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Proposed Development at the Huntstown Economic Hub, Co. Fingal for Rathdrinagh Land ULC

Engineering Report (Planning Application)

Made: ..... MJ

Checked:..... PC

Approved:..... PC

Revision	Description	Made	Checked	Approved	Date
A (Final)	Planning	MJ	PC	PC	08/2023

Proposed Industrial Units
at Huntstown Circular Economic Hub,
Huntstown, Fingal, Co Dublin

Engineering Report (Planning Application)

TABLE OF CONTENTS

1. INTRODUCTION

1.1. Background

This report has been prepared by Coyle Civil & Structural Ltd for a warehouse development at the Huntstown Circular Economic Hub, Huntstown, Co. Fingal.

This engineering report sets out the basis for the planning submission in terms of surface/foul drainage and water supply.

2. PROPOSED DEVELOPMENT

The development consists of a development of 2no industrial warehouse units to be constructed on an existing greenfield site at Huntstown/Coldwinters Tds. The entire site area is approximately 9.655 hectares.

3. SITE INFORMATION

3.1 Site Location

The proposed development is located in Huntstown/Coldwinters, Co Fingal.

Figure 1 Site Location Map

3.2 Site Topography

The existing site falls from east to west with a mound to the centre of the site. Existing services to the site are as detailed in Appendix E of this report.

Connection for the foul sewage and watermain supply are proposed to the North Rd using the existing services. The proposed deign in Appendix A outlines the connection points.

4. WATER SUPPLY

This section describes the existing water supply in the vicinity of the site and summarises the proposed watermain infrastructure required to serve the proposed development.

4.1 Proposed Water Supply

The site will be served by new 150mm HDPE water supply ring main. The connection is proposed to be provided from the existing public road, as per the layout in Appendix A via the existing 150mm uPVC watermain. All watermain infrastructure has been designed in accordance with the Irish Water code of Practice.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

5. FOUL DRAINAGE

It is proposed to provide new separate surface and foul drainage systems to serve the proposed development. This section describes the existing foul drainage services on or near the site and summarises the additional foul drainage infrastructure required to serve the proposed development.

5.1 Existing Foul Drainage

The nearest available connection to the public foul sewer is located to the North Rd, to the east of the site, it is noted that the foul sewage connection point sits outside the site boundaries.

The existing site is not serviced by foul sewage infrastructure.

5.2 Proposed Foul Drainage

The foul sewer branch pipes conveying the effluent from the development to the main foul drainage system will generally consist of 300mm dia pipes. Given the available gradient to the outfall point a 300mm diameter pipe is required to achieve an adequate self cleansing velocity.

The proposed Irish Water Greater Dublin Orbital Sewer route passes through the site as per Appendix F. A consultation meeting was held with Irish Water on the 13th December 2022 where agreement for the proposed warehouse development was provided in principle.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

5.2.1 Hydraulic & Organic Loading

Daily foul discharge has been estimated based on the proposed development use in accordance with the EPA and Irish Water guidelines.

The projected total wastewater discharge is as shown in Table 5.1 below:

Total Population	l/person/day	l/day	BOD (g/day per person)	Organic Loading (g/day BOD5)
60	60	3600	25	1500

Table 5.1 - Water Supply, Hydraulic and Organic Loading

Max Design Flow:

= 1500 litres per day.

Assuming 6 times dry weather flow (DWF), the peak hydraulic discharge arising from this development is: 0.42 l/second.

The pipe network has been designed to ensure that sufficient hydraulic capacity and cleansing velocities are achieved, in accordance with Irish Water Code of Practice.

Max Organic Load:

=2.5kg (BOD_5)/day.

Population Equivalent Value:

= 60 P.E.

All foul drainage will be constructed in accordance with Greater Dublin Region Code of Practice for Drainage Works and Irish Water requirements.

6. SURFACE WATER DRAINAGE

It is proposed to provide new separate surface and foul drainage systems to serve the proposed development.

This section outlines the existing surface water drainage services onsite and gives our proposals for the additional surface water drainage requirements as part of the development.

6.1 Existing Surface Water Drainage

The existing site generally drains from east to west, all surface water is dissipated through natural infiltration. There is no natural outfall to the site.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

6.2 Proposed Surface Water Drainage

The surface storm water design consists of the following components.

- SuD's infiltration soakaway with storage capacity.
- Permeable paving to carpark areas
- Rainwater harvesting to building roofs

It is proposed to harvest the rainwater from the building roofs allowing for attenuation of up to 10,000 litres per industrial unit for further use. As such 2no separate surface water drainage systems have been proposed to separate rainwater from the roof and to collect it in the rainwater harvesting tank. A separate surface water system for trafficked hardstand areas and all ground surface rainwater runoff has been proposed and to be discharged through a by-pass petrol interceptor (Klargester). All rainwater from the site will be stored and infiltrated at site, there is therefore no outfall form the site and the as such the controlled flow rate is 0.0 litres per second per hectare (0l/s/ha).

A BRE 365 infiltration test was carried out as part of the site investigation to the site, details of the infiltration rate can be found in Appendix H.

In order to comply with Fingal CoCo Development Plan requirements, it is necessary to include a SuDS based storm water management system in accordance with the Greater Dublin Strategic Drainage Strategy. The above listed SuD's design items are included through the following;

1. Permeable paving to all car parking areas to allow for self infiltration to the subsoil. Given the turning of heavy duty HGV's it is not possible to provide permeable paving to all hardstand areas.
2. Rainwater harvesting is provided to all roof water in the form of underground rain harvesting butts. The retained water will be used for general washing and vehicle washing.
3. The installation of an underground storage cell with subsoil infiltration (soakaway). The drainage from the hardstand yard areas will be directed to a petrol/oil interceptor and in turn to the storage cell to allow for infiltration to the subsoil.

The surface water drainage system has been designed to ensure adequate capacity is achieved with a minimum self-cleansing velocity in the pipes when flowing half full.

It is noted the previous planning application ref FW20A/0063 made reference to an open swale. Open swales or retention ponds are not a viable means of SuDs for this site. Open swales and ponds attract bird life and the proximity of the site to Dublin Airport would increase the risk to aircraft from increased bird number. This above is addressed further in the Aviation Consultants report accompanying the application.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

All surface water drainage shall be constructed in accordance with Greater Dublin Region Code of Practice for Drainage Works

7. SUMMARY

- Separate foul and surface water drainage systems will be constructed to serve the site.
- Separate surface water system to collect and harvest water from the roofs for re-use has been proposed.
- Sustainable Drainage Systems designed for the proposed development include: permeable paving to staff car park, rainwater harvesting system, storage and infiltration (soakaway) system.

