Engineering Assessment Report

Proposed Large Residential Development (LRD) at Old Slane Road, Mell/Tullyallen, Drogheda, Co. Louth

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015 and BS EN ISO 14001: 2015)

Issue	Date	Prepared by	Checked by	Approved by
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2	8 May 2024	Stephen Dent-Neville	Mark Duignan	Mark Duignan

Comments

Disclaimer

This report has been prepared by Waterman Moylan, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the Client.

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1. Introduction

1.1 Context

This Engineering Assessment Report has been prepared by Waterman Moylan as part of the documentation in support of a planning application for a proposed Large Residential Development (LRD) located off the Slane Road, east of Drogheda, in Mell/Tullyallen, Drogheda, Co. Louth.

A Strategic Housing Development (SHD) consisting of 237 no. units was granted planning permission from An Bord Pleanála in February 2022 (reference no. ABP-311678-21). The first 30 no. units of the permitted development are under construction under that planning grant. This application proposes a revised site layout for the remainder of the site, with roads, drainage, watermains and other utilities to tie into the infrastructure currently under construction as part of the first 30 no. units.

In general, the strategy for the roads layout, foul and surface water drainage, and water supply remain very similar to the approved Strategic Housing Development (SHD).

This report assesses wastewater and surface water drainage, water supply infrastructure and the road and transportation network in the vicinity of the site, and details the criteria used to design the proposed wastewater and surface water drainage, water supply and transport networks to serve the development.

1.2 Site Location and Description

The subject site is located in Mell/Tullyallen, Drogheda, Co. Louth. The site location is indicated on the Figure below:

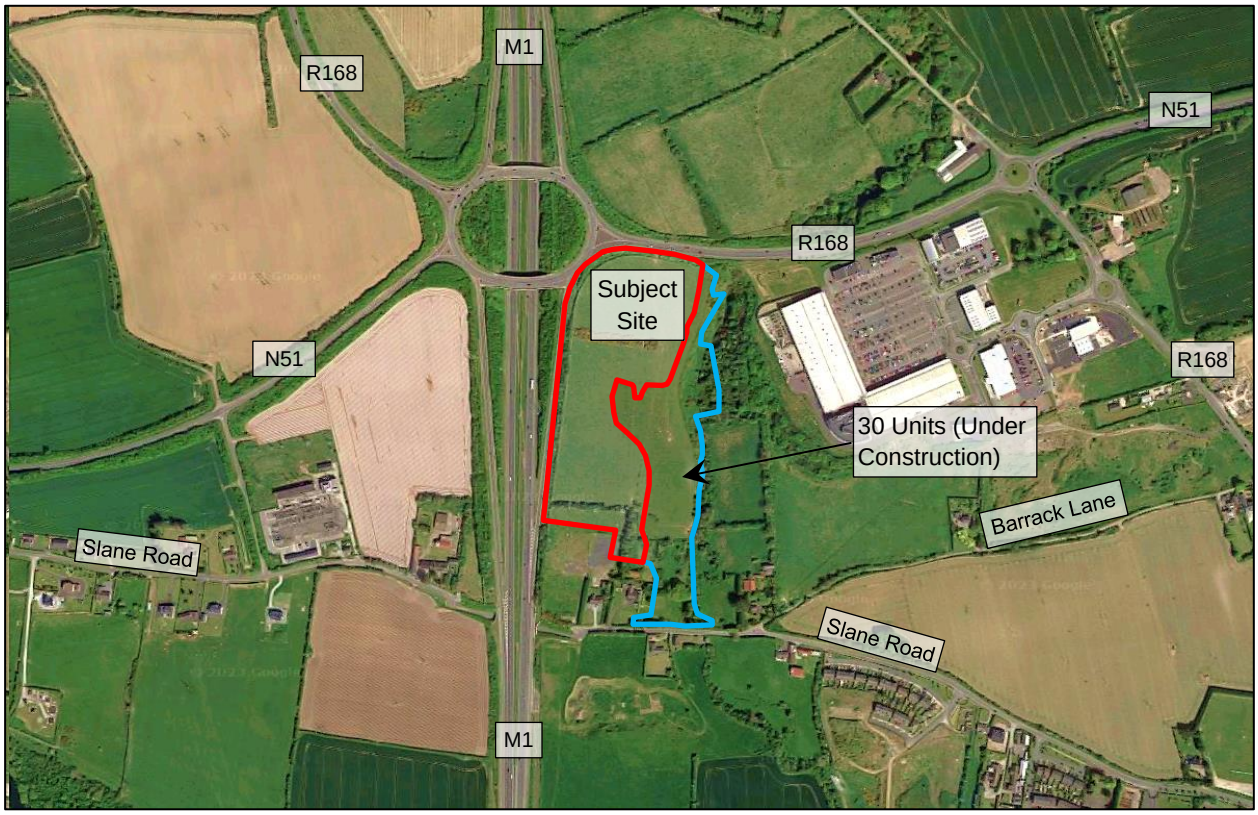


Figure 1 | *Site Location (Source: Google Maps)*

The site is currently greenfield. Topographic survey data indicates that the site falls generally from north-west to south-east, with a high point of approximately 32.8m OD Malin at the north-west corner of the site of the site and a low point of approximately 18.8m OD Malin at the south-east of the site. The lands continue to fall towards the south-east beyond the redline and within the 30-units development currently under construction, to a low point of approximately 10.0m OD Malin. There is a stream flowing in a southerly direction along the eastern boundary of the site, draining land to the north and crossing under the R168 Road. The stream crosses the Slane Road at Dry Bridge, discharging into the Boyne River approximately 650m south of the site. A Natura Impact Statement (NIS) accompanies this planning submission under separate cover.

In the Louth County Development Plan 2021-2027, the subject site is zoned “A2 New Residential”, as shown in the extract below:

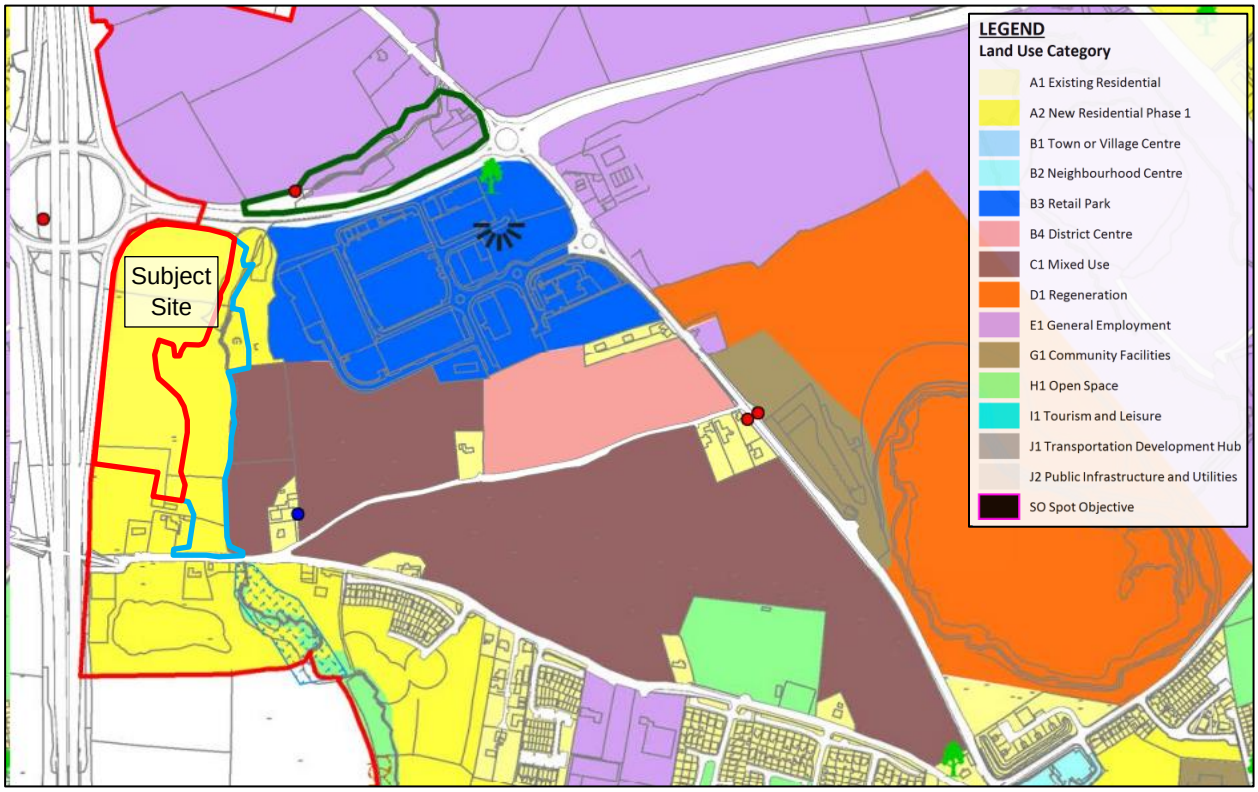


***Figure 2** | Louth Development Plan Zoning Map*

1.3 Proposed Development

The proposed development consists of 207 no. residential units, in addition to the permitted 30 no. units already under construction, as set out in the schedule of accommodation below:

Description	1-Bed Duplexes	2-Bed Duplexes	2-Bed Houses	3-Bed Houses	4-Bed Houses	Total No. of Residential Units
Permitted Development (Under Construction)	-	-	-	27	3	30
Proposed Development	21	21	28	115	22	207
Total	**21**	**21**	**28**	**142**	**25**	**237**

***Table 1** | Schedule of Accommodation*

The site will accommodate car parking spaces, bicycle parking spaces, storage, services and plant areas, and landscaping. The proposed application includes all site landscaping works, substations, boundary treatments, lighting, servicing, signage, and associated and ancillary works, including site development works and services above and below ground.

1.3.1 Riparian Corridor

There is a 20m riparian corridor at the east of the lands, adjacent to the existing stream. No houses, roads or infrastructure are proposed within this riparian corridor. This area lies outside the application's development boundary.

1.4 LRD Stage 2 Feedback

The proposals for the development have taken on board feedback received from Louth County Council during the Stage 2 meeting, held on the 31st of January 2024, and in the subsequent Planner's Report and LRD Opinion Notice, dated 21st of February 2024. Below is a summary of the relevant civil engineering feedback received from the Water/Drainage Section and from the Roads/Transport Section, along with commentary on how each item has been addressed.

1.4.1 Water & Drainage

The feedback noted that the Applicant should submit a new Pre-Connection Enquiry to Irish Water, since the Confirmation of Feasibility letter that accompanied the Stage 2 submission was dated July 2023.

A new Pre-Connection Enquiry was submitted to Irish Water, and an updated Confirmation of Feasibility letter, dated 26 April 2024, is included in Appendix A of this report. The content of the new Confirmation of Feasibility letter is discussed further in Section 2.3 (foul water) and Section 4.3 (water supply) of this report.

1.4.2 Traffic and Transport (Including Layout of Internal Streets)

Eight items were raised by the Transportation Section, and have been addressed as set out below:

1. To support the retrospective provision of walking and cycling infrastructure in existing settlements, the applicant has been asked to provide a sterile section of land on the boundary adjoining the public road, to accommodate future provision of a footpath and cycle path. These should comply with the widths outlined in DMURS and in Section 2.6 & Table 2.2 of "The Cycle Design Manual"; that is, a footpath width 1.8m, cycle path width of 2m, and a buffer zone of 0.5m, for a total width of 4.3m.

   The proposed layout includes a sterile section of land at the north of the site, adjacent to the R168, which achieves or exceeds this 4.3m requirement along the entire site boundary. All buildings, roads, and boundary fences and walls associated with this application are set clear of this sterile land for the future provision of cycle and walking infrastructure. Note that a new footpath is permitted between the subject site and the M1 Retail Park. However, this footpath does not prejudice or prohibit the future provision of pedestrian and cycle infrastructure. This is further discussed in Section 5.3.1 of this report, and the 4.3m sterile section of land is indicated on drawing no. OSR-WMC-ZZ-GF-DR-C-3102.

2. Details are required to demonstrate road centreline radii including chicanes are designed in accordance with DMURS.

   Horizontal curvature has been incorporated in the road design. These curves have been designed in accordance with Section 4.4.6 and Table 4.3 of DMURS, with a minimum centre line curvature

of 11m radius, suitable for a 20km/hr design speed. This is discussed further in Section 5.3.3 of this report.

3. A swept path analysis was requested for a large self-loading bin lorry and for service vehicles throughout the modified development.

   Swept path analysis drawings are now included as part of the drawing package – refer to drawing no.'s OSR-WMC-ZZ-GF-DR-C-3103 and 3104. These drawings demonstrate that a refuse vehicle and service vehicles can adequately manoeuvre throughout the site.

   Given the use of 3m corner radii, in accordance with DMURS, the refuse vehicle will occasionally cross the road centre line when making turning manoeuvres at corners. Section 4.3.3 of DMURS states that larger vehicles crossing the centre line of the road is acceptable on local or lightly trafficked streets where keeping vehicle speeds low is of a higher priority.

4. Layout plans were requested demonstrating road gradients in accordance with DMURS.

   Road levels and gradients are shown on the accompanying Road Layout and Levels drawings OSR-WMC-ZZ-GF-DR-C-3101 and 3102.

   The maximum gradient proposed is 1:20. Section 4.4.6 of DMURS notes that a maximum gradient of 1:20 is preferred on streets where pedestrians are active, and this is also in accordance with Part M of the building regulations.

   Section 4.4.6 of DMURS notes that a minimum gradient of 1:200 is preferred to maintain effective drainage. The minimum proposed gradient is 1:150.

5. Sightline details were requested, in accordance with DMURS.

   Please refer to drawing no.'s OSR-WMC-ZZ-GF-DR-C-3103 and 3104, which demonstrate that adequate sightlines are achieved in accordance with the forward visibility requirements set out in DMURS section 4.4.4.

6. The Applicant was requested to demonstrate that junction radii are in accordance with DMURS.

   Junction radii throughout the development are in accordance with DMURS, ranging from 3m to 6m, with a typical corner radius of 3m throughout the development. This is discussed further in Section 5.3.3 of this report.

7. The feedback received from LCC noted that turning bays should be incorporated to avoid long reversing movements by large vehicles.

   Please refer to the accompanying drawing no.'s OSR-WMC-ZZ-GF-DR-C-3101 and 3102, which show the updated site layout incorporating appropriate turning bays.

   As noted above, swept path analysis drawings are now included as part of the drawing package – refer to drawing no.'s OSR-WMC-ZZ-GF-DR-C-3103 and 3104. These drawings demonstrate that a refuse vehicle can adequately manoeuvre throughout the site, including turning movements.

8. The Planner's Report notes that the proposed 4.8m wide shared space provides a narrow corridor between houses. Where there are links between streets, the report states that these must be adequately designed in width to facilitate 2-way traffic (minimum 5.5m wide) and provide for footpath on both sides of the street, particularly on the main pedestrian desire lines.

The proposed development has been designed with residential units overlooking streets and pedestrian routes. This creates a strong sense of enclosure, as per Section 4.3.1 of DMURS, and provides good levels of passive security, as described in Section 4.4.9 of DMURS.

The proposed road layout includes shared surface homezones, in accordance with Section 4.3.4 of DMURS. Road widths throughout the development are generally 5.5m, with road widths of 4.8m at shared surfaces in accordance with Section 4.4.1 of DMURS, and as illustrated in DMURS Figure 4.55. Where there are links between shared surface homezones, these are 5.5m wide with footpaths provided on either side. This ensures that 2-way traffic can be facilitated, while still prioritising safe active travel modes.

The proposed road widths and homezone design are discussed further in Sections 5.3.3, 5.4.3 and 5.4.4 of this report. Refer also to the accompanying road layout drawing no.'s OSR-WMC-ZZ-GF-DR-C-3101 and 3102.

2. Foul Water Network

2.1 Existing Foul Water Network

Uisce Éireann records for the surrounding area have been consulted as part of this assessment, and are extracted below:

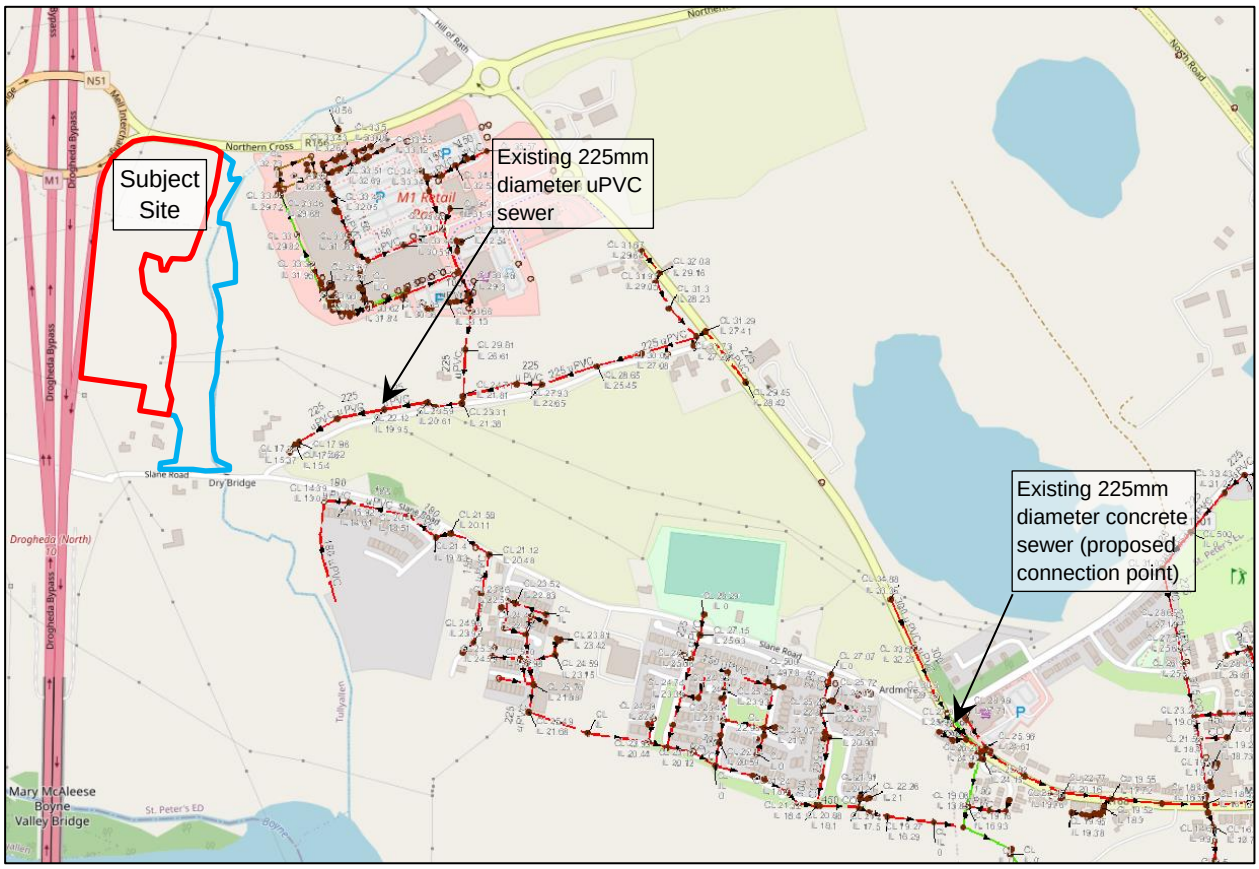


Figure 3 | *Extract of Uisce Éireann's Wastewater Drainage Records*

There is an existing 225mm diameter concrete sewer located approximately 800m east of the subject site. There are other foul water sewers serving developments to the south of the Old Slane Road and serving the M1 Retail Park. However, Uisce Éireann have confirmed that there is insufficient capacity in these networks to cater to the subject development.

2.2 Permitted Foul Water Network

As part of the permitted development, a new pumping station is under construction at the low point of the site at the south-east of the Applicant's lands. From here, wastewater will be pumped to the existing 225mm diameter concrete sewer. The invert level of the rising main leaving the pumping station is 8.4m OD Malin, and the invert level of the standoff manhole where the rising main terminates is 25.720m OD Malin.

The pumping station has been designed to accommodate development of the entire site, including the subject Large Residential Development (LRD), with capacity for up to 282 no. residential units (the subject proposal would provide 237 no. dwellings on the side). The proposed pumping station includes a 24-hour storage tank with sufficient storage for the subject LRD. In order to minimise the risk of odour, noise and vibration nuisance, a buffer zone of 35m is proposed between the pumping station and the nearest property. There are no existing or proposed buildings within this 35m buffer zone.

A Connection Offer has been issued by Uisce Éireann for the permitted pumping station and first 30 units, dated 20 November 2023, under reference number CDS2300528201. The pumping station and drainage for the first 30 units has been substantially constructed.

2.3 Proposed Foul Water Network

It is proposed to drain wastewater from the site by gravity, through a series of 150mm and 225mm diameter drains, to the new pumping station at the south-west of the site. As this is the low point of the site, this proposal allows for the drainage to discharge by gravity without resulting in excessive invert depths. Refer to the accompanying Drainage Layout drawing no. OSR-WMC-ZZ-GF-DR-C-2200.

Uisce Éireann will ultimately decide on the feasibility of the existing wastewater infrastructure to cater for the proposed development. In this regard, a Pre-Connection Enquiry was submitted to Uisce Éireann, and a Confirmation of Feasibility Letter was received, dated 26 April 2024. The letter notes that connection to the existing Uisce Éireann network, via the permitted pumping station and rising main, is feasible without any infrastructure upgrades required – refer to the letter included in Appendix A.

Uisce Éireann have also provided a Statement of Design Acceptance for the proposed development, and that letter is included in Appendix B.

2.4 Foul Water Drainage Calculations

The calculated foul water flows at the subject development are set out in the Table below. Domestic wastewater loads have been calculated based on 2.7 persons per unit with a per capita wastewater flow of 150 litres per head per day along with a 10% unit-consumption allowance, in line with Section 3.6 of the Uisce Éireann Code of Practice for Wastewater Infrastructure. Note that the Uisce Éireann Code of Practice assumes 2.7 residents per unit regardless of the unit type. A peak flow multiplier of 6 has been used, as per Section 2.2.5 of Appendix B of the Code of Practice.

Description	Total Population	Load per Capita	Daily Load	Total DWF	Peak Flow
	No. People	*l/day*	*l/day*	*l/s*	*l/s*
Permitted Development (30 of the Permitted SHD Units Under Construction)	81.0	150	13,365.0	0.155	0.928
Proposed Development (207 Units)	558.9	150	92,218.5	1.067	6.404
Total	**639.9**	**150**	**105,583.5**	**1.222**	**7.332**

Table 2 | *Calculation of Total Foul Water Flow from the Development*

The total dry weather flow from the development is 1.222l/s, with a peak flow of 7.332l/s. Both the permitted and proposed development are for 237 no. units on the site (including the 30 no. units currently under construction). The foul water discharge from the proposed development is therefore the same as that from the permitted development.

2.5 Foul Water Drainage – General

Foul water sewers will be constructed strictly in accordance with Uisce Éireann requirements. No private drainage will be located within public areas.

Drains will be laid to comply with the requirements of the latest Building Regulations, and in accordance with the recommendations contained in the Technical Guidance Document H.

