PUNCH
consulting engineers

Living Georgian City
33-34 Thomas Street

201220-PUNCH-XX-ZZ-RP-C-002
Engineering Planning Report

December 2022

Document Control

Document Number: **201220-PUNCH-XX-ZZ-RP-C-002**

Status	Revision	Description	Date	Prepared	Checked	Approved
A0	P01	Planning Issue	15 December 2022	T Nash	J Tiernan	J Tiernan

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1 Introduction

This report was prepared to accompany a planning application for the proposed development on a site located at 33/34 Thomas Street, Limerick. The site location is shown in Figure 1-1 below.

The site is irregular in shape and measures 0.054 Ha. The site consists of two existing buildings. 33 Thomas Street is a Georgian era building and 34 Thomas Street is a two-storey building constructed around the 20th century. The site is bound by an existing Georgian building, 32 Thomas Street, to the west and by a 20th Century single storey building, 35 Thomas Street, to the east. Access to the site is via the front of the building on Thomas Street only.

Figure 1-1: Site Location: 34-35 Thomas Street – Georgian Housing Limerick

1.1 Proposed Development

The proposed works are outlined in a series of architectural drawings prepared by Paul Keogh Architects and engineering drawings prepared by PUNCH Consulting Engineers and supplied as part of the planning documentation. This report deals specifically with the proposals for the provision of surface water drainage, foul water drainage and watermains associated with the development. The proposed finished floor level of ground floor of the development is 14.81 mAOD.

The proposed development consists of the redevelopment of the existing Georgian building on 33 Thomas Street and a new structure on 34 Thomas Street. The redevelopment of the existing building on 33 Thomas Street shall consist of 5no. apartment/studio units. The proposed new structure shall consist of one commercial unit, one community space unit and 8 apartment units. Both buildings shall share a communal, bin and bike storage area.

2 Stormwater Drainage Design

2.1 Existing Stormwater Drainage

Record drawings indicate that there is an existing combined sewer network located adjacent to the site on Thomas St.

A topographical survey carried out by NCW surveys was undertaken in February 2021. The survey confirmed the presence of the existing 225mm combined sewer pipe.

An extract from Irish Water Record Drawings is shown in Figure 2-1 below.

