

ENGINEERING SERVICES REPORT

FOR

A STRATEGIC HOUSING DEVELOPMENT

AT

DUNLO & POLLBOY, BALLINASLOE, CO GALWAY

ABP 312236-21

Client:
Our Ref:

LIMEHILL ESKER LTD
2521/WMG/RG



Prepared By:

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1. INTRODUCTION

RG Greene & Associates Consulting Engineers have been appointed by Limehill Esker Ltd, to prepare the design of the engineering services in support of a planning submission for the proposed development of 106 no. apartments/duplex units and 59 No. residential dwellings as part of a Strategic Housing Development at Dunlo & Pollboy, Ballinasloe, Co. Galway.

The purpose of this document is to describe the proposed drainage and water supply infrastructure associated with the new development. This infrastructure is indicated on drawings accompanying this planning submission.

Where reference is made to drawings and drawing numbers within this report, these should be taken as meaning those drawings unless specifically stated otherwise.

1.1 PROJECT DESCRIPTION

The project consists of the construction of a residential development of 165 no. residential units comprising of :

- Block A1 and A2, each consisting of 6 No Two-Bed Ground Floor apartments, 1 No One-Bed ground Floor apartment, 6 No Three-Bed First Floor Duplex Units, and 1 No Three-Bed Second Floor apartment.
- Blocks B1 to B3 and B6 to B13 inclusive, each consisting of 2 No Two-Bed Ground Floor Duplex Units, 2 No Three-Bed Ground Floor Duplex Units, 1 No Two-Bed Second Floor apartment, and 1 No One-Bed Second Floor apartment,
- Blocks B4 and B5 inclusive, each consisting of 1 No Two-Bed Ground Floor Duplex Unit, 2 No Three-Bed Ground Floor Duplex Units, 1 No Two-Bed Second Floor Apartment and 1 No One-Bed Second Floor apartment.
- House Type C : 32 No Two-Bed units in semi-detached pairs
- House Type E : 27 No Three-Bed units in triplet arrangements
- provision of 281 No. on-site car parking spaces incorporating 163 No. spaces for residents of the apartment/duplexes, and 118 No in-curtilage car parking spaces for the housing units
- Provision of all water, surface water, foul drainage, utility ducting and public lighting and all associated siteworks and ancillary services.
- All ancillary site development works including access roadways, footpaths, cycle ways, pedestrian links, Bicycle Sheds, waste storage areas, communal and open space, site landscaping, and boundary treatments.

Vehicular, cycle and pedestrian access to the site will be provided at two locations from the roundabout situated between the Tesco and Aldi store at south of the main roundabout at R446 within Ballinasloe, one heading northwest, which will approach the West side of the site, and the other at southeast of the same roundabout, coming to the East side of the site. There will also be an extension of road built at the southwest part of the development for further connection to the

Beechlawn Road, in Pollboy, and there is also a future potential connection at the southwest of the site.



The general layout of the scheme is shown above.

1.2 SITE DETAILS

The site has an overall area of 6.6702ha at Dunlo, Ballinasloe, Co. Galway, and is bounded by existing residential developments to the northwest and southeast, a Retail Park partially developed in 2008 to the centre-north, and by greenfields at southwest and east.

See general aerial view of the site below:



Figure 1 - Shows the site location, coloured red, in a local context

The entire area of the site was extensively disturbed over the course of a construction project which was being undertaken in or about 2009 . the entire existing surface consists of recolonizing grassland and servicing will be determined by the natural topography, which varies from south to north towards the internal roundabout which is at about 39m OD.

Finished floor levels will vary between about 46 m OD down to about 44.m OD over the western sector of the site, west to east, and from about 51.5m OD down to about 48.5m OD over the southern sector , south to north. The central area of the site is flat at about 47.5m OD.

Accordingly, this natural topography of the site supports the collection of surface water and wastewater by gravity means.

1.3 EXISTING DEVELOPMENTS

Approval was granted by Galway County Council for various developments in the general environs of Dunlo adjacent to the subject site in the 2007 2009.

Planning Permission was granted under Planning Ref No 07/9022 for:

Permission for demolition of 1 no. dwelling and construction of new entrance road including roundabout at junction with N6 at Harbour Road, construction of internal site roads, car parking and ancillary site services to service future commercial development at Harbour Road, (Dunlo Townland), Ballinasloe, Co. Galway

Subsequent planning permission was obtained under Planning Ref No. 07/9104 for:

Permission for a Retail Park Development at Dunlo Townland, Ballinasloe, Co. Galway. The site will be accessed via a roundabout at Harbour Road and road network granted under PL. Ref. Nos. P.D 06/090 and 07/9022. The development shall consist of the following:- Discount store (unit 1 - gross floor area 1629 sq m), Circa 750 seat five screen cinema (unit 9 - gross floor area 1864.4 sq m), Drive through restaurant (unit 11 - gross floor area 336 sq.m), Foodstore (unit 12 - gross floor area 5489 sq.m), including alcohol sales area, 433 car parking spaces, vehicular and pedestrian access and internal roads, advertising signage including signage on building and an internally illuminated totem sign, trolley bays, landscaping boundary treatment, service yard with enclosed dock leveller and delivery facilities, ESB substation and all associated site development works. 8 No. Retail units (unit 2 - floor area 1176.80 sq.m, Unit 3 - floor area 1179.80 sq.m, Unit 4 - floor area 1179.80 sq m, Unit 5 - floor area 1167.90 sq m, Unit 6 - floor area 2482.80 sq.m, Unit 7 - floor area 1115.20 sq.m, Unit 8 - floor area 2568.30 sq.m, (including outdoor display area of 594.00 sq.m), Unit 10 - floor area 1589.00 sq.m) Total gross floor area of development being 21778 sq.m (total gross retail area being 14094 sq.m) with associated car parking (circa 770-775 spaces), ancillary building signage, site development works, ancillary site services, service areas and circulation areas - alteration to previously granted road network (previous P.L. Ref Nos. P.D. 06/090 and P.D. 07/9022) including extension/alterations to road 'c' and junction alterations to road 'b'. This application will be accompanied by an Environmental Impact Statement

A Planning Permission was obtained under Planning Ref No. 08/9050 for:

Permission for full planning permission at a site (0.51ha) at Harbour Road, (Dunlo Townland), Ballinasloe, Co. Galway. The development will consist of: The demolition of 1 no. dwelling house and the construction of a 6 island petrol filling station incorporating a kiosk/shop (69.8m2 gross), 3 no. car parking spaces, forecourt canopy, underground storage tanks, circulation area, access and egress provisions, advertising signage (13.46m2), 2 no. totem signs (42.16m2), provision for air and water, landscaping, boundary treatment and all associated site developments works. Works will also include minor modifications to the previously permitted access road, granted under Reg. Ref No. 07/9022.

