

LISMORE HOMES LIMITED

Residential Development Baldoyle GA2

Water Services Report



Document Control Sheet

Client:	Lismore Homes Limited
Project Title:	Residential Development Baldoyle GA2
Document Title:	Water Services Report
File Name:	20211-JBB-00-XX-RP-C-00003_Water_Services_Report_P05

Table of Contents <i>(incl. Y/N)</i>	List of Tables <i>(incl. Y/N)</i>	List of Figures <i>(incl. Y/N)</i>	Pages of Text <i>(No.)</i>	Appendices <i>(No.)</i>
Y	N	N	9 No.	3 No.

Document Revision				Document Verification			
Issue Date <i>(DD/MM/YY)</i>	Revision Code	Suitability Code	Author <i>(Initials)</i>	Checker <i>(Initials)</i>	Reviewer <i>As Per PMP (Initials)</i>	Approver <i>As Per PMP (Initials)</i>	Peer Review <i>(Initials or N/A)</i>
Add hyperlink to Verification Email on PIM Register for each issue							
29/01/2021	P01	S0	JO'B	SW	JO'B	JO'B	N/A
22/11/2021	P02	S0	JO'B	SW	JO'B	JO'B	N/A
23/11/2021	P03	S0	JO'B	SW	JO'B	JO'B	N/A
04/01/2022	P04	S0	JO'B	SW	JO'B	JO'B	N/A
24/02/2022	P05	S0	JO'B	SW	JO'B	JO'B	N/A

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SECTION 1: INTRODUCTION

- 1.1 Lismore Homes Limited is applying for Planning Permission to An Bord Pleanála (ABP) for a residential development at Baldoyle in the townland of Stapolin, Baldoyle, Dublin 13. The proposed development corresponds to Growth Area 2 in the Baldoyle Stapolin LAP. This report has been prepared in support of the Planning Application. It takes account of the requirements of the Baldoyle Stapolin Local Area Plan (2013-2019 Extended) including Appendix 1 - SuDS Strategy and the Fingal County Development Plan (2017-2023).
- 1.2 The proposed development consists of a Strategic Housing Development for the construction of 1,007 residential apartments (consisting of 58 no. studio units, 247 no. 1 bedroom units, 94 no. 2 bedroom 3 person units, 563 no. 2 bedroom 4 person units, and 45 no. 3 bedroom units), communal residential community rooms, and a ground floor creche in 16 no. buildings with heights varying from 4 to 12 storeys, basement and surface level car parking, secure covered bicycle parking, landscaping, water supply connection at Red Arches Road, and all ancillary site development works on a site located in the townland of Stapolin, Baldoyle, Dublin 13.

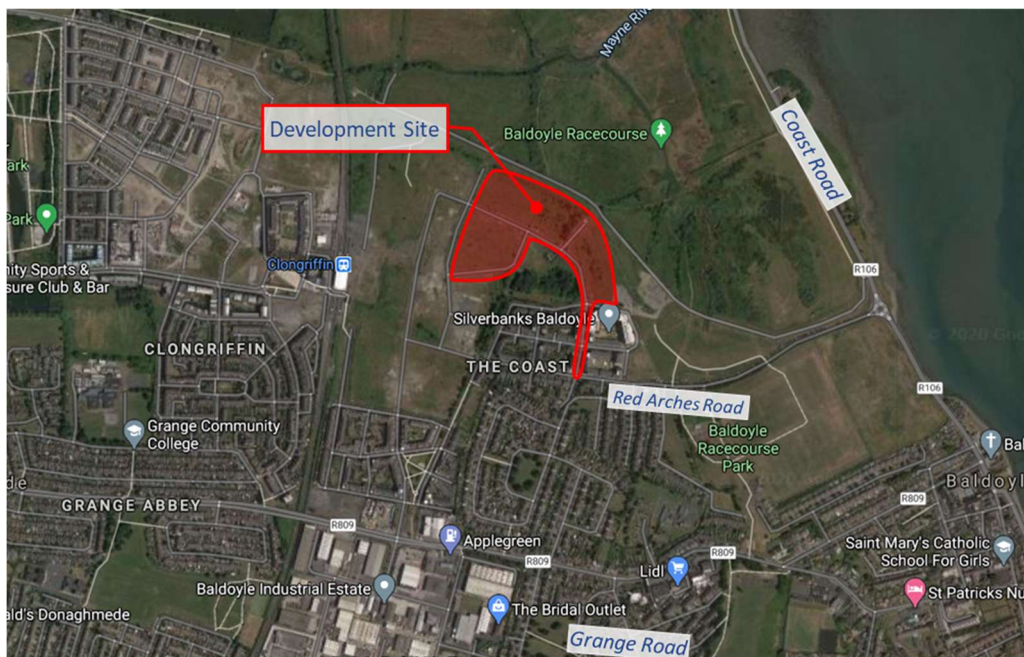


Figure 1: Location of Proposed Development
(Source: Google Maps, annotation by J.B. Barry & Partners)

- 1.3 This report addresses the following:
- Water Supply.
 - Foul Sewer Design.
 - Surface Water Design

SECTION 2: WATER SUPPLY

2.1 It is proposed to connect the proposed Baldoyle GA2 development to the existing watermain network in the Baldoyle Stapolin LAP lands which is fed by the adjacent North Fringe Watermain. Watermains are currently present in the roads running through the proposed development, but these have had little use since they were installed in the mid 2000's. As there is a doubt about their integrity, it is proposed that they are grubbed up, removed and replaced with an entirely new network. It is a requirement of Irish Water that the new network is connected to the 300mm watermain in Red Arches Road c. 170m from the boundary of the subject development. The proposed new watermain layout including the connection to Red Arches Road is shown on the accompanying drawing 20211-JBB-00-XX-DR-C-01002.

2.2 The projected water demand for the residential units is as follows:

$$1,007 \text{ units} \times 2.7 \times 150\text{l/head/day} = 407,835 \text{ litres}$$

$$\text{Average} = 407,835/24 \times 3600 = 4.72 \text{ litres/sec}$$

$$\text{Average Hour Water Demand} = 4.72 \times 1.25 = 5.90 \text{ litres/sec}$$

$$\text{Peak Hour Water Demand} = 5.90 \times 5 = 29.5 \text{ litres/sec}$$

The projected water demand for the Creche (assuming a total of 250 children and staff) is as follows:

$$250 \times 60 \text{ l/head/day} = 15,000 \text{ litres}$$

$$\text{Average} = 15,000/8 \times 3600 = 0.52 \text{ litres/sec}$$

$$\text{Average Hour Water Demand} = 0.52 \times 1.25 = 0.65 \text{ litres/sec}$$

$$\text{Peak Hour Water Demand} = 0.65 \times 5 = 3.25 \text{ litres/sec}$$

$$\text{The combined Average Hour Water Demand} = 5.90 + 0.65 = 6.55 \text{ litres/sec}$$

$$\text{The combined Peak Hour Water Demand} = 29.5 + 3.25 = 32.75 \text{ litres/sec}$$

2.3 A Pre-Connection Enquiry form was submitted to Irish Water on the 20th July 2020. A Confirmation of Feasibility was issued by Irish Water on the 28th January 2021 and a copy of this is included in Appendix 1. A Design Acceptance submission was submitted on 16th August, 2021. A Confirmation of Design Acceptance was issued by Irish Water on 18th November, 2021 and copy of this is also included in Appendix 1.

2.4 Watermain works, Water Conservation Measures, Metering and Pressure Control will be strictly in accordance with Irish Water and Fingal County Council requirements, specifications and standard details.

2.5 Water Management and Conservation Plan (Objective WS4 of Baldoyle-Stapolin LAP).

Water conservation measures to be adopted in the design of the proposed development will include the following:

- Dual Flush Toilets – provides the option to use a smaller volume of water for flushing.
- Aerator Taps – introduces air into the water flow reducing the volume of water used.

- Aerator Shower Heads – introduces air into the water flow reducing the volume of water used.
- Shower Timer – timer set to reduce the time spent in the shower.

In addition, emerging conservation technologies will be kept under review and adopted if deemed appropriate.

During the operational stage of the project, a Water Conservation Plan will be developed by the Management Company which will encourage the residents to adopt water conservation measures in their day to day activities. Examples of the potential measures that would be included in the Water Conservation Plan are as follows:

- Take a shower instead of a bath.
- Turn off the tap when brushing teeth.
- Consider only flushing toilet when it's really needed.
- Use a basin in the sink when rinsing and reuse the water for watering plants.
- Keep a jug of water in the fridge instead of running the tap for cold water.
- Run the washing machine and dishwasher only with full loads.
- Fix dripping taps.
- Regularly check pipes for leaks.

The above water saving measures ensure compliance with Objective WS5 of the Baldoyle-Stapolin LAP.

Stormwater management is dealt with in detail in Section 4 and Appendix 3.

SECTION 3: FOUL EFFLUENT DISPOSAL

- 3.1 It is proposed to connect the foul sewerage from the development to the existing foul sewer network in the Baldoyle Stapolin LAP lands. The network discharges to an existing pumping station in Stapolin Haggard from where it is pumped to the North Fringe Sewer. The pumping station has not been taken in charge. It will be upgraded as required by Irish Water in conjunction with the developer of Growth Areas 1 and 3 in accordance with the conditions of the Memorandum of Agreement dated 24th July 2003 between Helsingor Limited (the registered owner per Folio 3241 and Folio 132779F County Dublin in the Land Registry) and Penshanko Limited that applies to the application site. Foul sewers are currently present in the roads running through the proposed development, but these have had little use since they were installed in the mid 2000's. As there is a doubt about their integrity, it is proposed that they are grubbed up, removed and replaced. These works will be undertaken in the initial groundworks phase of the proposed development to ensure there is no inadvertent connection to the existing network. It is therefore not necessary to carry out a condition survey of the existing sewers as required by Objective WW3 of the LAP. The proposed new foul sewer network is shown on accompanying drawing 20211-JBB-00-XX-DR-C-01003.
- 3.2 The estimated Dry Weather Flow (DWF) based on Section 3.6 and Appendix C, IW Code of Practice for Wastewater Infrastructure (December 2017 – Rev 1) is as follows:
- The projected foul flow from the residential units is:
- $$1,007 \text{ units} \times 446 = 449,122 \text{ litres/sec}$$
- $$1 \text{ DWF} = 449,122/24 \times 3600 = 5.20 \text{ litres/sec}$$
- $$6 \text{ DWF} = 5.20 \times 6 = 31.20 \text{ litres/sec}$$
- The projected foul flow from the Creche is as follows:
- $$250 \text{ staff and children} \times 60 \text{ litres/head/day} = 15,000 \text{ litres}$$
- $$1 \text{ DWF} = 15,000/8 \times 3600 = 0.52 \text{ litres/sec}$$
- $$6 \text{ DWF} = 0.52 \times 6 = 3.12 \text{ litres/sec}$$
- $$\text{Combined 1 DWF} = 5.20 + 0.52 = 5.72 \text{ litres/sec}$$
- $$\text{Combined 6 DWF} = 31.20 + 3.12 = 34.32 \text{ litres/sec}$$
- A Pre-Connection Enquiry was submitted to Irish Water on 20th July 2020. A Confirmation of Feasibility was issued by Irish Water on the 28th of January 2021 and a copy is included in Appendix 1. A Design Acceptance submission was submitted to Irish Water on 16th August 2021. A Confirmation of Design Acceptance was issued by Irish Water on 18th November 2021 and copy of this is also included in Appendix 1.
- 3.3 Foul sewer construction will comply with Fingal County Council and Irish Water's requirements, specification and standard details.

