



Engineering Assessment Report

Clane Library, Clane, Co. Kildare

October 2022

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015 and BS EN ISO 14001: 2015)

Issue	Date	Prepared by	Checked by	Approved by
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Comments

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1. Introduction

1.1 Background of Report

This report has been prepared by Waterman Moylan and commissioned by Kildare County Council in support of a Part 8 planning application which proposes the refurbishment and change of use of existing retail and creche Units 8 + 9 The Village Centre, Clane, to a Library with Open Library Service.

This report assesses the existing wastewater and surface water drainage, water supply infrastructure and the road entrance in the vicinity of the site, and details the criteria used to design and detail the proposed foul water drainage, surface water drainage, water supply and parking to serve the development.

1.2 Site Location and Description

The proposed library site is located at Clane, Co. Kildare, at the Village Centre, Main Street, as shown in Figure 1 below.

The site was formerly used for retail and as a creche. The proposed library site is 451 square metres in area. The site is bounded by residential units to the North and East, commercial units and a church to the west, church car park and a field to the South.

The site falls from west to east. The existing levels range from 69.5 m – 68m.

The existing commercial unit on site is level at 68.14m.

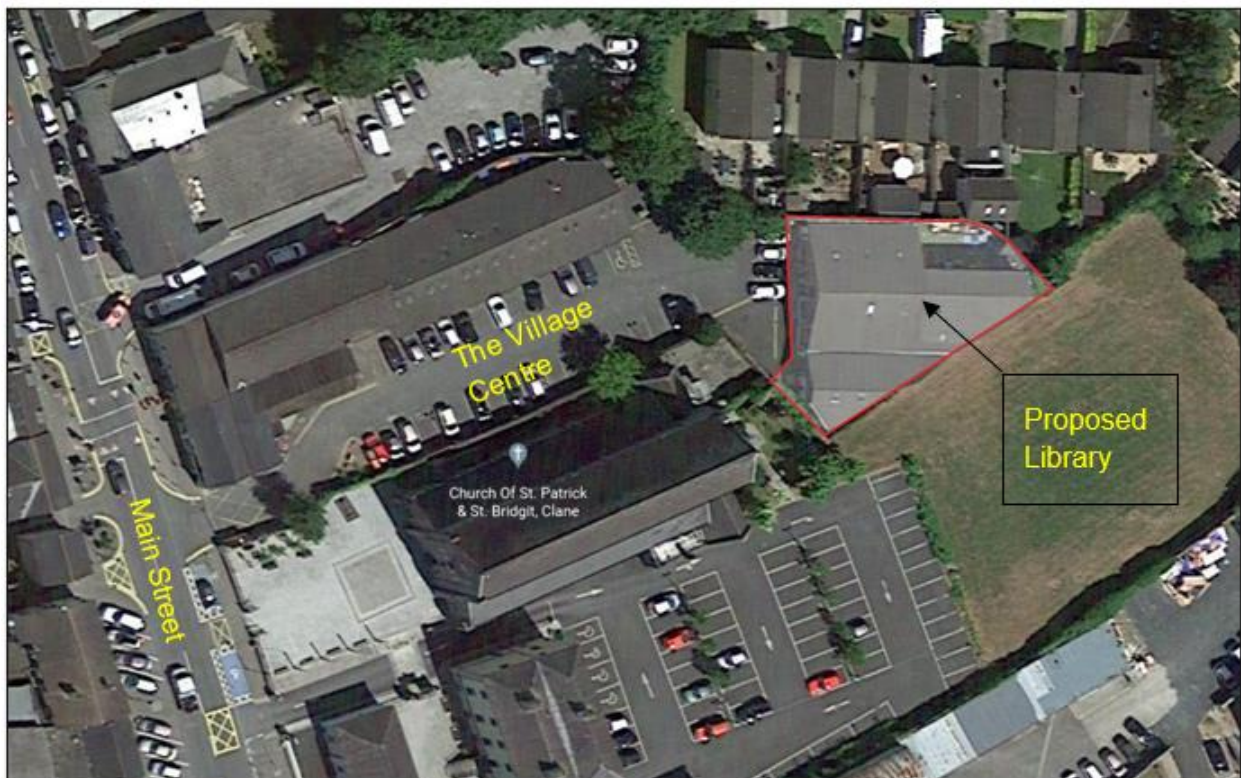


Figure 1 | Site location (Image: Google Earth)

The development will be designed to include associated site works, boundary treatments, drainage, and service connections.

2. Foul Water Network

2.1 Existing Foul Water Network

Foul drainage records were obtained for the site. The proposed library site is served by an existing 100mm foul main connection draining north and connecting to a 150mm sewer to the rear of the adjacent residential properties, as indicated in Figure 2 below.