A Planning Permission was obtained under Planning Ref No. 09/9009 for:

Permission for the following developments: demolition of existing agricultural shed and construction of: circa 600 seat Four Screen Cinema (Unit 1 - gross floor area circa 1,518 sq.m), 4 No. retail units, - Unit 2 - floor area circa 107.80 sq.m, Unit 3 - floor area circa 91.16 sq.m, Unit 4 - floor area circa 99.90 sq.m, Unit 5 - floor area circa 107.80 sq.m, 2 No. Office Units, - Unit 6 - floor area circa 220.55 sq.m, Unit 7 - floor area circa 220.55 sq.m, E.S.B. Sub-station and Meter Room. The development shall include ancillary roads, car parking, building signage and all associated site development works at Dunlo Townland, Ballinasloe, Co. Galway

Finally, the Planning Permission No. 20229 of 2020 (ABP-307521-20), was granted by An Bord Pleanála as follows:

to consist of the construction of a café building to be used for the preparation and sale of food and beverages for consumption on and off the premises. The proposal also includes associated signage, a bin storage, an external seating area, a new footpath, hard and soft landscaping, 10 no. bicycle parking spaces, 2 no. universal access spaces. Gross floor space of proposed works; 232sqm & 10 sqm (bin store)

A Planning Permission was obtained under Planning Ref No. 18/1525 for:

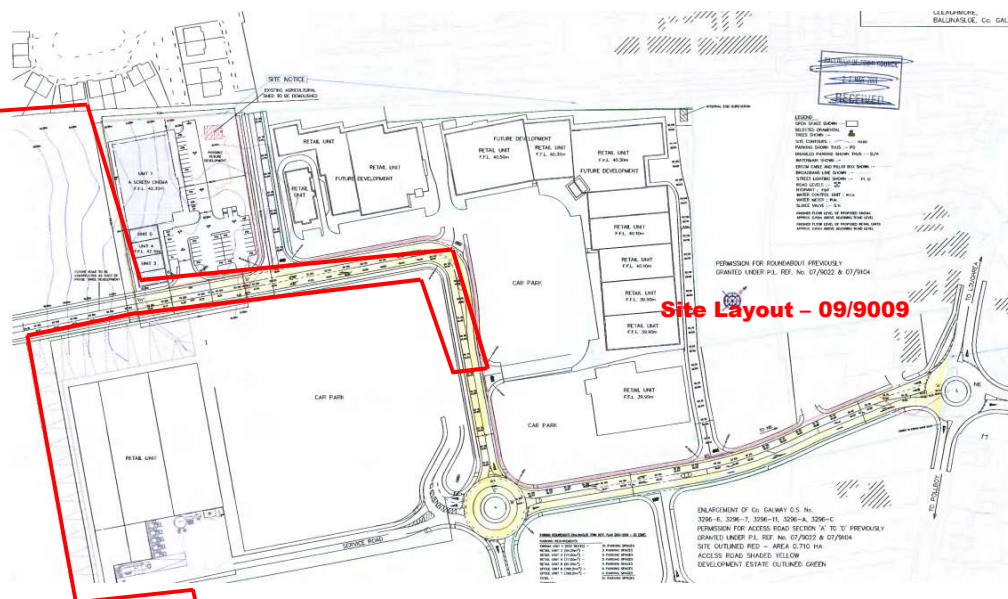
for a new single storey 5 screen cinema approx. 7.9m high and associated site works and car parking at the site beside Aldi. Gross floor space of proposed works: 1123 sqm

A Planning Permission was obtained under Planning Ref No. 19/1978 for:

for the following development on lands at Dunlo, Ballinasloe: Provision of (1) BLOCK A consisting of 1 No. One-bed apartment, 1 No. Three-Bed apartment, 4 No Two bed apartments, and a creche (321 Sq.m). (2) BLOCKS B1, B2, B3, B4, & B5 consisting of a total of 19 No Two-bed apartments and 19 No Three-bed maisonettes in a duplex arrangement (3) 7 No Three-bed detached two storey dwellings. (4) 2 No Two-bed detached single storey dwellings. (5) 4 No Two-bed semi-detached single storey dwellings. (6) 21 No Three-bed terraced two storey dwellings. (7) 2 No. Four-bed end-of-terrace two storey dwellings. (8) 8 No Two-bed semi-detached two storey dwellings. (9) All associated site development works and connection into existing services. Gross floor space of proposed works: 9354 sqm (Residential Dwellings - 9022 sqm, Creche - 332 sqm)

The primary works approved under the above planning permissions, as designed to accommodate the service requirements of the entire approved development in each case, were completed in the 2008/2009 period consisting of:

- Construction of the roundabout at Pollboy Road;
- Construction of main entrance roadway into the development site from the roundabout;
- Construction of the site services along entrance roadway, including:
 - Foul sewer and associated pumping station/rising main;
 - Construction of culverted section of stream;
 - Construction of the outfall of surface water collection system, including connection to stream culvert;
 - Construction of comms and electrics ducting and provision of street lighting;



The primary impact of the above range of site development works is that a roadway and associated services were extended through the applicants lands to the eastern edge of the subject site, as indicated above.

A total of three developments, namely Tesco Supermarket, Aldi Stores, and Certa Fuel Petrol Station (formerly Tesco Petrol Station), have been developed on site to date.

Construction work has recently commenced on a cinema complex and a 78 unit residential development on lands in the ownership of the applicant directly to the north of the subject site.

2. SCOPE OF SERVICES

The practice was retained to provide the following range of services:

- Design of surface drainage system;
- Design of foul sewer system, together with associated facilities;
- Design of water distribution system;
- Design of Roads and associated infrastructure

The design of the site services has been carried out in accordance with:

- Galway County Development Plan 2022 – 2028;
- Ballinasloe LAP 2022-2028
- The Building Regulations - TGD Document H Drainage & Wastewater Disposal, Dec. 2020;
- IW Code of Practice for Wastewater Infrastructure, Doc. IW-CDS-5030-03, July 2020 (Rev. 2);
- IW Code of Practice for Water Infrastructure, Doc. IW-CDS-5020-03, July 2020 (Rev. 2);
- Greater Dublin Regional Code of Practice for Drainage Works;
- Greater Dublin Strategic Drainage Strategy (GDSDS);
- BS EN 752:2017 - Drain and Sewer Systems outside Buildings;
- Recommendations for Site Development Works for Housing Areas, 1998;
- Sustainable Urban Drainage Systems (SUDS), CIRIA C753, 2015;
- BRE Digest 365 (1991) Soakaway Design, Revision 2003;
- Office of Public Works CFRAM Study.

3. STORM WATER DRAINAGE

The surface (Storm) water drainage design has been completed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and the principles of the Greater Dublin Strategic Drainage Strategy (GDSDS) including the Sustainable Urban Drainage Systems (SUDS), CIRIA C753 as a requirement of DM Standard 27 of the Galway County Development Plan 2022-2028, to minimise the risk of flooding and contamination, and to protect the environment and water resources.

3.1 DESIGN STRATEGY

Surface water management practice for the existing development to the north of the site is by means of a collection system which drains to attenuation tanks, which modify the discharge in accordance with SUDS principles, and discharge to a natural stream at the north of the site.

However, there are no natural water courses within or in the vicinity of the site. Accordingly, the solution of infiltration to ground via soakpits was investigated as the sustainable means of managing surface water runoff from the impervious areas of the development in the subject site in this case.

The Hydrological Impact Assessment, which was prepared for this development by Hydros Hydrology Engineering, revealed that the soil type beneath the subject site is described as coarse loamy soil and is well drained. The subsoil is described as till derived from Limestone and the texture is variable.

Trial pits which were carried out over the course of the investigation confirmed that the soils beneath the subject site are consistent with the above description.



Figure 3: Soil Map (Source: EPAMaps)

The subsoil map is as shown on Figure 4. The subsoil is described as till derived from Limestone and the texture is variable.



Figure 4: Subsoil map (Source: EPAMaps)

Accordingly, the strategy for the management of surface water runoff to soak pits was adopted in the design.

The specific **SUDS measures** to be applied to the proposed development on all catchment areas involve the application of pervious pavements at the front end of all apartment blocks and the collection of surface run-off via a road gully system and further discharge by gravity pipe system into the existing surface water system to on-site soakpit areas.

