Contact us
+353 1 5242060
info@ors.ie
www.ors.ie

2025

Residential Development, Kinnegad, Co. Westmeath

Engineering Planning Report

Residential Development, Kinnegad, Co. Westmeath
Engineering Planning Report

Document Control Sheet

Client:	JH Kinnie Ltd
Document No:	241139-ORS-XX-XX-RP-C-13a-001

Revision	Status	Author:	Reviewed by:	Approved By:	Issue Date
P01	**S2**	**KM**	**DG**	**MH**	**20/11/2024**
P02	**S2**	**RM**	**DG**	**MH**	**21/03/2025**
P03	**S2**	**RM**	**DG**	**MH**	**02/05/2025**

Table of Contents

1 LRD Opinion Response

The below summarises opinions raised by Westmeath County Council (WMCC) after the LRD Stage 2 meeting and our response to these items.

Ref	WMCC Opinion	ORS Response
4	The applicant is requested to submit the following in association with any future application.	
A	Roads	
(i)	Radii and sightlines at the entrance onto local secondary road L5014 and sightlines at all junctions within the proposed development to be DMURS compliant. DMURS compliance certificate to be submitted.	GA drawings have radii and sightlines illustrated on them. Refer to drawing 241139-ORS-ZZ-00-DR-TR-700 for details. A DMURS compliance statement report is attached to this report within Appendix H.
(ii)	A minimum road width of 6.0m for main access road through the site and 5.50m width for other roads. Dimensions of all roads widths to be documented on drawings.	A minimum road width of 6.0m is provided for the main access road through the development and 5.50m for all other roads. Refer to drawing 241139-ORS-ZZ-00-DR-TR-700 for details.
(iii)	Provision of a 3m shared footpath within the proposed development linking the L 5014 (Boreen Bradach Road) to St Etchen's school.	A 3m wide shared footpath is provided along southern side of the main access road and links Boreen Bradach to St Etchen's school.
(iv)	A swept path analysis for service vehicles and fire tenders throughout the scheme for the full internal road network together with a swept path analysis for vehicles manoeuvring in the Home zone areas.	A swept path analysis has been undertaken throughout the development. Refer to drawings 241139-ORS-ZZ-00-DR-TR-730 to 733 for further details.
(v)	Stage 1 & 2 Road Safety Audit in accordance with TII GE-STY-01024, with respect to the final design of the proposed road layout (to incorporate the new road junction onto the Boreen Bradach Road).	A Stage 1 & 2 Road Safety Audit has been undertaken as part of this planning application and is included in this submission.
(vi)	Provision of a hammerhead/ turning areas adjacent to house number 89 and house number 127, next to the site boundary.	Turning areas have been provided to cul de sac roads.
(vii)	Infrastructure consisting of footpath, surface water and public lighting to be provided along the L-5014 linking the proposed development to the main street in Kinnegad.	As agreed, a portion of new public footpath is to be installed on the western side of Boreen Bradach. Refer to drawing 241139-ORS-ZZ-00-DR-TR-701 for details. Additional road gullies have installed to cater for surface water runoff along Boreen Bradach for this new section of footpath and ramp.
(viii)	A tabletop to be provided at the junction of the L-5014 and the R148 road, designed in consultation with Westmeath County Council.	A speed survey has been carried along the main road within Kinnegad town (R148) to ascertain if a tabletop is required at the junction of L5014 / R148. Refer to Section 7 and Appendix J of this report for assessment of speed survey results.

(ix)	Design details for home zones, footpaths within the development and shared space signage. Any routes that have high level traffic would require 3m footpath / shared space.	Road signage for the various areas have been detailed on drawing 241139-ORS-ZZ-00-DR-TR-700 along with design details for home zones and footpath areas. A 3m wide footpath/shared surface has been provided along the main access road for any potential high level traffic volumes.
(x)	A Traffic and Transport Assessment from the development site along the L5014 (Boreen Bradach Road) to the main street (R148) of the town.	A Traffic and Transport Assessment report is included in this planning application.
(xi)	A Mobility Management plan including the mobility around the creche area, to the school and shopping centre.	A Mobility Management plan report is included in this planning application.
(xii)	Specification for roads and footpath.	Specification for roads and footpath are attached to this report in Appendix K.
5	The applicant is advised to submit the following details in any planning application:	
(a)	Surface Water	
(i)	Positive drainage to the storm water network serving the Boreen Brádach road area.	Positive drainage is incorporated into the stormwater drainage design for the existing Boreen Bradach road. Refer to drawing 241139-ORS-ZZ-00-DR-TR-701
(ii)	Surface water calculations which include for all private permeable areas, to ensure there is sufficient capacity where maintenance of private permeable areas.	Calculations have been included in Appendix E of this report, showing the required depth of build up, to store the 1:100 year event.
(iii)	Nature based surface water solutions to be incorporated into the scheme design such as rain gardens or shallow swales etc.	A swale has been incorporated into the drainage design to POS #1. Refer to drawing 241139-ORS-ZZ-00-DR-CE-400 and 241139-ORS-ZZ-ZZ-DR-CE-423 for details.
(b)	Water/Wastewater	
	Agreement(s) with Uisce Eireann in respect of water and wastewater connections. A statement of design acceptance from Uisce Eireann along with details of proposed connection routes to the existing water and wastewater networks.	Refer to Appendix L that outline correspondence between IW and ORS.

	Fire Officer Opinion	ORS Response
1	The Development is constructed in accordance with the provisions of the Building Regulations, Building Control Regulations & all associated Technical Guidance Documents	Development will be constructed in accordance with the relevant standards/guidance documents.
2	Provision of adequate water supplies for the purpose of Firefighting	Watermain pipe designed to cater for fire fighting purposes.
3	Provision of fire hydrants such that the maximum distance from a hydrant to the entrance of a building does not exceed 46m.	All buildings are covered with the required fire hydrants and this is shown on the watermain drawing (241139-ORS-ZZ-00-DR-CE-403).
4	Provision of adequate water run off areas to prevent pooling.	All roads and pedestrian footpaths have adequate falls along with road gullies to prevent pooling of water.
5	Dead – ends and Turing circles are within the provisions of Part B5 of the building regulations.	All dead-end roads have been assessed and where applicable, hammer heads have been provided. Where hammer heads have not been provided these have short length roads and are deemed acceptable.
6	The development is carried out in accordance with “Recommendation for Site Development Works for housing estates” (Department of the Environment & Local Government 1998).	The development is carried out in accordance with the relevant standards.

2 Introduction

ORS have been instructed by JH Kinnie Ltd to prepare an Engineering Planning Report for the propose Residential Development at Kinnegad, Co. Westmeath.

2.1 Site Location

The site is located approximately 18km to the east of Mullingar Town Centre and approximately 0.6km North of the M4/M6 motorway. The proposed site is a greenfield site. The application boundary extends to approximately 4.279 hectares, encompassing proposed offsite works as well as all onsite development.

The proposed development is bounded to the south by several existing businesses along the Main Street as well as the parish church. To the west by St Etchen's National School. To the north by an existing housing development, Bun Daire, and to the east by an existing road and another existing housing development, Riverside Lawns.

Entrance and exit to the proposed development site will be from Boreen Bradach Road that bounds the eastern edge of development boundary and connects to the R148/Main Street for Kinnegad.

This report should be read in conjunction with ORS design drawings.

Figure 1.1: Proposed Site Location, Kinnegad, Co. Westmeath – Approximate development boundary outlined in red. Source: Google Satellite imagery.

2.2 Proposed Development

The proposed development consists of the following:

The development will comprise a Large-Scale Residential Development (LRD) on a site at Boreen Bradach, Kinnegad, Co. Westmeath. The proposed development will comprise 129 no. houses (1 bed, 2 beds, 3 beds and 4 beds) and the provision of a crèche facility. Provision of car, cycle and motorbike parking. Provision of a new vehicular access and additional pedestrian/cyclist access from L-5014 (Boreen Bradach Road) and associated upgrades to the local road. All associated site development works and services provision, bin stores, residential private open space, public open space, substation, boundary treatments, landscaping and all associated site development works.

Figure 1.2: Finalised Site Layout Plan (From Architect).

3 Surveys

3.1 Topographical Survey

A topographical survey was carried out for the entire site. The survey includes contours, spot levels on the site (all to Malin Head datum), site boundary, edge of road, agricultural drainage features and fence lines. The subject site slopes generally from the south to the north of the site. The high point of the site is at an elevation of approximately 77.00m AOD in the south-west corner and the low point of the site is approximately 74.00m AOD excluding ditch inverts at the northern centre point of the site. The site has an average slope of 1:54. There are a few localised high points on the site, however, other than localised areas of cut and fill, it is envisaged that largely existing ground levels will be retained for this development. Levels on the public road in the east are of the order of 74m AOD.

Refer to Roads Layout, drawing number 241139-ORS-ZZ-00-DR-CE-400 for details of existing and proposed levels.

3.2 Site Investigation Survey

As part of the development design a site investigation was undertaking by “Site Investigations Limited” (SIL). A variety of site investigation tests were carried out on site to determine if the existing ground was suitable for stormwater infiltration and for future detailed design assumptions.

The initial fieldwork was undertaken between October and November 2024. For test results, refer to **Appendix G** for further details. A total of six infiltration tests were carried out in accordance with BRE 365: 2016 guidelines. The six tests were located within the public open spaces (POS) within the site development. The infiltration tests were undertaken across the site to determine the feasibility of discharging runoff to ground for potential SuDS features. From the six infiltration tests carried out, the ground had poor infiltration, and the tests did not support an effective rate of infiltration. The site is therefore deemed unsuitable for soakaways, and surface water will need to be attenuated on site with a connection to the Local Authority surface water network with a suitable hydro-brake to limit discharge at greenfield runoff rates only.

Figure 2.1: Location of Infiltration Tests

4 Design Codes & Standards

The civil engineering works presented in this report and the accompanying drawings have been designed in accordance with the following codes of practice and standards:

- “Irish Building Regulations Technical Guidance Documents” Department of the Environment and Local Government
- “Greater Dublin Strategic Drainage Study” published under the National Development Plan
- UK SuDS Manual - CIRIA Report “C753 Rev 1 – Sustainable Drainage Systems”
- EPA - Wastewater Treatment Manuals – Treatment Systems for Small Communities, Business, Leisure Centres and Hotels
- Guidance on the Authorisation of Discharges to Groundwater (EPA, 2011)
- EPA – Groundwater Protection Responses for On-site Wastewater Systems for Single Houses
- EPA - Guidance on the Authorisation of Discharges to Groundwater
- European Communities Environmental Objectives (Surface Water) Regulations, 2009.

5 Water and Wastewater Services

5.1 Existing Utilities

There are existing utilities in the vicinity of the proposed development which will allow for servicing the development for water and wastewater. Along Boreen Bradach Road traversing the eastern boundary of the site there is an existing foul water sewer that was surveyed as part of the proposed application. Although not shown on existing infrastructure mapping below (**Figure 4.1**) the levels and pipe size of this foul sewer infrastructure has been verified by the surveying team as a 225mm diameter pipe flowing to the east (**Figure 4.2**).

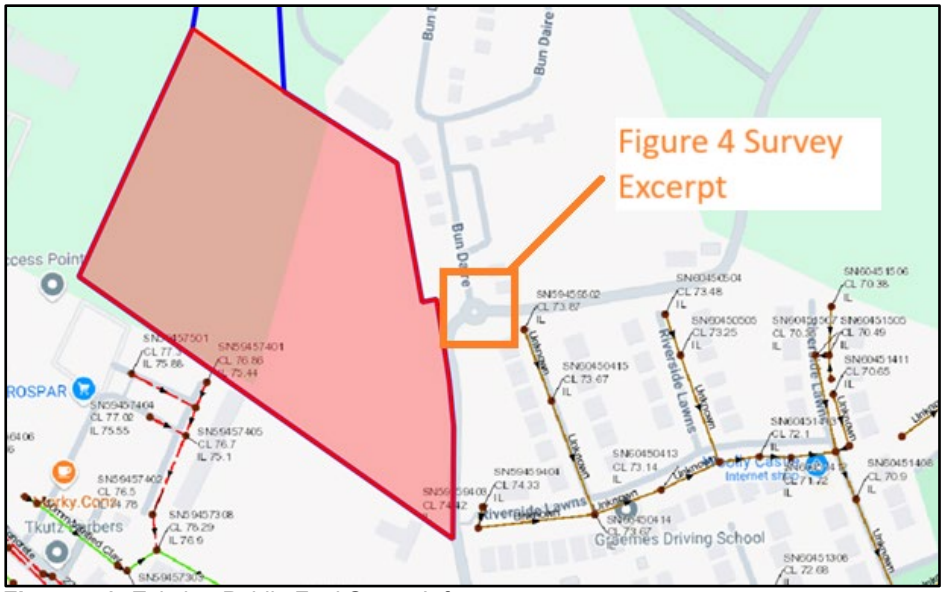


Figure 4.1: Existing Public Foul Sewer Infrastructure.

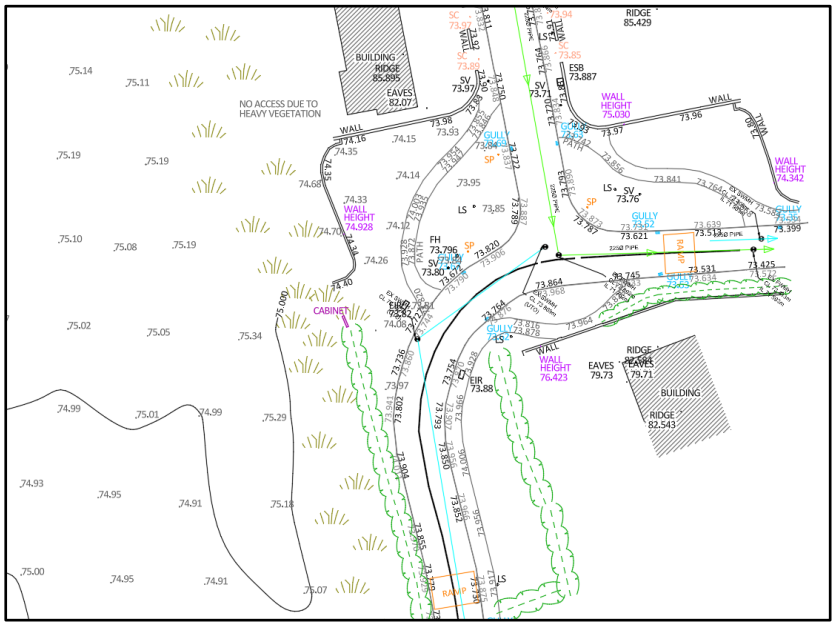


Figure 4.2: Excerpt of surveyed infrastructure. Foul sewer infrastructure in green, surface water infrastructure in cyan.

An existing 100mm diameter uPVC watermain is located in the vicinity of the site. The current water infrastructure does not reach the subject site.

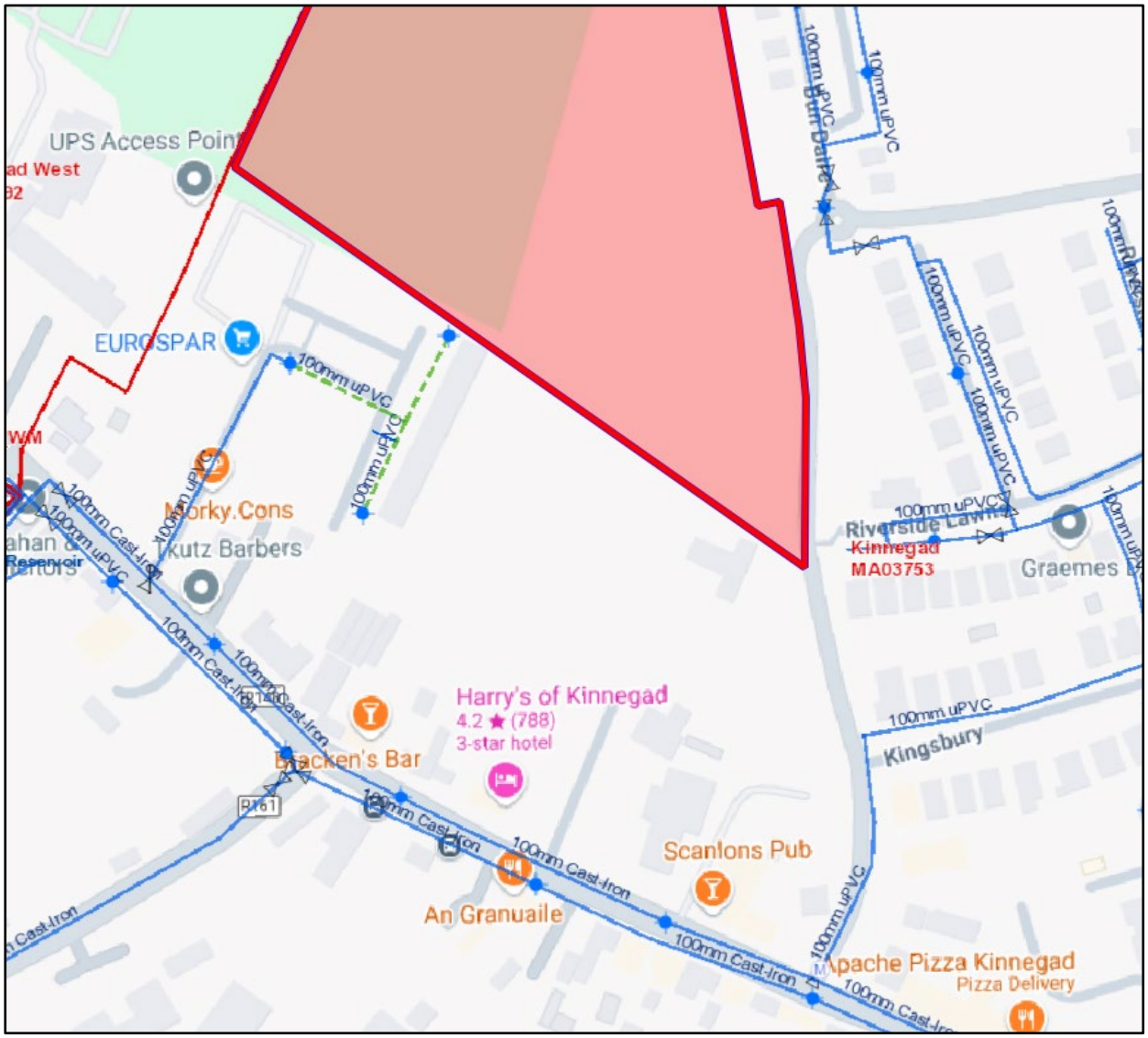


Figure 4.3: Existing Watermain Infrastructure

5.2 Irish Water Pre-Connection Enquiry

A pre-connection enquiry (PCE) was submitted to Irish Water and a Confirmation of Feasibility (CoF) was received on 22nd October 2024. Irish Water confirmed the feasibility of both the water and wastewater connections for the proposed development. A copy of the CoF response from Irish Water is attached in **Appendix A** of this report and noted the following:

Water Connection:

- *Feasible Subject to upgrades*
- *There is sufficient capacity at the Portloman Water Treatment Plant to supply the proposed development.*

- *However, please note upgrades to the existing water network are required to supply your proposed development.*
- *Approximately 690m of the existing network would need to be upsized and extended to facilitate your proposed development.*
- *Uisce Eireann has no plans under the current capital investment programme to undertake these works.*
- *Accordingly, these works must be completed to specifically serve your proposed development.*
- *Uisce Eireann would complete the required works, all of which are within the public road/space.*
- *The customer would be required to fund these works, the cost of which would be included in a Connection Agreement following receipt of your connection application. The details of the required upgrade works can be agreed at Connection Application Stage*

Wastewater Connection:

- *Feasible Subject to upgrades.*
- *There is sufficient capacity at the Kinnegad Wastewater Treatment Plant to facilitate your proposed development.*
- *Please note the nearest Uisce Eireann foul sewer network is approx. 45m from your proposed development site.*
- *Uisce Eireann has no plans under the current capital investment programme to undertake these works.*
- *Accordingly, these works must be completed to specifically serve your proposed development.*
- *Uisce Eireann would complete the required works, all of which are within the public road/space.*
- *The customer would be required to fund these works, the cost of which would be included in a Connection Agreement following receipt of your connection application. The details of the required upgrade works can be agreed at Connection Application Stage*

5.3 Proposed Water Network

The proposed development will connect into the public watermain network via the proposed upgrade works to existing pipes. The proposal is for the length of the existing watermain along the Main Street, R148, up to the subject site on Boreen Bradach Road to the north to be replaced with a new 150mm diameter watermain pipe. These upgrade works will be undertaken as part of this new development and financed by the applicant.