APPENDIX A
PROPOSED DRAINAGE & WATERMAIN DRAWING

- (AV) On-line Air Valve as per STD-W-22
- (SV) Sluice Valve as per STD-W-15
- (WH) Washout Hydrant as per STD-W-30A with Scour Chamber as per STD-W-30B
- (H) Off-line Hydrant as per STD-W-19
- WM Electromagnetic Meter chamber as per STD-W-26

GREYWATER INLET PIPE TO BUILDING

10,000 LITRE KINGSPAN KLARGESTER BELOW GROUND RAINWATER HARVESTING SYSTEM (ENV0350TKSW)

PROPOSED SUDS BASED PERMEABLE PAVING TO CARPARK AREA

10,000 LITRE KINGSPAN KLARGESTER BELOW GROUND RAINWATER HARVESTING SYSTEM (ENV0350TKSW)

GREYWATER INLET PIPE TO BUILDING

Drainage storage with infiltration - Geocellular storage 20m x 96m. Stormblock Optimum 0.8m x 0.8m x 0.66m, two layers of 3000 pcs, 2407m³ volume. 2335m³ required storage, 72m³ spare capacity.

By-pass Petrol Interceptor Klargester NSBE040 or similar approved

F.F.L. +78.700

G.L. +78.600

Approx location of overhead lines

NOTES:-

This is a planning drawing only and is therefore limited in its capacity to convey the total information, details & specification necessary to complete the works. Any work carried out that is not covered here will be the resonsibility of the persons carrying them out. If any situation arises which would cause a contravention of the building regulations, then the Engineer should be consulted, otherwise the Engineer cannot be held responsible. As these drawings are prepared as planning drawings only, it is strongly recommended that the Engineer be consulted for the preparation of full working drawings. It is solely the clients responsibility to appoint a Qualified Engineer to supervise the project during the construction stage and to prepare structural working drawings for the builder.

ALL WORK AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE CURRENT BUILDING REGULATIONS WHETHER DETAILED ON THIS DRAWING OR NOT.

All dimensions to be taken on site. Do not scale any dimensions from this drawing. This drawing is to be read in conjunction with all other relevant drawings and specifications etc that are issued.

No. 3 High Street, Monaghan Town,
Co. Monaghan. H18 X635
Tel: 047-72175
Website: www.coylecs.ie
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Project:
Huntstown Circular Economy Hub
Huntstown/Coldwinters, Fingal, Co Dublin

Client: Rathdrinagh Land ULC T/A Irish Recycling

Sheet Title: Drainage & Watermain Layout - Sheet 1

Project No.:		Date:	
22-039		07-03-23	
Drawing No.: C-100.	Scale: As shown.	Rev:	Checked: PC

NOTES:-

This is a planning drawing only and is therefore limited in its capacity to convey the total information, details & specification necessary to complete the works. Any work carried out that is not covered here will be the resonsibility of the persons carrying them out. If any situation arises which would cause a contravention of the building regulations, then the Engineer should be consulted, otherwise the Engineer cannot be held responsible. As these drawings are prepared as planning drawings only, it is strongly recommended that the Engineer be consulted for the preparation of full working drawings. It is solely the clients responsibility to appoint a Qualified Engineer to supervise the project during the construction stage and to prepare structural working drawings for the builder.

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Connection to existing 6" uPVC pipe as per STD-W-05

Outfall to existing manhole

F.F.L. +78.700

ESB Pylon

Approx location of overhead lines

FINGLAS 220KV STATION

Coyle CIVIL & STRUCTURAL

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Project:
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Sheet Title: Drainage & Watermain Layout - Sheet 2

Project No.:		Date:	
22-039.		07-03-23	
Drawing No.: C-101.	Scale: As shown.	Rev:	Checked: PC

