development, have been designed to accommodate the 100-year return period rainfall event (including an allowance of 20% increase in rainfall intensity for climate change) without flooding, so no flood routing off site will be experienced for such a rainfall event. The performance of the proposed drainage system in 100-year return period storm events (incl. 20% climate change allowance) has been analysed – Refer Appendix B for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

3.3.4 Criterion 4: River flood protection

Attenuation storage is to be provided for the 100-year return period rainfall event (including an increased 20% rainfall intensity; to allow for climate change). Discharge from site is to be achieved through the use of a flow restrictor (e.g., Hydro-Brake Optimum, by Hydro-International, or similar approved), which will reduce the risk of blockage present with other flow devices. Refer to Appendix B for details of hydraulic modelling calculations of attenuation and flow control facilities, as carried out using MicroDrainage software by Innovyze Inc.

3.4 Site Specific SUDS Measures

Sustainable Drainage Systems (SuDS) were considered for the site, in line with recommendations of Greater Dublin Strategic Drainage Strategy (GSDS). SuDS are a method of replicating the natural characteristics of rainfall runoff from any site. The various types of SuDS considered are outlined below.

- **Infiltration** – Soaking water into the ground. This is the most desirable solution to runoff management as it restores the natural hydrological process. Infiltration rates in this area not suitable for infiltration of a 100 year, 6 hour duration storm event within the site. This was determined by site investigation works carried out by Ground Investigations Ireland. However, local infiltration to ground can be accommodated to the rear of the proposed dwellings using a soakaway system design to meet the requirements of BRE 365.
- **Conveyance** – the transfer of surface water runoff from one place to another. Controlled conveyance can provide links between various SuDS components. Conveyance is implemented within this development through the use of landscaped swales. The swales will be placed where appropriate to drain roads next to Public open space. The swale will be broad and shallow and covered in suitable vegetation to slow water, facilitating sedimentation, filtration through root zones and soil matrix, evapotranspiration and infiltrating into the underlying soil. Excess flows will be conveyed into the stormwater system in periods of high rainfall.

- Detention/Attenuation – Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before infiltration, controlled release, or use. In this case, the slowing down of surface flows before discharging off-site. This is achieved using a Geo-cellular storage attenuation system with controlled release. This system will be utilised within this site with runoff rates determined by Galway City Council.

3.5 Design Parameters

The following parameters were used for the basis of design in the Innovyze MicroDrainage Module.

Table 3-1 Design Parameters Road Runoff Surface Network

Parameters	Values	Reference
Return Period	30 Year	Wallingford Procedure
M5-60	17.0	Wallingford Procedure
Ratio 'R'	0.300	Wallingford Procedure
Max Rainfall	Paved Areas 50mm/hr Roof Areas 75mm/hr	Wallingford Procedure
Global Time Entry	5 minutes	Wallingford Procedure
Minimum Velocity	0.75m/s	Site Development Works for Housing Areas
Run-Off Co-efficient	Roof Areas 1.0 Paved Areas 0.75	BS EN 16941-1
Pipe Roughness	0.6mm Concrete / 0.15mm uPVC	Colebrook/White
Pipe Cover	1.2m minimum without concrete encasement in trafficked areas 0.6m minimum with concrete encasement in trafficked areas	TGD H
Climate Change	20%	Transport Infrastructure Ireland Drainage Systems for National Roads - DN-DNG-03022

3.5.1 Proposed Storm Water Services

Storm water generated from new hard landscaping and roofs on site will be directed to an onsite attenuation tank. Prior to entering the attenuation system, the proposed surface water collection networks will outfall to a hydrocarbon interceptor and silt trap manhole. Terraced housing and apartment buildings will incorporate appropriately sized soakaways to rear gardens to capture storm water runoff. The soakaways are to be designed to BRE365 specifications and will infiltrate to ground.

Surface water from trafficked areas will be intercepted by a suitable petrol interceptor prior to entering the attenuation system. In some instances, surface water from trafficked areas will enter landscaped swales.

The attenuated storm water will then be discharged to the LA system at a suitable greenfield runoff rate, agreed with the LA (4l/s/ha).

The existing stormwater pipe network is directed east towards the Clybaun road and increases to a 1200mm Ø pipe on the Western Distributor Road.

The proposed Storm water sewer system is shown on Drawings **MGC0716-RPS-10-XX-DR-C-DR0001**. For detailed outputs from the surface water network design, including network details and 100-year storm event simulation results, refer to **Appendix B**.

3.6 Pipe and Manhole Numbering

The manhole numbers define the structure of the network. The surface manholes are labelled such that labels in the direction of flow are typically in increasing order. S01, S02, etc. is used for surface water sewers. Diverted manholes will be labelled DS01. Existing manholes will be labelled ES01. Diverted stream will be labelled C01. The manholes are labelled such that labels in the direction of flow are typically in increasing order. (refer to drawing **MGC0716-RPS-00-XX-DR-C-DR0001** in **Appendix A**).

3.7 Hydrocarbon / Oil Interceptor

A hydrocarbon interceptor will be provided prior to the attenuation areas. In accordance with the requirements of BS EN 858, 4.1 (b) '(run-off) from impervious areas, e.g., car parks, roads, factory yards areas,' the size of the separator will depend on the design, rainfall intensity and the catchment area draining to the separator.

A Class1 Bypass hydrocarbon Interceptor is proposed prior to attenuate and discharge to the proposed outfall ES01, within the estate. It is recommended to use a Kingspan Klargestor or equivalent approved surrounded in 300 mm mass concrete. The location of the interceptor is outlined in drawing **MGC0716-RPS-00-XX-DR-C-DA5001**, in **Appendix A**.

The maximum rainwater flow rate Q_r in l/sec shall be calculated using the equation below in accordance with EN 752-4:

$$Q_r = \Psi \cdot i \cdot A$$

Where,

- i is the rainfall intensity, in litres /sec / hectare.
- A is the area receiving rainfall, measured horizontally, in ha;
- Ψ is a dimensionless coefficient (usually taken as one)

Pollution prevention guidelines (PPG 3) use rainfall intensity equal to 6.5mm/hr which corresponds to the following formula for a bypass separator:

$$NSB = 0.0018 \times A$$

Where,

- NSB: Nominal Size of Bypass separator
- A : Catchment Area in m^2

The impermeable areas draining to the proposed bypass separator is approximately 8650 m² which includes all impermeable surfaces on the site.

NSB required = $0.0018 \times 8380 = 15.08$ l/s NSBE025 is suitable

Details of the sizing of the proposed interceptor for NSBE025 is provided in **Appendix D**. The maximum storm water flow that the bypass facility can cater for is 250 l/s. The maximum design flows in the storm system is 214.4 l/s for a 1 in 100yr storm event so the bypass facility has sufficient capacity to cater for this flow.

3.8 Attenuation Design

Overall site storage requirements have been estimated using the Wallingford IH124 Method attached in Appendix B. The MicroDrainage software Source Control has been utilised as the volume estimation tool is used as a baseline for storage. The Greenfield Run-off Rate is calculated to IH124 in accordance with GDSDS using the Source Control tool within MicroDrainage and the discharge rate is then input into the volume estimation tool. An integrated drainage model is then developed to verify storage requirements for the site using MicroDrainage provided by Innovyze.

The estimation tool is used to gauge the initial storage size for the model and adjustments are made to meet the requirements of the GDSDS. The calculations and output report in Appendix B has been produced using the Source Control storage volume estimation tool. Please see below a summary of the estimated required and proposed volumes in accordance with GDSDS requirements. It is noted that the storm water network, including manholes, is designed according to the GDSDS and the Greater Dublin Region Code of Practice. The wastewater network, including manholes, are designed according to the Irish Water Code of Practice Wastewater (IW-CDS-5030-03).

The attenuation is designed to cater for the 1 in 100-year return period storms with an additional allowance of 20% for climate change. The system attenuates the max outflow for the 1 in 100-year storm to the equivalent greenfield run-off rate. The greenfield run-off rate was calculated using the IH 124 method for a site in the Galway area. When using the IH 124 method for sites smaller than 50ha, best practise suggests calculating a flow for a 50ha site and factor down the rate according to the actual size of the site in question. The contributing area of the subject site **0.838ha**. The outputs from MicroDrainage Rural run-off calculator are given in **Appendix C**. The results indicate that the greenfield run-off rate for a 50ha site is 203.5 l/s and when this rate is factored down the allowable outflow rate for the 1 in 100-year return period storm is 4.084 l/s;

$203.5 \text{ l/s} \div 50\text{Ha} = 4.068 \text{ l/s/ha}$
 $4.07 \text{ l/s/ha} \times 0.838 \text{ Ha} = 3.41 \text{ l/s.}$

Following consultations with Galway City council, RPS have applied an outflow rate of **2 l/s/ha** to the proposed development. With a flow control of **4 l/s**, source Control attenuation design software indicates that **457.2m³** of storage is required to achieve the attenuation requirements – refer to **Appendix C**. Using a proprietary attenuation system and flow control system (attenuation system to have a nominal void ratio of 95%) the typical layout shown in Drawing **MGC0716-RPS-00-XX-DR-C-DR5002**, a plan area of 565m² will be required – During intense rainfall in excess of the allowable discharge rate, the proposed system will store the excess water and only allow this to discharge at the allowable discharge rate until the system is

completely empty. It should be noted that the proposed attenuation system will not impact the flow during low flow events. The maintenance of the system should be carried out as per the manufacturer's recommendations.

3.9 Diversion of Existing Storm Network

The existing LA storm water network crossing the site will have to be diverted to accommodate the proposed dwellings along the southern boundary of the site. RPS contacted Galway City Council on the 24th September 2020 to outline our proposals. The LA responded on the 25th September 2020 and stated that they were happy in principle with RPS' proposals.

RPS met with Galway City Council on the 04th March 2021 and updated GCC on the storm water diversion proposals. GCC were satisfied with RPS' proposals. Details of this can be seen in the drawing, **MGC0716-RPS-00-XX-C-DR0001**.

4 WATER SUPPLY

IW database shows a 250mm Ø uPVC watermain on the Ballymoneen road. NCW topographical survey has captured the location of the watermain. RPS have engaged with IW by completing a Pre-connection Enquiry form to establish the feasibility of a water/waste water connection.

It is proposed to tie into this watermain to provide a watermain feed to the proposed buildings. A sluice valve and water meter will be provided prior to connection to the new building as indicated in drawings in **Appendix A**. The water main layout and details including valves, hydrants, metering etc. will be in accordance with Irish Water's Code of Practice and Standard Details for water infrastructure

A looped watermain will service the site with hydrants used to provide hydrant fire cover. This new watermain will be 150mm diameter PE100 HDPE pipe. Individual houses will have their own connections to the looped watermain via service connections and boundary boxes. Individual service boundary boxes will be of the type to suit Irish Water and to facilitate domestic meter installation. Hydrants are provided for firefighting at locations to ensure that each dwelling is within the required Building Regulations distance of a hydrant.

An underground storage tank for firefighting requirements is proposed for the site. This storage tank will be connected to the watermain and will incorporate an automated level control system. The access requirements for fire fighters will be fully agreed with the Local Area Fire Officer prior to construction. The required supply for firefighting purposes comes from the Water UK document "National guidance document on the provision of water for firefighting" which calls for 35 litres/second for a site with an area of between one and two hectares.

The maximum tank volume will be **72m³**, this caters fully for the requirements of the above regulations. This may be reduced pending results from the testing of watermain and existing fire hydrant capacity. The proposed water main layout is shown on drawing No. **MGC0716-RPS-00-XX-DR-C-DR003** in **Appendix A**.

5 STREAM

There is a shallow stream crossing the site in a south – north direction. The stream enters the site from the south via an existing 600mm dia. concrete pipe. This pipe was installed to allow construction access to the east of the site. The concrete pipe outfalls into an open stream which falls to the north. There is an existing culvert at the northern boundary of the site. The stream passes through this culvert and enters the neighbouring site to the north.

Due to the layout of the housing development, the existing stream must be diverted. The stream will also be piped along its full length. RPS drainage drawings show proposed diversion and culvert, see drawings **MGC0716-RPS-00-XX-C-DR0001-01 & 02** - Storm Water Drainage.

In earlier design iterations, the stream was to be retained to create an amenity within the site, however, this option discounted due to the site layout which resulted in an unfavourable level differential within the site. Creating an amenity would result in the addition of several retention structures between the proposed road and the stream. This was believed to be both uneconomical and unsafe as the works would result in the retention of only a short section of the stream.

The proposed diversion will be a 900mm dia. concrete pipe which will carry flows from the south eastern corner of the site (via a headwall) to the northern lands (via an existing Culvert). Replicating the existing flow of the water on site.

6 FLOODING

A Flood Risk Assessment (Stage I) has been carried out for the site and forms part of the planning pack. Please refer to document MGC0716-RPS-00-XX-RP-C-RP0009 in **Appendix E** which concludes that the subject site is not under any flood risk. Therefore, no further detailed flood risk assessment for the subject site is required.

7 IRISH WATER

RPS completed a Pre-connection enquiry form and submitted this to Irish Water on the 22nd February 2021. RPS received feedback from Irish Water on the 05th August 2021 via a standard confirmation of feasibility, attached in **Appendix E**.

