CLONBURRIS CANAL EXTENSION SITE

Engineering Services Report

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1 INTRODUCTION

1.1 Overview

This report has been prepared to give a high level overview of the civil engineering design associated with the development of the Canal Extension site which forms part of the Clonburris Strategic Development Zone (SDZ).

1.2 Report Objective

This report has been written to support the South Dublin County Council (SDCC) Part 8 planning application for 118 residential units on the Clonburris Canal extension site and covers the civil engineering design aspects of the following elements:

- Surface water drainage & SuDS strategy
- Foul water drainage
- Watermain
- Roads and Traffic

3 WASTEWATER INFRASTRUCTURE

3.1 Background

The site area forms part of the Clonburris Strategic Development Zone (SDZ). A suite of documents has been produced by DBFL Consulting Engineers to identify a wastewater network strategy for the management of wastewater in the entire SDZ.

A *Water and Wastewater Design Report,* P*otential Interim Wastewater Solutions* drawing and a *Preliminary Design Report* have been produced by DBFL Consulting Engineers, all of which set out the proposed strategy to service the SDZ for wastewater.

In particular, the Preliminary Design Report develops the wastewater strategy within the SDZ, which was undertaken in consultation with Irish Water. This report and study allowed for the preparation of preliminary wastewater layouts. The wastewater catchments and proposed outfalls were agreed with Irish Water which allowed preliminary designs to be developed. Accordingly, the proposed wastewater strategy for serving the subject application site will follow the strategy as discussed and agreed previously with Irish Water.

The *Potential Interim Wastewater Solutions* drawing identified existing Irish Water wastewater infrastructure in the vicinity of the proposed site. It is proposed as part of this development, that all new wastewater sewers provided to serve the proposed development will connect by gravity to the existing Irish Water infrastructure.

3.2 Foul Drainage Strategy

From assessment of the *Water and Wastewater Design Report*, *Potential Interim Wastewater Solutions* drawing and *Preliminary Design Report* by DBFL Consulting Engineers, and from inspection of Irish Water record drawings, there is an existing public wastewater sewer that passes adjacent to the northern boundary of the site, which then turn southwards and then passes directly through the proposed site. Irish Water records would indicate that this sewer is a 600mm dia combined sewer where it passes parallel to the canal to the north of the site, which then increases to a 750mm dia sewer as it turns southwards and flows parallel to the eastern boundary of the site. The sewer then connects to the drainage network in the Fonthill Road. These existing sewers can be seen on accompanying engineering drawing MDC0709-RPS-00-XX-DR-C-DG3002, included in Appendix D.

In line with the SDZ masterplan proposal, it is proposed to install a new gravity wastewater sewer network to serve the proposed development, with this network discharging by gravity to connect to the existing 750mm dia public sewer at the south-eastern corner of the site.

Details of the proposed layout of the wastewater network to serve the subject site can be seen on the accompanying engineering drawings.

3.3 Foul Drainage Design Calculations

The proposed Canal Extension - Clonburris residential development consists of the provision of 118nr residential dwellings. The proposed wastewater generated from this development has been estimated using the guidance as included within the Irish Water Code of Practice IW-CDS-5030-03 Code of Practice for Wastewater Infrastructure and Irish Water Technical Standard IW-TEC-800-01 “Wastewater Gravity Sewers”, with detailed calculations included as **Appendix A** of this report.

In summary, the wastewater arising from the proposed development is estimated as follows:

Total Nr of Dwellings	=	118nr
Occupancy Rate	=	2.7 per dwelling
Water Consumption	=	150l/person/day
Domestic Wastewater Contribution	=	47,790 litres/day
Infiltration (10% of Unit Consumption)	=	4,779 litres/day
Design Foul Flow	=	291,519 litres/day
Misconnection Allowance	=	190,014 litres/day
Design Flow	=	481,533 litres/day
	=	5.6 litres/sec

2 DESCRIPTION OF DEVELOPMENT

2.1 Introduction

The existing site is a greenfield site which does not have any existing above ground structures. There are presently live overhead and underground services located on the site. Where required these will be diverted to facilitate the development.

The Proposed Development consists of the construction of 118 no. residential units comprising a combination of the following:

- three-bed houses
- four-bed houses
- Affordable Duplex units; consisting of both two-beds (Ground Floor units) and three-beds (2 storey units)
- Social Duplex units; consisting of both two-beds (Ground Floor units) and three-beds (2 storey units)
- Affordable Triplex units; consisting of two-beds (Ground Floor units) and one-bed units + study (First and Second Floor)
- Affordable Triplex units; consisting of both two-beds (Ground Floor units) and one-bed units (First and Second Floor)
- 4 Storey Apartment building; consisting of 19 No. Apartments (15 No. one-beds and 4 No. two-beds)

Site development and landscape works will include the provision of 112no. total car parking spaces, bicycle parking, bin storage, 1 No. ESB Substation, shared communal and private open space, play areas, site landscaping, public lighting, and related site services, access from Bawnogue Road and all associated site development works

2.2 Location of Proposed Development

The site is located on greenfield lands adjoining the Bawnogue Road and Ashwood drive in Clondalkin / Clonburris, just south of the Grand Canal, and west of the Fonthill road (the R113), on SDCC Council lands. The site extends to approximately 3.25 hectares and will form Phase 02 of the development of SDCC lands within the approved Strategic Development Zone (SDZ) at Clonburris.

The wastewater sewer sizing and gradients design will be in accordance with the following table, extracted from the Irish Water Code of Practice:

Table 3-1: Sewer Size / Gradients

Number of Dwellings	Pipe Diameter	Minimum Gradient
2 to 9	150mm (or 225mm)	1:60
10 to 20		1:150
21 to 210	225mm	1:200
211 to 250		1:150
251 to 330		1:100

The wastewater infrastructure will be detailed and constructed in accordance with the current revision of the Irish Water's Code of Practice and Standard Details, as listed below:

- Document IW-CDS-5030-01: Wastewater Infrastructure Standard Details,
- Document IW-CDS-5030-02: Design Risk Assessment for Wastewater Infrastructure Standard Details,
- Document IW-CDS-5030-03: Code of Practice for Wastewater Infrastructure.

3.4 Irish Water Pre-Connection Enquiry

As part of the development of the wastewater strategy for the SDZ, DBFL Consulting Engineers submitted a regional Pre-Connection Enquiry to Irish Water in respect to the foul connections associated with the masterplan total of 11,101nr units as proposed at the entire Clonburris SDZ development. Subsequently, Irish Water confirmed that based on the size of the proposed development and on the capacity currently available, that subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network can be facilitated. A copy of the Confirmation of Feasibility as received from Irish Water has been included as **Appendix B**.

A Pre-Connection Enquiry for the subject site will be submitted to Irish Water and a Confirmation of Feasibility letter will be obtained from Irish Water for subject Canal Extension Site located within the SDZ.

4 SURFACE WATER INFRASTRUCTURE

4.1 Background

The site area forms part of the Clonburris Strategic Development Zone (SDZ). A Surface Water Management Plan (SWMP) has been produced by DBFL Consulting Engineers to identify a strategy and suite of measures which provide robust, effective and economic measures for the management of surface water quality and quantity in the entire SDZ. The subject site is identified as within Sub-Catchment 7 within this SWMP.

The site is bounded to the north by a strip of greenfield lands and the Grand Canal, to the east by the Fonthill Road, by Ashwood residential development to the south and greenfield land to the west. The site area is typically greenfield.

There are known existing surface water sewers that currently traverse the site. A 225mm diameter sewer passes through the site in a west to east direction and ultimately connects to the 900mm diameter sewer on the eastern side of Fonthill Road. A separate 225mm diameter sewer, which collects runoff from the development to the south of the subject site, enters the subject site through its southern boundary and discharges to the 225mm diameter sewer which passes through the site in the south-western section of the subject site, There is also an existing 900mm diameter concrete surface water sewer that flows parallel to the canal to the north of the site boundary that crosses under Fonthill Road and connects to the public drainage to the east of Fonthill Road.

These existing sewers can be seen on accompanying engineering drawing MDC0709-RPS-00-XX-DR-C-DG3003.

This SWMP has identified a surface water strategy for the Sub-Catchment 7 and it is proposed that the strategy developed for the subject application site will be followed as part of the surface water proposal.

4.2 Surface Water Drainage – Network Design Requirements

The surface water generated by the proposed development will be collected by rainwater pipes located to the building perimeters and by road gullies to the roads and hardstanding areas, with the collected run-off directed towards the new gravity surface water sewer system to be provided for the proposed development. Car parking areas will be installed as permeable paving, with each parking bay also having an infiltration trench with a final connection to the main surface water network. The surface water collected in the main collection network will flow by gravity towards the proposed attenuation pond, which is proposed to be located to the northern section of the development lands.

Surface water infrastructure is to be constructed in accordance with the Greater Dublin Region Regional Code of Practice. This includes all pipelines and manholes. The following has been incorporated in the surface water drainage design:

- Gravity sewers will have adequate gradient to maintain self-cleansing conditions at least once a day. A minimum self-cleansing velocity of 1.0 m/s will be designed for (pipe full conditions);
- Access points are provided at all changes in pipe direction, gradient, material and/or diameter, at the head of all sewers, junction of two or more pipes and prior to outfall into the harbour; and
- Gully and rainwater downpipe connections will be minimum 150 mm Ø. They shall be laid to a gradient of no flatter than 1:80.

As per the requirements of IS EN 752:2017, the hydraulic capacity of the pipes is calculated in accordance with IS EN 16933-2:2017. The peak flow rate within the surface water infrastructure on the site is calculated as per Cl.8.2.2.2 of IS EN 16933-2:2017.

The network will ultimately discharge to the existing public surface water network located to Oakwood residential estate to the east of the proposed development, on the eastern side of the Fonthill Road.

Details of the proposed layout of the surface water network to serve the subject site can be seen on the accompanying engineering drawing MDC0709-RPS-00-XX-DR-C-DG3003, included in Appendix D.

4.3 Surface Water Drainage - Attenuation Strategy

An objective of the SWMP is that the development must incorporate SuDs measures. The development shall comply with guidance as set out in the Greater Dublin Strategic Drainage Study (GDSDS), Volume 2. As a result of the requirement to restrict the outflow rate from the site to a discharge rate equivalent to the greenfield rate of run-off, it is necessary to provide adequate attenuation storage on site. Due to the nature and use of the site, long term storage on site is not considered.

As referenced in Section 4.2 above, it is proposed to provide an attenuation pond on site to allow for the restricting of the run-off from the developed site to match a value equivalent to the greenfield rate of run-off. It is proposed to provide the pond in the form of a retention / detention basin to provide the required storage. The retention basin will provide the necessary attenuation volume, while the detention basin will provide for a degree of treatment and infiltration.

On the outlet manhole (last manhole) from the site, which will be located downstream of the attenuation pond, a discharge throttle or flow control device will be installed, with a limiting discharge throttle rate of QBAR for all extreme events (Return period of 1:100-year event). As per 6.3.3.1 of the GDSDS, flows much below 10 l/s are rarely achievable due to the operational requirements of the flow control device, i.e., a very small orifice require which will have major maintenance issues.

Notwithstanding the above, as stated in Section 4.1 above a Surface Water Management Plan (SWMP) has been produced by DBFL Consulting Engineers. As part of the strategy, this subject site was indicated as Sub-Catchment 7. As part of the SWMP, an assessment on the attenuation requirements for the catchment 7 lands was undertaken. This assessment calculated the maximum allowable outflow from the catchment, and estimated the total attenuation volume to be provided, based on a 1.0% AEP flood event.