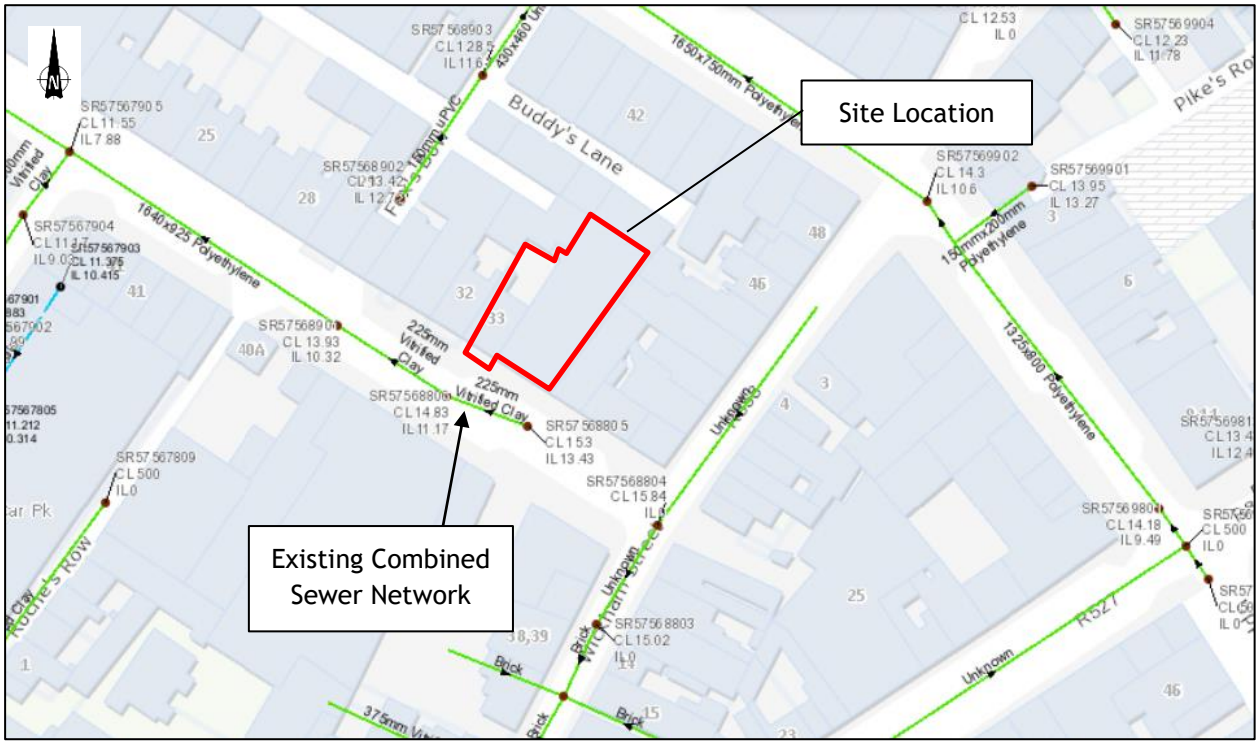


Figure 2-1: Existing combined drainage surrounding the site (Extract from Irish Water records)

2.2 Proposed Stormwater Drainage

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

A new surface water sewer network shall be provided for the proposed development. The stormwater network shall remain entirely separated from the foul sewer network within the development. This shall facilitate connection to a public stormwater network should one become available. Prior to entering the main sewer network, the stormwater network shall combine to the foul network. All surface water run-off from roof areas and hardstanding areas are designed to be collected by a gravity pipe network.

The majority of the proposed network is to discharge to an existing manhole located on Thomas Street. Due to the elevation levels of the basement and existing services located in the area, a second connection is proposed downstream of the existing manhole. The downstream sewer is a 225 mm vitrified clay sewer with an invert level of 11.17 m AOD.

The proposed surface water network will use SUDs measures to reduce the outflow and given the existing site is largely impervious it should be accepted that this will be a significant improvement to the existing.

The surface water drainage network has been analysed for the risk of flooding for a 1 in 5 year, 1 in 30 year and 1 in 100 year rainfall event by means of simulating such events in the drainage model. No flooding occurs in the 1 in 5 year, 1 in 30 year or 1 in 100 year rainfall event. Attenuation will be accommodated within the proposed stormwater network.

The proposed stormwater sewers have been designed using Causeway Flow software. Table 2-1 describes the stormwater drainage design parameters used and detailed calculations are enclosed in Appendix A.

Table 2-1: Stormwater Drainage Design Parameters

Description	Value
Total Impervious Site area	0.054ha
Return period target	Pipe Design 1 in 5 year. Network Design 1 in 30 year + CC. Check 1 in 100 year + CC for flooding.
Climate Change	30%
Urban Creep	10%
M5-60	17.2
Ratio R	0.325
SOIL type	5 (steep, rocky areas)
Soil value	0.5
SAAR	1011mm
Attenuation Storage Volume	Accommodated through SUDs Measures

2.3 SUDs Proposals

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS). SuDS measures may be adopted to comply with Council recommendations. All SuDS measures are to be implemented with reference to the UK Suds Manual and Limerick City and County Council drainage requirements.

Relatively small volumes of rainwater collected on the respective SuDS devices will enter the public sewer network during typical low intensity storms. This is because the proposed SuDS measures will retain rainwater until it is either used via evapotranspiration in the green areas.

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

The specific measures adopted for the proposed development comprise of the following:

2.3.1 Permeable Pavements

The outdoor ground level areas on site are proposed as permeable pavements. Permeable surfaces along with their base material provide an efficient means of reducing the peak flows.

CIRIA C753 (The SuDS Manual) notes that regarding interception design of pervious pavements, studies have shown that runoff typically does not occur from pervious pavements for rainfall events up to 5 mm.