3.2 SURFACE WATER DRAINAGE SYSTEM

It is proposed to divide the site into 6 natural catchment areas, as follows:

Catchment 1: Approx. 0.54ha, falls from a high point of about 47mOD on its south side down to level of about 40mOD at the North end of a newly constructed service road at Aldi stores. This catchment area has 1 No. existing Attenuation tank located beside the site of the cinema under construction. Provision for drainage of this road has been made to discharge into the Attenuation tank which was prepared for the extensive development approved under Planning Ref No 09/9009, which was never completed because of the financial crisis.

Catchment 2: Approx. 1.216ha, falls from a high point of about 47mOD on its south side down and 45mOD from North to its centre with a level of about 42mOD at the left end of a newly constructed service road. It drains towards a soakpit tank (SL0) located adjacent of apartment blocks B1, B2 and B3.

Catchment 3: Approx. 1.45ha, falls from a high point of about 49mOD on its south side and 46mOD from its West side down to level of about 43mOD at its Northeast. A soakpit tank (SC0) is located under the green space opposite the houses number 68 to 75.

Catchment 4: Approx. 1.57ha draining towards its north to a soakaway tank (SD0) under the green area adjacent to the apartments block B11. It drains from its south with levels of about 55mOD to about 50mOD.

Catchment 5: Approx. 0.885ha, at the eastern side of the development and falls from a high point of about 50mOD at its south end and 48mOD from its Southwest side down to level of about 46mOD at its North. A soakpit tank (SR0) is located under the green space adjacent to the back of the apartment Blocks B8 and B9.

Catchment 6: Approx. 0.22ha draining towards the north to a soakpit tank (S0) under the green area on the northeast end of the road to be built connecting the subject site with the development under construction. It drains from the south with levels of about 46m OD falling to about 45m OD at North.

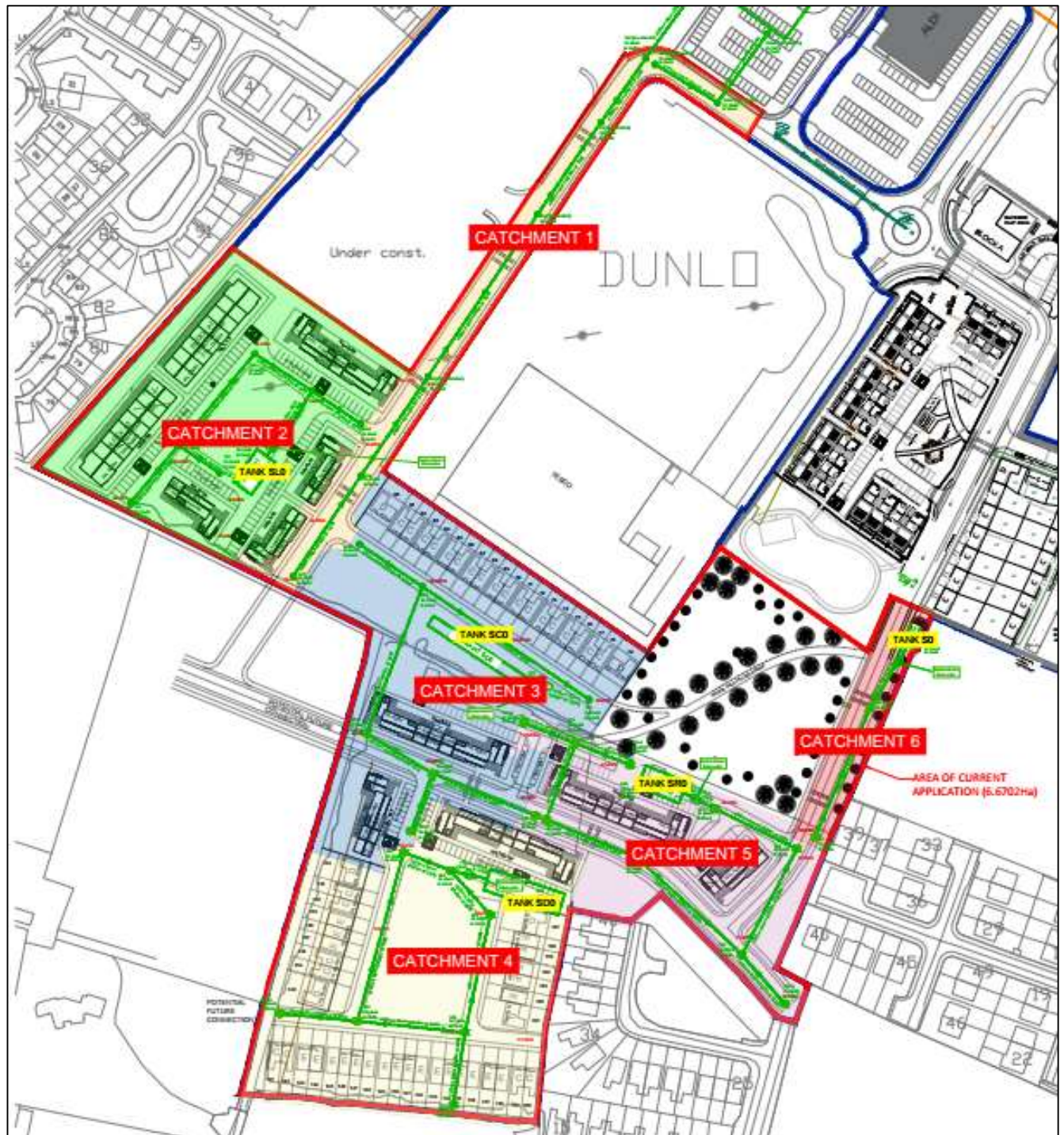


Figure 2 - Storm Water Catchment Areas

3.2 STORM WATER DRAINAGE DESIGN PROCEDURE

The storm sewer system was designed based on the Modified Rational Method.

All pipework used in the Storm Water design shall be Irish Water approved, $\varnothing 225\text{mm}$ ID with a roughness coefficient (K_s) of 0.6mm. Minimum velocity is 0.75m/s and gradients are between 1:50 and 1:200, all in accordance with TGD H: Drainage & Wastewater Disposal, Dec. 2020.

The layout of the Storm Water Drainage Services can be found in drawing **2521-311 - Proposed Foul and Storm Combined Layout**, where gradients, levels and pipework routes are also presented.

All soakpits are designed for exceedance in a 1 in 100 year storm event with 20% allowance for climate change and are presented on Figure 2 above. Design rationale and calculations are provided in **Appendix B** of this document.

Surface water runoff from new internal road surfaces, footpaths, other areas of hardstanding and the roofs of buildings will be collected by a gravity drainage network and directed towards 6 no. separate soakpit tanks which were individually sized to cater for a 1 in 100-year storm event with an allowance of 20% due to climate change.

The design parameters, rainfall data and calculations are presented in **Appendix B** of this report.

The soakpit tanks were sized in accordance with the method outlined in BRE Digest 365 (1991) Soakaway Design. They are:

Tank SU0: Existing attenuation tank located at outfall from system designed to drain extensive commercial development approved under Planning Ref 09/9009, which was not completed.

Tank SL0: 187.5m³ (10x25x0.75m effective);

Tank SC0: 375m³ (10x50x0.75m effective);

Tank SD0: 262.5m³ (10x21x0.75m effective);

Tank SR0: 157.5m³ (10x35x0.75m effective);

Tank S0: 37.5m³ (10x5x0.75m effective);

The treatment of surface water, to remove oils and hydrocarbons from vehicular areas, shall be by means of a Class 1 Bypass Separator and will be a NSBE020 Klargester Separator or equal approved, as detailed in **Appendix B**.