In order to make an assessment of the allowable greenfield rate of runoff and hence calculate required attenuation pond storage volumes, a high level assessment was made on the proposed development characteristics within the SDZ area. The SWMP assessment was not undertaken on the basis of the entire site/catchment area being developed to be impermeable hardstanding and instead applied a runoff factor to the proposed site area based on an assumed development density. This approach allowed for an estimate to be made on the proposed impermeable and permeable areas associated with the developed lands. Using this approach, an allowable rate of runoff for the subject site was estimated, along with a minimum required storage volume. The attenuation area is denoted in the SWMP as Attenuation Area 9 (ATN09) and the calculated values are as follows:

- Catchment Area = 11.8 hectares
- Assumed Impermeable Area = 2.94 hectares
- Assumed Percentage Impermeable = 24.9%
- Storage Type = Pond
- Maximum Allowable Outflow = 36.58l/s
- Storage Volume Required (100 Years) = 1,250m^3.

In order to comply with the general principle of the SWMP, it is proposed that the attenuation pond to facilitate the proposed development will be designed on a similar basis. However, the design layout for the proposed development is now at a more advanced stage than at the production of the SWMP. The number of proposed units, the final layout of roads / hardstanding and green landscaping is now known. This has now placed certainty on the proposed site area and hardstanding areas that will contribute surface water runoff to the collection network.

As part of the proposed application design, the following calculated values have been noted to apply:

- Total Site Area = 3.24 hectares
- Total Permeable Green Area = 1.186 hectares
- Pond Area = 0.240 hectares
- Total Impermeable Area = 1.814 hectares

Based on the above information, a revised assessment of the site attenuation requirements has been undertaken.

- Qbar = 10.73 l/s
- Q30 = 22.53 l/s
- Q100 = 27.90 l/s
- Storage Type = Pond
- Storage Volume Required (100 Years) = 997 m^3
- Storage Volume Provided = 1,250 m^3
- Excess Storage Provided = 253 m^3

From the design calculations, it has been determined that an attenuation volume of 997m^3 is required to allow for sufficient storage to attenuate the outflow from the pond to a maximum of 27.9 l/s during a 1.0% AEP storm event. However, it order to maintain a level of consistency with the SWMP design, it is proposed that an attenuation pond of volume 1,250m^3 will be provided, with a maximum allowable discharge rate of 36.58 l/s during a 1.0% AEP event (100 year storm) will be allowed from the site. The actual maximum run-off from the attenuation pond has been evaluated at 27.8l/s. This rate of run-off represents a reduction on that as shown in the SWMP.

The pond has been designed to, in as much as is possible, match the levels as shown in the Attenuation Area 9 design as included with the SWMP. Within the SWMP, Attenuation Area 9 had been designed in the SWMP as a retention pond, which was shown to have a permanent 0.6m depth of water, to function as an amenity. The pond was designed with an invert level of 57.5m, and allowed for a permanent storage depth of 0.6m which results in a permanent water level of 58.1m. A total storage depth allowance of 1.6m was provided, which resulted in a maximum water level in the pond during a 1% AEP event of 59.7m.

In order to increase the health and safety aspects associated with the provision of an fully wet pond, it is proposed that the attenuation pond will be provided in two distinct sections. The pond will commence with a permanently wet pond section, into which the collected surface water will discharge. This section will act as retention storage and will support biodiversity and contain associated planting that is supported in such wet environments. The retention pond section will also some degree of treatment through settlement of solids, and also some infiltration.

The attenuation storage is proposed to be provided in a separate section, which will remain dry under normal conditions and will act as a detention pond. This section will only contain surface water during storm events when the attenuation volume is required to reduce the outflow from the developed site.

To ensure that the surface water discharge to the attenuation pond is not contaminated by hydrocarbons, a Class 1 by-pass petrol/oil interceptor will be installed to fully treat all flows generated by rainfall rates up to 5mm/hr (99% of all rainfall events) prior to discharging into the attenuation pond.

Design calculations for the estimation of greenfield run-off associated with the proposed contributing hardstanding area and attenuation storage volumes are included **Appendix C**.

The provision of an above ground natural detention pond is a significant SuDS measure and will naturally slow down run off from the hardstanding development of the site. Other ***SuDS measures*** are also proposed to be incorporated in the development. These are listed below as follows:

- **Green roof on the apartment block,**
- **Use of permeable paving for all parking bays,**
- **Bio-retention tree pits.**

The use of swales as a SuDS measure were initially investigated. However due to the proximity of the footpath to the car parking bays, there is insufficient plan area to locate swales within the proposed development and hence they have not been included.

While green roofs are proposed for the apartment areas and permeable paving for the car parking areas, the attenuation and storage benefits of these have not been incorporated into the design calculations, which provides for a level of conservatism to the storage requirements and design outflow form the site.

4.4 Surface Water Network Diversions

As noted in Section 4.2, there is an existing 225mm diameter public surface water sewer that passes directly through the proposed site. Left in its current location, this surface water sewer would prevent the development of the Canal Extension site to its full capacity. Therefore it is proposed that this existing South Dublin County Council sewer is to be diverted to facilitate the development of the site area to its maximum potential.

The exact location and levels of this existing sewer is not currently known. The topographical survey could not locate any manholes on site, potentially due to existing overgrowth, and therefore no information from same was established in the survey. The connectivity of the sewer is also unknown, and it cannot be established as to what flow this sewer is currently collecting. This information will be established on the completion of the GPR survey of the site and from further discussions with South Dublin County Council as the project progresses.

In advance of the completion of the investigative surveys, it is proposed that this existing surface water sewer can be diverted to discharge to the existing 900mm diameter surface water sewer that follows the line of the canal to the north of the proposed site, as noted in Section 4.1 above. In the absence of detailed information of this sewer and its connectivity, the final diversion details cannot be established. However on completion of the GPR survey and on receipt of information regarding the source of flow within the sewer, the final diversion will be designed. This diversion design will include a plan and longitudinal section of the diversion route, and supporting calculations, to demonstrate that the gradients are designed to provide the required capacity and self-cleansing velocities.

4.5 Flood Mitigation Measures

4.5.1 Flood Risk Assessment

A separate Flood Risk Assessment (FRA) was carried out and is included under separate cover.

5 WATER INFRASTRUCTURE

5.1 Overview

The site area forms part of the Clonburris Strategic Development Zone (SDZ). A suite of documents has been produced by DBFL Consulting Engineers to identify a potable water network strategy for the management of wastewater in the SDZ, described as follows.

A Water and Wastewater Design Report and a Preliminary Design Report have been produced by DBFL Consulting Engineers, all of which set out potential potable water strategy to service the SDZ for wastewater.

In particular, the Preliminary Design Report develops the potable water strategy within the SDZ scheme, which was undertaken in consultation with Irish Water. This report and study allowed for the preparation of preliminary potable water layouts. The proposed strategy weas discussed and agreed with Irish Water which allowed preliminary designs to be developed. Accordingly, the proposed potable water strategy for serving the subject application site will follow the strategy as discussed and agreed previously with Irish Water.

5.2 Strategy

From assessment of the *Water and Wastewater Design Report* and *Preliminary Design Report* by DBFL Consulting Engineers, and from inspection of Irish Water record drawings, there is an existing public watermain that passes directly through the proposed site. Irish Water records would indicate that this watermain is a 12” asbestos concrete watermain.

In line with the SDZ masterplan proposal, it is proposed to install a new watermain to serve the proposed development, with this new watermain being supplied by the existing public network.

5.3 Water Drawdown

The proposed development consists of the provision of 118nr residential units. Section 3.7 of the Irish Water Code of Practice for Water Design states that the average daily domestic demand shall be based on a per-capita consumption of 150 l/person/day and an average occupancy ratio of 2.7 persons per dwelling. The average day/peak week demand should be taken as 1.25 times the average daily domestic demand. The peak demand for sizing the pipe network should normally be 5.0 times the average day/peak week demand.

Based on these figures, the water demand arising from the proposed development is calculated as follows:

Total Number of Dwellings	=	118nr
Occupancy Rate	=	2.7 per dwelling
Population	=	2.7 x 118
	=	319nr persons
Consumption	=	150 litres/day/person
Average Daily Domestic Demand	=	319 x 150litres/day
	=	47,850 litres/day
Average Day/Peak Week Demand	=	1.25 x 47,850
	=	59,813 litres/day
Peak Demand	=	5 x 59,813
	=	299,063 litres/day
	=	299.06m^3/day
	=	3.5l/s

Therefore, Peak Water Demand associated with the new development is 299.1m^3/day.

It is proposed to use low water usage appliances such as low-flush toilets and waterless urinals, to restrict/reduce potable water demand.

The water infrastructure will be detailed and constructed in accordance with the current revision of the Irish Water's Code of Practice and Standard Details, as listed below:

- Document IW-CDS-5020-01: Water Infrastructure Standard Details,
- Document IW-CDS-5020-02: Design Risk Assessment for Water Infrastructure Standard Details,
- Document IW-CDS-5020-03: Code of Practice for Water Infrastructure.

5.4 Watermain Diversions

As noted in Section 5.2, there is an existing 12" asbestos concrete public watermain that passes directly through the proposed site. Left in its current location, this watermain would prevent the development of the Canal Extension Site to its full capacity. Therefore it is proposed that this existing Irish Water watermain is to be diverted to facilitate the development of the site area to its maximum potential.

It is proposed that the diversion of this watermain will commence at the location of the proposed new roundabout to be constructed at the entrance to the site from on the Bawnogue Road. The line of the diversion will follow the proposed central spine road to be constructed as part of the development. The diverted main will ultimately connect back to the existing line along the eastern boundary of the site.

The proposed diversion works will be designed to meet then requirement of Irish Water. As part of these proposed diversion works, a Diversion Application will be submitted to Irish Water for agreement.

The existing location of this watermain, and its proposed diverted route, can be seen on accompanying engineering drawing MDC0709-RPS-00-XX-DR-C-DG3001, included in Appendix D.

5.5 Irish Water Pre-Connection Enquiry

As part of the development of the wastewater strategy for the SDZ, DDBL Consulting Engineers submitted a regional pre-connection enquiry form to Irish Water in respect to the potable water networks associated with the masterplan total units of 11,101nr proposed at the Clonburris SDZ development. Subsequently, Irish Water confirmed that based on the size of the proposed development and on the capacity currently available, that subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network can be facilitated. A copy of the Confirmation of Feasibility as received from Irish Water has been included as **Appendix B**.

A Pre-Connection Enquiry for the subject site will be submitted to Irish Water and a Confirmation of Feasibility letter will be obtained from Irish Water for individual subject site located within the SDZ.

6 ROAD DESIGN

RPS have carried out a full civil engineering design of the internal roads serving the development. Refer to **Appendix E** for details of road geometry. All design has been carried out in compliance with the Government of Ireland's Design Manual for Urban Roads and Streets 2019 (DMURS), the NTA's National Cycle Manual 2011 (NCM), the South Dublin County Council Development Plan 2016 – 2022 (SDCCDP), and the Clonburris Strategic Development Zone Planning Scheme 2019 (CSDZPS).

6.1 Traffic Surveys

An Automatic Turning Count (ATC) is currently being procured and is being carried out on the Bawnogue Road at the proposed entrance to the development lands. This survey will count the type and volumes of vehicles moving in all directions over the course of seven consecutive days for 12-hour periods, 7am to 7pm, at this location. The survey results will aid in the design of the proposed roundabout at this location. The proposed location of the ATC is show in **Figure 6.1** below.

