KILKENNY COUNTY COUNCIL

Refurbishment & Extension at Mayfair, Kilkenny

Water Infrastructure Design Report (WIDR01)

February 2019

Consulting Engineers
Ormonde Road
Kilkenny

For Further Information:
T: + 353 56 7702761
F: + 353 56 7790728
E: info@mpa.ie
W: www.mpa.ie

Prepared By:

Eddie Quann BEng, MIEI

Checked By:

Martin Peters BSc Eng, MSc Eng, CEng MIEI, MIStructE, Dip Planning

For and on behalf of
MPA Consulting Engineers

DOCUMENT CONTROL SHEET

	Client	Kilkenny County Council							
	Project Title	Proposed Refurbishment & Extension at Mayfair, Kilkenny.							
	Project Ref.	171029							
	Document Title	Water Infrastructure Design Report							
	Document No.	171029-WIDR01							
	This Document Comprises	DCS	TOC	Text	LOT	LOG	LOF	LOD	Appendices
		1	1	6	-	-	-	-	2
	Check								

Revision	Status	Author	Reviewed By	Approved By	Issues Date
D01	Draft	EJQ	MJP	MJP	21.03.2019
F01	**Final**	**EJQ**	**MJP**	**MJP**	**24.04.2019**

Contents:

APPENDICES:

1.0 INTRODUCTION

1.1 General

1.1.1 This report which has been prepared by MPA Consulting Engineers contains information on the design of foul drainage system, storm water drainage system and watermain to be constructed for the proposed redevelopment at the Mayfair, Kilkenny.

1.1.2 The application relates to a site of approximately 0.2 hectares. All designs have been carried out to take account of all developments proposed on site.

1.1.3 The design of the systems has been carried out to take account of the requirements of the Building Regulations, BS8301: Code of Practice for Building Drainage and the requirements of Kilkenny County Council. 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 were carried out using the Discharge Units Method in accordance with BS EN 12056-2:2000.

1.1.4 The existing building is currently served by means of a mains foul gravity sewer. The site is also served by the existing storm water drainage system located within the site which discharges to the Breagagh River. Similarly, the site is also serviced by public mains water from the adjoining St Francis Brewery Site.

1.1.1 As per the previous Part 8 application, the proposed foul system is a gravity feed system which conveys the effluent to the existing public main which crosses the former Brewery site.

1.1.2 Also as per the previous Part 8 application, the storm water system proposed for the development is a gravity system which conveys storm water to the existing storm drainage network within the adjoining site. This storm water network discharges to the adjacent Breagagh River, after passing through an existing petrol/oil interceptor.

1.1.3 The proposed watermain is to be maintained and upgraded as part of the redevelopment works to the adjoining St Francis Brewery building, therefore a new connection is proposed to the newly installed watermain which will connect to the existing public supply on Watergate Street.

2.0 FOUL DRAINAGE SYSTEM

2.1 General

2.1.1 There is an existing foul sewer network servicing the existing building on the proposed site. This network is connected to the public mains which passes through the St Francis Brewery site and exits onto Horse Barack Lane. Due to the nature of the extension & refurbishment works to be carried out it is necessary to provide a new foul sewer network discharging to the existing public sewer.

2.1.2 The foul sewer has been designed in accordance with the Colebrook-White formulas, BS EN 752:2008 – Drain & Sewer Systems Outside Buildings and the current Building Regulations. Calculations of design flows were carried out using the Discharge Units Method in accordance with BS EN 12056-2:2000 Gravity Drainage Systems.

2.1.3 The proposed system consists of gravity sewers on the site which convey all the effluent from the proposed development to an Irish Water foul sewer which crosses the lands adjacent to the proposed site.

2.1.4 The drawings included with this submission show the proposed Foul Sewer Layout (Drawing No. 171029/C/003, Rev PL1) and Sewer Longitudinal Sections (Drawing No. 171029/C/020, Rev PL1).

2.2 Gravity System

2.2.1 The pipes for the foul sewerage system consist of 150mm diameter uPVC pipes in accordance with Irish Water requirements, at gradients varying from 1:61 to 1:63. The foul system has been designed to take account of all foul drainage requirements on the proposed site.

2.2.2 The foul sewer design sheet is shown in Appendix A, it can be seen here that the maximum peak flow is 3.9 l/s. This figure was determined by using the discharge units set out in BS EN 12056-2:2000, based on the layout of the proposed building.

2.2.3 The proportional velocities have been extrapolated from the Wavin sewer Systems Design Manual for uPVC pipes based on the proportional capacity, and from this the partial velocity / design velocity has been calculated.

2.2.4 It can be seen in Appendix A that all pipes have been designed with adequate capacity and the partial velocities for all pipes are 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.

3.0 STORM

3.1 General

3.1.1 There is an existing storm water network servicing the existing site and Mayfair building. The existing site is comprised of buildings, covered areas and hard standing areas, therefore all storm water falling on the site is collected via the existing network. This network is connected into the overall drainage network of the St Francis Brewery site which discharges to the Breagagh River to the North East of the existing building.