4. FOUL WATER DRAINAGE

The foul drainage infrastructure has been designed in accordance with Irish Water Technical Standard for Wastewater Gravity Sewers (Document Number: IW-TEC-800-01), the Irish Water Code of Practice for Wastewater Infrastructure (Document Number: IW-CDS-5030-03), the BS EN 752, and the Building Regulations Part H.

A Pre-Connection Enquiry Form was submitted on 11th November 2021, to Irish Water in respect of this development. Irish Water provided a Confirmation of Feasibility dated 15th December 2021 which confirmed that, subject to an upgrade to the on site existing pump station, the proposed connection to the public sewer network could be facilitated.

Detailed drawings and calculations were subsequently submitted to Irish Water in respect of the foul drainage design and the pumping system upgrade. These documents were approved by Irish Water and a Statement of Design Acceptance was issued on the 26th August 2022.

The Irish Water Confirmation of Feasibility Letter and the Statement of Design Acceptance are presented in **Appendix C**.

The proposed foul drainage network is divided into 2no. sub-catchments:

The **Western sub-catchment** section will service 80 No. residential units with finished floor levels ranging from 44.175mOD to 46.15mOD and will flow by gravity to the north to the connection available with an existing manhole (FL1) within the subject site at Aldi's access road, as identified in the Drawing 2019-311. The flow then gravitates to the existing MH8 in the Ballinasloe Sewerage Scheme.

The **Eastern sub-catchment** section will service the remaining 85no. residential units with finished floor levels ranging from 51.73mOD to 47.30mOD and will flow by gravity to its Northeast side within the newly constructed access road where there is connection available with an existing manhole (FMH3.1) identified on Drawing 2019-311 as Proposed Foul Sewer Connection Point 2.

All the foul sewage flow from this development will discharge by gravity into an existing pumping station within the ownership and control of the applicant, located on the lands to the east of the main access roadway opposite of Aldi. Sewage it is pumped from this location into the main Ballinasloe Sewerage Scheme on Harbour Road.

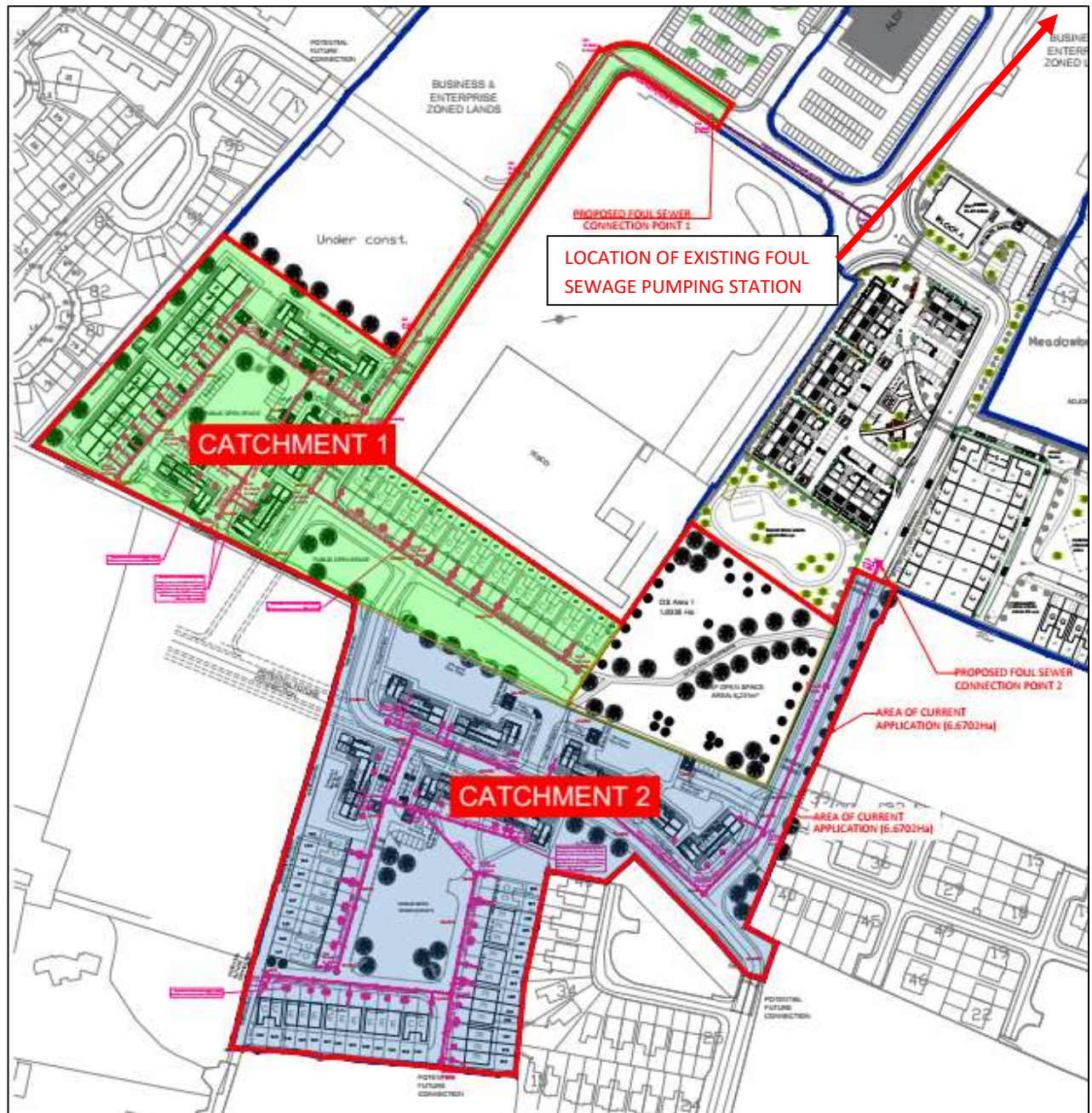


Figure 3 - Foul Water Catchment Areas

4.1 FOUL WATER DRAINAGE DESIGN PROCEDURE

The hydraulic design of the foul sewerage scheme shall be designed in accordance with the **Irish Water Code of Practice for Wastewater Infrastructure**.

The minimum size of gravity sewer, in keeping with Section 3.8 of the Code of Practice, being 150 mm nominal internal diameter, has a capacity of 13 l/s at the minimum recommended gradient of 1:150. (Section 3.6.7).

However, it is considered prudent to make provision for future development of the southern reaches of the masterplan lands by increasing the pipe size of the foul sewer to 225mm along the route of the central access roadway. Therefore, it is proposed to use 225mm nominal internal diameter sewer throughout the foul sewerage scheme on this development. Under these circumstances, the overriding criterion is that the pipe gradient will be determined by requirement to achieve a self-cleansing velocity of 0.75 m/s.

The discharge rates to the existing network shall be as follows:

Eastern sub catchment:

- 85 Dwellings: 2.64 l/s Peak discharge

Western sub catchment:

- 80 Dwellings: 2.58 l/s Peak discharge

Therefore, the peak discharge of the development is calculated as 5.22 l/s.

4.2 FOUL PUMPING STATION UPGRADE

In addition to this development, a development in the adjacent site under construction will also gravitate to the same pumping station. Accordingly, the pumping station will require an upgrade to sustain the required 24-hour emergency storage.

The upgraded foul pumping station capacity will be determined by volume and flow due to development on the subject site in this case, as well as the flow from the adjacent development under construction at Dunlo. The hydraulic flow calculations are as follows:

- 165 No. Dwellings(this proposed Scheme): 0.86 l/s 24-hour discharge
- 78 No. Dwellings(the Adjoining Scheme under construction): 0.41 l/s 24-hour discharge
- 24-hours Emergency Storage required of 110m³.