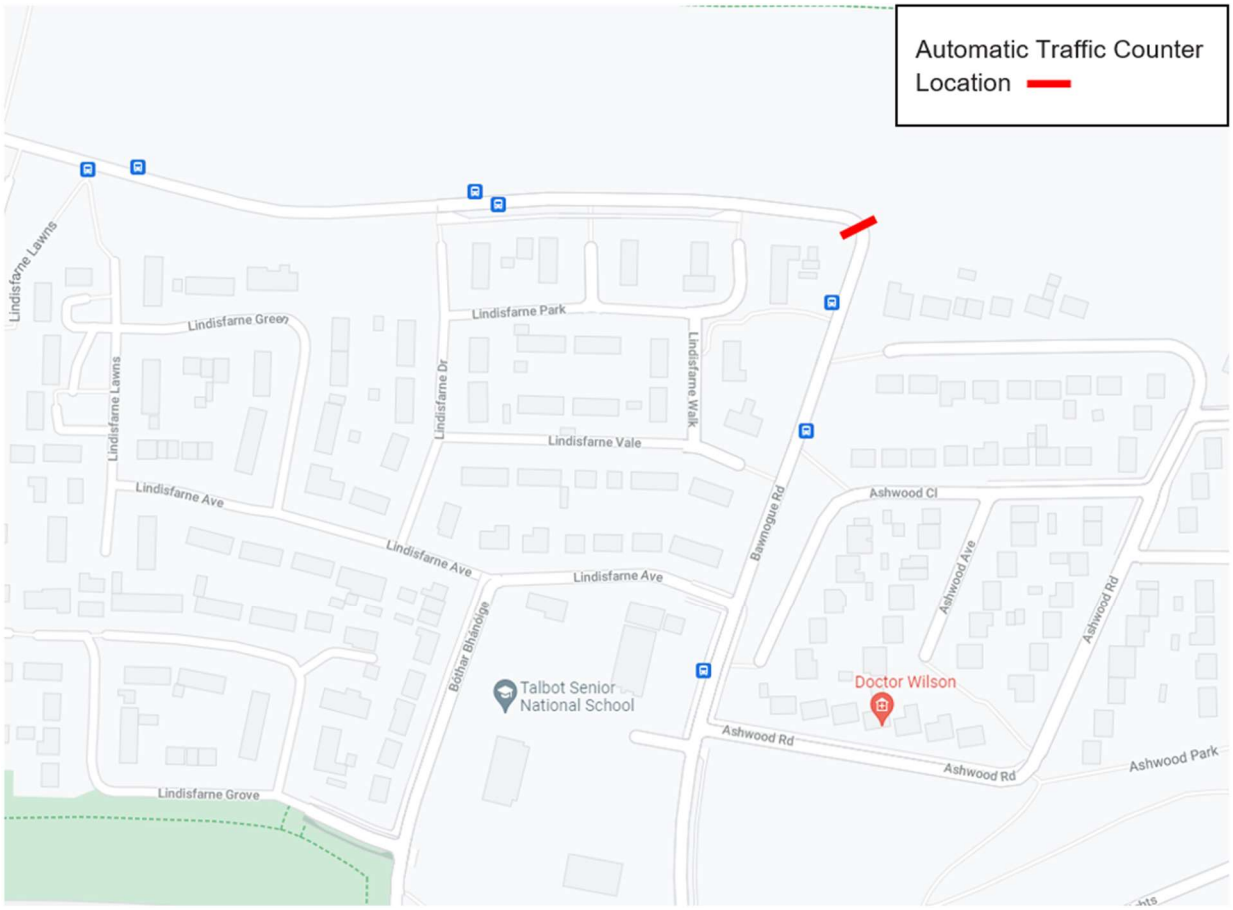


Figure 6.1: Proposed ATC Location

6.2 Proposed Access and Facilities for Vulnerable Road Users (VRUs)

The area will be developed with the aim of maximising travel by walking, cycling and public transport. The Grand Canal Way runs along the northern boundary of the development site, offering a strategic cycle link and leisure walk link to Dublin City Centre and Adamstown. Pedestrian links will be provided to the Fonthill Road, providing access to the Clondalkin-Fonthill Train Station and the Grand Canal Way, and to the Bawnogue Road, providing access to the Bawnogue Road bus stop.

6.2.1 Pedestrians

6.2.1.1 Footpaths

Within the Proposed Development a network of internal footways will be provided to facilitate the safe movement of pedestrians. Section 4.3.1 of DMURS states that minimum footway width is 1.8m. This is based on the space needed for two wheelchairs to pass each other. All proposed footpaths throughout the development will have a width of 2.2m.

6.2.1.2 Pedestrian Crossings

10 no. pedestrian crossings are proposed within the development. All crossings are to be uncontrolled, and 2m in width. 7 no. of these crossings are proposed to be 2m wide raised tables, while the other 3 no. are at-grade crossings. These raised table crossings will act as courtesy crossings as per Section 4.3.2 of DMURS. Courtesy crossings are effective in lower speed environments where formal crossing facilities are not required to assist in making such environments self-regulating. These uncontrolled crossings defined by vertical deflection will allow pedestrians to informally assert a degree of priority over drivers, while also calming vehicular traffic, and promoting pedestrian and cyclist activity and safety.

Additionally, a raised table zebra crossing is proposed along the Bawnogue Road, south of the proposed roundabout at the entrance to the development site. Zebra crossings promote greater levels of pedestrian priority, as drivers must give way to pedestrians once they have commenced the crossing.

6.2.2 Cyclists

Secure bicycle parking shall be provided throughout the development and shall be designed in accordance with the NCM. Bicycle parking is sheltered, secure and designed in a manner that integrates appropriately into the public realm.

Section 11.4.1 of the SDCCDP sets out minimum bicycle parking rates for residential apartments. These bicycle parking facilities are divided into two main categories;

- Long Term: These are to be designed for use by residents. Such spaces should be located in a secure area that is not freely accessible to the general public.
- Short Stay: These are to be designed for ease of use by the general public. Such spaces should be located in highly visible areas that are easy to access.

The minimum bicycle parking rates set out require one Long Term space for every 5 apartments, and one Short Stay space for every 10 apartments. To this end, the minimum number of bicycle parking spaces required for a development of this nature is 36.

As cycling is positively encouraged within the proposed development, the following bicycle parking facilities are proposed in order to promote active travel;

- 24 no. visitor bicycle parking spaces,
- A bicycle store compound is provided for all of the duplex and triplex units,
- A communal bicycle store is provided in the apartment building, with a stand for each unit.

6.3 Proposed Access Junction

It is proposed to provide a new roundabout on the Bawnogue Road to serve the Proposed Development. The roundabout will have radii of 7.5m or less, in accordance with Section 4.4.3 of DMURS. As well as providing access to the Proposed Development, this roundabout will also be useful as a traffic-calming measure along the Bawnogue Road.

A raised table zebra crossing is proposed on the southern arm of this roundabout, as previously discussed in **Section 6.2.1.2**.

6.4 Speed Management Proposals

6.4.1 Speed Limit

Due to large numbers of VRUs expected within this residential development, a 30km/h speed limit will be designated within the development, in line with Section 4.1.1 of DMURS.

6.4.2 Cul-de-sacs

There are 7 no. cul-de-sacs proposed as part of the development in total. However, the first two cul-de-sacs are shared surfaces, with the remaining five serving as vehicular cul-de-sacs.

The CSDZPS states; *"The purpose of Local Streets is to provide access within communities and to Arterial and Link Streets. Local Streets will act as quieter traffic calmed thoroughfares that are closely fronted and overlooked by development and will provide through access to neighbourhood blocks and local open spaces"*.

6.4.2.1 Shared Surface Cul-de-sacs

Section 2.2.4 of the CSDZPS states that some Local Streets will comprise Home Zones or Intimate Local Streets in the form of fully shared surfaces for the integrated movement of vehicles, pedestrians and cyclists in quieter residential areas. The Full Street Hierarchy is shown in **Figure 6.2** below.

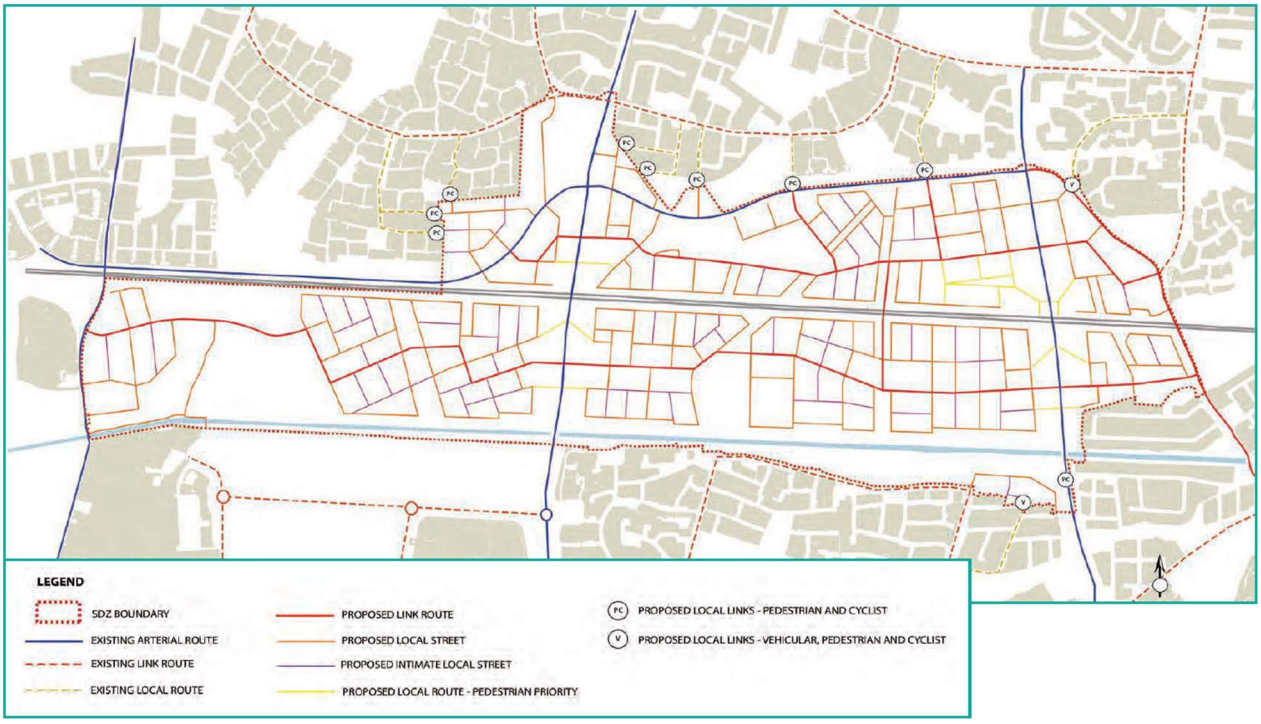


Figure 6.2: Street Hierarchy, CSDZPS

To this end, each of the shared surface cul-de-sacs are shared surfaces. Shared surface streets and junctions are integrated spaces where pedestrians, cyclists and vehicles share the main carriageway. Shared surfaces are an effective way of promoting place and providing pedestrians and cyclists with a more enjoyable experience. These shared cul-de-sacs vary in width, and are all between 5m and 6m in width.

Figure 6.2 above proposes a vehicular access to the south of the development, linking to Ashwood Road. This access is not proposed as part of this development.

6.4.3 Corner Radii

Reducing corner radii will significantly improve pedestrian and cyclist safety at junctions by lowering the speed at which vehicles can turn corners, and by increasing inter-visibility between users. Reduced corner

radii also assist in the creation of more compact junctions that also align crossing points with desire lines and reduce crossing distances.

As per Section 4.3.3 of DMURS, 6m radii will generally allow larger vehicles, such as buses and rigid body trucks, to turn corners without crossing the centre line of the intersecting road. However, corner radii may be reduced to 4.5m where larger vehicles are only expected occasionally. For this reason, 4.5m is the typical radius used for turns into cul-de-sacs.

