KAVANAGH BURKE
CONSULTING ENGINEERS

Drainage Design Report

for

Proposed LRD Development

at

Railpark West,
Maynooth,
County Kildare.

Job No:	**D1824**
Date:	**November 2025**
Client:	**Montane Developments**
Local Authority:	**Kildare County Council**




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Contents

1.0 Introduction

This report has been prepared by Kavanagh Burke Consulting Engineers to provide information on the design details for the foul and stormwater drainage systems, intended to serve the proposed development at Railpark West, Maynooth, County Kildare.

1.1 Project Description

The development will comprise a Large-Scale Residential Development (LRD) on a site at "Railpark West", in the townland of Railpark, Maynooth, Co. Kildare.

The proposed development is for 139 no. units comprising 36 no. houses (ranging in heights up to 3 storeys), 95 no. apartments (5 no. blocks ranging in heights up to 5 storeys partially over podium parking) and 08 no. duplexes (1 no. 3/4 storey Block).

The proposal includes for a new vehicular/pedestrian/cyclist access from the permitted Maynooth Eastern Ring Road (MERR) to the east and the adjoining development to the South, and pedestrian/cyclist access (and vehicular access for one of the proposed houses) to Parklands Grove/Old Railpark to the north of the site.

The development also includes all car and bicycle parking at surface and podium underdeck level, new streets and footpaths, bin stores, residential private open spaces, public & communal open spaces, boundary treatments, waste management areas, landscaping and all associated site development works.

1.2 Site Location

The proposed development is situated at Railpark West, approximately 1.4 km southeast of Maynooth Town Centre, County Kildare. The site covers an area of approximately 2.77 hectares and is currently utilized for agricultural purposes. The location of the site is shown in red on the Site Map below.

Figure 1 Site Location Map

2.0 Foul Water Drainage Design

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.

2.1 Introduction

A pre-connection enquiry was submitted to Uisce Eireann in mid-June 2025, reference No CDS25004480. A Confirmation of Feasibility Letter was received from Uisce Eireann in August 2025. Uisce Eireann have confirmed that a foul connection is feasible subject to upgrades. These upgrades include:

- In order to accommodate the proposed connection for this development, upgrade works are required to increase the capacity of the wastewater network in Maynooth. Uisce Éireann currently has a project on our current investment plan which will provide the necessary upgrade and capacity. This upgrade project (Maynooth Transfer Pipeline) is scheduled

to be completed by Q2 2027 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date.

- To facilitate this development, the main site connection shall be made to the Eastern Link Infrastructure following completion of the Maynooth East Relief Road (MERR) road project. Currently the scope of the MERR project is to deliver works within the MERR only, the required strategic WWPS is not currently on the Uisce Éireann investment plan therefore, the applicantwould be required to fund this infrastructure at Connection Application stage. The Applicant shall note that this would require:
  - Construction of new strategic WWPS and associated rising main to serve the entire area
  - Provision of 24 hour storage and telemetry link to the Maynooth PS
  - Completion of the MERR by third parties.
- Connection to the network can be facilitated prior to completion of the Upgrade Project subject to construction and commissioning of the strategic WWPS and rising main being completed.
- Applicant shall coordinate the drainage strategy with adjacent sites and works to ensure gravity connection can be achieved.
- Network upgrades may also be required based on connection uptake by other developments. These upgrades would consist of existing gravity sewer upsizing works. This requirement will be further determined at Connection Application stage.

General details of the foul water drainage system to serve the proposed development are shown on drawing no. D1824-KB-XX-XX-DR-C-0001. It is proposed to construct a gravity flow foul sewer network to serve the proposed development. It is intended that the foul sewer network will flow by gravity with a connection to proposed MERR Eastern Link Infrastructure following completion of the Maynooth East Relief Road (MERR) road project. The proposed MERR foul network will ultimately discharge to a new proposed foul pumping station located outside the site development. The proposed foul sewer system shall be constructed in accordance with the Irish Water "Wastewater Infrastructure Standard Details" and to the satisfaction of the Local Authority Water Services recommendations.