The anticipated water demand for the development has been calculated in accordance with Irish Water – Code of Practice (IW COP) for Water Infrastructure. The proposed development is for residential housing and the water demand has been quantified on this basis. The water usage per person has been taken as 150 litres per day as per IW COP. The ultimate number of housing units is 129 units with an allowance for the proposed creche. As per IW COP, occupancy per dwelling is 2.7. As calculated in **Appendix B**, the anticipated maximum water demand for the development will be approximately 80.4m^3/day.

All watermain infrastructure shall be designed and constructed in accordance with Irish Water documents “Code of Practice for Water Infrastructure” and Water Infrastructure Standard

Details". Please refer to ORS drawing number 241139-ORS-ZZ-00-DR-CE-402 for layout of the proposed water supply infrastructure.

IW have provided a letter in regard to Statement of Design Acceptance (SODA), please refer to **Appendix A** for details.

5.4 Proposed Wastewater Network

The proposed wastewater network for the development will discharge to the existing foul sewer infrastructure in the vicinity of the site, identified in **Figure 4.2** above, which in turn discharges to the Kinnegad Wastewater Treatment Plant (WWTP) to the east.

The anticipated wastewater volume generated from the development has been calculated in accordance with IW COP for Wastewater Infrastructure. The water usage per person has been taken as 150 litres per day. The proposed number of new units is 129 and the average occupancy has been taken at 2.7 per dwelling as per IW COP. An allowance for the proposed creche has also been made. Therefore, as calculated in **Appendix C**, the anticipated total daily flow for the development will be approximately 80.4m³/day. This translates to a Dry Weather Flow of 0.97l/s or Peak Dry Weather Flow (6.0DWF) of 5.79l/s.

The proposed internal wastewater sewer will consist of a series of 150mm – 225mm diameter sewer pipes falling at a rate to ensure self-cleansing velocities are provided. 100mm diameter pipes will be provided between access junctions enclosing dwellings and falling at a minimum grade of 1 in 60. All wastewater drainage pipe will be separate to surface water drainage infrastructure in accordance with IW COP.

All wastewater infrastructure shall be designed and constructed in accordance with Irish Water documents "Code of Practice for Wastewater Infrastructure" and "Wastewater Infrastructure Standard Details". Please refer to ORS drawing number **241139-ORS-ZZ-00-DR-CE-400** & **241139-ORS-ZZ-00-DR-CE-401** for layout of the proposed wastewater drainage infrastructure.

IW have provided a letter in regard to Statement of Design Acceptance (SODA), please refer to **Appendix A** for details.

6 Surface Water Drainage

Guidance for the design of the Surface Water network has been taken from the Greater Dublin Strategic Drainage Study (GDSDS) and Sustainable Drainage Systems (SuDS) guidance manual Ciria C753. Please refer to **Appendix F** for Surface Water Design Calculations.

6.1 Existing Stormwater Drainage

Similar to the existing foul sewer infrastructure there is an existing sewer within the vicinity of the site that has not been represented on the available infrastructure mapping for the area (see **Figure 6,** below). As per **Figure 4.2** above, there is a surface water sewer within the adjoining road, to the south of the Bun Daire road that has been identified as suitable for surface water to discharge to as part of the surveying undertaken for the development.

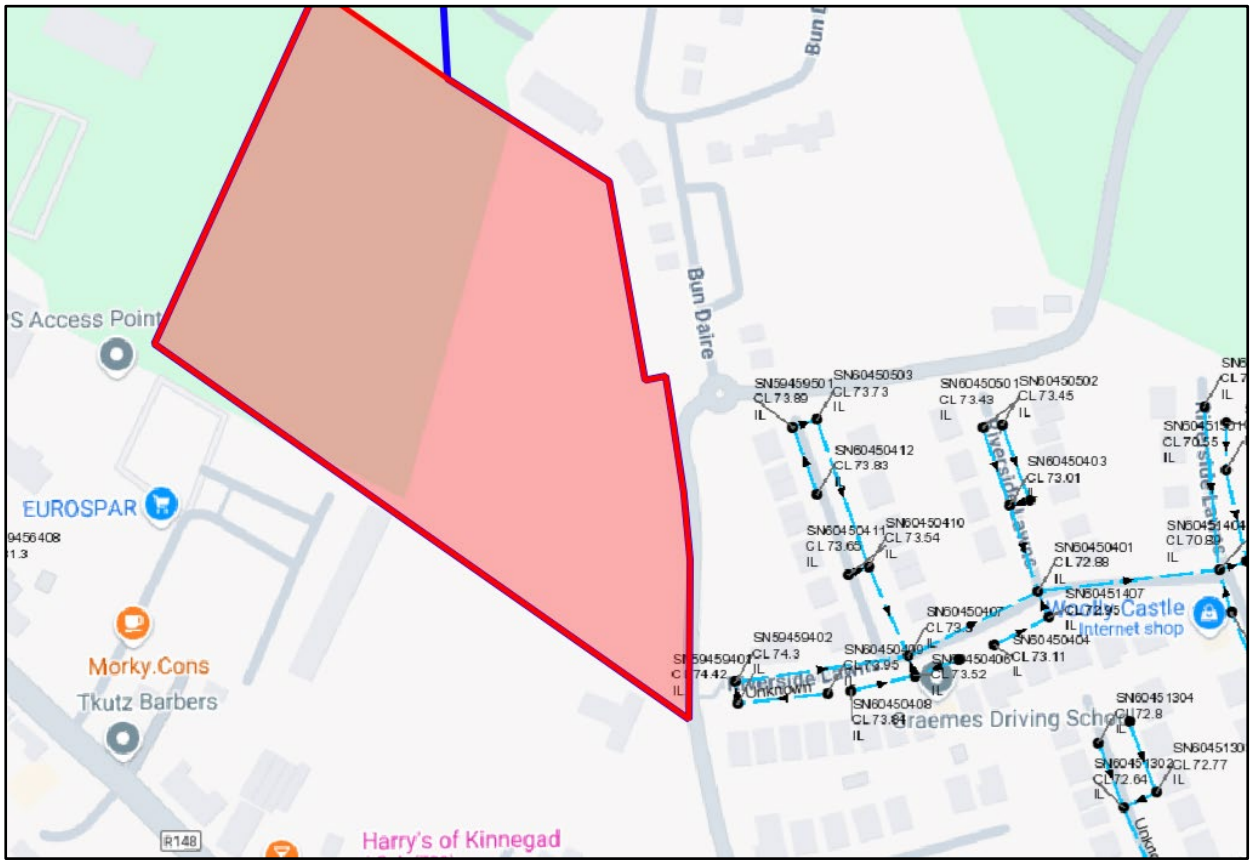


Figure 6: Existing mapped stormwater infrastructure

6.2 Proposed Surface Water Drainage Strategy

The proposed surface water drainage system has been designed using Causeway Flow software in accordance with the Department of Environment and Local Government's guidance document "Recommendations for Site Development Works for Housing Areas", with guidance taken from the "Greater Dublin Strategic Drainage Study" (GDSDS) and the WMCC Development Plan.

A new surface water sewer network shall be provided for the proposed development which will

be entirely separated from the foul water sewer network. All surface water run-off from roof areas and hardstanding areas are designed to be collected by a gravity pipe network. The proposed surface water network will discharge into the public surface water network sewer to the west of the site.

The current WMCC Development Plan requires the site discharge from future developments to be limited to a maximum of 4 l/sec/ha in general areas around the City and in the areas which contribute to areas of restricted capacity, control all surface water discharges to 2 l/sec/ha. The runoff is to be reduced for the 1% Annual Exceedance Probability (AEP) (1:100-year storm return period), with an additional percentage allowance to be added to rainfall to allow for climate change. A 30% Climate Change factor has been applied to the stormwater drainage design.

WMCC was consulted during the various stages of this LRD planning application. It was noted that no above ground storage would be permitted for attenuation purposes. All stormwater runoff was to be stored below ground.

The proposed site will be served via below ground gravity pipework which predominantly runs below the proposed internal roads, landscape areas and carpark within the development. The surface water network will be fed via road gullies and rainwater from building roofs via guttering and downpipes. The surface water network will be attenuated, and flow controlled at greenfield runoff rates prior to outfall into the existing 225mm diameter surface water drainage network in the adjacent road.

Sustainable Drainage Systems (SuDS) will be utilised throughout the site where practical to help mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequencies and reducing pollutant concentrations in stormwater runoff. SuDS measures which have been incorporated in this scheme include the use of permeable paving to all car parking spaces, except for disabled parking area. The soakaway results for the proposed site were reviewed and it was determined that infiltration to ground would not be attainable for the proposed SuDS features and as such their implementation and efficacy would be limited. Please see **Appendix G** for the results of soakaway testing.

All surface water pipes have been designed to achieve a minimum self-cleansing velocity of 0.75m/sec.

From reviewing Met Eireann SAAR values for this specific site location, it was determined that the SAAR value for this site is 877mm. This value has been used to calculate the greenfield runoff rate for this development.

6.3 Proposed Surface Water Drainage System

A new surface water sewer network shall be provided for the proposed development which will be entirely separate from the foul water sewer network. Surface water run-off from roof areas and hardstanding areas are designed to be collected by a gravity pipe network. Surface water will be collected and discharged via a mixture of traditional and Sustainable urban Drainage System (SuDS) to the existing surface water sewer network on Booreen Bradach Road.

The minimum diameter of the mainline surface water sewers is 225mm and minimum horizontal and vertical separation distances between the proposed drainage and other services are as per the Irish Water Code of Practice.

It is proposed that surface water will discharge via attenuation tanks, a class 1 bypass separator and flow control device prior to discharging to the existing surface water network.

The surface water drainage network has been analysed for the risk of flooding for the 1 in 1-year, 1 in 30-year and 1 in 100-year return period rainfall events by means of simulating such events in the Causeway Flow drainage model. The model confirms no flooding for 1 in 30-year and 1 in 100-year return period events.

All surface water manholes will be in line with the Irish Water Code of Practice.

6.4 SuDS Proposal

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) and a variety of SuDS measures have been adopted. All SuDS measures are to be implemented with reference to the UK SuDS Manual, Greater Dublin Strategic Drainage Study (GGSDS) and Westmeath County Council water services department requirements.

The SuDS processes decrease the impact of the development on the receiving environment and provide amenity and biodiversity in many cases. Regular maintenance of the SuDS proposals is required to ensure they are operating to their optimal level throughout their design life.

A central design concept for SuDS is the SuDS Management Train approach. The SuDS Management Train is a hierarchy to be tailored to suit the size and the complexity of the area being drained. The following objectives of the treatment train provide an integrated approach to assist in mitigating the increase of surface water runoff as greenfield sites are developed and urbanised in addition to mitigating the impacts of stormwater quality on receiving watercourses.

- Source Control: Control of runoff close to where rain falls on the ground or roof surfaces.
- Site Control: Attenuation or treatment for a group of buildings or a stretch of road

The following sections indicate how each of the SuDS proposals contribute to reducing and restricting the discharge rate from the site.

6.4.1 Bioretention Swales

Bioretention swales are shallow landscaped depressions which are typically under drained and rely on engineered soils, enhanced vegetation, and filtration to remove pollution and reduce runoff downstream. They are aimed at managing and treating runoff from frequent rainfall events. They are particularly effective in delivering interception and can also provide:

- attractive landscape features that are self-irrigating and fertilising
- habitat and biodiversity
- cooling of the local microclimate due to evapotranspiration.

Bioretention swales fall under both the source control and site control categories in the SuDS Management Train. A swale will be located in three areas around the perimeter to POS #1. These swales will intercept a small quantity of stormwater runoff from the internal road area and within the landscape areas.

These swales will incorporate hardcore and a perforated pipe which will provide additional attenuation storage below the swale to cater for stormwater runoff from these roads. This

additional storage area will be linked with an overflow chamber that will discharge water back into the stormwater network when the ground is too saturated.

CIRIA C753 (The SuDS Manual) Table 24.6 notes that regarding interception design of swales, pavements drained by swales can be considered to provide interception, i.e., it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter.

6.4.2 Catchment and Attenuation Systems

Attenuation tanks fall under the site control category in the SuDS Management Train. It is proposed to attenuate surface water from the proposed development with one attenuation tank located in POS #1. The proposed attenuation tanks have been designed to reduce the peak runoff from the site. The attenuation tank has been sized to cater for a 1:100 storm event with a 30% allowance for climate change. Please refer to **Appendix E** for supporting calculations.

The attenuation tank will be an “on-line” system with a hydrobrake controlling discharge rates from the tank to the downstream network. The proposed runoff areas can be broken down as per the table below:

Description	Area (Ha)
Roads & Footpaths	0.9708
Carpark (permeable pavement)	0.3520
Green Areas – gardens and landscaping	1.8856
Roof	1.0706
Total	4.279

The proposed attenuation system will be a cellular block system such as Wavin Aquacell Plus-R or a similar approved product with a minimum voids ratio of 95% (typical details are provided in **Appendix G**). This system is a modular system, with individual modules stacked together to provide the overall storage volume required. It is then wrapped in a geotextile membrane to provide protection to the system, before being backfilled around and above with suitable granular fill material.

The attenuation storage calculations for a 1:100-year storm event of critical duration is attached in **Appendix E**.

As surface water is to be collected from the roads and car parking areas with a low risk of spillage, a Class 1 Petrol/Oil Bypass Interceptor will be installed on all inlets into the proposed attenuation tanks. All surface water shall be drained from impermeable areas through precast lockable gully traps.

An assessment of the manhole cover levels was reviewed against top water level within the network to determine if any manholes lids would pop up. On review, we determined that based on the top water level within the network from a 1:100-year storm event, that no manhole lids pop up.

6.4.3 Permeable Paving

The private car parking bays on site are proposed as permeable pavement. Surface run-off in

the trafficked areas will flow towards road gullies that will be separated from the permeable paving car parking bays. To note, disabled carparking spaces are not to have permeable surfacing given the line-marking and hatch requirements.

Permeable paving provides a pavement suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying structural layers. The water is temporarily stored beneath the overlying surface before controlled discharge downstream. Permeable paving falls under the source control category in the SuDS Management Train.

Permeable paving, together with its associated substructures, are an efficient means of managing surface water runoff close to its source – intercepting runoff, reducing the volume and frequency of runoff, and providing a treatment medium. Treatment processes that occur within the surface structure, the subsurface matrix and the geotextile layers include:

- Filtration
- Adsorption
- Biodegradation
- Sedimentation

CIRIA C753 (The SuDS Manual) notes that regarding interception design of pervious pavements, studies have shown that runoff typically does not occur from pervious pavements for rainfall events up to 5.0mm.

The permeable paving car park bays will be connected to the surface water network using a perforated pipe with outfall to the inspection chamber with an orifice pipe.

Refer to ORS drawings **241139-ORS-ZZ-00-DR-CE-400** & **241139-ORS-ZZ-ZZ-DR-CE-423** for details of permeable pavements and surface water network layout.

6.4.4 Flow Control

A flow control device will be fitted to the outlet manhole from the attenuation tank. This will control outflow from the tank internally and offset discharge downstream within the network. The flow control device, prior to discharge into public network, will discharge at greenfield runoff rates. All flow control manholes will be fitted with a pen stock on the inlet to the flow control manhole to facilitate any future maintenance work. All flow control chambers are also to have slit traps installed.

6.4.5 Class 1 Bypass Interceptor

It is proposed that all surface water run-off from trafficked areas will outfall via a Class 1 Bypass Separator located upstream of the proposed attenuation tank. This device will remove hydrocarbons and fine sediment particles from the site runoff and lower the risk of downstream contamination following an oil spillage on site.

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

Class 1 devices are designed to achieve a concentration of less than 5mg/l of oil under standard test conditions and fall under the site control category in the SuDS Management Train.

Two Bypass interceptors, located upstream of the attenuation tank are proposed to treat internal access roads not covered by swales.

6.5 Compliance with Sustainable Drainage Systems (SuDS)

To reduce and attenuate the flow, the proposed development has been designed in accordance with the principles of Sustainable Drainage Systems (SuDS) as expressed in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS).

The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimise the impact of urbanisation by replicating the runoff characteristics of a greenfield site. The criteria provide a consistent approach to addressing both rate and volume of run-off as well as ensuring the environment is protected from pollution that is washed off roads and buildings.

The requirements of SUDS are typically addressed by provision of the following:

- Interception storage.
- Treatment storage (not required if interception storage is provided).
- Attenuation storage.
- Long term storage (not required if growth factors are not applied to Qbar when designing attenuation storage).

In the case of the subject site, interception storage will be provided, and growth factors will not be applied to the allowable discharge for the 100-year event. This means that both treatment storage and long-term storage (neither of which would be practical on this site) are not required. Attenuation storage is provided and is outlined in **Section 6.3** above

6.6 Catchpit Manholes

Catchpit manholes will be provided prior to discharge into the attenuation tank. The function of the catchpits is to collect silt and debris and prevent blockages thus reducing risk of flooding and maintenance of the system.

A maintenance programme for cleaning the silt traps and infiltration soakaways should be adhered to as per the engineering design to ensure ongoing effective operation. Please refer to ORS drawings **241139-ORS-ZZ-00-DR-CE-400** and **241139-ORS-ZZ-00-DR-CE-420** for details of the proposed surface water drainage network for the development.

7 Roads

From the Stage 2 meeting with Westmeath County Council, a number of items have been raised. One of the items relate to a tabletop being installed at the junction along the main road within Kinnegad (junction of R148 and L-5014). ORS have reviewed the requirement for this tabletop in relation to the traffic speed and whether it would be warranted. Please refer to **Appendix J** within this report that discusses the requirement for this tabletop.

Westmeath County Council (WMCC) requires the construction of a new footpath along a segment of Boreen Bradach road. This footpath will connect the new development's frontage with the existing footpath to the south. The proposed footpath width is set at 1.6 meters. It has been communicated to WMCC that the road's overall width will narrow to 5.275 meters at a pinch point due to this addition. To ensure safe traffic flow through this section, ORS has reviewed the situation and suggests installing a raised ramp at this location. This raised pedestrian crossing aims to enhance both traffic movement and pedestrian accessibility.

Further details are available in **Appendix L**, which outlines the options provided to WMCC. As no feedback was received concerning this narrowed section of road, an assessment from a Road Safety Audit (RSA) perspective has been conducted, confirming the proposed solution as the best option.

8 Flood Risk Assessment

The OPW website floodinfo.ie was consulted for high level information on any potential flood risk to the site. No indication of any likely past or future flood events were identified within an influenceable vicinity of the site, see **Figure 8.1** below.

The development will present no significant increase in the risk of flooding either within the site or downstream of the site. Surface water runoff will be limited to the appropriate greenfield runoff rate via the flow control devices.

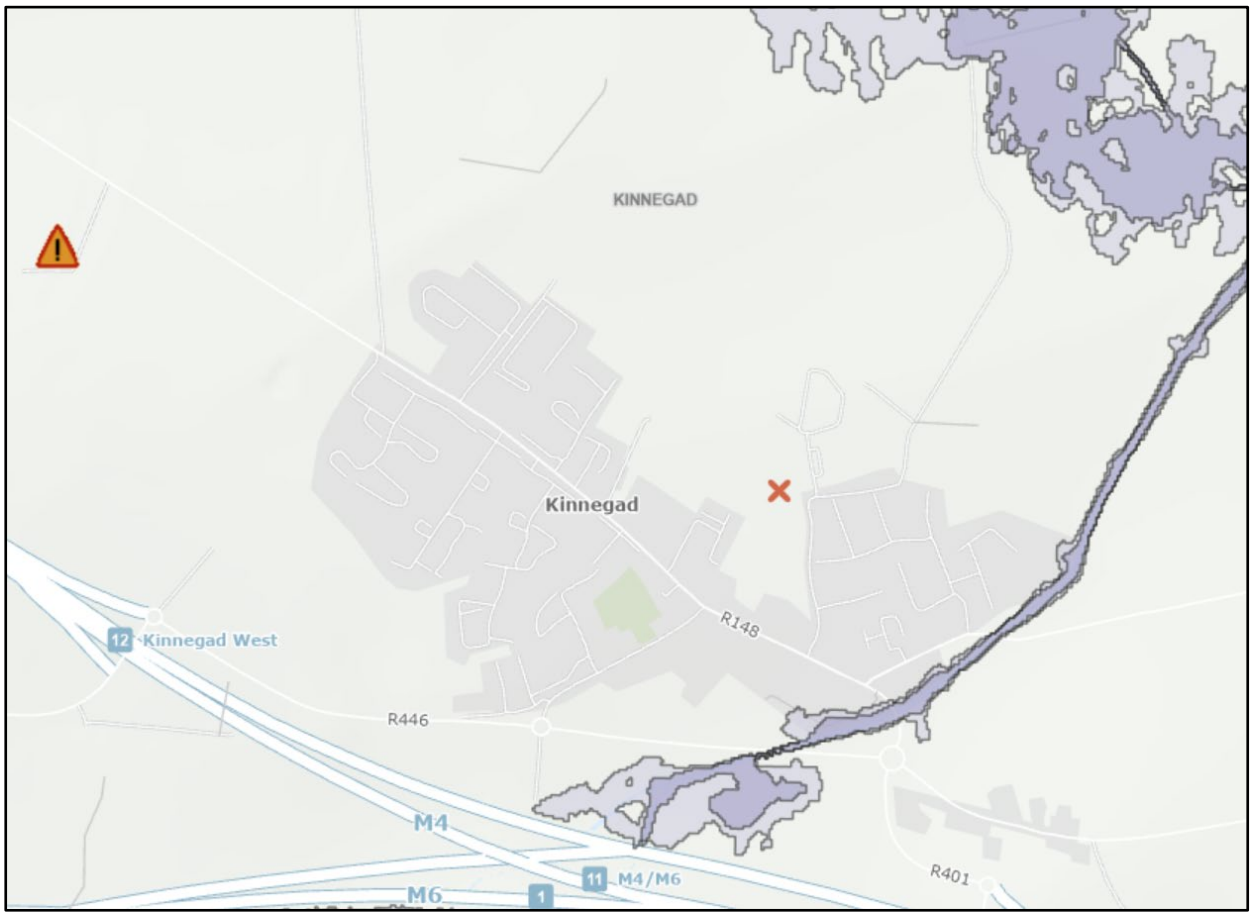


Figure 8.1: Mapped predictive flood extents and past flood event locations, site marked with red X. (Source floodinfo.ie)

9 DMURS Engineering Criteria

Guidance has been taken from DMURS for the engineering design of streets and footpaths in the development, the following criteria are addressed as follows.