Larger vehicles may need to cross the centre line of the intersecting street due to the 4.5m radii. However, such manoeuvres are acceptable when turning into/or between local or lightly trafficked link streets as keeping vehicle speeds low is of higher priority, as per Section 4.3.3 of DMURS.

6.4.4 Raised Table Pedestrian Crossings

Raised table pedestrian crossings as discussed in **Section 6.2.1.2** will aid in calming vehicular traffic and promote pedestrian and cyclist activity and safety.

6.4.5 Carriageway Widths

DMURS Section 4.4.1 states that research has found that narrow carriageways are one of the most effective design measures to calm traffic. It also states that the standard carriageway width on Local streets should be between 5m and 5.5m. To this end, carriageway width within the development is proposed to be a minimum of 5m, providing lane widths of 2.5m.

However, carriageway width increases to 5.5m in some areas where perpendicular parking bays are provided. This increased street width is required to accommodate additional manoeuvrability for vehicles entering / leaving perpendicular parking spaces, in compliance with DMURS Section 4.4.9. Where the carriageway is 5.5m, a 0.5m buffer area is provided between the carriageway and perpendicular car parking spaces.

6.5 Proposed Parking

6.5.1 Car Parking Rates

Section 2.2.2 of the CSDZPS dictates that the number of car parking spaces within the SDZ should be minimised. Section 11.4.2 of the SDCCDP sets out maximum parking rates for residential developments. The Development Plan states that the number of spaces provided for any particular development should not exceed the maximum provision, and the maximum provision should not be viewed as a target. These maximum parking rates are shown in **Table 6.1** below.

Table 6.1: South Dublin County Council Development Plan 2016 – 2022 Maximum Parking Rates

Dwelling Type	No. Bedrooms	No. Car Parking Spaces
Apartment / Duplex	1 Bed	0.75
	2 Bed	1
	3+ Bed	1.25
House	1 Bed	1
	2 Bed	1.25
	3+ Bed	1.5

Section 2.2.6 of the CSDZPS states that Zone 2 parking standards prescribed under the SDCCDP should apply to this development. **Table 6.2** shows the maximum number of car parking spaces permitted in the development is 127 as set out by the SDCCDP.

Table 6.2: Maximum Number of Car Parking Spaces Permitted

Dwelling Type	No. Proposed Units	Maximum No. Spaces	Total Maximum No. Spaces
1 Bed Apartment / Duplex	33	0.75	25
2 Bed Apartment / Duplex	38	1	38
3+ Bed Apartment / Duplex	25	1.25	31
3+ Bed House	22	1.5	33
Maximum No. Car Parking Spaces Permitted			**127 Spaces**

However, the development plan states that "the maximum provision should not be viewed as a target and a lower rate of parking may be acceptable subject to the proximity of the site to public transport and the quality of the transport service it provides".

The Bawnogue Road bus stop (stop 2152) is located approximately 105m from the entrance to the proposed development. This bus stop is serviced by the 13 Dublin Bus route which terminates at the Harristown Depot on the Old Dublin Road in Swords. This bus route services areas such as Clondalkin, Kylemore, Inchicore, Dublin City Centre (incl. Thomas Street, College Green, O'Connell Street and Parnell Square), Drumcondra, Glasnevin, Santry and Ballymun. This is a high frequency bus route where buses operate with a minimum 10-minute frequency at peak times and a minimum 20-minute off peak frequency.

The Clondalkin-Fonthill Train Station on the Fonthill Road will be accessible via a pedestrian link from the development site to the Fonthill Road. This train station is approximately 500m from the development site and is served by Commuter services operating to Heuston Station. The opening of the Phoenix Park Tunnel offers connection to Drumcondra, Connolly, Tara Street, Pearse and Grand Canal Dock.

Furthermore, as stated in the CSDZPS, the SDZ lands will be served (both directly and indirectly) by additional high quality public transport infrastructure projects planned under the NTA's Transport Strategy for the Greater Dublin Area 2016 – 2035. These planned projects will connect the SDZ lands, including existing public transport services and infrastructure into an integrated cross metropolitan network of orbital and radial routes and will greatly expand the route and mode choice for public transport users including residents and employees in Clonburris.

For the above reasons, ***112 car parking spaces are proposed*** as part of the development. In line with both DMURS and the CSDZPS, all on-street parking will be broken up, landscaped and designed according to street typology. To ensure that it does not dominate streetscapes, proposed on-street parking will be broken up into a series of bays separated by planted build outs.

6.5.2 Parking Bay Size

In compliance with Section 4.4.9 of DMURS, all parallel parking spaces will be 2.4m wide and 6m long. The same section also states that perpendicular spaces should be a minimum of 2.4m wide and 5m long. All perpendicular parking spaces within the development are proposed to be 2.5m wide and 5m long.

6.5.3 Wheelchair Accessible Parking Bays

Wheelchair accessible parking bays will account for a minimum of 5% of the total parking spaces. To this end, 6 wheelchair accessible bays are proposed as part of the development.

6.5.4 Car Parking for Electric Vehicles

The Electric Transport Programme (2008) contains a target for 10% of the national road transport fleet to be electrically powered by 2020. To facilitate the use of electrically operated cars and bicycles in line with National Policy, The SDCCDP states that; "all developments shall provide facilities for the charging of battery-operated cars at a rate of *up to* 10% of the total car parking spaces. The remainder of the parking spaces should be constructed to be capable of accommodating future charging points, as required".

10 of the 112 car parking spaces provided within the development will provide facilities for the charging of battery-operated vehicles.

6.6 Topography

In accordance with Section 2.8.4 of the CSDZPS, streets within the development will be as gradual as possible with a gradient of between 1 in 33 (3%) and 1 in 20 (5%).

A crossfall of 2.5% is proposed throughout the development to assist in drainage.

6.7 Larger Vehicles

6.7.1 Emergency Vehicles Access

As discussed in **Section 6.4.3**, larger vehicles may need to cross the centre line of the intersecting street due to the reduced corner radii. However, such manoeuvres are acceptable when turning into/or between local or lightly trafficked link streets, as keeping vehicle speeds low is of higher priority. An Emergency Vehicle Access drawing has been provided in **Appendix E**. This drawing demonstrates it is proposed that a fire tender may move throughout the development, with the ability to access all areas.

6.7.2 Bin Lorry Access

All houses, duplexes and triplexes within the development are proposed to have their own bin compound (per unit), and bins should be left at the back off the footpath on bin collection day.

It is proposed that the apartments will be privately managed, with a communal bin store where residents will deposit refuse for collection. The management company will ensure refuse is left in a safe place for bin collection on collection day.

From a road layout perspective, it is proposed that bin lorries will reverse into each cul-de-sac to collect bins, rather than driving into the cul-de-sacs and reversing out again. It is proposed that all refuse companies coordinate, so that bin collection only occurs one day each week.

Appendix A
Wastewater Flows Calculation

Wastewater Flows - New Networks

Project:	Clonburris Canal Extension	
Calculation:	118nr Dwellings	
Date:	09/03/2022	
Calculation By:	VN	
Checked By:	GMcC	

Equation 1				
Wastewater Contribution - Domestic				
No. of Dwellings		118		
Occupancy Rate		2.7	per dwelling	IW-TEC-800-01 Section 6.2.1
Population	(P)	319		
Water Consumption	(G)	150	l/ca/day	IW-TEC-800-01 Section 6.2.2
Domestic Wastewater Contribution	(PG)	47,790	litres/day	
Wastewater Contribution - Commercial/Trade				
Commercial/Industrial Population	(P_E)	0		
Commercial/Industrial Water Consumption	(G_E)	0	l/ca/day	
Domestic WW Element of Commercial & Industrial Flows	($P_E G_E$)	0	litres/day	
Proposed Trade Flows	(E)	0	litres/day	
Peaking Factors				
Peaking Factor (Domestic)	(Pf_{Dom})	6		IW-TEC-800-01 Table 6.2.5
Peaking Factor (Domestic element of Industrial)	($Pf_{Dom,Ind}$)	3		IW-TEC-800-01 Table 6.2.7
Peaking Factor (Trade Flow)	(Pf_{Trade})	3		IW-TEC-800-01 Table 6.2.9
Infiltration				
Infiltration (Domestic) New = 10% of Unit Consumption (10% PG)	(I)	4,779	litres/day	IW-TEC-800-01 Table 6.2.4
Infiltration (Industrial) New = 10% of Unit Consumption (10% $P_E G_E$)	(I_{Indust})	0	litres/day	IW-TEC-800-01 Table 6.2.5
Design Foul Flow	(Eqn. 1)	**291,519**	litres/day	
		292	m^3/day	
		3.4	litres/sec	
Dry Weather Flow	(DWF)	**52,569**	litres/day	
		53	m^3/day	
		0.6	litres/sec	

Equation 2				
Modified Rational Method				
Total Site Area		3	ha	
Catchment Area		2.5	ha	
Standard Average Annual Rainfall	SAAR	950	mm	uksuds.com
Percentage Impermeability	PIMP	55.00	%	SPON Urban Drainage value for dense housing
Soil Index	SOIL	0.3		uksuds.com
Urban Catchment Wetness Index	UCWI	116		GDSDS Figure D1
Percentage Runoff >= 0.4*PIMP	PR	41.44	%	
Percentage Runoff <= 0.4*PIMP	PR	22.00	%	
Runoff Coefficient	Cv	0.75		
Routing Coefficient	Cr	1.3		IW-TEC-800-01 Table 6.3.3
Time of Entry	T_e	7	min	IW-TEC-800-01 Table 6.3.2
Longest Pipe Route	L	2500	m	
Assumed Velocity in Pipe	V	1.0	m/s	
Time of Flow	T_f	41.67	min	
Time of Concentration	T_c	48.67	min	
Return Period	RP	2	1-in-(RP)year	IW-TEC-800-01 Table 5.4
Rainfall Intensity	i	19.58	mm/hr	Met Eireann DDF Table
Peak Flow	Qp	**133**	l/s	
	Qp	**0.13**	m^3/s	
	Qp	**11,515,970**	litres/day	
Misconnection Allowance - Domestic				
% of Gross Site Area		3.00	%	IW-TEC-800-01 Table 6.2.10
Surface Water Allowance (Domestic)	SW	2.20	l/s	
Surface Water Allowance (Domestic)		190,014	l/day	
Misconnection Allowance - Commercial/Industrial				
% of Gross Site Area		0.00	%	IW-TEC-800-01 Table 6.2.11
Surface Water Allowance (Commercial)	SW_E	0.00	l/s	
Surface Water Allowance (Commercial)		0.00	l/day	

Design Flow (Eqn. 1 + Eqn. 2)		**481,533**	litres/day	
		482	m^3/day	
		5.6	litres/sec	

Appendix B
Regional Irish Water Pre-Connection Agreement

Brendan Jackson
Newtown House
Newtown Eadestown
Naas
Co. Kildare

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

4 October 2019

Dear Brendan Jackson,

Re: Connection Reference No CDS19004954 pre-connection enquiry -
Subject to contract | Contract denied

Connection for Housing Development of 11,101 units at Clonburris, Dublin, Dublin.

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Clonburris, Dublin, Dublin.

Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated subject to following:

All infrastructure should be designed and installed in accordance with

- the Clonburris Master Plan (on going project) approved by Irish Water
- the Development phasing and connection timelines of each phase agreed with Irish Water
- the Irish Water Codes of Practice and Standard Details.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available 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.