2.2 Calculations for Foul Sewer Design

The foul sewer will be designed to in accordance with the recommendations in Irish Water Wastewater Code of Practice (table shown below).

Table: Sewer Size/Gradient for Multiple Properties

Number of Dwellings	Pipe Diameter	Minimum Gradient
2 to 9	150mm (or 225mm)	1:60
10 to 20		1:150
21 to 210	225mm	1:200
211 to 250		1:150
251 to 330		1:100
331 – 450	300mm	1:300
451 to 565		1:200
566 to 655		1:150
656 to 830		1:100

3.0 Surface Water Drainage Design

It is proposed to provide new separate surface and foul drainage systems to serve the proposed development. This section outlines the proposals for the additional surface water drainage requirements as part of the development.

3.1 Introduction

The development will incorporate a comprehensive surface water drainage system to manage runoff from the site. The proposed drainage network is designed as an individual gravity pipe system, which will collect surface water runoff from all impermeable hardstanding areas. Surface water runoff from the roofs and surrounding areas will be directed through the drainage network to proposed detention basins and a soakaway, located within the green open spaces of the site.

A flow-controlled discharge outflow from each detention basin will discharge into the next downstream surface water network. The design approach followed incorporates a Management Train approach, using a sequence of SuDS measures that work together to manage surface water runoff. These measures are designed to control flow rates, volume, and frequency of runoff while also providing water quality treatment through natural filtration processes. This approach is followed to ensure complies with the Kildare County Development Plan's Sustainable Drainage Systems (SuDS) Guidance Document.

An underground soakaway is proposed in the central open space of the site. Due to existing site levels and the proposal of a basement parking area for apartment Block

4 and 5, the provision of a detention basin in this location would have required an excessive depth and steep side slopes, leading to potential safety concerns. The levels with this approach would also not allow an outflow to the next system downstream to complete the management train. A high level outflow for the proposed soakaway would solve this issue and ensure the central green open area would remain usable and safe.

The proposed systems are designed to accommodate a storm event with a 1 in 100-year return period, factoring in a 30% climate change allowance and 10% urban creep.

Details of the proposed surface water attenuation systems are shown in drawings D1824-KB-XX-XX-DR-C-0001 and D1824-KB-XX-XX-DR-C-0002.

The groundwater monitoring data from the Geotechnical Report detailed in Appendix C indicates groundwater in the area at levels between 57.14 m OD and 58.15m OD. The proposed soakaway is designed to provide a minimum clearance of 1m between the critical groundwater level and bottom of proposed soakaway. Infiltration testing was conducted at the proposed basin and soakaway locations, and the results are detailed in Appendix B. The tests indicate relatively low infiltration rates. "f" values derived from the test locations. These values were used in the basins and soakaway designs.

All stormwater drainage works will be carried out in accordance with the Department of the Environment's Recommendations for Site Development Works for Housing Areas. Detailed plans will be agreed upon in advance with the Local Authority Water Services Department.

3.2 Surface Water SUDS Measures

As part of the development, a number of different SuDS measures are proposed to minimise the impact on water quality and water quantity of the runoff and maximise the amenity and biodiversity opportunities within the site. These measures have been chosen and designed in accordance with the Kildare County Council Sustainable Drainage Systems Guidance Document 2024.

The planned Sustainable Drainage Systems (SuDS) will incorporate Source Control techniques within a Management Train approach. This means surface water will be dealt with locally within smaller sub-catchments, rather than being directed into larger drainage networks further downstream. By using a combination of the SuDS methods outlined below, the strategy aims to optimize surface water retention and

lessen pressure on the existing downstream drainage infrastructure. These methods are also designed to provide effective water quality treatment, including the removal of nutrients and pollutants—especially during the 'first flush.' Additionally, the range of techniques proposed will contribute positively to local amenity value and biodiversity, offering more environmental benefits than traditional drainage solutions.

