LIMERICK CITY & COUNTY COUNCIL

Proposed Residential Development at Junction of Blackboy Road/Greenhill Road, Limerick

Engineering Services Design Report (ESDR02)

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For and on behalf of
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Contents:

APPENDICES:

1.0 INTRODUCTION

1.1 General

1.1.1 This report which has been prepared by MPA Consulting Engineers at the request of our client Limerick City & County Council, contains information on the design of roads & transport infrastructure, foul drainage, storm water management systems and watermain to be constructed for the proposed residential development on Blackboy Road/Greenhill Road.

1.1.2 Planning permission has previously been granted for a 14no. house development under Planning Permission Ref: 18/8001 and this report relates to a 3-house proposed extension to the previously approved development.

1.1.3 The design of the drainage systems has been carried out to take account of the Building Regulations, BS EN 752:2008 – Drain & Sewer Systems Outside Buildings, the Discharge Units Method of design in accordance with BS EN 12056-2:2000 – Gravity Drainage System and the requirements of Limerick City & County Council and Irish Water.

1.1.4 The proposed foul system is a gravity feed system which will connect to the system previously approved under PP Ref:18/8001, conveying the effluent to the existing combined public main which is located on Blackboy Road to the Southeast of the site.

1.1.5 The storm water system proposed for the development is an extension of the system approved under PP Ref:18/8001. It is a gravity system with attenuation and storage for the 100–year storm event provided on site as per Limerick City & County Council and Irish Water requirements.

1.1.6 The outflow from the proposed storm system to the existing combined sewer on Blackboy Road shall be limited to 4l/s as set out within the previously approved planning permission Ref: 18/8001.

1.1.7 The watermain for the adjacent development (planning permission Ref:18/8001), which will connect to the existing public supplies on Blackboy Road and Greenhill Road, and if extended North-West same is proposed to supply the additional 3 units.

1.2 Site

1.2.1 The site is located on Greenhill Road. The total site area of the proposed extension is approximately 0.028 hectares.

1.2.2 The site topography generally falls from the North to the South. The level difference along the front elevation is approx. 600mm.

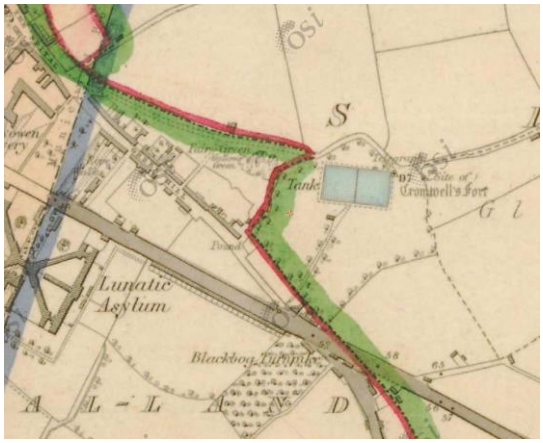
1.2.3 The site currently has existing buildings which will be demolished as part of the proposed development works.

2.0 FLOOD RISK

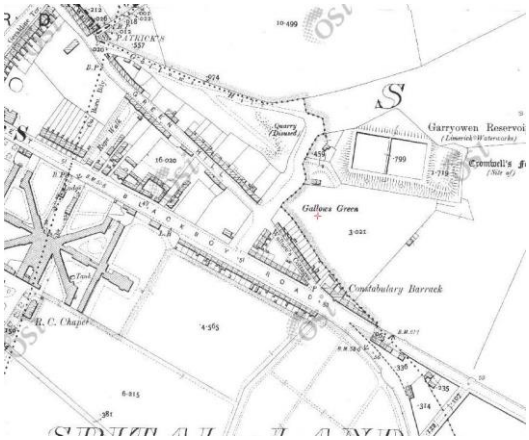
2.1 Mapped Data

Historic Mapped Data

2.1.1 Following a review of the historic maps for the area including the OS 6 inch map and 25" it can be seen on these maps that there is no record of areas "Liable to Flood". See extract below.