APPENDIX B
DRAINAGE SCEDULE

Document Ref; **HCEH Drainage schedule (S3 P1) (1)**

Project: HCEH
Zone: -
Description: Surface Drainage
Network: As shown
Area: -

Schedule Rev.: P1
Drawing Ref.: P0
(including rev.) -

	Issued;	Checked;	Approved;
Name	MJ	MJ	PC
Date	01/03/2023	01/03/2023	01/03/2023

	Pipe Details								*Upstream*						*Downstream*				
Network	Pipe Ref.	Length (m)	Gradient (1:xxx)	Full Bore Vel (m/s)	Internal Dia. (mm)	Pipe Capacity (l/s)	Flow (l/s)	Bedding Type	Chamber Ref.	Chamber Type	Cover Type	Pipe Invert Level (mAOD)	Cover Level (mAOD)	Pipe Cover Depth (m)	Chamber Ref.	Pipe Invert Level (mAOD)	Cover Level (mAOD)	Pipe Cover Depth (m)	Notes
Surface Drainage	S1.000	83.838	296.5	0.75	225	30.0	20.8	Type S	S1	Type C	C1	77.175	78.600	1.200	S4	76.892	78.600	1.483	
	S2.000	49.128	296.0	0.75	225	30.0	29.2	Type Z	S2	Type C	C1	78.430	78.600	-0.055	S3	78.264	78.600	0.111	Drainage run to be replaced with Aco drain and connected to manhole S3 if required
	S2.001	46.864	400.3	0.78	300	55.1	49.7	Type S	S3	Type C	C1	78.189	78.600	0.111	S4	78.072	78.600	0.228	
	S1.001	21.882	121.6	1.42	300	100.7	69.0	Type S	S4	Type C	C1	76.817	78.600	1.483	S17	76.637	78.600	1.663	
	S3.000	52.048	296.9	0.75	225	30.0	28.5	Type S	S5	Type C	C1	77.175	78.600	1.200	S6	77.000	78.600	1.375	
	S3.001	56.759	392.8	0.79	300	55.6	55.1	Type S	S6	Type C	C1	76.925	78.600	1.375	S7	76.780	78.600	1.520	
	S3.002	45.702	392.8	0.79	300	55.6	55.1	Type S	S7	Type C	C1	76.780	78.600	1.520	S14	76.664	78.600	1.636	
	S4.000	51.500	51.5	1.41	150	24.8	21.0	Type S	S8	Type C	C1	80.110	81.460	1.200	S9	79.110	80.460	1.200	
	S4.001	25.777	56.0	1.75	225	69.6	27.9	Type S	S9	Type C	C1	79.035	80.460	1.200	S10	78.575	80.000	1.200	
	S4.002	56.270	48.9	1.87	225	74.5	39.6	Type S	S10	Type C	C1	78.575	80.000	1.200	S11	77.425	78.850	1.200	
	S4.003	55.686	385.0	0.80	300	56.2	53.4	Type S	S11	Type C	C1	77.350	78.850	1.200	S12	77.205	80.000	2.495	
	S4.004	59.128	500.0	0.80	375	88.7	61.3	Type S	S12	Type C	C1	77.130	80.000	2.495	S13	77.012	79.200	1.813	
	S4.005	55.125	500.0	0.80	375	88.7	69.5	Type S	S13	Type C	C1	77.012	79.200	1.813	S14	76.902	78.600	1.323	
	S3.003	13.317	500.0	0.90	450	143.5	115.6	Type S	S14	Type C	C1	76.514	78.600	1.636	S17	76.487	78.600	1.663	
	S5.000	76.818	295.5	0.76	225	30.0	27.5	Type Z	S15	Type C	C1	78.240	78.600	0.135	S16	77.980	78.600	0.395	Drainage run to be replaced with Aco drain and connected to manhole S16 if required
	S5.001	2.984	14.7	3.43	225	136.4	27.5	Type S	S16	Type C	C1	77.980	78.600	0.395	S17	77.777	78.600	0.598	
	S1.002	10.439	500.0	0.99	525	215.4	195.1	Type S	S17	Type C	C1	76.412	78.600	1.663	S34	76.391	78.600	1.684	
	S6.000	41.830	98.9	1.01	150	17.9	6.1	Type S	Saj18	Access Junction	C1	77.250	78.600	1.200	Saj19	76.827	78.600	1.623	
	S6.001	18.553	174.6	0.76	150	13.4	11.1	Type S	Saj19	Access Junction	C1	76.827	78.600	1.623	Saj20	76.721	78.600	1.729	
	S6.002	30.000	296.1	0.75	225	30.0	26.2	Type S	Saj20	Access Junction	C1	76.646	78.600	1.729	Saj21	76.544	78.600	1.831	
	S6.003	40.000	426.5	0.76	300	53.4	43.8	Type S	Saj21	Access Junction	C1	76.469	78.600	1.831	Saj24	76.376	78.600	1.924	
	S7.000	41.830	175.3	0.76	150	13.4	11.0	Type S	Saj22	Access Junction	C1	77.250	78.600	1.200	Saj23	77.011	78.600	1.439	
	S7.001	40.000	296.5	0.75	225	30.0	20.6	Type S	Saj23	Access Junction	C1	76.936	78.600	1.439	Saj24	76.802	78.600	1.573	
	S6.004	12.654	500.0	0.80	375	88.7	62.3	Type S	Saj24	Access Junction	C1	76.301	78.600	1.924	Saj32	76.275	78.600	1.950	
	S8.000	41.841	175.1	0.76	150	13.4	12.5	Type S	Saj25	Access Junction	C1	77.250	78.600	1.200	Saj26	77.011	78.600	1.439	
	S8.001	45.574	296.1	0.75	225	30.0	23.5	Type S	Saj26	Access Junction	C1	76.936	78.600	1.439	Saj27	76.782	78.600	1.593	
	S8.002	31.174	426.5	0.76	300	53.4	38.8	Type S	Saj27	Access Junction	C1	76.707	78.600	1.593	Saj30	76.634	78.600	1.666	
	S9.000	41.830	168.2	0.77	150	13.6	13.6	Type S	Saj28	Access Junction	C1	77.250	78.600	1.200	Saj29	77.001	78.600	1.449	
	S9.001	51.805	238.5	0.84	225	33.5	26.0	Type S	Saj29	Type C	C1	76.926	78.600	1.449	Saj30	76.709	78.600	1.666	
	S8.004	54.998	219.0	1.22	375	134.8	62.3	Type S	Saj31	Access Junction	C1	76.526	78.600	1.699	Saj32	76.275	78.600	1.950	
	S6.005	21.668	500.0	0.90	450	143.5	116.4	Type S	Saj32	Access Junction	C1	76.200	78.600	1.950	Saj33	76.157	78.600	1.993	
	S6.006	4.714	500.0	0.90	450	143.5	116.4	Type S	Saj33	Access Junction	C1	76.157	78.600	1.993	S34	76.148	78.600	2.002	
	S1.003	5.238	500.0	1.08	600	306.0	303.1	Type S	S34	Type C	C1	75.998	78.600	2.002	S Outfall	75.987	78.600	2.013	Outfall to storage and infiltration
Foul Drainage	F1.000	41.331	241.7	1.01	300	71.2	2.4	Type S	Faj1	Access Junction	C1	78.132	78.600	0.168	F2	77.961	78.600	0.339	
	F2.000	1.480	58.5	1.01	100	7.9	0.0	Type S	S3	Type C	C1	78.187	78.600	0.313	F2	78.161	78.600	0.339	
	F1.001	30.397	241.7	1.01	300	71.2	2.4	Type S	F2	Type C	C1	77.961	78.600	0.339	F3	77.836	78.600	0.464	
	F1.002	21.882	59.0	2.05	300	144.9	4.8	Type S	F3	Type C	C1	77.836	78.600	0.464	F5	77.465	78.600	0.835	
	F3.000	1.694	58.5	1.01	100	7.9	0.0	Type S	S16	Type C	C1	77.981	78.600	0.519	F4	77.952	78.600	0.548	
	F3.001	16.808	58.5	1.01	100	7.9	0.0	Type S	F4	Type C	C1	77.952	78.600	0.548	F5	77.665	78.600	0.835	
	F1.003	45.461	240.8	1.01	300	71.3	4.8	Type S	F5	Type C	C1	77.465	78.600	0.835	F10	77.276	79.100	1.524	
	F4.000	41.382	240.6	1.01	300	71.3	2.4	Type S	Faj6	Access Junction	C1	78.141	78.600	0.159	Faj7	77.969	78.600	0.331	
	F4.001	30.879	111.9	1.49	300	105.0	2.4	Type S	Faj7	Access Junction	C1	77.969	78.600	0.331	Faj8	77.693	78.600	0.607	
	F4.002	33.646	241.1	1.01	300	71.3	2.4	Type S	Faj8	Access Junction	C1	77.693	78.600	0.607	F9	77.553	79.000	1.147	
	F4.003	20.941	75.6	1.81	300	127.9	2.4	Type S	F9	Type C	C1	77.553	79.000	1.147	F10	77.276	79.100	1.524	
	F1.004	42.899	241.1	1.01	300	71.3	7.2	Type S	F10	Type C	C1	77.276	79.100	1.524	F11	77.098	79.500	2.102	
	F1.005	39.504	241.1	1.01	300	71.3	7.2	Type S	F11	Type C	C1	77.098	79.500	2.102	F12	76.934	80.010	2.776	
	F1.006	66.505	241.1	1.01	300	71.3	7.2	Type S	F12	Type C	C1	76.934	80.010	2.776	F13	76.659	79.800	2.841	
	F1.007	71.290	241.1	1.01	300	71.3	7.2	Type S	F13	Type C	C1	76.659	79.800	2.841	F14	76.363	79.720	3.057	
	F1.008	55.075	241.1	1.01	300	71.3	7.2	Type S	F14	Type C	C1	76.363	79.720	3.057	F15	76.134	80.640	4.206	
	F1.009	12.865	241.1	1.01	300	71.3	7.2	Type S	F15	Type C	C1	76.134	80.640	4.206	F16	76.081	80.640	4.259	
	F1.010	50.956	241.1	1.01	300	71.3	7.2	Type S	F16	Type C	C1	76.081	80.640	4.259	F17	75.870	80.000	3.830	
	F1.011	48.647	241.1	1.01	300	71.3	7.2	Type S	F17	Type C	C1	75.870	80.000	3.830	F18	75.668	78.000	2.032	
	F1.012	55.188	241.1	1.01	300	71.3	7.2	Type S	F18	Type C	C1	75.668	78.000	2.032	F19	75.439	78.200	2.461	
	F1.013	39.881	241.1	1.01	300	71.3	7.2	Type S	F19	Type C	C1	75.439	78.200	2.461	F20	75.274	78.450	2.876	
	F1.014	23.246	241.1	1.01	300	71.3	7.2	Type S	F20	Type C	C1	75.274	78.450	2.876	F21	75.177	78.750	3.273	

Document Ref; **HCEH Drainage schedule (S3 P1) (1)**

	F1.015	36.852	241.1	1.01	300	71.3	7.2	Type S	F21	Type C	C1	75.177	78.750	3.273	F22	75.024	78.670	3.346	
	F1.016	57.820	241.1	1.01	300	71.3	7.2	Type S	F22	Type C	C1	75.024	78.670	3.346	F23	74.785	78.180	3.095	
	F1.017	8.342	241.1	1.01	300	71.3	7.2	Type S	F23	Type C	C1	74.785	78.180	3.095	F Outfall	74.750	78.155	3.105	Outfall to existing foul network

Notes

1. All covers to new chambers shall be positioned to be opened and the chamber accessed without obstruction. Chamber covers to be orientated to avoid obstructing access where located in close proximity to a safety barrier, where applicable.
2. All man entry chambers shall have access arranged such that the user faces oncoming traffic when entering and exiting.
3. Pipe Cover Depth is distance between finished ground surface level and pipe soffit level.

