Waterman Moylan
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Engineering Services Report

Proposed Residential Development at Units 5A-C Second Avenue, Cookstown, Tallaght, Dublin 24

September 2021

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

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Comments

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1. Introduction

1.1 Site Location

The site is located at Units 5A-C Second Avenue, Cookstown, Tallaght, Dublin 24. It is bounded to the east by existing industrial building, to the west by the Luas line and Cookstown Way, to the south by an abandon brownfield site and north by Second Avenue.

1.2 Proposed Development

Pyrmont Property Developments Ltd. (who have subsequently sold the subject site to Stranwil Ltd.) was granted Planning Permission (Strategic Housing Development under ABP Ref. No. ABP-303803-19) at a site measuring c. 0.595 Ha, at Cookstown, Tallaght, Dublin 24, for proposed development comprising: a residentially led development to accommodate: 196 no. residential units in total.

This Planning Application seeks design revisions to the approved residential scheme granted under Strategic Housing Development under ABP Ref. No. ABP-303803-19. These design revisions are listed in the subsequent section.

1.3 Site Description

The site area is approximately 0.595 hectares. The site is currently a brownfield with the following existing current grants of Planning Permission:

- Planning Permission granted under Planning Register Reference SD17A/0212 for 126 No. residential units on the site with crèche and gym.
- Planning Permission granted under Planning Register Reference SD04A/0760 for 150 No. parking facility.
- Planning Permission granted under Planning Register Reference SD16A/0267 for 184 No. residential units on the site with crèche, community room, underground car parking and bicycle parking.
- Planning Permission granted under Planning Register Reference SHD3ABP-303803-19 for 196 No. residential units on the site with 1 No. commercial unit, 1 No. office unit, crèche, gym, community storage areas, communal spaces, underground car parking and bicycle parking.

This Planning Application seeks design revisions to the approved residential scheme granted under Strategic Housing Development ABP Ref. No. ABP-303803-19. A summary of the engineering revisions is as follows:

1. Alterations to the layout, size and positioning of the concierge/reception area, communal amenity areas, creche and 2 no. commercial units provided at the ground floor and omission of the previously approved office and 2 no. apartments to facilitate the introduction of a larger commercial unit capable of accommodating a small supermarket.
2. Removal of Core C to facilitate the introduction of a larger ground floor commercial unit and reconfiguration of the Block C's internal space across first to fifth floor levels and the introduction of a glazed link between Blocks B and C at first floor level.

3. Reconfiguration of the approved basement layout.
4. Amalgamation and consolidation of communal amenity space serving the development at ground floor level.
5. Relocation of the substation and switch room previously proposed in Block D to Block A and associated alterations to previously approved ground floor Apartments 2 and 3 in Block D and Apartments 1 and 2 in Block A.
6. Minor alterations to party walls in Blocks A, B and D to accommodate a No. of 1 bedroom apartments in lieu of previous approved studio apartments.
7. Minor alterations to previously approved facades, building line and internal partition walls to accommodate the aforementioned amendments and a slight increase in the number of apartments featuring within the development, from 196 No. to 204 No.

1.4 Background of Report and Summary

This report describes the criteria used to design and detail the options available for the disposal of storm water (subject to a restriction to the discharge rate), disposal of foul water and water supply.

Foul Water

It is proposed to drain the foul effluent from the proposed site to the existing 300mm diameter foul sewer to the north of the site within Second Avenue. This is as per the previously approved scheme under Planning Register Reference SHD3ABP-303803-19

The total peak foul water flow from the approved development is 6.471 l/second. This proposal will not increase the peak foul water flow from that already permitted.

Surface Water

Surface water from the subject site will drain via gravity and discharge at a restricted rate to the existing 300mm diameter surface water sewer in Second Avenue Street to the north of the subject site. Surface water runoff from the site will be restricted to 2.07 l/s/Ha (1.26 l/s for site based on site area) as recommended by South Dublin County Council (SDCC). This is in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS). It would not be practical to limit the outflow to this value as the required hydrobrake outlet would be too small. The allowable outflow will be limited to 1.7 l/s using a hydrobreak orifice diameter of 50mm. This is as per the approved Planning Register Refence SHD3ABP-303803-19.

Surface water attenuation will be provided within an underground surface water storage tank beneath the basement (as applied for under Planning Register Refence SHD3ABP-303803-19), prior to discharging to the existing 300mm diameter surface water sewer. The original planning application surface water attenuation tank was incorrectly modelled at 340m3 due to incorrect rainfall information. Site-specific rainfall was not utilized.