9.1 Internal Road Widths

The minimum road width for a standard carriageway for local streets is defined by DMURS as 5.0-5.5m total. The proposed internal roads to be provided are designed as 5.5m to meet this requirement.

9.2 Internal Road Markings

Internal road markings are proposed to be limited to the approach to internal junctions and STOP lines. A STOP sign will be provided at each internal junction where a STOP line is proposed.

9.3 Pedestrian Linkages / Crossing Points

Proposed internal pedestrian pathways will be linked via dropped kerbs and tactile paving. A number of raised uncontrolled, pedestrian crossings are proposed throughout the site also.

9.4 Internal Road Junctions

Internal junctions have been designed perpendicular to each other where possible.

9.5 Turning Areas for Vehicles

All turning areas have been checked by swept path analysis (Autotrack) to ensure sufficient space to allow for refuse and emergency vehicles.

9.6 Speed Restraint Measures

The site layout has been designed such that there are limited straight stretches of roadway without horizontal or vertical speed restraints. Raised tables and raised crossings are provided in a number of locations to aid with speed restraint.

9.7 Vehicle Parking Locations

All car parking spaces have been designed such that they have a minimum of 5.5m of space behind them to reverse safely from a parking space. All parking spaces have minimum dimensions of 2.5m x 5.0m. Generally, parking is provided perpendicular to roadways throughout with the exception being the drop off area fronting the creche.

9.8 Service Vehicle Access

ORS have carried out an Autotrack swept path analysis on the proposed site plan to confirm adequate access for service vehicles within the site. A refuse truck, fire tender and car was modelled, and sufficient access is achieved. Please refer to **ORS drawing no. 241139-ORS-Z0-00-DR-TR-730,731, 732 & 733** for detail

Appendix A – IW Confirmation of Feasibility Letter & IW SODA Letter

CONFIRMATION OF FEASIBILITY

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

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

Karine Mamikonjana

ORS Consulting Engineers
Block A
Marlinstown Business Park
Mullingar
Co. Westmeath
N91RW96

22 October 2024

Our Ref: CDS24007195 Pre-Connection Enquiry
Site at, Boreen Bradach, Kinnegad, Co. Westmeath

Dear Applicant/Agent,

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

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Multi/Mixed Use Development of 133 unit(s) at Site at, Boreen Bradach, Kinnegad, Westmeath, (the **Development)**.

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

- **Water Connection**
  - Feasible Subject to upgrades
  - There is sufficient capacity at the Portloman Water Treatment Plant to supply the proposed development.
  - However, please note upgrades to the existing water network are required to supply your proposed development.
  - Approximately 690m of the existing network would need to be upsized and extended to facilitate your proposed development.
  - Uisce Eireann has no plans under the current capital investment programme to undertake these works.
  - Accordingly, these works must be completed to specifically serve your proposed development.

- Uisce Eireann would complete the required works, all of which are within the public road/space.
- The customer would be required to fund these works, the cost of which would be included in a Connection Agreement following receipt of your connection application. The details of the required upgrade works can be agreed at Connection Application Stage

- **Wastewater Connection**
  - Feasible Subject to upgrades
  - There is sufficient capacity at the Kinnegad Wastewater Treatment Plant to facilitate your proposed development.
  - Please note the nearest Uisce Eireann foul sewer network is approx. 45m from your proposed development site.
  - Uisce Eireann has no plans under the current capital investment programme to undertake these works.
  - Accordingly, these works must be completed to specifically serve your proposed development.
  - Uisce Eireann would complete the required works, all of which are within the public road/space.
  - The customer would be required to fund these works, the cost of which would be included in a Connection Agreement following receipt of your connection application. The details of the required upgrade works can be agreed at Connection Application Stage

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

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

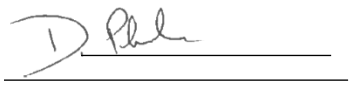
Where can you find more information?

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

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

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

Yours sincerely,



Dermot Phelan
Connections Delivery Manager

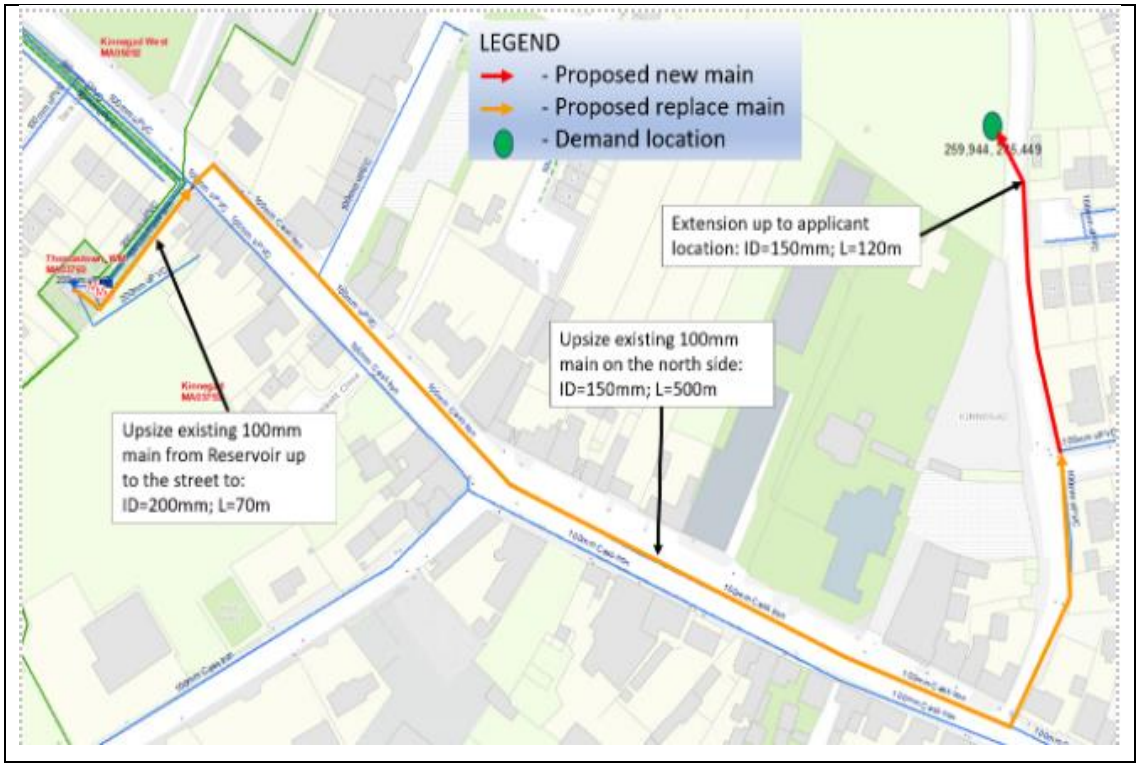
Section A - What is important to know?

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

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

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

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



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

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

Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Uisce Éireann's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

Karine Mamikonjana
ORS
Block A
Marlinstown Business Park
Mullingar
Westmeath
N91W5NN

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

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

2 May 2025

Re: Design Submission for Site at, Boreen Bradach, Kinnegad, Westmeath (the "Development")
(the "Design Submission") / Connection Reference No: CDS24007195

Dear Karine Mamikonjana,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Uisce Éireann has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before you can connect to our network you must sign a connection agreement with Uisce Éireann. This can be applied for by completing the connection application form at www.water.ie/connections. Uisce Éireann's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Uisce Éireann's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Uisce Éireann does not, in any way, render Uisce Éireann liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Uisce Éireann representative:
Name: Alicia Ros Bernal
Email: ailciarosbernal.bernal@water.ie

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

Appendix A

Document Title & Revision

- 241139-ORS-ZZ-00-DR-CE-402
- 241139-ORS-ZZ-00-DR-CE-400
- 241139-ORS-ZZ-00-DR-CE-401
- 241139-ORS-ZZ-XX-DR-CE-410
- 241139-ORS-ZZ-XX-DR-CE-411

Additional Comments:

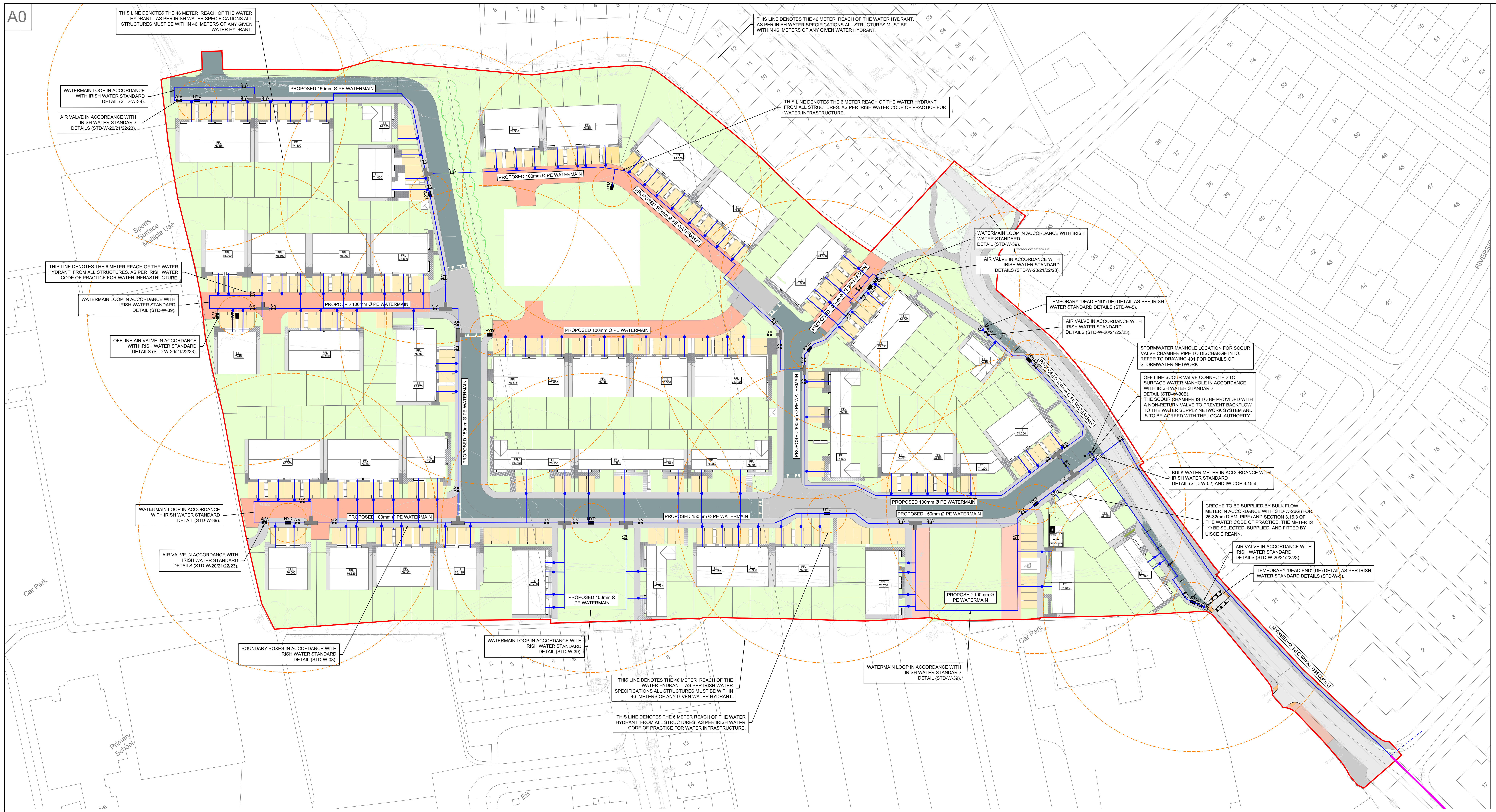
The design submission will be subject to further technical review at connection application stage.

Uisce Éireann cannot guarantee that its Network in any location will have the capacity to deliver a particular flow rate and associated residual pressure to meet the requirements of the relevant Fire Authority, see Section 1.17 of Water Code of Practice.

*For further information, visit **www.water.ie/connections***

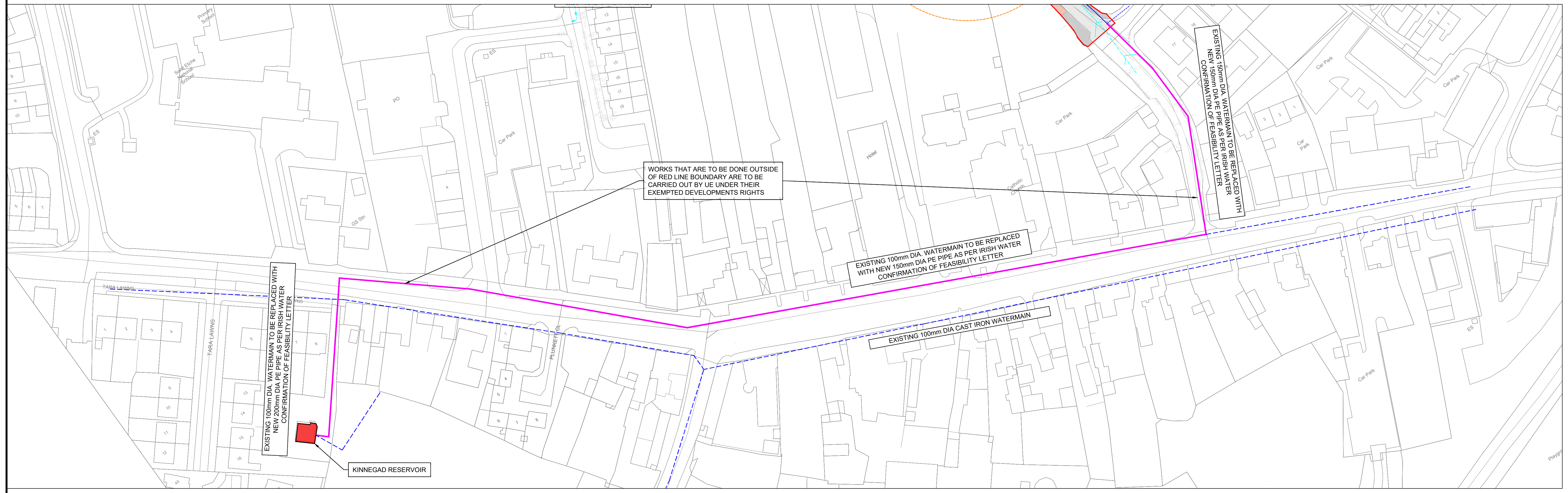
Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Uisce Éireann will not, in any way, render Uisce Éireann liable for any elements of the design and/or construction of the Self-Lay Works.

A0



WATERMAIN LAYOUT - AREA A

SCALE 1:500



WATERMAIN LAYOUT - AREA B

SCALE 1:500

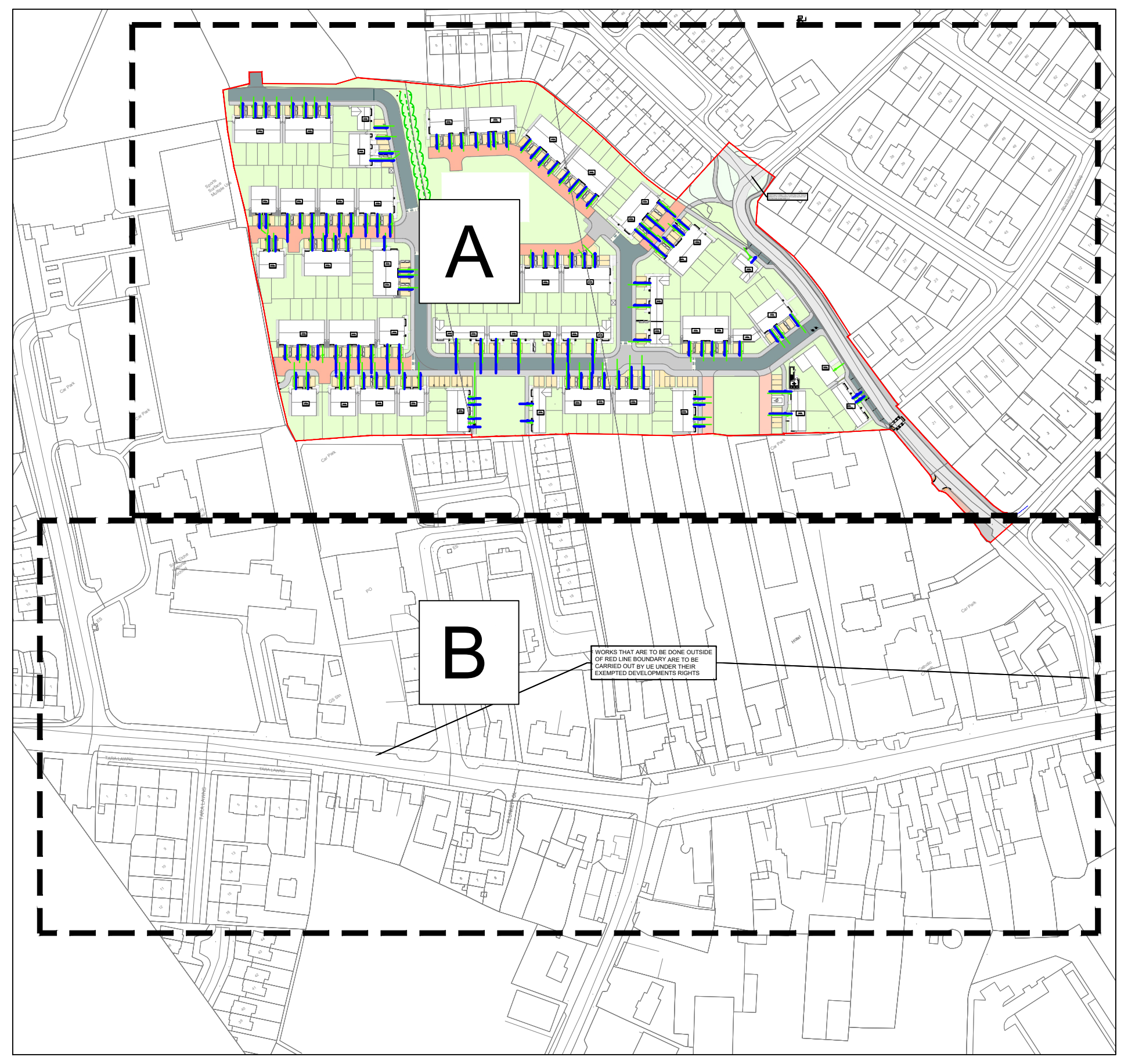
GENERAL NOTES

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEER'S AND ARCHITECT'S DRAWINGS AND SPECIFICATIONS.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM, MALIN HEAD UNLESS NOTED OTHERWISE.
3. THE POSITION OF EXISTING SERVICES AS SHOWN ON THE DRAWING MAY NOT BE ACCURATE. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES ON THE SITE AND SHOULD CONTACT THE RESPECTIVE UTILITY PROVIDERS AND AUTHORITIES FOR THE MOST UP-TO-DATE INFORMATION BEFORE COMMENCING THE WORKS.
4. EXISTING LEVELS ARE INDICATIVE ONLY AND MUST BE CHECKED AND VERIFIED ON SITE PRIOR TO COMMENCEMENT.
5. PROPOSED MANHOLE COVER LEVELS ARE APPROXIMATE AND SHOULD BE ADJUSTED TO SUIT LOCAL FINISHES.
6. ALL SURFACE WATER DRAINAGE INFRASTRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH LOCAL AUTHORITY REQUIREMENTS.
7. LOCKABLE TYPE GULLY TRAPS TO BE USED ON ALL SURFACE WATER DRAINS.
8. GULLY POSITIONS ARE APPROXIMATE ONLY AND SHOULD BE LOCATED AT LOW POINTS.
9. REFER TO ARCHITECTS' DRAWINGS FOR ALL ROOF DRAINAGE, STRIP DRAINS AND GULLY TRAPS BENEATH DOWNPIPES.
10. WHERE IT IS NOT POSSIBLE TO ACHIEVE MINIMUM COVER, PIPES SHOULD BE BEDDED AND SURROUNDED IN CONCRETE 150MM THICK, CLASS E IN ACCORDANCE WITH TII STANDARD CONSTRUCTION DETAIL CC-SCD-00521.
11. ALL WASTEWATER DRAINAGE INFRASTRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER STANDARDS. REFER TO IRISH WATER PUBLICATIONS “WASTEWATER INFRASTRUCTURE STANDARD DETAILS - IW-CDS-5030-01” AND “CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE - IW-CDS-5030-03”
12. HYDRANTS TO BE ACCORDANCE WITH IRISH WATER STANDARD DETAILS STD-W-16 TO STD-W-19.
13. THRUST BLOCK ARRANGEMENTS SHALL COMPLY WITH IRISH WATER STANDARD DETAILS STD-W-28
14. REFER TO MECHANICAL AND ELECTRICAL ENGINEER'S DRAWINGS FOR INTERNAL DRAINAGE AND DETAILS OF SOIL AND VENT PIPES LEADING TO WASTEWATER DRAINAGE AJS.
15. ALL WATER INFRASTRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER STANDARDS. REFER TO IRISH WATER PUBLICATIONS “WATER INFRASTRUCTURE STANDARD DETAILS - IW-CDS-5020-01” AND “CODE OF PRACTICE FOR WATER INFRASTRUCTURE - IW-CDS-5020-03”
16. ALL PLANTING & TREES TO COMPLY WITH SEPERATION DISTANCES AS PER IRISH WATER STANDARD DETAILS FOR WASTEWATER, STD-WW-06 AND STD-WW-06A AND FOR WATER, STD-W-12 AND STD-W-12A
17. A METHOD STATEMENT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION AND TESTING
18. ALL PIPE DIAMETERS INDICATED ARE INNER DIAMETER.
19. THESE DRAWINGS ARE NOT TO BE USED FOR SETTING OUT PURPOSES. REFER TO ARCHITECTS DRAWINGS FOR SETTING OUT.