APPENDIX C
INFILTRATION (SOAKAWAY) STORAGE CALCULATION

SURFACE WATER ATTENUATION & STORAGE

Version 1.04

INPUT			
Total Area to be Drained		24,100	Sq m
Impermeability Factor		0.9	
Storm Return Period	T	100	Yrs
Allowable Discharge **per hectare**		0.00	l/s
Time of Concentration	TC	4.00	min
2 Day M5 (mm) =		53.00	mm
Ratio 60 Minute M5/2 Day M5	r	0.31	
Impermeable Area		21690	Sq m
Allowable Discharge	P	0.00	Cu m/min
60 Minute M5		16.50	mm
Storage Event		Maximum Event	

Storage C = Q*TS - P*(TS + TC) + P^2*TC/Q

W = LN(1.06 * M5-60/(48*r))
X = LN(721/(1 + 15 * D))
Y = LN(48 * r/1.06)
Z = LN(721/16)
LN(M5-D) = LN(D) + W + (X * Y)/Z

Cr = J0 + J1 * (M5-D) + J2 * (M5-D)^2

LN((MT-D)/M5-D)) = Cr * (LN(T) - 1.5)

Project No.:	**HCEH**
Project:	**HCEH**
Date:	**16-Feb-2023**
Designer:	**MJK**

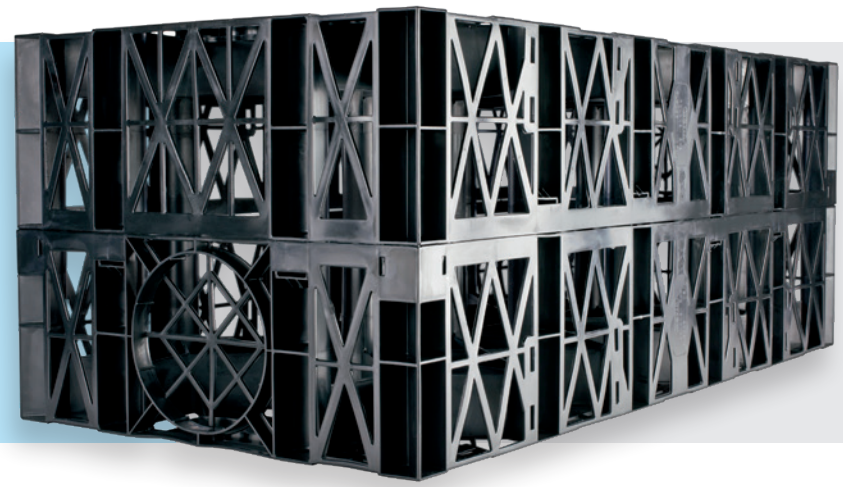
Time of Storm TS	Time of Storm D	Time of Concentration TC	W	X	Y	Z	LN(D)	LN(M5-D)	M5-D	Rainfall Intensity	J0	J1	J2	Cr	M100-D	Rainfall Intensity +20%	Discharge to Storage	Discharge to Storage Q	Storage Required C
Minutes	Hours	Minutes							mm	mm/hr					mm	mm/hr	l/s	Cu.m/min	Cu. m
3	0.050	4.0	0.157	6.021	2.646	3.808	-2.996	1.345	3.839	76.787	0.165	0.008	-0.000305	0.192	6.975	167.410	1008.646	60.519	181.56
5	0.083	4.0	0.157	5.770	2.646	3.808	-2.485	1.682	5.374	64.483	0.165	0.008	-0.000305	0.201	10.023	144.335	869.616	52.177	260.88
7	0.117	4.0	0.157	5.569	2.646	3.808	-2.148	1.879	6.544	56.091	0.165	0.008	-0.000305	0.206	12.416	127.712	769.462	46.168	323.17
10	0.167	4.0	0.157	5.328	2.646	3.808	-1.792	2.068	7.906	47.437	0.165	0.008	-0.000305	0.212	15.252	109.817	661.648	39.699	396.99
13	0.217	4.0	0.157	5.134	2.646	3.808	-1.529	2.195	8.981	41.450	0.165	0.008	-0.000305	0.215	17.511	96.983	584.322	35.059	455.77
16	0.267	4.0	0.157	4.971	2.646	3.808	-1.322	2.290	9.873	37.024	0.165	0.008	-0.000305	0.217	19.389	87.250	525.678	31.541	504.65
20	0.333	4.0	0.157	4.789	2.646	3.808	-1.099	2.386	10.873	32.619	0.165	0.008	-0.000305	0.219	21.486	77.349	466.026	27.962	559.23
25	0.417	4.0	0.157	4.600	2.646	3.808	-0.875	2.478	11.916	28.600	0.165	0.008	-0.000305	0.221	23.654	68.123	410.444	24.627	615.67
30	0.500	4.0	0.157	4.441	2.646	3.808	-0.693	2.550	12.803	25.607	0.165	0.008	-0.000305	0.222	25.471	61.129	368.305	22.098	662.95
45	0.750	4.0	0.157	4.075	2.646	3.808	-0.288	2.701	14.898	19.864	0.235	-0.001	-0.000017	0.220	29.462	47.139	284.011	17.041	766.83
60	1.000	4.0	0.157	3.808	2.646	3.808	0.000	2.803	16.500	16.500	0.235	-0.001	-0.000017	0.217	32.417	38.900	234.374	14.062	843.75
75	1.250	4.0	0.157	3.597	2.646	3.808	0.223	2.880	17.818	14.254	0.235	-0.001	-0.000017	0.216	34.811	33.419	201.347	12.081	906.06
90	1.500	4.0	0.157	3.424	2.646	3.808	0.405	2.942	18.948	12.632	0.235	-0.001	-0.000017	0.214	36.838	29.470	177.559	10.654	958.82
105	1.750	4.0	0.157	3.276	2.646	3.808	0.560	2.993	19.945	11.397	0.235	-0.001	-0.000017	0.213	38.603	26.471	159.487	9.569	1004.77
120	2.000	4.0	0.157	3.147	2.646	3.808	0.693	3.037	20.841	10.421	0.235	-0.001	-0.000017	0.211	40.172	24.103	145.223	8.713	1045.61
135	2.250	4.0	0.157	3.032	2.646	3.808	0.811	3.075	21.658	9.626	0.235	-0.001	-0.000017	0.210	41.588	22.180	133.635	8.018	1082.44
150	2.500	4.0	0.157	2.930	2.646	3.808	0.916	3.110	22.411	8.964	0.235	-0.001	-0.000017	0.209	42.879	20.582	124.006	7.440	1116.05
165	2.750	4.0	0.157	2.837	2.646	3.808	1.012	3.140	23.110	8.404	0.235	-0.001	-0.000017	0.208	44.068	19.230	115.858	6.951	1147.00
180	3.000	4.0	0.157	2.752	2.646	3.808	1.099	3.168	23.764	7.921	0.235	-0.001	-0.000017	0.207	45.170	18.068	108.861	6.532	1175.70
240	4.000	4.0	0.157	2.470	2.646	3.808	1.386	3.260	26.043	6.511	0.250	-0.002	0.000012	0.204	48.992	14.698	88.554	5.313	1275.17
300	5.000	4.0	0.157	2.250	2.646	3.808	1.609	3.330	27.942	5.588	0.250	-0.002	0.000012	0.201	52.116	12.508	75.359	4.522	1356.47
360	6.000	4.0	0.157	2.070	2.646	3.808	1.792	3.387	29.586	4.931	0.250	-0.002	0.000012	0.198	54.785	10.957	66.016	3.961	1425.96
420	7.000	4.0	0.157	1.917	2.646	3.808	1.946	3.435	31.045	4.435	0.250	-0.002	0.000012	0.196	57.130	9.794	59.007	3.540	1486.99
480	8.000	4.0	0.157	1.785	2.646	3.808	2.079	3.477	32.362	4.045	0.250	-0.002	0.000012	0.195	59.230	8.884	53.529	3.212	1541.63
540	9.000	4.0	0.157	1.668	2.646	3.808	2.197	3.514	33.568	3.730	0.250	-0.002	0.000012	0.193	61.136	8.151	49.112	2.947	1591.24
600	10.000	4.0	0.157	1.563	2.646	3.808	2.303	3.546	34.683	3.468	0.250	-0.002	0.000012	0.192	62.886	7.546	45.467	2.728	1636.80
660	11.000	4.0	0.157	1.469	2.646	3.808	2.398	3.576	35.721	3.247	0.250	-0.002	0.000012	0.190	64.508	7.037	42.399	2.544	1679.00
720	12.000	4.0	0.157	1.382	2.646	3.808	2.485	3.603	36.695	3.058	0.250	-0.002	0.000012	0.189	66.020	6.602	39.777	2.387	1718.38
780	13.000	4.0	0.157	1.303	2.646	3.808	2.565	3.627	37.613	2.893	0.250	-0.002	0.000012	0.188	67.440	6.225	37.507	2.250	1755.33
840	14.000	4.0	0.157	1.229	2.646	3.808	2.639	3.650	38.483	2.749	0.250	-0.002	0.000012	0.187	68.779	5.895	35.520	2.131	1790.19
900	15.000	4.0	0.157	1.160	2.646	3.808	2.708	3.672	39.311	2.621	0.250	-0.002	0.000012	0.186	70.048	5.604	33.763	2.026	1823.21
960	16.000	4.0	0.157	1.096	2.646	3.808	2.773	3.691	40.100	2.506	0.250	-0.002	0.000012	0.185	71.255	5.344	32.198	1.932	1854.62
1020	17.000	4.0	0.157	1.035	2.646	3.808	2.833	3.710	40.856	2.403	0.250	-0.002	0.000012	0.184	72.406	5.111	30.794	1.848	1884.57
1080	18.000	4.0	0.157	0.979	2.646	3.808	2.890	3.728	41.581	2.310	0.250	-0.002	0.000012	0.183	73.507	4.900	29.525	1.772	1913.24
1140	19.000	4.0	0.157	0.925	2.646	3.808	2.944	3.744	42.279	2.225	0.250	-0.002	0.000012	0.183	74.563	4.709	28.373	1.702	1940.74
1400	23.333	4.0	0.157	0.720	2.646	3.808	3.150	3.807	45.034	1.930	0.250	-0.002	0.000012	0.180	78.713	4.048	24.390	1.463	2048.74
1900	31.667	4.0	0.157	0.415	2.646	3.808	3.455	3.901	49.459	1.562	0.250	-0.002	0.000012	0.176	85.310	3.233	19.478	1.169	2220.45
2200	36.667	4.0	0.157	0.269	2.646	3.808	3.602	3.946	51.732	1.411	0.227	-0.001	0.000003	0.174	88.668	2.902	17.484	1.049	2307.85
2300	38.333	4.0	0.157	0.225	2.646	3.808	3.646	3.960	52.441	1.368	0.227	-0.001	0.000003	0.173	89.711	2.808	16.920	1.015	2335.01

