

# Civil Engineering Report

## Presentation House, Proposed Community Enterprise Centre, Bagenalstown, Co. Carlow



This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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## 1. INTRODUCTION

The purpose of this report is to outline the design recommendations and construction methodology used by Bowe Consulting Engineers in completing the site services drainage design for the development of Presentation House, Proposed Community Enterprise Centre, Bagenalstown, Co. Carlow.

Bowe Consulting Engineers were engaged by Carlow County Council to assess and design the following civil engineering elements for the proposed development,

- Site utility requirements for water services, stormwater drainage and foul sewer drainage.
- Assess the proposed internal road layout to ensure appropriate visibility and sightlines for vehicles entering and exiting the site are available.

The proposed development site in the village of Bagenalstown. The site is accessed off Long Range Street. Currently the site is occupied by the Presentation Convent and associated outbuildings and the site contains a large garden. Ground levels varied across the site from 41.20m OD and 41.60m OD.

This Part 8 planning stage civil engineering design report forms part of a suite of documents attached with the planning submission for the proposed development.



**Figure 1: Front Elevation**

## 2. ROAD LAYOUT DESIGN – SIGHTLINES / ROAD SAFETY

### 2.1.1 Sightlines, Traffic Speed Restriction

It is proposed that the site development make use of the existing access to Long Range Street. The sight visibility for this entrance was assessed against Transport Infrastructure Ireland guidance and the DMURS. A 49m sight envelope allowing for bus routes with a proposed 2m urban set back in accordance with the department of transport DMURS guidance.

The internal road traffic speed is restricted to 15 km/h and all internal access road junctions are designed to ensure minimum stopping sight distance of 11m in accordance with DMURS. Please see BCE dwg.22P1571-P04 Vehicle Swept Path and Sightline Assessment for full details of our proposal.

### 2.1.2 Signage and Pedestrian Road Crossing

All road signs shall be supplied and erected by the Developer in accordance with the “Traffic Signs Manual” – Department of the Environment, except where the Council otherwise require.

## 2.2 Pavement Design

The following tables contain a description of the the proposed pavement construction associated with the development.

Note: Final pavement design is subject to agreement with Kilkenny County Council.

### Internal Access Road

<b>Internal Access Road Surface</b>	Surface course (40mm) polymer modified stone mastic asphalt (pmsma) 10 surf 40/60 des industrial supplied, laid and compacted in accordance with Clause 906 “Specification for Roadworks” by the National Roads Authority.
<b>Internal Access Road Base</b>	Base course (150mm) well compacted granular material (Type B) in accordance with clause SR21 “Specification for Roadworks” by the National Roads Authority.
<b>Capping Layer</b>	Exact thickness of capping to be based on CBR results.

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**CAR PARKING BAYS (Permeable paving)**

<b>Surface course</b>	80mm deep Permeable Paving Blocks, Manufactured to: BS EN 1338:2003.
<b>Bedding course</b>	50mm of graded 6mm - 2.0mm grit bedding under permeable bricks to BS EN 13242:2002
<b>Upper subbase</b>	100mm of 5-20mm clean crushed stone
<b>Lower subbase</b>	250mm of 10-63mm coarse graded aggregate to BS EN 13242:2002
<b>Capping Layer</b>	Exact thickness of capping to be based on CBR results.

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Note: Permeable paving provides significant environmental benefits including improvement to water quality and increased evaporation levels across the site. A pavement structural depth of 350mm was derived from an assumed CBR of 2-5%.

Please refer to the architects site plan and BCE dwg.22P1571-P04 Vehicle Swept Path and Sightline Assessment for the setting out of the parking bays and the proposed access road.

### 3. PROPOSED SITE SERVICES DESIGN

#### 3.1 Foul Drainage Design

The existing onsite combined foul sewer network will be used for convey the foul effluent associated with the development. This existing system flows under gravity to a combined public sewer which located on Long Range Street. We reference to the section 3.2 below we have proposed to reduce the rainwater catchment collected by the combined use onsite infiltration of stormwater.

A CCTV condition survey of the existing site pipe and manhole network was carried out by A&T Drain Services Ltd. The network was found to be in good condition. Where significant defects issues were identified these were highlighted for remediation on the proposed site services layout drawing ref. 22P1571-P02.

##### 3.1.1 Foul Wastewater Demand Calculation

The project architect O'Driscoll Lynn Architects have determined the projected occupancy of Presentation House to be 176 people. With reference to guidance contained in appendix C of the Irish Water Code of Practice for Wastewater Infrastructure – July 2020 we note that a foul flow rate of 100 litres / person / day is recommended.

##### 3.1.2 Foul Effluent Flow Rate:

The maximum daily wastewater flow rate =  $176 \times 100 = 17,600$  l/d  
The peak flow rate for foul effluent =  $(6 \times 17,600) / (24 \times 60 \times 60) = 1.2$  l/s

##### 3.1.3 Outfall Pipe Capacity Assessment:

- The catchment area of hardstanding pavement removed from contributing to the combined sewer was 1240 sqm.
- The area of roof and hardstanding pavement which will continue to discharge to the combined sewer totals 925m<sup>2</sup>.
- The flow rate through the outfall combined sewer resulting solely from rainfall was calculated at 19 l/s.
- The total combined flow rate through the outfall pipe =  $19 + 1.2 = 20.2$  l/s
- The flow rate capacity of the existing 150mm diameter combined sewer outfall pipe was calculated at 24.0 l/s.

