TOBIN

Galway County Council

Loughrea Fire Station, Athenry Road, Loughrea, Co. Galway

Engineering Planning Report

Comhairle Chontae na Gaillimhe
Galway County Council

BUILT ON KNOWLEDGE

Document Control Sheet	
Document Reference	TR03 Engineering Planning Report
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Project Reference	11315

Rev	Description	Author	Date	Reviewer	Date	Approval	Date
P0-1	Planning Issue	GM	08/08/2024	SB	08/08/2024	MG	08/08/2024

Table of Contents

Appendices

List of Tables

1. INTRODUCTION

1.1 GENERAL

Galway County Council intend to develop a new Fire Station at their lands located at the Athenry Road, Loughrea, Co Galway. The development will consist of the clearance of the existing greenfield site and construction of a fire station including access roads & parking spaces, training tower, landscaping, open space and all ancillary site development works.

TOBIN are the consultants appointed to provide civil engineering design and flood risk assessment services for the planning stage of the project. This report discusses the civil engineering aspects of the project while the Flood Risk Assessment is documented in a separate report included with the planning application submission.

1.2 ENGINEERING INFORMATION

As part of the planning submission for the above proposed development, TOBIN have prepared this Engineering Report addressing the following design aspects of the proposed development.

- ✓ Storm Water Drainage
- ✓ Wastewater Drainage
- ✓ Water Supply
- ✓ Road Layout
- ✓ Traffic Management

The following drawings are included outlining the design proposals and a Drawing Register is included in **Appendix A**:

- ✓ LFS-DR-TOB-CE-2000_Proposed Storm Drainage Layout
- ✓ LFS-DR-TOB-CE-2001_Proposed Foul Drainage Layout
- ✓ LFS-DR-TOB-CE-2002_Proposed Watermain Layout
- ✓ LFS-DR-TOB-CE-2003_Proposed Roads Layout
- ✓ LFS-DR-TOB-CE-2004_Visibility Splays & Swept Path Analysis
- ✓ LFS-DR-TOB-CE-2005_Standard Watermain Details
- ✓ LFS-DR-TOB-CE-2006_Standard Manhole Details Sheet 1 of 2
- ✓ LFS-DR-TOB-CE-2007_Standard Manhole Details Sheet 2 of 2
- ✓ LFS-DR-TOB-CE-2008_Standard Pipe Bedding Details
- ✓ LFS-DR-TOB-CE-2009_Site Development Details
- ✓ LFS-DR-TOB-CE-2010_Static Storage Tank Details

2. STORM WATER DRAINAGE

Storm water drainage services for the proposed development are considered to include the following:

- ✓ Storm Water Network for footpaths, external paved areas and roofs
- ✓ Flow restriction and soakaway within site
- ✓ Removal of hydrocarbon pollutants

The storm water drainage services have been designed to take account of the requirements of the Department of Environment "Recommendations for Site Development Works for Housing Areas", 1998 and "Sewers for Adoption" published by WRC, UK.

The storm water drainage network was designed using Causeway Flow Design software and the following parameters formed the basis of the design:

The surface water run-off is calculated using the Modified Rational Method (Wallingford Procedure),

$$Q = 2.78 \times Cv \times Cr \times I \times A$$

Where,	Q	=	rate of run-off, l/s
	Cv	=	Volumetric run-off coefficient
	Cr	=	Routing coefficient
	I	=	Intensity of rainfall, mm/hr
	A	=	Impermeable Area, ha

- A design return period of 1 year has been adopted for the sewer network in accordance with good design practice.
- The rainfall intensity is based on rainfall data obtained from Met Eireann
- Minimum self cleansing velocity of 0.75m/s
- An allowable discharge of 2/s has been included in the model in accordance with the Greater Dublin Design Strategy

The following impermeability factors were adopted in accordance with good design practice:

- Macadam Roadways = 0.85
- Roof Areas = 0.95
- Concrete Areas = 0.85

2.1 STORM NETWORK

There is an existing storm water drainage network located in the St Laurence Fields estate to the south of the site which flows by gravity to a discharge point in the Loughrea Lake. The existing storm sewer is a 225mm diameter uPVC sewer.

As noted above, the storm drainage for the entire development has been designed using the Causeway Flow Design Software in accordance with the Recommendations for Site Development Works for Housing Areas and also some of the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). The details of the Causeway Flow Outputs for the pipe design, attenuation design and associated long sections are outlined at **Appendix B** of this report.

Please refer to drawing LFS-DR-TOB-CE-2000 details of the existing storm drainage network.

2.2 ATTENUATION

It is proposed to attenuate all roof and surface -run via an attenuation tank located in the south of the site. A 125m^3 cellular storage type system (95% voids) will discharge storm water at a rate of 2 L/sec into the existing sewer system. The discharge rate will be regulated by a hydro brake or a similar device. The attenuation tank has been designed to cater for a 100-year rainfall event with a 20% factor for climate change).

Refer to Drawings LFS-DR-TOB-CE-2000 for details of the proposed storm drainage network. Please refer to **Appendix B** for details of storm water attenuation / infiltration calculations.