The layout of the foul sewerage scheme for the proposed development is shown in detail on Drawing 2512 – 311, which is included with this report.

Design calculations are presented in **Appendix D**.

5. POTABLE WATER SUPPLY

Details of the existing watermain infrastructure were provided by Irish Water. These indicate that there are existing watermains located adjacent to the site. It is proposed to maintain and connect to the existing services at the newly constructed road on the Western side of the development as shown on the proposed watermain layout Drawing no. 2521-202.

The watermain layout and details shall be in accordance with Irish Water Code of Practice for Water Infrastructure (Document Number: IW-CDS-5020-03, July 2020 (Rev. 2)), and the Irish Water's Water Infrastructure Standard Details (IW-CDS-5020-03, July 2020 (Rev. 2)).

A Pre-Connection Enquiry Form was submitted to Irish Water in respect of this development. Irish Water provided a Confirmation of Feasibility dated 15th December 2021 which confirmed that, subject to a valid connection agreement being put in place, the proposed connection to the public water supply network could be facilitated.

Detailed drawings and calculations were subsequently submitted to Irish Water in respect of the watermain design. These documents were approved by Irish Water and a Statement of Design Acceptance was issued on the 26th August 2022. A copy of the Irish Water Confirmation of Feasibility Letter and the Statement of Design are contained in **Appendix C**.

The water supply network shall be provided with all the ancillary infrastructural facilities such as metres, meter boxes, hydrants, sluice valves, and scour valves, all in compliance with the requirements of the Irish Water Code of Practice for Water Infrastructure. The map below shows current Irish Water infrastructure adjacent to the site:

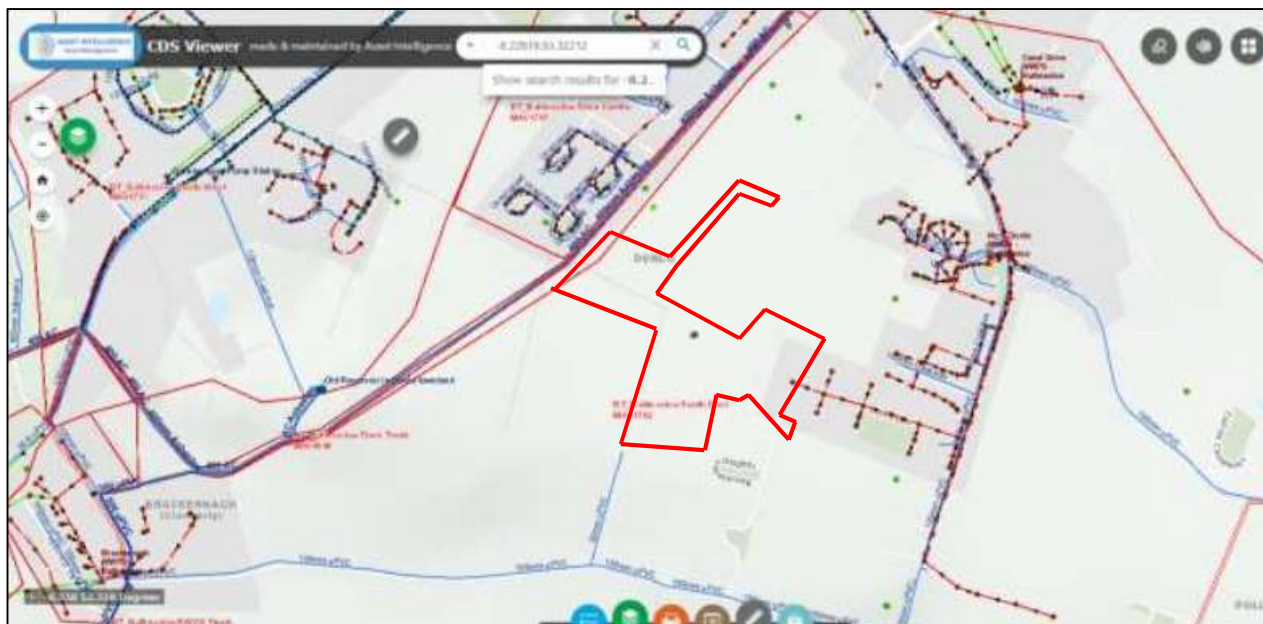


Figure 4 - IW Infrastructure Adjacent to Site

The indicative Water connection proposal is shown on the Irish Water GIS Map below:

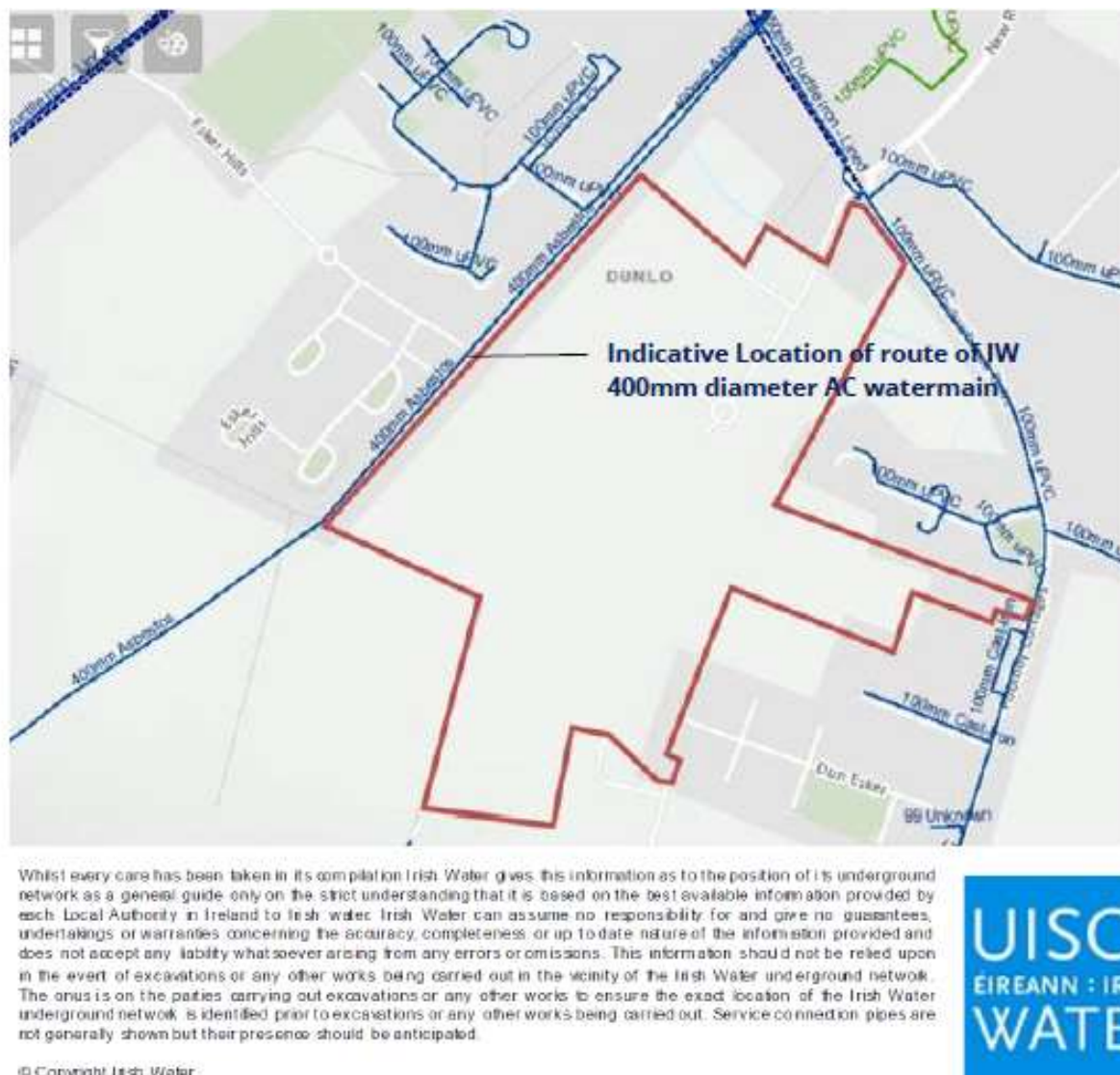


Figure 5 - Indicative Proposed Water Connection

The above IW Map shows the extend of the Applicants lands with regard to local IW water supply infrastructure