If you have any further questions, please contact Marina Zivanovic Byrne from the design team on 01 89 25991 or email mzbyrne@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services

Appendix C
Greenfield Run-Off and Attenuation Volume Calculations

		Calculation Sheet		
Project Title	**Canal Extension - Clonburris**	Designed by	VN	Sheet 1 of 3
		Checked by	GMcC	
Project No.	**MDC0709**	Approved by		
Element	**Greenfield Runoff Calculation**	File Ref.	MDC0709	**Rev.:** S2 P01
Package	**Drainage and Flooding**	Package No.		**Date:** 11/03/2022
Item				Output

Equation: ADAS 345 (The Agricultural Development and Advisory Service)

$$Q = AREA(0.0443SAAR - 11.19)SOIL^{2.0}\left[\frac{18.79T^{0.28} - 1}{10T}\right]$$

Note: According to the TII Publication Design of Runoff for Natural Catchents (DN-DNG-03064), it is recommended to use the IoH Method for catchments greater than 0.4km^2 and the ADAS Method for catchments less than or equal to 0.4km^2

Data:

SAAR:	765	mm	(extracted from Met Eireann historical data using the Northing and Easting site location data)			
Soil:	0.3	Soil Type 2	(As per FSR Soil Map and GDSDS Volume 2 Table 6.7)			
Contributing Area:	0.018140	km^2				
Time of Concentration:	12.9494026	hrs				
W	300	m		Upper Level	62.6	
Z	1.3	m	1.3	Lower Level	60	

$$T = 0.1677\frac{W^{0.78}}{Z^{0.39}}$$

Where: W is the maximum catchment width in metres, Z is the average height of the upstream catchment divide in metres above the discharge level.

Calculation:

Qbar= 0.01073 m^3/s
10.73 l/s

Greenfield Runoff 5.91 l/s/ha As per GDSDS reccomendations to pick greenfield 1 year rate or 2l/s/ha whichever is larger

1 year Growth Factor	0.85	As per GDSDS guidance (Volume 2)
2 year Growth Factor	1	As per GDSDS guidance (Volume 2)
30 year Growth Factor	2.1	As per GDSDS guidance (Volume 2)
100 year Growth Factor	2.6	As per GDSDS guidance (Volume 2)

Greenfield Limiting Discharges

For the 1.9266 ha site, the total allowable Qbar = 10.73 l/s

Based on GDSDS Volume 2 = 5.91 l/s/ha

1 year	9.12	l/s	9.119893035 l/s/ha
2 year	10.73	l/s	10.72928592 l/s/ha
30 year	22.53	l/s	22.53150044 l/s/ha
100 year	27.90	l/s	27.8961434 l/s/ha

			Calculation Sheet		
Project Title	**Canal Extension - Clonburris**		Designed by	VN	Sheet 2 of 3
Project No.	**MDC0709**		Checked by	GMcC	
Element	**Greenfield Runoff Calculation**		Approved by		
Package	**Drainage and Flooding**		File Ref.	MDC0709	**Rev.:** S2 P01
Item			Package No.		**Date:** 11/03/2022
					Output

Total Site Footprint Area (sqm)	Total Landscaped Area (sqm)
32405	14261

Roof and Hardstanding Contributing Area (sqm)
18144

Roof and Hardstanding Runoff Coefficient	1
Landscaped Runoff Coefficient	0

Total Impermeable Area (sqm)	18144

Time	Unit	Seconds	Rainfall (mm) - 30 year [1]	Rainfall (mm) - 30 year 20% CC [2]	Area (m^2)	Volume Incoming (A1) m^3	Outgoing Volume l/s for Area (m^3)	Storage Required (m^3)
5	mins	300	11.9	14.3	18144	259	7	252
10	mins	600	16.6	19.9	18144	361	14	348
15	mins	900	19.6	23.5	18144	427	20	406
30	mins	1800	24.5	29.4	18144	533	41	493
1	hours	3600	30.7	36.8	18144	668	81	587
2	hours	7200	38.5	46.2	18144	838	162	676
3	hours	10800	43.9	52.7	18144	956	243	712
4	hours	14400	48.2	57.8	18144	1049	324	725
6	hours	21600	54.9	65.9	18144	1195	487	709
9	hours	32400	62.7	75.2	18144	1365	730	635
12	hours	43200	68.8	82.6	18144	1498	973	525
18	hours	64800	78.5	94.2	18144	1709	1460	249
24	hours	86400	86.1	103.3	18144	1875	1947	-72
2	days	172800	97.0	116.4	18144	2112	3893	-1781
3	days	259200	106.0	127.2	18144	2308	5840	-3532
4	days	345600	113.8	136.6	18144	2478	7787	-5309
6	days	518400	127.4	152.9	18144	2774	11680	-8906
8	days	691200	139.2	167.0	18144	3031	15574	-12543
10	days	864000	149.8	179.8	18144	3262	19467	-16206
12	days	1036800	159.6	191.5	18144	3475	23361	-19886
16	days	1382400	177.4	212.9	18144	3862	31148	-27285
20	days	1728000	193.5	232.2	18144	4213	38934	-34721
25	days	2160000	212.0	254.4	18144	4616	48668	-44052

Note:
[1] Rainfall data used from MET Rainfall Table for Site
[2] 20% climate change factor applied

Storage required (m^3)	**725.00**
Storage provided (m^3)	**1250.00**
Excess Storage (m^3)	**525.00**

			Calculation Sheet		
Project Title	**Canal Extension - Clonburris**		Designed by	VN	
			Checked by	GMcC	Sheet 3 of 3
Project No.	**MDC0709**		Approved by		
Element	**Greenfield Runoff Calculation**		File Ref.	MDC0709	**Rev.:** S2 P01
Package	**Drainage and Flooding**		Package No.		**Date:** 11/03/2022
Item					Output

Total Site Footprint Area (sqm)	Total Landscaped Area (sqm)
32405	14261

Roof and Hardstanding Contributing Area (sqm)
18144

Roof and Hardstanding Runoff Coefficient	1
Landscaped Runoff Coefficient	0

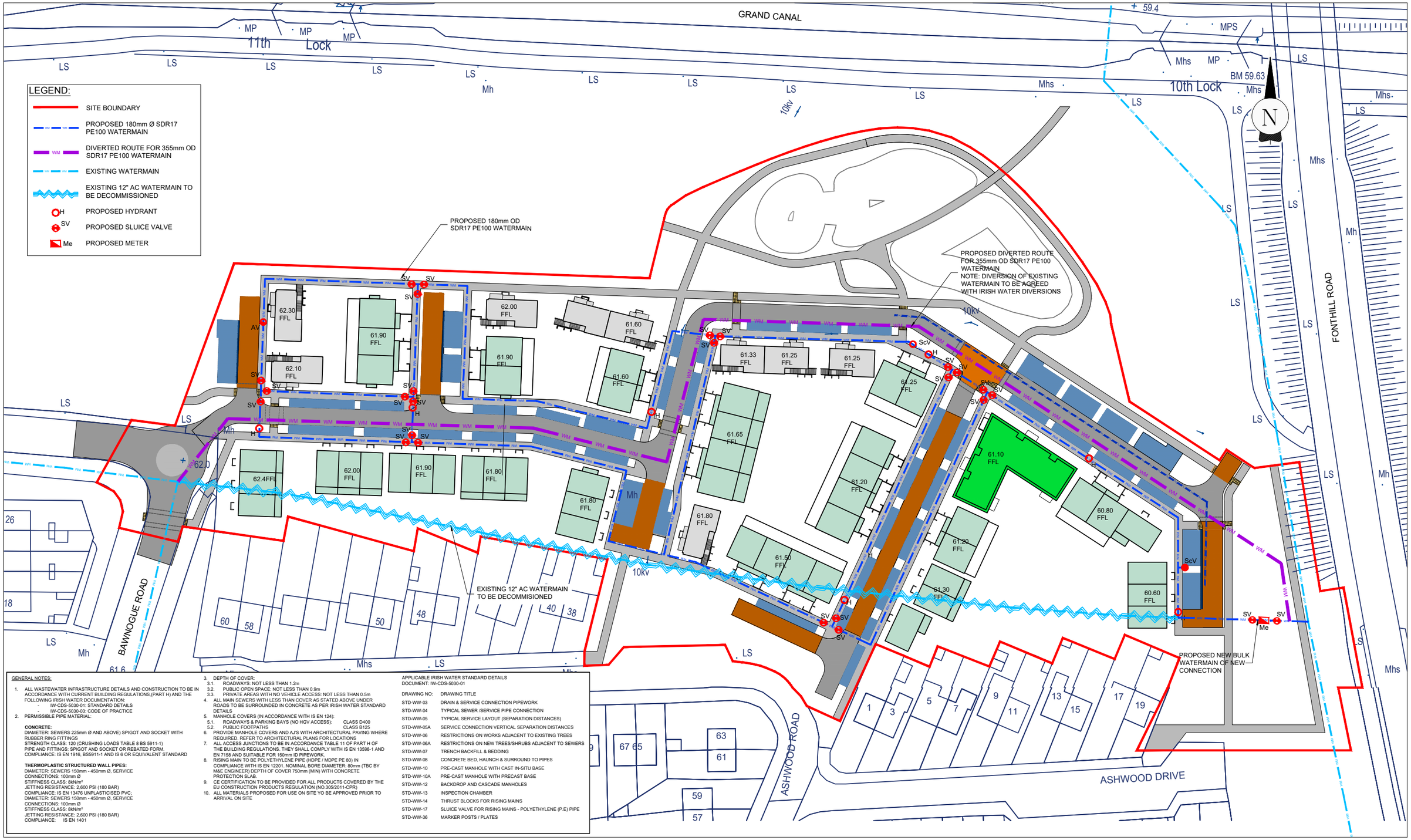
Total Impermeable Area (sqm)	18144

Time	Unit	Seconds	Rainfall (mm) - 100 year [1]	Rainfall (mm) - 100 year 20% CC [2]	Area ($m^{2)}$	Volume Incoming (A1) m^3	Outgoing Volume l/s for Area (m^3)	Storage Required (m^3)
5	mins	300	17.6	21.12	18144.0	383	8	375
10	mins	600	24.6	29.52	18144.0	536	17	519
15	mins	900	28.9	34.68	18144.0	629	25	604
30	mins	1800	35.7	42.84	18144.0	777	50	727
1	hours	3600	44.2	53.04	18144.0	962	100	862
2	hours	7200	54.6	65.52	18144.0	1189	201	988
3	hours	10800	61.9	74.28	18144.0	1348	301	1046
4	hours	14400	67.6	81.12	18144.0	1472	402	1070
6	hours	21600	76.5	91.8	18144.0	1666	603	1063
9	hours	32400	86.6	103.92	18144.0	1886	904	982
12	hours	43200	94.6	113.52	18144.0	2060	1205	855
18	hours	64800	107.1	128.52	18144.0	2332	1808	524
24	hours	86400	116.9	140.28	18144.0	2545	2410	135
2	days	172800	128.5	154.2	18144.0	2798	4820	-2023
3	days	259200	138.3	165.96	18144.0	3011	7231	-4220
4	days	345600	147.1	176.52	18144.0	3203	9641	-6438
6	days	518400	162.3	194.76	18144.0	3534	14461	-10928
8	days	691200	175.5	210.6	18144.0	3821	19282	-15461
10	days	864000	187.4	224.88	18144.0	4080	24102	-20022
12	days	1036800	198.3	237.96	18144.0	4318	28923	-24605
16	days	1382400	218.2	261.84	18144.0	4751	38564	-33813
20	days	1728000	236.1	283.32	18144.0	5141	48205	-43064
25	days	2160000	256.6	307.92	18144.0	5587	60256	-54669