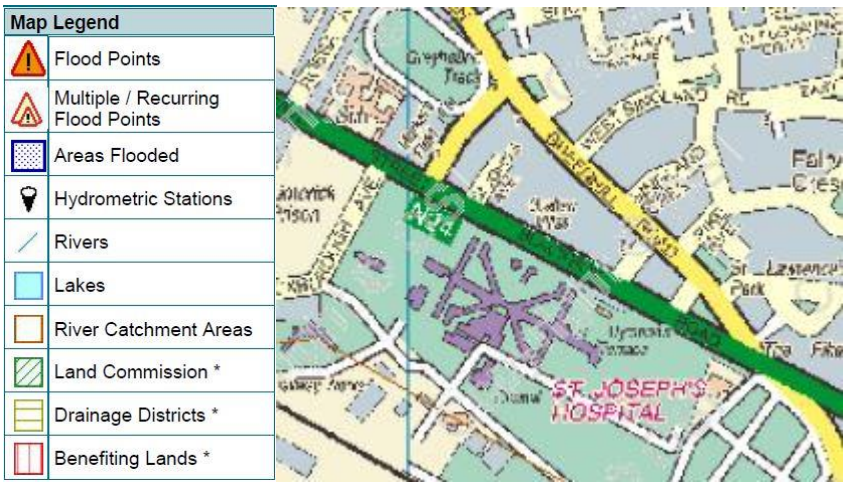
Historic 6"



Historic 25" Map

OPW Flood Hazard Mapping

2.1.2 As part of the National Flood Risk Management Policy, the OPW developed a web based data set, which contains information concerning historical flood data and displays related mapped information. After reviewing Flood Hazard Maps for the area it is apparent that there is no record of any flooding in the area. See extract below.



OPW Flood Hazard Map

CFRAM Mapping

2.1.3 Catchment Flood Risk Assessment and Management (CFRAM) Studies carried out by the OPW are at the core of the national policy for flood risk management and the strategy for its implementation. Part of the CFRAM Studies is to assess flood risk, through the identification of flood hazard areas and the associated impacts of flooding. Flood extent and flood depth maps are produced as part of the CFRAM studies. There are no CFRAM maps for the Blackboy Road/Greenhill Road area thus indicating no flood risk in the area.

3.0 TRANSPORT & ACCESS

3.1 General

3.1.1 Provision for the safety of existing and future road users is an important consideration in the design of any proposed development and this has been considered in detail during the development of the proposed scheme layout. This section outlines key road safety issues and how these have been addressed.

3.2 Proposed Works

3.2.1 The proposed scheme includes 3no. dwellings with pedestrian access only from the public street. There are no proposals to include for vehicular access to the dwellings within the development.

3.2.2 Additional on street car parking will be provided to service the proposed development. It is proposed to provide an additional 3no. on street car parking spaces on Greenhill Road as indicated on Drawing No. 171027-C-002.1, Proposed Site Layout.

3.2.3 All car parking spaces will be parallel spaces and the bays will measure 6.0 x 2.4m, these parking spaces will be delineated with line markings, as enclosed within this application.

3.2.4 As part of the development, it is proposed to upgrade the pedestrian footpath fronting the development to a minimum width of 1.8m as per DMURS (Design Manual for Urban Roads & Streets) with footpaths all to be adequately paved with dished kerbs provided as necessary.

4.0 FOUL DRAINAGE SYSTEM

4.1 General

4.1.1 It is proposed to service the 3 additional units by extending the foul sewer system previously approved under PP ref: 18/8001.

4.1.2 The foul sewer has been designed in accordance with the Colebrook-White formulas, B.S. 752: 2008, Drain & Sewer Systems and the current Building Regulations. Calculations of design flows will be carried out using the Discharge Units Method in accordance with BS EN 12056-2:2000.

4.1.3 The proposed layout of the foul drainage system has been set out with the enclosed Proposed Foul Sewer Layout (Drawing No. 171027/C/003.1 Rev PL1).

4.1.4 The proposed system consists of gravity sewers on the site which will convey all the effluent from the proposed development to an existing 900mm diameter Irish Water combined sewer on Blackboy Road.