The following SUDS measures are proposed to meet the objectives of Amenity, Quantity, Quality and Biodiversity:

- Green and blue Roofs to apartment blocks and the creche.
- Permeable paving to car parking spaces and vehicular access to home zones. The runoff from these areas have been taken into account in the surface water design calculations in the event of extreme rainfall where the permeable paving may temporarily become ponded.
- The hardstanding areas such as roads and footpaths will be directed towards to adjacent soft landscaping via dropped kerbs etc.
- Vegetated detention basins
- Tree pits/Bio-retention areas
- Rain gardens
- Soakaway
- Flow control devices to limit discharge

3.3 Surface Water Design Criteria

The storm water drainage network was designed using Causeway Flow Design software and the following parameters formed the basis of the design:

- The surface water run-off is calculated using the Modified Rational Method (Wallingford Procedure),

Q = 2.78 x Cv x Cr x I x A

Where, Q = rate of run-off, l/s

Cv = Volumetric run-off coefficient

Cr = Routing coefficient

I = Intensity of rainfall, mm/hr

A = Impermeable Area, ha

- A design return period of 1 year has been adopted for the sewer network in accordance with good design practice.
- The rainfall intensity is based on rainfall data for Maynooth
- Minimum self-cleansing velocity of 0.75m/s
- M5-60 = 16.3
- Ratio (R) = 0.27

The calculations for the design of the main surface water network and the surface water soakaway systems tank are enclosed in Appendix A.

4.0 Watermain Design

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

4.1 Introduction

A pre-connection enquiry was submitted to Uisce Eireann in mid-June 2025, reference No CDS25004480. A Confirmation of Feasibility Letter was received from Uisce Eireann in August 2025. Uisce Eireann have confirmed that a watermain connection is feasible subject to upgrades.

- To facilitate this development, the main site connection shall be made to the Eastern Link Main following completion of the Maynooth East Relief Road (MERR) road project.
- Network upgrades may be required based on connection uptake by other developments. These upgrades would consist of approx. 600m of existing 400mm main to be upsized to 450mm. This requirement will be further determined at Connection Application stage.

The proposed watermain system shall be constructed in accordance with the Irish Water "Water Infrastructure Standard Details" and to the satisfaction of the Local Authority Water Services recommendations.

4.2 Water Demand Calculations

The water demand for the proposed development of residential units is calculated based on the recommendations set out in the Irish Water Code of Practice for Water Infrastructure and the Pre-Connection Enquiry application form. The average and peak water demand rates were calculated based on the following:

- Average occupancy rate of 2.7 persons per dwelling.
- Average water usage of 150 litres per person per day.
- The peak hour water demand is taken as 1.25 times the average daily domestic demand.

139 Residential Units @ 2.7 persons per unit = 376 persons.
Total domestic demand = 376 x 150 litres per day
= 56400 litres/day
= 0.653 litres/sec. (Average hour water demand)
Peak hour water demand = 1.25 x 0.653
= 0.817 litres/sec.

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Appendix A
Surface Water Calculations