WATERMAIN LEGEND

───	PROPOSED Ø150mm/110mm PE WATERMAIN
– – –	EXISTING WATERMAIN
─●─	WATERMAIN BOUNDARY BOX
───	PROPOSED Ø150mm/200mm PE WATERMAIN UPGRADED AS PER IW COF LETTER
━━━	BOUNDARY LINE
– – –	DENOTES 6m & 46m SEPARATION DISTANCE OF WATER HYDRANT
▛ ▮	ANCHOR/THRUST BLOCK
S.V. ⋈	SLUICE VALVE
Sc.V. ⋈	SCOUR VALVE
HYD. ▬	HYDRANT
DRM ▽	DRY RISING MAIN
A.V. ⋈	AIR VALVE
W.M	WATER METER

NOTES:
ALL LEVELS RELATE TO MALIN HEAD DATUM.



KEYPLAN

SCALE 1:2500

INFORMATION

Figured dimension only to be taken from this drawing.
All dimensions to be checked on site.
Consultants to be informed immediately of any discrepancies before work proceeds.

REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	26/02/2025	ISSUED FOR PRE-PLANNING STAGE 2 (S247)	JG	DG
P02	12/03/2025	ISSUED TO IRISH WATER	RS	DG
P03	14/03/2025	ISSUED FOR INFORMATION	RS	DG
P04	21/03/2025	PRELIMINARY PLANNING PACK	PM	DG
P05	02/04/2025	ISSUED FOR PLANNING	PM	DG
P06	22/04/2025	IW SODA RESPONSE	PM	DG
P07	30/04/2025	IW SODA RESPONSE - ADDITIONAL COMMENTS	PM	DG
P08	01/05/2025	IW SODA RESPONSE - ADDITIONAL COMMENTS	PM	DG

CLIENT:	JH KINNIE LTD.		
PROJECT:	HOUSING DEVELOPMENT AT KINNEGAD, Co. WESTMEATH.		
TITLE:	WATERMAIN LAYOUT PLAN		
DRAWN: PM	CHECKED: MH	APPROVED: DG	JOB NO: 241139
DATE: MARCH 2025	SCALE: 1:500	DRAWING NO: 241139-ORS-ZZ-00-DR-CE-402	REV: P08

ORS
Mullingar | Dublin | Galway | Donegal | Cork | Waterford
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

A0

GENERAL NOTES

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEER'S AND ARCHITECT'S DRAWINGS AND SPECIFICATIONS.
2. ALL LEVELS ARE IN METRES TO ORDNANCE DATUM, MALIN HEAD UNLESS NOTED OTHERWISE.
3. THE POSITION OF EXISTING SERVICES AS SHOWN ON THE DRAWING MAY NOT BE ACCURATE. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES ON THE SITE AND SHOULD CONTACT THE RESPECTIVE UTILITY PROVIDERS AND AUTHORITIES FOR THE MOST UP-TO-DATE INFORMATION BEFORE COMMENCING THE WORKS.
4. EXISTING LEVELS ARE INDICATIVE ONLY AND MUST BE CHECKED AND VERIFIED ON SITE PRIOR TO COMMENCEMENT.
5. PROPOSED MANHOLE COVER LEVELS ARE APPROXIMATE AND SHOULD BE ADJUSTED TO SUIT LOCAL FINISHES.
6. ALL SURFACE WATER DRAINAGE INFRASTRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH LOCAL AUTHORITY REQUIREMENTS.
7. LOCKABLE TYPE GULLY TRAPS TO BE USED ON ALL SURFACE WATER DRAINS.
8. GULLY POSITIONS ARE APPROXIMATE ONLY AND SHOULD BE LOCATED AT LOW POINTS.
9. REFER TO ARCHITECTS' DRAWINGS FOR ALL ROOF DRAINAGE, STRIP DRAINS AND GULLY TRAPS BENEATH DOWNPIPES.
10. WHERE IT IS NOT POSSIBLE TO ACHIEVE MINIMUM COVER, PIPES SHOULD BE BEDDED AND SURROUNDED IN CONCRETE 150MM THICK, CLASS E IN ACCORDANCE WITH TII STANDARD CONSTRUCTION DETAIL CC-SCD-00521.
11. ALL WASTEWATER DRAINAGE INFRASTRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER STANDARDS. REFER TO IRISH WATER PUBLICATIONS "WASTEWATER INFRASTRUCTURE STANDARD DETAILS - IW-CDS-5030-01" AND "CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE - IW-CDS-5030-03"
12. HYDRANTS TO BE ACCORDANCE WITH IRISH WATER STANDARD DETAILS STD-W-16 TO STD-W-19.
13. THRUST BLOCK ARRANGEMENTS SHALL COMPLY WITH IRISH WATER STANDARD DETAILS STD-W-28
14. REFER TO MECHANICAL AND ELECTRICAL ENGINEERS DRAWINGS FOR INTERNAL DRAINAGE AND DETAILS OF SOIL AND VENT PIPES LEADING TO WASTEWATER DRAINAGE AJS.
15. ALL WATER INFRASTRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER STANDARDS. REFER TO IRISH WATER PUBLICATIONS "WATER INFRASTRUCTURE STANDARD DETAILS - IW-CDS-5020-01" AND "CODE OF PRACTICE FOR WATER INFRASTRUCTURE - IW-CDS-5020-03"
16. ALL PLANTING & TREES TO COMPLY WITH SEPERATION DISTANCES AS PER IRISH WATER STANDARD DETAILS FOR WASTEWATER, STD-WW-06 AND STD-WW-06A AND FOR WATER, STD-W-12 AND STD-W-12A
17. A METHOD STATEMENT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION AND TESTING
18. ALL PIPE DIAMETERS INDICATED ARE INNER DIAMETER.
19. THESE DRAWINGS ARE NOT TO BE USED FOR SETTING OUT PURPOSES. REFER TO ARCHITECTS DRAWINGS FOR SETTING OUT.

CIVIL SERVICES LEGEND

- EXISTING SURFACE WATER PIPES
- PROPOSED PVC FOUL SEWER PIPES (IN ACCORDANCE WITH SECTION 3.13 OF IRISH WATER CODE OF PRACTICE FOR PIPE MATERIALS)
- EXISTING FOUL SEWER PIPES
- BOUNDARY LINE
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL SEWER MANHOLE (IN ACCORDANCE WITH IRISH WATER TYPICAL DETAILS STD-W10/W11)
- EXISTING MANHOLE
- ROAD GULLY
- 100mm DIA. PERFORATED PIPE TO SWALE AREA
- OFC PROPOSED OVERFLOW CHAMBER
- FLUSH KERB TO FACILITATE RUN-OFF TO SWALE
- PROPOSED ATTENUATION TANK (SEE DRAWING No. 421 FOR DETAILS)
- PROPOSED PERMEABLE PAVING AT PRIVATE PARKING BAYS
- PRIVATE SIDE FOUL SEWER INSPECTION CHAMBER (IN ACCORDANCE WITH IRISH WATER STANDARD DETAIL STD-WW-13)
- STORM WATER INSPECTION CHAMBER
- C.L. COVER LEVEL
- I.L. INVERT LEVEL

NOTES:
ALL LEVELS RELATE TO MALIN HEAD DATUM.

NOTE:
FOR BOTH FOUL SEWER AND STORMWATER DRAINAGE PIPE INFORMATION REFER TO DRAWING No. 241139-ORS-ZZ-XX-DR-CE-415

FOR CONTINUATION SEE 241139-ORS-ZZ-00-DR-CE-401

KEYPLAN
SCALE 1:2500

INFORMATION

Figured dimension only to be taken from this drawing. All dimensions to be checked on site. Consultants to be informed immediately of any discrepancies before work proceeds.

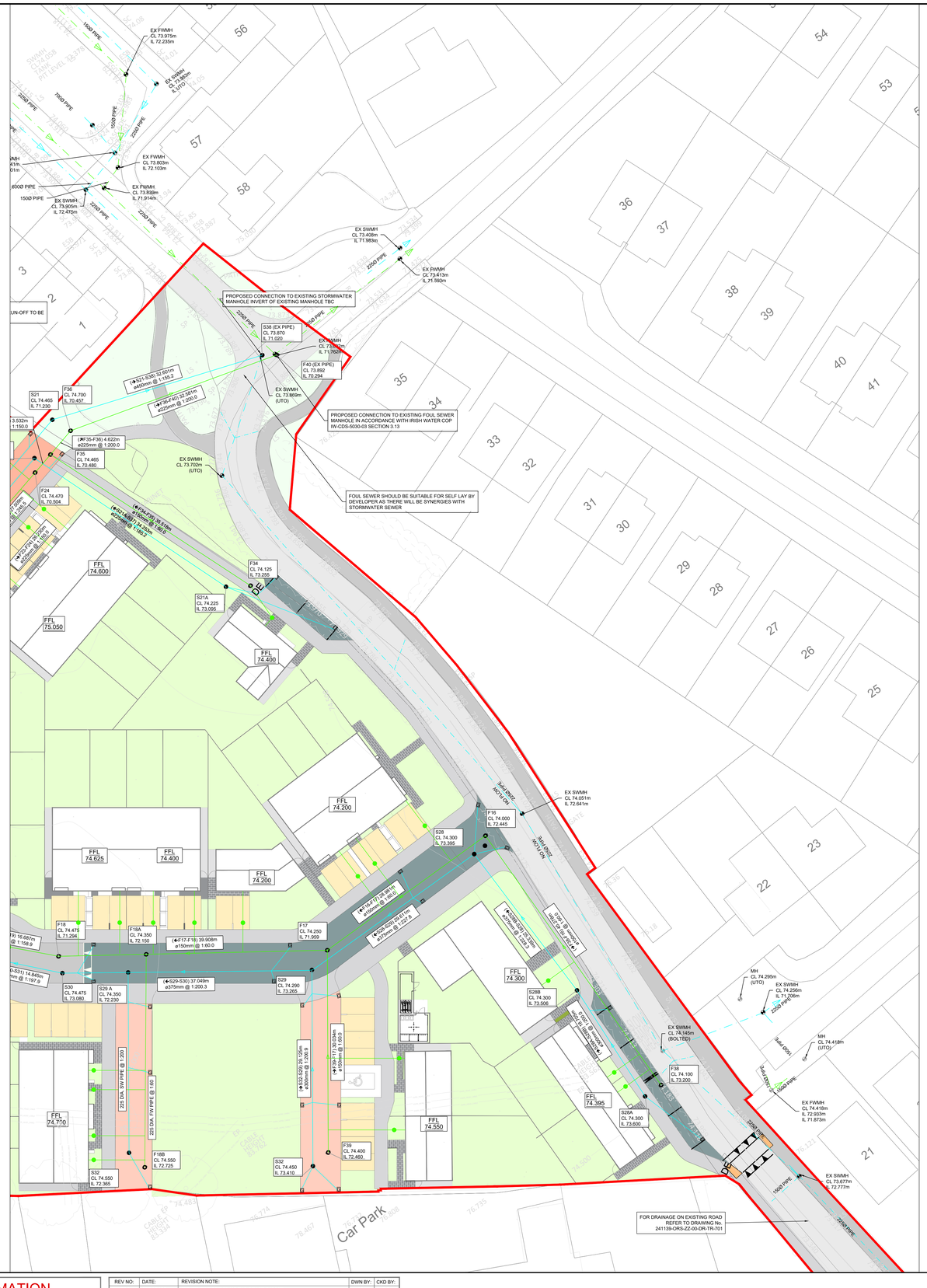
REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	26/02/2025	ISSUED FOR PRE-PLANNING STAGE 2 (S247)	JG	DG
P02	12/03/2025	ISSUED TO IRISH WATER	RS	DG
P03	14/03/2025	ISSUED FOR INFORMATION	RS	DG
P04	21/03/2025	PRELIMINARY PLANNING PACK	PM	DG
P05	02/04/2025	ISSUED FOR PLANNING	PM	DG
P06	22/04/2025	IW SODA RESPONSE	PM	DG
P07	30/04/2025	IW SODA RESPONSE - ADDITIONAL COMMENTS	PM	DG
P08	01/05/2025	IW SODA RESPONSE - ADDITIONAL COMMENTS	PM	DG

CLIENT:	JH KINNIE LTD.
PROJECT:	HOUSING DEVELOPMENT AT KINNEGAD, Co. WESTMEATH.
TITLE:	FOUL & STORMWATER SEWER LAYOUT PLAN SHEET 1

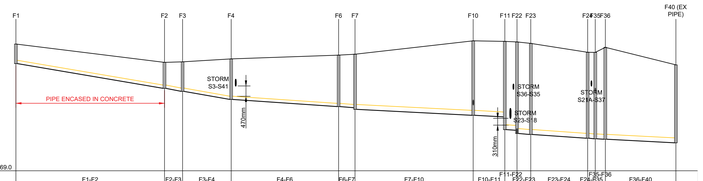
DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
PM	MH	DG	241139	P08
DATE: MARCH 2025	SCALE: 1:250		DRAWING NO: 241139-ORS-ZZ-00-DR-CE-400	

ORS
Mullingar | Dublin | Galway | Donegal | Cork | Waterford
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