3. Surface Water Network

3.1 Existing Surface Water Network

The subject site is a greenfield site. Topographic survey data indicates that the site falls generally from north-west to south-east, with a high point of approximately 32.8m OD Malin at the north-west corner of the site of the site and a low point of approximately 18.8m OD Malin at the south-east of the site. The lands continue to fall towards the south-east beyond the redline and within the 30-units development currently under construction, to a low point of approximately 10.0m OD Malin.

There is a stream flowing in a southerly direction along the eastern boundary of the site, draining the subject site and land to the north, crossing under the R168 Road. The stream crosses the Slane Road at Dry Bridge, discharging into the Boyne River approximately 650m south of the site.

3.2 Permitted Surface Water Network

The permitted surface water network drains the site via a series of sewers, as part of two separate catchments. Each of the catchments is attenuated separately in below ground tanks, both located in the open space at the east of the site. The permitted layout includes two outfalls to the existing stream at the south-east of the site via new headwalls, with the discharge rate restricted by flow control devices to the greenfield equivalent runoff rate. Each catchment includes a Class 1 Petrol Interceptor at the outfall to protect the quality of the receiving waters.

The surface water sewer network, including the attenuation, has been substantially completed as part of the permitted works for the first 30 units. The constructed attenuation was designed and sized to accommodate the subject Phase 2 site.

3.3 Proposed Surface Water Network and SuDS Strategy

It is proposed to drain surface water through the site via a series of sewers, ultimately discharging to the existing stream via a new sewer and headwall to be constructed at the south-east of the site. Note that this headwall is under construction as part of the permitted 30 unit development in Phase 1, and has been designed to serve the subject development.

The discharge rate will be restricted to the greenfield equivalent runoff rate, as calculated in Section 3.3 below, by a Hydrobrake or similar approved flow control device. Excess flows over and above the greenfield runoff will be attenuated in an underground storage tank located in the open space at the ease of the site. The attenuation has been designed to accommodate runoff volumes up to the 1-in-100-year storm, accounting for a 20% increase due to climate change.

While it is proposed to provide 2 no. attenuation tanks, as per the permitted development, it is now proposed to construct just one outfall to the existing stream. The northern attenuation tank will discharge back into the on-site drainage network at a restricted rate, with the discharge rate from the Hydrobrake at the southern attenuation tank adjusted to account for the revision. The permitted northern outfall is at a steep embankment, so by removing the northern outfall this alteration minimises the works required at the stream and simplifies the construction programme.

The proposed development is designed to incorporate best drainage practice. Section 3.3, below, sets out the methodology used in determining the existing greenfield runoff rates and calculating attenuation storage requirements for the site. The relevant calculations are included in full in Appendix C.

It is proposed to incorporate a Storm Water Management Plan through the use of various SuDS techniques to treat and minimise surface water runoff from the site. The methodology involved in developing a Storm Water Management Plan for the subject site is based on recommendations set out in the Greater Dublin

Strategic Drainage Study (GDSDS) and in the SuDS Manual (Ciria C753). Based on three key elements – Water Quantity, Water Quality and Amenity – the targets of the SuDS train concept have been implemented in the design, providing SuDS devices for Source Control, Site Control and Regional Control.

3.3.1 Source Control

Permeable Paving:

It is proposed to introduce permeable paving at private paved garden areas throughout the development. Downpipes from the houses will drain to filter drains beneath the permeable paving to facilitate maximum infiltration of surface water from roof areas. The goal of permeable paving is to control stormwater at the source to reduce runoff. In addition to reducing surface runoff, permeable paving has the dual benefit of improving water quality by trapping suspended solids and filtering pollutants in the substrata layers.

3.3.2 Site Control

Tree Pits:

It is proposed to introduce tree planting throughout the site, including roadside tree pits. Surface water runoff from the roads will drain to the tree pits before discharging to the below-ground surface water network.

Roads will have the most pollutants and it is appropriate to provide an at-source treatment SuDS technique to address this. The proposed tree pits will provide infiltration, optimise the retention time, and provide quality improvement to the storm water runoff, in particular the first flush from the roads. The tree pits will include an underlying 225mm diameter perforated pipe surrounded in stone, which discharges to the main surface water network.

Trees can help control storm water runoff because their leaves, stems, and roots slow rain from reaching the ground and capture and store rainfall to be released later. Trees help to attenuate flows, trap silts and pollutants, promote infiltration and prevent erosion. Incorporating tree planting offers multiple benefits, including attractive planting features, improved air quality and increased biodiversity whilst helping to ensure adaptation to climate change.

3.3.3 Regional Control

Underground Attenuation and Flow Control:

The attenuation storage required for the 1-in-100-year storm will be provided in below ground attenuation storage tanks located in the open space at the east of the site. Flows will be controlled by a Hydrobrake or similar approved flow control device, limited to the greenfield equivalent runoff rate (as calculated in Section 3.4 below), with excess flows being attenuated in the tank before outfalling by gravity to the tributary stream at the east of the site.

Petrol Interceptor:

A Petrol interceptor is to be installed before the surface water outfall to the existing stream. Petrol Interceptors will remove hydrocarbons from surface flows, protecting the natural watercourse. Petrol interceptors work on the premise that some hydrocarbons, such as petroleum and diesel, are less dense than water and float on the top of surface water flows. Typically, it is runoff from roads and other trafficked areas that are contaminated with hydrocarbons. The petrol interceptor will prevent a layer of hydrocarbons and other light pollutants in contaminated waters from entering the water course.

Note that all of the other SuDS features described above are upstream of the proposed petrol interceptor and will serve to slow and treat surface water runoff.

3.3.4 Treatment Train Summary

The SuDS treatment train at the site includes open green spaces and permeable paving to slow and intercept rainwater. Tree pits will further slow and reduce the runoff rate, while providing treatment of runoff, particularly from the roads. The use of these SuDS measures will encourage infiltration of surface water into the ground, with rainwater from roads will be directed towards tree pits. During large storm events, there is a high-level overflow from these tree pits into an adjacent gully, which discharges to the below-ground sewer network.

After these SuDS devices, rainwater will make its way into the below ground sewer network, which includes perforated filter drains where appropriate beneath permeable paving. The runoff is restricted to the greenfield equivalent rate, and excess storm water above this rate is directed to the proposed below ground attenuation. Finally, a petrol interceptor is proposed as a final measure, but as noted above, all of the other SuDS features described are upstream of the proposed petrol interceptor and will serve to slow and treat surface water runoff before it reaches the interceptor or the outfall to the existing stream.

3.4 Interception or Treatment Storage and Attenuation Storage

As noted above, the methodology involved in developing the Storm Water Management Plan for the subject site is based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual (Ciria C753). Appendix E of the Greater Dublin Strategic Drainage Study (GDSDS) sets out criteria for determining the provision of interception or treatment storage, attenuation storage and long-term storage at a development site. These calculations are included in full in Appendix C and are summarised below:

3.4.1 Criterion 1: River Water Quality Protection

The Greater Dublin Strategic Drainage Study (GDSDS) states that approximately 30% to 40% of rainfall events are sufficiently small that there is no measurable runoff from greenfield areas into the receiving waters. These events are generally considered as the first 5mm of rainfall. Assuming 80% runoff from paved surfaces and 0% from pervious surfaces for the first 5mm of rainfall yields the following:

Paved surfaces connected to drainage system	*47970m² x 0.6 x 1 =* 28,782.00m²	*47,970m² site area* *60% of the site is paved* *100% of the paved area*
Volume of Interception Storage	*28782m² x 5mm x 0.8 =* **115.13m³**	*Paved area directly drained* *5mm rainfall depth* *80% paved runoff factor*

Table 3 | *Interception Calculation*

Table 24.6 of the SuDS Manual (Ciria 753) states that permeable paving can intercept rainfall from an impermeable contributing area up to 2 times the permeable pavement area.

There is approximately 3,750m² of permeable paving proposed, with a contributing area of 6,500m² draining to permeable paving. The impermeable areas draining to permeable paving comprise much less than 2 times the area of permeable paving, thus meeting the requirements set out in Table 24.6.

The remainder of the site drains to softscape, including grassed/planted areas and tree pits, with more than 50% of the drained area softscape. As per Table 24.6, bioretention components can be assumed to comply with interception requirements where the impermeable surface area is less than 5 times the vegetated surface area receiving the runoff.

3.4.2 Criterion 2: River Regime Protection

Attenuation storage is provided to limit the discharge rate from the site into the public network. As per the GDSDS, the required attenuation volume is calculated assuming 100% runoff from paved areas, and has been calculated for the 1-year, 30-year and 100-year return periods, identifying the critical storm for each – refer to the calculations included in Appendix C.

Based on these calculations, the 1-in-100-year 6-hour storm is the critical storm for the development, with a required attenuation storage volume of 1,269m^3. This volume is sufficient for the 1-in-100-year storm, accounting for a 20% increase due to climate change.

The required attenuation storage is to be provided in the 2 No. below ground storage tanks located in the open space at the east of the site. These provide a combined storage volume of 1,860m^3, with the northern tank providing 1,000m^3 of storage and the southern tank providing 860m^3. This exceeds the 100-year volume. The drainage catchments are indicated in the Figure below:

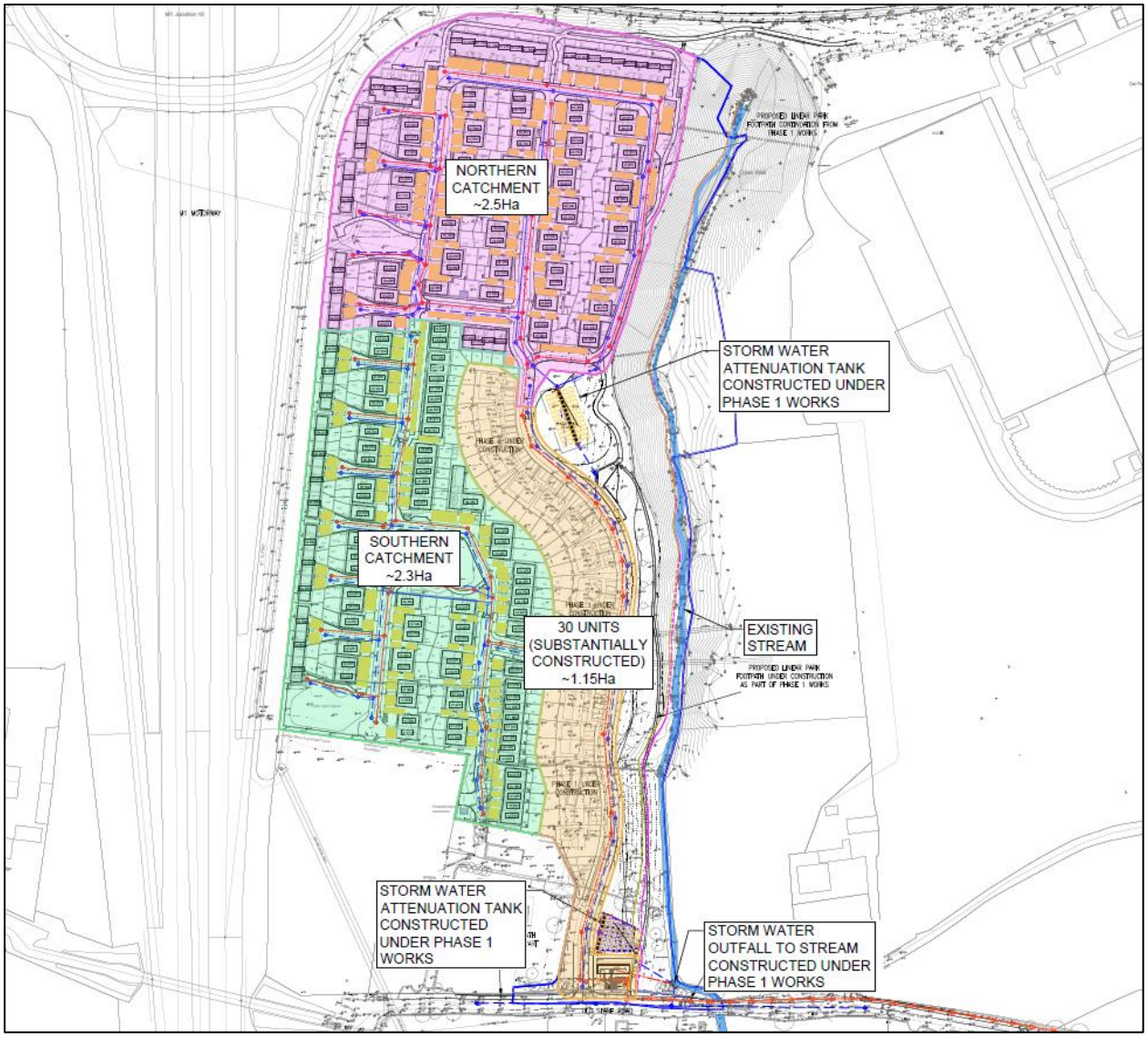


Figure 4 | *Surface Water Drainage Catchments*

As noted above, surface water runoff from the catchment will be restricted via a Hydro-brake or similar approved flow control device, limited to the calculated greenfield equivalent runoff rate, before discharging to the public network.

3.4.3 Criterion 3: Levels of Service

There are four criteria for levels of service. These are:

Criterion 3.1: No external flooding except where specifically planned (30-year high intensity rainfall event).

Criterion 3.2: No internal flooding (100-year high intensity rainfall event).

Criterion 3.3: No internal flooding (100-year river event and critical duration for site storage).

Criterion 3.4: No flood routing off site except where specifically planned (100-year high intensity rainfall event).

Both internal and external flooding have been assessed in the Flood Risk Assessment report which accompanies this Engineering Assessment Report. The Flood Risk Assessment has been carried out in accordance with the *DEHLG/OPW Guidelines on the Planning Process and Flood Risk Management* published in November 2009.

The assessment identifies the risk of both internal and external flooding at the site from various sources and sets out mitigation measures against the potential risks of flooding. The sources of possible flooding assessed in the report include coastal, fluvial, pluvial (direct heavy rain), groundwater and human/mechanical errors.

As a result of the flood risk management and mitigation measures proposed, the residual risk of internal or external flooding for the 30-year and 100-year flood events is low, and accordingly all four of the above criteria have been met. Please refer to the accompanying Flood Risk Assessment report for the full analysis of the flood risk at the subject site.

3.4.4 Criterion 4: River Flood Protection

The long-term storage volume is a comparison of pre- and post-development runoff volumes. The objective is to limit the runoff discharged after development to the same as that which occurred prior to development.

Of the three methods described in the GDSDS for establishing River Flood Protection by comparison of the pre- and post-development runoff volumes, (Criteria 4.1, 4.2 and 4.3 respectively), Criteria 4.3 is selected for use as the most practical criteria at this stage in the design.

The Criteria 4.3 approach is for all runoff to be limited to either Q_{BAR} or to 2 l/s/Ha, whichever is the greater. The proposed drainage system includes a flow control device to ensure that the discharge rate is limited to the greenfield equivalent and ample attenuation is provided for the 1-in-100-year storm, accounting for a 20% increase due to climate change.

The extra runoff volume of the development runoff over greenfield runoff, Vol_{xs}, as calculated in Appendix C is 379.6m^3. Note that as stated in the GDSDS, this volume is not additional to the attenuation storage volume but is effectively an element of it.

3.5 Surface Water – General

Surface water sewers will be laid strictly in accordance with Louth County Council requirements for taking in charge and will generally consist of PVC (to IS 123) or concrete socket and spigot pipes (to IS 6).

All private outfall manholes will be built in accordance with the Greater Dublin Regional Code of Practice for Drainage Works. No private drainage will be located within public areas.

Drains will be laid in accordance with the requirements of the Building Regulations, Technical Guidance Document H.

3.6 Flood Risk Assessment

A site-specific Flood Risk Assessment has been carried out for the proposed development and accompanies this submission under separate cover.

4. Water Supply Network

4.1 Existing Water Supply Network

Uisce Éireann records for the surrounding area have been consulted as part of this assessment, and are extracted below:

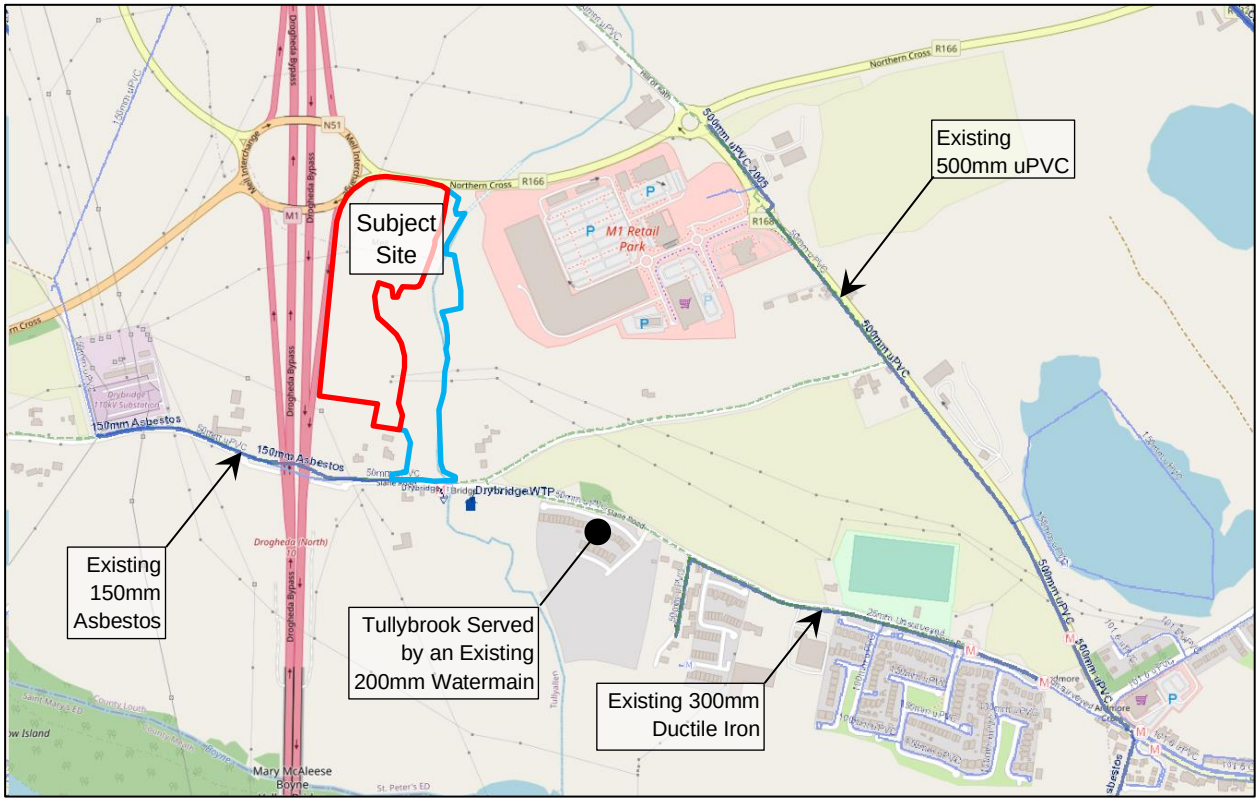


***Figure 5** | Extract of Uisce Éireann's Water Supply Service Records*

There is an existing 150mm diameter watermain in Slane Road to the south of the site. The existing Tullybrook development, to the south-east of the subject site, is served by a 200mm watermain (note that this watermain is not yet included in the extracted service record map above). This 200mm watermain connects to the existing 300mm ductile iron main to the east along Slane Road. There is an existing 500mm uPVC watermain in the R168 (Trinity Street).

Supply to the region has recently been upgraded, with new mains being laid as part of the Port Access Northern Cross Route (PANCR) Project. The PANCR Project has recently been completed and commissioned.

4.2 Permitted Water Supply Network

The permitted development includes a new watermain network around the site serving the permitted units, fed by a new connection to the existing 500mm uPVC watermain in the R168 (Trinity Street). This watermain network is under construction for the first 30 units.

4.3 Proposed Water Supply Network

It is proposed to supply water to the site via the watermain constructed as part of the 30 units under the permitted development. A new looped network will be constructed through the site, as shown on the accompanying Watermain Layout Drawing No. OSR-WMC-ZZ-GF-DR-C-2300.

Uisce Éireann will ultimately decide on the feasibility of the existing water supply infrastructure to cater for the proposed development. In this regard, a Pre-Connection Enquiry was submitted to Uisce Éireann, and a Confirmation of Feasibility Letter was received, dated 26 April 2024. The letter notes that connection to the existing Uisce Éireann network is feasible subject to upgrade works. Approximately 160m of new 300mm watermain is to be laid to replace the existing main in Slane Road between Loughboy (off Trinity Street) and the private driveway east of Boyne Lodge. The letter notes that this 160m length of the main is not surveyed, and that if it is confirmed to be 300mm then these upgrade works may not be required. Refer to the letter included in Appendix A.

Uisce Éireann have also provided a Statement of Design Acceptance for the proposed development, and that letter is included in Appendix B.

4.4 Water Supply Calculations

The calculated water demand at the subject development is set out in the below table. The average domestic demand has been established based on an average occupancy ratio of 2.7 persons per dwelling with a daily domestic per capita consumption of 150 litres per head per day and with a 10% allowance factor. Note that the Uisce Éireann Code of Practice assumes 2.7 residents per unit regardless of the unit type.

The average day/peak week demand has been taken as 1.25 times the average daily domestic demand, while the peak demand has been taken as 5 times the average day/peak week demand, as per Section 3.7.2 of the Uisce Éireann Code of Practice for Water Infrastructure.

Description	Total Population	Water Demand	Average Demand	Average Peak Demand	Peak Demand
	No. People	*l/day*	*l/s*	*l/s*	*l/s*
Permitted Development (30 of the Permitted SHD Units Under Construction)	81.0	13,365	0.155	0.193	0.967
Proposed Development (207 Units)	558.9	92,219	1.067	1.334	6.671
Total	**639.9**	**105,584**	**1.222**	**1.528**	**7.638**

Table 4 | *Calculation of Water Demand for the Development*

The average demand for the development is 1.222l/s, with a peak demand of 7.638l/s.

Both the permitted and proposed development are for 237 no. units on the site (including the 30 no. units currently under construction). The water demand for the proposed development is therefore the same as that for the permitted development.

4.5 Water Supply – General

All watermains will be laid strictly in accordance with Uisce Éireann requirements and standard details.

Valves, hydrants, scour and sluice valves and bulk water meters will be provided in accordance with the requirements of Uisce Éireann.

5. Roads and Transport Network

This section provides an overview of the existing and proposed road and transportation network in the vicinity of the site. A comprehensive Traffic and Transport Assessment and Travel Plan have also been prepared by Waterman Moylan and accompanies this submission under separate cover.

5.1 Existing Transport Network

5.1.1 Existing Pedestrian Network

There is limited existing pedestrian infrastructure along Slane Road adjacent to the site, with non-contiguous extents of footpath along the southern side. The Figure below indicates the typical walkable catchments from the subject site for 15-minute, 30-minute, and 1-hour walking times. Areas of Drogheda Town Centre are accessible within 15-minute and 30-minute walks, with most of the Town Centre falling within a 1-hour walking catchment.