2.3.2 Tree Root Systems

Proposed surface water along the development's landscaped paved areas where possible will discharge to a SuDS element such as tree root systems for interception and treatment prior to entering the drainage network. The tree root systems will incorporate drainage stone/subsoil and will provide a level of additional attenuation within the tree root system. The base and sides of the tree root system will be lined and a high level overflow to the drainage network within the build-up will accommodate removal of water.

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

3 Foul Water Drainage Design

3.1 Existing Foul Water Drainage

As outlined in section 2.1 above, an existing combined sewer is located adjacent to the site.

3.2 Proposed Foul Water Drainage

The proposed foul water sewers have been designed using Causeway Flow software in accordance with the DOE's "Recommendations for Site Development Works for Housing Areas". The foul loading has been calculated in accordance with "Code of Practice for Wastewater Infrastructure" (particularly clause 36, Appendix C and Appendix D) published by Irish Water.

The majority of the proposed foul network is to discharge to an existing manhole located on Thomas Street. Due to the elevation levels of the basement and existing services located in the area, a second connection is proposed downstream of the existing manhole. The downstream sewer is a 225 mm vitrified clay sewer with an invert level of 11.17 m AOD. Approximately 20 m downstream, the combined sewer increases to a 1640 x 925 mm PE pipe. Table 3-1 describes the foul water drainage design parameters used and detailed calculations are enclosed in Appendix B.

Table 3-1: Foul Water Drainage Design Parameters

Description	Value
Residential Flow Rate	150 l/person/day
Persons per Dwelling	2.7
Commercial Flow Rate	14 m3/ha/day
Infiltration	10%
Peaking Factor	6 DWF (Residential) 4.5 DWF (Commercial)
Minimum Self Cleansing Velocity	0.75m/s
Minimum Pipe Diameter	150mm

Table 3-2: Foul Water Drainage Design Calculations

Category	Quantity	Flow Rate + Infiltration	Daily Flow (l/day)	DWF (l/s)	Design Peak Flow (l/s)
Residential	13 units 35 persons	165 l/person/day	5,792 l/day	0.067 l/s	0.402 l/s
Commercial	42 m^2	14.14 m3/ha/day	59 l/day	0.001 l/s	0.003 l/s
Design Flow				**0.068 l/s**	**0.405 l/s**

A Pre-Connection Enquiry Form has been issued to Irish Water in relation to the proposed development. Irish water has provided a response, advising that the wastewater connections are feasible without any infrastructure upgrade. Please refer to Appendix C for Irish Water correspondence.

4 Watermain Design

4.1 Existing Watermain

Irish Water record drawings indicate that there is an existing watermain network adjacent to the site. This consists of a 6" cast iron watermain on Thomas Street.

A topographical survey carried out by NCW surveys was undertaken in November 2020. This confirmed the presence of the existing watermain network and the existing connections.

An extract is shown in Figure **4-1** below.