A0


EX FWMH
CL 73.975m
IL 72.235m
EX SWMH
CL 73.983m
IL 71.913
EX FWMH
CL 73.803m
IL 72.103m
EX FWMH
CL 73.838m
IL 71.914m
EX SWMH
CL 73.905m
IL 72.475m
EX SWMH
CL 73.408m
IL 71.983m
EX FWMH
CL 73.413m
IL 71.592m
PROPOSED CONNECTION TO EXISTING STORMWATER MANIFOLD INVERT OF EXISTING MANHOLE TBC
S38 (EX PIPE)
CL 73.870
IL 71.020
EX SWMH
CL 73.869m
IL 71.782m
F40 (EX PIPE)
CL 73.892
IL 70.294
EX SWMH
CL 73.869m
(UTO)
PROPOSED CONNECTION TO EXISTING FOUL SEWER MANHOLE IN ACCORDANCE WITH IRISH WATER COP IW-CDS-5030-03 SECTION 3.13
FOUL SEWER SHOULD BE SUITABLE FOR SELF LAY BY DEVELOPER AS THERE WILL BE SYNERGIES WITH STORMWATER SEWER
EX SWMH
CL 73.702m
(UTO)
S21
CL 74.465
IL 71.230
F30
CL 74.700
IL 70.457
F35
CL 74.465
IL 70.480
F24
CL 74.470
IL 70.504
S21A
CL 74.225
IL 73.095
F34
CL 74.125
IL 73.255
FFL 74.600
FFL 75.050
FFL 74.400
FFL 74.200
FFL 74.625
FFL 74.400
FFL 74.200
FFL 74.300
FFL 74.395
FFL 74.550
FFL 74.770
S28
CL 74.300
IL 73.395
F16
CL 74.000
IL 72.445
EX SWMH
CL 74.051m
IL 72.641m
S28B
CL 74.300
IL 73.506
S28A
CL 74.300
IL 73.600
F38
CL 74.100
IL 73.200
MH
CL 74.295m
(UTO)
EX SWMH
CL 74.296m
IL 71.206m
MH
CL 74.418m
(UTO)
EX SWMH
CL 74.145m
(BOX LTD)
EX FWMH
CL 74.418m
IL 72.933m
IL 71.873m
EX SWMH
CL 73.677m
IL 72.777m
F18
CL 74.475
IL 71.294
F18A
CL 74.350
IL 72.150
F17
CL 74.250
IL 71.959
S30
CL 74.475
IL 73.080
S29 A
CL 74.350
IL 72.230
S29
CL 74.290
IL 73.265
F18B
CL 74.550
IL 72.725
S32
CL 74.450
IL 73.410
F39
CL 74.400
IL 72.460
S32
CL 74.550
IL 72.365
225 DIA. SW PIPE @ 1.200
225 DIA. FW PIPE @ 1.00
(◆S21-S38) 32.851m ø225mm @ 1:166.2
(◆F36-F40) 32.581m ø225mm @ 1:200.0
(◆F35-F36) 4.622m ø225mm @ 1:200.0
(◆F24-F35) 29.518m ø225mm @ 1:166.2
(◆S21A-S21) 34.229m ø150mm @ 1:66.0
(◆F16-F18) 39.918m ø150mm @ 1:66.0
(◆S28-S29) 33.413m ø375mm @ 1:267.8
(◆S29-S30) 37.049m ø375mm @ 1:200.3
(◆F17-F18) 39.908m ø150mm @ 1:60.0
(◆S30-S31) 14.840m ø225mm @ 1:200.0
(◆S28-S28B) 33.130m ø225mm @ 1:267.8
(◆S28B-S28A) 30.024m ø225mm @ 1:300.9
(◆S28A-S28) 30.024m ø225mm @ 1:300.9
(◆S28-F16) 33.413m ø225mm @ 1:267.8
(◆F16-F38) 29.518m ø225mm @ 1:166.2
(◆F38-F39) 29.518m ø225mm @ 1:166.2
(◆F39-F40) 29.518m ø225mm @ 1:166.2
(◆S32-S31) 30.024m ø225mm @ 1:300.9
(◆S31-S31A) 30.024m ø225mm @ 1:300.9
(◆S31A-S31B) 30.024m ø225mm @ 1:300.9
(◆S31B-S31C) 30.024m ø225mm @ 1:300.9
(◆S31C-S31D) 30.024m ø225mm @ 1:300.9
(◆S31D-S31E) 30.024m ø225mm @ 1:300.9
(◆S31E-S31F) 30.024m ø225mm @ 1:300.9
(◆S31F-S31G) 30.024m ø225mm @ 1:300.9
(◆S31G-S31H) 30.024m ø225mm @ 1:300.9
(◆S31H-S31I) 30.024m ø225mm @ 1:300.9
(◆S31I-S31J) 30.024m ø225mm @ 1:300.9
(◆S31J-S31K) 30.024m ø225mm @ 1:300.9
(◆S31K-S31L) 30.024m ø225mm @ 1:300.9
(◆S31L-S31M) 30.024m ø225mm @ 1:300.9
(◆S31M-S31N) 30.024m ø225mm @ 1:300.9
(◆S31N-S31O) 30.024m ø225mm @ 1:300.9
(◆S31O-S31P) 30.024m ø225mm @ 1:300.9
(◆S31P-S31Q) 30.024m ø225mm @ 1:300.9
(◆S31Q-S31R) 30.024m ø225mm @ 1:300.9
(◆S31R-S31S) 30.024m ø225mm @ 1:300.9
(◆S31S-S31T) 30.024m ø225mm @ 1:300.9
(◆S31T-S31U) 30.024m ø225mm @ 1:300.9
(◆S31U-S31V) 30.024m ø225mm @ 1:300.9
(◆S31V-S31W) 30.024m ø225mm @ 1:300.9
(◆S31W-S31X) 30.024m ø225mm @ 1:300.9
(◆S31X-S31Y) 30.024m ø225mm @ 1:300.9
(◆S31Y-S31Z) 30.024m ø225mm @ 1:300.9
(◆S31Z-S31AA) 30.024m ø225mm @ 1:300.9
(◆S31AA-S31AB) 30.024m ø225mm @ 1:300.9
(◆S31AB-S31AC) 30.024m ø225mm @ 1:300.9
(◆S31AC-S31AD) 30.024m ø225mm @ 1:300.9
(◆S31AD-S31AE) 30.024m ø225mm @ 1:300.9
(◆S31AE-S31AF) 30.024m ø225mm @ 1:300.9
(◆S31AF-S31AG) 30.024m ø225mm @ 1:300.9
(◆S31AG-S31AH) 30.024m ø225mm @ 1:300.9
(◆S31AH-S31AI) 30.024m ø225mm @ 1:300.9
(◆S31AI-S31AJ) 30.024m ø225mm @ 1:300.9
(◆S31AJ-S31AK) 30.024m ø225mm @ 1:300.9
(◆S31AK-S31AL) 30.024m ø225mm @ 1:300.9
(◆S31AL-S31AM) 30.024m ø225mm @ 1:300.9
(◆S31AM-S31AN) 30.024m ø225mm @ 1:300.9
(◆S31AN-S31AO) 30.024m ø225mm @ 1:300.9
(◆S31AO-S31AP) 30.024m ø225mm @ 1:300.9
(◆S31AP-S31AQ) 30.024m ø225mm @ 1:300.9
(◆S31AQ-S31AR) 30.024m ø225mm @ 1:300.9
(◆S31AR-S31AS) 30.024m ø225mm @ 1:300.9
(◆S31AS-S31AT) 30.024m ø225mm @ 1:300.9
(◆S31AT-S31AU) 30.024m ø225mm @ 1:300.9
(◆S31AU-S31AV) 30.024m ø225mm @ 1:300.9
(◆S31AV-S31AW) 30.024m ø225mm @ 1:300.9
(◆S31AW-S31AX) 30.024m ø225mm @ 1:300.9
(◆S31AX-S31AY) 30.024m ø225mm @ 1:300.9
(◆S31AY-S31AZ) 30.024m ø225mm @ 1:300.9
(◆S31AZ-S31BA) 30.024m ø225mm @ 1:300.9
(◆S31BA-S31BB) 30.024m ø225mm @ 1:300.9
(◆S31BB-S31BC) 30.024m ø225mm @ 1:300.9
(◆S31BC-S31BD) 30.024m ø225mm @ 1:300.9
(◆S31BD-S31BE) 30.024m ø225mm @ 1:300.9
(◆S31BE-S31BF) 30.024m ø225mm @ 1:300.9
(◆S31BF-S31BG) 30.024m ø225mm @ 1:300.9
(◆S31BG-S31BH) 30.024m ø225mm @ 1:300.9
(◆S31BH-S31BI) 30.024m ø225mm @ 1:300.9
(◆S31BI-S31BJ) 30.024m ø225mm @ 1:300.9
(◆S31BJ-S31BK) 30.024m ø225mm @ 1:300.9
(◆S31BK-S31BL) 30.024m ø225mm @ 1:300.9
(◆S31BL-S31BM) 30.024m ø225mm @ 1:300.9
(◆S31BM-S31BN) 30.024m ø225mm @ 1:300.9
(◆S31BN-S31BO) 30.024m ø225mm @ 1:300.9
(◆S31BO-S31BP) 30.024m ø225mm @ 1:300.9
(◆S31BP-S31BQ) 30.024m ø225mm @ 1:300.9
(◆S31BQ-S31BR) 30.024m ø225mm @ 1:300.9
(◆S31BR-S31BS) 30.024m ø225mm @ 1:300.9
(◆S31BS-S31BT) 30.024m ø225mm @ 1:300.9
(◆S31BT-S31BU) 30.024m ø225mm @ 1:300.9
(◆S31BU-S31BV) 30.024m ø225mm @ 1:300.9
(◆S31BV-S31BW) 30.024m ø225mm @ 1:300.9
(◆S31BW-S31BX) 30.024m ø225mm @ 1:300.9
(◆S31BX-S31BY) 30.024m ø225mm @ 1:300.9
(◆S31BY-S31BZ) 30.024m ø225mm @ 1:300.9
(◆S31BZ-S31CA) 30.024m ø225mm @ 1:300.9
(◆S31CA-S31CB) 30.024m ø225mm @ 1:300.9
(◆S31CB-S31CC) 30.024m ø225mm @ 1:300.9
(◆S31CC-S31CD) 30.024m ø225mm @ 1:300.9
(◆S31CD-S31CE) 30.024m ø225mm @ 1:300.9
(◆S31CE-S31CF) 30.024m ø225mm @ 1:300.9
(◆S31CF-S31CG) 30.024m ø225mm @ 1:300.9
(◆S31CG-S31CH) 30.024m ø225mm @ 1:300.9
(◆S31CH-S31CI) 30.024m ø225mm @ 1:300.9
(◆S31CI-S31CJ) 30.024m ø225mm @ 1:300.9
(◆S31CJ-S31CK) 30.024m ø225mm @ 1:300.9
(◆S31CK-S31CL) 30.024m ø225mm @ 1:300.9
(◆S31CL-S31CM) 30.024m ø225mm @ 1:300.9
(◆S31CM-S31CN) 30.024m ø225mm @ 1:300.9
(◆S31CN-S31CO) 30.024m ø225mm @ 1:300.9
(◆S31CO-S31CP) 30.024m ø225mm @ 1:300.9
(◆S31CP-S31CQ) 30.024m ø225mm @ 1:300.9
(◆S31CQ-S31CR) 30.024m ø225mm @ 1:300.9
(◆S31CR-S31CS) 30.024m ø225mm @ 1:300.9
(◆S31CS-S31CT) 30.024m ø225mm @ 1:300.9
(◆S31CT-S31CU) 30.024m ø225mm @ 1:300.9
(◆S31CU-S31CV) 30.024m ø225mm @ 1:300.9
(◆S31CV-S31CW) 30.024m ø225mm @ 1:300.9
(◆S31CW-S31CX) 30.024m ø225mm @ 1:300.9
(◆S31CX-S31CY) 30.024m ø225mm @ 1:300.9
(◆S31CY-S31CZ) 30.024m ø225mm @ 1:300.9
(◆S31CZ-S31DA) 30.024m ø225mm @ 1:300.9
(◆S31DA-S31DB) 30.024m ø225mm @ 1:300.9
(◆S31DB-S31DC) 30.024m ø225mm @ 1:300.9
(◆S31DC-S31DD) 30.024m ø225mm @ 1:300.9
(◆S31DD-S31DE) 30.024m ø225mm @ 1:300.9
(◆S31DE-S31DF) 30.024m ø225mm @ 1:300.9
(◆S31DF-S31DG) 30.024m ø225mm @ 1:300.9
(◆S31DG-S31DH) 30.024m ø225mm @ 1:300.9
(◆S31DH-S31DI) 30.024m ø225mm @ 1:300.9
(◆S31DI-S31DJ) 30.024m ø225mm @ 1:300.9
(◆S31DJ-S31DK) 30.024m ø225mm @ 1:300.9
(◆S31DK-S31DL) 30.024m ø225mm @ 1:300.9
(◆S31DL-S31DM) 30.024m ø225mm @ 1:300.9
(◆S31DM-S31DN) 30.024m ø225mm @ 1:300.9
(◆S31DN-S31DO) 30.024m ø225mm @ 1:300.9
(◆S31DO-S31DP) 30.024m ø225mm @ 1:300.9
(◆S31DP-S31DQ) 30.024m ø225mm @ 1:300.9
(◆S31DQ-S31DR) 30.024m ø225mm @ 1:300.9
(◆S31DR-S31DS) 30.024m ø225mm @ 1:300.9
(◆S31DS-S31DT) 30.024m ø225mm @ 1:300.9
(◆S31DT-S31DU) 30.024m ø225mm @ 1:300.9
(◆S31DU-S31DV) 30.024m ø225mm @ 1:300.9
(◆S31DV-S31DW) 30.024m ø225mm @ 1:300.9
(◆S31DW-S31DX) 30.024m ø225mm @ 1:300.9
(◆S31DX-S31DY) 30.024m ø225mm @ 1:300.9
(◆S31DY-S31DZ) 30.024m ø225mm @ 1:300.9
(◆S31DZ-S31EA) 30.024m ø225mm @ 1:300.9
(◆S31EA-S31EB) 30.024m ø225mm @ 1:300.9
(◆S31EB-S31EC) 30.024m ø225mm @ 1:300.9
(◆S31EC-S31ED) 30.024m ø225mm @ 1:300.9
(◆S31ED-S31EE) 30.024m ø225mm @ 1:300.9
(◆S31EE-S31EF) 30.024m ø225mm @ 1:300.9
(◆S31EF-S31EG) 30.024m ø225mm @ 1:300.9
(◆S31EG-S31EH) 30.024m ø225mm @ 1:300.9
(◆S31EH-S31EI) 30.024m ø225mm @ 1:300.9
(◆S31EI-S31EJ) 30.024m ø225mm @ 1:300.9
(◆S31EJ-S31EK) 30.024m ø225mm @ 1:300.9
(◆S31EK-S31EL) 30.024m ø225mm @ 1:300.9
(◆S31EL-S31EM) 30.024m ø225mm @ 1:300.9
(◆S31EM-S31EN) 30.024m ø225mm @ 1:300.9
(◆S31EN-S31EO) 30.024m ø225mm @ 1:300.9
(◆S31EO-S31EP) 30.024m ø225mm @ 1:300.9
(◆S31EP-S31EQ) 30.024m ø225mm @ 1:300.9
(◆S31EQ-S31ER) 30.024m ø225mm @ 1:300.9
(◆S31ER-S31ES) 30.024m ø225mm @ 1:300.9
(◆S31ES-S31ET) 30.024m ø225mm @ 1:300.9
(◆S31ET-S31EU) 30.024m ø225mm @ 1:300.9
(◆S31EU-S31EV) 30.024m ø225mm @ 1:300.9
(◆S31EV-S31EW) 30.024m ø225mm @ 1:300.9
(◆S31EW-S31EX) 30.024m ø225mm @ 1:300.9
(◆S31EX-S31EY) 30.024m ø225mm @ 1:300.9
(◆S31EY-S31EZ) 30.024m ø225mm @ 1:300.9
(◆S31EZ-S31FA) 30.024m ø225mm @ 1:300.9
(◆S31FA-S31FB) 30.024m ø225mm @ 1:300.9
(◆S31FB-S31FC) 30.024m ø225mm @ 1:300.9
(◆S31FC-S31FD) 30.024m ø225mm @ 1:300.9
(◆S31FD-S31FE) 30.024m ø225mm @ 1:300.9
(◆S31FE-S31FF) 30.024m ø225mm @ 1:300.9
(◆S31FF-S31FG) 30.024m ø225mm @ 1:300.9
(◆S31FG-S31FH) 30.024m ø225mm @ 1:300.9
(◆S31FH-S31FI) 30.024m ø225mm @ 1:300.9
(◆S31FI-S31FJ) 30.024m ø225mm @ 1:300.9
(◆S31FJ-S31FK) 30.024m ø225mm @ 1:300.9
(◆S31FK-S31FL) 30.024m ø225mm @ 1:300.9
(◆S31FL-S31FM) 30.024m ø225mm @ 1:300.9
(◆S31FM-S31FN) 30.024m ø225mm @ 1:300.9
(◆S31FN-S31FO) 30.024m ø225mm @ 1:300.9
(◆S31FO-S31FP) 30.024m ø225mm @ 1:300.9
(◆S31FP-S31FQ) 30.024m ø225mm @ 1:300.9
(◆S31FQ-S31FR) 30.024m ø225mm @ 1:300.9
(◆S31FR-S31FS) 30.024m ø225mm @ 1:300.9
(◆S31FS-S31FT) 30.024m ø225mm @ 1:300.9
(◆S31FT-S31FU) 30.024m ø225mm @ 1:300.9
(◆S31FU-S31FV) 30.024m ø225mm @ 1:300.9
(◆S31FV-S31FW) 30.024m ø225mm @ 1:300.9
(◆S31FW-S31FX) 30.024m ø225mm @ 1:300.9
(◆S31FX-S31FY) 30.024m ø225mm @ 1:300.9
(◆S31FY-S31FZ) 30.024m ø225mm @ 1:300.9
(◆S31FZ-S31GA) 30.024m ø225mm @ 1:300.9
(◆S31GA-S31GB) 30.024m ø225mm @ 1:300.9
(◆S31GB-S31GC) 30.024m ø225mm @ 1:300.9
(◆S31GC-S31GD) 30.024m ø225mm @ 1:300.9
(◆S31GD-S31GE) 30.024m ø225mm @ 1:300.9
(◆S31GE-S31GF) 30.024m ø225mm @ 1:300.9
(◆S31GF-S31GG) 30.024m ø225mm @ 1:300.9
(◆S31GG-S31GH) 30.024m ø225mm @ 1:300.9
(◆S31GH-S31GI) 30.024m ø225mm @ 1:300.9
(◆S31GI-S31GJ) 30.024m ø225mm @ 1:300.9
(◆S31GJ-S31GK) 30.024m ø225mm @ 1:300.9
(◆S31GK-S31GL) 30.024m ø225mm @ 1:300.9
(◆S31GL-S31GM) 30.024m ø225mm @ 1:300.9
(◆S31GM-S31GN) 30.024m ø225mm @ 1:300.9
(◆S31GN-S31GO) 30.024m ø225mm @ 1:300.9
(◆S31GO-S31GP) 30.024m ø225mm @ 1:300.9
(◆S31GP-S31GQ) 30.024m ø225mm @ 1:300.9
(◆S31GQ-S31GR) 30.024m ø225mm @ 1:300.9
(◆S31GR-S31GS) 30.024m ø225mm @ 1:300.9
(◆S31GS-S31GT) 30.024m ø225mm @ 1:300.9
(◆S31GT-S31GU) 30.024m ø225mm @ 1:300.9
(◆S31GU-S31GV) 30.024m ø225mm @ 1:300.9
(◆S31GV-S31GW) 30.024m ø225mm @ 1:300.9
(◆S31GW-S31GX) 30.024m ø225mm @ 1:300.9
(◆S31GX-S31GY) 30.024m ø225mm @ 1:300.9
(◆S31GY-S31GZ) 30.024m ø225mm @ 1:300.9
(◆S31GZ-S31HA) 30.024m ø225mm @ 1:300.9
(◆S31HA-S31HB) 30.024m ø225mm @ 1:300.9
(◆S31HB-S31HC) 30.024m ø225mm @ 1:300.9
(◆S31HC-S31HD) 30.024m ø225mm @ 1:300.9
(◆S31HD-S31HE) 30.024m ø225mm @ 1:300.9
(◆S31HE-S31HF) 30.024m ø225mm @ 1:300.9
(◆S31HF-S31HG) 30.024m ø225mm @ 1:300.9
(◆S31HG-S31HH) 30.024m ø225mm @ 1:300.9
(◆S31HH-S31HI) 30.024m ø225mm @ 1:300.9
(◆S31HI-S31HJ) 30.024m ø225mm @ 1:300.9
(◆S31HJ-S31HK) 30.024m ø225mm @ 1:300.9
(◆S31HK-S31HL) 30.024m ø225mm @ 1:300.9
(◆S31HL-S31HM) 30.024m ø225mm @ 1:300.9
(◆S31HM-S31HN) 30.024m ø225mm @ 1:300.9
(◆S31HN-S31HO) 30.024m ø225mm @ 1:300.9
(◆S31HO-S31HP) 30.024m ø225mm @ 1:300.9
(◆S31HP-S31HQ) 30.024m ø225mm @ 1:300.9
(◆S31HQ-S31HR) 30.024m ø225mm @ 1:300.9
(◆S31HR-S31HS) 30.024m ø225mm @ 1:300.9
(◆S31HS-S31HT) 30.024m ø225mm @ 1:300.9
(◆S31HT-S31HU) 30.024m ø225mm @ 1:300.9
(◆S31HU-S31HV) 30.024m ø225mm @ 1:300.9
(◆S31HV-S31HW) 30.024m ø225mm @ 1:300.9
(◆S31HW-S31HX) 30.024m ø225mm @ 1:300.9
(◆S31HX-S31HY) 30.024m ø225mm @ 1:300.9
(◆S31HY-S31HZ) 30.024m ø225mm @ 1:300.9
(◆S31HZ-S31IA) 30.024m ø225mm @ 1:300.9
(◆S31IA-S31IB) 30.024m ø225mm @ 1:300.9
(◆S31IB-S31IC) 30.024m ø225mm @ 1:300.9
(◆S31IC-S31ID) 30.024m ø225mm @ 1:300.9
(◆S31ID-S31IE) 30.024m ø225mm @ 1:300.9
(◆S31IE-S31IF) 30.024m ø225mm @ 1:300.9
(◆S31IF-S31IG) 30.024m ø225mm @ 1:300.9
(◆S31IG-S31IH) 30.024m ø225mm @ 1:300.9
(◆S31IH-S31II) 30.024m ø225mm @ 1:300.9
(◆S31II-S31IJ) 30.024m ø225mm @ 1:300.9
(◆S31IJ-S31IK) 30.024m ø225mm @ 1:300.9
(◆S31IK-S31IL) 30.024m ø225mm @ 1:300.9
(◆S31IL-S31IM) 30.024m ø225mm @ 1:300.9
(◆S31IM-S31IN) 30.024m ø225mm @ 1:300.9
(◆S31IN-S31IO) 30.024m ø225mm @ 1:300.9
(◆S31IO-S31IP) 30.024m ø225mm @ 1:300.9
(◆S31IP-S31IQ) 30.024m ø225mm @ 1:300.9
(◆S31IQ-S31IR) 30.024m ø225mm @ 1:300.9
(◆S31IR-S31IS) 30.024m ø225mm @ 1:300.9
(◆S31IS-S31IT) 30.024m ø225mm @ 1:300.9
(◆S31IT-S31IU) 30.024m ø225mm @ 1:300.9
(◆S31IU-S31IV) 30.024m ø225mm @ 1:300.9
(◆S31IV-S31IW) 30.024m ø225mm @ 1:300.9
(◆S31IW-S31IX) 30.024m ø225mm @ 1:300.9
(◆S31IX-S31IY) 30.024m ø225mm @ 1:300.9
(◆S31IY-S31IZ) 30.024m ø225mm @ 1:300.9
(◆S31IZ-S31JA) 30.024m ø225mm @ 1:300.9
(◆S31JA-S31JB) 30.024m ø225mm @ 1:300.9
(◆S31JB-S31JC) 30.024m ø225mm @ 1:300.9
(◆S31JC-S31JD) 30.024m ø225mm @ 1:300.9
(◆S31JD-S31JE) 30.024m ø225mm @ 1:300.9
(◆S31JE-S31JF) 30.024m ø225mm @ 1:300.9
(◆S31JF-S31JG) 30.024m ø225mm @ 1:300.9
(◆S31JG-S31JH) 30.024m ø225mm @ 1:300.9
(◆S31JH-S31JI) 30.024m ø225mm @ 1:300.9
(◆S31JI-S31JJ) 30.024m ø225mm @ 1:300.9
(◆S31JJ-S31JK) 30.024m ø225mm @ 1:300.9
(◆S31JK-S31JL) 30.024m ø225mm @ 1:300.9
(◆S31JL-S31JM) 30.024m ø225mm @ 1:300.9
(◆S31JM-S31JN) 30.024m ø225mm @ 1:300.9
(◆S31JN-S31JO) 30.024m ø225mm @ 1:300.9
(◆S31JO-S31JP) 30.024m ø225mm @ 1:300.9
(◆S31JP-S31JQ) 30.024m ø225mm @ 1:300.9
(◆S31JQ-S31JR) 30.024m ø225mm @ 1:300.9
(◆S31JR-S31JS) 30.024m ø225mm @ 1:300.9
(◆S31JS-S31JT) 30.024m ø225mm @ 1:300.9
(◆S31JT-S31JU) 30.024m ø225mm @ 1:300.9
(◆S31JU-S31JV) 30.024m ø225mm @ 1:300.9
(◆S31JV-S31JW) 30.024m ø225mm @ 1:300.9
(◆S31JW-S31JX) 30.024m ø225mm @ 1:300.9
(◆S31JX-S31JY) 30.024m ø225mm @ 1:300.9
(◆S31JY-S31JZ) 30.024m ø225mm @ 1:300.9
(◆S31JZ-S31KA) 30.024m ø225mm @ 1:300.9
(◆S31KA-S31KB) 30.024m ø225mm @ 1:300.9
(◆S31KB-S31KC) 30.024m ø225mm @ 1:300.9
(◆S31KC-S31KD) 30.024m ø225mm @ 1:300.9
(◆S31KD-S31KE) 30.024m ø225mm @ 1:300.9
(◆S31KE-S31KF) 30.024m ø225mm @ 1:300.9
(◆S31KF-S31KG) 30.024m ø225mm @ 1:300.9
(◆S31KG-S31KH) 30.024m ø225mm @ 1:300.9
(◆S31KH-S31KI) 30.024m ø225mm @ 1:300.9
(◆S31KI-S31KJ) 30.024m ø225mm @ 1:300.9
(◆S31KJ-S31KK) 30.024m ø225mm @ 1:300.9
(◆S31KK-S31KL) 30.024m ø225mm @ 1:300.9
(◆S31KL-S31KM) 30.024m ø225mm @ 1:300.9
(◆S31KM-S31KN) 30.024m ø225mm @ 1:300.9
(◆S31KN-S31KO) 30.024m ø225mm @ 1:300.9
(◆S31KO-S31KP) 30.024m ø225mm @ 1:300.9
(◆S31KP-S31KQ) 30.024m ø225mm @ 1:300.9
(◆S31KQ-S31KR) 30.024m ø225mm @ 1:300.9
(◆S31KR-S31KS) 30.024m ø225mm @ 1:300.9
(◆S31KS-S31KT) 30.024m ø225mm @ 1:300.9
(◆S31KT-S31KU) 30.024m ø225mm @ 1:300.9
(◆S31KU-S31KV) 30.024m ø225mm @ 1:300.9
(◆S31KV-S31KW) 30.024m ø225mm @ 1:300.9
(◆S31KW-S31KX) 30.024m ø225mm @ 1:300.9
(◆S31KX-S31KY) 30.024m ø225mm @ 1:300.9
(◆S31KY-S31KZ) 30.024m ø225mm @ 1:300.9
(◆S31KZ-S31LA) 30.024m ø225mm @ 1:300.9
(◆S31LA-S31LB) 30.024m ø225mm @ 1:300.9
(◆S31LB-S31LC) 30.024m ø225mm @ 1:300.9
(◆S31LC-S31LD) 30.024m ø225mm @ 1:300.9
(◆S31LD-S31LE) 30.024m ø225mm @ 1:300.9
(◆S31LE-S31LF) 30.024m ø225mm @ 1:300.9
(◆S31LF-S31LG) 30.024m ø225mm @ 1:300.9
(◆S31LG-S31LH) 30.024m ø225mm @ 1:300.9
(◆S31LH-S31LI) 30.024m ø225mm @ 1:300.9
(◆S31LI-S31LJ) 30.024m ø225mm @ 1:300.9
(◆S31LJ-S31LK) 30.024m ø225mm @ 1:300.9
(◆S31LK-S31LL) 30.024m ø225mm @ 1:300.9
(◆S31LL-S31LM) 30.024m ø225mm @ 1:300.9
(◆S31LM-S31LN) 30.024m ø225mm @ 1:300.9
(◆S31LN-S31LO) 30.024m ø225mm @ 1:300.9
(◆S31LO-S31LP) 30.024m ø225mm @ 1:300.9
(◆S31LP-S31LQ) 30.024m ø225mm @ 1:300.9
(◆S31LQ-S31LR) 30.024m ø225mm @ 1:300.9
(◆S31LR-S31LS) 30.024m ø225mm @ 1:300.9
(◆S31LS-S31LT) 30.024m ø225mm @ 1:300.9
(◆S31LT-S31LU) 30.024m ø225mm @ 1:300.9
(◆S31LU-S31LV) 30.024m ø225mm @ 1:300.9
(◆S31LV-S31LW) 30.024m ø225mm @ 1:300.9
(◆S31LW-S31LX) 30.024m ø225mm @ 1:300.9
(◆S31LX-S31LY) 30.024m ø225mm @ 1:300.9
(◆S31LY-S31LZ) 30.024m ø225mm @ 1:300.9
(◆S31LZ-S31MA) 30.024m ø225mm @ 1:300.9
(◆S31MA-S31MB) 30.024m ø225mm @ 1:300.9
(◆S31MB-S31MC) 30.024m ø225mm @ 1:300.9
(◆S31MC-S31MD) 30.024m ø225mm @ 1:300.9
(◆S31MD-S31ME) 30.024m ø225mm @ 1:300.9
(◆S31ME-S31MF) 30.024m ø225mm @ 1:300.9
(◆S31MF-S31MG) 30.024m ø225mm @ 1:300.9
(◆S31MG-S31MH) 30.024m ø225mm @ 1:300.9
(◆S31MH-S31MI) 30.024m ø225mm @ 1:300.9
(◆S31MI-S31MJ) 30.024m ø225mm @ 1:300.9
(◆S31MJ-S31MK) 30.024m ø225mm @ 1:300.9
(◆S31MK-S31ML) 30.024m ø225mm @ 1:300.9
(◆S31ML-S31MM) 30.024m ø225mm @ 1:300.9
(◆S31MM-S31MN) 30.024m ø225mm @ 1:300.9
(◆S31MN-S31MO) 30.024m ø225mm @ 1:300.9
(◆S31MO-S31MP) 30.024m ø225mm @ 1:300.9
(◆S31MP-S31MQ) 30.024m ø225mm @ 1:300.9
(◆S31MQ-S31MR) 30.024m ø225mm @ 1:300.9
(◆S31MR-S31MS) 30.024m ø225mm @ 1:300.9
(◆S31MS-S31MT) 30.024m ø225mm @ 1:300.9
(◆S31MT-S31MU) 30.024m ø225mm @ 1:300.9
(◆S31MU-S31MV) 30.024m ø225mm @ 1:300.9
(◆S31MV-S31MW) 30.024m ø225mm @ 1:300.9
(◆S31MW-S31MX) 30.024m ø225mm @ 1:300.9
(◆S31MX-S31MY) 30.024m ø225mm @ 1:300.9
(◆S31MY-S31MZ) 30.024m ø225mm @ 1:300.9
(◆S31MZ-S31NA) 30.024m ø225mm @ 1:300.9
(◆S31NA-S31NB) 30.024m ø225mm @ 1:300.9
(◆S31NB-S31NC) 30.024m ø225mm @ 1:300.9
(◆S31NC-S31ND) 30.024m ø225mm @ 1:300.9
(◆S31ND-S31NE) 30.024m ø225mm @ 1:300.9
(◆S31NE-S31NF) 30.024m ø225mm @ 1:300.9
(◆S31NF-S31NG) 30.024m ø225mm @ 1:300.9
(◆S31NG-S31NH) 30.024m ø225mm @ 1:300.9
(◆S31NH-S31NI) 30.024m ø225mm @ 1:300.9
(◆S31NI-S31NJ) 30.024m ø225mm @ 1:300.9
(◆S31NJ-S31NK) 30.024m ø225mm @ 1:300.9
(◆S31NK-S31NL) 30.024m ø225mm @ 1:300.9
(◆S31NL-S31NM) 30.024m ø225mm @ 1:300.9
(◆S31NM-S31NN) 30.024m ø225mm @ 1:300.9
(◆S31NN-S31NO) 30.024m ø225mm @ 1:300.9
(◆S31NO-S31NP) 30.024m ø225mm @ 1:300.9
(◆S31NP-S31NQ) 30.024m ø225mm @ 1:300.9
(◆S31NQ-S31NR) 30.024m ø225mm @ 1:300.9
(◆S31NR-S31NS) 30.024m ø225mm @ 1:300.9
(◆S31NS-S31NT) 30.024m ø225mm @ 1:300.9
(◆S31NT-S31NU) 30.024m ø225mm @ 1:300.9
(◆S31NU-S31NV) 30.024m ø225mm @ 1:300.9
(◆S31NV-S31NW) 30.024m ø225mm @ 1:300.9
(◆S31NW-S31NX) 30.024m ø225mm @ 1:300.9
(◆S31NX-S31NY) 30.024m ø225mm @ 1:300.9
(◆S31NY-S31NZ) 30.024m ø225mm @ 1:300.9
(◆S31NZ-S31OA) 30.024m ø225mm @ 1:300.9
(◆S31OA-S31OB) 30.024m ø225mm @ 1:300.9
(◆S31OB-S31OC) 30.024m ø225mm @ 1:300.9
(◆S31OC-S31OD) 30.024m ø225mm @ 1:300.9
(◆S31OD-S31OE) 30.024m ø225mm @ 1:300.9
(◆S31OE-S31OF) 30.024m ø225mm @ 1:300.9
(◆S31OF-S31OG) 30.024m ø225mm @ 1:300.9
(◆S31OG-S31OH) 30.024m ø225mm @ 1:300.9
(◆S31OH-S31OI) 30.024m ø225mm @ 1:300.9
(◆S31OI-S31OJ) 30.024m ø225mm @ 1:300.9
(◆S31OJ-S31OK) 30.024m ø225mm @ 1:300.9
(◆S31OK-S31OL) 30.024m ø225mm @ 1:300.9
(◆S31OL-S31OM) 30.024m ø225mm @ 1:300.9
(◆S31OM-S31ON) 30.024m ø225mm @ 1:300.9
(◆S31ON-S31OO) 30.024m ø225mm @ 1:300.9
(◆S31OO-S31OP) 30.024m ø225mm @ 1:300.9
(◆S31OP-S31OQ) 30.024m ø225mm @ 1:300.9
(◆S31OQ-S31OR) 30.024m ø225mm @ 1:300.9
(◆S31OR-S31OS) 30.024m ø225mm @ 1:300.9
(◆S31OS-S31OT) 30.024m ø225mm @ 1:300.9
(◆S31OT-S31OU) 30.024m ø225mm @ 1:300.9
(◆S31OU-S31OV) 30.024m ø225mm @ 1:300.9
(◆S31OV-S31OW) 30.024m ø225mm @ 1:300.9
(◆S31OW-S31OX) 30.024m ø225mm @ 1:300.9
(◆S31OX-S31OY) 30.024m ø225mm @ 1:300.9
(◆S31OY-S31OZ) 30.024m ø225mm @ 1:300.9
(◆S31OZ-S31PA) 30.024m ø225mm @ 1:300.9
(◆S31PA-S31PB) 30.024m ø225mm @ 1:300.9
(◆S31PB-S31PC) 30.024m ø225mm @ 1:300.9
(◆S31PC-S31PD) 30.024m ø225mm @ 1:300.9
(◆S31PD-S31PE) 30.024m ø225mm @ 1:300.9
(◆S31PE-S31PF) 30.024m ø225mm @ 1:300.9
(◆S31PF-S31PG) 30.024m ø225mm @ 1:300.9
(◆S31PG-S31PH) 30.024m ø225mm @ 1:300.9
(◆S31PH-S31PI) 30.024m ø225mm @ 1:300.9
(◆S31PI-S31PJ) 30.024m ø225mm @ 1:300.9
(◆S31PJ-S31PK) 30.024m ø225mm @ 1:300.9
(◆S31PK-S31PL) 30.024m ø225mm @ 1:300.9
(◆S31PL-S31PM) 30.024m ø225mm @ 1:300.9
(◆S31PM-S31PN) 30.024m ø225mm @ 1:300.9
(◆S31PN-S31PO) 30.024m ø225mm @ 1:300.9
(◆S31PO-S31PP) 30.024m ø225mm @ 1:300.9
(◆S31PP-S31PQ) 30.024m ø225mm @ 1:300.9
(◆S31PQ-S31PR) 30.024m ø225mm @ 1:300.9
(◆S31PR-S31PS) 30.024m ø225mm @ 1:300.9
(◆S31PS-S31PT) 30.024m ø225mm @ 1:300.9
(◆S31PT-S31PU) 30.024m ø225mm @ 1:300.9
(◆S31PU-S31PV) 30.024m ø225mm @ 1:300.9
(◆S31PV-S31PW) 30.024m ø225mm @ 1:300.9
(◆S31PW-S31PX) 30.024m ø225mm @ 1:300.9
(◆S31PX-S31PY) 30.024m ø225mm @ 1:300.9
(◆S31PY-S31PZ) 30.024m ø225mm @ 1:300.9
(◆S31PZ-S31QA) 30.024m ø225mm @ 1:300.9
(◆S31QA-S31QB) 30.024m ø225mm @ 1:300.9
(◆S31QB-S31QC) 30.024m ø225mm @ 1:300.9
(◆S31QC-S31QD) 30