5.1 WATER NETWORK DESIGN PROCEDURE

Average and peak water demand rates have been calculated as follows, in accordance with the Irish Water Code of Practice for Water Infrastructure:

- Average daily domestic demand = 150 litres/person/day
 - Average occupancy ratio of 2.7 persons per dwelling
 - Average daily demand = $167 \times 2.7 \times 150 = 67,635$ litres/day = 0.79 l/s
 - Average day / peak week demand = $0.79 \times 1.25 = 0.99$ l/s
- Peak demand = $0.99 \times 5 = 4.95$ l/s

6. ROADS & SERVICES

Site Services have been provided within the footpaths along the existing roadway from the entrance to the nearby Retail Park at the northern boundary of the subject site.

These services include telecommunications ducting, general electrical supply ducting and Public lighting ducting.

All the services are located beneath the footpaths and they are provided with duct chambers in accordance with the Design Manual for Urban Roads and Streets(DMURS) and Recommendations for Site Development Works for Housing Areas.

These services including telecommunications ducting, general electrical supply ducting and street lighting ducting shall be located in the footpaths throughout the development.

The Proposed Site Ducting Services Layout is shown on Drawing No 2021-201, which is included with this report.

The proposed road details are set out on Drawing No 2521-203.

A stage 1/2 road safety audit has been undertaken for the roads development throughout the scheme by CST Consulting Engineers, which is included with this application.

APPENDIX A IW STATEMENT OF DESIGN ACCEPTANCE

Caherlavinne,
Loughrea,
Co. Galway,
H62 FF61.

26 August 2022

**Re: Design Submission for Dunlo SHD Ballinasloe Town Centre (the "Development")
(the "Design Submission") / Connection Reference No: CDS21008081**

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

Dear William Greene,

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.

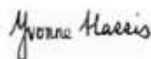
This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. 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: Barry Butler
Phone: 086 7776227
Email: barry.butler@water.ie

Yours sincerely,



Yvonne Harris

Head of Customer Operations

Soláthair / Directors: Cathal Marley (Chairman), Niall Gleeson, Eamon Gallen, Yvonne Harris, Brendan Murphy, Dawn O'Driscoll, Maria O'Dwyer
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sánd Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1 D01 NP86
Is cuideachta ghriomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363

Appendix A

Document Title & Revision

- [Dunlo SHD - 2521-311 - Proposed Foul & Storm Sewers Layout]
- [Dunlo SHD - 2521-202 - Proposed Watermain Layout]

Standard Details/Code of Practice Exemption:

Not Used

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.

APPENDIX B STORMWATER DESIGN RATIONALE

Rainfall data for the Ballinasloe area was obtained from MET Eireann for use in the design.

Met Eireann Return Period Rainfall Depths for sliding Durations Irish Grid: Easting: 184697, Northing: 230374,													
DURATION	Interval	Years											
	6months, 1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,
5 mins	2.8, 3.9,	4.5,	5.5,	6.1,	6.6,	8.2,	10.0,	11.1,	12.8,	14.3,	15.5,	17.2,	18.6,
10 mins	3.9, 5.5,	6.3,	7.6,	8.5,	9.2,	11.4,	13.9,	15.5,	17.9,	19.9,	21.5,	24.0,	26.0,
15 mins	4.6, 6.4,	7.5,	9.0,	10.0,	10.8,	13.4,	16.3,	18.3,	21.0,	23.5,	25.3,	28.3,	30.5,
30 mins	6.0, 8.2,	9.4,	11.2,	12.4,	13.3,	16.2,	19.5,	21.6,	24.6,	27.2,	29.3,	32.4,	34.7,
1 hours	7.9, 10.5,	11.9,	13.9,	15.3,	16.3,	19.6,	23.2,	25.6,	28.8,	31.6,	33.8,	37.0,	39.6,
2 hours	10.3, 13.5,	15.1,	17.4,	18.9,	20.1,	23.7,	27.7,	30.2,	33.7,	36.7,	39.0,	42.4,	45.0,
3 hours	12.1, 15.5,	17.3,	19.8,	21.4,	22.6,	26.5,	30.7,	33.4,	37.0,	40.1,	42.4,	45.9,	48.6,
4 hours	13.5, 17.2,	19.0,	21.7,	23.4,	24.7,	28.7,	33.0,	35.8,	39.5,	42.6,	45.0,	48.6,	51.3,
6 hours	15.8, 19.9,	21.8,	24.7,	26.5,	27.9,	32.1,	36.6,	39.5,	43.3,	46.5,	49.0,	52.6,	55.3,
9 hours	18.6, 22.9,	25.1,	28.1,	30.0,	31.5,	35.9,	40.6,	43.5,	47.5,	50.8,	53.3,	56.9,	59.7,
12 hours	20.8, 25.4,	27.6,	30.8,	32.8,	34.3,	38.9,	43.7,	46.7,	50.7,	54.0,	56.5,	60.3,	63.0,
18 hours	24.3, 29.3,	31.7,	35.0,	37.1,	38.7,	43.5,	48.5,	51.5,	55.6,	59.0,	61.5,	65.2,	68.0,
24 hours	27.2, 32.5,	35.0,	38.4,	40.6,	42.2,	47.1,	52.2,	55.3,	59.3,	62.8,	65.3,	69.0,	71.8,
2 days	34.1, 40.0,	42.7,	46.6,	48.9,	50.7,	56.0,	61.4,	64.7,	69.0,	72.6,	75.3,	79.2,	82.0,
3 days	40.0, 46.4,	49.4,	53.6,	56.1,	58.0,	63.7,	69.5,	73.0,	77.5,	81.3,	84.1,	88.2,	91.2,
4 days	45.3, 52.3,	55.5,	59.9,	62.7,	64.7,	70.7,	76.8,	80.5,	85.3,	89.2,	92.2,	96.4,	99.5,
6 days	55.1, 62.9,	66.5,	71.4,	74.4,	76.7,	83.3,	90.0,	94.0,	99.2,	103.5,	106.6,	111.2,	114.6,
8 days	64.0, 72.6,	76.5,	81.9,	85.2,	87.6,	94.8,	102.0,	106.3,	111.8,	116.4,	119.8,	124.6,	128.2,
10 days	72.4, 81.7,	85.9,	91.7,	95.2,	97.8,	105.5,	113.1,	117.7,	123.6,	128.5,	132.0,	137.1,	140.9,
12 days	80.5, 90.4,	94.9,	101.0,	104.8,	107.5,	115.7,	123.7,	128.5,	134.8,	139.8,	143.6,	148.9,	152.9,
16 days	95.9, 106.9,	112.0,	118.8,	122.9,	126.0,	134.9,	143.7,	149.0,	155.7,	161.3,	165.3,	171.1,	175.4,
20 days	110.6, 122.7,	128.2,	135.6,	140.1,	143.4,	153.1,	162.6,	168.2,	175.5,	181.4,	185.7,	191.9,	196.5,
25 days	128.4, 141.7,	147.8,	155.8,	160.7,	164.3,	174.8,	185.1,	191.1,	199.0,	205.3,	210.0,	216.6,	221.5,
												225.3,	237.6

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

Soakpit tests were conducted at 6 No locations across the site in accordance with the method outlined in BRE 365.