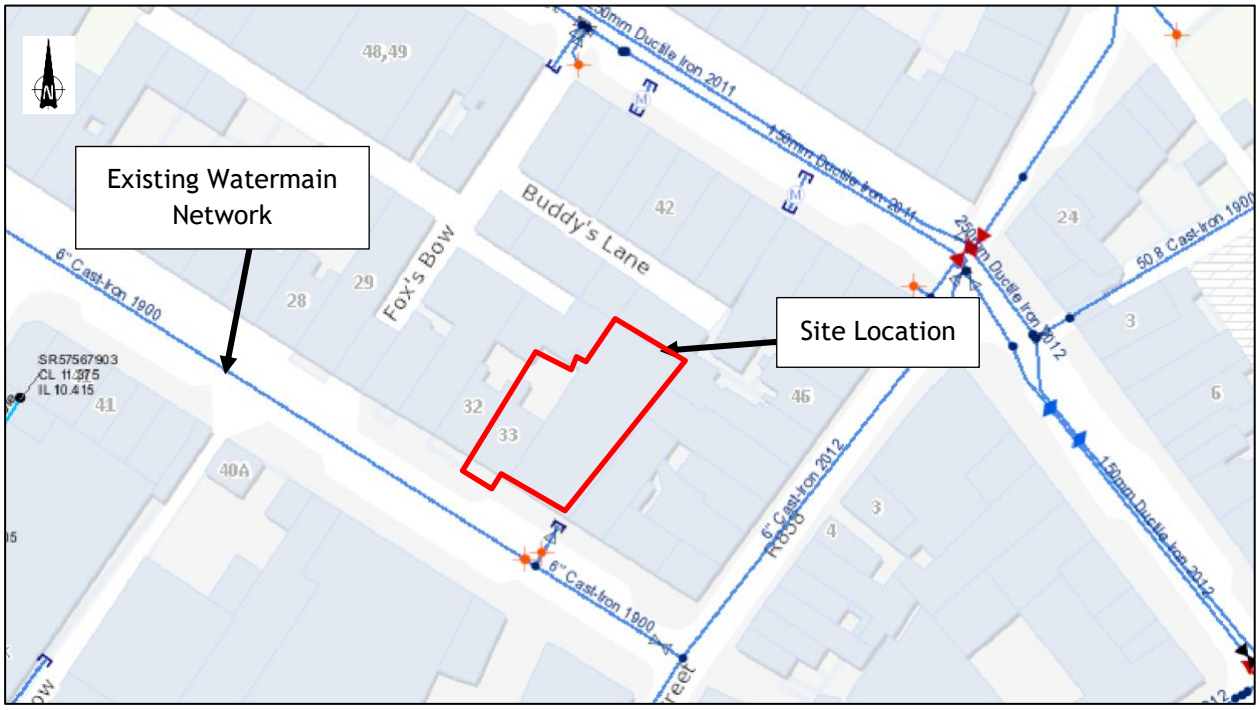


Figure 4-1: Existing watermain surrounding the site (Extract from Irish Water records)

4.2 Proposed Watermain

With reference to Irish Water's Code of Practice for Water Infrastructure, the average daily flow is calculated as the number of persons multiplied by the flow rate per person. The average day peak week flow is taken to be 1.25 x the average flow. The peak demand is taken to be the average day peak week flow multiplied by a peaking factor of 5. Table 4-1 describes the watermain design parameters used.

Table 4-2: Watermain Design Parameters

Description	Value
Residential Flow Rate	150 l/person/day
Persons per Dwelling	2.7
Commercial Flow Rate	14 m3/ha/ day
Average Demand	1.25 DWF
Peak Demand	5 DWF

Table 4-2: Watermain Design Calculation

Category	Quantity	Flow Rate	Daily Flow (l/day)	DWF (l/s)	Average Demand (1.25DWF) (l/s)	Peak Demand (5DWF) (l/s)
Residential	13 units 35 persons	150 l/person/day	5265	0.061	0.076	0.305
Commercial	42 m^2	14 m3/ha/day	58.8	0.001	0.001	0.003
Total				**0.062**	**0.077**	**0.308**

On the basis of the above tables, the development will have an average water demand of 0.077 l/s and a peak water demand of 0.308 l/s.

It is proposed to provide a new watermain to serve the proposed development based on the above calculated demand. The proposed watermain will connect to the main line on Thomas Street.

A bulk water meter shall be provided at the site boundary at the location of the proposed connection to the existing watermain. The watermain layout has been designed in accordance with "Irish Water Code of Practice for Water Infrastructure". All watermains are to be constructed in accordance with Irish Water Code of Practice and the Local Authority's requirements. Fire coverage is to be reviewed and certified by the fire consultant.

To reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets, monobloc low volume push taps and waterless urinals.

A Pre-Connection Enquiry Form has been issued to Irish Water in relation to the proposed development. Irish water has provided a response, advising that the watermain connection is feasible without any infrastructure upgrade. Please refer to Appendix C for Irish Water correspondence.