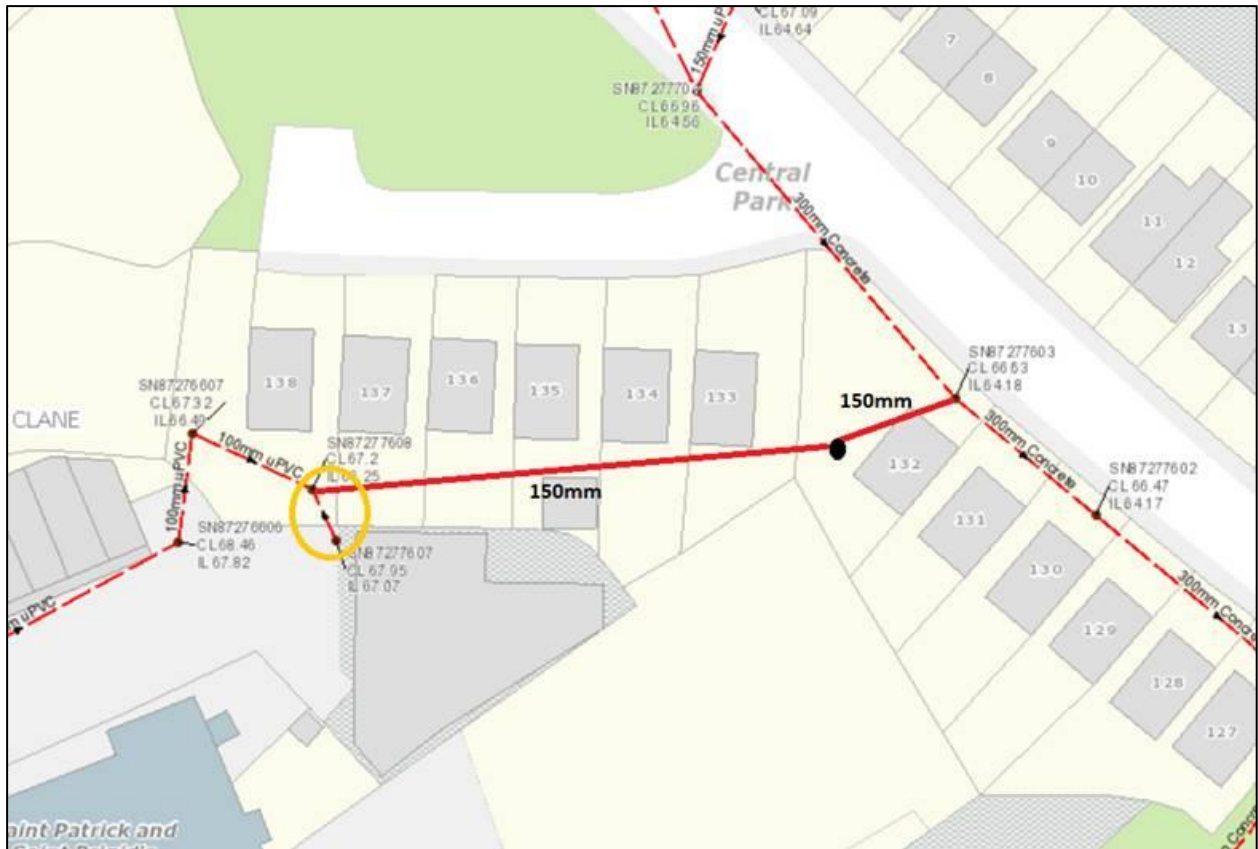


Figure 2 | Foul Infrastructure Records (Image: Google Earth)

2.2 Proposed Foul Water Network

It is proposed to drain wastewater from the library via the existing foul network in place serving the subject site.

A pre-connection enquiry was submitted to Irish Water. The subsequent confirmation of feasibility letter (CDS22002582) dated April 14th, 2022, included as Appendix A, advises that connection of the proposed premises is feasible without the need for infrastructure upgrade by Irish Water

2.3 Foul Water Drainage Calculations

The calculated foul water flows at the subject site are set out in the table overleaf. Wastewater loads have been calculated based on 200 persons per/day maximum occupancy, with a wastewater flow of 150 litres/person/day with a 10%-unit consumption allowance, in line with Section 3.6 of the Irish Water Code of Practice for Wastewater Infrastructure. These calculations conservatively assume all persons use the facilities.

Description	Total Population	Load per Capita	Daily Load	Total DWF
	<i>No. People</i>	<i>l/day</i>	<i>l/day</i>	<i>l/s</i>
Library (Max Occupancy)	200	150 + 10%	33,000	0.3818
Total	200	165	33,000	0.3818

Table 1 | Calculation of Total Foul Water Flow from the Development

The total dry weather flow from the development is 0.382 l/s

2.4 Foul Water Drainage – General

Foul water sewers will be constructed strictly in accordance with Irish Water requirements. No private drainage will be located within public areas.

Drains will be laid to comply with the requirements of the latest Building Regulations, and in accordance with the recommendations contained in the Technical Guidance Document H.

3. Surface Water Network

3.1 Existing Surface Water Network

The subject site is an existing building that is proposed to be refurbished to be a library.

The site is currently drained by a 100mm uPVC drain to the front of the site as shown in the figure below, which in turn flows north and connects into a larger diameter surface water (~450mm) in the rear garden of the adjacent property. The site is in the catchment of the River Liffey. The existing 100mm pipe caters for surface water from the proposed library site, as well as the hardstanding from the entrance road “The Village Centre” and adjacent roofs.



Figure 3 | Existing Surface Water Drainage Network

3.2 Proposed Surface Water Network and SuDS Strategy

The proposed library site development/refurbishment seeks where possible to achieve maximum surface water compliance with the requirements of GSDS and CIRIA SuDS manual, and in accordance with the Kildare County Council water services division (WSD).