SECTION 4: SURFACE WATER MANAGEMENT

- 4.1 It is proposed to connect surface water runoff from the proposed development to a new surface water sewer network within the Baldoyle Stapolin LAP lands. Currently, surface water sewers are present in the roads running through the proposed development and outfall under the North Fringe Sewer and Watermain to the Mayne River. The existing surface water sewers have had little use since they were installed in the mid 2000s. In addition, the sewers were laid at a depth that will not allow discharge by gravity above the existing North Fringe Sewer to a wetland within the open space to the north as required by the LAP. Consequently, to comply with the LAP, finished ground levels will have to be raised by up to 1.5m and a new surface water network for the proposed development will have to be installed. The existing surface water sewer network will therefore be grubbed up and removed and these works will be undertaken in the initial groundworks phase of the proposed development to ensure that there is no inadvertent connection to the existing network. Details of the proposed new network are shown on accompanying drawing 20211-JBB-00-XX-DR-C-01003. This new network will discharge to a new permitted network to be installed by The Shoreline Partnership for Growth Area 3 (ABP ref. TA06F.311016). This discharges to a new outfall pipe which traverses over the North Fringe Sewer and discharges into a new permitted wetland in the open space area. The wetland discharges to the Mayne River and ultimately to Baldoyle Estuary through a series of flap valves.
- 4.2 As noted in Appendix 1 of the LAP, the site is located adjacent to Baldoyle Estuary and as there is no downstream development before outfalling to the Irish Sea, it is not required to provide full attenuation for the 100 year return storm. Storm events will be allowed to overflow into the 40 hectare Mayne River flood plain. Full Interception storage will be provided within the proposed development which means that both treatment storage and long-term storage are not required.

Interception storage will be provided within SuDS devices as outlined below:

Interception Storage

The total area (hardstanding, roofs, roads & paving) which drains positively to the surface water network is 42,640m² which requires a minimum 5mm interception storage volume equating to 213m³.

Proposed SuDS Devices and Interception storage will be provided by the following:

- Green Roofs are proposed over a total area of 10,937m². The green roofs will include a drainage mat which will provide a minimum of 10mm of interception storage per 1 m², allowing for a total interception storage of 109.37m³ at roof level.
- Podiums over underground car parks are proposed over a total area of 13,000m². The Podiums will include permeable paving and a drainage mat which will provide a minimum of 10mm of interception storage per 1 m², allowing for a total interception storage of 130m³ at podium level.

The Green Roofs/Podiums noted above have a total combined area of 23,937m² (10,937m² + 13,000m²) which equates to 68% of combined roof + podium areas (22,024m² + 13,000m²). The green roofs will include a drainage mat which will provide a minimum of 10mm of interception storage per 1 m², allowing for a total interception storage of 239.37m³ at roof/podium levels.

In addition to the measure noted above, further interception storage and treatment will be provided within the development with the use of supplementary SuDS systems eg swales, filter drains.

Interception Storage Summary

Total Area (hardstanding, roofs, road & paving)	= 42,640m ²
Required Interception Storage (5mm) (0.005m x 42,640 m ²)	= 213m ³
Provided Interception Storage	
Green Roofs	109.37m ³
Podiums	<u>130.00m³</u>
Total Provided =	239.39m ³

The total provided interception storage is 239.37m³ which is 12% more than the minimum requirement. As full interception storage has been provided, treatment storage is not required.

Long-sections of the proposed surface water drainage system including cover levels, invert levels, pipe gradients and diameters have been generated with the aid of MicroDrainage and are included in Appendix 2.

- 4.3 SuDS (Sustainable Urban Drainage Systems) is defined in The SuDS Manual, CIRIA 753, 2015 as follows:

"Drainage systems that are considered to be environmentally beneficial, causing minimum or no long-term detrimental impact."

The SuDS strategy adopted for the proposed development provides a comprehensive approach to the management of storm water on the site in line with the SuDS triangle namely, water quality, water quantity and amenity/biodiversity. The treatment train approach has been adopted for the design of the storm water system for the development. This approach uses suitable SuDS measures in providing source, site and regional controls. The SuDS recommendations included in the Baldoyle Stapolin LAP have been assessed and have been included where deemed appropriate and suitable for this development. The storm water wetland is included as one of the essential SuDS measures for the development. A SuDS Hierarchy sheet is contained in Appendix 3 and ensures compliance with the SuDS Strategy as required by Objective SW2 of the Baldoyle-Stapolin LAP.

- 4.4 The various SuDS measures proposed for Baldoyle GA2 are discussed below under the following headings:

- Source Controls.
- Site Controls.
- Regional Controls.

4.5 Source Controls

Source Control measures can be defined as: *"the control of runoff at or near its source"*. In the case of this development, this relates to the individual buildings and associated footpaths.

SuDS measures proposed, within the curtilage of dwellings, include the following:

- Green Roofs.
- Podiums including Permeable Paving.

There is provision for overflows from the above source controls to the proposed storm water sewers in the road carriageways.

4.6 Site Controls

Site control is defined as: *"a control which is designed to control storm water quality and/or quantity for a small development or site"*.

SuDS measures proposed as site controls within public road carriageways and the public open space include the following:

- Bio-retention areas/tree pits.
- Swales running parallel to road carriageways/footpaths.
- Filter drains running parallel to footpaths.
- Silt and Hydrocarbon interceptors for road carriageways/carpark areas.

4.7 Regional Controls

Regional Control is defined as: *"a storm water control practice which is designed to control storm Water quality and/or quantity from a large urban development, or a group of developments."*

A storm water wetland is provided in the open space amenity lands to the north of the proposed development consented under planning permission F16A/0412. This wetland is a regional control as recommended in the SuDS Strategy Briefing Document, Baldoyle Stapolin LAP. All storm water from the proposed development will pass through the wetland for attenuation and treatment prior to discharge to Baldoyle Estuary. The wetlands comply with the Storm Water Wetland Briefing Paper, GDSDS.

- 4.8 The storm water run-off from the Development will pass through a minimum of 2 SuDS Devices. This treatment train approach complies with Volume 2, New Development, GDSDS and the LAP Appendix 1.
- 4.9 The green roofs will be designed and supplied by a reputable supplier as well as any additional measures required pursuant to planning conditions which may be imposed.
- 4.10 The storm water system will be in accordance with "The Regional Code of Practice for Drainage Works.

SECTION 5: RESPONSES TO PLANNING AUTHORITY COMMENTS

5.1 Both An Bord Pleanala and Fingal County Council have reviewed the documentation submitted during the pre-application consultation process. In addition, a tri-partite meeting has taken place where the details of the proposed development were discussed.

5.2 **An Bord Pleanala Opinion**

An Bord Pleanala has issued an opinion which includes Item 10 which deals with drainage/SUDS issues. This states that the full application is to include:

Response to issues raised in Appendix C of the Planning Authority Report, which includes the internal reports of the Drainage Dept. relating to SUDS hierarchy;

Response

The issues raised by the Planning Authority are dealt with on an Item by item basis below.

5.3 **Fingal County Council Opinion - Water Services**

Fingal County Council has issued an opinion noting the following points with regard to drainage.

FCC Point 1

The applicant has received confirmation of feasibility which states that connection is feasible subject to upgrades which are listed within the Irish Water feasibility letter. The applicant should be requested to clarify that the upgrades required can be provided.

Response

Irish Water requires that the watermain connection for GA2 is taken from the existing watermain in Red Arches Road and the red line application boundary has been extended to include this. This watermain connection will be carried out by Irish Water following the signing of a Connection Agreement.

Upgrade works to the existing foul sewer pumping station will be required and Irish Water has confirmed that these works will be agreed at Connection Agreement stage. It will be upgraded in conjunction with the developer of Growth Areas 1 and 3.

FCC Point 2

A hydraulic assessment was requested to be undertaken by the applicant to assist in the estimation of potential flood risk to the proposed development from the Mayne River. This should be requested to be submitted as part of any application going forward.

Response

A Flood Risk Assessment which includes a hydraulic assessment of the Mayne River has been carried out by Jeremy Benn Associates and accompanies this planning application as a separate document. This ensures compliance with Objective FRM3 of the Baldoyle-Stapolin LAP.

FCC Point 3

The applicant should be requested to submit a Suds hierarchy sheet to justify the use and non use of certain Suds measures and clarify if it is intended to provide for permeable paving as part of the scheme

Response

A SuDS hierarchy sheet is included in Appendix 3. It is proposed that permeable paving is provided in the courtyard/podium areas which will be in the control of the Management Company.

FCC Point 4

The planning authority still has concerns over the scale of the proposed wetland which was designed in a manner to serve unit numbers (c1900) set out within the LAP document. This pre-app together with the 2 no. concurrent pre-apps for GA1 and GA3 deviate significantly from this and as such the planning authority would question whether the scale of the wetland is large enough to serve all the development being proposed.

Response

As noted in Appendix 1 of the LAP, the GA1, GA2 and GA3 development sites are located adjacent to Baldoyle Estuary and as there is no downstream development, it is *not required to provide full attenuation for the 100 year return storm* as per the normal requirements in the Greater Dublin Strategic Drainage Study. In accordance with the LAP, the size of the wetland is based upon providing a treatment volume (Vt) equal to 15mm of rainfall on the impervious areas (roofs, roads, hardstanding etc) of GA1, GA2 and GA3. Although the proposed number of units has increased, this has been achieved by increasing the heights of the proposed developments. The impervious areas, therefore, have remained broadly the same and an increase in the size of the wetland is not proposed.

FCC Point 5

Given that some of the proposed water service infrastructure is located outside of the red line boundary of the site the Bord should satisfy itself that the applicant has the ability to undertake such works.