Note:
[1] Rainfall data used from MET Rainfall Table for Site
[2] 20% climate change factor applied

Storage required (m^3)	**1070.14**
Storage provided (m^3)	**1250.00**
Excess Storage (m^3)	**179.86**

Appendix D
Drainage and Watermain Drawings



GENERAL NOTES:

1. ALL WASTEWATER INFRASTRUCTURE DETAILS AND CONSTRUCTION TO BE IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS,(PART H) AND THE FOLLOWING IRISH WATER DOCUMENTATION:
   - IW-CDS-5030-01: STANDARD DETAILS
   - IW-CDS-5030-03: CODE OF PRACTICE
2. PERMISSIBLE PIPE MATERIAL:

   CONCRETE:
   DIAMETER: SEWERS 225mm Ø AND ABOVE) SPIGOT AND SOCKET WITH RUBBER RING FITTINGS
   STRENGTH CLASS: 120 (CRUSHING LOADS TABLE 8 BS 5911-1)
   PIPE AND FITTINGS: SPIGOT AND SOCKET OR REBATED FORM.
   COMPLIANCE: IS EN 1916, BS5911-1 AND IS 6 OR EQUIVALENT STANDARD

   THERMOPLASTIC STRUCTURED WALL PIPES:
   DIAMETER: SEWERS 150mm - 450mm Ø, SERVICE CONNECTIONS: 100mm Ø
   STIFFNESS CLASS: 8kN/m²
   JETTING RESISTANCE: 2,600 PSI (180 BAR)
   COMPLIANCE: IS EN 13476 UNPLASTICISED PVC;
   DIAMETER: SEWERS 150mm - 450mm Ø, SERVICE CONNECTIONS: 100mm Ø
   STIFFNESS CLASS: 8kN/m²
   JETTING RESISTANCE: 2,600 PSI (180 BAR)
   COMPLIANCE: IS EN 1401
3. DEPTH OF COVER:
   3.1. ROADWAYS: NOT LESS THAN 1.2m
   3.2. PUBLIC OPEN SPACE: NOT LESS THAN 0.9m
   3.3. PRIVATE AREAS WITH NO VEHICLE ACCESS: NOT LESS THAN 0.5m
4. ALL MAIN SEWERS WITH LESS THAN COVER AS STATED ABOVE UNDER ROADS TO BE SURROUNDED IN CONCRETE AS PER IRISH WATER STANDARD DETAILS
5. MANHOLE COVERS (IN ACCORDANCE WITH IS EN 124):
   5.1. ROADWAYS & PARKING BAYS (NO HGV ACCESS): CLASS D400
   5.2. PUBLIC FOOTPATHS CLASS B125
6. PROVIDE MANHOLE COVERS AND AJ'S WITH ARCHITECTURAL PAVING WHERE REQUIRED. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS
7. ALL ACCESS JUNCTIONS TO BE IN ACCORDANCE TABLE 11 OF PART H OF THE BUILDING REGULATIONS. THEY SHALL COMPLY WITH IS EN 13598-1 AND EN 7158 AND SUITABLE FOR 150mm ID PIPEWORK.
8. RISING MAIN TO BE POLYETHYLENE PIPE (HDPE / MDPE PE 80) IN COMPLIANCE WITH IS EN 12201. NOMINAL BORE DIAMETER: 80mm (TBC BY M&E ENGINEER) DEPTH OF COVER 750mm (MIN) WITH CONCRETE PROTECTION SLAB.
9. CE CERTIFICATION TO BE PROVIDED FOR ALL PRODUCTS COVERED BY THE EU CONSTRUCTION PRODUCTS REGULATION (NO.305/2011-CPR)
10. ALL MATERIALS PROPOSED FOR USE ON SITE YO BE APPROVED PRIOR TO ARRIVAL ON SITE

APPLICABLE IRISH WATER STANDARD DETAILS
DOCUMENT: IW-CDS-5030-01

DRAWING NO:	DRAWING TITLE
STD-WW-03	DRAIN & SERVICE CONNECTION PIPEWORK
STD-WW-04	TYPICAL SEWER /SERVICE PIPE CONNECTION
STD-WW-05	TYPICAL SERVICE LAYOUT (SEPARATION DISTANCES)
STD-WW-05A	SERVICE CONNECTION VERTICAL SEPARATION DISTANCES
STD-WW-06	RESTRICTIONS ON WORKS ADJACENT TO EXISTING TREES
STD-WW-06A	RESTRICTIONS ON NEW TREES/SHRUBS ADJACENT TO SEWERS
STD-WW-07	TRENCH BACKFILL & BEDDING
STD-WW-08	CONCRETE BED, HAUNCH & SURROUND TO PIPES
STD-WW-10	PRE-CAST MANHOLE WITH CAST IN-SITU BASE
STD-WW-10A	PRE-CAST MANHOLE WITH PRECAST BASE
STD-WW-12	BACKDROP AND CASCADE MANHOLES
STD-WW-13	INSPECTION CHAMBER
STD-WW-14	THRUST BLOCKS FOR RISING MAINS
STD-WW-17	SLUICE VALVE FOR RISING MAINS - POLYETHYLENE (P.E) PIPE
STD-WW-36	MARKER POSTS / PLATES

Client: Comhairle Contae Átha Cliath Theas — South Dublin County Council

Architect: MCCAULEY DAYE O'CONNELL ARCHITECTS

General Notes

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(ii) DO NOT SCALE, use figured dimensions only.

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(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn	Chk	Amendment / Issue	App
A1 C01	14.03.22	PH	CW	ISSUE FOR PLANNING	CW

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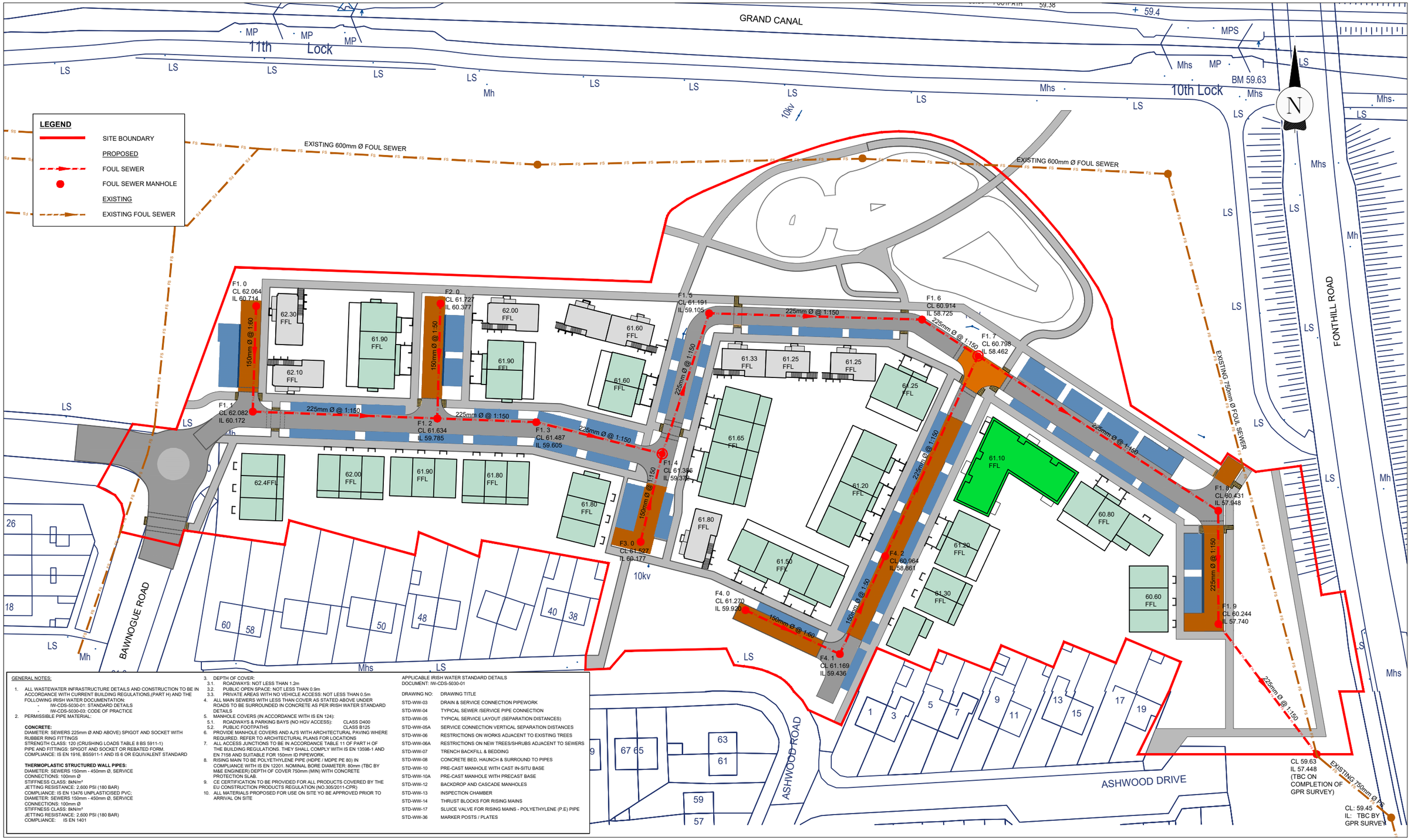
Model File Identifier

Scale	1:500 @ A1 1:1000 @ A3
Created on	07/02/22
Sheets	1 OF 1
Project	CANAL EXTENSION - CLONBURRIS
Title	PROPOSED WATERMAIN LAYOUT
File Identifier	MDC0709-RPS-00-XX-DR-C-DG3001.dwg
Status	A1
Rev	C01

S:\MDC0709 - Clonburris\8.0 Drawings\DG\MDC0709-RPS-00-XX-DR-C-DG3001 Watermain.dwg



S:\MDC0709 - Clonburris\8.0 Drawings\DG\MDC0709-RPS-00-XX-DR-C-DG3002 Foul Main.dwg

Client: Comhairle Contae Átha Cliath Theas / South Dublin County Council

Architect: MCCAULEY DAYE O'CONNELL ARCHITECTS

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A1 C01	140322	PH / CW	ISSUE FOR PLANNING	CW