In this regard, a meeting was held on 5th May with the WSD to discuss and agree surface water proposals for the subject site, taking account of the site restrictions that are in place

At the above meeting, the site restrictions were discussed, and a design strategy was agreed in principle, and is outlined as follows and as indicated on drawing 21-105-P2000.

The development area of the proposed library is 451 sqm. This is an existing building that is proposed to be refurbished on a very restricted site, with a small extension. The surface car park to the front does not form part of the proposed underground works and is not under KCC ownership, with potential archaeology at play and it is only proposed to alter surfacing outside of the red line boundary of the site.

In this regard, it is proposed to install permeable surfacing immediately to the front of the library building, to better the existing arrangement of full hardstanding in this location.

The rear garden size and proximity to the boundary/building do not offer the necessary separations (*5m from foundations/3m to boundary) to facilitate infiltration to ground.

It is proposed to direct the refurbished building roof area rainfall to pass through nature-based SuDS features including raised planters connected to downpipes, appropriately located at downpipe collection points. In the rear garden, in conjunction with raised planters, where there is space to incorporate SuDS features, it is proposed to install a bio-retention tree pit with a high-level overflow to a bio-retention swale. The planters, bio-retention tree pit and swale shall cater for development hardstanding rainwater with a high-level overflow pipe that is proposed to outfall to the surface water outfall drainage to the front of the building, discussed in section 3.1.

The 100mm surface water outfall fronting the library site is proposed to be upgraded to 225mm directly in front of the library building. This upsized surface water will tie into the existing 100mm outfall that runs beneath the adjacent boundary wall, and into the rear garden of the adjacent residence, which in turn outfalls into a surface water pipe 450mm in diameter, as indicated on drainage layout drawing 21-105-P2000. The proposed site and upstream catchment have been designed and modelled through Flow software for various return events, as agreed with KCC WSD. Flow Model results are appended as Annex C of this report.

The private surface water network within the proposed library site is designed to accommodate flows from the 1 in 5-year storm. The larger storm events for the library site (plus 20% to accommodate climate change) are proposed to be catered for via the nature-based SuDS discussed above, with overflow to the upgraded 225mm diameter surface water outfall and new soakpit, to the front of the property. This is a vast betterment from the existing arrangement of full hardstanding from the subject site entering the surface water network.

The Surface Water Flow modelling carried out for the site, has taken account of the restricted outfall size (100mm), passing beneath the adjacent boundary wall. It has been demonstrated that the 100mm pipe size can cater for the full wider surface water catchment (including the subject library site, which shall be vastly improved as explained above/below) for a 1 in 5-year storm event, with some minor surface flooding for larger storm events. Following extensive discussions with KCC WSD, all available surface water disposal options have been fully explored and it was agreed that given pluvial flood risk can be managed/mitigated to an acceptable level, the retention of the 100mm outfall was acceptable, in the adjacent back garden only. In this regard, we refer you to the Flood Risk Assessment for this site, which discusses all proposed mitigation measures to be put in place.

The upgrade of the outfall pipe to 225mm within the adjacent property was explored, however, considering the potential for legal agreement, the associated and extensive reinstatement works required, the requirement for a wayleave for future maintenance and similarly the potential for financial compensation, it was agreed that the retention of the 100mm outfall was acceptable, as outlined above.

This drainage strategy for the proposed library site is based upon recommendations in the Greater Dublin Strategic Drainage Study (GDSDS) and in the Ciria SuDS Manual.

Based on three key elements, Water Quantity, Water Quality and Amenity, the targets of the Clane Library SuDS Strategy are:-

- Water Quality Protection – in receiving watercourses and groundwater.
- Stream Regime Protection – minimisation of ecological/physical impacts on receiving streams.
- Level of Service Protection – protection of the site from flooding of the drainage system.

- Stream Flood Protection – minimising the risk of downstream flooding.
- Site Flood Protection – control of flooding of the site during extreme events.
- Amenity – Ponds/wetlands can be visually attractive & add to the character of developments.

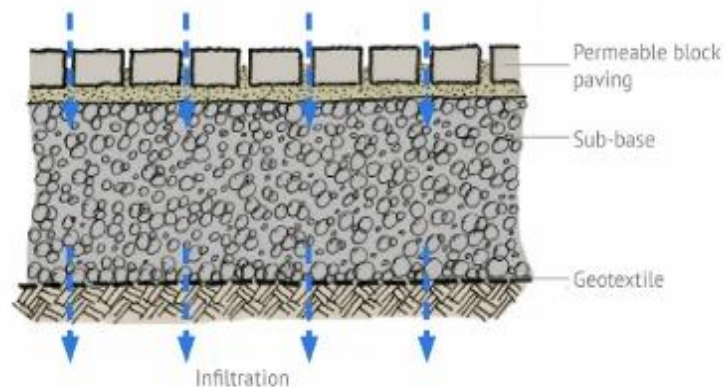
The following outlines the proposed SuDS elements that will be employed on this site, with typical example images of the SUDS feature provided beneath each element

Source Control

Permeable Surfacing:

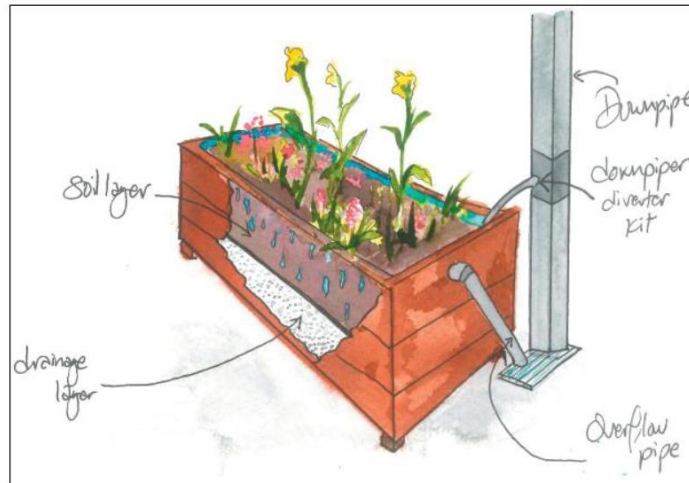
It is proposed to introduce permeable surfacing in front of the library site which will drain to filter drains beneath to facilitate maximum infiltration of surface water from the library entrance. For details of permeable surfacing, please refer to landscape architect package under separate cover

The goal of permeable surfacing is to control stormwater at the source to reduce runoff. In addition to reducing surface runoff, permeable surfacing has the dual benefit of improving water quality by trapping suspended solids and filtering pollutants in the substrata layers.



Bio-retention Systems/Raingardens:

Bio-retention raised planters will be provided around library. Planted boxes will intercept down pipes from the library roof.



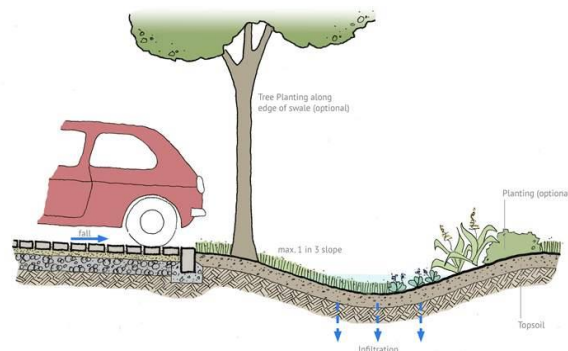
Site & Regional Control

Bio-retention Trees:

It is proposed to provide a bio-retention tree in the rear garden. Trees can help control storm water runoff because their leaves, stems, and roots slow rain from reaching the ground and capture and store rainfall to be released later. Trees help to attenuate flows, trap silts and pollutants, promote infiltration and prevent erosion. Incorporating tree planting offers multiple benefits, including attractive planting features, improved air quality and increased biodiversity whilst helping to ensure adaptation to climate change. The proposed bio-retention tree shall collect from the raised planters and in turn has an overflow to the proposed bio-retention swale

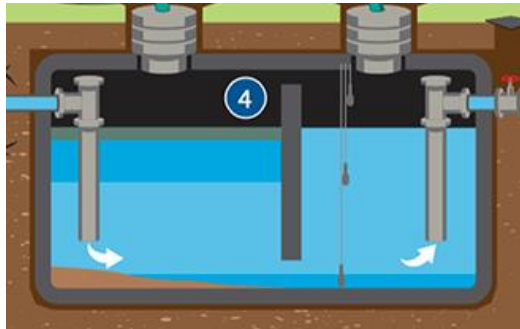
Bio-retention Swale:

It is proposed to provide a Bio-retention swale in the rear garden of the site. The proposed swale is planted with specialist grass in a small depression, and is designed to temporarily hold and soak in rainwater runoff that flows from roofs. The swale shall collect overflow from the adjacent tree pit and shall be piped to release water to the surface water outfall to the front of the building.



Petrol Interceptors:

A Class 1 Light Liquid bypass Interceptors is proposed to be installed on the existing surface water outfall line at the front of the library, which collects rainwater from the entrance car park.



As previously noted, the above SUDS strategy was agreed and approved in principle with the water services division of Kildare County Council.

3.3 Flood Risk Assessment

Both internal and external flooding have been assessed in the Flood Risk Assessment Report which accompanies this Engineering Assessment Report. The Flood Risk Assessment has been carried out in accordance with the *DEHLG/OPW Guidelines on the Planning Process and Flood Risk Management* published in November 2009.

The assessment identifies the risk of both internal and external flooding at the site from various sources and sets out mitigation measures against the potential risks of flooding. The sources of possible flooding assessed in the report include coastal, fluvial, pluvial (direct heavy rain), groundwater and human/mechanical errors.

As a result of the flood risk management and mitigation measures proposed, the residual risk of internal or external flooding for the 30-year and 100-year flood events is moderate. Please refer to the accompanying Flood Risk Assessment report for the full analysis of the flood risk at the subject site.

3.4 Surface Water – General

Surface water sewers will generally consist of PVC (to IS 123) or concrete socket and spigot pipes (to IS 6) and laid strictly in accordance with Kildare Council requirements for taking in charge.

All private outfall manholes will be built in accordance with the Greater Dublin Regional Code of Practice for Drainage Works. No private drainage will be located within public areas.

Drains will be laid in accordance with the requirements of the Building Regulations, Technical Guidance Document H.

4. Water Supply

4.1 Existing Water Supply

Water records were obtained for the site. The proposed library site is served by an existing connection, which is fed from a 6" (150mm) main on Main Street to the west, as indicated in Figure 4 below.