2.3 PETROL INTERCEPTOR

It is proposed to install two Petrol Interceptors, upstream of the connection into the existing open drain. The design will include 1 No. Class 1 Bypass Petrol Interceptor and 1 Full Retention Petrol Interceptor. From the selection tables in the separator product brochure, the Kingspan Klargester model NSBE015 and NSFA010 or similar equivalent type bypass and full retention petrol interceptors are required to cater for the hydrocarbons which may be present in the storm water.

Surface water run-off entering the system will include run-off from the roadways and parking areas throughout the site and therefore may have hydrocarbons within their flow. These hydrocarbon pollutants require removal and are not to be discharged back into the environment. The separator has been sized to cater for roads, footways and driveway areas of the site.

3. WASTEWATER DRAINAGE

3.1 GENERAL

It is proposed to discharge wastewater generated by the proposed development to the existing foul sewer network which serves the St Laurence Fields Estate to the south. The existing foul sewer is a 225mm diameter uPVC sewer. It is proposed to discharge to this network via gravity using a 225 mm diameter sewer in accordance with Section 3.6 of The Irish Water Code of Practice for Wastewater Infrastructure. The existing organic capacity of the Loughrea wastewater treatment plant as constructed is 9500 m^3/day. Seeing as the organic capacity collected during peak week was 7730m^3/day as per the Loughrea WWTP AER 2023, it is not envisaged that the addition of the fire station will exceed system capacity.

A Confirmation of Feasibility has been obtained from Irish Water based on the approach discussed above as shown in the drawings and on the envisaged wastewater discharge volumes from the development. Refer to drawing LFS-DR-TOB-CE-2001 for details of the propose foul drainage network.

The drainage systems including all pipe sizes and gradients have been designed in accordance with the Irish Water Code of Practice for Wastewater Infrastructure using Causeway Flow Design Software. The details of the Flow Outputs for the pipe designs and associated long sections are outlined at **Appendix C** of this report. The pipework for the drainage system has been designed to provide for six times the dry weather flow (DWF) in accordance with the recommendations of the Irish Water Code of Practice for Wastewater Infrastructure.

A confirmation of Feasibility for this development has been received from Irish Water – Reference No CDS22002551, see **Appendix D**.

3.2 OCCUPANCY FIGURES AND WASTEWATER FLOW RATES

The foul loadings for the sewers have been evaluated in accordance with the Irish Water Code of Practice for Wastewater Supply.

The foul loading for the sewers has been evaluated in accordance with the Irish Water Code of Practice for Wastewater Infrastructure. The occupancy per house type is based on Section 3.6 of the IW Code of Practice for Wastewater Infrastructure, a summary of the total Hydraulic and Organic loadings based on these figures is outlined as follows:

Table 3-1 Summary of Hydraulic and Organic Loadings

Source		Hydraulic Loading (Litres/Day)		BOD_5 Load (Grams/Day)		P.E.
Description	Total Occupancy	Per Occupancy	Total	Per Occupancy	Total	
Total	16	50	800	20	320	5.3

Table 3-2 Summary of Total Occupancy

Location	Fire Fighters	Admin	Total Occupancy
Loughrea Fire Station	14	2	16
Total	**14**	**2**	**16**

Therefore, the total Hydraulic load for the proposed development is 800 Litres per day and the proposed PE is 5.33.

4. WATER SUPPLY

4.1 GENERAL OVERVIEW

The proposed water supply main has been designed in accordance with the Irish Water Code of Practice for Water Supply and Recommendations for Site Development Works for Housing Areas published by the Department of the Environment and Local Government. There is an existing 100mm diameter uPVC watermain located under the R446, Athenry Road, see Figure 6-1. It is proposed to take a feed from this watermain as shown in Drawing LFS-DR-TOB-CE-2002. The proposed pipe will consist of 100mm diameter PE100 SDR17 pipe. There is also a 150mm diameter watermain crossing through the eastern portion of the site, no works are proposed in this area. To reduce the connection costs arising from a large diameter connection, an on-site static storage tank is to be provided to supply training requirements as previously noted. A high-capacity hydrant will be required within the yard with an additional hydrant located to the front of the building.

The development will be provided with a Bulk Meter to Irish Water requirements and be compatible with the automatic meter reading (AMR) system.

All hydrants, valves and meters shall be provided with Indicator Plate and RC Marker Post in accordance with Irish Water Standard Details

A Pre-Connection Enquiry for the proposed development has been submitted to Irish Water based on this approach and on the envisaged water demand volumes.

A confirmation of Feasibility for this development has been received from Irish Water – Reference No CDS22002551. See **Appendix D**.

5. TRAFFIC

The proposed development will be accessed off the R380. This section of road has a 50kph speed limit. The 49m visibility splay requirement from the Design Manual for Urban Roads and Streets 2019 is achievable. However, due to the site being on the edge of the town, we have used the higher TII requirement of 70m (as per Table 5.5 from TII Publication DN-GEO-03060). These are demonstrated for both the main access junction and the Fire Tender access junction on Drawing LFS-DR-TOB-CE-2003 Proposed Roads Layout.

The proposed development is envisaged to have a total occupancy of 16 people. For design purposes, it is estimated that everyone will drive to the site giving a trip rate of 32 trips per day (2 trips per person). This is well below the thresholds as set out in Table 2.1 of the TII Traffic and Transport Assessment Guidelines (see below) as the estimated traffic to and from the development is well below 10% of the traffic flows on the R380.

