Civic Offices
Infirmary Hill,
Roosky,
Monaghan Town,
Co. Monaghan.

Engineering Services Report

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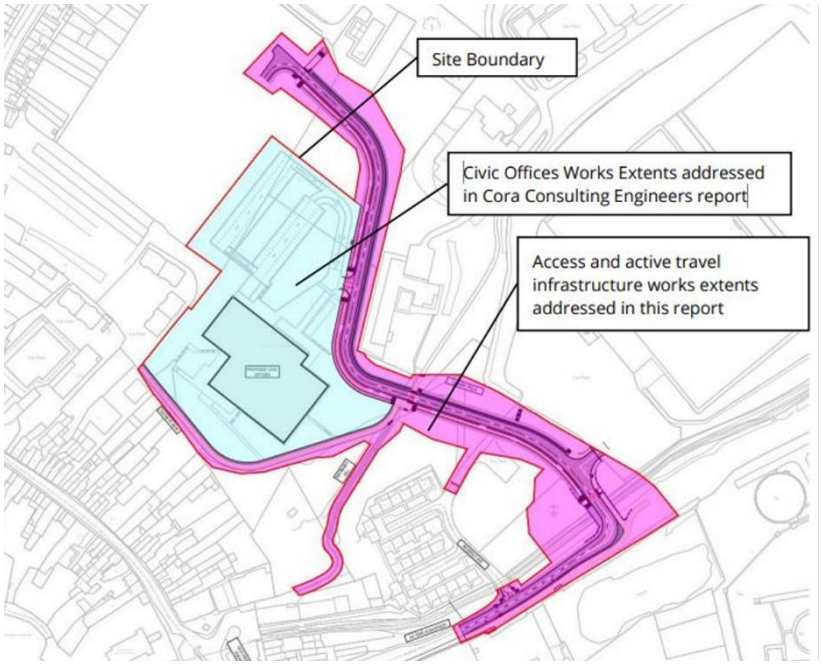
1 Introduction

The existing site is located in Roosky Lands, north of the existing Ulster Canal Greenway route and is surrounded by Monaghan Harps GAA Club to the east, residential area to the south with various business on Dublin St. & Glaslough St. backing on to the site to the west & north. The site is currently a sloping greenfield site with no access by road. The River Shambles is to the south of the site.

CORA Consulting Engineers are responsible for the design of the Foul & Surface Water Drainage for the Office and Carpark area of the site while DBFL Consulting Engineers are responsibility for the roads elements. This Report specifically refers to the Office & Carpark areas which are defined in light blue in the figure below.



2 Summary of Design

The following is proposed for the site.

(i) a new road will be constructed, initially as a construction access road for the site during construction and, upon completion of the site, an access road for the civic offices & any future development in the area;

(ii) a new 3 storey building for Monaghan County Council Civic Offices with a gross floor area of 5601m² incorporating an entrance foyer, office space, meeting rooms, staff restaurant, council chamber, public counter, reception desk, welfare facilities, internal landscaped courtyards and supporting spaces;

(iii) provision of 112 no. vehicular parking spaces (including 4 no. mobility parking spaces, and 12 no. electric charging spaces);

(iv) provision of 80 no. bicycle parking spaces;

(v) all ancillary works including, landscaping, boundary treatments, internal footpaths, bin storage, services enclosure, foul and surface water drainage, ESB substation and all site services, site infrastructure and associated site development works necessary to facilitate the development.

The civic offices consist of a grey roof with a drainage barrier collected via rainwater pipes and carried to the attenuation tank to the south-east of the site. The outflow from here is limited by a HydroBrake® to 4.3 l/s/ha towards the new surface water pipe under the road. From here is flow to a new attenuation basin at the bottom of Quarry Walk. The attenuation tank also has a high-level overflow to the public sewer. Car parks consist of permeable paving with storage below that infiltrates into the ground. Podiums have storage below that drains to the attenuation tank. All internal drainage devices have overflows to the attenuation tank. The entrance area adjacent to St. Davnet's Row flows into a soakaway which infiltrates into the ground.

3 Design Assumptions

1. SOIL type

The SOIL type was calculated using GDSDS providing a SOIL type 3. This value was used in the surface water calculations. The calculation is included in the surface water calculations in Appendix B.

2. QBAR

QBAR was calculated using the www.uksuds.com website. Using the SOIL type 3, a value of 4.3 l/s/ha was calculated. The total site area is inclusive of any large parkland areas and public open space as per the HR Wallingford website (uksuds.com). The allowable runoff for specific catchment areas is calculated on a catchment area basis. The findings of the soil testing was that the soil was reasonably suitable in certain areas for infiltration with soakaway tests generally passing.

3. Storm Events Analysed

The following Storm events have been considered:

- 1 year return period plus 20% for climate change
- 5 year return period plus 20% for climate change
- 30 year return period plus 20% for climate change
- 100 year return period plus 20% for climate change

4. Runoff Coefficients

The following runoff coefficients have been used:

Grey Roof (Selected Stone Ballast):	1.0
Hardstanding Areas (Paving, etc.):	1.0
Landscaped Areas (Grassed, etc.):	0.3

4 SuDS Measures Considered

The following is a list of the SuDS measures considered for the site.