The attenuation tank has been re-modelled with site-specific rainfall and a tank of 607m3 is required to cater for the critical storm event of 1:100 at 1 440 minutes. The enlarged attenuation tank will be located within revised basement layout as there is sufficient capacity to accommodate it.

Water Supply

The proposed site will be supplied with a 150mm diameter watermain via the existing 350mm diameter watermain located within Cookstown Way. All water supply details shall be in accordance with Irish Water and South Dublin County Council's requirements. This is as per the previously approved scheme under Planning Register Reference SHD3ABP-303803-19.

The total peak foul water flow from the approved development is 6.153 l/second. This proposal will not increase the peak hour water demand from that already permitted.

Site Access

The site's main vehicular access will be provided from Second Avenue, via a proposed entrance, to the basement.

The main pedestrian access will also be from Second Avenue. This is as per the previously approved scheme under Planning Register Reference SHD3ABP-303803-19.

2. Foul Water Drainage

2.1 Receiving Environment

It is proposed to drain the foul effluent from the proposed site to the existing 300mm diameter foul sewer to the north of the site within Second Avenue. This is as per the previously approved scheme under Planning Register Reference SHD3ABP-303803-19.

A pre connection enquiry form was submitted to Irish Water with a response of no objection.

2.2 Foul Water Calculations

The design of the foul water drainage has been based on the "*Code of Practice for Wastewater Supply*", (December 2017). The peak foul flow is based on Irish Water recommended peak demand / flow factors. Pipe capacities and velocities have been calculated using Colebrook-White formula with a roughness coefficient (Ks) of 1.5 mm.

We would note that there is an increase in 8 No. of proposed apartments from the original planning application. A total of 204 No. residential units will be amended to the original planning application.

The existing planning permission on the subject site (Planning Register Reference SHD3ABP-303803-19) granted provides for 196 No. residential units with the total peak foul water flow from the approved development at 6.471 l/s. The previous calculations did not align with Irish Water requirements and over estimated foul flow from the development, this proposal will not increase the peak foul water flow from that already permitted.

The proposed foul water outfall from the subject site are 225mm diameter pipes laid at a gradient of 1:200, giving a capacity of 32 l/s and therefore has adequate capacity to cater for the flows from the development.

3. Surface Water Drainage

3.1 Introduction – Existing Drainage Scenario

The subject site is currently 100% hardstanding with surface water drains on site draining unrestricted to the existing 300 diameter pipes within Second Avenue Street to the north of the site. Rainfall values for the subject site have been acquired from the Met Eireann Website and are attached in Appendix A and are summarised below.

Site Location: Easting 307792 Northing 228248

1 in 100 Year 60 min Storm 47.2mm

1 in 100 Year 60 min Storm with 20% Climate Change 51.92mm (0.05192)

Site area currently stands at 0.595 hectares.

Based on a site area of 0.595 Hectares, the peak outfall rate in a 1 in 100 Year 60 min Storm with 10% Climate Change allowed for is as follows:

5950m^2 x 0.05192m = 308.93m^3/hour = 85.8 l/sec unrestricted flow

3.2 Surface Water – Proposed Drainage

Surface water from the subject site will drain via gravity and discharge at a restricted rate to the existing 300mm diameter surface water sewer in Second Avenue Street to the north of the subject site. Surface water runoff from the site will be restricted to 2.07 l/s/Ha (1.26 l/s for site based on site area) as recommended by South Dublin County Council (SDCC). This is in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS). It would not be practical to limit the outflow to this value as the required hydrobrake outlet would be too small. The allowable outflow will be limited to 1.7 l/s using a hydrobreak orifice diameter of 50mm. This is as per the approved Planning Register Refence SHD3ABP-303803-19.

Surface water attenuation will be provided within an underground surface water storage tank beneath the basement (as applied for under Planning Register Refence SHD3ABP-303803-19), prior to discharging to the existing 300mm diameter surface water sewer. The original planning application surface water attenuation tank was incorrectly model at 340m3 because of incorrect rainfall information. Site-specific rainfall was not utilized.

The attenuation tank has been re-modelled with site-specific rainfall and a tank of 607m3 is required to cater for the critical storm event of 1:100 at 1 440 minutes. The enlarged attenuation tank will be located within revised basement layout as there is sufficient capacity to accommodate it.

Green roofs are provided on the some of the roof areas of the proposed buildings. The green roof areas have been maximized as much as possible. This complies with South Dublin County Council policy. This is as per the previously approved scheme under Planning Register Refence SHD3ABP-303803-19.