MAXIMUM STORAGE REQUIRED (Cu. M) = 2335.01

APPENDIX D
SOAKAWAY STORAGE SYSTEM SPEC SHEETS

Product Datasheet

AquaCell Eco



Product description

AquaCell Eco is manufactured from specially reformulated, recycled material and has been specifically designed for shallow, non-trafficked, landscaped applications. AquaCell Eco is NOT suitable for locations subject to high water tables.

Technical specification

Product code / SAP code	6LB025 / 4040289	**Void ratio**	95%
Colour	Black	**Material**	Recycled PP
Dimensions	1m x 0.5m x 0.4m	**Vertical loading**	21.3 tonnes/m^2 (213 kN/m^2)
Weight	7kg	**Lateral loading**	5.2 tonnes/m^2 (52 kN/m^2)
Storage volume	190 litres	**BBA approval**	Certificate 03/4018

Maximum installation depths

Typical soil type	**Maximum depth of installation – to base of units (m)[1]**		
	Soil weight kN/m^3	**Angle of internal friction φ (degrees)[2, 3]**	**Landscaped areas**
Over consolidated stiff clay	20	24	1.53
Silty sandy clay	19	26	1.68
Loose sand and gravel	18	30	2.08
Medium dense sand and gravel	19	34	2.35
Dense sand and gravel	20	38	2.68

Minimum cover depths

	Landscaped areas
Minimum cover depth (m)	0.30[3]

1. These values relate to installations where the groundwater is a minimum of one metre below the base of the excavation.
2. AquaCell Eco units should not be used where groundwater is present.
3. 0.5m cover is required where a ride-on mower may be used.