Swales/Filter Drains/Infiltration Basin

Swales/Infiltration Basins are not being proposed for the site. There is a Filter Drain running along St. Davnet's Row. This is taking the rainwater from St. Davnet's Row only.

Permeable Paving

Permeable paving is provided for the overground car parks. The car parking spaces will have a permeable surface whereas the circulation areas will have a more traditional hard wearing impermeable surface with storage below. There are overflow pipes from each car park to a surface water pipe system to the attenuation tank.

Surface Water Attenuation

An attenuation tank is provided to the south-east of the site collecting rainwater from the building and overflows from the remainder of the site. There is also attenuation over the podium in the form of 85mm deep drainage board (such as permavoid cells or similar approved).

Rainwater Harvesting

Rainwater harvesting is not being proposed for the site.

Detention Basins, Retention Ponds, Stormwater Wetlands, etc.

Not proposed for this development.

5 Storm Network Details

The civic offices consist of a grey roof made up of selected stone. There is a drainage barrier below the stone removing the rainwater of any debris. The roof areas drain to the edges where they are collected via rainwater pipes and carried to the attenuation tank. The outflow from the attenuation tank is limited by a HydroBrake ®, limiting the flow to 4.3 l/s/ha. This attenuated flow is discharged into the new public sewer under Infirmary Hill/Quarry Walk where it flows into a new attenuation basin and the bottom of Quarry Walk. There is also a high-level overflow pipe from the attenuation tank into the public sewer in the event of a major rainfall event or an unforeseen blockage.

The car parking areas have a permeable surface with storage underneath taking rainwater from the area of the car park & a percentage of the soft landscaping uphill from it. The rainwater is infiltrated into the ground and there is an overflow pipe that drains to the Attenuation Tank in the event of a major rainfall event.

The podium area is an impermeable surface. The rainfall is collected through channels and stored under the podium where it flows to the attenuation tank.

The entrance area adjacent to St. Davnet's Row is drained to a soakaway which infiltrates into the ground.

The storm network is designed based on the Modified Rational Method where:

Q (l/s) = Cv*Cr*(2.78*I (mm/hr)*A (ha))

Cv = 0.75 and Cr = 1.3 (as recommended by the Wallingford Procedure)

The M5-60 and ratio R values were obtained from Met Eireann data for the site and can be found in Appendix B (16.1mm & 0.271 respectively).

Details of the proposed surface water drainage are detailed on CORA Drawing no. MCC-CORA-ZZ-ZZ-DR-C-0004.

6 Foul Drainage Details

We have calculated the total foul discharge from the site using the Irish Water Codes of Practice for Waste Water based on an office with a canteen (100 l/person/activity/day.)

Post Development Wastewater Loading:

Proposed number of people in the office = 210

For an Office with a canteen:

Wastewater Loading = 100 l/person/day (Irish Water Code of Practice - Appendix D).

Average = 210 x 100 = 21000 l/day

Average Discharge = 21000/(24x60x60) = 0.24 l/s (Average) DWF

Peak Discharge = 6 DWF = 6 x 0.24 = 1.44 l/s

• Emergency Wastewater Storage:

Emergency storage is based on the Average DWF for 24 hours.

21000 l/day = 21.00m³/day => Storage Required = 21.00m³ min.

Storage Tanks will be provided.

The foul sewer falls by gravity within the site to a final manhole where it then enters the new public sewer under Infirmary Hill/Quarry Walk. From here it flows down to Slí Ógie Uí Dhufaigh where it ties into the existing public sewer.

The connection point to the public sewer has been confirmed as feasible subject to upgades (including new foul sewer under proposed new road) by Uisce Eireann following a review of the pre-connection enquiry process. See Appendix D for copy of correspondence from Irish Water.

Details of the proposed foul drainage are detailed on CORA Drawing no. MCC-CORA-ZZ-ZZ-DR-C-0003.

7 Water Main

There is an existing watermain running through the site (through the proposed location of the civic offices). This will be diverted along St. Davnet's Row and Infirmary Hill. The proposed new water supply will be connected into this diverted line along Infirmary Hill.

Post Development Wastewater Loading:

It is generally accepted that design loading for foul drainage can be used to evaluate an

approximation of the water demand:

From wastewater discharge (Section 6)

Average Discharge = 0.24 l/s (DWF)

Water main demand is designed with a peak flow of 1.25 x DWF (Irish Water CoP - Cl. 3.7.2).

Peak Water Demand = 1.25 DWF = 1.25 x 0.24 = 0.3 l/s

Fire hydrants are provided throughout the site.

Details of the proposed water main are detailed on CORA Drawing no. MCC-CORA-ZZ-ZZ-DR-C-0005.

8 Flood Risk Assessment

At an early stage of the project it was decided that a detailed Flood Risk Assessment was not required due to the location & topography of the proposed site. A flood map, extracted from https://www.floodinfo.ie/map/floodmaps/, can be found in Appendix F.

9 Maintenance

The required maintenance for each of the SuDS measures on the site is outlined in the various tables below.

9.1 Attenuation Storage Tanks

Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly

Regular maintenance	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of the tank for sediment build-up and remove if necessary	Every 5 years or as required

9.2 Soakaways

Operation and maintenance requirements for soakaways

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

9.3 Permeable Pavements

Operation and maintenance requirements for permeable pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto permeable surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of structure and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three monthly, 48hrs after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Appendix A – CORA Drainage Drawings