Table 2.1 Traffic Management Guidelines Thresholds For Transport Assessments

Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road.
Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists or the location is sensitive.*
Residential development in excess of 200 dwellings.
Retail and leisure development in excess of 1,000m^2.
Office, education and hospital development in excess of 2,500m^2.
Industrial development in excess of 5,000m^2.
Distribution and warehousing in excess of 10,000m^2.

* In locations that experience particularly heavy congestion and when traffic flows from a proposed development are less than 5% of the traffic flows on the adjoining road, a Transport Assessment may still be required. When in doubt, the requirement for a Transport Assessment should always be scoped with the relevant local authority.

Therefore, this development does not meet the threshold for the requirement for a Transport Assessment.

The existing footpath is to be extended along the site frontage to provide access for pedestrians. All line marking, signage, etc is to be provided in accordance with the relevant standards (Traffic Signs Manual).

Appendix A DRAWING REGISTER

TOBIN

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Document and Drawing Issue Register

Project

11315 - Galway Co Co (Arch Led Framework) (VHA) Call-off #2 -Loughrea Fire Station

PLEASE ACKNOWLEDGE RECEIPT OF DRAWINGS

Reasons: AB - As Built, C - For Construction, CM - For Comment,

I - For Information, P - Preliminary, T - For Tender

MU - Multiple

ISSUE NO.	5
ISSUED BY	GM
DAY	8
MONTH	8
YEAR	24
ISSUE REASON	I

DRG NO.	DRAWING/DOCUMENT TITLE	SIZE	SCALE	
LFS-DR-TOB-CE-2000	Proposed Storm Drainage Layout	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2001	Proposed Foul Drainage Layout	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2002	Proposed Watermain Layout	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2003	Proposed Roads Layout	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2004	Visibility Splays & Swept Path Analysis	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2005	Standard Watermain Details	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2006	Standard Manhole Details Sheet 1 of 2	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2007	Standard Manhole Details Sheet 2 of 2	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2008	Standard Pipe Bedding Details	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2009	Site Development Details	A1	As Drawing	P0-1
LFS-DR-TOB-CE-2010	Static Storage Tank Details	A1	As Drawing	P0-1
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Vincent Hannon Architects				
	Brian Fahy			e
ELECTRONIC FORMATS				
	pdf			x

DOCUMENT AND DRAWING ISSUE REGISTER

Appendix B CAUSEWAY FLOW – PROPOSED STORM WATER NETWORK

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	55.0
Additional Flow (%)	0	Minimum Velocity (m/s)	0.75
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	16.200	Minimum Backdrop Height (m)	0.200
Ratio-R	0.271	Preferred Cover Depth (m)	1.200
CV	0.850	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
PrS01	0.024	5.00	95.150	1200	150.000	429.250	1.430
Pr S02	0.027	5.00	95.300	1200	178.000	429.250	1.767
Pr S03	0.044	5.00	95.500	1200	195.500	464.250	1.420
Pr S04			95.400	1200	195.500	449.250	1.420
Pr S05	0.060	5.00	95.030	1200	195.500	429.250	1.613
Pr S06			94.700	1200	214.500	429.250	1.410
Pr S11	0.028	5.00	94.450	1200	225.000	482.250	1.420
Pr S12	0.045	5.00	94.400	1200	225.000	465.250	1.483
Pr S13			94.100	1200	225.000	445.250	1.316
Pr S14	0.067	5.00	94.160	1200	236.000	439.250	1.350
Pr S15			94.160	1200	225.000	439.250	1.423
Pr S07			94.640	1200	225.000	429.250	2.110
Pr S08			94.530	1200	241.000	429.250	2.107
Pr S09			94.360	1200	257.200	429.250	2.100
14_OUT			93.350		289.700	429.250	1.632

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	PrS01	Pr S02	28.000	0.600	93.720	93.533	0.187	150.0	225	5.44	38.3
1.001	Pr S02	Pr S05	17.500	0.600	93.533	93.417	0.117	150.0	225	5.71	37.6
2.000	Pr S03	Pr S04	15.000	0.600	94.080	93.980	0.100	150.0	225	5.23	38.8
2.001	Pr S04	Pr S05	20.000	0.600	93.980	93.847	0.133	150.4	225	5.55	38.0
1.002	Pr S05	Pr S06	19.000	0.600	93.417	93.290	0.127	150.0	225	6.01	36.9
1.003	Pr S06	Pr S07	10.500	0.600	93.290	93.115	0.175	60.0	225	6.11	36.6
3.000	Pr S11	Pr S12	17.000	0.600	93.030	92.917	0.113	150.4	225	5.27	38.8
3.001	Pr S12	Pr S13	20.000	0.600	92.917	92.784	0.133	150.0	225	5.58	37.9

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.065	42.3	2.8	1.205	1.542	0.024	0.0
1.001	1.065	42.3	5.9	1.542	1.388	0.051	0.0
2.000	1.065	42.3	5.2	1.195	1.195	0.044	0.0
2.001	1.064	42.3	5.1	1.195	0.958	0.044	0.0
1.002	1.065	42.3	17.6	1.388	1.185	0.155	0.0
1.003	1.691	67.2	17.4	1.185	1.300	0.155	0.0
3.000	1.063	42.3	3.3	1.195	1.258	0.028	0.0
3.001	1.065	42.3	8.5	1.258	1.091	0.073	0.0