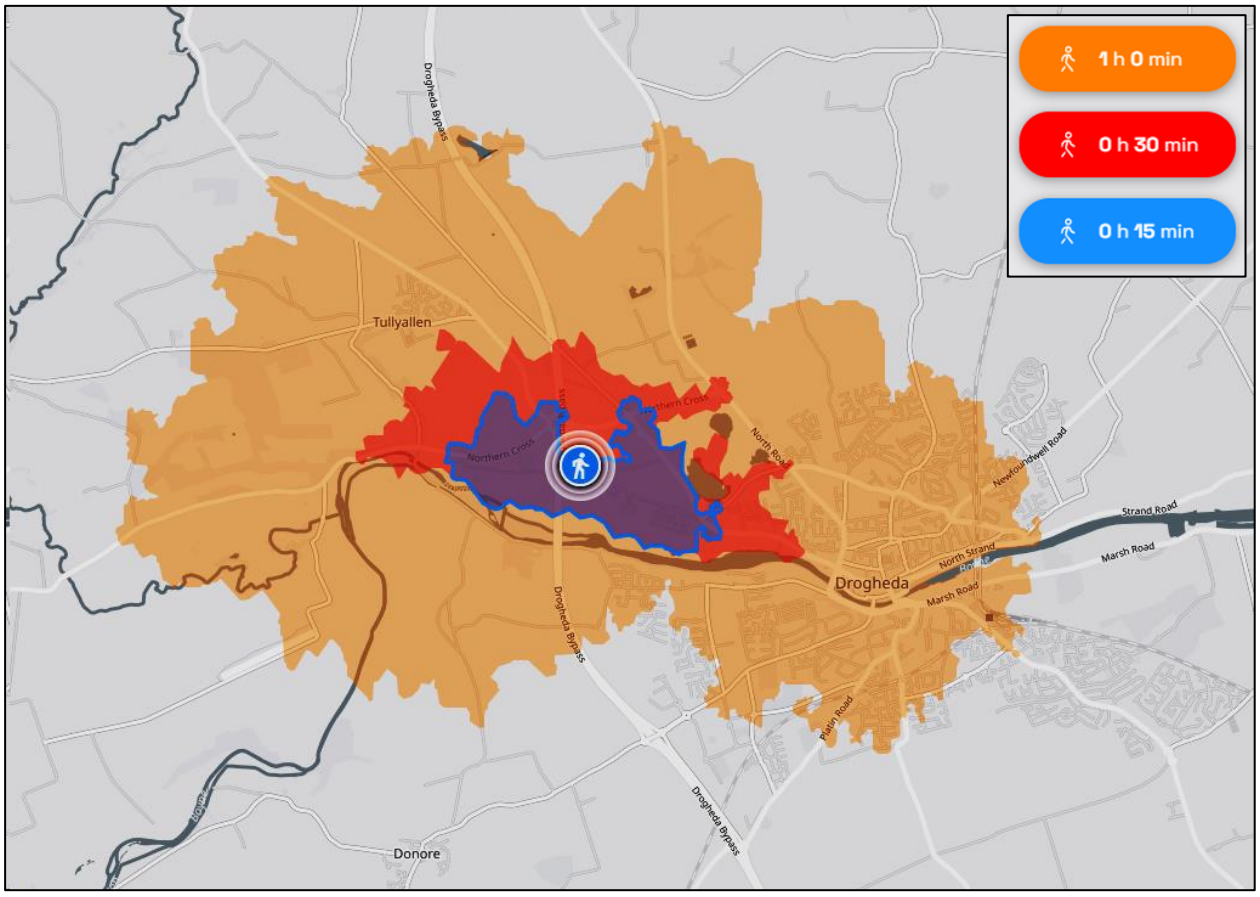


Figure 6 | *Walking Catchments from the Site*

5.1.2 Existing Cycle Network

There are no dedicated cycle facilities in the vicinity of the site, with cyclists sharing the carriageway with other road vehicles. The Figure below indicates the typical cycling catchments from the subject site for 15-minute, 30-minute, and 1-hour cycling times:

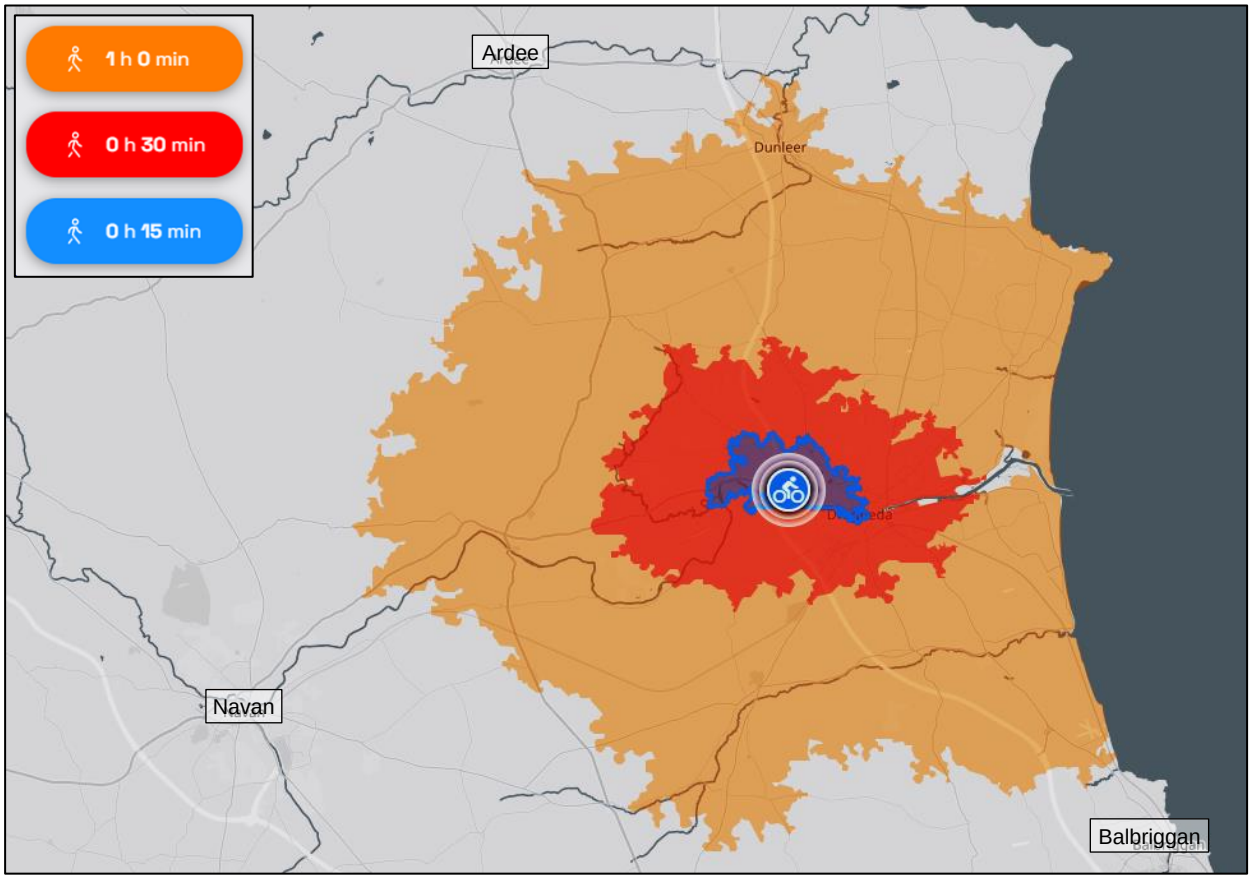


Figure 7 | *Cycling Catchments from the Site*

Much of Drogheda Town Centre is accessible from the site within a 15-minute cycle, with the entirety of the Town Centre falling within the 30-minute catchment.

5.1.3 Existing Bus Network

There are several bus services in Drogheda with bus stops in the vicinity of the site. The 173 Drogheda Town Service stops at the M1 Retail Park, approximately 900m (approximately a 5 to 10 minutes' walk) from the subject site, and operates hourly from 09:00-19:00 on weekdays and 09:00-18:00 on Saturdays. The 190 Drogheda–Navan–Trim Service also stops at the M1 Retail Park, operating Monday to Saturday, with hourly service from 06:20-20:30 from Drogheda to Trim and from 07:30-22:10 from Trim to Drogheda.

In addition to these services, there are regional bus routes operated by the NTA which serve Drogheda, as tabulated below:

Route No.	Route Name	Fequency
100	Dundalk – Drogheda	Every Hour (06:00 – 17:00)
100X	Dundalk – Dublin	Every Hour (06:40 – 23:40)
101	Dublin – Drogheda	Every 30 Minutes (05:30 – 23:30)
101X	Drogheda – Balbriggan – Dublin City	4 Services (16:00, 16:40, 17:10, 17:30)
D1	Drogheda – Laytown	Every 30 Minutes (05:35 – 23:35)

Table 5 | *Regional Bus Routes*

5.1.4 Existing Rail Network

The nearest rail station to the subject site is the Drogheda MacBride Train Station, approximately 4.1km to the east of the proposed development, served by Commuter Rail services with connections to the Dart. The trains from this station facilitate services that allow for good connection to other onward destinations both north and south. Services generally operate with 30-minute frequencies during the peak hour morning and evening commuter periods.

5.1.5 Existing Road Layout

The subject site is located adjacent to a comprehensive road network consisting of national roads, regional roads, and local roads.

The M1 Motorway runs adjacent the western boundary of the proposed development site. The M1 runs from Dublin to Belfast serving towns including Dundalk, Balbriggan, and Skerries.

The 51 National Road runs east-west to the north of the site. It runs from Delvin, County Westmeath, through Athboy, Navan and Slane, before crossing the M1 Motorway to the north-west of the site and terminating near Drogheda at a roundabout on the R132.

The R132 Regional Road runs north from Drogheda, continuing through Dunleer and Castlebellingham to Dundalk, where it joins the N52. The R132 is the former N1 route (now by-passed by the M1 motorway).

The R168 runs to the east of the site between the N51 and Drogheda Town Centre, and forms the northern boundary of the site. From Drogheda Town Centre, the R152 Regional Road runs south, by Duleek, before joining the national road N2 towards to Ashbourne. The R108 Regional Road also runs south from Drogheda Town Centre, leading directly through Ballymun before intersecting with the M50 in Dublin.

The proposed development will be accessed from the Slane Road, which runs directly into Drogheda Town Centre. The Slane Road is a single carriageway local road with no cycle or bus facilities provided along any of the route. As the Slane Road continues east, it intersects Trinity Street (R168), which leads directly into the Drogheda Town Centre.

5.2 Permitted Transport Network

The permitted development is served by a single main access junction located along the site frontage onto Slane Road. This is a priority junction and is designed in accordance with DMURS. The internal road layout for the permitted development includes local roads and shared surface homezones.

As part of the permitted 30 unit development, which is currently under construction, it is proposed to provide new footpath along Slane Road. The proposed new footpath extends west along Slane Road from the site entrance as far as the M1 underpass (approximately 110m). The new footpath extends to the east from the site entrance approximately 220m to connect to the existing footpath in front of the Tullybrook development, with additional footpath to be provided at the entrance to The Pass along Slane Road.

This section was walked by representatives from the design team, along with Aaron Lynch and Patrick Rodgers from Louth County Council on 25 September 2023. During that site visit, the extent of footpaths that could be provided was agreed in principle. The works have subsequently been agreed in writing with Louth County Council Senior Executive Engineer Noel Treanor and are currently under construction.

5.3 Proposed Transport Network

5.3.1 Proposed Pedestrian Facilities

The proposed development will include a network of footpaths throughout the site, connecting with Slane Road to the south and the R168 to the north. The proposed development provides efficient, high quality pedestrian routes along anticipated desire lines. These pedestrian linkages through and around the proposed development have been considered in the context of desire lines, particularly in the context of facilitating connections to Drogheda town centre via Trinity Street and the adjacent M1 Retail Park.

A 3m shared path is permitted from the north of the development along the southside of the R168 to access the M1 Retail Park facilities and bus stop. A shared path is appropriate given that this link serves just the proposed development.

The permitted development which is currently under construction includes additional sections of footpath to provide continuous footpath provision from the development to Trinity Street to the east and to the M1 underpass to the west – refer to Section 5.2, below, for further information on the upgrade works to be carried out as part of the permitted development.

An active frontage along routes within the development is achieved with frequent entrances and openings that ensure the street is overlooked and that generate pedestrian activity as people come and go from buildings. All footpaths will be a minimum 1.8m in accordance with the requirements of DMURS.

The proposed development includes shared surface homezones, which provide a safe space for residents, pedestrians and cyclists with the dominance of cars reduced.

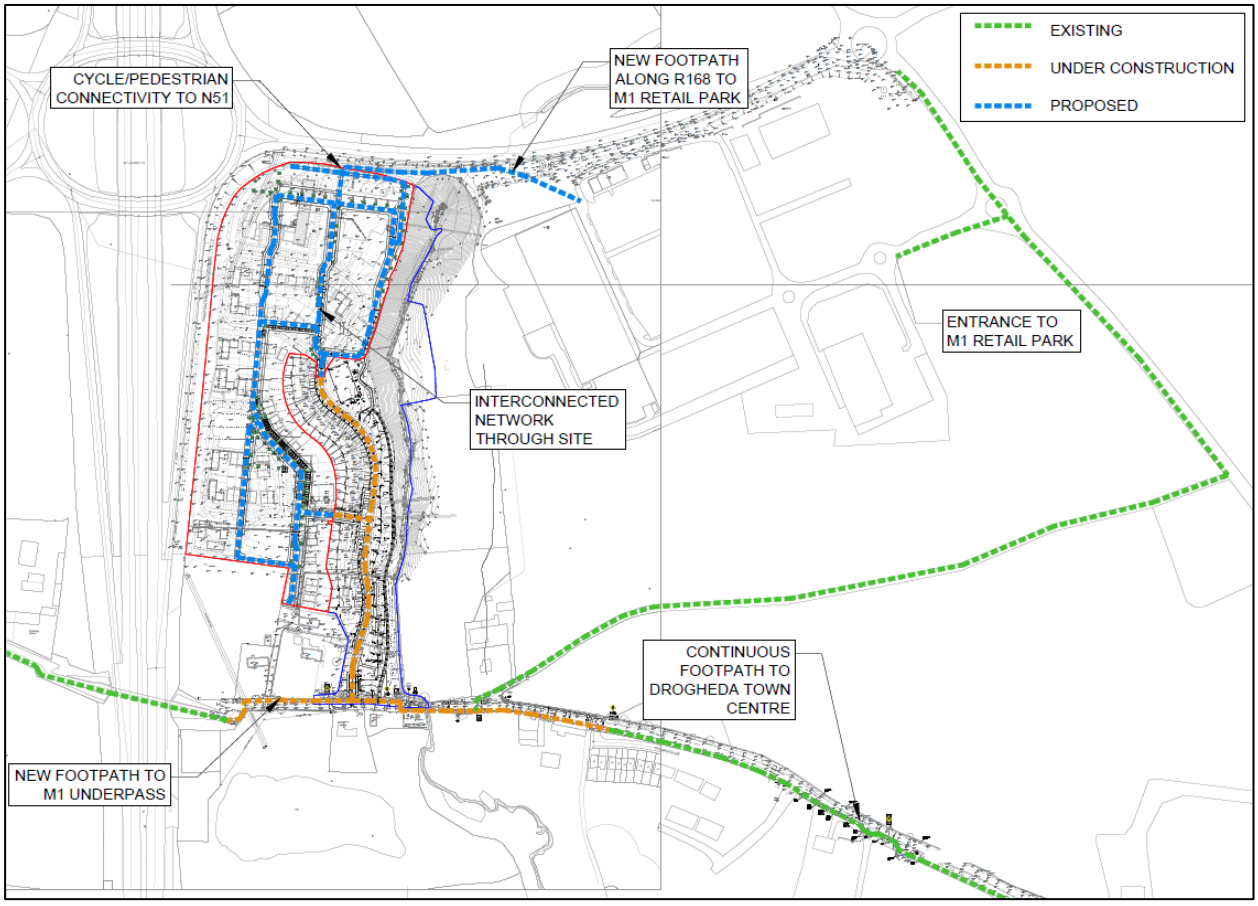


Figure 8 | *Pedestrian and Cycle Connectivity*

To support the retrospective provision of walking and cycling infrastructure, a sterile section of land has been provided at the north of the site, adjacent to the existing R168. This sterile section of land, in which no development is proposed, has a width of at least 4.3m, sufficient for future provision of a 1.8m footpath, 2m cycle lane and a buffer of 0.5m. All boundary fences / walls associated with the subject application are set clear of this sterile land for the future provision of cycle / walking infrastructure. This was requested by Louth County Council at the Stage 2 meeting and in the corresponding planner's report.

5.3.2 Proposed Cycle Facilities

The proposed layout achieves a high level of pedestrian and cyclist permeability, with sustainable transport modes central to the design principles.

Cycle facilities will be on street facilities, in line with the principles set out in the National Cycle Manual and reinforced within DMURS. The design of the streets as self-regulating with a low 30km/hr design speed with low volumes of vehicular traffic is central to the safe provision of the shared street cycle regime.

As noted in Section 5.2.1 above, a 3m shared path is permitted from the north of the development along the southside of the R168 to access the M1 Retail Park facilities and bus stop. Given that this route serves only the subject development, a 3m shared path is considered appropriate.

As noted in Section 5.3.1, above, a sterile section of land has been provided at the north of the site, adjacent to the existing R168, to support the retrospective provision of walking and cycling infrastructure. The sterile section of land is wide enough to provide a future 1.8m footpath, in accordance with DMURS, and a 2m cycle path with 0.5m buffer, in accordance with the requirements set out in Section 2.6 and Table 2.2 of "The Cycle Design Manual".

The constrained nature of the existing Slane Road corridor precludes the provision of segregated cycle facilities or a shared path. However, the provision of footpaths on the Slane Road adjacent the development, as set out in Section 5.1.2 above, will change the road character from rural to urban and will encourage lower vehicle speeds, creating a safer environment for cyclists.

The proposed development includes bicycle parking at a ratio of 1 space per bedroom for duplex units, with 1 visitor space per 2 duplex units and 1 visitor space per 5 houses. Bicycle parking for residents of the houses will be in curtilage.

Description	**No. of Units**	**Proposed Bicycle Parking**	
		Per Unit	*Total*
1-Bed Duplexes	21	1 per bedroom plus 1 visitor space per 2 units	32
2-Bed Duplexes	21	1 per bedroom plus 1 visitor space per 2 units	53
Houses	165	1 visitor space per 5 units	33
Total	**207**	**-**	**117**

Table 6 | *Proposed Bicycle Parking*

5.3.3 Proposed Road Layout

The proposed road layout will tie into the main access road from Slane Road (under construction) and new internal local access roads, including shared surface/homezones. Road widths throughout the development are generally 5.5m, with road widths of 4.8m at shared surfaces in accordance with Section 4.4.1 of DMURS.

The development will be served by a single access junction located along the site frontage onto Slane Road. This junction is a priority junction and is designed in accordance with DMURS, with 6m corner radii.

DMURS only specifies sightlines for design speeds up to 60km/hr. Sufficient sight lines are achieved in accordance with TII Rural Road Link Design Standard (ref: DN-GEO-03031) with visibility splays of 160m commensurate with a design speed of 80km/hr at a setback of 2.4m.

Throughout the development, tight corner radii are proposed in accordance with DMURS, in order to reduce traffic speeds which, in turn, creates a safer urban environment for pedestrians and cyclists, with minimum corner radii of 3m. While the main road layout is designed for 30km/hr, the speed reducing bends, raised tables, shared surfaces, frequent junctions, and tight corner radii at junctions promote low speeds. Horizontal curvature is designed in accordance with Section 4.4.6 and Table 4.3 of DMURS, with a minimum centre line curvature of 11m radius, suitable for a 20km/hr design speed. Public roads throughout the development have been designed with a maximum gradient of 1:20.

Swept path analysis has been carried out for a large refuse vehicle and for fire tender, using AutoTrack software, and the relevant swept path analysis is included in the accompanying drawing package. Note that turning heads have been added since the Stage 2 submission based on the findings of the swept path analysis.

5.3.4 Proposed Car Parking Facilities

It is proposed to provide car parking as set out in the Table below:

Description	**No. of Units**	**Proposed Car Parking**	
		Per Unit	*Total*
1-Bed Duplexes	21	1 per unit plus 1 visitor space per 3 units	28
2-Bed Duplexes	21	1 per unit plus 1 visitor space per 3 units	28
2-Bed Houses	28	1 per unit	28
3-Bed Houses	115	2 per unit	230
4-Bed Houses	22	2 per unit	44
Créche & Visitor	-	1 Additional Visitor Space, 9 Créche Spaces	10
Total	**207**	**-**	**368**

Table 7 | *Proposed Car Parking*

The car parking is generally in curtilage, with some assigned on-street parking spaces proposed, as shown on the accompanying Road Layout drawing no. OSR-WMC-ZZ-GF-DR-C-2100. The car parking quantum is also discussed in the accompanying Traffic and Transport Assessment and Travel Plan.

5.3.5 Refuse, Delivery and Emergency Vehicle Access

Refuse collection and deliveries will be facilitated via the vehicular access from Slane Road. The streets throughout the development have been designed to accommodate a refuse truck, with swept path analysis confirming that a refuse vehicle can safely navigate the streets.

Refuse and delivery vehicles are facilitated via the looped local streets and looped home zone streets to remove the need for the vehicle to reverse on these streets, thus mitigating potential conflicts with pedestrians and cyclists. On the cul-de-sac streets, turning heads are provided to enable the refuse and delivery vehicles to manoeuvre safely.

Deliveries will be appropriately accommodated by parking on street on the local and homezone streets, which will carry low traffic volumes, and wherein there is adequate space for other traffic to pass a refuse or delivery vehicle.

Emergency vehicle access to the site is also via the main entrance from Slane Road. Swept path analysis has been carried out for a fire tender using AutoTrack software, confirming that a fire tender can safely navigate the site if required. The design incorporates appropriate access on all streets for fire tender and ambulance access.

5.4 Design Manual for Urban Roads and Streets

5.4.1 Background

The stated objective of DMURS is to achieve better street design in urban areas. This will encourage more people to choose to walk, cycle or use public transport by making the experience safer and more pleasant. It will lower traffic speeds, reduce unnecessary car use and create a built environment that promotes healthy lifestyles and responds more sympathetically to the distinctive nature of individual communities and places. The implementation of DMURS is intended to enhance how we go about our business, enhance how we interact with each other, and have a positive impact on our enjoyment of the places to and through which we travel.

Outlined below are some of the specific design features that have been incorporated within the proposed scheme to ensure that the design is in compliance with DMURS.

5.4.2 Creating a Sense of Place

DMURS states that four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods. These characteristics are connectivity, enclosure, active edge and pedestrian activities/facilities.

Connectivity

"The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected."

In order of importance, DMURS prioritises pedestrians, cyclists, public transport and private cars.

The proposed development has been developed specifically to avoid a car dominated environment and to optimise pedestrian and cyclist links. The proposed development has been designed with pedestrians and cyclists taking precedence over other modes of transport. In this regard, footpaths are provided throughout the development with regular pedestrian crossings along anticipated desire lines. Pedestrian and cycle only routes are provided to the R168 to the north, where there is no vehicular access.

It is proposed to incorporate shared surfaces within the development. Shared surface streets and junctions are highly desirable where movement priorities are low and there is a high place value in promoting more liveable streets, such as on local streets within neighbourhoods and suburbs. Section 4.3.4 of DMURS states that shared surface streets and junctions are particularly effective at calming traffic, and notes that shared carriageways perform well in terms of safety.

Enclosure

"A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings towards the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure."