Response

The red line application boundary has been extended to include the watermain connection to Red Arches Road and consent is addressed in the planning report that accompanies this SHD application. The foul sewer connection to the existing infrastructure adjacent to manhole F1.1 is also present within the red line. It is proposed to connect the surface water outfall from the GA2 development to the permitted surface water network for GA3 (ABP ref TA06F.311016) at manhole S1.2 which again is within the application red line. The watermain and foul and surface water sewer connections are shown on drawings 20211-JBB-00-XX-DR-C-01002 and C-01003 respectively.

SECTION 6: FLOOD RISK ASSESSMENT

- 6.1 A Flood Risk Assessment, which contains a hydraulic study of the Mayne River, has been carried out (as required by Objective FRM3 of the Baldoyle-Stapolin LAP) by Jeremy Benn Associates and is included in the planning application as a separate document. Table 5-1 in Section 5.3 details the maximum flood levels for both fluvial and tidal events taking Climate Change into account. The maximum flood level is +4.42m OD for the 0.1% AEP HEFS Tidal scenario.

The lowest finished floor level of the buildings is +6.20m OD which is 1.78m above the 0.1% AEP HEFS flood level. The lowest level at the entrance to the underground car parks is +4.65m OD which is 0.23m above the 0.1% AEP HEFS flood level. The basements will be lined concrete structures designed in accordance with the Water Retaining Eurocode and will be fully sealed below this level. Reference to the basements is contained in Section 5.3 of the Flood Risk Assessment as required by Objective FRM4 of the Baldoyle-Stapolin LAP.

APPENDIX 1:

IRISH WATER – CONFIRMATION OF FEASIBILITY STATEMENT

IRISH WATER – CONFIRMATION OF DESIGN ACCEPTANCE

Jerome O'Brien

Classon House
Dundrum Business Park, Dundrum
Dublin 14
D14T9T0

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

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

www.water.ie

28 January 2021

Re: CDS20004716 pre-connection enquiry - Subject to contract | Contract denied

Connection for Multi/Mixed Use Development of 1,040 units at Baldoyle, Phase 5, Co. Dublin

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Baldoyle, Phase 5, Co. Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	<p style="text-align: center;">OUTCOME OF PRE-CONNECTION ENQUIRY</p> <p style="text-align: center;"><u>THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.</u></p>
Water Connection	Feasible Subject to upgrades
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	<p>Approximately 200m network extension will be required to connect the Premises to the existing 300mm MOPVC main in Red Arches Rd./Castlerosse Crescent. The connection main should be 200mm ID pipe with a bulk meter and associated telemetry system. Should you wish to progress with the connection, you have to fund the extension works and the fee will be calculated at a connection application stage.</p> <p>On site water storage will be required for the average day peak week demand rate of the commercial section for 24 hour period with a re-fill time of 12 hours.</p>
Wastewater Connection	Connection detail to the adjacent 1600mm sewer has to be submitted and agreed at Connection Application stage. The sewer can surcharge at this location and connection detail will need to withstand any surcharging effect to the internal network.

In case of connection to the Irish Water networks through third party infrastructure and/or lands, all relevant wayleave and permissions would need to be obtained by the Developer. Please be advised that at a connection application stage you have to provide written confirmation from the owner of the infrastructure that you have received legal permission to connect to and that the infrastructure is fit for purpose and has capacity to cater for the additional load/demand.

The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.

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



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


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

General Notes:

- 1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
- 2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
- 3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
- 4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at <https://www.water.ie/connections/get-connected/>
- 5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
- 6) Irish Water Connection Policy/ Charges can be found at <https://www.water.ie/connections/information/connection-charges/>
- 7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
- 8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
- 9) To access Irish Water Maps email datarequests@water.ie
- 10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Marina Byrne from the design team via email mzbyrne@water.ie For further information, visit **www.water.ie/connections**.

Yours sincerely,



Yvonne Harris

Head of Customer Operations

Jerome O'Brien
Classon House
Dundrum Business Park
Dublin 14
Co. Dublin D14T9T0

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

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

www.water.ie

17 November 2021

**Re: Design Submission for Baldoye, Phase 5, Co. Dublin (the “Development”)
(the “Design Submission”) / Connection Reference No: CDS20004716**

Dear Jerome O'Brien,

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, Irish Water has no objection to your proposals.

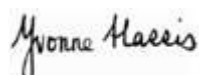
This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water'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 Irish Water's network(s) (the “**Self-Lay Works**”), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:

Name: Marina Byrne
Phone: 01 89 25991/ 087619321
Email: mzbyrne@water.ie

Yours sincerely,



Yvonne Harris
Head of Customer Operations

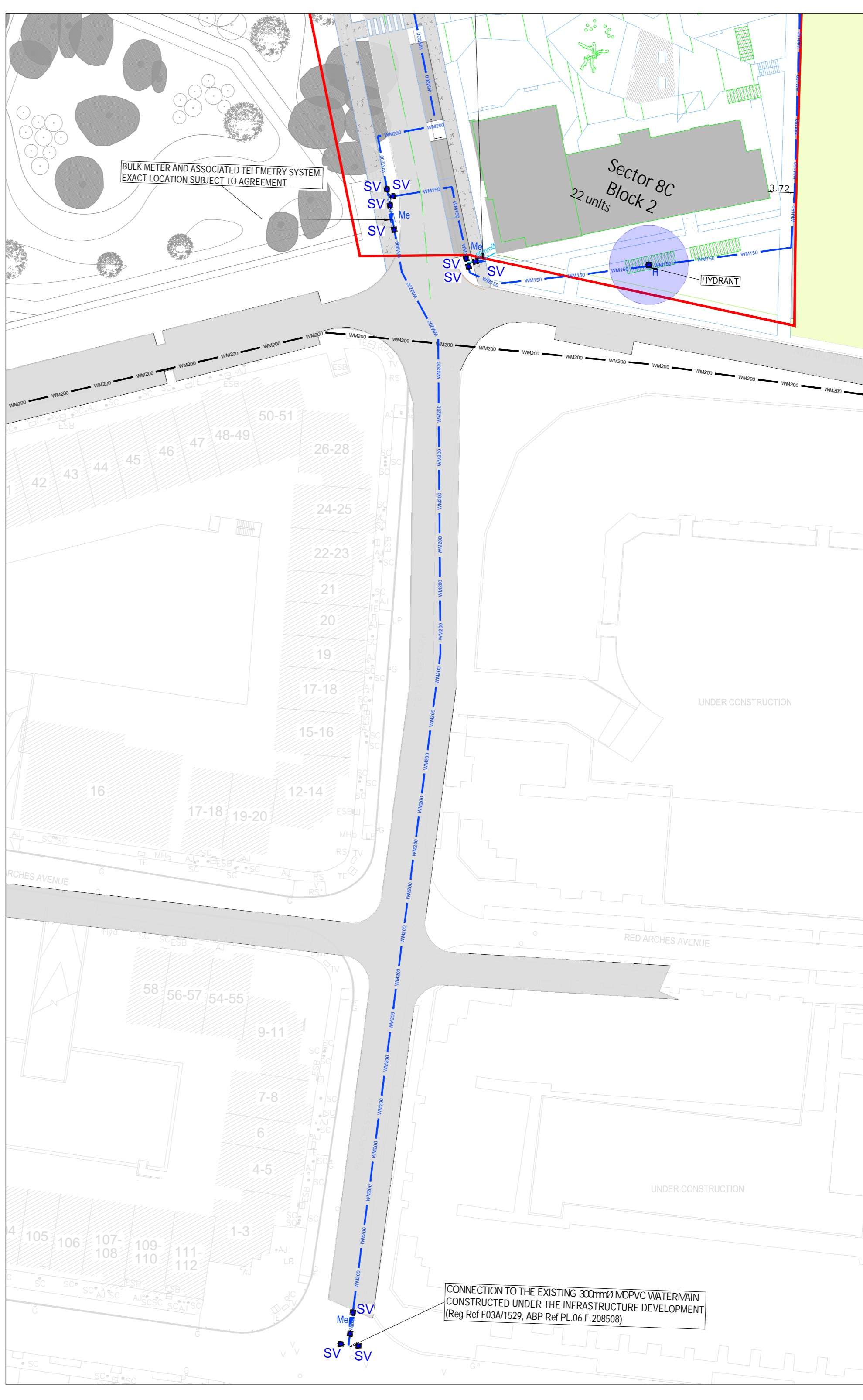
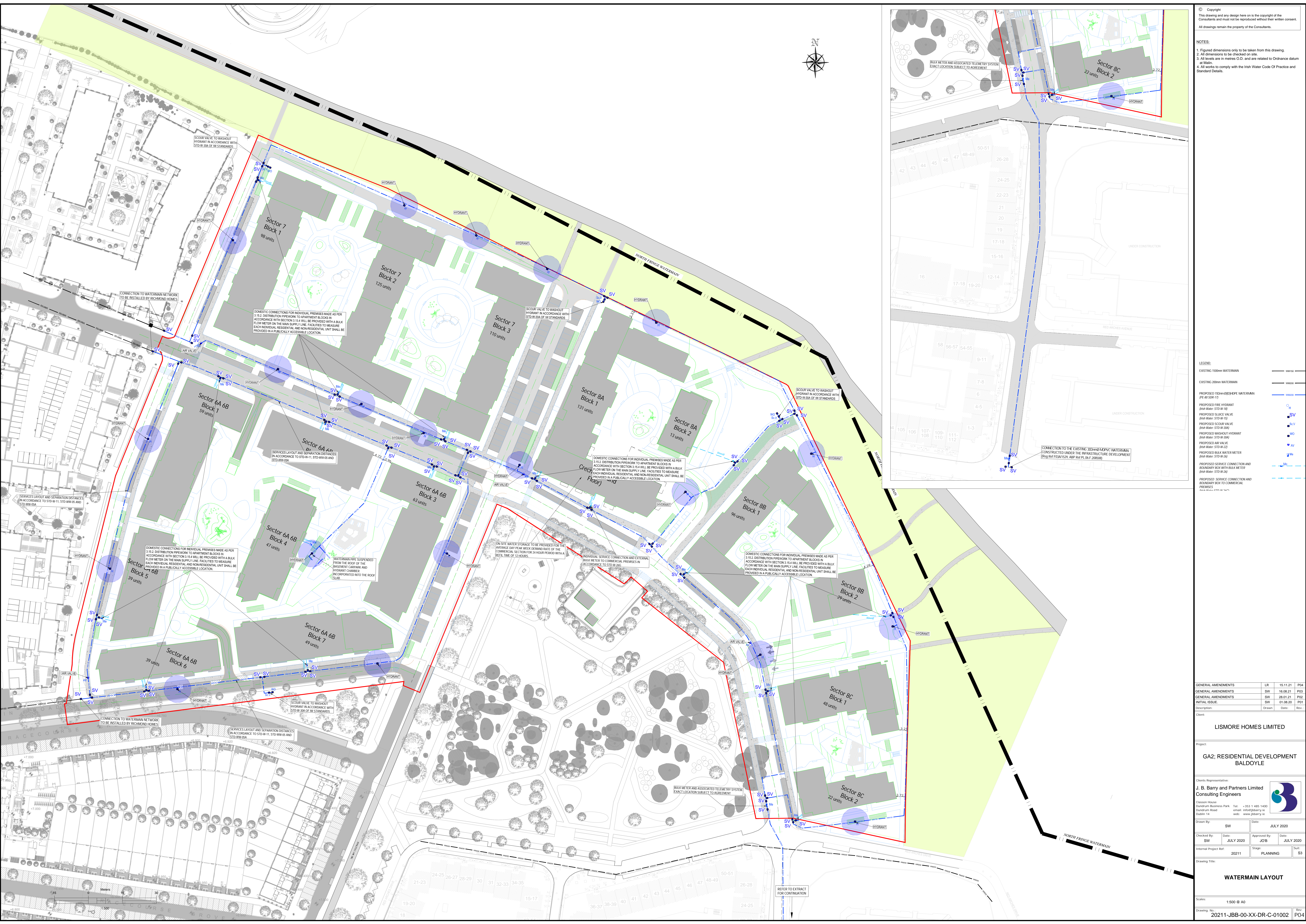
Appendix A