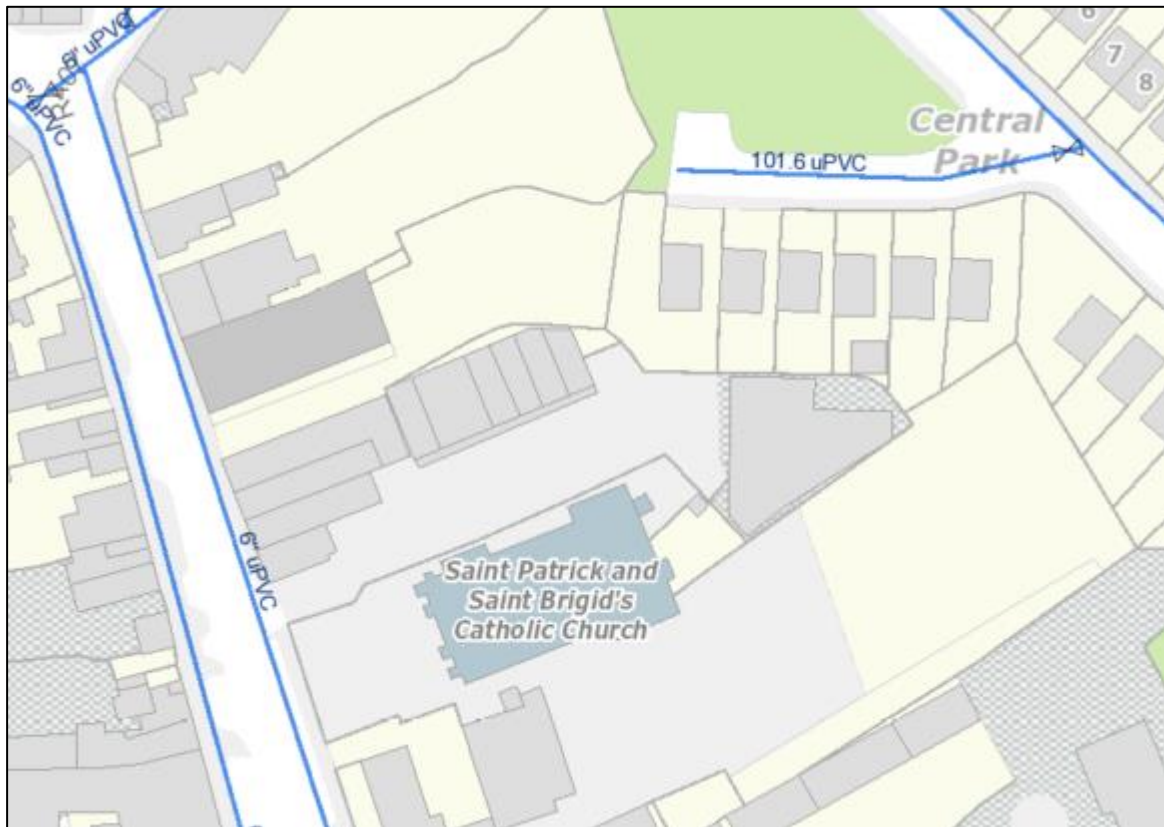


Figure 4 | Water Infrastructure Records (Image: Google Earth)

4.2 Proposed Water Supply

It is proposed to connect the library via the existing network in place serving the subject site.

A pre-connection enquiry was submitted to Irish Water. The subsequent confirmation of feasibility letter (CDS22002582) dated April 14th 2022, included as Appendix A, advises that connection of the proposed premises is feasible without the need for infrastructure upgrade by Irish Water

4.3 Water Supply Calculations

The calculated water demand at the subject development is set out in the table overleaf. The demand has been established based on 200 persons max occupancy with a conservative allowance utilising domestic consumption figures of 150 litres and with a 10% allowance factor. These calculations conservatively assume all persons use the facilities.

Description	Total Population	Water Demand	Average Demand	Average Peak Demand
	<i>No. People</i>	<i>l/day</i>	<i>l/s</i>	<i>l/s</i>
Library (Max Occup)	200	150+10%	0.3818	0.4773
Total	200	165	0.3818	0.4773

Table 2 | *Calculation of Water Demand for the Development*

The average demand for the development is 0.38 l/s, with an average peak demand of just under 0.5 l/s..

4.4 Water Supply – General

All watermains will be laid strictly in accordance with Irish Water requirements for taking in charge.

5. Roads and Transport Network

This section provides an overview of the existing and proposed road and transportation network in the vicinity of the site.

5.1 Existing Road Network and Public Transport

The site is to be accessed from Clane Main Street (R403), via the privately owned “The Village Centre” entrance road and car park, as indicated on accompanying drawing 21-105-P1000.

Pedestrians and cyclists currently have access to the site via the R403. Pedestrians can access via the Main Street public path network and the private internal path network in “The Village Centre”. Cyclists can access the site via the road network. There is an existing at grade raised ramp signalised pedestrian crossing on Main Street, 15m to the north of the “The Village Centre” entrance road, affording a safe crossing point for pedestrians from the far side of Main Street to the proposed library.

The proposed library is served by public transport and is located 150m from the Main Street bus stop (Stop ID: 13042). This stop serves bus routes 846 and 139. The frequency of these buses is supplied below.