A0



Vert exaggeration = 10.0 Datum = 69.0

Link Name	F1-F2	F2-F3	F3-F4	F4-F6	F6-F7	F7-F10	F10-F11	F11-F22	F22-F23	F23-F24	F24-F35	F35-F36	F36-F40
Section Type	150mm	150mm	150mm	150mm	150mm	225mm	225mm	225mm	225mm	225mm	225mm	225mm	225mm
Slope (1:X)	1:60.0	1:60.0	1:60.0	1:150.0	1:150.0	1:200.0	1:200.0	1:200.0	1:150.0	1:150.0	1:100.0	1:200.0	1:200.0
Cover Level (m)	74.850	74.055	74.000	74.165	74.340	74.380	75.000	74.975	74.950	74.880	74.470	74.465	74.109	73.682
Invert Level (m)	73.350	72.807	72.667	72.496	72.294	71.963	71.863	71.617	71.564	71.491	71.363	70.722	70.679	70.394
Length (m)	68.585	8.366	22.422	49.587	7.582	54.532	14.564	5.631	1.387	26.230	3.530	2.622	32.581	
Link Ht (mm)	150	150	150	150	150	225	225	225	225	225	225	225	225	
Node Depth (m)	0.900	1.198	1.382	1.871	2.377	2.543	3.436	4.075	4.228	4.201	3.966	3.985	4.243	3.988

FOUL SEWER LONGITUDINAL SECTION
F1 - F40 (EXISTING PIPE)
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 Datum = 70.0

Link Name	F25-F26	F26-F27	F27-F9	F9-F10
Section Type	150mm	150mm	225mm	225mm
Slope (1:X)	1:100.0	1:136.0	1:150.0	1:150.0
Cover Level (m)	75.420	75.025	75.370	75.100	75.000
Invert Level (m)	74.070	73.383	73.363	72.870	72.157	72.038
Length (m)	70.712	8.367	77.756	17.903	
Link Ht (mm)	150	150	225	225	
Node Depth (m)	1.350	1.662	2.695	2.443	3.438

FOUL SEWER LONGITUDINAL SECTION
F25 - F10
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 Datum = 71.0

Link Name	F27A-F27
Section Type	150mm
Slope (1:X)	1:60.0
Cover Level (m)	76.630	75.370
Invert Level (m)	73.400	73.044
Length (m)	21.372
Link Ht (mm)	150
Node Depth (m)	2.230	2.695

FOUL SEWER LONGITUDINAL SECTION
F27A - F27
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 Datum = 69.0

Link Name	F12-F13	F13-F14	F14-F15	F15-F20	F20-F21	F21-F22
Section Type	150mm	225mm	225mm	225mm	225mm	225mm
Slope (1:X)	1:128.9	1:150.0	1:155.5	1:150.0	1:150.0	1:150.0
Cover Level (m)	76.280	75.840	76.690	75.690	75.150	75.050	74.950
Invert Level (m)	74.980	74.500	74.190	73.500	72.450	72.313	72.143	70.869	70.669	70.722
Length (m)	61.881	51.222	38.864	11.550	26.077	22.019
Link Ht (mm)	150	225	225	225	225	225
Node Depth (m)	1.300	1.340	2.441	3.190	4.107	4.181	4.225

FOUL SEWER LONGITUDINAL SECTION
F12 - F22
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 Datum = 70.0

Link Name	F38-F16	F16-F17	F17-F18	F18-F19	F19-F20
Section Type	150mm	150mm	150mm	150mm	150mm
Slope (1:X)	1:60.0	1:60.0	1:60.0	1:158.9	1:150.0
Cover Level (m)	74.100	74.000	74.250	74.475	75.280	75.150
Invert Level (m)	73.200	72.445	72.445	71.990	71.959	71.364	71.264	71.189	71.118
Length (m)	45.278	28.981	39.908	16.687	10.587
Link Ht (mm)	150	150	150	150	150
Node Depth (m)	0.900	1.555	2.291	3.181	4.091	4.107

FOUL SEWER LONGITUDINAL SECTION
F38 - F20
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 Datum = 70.0

Link Name	F39-F17
Section Type	150mm
Slope (1:X)	1:60.0
Cover Level (m)	74.400	74.250
Invert Level (m)	72.460	71.959
Length (m)	30.034
Link Ht (mm)	150
Node Depth (m)	1.940	2.291

FOUL SEWER LONGITUDINAL SECTION
F39 - F17
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 Datum = 69.0

Link Name	F34-F35
Section Type	150mm
Slope (1:X)	1:60.0
Cover Level (m)	74.125	74.460
Invert Level (m)	73.255	72.663
Length (m)	35.518
Link Ht (mm)	150
Node Depth (m)	0.870	3.985

FOUL SEWER LONGITUDINAL SECTION
F34 - F35
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100

INFORMATION

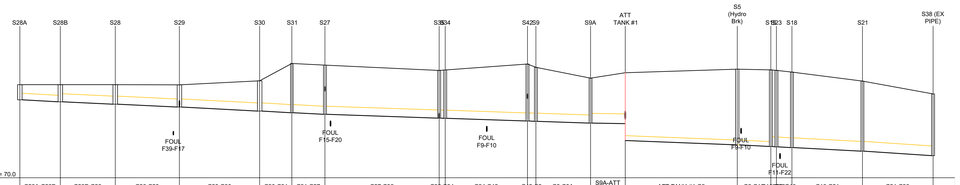
REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	26/02/2025	ISSUED FOR PRE-PLANNING STAGE 2 (5247)	JG	DG
P02	12/03/2025	ISSUED TO IRISH WATER	RS	DG
P03	14/03/2025	ISSUED FOR INFORMATION	RS	DG
P04	21/03/2025	PRELIMINARY PLANNING PACK	PM	DG
P05	02/04/2025	ISSUED FOR PLANNING	PM	DG
P06	22/04/2025	IW SODA RESPONSE	PM	DG
P07	29/04/2025	IW SODA RESPOSNE - ADDITIONAL COMMENTS	PM	DG

CLIENT:	JH KINNIE LTD.
PROJECT:	HOUSING DEVELOPMENT AT KINNEGAD, Co. WESTMEATH.
TITLE:	LONGITUDINAL SECTIONS FOUL SEWER

DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
RS	PM	DG	241139	P07
DATE:	SCALE:		DRAWING NO:	
APRIL 2025	AS SHOWN		241139-ORS-ZZ-XX-DR-CE-410	

ORS
Mullingar | Dublin | Galway | Donegal | Cork
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

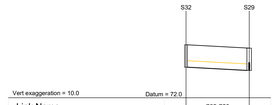
A0



Vert exaggeration = 10.0 — Datum = 70.0

Link Name	S28A-S28B	S28B-S28	S28-S29	S29-S30	S30-S31	S31-S27	S27-S35	S35-S34	S34-S42	S42-S9	S9-S9A	S9A-ATT TANK #1	ATT TANK #1-S5	S5-S1	S1-S23	S23-S18	S18-S21	S21-S38
Section Type	300mm	375mm	375mm	375mm	375mm	375mm	375mm	375mm	375mm	375mm	375mm	450mm	225mm	225mm	450mm	450mm	450mm	450mm
Slope (1:X)	1:200.0	1:228.3	1:227.8	1:200.3	1:197.9	1:203.8	1:301.1	1:279.6	1:303.8	1:200.0	1:315.3	1:640.6	1:258.5	1:206.4	1:171.7	1:204.3	1:197.3	1:155.2
Cover Level (m)	74.300	74.300	74.300	74.290	74.475	75.275	75.200	74.915	74.915	75.250	75.100	74.600	74.850	75.015	74.990	74.990	74.880	74.465	73.870
Invert Level (m)	73.600	73.506	73.395	73.285	73.090	73.000	72.900	72.755	72.715	72.605	72.525	72.525	71.700	71.520	71.445	71.420	71.395	71.290	71.080
Length (m)	18.705	25.339	29.611	37.049	14.845	15.288	52.685	2.796	37.976	3.901	25.221	16.015	51.709	15.483	2.512	2.150	32.555	32.601	
Node Depth (m)	0.700	0.794	0.905	1.025	1.385	2.270	2.270	2.250	2.250	2.630	2.495	2.075	3.130	3.495	3.515	3.530	3.485	3.325	2.850