3.3 SUDS Selection Criteria

Sustainable Urban Drainage systems (SUDS) remain largely the same as those issued under Planning Register Refence SHD3ABP-303803-19, with changes that include the alignment and levels of the network.

3.4 Site Characteristics

The following site characteristics are contained in the Attenuation calculations in Appendix B and are reiterated in the following sections.

Table 2: Surface Water Catchment Details

	Catchment
Site Area (Catchment) – Ha	0.595
Impermeable Area - Ha	0.511
% Hardstanding	84
SAAR - mm	782
SOIL Index	0.3
Climate Change	10%

3.5 Outflow Limits

The outflow limits are calculated in accordance with the Institute of Hydrology report No 124 “Flood Estimation for Small Catchments”:

Table 3: Surface Water Outflow

	Catchment
Site Area (Catchment) - Ha	2.07
$Qbar_{rural}$ – l/s	1.26

It would not be practical to limit the outflow to this value as the required hydrobrake outlet would be too small. The allowable outflow will be limited to 1.7 l/s using a hydrobreak orifice diameter of 50mm. This is as per the approved Planning Register Refence SHD3ABP-303803-19.

3.6 Storm Water Calculations

The total impermeable area of the catchment including roads, car-parking and roofs, is approximately 5950 m^2, with the net contributing area of 5110 m^2. It is proposed that the 1 in 100-year critical design storm will be used for storm water attenuation volumetric calculations with 10% climate change allowed for. This is in line with the approved Planning Register Refence SHD3ABP-303803-19.

The calculation for the total impermeable area for the proposed scheme is shown below in Table 5:

Table 5: Impermeable Area for Proposed Development

Description	Area (ha)	Factor	Impermeable Area (ha)
Green Roof	0.248	0.8	0.198
Roof	0.027	0.90	0.024
Permeable area	0.116	0.80	0.093
Hardstand / Walkways	0.217	0.90	0.194
Total Impermeable Area:			**0.511**

The maximum attenuated outflow from the subject site is calculated as 1.7 l/s.

Storage design calculations are included in Appendix B of this report. Storage requirement's calculations indicate that for a return period of 100 years the 1440-minute winter storm is the critical storm and requires a storage volume of approximately 607 m^3.

The storage capacity of the proposed basement storage tank is approximately 607 m^3. Therefore, there is sufficient storage capacity available in the underground storage tank to cover the surface water attenuation requirements.

3.7 Flood Risk Assessment

A Flood Risk Assessment has been carried out in the existing planning application on the subject site (granted under Planning Register Refence SHD3ABP-303803-19) in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities. The Assessment identified and set out potential risks of flooding from various sources. Sources of possible flooding include coastal and fluvial.

The proposed development contains land uses classified as both highly vulnerable and less vulnerable development and is located within Flood Zone C: Low Probability of Flooding. Therefore, the development does not require a Justification Test as the development is deemed appropriate. This is as per the previously approved scheme under Planning Register Reference SHD3ABP-303803-19.

4. Water Supply

4.1 Water Supply – General

A pre connection enquiry form was submitted to Irish Water with a response of no objection.

The proposed site will be supplied with a 150mm diameter watermain via the existing 350mm diameter watermain located within Cookstown Way. The proposed development will have an on-site booster system to feed all the apartment and commercial units within the development.

A bulk water meter will be provided at the connection to the requirements of SDCC Water Management Section.

The existing 500mm diameter bulk water, which traverses the site, will be diverted along Cookstown Way and Second Avenue with a minimum of 5m set-back from the proposed building.

All the above is in line with the granted Planning Register Reference SHD3ABP-303803-19.

4.2 Water Demand Calculation

The water demand calculations have been designed based on Irish Water requirements. There is an increase in 8 No. of proposed apartments from the original planning application. A total of 204 No. residential units will be amended to the original planning application.

The existing planning permission on the subject site (Planning Register Reference SHD3ABP-303803-19) granted provides for 196 No. residential units. The total peak foul water flow from the approved development is 6.153 l/second. The previous calculations did not align with Irish Water requirements and over estimated foul flow from the development, this proposal will not increase the peak foul water flow from that already permitted.