The infiltration rate found on the 5 no. sub-catchments chosen for the storm water retention in the development demonstrated that the soakpit method for the infiltration of surface water to ground is feasible. The soakpit volumes were based on the infiltration rate calculation methodology set out in the *BRE Digest 365 (1991) Soakaway Design, Revision 2003*. As follows:

SOAKPIT DESIGN

- Trial hole dimension: 2.7m long, 1.0m wide and 2.0 metres deep.
- Soil details: 300mm brown topsoil over sandy clay with boulders and cobbles.
- Ground water level: None observed.
- Soil infiltration rate: $f = 5.11 \times 10^{-5}$

The parameters used in the design of the surface water collection system are as follows:

Parameter	Value
Surface Water Drainage Pipework Design Return Period	2 Years
Design Return Period	100 Years

Storm Duration	12 Hours
Allowance for Climate Change	20%
M5-60	18mm
M5-2D	53.4mm
Time of Entry	4m
Pipe Roughness	0.6mm
Medium Velocity	0.75m/s

Calculations:

$$S = I - O, \quad I = A \times R, \quad O = A_{S50} \times f \times D$$

Where:

S = Soakway volume (m³). The free volume of the soakaways is 95% free volume, achieved with Wavin Aqua Cell system or similar.

I = Inflow to soakaway (m³)

O = Outflow from soakaway (m³)

A = Impermeable Area (m²)

R = M100-D rainfall (mm). Values for 100-year return period of duration D. See table below:

A_{S50} = the internal surface area of the soakaway to 50% effective depth: this excludes the base area which is assumed to clog with fine particles and become ineffective in the long-term.

f = Soil infiltration rate

D = Storm duration

Note: The selected values are highlighted in green and the length was achieved using the next upper integer or more appropriate considering size of units used.

The width of each soakpit was nominated by having regard to the space available in the open spaces where each of them are to be located. The principal chosen width was 10m except at one location where space was restricted. A convenient depth of 1.5m was chosen in each case.

Accordingly, required soakpit volumes were expressed in terms of soakpit length L in the calculations below.

SOAKPIT SLO						
D	R (mm)	I (m³)	O (m³)		S (m³)	L (m)
10	16.2	120.95	(1.5L+15) x (5.11x10 ⁻⁵) x (Dx60)	0.51	10 x L x 0.75 x 0.95 = 7.125L	15.850
15	21	156.79		0.76		19.887
30	27	201.59		1.52		23.324
60	33	246.38		3.04		24.249
120	40	298.64		6.07		22.632
240	48	358.37		12.14		18.601
360	55	410.64		18.21		16.207
720	67	500.23		36.42		11.487
1440	78	582.36		72.85		7.282
Width assumed = 10m. Depth assumed 1.5m. Free volume of 95%. S = 7.125L						
f = 5.11 x 10 ⁻⁵						
R for a Return Period of 1 in 100 year.						

SOAKPIT SCO						
D	R (mm)	I (m³)	O (m³)		S (m³)	L (m)
10	16.2	125.56	(1.5L+7.5) x (5.11x10 ⁻⁵) x (Dx60)	0.28	10 x L x 0.75 x 0.95 = 3.5625L	32.712
15	21	162.77		0.41		40.933
30	27	209.27		0.83		47.667
60	33	255.78		1.66		49.017
120	40	310.03		3.31		45.104
240	48	372.04		6.62		36.528
360	55	426.30		9.93		31.586
720	67	519.31		19.87		22.164
1440	78	604.57		39.74		13.963
Width assumed = 5m. Depth assumed 1.5m. Free volume of 95%. S = 3.5625L						
f = 5.11 x 10 ⁻⁵						
R for a Return Period of 1 in 100 year.						

SOAKPIT SDO						
D	R (mm)	I (m³)	O (m³)		S (m³)	L (m)
10	16.2	172.94	(1.5L+15) x (5.11x10 ⁻⁵) x (Dx60)	0.51	10 x L x 0.75 x 0.95 = 7.125L	22.663
15	21	224.18		0.76		28.435
30	27	288.23		1.52		33.350
60	33	352.28		3.04		34.672
120	40	427.01		6.07		32.360
240	48	512.41		12.14		26.596
360	55	587.14		18.21		23.173
720	67	715.24		36.42		16.424
1440	78	832.67		72.85		10.412
Width assumed = 10m. Depth assumed 1.5m. Free volume of 95%. S = 7.125L						
f = 5.11 x 10 ⁻⁵						
R for a Return Period of 1 in 100 year.						

SOAKPIT SRO						
D	R (mm)	I (m³)	O (m³)		S (m³)	L (m)
10	16.2	103.87	(1.5L+15) x (5.11x10 ⁻⁵) x (Dx60)	0.51	10 x L x 0.75 x 0.95 = 7.125L	13.612
15	21	134.65		0.76		17.079
30	27	173.12		1.52		20.031
60	33	211.59		3.04		20.825
120	40	256.47		6.07		19.436
240	48	307.77		12.14		15.974
360	55	352.65		18.21		13.918
720	67	429.59		36.42		9.865
1440	78	500.12		72.85		6.254
Width assumed = 10m. Depth assumed 1.5m. Free volume of 95%. S = 7.125L						
f = 5.11 x 10 ⁻⁵						
R for a Return Period of 1 in 100 year.						

SOAKPIT SOO						
D	R (mm)	I (m³)	O (m³)		S (m³)	L (m)
10	16.2	24.88	(1.5L+15) x (5.11x10 ⁻⁵) x (Dx60)	0.51	10 x L x 0.75 x 0.95 = 7.125L	3.261
15	21	32.25		0.76		4.091
30	27	41.47		1.52		4.798
60	33	50.69		3.04		4.989
120	40	61.44		6.07		4.656
240	48	73.72		12.14		3.827
360	55	84.48		18.21		3.334
720	67	102.91		36.42		2.363
1440	78	119.80		72.85		1.498
Width assumed = 10m. Depth assumed 1.5m. Free volume of 95%. S = 7.125L						
f = 5.11 x 10 ⁻⁵						
R for a Return Period of 1 in 100 year.						

Bypass NSB RANGE

APPLICATION

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g.

- Surface car parks.
- Roadways.
- Lightly contaminated commercial areas.

PERFORMANCE

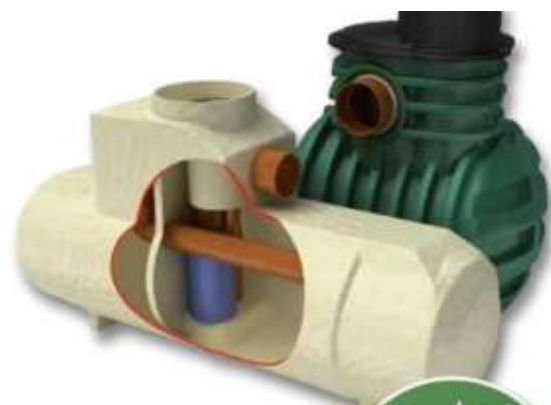
Klargester were one of the first UK manufacturers to have separators tested to EN 858-1. Klargester have now added the NSB bypass range to their portfolio of certified and tested models. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan Klargester Bypass separators and certified their performance in relation to their flow and process performance assessing the effluent qualities to the requirements of EN 858-1. Klargester bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Oil storage volume.
- Silt storage capacity.
- Coalescer.