3.1.2 The proposed development shall generate no additional storm water runoff to that of the existing, hence attenuation is not required. Due to the location of the proposed extensions, a new storm water network is to be provided.

3.1.3 It is proposed to provide a new gravity storm water network on the site, connecting to the existing storm water network which is located on the adjoining lands. This existing storm sewer discharges to the Breagagh River via an existing petrol/oil interceptor as indicated within drawing, 171029/C/004 Rev PL1.

3.1.4 The gravity 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)

3.1.5 A storm sewer layout has been included with this submission (Drawing No. 171029/C/003, Rev PL1).

3.2 Gravity System

3.2.1 The pipe network serving the development has been designed in accordance with the Modified Rational Method, utilising rainfall data for the Kilkenny area from Met Eireann. The rational design sheet has been included in Appendix B of this report.

3.2.2 As can be seen from these tables the storm frequency proposed is 1 in 2 years, thereby ensuring an appropriate level of service for the storm drainage system. The time of entry has been taken to be 5 minutes in accordance with Recommendations for Site Development

Works. Appropriate pipe roughness coefficients have been taken from the pipe manufacturer's literature.

3.2.3 The pipes required to drain the proposed development are 100mm & 150mm in diameter, at gradients varying from 1:60 to 1:103

3.2.4 It can be seen in Appendix B that all pipes have been designed with adequate capacity and the partial velocities for all pipes are above 0.70 m/s, as per BS EN 752:2008 – Drain & Sewer Systems Outside Buildings, thereby ensuring adequate self-cleansing velocities for the entire system.

4.0 WATERMAIN

4.1 General

4.1.1 As part of the redevelopment of St Francis Brewery site it has been proposed to provide a 200mm diameter MDPE watermain. This main is be served with a connection to the existing public supply located on Watergate Street.

4.1.2 It proposed to provide a new 32mm diameter MDPE potable water connection in accordance with Irish Water Details to the approved watermain as set out previously.

4.1.3 The watermain is to be provided as set out on Proposed Watermain Layout (Drawing No. 171029/C/005, Rev PL1), and Proposed Watermain Details (Drawing No. 171029/C/032, Rev PL1).

4.2 Design Data

4.2.1 A water meter, 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. 171029/C/005, Rev PL1.

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

5.0 SUMMARY AND CONCLUSIONS

5.1 Summary

5.1.1 This report which has been prepared by MPA Consulting Engineers and contains information on the design of the foul drainage, storm water drainage and watermain to be constructed for the proposed refurbishment & extension of the Mayfair, Kilkenny.

5.1.2 The proposed foul drainage system for the site has sufficient capacity and a connection to the existing Irish Water main located on the adjacent site can be established without difficulty, thereby ensuring adequate drainage for the proposed development as shown on Foul Drainage Drawing No. 171029/C/003, Rev PL1.

5.1.3 The storm drainage strategy caters for all storm water collected within the site. The proposed storm drainage shall be connected into the existing storm sewer located on the adjacent site, as shown on Storm Drainage Drawing No. 171029/C/004, Rev PL1.

5.1.4 A connection to a potable water supply is to be provided via the proposed watermain which is to serve the St Francis Brewery site development as set out on Watermain Layout Drawing No. 171029/C/005, Rev PL1.

5.2 Conclusions

5.2.1 The report has shown that the foul drainage proposed for the site has sufficient capacity and a connection to the exiting public mains can be established without difficulty, thus ensuring adequate drainage for the proposed development.

5.2.2 As can be seen from the preceding information, the new storm water drainage system on the proposed site has sufficient capacity, and connection to the existing outfall can be established without difficulty, thus ensuring adequate drainage for the proposed development.

5.2.3 Similarly the proposed watermain can be facilitated on site without difficulty with a prosed new connection to the new 200mm diameter watermain which is to be provided as part of the redevelopment of t Francis Brewery Site.

Appendix A

Foul Sewer Design Sheets

Project: Library at the Mayfair Building Kilkenny **Project No:** 171029 **Drawing Ref.** 171029/C/002	**Calc. Sheet No.** Page 1 of 1 **Calculations by** EJQ **Checked by** MJP **Date** 21.03.19	**Martin Peters Associates** **Consulting Engineers** **Ormonde Road** **Kilkenny** **R95 AHX8** **T: + 353 56 77 02761** **E: info@mpa.ie** **W: www.mpa.ie**

FOUL SEWER NETWORK SCHEDULE

Design in accordance with B.S. EN 752:2008 DRAIN & SEWER SYSTEMS OUTSIDE BUILDINGS

Design Data:

Frequency Type **Frequent Use, e.g. hospital, school, hotel**

As per Table 3 of EN 12056-2:2000

Frequency Factors (K) **0.7**

Pipe Material **uPVC**

Effective Roughness (Ks) **0.6**

US MH Ref:		US MH CL [mod]	US MH IL [mod]	DS MH IL [mod]	Length [m]	Fall [m]	Gradient [1 in…]	Pipe Diameter [mm]	Cover to US Soffit [m]	Velocity [m/s]	Discharge Units Per Run	Discharge Units Cum	Peak Flow [l/s]	Cap [l/s]	Proportional Capacity	Proportional Velocity	Design Velocity [m/s]
F1.0	F1.1	45.750	45.050	44.960	5.5	0.090	61	150	0.550	1.28	15.0	15	2.7	22.67	0.120	0.679	0.87
F1.1	F1.2	45.720	44.960	44.895	4.1	0.065	63	150	0.610	1.26	8.0	23	3.4	22.32	0.150	0.736	0.93
F1.2	F1.3	45.710	44.895	44.800	5.8	0.095	61	150	0.665	1.28	8.0	31	3.9	22.69	0.172	0.763	0.98

Notes:

* Denotes imperical pipe design as per Section 9.6.3.1 Design for Self Cleansing in B.S. EN 752:2008 - Drain & Sewer Systems Outside Buildings

Appendix B

Storm Sewer Design Sheets

Project: Library at the Mayfair Building Kilkenny **Project No:** 171029 **Drawing Ref.** 171029/C/003	**Calc. Sheet No.** Page 1 of 1 **Calculations by** EJQ **Checked by** MJP **Date** 21.03.19	**Martin Peters Associates** **Consulting Engineers** **Ormonde Road** **Kilkenny** **R95 AHX8** **T: + 353 56 77 02761** **E: info@mpa.ie** **W: www.mpa.ie**

SURFACE WATER NETWORK SCHEDULE

Design Data:

Station Name	Kilkenny	Pipe Material	uPVC
$M_{5\text{-}2min}$	3.3	Effective Roughness (Ks) =	0.06
Design Return Period	2		
Time to Entry	5		

US MH Ref:		US MH CL [mod]	US MH IL [mod]	DS MH IL [mod]	Length [m]	Gradient [1 in…]	Pipe Diameter [mm]	Cover to US Soffit [m]	Velocity [m/s]	Time of Flow [min]	Time of Conc. [min]	Rate of Rainfall [mm/hr]	Total Area [m2]	% Imperv.	Imperv. Area [m2]	Cumul. Imperv. Area [m2]	Actual Rate of Flow [m3/s]	Allow. Rate of Flow [m3/s]	Proportional Capacity	Proportional Velocity	Design Velocity [m/s]
S1.0	S1.1	45.780	45.280	45.105	14.8	85	150	0.350	1.37	0.180	5.180	55.99	280	100	280	280	0.004	0.024	0.18	0.767	1.05
S1.1	S1.2	45.678	45.105	45.050	4.54	83	150	0.423	1.39	0.054	5.234	55.77	125	100	125	405	0.006	0.025	0.25	0.824	1.15
S1.2	S1.3	45.480	44.530	44.100	32.65	76	150	0.800	1.45	0.375	5.609	54.28	200	100	200	605	0.009	0.026	0.35	0.890	1.29
S2.0	S2.1	45.300	44.800	44.730	5.67	81	150	0.350	1.40	0.067	5.067	56.47	144	100	144	144	0.002	0.025	0.09	0.590	0.83
S2.1	S1.2	45.300	44.730	44.620	8.62	78	150	0.420	1.43	0.101	5.168	56.04	56	100	56	200	0.003	0.025	0.12	0.680	0.97
S3.0	S3.1	44.810	44.310	44.140	14.28	84	150	0.350	1.38	0.173	5.173	56.02	280	100	280	280	0.004	0.024	0.17	0.766	1.06
S3.1	S3.2	44.710	44.140	44.040	8.01	80	150	0.420	1.41	0.095	5.267	55.63	206	100	206	486	0.007	0.025	0.29	0.852	1.20
S3.2	S3.3	45.900	44.040	43.900	14.46	103	150	1.710	1.23	0.195	5.462	54.85	400	100	400	886	0.013	0.022	0.60	1.058	1.31
S3.3	Outfall	44.800	43.900	43.870	1.8	60	150	0.750	1.64	0.018	5.286	55.56	348	100	348	834	0.013	0.029	0.43	0.959	1.58
S4.0	S4.1	44.950	44.500	44.300	16.01	80	100	0.350	1.08	0.246	5.246	55.72	175	100	175	175	0.003	0.009	0.31	0.863	0.94
S4.1	S3.3	45.010	44.300	44.110	15.22	80	100	0.610	1.08	0.234	5.480	54.78	74	100	74	249	0.004	0.009	0.43	0.961	1.04

Notes:

* Denotes imperical pipe design as per Section 9.6.3.1 Design for Self Cleansing in B.S. EN 752:2008 - Drain & Sewer Systems Outside Buildings