The proposed development has been designed with residential units overlooking streets and pedestrian routes. High quality landscaping and tree planting are proposed throughout the scheme which creates a definitive sense of place. Road widths of generally 5.5m throughout the development ensure that a strong

sense of enclosure is achieved, with road widths of 4.8m at shared surfaces in accordance with Section 4.4.1 of DMURS.

Active Edge

"An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings."

An active frontage along routes within the development is achieved with frequent entrances and openings that ensure the street is overlooked and that generate pedestrian activity as people come and go from buildings.

The number of walkable/cyclable routes between destinations has been maximised. Pedestrian and cyclist connectivity are provided to the wider public realm, with connectivity to the north only limited for road vehicles. The proposed roads are safe, with clear, open sightlines and passive surveillance, all of which will encourage active modes of transport and help to enliven the streets.

Pedestrian Activities/Facilities

"The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian's feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also makes walking a more convenient and pleasurable experience that will further encourage pedestrian activity."

As outlined in the items above, the proposed development has been designed to provide excellent pedestrian connectivity, with a network of inter-connecting footpaths providing permeability throughout the site and to the surrounding area.

Throughout the site, pedestrian routes are generally 2m wide, which provides adequate space for two wheelchairs to pass one another. DMURS identifies a 1.8m wide footpath as being suitable for areas of low pedestrian activity.

5.4.3 Key Design Principles

DMURS sets out four core design principles which designers must have regard to when designing roads and streets. These four core principles are set out below together with a commentary establishing how these design principles have been incorporated into the design of the proposed development.

Design Principle 1: Pedestrian Activity/Facilities

"To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users and in particular more sustainable forms of transport."

Streets have been designed in accordance with the alignment and curvature recommendations set out in DMURS Section 4.4.6. The road layout is generally curvilinear. Section 3.3.1 of DMURS notes that street networks that are generally curvilinear in nature can be highly effective. Within the Irish context, these types of grids are often found within Suburbs, and have been successfully implemented in higher density developments to draw people toward spaces, highlighting Focal Points and creating attractive streetscapes.

Regular junctions along with raised tables at shared surface homezones will encourage reduced driving speeds. The proposed shared surface homezones include an embedded kerb line along the carriageway to indicate an area of pedestrian refuge, in accordance with Section 4.4.8 of DMURS. This is particularly important for visually-impaired users who may feel less comfortable on shared surfaces, and also require a kerb line for navigation.

Design Principle 2: Multi-Functional Streets

"The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment."

The road layout will comprise of a new access road from Slane Road and new internal local access roads, including shared surface/homezones. This mix of street types is in accordance with the objectives of DMURS.

Design Principle 3: Pedestrian Focus

"The quality of the street is measured by the quality of the pedestrian environment."

The design of the scheme has placed a particular focus on the pedestrian. Connectivity throughout the scheme is weighted towards the pedestrian. There are excellent pedestrian links to the surrounding road network.

Shared surfaces with raised tables allow pedestrians to continue at grade. Raised tables and shared surfaces also promote lower vehicle speeds.

Roads through the site incorporate horizontal deflections to encourage low vehicular speeds. Horizontal curvature is proposed in accordance with Section 4.4.6 of DMURS, with a minimum radius of 11m at local roads (suitable for a design speed of 20km/hr).

Design Principle 4: Multi-Disciplinary Approach

"Greater communication and co-operation between design professionals through promotion plan led multidisciplinary approach to design."

The design of the proposed scheme has been developed through the design team working closely together. The proposed development design is led by JFOC Architects working together with multiple disciplines including Waterman Moylan Consulting Engineers and NMP Landscape Architects.

Public areas fronting and within the proposed development will be designed by a multidisciplinary design team to accommodate pedestrians and cyclists in accordance with the appropriate principles and guidelines set out in DMURS. In particular the vehicular access and public footways within the remit of the development will incorporate the relevant DMURS requirements and guidelines as set out above.

5.4.4 External Quality Audit

Section 5.4.2 of DMURS states that a Quality Audit should be undertaken to demonstrate that appropriate consideration has been given to all of the relevant aspects of the design.

A Quality Audit has been carried out by Traffico, and the audit includes a Stage 1 Road Safety Audit, and additionally assesses the access, walking, cycling and parking proposals. The full report is included in Appendix D. Note that the Quality Audit is intended to be a preliminary design tool to assess the early-stage proposals. The auditor's recommendations have been reviewed and, where appropriate, have subsequently been taken on board by the design team, with the development proposals revised to address any of the issues identified.

A summary of the issues identified by the Quality Audit is set out in the table below, alongside the remedial measures taken to address each of the issues identified.

Section	Issue Identified	Measure Proposed
3.1	Footpath Terminations at Direct Access onto Old Slane Road could result in vehicle strikes in low light conditions and progression issues for pedestrians attempting to gain access to them from the public road.	Note that this is outside the redline and scope of the subject application. However, as part of the permitted works, which are under construction, a scope of off-site upgrade works have been agreed with LCC. This scope of works includes provision of a new footpath extending approximately 220m east of the site, with a new pedestrian crossing connecting to the existing footpath on the south of the road. It also includes provision of a new footpath extending approximately 100m to the west of the site, with a new pedestrian crossing to be provided.
3.2	Failing to provide facilities for pedestrians to cross the internal streets could lead to slips, trips and progression issues for mobility impaired road users.	Appropriate pedestrian crossings have been added throughout the development at key crossing desire lines.
3.3	It may not be readily apparent to drivers entering Homezone streets that they will be required to give way to pedestrians (including children at play), who will be sharing the road space with them. This is likely to increase the risk of conflict between vehicles and vulnerable road users in Homezone streets.	Appropriate measures have been implemented to make it abundantly clear to drivers that they are entering a Homezone environment. These measures include a ramp-up entry treatment and change of road surfacing to a buff colour.

Table 8 | *Quality Audit Issues Identified and Remedial Actions*

5.4.5 Statement of Design Consistency

As set out above, the development has been specifically designed to meet the objectives of DMURS. A Quality Audit has been undertaken to identify any specific issues with the design, and the issues identified have been remedied accordingly.

The multidisciplinary design team considers that the proposed road and street design is consistent with the principles and guidance outlined in the Design Manual for Urban Roads and Streets (DMURS), as set out in the sections above.

Appendices

A. Uisce Éireann Confirmation of Feasibility 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

Stephen Dent-Neville

Eastpoint Business Park
Block S
Alfie Byrne Road
Dublin
D03H3F4

26 April 2024

Our Ref: CDS24002664 Pre-Connection Enquiry
Site at, Slane Road, Drogheda, Louth

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 Housing Development of 280 unit(s) at Site at, Slane Road, Drogheda, Louth, (the **Development)**.

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

- **Water Connection**
  - Feasible Subject to upgrades
  - In order to accommodate the proposed connection at the Premises, upgrade works are required to increase the capacity of the Uisce Eireann network. Approximately 160m of new 300mm ID watermain is to be laid to replace the existing unsurveyed main (Figure 2 in mapping below). If this main is confirmed as already 300mm then these upgrades works may not be required. These works are not currently on the Uisce Eireann investment plan therefore, the applicant will be required to fund these local network upgrades. The fee will be calculated at connection application stage.
- **Wastewater Connection**
  - Feasible without infrastructure upgrade by Irish Water

- Pump station is to be upsized for 280 units.

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

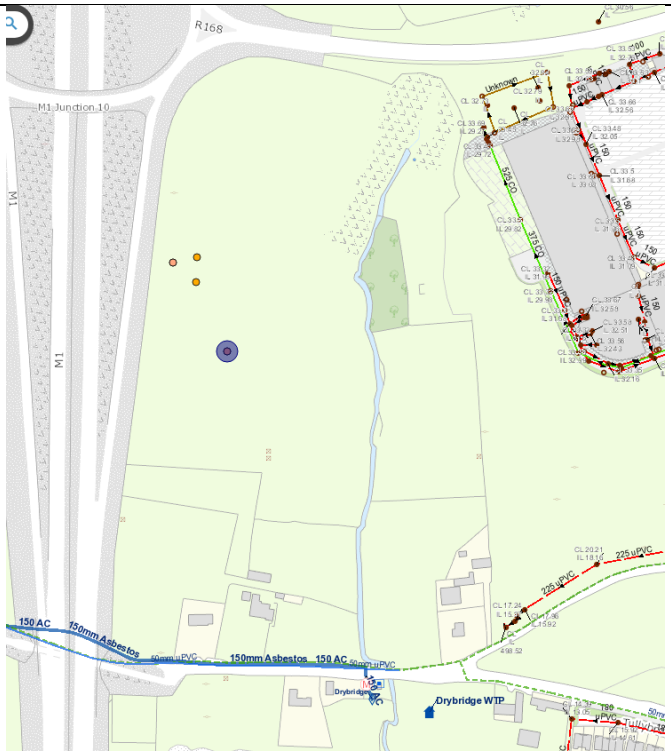


Figure 1 - Existing GIS Layout

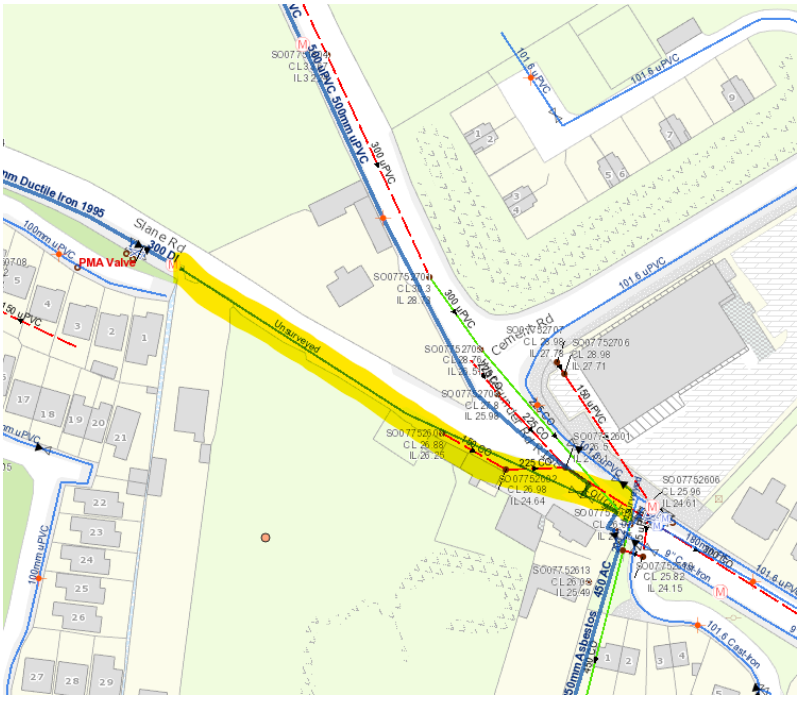


Figure 2 - Upgrades

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.

B. Uisce Éireann Statement of Design Acceptance

Stephen Dent-Neville
Waterman Moylan Consulting Engineers
Eastpoint Business Park
Block S
Alfie Byrne Road
Dublin
D03H3F4

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

9 May 2024

Re: Design Submission for Site at, Slane Road, Drogheda, Louth (the "Development") (the "Design Submission") / Connection Reference No: CDS24002664

Dear Stephen Dent-Neville,

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: Antonio Garzón Mielgo
Email: antonio.garzonmielgo@water.ie

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

Appendix A

Document Title & Revision

- OSR-WMC-ZZ-GF-DR-C-3200 Drainage General Arrangement
- OSR-WMC-ZZ-GF-DR-C-3201 Drainage Layout Sheet 1 of 2
- OSR-WMC-ZZ-GF-DR-C-3202 Drainage Layout Sheet 2 of 2
- OSR-WMC-ZZ-GF-DR-C-3300 Watermain Layout General Arrangement
- OSR-WMC-ZZ-GF-DR-C-3301 Watermain Layout Sheet 1 of 2
- OSR-WMC-ZZ-GF-DR-C-3302 Watermain Layout Sheet 2 of 2
- OSR-WMC-ZZ-GF-DR-C-3225 Waste Water Long sections Sheet 1 of 2
- OSR-WMC-ZZ-GF-DR-C-3226 Waste Water Long sections Sheet 2 of 2

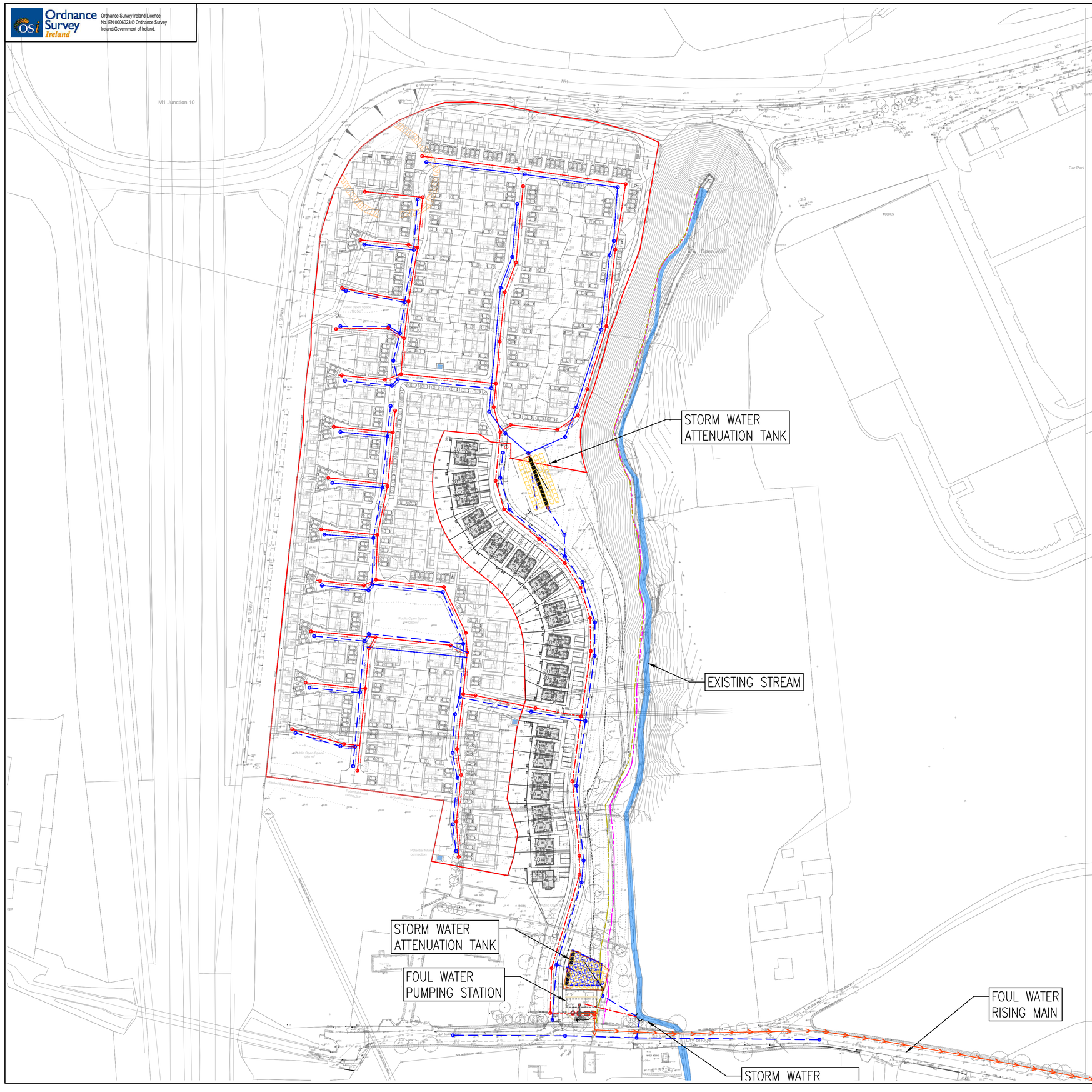
Additional Comments

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.



GRAVITY SEWER PIPE MATERIAL TYPES

WASTEWATER PIPE MATERIALS SHALL BE IN ACCORDANCE WITH SECTION 3.13 OF THE IRISH WATER CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE.

THE TYPES AND FITTINGS OUTLINED HEREIN SHALL BE USED IN THE CONSTRUCTION OF THE GRAVITY SEWERS. PIPE MATERIAL SHOULD NOT CHANGE BETWEEN MANHOLES. THE LIST BELOW DOES NOT APPLY TO PIPES INSTALLED BY PIPE JACKING OR MICRO TUNNELLING.

CONCRETE: CONCRETE SEWER PIPES WITH SPIGOT AND SOCKET JOINTS AND RUBBER RING FITTINGS SHALL COMPLY WITH IS EN 1916 (2002), BS 5911, PART 1 (2002 –2010) AND IS 6 (2004) OR EQUIVALENT STANDARD, STRENGTH CLASS 120 WITH MINIMUM CRUSHING LOADS IN ACCORDANCE WITH TABLE 8 OF BS 5911–1 (20022010).

ALL PIPES AND FITTINGS SHALL HAVE GASKET TYPE JOINTS OF SPIGOT AND SOCKET OR REBATED FORM (PIPE DIAMETERS 225MM AND ABOVE).

THERMOPLASTIC STRUCTURED WALL PIPES: THERMOPLASTIC STRUCTURED WALL PIPES SHALL COMPLY WITH THE PROVISIONS OF IS EN 13476 (2007/2009). PIPES TO BE OF STIFFNESS CLASS 8KN/M2 AND TO BE CAPABLE OF DEMONSTRATING A JETTING RESISTANCE OF 2,600 PSI (180 BAR) WITHOUT DAMAGE WHEN TESTED IN ACCORDANCE WITH SECTION 3.3 OF WIS 4–35–01 (2008). (SEWER DIAMETERS 150MM UP TO 450MM, SERVICE CONNECTIONS OF 100MM DIAMETER).

UNPLASTICISED PVC: UNPLASTICISED PVC PIPES AND FITTINGS SHALL COMPLY WITH THE PROVISIONS IS EN 1401 2009/2012. PIPES TO BE APPLICATION AREA CODE 'UD', STIFFNESS CLASS 8KN/M2. PROVISION FOR JETTING SHALL BE BASED ON THE WRC SEWER JETTING CODE OF PRACTICE, JUNE 1997. PIPES TO BE CAPABLE OF RESISTING A MAXIMUM JETTING PUMP PRESSURE OF 2,600PSI (180 BAR) WITHOUT DAMAGE. (SEWER DIAMETERS 150MM UP TO 450MM, SERVICE CONNECTIONS OF 100MM DIAMETER);
NOTES: THE USE OF ALTERNATIVE PIPE TYPES AND MATERIALS WILL REQUIRE THE PRIOR WRITTEN AGREEMENT OF IRISH WATER.

WHERE 1.2m COVER TO FOUL WATER PIPE SOFFIT IS NOT ACHIEVABLE IN ROADWAYS, CONCRETE SURROUND SHALL BE PROVIDED IN ACCORDANCE WITH STD–WW–08 OF WASTEWATER INFRASTRUCTURE STANDARD DETAILS.

SERVICE LAYOUT DISTANCES:

HORIZONTAL AND VERTICAL SERVICE LAYOUT DISTANCES SHALL BE AS PER IRISH WATER STANDARD DETAIL STD–WW–05.

THE EXTERNAL FACE OF MANHOLES SHALL BE AT LEAST 0.5m FROM KERB LINE.

RESTRICTIONS ON PLANTING:

PLANTING ADJACENT TO WASTEWATER INFRASTRUCTURE SHALL BE IN COMPLIANCE
WITH IRISH WATER STANDARD DETAILS STD–WW–06 AND STD–WW–06A.

NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL WORKS ARE CONSTRUCTED IN ACCORDANCE WITH THE IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS. THE CODE OF PRACTICE AND STANDARD DETAILS ARE AVAILABLE TO DOWNLOAD FROM THE IRISH WATER WEBSITE AT WWW.WATER.IE/CONNECTIONS/DEVELOPER-SERVICES/ WHERE THE DETAILS CONTAINED ON THIS DRAWING DIFFER FROM THE IRISH WATER CODE OF PRACTICE OR STANDARD DETAILS THIS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY. IRISH WATER STANDARDS WILL TAKE PRECEDENCE.
4. ALL PROPOSED PUBLIC STORM WATER DRAINAGE WORKS TO BE IN ACCORDANCE WITH LOUTH COUNTY COUNCIL'S REQUIREMENTS FOR TAKING IN CHARGE.
5. ALL PROPOSED PUBLIC FOUL WATER DRAINAGE WORKS TO BE IN ACCORDANCE WITH IRISH WATER REQUIREMENTS.
6. ALL PRIVATE DRAINAGE WORKS SHALL BE IN ACCORDANCE WITH THE BUILDING REGULATIONS PART H.
7. ALL COVER LEVELS ARE INDICATIVE ONLY AND SHOULD BE SET TO SUIT THE FINISHED ROAD OR PAVED LEVEL. LEVELS IN REAR GARDENS HAVE BEEN ASSUMED AS STRAIGHT GRADE TO ADJACENT BOUNDARY FROM FFL – 150mm. EXTERNAL LEVELS TO BE CONFIRMED BY ARCHITECT

LEGEND:

- PROPOSED SURFACE WATER PIPE
- PROPOSED FOUL SEWER
- PROPOSED FOUL RISING MAIN
- PROPOSED ATTENUATION STORAGE
- EXISTING STREAM

Rev	Date	Description	By	Chk

Amendments

Project

PROPOSED RESIDENTAIL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA CO.LOUTH

Title

PHASE 2
DRAINAGE GENERAL ARRANGEMENT

Client

LAGAN HOMES TULLYALLEN LTD.

BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD,
DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status: PLANNING

Designed By	Approved	Waterman Ref
NS	MD	23-067
Drawn By	Date	Scales @ A1
NS	APRIL 2024	1:1000

Project - Originator - Volume - Level - Type - Role - Number: OSR-WMC-ZZ-GF-DR-C- 3200

Revision: -

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Date: Apr 18, 2024 - 5:59pm

NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND

- PROPOSED FOUL WATER MANHOLE AND SEWER WITH 0.5m OFFSET INDICATED DASHED
- PROPOSED STORM WATER MANHOLE AND SEWER WITH 0.5m OFFSET INDICATED DASHED
- INDIVIDUAL PRIVATE FOUL WATER DRAIN WITH INSPECTION CHAMBER 1.2m DEEP
- PROPOSED GULLY AND 150ø GULLY PIPE, DOUBLE GULLY AT LOW POINTS
- PROPOSED RISING MAIN
- PROPOSED FUTURE FOUL MANHOLE SUBJECT TO SEPERATE APPLICATION
- PROPOSED FUTURE STORM MANHOLE SUBJECT TO SEPERATE APPLICATION
- PROPOSED PRIVATE STORM MANHOLE OUTFALL AND CONNECTION TO PUBLIC SEWER
- PROPOSED PRIVATE PERFORATED STORM COLLECTOR DRAINS 150ø @ 1/100
- PROPOSED PERMEABLE PAVING

Rev	Date	Description	By	Chk
A	08/05/23	REVISED TO SUIT COMMENTS FROM IRISH WATER	NS	SDN

Amendments

Project

PROPOSED RESIDENTIAL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA, CO. LOUTH

Title

PHASE 2
DRAINAGE LAYOUT AND LEVELS
SHEET 1 OF 2

Client

LAGAN HOMES TULLYALLEN LTD.

BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD,
DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status

PLANNING

Designed By	NS	Approved	MD	Waterman Ref	23-067
Drawn By	NS	Date	APRIL 2024	Scales @ A1	1:500

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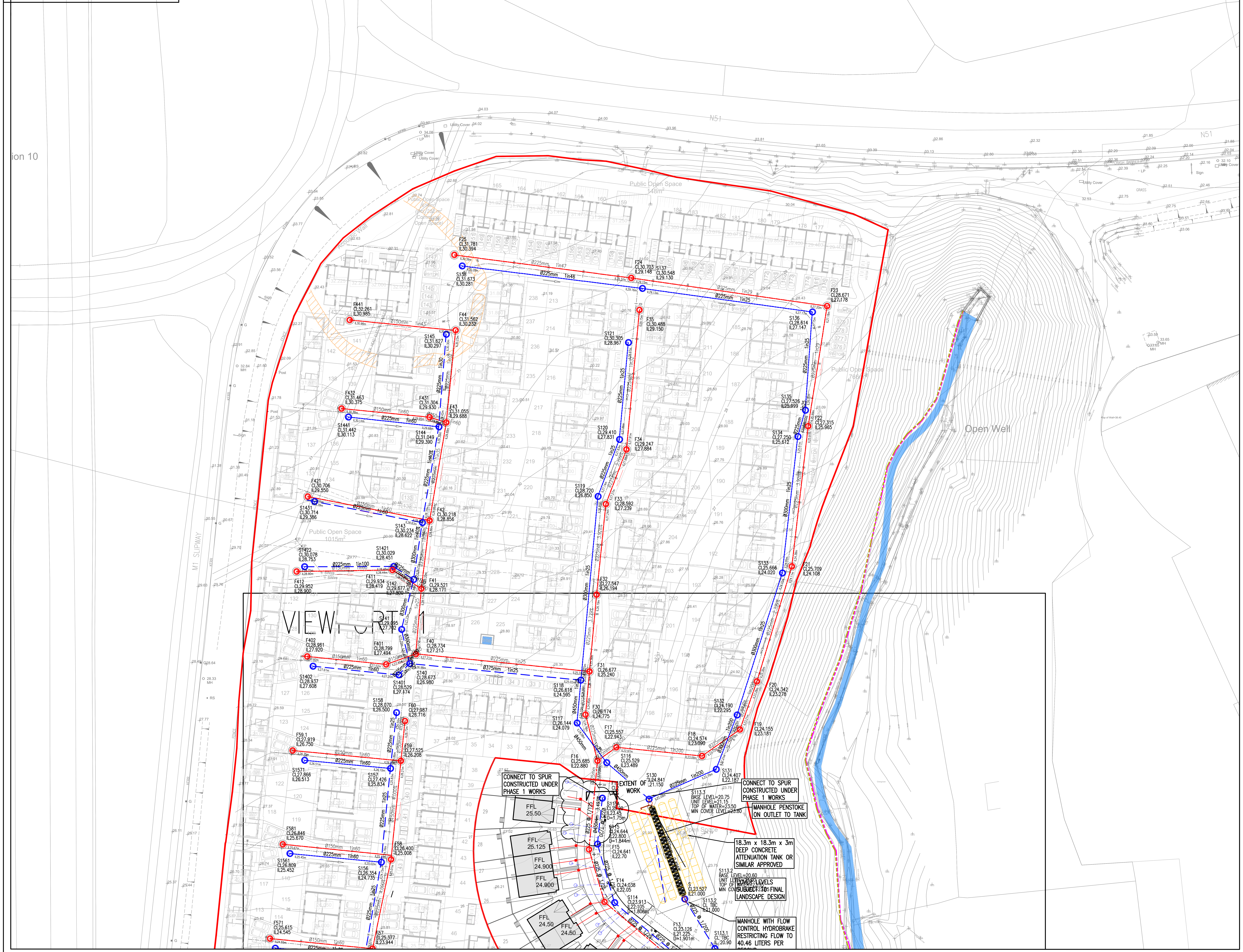

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.
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t +353 1 664 8900

NOTES:

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2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

LEGEND

Symbol	Description
F12 CL22.556 IL20.694 D=1.862m	PROPOSED FOUL WATER MANHOLE AND SEWER WITH 0.5m OFFSET INDICATED DASHED
S113 CL22.577 IL20.515 D=2.063m	PROPOSED STORM WATER MANHOLE AND SEWER WITH 0.5m OFFSET INDICATED DASHED
100ø IC	INDIVIDUAL PRIVATE FOUL WATER DRAIN WITH INSPECTION CHAMBER 1.2m DEEP
G	PROPOSED GULLY AND 150ø GULLY PIPE, DOUBLE GULLY AT LOW POINTS
	PROPOSED RISING MAIN
FD-B2	EXISTING FOUL SEWER
SD-B2	EXISTING STORM PIPE

Rev	Date	Description	By	Chk

Amendments

Project
PROPOSED RESIDENTIAL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA, CO. LOUTH

Title
PHASE 2
DRAINAGE LAYOUT AND LEVELS
SHEET 2 OF 2

Client
LAGAN HOMES TULLYALLEN LTD.

BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status
PLANNING

Designed By	NS	Approved	MD	Waterman Ref	23-067
Drawn By	NS	Date	APRIL 2024	Scales @ A1	1:500

Project - Originator - Volume - Level - Type - Role - Number	Revision
OSR - WMC - ZZ - ZZ - DR - C - 3202	-

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Date: Apr 19, 2024 - 6:09pm

NOTES:

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3. ALL PIPE MATERIALS SHALL BE IN ACCORDANCE WITH SECTION 3.9 OF THE IRISH WATER CODE OF PRACTICE FOR WATER INFRASTRUCTURE. WATERMAINS SHALL BE EITHER DUCTILE IRON (DI) OR POLYETHYLENE (PE), WITH PE80 OR PE100 RATING (MDPE, HDPEOR HPPE). ALL PLASTIC WATER PIPES SHALL BE BLUE IN COLOUR.
4. ALL SERVICE CONNECTIONS TO BE 25ø HDPE(SDR-17).
5. ALL WATERMAINS UNDER ROADS OR AT ROAD CROSSINGS TO BE HDPE OR DUCTILE IRON.
6. HDPE DISTRIBUTION PIPES TO BE PE-100(SDR-17).
7. DUCTILE IRON PIPES TO IS EN 545 WITH C40 POWER RATING.
8. AIR VALVE AND HYDRANTS COVERS, WHERE LOCATED IN GRASS AREAS, SHALL BE SURROUNDED BY A CONCRETE PLINTH, 200mm ALL ROUND AND 100mm DEEP FORMED WITH C20/25 CONCRETE, 20mm AGGREGATE SIZE, BEDDED IN CLAUSE 804 MATERIAL. THE PLINTH SHALL INCORPORATE MILD STEEL REINFORCED LINKS AND SHALL HAVE BULL-NOSE FINISH AROUND ITS EXTERNAL PERIMETER.
9. THRUST BLOCKS SHALL BE PROVIDED AT EACH BEND ALONG THE COURSE OF THE WATERMAIN.
10. PLANTING ADJACENT TO WATER INFRASTRUCTURE SHALL COMPLY WITH IRISH WATER STANDARD DETAIL STD-W-12A.
11. HORIZONTAL AND VERTICAL SERVICE LAYOUT DISTANCES SHALL BE AS PER IRISH WATER STANDARD DETAIL STD-W-11.
12. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT ALL WORKS ARE CONSTRUCTED IN ACCORDANCE WITH THE IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS. THE CODE OF PRACTICE AND STANDARD DETAILS ARE AVAILABLE TO DOWNLOAD FROM THE IRISH WATER WEB SITE AT WWW.WATER.IE/CONNECTIONS/DEVELOPER-SERVICES/ WHERE THE DETAILS CONTAINED ON THIS DRAWING DIFFER FROM THE IRISH WATER CODE OF PRACTICE OR STANDARD DETAILS THIS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY. IRISH WATER STANDARDS WILL TAKE PRECEDENCE.

LEGEND:

- PROPOSED 150ø HDPE WATERMAIN
- EXISTING 150ø ASBESTOS WATERMAIN
- EXISTING 50ø WATERMAIN

Rev	Date	Description	By	Chk
A	30/04/24	REVISED FOLLOWING COMMENTS RECEIVED FROM IRISH WATER	NS	SDN

Amendments

Project

PROPOSED RESIDENTAIL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA CO.LOUTH

Title

PHASE 2
WATERMAIN GENERAL ARRANGEMENT

Client

LAGAN HOMES TULLYALLEN LTD.

BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD,
DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status

PLANNING

Designed By	Approved	Waterman Ref
NS	MD	23-067
Drawn By	Date	Scales @ A1
NS	APRIL 2024	1:1000

Project - Originator - Volume - Level - Type - Role - Number

OSR-WMC-ZZ-GF-DR-C- 3300

Revision A

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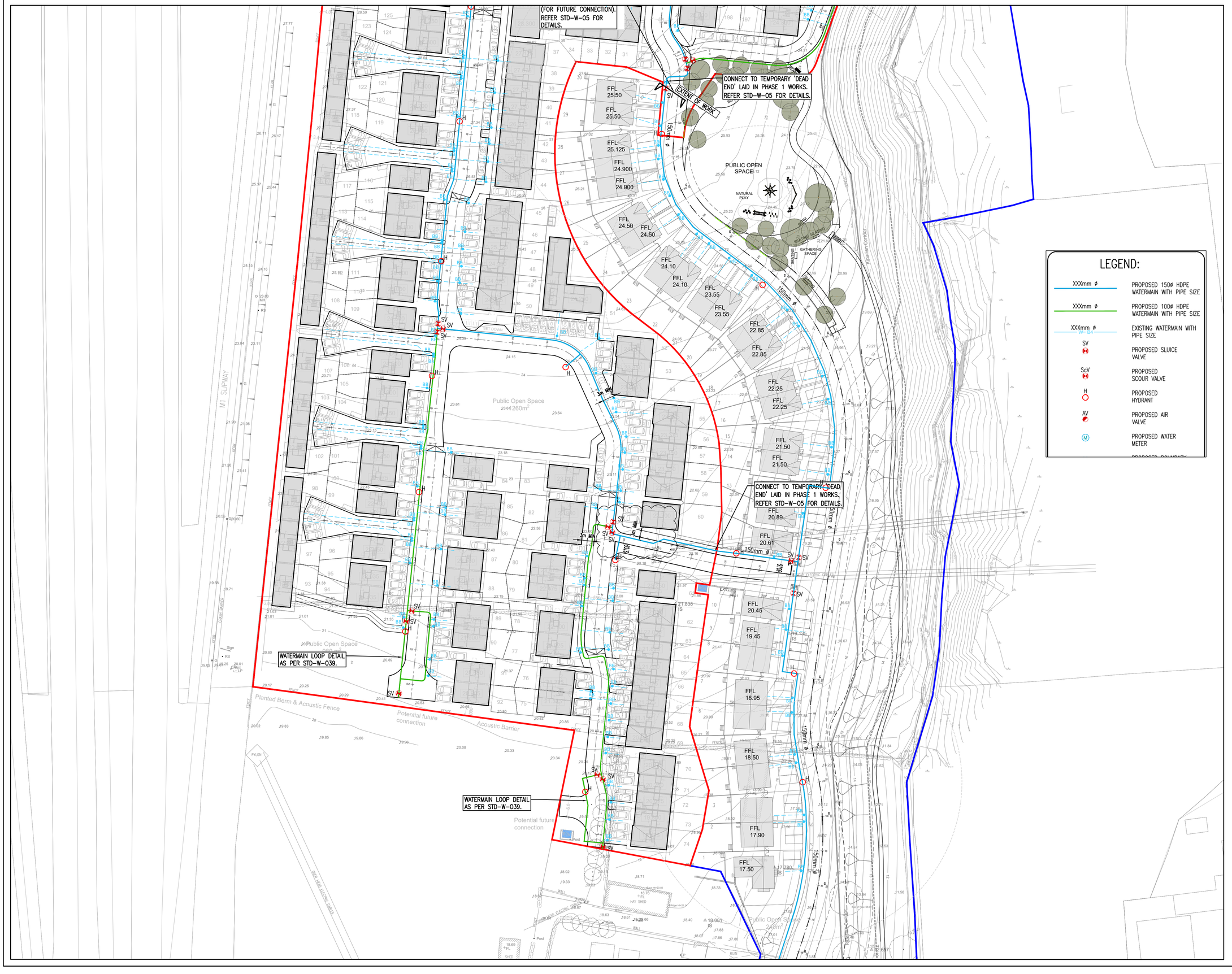

NOTES:

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4. ALL SERVICE CONNECTIONS TO BE 25ø HDPE(SDR-17).
5. ALL WATERMAINS UNDER ROADS OR AT ROAD CROSSINGS TO BE HDPE OR DUCTILE IRON.
6. HDPE DISTRIBUTION PIPES TO BE PE-100(SDR-17).
7. DUCTILE IRON PIPES TO IS EN 545 WITH C40 POWER RATING.
8. AIR VALVE AND HYDRANTS COVERS, WHERE LOCATED IN GRASS AREAS, SHALL BE SURROUNDED BY A CONCRETE PLINTH, 200mm ALL ROUND AND 100mm DEEP FORMED WITH C20/25 CONCRETE, 20mm AGGREGATE SIZE, BEDDED IN CLAUSE 804 MATERIAL. THE PLINTH SHALL INCORPORATE MILD STEEL REINFORCED LINKS AND SHALL HAVE BULL-NOSE FINISH AROUND ITS EXTERNAL PERIMETER.
9. THRUST BLOCKS SHALL BE PROVIDED AT EACH BEND ALONG THE COURSE OF THE WATERMAIN.
10. PLANTING ADJACENT TO WATER INFRASTRUCTURE SHALL COMPLY WITH IRISH WATER STANDARD DETAIL STD-W-12A.
11. HORIZONTAL AND VERTICAL SERVICE LAYOUT DISTANCES SHALL BE AS PER IRISH WATER STANDARD DETAIL STD-W-11.
12. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT ALL WORKS ARE CONSTRUCTED IN ACCORDANCE WITH THE IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS. THE CODE OF PRACTICE AND STANDARD DETAILS ARE AVAILABLE TO DOWNLOAD FROM THE IRISH WATER WEB SITE AT WWW.WATER.IE/CONNECTIONS/DEVELOPER-SERVICES/ WHERE THE DETAILS CONTAINED ON THIS DRAWING DIFFER FROM THE IRISH WATER CODE OF PRACTICE OR STANDARD DETAILS THIS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY. IRISH WATER STANDARDS WILL TAKE PRECEDENCE.

Rev	Date	Description	By	Chk
B	08/05/23	REVISED TO SUIT COMMENTS FROM IRISH WATER	NS	SDN
A	30/04/24	REVISED FOLLOWING COMMENTS RECEIVED FROM IRISH WATER	NS	SDN

Amendments

Project
PROPOSED RESIDENTIAL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA, CO. LOUTH

Title
PHASE 2
WATERMAIN LAYOUT AND LEVELS
SHEET 1 OF 2

Client
LAGAN HOMES TULLYALLEN LTD.

BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status
PLANNING

Designed By	Approved	Waterman Ref
NS	MD	23-067
Drawn By	Date	Scales @ A1
NS	APRIL 2024	1:500

Project - Originator - Volume - Level - Type - Role - Number	Revision
OSR - WMC - ZZ - ZZ - DR - C - 3301	B

Drawing Location: M:\Projects\23\23-067 Old Slane Road\Drawings\Waterman Moylan\Civil\Autocad Drawings\Phase 2\OSR-WMC-ZZ-GF-DR-C-3301 & 3302 Watermain Layout Sheet 1 & 2.dwg
Date: May 03, 2024 - 5:46pm

NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.
3. ALL PIPE MATERIALS SHALL BE IN ACCORDANCE WITH SECTION 3.9 OF THE IRISH WATER CODE OF PRACTICE FOR WATER INFRASTRUCTURE. WATERMAINS SHALL BE EITHER DUCTILE IRON (DI) OR POLYETHYLENE (PE), WITH PE80 OR PE100 RATING (MDPE, HDPEOR HPPE). ALL PLASTIC WATER PIPES SHALL BE BLUE IN COLOUR.
4. ALL SERVICE CONNECTIONS TO BE 25ø HDPE(SDR-17).
5. ALL WATERMAINS UNDER ROADS OR AT ROAD CROSSINGS TO BE HDPE OR DUCTILE IRON.
6. HDPE DISTRIBUTION PIPES TO BE PE-100(SDR-17).
7. DUCTILE IRON PIPES TO IS EN 545 WITH C40 POWER RATING.
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9. THRUST BLOCKS SHALL BE PROVIDED AT EACH BEND ALONG THE COURSE OF THE WATERMAIN.
10. PLANTING ADJACENT TO WATER INFRASTRUCTURE SHALL COMPLY WITH IRISH WATER STANDARD DETAIL STD-W-12A.
11. HORIZONTAL AND VERTICAL SERVICE LAYOUT DISTANCES SHALL BE AS PER IRISH WATER STANDARD DETAIL STD-W-11.
12. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT ALL WORKS ARE CONSTRUCTED IN ACCORDANCE WITH THE IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS. THE CODE OF PRACTICE AND STANDARD DETAILS ARE AVAILABLE TO DOWNLOAD FROM THE IRISH WATER WEB SITE AT WWW.WATER.IE/CONNECTIONS/DEVELOPER-SERVICES/ WHERE THE DETAILS CONTAINED ON THIS DRAWING DIFFER FROM THE IRISH WATER CODE OF PRACTICE OR STANDARD DETAILS THIS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY. IRISH WATER STANDARDS WILL TAKE PRECEDENCE.

TEMPORARY 'DEAD END' (FOR FUTURE CONNECTION). REFER STD-W-05 FOR DETAILS.

CONNECT TO TEMPORARY 'DEAD END' LAID IN PHASE 1 WORKS. REFER STD-W-05 FOR DETAILS.

EXTENT OF WORK

LEGEND:

XXXmm ø	PROPOSED 150ø HDPE WATERMAIN WITH PIPE SIZE
XXXmm ø	PROPOSED 100ø HDPE WATERMAIN WITH PIPE SIZE
XXXmm ø W- B4	EXISTING WATERMAIN WITH PIPE SIZE
SV	PROPOSED SLUICE VALVE
ScV	PROPOSED SCOUR VALVE
H	PROPOSED HYDRANT
AV	PROPOSED AIR VALVE
M	PROPOSED WATER METER
BB	PROPOSED BOUNDARY BOX AND CONNECTION

Rev	Date	Description	By	Chk
A	30/04/24	REVISED FOLLOWING COMMENTS RECEIVED FROM IRISH WATER	NS	SDN

Amendments

Project

PROPOSED RESIDENTIAL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA, CO. LOUTH

Title

PHASE 2 WATERMAIN LAYOUT AND LEVELS SHEET 2 OF 2

Client

LAGAN HOMES TULLYALLEN LTD.

BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status: PLANNING

Designed By	Approved	Waterman Ref
NS	MD	23-067
Drawn By	Date	Scales @ A1
NS	APRIL 2024	1:500

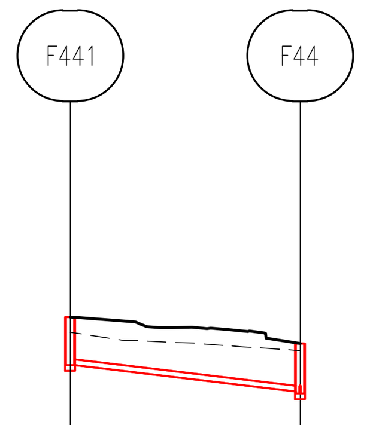
Project - Originator - Volume - Level - Type - Role - Number: OSR - WMC - ZZ - ZZ - DR - C - 3302

Revision: -

Drawing Location: M:\Projects\23\23-067 Old Slane Road\Drawings\Waterman Moylan\Civil\Autocad Drawings\Phase 2\OSR-WMC-ZZ-GF-DR-C-3301 & 3302 Watermain Layout Sheet 1 & 2.dwg
Date: Apr-30, 2024 - 2:47pm

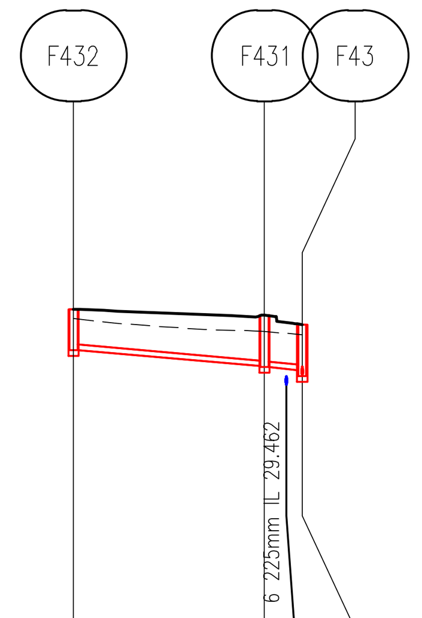
NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

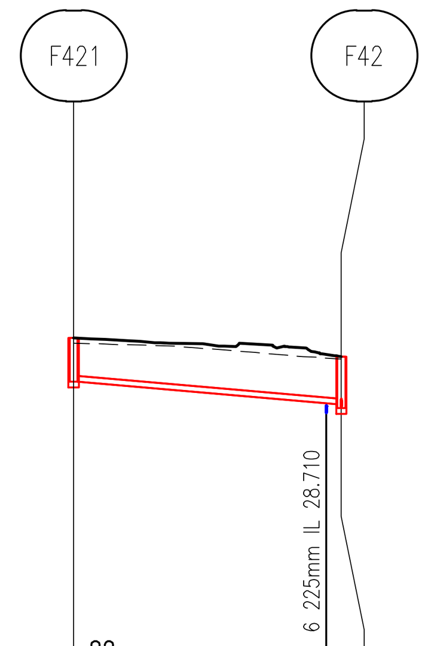


DATUM R.L. 23	F441		F44
GRADE		1in43	
DIAMETER		150	
DEPTH TO INVERT OF SEWER	1.276		1.276 1.330
INVERT LEVEL	30.985		30.286 30.232
DESIGN SURFACE LEVEL	32.261		31.562
EXISITNG GROUND LEVEL	31.851		31.366
RUNNING CHAINAGE	0.000	30.351	30.351

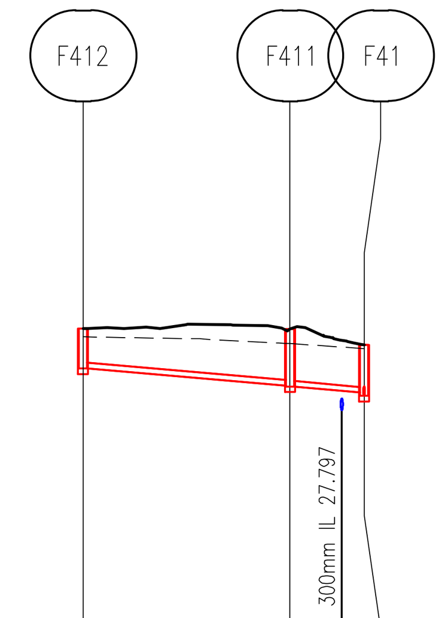
SCALE 1:500 HORIZONTAL @ A1
1:100 VERTICAL @ A1