5 Flooding

Planning guidelines on flood risk and development have been published by the OPW and Department of Environment, Heritage and Local Government (DoEHLG). The below sections summarise how the development's design will be assessed in accordance with the main principles of the guidelines.

5.1 Sequential Approach

The sequential approach makes use of flood zones for river and coastal flooding, as described below:

Zone A – High probability. This zone defines areas with the highest risk of flooding. For river flooding it is defined as more than 1% probability or more than 1 in 100 year, and for coastal flooding it is defined as 0.5% probability or more than 1 in 200 year.

Zone B – Moderate probability. This zone defines areas with a moderate risk of flooding. For river flooding it is defined as 0.1% to 1% probability or between 1 in 100 and 1 in 1,000 years, and for coastal flooding 0.1% and 0.5% probability or between 1 in 200 and 1 in 1,000 years.

Zone C – Low probability. This zone defines areas with a low risk of flooding less than 0.1% probability or less than 1 in 1,000 years.

The flood zones are then to be looked at with the vulnerability of the building proposed;

Highly Vulnerable	– Hospitals, Garda stations, homes, motorways etc.
Less Vulnerable	– Commercial, retail, offices etc.
Water Compatible	– Marina's, green areas

A sequential approach is then taken to assess the most favourable location for the development based on its vulnerability.

Zone A - Water Compatible or Justification Test

Zone B - Less Vulnerable if no other lands are available or highly vulnerable with Justification Test

Zone C - Any development

5.2 Development Sequential Test

5.2.1 Coastal Flood Risk

Coastal flooding results from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influenced by the following three factors which often work in combination: high tide level, storm surges and wave action.

There is no risk associated with coastal flooding for this site as general ground levels for the site are much higher than expected extreme coastal flood levels.

5.2.2 Fluvial Flood Risk

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain.

There is no risk associated with fluvial flooding for this site as general ground levels for the site are much higher than expected extreme coastal flood levels.

5.2.3 Pluvial Flood Risk

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall and typically occurs in the

summer months. Pluvial flood risk has not been identified by the Preliminary Flood Risk Assessment (PFRA) mapping as being a risk to this site.

Additionally, the proposed drainage network will alleviate any concerns of pluvial flooding by catering for the 100 year return period plus 10% climate change allowance.

5.2.4 OPW Flood Maps

The OPW Flood Hazard Mapping Website is a record of historic flood events. This database indicates that there is no record of flooding incidents in the area of the proposed development.

5.3 Flood Risk Assessment Conclusions

The site has been assessed in accordance with the "The Planning System and Flood Risk Management" Guidelines. As part of the sequential test, the OPW flood hazard maps have been consulted, as have the Catchment Flood Risk Assessment Maps produced by the OPW.

In all cases it was found that the development is at low risk of flooding and the development is deemed appropriate within the proposed site location.

Appendix A Causeway Stormwater Drainage Design Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.200	Minimum Backdrop Height (m)	0.200
Ratio-R	0.325	Preferred Cover Depth (m)	1.200
CV	0.750	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)
S1-0	0.008	5.00	14.500	450	557799.705	656957.223	1.350
S1-1			14.500	450	557804.099	656953.585	1.400
R2	0.018	5.00	14.500	450	557808.994	656951.734	1.350
R1	0.018	5.00	14.500	450	557807.156	656949.173	1.350
S1-2			14.500	450	557808.549	656949.858	1.498
S1-3	0.003	5.00	14.500	450	557810.895	656947.894	1.550
S1-4			14.500	1200	557801.686	656934.726	1.824
S2-0	0.002	5.00	12.000	300	557797.741	656952.662	0.300
S2-1	0.003	5.00	12.000	300	557790.508	656942.019	0.517
S2-2			14.500	1200	557789.442	656940.254	3.052