Route Number	Frequency		
	Weekdays	Saturday	Sunday
846 – Clane-Sallins-Naas	Every hour	Every hour	N/A
139 – Corduff – Blanchardstown - Naas	Every 2 hours	Every 2 hours	Every 2 hours

5.2 Proposed Road Layout and parking provision

It is not proposed to alter the existing entrance road network or entrance. The only edits are to the surfacing proposed to the paved walkways and in front of the proposed library site, as indicated on accompanying landscape architect’s layout and drawings.

It is proposed to supply a stop sign and lines on exit from the entrance road, as indicated on accompanying drawing 21-105-P1000, immediately in advance of the footpath. This is to improve pedestrian safety at this vulnerable road user crossing point.

The site proposes to supply 33 parking spaces to the Village Centre, inclusive of 2 No. new e-charging spaces. The proposed library site shall also be supply with 7 No. bicycle stands. We refer you to the architectural layouts and drawings for details of the proposed bike shelter, and to drawing 21-105-P1000 indicating proposed vehicle and bicycle parking locations.

As per agreement with Kildare County Council Roads, Transportation and Public Safety Department, Swept Path Analysis has been undertaken for the entrance road to demonstrate that a rigid van and minibuses have adequate turning room.

In this regard, we refer you to the turning movements for the rigid van and minibus vehicles, demonstrated in Appendix B of this report.

5.3 Traffic and Transport Assessment

An assessment has been undertaken to determine as to whether the proposed library meets the criteria (refer table snip below) of requiring a Traffic and Transport Assessment. In order to undertake this assessment, research of the "My Plan" website found a suitable traffic survey in the locale (AM and PM peak hours).

It was carried out in 2019 for a mixed use development located in relatively close proximity to the library site (Ref. 19757) - just west of the junction between R407 and Ballinagappa Road.

Table 2.1 Traffic Management Guidelines Thresholds For Transport Assessments

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

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

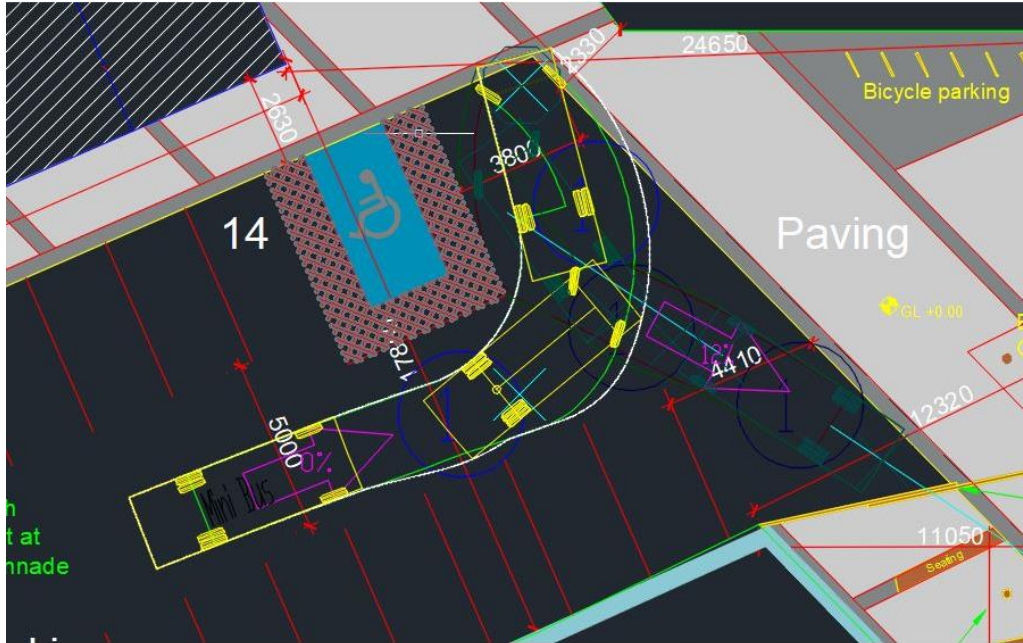
With the surveyed flows, it was possible to estimate the 2019 two-way flows along the R407 - which were:
 AM peak hour (07:30 to 08:30): 559 southbound and 569 northbound. Two-way = 1128
 PM peak hour (17:30 to 18:30): 501 southbound and 602 northbound. Two-way = 1103

For the library to meet the more onerous 5% of traffic flow threshold, the two-way traffic flow from the library between 14h and 15h would have to be 400. Utilising TRICS software, the two-way flow from the library does not come close to this threshold figure. It has therefore been determined that the proposed site does not meet the required threshold level for requiring a Traffic and Transport Assessment.