- Water connection –
 - IW not that the 250mm diameter watermain positioned in the road at the site entrance has capacity to supply the proposed development
- Wastewater connection
 - IW note that the 300mm diameter existing foul sewer main positioned in the South West boundary of the site may have be to diverted. See sections 2.6 of this report outlining RPS correspondence with IW relating to the foul water network diversion.

Appendix A

Drainage Layout, Detailed Drawings

S:\MGC0716 - Keeraun Social Housing Galway CC\6.0 Drawings\DR\DR0001 - Storm Water Network\MGC0716-RPS-00-XX-C-DR0001 - Storm Water Drainage.dwg

LEGEND

- SITE BOUNDARY
- EXISTING SURFACE WATER SERVICE & MANHOLE
- EXISTING SURFACE WATER SERVICE & MANHOLE TO BE DECOMMISSIONED
- PROPOSED SURFACE WATER SERVICE & MANHOLE TO BE DIVERTED
- PROPOSED SURFACE WATER SERVICE & MANHOLE
- EXISTING FOUL WATER SERVICE & MANHOLE
- EXISTING FOUL WATER SERVICE & MANHOLE TO BE DECOMMISSIONED
- PROPOSED FOUL WATER SERVICE & MANHOLE TO BE DIVERTED
- PROPOSED FOUL WATER SERVICE & MANHOLE
- FOUL NETWORK WITH CONCRETE SURROUND
- STORM NETWORK WITH CONCRETE SURROUND
- EXISTING 250mm WATER MAIN
- PROPOSED 150mm WATERMAIN
- PROPOSED GULLY
- PROPOSED SLUICE VALVE
- PROPOSED AIR VALVE
- PROPOSED BULK FLOW METER
- NON RETURN VALVE
- HYDRANT
- PROPOSED THRUST BLOCK

STORM WATER DIVERSION - NETWORK DETAILS							
Manhole Name	Cover Level (m)	MH Depth (m)	Pipe Out PN	Pipes In Invert Level (m)	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In Backdrop (mm)
DS1	59.290	1.350	DS1.000		57.940	300	
DS2	59.250	1.489	DS1.001	57.761	57.761	300	
DS3	58.750	1.493	DS1.002	57.257	57.257	300	
DS4	58.250	1.325	DS1.003	56.925	56.925	300	
DS5	58.250	1.657	DS1.004	56.593	56.593	300	
DS6	58.300	1.870	DS1.005	56.430	56.430	300	
DS7	58.000	1.996	DS1.006	56.004	56.004	300	
DS8	58.000	2.387	DS1.007	55.613	55.613	300	
DS9	57.750	2.397	DS1.008	55.353	55.353	300	
DS	57.450	2.213		55.237	OUTFALL		

CULVERT DIVERSION - NETWORK DETAILS							
Manhole Name	Cover Level (m)	MH Depth (m)	Pipe Out PN	Pipes In Invert Level (m)	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In Backdrop (mm)
C1	57.800	1.950	C1.000		55.850	900	
C2	58.000	2.206	C1.001	55.794	55.794	900	
C3	58.000	2.227	C1.002	55.773	55.773	900	
C4	58.000	2.419	C1.003	55.581	55.581	900	
C5	57.950	2.585	C1.004	55.365	55.365	900	
C	57.950	2.816		55.134	OUTFALL		

STORM WATER - NETWORK DETAILS							
Manhole Name	Cover Level (m)	MH Depth (m)	Pipe Out PN	Pipes In Invert Level (m)	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In Backdrop (mm)
S01	59.250	1.000	S1.000		58.250	300	
S10	58.750	1.250	S2.000		57.500	300	
S11	59.000	1.569	S2.001	57.431	57.431	300	
S12	59.000	1.644	S2.002	57.356	57.356	300	
S13	59.000	1.722	S2.003	57.278	57.278	300	
S02	59.000	1.802	S1.001	58.216	57.198	300	1018
S03	59.000	1.952	S1.002	57.048	57.048	300	
S04	59.000	2.040	S1.003	56.960	56.960	300	
S05	59.000	2.128	S1.004	56.872	56.872	300	
S14	58.000	1.000	S3.000		57.000	300	
S06	58.500	1.769	S1.005	56.806	56.731	375	
S15	58.250	1.250	S4.000		57.000	300	
S07	58.250	1.632	S1.006	56.618	56.618	375	
S16	58.250	1.250	S5.000		57.000	300	
S17	58.750	2.000	S6.000		56.750	300	
S18	58.500	1.783	S5.001	56.903	56.717	300	186
S19	58.750	1.300	S7.000		57.450	300	
S20	59.000	1.750	S7.001	57.327	57.250	300	77
S21	58.250	1.564	S5.002	56.686	56.686	300	
ST MH	58.150	1.715	S1.007	56.510	56.435	450	
PI	58.150	1.839	S1.008	56.411	56.311	450	100mm accounts for PI
ATT IN	58.150	1.859	S1.009	56.291	56.291	450	
ATT	58.150	2.711	S1.010	56.239	55.439	450	800mm accounts for ATT
S08	58.150	2.788	S1.011	55.362	55.362	450	
S09	58.150	2.877	S1.012	55.273	55.273	450	
	57.450	2.192		55.258	OUTFALL		

- Foul Sewer Notes:
- All foul sewer works shall be carried out in accordance with Irish Water Standard Details and Code of Practice for Wastewater Infrastructure Document CDS-5030-03.
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P05	31.08.21	CS	Issue for Stage Approval	DT
Rev	Date	Dr	Amendment / Issue	App
Client				
Galway City Council				
Project				
Housing Development , Keeraun, Ballymoneen Road, Galway				
Title				
Storm Water Network Layout				
Model File Identifier				
MGC0716-RPS-00-XX-C-DR0001				
File Identifier				
MGC0716-RPS-00-XX-C-DR0001-01				
Created on		Sheets		
December 2020		01 of 02		
Scale		Status	Rev	
1:250 @ A1 1:500 @ A3		S4	P05	



900 mm CONCRETE PIPE
WITH min 2500mm WIDE BOX
CHAMBER / HEADWALL TO
TIE INTO EXISTING CULVERT
UNDER STONE WALL

STORM WATER DIVERSION - NETWORK DETAILS							
Manhole Name	Cover Level (m)	MH Depth (m)	Pipe Out PN	Pipes In Invert Level (m)	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In Backdrop (mm)
DS1	59.290	1.350	DS1.000		57.940	300	
DS2	59.250	1.489	DS1.001	57.761	57.761	300	
DS3	58.750	1.493	DS1.002	57.257	57.257	300	
DS4	58.250	1.325	DS1.003	56.925	56.925	300	
DS5	58.250	1.657	DS1.004	56.593	56.593	300	
DS6	58.300	1.870	DS1.005	56.430	56.430	300	
DS7	58.000	1.996	DS1.006	56.004	56.004	300	
DS8	58.000	2.387	DS1.007	55.613	55.613	300	
DS9	57.750	2.397	DS1.008	55.353	55.353	300	
DS	57.450	2.213		55.237	OUTFALL		

- Watermain Notes:**
1. All watermain works shall be carried out in accordance with Irish Water Standard Details and Code of Practice for Water Infrastructure Document CDS-5020-03.
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 6. On line and off-line air valve details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 7. Sluice valve details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 8. On line and off-line hydrant details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 9. Scour valve and chamber details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.

Client	
Galway City Council	
 MAKING COMPLEX EASY	Lyrr 2, IDA Business & Technology Park, Mervue, Galway T +353 91 400200 W www.rpsgroup.com/ireland E ireland@rpsgroup.com

Storm Water Network Layout

File Identifier
MGC0712-RPS-00-XX-C-DR0001-02

Created on December 2020	Sheets 02 of 02	
Scale 1:250 @ A1 1:500 @ A3	Status S4	Rev P05

Manhole Name	Cover Level (m)	MH Depth (m)	Pipe Out PN	Pipes In Invert Level (m)	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In Backdrop (mm)
F01	58.750	1.675	F1.000		57.075	225	
F02	58.750	1.888	F1.001	56.862	56.862	225	
F03	59.000	2.444	F1.002	56.556	56.556	225	
F04	59.000	2.631	F1.003	56.369	56.369	225	
F05	59.000	3.242	F1.004	55.758	55.758	225	
F09	58.750	1.550	F2.000		57.200	225	
F10	59.000	2.107	F2.001	56.893	56.893	225	
F11	58.250	1.597	F2.002	56.653	56.653	225	
F12	58.250	1.925	F3.000		56.325	225	
F13	58.250	2.153	F2.003	56.497	56.097	225	400
				56.097			
F14	58.750	2.731	F2.004	56.019	56.019	225	
F06	58.750	3.172	F1.005	55.578	55.578	225	
				55.753			175
F15	58.000	1.925	F4.000		56.075	225	
F07	58.500	3.052	F1.006	55.448	55.448	225	
				55.832			384
F08	58.250	3.303	F1.007	54.947	54.947	225	
	58.150	3.233		54.917	OUTFALL		

- [illegible]



Manhole Name	Cover Level (m)	MH Depth (m)	Pipe Out PN	Pipes In Invert Level (m)	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In Backdrop (mm)
F01	58.750	1.675	F1.000		57.075	225	
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F04	59.000	2.631	F1.003	56.369	56.369	225	
F05	59.000	3.242	F1.004	55.758	55.758	225	
F09	58.750	1.550	F2.000		57.200	225	
F10	59.000	2.107	F2.001	56.893	56.893	225	
F11	58.250	1.597	F2.002	56.653	56.653	225	
F12	58.250	1.925	F3.000		56.325	225	
F13	58.250	2.153	F2.003	56.497	56.097	225	400
				56.097			
F14	58.750	2.731	F2.004	56.019	56.019	225	
F06	58.750	3.172	F1.005	55.578	55.578	225	
				55.753			175
F15	58.000	1.925	F4.000		56.075	225	
F07	58.500	3.052	F1.006	55.448	55.448	225	
				55.832			384
F08	58.250	3.303	F1.007	54.947	54.947	225	
	58.150	3.233		54.917	OUTFALL		

- Sewer Notes:**
1. All foul sewer works shall be carried out in accordance with Irish Water Standard Details and Code of Practice for Wastewater Infrastructure Document CDS-5030-03.
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 7. Sluice valve details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 8. On line and off-line air vent details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 9. Scour valve and chamber details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.

P05	31.08.21	OS PMIC	Issue for Stage Approval	OK
Rev	Date	Drn / PM	Amendment / Issue	App

Client		Galway City Council	
		Lyrr 2, IDA Business & Technology Park, Mervue, Galway T +353 91 400200 W www.rpsgroup.com/Ireland E ireland@rpsgroup.com	
Project			
Housing Development , Keeraun, Ballymoneen Road, Galway			
Title			
Foul Water Network Layout			
Model File Identifier			
MGC0712-RPS-00-XX-C-DR0002			
File Identifier			
MGC0712-RPS-00-XX-C-DR0002-02			
Created on		Sheets	
December 2020		02 of 02	
Scale	1:250 @ A1 1:500 @ A3	Status	Rev
		S4	P05

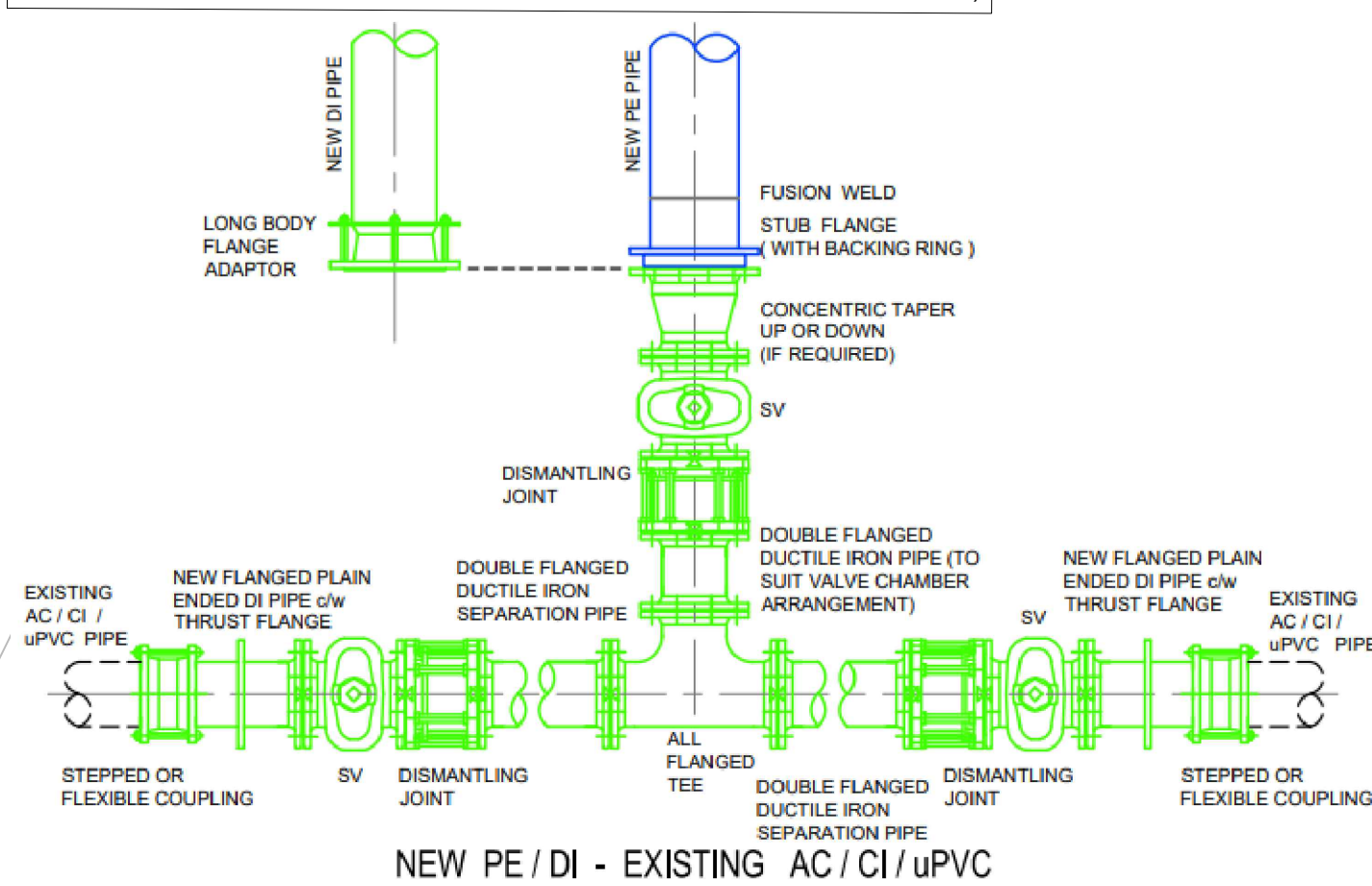
EXISTING 250mm Ø uPVC WATERMAIN ON THE BALLYMONEEN ROAD
PROPOSED CONNECTION DETAIL SHOWN BELOW (STD-W-05 GENERAL PIPE CONNECTIONS)