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)
S1.003	S1-3	S1-4	16.069	0.600	12.950	12.676	0.274	58.6	150	5.42	50.0
S1.002	S1-2	S1-3	3.060	0.600	13.002	12.950	0.052	58.8	150	5.21	50.0
S1.001	S1-1	S1-2	5.805	0.600	13.100	13.002	0.098	59.2	150	5.18	50.0
S2.000	R2	S1-2	1.928	0.600	13.150	13.002	0.148	13.0	150	5.01	50.0
S3.000	R1	S1-2	1.552	0.600	13.150	13.002	0.148	10.5	150	5.01	50.0
S1.000	S1-0	S1-1	5.705	0.600	13.150	13.100	0.050	114.1	150	5.10	50.0
S4.001	S2-1	S2-2	2.062	0.600	11.483	11.448	0.035	58.9	150	5.19	50.0
S4.000	S2-0	S2-1	12.868	0.600	11.700	11.483	0.217	59.3	150	5.16	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S1.003	1.316	23.2	6.3	1.400	1.674	0.046	0.0	53	1.118
S1.002	1.313	23.2	5.9	1.348	1.400	0.043	0.0	51	1.097
S1.001	1.309	23.1	1.1	1.250	1.348	0.008	0.0	22	0.666
S2.000	2.806	49.6	2.4	1.200	1.348	0.018	0.0	23	1.458
S3.000	3.129	55.3	2.4	1.200	1.348	0.018	0.0	21	1.573
S1.000	0.940	16.6	1.1	1.200	1.250	0.008	0.0	26	0.531
S4.001	1.313	23.2	0.7	0.367	2.902	0.005	0.0	18	0.585
S4.000	1.308	23.1	0.3	0.150	0.367	0.002	0.0	11	0.433

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)
S1.003	16.069	58.6	150	Circular	14.500	12.950	1.400	14.500	12.676	1.674
S1.002	3.060	58.8	150	Circular	14.500	13.002	1.348	14.500	12.950	1.400
S1.001	5.805	59.2	150	Circular	14.500	13.100	1.250	14.500	13.002	1.348
S2.000	1.928	13.0	150	Circular	14.500	13.150	1.200	14.500	13.002	1.348
S3.000	1.552	10.5	150	Circular	14.500	13.150	1.200	14.500	13.002	1.348
S1.000	5.705	114.1	150	Circular	14.500	13.150	1.200	14.500	13.100	1.250
S4.001	2.062	58.9	150	Circular	12.000	11.483	0.367	14.500	11.448	2.902
S4.000	12.868	59.3	150	Circular	12.000	11.700	0.150	12.000	11.483	0.367

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S1.003	S1-3	450	Manhole	Adoptable	S1-4	1200	Manhole	Adoptable
S1.002	S1-2	450	Manhole	Adoptable	S1-3	450	Manhole	Adoptable
S1.001	S1-1	450	Manhole	Adoptable	S1-2	450	Manhole	Adoptable
S2.000	R2	450	Manhole	Adoptable	S1-2	450	Manhole	Adoptable
S3.000	R1	450	Manhole	Adoptable	S1-2	450	Manhole	Adoptable
S1.000	S1-0	450	Manhole	Adoptable	S1-1	450	Manhole	Adoptable
S4.001	S2-1	300	Manhole	Adoptable	S2-2	1200	Manhole	Adoptable
S4.000	S2-0	300	Manhole	Adoptable	S2-1	300	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	17.200	Additional Storage (m³/ha)	20.0
Ratio-R	0.325	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

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

Node S1-1 Online Orifice Control

Flap Valve	x	Invert Level (m)	13.100	Discharge Coefficient	0.250
Replaces Downstream Link	✓	Diameter (m)	0.100		

Node S1-2 Online Orifice Control

Flap Valve	x	Invert Level (m)	13.002	Discharge Coefficient	0.250
Replaces Downstream Link	✓	Diameter (m)	0.100		

Node S1-2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	13.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	17.0	0.0	1.000	17.0	0.0	1.001	0.0	0.0

Node S1-1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	13.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	15.0	0.0	1.000	15.0	0.0	1.001	0.0	0.0