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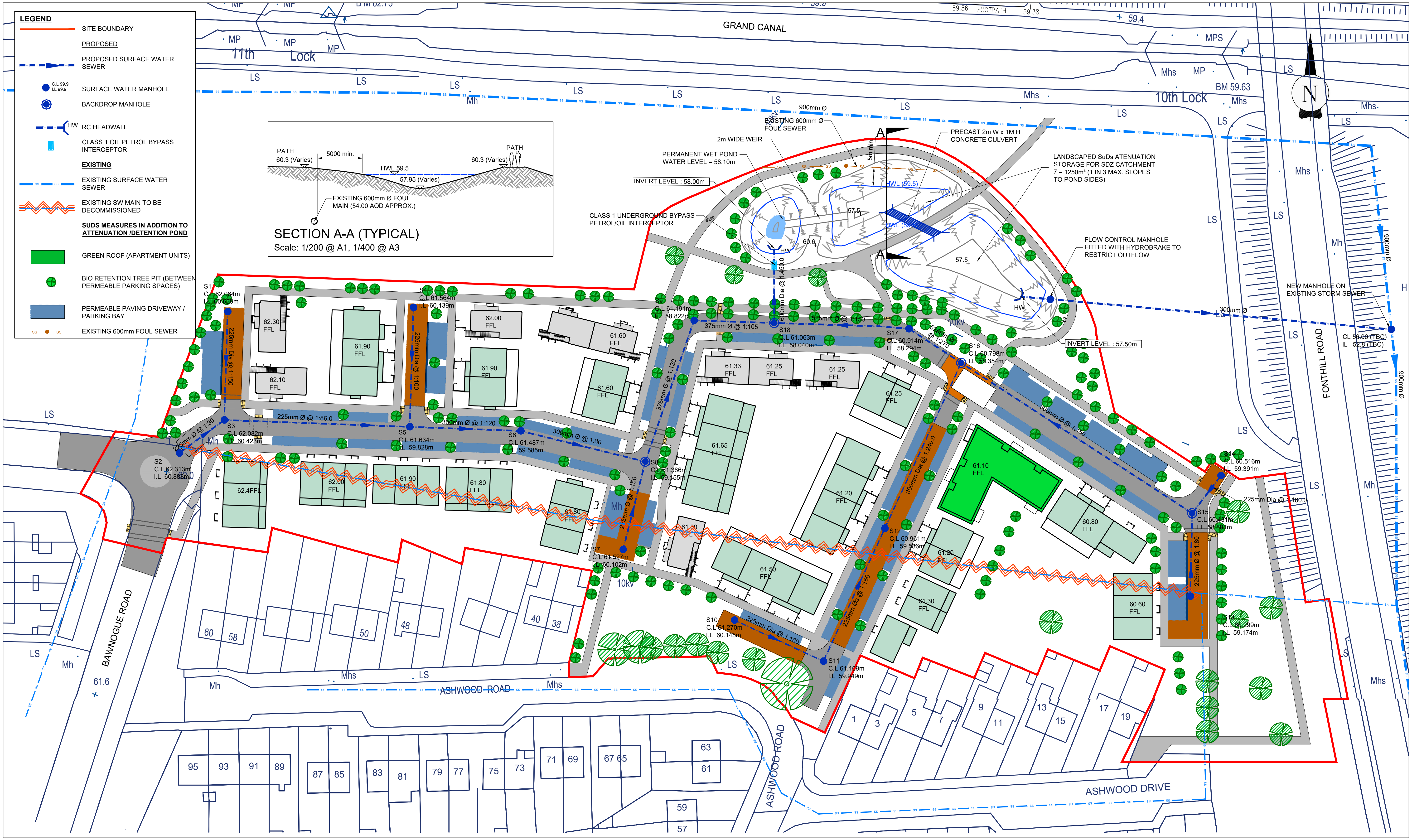
Model File Identifier

Scale	1:500 @ A1 1:1000 @ A3
Created on	07/02/22
Sheets	1 OF 1
Project	CANAL EXTENSION - CLONBURRIS
Title	PROPOSED FOUL DRAINAGE LAYOUT
File Identifier	MDC0709-RPS-00-XX-DR-C-DG3002.dwg
Status	A1
Rev	C01


LEGEND
SITE BOUNDARY
PROPOSED
PROPOSED SURFACE WATER SEWER
SURFACE WATER MANHOLE
BACKDROP MANHOLE
RC HEADWALL
CLASS 1 OIL PETROL BYPASS INTERCEPTOR
EXISTING
EXISTING SURFACE WATER SEWER
EXISTING SW MAIN TO BE DECOMMISSIONED
SUDS MEASURES IN ADDITION TO ATTENUATION /DETENTION POND
GREEN ROOF (APARTMENT UNITS)
BIO RETENTION TREE PIT (BETWEEN PERMEABLE PARKING SPACES)
PERMEABLE PAVING DRIVEWAY / PARKING BAY
EXISTING 600mm FOUL SEWER
SECTION A-A (TYPICAL)
Scale: 1/200 @ A1, 1/400 @ A3
PATH
60.3 (Varies)
5000 min.
HWL 59.5
57.95 (Varies)
EXISTING 600mm Ø FOUL MAIN (54.00 AOD APPROX.)
GRAND CANAL
11th Lock
10th Lock
FONTHILL ROAD
BAWNOGUE ROAD
ASHWOOD ROAD
ASHWOOD DRIVE
900mm Ø
EXISTING 600mm Ø FOUL SEWER
2m WIDE WEIR
PRECAST 2m W x 1M H CONCRETE CULVERT
PERMANENT WET POND WATER LEVEL = 58.10m
INVERT LEVEL : 58.00m
LANDSCAPED SuDs ATENUATION STORAGE FOR SDZ CATCHMENT 7 = 1250m³ (1 IN 3 MAX. SLOPES TO POND SIDES)
CLASS 1 UNDERGROUND BYPASS PETROL/OIL INTERCEPTOR
FLOW CONTROL MANHOLE FITTED WITH HYDROBRAKE TO RESTRICT OUTFLOW
INVERT LEVEL : 57.50m
NEW MANHOLE ON EXISTING STORM SEWER
CL 58.80 (TBC)
IL 52.8 (TBC)
300mm Ø
225mm Ø @ 1:86.0
300mm Ø @ 1:120
300mm Ø @ 1:80
375mm Ø @ 1:105
375mm Ø @ 1:120
300mm Ø @ 1:150
300mm Dia @ 1:240.0
225mm Dia @ 1:160
225mm Dia @ 1:80
225mm Dia @ 1:100
225mm Dia @ 1:150
S1 C.L 62.064m I.L 60.638m
S2 C.L 62.313m I.L 60.889m
S3 C.L 62.082m I.L 60.423m
S5 C.L 61.634m I.L 59.828m
S6 C.L 61.487m I.L 59.585m
S7 C.L 61.527m I.L 60.102m
S10 C.L 61.270m I.L 60.145m
S11 C.L 61.109m I.L 59.949m
S12 C.L 60.961m I.L 59.596m
S16 C.L 60.798m I.L 58.354m
S17 C.L 60.914m I.L 58.294m
S18 C.L 61.063m I.L 58.040m
S14 C.L 60.516m I.L 59.391m
61.90 FFL
61.60 FFL
61.10 FFL
60.60 FFL

Client:

Comhairle Contae Átha Cliath Theas
South Dublin County Council

Architect:

MC CAULEY DAYE O'CONNELL ARCHITECTS

General Notes

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(v) All Levels refer to Ordnance Survey Datum, Malin Head.

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A1 C01	14.03.22	PH	CW	ISSUE FOR PLANNING	CW

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Model File Identifier

Scale: 1:500 @ A1, 1:1000 @ A3

Project: CANAL EXTENSION - CLONBURRIS

Created on: 07/02/22

Title: PROPOSED SURFACE WATER DRAINAGE LAYOUT

Sheets: 1 OF 1

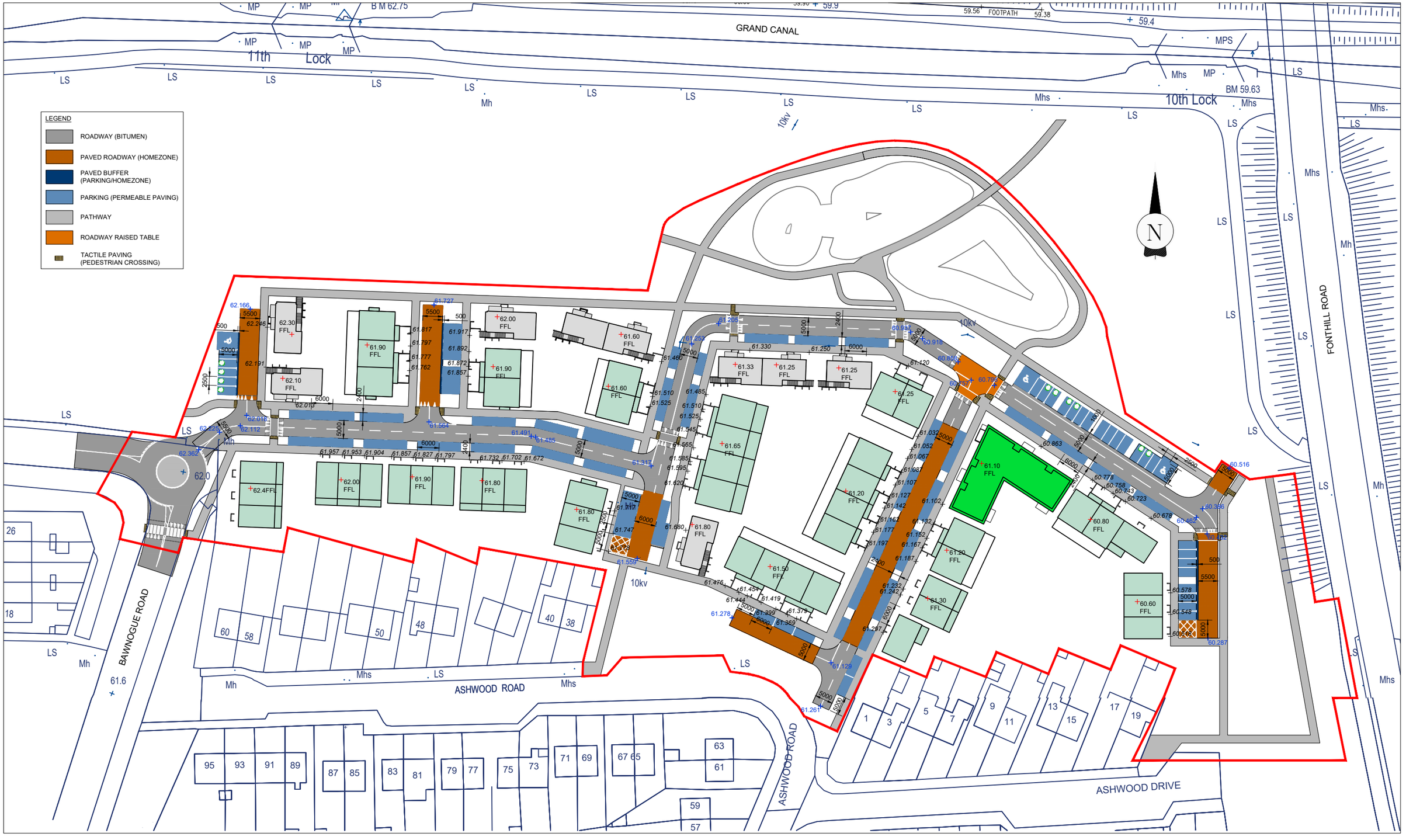
File Identifier: MDC0709-RPS-00-XX-DR-C-DG3003.dwg

Status: A1

Rev: C01

S:\MDC0709 - Clonburris\8.0 Drawings\DG\MDC0709-RPS-00-XX-DR-C-DG3003 Surface Water.dwg

Appendix E
Road Layout & AutoTrack Drawings



Client:
Comhairle Contae Átha Cliath Theas
South Dublin County Council

Architect:
MCCAULEY DAYE O'CONNELL ARCHITECTS

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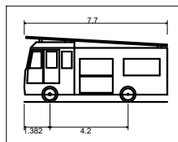
Model File Identifier

Scale	1:500 @ A1 1:1000 @ A3
Created on	16/11/2021
Sheets	1 OF 1
Project	CANAL EXTENSION - CLONBURRIS
Title	PROPOSED ROAD LAYOUT
File Identifier	MDC0709-RPS-00-XX-DR-C-DG2001.dwg
Status	A1
Rev	C01

S:\MDC\0709 - Clonburris\8.0 Drawings\DG\MDC0709-RPS-00-XX-DR-C-DG2001 Road Layout.dwg



Dennis Sabre Fire Tender (LWB)	
Overall Length	7.700m
Overall Width	2.430m
Overall Body Height	3.512m
Min Body Ground Clearance	0.397m
Track Width	2.380m
Lock to lock time	5.00s
Kerb to Kerb Turning Radius	7.400m