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.002	Pr S13	Pr S15	6.000	0.600	92.784	92.737	0.047	128.6	225	5.67	37.7
4.000	Pr S14	Pr S15	11.000	0.600	92.810	92.737	0.073	150.7	225	5.17	39.0
3.003	Pr S15	Pr S07	10.000	0.600	92.737	92.670	0.067	149.3	225	5.82	37.3
1.004	Pr S07	Pr S08	16.000	0.600	92.530	92.423	0.107	149.5	225	6.36	36.1
1.005	Pr S08	Pr S09	16.200	0.600	92.423	92.315	0.108	150.0	225	6.62	35.5
1.006	Pr S09	14_OUT	32.500	0.600	92.260	91.718	0.542	60.0	225	6.94	34.8

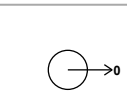
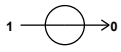
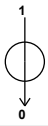
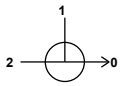
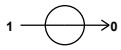
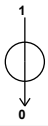
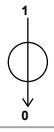
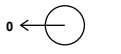
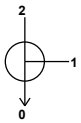
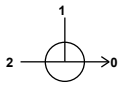
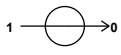
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
3.002	1.151	45.8	8.5	1.091	1.198	0.073	0.0
4.000	1.063	42.2	8.0	1.125	1.198	0.067	0.0
3.003	1.068	42.5	16.1	1.198	1.745	0.140	0.0
1.004	1.067	42.4	32.7	1.885	1.882	0.295	0.0
1.005	1.065	42.3	32.2	1.882	1.820	0.295	0.0
1.006	1.691	67.2	31.6	1.875	1.407	0.295	0.0

Pipeline Schedule

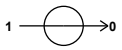
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	28.000	150.0	225	1 STANDARD	95.150	93.720	1.205	95.300	93.533	1.542
1.001	17.500	150.0	225	1 STANDARD	95.300	93.533	1.542	95.030	93.417	1.388
2.000	15.000	150.0	225	1 STANDARD	95.500	94.080	1.195	95.400	93.980	1.195
2.001	20.000	150.4	225	1 STANDARD	95.400	93.980	1.195	95.030	93.847	0.958
1.002	19.000	150.0	225	1 STANDARD	95.030	93.417	1.388	94.700	93.290	1.185
1.003	10.500	60.0	225	1 STANDARD	94.700	93.290	1.185	94.640	93.115	1.300
3.000	17.000	150.4	225	1 STANDARD	94.450	93.030	1.195	94.400	92.917	1.258
3.001	20.000	150.0	225	1 STANDARD	94.400	92.917	1.258	94.100	92.784	1.091
3.002	6.000	128.6	225	1 STANDARD	94.100	92.784	1.091	94.160	92.737	1.198
4.000	11.000	150.7	225	1 STANDARD	94.160	92.810	1.125	94.160	92.737	1.198
3.003	10.000	149.3	225	1 STANDARD	94.160	92.737	1.198	94.640	92.670	1.745
1.004	16.000	149.5	225	1 STANDARD	94.640	92.530	1.885	94.530	92.423	1.882
1.005	16.200	150.0	225	1 STANDARD	94.530	92.423	1.882	94.360	92.315	1.820
1.006	32.500	60.0	225	1 STANDARD	94.360	92.260	1.875	93.350	91.718	1.407