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Inverts
M5-60 (mm)	16.200	Minimum Backdrop Height (m)	0.200
Ratio-R	0.290	Preferred Cover Depth (m)	0.800
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
BR1A	0.052	5.00	67.000	1200	694852.750	737290.692	1.000
MH1A	0.045	5.00	61.900	1200	694862.842	737303.347	1.100
BR1B	0.064	5.00	67.000	1200	694830.271	737249.716	0.950
MH1B	0.000		61.800	1200	694829.760	737234.544	1.399
BR2B	0.064	5.00	67.000	1200	694778.197	737205.484	0.950
MH1C	0.053	5.00	61.650	1200	694836.379	737269.657	1.150
MH2C	0.157	5.00	61.300	1200	694814.223	737285.164	1.709
MH3C	0.069	5.00	61.600	1200	694794.551	737257.102	2.165
MH4C	0.035	5.00	61.700	1200	694803.699	737247.883	2.317
MH7C	0.027	5.00	61.200	1200	694790.504	737222.536	1.786
MH6C	0.026	5.00	60.900	1200	694781.385	737222.706	1.440
BR1C	0.074	5.00	67.000	1200	694774.727	737278.995	0.950
MH1D	0.020	5.00	61.200	1200	694815.345	737370.932	1.150
INLET A	0.055		61.900	1200	694874.819	737294.928	1.200
MH3			61.600	1350	694773.729	737233.710	2.242
MH4			60.900	1200	694767.577	737224.262	1.655
MH5			60.700	1200	694756.942	737224.477	1.508
BASIN1		5.00	61.800	1200	694875.980	737279.563	1.000
MH8C	0.058	5.00	60.800	1200	694776.541	737311.342	1.000
MH2A			61.900	1200	694846.660	737265.580	1.262
MH3D	0.043	5.00	60.470	1200	694781.848	737377.957	1.001
MH9C			64.000	1200	694789.070	737264.547	1.000
MH4D	0.061	5.00	60.580	1200	694778.648	737369.136	1.282
MH5D	0.187	5.00	60.500	1200	694759.411	737316.327	1.403
MH6D	0.172	5.00	60.900	1350	694744.164	737274.053	1.963
MH7D	0.092	5.00	60.400	1500	694730.218	737233.122	1.607
MH8D	0.100	5.00	60.350	1500	694714.624	737235.435	1.596
MH9D	0.070		60.250	1500	694708.925	737222.761	1.547
BASIN2		5.00	61.700	1200	694828.125	737219.256	1.200
MH10D	0.108	5.00	60.650	1200	694727.218	737190.703	1.250
BASIN3		5.00	60.100	1200	694701.187	737193.776	1.400
MH5C	0.047	5.00	61.600	1350	694797.971	737237.010	2.267
MH2D	0.010	5.00	60.600	1200	694788.057	737381.616	1.000
BR2C	0.047	5.00	64.000	1200	694750.858	737245.569	0.900
RWP3			64.000	1200	694758.406	737231.575	1.167
BR3C	0.071	5.00	67.000	1200	694766.175	737205.567	1.000
RWP4			64.000	1200	694757.318	737217.869	1.000
SOAK			61.400	2100	694788.985	737241.551	2.109
Out			60.200	1200	694700.158	737180.338	1.567