MOVEMENT 1
EMERGENCY VEHICLE ACCESS

MOVEMENT 2
REVERSE INTO CUL DE SAC

MOVEMENT 3
REVERSE INTO CUL DE SAC

MOVEMENT 4
REVERSE INTO CUL DE SAC

1

2

3

CONTINUED ON DG2012

BAWNOGUE ROAD

10kv

48

40

38

S:\MDC0709 - Clonburris\8.0 Drawings\DG\MDC0709-RPS-00-XX-DR-C-DG2011 Autotrack Vehicle Access.dwg

Client:
Comhairle Contae Átha Cliath Theas
South Dublin County Council

Architect:
MC CAULEY DAYE O'CONNELL
A R C H I T E C T S

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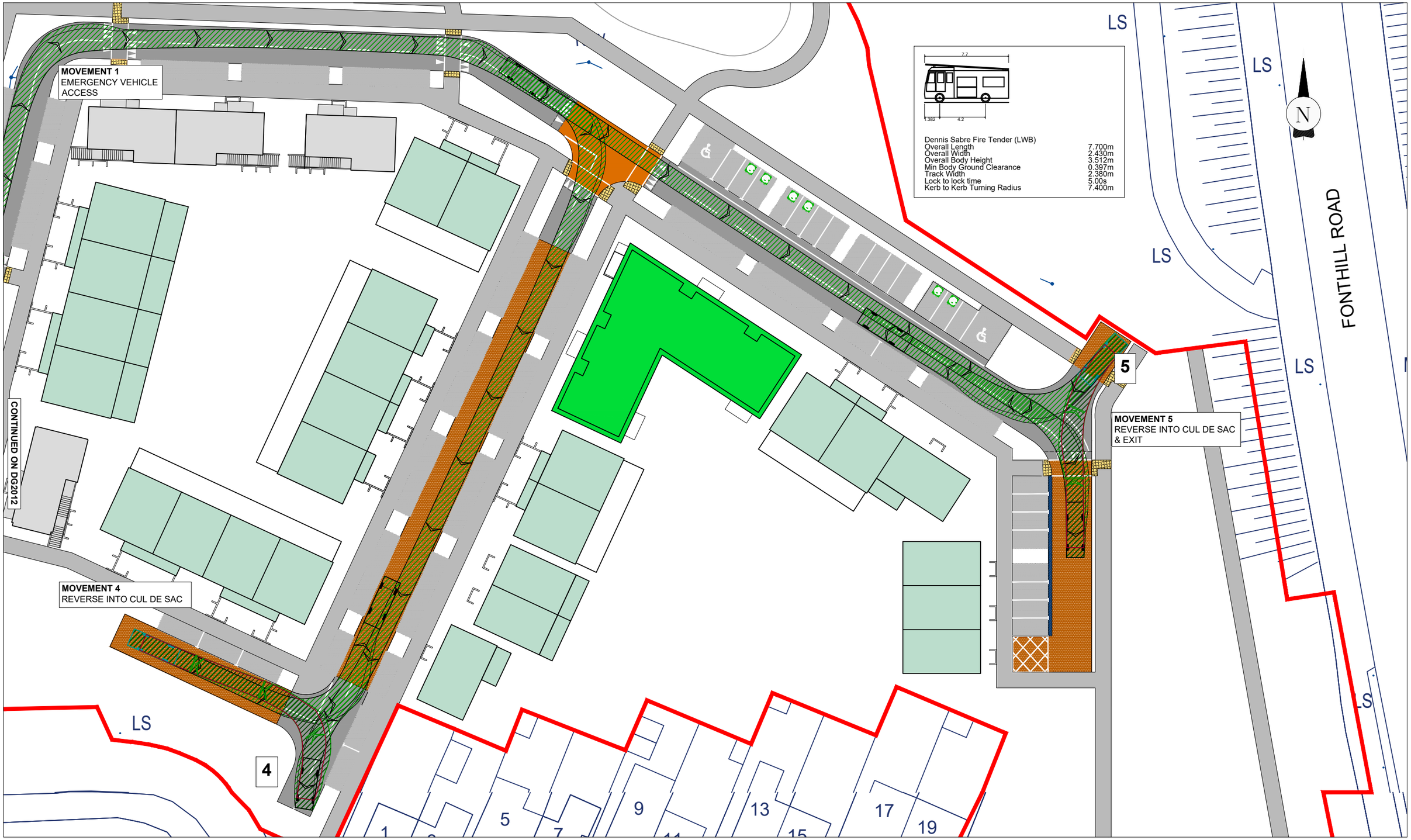
Model File Identifier

Scale	1:250 @ A1 1:500 @ A3
Created on	09/02/2022
Sheets	1 OF 1

Project: **CANAL EXTENSION - CLONBURRIS**

Title: EMERGENCY VEHICLE ACCESS (AUTOTRACK) SHEET 1 OF 2

File Identifier	Status	Rev
MDC0709-RPS-00-XX-DR-C-DG2011.dwg	A1	C01



S:\MDC0709 - Clonburris\8.0 Drawings\DG\MDC0709-RPS-00-XX-DR-C-DG2011 Autotrack Vehicle Access.dwg

Client:
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South Dublin County Council

Architect:
MC CAULEY DAYE O'CONNELL ARCHITECTS

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A1 C01	14.03.22	PH	MMOD	ISSUE FOR PLANNING	CW

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Model File Identifier

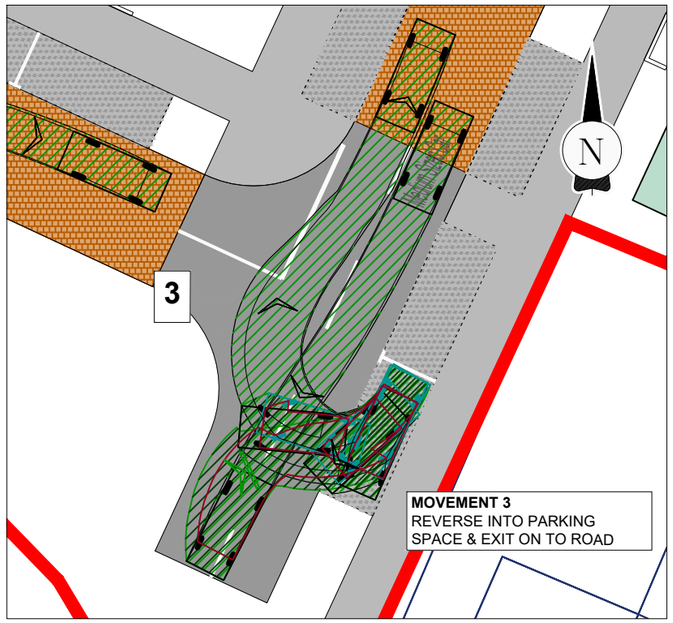
Scale 1:250 @ A1, 1:500 @ A3
Created on 09/02/2022
Sheets 1 OF 1

Project: CANAL EXTENSION - CLONBURRIS
Title: EMERGENCY VEHICLE ACCESS (AUTOTRACK) SHEET 2 OF 2

File Identifier: MDC0709-RPS-00-XX-DR-C-DG2012.dwg
Status: A1
Rev: C01

1

2



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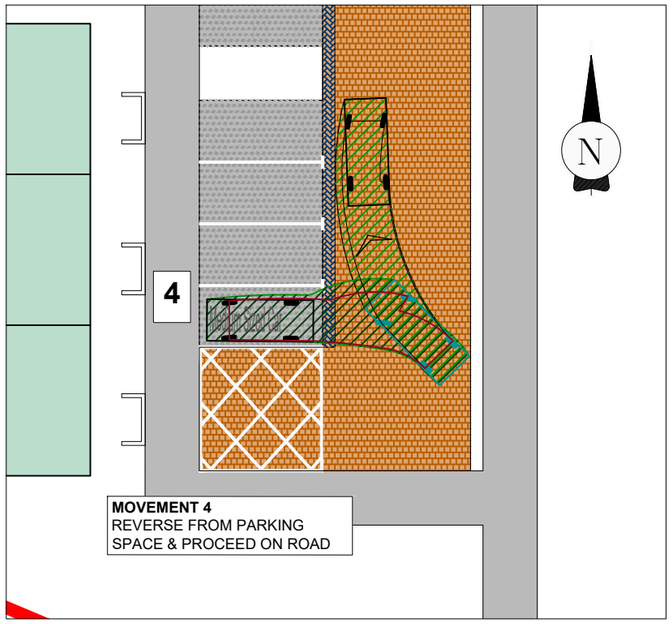

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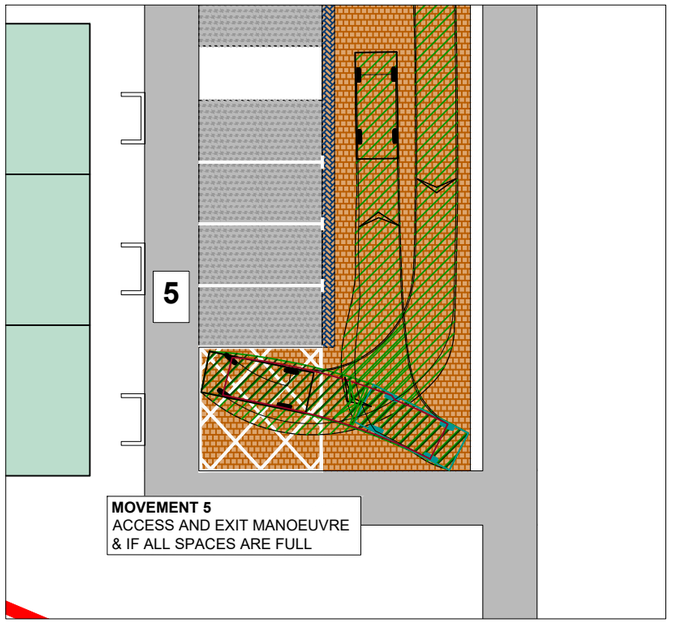

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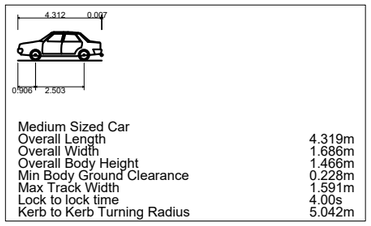
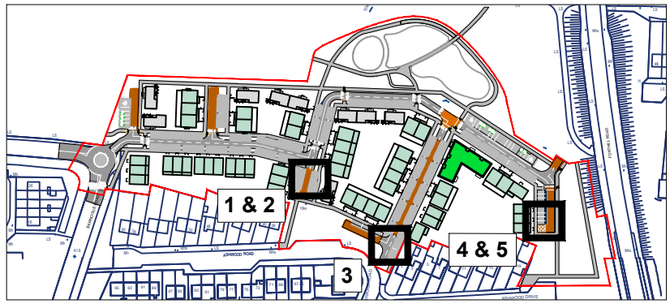


Medium Sized Car	
Overall Length	4.319m
Overall Width	1.686m
Overall Body Height	1.466m
Min Body Ground Clearance	0.228m
Max Track Width	1.591m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	5.042m

Vehicle type



Key

Client: Comhairle Contae Átha Cliath Theas, South Dublin County Council

Architect: MCCAULEY DAYE O'CONNELL ARCHITECTS

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Model File Identifier

Scale	1:125 @ A1 1:250 @ A3
Created on	16/11/2022
Sheets	1 OF 1

Project: CANAL EXTENSION - CLONBURRIS

Title: CAR ACCESS (AUTOTRACK) SHEET 1

File Identifier: MDC0709-RPS-00-XX-DR-C-DG2013.dwg

Status: A1

Rev: C01

S:\MDC0709 - Clonburris\8.0 Drawings\DG\MDC0709-RPS-00-XX-DR-C-DG2011 Autotrack Vehicle Access.dwg