FOR APARTMENT BUILDINGS A BOOSTED WATER SUPPLY SYSTEM IS TO BE PROVIDED USING A CONNECTION VIA AN UNRESTRICTED AIR-GAP DEVICE (AA TYPE DEVICE, IS EN 1717) IN ACCORDANCE WITH SECTION 3.13 OF THE WATER CODE OF PRACTICE. METER IS TO BE SELECTED, SUPPLIED AND FITTED BY IW.

LEGEND

- SITE BOUNDARY
- EXISTING 250mm uPVC WATER MAIN
- PROPOSED 150mm WATERMAIN (STD-W-13)
- PROPOSED SERVICE CONNECTION 25mm HDPE (STD-W-03)
- PROPOSED SERVICE CONNECTION 80mm HDPE (STD-W-03)
- PROPOSED SLUICE VALVE (STD-W-07)
- PROPOSED HYDRANT (STD-W-18 / STD-W-19)
- PROPOSED AIR VALVE (STD-W-22 / STD-W-23)
- PROPOSED SCOUR VALVE (STD-W-30)
- PROPOSED BULK FLOW METER AND ASSOCIATED TELEMTRY SYSTEM (STD-W-26)
- PROPOSED BOUNDARY BOX (STD-W-03)
- PROPOSED THRUST BLOCK

PROPOSED CONNECTION DETAIL (STD-W-05 GENERAL PIPE CONNECTIONS)



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P04	31.08.21	CS PM/MS	Issue for Stage Approval	DT
Rev	Date	Chk	Amendment / Issue	App

Client

Galway City Council

rps MAKING COMPLEX EASY

Lyrr 2, IDA Business & Technology Park, Mervue, Galway
T +353 91 400200
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Project

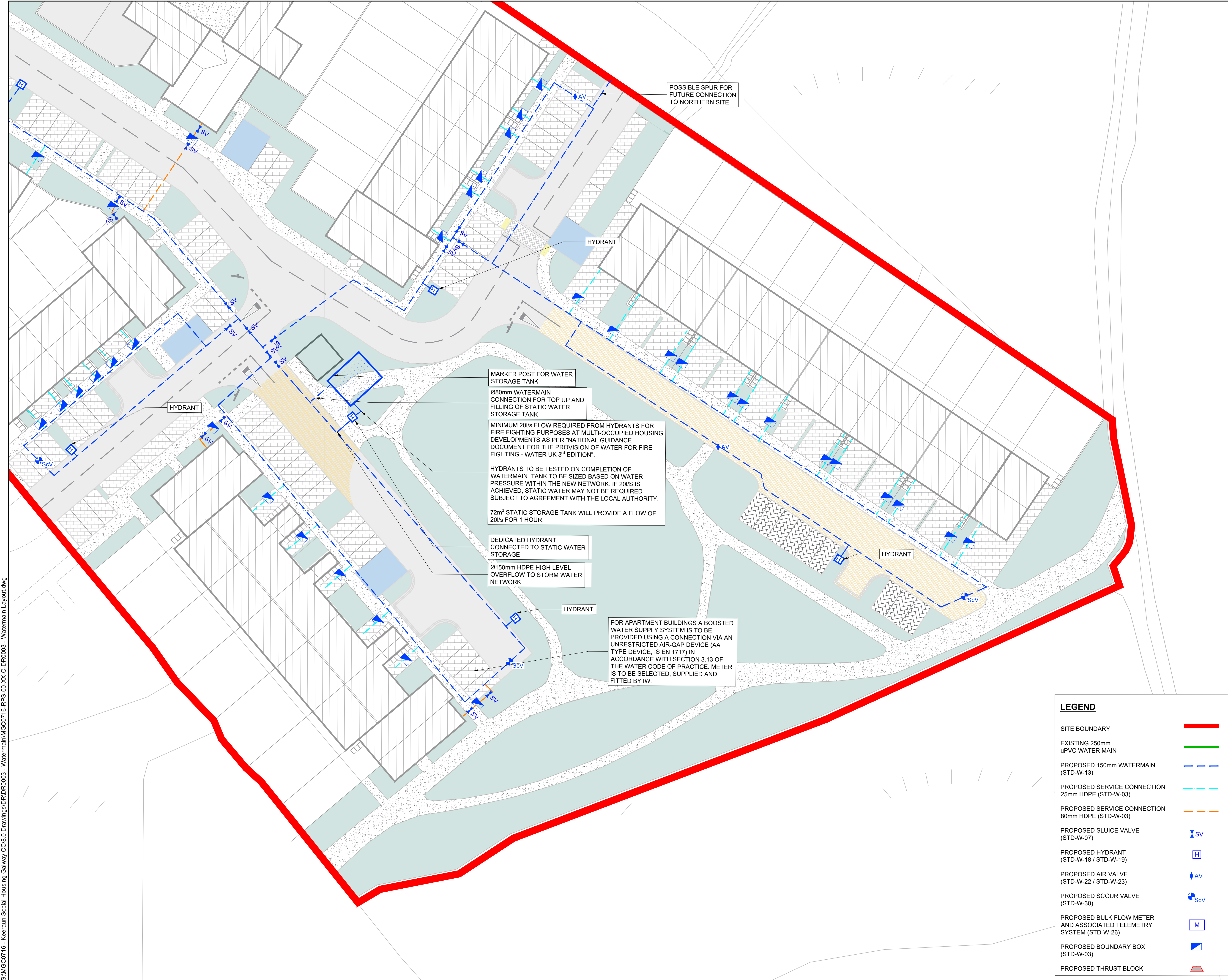
Housing Development ,
Keeraun, Ballymoneen Road, Galway

Title

Watermain Layout

Model File Identifier	MGC0716-RPS-00-XX-C-DR0003		
File Identifier	MGC0716-RPS-00-XX-C-DR0003-01		
Created on	February 2021	Sheets	01 of 02
Scale	1:250 @ A1 1:500 @ A3	Status	S4
		Rev	P05

S:\MGC0716 - Keeraun Social Housing Galway CC\8.0 Drawings\DR\DR0003 - Watermain\MGC0716-RPS-00-XX-C-DR0003 - Watermain Layout.dwg



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 3. Individual water service connections and boundary boxes shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 4. Separation distances from other services, boundary walls etc. shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 5. Separation distances from trees, shrubs etc. shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 6. On line and off-line air valve details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 7. Sluice valve details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 8. On line and off-line hydrant details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.
 9. Scour valve and chamber details shall be in accordance with Irish Water standard details as set out in IW Wastewater Infrastructure Standard Details document - IW-CDS-5030-01.

P04	31.08.21	CS-PM/CS	Issue for Stage Approval	OK
Rev	Date	Chk	Amendment / Issue	App

Client

Galway City Council

rps MAKING COMPLEX EASY

Lyrr 2, IDA Business & Technology Park, Mervue, Galway
T +353 91 400200
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Project

Housing Development ,
Keeraun, Ballymoneen Road, Galway

Title

Watermain Layout

Model File Identifier

MGC0712-RPS-00-XX-C-DG0003

File Identifier

MGC0712-RPS-00-XX-C-DG0003-02

Created on	February 2021	Sheets	02 of 02
Scale	1:250 @ A1 1:500 @ A3	Status	S4
		Rev	P05

LEGEND	
SITE BOUNDARY	
EXISTING 250mm uPVC WATER MAIN	
PROPOSED 150mm WATERMAIN (STD-W-13)	
PROPOSED SERVICE CONNECTION 25mm HDPE (STD-W-03)	
PROPOSED SERVICE CONNECTION 80mm HDPE (STD-W-03)	
PROPOSED SLUICE VALVE (STD-W-07)	
PROPOSED HYDRANT (STD-W-18 / STD-W-19)	
PROPOSED AIR VALVE (STD-W-22 / STD-W-23)	
PROPOSED SCOUR VALVE (STD-W-30)	
PROPOSED BULK FLOW METER AND ASSOCIATED TELEMETRY SYSTEM (STD-W-26)	
PROPOSED BOUNDARY BOX (STD-W-03)	
PROPOSED THRUST BLOCK	

Appendix B

Design Calculations

Foul Water Design Calculations

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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)	0.100
Flow Per Person (l/per/day)	200.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	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 Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	26.587	0.213	124.8	0.000	0	1.0	1.500	o	225	Pipe/Conduit	
F1.001	38.426	0.306	125.6	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.002	21.727	0.187	116.2	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.003	76.100	0.611	124.5	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.004	19.585	0.180	108.8	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F2.000	40.270	0.307	131.2	0.000	0	1.0	1.500	o	225	Pipe/Conduit	
F2.001	31.505	0.240	131.3	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F2.002	13.887	0.156	89.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F3.000	26.570	0.228	116.5	0.000	0	1.0	1.500	o	225	Pipe/Conduit	
F2.003	12.342	0.078	158.2	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F2.004	24.983	0.266	93.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	E Area (ha)	E Base Flow (l/s)	E Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	57.075	0.000	1.0	0	0.0	25	0.43	1.03	40.8	1.0
F1.001	56.862	0.000	1.0	0	0.0	25	0.43	1.02	40.7	1.0
F1.002	56.556	0.000	1.0	0	0.0	24	0.44	1.06	42.3	1.0
F1.003	56.369	0.000	1.0	0	0.0	25	0.43	1.03	40.9	1.0
F1.004	55.758	0.000	1.0	0	0.0	24	0.45	1.10	43.7	1.0
F2.000	57.200	0.000	1.0	0	0.0	25	0.42	1.00	39.8	1.0
F2.001	56.893	0.000	1.0	0	0.0	25	0.42	1.00	39.8	1.0
F2.002	56.653	0.000	1.0	0	0.0	23	0.48	1.22	48.4	1.0
F3.000	56.325	0.000	1.0	0	0.0	24	0.44	1.06	42.3	1.0
F2.003	56.097	0.000	2.0	0	0.0	36	0.49	0.91	36.2	2.0
F2.004	56.019	0.000	2.0	0	0.0	32	0.58	1.18	47.1	2.0

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Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.005	13.839	0.130	106.5	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F4.000	31.667	0.243	130.3	0.000	0	1.0	1.500	o	225	Pipe/Conduit	
F1.006	63.528	0.501	126.8	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.007	6.392	0.030	213.1	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.005	55.578	0.000	3.0	0	0.0	40	0.63	1.11	44.2	3.0
F4.000	56.075	0.000	1.0	0	0.0	25	0.42	1.00	40.0	1.0
F1.006	55.448	0.000	4.0	0	0.0	48	0.65	1.02	40.5	4.0
F1.007	54.947	0.000	4.0	0	0.0	54	0.54	0.78	31.2	4.0