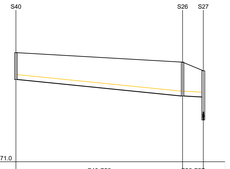
STORMWATER LONGITUDINAL SECTION
S28A - S8 (EXISTING PIPE)
VERTICAL SCALE 1:100
HORIZONTAL SCALE 1:100



Vert exaggeration = 10.0 — Datum = 72.0

Link Name	S32-S29
Section Type	300mm
Slope (1:X)	1:200.9
Cover Level (m)	74.465 / 74.290
Invert Level (m)	73.410 / 73.265
Length (m)	29.125
Node Depth (m)	1.040 / 1.025

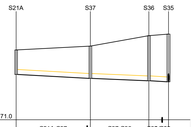
STORMWATER LONGITUDINAL SECTION
S32 - S29
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100



Vert exaggeration = 10.0 — Datum = 71.0

Link Name	S40-S26	S26-S27
Section Type	225mm	225mm
Slope (1:X)	1:100.5	1:212.5
Cover Level (m)	76.038	75.600 / 75.200
Invert Level (m)	74.800	74.035 / 73.990
Length (m)	76.912	9.562
Node Depth (m)	1.238	1.565 / 2.270

STORMWATER LONGITUDINAL SECTION
S40 - S27
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100



Vert exaggeration = 10.0 — Datum = 71.0

Link Name	S21A-S37	S37-S36	S36-S35	S35-S12A
Section Type	225mm	225mm	225mm	225mm
Slope (1:X)	1:185.2	1:245.5	1:201.1	
Cover Level (m)	74.225	74.400	74.885 / 74.665	
Invert Level (m)	73.095	72.910	72.800 / 72.755	
Length (m)	34.253	27.009	9.050	
Node Depth (m)	1.130	1.490	2.085 / 2.200	

STORMWATER LONGITUDINAL SECTION
S12A - S35
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 — Datum = 70.0

Link Name	S19-S24	S24-S12	S12-S17	S17-S41	S41-S4	S4-ATT TANK #1
Section Type	225mm	225mm	300mm	300mm	375mm	375mm
Slope (1:X)	1:152.6	1:150.2	1:149.6	1:79.0	1:440.6	1:198.2
Cover Level (m)	76.265	75.845	75.600	75.510	74.170	74.600	74.650
Invert Level (m)	74.900	74.500 / 74.600	73.945 / 73.845	73.585 / 73.560	73.500 / 73.400	72.850 / 72.800	72.700
Length (m)	61.024	27.032	38.903	36.344	22.028	29.728	
Node Depth (m)	1.365	2.045	1.585	1.725	1.970	1.550	3.100

STORMWATER LONGITUDINAL SECTION
S19 - ATT TANK #1
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 — Datum = 72.0

Link Name	S16-S17
Section Type	225mm
Slope (1:X)	1:169.7
Cover Level (m)	75.695 / 75.510
Invert Level (m)	73.800 / 73.360
Length (m)	74.687
Node Depth (m)	1.685 / 1.725

STORMWATER LONGITUDINAL SECTION
S16 - S17
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 — Datum = 71.0

Link Name	S1-S2	S2-S3	S3-S41
Section Type	225mm	225mm	300mm
Slope (1:X)	1:201.5	1:97.8	1:82.4
Cover Level (m)	74.830	74.150	74.715	74.170
Invert Level (m)	73.630	73.300 / 73.200	73.200	72.900
Length (m)	64.474	9.780	24.730	
Node Depth (m)	1.200	0.850	0.975	1.270

STORMWATER LONGITUDINAL SECTION
S1 - S41
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 — Datum = 71.0

Link Name	S43-S6	S6-S7	S7-S8	S8-S4
Section Type	225mm	225mm	225mm	225mm
Slope (1:X)	1:151.2	1:119.0	1:65.7	1:91.0
Cover Level (m)	74.995	74.380	74.345	74.175	74.400
Invert Level (m)	73.500	72.255 / 72.205	73.200	73.000 / 73.000	72.950
Length (m)	37.035	8.545	13.144	13.654	
Node Depth (m)	1.665	1.100	1.145	1.175	1.550

STORMWATER LONGITUDINAL SECTION
S43 - S4
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100

Vert exaggeration = 10.0 — Datum = 71.0

Link Name	S11-S42
Section Type	225mm
Slope (1:X)	1:208.2
Cover Level (m)	75.745 / 75.250
Invert Level (m)	73.890 / 73.650
Length (m)	49.962
Node Depth (m)	1.855 / 2.630

STORMWATER LONGITUDINAL SECTION
S11 - S42
VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:100

INFORMATION

REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	20/11/2024	ISSUED FOR PLANNING	LH	DG
P02	12/03/2025	ISSUED TO IRISH WATER	RS	DG
P03	13/03/2025	ISSUED FOR INFORMATION	RS	DG
P04	21/03/2025	PRELIMINARY PLANNING PACK	RS	DG
P05	02/04/2025	ISSUED FOR PLANNING	PM	DG

CLIENT:	JH KINNIE LTD.
PROJECT:	HOUSING DEVELOPMENT AT KINNEGAD, Co. WESTMEATH.
TITLE:	LONGITUDINAL SECTIONS STORMWATER

DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
RS	PM	DG	241139	P05
DATE: APRIL 2025	SCALE: AS SHOWN		DRAWING NO: 241139-ORS-ZZ-XX-DR-CE-411	

Mullingar | Dublin | Galway | Donegal | Cork
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

Appendix B – Water Demand Calculations

PROPOSED WATER DEMAND CALCULATIONS

ORS Ref: **241139**

CLIENT:	**Corcom Enterprises Lt**
PROJECT DESCRIPTION:	**Proposed Residential Development at Boreen Bradach, Kinnegad, Co. Westmeath**
DRAWING REFERENCE:	241139-ORS-Z0-00-DR-C-400

Residential/ Creche

Unit Type:	*Number of Units:*	*Flow (l/day/person):*	*Persons per Unit:*	*Total Flow (l/day)*
Houses	129	150	4	77400
Creche	1	60	50	3000

Total Flow (l/day):	80400	*Total Flow (m^3/day):*	80.4

Residential Average Hour Water Demand	**0.90**	*l/s*
Creche Average Hour Water Demand	**0.07**	*l/s*
Peak Hour Water Demand (Average Hour Water Demand x 5)	**4.83**	*l/s*

Appendix C – Wastewater Demand Calculations

ORS

PROPOSED FOUL SEWER DESIGN CALCULATIONS

ORS Ref: **241139**

CLIENT:	**Corcom Enterprises Lt**
PROJECT DESCRIPTION:	**Proposed Residential Development at Boreen Bradach, Kinnegad, Co. Westmeath**
DRAWING REFERENCE:	**241139-ORS-Z0-00-DR-C-400**

Residential/ Creche

Unit Type:	*Number of Units:*	*Flow (l/day/person):*	*BOD (g/day/person)*	*Persons per Unit*	*Total Flow (l/day)*	*BOD (g/day/person)*	*P.E.*
Houses	129	150		4	77400		
Creche	1	60		24	3000		

Total Houses	77400
Total Creche	3000

Residential Dry Weather Flow (DWF)	**0.90**	***litres/second***
Creche Dry Weather Flow (DWF)	**0.07**	***litres/second***
Peak Dry Weather Flow	**5.79**	***l/s @ 6 x DWF***

Appendix D – Qbar Calculation and Rainfall Data

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Jean McLoughlin
Site name:	Kinnegad Residental Development
Site location:	Kinnegad, Co. Westmeath

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.45656° N
Longitude:	7.09914° W
Reference:	3911972668
Date:	Nov 07 2024 12:22

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 2.3

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	916	877
Hydrological region:	13	13
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	1.65	1.65
Growth curve factor 100 years:	1.95	1.95
Growth curve factor 200 years:	2.15	2.15

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	15.21	14.46
1 in 1 year (l/s):	12.93	12.29
1 in 30 years (l/s):	25.1	23.85
1 in 100 year (l/s):	29.66	28.19
1 in 200 years (l/s):	32.7	31.08

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 259867, Northing: 245550,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.5,	4.0,	4.7,	5.2,	5.6,	6.8,	8.1,	9.0,	10.2,	11.3,	12.2,	13.4,	14.4,	15.2,	N/A ,
10 mins	3.5,	4.8,	5.5,	6.5,	7.2,	7.7,	9.4,	11.3,	12.6,	14.3,	15.8,	16.9,	18.7,	20.1,	21.2,	N/A ,
15 mins	4.2,	5.7,	6.5,	7.7,	8.5,	9.1,	11.1,	13.3,	14.8,	16.8,	18.6,	19.9,	22.0,	23.6,	24.9,	N/A ,
30 mins	5.5,	7.4,	8.4,	9.9,	10.9,	11.7,	14.1,	16.8,	18.5,	20.9,	23.0,	24.6,	27.1,	29.0,	30.5,	N/A ,
1 hours	7.3,	9.7,	10.9,	12.8,	14.0,	14.9,	17.8,	21.1,	23.2,	26.0,	28.5,	30.5,	33.4,	35.6,	37.4,	N/A ,
2 hours	9.6,	12.6,	14.2,	16.4,	17.9,	19.0,	22.6,	26.5,	29.0,	32.4,	35.4,	37.7,	41.1,	43.7,	45.8,	N/A ,
3 hours	11.3,	14.8,	16.5,	19.1,	20.7,	22.0,	26.0,	30.3,	33.1,	36.9,	40.1,	42.6,	46.4,	49.2,	51.6,	N/A ,
4 hours	12.7,	16.5,	18.4,	21.2,	23.0,	24.3,	28.7,	33.3,	36.3,	40.4,	43.9,	46.6,	50.6,	53.6,	56.1,	N/A ,
6 hours	15.0,	19.2,	21.4,	24.5,	26.6,	28.1,	32.9,	38.1,	41.4,	45.9,	49.8,	52.7,	57.1,	60.4,	63.1,	N/A ,
9 hours	17.6,	22.5,	24.9,	28.4,	30.7,	32.4,	37.8,	43.6,	47.3,	52.2,	56.5,	59.7,	64.5,	68.1,	71.1,	N/A ,
12 hours	19.8,	25.1,	27.8,	31.6,	34.1,	35.9,	41.8,	48.0,	51.9,	57.2,	61.7,	65.2,	70.3,	74.2,	77.3,	N/A ,
18 hours	23.3,	29.3,	32.3,	36.6,	39.4,	41.5,	48.0,	54.9,	59.2,	65.0,	70.0,	73.8,	79.4,	83.6,	87.1,	N/A ,
24 hours	26.1,	32.7,	36.0,	40.7,	43.7,	45.9,	52.9,	60.3,	65.0,	71.2,	76.6,	80.6,	86.5,	91.0,	94.7,	106.9,
2 days	31.3,	38.5,	42.1,	47.1,	50.3,	52.8,	60.2,	68.0,	72.8,	79.3,	84.8,	88.9,	95.0,	99.6,	103.3,	115.7,
3 days	35.8,	43.8,	47.6,	53.1,	56.5,	59.1,	67.0,	75.3,	80.4,	87.2,	93.0,	97.3,	103.6,	108.4,	112.2,	125.0,
4 days	40.1,	48.6,	52.8,	58.5,	62.2,	65.0,	73.4,	82.1,	87.5,	94.6,	100.7,	105.2,	111.8,	116.8,	120.8,	134.1,
6 days	47.8,	57.5,	62.1,	68.6,	72.7,	75.7,	85.0,	94.6,	100.5,	108.3,	114.9,	119.8,	127.0,	132.3,	136.6,	150.9,
8 days	55.0,	65.7,	70.8,	77.9,	82.4,	85.7,	95.8,	106.2,	112.5,	121.0,	128.0,	133.3,	141.0,	146.7,	151.3,	166.5,
10 days	61.9,	73.5,	79.0,	86.7,	91.5,	95.1,	106.0,	117.1,	123.9,	132.9,	140.4,	145.9,	154.1,	160.2,	165.1,	181.1,
12 days	68.4,	80.9,	86.9,	95.1,	100.2,	104.1,	115.6,	127.5,	134.7,	144.2,	152.2,	158.0,	166.7,	173.1,	178.2,	195.1,
16 days	81.0,	95.2,	101.9,	111.1,	116.9,	121.1,	134.1,	147.2,	155.2,	165.7,	174.5,	180.9,	190.4,	197.5,	203.1,	221.5,
20 days	93.1,	108.8,	116.2,	126.4,	132.7,	137.4,	151.6,	165.9,	174.7,	186.1,	195.6,	202.6,	212.9,	220.5,	226.6,	246.4,
25 days	107.8,	125.3,	133.5,	144.8,	151.8,	157.0,	172.6,	188.4,	198.0,	210.5,	220.9,	228.5,	239.7,	248.0,	254.6,	276.1,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Appendix E – Stormwater Drainage Design

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	14.900	Minimum Backdrop Height (m)	0.200
Ratio-R	0.282	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S28A	0.034	5.00	74.300	2100	659882.614	745441.984	0.700
S28	0.066	5.00	74.300	2100	659883.012	745485.995	0.905
S32	0.021	5.00	74.450	1200	659836.525	745462.367	1.040
S29	0.039	5.00	74.290	2100	659853.407	745486.100	1.025
S30	0.094	5.00	74.475	2100	659823.059	745507.343	1.395
S31	0.053	5.00	75.275	1200	659813.011	745518.270	2.270
S40	0.193	5.00	76.038	1200	659728.934	745575.134	1.238
S26	0.099	5.00	75.600	1200	659791.281	745530.097	1.565
S27	0.028	5.00	75.200	1350	659800.164	745526.557	2.270
S37	0.092	5.00	74.400	1200	659864.318	745571.838	1.490
S36	0.051	5.00	74.885	1200	659838.083	745565.418	2.085
S35	0.112	5.00	74.955	1350	659830.190	745569.841	2.200
S34	0.001	5.00	74.975	1350	659831.482	745572.318	2.230
S28B			74.300	2100	659883.593	745460.663	0.794
S11	0.075	5.00	75.745	1200	659760.194	745623.807	1.855
S42	0.087	5.00	75.250	1350	659800.768	745594.653	2.630
S9			75.100	1350	659803.262	745597.652	2.495
S9A			74.600	1350	659785.935	745615.979	2.075
S19	0.182	5.00	76.265	1200	659670.778	745617.034	1.365
ATT TANK #1			74.850		659796.773	745627.770	3.130
S24	0.064	5.00	75.845	1200	659720.293	745581.367	2.045
S12	0.144	5.00	75.500	1200	659736.110	745603.289	1.955
S16	0.171	5.00	75.405	1200	659699.737	745677.263	1.605
S17	0.029	5.00	75.010	1200	659757.539	745635.758	1.725
S1	0.122	5.00	74.820	1200	659727.801	745738.581	1.200
S2	0.023	5.00	74.150	1200	659780.129	745700.916	0.850
S3	0.041	5.00	74.175	1200	659782.536	745691.439	0.975
S41	0.054	5.00	74.170	1350	659772.076	745669.068	1.270
S43	0.046	5.00	74.595	1200	659825.883	745601.198	1.095
S6	0.046	5.00	74.385	1200	659816.967	745637.144	1.130
S7	0.062	5.00	74.345	1200	659812.856	745642.235	1.145
S8	0.027	5.00	74.175	1200	659801.999	745649.644	1.175
S4			74.400	1350	659790.371	745656.800	1.550
S5 (Hydro Brk)	0.056	5.00	75.015	1500	659829.286	745587.562	3.495
S15			74.980	1350	659833.320	745572.614	3.535
S23			74.960	1350	659831.958	745570.432	3.530
S18			74.880	1350	659838.231	745567.000	3.485
S21A	0.042	5.00	74.225	1200	659876.263	745539.735	1.130
S21			74.465	1350	659869.809	745574.914	3.235

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S38 (EX PIPE)			73.870	1350	659900.704	745564.505	2.850

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
S28B-S28	S28B	S28	25.339	0.600	73.506	73.395	0.111	228.3	375	5.63	35.4
S28A-S28B	S28A	S28B	18.705	0.600	73.600	73.506	0.094	200.0	300	5.28	36.3
S28-S29	S28	S29	29.611	0.600	73.395	73.265	0.130	227.8	375	6.05	34.5
S32-S29	S32	S29	29.125	0.600	73.410	73.265	0.145	200.9	300	5.44	35.9
S29-S30	S29	S30	37.049	0.600	73.265	73.080	0.185	200.3	375	6.53	33.4
S30-S31	S30	S31	14.845	0.600	73.080	73.005	0.075	197.9	375	6.72	33.0
S31-S27	S31	S27	15.288	0.600	73.005	72.930	0.075	203.8	375	6.93	32.6
S40-S26	S40	S26	76.912	0.600	74.800	74.035	0.765	100.5	225	5.98	34.6
S26-S27	S26	S27	9.562	0.600	74.035	73.990	0.045	212.5	225	6.16	34.2
S27-S35	S27	S35	52.685	0.600	72.930	72.755	0.175	301.1	375	7.77	31.1
S37-S36	S37	S36	27.009	0.600	72.910	72.800	0.110	245.5	225	6.14	34.3
S36-S35	S36	S35	9.050	0.600	72.800	72.755	0.045	201.1	225	6.30	33.9
S35-S34	S35	S34	2.796	0.600	72.755	72.745	0.010	279.6	375	7.81	31.0
S34-S42	S34	S42	37.976	0.600	72.745	72.620	0.125	303.8	375	8.43	30.0
S11-S42	S11	S42	49.962	0.600	73.890	73.650	0.240	208.2	225	5.92	34.7
S42-S9	S42	S9	3.901	0.600	72.620	72.605	0.015	260.0	375	8.48	29.9
S9-S9A	S9	S9A	25.221	0.600	72.605	72.525	0.080	315.3	375	8.90	29.3
S9A-ATT TANK #1	S9A	ATT TANK #1	16.015	0.600	72.525	72.500	0.025	640.6	450	9.23	28.8
S19-S24	S19	S24	61.024	0.600	74.900	74.500	0.400	152.6	225	5.96	34.7
S16-S17	S16	S17	71.160	0.600	73.800	73.360	0.440	161.7	225	6.16	34.2
S24-S12	S24	S12	27.032	0.600	73.800	73.620	0.180	150.2	225	6.39	33.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S28B-S28	1.195	132.0	3.2	0.419	0.530	0.034	0.0	40	0.508
S28A-S28B	1.108	78.3	3.3	0.400	0.494	0.034	0.0	42	0.556
S28-S29	1.196	132.1	9.4	0.530	0.650	0.100	0.0	67	0.700
S32-S29	1.105	78.1	2.0	0.740	0.725	0.021	0.0	33	0.478
S29-S30	1.276	141.0	14.4	0.650	1.020	0.159	0.0	80	0.830
S30-S31	1.284	141.8	22.7	1.020	1.895	0.253	0.0	101	0.949
S31-S27	1.265	139.7	27.1	1.895	1.895	0.306	0.0	111	0.985
S40-S26	1.304	51.8	18.1	1.013	1.340	0.193	0.0	92	1.191
S26-S27	0.893	35.5	27.1	1.340	0.985	0.292	0.0	147	0.980
S27-S35	1.039	114.7	52.8	1.895	1.825	0.627	0.0	178	1.017
S37-S36	0.830	33.0	12.4	1.265	1.860	0.134	0.0	95	0.771
S36-S35	0.918	36.5	17.0	1.860	1.975	0.186	0.0	108	0.901
S35-S34	1.078	119.1	77.7	1.825	1.855	0.925	0.0	221	1.146
S34-S42	1.034	114.2	75.2	1.855	2.255	0.925	0.0	222	1.101
S11-S42	0.902	35.9	7.1	1.630	1.375	0.075	0.0	67	0.703
S42-S9	1.119	123.5	88.1	2.255	2.120	1.087	0.0	235	1.211
S9-S9A	1.015	112.1	86.2	2.120	1.700	1.087	0.0	247	1.115
S9A-ATT TANK #1	0.796	126.5	84.8	1.625	1.900	1.087	0.0	270	0.851
S19-S24	1.056	42.0	17.1	1.140	1.120	0.182	0.0	100	1.002
S16-S17	1.025	40.8	15.9	1.380	1.425	0.171	0.0	97	0.961
S24-S12	1.064	42.3	22.5	1.820	1.655	0.247	0.0	116	1.079