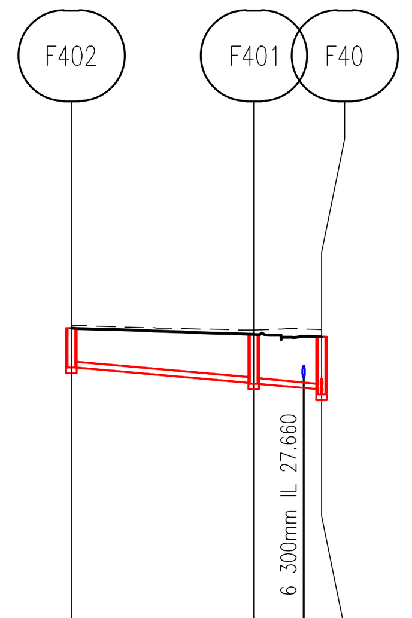
DATUM R.L. 22	F432		F431		F43
GRADE		1in60		1in60	
DIAMETER		150		150	
DEPTH TO INVERT OF SEWER	1.088		1.349 1.374		1.209 1.367
INVERT LEVEL	30.375		29.955 29.880		29.847 29.688
DESIGN SURFACE LEVEL	31.463		31.304		31.055
EXISITNG GROUND LEVEL	31.217		30.872		30.786
RUNNING CHAINAGE	0.000	25.214	28.214	4.995	30.209



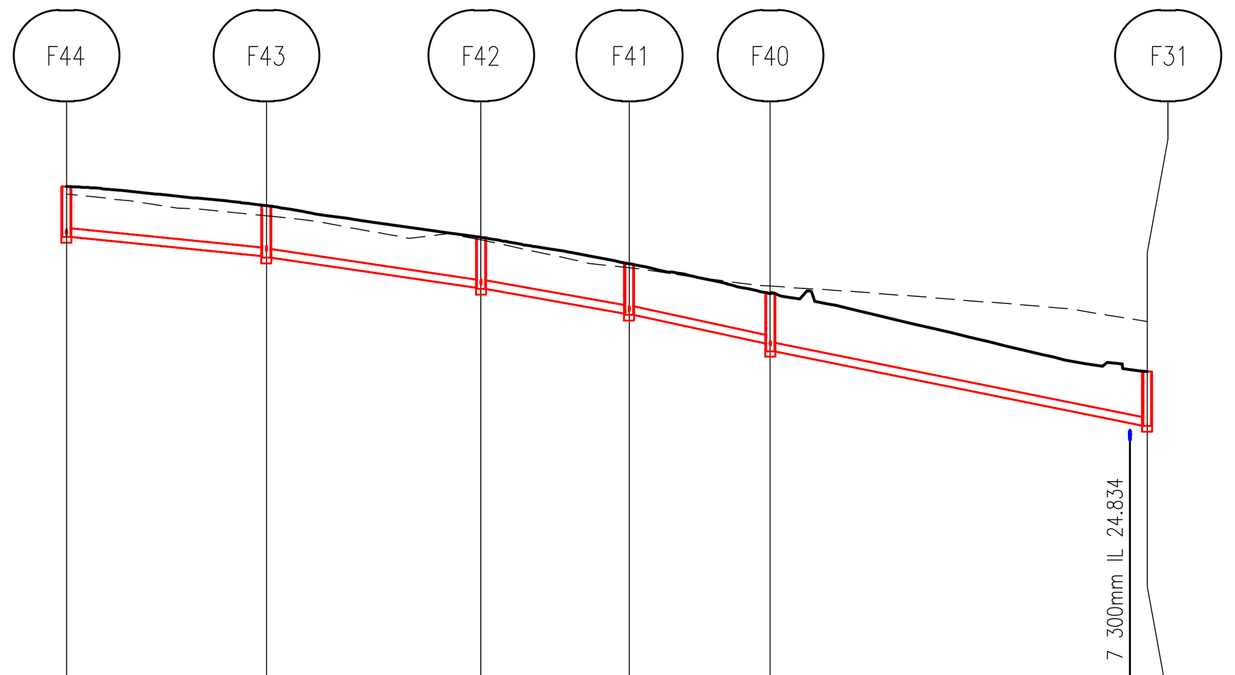
DATUM R.L. 22	F421		F42
GRADE		1in60	
DIAMETER		150	
DEPTH TO INVERT OF SEWER	1.156		1.258 1.362
INVERT LEVEL	29.550		28.985 28.960 28.856
DESIGN SURFACE LEVEL	30.706		30.218
EXISITNG GROUND LEVEL	30.570		30.153
RUNNING CHAINAGE	0.000	35.398	33.427 35.398



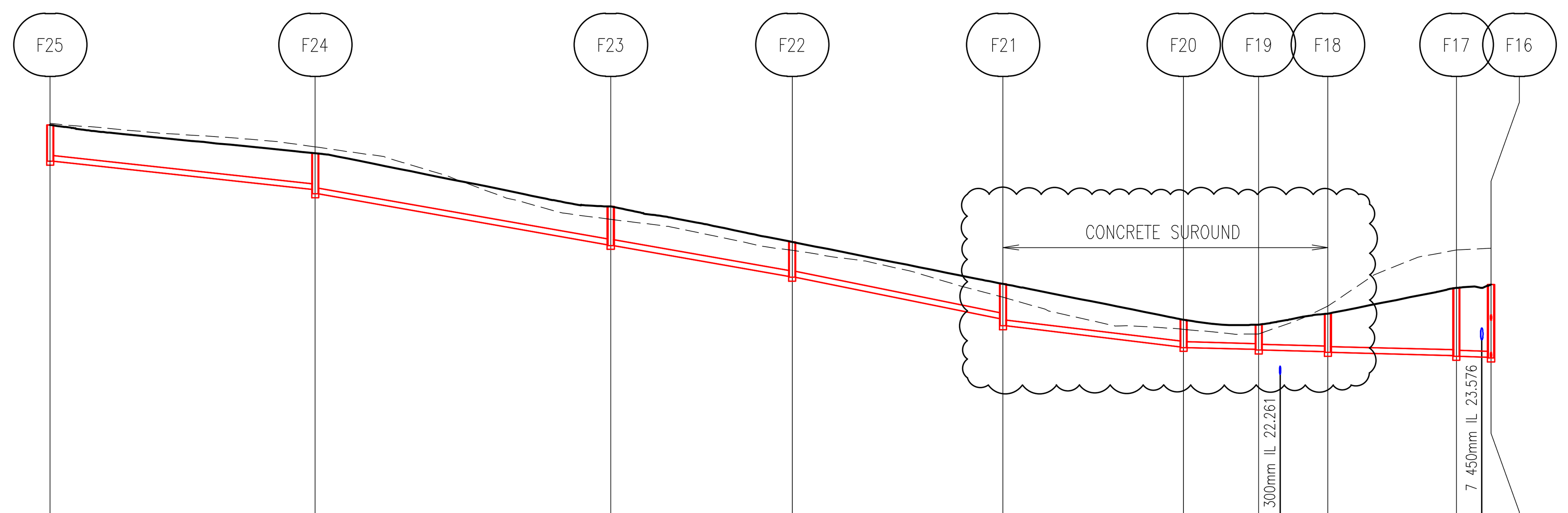
DATUM R.L. 21	F412		F411		F41
GRADE		1in60		1in60	
DIAMETER		150		150	
DEPTH TO INVERT OF SEWER	1.052		1.490 1.515		1.265 1.350
INVERT LEVEL	28.900		28.444 28.419 28.301		28.256 28.171
DESIGN SURFACE LEVEL	29.952		29.934		29.521
EXISITNG GROUND LEVEL	29.738		29.558		29.416
RUNNING CHAINAGE	0.000	27.343	27.343 34.795	9.793	37.136



DATUM R.L. 20	F402		F401		F40
GRADE		1in60		1in60	
DIAMETER		150		150	
DEPTH TO INVERT OF SEWER	1.041		1.281 1.306		1.389 1.521
INVERT LEVEL	27.920		27.519 27.494 27.380		27.345 27.213
DESIGN SURFACE LEVEL	28.961		28.799		28.734
EXISITNG GROUND LEVEL	29.034		28.906		28.931
RUNNING CHAINAGE	0.000	24.070	24.070 30.347	8.949	33.018

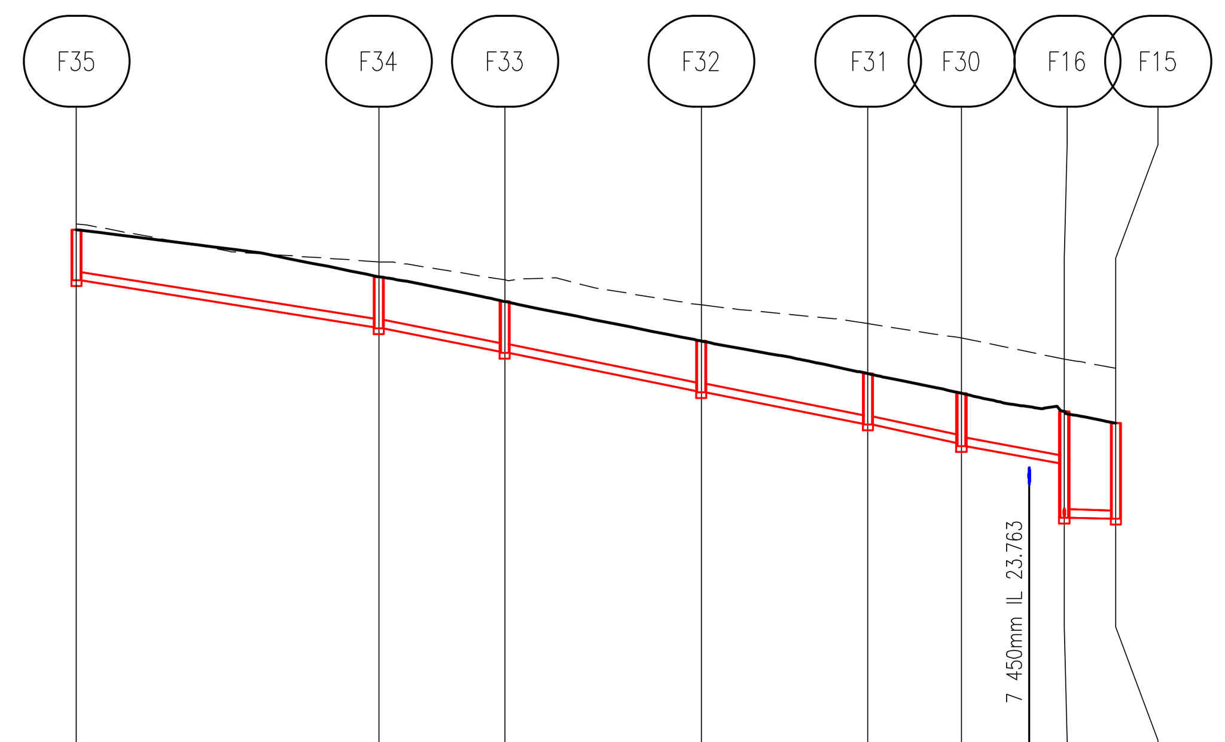


DATUM R.L. 17	F44		F43		F42		F41		F40		F31
GRADE		1in52		1in35		1in30		1in24		1in25	
DIAMETER		225		225		225		225		225	
DEPTH TO INVERT OF SEWER	1.330		1.330 1.367		1.337 1.362		1.325 1.350		1.325 1.521		1.437
INVERT LEVEL	30.232		29.725 29.688		28.881 28.856		28.196 28.171		27.409 27.213		25.310 25.240
DESIGN SURFACE LEVEL	31.562		31.055		30.218		29.521		28.734		26.677
EXISITNG GROUND LEVEL	31.366		30.786		30.153		29.416		28.931		27.994
RUNNING CHAINAGE	0.000	26.421	26.421	28.359	54.780	19.588	74.368	18.647	93.015	49.800	140.545 142.815

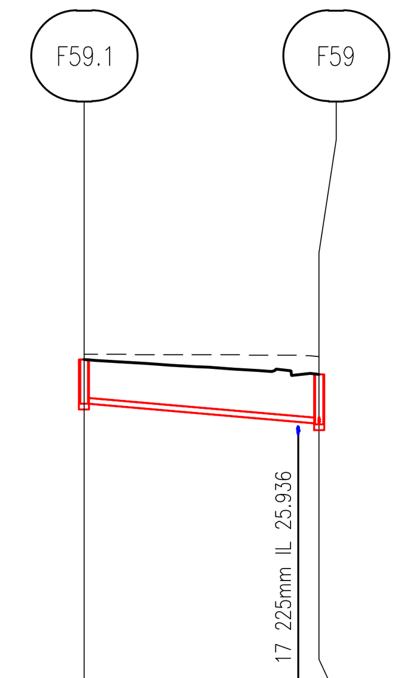


DATUM R.L. 16	F25		F24		F23		F22		F21		F20		F19		F18		F17		F16
GRADE		1in47		1in29		1in29		1in25		1in43		1in200		1in200		1in200		1in200	
DIAMETER		225		225		225		225		225		225		225		225		225	
DEPTH TO INVERT OF SEWER	1.388		1.388 1.555		1.467 1.492		1.325 1.350		1.325 1.601		1.037 1.064		0.949 0.974		1.459 1.484		2.590 2.615		2.776 2.805
INVERT LEVEL	30.394		29.315 29.148		27.203 27.178		25.990 25.965		24.384 24.108		23.305 23.278		23.206 23.182		23.115 23.090		22.968 22.943		22.909 22.880
DESIGN SURFACE LEVEL	31.781		30.703		28.671		27.315		25.709		24.342		24.155		24.574		25.557		25.685
EXISITNG GROUND LEVEL	31.849		30.944		28.177		26.990		25.203		23.977		23.789		24.860		27.008		27.068
RUNNING CHAINAGE	0.000	50.619	50.619	56.413	107.031	34.653	141.684	40.241	181.925	34.485	216.410	14.348	230.758	13.195	243.953	24.551	268.505	6.606	275.111

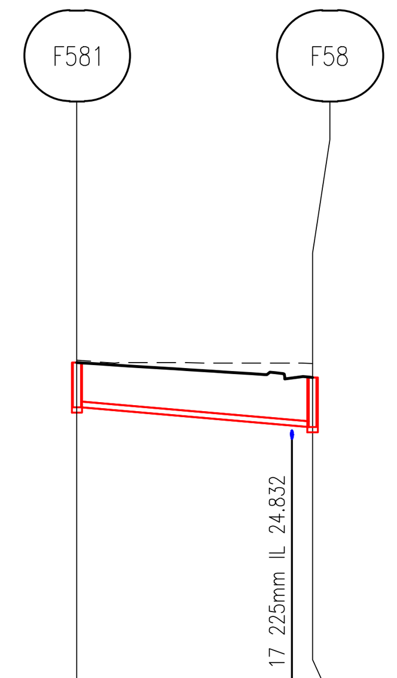
SCALE 1:500 HORIZONTAL @ A1
1:100 VERTICAL @ A1



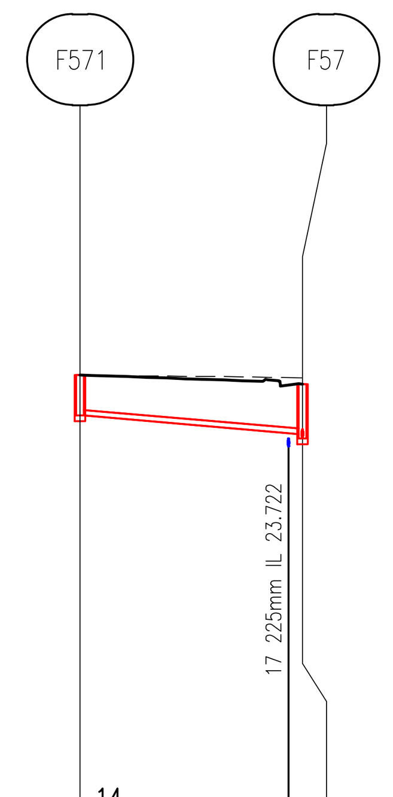
DATUM R.L. 16	F35		F34		F33		F32		F31		F30		F16		F15
GRADE		1in32		1in27		1in25		1in26		1in25		1in29		1in227	
DIAMETER		225		225		225		225		225		225		225	
DEPTH TO INVERT OF SEWER	1.338		1.338 1.363		1.325 1.353		1.328 1.353		1.325 1.350		1.325 1.399		1.374 2.805		2.527
INVERT LEVEL	29.150		27.909 27.884		27.267 27.239		26.219 26.194		25.362 25.337		24.849 24.775	24.463	24.311 22.880		22.850
DESIGN SURFACE LEVEL	30.488		29.247		28.592		27.547		26.687		26.174		25.685		25.377
EXISITNG GROUND LEVEL	30.644		29.641		29.163		28.505		28.011		27.631		27.068		26.825
RUNNING CHAINAGE	0.000	39.953	39.953	16.643	56.596	25.958	82.554	22.016	104.570	12.365	116.934	13.591 125.898	130.525	6.820	137.345



DATUM R.L. 14	F59.1		F59
GRADE		1in60	
DIAMETER		150	
DEPTH TO INVERT OF SEWER	1.169		1.293 1.317
INVERT LEVEL	26.750		26.272 26.233 26.208
DESIGN SURFACE LEVEL	27.919		27.525
EXISITNG GROUND LEVEL	28.061		27.994
RUNNING CHAINAGE	0.000	31.024	28.258 31.024

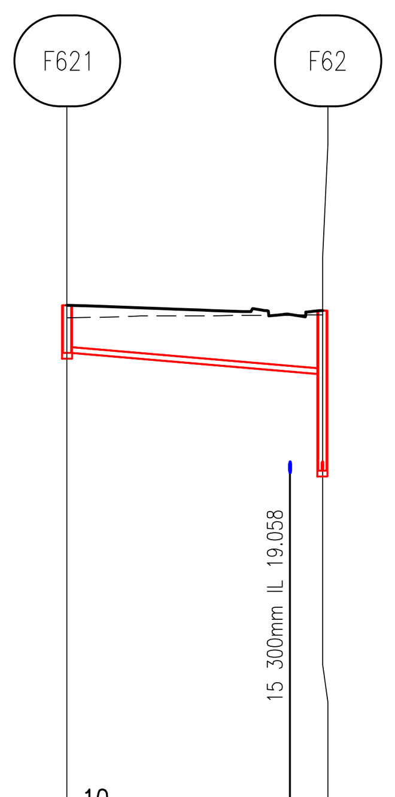


DATUM R.L. 13	F581		F58
GRADE		1in60	
DIAMETER		150	
DEPTH TO INVERT OF SEWER	1.176		1.297
INVERT LEVEL	25.670		25.189 25.151
DESIGN SURFACE LEVEL	26.846		26.448
EXISITNG GROUND LEVEL	26.906		26.825
RUNNING CHAINAGE	0.000	31.153	28.426 31.153

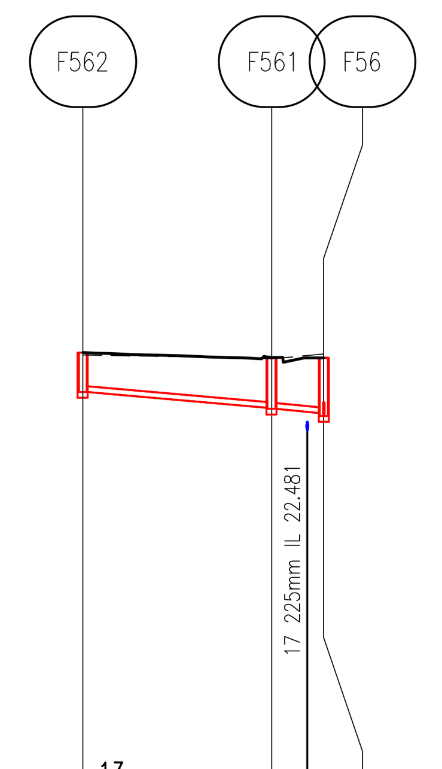


DATUM R.L. 14	F571		F57
GRADE		1in60	
DIAMETER		150	
DEPTH TO INVERT OF SEWER	1.070		1.321 1.433
INVERT LEVEL	24.545		24.078 24.055 23.944
DESIGN SURFACE LEVEL	25.615		25.377
EXISITNG GROUND LEVEL	25.603		25.543
RUNNING CHAINAGE	0.000	29.391	27.540 29.391

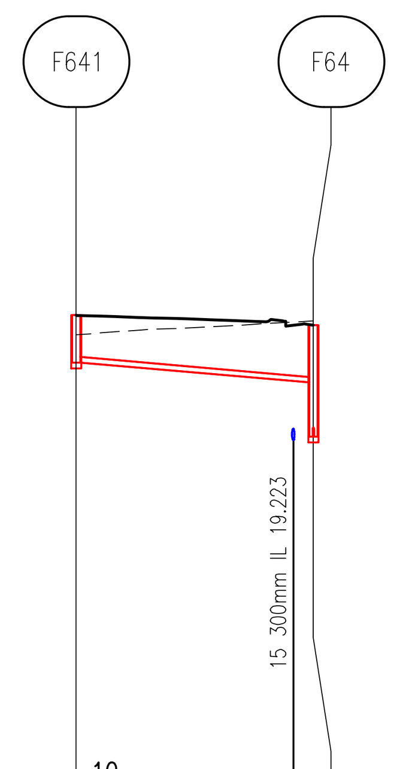
SCALE 1:500 HORIZONTAL @ A1
1:100 VERTICAL @ A1



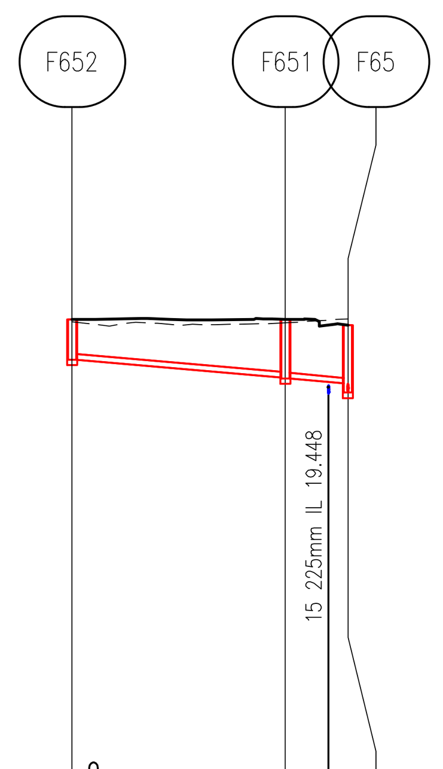
DATUM R.L. 10	F621		F62
GRADE		1in60	
DIAMETER		150	
DEPTH TO INVERT OF SEWER	1.257		1.676 4.225
INVERT LEVEL	22.230		21.733 21.668 19.118
DESIGN SURFACE LEVEL	23.487		23.344
EXISITNG GROUND LEVEL	23.154		23.237
RUNNING CHAINAGE	0.000	33.725	29.451 33.725