Assumptions made:
- Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil

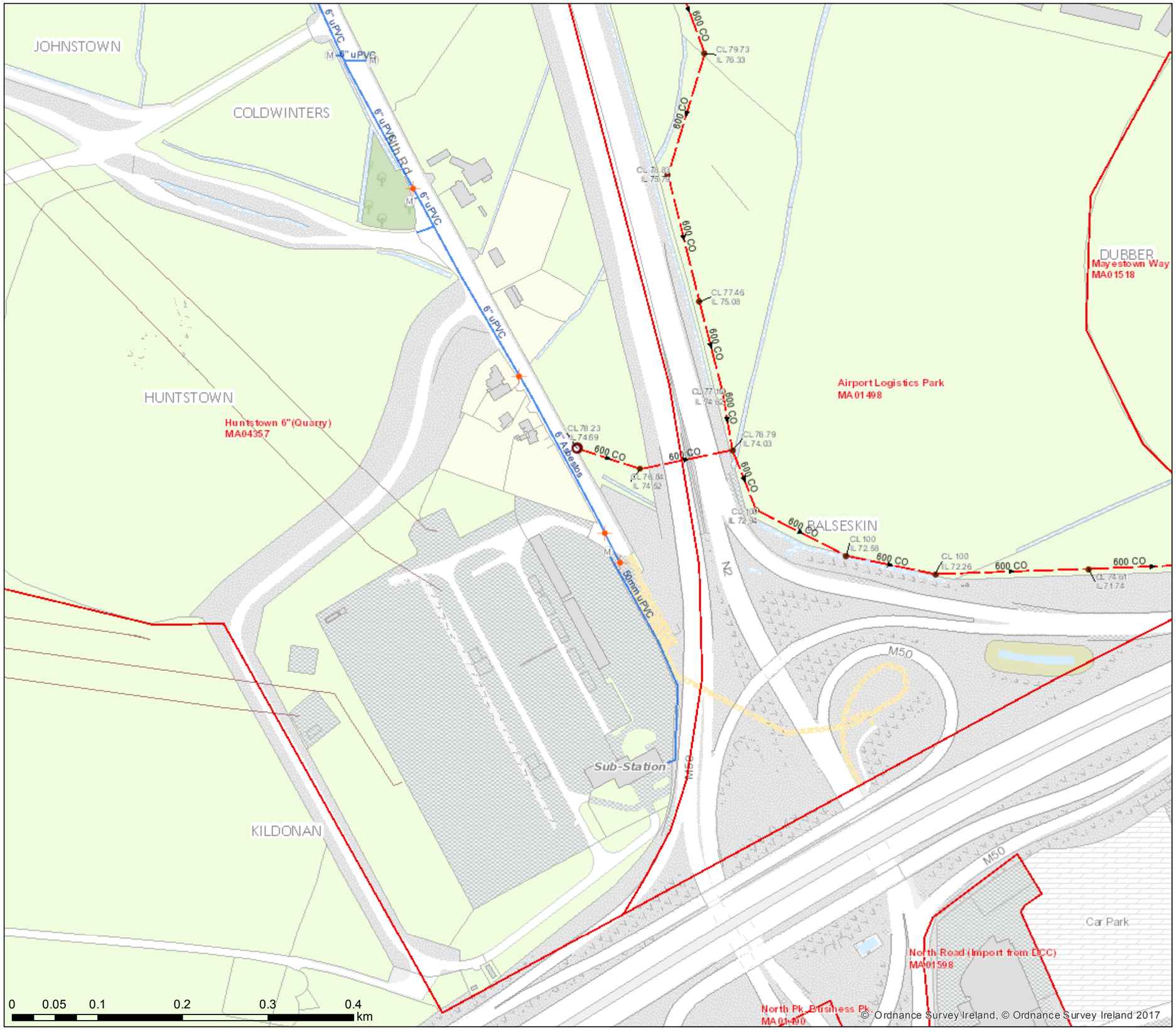
Source: BBA

Wavin Ireland Ltd | Balbriggan | Co Dublin | K32 K840
Tel 01 8020200 | **Email** info.ie@wavin.com | **Website** www.wavin.ie

June 2021

APPENDIX E
EXISTING WATERMAIN LAYOUT
(IRISH WATER)

Balseskin, North Road



UISCE ÉIREANN : IRISH WATER

Print Date: 18/08/2022

Printed by:Irish Water

Water Distribution Network
- Water Treatment Plant
- Water Pump Station
- Storage Cell/Tower
- Dosing Point
- Meter Station
- Abstraction Point
- Telemetry Kiosk

Reservoir
- Potable
- Raw Water

Water Distribution Mains
- Irish Water
- Private

Trunk Water Mains
- Irish Water
- Private

Water Lateral Lines
- Irish Water
- Non IW
- Water Casings
- Water Abandoned Lines
- Boundary Meter
- Bulk/Check Meter
- Group Scheme
- Source Meter
- Waste Meter
- Unknown Meter ; Other Meter
- Non-Return
- PRV
- PSV
- Sluice Line Valve Open/Closed
- Butterfly Line Valve Open/Closed
- Sluice Boundary Valve Open/Closed
- Butterfly Boundary Valve Open/Closed
- Scour Valves
- Single Air Control Valve
- Double Air Control Valve
- Water Stop Valves
- Water Service Connections
- Water Distribution Chambers
- Water Network Junctions
- Pressure Monitoring Point
- Fire Hydrant
- Fire Hydrant/Washout

Water Fittings
- Cap
- Reducer
- Tap
- Other Fittings

Sewer Foul Combined Network
- Waste Water Treatment Plant
- Waste Water Pump station

Sewer Mains Irish Water
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow

Sewer Mains Private
- Gravity - Combined
- Gravity - Foul
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Overflow
- Sewer Lateral Lines
- Sewer Casings

Sewer Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other; Unknown

Discharge Type
- Outfall
- Overflow
- Soakaway
- Standard Outlet
- Other; Unknown

Cleanout Type
- Rodding Eye
- Flushing Structure
- Other; Unknown

Sewer Inlets
- Catchpit
- Gully
- Standard
- Other; Unknown

Sewer Fittings
- Vent/Col
- Other; Unknown

Storm Water Network

Surface Water Mains
- Surface Gravity Mains
- Surface Gravity Mains Private
- Surface Water Pressurised Mains
- Surface Water Pressurised Mains Private

Inlet Type
- Gully
- Standard
- Other; Unknown

Storm Manholes
- Standard
- Backdrop
- Cascade
- Catchpit
- Bifurcation
- Hatchbox
- Lamphole
- Hydrobrake
- Other; Unknown
- Storm Culverts
- Storm Clean Outs
- Stormwater Chambers

Discharge Type
- Outfall
- Overflow
- Soakaway
- Other; Unknown

Gas Networks Ireland
- Transmission High Pressure Gasline
- Distribution Medium Pressure Gasline
- Distribution Low Pressure Gasline