4.2 Gravity System

4.2.1 The pipes for the proposed foul sewerage system will consist of 150mm diameter uPVC pipes, at varying gradients to achieve self-cleansing velocities and calculated in accordance with BS EN 12056-2:2000. The design of the foul system has taken account of all foul drainage requirements on the proposed site.

4.2.2 The proportional velocities will be assessed using the Wavinsewer Systems Design Manual for uPVC pipes based on the proportional capacity, and from this the partial velocity / design velocity has been calculated.

4.2.3 All pipes will be designed with adequate capacity and the partial velocities for all pipes will be 0.70 m/s or greater as per BS EN 752:2008 – Drain & Sewer Systems Outside Buildings, thereby ensuring adequate self-cleansing velocities for the entire system.

5.0 STORM

5.1 General

5.1.1 It is proposed that the main infrastructure on site, i.e. roads and concrete footpaths shall be provided with a gravity sewer on site discharging to the existing combined sewer on Blackboy Road following attenuation controlled by means of a hydrobrake.

5.1.2 The storm drainage system for the proposed dwellings consists of gravity feed pipes connecting to the storm network and attenuation tank previously approved under PP Ref: 18/8001.

5.1.3 The storm sewer system has been designed in accordance with the Colebrook-White formulas and the Modified Rational Method, where;

$Q_p = CiA$

and

Q_p = Peak Flow (l/s)

$C = C_v \times C_r$ ($C_v = 0.75$ & $C_r = 1.3$)

i = Rainfall intensity (mm/hr)

5.1.4 The drawings included with this submission show the proposed Storm Sewer Layout (Drawing No. 171027/C/004.1 Rev PL1).

5.2 Gravity System

5.2.1 The pipe network serving the roads and hardstanding areas will be designed in accordance with the Modified Rational Method, utilising rainfall data for the Limerick area from Met Éireann.

5.2.2 The pipes required to drain the proposed development will be 225mm in diameter and will be laid at varying falls and in accordance with BS EN 752: 2008, all pipes will have adequate self-cleansing velocities.

5.3 Attenuation

5.3.1 It is proposed that the storm drainage will connect into the system approved under PP Ref: 18/8001. The attenuation storage volume will be provided on site using a geo-cellular modular tank which will provide the required storage volume. It is proposed to increase the size of the tank approved under PP Ref: 18/8001 from 39m^3 to 49m^3 to account for surface water runoff from the additional development. The storage has been designed to cater for areas of the storm water generated from the roofs and hard standing areas of the development.

5.3.2 The Q_{BAR} value for the previously approved development has been set as 4l/s as stated within the Part 8 Grant.

5.3.3 The overall is divided into 2 sub-catchments and the outflow from each of the sub-catchments will be limited to 2l/s using hydrobrakes.

5.3.4 It is proposed to connect the storm sewer system serving the additional units to the attenuation system serving sub-catchment 1 as indicated within PP Ref: 18/8001.

5.3.5 The total storage required for the site, including the additional units, is 49m^3 for the 1 in 100 year storm event. This includes an additional attenuation capacity of 10m^3 from that as previously approved. The revised attenuation design can be seen in Appendix A.

5.3.6 The required 49m^3 attenuation storage volume will be provided on site geo-cellular module tank (stormtech OSA) to the south of the site adjacent to Blackboy Road as shown on Drawing No. 171027/C/004.1 Rev PL1.

5.3.7 Following the hydro brake, the surface water drain shall discharge to the existing 900mm combined sewer on Blackboy Road.

6.0 WATERMAIN

6.1 General

6.1.1 The watermain will be laid out as per Drawing No. 171027/C/005.1 Rev PL1 - Proposed Watermain Layout. Watermain Details (Drawing No. 171027/C/032.1 Rev PL1) have also been included in this submission.

6.1.2 A 100mm diameter MDPE watermain will be installed on Greenhill road under PP Ref: 18/8001. It is proposed to extend this in the North-West direction to serve the proposed development, as shown in Watermain Layout, Drawing No. 171027/C/005.1 RevPL1.