Document Title & Revision

- [20211-JBB-00-XX-DR-C-01002_Watermain_Layout_P04]
- [20211-JBB-00-XX-DR-C-01003_Foul_And_SW_Layout_P03]

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 Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.



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- NOTES:
1. Figured dimensions only to be taken from this drawing.
 2. All dimensions to be checked on site.
 3. All levels are in metres O.D. and are related to Ordnance datum at Malin.
 4. All works to comply with the Irish Water Code of Practice and Standard Details.

LEGEND:

EXISTING 150mm WATERMAIN	—
EXISTING 200mm WATERMAIN	—
PROPOSED 150mm WATERMAIN	—
PROPOSED FIRE HYDRANT	⊙
PROPOSED SLUCE VALVE	⊙
PROPOSED SCOUR VALVE	⊙
PROPOSED WASHOUT HYDRANT	⊙
PROPOSED AIR VALVE	⊙
PROPOSED BULK WATER METER	⊙
PROPOSED SERVICE CONNECTION AND BOUNDARY AS WITH BULK METER	—
PROPOSED SERVICE CONNECTION AND BOUNDARY FOR COMMERCIAL PREMISES	—

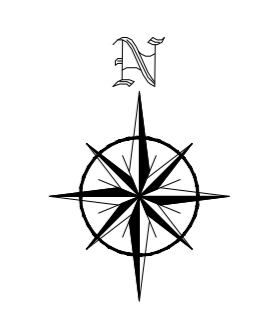
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GENERAL AMENDMENTS	SW	16.08.21	P03
GENERAL AMENDMENTS	SW	28.01.21	P02
INITIAL ISSUE	SW	01.08.20	P01

LISMORE HOMES LIMITED
 Project:
GA2: RESIDENTIAL DEVELOPMENT BALDOYLE

Client's Representative:
J. B. Barry and Partners Limited
 Consulting Engineers

Checked By:	SW	Date:	JULY 2020
Approved By:	JOB	Date:	JULY 2020
Internal Project Ref:	20211	Stage:	PLANNING
Sheet:	S3		

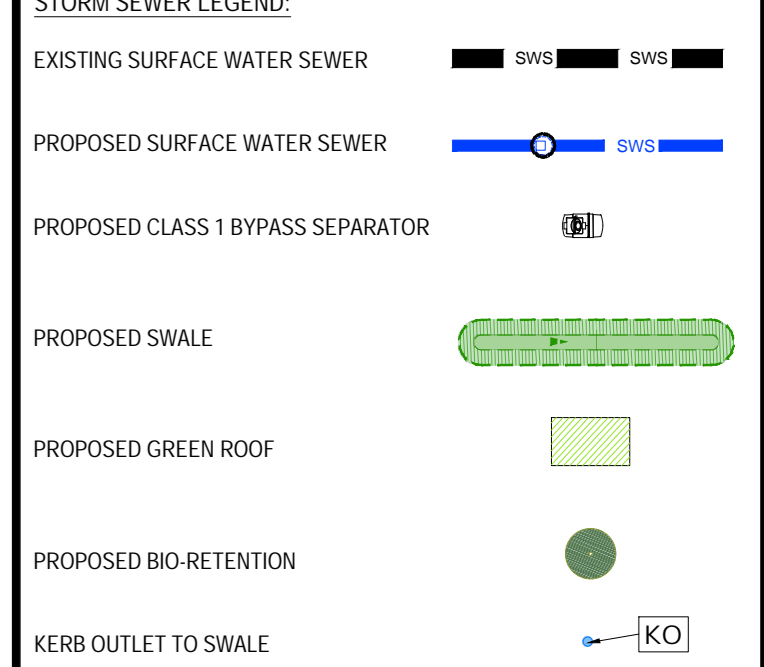
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 Scale:
 1:500 @ A0
 Drawing No:
20211-JBB-00-XX-DR-C-01002
 Rev: **P04**



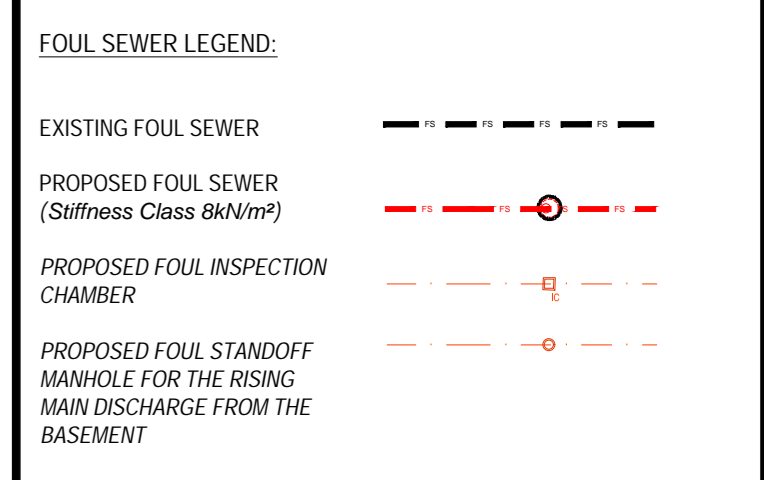
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 2. All dimensions to be checked on site.
 3. All levels are in metres O.D. and are related to Ordnance datum at Malin.
 4. All works to comply with the Irish Water Code Of Practice and Standard Details.

- STORM SEWER NOTES:
1. Sewer laying to be in accordance with the 'Greater Dublin Regional Code of Practice for Drainage Works' version 6.0
 2. Refer to architects layout for overall setting out information (buildings, roads, boundaries and footpaths).
 3. All pipes with less than 1.2m cover (road) and 0.9m (landscaped areas) shall be encased in min 150mm concrete surround CL - 1620



- FOUL SEWER NOTES:
1. Sewer laying to be in accordance with the 'Greater Dublin Regional Code of Practice for Drainage Works' version 6.0
 2. Refer to architects layout for overall setting out information (buildings, roads, boundaries and footpaths).
 3. All pipes with less than 1.2m cover (road) and 0.9m (landscaped areas) shall be encased in min 150mm concrete surround CL - 1620
 4. Foul sewer pipes to be uPVC (stiffness class Bk100) in accordance with section 3.11 of wastewater code of practice.
 5. External face of proposed manhole chambers to be minimum of 0.5m from kerb line and external face of sewers are a minimum of 1.0m from kerb line as per Section 3.5.15 of Wastewater Code of Practice.



GENERAL AMENDMENTS	LR	15.11.21	P03
GENERAL AMENDMENTS	SW	28.01.21	P02
INITIAL ISSUE	SW	01.08.20	P01
Description:	Drawn	Date:	Rev:

Client: LISMORE HOMES LIMITED

Project: GA2; RESIDENTIAL DEVELOPMENT BALDOYLE

Client's Representative: J. B. Barry and Partners Limited Consulting Engineers

Company Name: J. B. Barry and Partners Limited Consulting Engineers
 Dunurum Business Park Tel: +353 1 485 1400
 Dunurum Road email: info@jbb.ie
 Dublin 14 web: www.jbb.ie

Drawn By:	SW	Date:	JULY 2020
Checked By: <td>SW</td> <td>Date:</td> <td>JULY 2020</td>	SW	Date:	JULY 2020
Approved By: <td>JOB</td> <td>Date:</td> <td>JULY 2020</td>	JOB	Date:	JULY 2020
Internal Project Ref:	20211	Stage:	PLANNING
Sheet:	S3		

Drawing Title: FOUL AND STORM SEWERS LAYOUT

Scale: 1:500 @ A0

Drawing No: 20211-JBB-00-XX-DR-C-01003

Rev: P03

APPENDIX 2:

MICRODRAINAGE ANALYSIS

- GDSDS Critical Storm 1, 30 and 100 year return periods + 20% for climate change
- Longitudinal Sections

Classon House
 Dundrum Business Park
 Dublin 14

Baldoyle GA2
 1_30_100Year + 20%
 Storm Sewers



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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	15.900	Add Flow / Climate Change (%)	0
Ratio R	0.300	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.600
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	900

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	58.966	0.147	400.0	0.000	4.00	0.0	0.600	600 []	1200	600 Culvert	
S2.000	50.000	0.071	700.0	0.351	4.00	0.0	0.600	o	750	Pipe/Conduit	
S2.001	52.996	0.076	700.0	0.255	0.00	0.0	0.600	o	750	Pipe/Conduit	
S3.000	82.000	0.304	270.0	0.270	4.00	0.0	0.600	o	300	Pipe/Conduit	
S2.002	70.270	0.100	700.0	0.290	0.00	0.0	0.600	o	750	Pipe/Conduit	
S4.000	89.860	0.333	270.0	0.231	4.00	0.0	0.600	o	300	Pipe/Conduit	
S2.003	15.175	0.022	700.0	0.035	0.00	0.0	0.600	o	750	Pipe/Conduit	
S5.000	90.000	0.333	270.0	0.283	4.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	61.641	0.228	270.0	0.140	4.00	0.0	0.600	o	300	Pipe/Conduit	
S6.001	68.610	0.254	270.0	0.183	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.002	87.902	0.326	270.0	0.185	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	4.67	4.200	0.000	0.0	0.0	0.0	1.47	940.8	0.0
S2.000	50.00	4.79	4.627	0.351	0.0	0.0	0.0	1.05	463.9	47.5
S2.001	47.71	5.63	4.556	0.605	0.0	0.0	0.0	1.05	463.9	78.2
S3.000	48.40	5.44	4.910	0.270	0.0	0.0	0.0	0.95	67.3	35.4
S2.002	44.26	6.75	4.480	1.166	0.0	0.0	0.0	1.05	463.9	139.7
S4.000	47.92	5.57	5.153	0.231	0.0	0.0	0.0	0.95	67.3	30.0
S2.003	43.59	6.99	4.380	1.432	0.0	0.0	0.0	1.05	463.9	169.0
S5.000	47.91	5.58	5.113	0.283	0.0	0.0	0.0	0.95	67.3	36.7
S6.000	49.69	5.08	5.610	0.140	0.0	0.0	0.0	0.95	67.3	18.8
S6.001	46.13	6.12	5.307	0.322	0.0	0.0	0.0	1.10	121.2	40.3
S6.002	42.38	7.46	5.053	0.508	0.0	0.0	0.0	1.10	121.2	58.3