Thus, the outfall pipe flow rate capacity of 24 l/s is sufficient to cater for the outfall flow rate generated by the proposed development of 20.2 l/s. Please refer to BCE dwg.22P1571-P02 Proposed Site Services layout plan for the layout the existing and proposed site services.

### 3.2 Storm Water Drainage Design

The proposed storm water drainage system was designed in accordance with the principals of sustainable Drainage Systems (SuDS) to ensure the environment is protected from any pollution from roads and buildings.

The runoff from the existing roof and the 5m wide paved access located to the west of the building will continue to discharge into the combined sewer network. The runoff from all other paved areas will be conveyed overground to the proposed permeable pavement and will discharge via infiltration into the underlying soil.

#### 3.2.1 Stormwater infiltration Capacity

Bowe Consulting Engineers carried out a sub-soil hydrological assessment of the site. In summary of our findings, we note that the land within the development site was found to have very high subsoil infiltration potential. We also that that the infiltration rate of 10mm fall per minute matched similar testing carried out on neighbouring sites by Bowe Consulting Engineers.



**Figure 1: Soil infiltration test locations**

The test results have been used to confirm that the final design of the permeable paving, as follows:

- The overall site area = 3070 sqm.
- The area of permeable paving = 255 sqm
- The area of hardstanding catchment to permeable paving = 1240 sqm
- The area infiltrating to ground through via grassland = 905 sqm

Based on the above the allowing infiltration rate =  $255/1240 \times 600 = 123$  mm/hr. Thus, permeable paving has sufficient infiltration capacity to accommodate worst case storm events which range up to 50-75 mm/hr. Please refer to BCE dwg.22P1571-P02 Proposed Site Services layout plan for the layout the existing and proposed site services.

### 3.3 Watermain Design

It is proposed that the existing potable and metered water supply will continue to be used to serve the proposed development. However, an application to Irish Water will be made for a new watermain connection to the existing 75mm cast iron public watermain which is located on Long Range Street. This new connection will be needed to supply a proposed onsite firefighting hydrant, which is located within 46m of all elevations of the building.

Please refer to BCE dwg.22P1571-P02 Proposed Site Services layout plan for the layout of the existing and proposed watermain network.

### 3.4 Flood Risk Assessment

A review of the Floodmap.ie and Floodinfo.ie website-based flood history records confirms that there is no history of flooding on the proposed development site. In summary, the proposed development is not located within a flood zone.

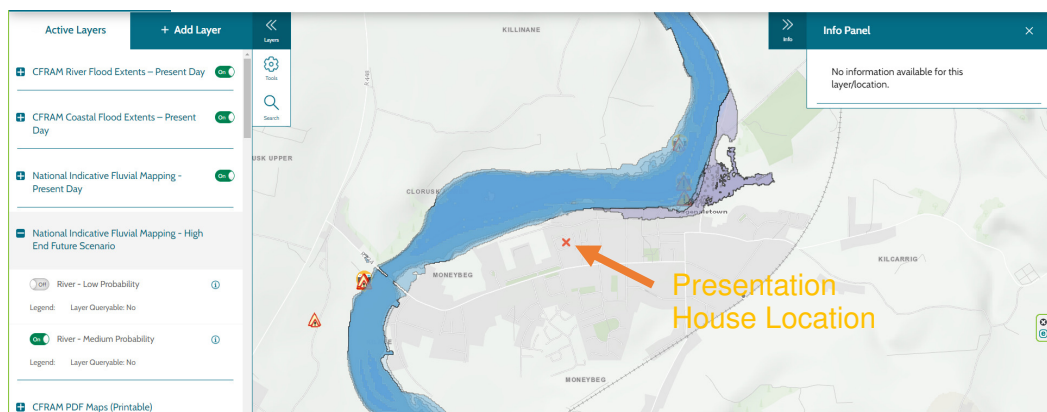


Figure 2: River Slaney floodmap extract taken Floodmaps.ie



## 5 CONCLUSIONS & RECOMMENDATIONS

- ✓ The proposed development will significantly reduce the volume of outflow from the site and the proposed onsite permeable pavement has sufficient infiltration capacity to ensure storm water drainage generated by the proposed carpark hardstanding will not enter the public combined sewer.
- ✓ The existing potable water connection will continue to serve the development, while an onsite firefighting water hydrant is proposed to serve the development.
- ✓ There is no history of flooding to the site and the site is not located within a flood zone.

Should you have any queries regarding the above, please contact the office of Bowe Consulting Engineers.

Signed: \_\_\_\_\_



Date: \_\_\_\_\_


23<sup>rd</sup> of March 2023

IVOR BOWE BSc(Eng), Dip.Eng, CEng, MIEI.  
Chartered Engineer, on behalf of Bowe Consulting Engineers

**ISSUE REGISTRATION:**

**Project:** Presentation House, Proposed  
Community Enterprise Centre,  
Bagenalstown, Co. Carlow.

**Project No:** 22P1571-C6.2

Rev.	Date	Purpose of Issue/Nature of Revision	Prepared by.	Issue Authorised by.
	24 <sup>th</sup> March '23	Issued to Carlow County Council	IB	

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**BOWE CONSULTING ENGINEERS  
CIVIL & STRUCTURAL  
Strawhall Business Park  
Athy Road Carlow  
Ireland  
Telephone (059) 9137422  
Facsimile (059) 9137411**