ESB Networks

ESB HV Lines
- HV Underground
- HV Overhead
- HV Abandoned

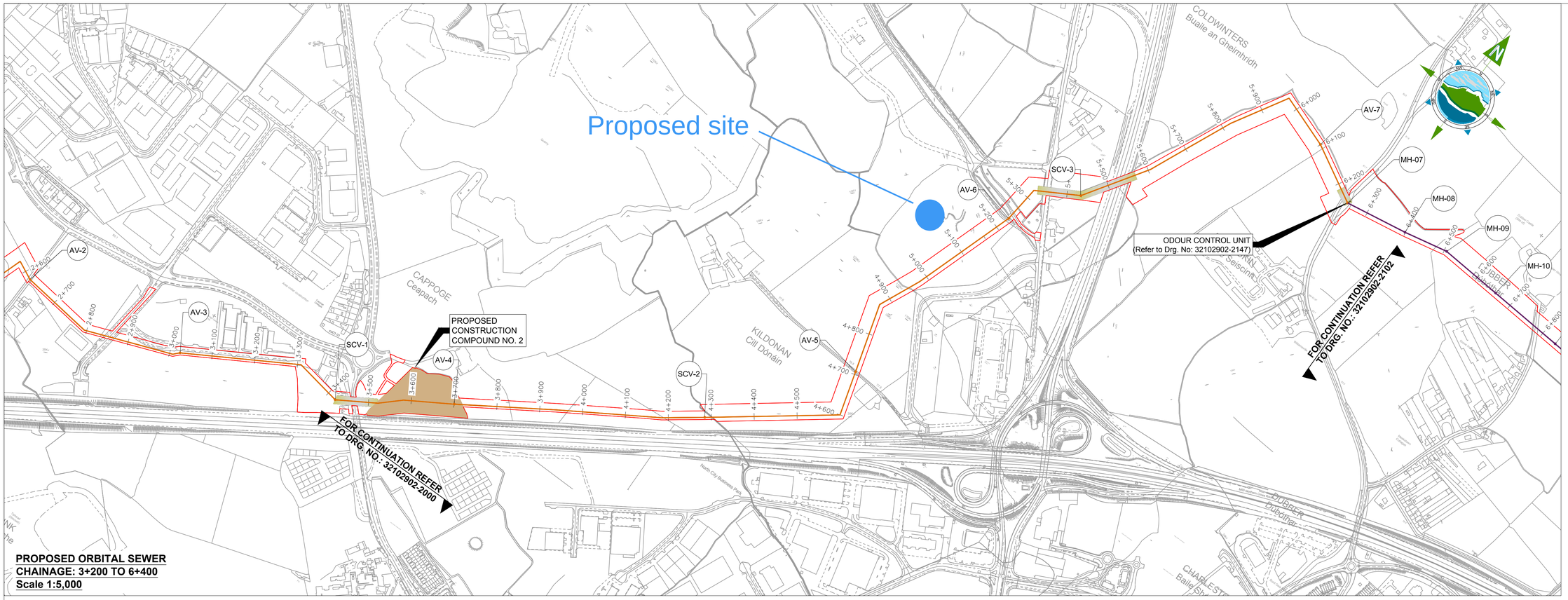
ESB MVLV Lines
- MV Overhead Three Phase
- MV Overhead Single Phase
- LV Overhead Three Phase
- LV Overhead Single Phase
- MVLV Underground
- Abandoned

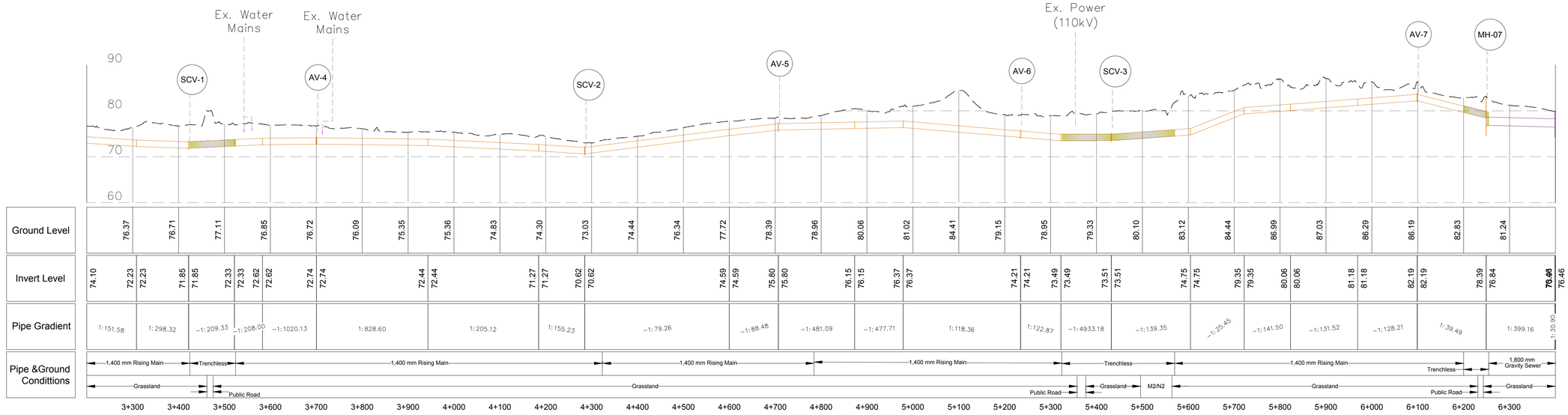
Non Service Categories
- Proposed
- Under Construction
- Out of Service
- Decommissioned

Water Non Service Assets
- Water Point Feature
- Water Pipe
- Water Structure

Waste Non Service Assets
- Waste Point Feature
- Sewer
- Waste Structure

APPENDIX F
IRISH WATER GREATER DUBLIN ORBITAL SEWER





PROPOSED ORBITAL SEWER
CHAINAGE: 3+200 TO 6+400
Scale H-1:5,000 / V-1:500

LEGEND:

- PLANNING BOUNDARY
- CONSTRUCTION COMPOUNDS
- PROPOSED WWTP/PS
- PROPOSED ORBITAL SEWER ROUTE (GRAVITY)
- PROPOSED ORBITAL SEWER ROUTE (RISING MAIN)
- PROPOSED OUTFALL PIPELINE ROUTE (LAND BASED SECTION)
- PROPOSED OUTFALL PIPELINE ROUTE (MARINE SECTION)
- PROPOSED TRENCHLESS SECTION
- MANHOLE (MH-1)
- ACCESS CHAMBER (AC-1)
- AIR VALVE (AV-1)
- SCOUR VALVE (SCV-1)

OSI 1:2,500 Sheet No's:
3062-D, 3063-C, 3063-D, 3064-C, 3064-D, 3130-A, 3130-B, 3130-C, 3130-D, 3131-A.

OSI 1:1,000 Sheet No's:
3063-12, 3063-13, 3063-14, 3063-15, 3064-11, 3064-12, 3129-15, 3129-20, 3129-25, 3130-06, 3130-07, 3130-11, 3130-12, 3130-15, 3130-16, 3130-17, 3130-21, 3130-22, 3131-01, 3131-06, 3131-07.

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
P01	08.06.18	ISSUE FOR PLANNING	AOC	BD

Client: UISCE ÉIREANN / IRISH WATER

Project: Greater Dublin Drainage

Title: PROPOSED ORBITAL SEWER ROUTE - Sheet 2 of 4 -

Scale @ A1:	As Shown		
Prepared by: A. O'Callaghan	Checked: B. Downes	Date: June 2018	
Project Director:	C. O'Keeffe		
Drawing Status:	Planning		

JACOBS TOBIN Patrick J. Tobin & Co. Ltd.

Drawing No.: 32102902-2101 P01

APPENDIX G
IRISH WATER CORRESPONDENCE

Peter Coyle <peter@coylecs.ie>

FW: Greater Dublin Drainage Project IW/10001369/WL/11a Landowner:- Rathdrinagh Land Ltd.

Paul McCarthy <paul.mccarthy@sretaw.ie> 23 March 2023 at 08:13
To: Peter Coyle <peter@coylecs.ie>
Cc: Jim O'Callaghan <jim@ocallaghanmoran.com>, Ronan Woods <ronan@genesisplanning.co.uk>, Andrew Bunbury <andrewbunbury@parkhood.com>, O'Dwyer & Jones - Aviation Planning <admin@aviationplanning.ie>, "jkeenan@trafficwise.ie" <jkeenan@trafficwise.ie>

Hi all,

Please see below response from Irish Water.