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	PrS01	1200	Manhole	1 STANDARD	Pr S02	1200	Manhole	1 STANDARD
1.001	Pr S02	1200	Manhole	1 STANDARD	Pr S05	1200	Manhole	1 STANDARD
2.000	Pr S03	1200	Manhole	1 STANDARD	Pr S04	1200	Manhole	1 STANDARD
2.001	Pr S04	1200	Manhole	1 STANDARD	Pr S05	1200	Manhole	1 STANDARD
1.002	Pr S05	1200	Manhole	1 STANDARD	Pr S06	1200	Manhole	1 STANDARD
1.003	Pr S06	1200	Manhole	1 STANDARD	Pr S07	1200	Manhole	1 STANDARD
3.000	Pr S11	1200	Manhole	1 STANDARD	Pr S12	1200	Manhole	1 STANDARD
3.001	Pr S12	1200	Manhole	1 STANDARD	Pr S13	1200	Manhole	1 STANDARD
3.002	Pr S13	1200	Manhole	1 STANDARD	Pr S15	1200	Manhole	1 STANDARD
4.000	Pr S14	1200	Manhole	1 STANDARD	Pr S15	1200	Manhole	1 STANDARD
3.003	Pr S15	1200	Manhole	1 STANDARD	Pr S07	1200	Manhole	1 STANDARD
1.004	Pr S07	1200	Manhole	1 STANDARD	Pr S08	1200	Manhole	1 STANDARD
1.005	Pr S08	1200	Manhole	1 STANDARD	Pr S09	1200	Manhole	1 STANDARD
1.006	Pr S09	1200	Manhole	1 STANDARD	14_OUT		Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
PrS01	150.000	429.250	95.150	1.430	1200		0	1.000	93.720	225
Pr S02	178.000	429.250	95.300	1.767	1200		1 0	1.000 1.001	93.533 93.533	225 225
Pr S03	195.500	464.250	95.500	1.420	1200		0	2.000	94.080	225
Pr S04	195.500	449.250	95.400	1.420	1200		1 0	2.000 2.001	93.980 93.980	225 225
Pr S05	195.500	429.250	95.030	1.613	1200		1 2 0	2.001 1.001 1.002	93.847 93.417 93.417	225 225 225
Pr S06	214.500	429.250	94.700	1.410	1200		1 0	1.002 1.003	93.290 93.290	225 225
Pr S11	225.000	482.250	94.450	1.420	1200		0	3.000	93.030	225
Pr S12	225.000	465.250	94.400	1.483	1200		1 0	3.000 3.001	92.917 92.917	225 225
Pr S13	225.000	445.250	94.100	1.316	1200		1 0	3.001 3.002	92.784 92.784	225 225
Pr S14	236.000	439.250	94.160	1.350	1200		0	4.000	92.810	225
Pr S15	225.000	439.250	94.160	1.423	1200		1 2 0	4.000 3.002 3.003	92.737 92.737 92.737	225 225 225
Pr S07	225.000	429.250	94.640	2.110	1200		1 2 0	3.003 1.003 1.004	92.670 93.115 92.530	225 225 225
Pr S08	241.000	429.250	94.530	2.107	1200		1 0	1.004 1.005	92.423 92.423	225 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Pr S09	257.200	429.250	94.360	2.100	1200	1	1.005	92.315	225
									
						0	1.006	92.260	225
14_OUT	289.700	429.250	93.350	1.632		1	1.006	91.718	225
									

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	Scotland and Ireland	Skip Steady State	x
M5-60 (mm)	16.200	Drain Down Time (mins)	240
Ratio-R	0.271	Additional Storage (m³/ha)	20.0
Summer CV	0.850	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
30	10	0	0
100	20	0	0

Node Pr S09 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	92.260	Product Number	CTL-SHE-0064-2000-1200-2000
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Pr S09 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	92.260
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	120.0	120.0	1.100	120.0	168.4	1.200	0.0	168.4

Results for 30 year +10% CC Critical Storm Duration. Lowest mass balance: 99.61%

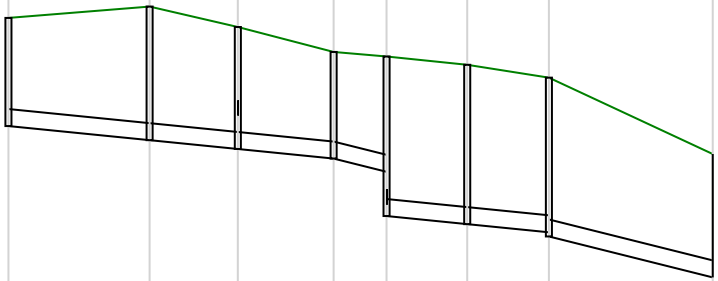
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	PrS01	10	93.781	0.061	7.0	0.0894	0.0000	OK
15 minute summer	Pr S02	11	93.625	0.092	14.8	0.1319	0.0000	OK
15 minute summer	Pr S03	10	94.169	0.089	12.9	0.1562	0.0000	OK
15 minute summer	Pr S04	11	94.067	0.087	12.8	0.0988	0.0000	OK
15 minute summer	Pr S05	11	93.615	0.198	44.4	0.3713	0.0000	OK
15 minute summer	Pr S06	11	93.441	0.151	44.1	0.1708	0.0000	OK
15 minute summer	Pr S11	13	93.269	0.239	8.2	0.3651	0.0000	SURCHARGED
15 minute summer	Pr S12	12	93.283	0.366	21.3	0.6363	0.0000	SURCHARGED
15 minute summer	Pr S13	12	93.263	0.479	19.9	0.5420	0.0000	SURCHARGED
15 minute summer	Pr S14	12	93.257	0.447	19.6	0.9488	0.0000	SURCHARGED
15 minute summer	Pr S15	12	93.252	0.515	32.9	0.5824	0.0000	SURCHARGED
15 minute summer	Pr S07	12	93.210	0.680	68.3	0.7692	0.0000	SURCHARGED
960 minute summer	Pr S08	720	93.078	0.655	11.0	0.7412	0.0000	SURCHARGED
960 minute summer	Pr S09	720	93.078	0.818	10.9	94.1939	0.0000	SURCHARGED
30 minute summer	14_OUT	149	91.743	0.025	1.8	0.0000	0.0000	OK