Classon House
 Dundrum Business Park
 Dublin 14

Baldoyle GA2
 1_30_100Year + 20%
 Storm Sewers



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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.004	67.000	0.096	700.0	0.409	0.00	0.0	0.600	o	750	Pipe/Conduit	
S2.005	77.007	0.110	700.0	0.855	0.00	0.0	0.600	o	750	Pipe/Conduit	
S7.000	19.504	0.195	100.0	0.041	4.00	0.0	0.600	o	225	Pipe/Conduit	
S7.001	67.967	0.453	150.0	0.163	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.002	54.806	0.365	150.0	0.199	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.000	90.000	0.333	270.0	0.335	4.00	0.0	0.600	o	300	Pipe/Conduit	
S2.006	62.301	0.089	700.0	0.039	0.00	0.0	0.600	o	750	Pipe/Conduit	
S2.007	7.301	0.010	700.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.001	31.022	0.078	400.0	0.000	0.00	0.0	0.600	600 []	1200	600 Culvert	
S1.002	81.426	0.204	400.0	0.000	0.00	0.0	0.600	600 []	1200	600 Culvert	
S1.003	8.760	0.022	400.0	0.000	0.00	0.0	0.600	600 []	1200	600 Culvert	
S1.004	68.413	0.171	400.1	0.000	0.00	0.0	0.600	600 []	1200	600 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.004	39.87	8.52	4.358	2.631	0.0	0.0	0.0	1.05	463.9	284.2
S2.005	37.41	9.74	4.262	3.486	0.0	0.0	0.0	1.05	463.9	353.2
S7.000	50.00	4.25	5.680	0.041	0.0	0.0	0.0	1.31	52.0	5.6
S7.001	49.49	5.13	5.410	0.204	0.0	0.0	0.0	1.28	90.6	27.4
S7.002	47.01	5.85	4.957	0.403	0.0	0.0	0.0	1.28	90.6	51.3
S8.000	47.91	5.58	4.630	0.335	0.0	0.0	0.0	0.95	67.3	43.5
S2.006	35.67	10.73	4.152	4.264	0.0	0.0	0.0	1.05	463.9	411.9
S2.007	35.48	10.85	4.063	4.264	0.0	0.0	0.0	1.05	463.9	411.9
S1.001	34.91	11.20	4.053	4.264	0.0	0.0	0.0	1.47	940.8	411.9
S1.002	33.53	12.12	3.975	4.264	0.0	0.0	0.0	1.47	940.8	411.9
S1.003	33.39	12.22	3.771	4.264	0.0	0.0	0.0	1.47	940.8	411.9
S1.004	32.34	13.00	2.671	4.264	0.0	0.0	0.0	1.47	940.7	411.9

Classon House
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Baldoyle GA2
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 Storm Sewers



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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	600 []	1200	S4	5.750	4.200	0.950	Open Manhole	3000
S2.000	o	750	S1.9	6.600	4.627	1.223	Sealed Manhole	1800
S2.001	o	750	S1.8	6.620	4.556	1.314	Sealed Manhole	1800
S3.000	o	300	S1.7a	6.180	4.910	0.970	Sealed Manhole	1200
S2.002	o	750	S1.7	6.730	4.480	1.500	Open Manhole	1800
S4.000	o	300	S1.6a	6.400	5.153	0.947	Open Manhole	1200
S2.003	o	750	S1.6	6.870	4.380	1.740	Open Manhole	1800
S5.000	o	300	S1.5a	6.400	5.113	0.987	Sealed Manhole	1200
S6.000	o	300	S3.4	7.150	5.610	1.240	Open Manhole	1200
S6.001	o	375	S3.2	6.730	5.307	1.048	Open Manhole	1350
S6.002	o	375	S3.1	6.950	5.053	1.522	Open Manhole	1350
S2.004	o	750	S1.5	6.780	4.358	1.672	Open Manhole	1800
S2.005	o	750	S1.4	6.310	4.262	1.298	Open Manhole	1800
S7.000	o	225	S4.3	7.160	5.680	1.255	Open Manhole	1200
S7.001	o	300	S4.2	7.030	5.410	1.320	Open Manhole	1200
S7.002	o	300	S4.1	6.570	4.957	1.313	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	58.966	400.0	S1.1	5.600	4.053	0.947	Open Manhole	3000
S2.000	50.000	700.0	S1.8	6.620	4.556	1.314	Sealed Manhole	1800
S2.001	52.996	700.0	S1.7	6.730	4.480	1.500	Open Manhole	1800
S3.000	82.000	270.0	S1.7	6.730	4.606	1.824	Open Manhole	1800
S2.002	70.270	700.0	S1.6	6.870	4.380	1.740	Open Manhole	1800
S4.000	89.860	270.0	S1.6	6.870	4.820	1.750	Open Manhole	1800
S2.003	15.175	700.0	S1.5	6.780	4.358	1.672	Open Manhole	1800
S5.000	90.000	270.0	S1.5	6.780	4.780	1.700	Open Manhole	1800
S6.000	61.641	270.0	S3.2	6.730	5.382	1.048	Open Manhole	1350
S6.001	68.610	270.0	S3.1	6.950	5.053	1.522	Open Manhole	1350
S6.002	87.902	270.0	S1.5	6.780	4.727	1.678	Open Manhole	1800
S2.004	67.000	700.0	S1.4	6.310	4.262	1.298	Open Manhole	1800
S2.005	77.007	700.0	S1.3	6.200	4.152	1.298	Open Manhole	1800
S7.000	19.504	100.0	S4.2	7.030	5.485	1.320	Open Manhole	1200
S7.001	67.967	150.0	S4.1	6.570	4.957	1.313	Open Manhole	1200
S7.002	54.806	150.0	S1.3	6.200	4.592	1.308	Open Manhole	1800

Classon House
 Dundrum Business Park
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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S8.000	o	300	S1.3a	6.000	4.630	1.070	Sealed Manhole	1200
S2.006	o	750	S1.3	6.200	4.152	1.298	Open Manhole	1800
S2.007	o	750	S1.2	5.800	4.063	0.987	Open Manhole	1800
S1.001	600 []	1200	S1.1	5.600	4.053	0.947	Open Manhole	3000
S1.002	600 []	1200	S3	5.500	3.975	0.925	Open Manhole	3000
S1.003	600 []	1200	S2	4.900	3.771	0.529	Open Manhole	3000
S1.004	600 []	1200	S1	4.850	2.671	1.579	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S8.000	90.000	270.0	S1.3	6.200	4.297	1.603	Open Manhole	1800
S2.006	62.301	700.0	S1.2	5.800	4.063	0.987	Open Manhole	1800
S2.007	7.301	700.0	S1.1	5.600	4.053	0.797	Open Manhole	3000
S1.001	31.022	400.0	S3	5.500	3.975	0.925	Open Manhole	3000
S1.002	81.426	400.0	S2	4.900	3.771	0.529	Open Manhole	3000
S1.003	8.760	400.0	S1	4.850	3.750	0.500	Open Manhole	3000
S1.004	68.413	400.1	S	4.800	2.500	1.700	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.070	0.070	0.070
	User	-	100	0.122	0.122	0.192
	User	-	100	0.008	0.008	0.200
	User	-	100	0.052	0.052	0.252
	User	-	100	0.099	0.099	0.351
2.001	User	-	100	0.084	0.084	0.084
	User	-	100	0.064	0.064	0.149
	User	-	100	0.013	0.013	0.162
	User	-	100	0.003	0.003	0.165
	User	-	100	0.001	0.001	0.166
	User	-	100	0.004	0.004	0.170
	User	-	100	0.085	0.085	0.255
3.000	User	-	100	0.111	0.111	0.111
	User	-	100	0.048	0.048	0.159
	User	-	100	0.067	0.067	0.226
	User	-	100	0.044	0.044	0.270
2.002	User	-	100	0.123	0.123	0.123
	User	-	100	0.012	0.012	0.135
	User	-	100	0.001	0.001	0.136
	User	-	100	0.056	0.056	0.192
	User	-	100	0.098	0.098	0.290
4.000	User	-	100	0.129	0.129	0.129
	User	-	100	0.059	0.059	0.188
	User	-	100	0.027	0.027	0.214
	User	-	100	0.017	0.017	0.231
2.003	User	-	100	0.035	0.035	0.035
5.000	User	-	100	0.201	0.201	0.201
	User	-	100	0.066	0.066	0.267
	User	-	100	0.016	0.016	0.283
6.000	User	-	100	0.079	0.079	0.079
	User	-	100	0.008	0.008	0.087
	User	-	100	0.053	0.053	0.140
6.001	User	-	100	0.126	0.126	0.126
	User	-	100	0.057	0.057	0.183
6.002	User	-	100	0.137	0.137	0.137
	User	-	100	0.049	0.049	0.185
2.004	User	-	100	0.095	0.095	0.095
	User	-	100	0.114	0.114	0.209
	User	-	100	0.065	0.065	0.274
	User	-	100	0.070	0.070	0.344
	User	-	100	0.018	0.018	0.362
	User	-	100	0.002	0.002	0.364
	User	-	100	0.002	0.002	0.366
	User	-	100	0.003	0.003	0.369
	User	-	100	0.040	0.040	0.409
2.005	User	-	100	0.275	0.275	0.275
	User	-	100	0.100	0.100	0.375
	User	-	100	0.142	0.142	0.517
	User	-	100	0.264	0.264	0.782
	User	-	100	0.041	0.041	0.823
	User	-	100	0.032	0.032	0.855
7.000	User	-	100	0.041	0.041	0.041
7.001	User	-	100	0.098	0.098	0.098
	User	-	100	0.065	0.065	0.163
7.002	User	-	100	0.141	0.141	0.141
	User	-	100	0.058	0.058	0.199
8.000	User	-	100	0.200	0.200	0.200
	User	-	100	0.009	0.009	0.209
	User	-	100	0.024	0.024	0.233
	User	-	100	0.004	0.004	0.237
	User	-	100	0.098	0.098	0.335