The unit is designed to treat 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 NSB = 0.0018A(m²). Flows generated by higher rainfall rates will pass through part of the separator and bypass the main separation chamber.

Class 1 separators are designed to achieve a concentration of 5mg/litre of oil under standard test conditions.



Advanced rotomoulded construction on selected models

- Compact and robust
- Require less backfill
- Tough, lightweight and easy to handle

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size bypass separator, the following information is needed:-

- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the flow is not pumped.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	PEAK FLOW RATE (l/s)	DRAINAGE AREA (m ²)	STORAGE CAPACITY (litres)		UNIT LENGTH (mm)	UNIT DIA. (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	STANDARD FALL ACROSS (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA.
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

■ Rotomoulded chamber construction ■ GRP chamber construction * Some units have more than one access shaft – diameter of largest shown.



Ronnie Greene

Consulting Engineers, Unit 2
Kilkerrin Business Park
Liosban, Tuam Road
Galway

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

15 December 2021

Re: CDS21008081 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 181 unit(s) at Dunlo, Ballinasloe, Galway

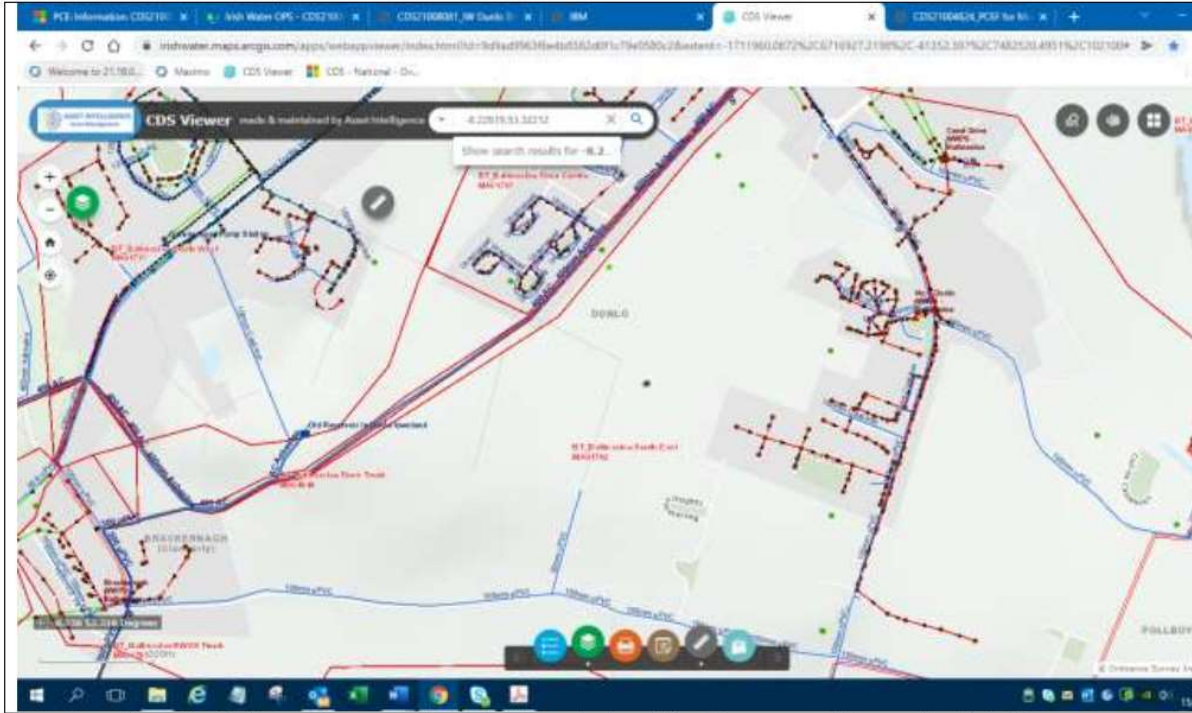
Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Dunlo, Ballinasloe, 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 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 <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>
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Water Connection	Based on current Irish Water records, there is a 150mm diameter water main planned to service the adjacent sites. A self Lay agreement was issued recently for the adjacent development to get a 150mm diameter connection from the existing 400mm Asbestos water main (CDS2100198801). Based on current records, the 150mm main will have the capacity to service the proposed development.
Wastewater Connection	Based on current Irish Water records there is an existing pumping station servicing the existing development of the petrol station, Aldi and Tesco. The pumping station is owned and managed by the developer of this proposed development of 181 units. A self lay agreement was issued to the same developer recently for 78 no. Units to connect to the existing pumping station. (CDS 2100198801) The agent identified that an upgrade to the pumping station is required for this proposed development but the rising

	main to the Ballinasloe WWTP is has sufficient capacity to cater for the entire development. Ballinasloe WWTP has capacity for the proposed development.
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

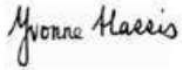
Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish 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 Barry Butler from the design team by email barry.butler@water.ie For further information, visit **www.water.ie/connections**.

Yours sincerely,



Yvonne Harris

Head of Customer Operations

APPENDIX D FOUL WATER CALCULATIONS

The foul drainage infrastructure has been designed in accordance with Irish Water Technical Standard for Wastewater Gravity Sewers (Document Number: IW-TEC-800-01), the Irish Water Code of Practice for Wastewater Infrastructure (Document Number: IW-CDS-5030-03), the BS EN 752, and the Building Regulations Part H.

Parameters are as follows:

Parameter	Value
Hydraulic Loading	446l/house/day
Pipe Friction	1.5mm
Minimum Velocity	0.7m/s
Maximum Velocity	3m/s
Pipe Capacity (DWF)	6

Discharge Calculations:

Eastern sub catchment:

- 85 Dwellings @ 1 DWF = 0.44 l/s (37,910 l/day). Peak discharge of 6DWF = 2.64 l/s.

Western sub catchment:

- 80 Dwellings: 1 DWF = 0.43 l/s (36,572 l/day). Peak discharge of 6DWF = 2.58 l/s.

The peak discharge of the development is calculated as 6 DWF = 5.22 l/s.

Pump Station Upgrade Calculations:

The Irish Water Code of Practice states that pumping stations are to be provided with emergency storage capacity of 24-hour Dry Weather Flow for developments up to 250 units. The emergency storage capacity requirement is reduced to 18, 12 and 10 hours on a stepped approach for larger developments in accordance with the table below:

Houses	Storage Hours	Max. Storage Vol. (m ³)
0-250	24 for up to 250	112
251-333	24 for 250 and 18 for up to 333	139
334-1667	24 for 250, 18 for 333 and 12 for up to 1667	437
1668-3333	25 for 250, 18 for 333, 12 for 1667 and 10 thereafter.	746

To determine the storage, similar calculations were carried out for the adjacent development, as follows:

- 78 Dwellings: 1 DWF = 0.41 l/s (34,788 l/day).

Therefore, along with the 165no. dwellings targeted in this application, the daily flow from a total of 243 No. units will gravitate to the upgraded pumping station. This equates to a required emergency storage volume of:

- 243 No. units @ 446 litres each = 108,378 l.
- Storage required of say, 110m³.

The layout of the foul sewerage scheme for the proposed development is shown in detail on Drawing 2521 – 311, which is included with this report.