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
S12-S17	S12	S17	38.903	0.600	73.545	73.285	0.260	149.6	300	6.89	32.7
S1-S2	S1	S2	64.474	0.600	73.620	73.300	0.320	201.5	225	6.17	34.2
S17-S41	S17	S41	36.344	0.600	73.360	72.900	0.460	79.0	300	7.23	32.0
S2-S3	S2	S3	9.780	0.600	73.300	73.200	0.100	97.8	225	6.29	33.9
S3-S41	S3	S41	24.730	0.600	73.200	72.900	0.300	82.4	300	6.53	33.4
S41-S4	S41	S4	22.028	0.600	72.900	72.850	0.050	440.6	375	7.66	31.3
S43-S6	S43	S6	37.035	0.600	73.500	73.255	0.245	151.2	225	5.58	35.6
S6-S7	S6	S7	6.545	0.600	73.255	73.200	0.055	119.0	225	5.67	35.3
S7-S8	S7	S8	13.144	0.600	73.200	73.000	0.200	65.7	225	5.81	35.0
S8-S4	S8	S4	13.654	0.600	73.000	72.850	0.150	91.0	225	5.97	34.6
S4-ATT TANK #1	S4	ATT TANK #1	29.728	0.600	72.850	72.700	0.150	198.2	375	8.05	30.6
ATT TANK #1-S5	ATT TANK #1	S5 (Hydro Brk)	51.709	0.600	71.720	71.520	0.200	258.5	225	10.30	27.4
S5-S15	S5 (Hydro Brk)	S15	15.483	0.600	71.520	71.445	0.075	206.4	225	10.58	27.0
S15-S23	S15	S23	2.572	0.600	71.445	71.430	0.015	171.5	450	10.61	27.0
S23-S18	S23	S18	7.150	0.600	71.430	71.395	0.035	204.3	450	10.70	26.9
S18-S21	S18	S21	32.555	0.600	71.395	71.230	0.165	197.3	450	11.07	26.4
S21A-S37	S21A	S37	34.253	0.600	73.095	72.910	0.185	185.2	225	5.60	35.5
S21-S38	S21	S38 (EX PIPE)	32.601	0.600	71.230	71.020	0.210	155.2	450	11.41	26.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S12-S17	1.283	90.7	34.6	1.655	1.425	0.391	0.0	129	1.200
S1-S2	0.917	36.5	11.3	0.975	0.625	0.122	0.0	86	0.810
S17-S41	1.770	125.1	51.3	1.350	0.970	0.591	0.0	134	1.686
S2-S3	1.322	52.6	13.3	0.625	0.750	0.145	0.0	77	1.106
S3-S41	1.733	122.5	16.9	0.675	0.970	0.186	0.0	75	1.226
S41-S4	0.857	94.6	70.4	0.895	1.175	0.831	0.0	241	0.935
S43-S6	1.061	42.2	4.5	0.870	0.905	0.046	0.0	49	0.690
S6-S7	1.197	47.6	8.8	0.905	0.920	0.092	0.0	65	0.920
S7-S8	1.615	64.2	14.6	0.920	0.950	0.154	0.0	73	1.312
S8-S4	1.371	54.5	17.0	0.950	1.325	0.181	0.0	86	1.211
S4-ATT TANK #1	1.283	141.7	83.9	1.175	1.775	1.012	0.0	208	1.334
ATT TANK #1-S5	0.808	32.1	155.6	2.905	3.270	2.099	0.0	225	0.823
S5-S15	0.906	36.0	157.7	3.270	3.310	2.155	0.0	225	0.923
S15-S23	1.549	246.4	157.6	3.085	3.080	2.155	0.0	262	1.640
S23-S18	1.418	225.6	157.0	3.080	3.035	2.155	0.0	277	1.528
S18-S21	1.443	229.6	154.4	3.035	2.785	2.155	0.0	271	1.544
S21A-S37	0.957	38.1	4.0	0.905	1.265	0.042	0.0	49	0.622
S21-S38	1.629	259.1	152.2	2.785	2.400	2.155	0.0	248	1.691

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
S28B-S28	25.339	228.3	375	Circular	74.300	73.506	0.419	74.300	73.395	0.530
S28A-S28B	18.705	200.0	300	Circular	74.300	73.600	0.400	74.300	73.506	0.494
S28-S29	29.611	227.8	375	Circular	74.300	73.395	0.530	74.290	73.265	0.650
S32-S29	29.125	200.9	300	Circular	74.450	73.410	0.740	74.290	73.265	0.725
S29-S30	37.049	200.3	375	Circular	74.290	73.265	0.650	74.475	73.080	1.020
S30-S31	14.845	197.9	375	Circular	74.475	73.080	1.020	75.275	73.005	1.895
S31-S27	15.288	203.8	375	Circular	75.275	73.005	1.895	75.200	72.930	1.895
S40-S26	76.912	100.5	225	Circular	76.038	74.800	1.013	75.600	74.035	1.340
S26-S27	9.562	212.5	225	Circular	75.600	74.035	1.340	75.200	73.990	0.985
S27-S35	52.685	301.1	375	Circular	75.200	72.930	1.895	74.955	72.755	1.825
S37-S36	27.009	245.5	225	Circular	74.400	72.910	1.265	74.885	72.800	1.860
S36-S35	9.050	201.1	225	Circular	74.885	72.800	1.860	74.955	72.755	1.975
S35-S34	2.796	279.6	375	Circular	74.955	72.755	1.825	74.975	72.745	1.855
S34-S42	37.976	303.8	375	Circular	74.975	72.745	1.855	75.250	72.620	2.255
S11-S42	49.962	208.2	225	Circular	75.745	73.890	1.630	75.250	73.650	1.375
S42-S9	3.901	260.0	375	Circular	75.250	72.620	2.255	75.100	72.605	2.120
S9-S9A	25.221	315.3	375	Circular	75.100	72.605	2.120	74.600	72.525	1.700
S9A-ATT TANK #1	16.015	640.6	450	Circular	74.600	72.525	1.625	74.850	72.500	1.900
S19-S24	61.024	152.6	225	Circular	76.265	74.900	1.140	75.845	74.500	1.120
S16-S17	71.160	161.7	225	Circular	75.405	73.800	1.380	75.010	73.360	1.425
S24-S12	27.032	150.2	225	Circular	75.845	73.800	1.820	75.500	73.620	1.655
S12-S17	38.903	149.6	300	Circular	75.500	73.545	1.655	75.010	73.285	1.425
S1-S2	64.474	201.5	225	Circular	74.820	73.620	0.975	74.150	73.300	0.625
S17-S41	36.344	79.0	300	Circular	75.010	73.360	1.350	74.170	72.900	0.970
S2-S3	9.780	97.8	225	Circular	74.150	73.300	0.625	74.175	73.200	0.750

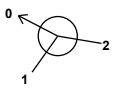
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S28B-S28	S28B	2100	Manhole	Adoptable	S28	2100	Manhole	Adoptable
S28A-S28B	S28A	2100	Manhole	Adoptable	S28B	2100	Manhole	Adoptable
S28-S29	S28	2100	Manhole	Adoptable	S29	2100	Manhole	Adoptable
S32-S29	S32	1200	Manhole	Adoptable	S29	2100	Manhole	Adoptable
S29-S30	S29	2100	Manhole	Adoptable	S30	2100	Manhole	Adoptable
S30-S31	S30	2100	Manhole	Adoptable	S31	1200	Manhole	Adoptable
S31-S27	S31	1200	Manhole	Adoptable	S27	1350	Manhole	Adoptable
S40-S26	S40	1200	Manhole	Adoptable	S26	1200	Manhole	Adoptable
S26-S27	S26	1200	Manhole	Adoptable	S27	1350	Manhole	Adoptable
S27-S35	S27	1350	Manhole	Adoptable	S35	1350	Manhole	Adoptable
S37-S36	S37	1200	Manhole	Adoptable	S36	1200	Manhole	Adoptable
S36-S35	S36	1200	Manhole	Adoptable	S35	1350	Manhole	Adoptable
S35-S34	S35	1350	Manhole	Adoptable	S34	1350	Manhole	Adoptable
S34-S42	S34	1350	Manhole	Adoptable	S42	1350	Manhole	Adoptable
S11-S42	S11	1200	Manhole	Adoptable	S42	1350	Manhole	Adoptable
S42-S9	S42	1350	Manhole	Adoptable	S9	1350	Manhole	Adoptable
S9-S9A	S9	1350	Manhole	Adoptable	S9A	1350	Manhole	Adoptable
S9A-ATT TANK #1	S9A	1350	Manhole	Adoptable	ATT TANK #1		Junction	
S19-S24	S19	1200	Manhole	Adoptable	S24	1200	Manhole	Adoptable
S16-S17	S16	1200	Manhole	Adoptable	S17	1200	Manhole	Adoptable
S24-S12	S24	1200	Manhole	Adoptable	S12	1200	Manhole	Adoptable
S12-S17	S12	1200	Manhole	Adoptable	S17	1200	Manhole	Adoptable
S1-S2	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
S17-S41	S17	1200	Manhole	Adoptable	S41	1350	Manhole	Adoptable
S2-S3	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
S3-S41	24.730	82.4	300	Circular	74.175	73.200	0.675	74.170	72.900	0.970
S41-S4	22.028	440.6	375	Circular	74.170	72.900	0.895	74.400	72.850	1.175
S43-S6	37.035	151.2	225	Circular	74.595	73.500	0.870	74.385	73.255	0.905
S6-S7	6.545	119.0	225	Circular	74.385	73.255	0.905	74.345	73.200	0.920
S7-S8	13.144	65.7	225	Circular	74.345	73.200	0.920	74.175	73.000	0.950
S8-S4	13.654	91.0	225	Circular	74.175	73.000	0.950	74.400	72.850	1.325
S4-ATT TANK #1	29.728	198.2	375	Circular	74.400	72.850	1.175	74.850	72.700	1.775
ATT TANK #1-S5	51.709	258.5	225	Circular	74.850	71.720	2.905	75.015	71.520	3.270
S5-S15	15.483	206.4	225	Circular	75.015	71.520	3.270	74.980	71.445	3.310
S15-S23	2.572	171.5	450	Circular	74.980	71.445	3.085	74.960	71.430	3.080
S23-S18	7.150	204.3	450	Circular	74.960	71.430	3.080	74.880	71.395	3.035
S18-S21	32.555	197.3	450	Circular	74.880	71.395	3.035	74.465	71.230	2.785
S21A-S37	34.253	185.2	225	Circular	74.225	73.095	0.905	74.400	72.910	1.265
S21-S38	32.601	155.2	450	Circular	74.465	71.230	2.785	73.870	71.020	2.400

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S3-S41	S3	1200	Manhole	Adoptable	S41	1350	Manhole	Adoptable
S41-S4	S41	1350	Manhole	Adoptable	S4	1350	Manhole	Adoptable
S43-S6	S43	1200	Manhole	Adoptable	S6	1200	Manhole	Adoptable
S6-S7	S6	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
S7-S8	S7	1200	Manhole	Adoptable	S8	1200	Manhole	Adoptable
S8-S4	S8	1200	Manhole	Adoptable	S4	1350	Manhole	Adoptable
S4-ATT TANK #1	S4	1350	Manhole	Adoptable	ATT TANK #1		Junction	
ATT TANK #1-S5	ATT TANK #1		Junction		S5 (Hydro Brk)	1500	Manhole	Adoptable
S5-S15	S5 (Hydro Brk)	1500	Manhole	Adoptable	S15	1350	Manhole	Adoptable
S15-S23	S15	1350	Manhole	Adoptable	S23	1350	Manhole	Adoptable
S23-S18	S23	1350	Manhole	Adoptable	S18	1350	Manhole	Adoptable
S18-S21	S18	1350	Manhole	Adoptable	S21	1350	Manhole	Adoptable
S21A-S37	S21A	1200	Manhole	Adoptable	S37	1200	Manhole	Adoptable
S21-S38	S21	1350	Manhole	Adoptable	S38 (EX PIPE)	1350	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S28A	659882.614	745441.984	74.300	0.700	2100	 0	S28A-S28B	73.600	300
S28	659883.012	745485.995	74.300	0.905	2100	1	S28B-S28	73.395	375
						 0	S28-S29	73.395	375
S32	659836.525	745462.367	74.450	1.040	1200	 0	S32-S29	73.410	300
S29	659853.407	745486.100	74.290	1.025	2100	1	S32-S29	73.265	300
						 2	S28-S29	73.265	375
						0	S29-S30	73.265	375

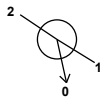
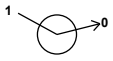
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S30	659823.059	745507.343	74.475	1.395	2100	1	S29-S30	73.080	375
						0	S30-S31	73.080	375
S31	659813.011	745518.270	75.275	2.270	1200	1	S30-S31	73.005	375
						0	S31-S27	73.005	375
S40	659728.934	745575.134	76.038	1.238	1200	0	S40-S26	74.800	225
S26	659791.281	745530.097	75.600	1.565	1200	1	S40-S26	74.035	225
						0	S26-S27	74.035	225
S27	659800.164	745526.557	75.200	2.270	1350	1	S26-S27	73.990	225
						2	S31-S27	72.930	375
						0	S27-S35	72.930	375
S37	659864.318	745571.838	74.400	1.490	1200	1	S21A-S37	72.910	225
						0	S37-S36	72.910	225
S36	659838.083	745565.418	74.885	2.085	1200	1	S37-S36	72.800	225
						0	S36-S35	72.800	225
S35	659830.190	745569.841	74.955	2.200	1350	1	S36-S35	72.755	225
						2	S27-S35	72.755	375
						0	S35-S34	72.755	375
S34	659831.482	745572.318	74.975	2.230	1350	1	S35-S34	72.745	375
						0	S34-S42	72.745	375
S28B	659883.593	745460.663	74.300	0.794	2100	1	S28A-S28B	73.506	300
						0	S28B-S28	73.506	375
S11	659760.194	745623.807	75.745	1.855	1200	0	S11-S42	73.890	225
S42	659800.768	745594.653	75.250	2.630	1350	1	S11-S42	73.650	225
						2	S34-S42	72.620	375
						0	S42-S9	72.620	375
S9	659803.262	745597.652	75.100	2.495	1350	1	S42-S9	72.605	375
						0	S9-S9A	72.605	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S9A	659785.935	745615.979	74.600	2.075	1350	1	S9-S9A	72.525	375
						0	S9A-ATT TANK #1	72.525	450
S19	659670.778	745617.034	76.265	1.365	1200	0	S19-S24	74.900	225
ATT TANK #1	659796.773	745627.770	74.850	3.130		1	S4-ATT TANK #1	72.700	375
						2	S9A-ATT TANK #1	72.500	450
						0	ATT TANK #1-S5	71.720	225
S24	659720.293	745581.367	75.845	2.045	1200	1	S19-S24	74.500	225
						0	S24-S12	73.800	225
S12	659736.110	745603.289	75.500	1.955	1200	1	S24-S12	73.620	225
						0	S12-S17	73.545	300
S16	659699.737	745677.263	75.405	1.605	1200	0	S16-S17	73.800	225
S17	659757.539	745635.758	75.010	1.725	1200	1	S16-S17	73.360	225
						2	S12-S17	73.285	300
						0	S17-S41	73.360	300
S1	659727.801	745738.581	74.820	1.200	1200	0	S1-S2	73.620	225
S2	659780.129	745700.916	74.150	0.850	1200	1	S1-S2	73.300	225
						0	S2-S3	73.300	225
S3	659782.536	745691.439	74.175	0.975	1200	1	S2-S3	73.200	225
						0	S3-S41	73.200	300
S41	659772.076	745669.068	74.170	1.270	1350	1	S3-S41	72.900	300
						2	S17-S41	72.900	300
						0	S41-S4	72.900	375
S43	659825.883	745601.198	74.595	1.095	1200	0	S43-S6	73.500	225
S6	659816.967	745637.144	74.385	1.130	1200	1	S43-S6	73.255	225
						0	S6-S7	73.255	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S7	659812.856	745642.235	74.345	1.145	1200	 1	S6-S7	73.200	225
						0	S7-S8	73.200	225
S8	659801.999	745649.644	74.175	1.175	1200	 1	S7-S8	73.000	225
						0	S8-S4	73.000	225
S4	659790.371	745656.800	74.400	1.550	1350	 1	S8-S4	72.850	225
						2	S41-S4	72.850	375
						0	S4-ATT TANK #1	72.850	375
S5 (Hydro Brk)	659829.286	745587.562	75.015	3.495	1500	 1	ATT TANK #1-S5	71.520	225
						0	S5-S15	71.520	225
S15	659833.320	745572.614	74.980	3.535	1350	 1	S5-S15	71.445	225
						0	S15-S23	71.445	450
S23	659831.958	745570.432	74.960	3.530	1350	 1	S15-S23	71.430	450
						0	S23-S18	71.430	450
S18	659838.231	745567.000	74.880	3.485	1350	 1	S23-S18	71.395	450
						0	S18-S21	71.395	450
S21A	659876.263	745539.735	74.225	1.130	1200				
						0	S21A-S37	73.095	225
S21	659869.809	745574.914	74.465	3.235	1350	 1	S18-S21	71.230	450
						0	S21-S38	71.230	450
S38 (EX PIPE)	659900.704	745564.505	73.870	2.850	1350	 1	S21-S38	71.020	450

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	14.900	Additional Storage (m³/ha)	20.0
Ratio-R	0.282	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	30	0	0
30	30	0	0
100	30	0	0

Node S5 (Hydro Brk) Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	71.520	Product Number	CTL-SHE-0157-1450-2000-1450
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	14.5	Min Node Diameter (mm)	1500

Node ATT TANK #1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	71.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	975.0	0.0	0.750	975.0	0.0	0.751	0.0	0.0

SOAKAWAY DESIGN

In accordance with CIRIA C753 SUDS

Tedds calculation version 2.0.06

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **125.0** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.282**
5-year return period rainfall of 60 minutes duration	M5_60min = **14.9** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Width of pit	w = **5000** mm
Length of pit	l =**4800** mm
Percentage free volume	V_{free} = **33** %
Soil infiltration rate	f = **30.1×10^{-6}** m/s
Base area	$A_b = w \times l$ = **24000000** mm^2
Perimeter	$P = 2 \times (w + l)$ = **19600** mm
Coefficient b	$b = P \times f / (A_b \times V_{free})$ = **0.27** hr^{-1}

Table equations (Eq. 25.4)

Rainfall intensity	i = M100 / D
Coefficient a	$a = A_b / P - (A \times i / (P \times f))$
Minimum depth required	$H = a \times (e^{(-bD)} - 1)$

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Intensity, i (mm/hr)	a (mm)	Min depth req (mm)
5	0.33;	6.0;	1.88;	11.2;	134.83;	-6711;	148
10	0.48;	8.7;	1.94;	16.8;	100.75;	-4705;	206
15	0.58;	10.4;	1.97;	20.6;	82.32;	-3620;	235
30	0.76;	13.7;	1.98;	27.0;	54.02;	-1955;	245
60	1.00;	17.9;	1.95;	34.9;	34.89;	-829;	195
120	1.26;	22.6;	1.91;	43.1;	21.54;	-43;	18
240	1.61;	28.8;	1.86;	53.6;	13.40;	436;	0
360	1.84;	32.9;	1.83;	60.1;	10.02;	635;	0
600	2.19;	39.2;	1.78;	69.6;	6.96;	815;	0
1440	3.00;	53.6;	1.71;	91.4;	3.81;	1000;	0

Minimum depth of soakaway	H_{max} = **245** mm
Time to empty soakaway to half vol. - Eq.24.6(2)	$t_{s50} = V_{free} \times A_b / (f \times P) \times Ln((H_{max} + A_b / P) / (H_{max} / 2 + A_b / P))$ = 19min 30s

PASS - Soakaway discharge time less than or equal to 24 hours

Appendix F – Typical Attenuation Tank System

Product Datasheet

AquaCell Plus-R

Product description

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

Technical specification

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

Maximum installation depths

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

Minimum cover depths

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

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

Assumptions made:

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

Wavin Limited | Edlington Lane | Edlington | Doncaster | DN12 1BY
Orders 0844 856 5152 | **Technical Advice** 0844 856 5165 | **Email** technical.design@wavin.co.uk | **Website** aquacell.wavin.co.uk

August 2020