Classon House
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Baldoyle GA2
 1_30_100Year + 20%
 Storm Sewers



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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
2.006	User	-	100	0.039	0.039	0.039
2.007	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				4.264	4.264	4.264

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	4.800	2.500	0.000	0	0

Simulation Criteria for Storm

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

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

Synthetic Rainfall Details

Rainfall Model FSR Profile Type Summer
 Return Period (years) 2 Cv (Summer) 0.750
 Region Scotland and Ireland Cv (Winter) 0.840
 M5-60 (mm) 15.900 Storm Duration (mins) 30
 Ratio R 0.300

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Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage	Total Volume (m³)
				Structure Volume (m³)	
S1.000	S4	10.956	37.738	0.000	48.694
S2.000	S1.9	5.021	22.089	0.000	27.110
S2.001	S1.8	5.253	23.413	0.000	28.666
S3.000	S1.7a	1.436	5.796	0.000	7.233
S2.002	S1.7	5.726	31.044	0.000	36.770
S4.000	S1.6a	1.410	6.352	0.000	7.762
S2.003	S1.6	6.336	6.704	0.000	13.040
S5.000	S1.5a	1.456	6.362	0.000	7.817
S6.000	S3.4	1.742	4.357	0.000	6.099
S6.001	S3.2	2.037	7.578	0.000	9.615
S6.002	S3.1	2.715	9.708	0.000	12.424
S2.004	S1.5	6.163	29.600	0.000	35.763
S2.005	S1.4	5.212	34.021	0.000	39.232
S7.000	S4.3	1.674	0.776	0.000	2.449
S7.001	S4.2	1.832	4.804	0.000	6.637
S7.002	S4.1	1.824	3.874	0.000	5.698
S8.000	S1.3a	1.549	6.362	0.000	7.911
S2.006	S1.3	5.212	27.524	0.000	32.735
S2.007	S1.2	4.420	3.226	0.000	7.646
S1.001	S1.1	10.938	19.854	0.000	30.792
S1.002	S3	10.779	52.112	0.000	62.892
S1.003	S2	7.977	5.606	0.000	13.584
S1.004	S1	15.402	43.784	0.000	59.186
Total		117.072	392.683	0.000	509.756

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 17.000 Cv (Summer) 0.750
 Region Scotland and Ireland Ratio R 0.300 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S4	30 Winter	100	+20%					4.729	-0.071	0.000
S2.000	S1.9	30 Winter	100	+20%	30/15	Winter			6.224	0.847	0.000
S2.001	S1.8	30 Winter	100	+20%	30/15	Summer			6.213	0.908	0.000
S3.000	S1.7a	30 Summer	100	+20%	30/15	Summer			6.180	0.970	0.000
S2.002	S1.7	30 Winter	100	+20%	30/15	Summer			6.194	0.964	0.000
S4.000	S1.6a	30 Winter	100	+20%	30/15	Summer			6.318	0.865	0.000
S2.003	S1.6	30 Winter	100	+20%	30/15	Summer			6.151	1.021	0.000
S5.000	S1.5a	30 Winter	100	+20%	30/15	Summer			6.380	0.967	0.000
S6.000	S3.4	30 Winter	100	+20%	100/15	Summer			6.517	0.607	0.000
S6.001	S3.2	30 Winter	100	+20%	100/15	Summer			6.470	0.789	0.000
S6.002	S3.1	30 Winter	100	+20%	30/15	Summer			6.386	0.958	0.000
S2.004	S1.5	30 Winter	100	+20%	30/15	Summer			6.118	1.010	0.000
S2.005	S1.4	30 Winter	100	+20%	30/15	Summer			5.934	0.922	0.000
S7.000	S4.3	15 Winter	100	+20%	100/15	Summer			6.254	0.349	0.000
S7.001	S4.2	15 Winter	100	+20%	30/15	Winter			6.230	0.520	0.000
S7.002	S4.1	15 Winter	100	+20%	30/15	Summer			5.973	0.716	0.000
S8.000	S1.3a	30 Winter	100	+20%	30/15	Summer			6.000	1.070	0.000
S2.006	S1.3	30 Winter	100	+20%	30/15	Summer			5.563	0.661	0.000
S2.007	S1.2	30 Winter	100	+20%	30/15	Summer			5.100	0.287	0.000
S1.001	S1.1	30 Winter	100	+20%	100/15	Winter			4.729	0.076	0.000
S1.002	S3	30 Winter	100	+20%	100/15	Winter			4.611	0.036	0.000
S1.003	S2	30 Winter	100	+20%	100/15	Winter			4.386	0.015	0.000
S1.004	S1	30 Winter	100	+20%					3.271	0.000	0.000

PN	US/MH Name	Flow / Cap.	Half Drain / Overflow (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S4	0.00			3.9	OK	
S2.000	S1.9	0.25			99.7	SURCHARGED*	
S2.001	S1.8	0.35			139.0	SURCHARGED*	
S3.000	S1.7a	1.19			77.2	FLOOD RISK*	3
S2.002	S1.7	0.63			256.3	SURCHARGED	
S4.000	S1.6a	0.98			63.8	FLOOD RISK	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S2.003	S1.6	1.56			312.5	SURCHARGED	
S5.000	S1.5a	1.16			75.5	FLOOD RISK*	
S6.000	S3.4	0.70			45.0	SURCHARGED	
S6.001	S3.2	0.74			85.1	FLOOD RISK	
S6.002	S3.1	0.93			107.6	SURCHARGED	
S2.004	S1.5	1.38			561.1	SURCHARGED	
S2.005	S1.4	1.81			746.8	SURCHARGED	
S7.000	S4.3	0.33			15.6	SURCHARGED	
S7.001	S4.2	0.77			66.3	SURCHARGED	
S7.002	S4.1	1.52			130.4	SURCHARGED	
S8.000	S1.3a	1.40			90.8	FLOOD RISK*	2
S2.006	S1.3	2.25			908.0	SURCHARGED	
S2.007	S1.2	3.01			907.3	SURCHARGED	
S1.001	S1.1	1.23			883.3	SURCHARGED	
S1.002	S3	1.04			869.3	SURCHARGED	
S1.003	S2	2.01			869.1	SURCHARGED	
S1.004	S1	1.05			858.4	OK	

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MH Name	S4	S1.1	S3	S1
Hor Scale 1000				
Ver Scale 100				
Datum (m) -1.000				
PN	S1.000	S1.001	S1.002	
Dia (mm)	1200	1200	1200	
Slope (1:X)	400.0	400.0	400.0	
Cover Level (m)	5.750	5.600	5.500	4.900
Invert Level (m)	4.200	4.053	3.975	3.771
Length (m)	58.966	31.022	81.426	3.750

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MH Name	S1	S
Hor Scale 1000		
Ver Scale 100		
Datum (m)-1.000		
PN	S1.004	
Dia (mm)	1200	
Slope (1:X)	400.1	
Cover Level (m)	4.850	4.800
Invert Level (m)	2.671	2.500
Length (m)	68.413	

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MH Name		S1.9	S1.8	S1.7	S1.6	S1.5
Hor Scale 1000 Ver Scale 100 Datum (m) 0.000						
				3.000	4.000	5.000
						6.002
PN		S2.000	S2.001	S2.002	S2.003	
Dia (mm)		750	750	750	750	
Slope (1:X)		700.0	700.0	700.0	700.0	
Cover Level (m)		6.600	6.620	6.730	6.870	6.780
Invert Level (m)		4.627	4.556 4.556	4.480 4.480	4.380 4.380	4.358
Length (m)		50.000	52.996	70.270	15.175	

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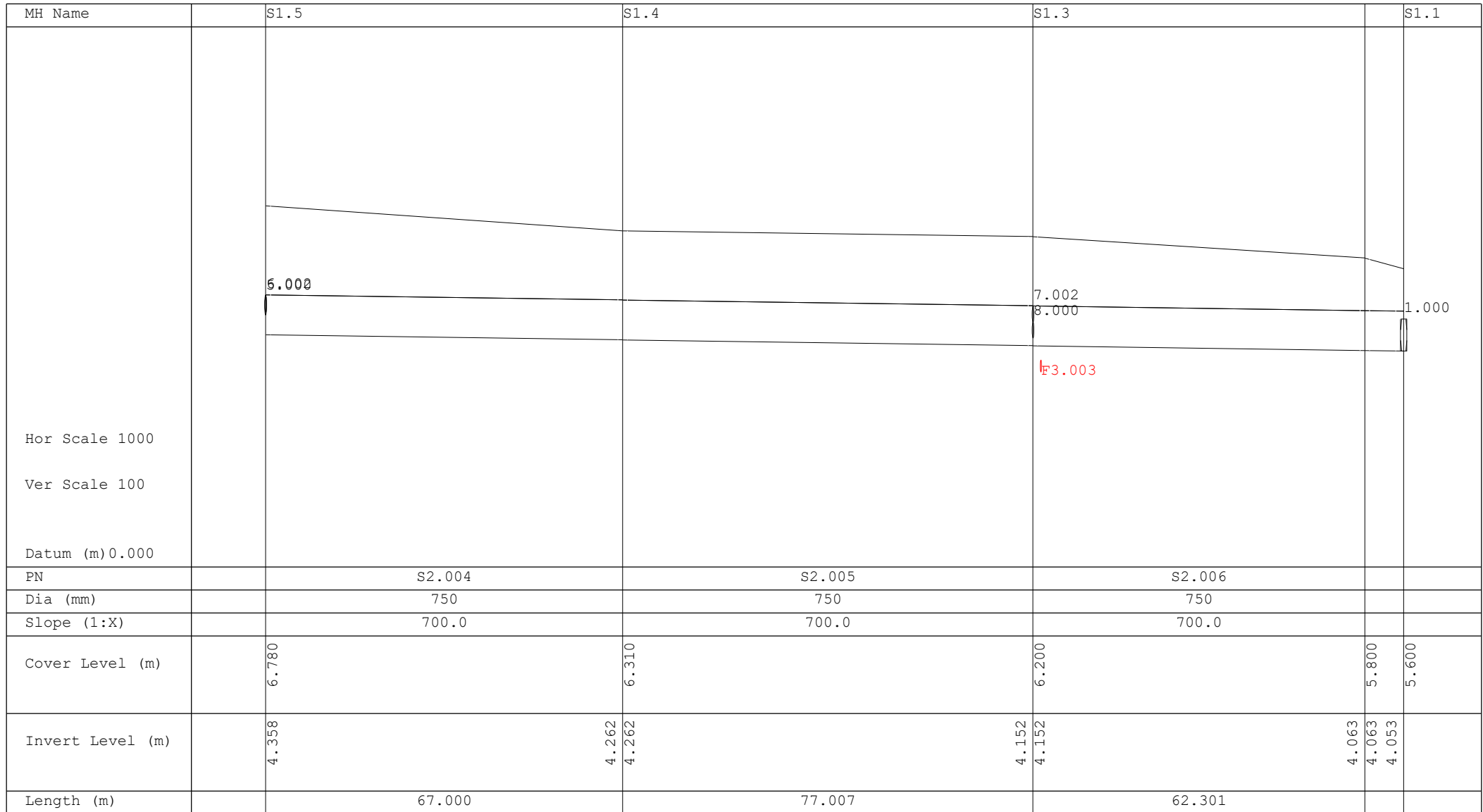
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MH Name	S1.7a	S1.7
Hor Scale 1000 Ver Scale 100 Datum (m) 1.000		
PN	S3.000	
Dia (mm)	300	
Slope (1:X)	270.0	
Cover Level (m)	6.180	6.730
Invert Level (m)	4.910	4.606
Length (m)	82.000	