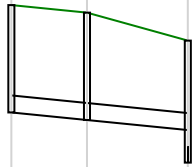
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	PrS01	1.000	Pr S02	6.9	0.591	0.163	0.3329	
15 minute summer	Pr S02	1.001	Pr S05	14.4	0.544	0.341	0.4571	
15 minute summer	Pr S03	2.000	Pr S04	12.8	0.887	0.301	0.2158	
15 minute summer	Pr S04	2.001	Pr S05	12.7	0.916	0.299	0.2766	
15 minute summer	Pr S05	1.002	Pr S06	44.1	1.334	1.041	0.6209	
15 minute summer	Pr S06	1.003	Pr S07	44.2	1.683	0.658	0.2759	
15 minute summer	Pr S11	3.000	Pr S12	8.4	0.522	0.198	0.6761	
15 minute summer	Pr S12	3.001	Pr S13	19.9	0.869	0.470	0.7954	
15 minute summer	Pr S13	3.002	Pr S15	24.1	0.606	0.526	0.2386	
15 minute summer	Pr S14	4.000	Pr S15	17.1	0.700	0.405	0.4375	
15 minute summer	Pr S15	3.003	Pr S07	35.1	1.010	0.827	0.3977	
15 minute summer	Pr S07	1.004	Pr S08	66.8	1.680	1.575	0.6363	
960 minute summer	Pr S08	1.005	Pr S09	10.9	0.521	0.258	0.6443	
960 minute summer	Pr S09	1.006	14_OUT	1.8	0.730	0.026	0.0789	96.3

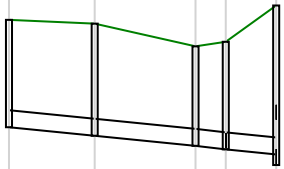
Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.61%

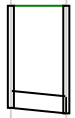
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	PrS01	12	93.898	0.178	9.9	0.2618	0.0000	OK
30 minute summer	Pr S02	20	93.898	0.365	20.1	0.5240	0.0000	SURCHARGED
15 minute summer	Pr S03	10	94.189	0.109	18.2	0.1913	0.0000	OK
15 minute summer	Pr S04	11	94.086	0.106	18.0	0.1204	0.0000	OK
30 minute summer	Pr S05	20	93.882	0.466	56.9	0.8730	0.0000	SURCHARGED
30 minute summer	Pr S06	20	93.701	0.411	51.3	0.4649	0.0000	SURCHARGED
30 minute summer	Pr S11	20	93.725	0.695	11.0	1.0594	0.0000	SURCHARGED
30 minute summer	Pr S12	20	93.719	0.802	28.2	1.3947	0.0000	SURCHARGED
30 minute summer	Pr S13	20	93.682	0.898	20.4	1.0157	0.0000	SURCHARGED
30 minute summer	Pr S14	20	93.685	0.875	26.4	1.8595	0.0000	SURCHARGED
30 minute summer	Pr S15	20	93.667	0.930	38.8	1.0513	0.0000	SURCHARGED
30 minute summer	Pr S07	20	93.588	1.058	82.9	1.1961	0.0000	SURCHARGED
960 minute summer	Pr S08	750	93.547	1.124	13.6	1.2708	0.0000	SURCHARGED
960 minute summer	Pr S09	750	93.546	1.286	13.5	132.5548	0.0000	SURCHARGED
960 minute summer	14_OUT	735	91.745	0.027	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	PrS01	1.000	Pr S02	11.2	0.604	0.266	1.0296	
30 minute summer	Pr S02	1.001	Pr S05	18.8	0.542	0.443	0.6960	
15 minute summer	Pr S03	2.000	Pr S04	18.0	0.960	0.426	0.2816	
15 minute summer	Pr S04	2.001	Pr S05	17.9	1.000	0.423	0.3577	
30 minute summer	Pr S05	1.002	Pr S06	51.3	1.313	1.211	0.7557	
30 minute summer	Pr S06	1.003	Pr S07	47.9	1.701	0.712	0.4176	
30 minute summer	Pr S11	3.000	Pr S12	10.5	0.525	0.249	0.6761	
30 minute summer	Pr S12	3.001	Pr S13	20.4	0.850	0.482	0.7954	
30 minute summer	Pr S13	3.002	Pr S15	20.1	0.595	0.438	0.2386	
30 minute summer	Pr S14	4.000	Pr S15	22.9	0.670	0.542	0.4375	
30 minute summer	Pr S15	3.003	Pr S07	38.3	1.026	0.902	0.3977	
30 minute summer	Pr S07	1.004	Pr S08	82.3	2.070	1.941	0.6363	
960 minute summer	Pr S08	1.005	Pr S09	13.5	0.537	0.319	0.6443	
960 minute summer	Pr S09	1.006	14_OUT	2.0	0.762	0.030	0.0873	113.6

Node Name		PrS01	Pr S02	Pr S05	Pr S06	Pr S07	Pr S08	Pr S09	14_OUT
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 88.000									
Link Name		1.000	1.001	1.002	1.003	1.004	1.005	1.006	
Section Type		225mm	225mm	225mm	225mm	225mm	225mm	225mm	
Slope (1:X)		150.0	150.0	150.0	60.0	149.5	150.0	60.0	
Cover Level (m)		95.150	95.300	95.030	94.700	94.640	94.530	94.360	93.350
Invert Level (m)		93.720 93.533	93.533 93.417	93.417 93.290	93.290 93.115	92.530 92.423	92.423 92.315	92.260 91.718	
Length (m)		28.000	17.500	19.000	10.500	16.000	16.200	32.500	