Results for 30 year +30% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1-0	22	13.584	0.434	2.5	0.1206	0.0000	SURCHARGED
30 minute summer	S1-1	22	13.584	0.484	3.3	0.4563	0.0000	SURCHARGED
30 minute summer	R2	21	13.576	0.426	5.5	0.1786	0.0000	SURCHARGED
30 minute summer	R1	21	13.576	0.426	5.6	0.1812	0.0000	SURCHARGED
30 minute summer	S1-2	21	13.575	0.573	9.5	0.4773	0.0000	SURCHARGED
30 minute summer	S1-3	19	13.008	0.058	7.0	0.0116	0.0000	OK
15 minute summer	S1-4	12	12.732	0.056	7.0	0.0000	0.0000	OK
15 minute summer	S2-0	10	11.718	0.018	0.7	0.0036	0.0000	OK
15 minute summer	S2-1	10	11.513	0.030	1.8	0.0058	0.0000	OK
15 minute summer	S2-2	10	11.476	0.028	1.7	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)
30 minute summer	S1-0	S1.000	S1-1	2.8	0.398	0.166	0.1004	
30 minute summer	S1-1	Orifice	S1-2	2.3				
30 minute summer	R2	S2.000	S1-2	4.7	0.689	0.094	0.0339	
30 minute summer	R1	S3.000	S1-2	4.9	0.740	0.088	0.0273	
30 minute summer	S1-2	Orifice	S1-3	6.3				
30 minute summer	S1-3	S1.003	S1-4	7.0	1.127	0.300	0.0995	9.2
15 minute summer	S2-0	S4.000	S2-1	0.7	0.368	0.029	0.0237	
15 minute summer	S2-1	S4.001	S2-2	1.7	0.717	0.073	0.0049	0.7

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1-0	23	13.704	0.554	3.3	0.1539	0.0000	SURCHARGED
30 minute summer	S1-1	23	13.703	0.603	3.8	1.0133	0.0000	SURCHARGED
30 minute summer	R2	22	13.694	0.544	7.2	0.2280	0.0000	SURCHARGED
30 minute summer	R1	22	13.694	0.544	7.3	0.2312	0.0000	SURCHARGED
30 minute summer	S1-2	22	13.693	0.691	12.7	1.0968	0.0000	SURCHARGED
30 minute summer	S1-3	19	13.012	0.062	7.8	0.0123	0.0000	OK
30 minute summer	S1-4	20	12.736	0.060	7.8	0.0000	0.0000	OK
15 minute summer	S2-0	10	11.720	0.020	0.9	0.0040	0.0000	OK
15 minute summer	S2-1	10	11.518	0.035	2.3	0.0066	0.0000	OK
15 minute summer	S2-2	10	11.479	0.031	2.2	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)
30 minute summer	S1-0	S1.000	S1-1	2.4	0.405	0.146	0.1004	
30 minute summer	S1-1	Orifice	S1-2	2.9				
30 minute summer	R2	S2.000	S1-2	6.3	0.547	0.127	0.0339	
30 minute summer	R1	S3.000	S1-2	6.4	0.576	0.115	0.0273	
30 minute summer	S1-2	Orifice	S1-3	7.0				
30 minute summer	S1-3	S1.003	S1-4	7.8	1.160	0.335	0.1079	12.0
15 minute summer	S2-0	S4.000	S2-1	0.9	0.395	0.038	0.0289	
15 minute summer	S2-1	S4.001	S2-2	2.2	0.769	0.095	0.0059	1.0

Appendix B Causeway Foul Water Drainage Design Calculation

Design Settings

Frequency of use (kDU)	0.00	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	2673	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)
F1-0	4	14.500	Adoptable	557813.084	656951.990	1.000
F2-0	4	14.500	Adoptable	557802.842	656949.948	1.350
F1-1		14.500	Adoptable	557808.469	656945.983	1.540
F1-2	4	14.500	Adoptable	557807.349	656944.525	1.586
F1-3		14.500	Adoptable	557799.705	656934.575	1.900
F1-4		14.609	Adoptable	557787.461	656934.764	2.091
F3-0	1	12.000	Adoptable	557789.472	656942.666	0.600
F3-1		12.000	Adoptable	557787.862	656940.653	0.633
F3-2		14.499	Adoptable	557784.942	656936.387	3.219