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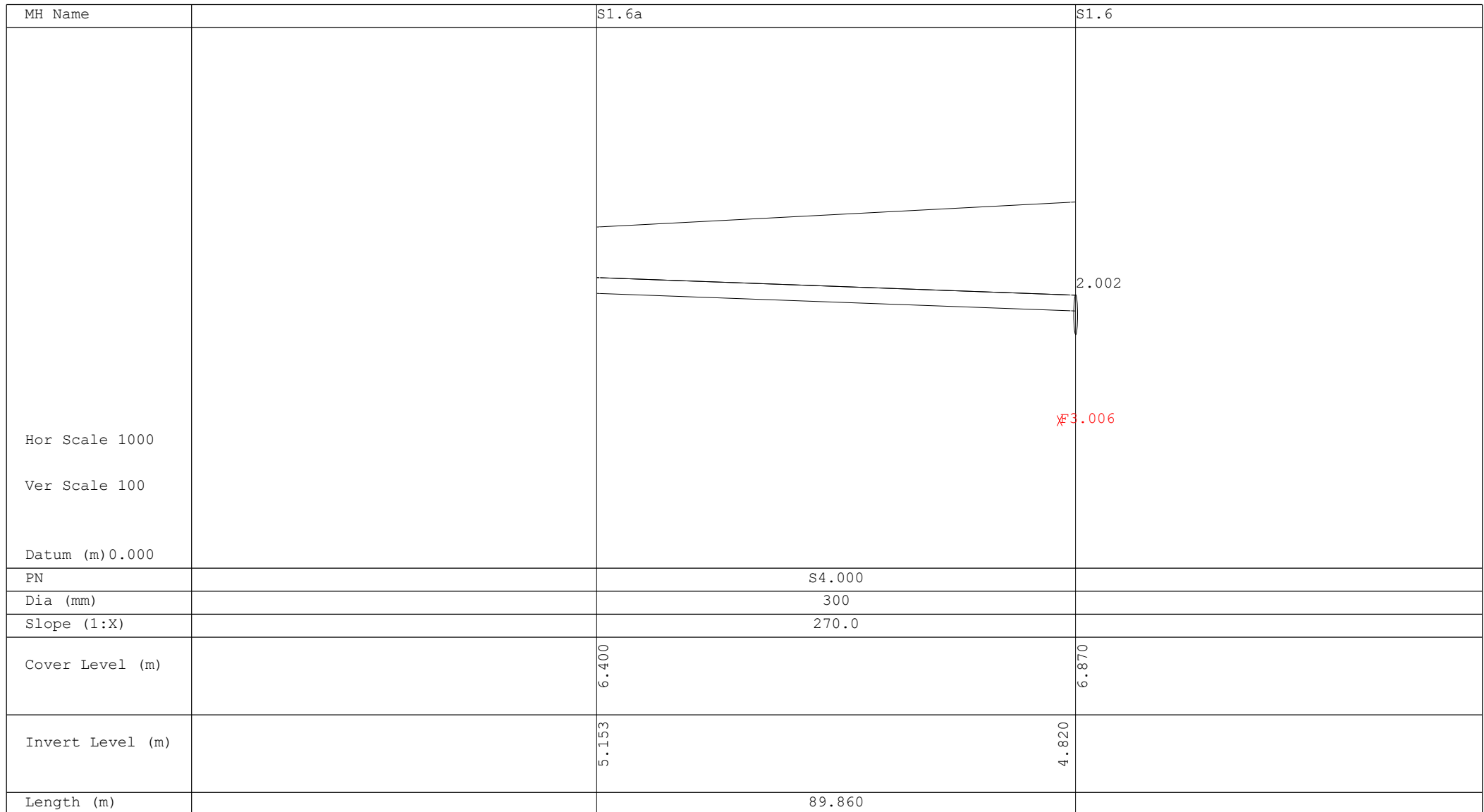
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MH Name	S1.5a	S1.5
Hor Scale 1000		
Ver Scale 100		
Datum (m) 0.000		
PN		S5.000
Dia (mm)		300
Slope (1:X)		270.0
Cover Level (m)	6.400	6.780
Invert Level (m)	5.113	4.780
Length (m)		90.000

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MH Name	S3.4	S3.2	S3.1
Hor Scale 1000			
Ver Scale 100			
Datum (m) 1.000			
PN	S6.000	S6.001	
Dia (mm)	300	375	
Slope (1:X)	270.0	270.0	
Cover Level (m)	7.150	6.730	6.950
Invert Level (m)	5.610	5.382 5.307	5.053
Length (m)	61.641	68.610	