Node Name		Pr S03	Pr S04	Pr S05
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 89.000				
Link Name		2.000	2.001	
Section Type		225mm	225mm	
Slope (1:X)		150.0	150.4	
Cover Level (m)		95.500	95.400	95.030
Invert Level (m)		94.080	93.980 / 93.980	93.847
Length (m)		15.000	20.000	

Node Name		Pr S11	Pr S12	Pr S13	Pr S07
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 88.000					
Link Name		3.000	3.001	3.0	3.00
Section Type		225mm	225mm	22	225r
Slope (1:X)		150.4	150.0	12	149.
Cover Level (m)		94.450	94.400	94.100	94.160 94.640
Invert Level (m)		93.030 92.917	92.917 92.784	92.7	92.737 92.670
Length (m)		17.000	20.000	6.0	10.0

Node Name		Pr S14	Pr S15
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 88.000			
Link Name		4.000	
Section Type		225m	
Slope (1:X)		150.7	
Cover Level (m)		94.160	94.160
Invert Level (m)		92.810	92.737
Length (m)		11.00	

Appendix C CAUSEWAY FLOW – PROPOSED FOUL NETWORK

Design Settings

Frequency of use (kDU)	1.00	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	2430	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	1.200
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

Name	Dwellings	Cover Level (m)	Manhole Type	Easting (m)	Northing (m)	Depth (m)
Pr F01	2	95.150	1 STANDARD	240.500	215.000	1.350
Pr F02		94.700	1 STANDARD	263.500	215.000	1.360
Pr F03		94.500	1 STANDARD	300.500	215.000	1.900
Pr F04		94.100	1 STANDARD	313.500	215.000	1.760
4_OUT		93.350	1 STANDARD	346.000	215.000	1.660

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	Pr F01	Pr F02	23.000	1.500	93.800	93.340	0.460	50.0	150
1.001	Pr F02	Pr F03	37.000	1.500	93.340	92.600	0.740	50.0	150
1.002	Pr F03	Pr F04	13.000	1.500	92.600	92.340	0.260	50.0	150
1.003	Pr F04	4_OUT	32.500	1.500	92.340	91.690	0.650	50.0	150

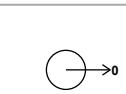
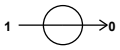
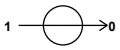
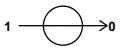
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)
1.000	1.241	21.9	0.1	1.200	1.210	0.000	2	0.0	0.0
1.001	1.241	21.9	0.1	1.210	1.750	0.000	2	0.0	0.0
1.002	1.241	21.9	0.1	1.750	1.610	0.000	2	0.0	0.0
1.003	1.241	21.9	0.1	1.610	1.510	0.000	2	0.0	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	23.000	50.0	150	1 STANDARD	95.150	93.800	1.200	94.700	93.340	1.210
1.001	37.000	50.0	150	1 STANDARD	94.700	93.340	1.210	94.500	92.600	1.750
1.002	13.000	50.0	150	1 STANDARD	94.500	92.600	1.750	94.100	92.340	1.610
1.003	32.500	50.0	150	1 STANDARD	94.100	92.340	1.610	93.350	91.690	1.510

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Pr F01	1200	Manhole	1 STANDARD	Pr F02	1200	Manhole	1 STANDARD
1.001	Pr F02	1200	Manhole	1 STANDARD	Pr F03	1200	Manhole	1 STANDARD
1.002	Pr F03	1200	Manhole	1 STANDARD	Pr F04	1200	Manhole	1 STANDARD
1.003	Pr F04	1200	Manhole	1 STANDARD	4_OUT		Manhole	1 STANDARD

Manhole Schedule

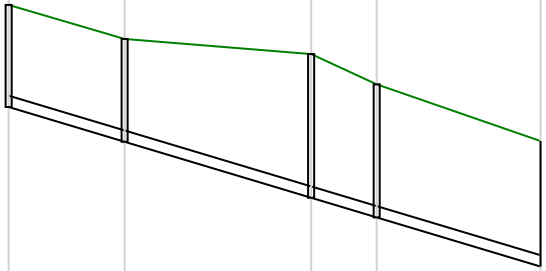
Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Pr F01	240.500	215.000	95.150	1.350	1200		0	1.000	93.800	150
Pr F02	263.500	215.000	94.700	1.360	1200	1	1.000	93.340	150
							0	1.001	93.340	150
Pr F03	300.500	215.000	94.500	1.900	1200	1	1.001	92.600	150
							0	1.002	92.600	150
Pr F04	313.500	215.000	94.100	1.760	1200	1	1.002	92.340	150
							0	1.003	92.340	150
4_OUT	346.000	215.000	93.350	1.660		1	1.003	91.690	150
										

Simulation Settings

Analysis Speed	Normal	Drain Down Time (mins)	240
Skip Steady State	x	Foul Event Duration (mins)	

Storm Durations

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

Node Name		Pr F01	Pr F02	Pr F03	Pr F04	4_OUT
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 88.000						
Link Name		1.000	1.001	1.002	1.003	
Section Type		150mm	150mm	150mm	150mm	
Slope (1:X)		50.0	50.0	50.0	50.0	
Cover Level (m)		95.150	94.700	94.500	94.100	93.350
Invert Level (m)		93.800 93.340	93.340 92.600	92.600 92.340	92.340 91.690	
Length (m)		23.000	37.000	13.000	32.500	