APPENDICES

A. Met Eireann Rainfall Values

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 307799, Northing: 228240,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.6,	3.8,	4.5,	5.6,	6.3,	6.9,	8.8,	11.0,	12.5,	14.7,	16.7,	18.2,	20.6,	22.5,	24.1,	N/A ,
10 mins	3.6,	5.3,	6.3,	7.7,	8.8,	9.6,	12.2,	15.4,	17.5,	20.5,	23.2,	25.4,	28.8,	31.4,	33.6,	N/A ,
15 mins	4.2,	6.2,	7.4,	9.1,	10.3,	11.2,	14.4,	18.1,	20.6,	24.1,	27.3,	29.9,	33.8,	37.0,	39.6,	N/A ,
30 mins	5.5,	8.1,	9.6,	11.8,	13.3,	14.4,	18.4,	23.0,	26.0,	30.4,	34.4,	37.5,	42.4,	46.2,	49.4,	N/A ,
1 hours	7.3,	10.6,	12.4,	15.2,	17.1,	18.6,	23.5,	29.2,	33.0,	38.4,	43.3,	47.2,	53.1,	57.8,	61.7,	N/A ,
2 hours	9.6,	13.8,	16.1,	19.6,	22.0,	23.8,	30.0,	37.1,	41.8,	48.5,	54.5,	59.2,	66.5,	72.2,	77.0,	N/A ,
3 hours	11.2,	16.1,	18.7,	22.7,	25.5,	27.6,	34.6,	42.7,	48.0,	55.6,	62.4,	67.7,	75.9,	82.3,	87.6,	N/A ,
4 hours	12.6,	17.9,	20.9,	25.3,	28.3,	30.6,	38.3,	47.1,	53.0,	61.2,	68.6,	74.4,	83.3,	90.3,	96.1,	N/A ,
6 hours	14.7,	20.9,	24.3,	29.3,	32.8,	35.4,	44.2,	54.2,	60.8,	70.2,	78.5,	85.0,	95.1,	102.9,	109.4,	N/A ,
9 hours	17.3,	24.4,	28.3,	34.1,	38.0,	41.0,	51.0,	62.4,	69.9,	80.4,	89.9,	97.2,	108.4,	117.2,	124.5,	N/A ,
12 hours	19.3,	27.2,	31.5,	37.9,	42.2,	45.5,	56.5,	68.9,	77.1,	88.6,	98.9,	106.8,	119.1,	128.6,	136.5,	N/A ,
18 hours	22.7,	31.8,	36.7,	43.9,	48.9,	52.7,	65.2,	79.2,	88.5,	101.5,	113.1,	122.1,	135.8,	146.5,	155.4,	N/A ,
24 hours	25.4,	35.5,	40.8,	48.9,	54.3,	58.5,	72.1,	87.5,	97.6,	111.8,	124.4,	134.2,	149.2,	160.8,	170.4,	204.0,
2 days	32.1,	43.5,	49.6,	58.4,	64.3,	68.9,	83.5,	99.7,	110.2,	124.9,	137.7,	147.5,	162.6,	174.2,	183.7,	216.6,
3 days	37.5,	50.1,	56.6,	66.1,	72.4,	77.3,	92.7,	109.7,	120.6,	135.7,	148.9,	159.0,	174.3,	186.0,	195.6,	228.7,
4 days	42.2,	55.7,	62.7,	72.8,	79.5,	84.6,	100.7,	118.4,	129.7,	145.3,	158.8,	169.1,	184.7,	196.6,	206.4,	239.8,
6 days	50.5,	65.6,	73.3,	84.4,	91.7,	97.2,	114.6,	133.4,	145.4,	161.8,	175.9,	186.7,	202.9,	215.2,	225.2,	259.4,
8 days	57.9,	74.3,	82.6,	94.6,	102.3,	108.2,	126.7,	146.5,	159.1,	176.1,	190.9,	202.0,	218.7,	231.3,	241.6,	276.6,
10 days	64.6,	82.3,	91.1,	103.8,	112.0,	118.2,	137.6,	158.3,	171.4,	189.1,	204.3,	215.7,	232.9,	245.9,	256.5,	292.2,
12 days	71.0,	89.7,	99.0,	112.3,	120.9,	127.4,	147.7,	169.2,	182.7,	201.0,	216.6,	228.4,	246.0,	259.3,	270.1,	306.5,
16 days	82.7,	103.3,	113.5,	128.0,	137.3,	144.3,	166.0,	189.0,	203.3,	222.6,	239.1,	251.4,	269.8,	283.7,	294.9,	332.6,
20 days	93.6,	115.9,	126.9,	142.4,	152.3,	159.7,	182.8,	206.9,	221.9,	242.1,	259.3,	272.1,	291.3,	305.6,	317.2,	356.0,
25 days	106.4,	130.6,	142.4,	159.0,	169.6,	177.5,	202.0,	227.5,	243.3,	264.5,	282.5,	295.9,	315.7,	330.6,	342.6,	382.7,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