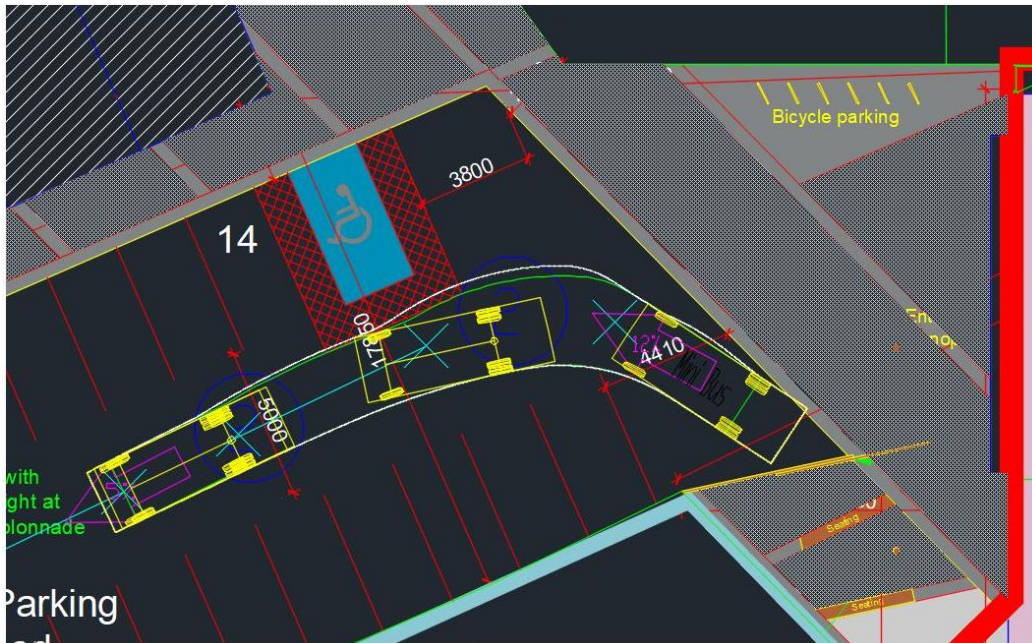
Appendices

A. Irish Water Confirmation of Feasibility Letter

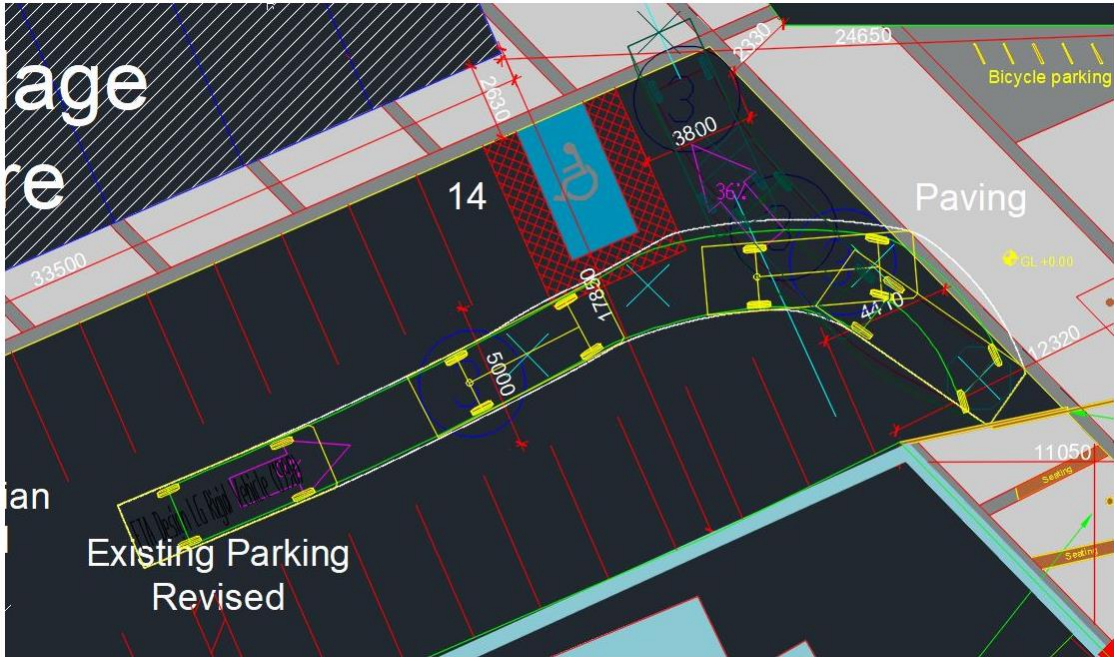
B. Autotrack Movements – Minibus and Rigid Van