6.2 Design Data

6.2.1 The proposed supply to each unit will be metered in accordance with the requirements of Irish Water.

6.2.2 A summary of the expected average and daily demand for the proposed 3no. houses is shown in the Table 5.1 below. Peak flow has been calculated based on 3 x average flow.

Table 5.1 **Estimated Average Flows**	
Building use Category	Residential
Number of Houses	3
Daily Demand (litres/person/day) (12 persons)	150
Total Daily Demand (litres/day)	1800
Average Demand (litres/second)	0.031
Peak Flow (litres/second)	0.093

* The unit has been assumed to be used for 16 hours per day.

** Daily Demand calculated based on Irish Water Code of Practice 2017 Section 3.7.2

6.2.3 All boundary boxes, air valves, scour valves, stop cocks and sluice valves as required, will be provided around the site as shown on the Watermain Layout Drawing No. 171027/C/005.1 Rev PL1.

6.2.4 Screw down type fire hydrants complying with B.S. 750: 1984 will be provided as shown, as can be seen hydrants are not located in roadways or parking spaces, and no building is more than 46m from a hydrant. Hydrant outlets will be no more than 300mm below finished ground level.

7.0 SUMMARY AND CONCLUSIONS

7.1 Summary

7.1.1 This report which has been prepared by MPA Consulting Engineers at the request of our client Limerick City & County Council, contains information on the design of roads & transport infrastructure, foul drainage, storm water management systems and watermain to be constructed for the proposed additional 3no. residential units on Greenhill Road.

7.1.2 The application relates to a site of approximately 0.028 hectares, which is proposed to be developed as an extension to the development previously approved under PP Ref: 18/8001.

7.1.3 In terms of transport and access, the proposed development will not require any new access roads or entrances, the development has been designed to provide pedestrian facilities, corner radii and car parking in accordance with the DMURS manual. It is proposed to adjust the existing carriageway kerb lines to incorporate new car parking spaces to service the development.

7.1.4 All pipes in the proposed foul gravity system have been set up so as to ensure adequate capacity and self-cleansing velocities are obtained. These velocities shall be designed to be a minimum of 0.70 m/s in the foul line which connects to the previously approved system and conveys the effluent to a local authority sewer to the South West of the site.

7.1.5 The storm management system has been designed to best practice principles together with meeting the requirements of Limerick City & County Council and Irish Water.

7.1.6 The storm water system comprises of a gravity gulley and pipe system and it is proposed to connect to the attenuation system approved under PP Ref: 18/8001 providing storage for the 100–year storm event on site.

7.1.7 The attenuation storage volume will be provided on site using a geo-cellular modular tank system providing the required storage volume. It is proposed to increase the tank size from 39m^3 as set out within PP Ref: 18/8001 to 49m^3 to account for the additional 3no. houses. All designs have been carried out to take account of all development proposed within the catchment area.

7.1.8 All pipes in the proposed storm gravity systems will be set up so as to ensure adequate capacity and self-cleansing velocities are obtained. These velocities are a minimum of 0.70 m/s for the estimated design flow.

7.1.9 The proposed water supply to the development shall be an extension of the previously approved system - a 100mm diameter MDPE watermains connected to the existing public supplies on Blackboy Road and Greenhill Road.

7.2 Conclusions

7.2.1 The proposed works required to facilitate the development have been designed in accordance with the DMURS guidelines and will provide safe parking, access & egress from the development.

7.2.2 The report has shown that the foul drainage proposed for the site has sufficient capacity and a connection to an appropriate public main can be established by connecting to the sewer which

was approved in PP Ref: 18/8001, thus ensuring adequate drainage for the proposed development.

7.2.3 As can be seen from the preceding information, the storm management system on the site has sufficient capacity, and connection to an appropriate outfall can be established by connecting to the system previously approved in PP Ref: 18/8001, thus ensuring adequate drainage for the proposed development.

7.2.4 A potable water supply to the proposed development can be made by extending the system previously approved within PP Ref: 18/8001.

Appendix A

Attenuation Volume Calculation Sheet