Appendix D IRISH WATER CONFIRMATION OF FEASIBILITY

Shane Byrne

Tobin Consulting Engineers
Fairgreen House
Fairgreen Road
Galway
H91AXK8

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

11 April 2022

Re: CDS22002551 pre-connection enquiry - Subject to contract | Contract denied

Connection for Business Connection of 1 unit(s) at Athenry Road, Loughrea, Co. Galway

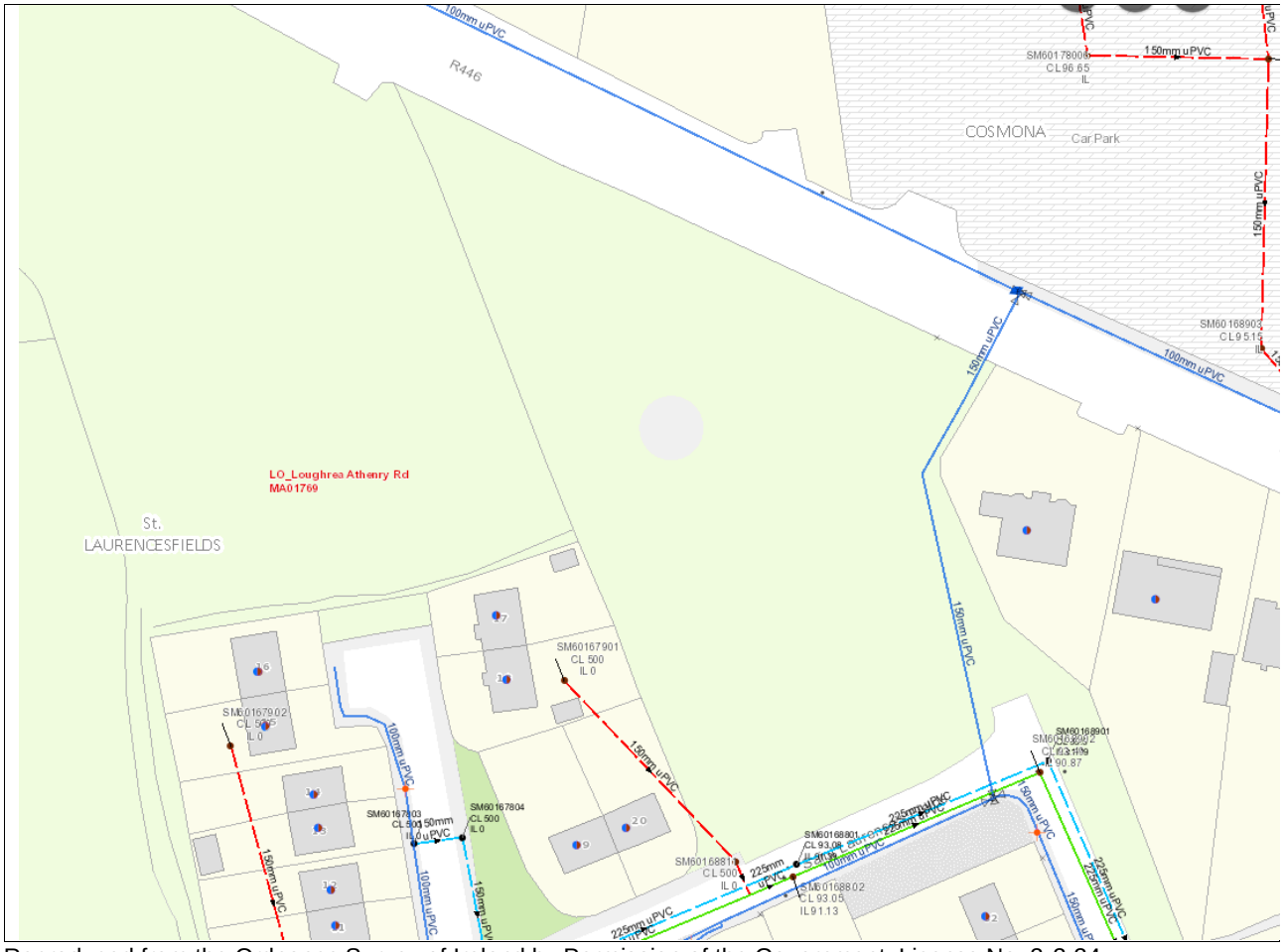
Dear Sir/Madam,

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

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	The proposed Development indicates that Irish Water assets are present on the site. The Developer has to demonstrate that proposed structures and works will not inhibit access for maintenance or endanger structural or functional integrity of the assets during and after the works. Drawings (showing clearance distances, changing to ground levels) and Method Statements should be included in the Detailed Design of the Development. A wayleave in favour of Irish Water will be required over the assets that are not located within the Public Space. For design submissions and queries related to diversion/build near or over, please contact IW Diversion Team via email address diversions@water.ie

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

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



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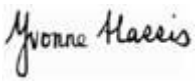
Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish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

General Notes:

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

If you have any further questions, please contact Tinus van der Walt from the design team at twalt@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris

Head of Customer Operations

www.tobin.ie