Manhole Schedules for Foul - Main

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
F01	58.750	1.675	Open Manhole	1200	F1.000	57.075	225				
F02	58.750	1.888	Open Manhole	1200	F1.001	56.862	225	F1.000	56.862	225	
F03	59.000	2.444	Open Manhole	1200	F1.002	56.556	225	F1.001	56.556	225	
F04	59.000	2.631	Open Manhole	1200	F1.003	56.369	225	F1.002	56.369	225	
F05	59.000	3.242	Open Manhole	1200	F1.004	55.758	225	F1.003	55.758	225	
F09	58.750	1.550	Open Manhole	1200	F2.000	57.200	225				
F10	59.000	2.107	Open Manhole	1200	F2.001	56.893	225	F2.000	56.893	225	
F11	58.250	1.597	Open Manhole	1200	F2.002	56.653	225	F2.001	56.653	225	
F12	58.250	1.925	Open Manhole	1200	F3.000	56.325	225				
F13	58.250	2.153	Open Manhole	1200	F2.003	56.097	225	F2.002	56.497	225	400
								F3.000	56.097	225	
F14	58.750	2.731	Open Manhole	1200	F2.004	56.019	225	F2.003	56.019	225	
F06	58.750	3.172	Open Manhole	1200	F1.005	55.578	225	F1.004	55.578	225	
								F2.004	55.753	225	175
F15	58.000	1.925	Open Manhole	1200	F4.000	56.075	225				
F07	58.500	3.052	Open Manhole	1200	F1.006	55.448	225	F1.005	55.448	225	
								F4.000	55.832	225	384
F08	58.250	3.303	Open Manhole	1200	F1.007	54.947	225	F1.006	54.947	225	
	58.150	3.233	Open Manhole	1200		OUTFALL		F1.007	54.917	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F01	525601.268	725941.592	525601.268	725941.592	Required	
F02	525574.741	725943.374	525574.741	725943.374	Required	
F03	525542.417	725964.152	525542.417	725964.152	Required	
F04	525531.386	725945.434	525531.386	725945.434	Required	
F05	525594.244	725902.538	525594.244	725902.538	Required	

Manhole Schedules for Foul - Main

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F09	525707.835	725838.670	525707.835	725838.670	Required	
F10	525674.417	725861.141	525674.417	725861.141	Required	
F11	525648.239	725878.671	525648.239	725878.671	Required	
F12	525651.544	725908.469	525651.544	725908.469	Required	
F13	525636.716	725886.421	525636.716	725886.421	Required	
F14	525629.893	725876.137	525629.893	725876.137	Required	
F06	525608.620	725889.236	525608.620	725889.236	Required	
F15	525577.895	725857.335	525577.895	725857.335	Required	
F07	525603.055	725876.565	525603.055	725876.565	Required	
F08	525644.445	725828.370	525644.445	725828.370	Required	
	525646.956	725822.493			No Entry	

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)
F1.007		58.150	54.917	54.898	1200	0

Storm Water Design Calculations

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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)	30	PIMP (%)	100
M5-60 (mm)	17.000	Add Flow / Climate Change (%)	20
Ratio R	0.300	Minimum Backdrop Height (m)	0.100
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	300

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.258	4-8	0.523	8-12	0.057

Total Area Contributing (ha) = 0.838

Total Pipe Volume (m³) = 46.291

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	10.137	0.034	298.1	0.026	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	24.450	0.069	354.3	0.046	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.001	17.137	0.075	228.5	0.057	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.002	23.106	0.078	296.2	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.003	24.521	0.080	306.5	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.19	58.250	0.026	0.0	0.0	0.7	0.91	64.0	4.1
S2.000	50.00	5.49	57.500	0.046	0.0	0.0	1.3	0.83	58.6	7.5
S2.001	50.00	5.77	57.431	0.103	0.0	0.0	2.8	1.04	73.2	16.7
S2.002	50.00	6.19	57.356	0.186	0.0	0.0	5.0	0.91	64.2	30.2
S2.003	50.00	6.65	57.278	0.226	0.0	0.0	6.1	0.89	63.1	36.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.001	44.984	0.150	299.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	32.820	0.088	373.0	0.095	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	18.888	0.088	214.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	11.791	0.066	178.7	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	25.650	0.127	202.0	0.050	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	32.497	0.113	287.6	0.028	0.00	0.0	0.600	o	375	Pipe/Conduit	
S4.000	27.969	0.093	300.7	0.062	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	11.762	0.108	108.9	0.049	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.000	29.177	0.097	300.8	0.044	5.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	9.747	0.033	295.4	0.027	5.00	0.0	0.600	o	300	Pipe/Conduit	
S5.001	9.446	0.031	304.7	0.023	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.000	37.016	0.123	300.9	0.036	5.00	0.0	0.600	o	300	Pipe/Conduit	
S7.001	37.016	0.123	300.9	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.001	50.00	7.48	57.198	0.251	0.0	0.0	6.8	0.90	63.8	40.8
S1.002	50.00	8.16	57.048	0.346	0.0	0.0	9.4	0.81	57.1	56.2
S1.003	50.00	8.45	56.960	0.346	0.0	0.0	9.4	1.07	75.6	56.2
S1.004	50.00	8.62	56.872	0.409	0.0	0.0	11.1	1.17	82.9	66.5
S3.000	50.00	5.39	57.000	0.050	0.0	0.0	1.4	1.10	77.9	8.2
S1.005	50.00	9.13	56.731	0.487	0.0	0.0	13.2	1.06	117.4	79.2
S4.000	50.00	5.52	57.000	0.062	0.0	0.0	1.7	0.90	63.7	10.0
S1.006	50.00	9.24	56.618	0.598	0.0	0.0	16.2	1.74	191.7	97.2
S5.000	50.00	5.54	57.000	0.044	0.0	0.0	1.2	0.90	63.7	7.2
S6.000	50.00	5.18	56.750	0.027	0.0	0.0	0.7	0.91	64.3	4.4
S5.001	50.00	5.72	56.717	0.095	0.0	0.0	2.6	0.90	63.3	15.4
S7.000	50.00	5.68	57.450	0.036	0.0	0.0	1.0	0.90	63.7	5.8
S7.001	50.00	6.37	57.250	0.084	0.0	0.0	2.3	0.90	63.7	13.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.002	21.789	0.101	215.7	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	7.301	0.024	300.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.008	5.998	0.020	299.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.009	15.476	0.052	297.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.010	9.584	0.077	124.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.011	35.736	0.089	401.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.012	5.942	0.015	396.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.002	50.00	6.71	56.686	0.239	0.0	0.0	6.5	1.07	75.4	38.9
S1.007	50.00	9.34	56.435	0.838	0.0	0.0	22.7	1.17	185.8	136.1
S1.008	50.00	9.43	56.311	0.838	0.0	0.0	22.7	1.17	185.9	136.1
S1.009	50.00	9.65	56.291	0.838	0.0	0.0	22.7	1.17	186.6	136.1
S1.010	50.00	9.74	55.439	0.838	0.0	0.0	22.7	1.82	289.6	136.1
S1.011	50.00	10.33	55.362	0.838	0.0	0.0	22.7	1.01	160.4	136.1
S1.012	50.00	10.43	55.273	0.838	0.0	0.0	22.7	1.02	161.5	136.1

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S01	59.250	1.000	Open Manhole	1200	S1.000	58.250	300				
S10	58.750	1.250	Open Manhole	1200	S2.000	57.500	300				
S11	59.000	1.569	Open Manhole	1200	S2.001	57.431	300	S2.000	57.431	300	
S12	59.000	1.644	Open Manhole	1200	S2.002	57.356	300	S2.001	57.356	300	
S13	59.000	1.722	Open Manhole	1200	S2.003	57.278	300	S2.002	57.278	300	
S02	59.000	1.802	Open Manhole	1200	S1.001	57.198	300	S1.000	58.216	300	1018
								S2.003	57.198	300	
S03	59.000	1.952	Open Manhole	1200	S1.002	57.048	300	S1.001	57.048	300	
S04	59.000	2.040	Open Manhole	1200	S1.003	56.960	300	S1.002	56.960	300	
S05	59.000	2.128	Open Manhole	1200	S1.004	56.872	300	S1.003	56.872	300	
S14	58.000	1.000	Open Manhole	1200	S3.000	57.000	300				
S06	58.500	1.769	Open Manhole	1350	S1.005	56.731	375	S1.004	56.806	300	
								S3.000	56.873	300	67
S15	58.250	1.250	Open Manhole	1200	S4.000	57.000	300				
S07	58.250	1.632	Open Manhole	1350	S1.006	56.618	375	S1.005	56.618	375	
								S4.000	56.907	300	214
S16	58.250	1.250	Open Manhole	1200	S5.000	57.000	300				
S17	58.750	2.000	Open Manhole	1200	S6.000	56.750	300				
S18	58.500	1.783	Open Manhole	1200	S5.001	56.717	300	S5.000	56.903	300	186
								S6.000	56.717	300	
S19	58.750	1.300	Open Manhole	1200	S7.000	57.450	300				
S20	59.000	1.750	Open Manhole	1200	S7.001	57.250	300	S7.000	57.327	300	77
S21	58.250	1.564	Open Manhole	1200	S5.002	56.686	300	S5.001	56.686	300	
								S7.001	57.127	300	441
ST MH	58.150	1.715	Open Manhole	1350	S1.007	56.435	450	S1.006	56.510	375	
								S5.002	56.585	300	
PI	58.150	1.839	Open Manhole	1350	S1.008	56.311	450	S1.007	56.411	450	100
ATT IN	58.150	1.859	Open Manhole	1350	S1.009	56.291	450	S1.008	56.291	450	
ATT	58.150	2.711	Open Manhole	1350	S1.010	55.439	450	S1.009	56.239	450	800
S08	58.150	2.788	Open Manhole	1350	S1.011	55.362	450	S1.010	55.362	450	
S09	58.150	2.877	Open Manhole	1350	S1.012	55.273	450	S1.011	55.273	450	
	57.450	2.192	Open Manhole	1200		OUTFALL		S1.012	55.258	450	

RPS (Galway)		Page 5
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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S01	525520.427	725950.930	525520.427	725950.930	Required	
S10	525600.403	725942.995	525600.403	725942.995	Required	
S11	525576.006	725944.601	525576.006	725944.601	Required	
S12	525561.441	725953.630	525561.441	725953.630	Required	
S13	525541.960	725966.054	525541.960	725966.054	Required	
S02	525528.870	725945.319	525528.870	725945.319	Required	
S03	525566.217	725920.243	525566.217	725920.243	Required	
S04	525593.204	725901.566	525593.204	725901.566	Required	
S05	525607.361	725889.062	525607.361	725889.062	Required	
S14	525582.298	725862.814	525582.298	725862.814	Required	
S06	525602.842	725878.171	525602.842	725878.171	Required	
S15	525642.440	725832.476	525642.440	725832.476	Required	
S07	525624.015	725853.518	525624.015	725853.518	Required	
S16	525652.989	725908.529	525652.989	725908.529	Required	
S17	525631.525	725876.058	525631.525	725876.058	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S18	525636.880	725884.202	525636.880	725884.202	Required	
S19	525706.548	725838.239	525706.548	725838.239	Required	
S20	525675.779	725858.816	525675.779	725858.816	Required	
S21	525645.010	725879.394	525645.010	725879.394	Required	
ST MH	525632.782	725861.359	525632.782	725861.359	Required	
PI	525637.806	725856.061	525637.806	725856.061	Required	
ATT IN	525642.051	725851.824	525642.051	725851.824	Required	
ATT	525652.840	725840.729	525652.840	725840.729	Required	
S08	525653.827	725831.196	525653.827	725831.196	Required	
S09	525626.990	725807.598	525626.990	725807.598	Required	
	525627.019	725801.657			No Entry	

Simulation Criteria for Storm

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

Synthetic Rainfall Details

RPS (Galway)		Page 7
Lyrr Building, IDA Business & Mervue Galway, Ireland		
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Innovyze	Network 2020.1	

Simulation Criteria for Storm

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)	17.200	Storm Duration (mins)	30
Ratio R	0.300		

RPS (Galway)		Page 8																																																																																								
Lyrr Building, IDA Business & Mervue Galway, Ireland																																																																																										
Date 30/07/2021 10:51	Designed by PMGB																																																																																									
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Online Controls for Storm Hydro-Brake® Optimum Manhole: ATT, DS/PN: S1.010, Volume (m³): 6.1 Unit Reference MD-SHE-0098-4000-0810-4000 Design Head (m)0.810 Design Flow (l/s)4.0 Flush-Flo™Calculated ObjectiveMinimise upstream storage ApplicationSurface Sump AvailableYes Diameter (mm)98 Invert Level (m)55.439 Minimum Outlet Pipe Diameter (mm)150 Suggested Manhole Diameter (mm)1200 <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>0.810</td><td>4.0</td><td>Kick-Flo®</td><td>0.532</td><td>3.3</td></tr><tr><td>Flush-Flo™</td><td>0.241</td><td>4.0</td><td>Mean Flow over Head Range</td><td>-</td><td>3.5</td></tr></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>3.2</td><td>0.800</td><td>4.0</td><td>2.000</td><td>6.1</td><td>4.000</td><td>8.4</td><td>7.000</td><td>11.0</td></tr><tr><td>0.200</td><td>4.0</td><td>1.000</td><td>4.4</td><td>2.200</td><td>6.4</td><td>4.500</td><td>8.9</td><td>7.500</td><td>11.4</td></tr><tr><td>0.300</td><td>4.0</td><td>1.200</td><td>4.8</td><td>2.400</td><td>6.6</td><td>5.000</td><td>9.4</td><td>8.000</td><td>11.7</td></tr><tr><td>0.400</td><td>3.8</td><td>1.400</td><td>5.2</td><td>2.600</td><td>6.9</td><td>5.500</td><td>9.8</td><td>8.500</td><td>12.1</td></tr><tr><td>0.500</td><td>3.5</td><td>1.600</td><td>5.5</td><td>3.000</td><td>7.4</td><td>6.000</td><td>10.2</td><td>9.000</td><td>12.4</td></tr><tr><td>0.600</td><td>3.5</td><td>1.800</td><td>5.8</td><td>3.500</td><td>7.9</td><td>6.500</td><td>10.6</td><td>9.500</td><td>12.7</td></tr></table>			Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	0.810	4.0	Kick-Flo®	0.532	3.3	Flush-Flo™	0.241	4.0	Mean Flow over Head Range	-	3.5	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	3.2	0.800	4.0	2.000	6.1	4.000	8.4	7.000	11.0	0.200	4.0	1.000	4.4	2.200	6.4	4.500	8.9	7.500	11.4	0.300	4.0	1.200	4.8	2.400	6.6	5.000	9.4	8.000	11.7	0.400	3.8	1.400	5.2	2.600	6.9	5.500	9.8	8.500	12.1	0.500	3.5	1.600	5.5	3.000	7.4	6.000	10.2	9.000	12.4	0.600	3.5	1.800	5.8	3.500	7.9	6.500	10.6	9.500	12.7
Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)																																																																																					
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0.300	4.0	1.200	4.8	2.400	6.6	5.000	9.4	8.000	11.7																																																																																	
0.400	3.8	1.400	5.2	2.600	6.9	5.500	9.8	8.500	12.1																																																																																	
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RPS (Galway)		Page 9
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Storage Structures for Storm