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
F1.000	F1-0	F1-1	7.575	1.500	13.500	13.310	0.190	39.9	150
F2.000	F2-0	F1-1	6.884	1.500	13.150	12.960	0.190	36.2	150
F1.001	F1-1	F1-2	1.839	1.500	12.960	12.914	0.046	40.0	150
F1.002	F1-2	F1-3	12.547	1.500	12.914	12.600	0.314	40.0	150
F1.003	F1-3	F1-4	12.245	1.500	12.600	12.518	0.082	149.3	150
F3.000	F3-0	F3-1	2.578	1.500	11.400	11.367	0.033	78.1	150
F3.001	F3-1	F3-2	5.170	1.500	11.367	11.280	0.087	59.4	150

Name	Pro Vel @ 1/3 Q (m/s)	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)	Pro Depth (mm)	Pro Velocity (m/s)
F1.000	0.237	1.390	24.6	0.1	0.850	1.040	0.000	4	0.0	0.0	8	0.338
F2.000	0.249	1.458	25.8	0.1	1.200	1.390	0.000	4	0.0	0.0	8	0.355
F1.001	0.299	1.388	24.5	0.2	1.390	1.436	0.000	8	0.0	0.0	11	0.425
F1.002	0.337	1.388	24.5	0.4	1.436	1.750	0.000	12	0.0	0.0	13	0.489
F1.003	0.217	0.716	12.6	0.4	1.750	1.941	0.000	12	0.0	0.0	18	0.309
F3.000	0.117	0.992	17.5	0.0	0.450	0.483	0.000	1	0.0	0.0	5	0.168
F3.001	0.135	1.138	20.1	0.0	0.483	3.069	0.000	1	0.0	0.0	5	0.193

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)
F1.000	7.575	39.9	150	Circular	14.500	13.500	0.850	14.500	13.310	1.040
F2.000	6.884	36.2	150	Circular	14.500	13.150	1.200	14.500	12.960	1.390
F1.001	1.839	40.0	150	Circular	14.500	12.960	1.390	14.500	12.914	1.436
F1.002	12.547	40.0	150	Circular	14.500	12.914	1.436	14.500	12.600	1.750
F1.003	12.245	149.3	150	Circular	14.500	12.600	1.750	14.609	12.518	1.941
F3.000	2.578	78.1	150	Circular	12.000	11.400	0.450	12.000	11.367	0.483
F3.001	5.170	59.4	150	Circular	12.000	11.367	0.483	14.499	11.280	3.069

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
F1.000	F1-0	300	Manhole	Adoptable	F1-1	300	Manhole	Adoptable
F2.000	F2-0	300	Manhole	Adoptable	F1-1	300	Manhole	Adoptable
F1.001	F1-1	300	Manhole	Adoptable	F1-2	300	Manhole	Adoptable
F1.002	F1-2	300	Manhole	Adoptable	F1-3	1200	Manhole	Adoptable
F1.003	F1-3	1200	Manhole	Adoptable	F1-4	1200	Manhole	Adoptable
F3.000	F3-0	300	Manhole	Adoptable	F3-1	1200	Manhole	Adoptable
F3.001	F3-1	1200	Manhole	Adoptable	F3-2	1200	Manhole	Adoptable

Appendix C Irish Water Confirmation of Feasibility

Jamie Fennell
97 Henry Street
Limerick
V94YC2H

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

25 November 2021

Re: CDS21007517 pre-connection enquiry - Subject to contract | Contract denied

Connection for Multi/Mixed Use Development of 16 unit(s) at 33 & 34 Thomas Street, Limerick, Co Limerick

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at 33 & 34 Thomas Street, Limerick, Co Limerick (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

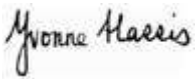
SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
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.	

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 Brian Lavelle from the design team on or email brian.lavelle@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris
Head of Customer Operations