Kind regards

Paul

From: John Donoghue (Wayleaves) <John.Donoghue@water.ie>
Sent: Wednesday 22 March 2023, 16:25
To: Paul McCarthy <paul.mccarthy@sretaw.ie>
Cc: Monika Prokop <monika.prokop@water.ie>
Subject: RE: Greater Dublin Drainage Project IW/10001369/WL/11a Landowner:- Rathdrinagh Land Ltd.

Paul

Thank you for your email below and for forwarding the Site Plan, Service Drawings including the proposed Drainage & Watermain Layout Drawing,

Our Project Management Team ('PMT') have reviewed the service drawings provided and have the following **observations**:

- Foul sewer manhole 14 is just inside the permeant wayleave, can this be relocated outside the corridor? (Including suitable separation distance for any concrete surround)
- Watermain layout shows a valve and washout hydrant in the temporary working area, can this be relocated outside the corridor? (Including suitable separation distance for any concrete surround/ thrust blocks)
- Can the surface water layout be revisited to minimise impacts on the permanent wayleave/ TWA? - If it is not possible to remove gullies and road crossings from the corridor perhaps they could be relocated and realigned to minimise future impacts on GDD constructability?
- Public lighting, is there scope to move the lamp standards out of the permanent wayleave?

In terms of the other queries (as addressed below) our PMT are satisfied that these are sufficiently covered off now, such that Uisce Éireann can make a favourable observation should a planning application be submitted.

Kind regards

John

John Donoghue
Valuation Lead - Major Projects

APPENDIX H
BRE 365 TEST RESULTS

Project No. 22-125
Site Huntstown
Test Location Per 01 Glacial Till

Full analysis not possible using method as described in BRE Digest 365/CIRIA Report 156

	width (m)	length (m)
test pit top dimensions	0.4	1.2
test pit base dimensions	0.4	1.2

test infiltration rate (q) = ####### m/h
depth to groundwater before adding water = Dry
test pit depth 1 m
depth to water surface at start of test 0 m

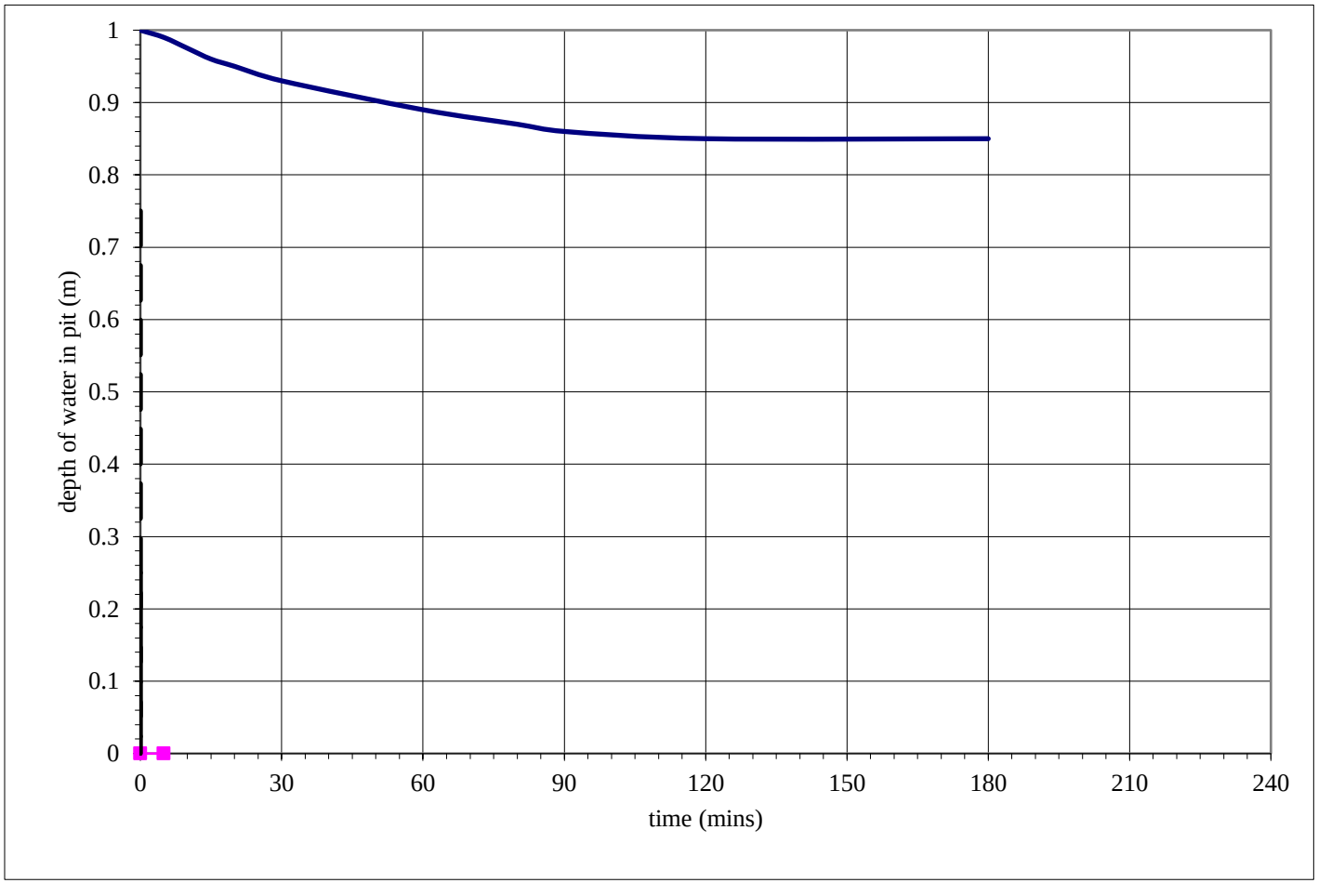
time (mins)	depth to water surface (m)	depth of water in pit (m)	time elapsed from test start (mins)	volume of water lost from test start (m3)	Area of walls and base at 50% drop from test start (m2)	q from start of test (m/min)	q from start of test (m/h)
0	0	1	0	0	3.68		
5	0.01	0.99	5	0.0048	3.664		
10	0.025	0.975	10	0.012	3.64		
15	0.04	0.96	15	0.0192	3.616		
20	0.05	0.95	20	0.024	3.6		
30	0.07	0.93	30	0.0336	3.568		
60	0.11	0.89	60	0.0528	3.504		
80	0.13	0.87	80	0.0624	3.472		
90	0.14	0.86	90	0.0672	3.456		
120	0.15	0.85	120	0.072	3.44		
180	0.15	0.85	180	0.072	3.44		

From graph:

test start - 75% depth at 0.75 m water depth
time is - minutes

test end - 25% depth at 0.25 m water depth
time is - minutes

-	0.25	0.75	#VALUE!	0	2.8800		
-	0.75	0.25	#VALUE!	0.2400	2.0800	#######	#VALUE!



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