Tank or Pond Manhole: ATT, DS/PN: S1.010

Invert Level (m) 55.439

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	565.0	0.810	565.0	0.811	0.0

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

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Synthetic Rainfall Details

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

									Water	Surcharged
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)
S1.000	S01	15 Winter	100	+20%					58.343	-0.207
S2.000	S10	15 Winter	100	+20%	100/15 Summer				58.301	0.501
S2.001	S11	15 Winter	100	+20%	30/15 Winter				58.287	0.556
S2.002	S12	15 Winter	100	+20%	30/15 Summer				58.261	0.605
S2.003	S13	15 Winter	100	+20%	30/15 Summer				58.209	0.631
S1.001	S02	15 Winter	100	+20%	30/15 Summer				58.130	0.632
S1.002	S03	15 Winter	100	+20%	30/15 Summer				57.959	0.611
S1.003	S04	15 Winter	100	+20%	30/15 Summer				57.710	0.450
S1.004	S05	15 Winter	100	+20%	30/15 Summer				57.555	0.383
S3.000	S14	15 Winter	100	+20%	100/15 Summer				57.405	0.105
S1.005	S06	15 Winter	100	+20%	30/15 Winter				57.390	0.284
S4.000	S15	15 Winter	100	+20%					57.260	-0.040
S1.006	S07	15 Winter	100	+20%	30/15 Winter				57.240	0.247
S5.000	S16	15 Winter	100	+20%					57.246	-0.054
S6.000	S17	15 Winter	100	+20%	30/15 Winter				57.234	0.184
S5.001	S18	15 Winter	100	+20%	30/15 Summer				57.229	0.212
S7.000	S19	15 Winter	100	+20%					57.552	-0.198
S7.001	S20	15 Winter	100	+20%					57.419	-0.131
S5.002	S21	15 Winter	100	+20%	30/15 Summer				57.211	0.225
S1.007	ST MH	15 Winter	100	+20%	30/15 Summer				57.098	0.213
S1.008	PI	15 Winter	100	+20%	30/15 Summer				56.952	0.191
S1.009	ATT IN	15 Winter	100	+20%	30/15 Summer				56.810	0.069
S1.010	ATT	960 Winter	100	+20%	30/180 Winter				56.243	0.354

RPS (Galway)		Page 11
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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Half Drain Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
S1.000	S01	0.000	0.21		10.5	OK	
S2.000	S10	0.000	0.27		14.1	SURCHARGED	
S2.001	S11	0.000	0.42		26.4	SURCHARGED	
S2.002	S12	0.000	0.90		50.9	SURCHARGED	
S2.003	S13	0.000	1.06		59.8	SURCHARGED	
S1.001	S02	0.000	1.08		64.8	SURCHARGED	
S1.002	S03	0.000	1.69		88.5	SURCHARGED	
S1.003	S04	0.000	1.34		87.3	SURCHARGED	
S1.004	S05	0.000	1.56		100.5	SURCHARGED	
S3.000	S14	0.000	0.27		19.1	SURCHARGED	
S1.005	S06	0.000	1.13		118.7	SURCHARGED	
S4.000	S15	0.000	0.43		24.6	OK	
S1.006	S07	0.000	1.13		145.0	SURCHARGED	
S5.000	S16	0.000	0.29		16.9	OK	
S6.000	S17	0.000	0.18		9.1	SURCHARGED	
S5.001	S18	0.000	0.59		28.5	SURCHARGED	
S7.000	S19	0.000	0.24		14.4	OK	
S7.001	S20	0.000	0.59		34.6	OK	
S5.002	S21	0.000	1.19		78.9	SURCHARGED	
S1.007	ST MH	0.000	1.81		214.4	SURCHARGED	
S1.008	PI	0.000	1.92		214.1	SURCHARGED	
S1.009	ATT IN	0.000	1.48		213.4	SURCHARGED	
S1.010	ATT	0.000	0.02		4.0	SURCHARGED	

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

		US/MH		Return Climate		First (X)	First (Y)	First (Z)	Overflow	Water Level	Surcharged Depth	Flooded Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)	
S1.011	S08	960 Winter	100	+20%					55.413	-0.399	0.000	
S1.012	S09	960 Winter	100	+20%					55.328	-0.395	0.000	

		US/MH		Flow /	Overflow	Time	Flow	Level
PN	Name	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded	
S1.011	S08	0.03			4.0	OK		
S1.012	S09	0.04			4.0	OK		

Appendix C

Surface Water Attenuation Design Output and Sizing

RPS (Galway)					Page 1	
Lyrr Building, IDA Business... Mervue Galway, Ireland						
Date 30/07/2021 10:47			Designed by PMGB			
File 2021.02.15 - 565m2 tank...			Checked by			
Innovyze			Source Control 2020.1			
Summary of Results for 100 year Return Period (+20%)						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Summer	55.688	0.249	4.0	140.9	O K
	30 min Summer	55.777	0.338	4.0	191.0	O K
	60 min Summer	55.865	0.426	4.0	240.7	O K
	120 min Summer	55.957	0.518	4.0	292.8	O K
	180 min Summer	56.011	0.572	4.0	323.2	O K
	240 min Summer	56.047	0.608	4.0	343.7	O K
	360 min Summer	56.092	0.653	4.0	369.1	O K
	480 min Summer	56.118	0.679	4.0	383.4	O K
	600 min Summer	56.131	0.692	4.0	391.2	O K
	720 min Summer	56.138	0.699	4.0	394.9	O K
	960 min Summer	56.141	0.702	4.0	396.4	O K
	1440 min Summer	56.135	0.696	4.0	393.5	O K
	2160 min Summer	56.115	0.676	4.0	381.9	O K
	2880 min Summer	56.087	0.648	4.0	366.4	O K
	4320 min Summer	56.025	0.586	4.0	331.0	O K
	5760 min Summer	55.950	0.511	4.0	288.7	O K
	7200 min Summer	55.875	0.436	4.0	246.3	O K
	8640 min Summer	55.811	0.372	4.0	210.4	O K
	10080 min Summer	55.756	0.317	4.0	179.1	O K
	15 min Winter	55.719	0.280	4.0	158.1	O K
	30 min Winter	55.819	0.380	4.0	214.5	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	15 min Summer	91.990	0.0	135.9	24	
	30 min Summer	62.658	0.0	186.2	38	
	60 min Summer	39.995	0.0	246.7	68	
	120 min Summer	24.904	0.0	307.6	126	
	180 min Summer	18.717	0.0	346.7	186	
	240 min Summer	15.262	0.0	376.8	246	
	360 min Summer	11.412	0.0	422.1	364	
	480 min Summer	9.274	0.0	456.6	484	
	600 min Summer	7.890	0.0	484.5	602	
	720 min Summer	6.913	0.0	507.8	720	
	960 min Summer	5.608	0.0	544.4	842	
	1440 min Summer	4.175	0.0	573.9	1102	
	2160 min Summer	3.107	0.0	698.9	1512	
	2880 min Summer	2.518	0.0	754.5	1932	
	4320 min Summer	1.870	0.0	837.3	2768	
	5760 min Summer	1.512	0.0	910.7	3576	
	7200 min Summer	1.283	0.0	965.1	4320	
	8640 min Summer	1.121	0.0	1011.3	5016	
	10080 min Summer	1.000	0.0	1050.6	5744	
	15 min Winter	91.990	0.0	152.7	24	
	30 min Winter	62.658	0.0	208.5	38	
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RPS (Galway)				Page 2	
Lyrr Building, IDA Business...					
Mervue					
Galway, Ireland					
Date 30/07/2021 10:47		Designed by PMGB			
File 2021.02.15 - 565m2 tank...		Checked by			
Innovyze		Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+20%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	55.918	0.479	4.0	270.7	O K
120 min Winter	56.024	0.585	4.0	330.3	O K
180 min Winter	56.084	0.645	4.0	364.6	O K
240 min Winter	56.126	0.687	4.0	388.3	O K
360 min Winter	56.180	0.741	4.0	418.5	O K
480 min Winter	56.211	0.772	4.0	436.3	O K
600 min Winter	56.230	0.791	4.0	447.1	O K
720 min Winter	56.241	0.802	4.0	453.3	O K
960 min Winter	56.248	0.809	4.0	457.2	O K
1440 min Winter	56.237	0.798	4.0	450.9	O K
2160 min Winter	56.207	0.768	4.0	434.0	O K
2880 min Winter	56.164	0.725	4.0	409.8	O K
4320 min Winter	56.066	0.627	4.0	354.0	O K
5760 min Winter	55.946	0.507	4.0	286.3	O K
7200 min Winter	55.828	0.389	4.0	219.6	O K
8640 min Winter	55.735	0.296	4.0	167.3	O K
10080 min Winter	55.664	0.225	4.0	127.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	39.995	0.0	276.5	68	
120 min Winter	24.904	0.0	344.5	126	
180 min Winter	18.717	0.0	388.2	184	
240 min Winter	15.262	0.0	421.7	242	
360 min Winter	11.412	0.0	472.0	358	
480 min Winter	9.274	0.0	509.8	472	
600 min Winter	7.890	0.0	539.9	586	
720 min Winter	6.913	0.0	564.3	696	
960 min Winter	5.608	0.0	597.0	912	
1440 min Winter	4.175	0.0	590.4	1154	
2160 min Winter	3.107	0.0	782.8	1620	
2880 min Winter	2.518	0.0	844.9	2080	
4320 min Winter	1.870	0.0	936.0	2988	
5760 min Winter	1.512	0.0	1020.1	3864	
7200 min Winter	1.283	0.0	1081.2	4536	
8640 min Winter	1.121	0.0	1133.1	5192	
10080 min Winter	1.000	0.0	1177.6	5848	
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RPS (Galway)		Page 4																																																																																																			
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Model Details Storage is Online Cover Level (m) 58.150 Tank or Pond Structure Invert Level (m) 55.439 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>565.0</td><td>0.810</td><td>565.0</td><td>0.811</td><td>0.0</td></tr></tbody></table> Hydro-Brake® Optimum Outflow Control Unit Reference MD-SHE-0098-4000-0810-4000 Design Head (m) 0.810 Design Flow (l/s) 4.0 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 98 Invert Level (m) 55.439 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200 Control Points <table><thead><tr><th></th><th>Head (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>Design Point (Calculated)</td><td>0.810</td><td>4.0</td></tr><tr><td>Flush-Flo™</td><td>0.241</td><td>4.0</td></tr><tr><td>Kick-Flo®</td><td>0.532</td><td>3.3</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>3.5</td></tr></tbody></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>3.2</td><td>1.200</td><td>4.8</td><td>3.000</td><td>7.4</td><td>7.000</td><td>11.0</td></tr><tr><td>0.200</td><td>4.0</td><td>1.400</td><td>5.2</td><td>3.500</td><td>7.9</td><td>7.500</td><td>11.4</td></tr><tr><td>0.300</td><td>4.0</td><td>1.600</td><td>5.5</td><td>4.000</td><td>8.4</td><td>8.000</td><td>11.7</td></tr><tr><td>0.400</td><td>3.8</td><td>1.800</td><td>5.8</td><td>4.500</td><td>8.9</td><td>8.500</td><td>12.1</td></tr><tr><td>0.500</td><td>3.5</td><td>2.000</td><td>6.1</td><td>5.000</td><td>9.4</td><td>9.000</td><td>12.4</td></tr><tr><td>0.600</td><td>3.5</td><td>2.200</td><td>6.4</td><td>5.500</td><td>9.8</td><td>9.500</td><td>12.7</td></tr><tr><td>0.800</td><td>4.0</td><td>2.400</td><td>6.6</td><td>6.000</td><td>10.2</td><td></td><td></td></tr><tr><td>1.000</td><td>4.4</td><td>2.600</td><td>6.9</td><td>6.500</td><td>10.6</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	565.0	0.810	565.0	0.811	0.0		Head (m)	Flow (l/s)	Design Point (Calculated)	0.810	4.0	Flush-Flo™	0.241	4.0	Kick-Flo®	0.532	3.3	Mean Flow over Head Range	-	3.5	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	3.2	1.200	4.8	3.000	7.4	7.000	11.0	0.200	4.0	1.400	5.2	3.500	7.9	7.500	11.4	0.300	4.0	1.600	5.5	4.000	8.4	8.000	11.7	0.400	3.8	1.800	5.8	4.500	8.9	8.500	12.1	0.500	3.5	2.000	6.1	5.000	9.4	9.000	12.4	0.600	3.5	2.200	6.4	5.500	9.8	9.500	12.7	0.800	4.0	2.400	6.6	6.000	10.2			1.000	4.4	2.600	6.9	6.500	10.6		
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Greenfield Runoff rates