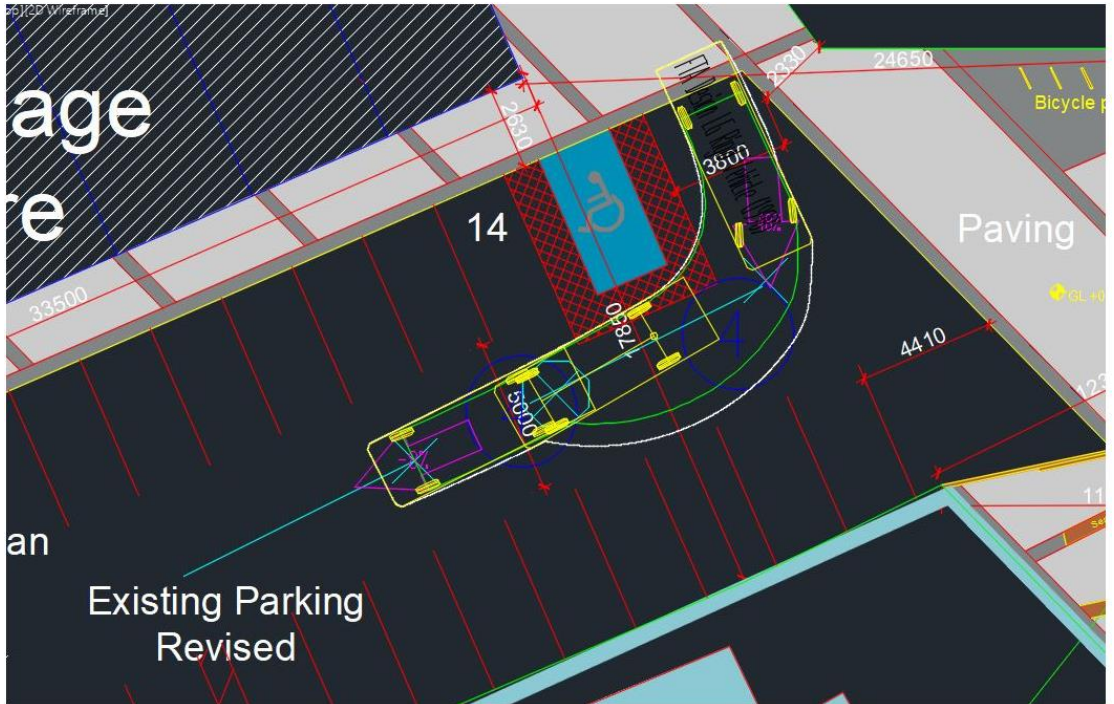
Minibus – Tracking In



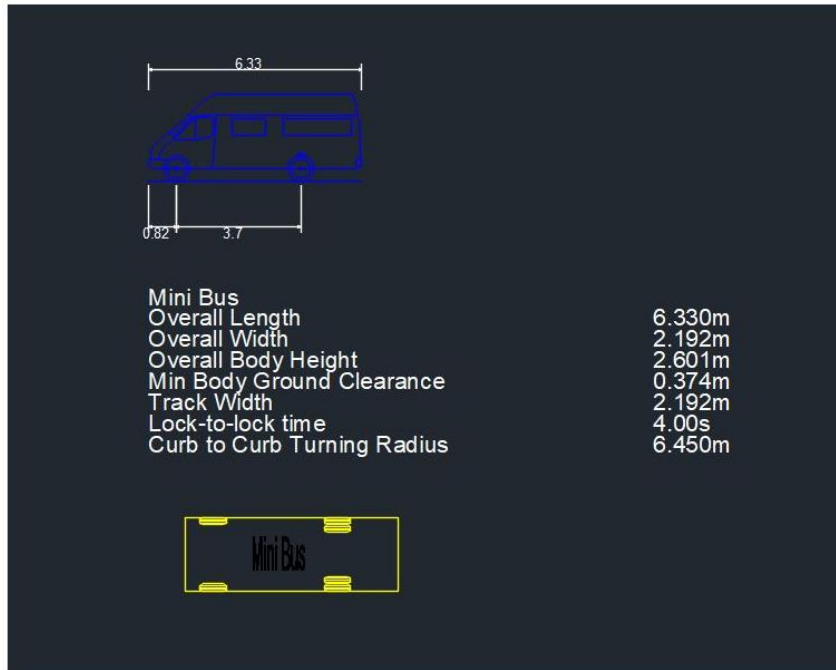
Minibus – Tracking Out



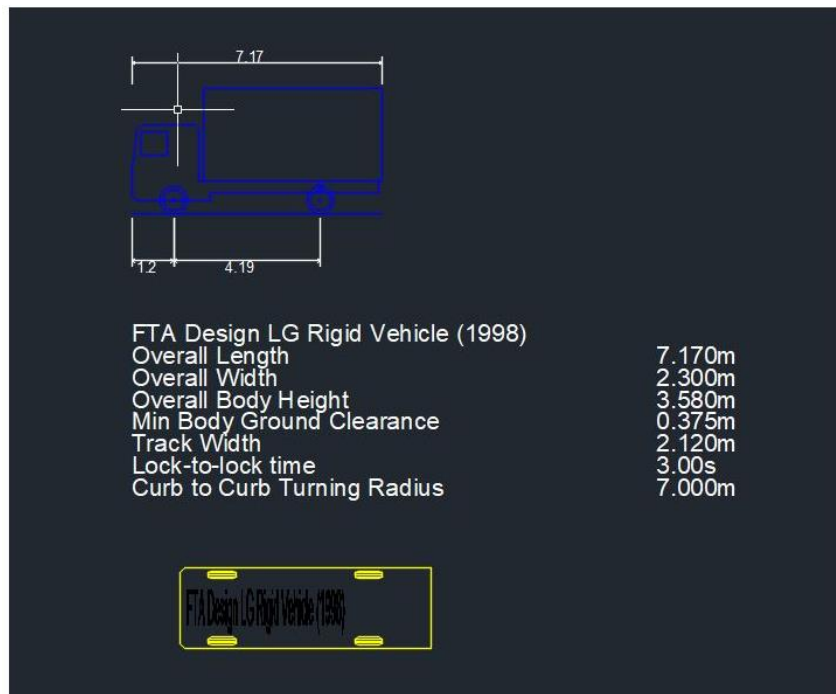
Rigid Van – Tracking In



Rigid Van – Tracking Out



Minibus – Statistics



Rigid Van – Statistics

C. Flow Surface Water Modelling Output

UK and Ireland Office Locations