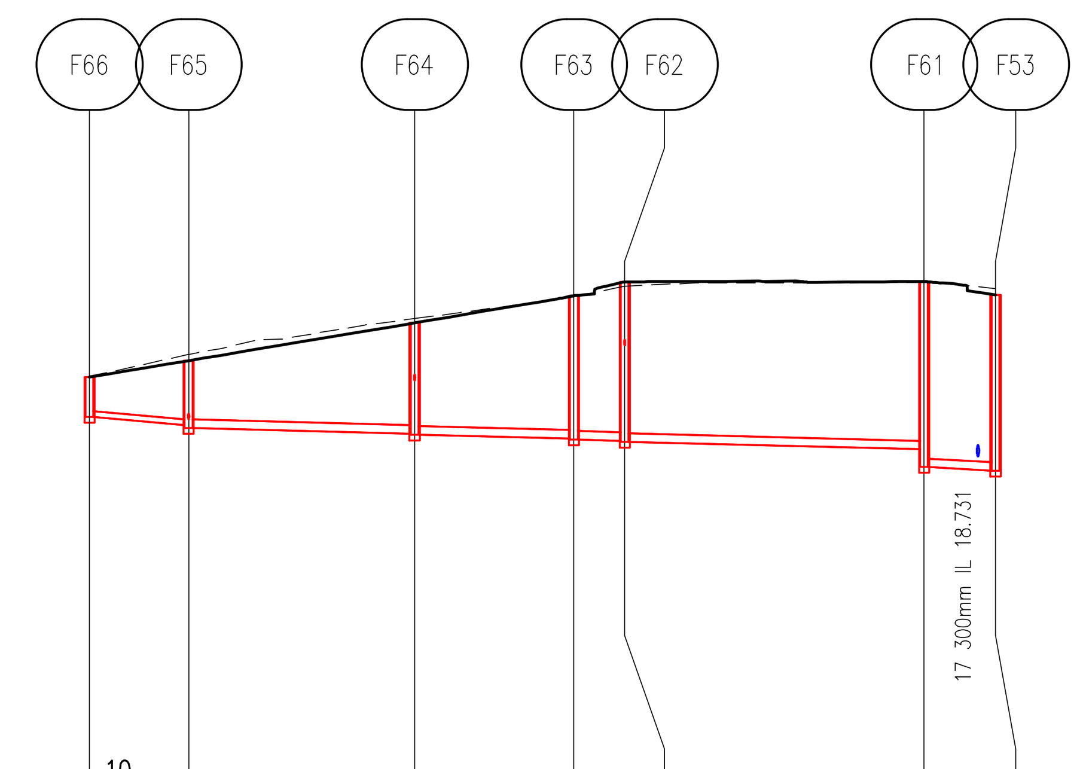
DATUM R.L. 13	F562		F561		F56
GRADE		1in60		1in60	
DIAMETER		150		150	
DEPTH TO INVERT OF SEWER	1.040		1.335 1.360		1.465 1.540
INVERT LEVEL	23.490		23.074 23.049 22.967		22.934 22.859
DESIGN SURFACE LEVEL	24.530		24.409		24.399
EXISITNG GROUND LEVEL	24.474		24.368		24.498
RUNNING CHAINAGE	0.000	24.938	24.938	6.908	31.847



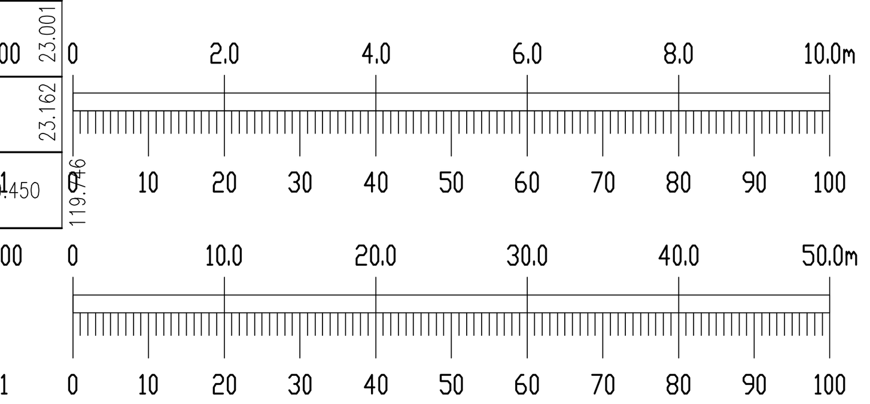
DATUM R.L. 10	F641		F64
GRADE		1in60	
DIAMETER		150	
DEPTH TO INVERT OF SEWER	1.255		1.521 2.956
INVERT LEVEL	21.264		20.779 20.743 19.307
DESIGN SURFACE LEVEL	22.519		22.263
EXISITNG GROUND LEVEL	22.005		22.378
RUNNING CHAINAGE	0.000	31.306	28.650 31.306



DATUM R.L. 9	F652		F651		F65
GRADE		1in60		1in60	
DIAMETER		150		150	
DEPTH TO INVERT OF SEWER	1.055		1.535 1.560		1.547 1.782
INVERT LEVEL	20.350		19.880 19.855 19.756		19.717 19.482
DESIGN SURFACE LEVEL	21.405		21.415		21.264
EXISITNG GROUND LEVEL	21.349		21.317		21.430
RUNNING CHAINAGE	0.000	28.196	28.196 33.916	8.282	36.479



DATUM R.L. 10	F66		F65		F64		F63		F62		F61		F53
GRADE		1in60		1in200		1in200		1in200		1in200		1in100	
DIAMETER		150		225		225		225		225		225	
DEPTH TO INVERT OF SEWER	1.051		1.707 1.782		2.931 2.956		3.780 3.805		4.200 4.225		4.438 4.909		4.646
INVERT LEVEL	19.775		19.557 19.482		19.332 19.307		19.202 19.177		19.143 19.118		18.921 18.450		18.355
DESIGN SURFACE LEVEL	20.826		21.264		22.263		22.982		23.344		23.359		23.001
EXISITNG GROUND LEVEL	20.853		21.430		22.378		22.957		23.237		23.331		23.162
RUNNING CHAINAGE	0.000	13.101	13.101	29.875	42.975	21.037	64.013	6.726	70.739	39.557	110.296	9.450	119.746



Rev	Date	Description	By	Chk
A	08/05/23	REVISED TO SUIT COMMENTS FROM IRISH WATER	NS	SDN

Amendments

Project
PROPOSED RESIDENTIAL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA, CO. LOUTH

Title
PUBLIC WASTE WATER LONG SECTIONS SHEET 1 OF 2

Client
LAGAN HOMES TULLYALLEN LTD.

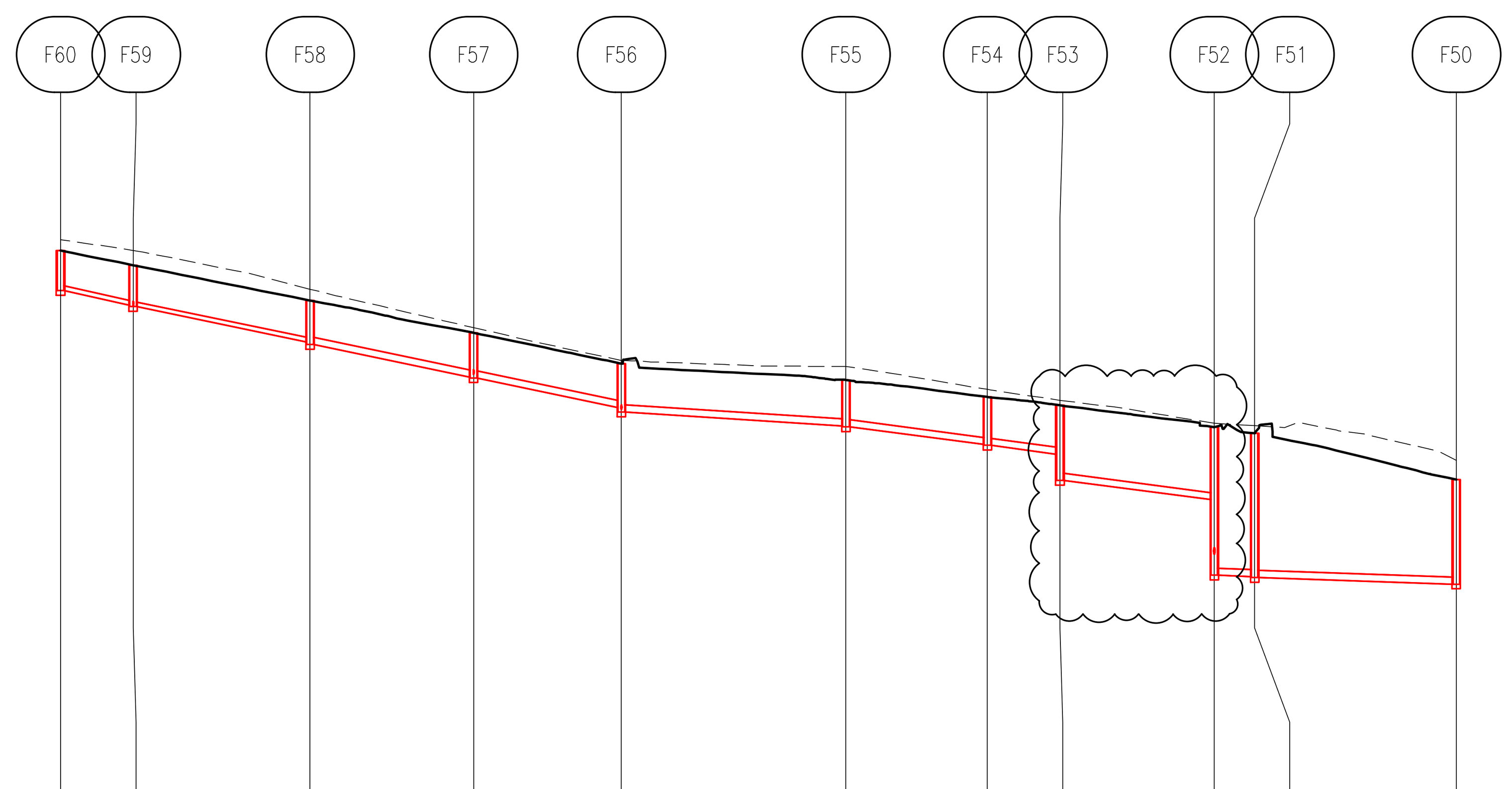
BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD, DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status
PLANNING

Designed By	Approved	Waterman Ref
NS		23-067
Drawn By NS	Date APRIL 2024	Scales @ A1 1:500H, 1:100V

Project - Originator - Volume - Level - Type - Role - Number: OSR - WMC - ZZ - ZZ - DR - C - 3225
Revision: A

Drawing Location: M:\Projects\23\23-067 Old Slane Road\Drawings\Waterman Moylan\Civil\Autocad Drawings\Phase 2\OSR-WMC-ZZ-GF-DR-C-3225 Wastewater Long Sections.dwg
Date: May 08, 2024 - 5:43pm

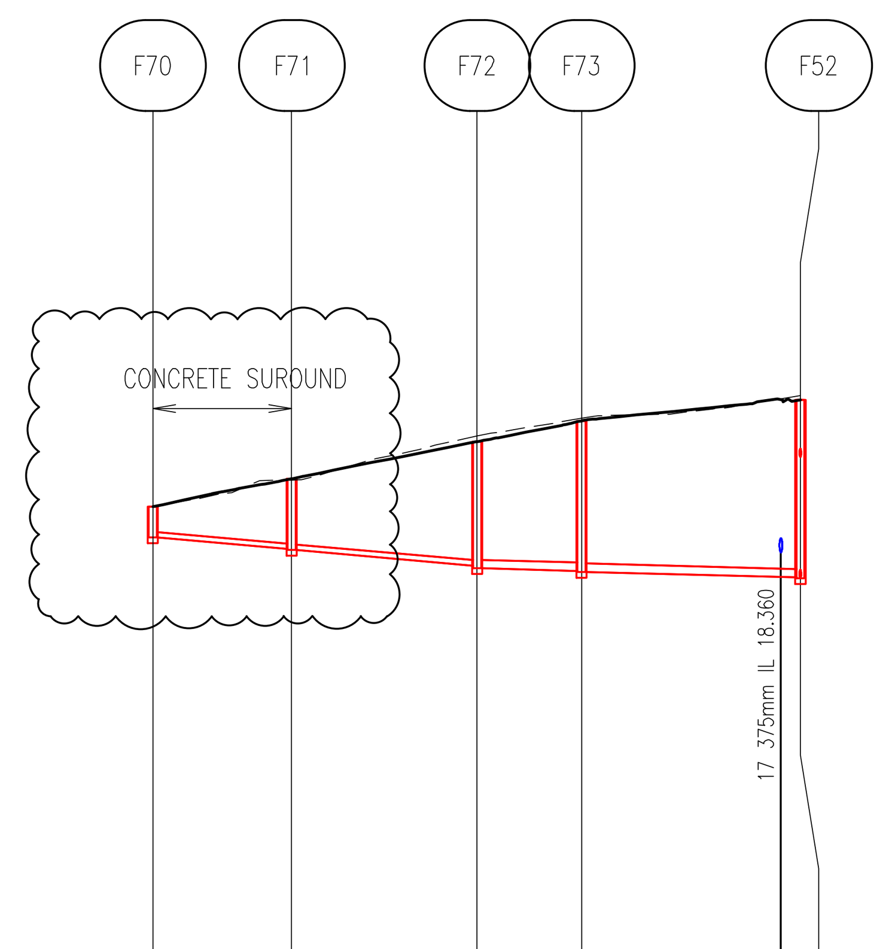


DATUM R.L. 10

	F60	F59	F58	F57	F56	F55	F54	F53	F52	F51	F50
DEPTH TO INVERT OF SEWER	1.271	1.271 / 1.317	1.317 / 1.392	1.408 / 1.433	1.394 / 1.540	1.468 / 1.493	1.513 / 1.538	1.557 / 2.386	1.508 / 4.710	4.553 / 4.578	3.322
INVERT LEVEL	26.716	26.255 / 26.208	25.083 / 25.008	23.969 / 23.944	23.005 / 22.859	22.413 / 22.388	21.826 / 21.801	21.513 / 20.685	19.673 / 17.673	17.630 / 17.605	17.391
DESIGN SURFACE LEVEL	27.987	27.525	26.400	25.377	24.399	23.881	23.339	23.071	22.382	22.182	20.713
EXISITNG GROUND LEVEL	28.336	27.994	26.764	25.543	24.498	24.302	23.578	23.230	22.499	22.429	21.327
RUNNING CHAINAGE	0.000	11.541	39.652	65.639	89.116	124.799	147.281	158.802	183.334	189.743	221.791

Pipe run	GRADE	DIAMETER	Length
F60–F59	1in25	150	11.541
F59–F58	1in25	150	28.111
F58–F57	1in25	225	25.987
F57–F56	1in25	225	23.477
F56–F55	1in80	225	35.682
F55–F54	1in40	225	22.483
F54–F53	1in40	225	11.521
F53–F52	1in40	225	24.531
F52–F51	1in150	225	6.409
F51–F50	1in150	225	32.048

SCALE 1:500 HORIZONTAL @ A1
1:100 VERTICAL @ A1



DATUM R.L. 7

	F70	F71	F72	F73	(82.963)	F52
DEPTH TO INVERT OF SEWER	0.813	1.855 / 1.880	3.272 / 3.347	3.966 / 3.991		4.685 / 4.710
INVERT LEVEL	18.750	18.445 / 18.420	18.011 / 17.936	17.867 / 17.842	17.708	17.698 / 17.673
DESIGN SURFACE LEVEL	19.563	20.300	21.283	21.833		22.382
EXISITNG GROUND LEVEL	19.579	20.271	21.438	21.898		22.499
RUNNING CHAINAGE	0.000	18.327	42.839	56.633	82.963	85.542

Pipe run	GRADE	DIAMETER	Length
F70–F71	1in60	150	18.327
F71–F72	1in60	150	24.512
F72–F73	1in200	225	13.794
F73–(82.963)	1in200	225	28.909

NOTES:

1. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTURAL AND ENGINEERING DRAWINGS.

1:100 0 2.0 4.0 6.0 8.0 10.0m
1:1 0 10 20 30 40 50 60 70 80 90 100
1:500 0 10.0 20.0 30.0 40.0 50.0m
1:1 0 10 20 30 40 50 60 70 80 90 100

Rev	Date	Description	By	Chk
A	08/05/23	REVISED TO SUIT COMMENTS FROM IRISH WATER	NS	SDN

Amendments

Project
PROPOSED RESIDENTIAL DEVELOPMENT AT OLD SLANE ROAD, DROGHEDA, CO. LOUTH

Title
PUBLIC WASTE WATER LONG SECTIONS SHEET 2 OF 2

Client
LAGAN HOMES TULLYALLEN LTD.

BLOCK S, EASTPOINT BUSINESS PARK, ALFIE BYRNE ROAD,
DUBLIN D03 H3F4 IRELAND. Tel: (01) 664 8900
Email: info@waterman-moylan.ie www.waterman-moylan.ie

Status
PLANNING

Designed By	Approved	Waterman Ref
NS		23-067
Drawn By: NS	Date: APRIL 2024	Scales @ A1: 1:500H, 1:100V

Project - Originator - Volume - Level - Type - Role - Number
OSR - WMC - ZZ - ZZ - DR - C - 3226
Revision: A

Drawing Location: M:\Projects\23\23-067 Old Slane Road\Drawings\Waterman Moylan\Civil\Autocad Drawings\Phase 2\OSR-WMC-ZZ-GF-DR-C-3225 Wastewater Long Sections.dwg
Date: May 08, 2024 - 5:42pm

C. GDSDS Attenuation Calculations

Block S, EastPoint Business Park,
Alfie Byrne Road, Dublin D03 H3F4
t 01 664 8900 f 01 661 3618 e info@waterman-moylan.ie

Calculation By:	SDN
Approved by:	MD

Project Data

Project Name	Old Slane Road LRD
Project Number	23-067
Client	Lagan Homes
Architect	JFOC Architects
Status	Planning
Date	08/05/2024

Description		%	Area
Total Site Area		-	47,970m²
Paved Area	Total	60%	28,782m²
	Drained	100%	28,782m²
Soil Area	Total	40%	19,188m²
	Drained	0%	0m²

Soil Type:	Type 4
SPR Index (from FSR):	0.47
SAAR:	801mm
Rain Data:	Met Éireann
Climate Change Factor:	20%

Greenfield Runoff:

$Q_{BARrural} = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$

Area = 0.04797km² … *Total site area in km²*
SAAR = 801mm … *Standard Average Annual Rainfall in mm*
SOIL = 0.47 … *The "SPR" index from FSR*

Note: Where a site is <0.5km², the $Q_{BARrural}$ formula should be applied for 0.5km² and the result factored based on the ratio of the actual site area and the applied area.

$Q_{BARrural}$ = 0.027m³/s
$Q_{BARrural}$ = 27.115 l/s
$Q_{BARrural}$ = 5.652 l/s/Ha

Return Period	1-year	30-year	100-year
Growth Factor	0.85	2.10	2.60
Q_{BAR} (l/s)	23.05	56.94	70.50
Q_{BAR} (l/s/Ha)	4.80	11.87	14.70
Allowable Discharge	27.11	27.11	27.11

Rainfall Data:

Rain Data From: Met Éireann Archive
Climate Change Factor: 20%

Duration	Return Period *(Years)*						
(Hours)	1	5	10	20	30	50	100
0.5	9.2	14.4	17.3	20.6	22.7	25.6	30.1
1	12.0	18.4	22.0	25.9	28.4	31.9	37.2
2	15.7	23.5	27.8	32.5	35.5	39.7	46.0
4	20.5	30.0	35.3	40.9	44.5	49.4	56.9
6	23.9	34.7	40.6	46.8	50.8	56.2	64.4
12	31.2	44.3	51.4	58.9	63.6	70.0	79.6
24	40.7	56.6	65.2	74.0	79.7	87.2	98.4
48	49.3	67.3	76.7	86.5	92.5	100.7	112.7

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Calculation By:	SDN
Approved by:	MD

Summary

Project Name	Old Slane Road LRD
Project Number	23-067
Client	Lagan Homes
Architect	JFOC Architects
Status	Planning
Date	08/05/2024

Summary of GDSDS Calculations:

Criterion 1: River Protection Volume

Interception Volume	**115.13m³**
Treatment Volume	**345.38m³**

Criterion 2: River Regime Protection

Critical Storm:	6-hour 1-in-100-year storm
Volume Required	**1,269.03m³**

Criterion 4: River Flood Protection

Long Term Storage *(no interception provided)*	**379.60m³**
Long Term Storage *(Interception provided)*	**264.47m³**

Attenuation Volume Requirement for Various Storm Events:

1-in-1-Year Storm	257.23m³
1-in-5-Year Storm	481.72m³
1-in-10-Year Storm	624.97m³
1-in-20-Year Storm	787.30m³
1-in-30-Year Storm	890.92m³
1-in-50-Year Storm	1,032.53m³
1-in-100-Year Storm	1,269.03m³
Maximum Volume Requirement	**1,269.03m³**

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Calculation By:	SDN
Approved by:	MD

Criterion 1
River Protection Volume

Project Name	Old Slane Road LRD
Project Number	23-067
Client	Lagan Homes
Architect	JFOC Architects
Status	Planning
Date	08/05/2024

1.1 Interception

Paved surfaces connected to drainage system	*47970m² x 0.6 x 1 =* 28,782.00m²	*47,970m² site area* *60% of the site is paved* *100% of the paved area*
Volume of Interception Storage	*28782m² x 5mm x 0.8 =* **115.13m³**	*Paved area directly drained* *5mm rainfall depth* *80% paved runoff factor*

1.2 Treatment Volume

Paved surfaces draining to public drainage network	*47970m² x 0.6 x 1 =* 28,782.00m²	*47,970m² site area* *60% of the site is paved* *100% of the paved area*
Volume of Treatment Storage	*28782m² x 15mm x 0.8 =* **345.38m³**	*Paved area directly drained* *15mm rainfall depth* *80% runoff from paved surfaces*

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Calculation By:	SDN
Approved by:	MD

Criterion 2
River Regime Protection

Project Name	Old Slane Road LRD
Project Number	23-067
Client	Lagan Homes
Architect	JFOC Architects
Status	Planning
Date	08/05/2024

Rainfall Data *(Including 20% increase due to climate change)*

Duration	**Return Period** *(Years)*						
(Hours)	**1**	**5**	**10**	**20**	**30**	**50**	**100**
0.5	9.2	14.4	17.3	20.6	22.7	25.6	30.1
1	12.0	18.4	22.0	25.9	28.4	31.9	37.2
2	15.7	23.5	27.8	32.5	35.5	39.7	46.0
4	20.5	30.0	35.3	40.9	44.5	49.4	56.9
6	23.9	34.7	40.6	46.8	50.8	56.2	64.4
12	31.2	44.3	51.4	58.9	63.6	70.0	79.6
24	40.7	56.6	65.2	74.0	79.7	87.2	98.4
48	49.3	67.3	76.7	86.5	92.5	100.7	112.7

Inflow *(m^3)*

Duration	**Return Period** *(Years)*						
(Hours)	**1**	**5**	**10**	**20**	**30**	**50**	**100**
0.5	265.9	414.5	497.4	594.1	652.8	735.7	866.9
1	345.4	528.4	632.1	746.0	818.6	918.7	1,070.7
2	452.5	677.0	801.3	936.0	1,022.3	1,143.2	1,322.8
4	590.6	863.5	1,015.4	1,177.8	1,281.4	1,423.0	1,637.1
6	687.3	998.2	1,167.4	1,347.0	1,461.0	1,616.4	1,854.7
12	898.0	1,274.5	1,478.2	1,695.8	1,830.5	2,013.6	2,289.9
24	1,170.9	1,630.2	1,875.4	2,131.0	2,293.3	2,510.9	2,832.1
48	1,419.5	1,937.6	2,207.0	2,490.2	2,662.9	2,897.8	3,243.2

Outflow *(m^3)*

Duration	**Return Period** *(Years)*						
(Hours)	**1**	**5**	**10**	**20**	**30**	**50**	**100**
0.5	48.8	48.8	48.8	48.8	48.8	48.8	48.8
1	97.6	97.6	97.6	97.6	97.6	97.6	97.6
2	195.2	195.2	195.2	195.2	195.2	195.2	195.2
4	390.5	390.5	390.5	390.5	390.5	390.5	390.5
6	585.7	585.7	585.7	585.7	585.7	585.7	585.7
12	1,171.4	1,171.4	1,171.4	1,171.4	1,171.4	1,171.4	1,171.4
24	2,342.7	2,342.7	2,342.7	2,342.7	2,342.7	2,342.7	2,342.7
48	4,685.5	4,685.5	4,685.5	4,685.5	4,685.5	4,685.5	4,685.5

Storage Required *(m^3)*

Duration	**Return Period** *(Years)*						
(Hours)	**1**	**5**	**10**	**20**	**30**	**50**	**100**
0.5	217.1	365.7	448.5	545.3	604.0	686.9	818.1
1	247.8	430.8	534.4	648.4	720.9	821.1	973.1
2	257.2	481.7	606.1	740.8	827.1	948.0	1,127.6
4	200.2	473.0	625.0	787.3	890.9	1,032.5	1,246.7
6	101.6	412.5	581.7	761.3	875.3	1,030.7	1,269.0
12	0.0	103.1	306.9	524.5	659.2	842.2	1,118.5
24	0.0	0.0	0.0	0.0	0.0	168.2	489.4
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Calculation By:	SDN
Approved by:	MD

Criterion 4
River Flood Protection

Project Name	Old Slane Road LRD
Project Number	23-067
Client	Lagan Homes
Architect	JFOC Architects
Status	Planning
Date	08/05/2024

Vol_{XS} = RD x A x 10 [(PIMP/100 x α0.8) + (1 - (PIMP/100))(β x Soil) - Soil]

Vol_{XS}			*… Extra runoff volume of development over Greenfield runoff*
RD	=	64 mm	*… Rainfall depth of the 100-year, 6-hour event*
A	=	4.797 Ha	*… Area of site*
PIMP	=	60%	*… Impermeable area of total site*
α0.8	=	100%	*… Proportion of paved area drained to drainage network or river with 80% runoff*
β	=	60%	*… Proportion of pervious area drained to the network or river*
Soil	=	0.47	*… SPR index*

Vol_{XS} = 379.60m³

D. External Quality Audit

traffico
ROAD SAFETY ENGINEERING

Residential Development at Slane Road, Drogheda

Quality Audit

Lagan Homes Ireland Ltd.