RPS (Galway)		Page 1																																										
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IH 124 Mean Annual Flood Input <table><tr><td>Return Period (years)</td><td>100</td><td>Soil</td><td>0.150</td></tr><tr><td>Area (ha)</td><td>50.000</td><td>Urban</td><td>0.750</td></tr><tr><td>SAAR (mm)</td><td>1181</td><td>Region Number</td><td>Ireland West</td></tr></table> Results l/s <table><tr><td>QBAR Rural</td><td>37.3</td></tr><tr><td>QBAR Urban</td><td>139.9</td></tr><tr><td>Q100 years</td><td>203.5</td></tr><tr><td>Q1 year</td><td>118.9</td></tr><tr><td>Q2 years</td><td>145.5</td></tr><tr><td>Q5 years</td><td>169.3</td></tr><tr><td>Q10 years</td><td>180.2</td></tr><tr><td>Q20 years</td><td>188.7</td></tr><tr><td>Q25 years</td><td>190.8</td></tr><tr><td>Q30 years</td><td>192.5</td></tr><tr><td>Q50 years</td><td>197.2</td></tr><tr><td>Q100 years</td><td>203.5</td></tr><tr><td>Q200 years</td><td>208.3</td></tr><tr><td>Q250 years</td><td>n/a</td></tr><tr><td>Q1000 years</td><td>n/a</td></tr></table> WARNING: Irish growth curves are not defined above 200 years.			Return Period (years)	100	Soil	0.150	Area (ha)	50.000	Urban	0.750	SAAR (mm)	1181	Region Number	Ireland West	QBAR Rural	37.3	QBAR Urban	139.9	Q100 years	203.5	Q1 year	118.9	Q2 years	145.5	Q5 years	169.3	Q10 years	180.2	Q20 years	188.7	Q25 years	190.8	Q30 years	192.5	Q50 years	197.2	Q100 years	203.5	Q200 years	208.3	Q250 years	n/a	Q1000 years	n/a
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Appendix D

Hydrocarbon Interceptor – Brochure

Bypass NSB RANGE

APPLICATION

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g.

- Surface car parks.
- Roadways.
- Lightly contaminated commercial areas.

PERFORMANCE

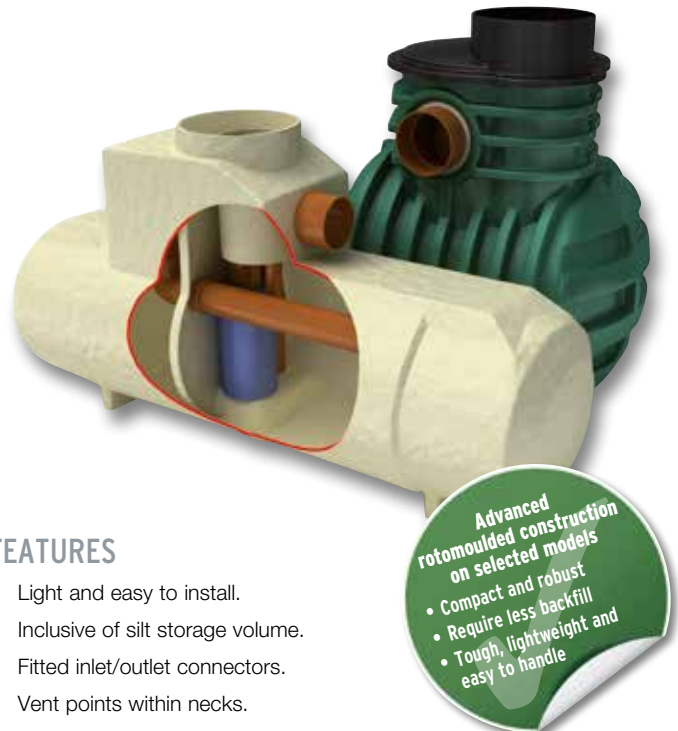
Klargester were one of the first UK manufacturers to have separators tested to EN 858-1. Klargester have now added the NSB bypass range to their portfolio of certified and tested models. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan Klargester Bypass separators and certified their performance in relation to their flow and process performance assessing the effluent qualities to the requirements of EN 858-1. Klargester bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Oil storage volume.
- Silt storage capacity.
- Coalescer.

The unit is designed to treat 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 $NSB = 0.0018A(m^2)$. Flows generated by higher rainfall rates will pass through part of the separator and bypass the main separation chamber.

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



FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

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

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

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	PEAK FLOW RATE (l/s)	DRAINAGE AREA (m ²)	STORAGE CAPACITY (litres)		UNIT LENGTH (mm)	UNIT DIA. (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	STANDARD FALL ACROSS (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA.
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

■ Rotomoulded chamber construction ■ GRP chamber construction * Some units have more than one access shaft – diameter of largest shown.

Appendix E

Flood Risk Assessment

KEERAUN SOCIAL HOUSING GALWAY

Stage 1 Flood Risk Assessment



MGC0716-RPS-00-XX-RP-C-RP0009
Stage 1 Flood Risk Assessment
S4 P01
31 August 2021

KEERAUN SOCIAL HOUSING STAGE 1 FLOOD RISK ASSESSMENT

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
S3. P01	Issue for Review	RMcL	UM	PMGB	11.08.2021
S4. P01	Issue for Stage Approval	RMcL	UM	PMGB	31.08.2021

Approval for issue

PMGB

31 August 2021

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Prepared by:

Prepared for:

RPS

Galway City Council

Rory McLoughlin
Project Engineer

Lyrr 2, IDA Business & Technology Park, Mervue
Galway, H91 H9CK

T +353 91 400 200
E rory.mcloughlin@rpsgroup.com

Stage 1 Flood Risk Assessment for Keeraun Social Housing Development

Sources of Information	Descriptions / Comments / Impacts
Existing site condition and proposed development	
Site location & proposed development	The site of the proposed Social Housing Development is a greenfield site located in Keeraun, Ballymoneen Road (Grid Reference: E525600; N725890). Galway City Council (GCC) is the owner of the plot of residential zoned lands and intend to develop 71 housing units (mix of 1 – 4 bed housing units) and 8no. culturally appropriate traveller specific units on site. Refer to Figure 1 in Appendix A.
Existing site topography & surface water drainage systems	The site is largely a greenfield site with a temporary access road bounding the southern edge of the site. The site is relatively flat along the access road. The level of the site appears to have been lowered along the access road to suit cover and invert levels of Irish Water and Local Authority infrastructure (foul and stormwater manholes). There is a variation in the levels across the site with high and low points throughout. The site dips in the middle where an existing drain runs from south to the north through the site. From the topographical survey, the existing site varies from 56.0-60.5mOD while the adjacent Ballymoneen road has a level of approx. 59.3mOD at the junction with the temporary access road. The drain has a low point invert level of 54.89mOD at the inlet of the culvert downstream, with an invert level of 55.95mOD at the upstream culvert. The depth of the drain varies from 0.5m to 1.0m. Refer to Figure 2 for topography of site and location of existing culverts. According to the Irish Water online database, there is a 300mm diameter foul and a 300mm diameter storm water pipe running along the temporary access road to the south of the site. The two pipes are shown to be 225mm diameter according to the NCW topographical survey completed in October 2020. Refer to Figure 3 in Appendix A.
Sources of information consulted in terms of flooding as recommended in the OPW Guidelines on "The Planning System and Flood Risk Management Guidance and Planning (2009)"	
Historical Six Inch Mapping (osi.ie)	The historical 6" maps were consulted on the Ordnance Survey Ireland website. There was no indication of historic flooding at the proposed site. Refer to Figure 4 in Appendix A.
Historical Flood Maps (Floodmaps.ie and floodinfo.ie)	There are no instances of flooding at the proposed site. Refer to Figure 5 in Appendix A.

Arterial Drainage Schemes / Drainage Districts & Benefitting Land Maps	According to www.floodinfo.ie , the proposed site is not designated/identified as benefitting lands under any Arterial Drainage Schemes / Drainage Districts.
Topographical Maps/DTM (Discovery maps and regional WFD Catchments)	There is a variation in the levels across the site with high and low points throughout. The site dips in the middle where an existing drain runs from south to the north through the site. From the topographical survey, the existing site varies from 56.0-60.5mOD while the adjacent Ballymoneen road has a level of approx. 59.3mOD at the junction with the temporary access road. The drain has a low point invert level of 54.89mOD at the inlet of the culvert downstream, with an invert level of 55.95mOD at the upstream culvert. The depth of the drain varies from 0.5m to 1.0m. Refer to Figure 2 for topography of site and location of existing culverts.
OPW Preliminary Flood Risk (PFRA) Assessment Indicative Fluvial Flood Maps	Fluvial PFRA maps were consulted and show no flooding at the proposed site. The drain doesn't appear to have been considered for modelling during the PFRA study. Refer to Figure 6 in Appendix A .
Predictive Flood Maps produced under the CFRAM Studies	Floodinfo.ie was consulted and no watercourse in the vicinity of the proposed site was modelled under the CFRAM programme.
River Basin Management Plans and Reports (CFRAM Studies)	As the proposed site has no history of flooding, there are no plans available on floodinfo.ie for the area around the proposed site.
National Coastal Protection Strategy Study and Coastal Erosion Risk Maps	Not applicable.
GSI Groundwater Flooding Maps	No evidence of groundwater flooding at the site.
Previous Flood Risk Assessments: At site or Strategic Flood Risk Assessments (SFRA)	An SFRA was carried out for the Galway City Development Plan 2017 – 2023. No watercourses near the proposed site were considered under this SFRA.
National/Regional/Local Spatial Plans	An SFRA was carried out for the Galway City Development Plan 2017 – 2023. No watercourses near the proposed site were considered under this SFRA.
Information of Flood Defence Condition and Performance	Not applicable.
Alluvial Deposit Maps	Not applicable.
Consultation with the OPW	Not consulted at this stage.
Consultation with the Local Authorities	On-going under the planning process.

Walkover Survey	Not applicable.
Stage 1: Flood Risk Assessment Summary	
There is no evidence to show that the proposed site is liable to flooding. The site is located outside the fluvial areas as modelled under the PFRA and CFRAM programmes. There is also no evidence of groundwater flooding at the site. Any proposed drainage and culverting of the drain as part of the development is expected to be adequately designed to prevent any increase in flood risk to the site.	
Flood/Drainage Impacts & Proposed Measures	
Surface water generated will likely be infiltrated on site in combination with the use of attenuation on site in order to ensure the risk of flooding in the vicinity of the development is not increased. Any proposed drainage and culverting of the drain as part of the development is expected to be adequately designed to prevent any increase in flood risk to the site.	