B. Surface Water Attenuation Calculations

Column1	Proposed Developme nt
Site Area (Catchment) – Ha	0.595
Impermeable Area - Ha	0.511
% Hardstanding	86%
SAAR - mm	782
SOIL Index	0.3
Climate Change	10%

QBAR (50 Hectares)	103.73	l/s
QBAR per Hectare	2.07	l/s/Ha

Column1	Proposed Developme nt
Site Area (Catchment)	0.595
$Qbar_{rural}$	1.70

Soil Type	SOIL
1	0.1
2	0.3
3	0.37
4	0.47
5	0.53

Imp Area 5110 m2

Rainfall (mm) http://archive.met.ie/climate/products03.asp

Duration	Insert Rainfall Data							
(min)	1	5	10	20	30	50	100	
30	8.1	14.4	18.4	23	26	30.4	37.5	0.5 Hrs
60	10.6	18.6	23.5	29.2	33	38.4	47.2	1 Hrs
120	13.8	23.8	30	37.1	41.8	48.5	59.2	2 Hrs
240	17.9	30.4	38.3	47.1	53	61.2	74.4	4 Hrs
360	20.9	35.4	44.2	54.2	60.8	70.2	85	6 Hrs
720	27.2	45.5	56.5	68.9	77.1	88.6	106.8	12 Hrs
1 440	35.5	58.5	72.1	87.5	97.6	111.8	134.2	24 Hrs
2 880	43.5	68.9	83.5	99.7	110.2	124.9	147.5	48 Hrs

Inflow (m3)

Duration	Return Period (Years)							
(min)	1	5	10	20	30	50	100	
30.00	45.53	80.94	103.43	129.28	146.15	170.88	210.79	0.5 Hrs
60.00	59.58	104.55	132.09	164.13	185.49	215.85	265.31	1 Hrs
120.00	77.57	133.78	168.63	208.54	234.96	272.62	332.76	2 Hrs
240.00	100.62	170.88	215.28	264.75	297.91	344.01	418.20	4 Hrs
360.00	117.48	198.98	248.45	304.66	341.76	394.59	477.79	6 Hrs
720.00	152.89	255.76	317.59	387.29	433.38	498.02	600.32	12 Hrs
1 440.00	199.55	328.83	405.27	491.84	548.61	628.43	754.34	24 Hrs
2 880.00	244.51	387.29	469.35	560.41	619.43	702.06	829.10	48 Hrs

Outflow (m3)

Duration	Return Period (Years)							
(min)	1	5	10	20	30	50	100	
30.00	3.06	3.06	3.06	3.06	3.06	3.06	3.06	0.5 Hrs
60.00	6.12	6.12	6.12	6.12	6.12	6.12	6.12	1 Hrs
120.00	12.24	12.24	12.24	12.24	12.24	12.24	12.24	2 Hrs
240.00	24.48	24.48	24.48	24.48	24.48	24.48	24.48	4 Hrs
360.00	36.72	36.72	36.72	36.72	36.72	36.72	36.72	6 Hrs
720.00	73.44	73.44	73.44	73.44	73.44	73.44	73.44	12 Hrs
1 440.00	146.88	146.88	146.88	146.88	146.88	146.88	146.88	24 Hrs
2 880.00	293.76	293.76	293.76	293.76	293.76	293.76	293.76	48 Hrs

Storage Reqd. (m3)

Duration	Return Period (Years)							
(min)	1	5	10	20	30	50	100	
30.00	42.47	77.88	100.37	126.22	143.09	167.82	207.73	0.5 Hrs
60.00	53.46	98.43	125.97	158.01	179.37	209.73	259.19	1 Hrs
120.00	65.33	121.54	156.39	196.30	222.72	260.38	320.52	2 Hrs
240.00	76.14	146.40	190.80	240.27	273.43	319.53	393.72	4 Hrs
360.00	80.76	162.26	211.73	267.94	305.04	357.87	441.07	6 Hrs
720.00	79.45	182.32	244.15	313.85	359.94	424.58	526.88	12 Hrs
1 440.00	52.67	181.95	258.39	344.96	401.73	481.55	607.46	24 Hrs
2 880.00	0.00	93.53	175.59	266.65	325.67	408.30	535.34	48 Hrs

UK and Ireland Office Locations