April 2024

traffico

Residential at Slane Road, Drogheda

Quality Audit

April 2024

Notice

This document and its contents have been prepared and are intended solely for Lagan Homes Ireland Ltd.'s information and use in relation to the Residential Development at Slane Road, Drogheda.

Traffico assumes no responsibility to any other party in respect of or arising out of or in connection with this document and / or its contents.

Document History

JOB NUMBER: 240031			DOCUMENT REF: 240031RPT001_QA_Rev_1			
1	Final Issue	MD	MD	AB	MD	22 April 2024
0	Draft Issue	MD	MD	AB	MD	5 April 2024
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date

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Appendices

1. Introduction

1.1 Report Context

This report describes the findings of a Quality Audit associated with the Residential Development at Slane Road, Drogheda.

The Audit has been completed by Traffico Ltd. on behalf of Lagan Homes Ireland Ltd.

1.2 Details of Site Inspection

Date	Daylight / Darkness	Weather & Road Conditions
Tuesday 2nd April 2024	Daylight	Foggy with damp road pavements.

Table 1.1 – Site Inspection Details

1.3 The Road Safety Audit Team

The members of the Road Safety Audit Team have been listed following:

Status	Name / Qualifications	TII Auditor Reference No:
Audit Team Leader (ATL)	**Martin Deegan** BEng(Hons) MSc CEng MIEI	MD101312
Audit Team Member (ATM)	**Andrew Butterly** BEng, Bcs (Hons), PCert (RSA), MIEI	AB4429918
Audit Trainee (AT)	-	-

Table 1.2 – Audit Team Details

1.4 Drawings & Documents Examined as Part of the Audit Process

The following drawings and documents were examined as part of the Audit process:

Drawing No.	Drawing / Document Title	Rev.
22.127.PD1003	Phase 2 Site Layout Plan – Block Plan	-
22.127.PD1004	Phase 2 Site Layout Plan – Unit Key	-
22.127.PD2004	Site Layout Plan – Ground Floor	-

Table 1.3 – Designers Drawing & Document List

1.5 Quality Audit Content and Compliance

Procedure and Scope for Quality Audit

This Quality Audit is undertaken in accordance with Section 5.4.2 of the Design Manual for Urban Roads and Streets. The UK Department for Transport Traffic Advisory Leaflet (TAL) 5/11 has also been referred to for guidance.

This Quality Audit consists of the following audit sections:

- Walking, Cycling and Access Audit – focusing on accessibility requirements of vulnerable road users (and in particular, those with visual or mobility impairments), and on the movement and place function requirements of pedestrians and cyclists
- Road Safety Audit – focusing on issues relating directly to road safety

Procedure and Scope Specific to the Road Safety Audit

The Road Safety Audit has been carried out in accordance with the procedures and scope set out in TII publication number GE-STY-01024 - Road Safety Audit.

As part of the road safety audit process, the Audit Team have examined only those issues within the design which relate directly to road safety.

Compliance with Design Standards

The road safety audit process is not a design check, therefore verification or compliance with design standards has not formed part of the audit process.

Minimizing Risk of Collision Occurrence

All problems described in this report are considered by the Audit Team to require action in order to improve the safety of the scheme and minimise the risk of collision occurrence.

2. Walking, Cycling and Access Audit

2.1 Best Practice Guidance

This Quality Audit has been carried out in accordance with general best practice guidance set out within the following documents:

- The Disability Act 2005
- Building Regulations 2000, Technical Guidance Document M – Access for People with Disabilities (Department of the Environment, Heritage and Local Government)
- Buildings for Everyone Access and use for all citizens (National Disability Authority)
- Access Auditing of the Built Environment Guidelines (National Disability Authority)
- Traffic Management Guidelines (Irish Government Publications 2003)
- Guidance on the use of Tactile Paving Surfaces: UK Department for Transport.

2.2 Objectives of the Walking, Cycling and Access Audit

The objectives of this Walking, Cycling and Access Audit are as follows:

- To ensure a high level of accessibility to the proposed development site for all vulnerable road users and in particular, for visually and mobility impaired users
- To ensure that the current and future access needs within the scheme are recognised and developed
- To ensure that advantage is afforded to walkers and cyclists at every opportunity.

2.3 General Accessibility Recommendations

Following delivery of the Walking, Cycling and Access Audit, the design team should consider all issues raised herein for inclusion into the final design. It is less costly to make the changes now, pre-construction, than later after the scheme has been commissioned.

The client should consider setting up a dedicated access team for the project, responsible for the long-term management of universal access throughout the development.

This process should be facilitated by an Access Plan, which is a strategy for improving accessibility developed from the Audit and can ensure that access is an on-going concern and help identify opportunities for change.

The access plan should incorporate planned maintenance programmes, a schedule of works that has been devised to take into account the priority information in the Audit, processes to allow regular updating of the Audit information and links to maintenance and management procedures.

It should also set out procedures to ensure that when opportunities for access improvement arise, they are recognised.

2.4 Specific Walking, Cycling and Accessibility Recommendations

A summary of the design features, together with recommended actions to be taken during the relevant stage of the design or operation of the scheme have been detailed in the following table.

Table 2.1 - Walking, Cycling and Access Audit Summary Table

I.D.	Location	Feature	Action	When
Recommendations to Encourage Walking				
W1	Footpaths within Slane Rd Residential Development	Pedestrian provision & universal access	Ensure pedestrian environments are logical, continuous, easy to understand and consistent throughout the development.	Design Stage
W2	Footpaths within Slane Rd Residential Development	Pedestrian Provision / Universal Access	Ensure continuity for pedestrians is provided at crossing points, and that crossing points are located with good forward stopping sight distance for approaching vehicles.	Design Stage
W3	Pedestrian linkage to external Public Roads serving Slane Rd Residential Development	Pedestrian provision – connections to external public roads	Provide seamless connections onto the external public roads to encourage uptake for car sharing / public transport.	Design Stage
W4	Footpaths serving Slane Rd Residential Development	Street furniture positioning	Ensure street furniture is carefully positioned to avoid obstruction in footways and to maximise the effective width.	Design & Operational Stages
W5	Footpaths serving Slane Rd Residential Development	Footpaths and crossing points	Ensure footpaths and crossing points are located on all significant desire lines, where they are safe and convenient to use for all vulnerable road users.	Design Stage
W6	Footpaths serving Slane Rd Residential Development	Pedestrian Provision / Universal Access	Ensure continuity for pedestrians is provided at crossing points, and that crossing points are located with good forward stopping sight distance for approaching vehicles.	Design Stage
W7	Footpaths serving Slane Rd Residential Development	Pedestrian Provision / Universal Access	At access points through the site boundaries which connect with public thoroughfares, all internal footpaths should link seamlessly with external footpaths / walking opportunities to accommodate universal access and facilitate pedestrian progression.	Design Stage

I.D.	Location	Feature	Action	When
	Recommendations to Encourage Cycling			
C1	Internal Streets within Slane Rd Residential Development	Streets where car and cycling use is integrated	Upon entering the development streets, drivers should immediately recognise that they are in a shared space where their behaviour should be adjusted to suit the environment. To achieve this, appropriate measures should be prescribed which might make it abundantly clear to drivers that the movement of cyclists takes precedence over vehicles. This might be achieved with gateway treatment, lane narrowing, surface materials or lane cycle logos.	Design Stage
C2	Shared cycling and walking areas within Slane Rd Residential Development	Pedestrian & cyclist facilities.	Conflicts can arise where different modes of transport share the same space. Ensure cycle environments are logical, continuous, and legible throughout the development. Where cyclists are encouraged to share with pedestrians, ensure that sufficient width and end user information are provided.	Design Stage
C3	Formal Road Crossings within Slane Rd Residential Development	Continuity and crossing.	Ensure continuity for cyclists and pedestrians are provided at key crossing points, and that crossing points are located with good forward stopping sight distance for approaching vehicles (these should not be obscured with landscaping).	Design Stage
C4	All dedicated cycling provisions within Slane Rd Residential Development	Street furniture positioning.	Ensure street furniture is carefully positioned to avoid obstruction in footpaths / cycle paths (if applicable) and to maximise the effective width available to cyclists.	Design & Operational Stages
C5	Dedicated cycle tracks within Slane Rd Residential Development	Commencements and terminations	Where cycle tracks commence, measures to allow ease of access for cyclists should be included. Where cycle tracks terminate, then termination points should be carefully designed to optimise cycle safety.	Design Stage
C6	Cycle Parking Areas within Slane Rd Residential Development	Cycle Parking	Ensure appropriate cycle parking is provided within the development to encourage uptake for cycling. Ensure it is comfortable and safe for cyclists to access the parking.	Design Stage

I.D.	Location	Feature	Action	When
C7	Cycle Parking Areas within Slane Rd Residential Development	Cycle Parking & security	To encourage use and safeguard security, position cycle parking away from isolated areas and close to building entrances which are well lit and have natural passive surveillance. Consider providing cover over the cycle parking to protect cyclists from the elements where possible.	Design Stage
Recommendations to Provide for Universal Access & Accessibility				
A1	Footpaths serving Slane Rd Residential Development	Dropped kerbs & tactile paving	Ensure appropriate dropped kerbs and tactile paving are provided at key crossing points.	Design Stage
A2	Footpaths serving Slane Rd Residential Development	Universal Access – footpath types and finishes	Ensure consistency in the types of footpath surface utilised and ensure that the surface provides appropriate contrast with the adjacent road pavement.	Design Stage
A3	Footpaths serving Slane Rd Residential Development	Universal Access – material contrast	Ensure contrasting colours/materials are used to define areas which are meant for sole use by vulnerable road users.	Design Stage
A4	Footpaths serving Slane Rd Residential Development	Universal Access – footpaths	Ensure that measures are taken to actively maintain and police errant car parking on footpaths which might impact negatively upon pedestrian progression.	Design Stage & Operational Stage
A5	Footpaths serving Slane Rd Residential Development	Definition of footpath edges & terminations	Ensure footpath edges are clearly defined and ensure that appropriate termination details are provided when footpaths end.	Design Stage
A6	Footpaths serving Slane Rd Residential Development	Steps - legibility	Ensure steps are legible and easy to define by providing step nosings with contrasting colour.	Design Stage
A7	Building structures – Slane Rd Residential Development	Building Entrances	Ensure that dwelling entrances are well defined and by employing colours and material finishes which contrast with the rest of the building façade.	Design Stage
A8	Building structures – Slane Rd Residential Development	Building Entrances	Ensure clear sight lines to house entrances are provided from all approaches to the buildings. Trees and street furniture should not block these.	Design Stage
A9	Footpaths serving Slane Rd Residential Development	Street Lighting	Ensure public lighting is located where pedestrian movement decisions are required (i.e. at crossing points, entrances and in shared street areas).	Design Stage

I.D.	Location	Feature	Action	When
A10	External Landscaped areas serving Slane Rd Residential Development	Drainage gaps	Ensure any break in surface or gap (such as a drainage gulley) is no greater than 10mm and is perpendicular to line of travel. Locate drainage features both away from (and up gradient from) crossing points.	Design Stage
A11	External Landscaped areas serving Slane Rd Residential Development	Drainage / pavement gradients	Ensure access routes are constructed with even and gentle falls to allow proper drainage and prevent the formation of puddles. The cross-fall gradient to any access route should not exceed 1 in 50, except when associated with a dropped-kerb.	Design Stage
A12	External Landscaped areas serving Slane Rd Residential Development	Obstructions from Street Furniture or landscaping	Ensure street furniture / landscaping do not encroach on the clear width of pathways.	Design Stage
A13	External Landscaped areas Slane Rd Residential Development	Street Furniture – visually impaired	Ensure street furniture contrasts in colour with the surrounding pavement surfaces.	Design Stage
A14	Car Parking Areas within Slane Rd Residential Development	Universal access to parking	Ensure car parking is accessible, easy to use, and sufficient parking spaces are provided within a well-designed environment to meet the needs of all end users who might (reasonably) be expected to use them.	Design Stage
A15	Car Parking Areas within Slane Rd Residential Development	Disabled parking (if applicable)	Ensure the location of designated spaces for car users with disabilities are located as close as possible to the building access points.	Design Stage
A16	Car Parking Areas within Slane Rd Residential Development	Car park & boundary treatment	Ensure that access to/from parked vehicles is not inhibited by boundary treatments, trees, hedges, street furniture or structural features.	Design Stage
A17	Bin storage within Slane Rd Residential Development	Bin storage	Bin storage and collection can lead to obstruction of the footpaths and cycle facilities. The Designer should ensure that refuse truck access and turning, bin storage and bin collection are all considered and comprehensively catered for within the development proposals.	Design Stage

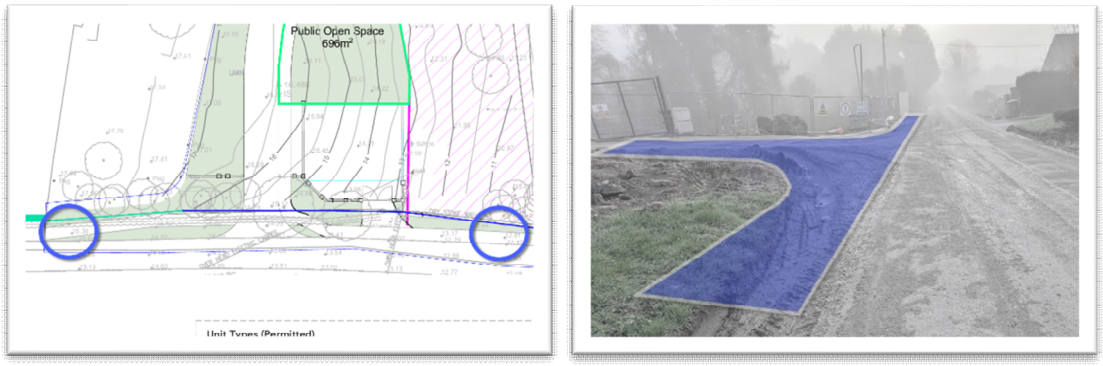
3. Stage 1 Road Safety Audit Problems

3.1 Problem: Treatment of Footpath Terminations on Public Road

Location: Footpath Terminations at Direct Access onto Old Slane Road

The footpath terminations could result in vehicle strikes in low light conditions and progression issues for pedestrians attempting to gain access to them from the public road.

Figure 3.1 – Footpath Terminations Either Side of Direct Access onto Old Slane Road



Recommendation

The footpath terminations should be designed to facilitate universal access for pedestrians. This should be coupled with appropriate measures for drivers to highlight the presence of the footpath terminations during low light conditions.

3.2 Problem: Facilities for Pedestrians to Cross Internal Streets

Location: Throughout Development Streets at Key Pedestrian Crossing Desire Lines

Failing to provide facilities for pedestrians to cross the internal streets could lead to slips, trips and progression issues for mobility impaired road users.

Figure 3.2 – Examples of Some Key Pedestrian Crossing Desire Lines within Development Streets

Recommendation

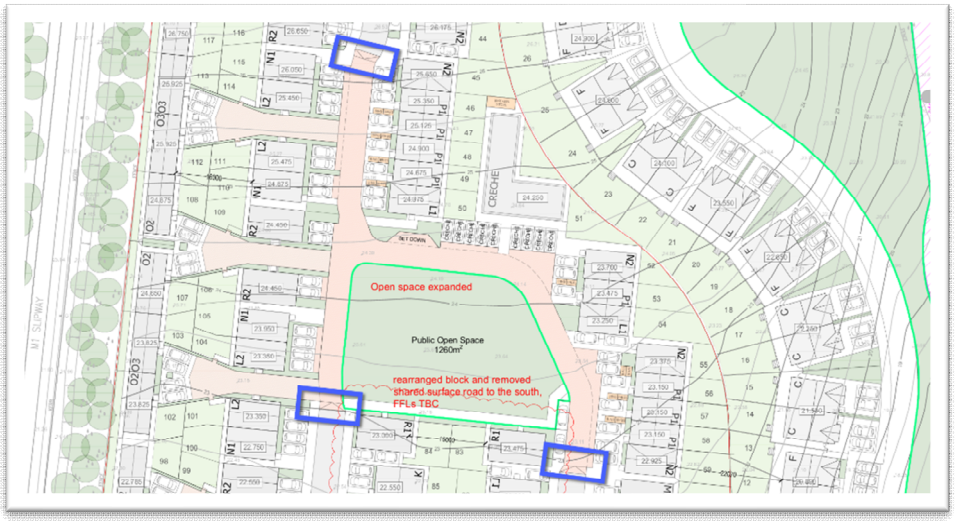
Appropriate pedestrian crossings should be provided on all key crossing desire lines within the internal street network.

3.3 Problem: Treatment of Homezone Entry Points

Location: All Homezone Gateway Entry Points

It may not be readily apparent to drivers entering Homezone streets that they will be required to give way to pedestrians (including children at play), who will be sharing the road space with them. This is likely to increase the risk of conflict between vehicles and vulnerable road users in Homezone streets.

Figure 3.3 – Example Locations Where Drivers will Enter Homezone Streets and Mix with Pedestrians



Recommendation

Appropriate measures should be prescribed to make it abundantly clear to drivers that they are entering a Homezone environment where the movement of vulnerable road users is afforded priority over the movement of vehicles. Such measures might include a change in surface treatment colour, in-lane Homezone roundels and / or Homezone gateway signage which could be installed at entry points.

4. Audit Team Statement

4.1 Certification & Purpose

We certify that we have examined the drawing listed in Chapter 1 of this Report.

Sole Purpose of the Road Safety Audit

The Road Safety Audit has been carried out with the sole purpose of identifying any features of the design which could be removed or modified to improve the road safety aspects of the scheme.

4.2 Implementation of RSA Recommendations

The problems identified herein have been noted in the Report together with their associated recommendations for road safety improvements.

We (the Audit Team) propose that these recommendations should be studied with a view to implementation.

Audit Team's Independence to the Design Process

No member of the Audit Team has been otherwise involved with the design of the measures audited.

4.3 Road Safety Audit Team Sign-Off

Martin Deegan
Audit Team Leader
Road Safety Engineering Team
traffico

Signed: 

Date: 5th August 2024

Andrew Butterly
Audit Team Member
Road Safety Engineering Team
traffico

Signed: 

Date: 5th August 2024

5. Responding to the Road Safety Audit

5.1 How the Designer Should Respond to the Road Safety Audit

The Designer should prepare an Audit Response for each of the recommendations using the Road Safety Audit Feedback Form attached in Appendix A.

When completed, this form should be signed by the Designer and returned to the Audit Team for consideration. See flow-chart following for further description.

Figure 5.1 – Road Safety Audit Sign-Off and Completion Process

5.2 Returning the Completed Feedback Form

The Designer should return the completed Road Safety Audit Feedback Form attached in Appendix A of this report to the following email address:

- Email address: martin@traffico.ie

The Audit Team will consider the Designer's response and reply indicating acceptance or otherwise of the Designers response to each recommendation.

Triggering the Need for an Exception Report

Where the Designer and the Audit Team cannot agree on an appropriate means of addressing an underlying safety issue identified as part of the audit process, an Exception Report must be prepared by the Designer on each disputed item listed in the audit report.

Appendix A

A.1 Road Safety Audit Feedback Form

Road Safety Audit Feedback Form

Scheme: Residential Development at Slane Road, Drogheda

Audit Stage: Stage 1 Road Safety Audit | **Audit Date:** 5th April 2024

Problem Reference (Section 3)	Designer Response Section			Audit Team Response Section
	Problem Accepted (yes / no)	Recommended Measure Accepted (yes / no)	Alternative Measures or Comments	Alternative Measures Accepted (yes / no)
3.1	Yes	Yes	Note that this is outside the redline and scope of the subject application. However, as part of the permitted works, which are under construction, a scope of off-site upgrade works have been agreed with LCC. This scope of works includes provision of a new footpath extending approximately 220m east of the site, with a new pedestrian crossing connecting to the existing footpath on the south of the road. It also includes provision of a new footpath extending approximately 100m to the west of the site, with a new pedestrian crossing to be provided.	Comment noted & accepted.
3.2	Yes	Yes	Appropriate pedestrian crossings have been added throughout the development at key crossing desire lines.	Comment noted & accepted.
3.3	Yes	Yes	Appropriate measures have been implemented to make it abundantly clear to drivers that they are entering a Homezone environment. These measures include a ramp-up entry treatment and change of road surfacing to a buff colour.	Comment noted & accepted.

**The Designer should complete the Designer Response Section above, then fill out the designer details below and return the completed form to the Road Safety Audit Team for consideration and signing.*

Designer's Name:	Mark Duignan	Designer's Signature:	Mark Duignan	Date:	22/04/2024
Employer's Name:	Colm Burns	Employer's Signature:		Date:	22/4/24
Audit Team's Name:	Martin Deegan	Audit Team's Signature:		Date:	22 April 2024

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