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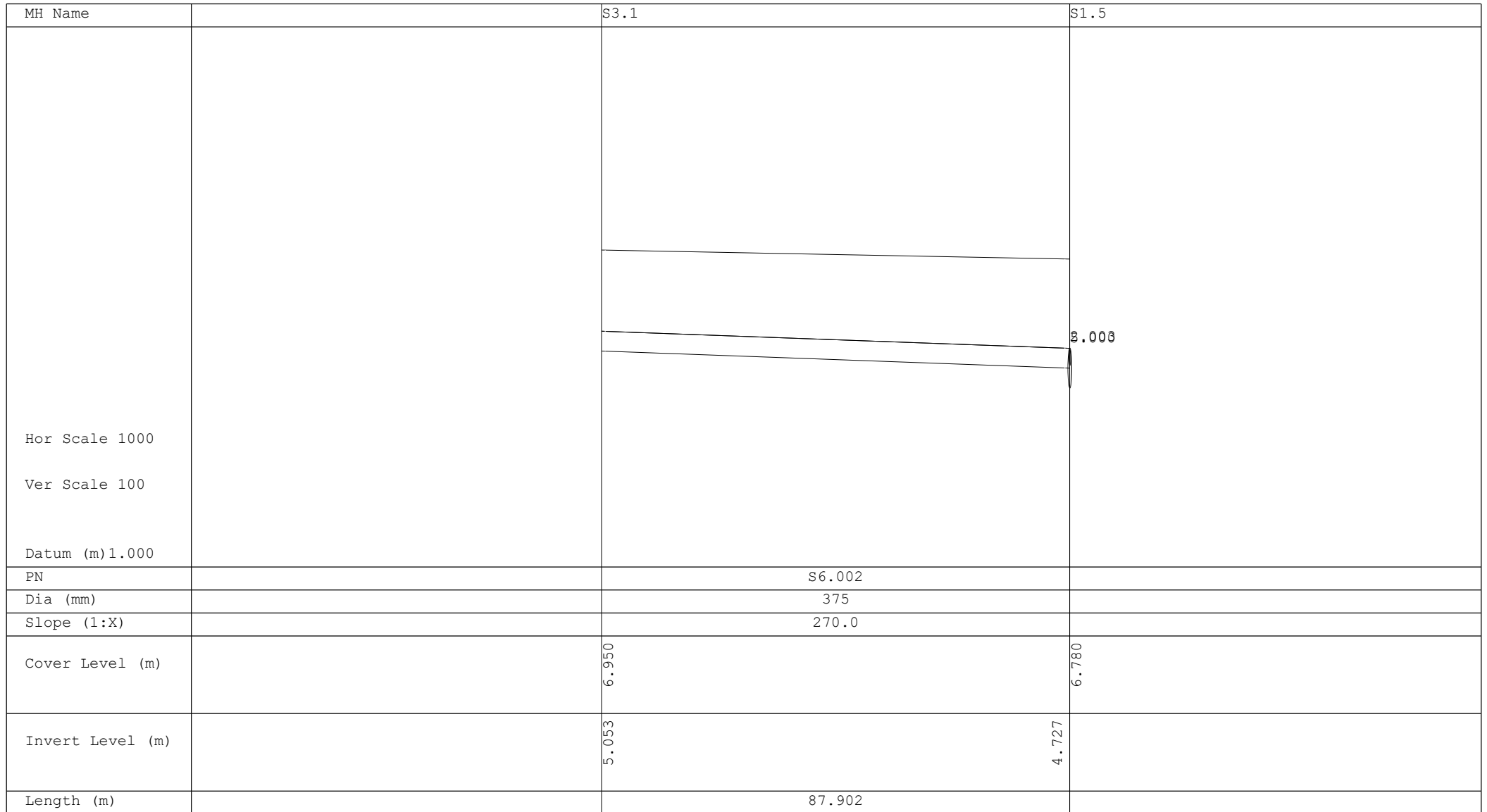
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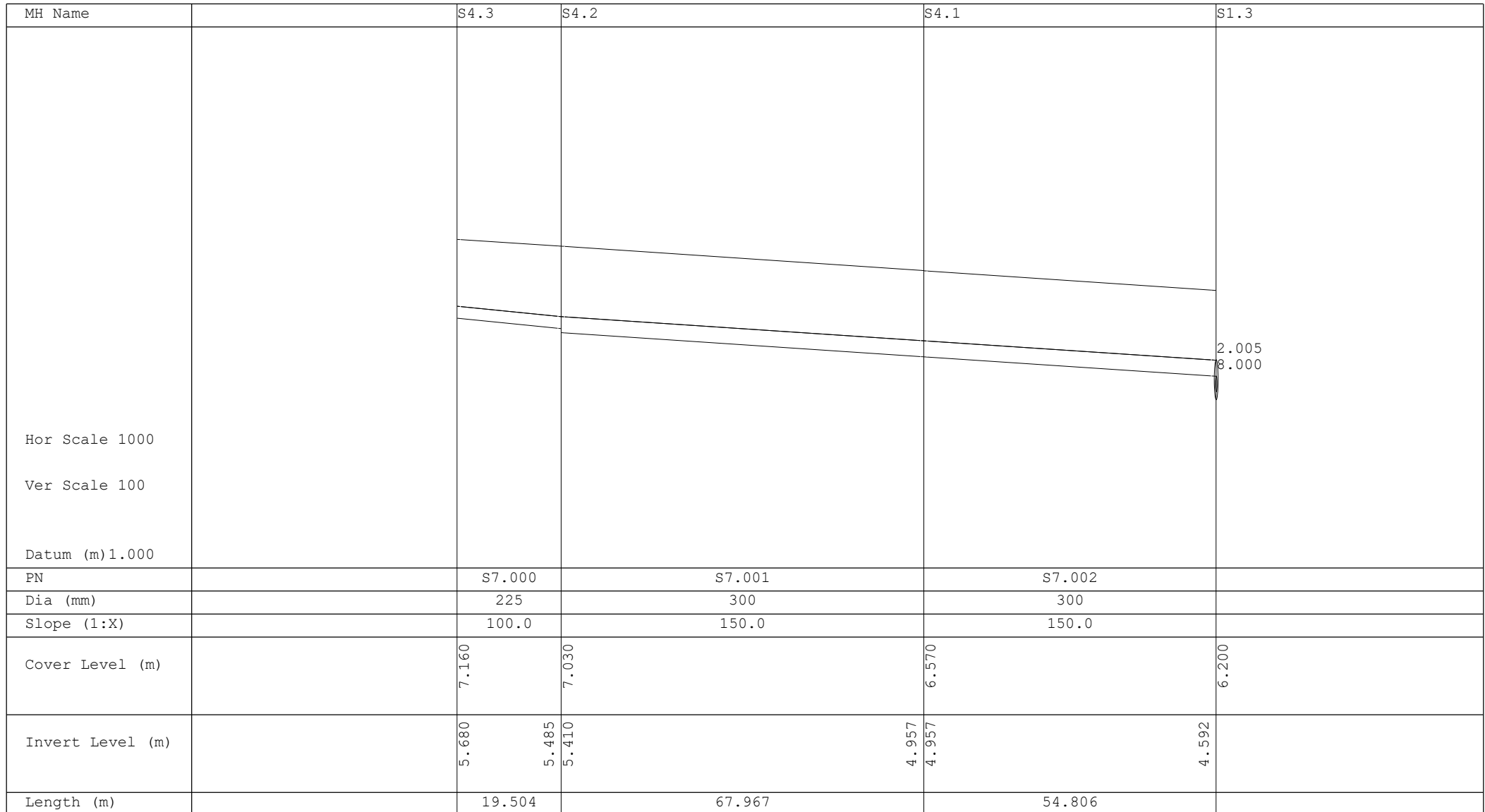
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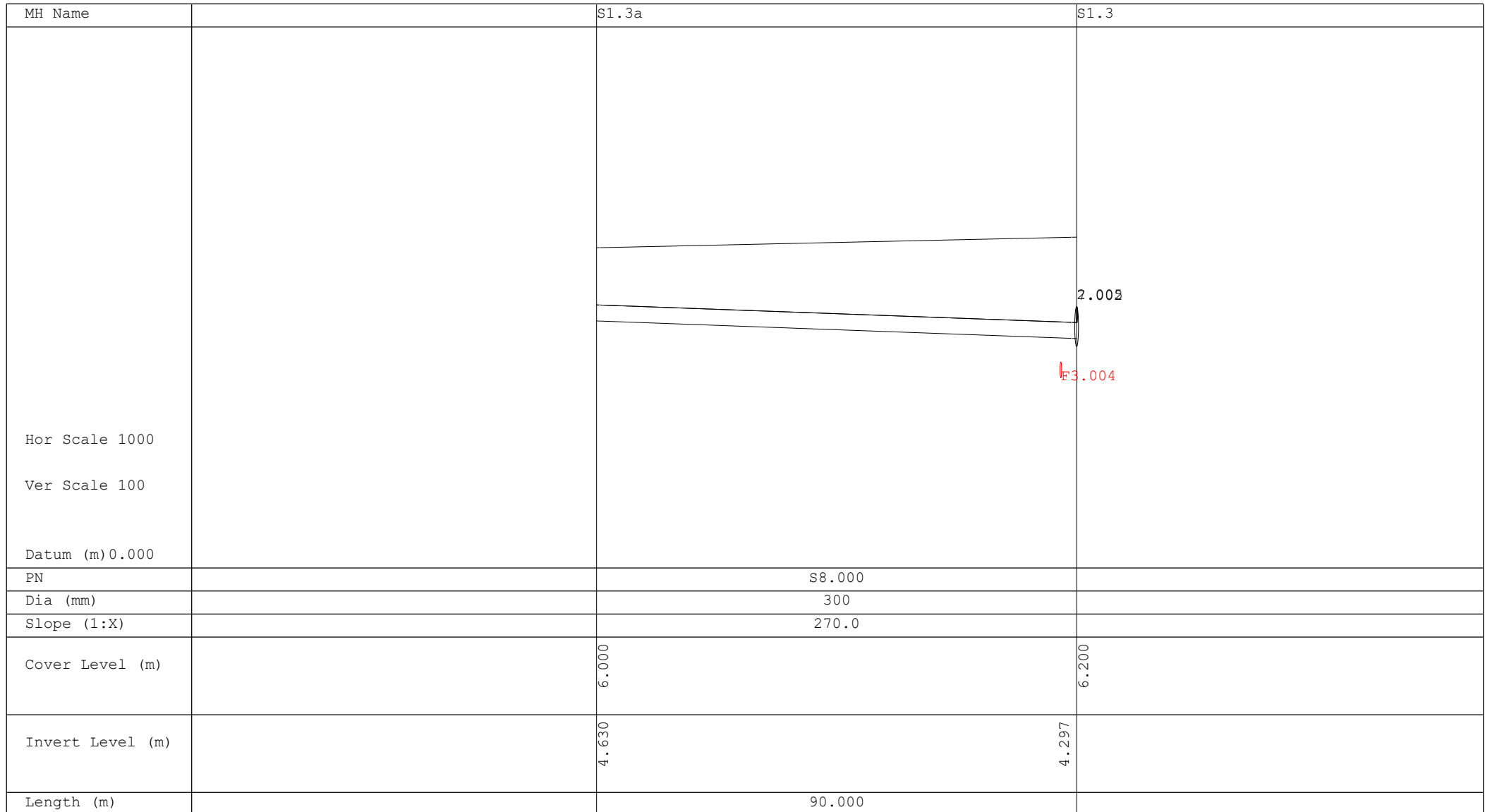
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APPENDIX 3: SUDS Hierarchy Sheet

SUDS/Green Infrastructure selection checklist –To be submitted in planning submission - Rev 2

Suds Measures	Measures to be used on this site	Rationale for selecting/not selecting measure	Checklist submitted? See no. 8 below
Source Control			
Swales	Yes	Kerb Outlets from roads to swales. This will convey flows to Storm system and provide water quality and attenuation measures.	
Tree Pits	Yes	Tree pits in open space areas.	
Rainwater Butts	No	Not suitable due to question of ownership/responsibility	
Rainwater harvesting	No	Not suitable due to question of ownership/responsibility	
Soakaways	No	Subsoil is an impermeable boulder clay unsuitable for soakaways.	
Infiltration trenches	Yes	In conjunction with tree pits and bio retention areas with overflow to surface water sewer.	
Permeable pavement (Block paving, Porous Asphalt etc.)	Yes	Podium/courtyard private open space in the control of the Management Company	
Green Roofs	Yes	Green Roofs provided.	
Filter strips	Yes	Filter drains in conjunction with footpaths outside podium areas.	
Bio-retention systems/Raingardens	Yes	In conjunction with tree pits and bio retention areas.	
Blue Roofs	No	Green Roofs provided.	
Filter Drain	Yes	Filter drains in conjunction with footpaths outside podium areas.	
Site Control			
Detention Basins	No	Lack of space. Proposed to discharge flows to the wetland to the north west of the site	
Retentions basins	No	Lack of space. Proposed to discharge flows to the wetland to the north west of the site	
Regional Control			
Ponds	No	Proposed to discharge flows to the wetland to the north west of the site	
Wetlands	Yes	Proposed to discharge flows to the wetland to the north west of the site	
Other			
Petrol/Oil interceptor	Yes	Petrol Interceptor(s) to be installed	
Attenuation tank – only as a last resort where	No	Attenuation not required as per LAP.	

other measures are not feasible			
Oversized pipes– only as a last resort where other measures are not feasible	No	Attenuation not required as per LAP	

Note:

1. Fingal has a preference for above ground Green Infrastructure rather than tanks or oversized pipes . Above ground flows through swales, basins etc are encouraged.
2. Demonstrate SUDS system will have sufficient Pollutant removal efficiency in accordance with Ciria Suds Manual C753
3. Basins sides should be no steeper than 1:4 and no deeper than 1.2m in the 1%AEP
4. Culverting shall be avoided where possible
5. De-culverting is encouraged.
6. Please submit evidence of infiltration rates
7. To account for climate change in the design of the drainage system rainfall intensities should be factored up by 20%
8. The Applicant must provide Suds checklists in accordance with the Appendix B of the Ciria Suds manual C753

Appendix	Name
B3	Full planning
B4	Scheme design
B5	Health and safety
B6	Infiltration assessment
B7	Proprietary treatment
B9	filter strip
B11	filter drain
B13	swale
B15	bioretention
B16	pervious pavement
B17	attenuation tank
B19	basin
B21	pond wetland

Flood risk to be assessed

Flood risk	Applicable to subject site	Measures to reduce risk	Residual risk
Fluvial	Yes	Finished Floor levels of buildings will be well above Mayne River flood level.	
Pluvial	Yes	Surface water drainage network will be designed to comply with GSDSDS with 20% allowance for climate change.	
Coastal	Yes	Mayne River discharges to Baldoyle Estuary through 2 flap valves. Combination of high rainfall event during tide lock has been modelled in the Flood Risk Assessment prepared by Jeremy Benn Associates including a hydraulic study of the Mayne River. Building FFLs will be well above flood level.	
Groundwater	No		
Dam/Embankment/Canal bank breach	No		
Network drainage	Yes	Will be designed in accordance with GSDSDS.	
Snow melt	No		
Watermain burst	Possible	Surface water drainage network will cater for watermain network burst.	

Note:

Models should consider the risk when outlets are surcharged

Climate Change scenarios to be considered both MRFS and HEFS