Appendix A

Figures

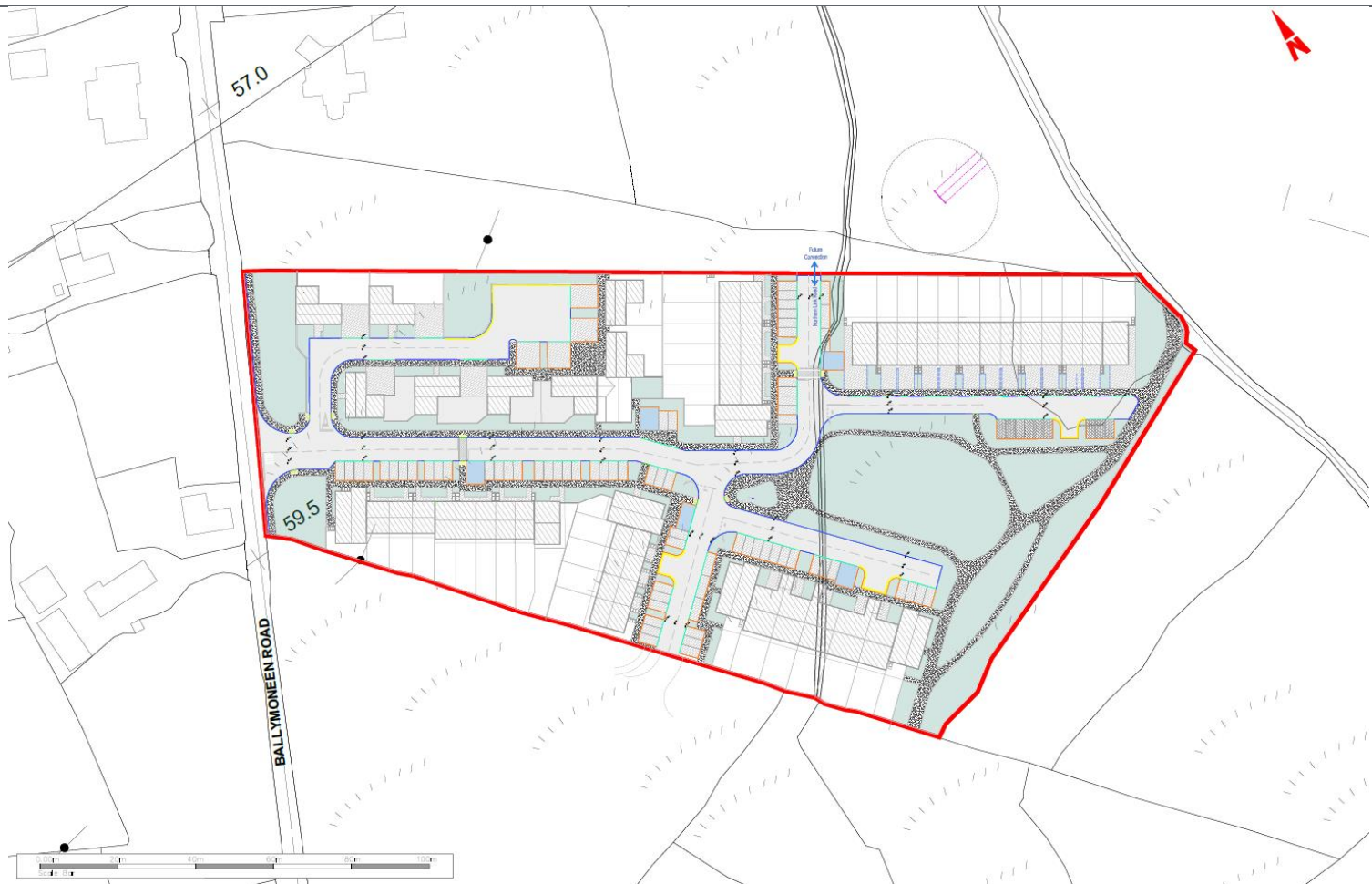


Figure 1 Site Location and Development Layout Plan

KEERAUN SOCIAL HOUSING STAGE 1 FLOOD RISK ASSESSMENT

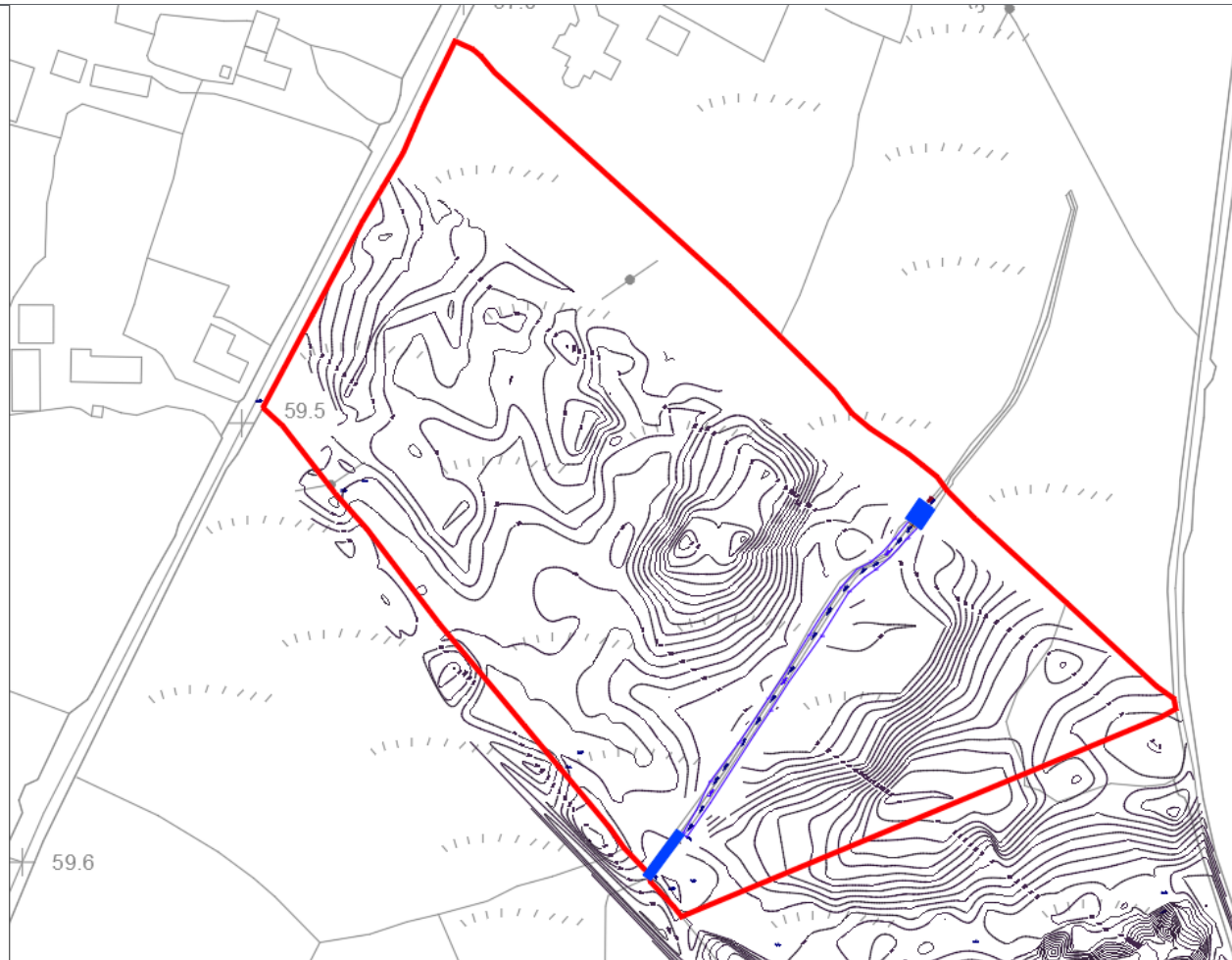


Figure 2 Site Location with topography and existing culvert locations

KEERAUN SOCIAL HOUSING STAGE 1 FLOOD RISK ASSESSMENT

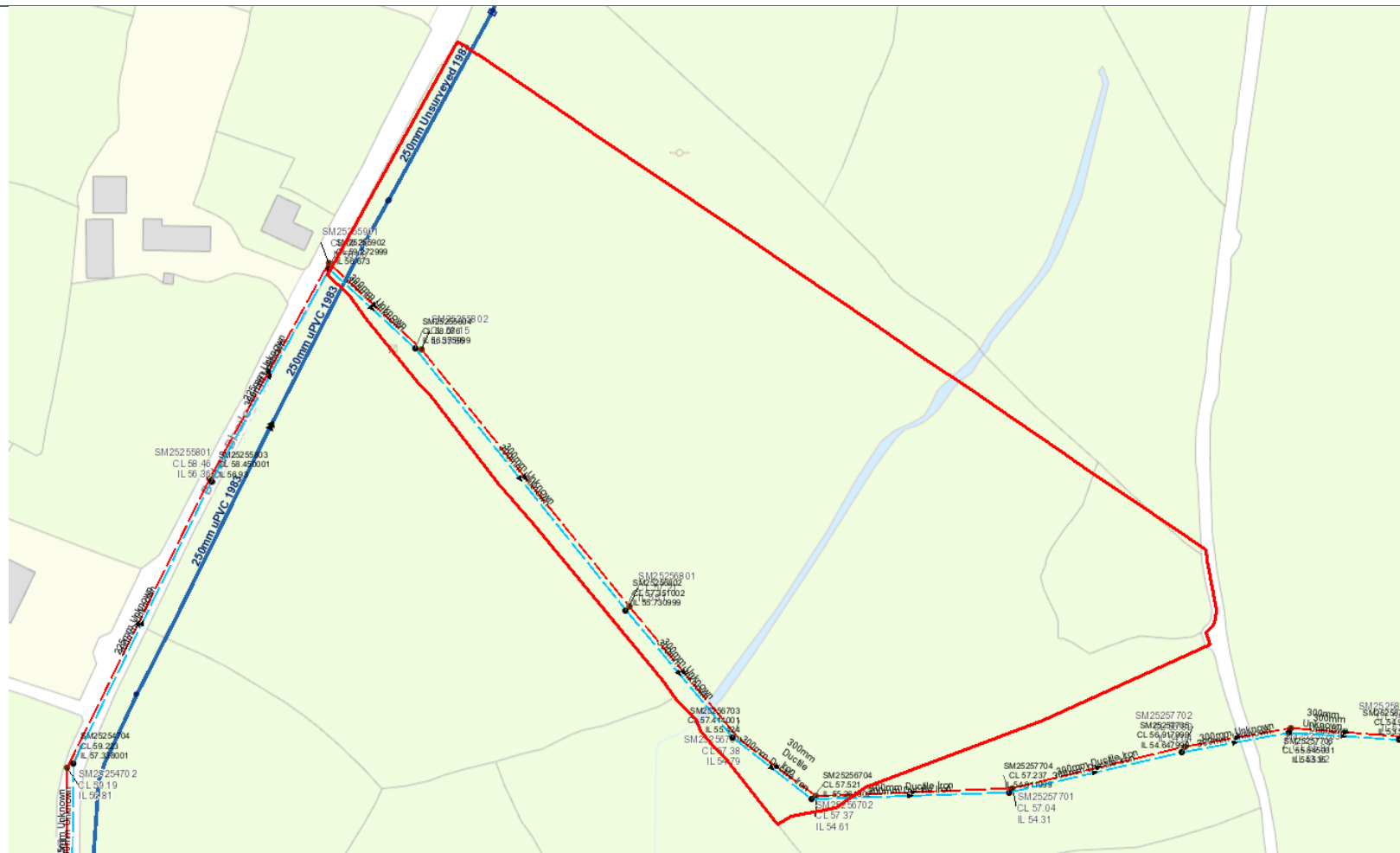


Figure 3 Existing Watermain, Foul & Surface Water Network

KEERAUN SOCIAL HOUSING STAGE 1 FLOOD RISK ASSESSMENT

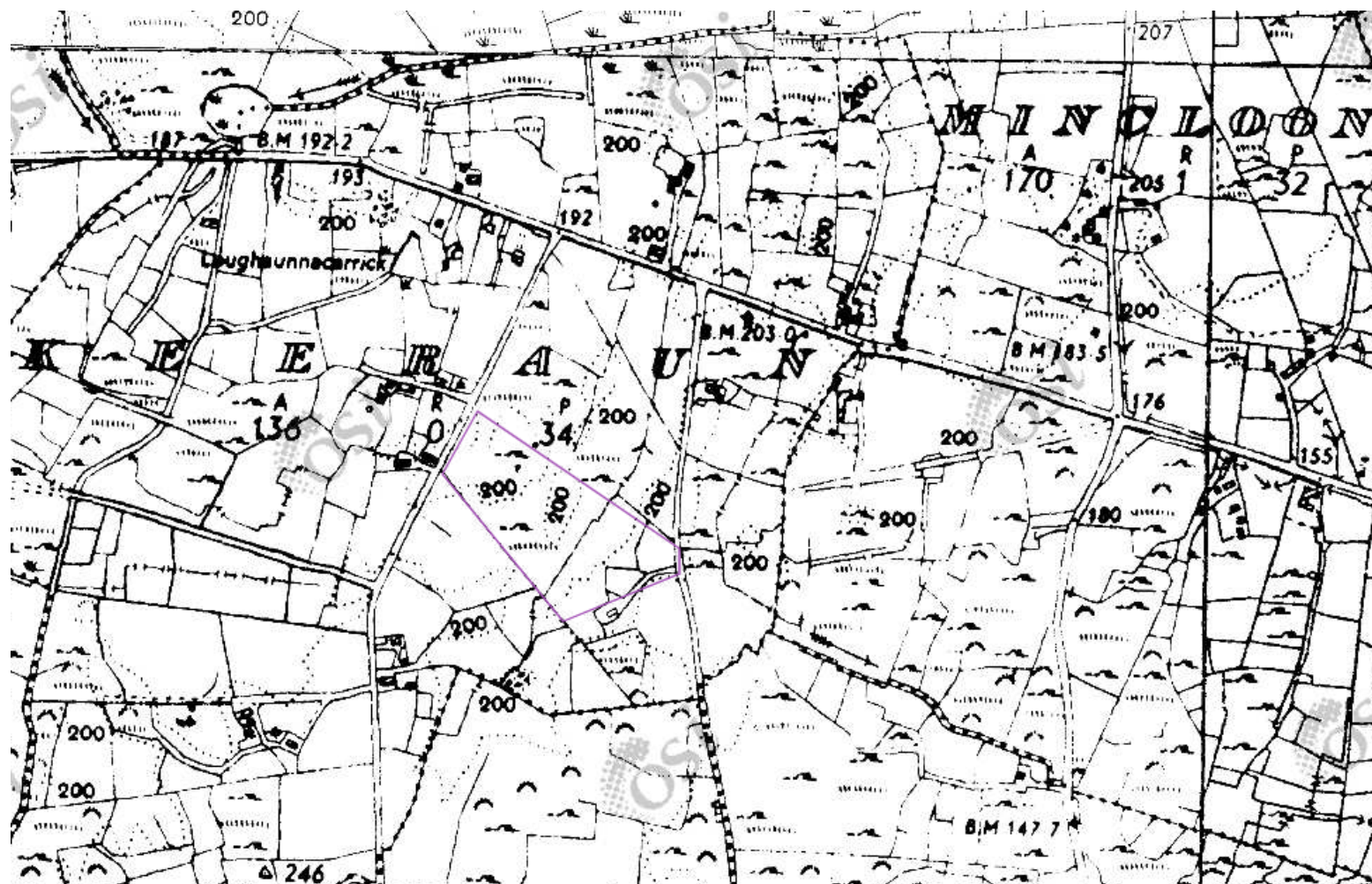


Figure 4 Historical 6" mapping with site boundary line overlay

KEERAUN SOCIAL HOUSING STAGE 1 FLOOD RISK ASSESSMENT

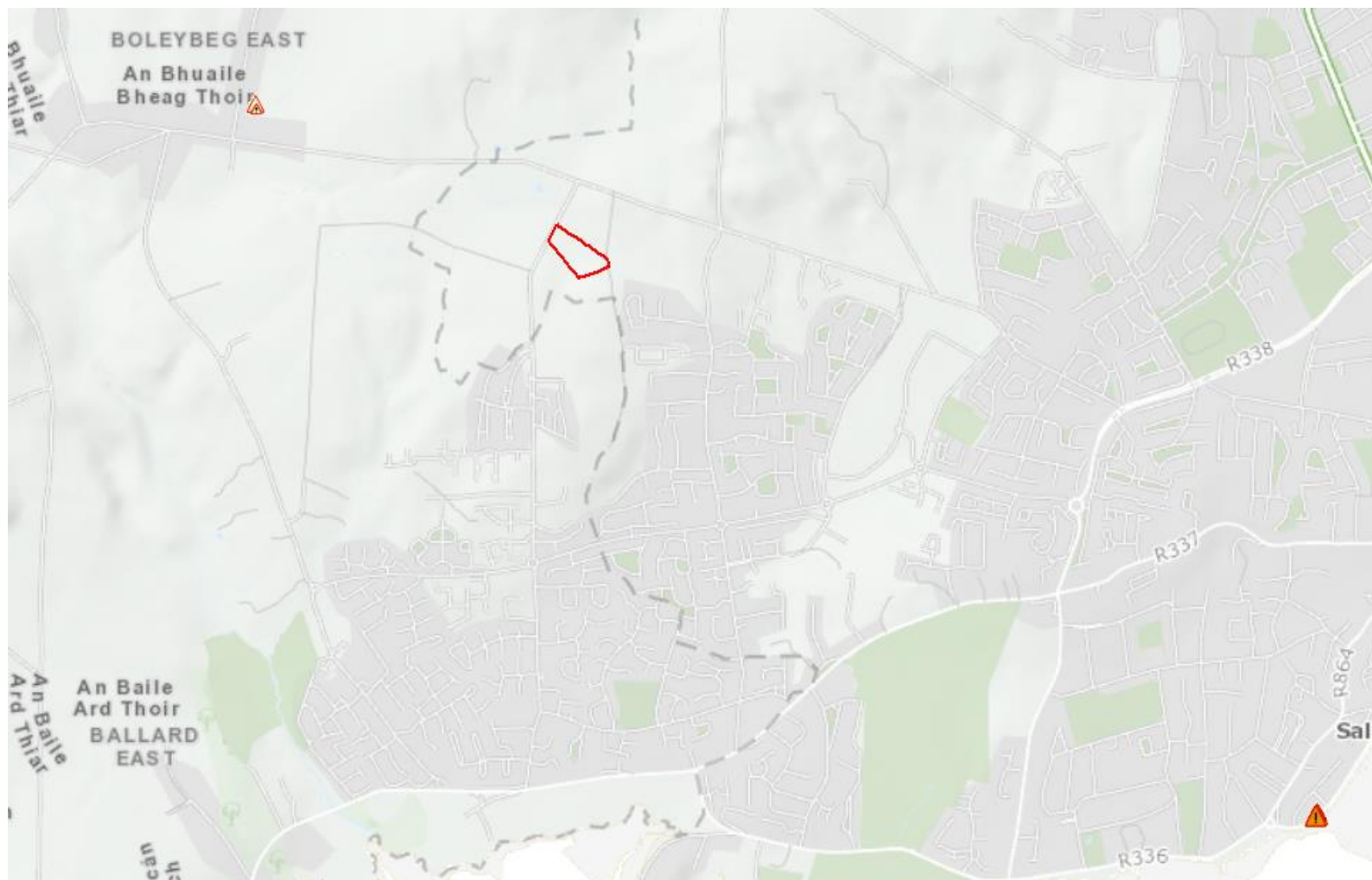


Figure 5 OPW Historical Flood Events

KEERAUN SOCIAL HOUSING STAGE 1 FLOOD RISK ASSESSMENT

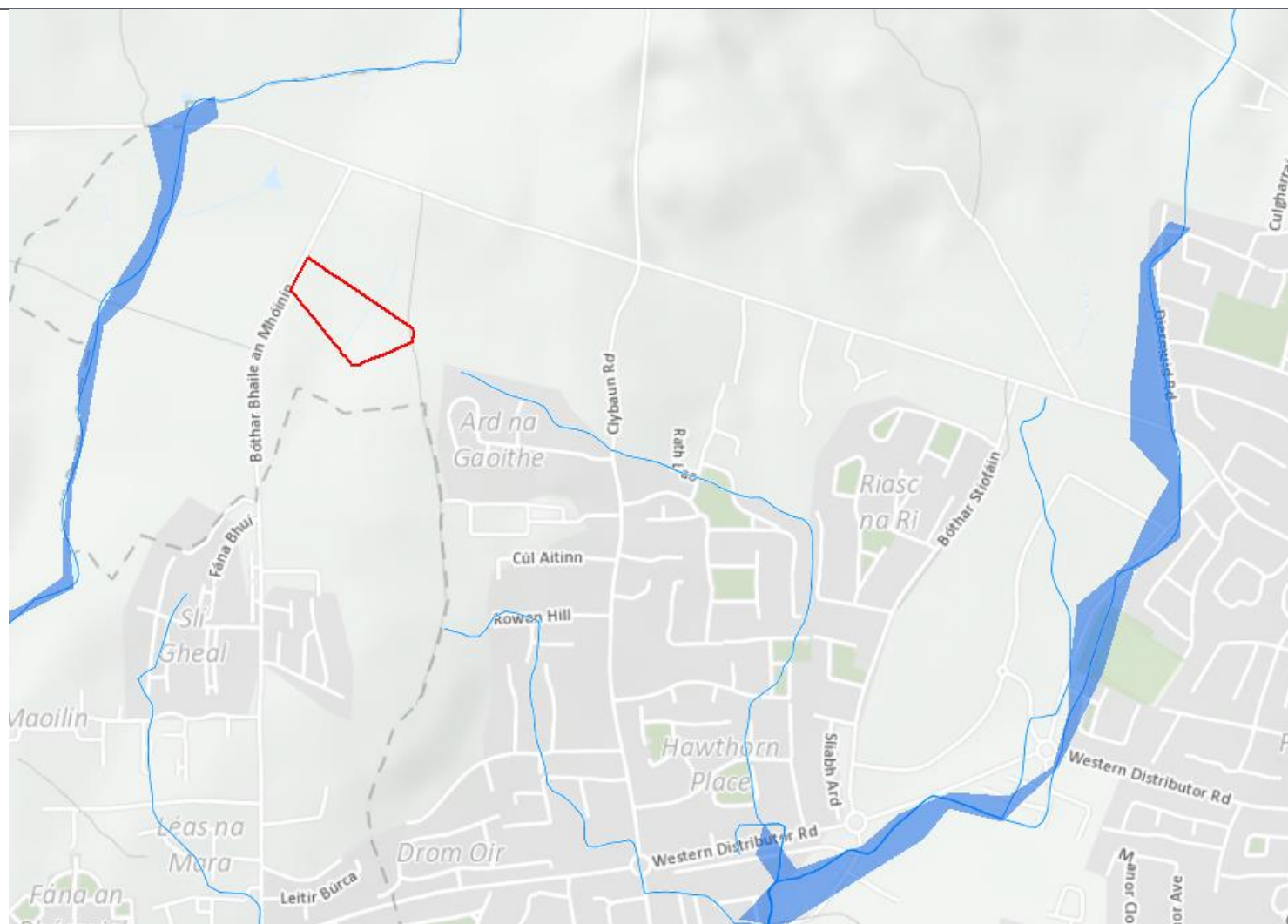


Figure 6 OPW PFRA 100-Year Flood Extents

Appendix F

Irish Water Pre Connection Enquiry

Padraig Mac Giolla Bhríde
Lyrr 2
IDA Bus & Technology Park
Mervue
Galway

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

5 August 2021

Re: CDS21001178 pre-connection enquiry - Subject to contract | Contract denied

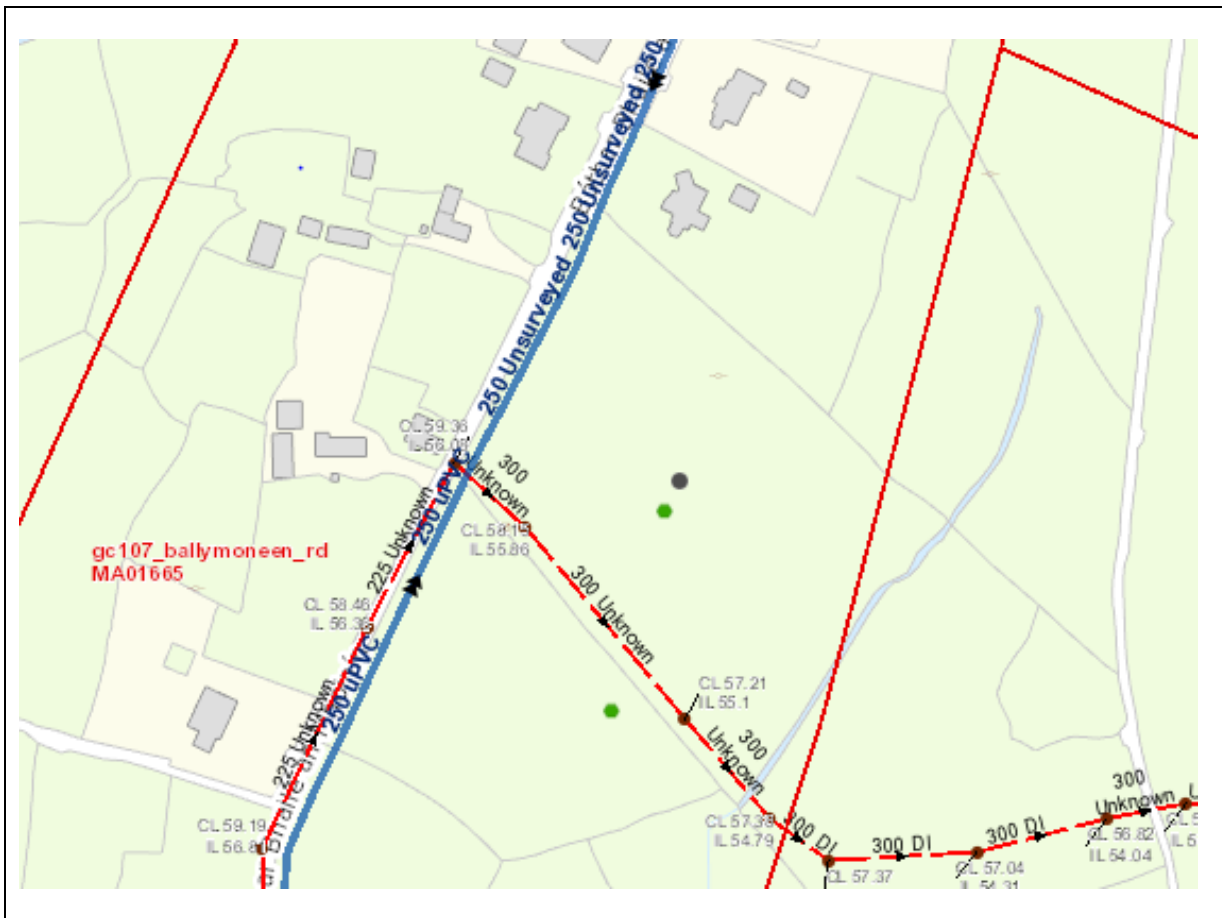
Connection for Housing Development of 69 unit(s) at Keeraun, Ballymoneen, Galway, Co. Galway

Dear Padraig,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Keeraun, Ballymoneen, Galway, Co. Galway (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 <u>THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.</u>
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	250mm diameter watermain positioned in the road at the site entrance that has capacity to supply the proposed development
Wastewater Connection	300mm diameter existing foul sewer main positioned in the South West boundary of the site may have to be diverted. Please consult with the diversions team in Irish Water about same.
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:



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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.

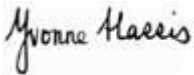
General Notes:

- 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 Barry Butler from the design team by email barry.butler@water.ie For further information, visit **www.water.ie/connections**.

Yours sincerely,



Yvonne Harris

Head of Customer Operations