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.002	MH1C	MH2C	27.044	0.600	60.500	59.591	0.909	29.8	225	5.98	46.7
1.003	MH2C	MH3C	34.270	0.600	59.591	59.435	0.156	220.0	225	6.63	44.7
1.004	MH3C	MH4C	12.988	0.600	59.435	59.383	0.052	250.0	300	6.85	44.1
1.005	MH4C	MH5C	12.290	0.600	59.383	59.334	0.049	250.0	300	7.05	43.6
4.001	MH6C	MH7C	9.121	0.600	59.460	59.414	0.046	200.0	225	5.21	49.3
8.000	MH1D	MH2D	29.305	0.600	60.050	59.600	0.450	65.1	225	5.30	49.0
8.001	MH2D	MH3D	7.207	0.600	59.600	59.469	0.131	55.0	225	5.37	48.7
1.000	BASIN1	MH2A	32.484	0.600	60.800	60.638	0.162	200.0	225	5.59	48.0
10.000	BR1A	MH1A	16.186	0.600	66.000	61.050	4.950	3.3	100	5.06	49.8
10.001	MH1A	INLET A	14.640	0.600	60.800	60.700	0.100	146.4	225	5.29	49.0
11.000	BR1B	MH1B	15.181	0.600	66.050	60.800	5.250	2.9	150	5.04	49.9
5.000	BASIN2	MH5C	34.992	0.600	60.500	59.400	1.100	31.8	225	5.25	49.1
4.000	BR2B	MH6C	17.515	0.600	66.050	59.460	6.590	2.7	150	5.05	49.9
4.002	MH7C	MH5C	16.287	0.600	59.414	59.333	0.081	200.0	225	5.51	48.2
1.001	MH2A	MH1C	11.060	0.600	60.638	60.583	0.055	200.0	225	5.79	47.3
2.000	MH8C	MH2C	45.883	0.600	59.800	59.591	0.209	220.0	225	5.87	47.0
3.000	BR1C	MH9C	20.358	0.600	66.050	63.000	3.050	6.7	100	5.11	49.6
3.001	MH9C	MH3C	9.245	0.600	63.000	59.435	3.565	2.6	100	5.14	49.5
1.008	MH3	MH4	11.274	0.600	59.358	59.245	0.113	100.0	300	7.64	42.1
1.009	MH4	MH5	10.637	0.600	59.245	59.192	0.053	200.0	300	7.80	41.7
6.000	BR2C	RWP3	15.900	0.600	63.100	62.833	0.267	59.5	100	5.27	49.1
6.001	RWP3	MH5	7.247	0.600	62.833	59.192	3.641	2.0	100	5.29	49.0
8.002	MH3D	MH4D	9.383	0.600	59.469	59.298	0.171	55.0	225	5.46	48.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	2.407	95.7	6.8	0.925	1.484	0.053	0.0	40	1.397
1.003	0.877	34.9	34.3	1.484	1.940	0.283	0.0	181	0.996
1.004	0.990	70.0	51.8	1.865	2.017	0.433	0.0	192	1.080
1.005	0.990	70.0	57.4	2.017	1.966	0.486	0.0	208	1.100
4.001	0.921	36.6	14.2	1.215	1.561	0.106	0.0	97	0.863
8.000	1.623	64.5	2.6	0.925	0.775	0.020	0.0	30	0.793
8.001	1.767	70.3	3.9	0.775	0.776	0.030	0.0	36	0.954
1.000	0.921	36.6	0.0	0.775	1.037	0.000	0.0	0	0.000
10.000	4.308	33.8	7.0	0.900	0.750	0.052	0.0	31	3.401
10.001	1.078	42.9	14.4	0.875	0.975	0.108	0.0	89	0.971
11.000	5.970	105.5	11.0	0.800	0.850	0.081	0.0	33	3.879
5.000	2.327	92.5	0.0	0.975	1.975	0.000	0.0	0	0.000
4.000	6.228	110.1	10.8	0.800	1.290	0.080	0.0	32	4.004
4.002	0.921	36.6	17.4	1.561	2.042	0.133	0.0	109	0.910
1.001	0.921	36.6	0.0	1.037	0.842	0.000	0.0	0	0.000
2.000	0.877	34.9	9.0	0.775	1.484	0.071	0.0	78	0.738
3.000	3.011	23.7	10.0	0.850	0.900	0.074	0.0	45	2.873
3.001	4.839	38.0	9.9	0.900	2.065	0.074	0.0	35	4.071
1.008	1.572	111.1	76.0	1.942	1.355	0.667	0.0	183	1.688
1.009	1.108	78.3	75.3	1.355	1.208	0.667	0.0	238	1.255
6.000	1.000	7.9	6.3	0.800	1.067	0.047	0.0	68	1.110
6.001	5.526	43.4	6.2	1.067	1.408	0.047	0.0	25	3.911
8.002	1.767	70.3	11.8	0.776	1.057	0.090	0.0	62	1.319

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
8.003	MH4D	MH5D	56.204	0.600	59.298	59.097	0.201	280.0	300	6.46	45.2
8.004	MH5D	MH6D	44.940	0.600	59.097	58.937	0.160	280.0	300	7.26	43.0
8.005	MH6D	MH7D	43.242	0.600	58.937	58.793	0.144	300.0	375	7.95	41.3
1.011	MH7D	MH8D	15.765	0.600	58.793	58.754	0.039	400.0	525	8.28	40.6
1.012	MH8D	MH9D	13.896	0.600	58.754	58.719	0.035	400.0	525	8.49	40.1
7.000	BR3C	RWP4	15.159	0.600	66.000	63.000	3.000	5.1	150	5.06	49.8
1.010	MH5	MH7D	28.088	0.600	59.192	58.793	0.399	70.4	300	8.05	41.1
7.001	RWP4	MH5	6.619	0.600	63.000	59.192	3.808	1.7	150	5.07	49.8
9.000	MH10D	MH7D	42.525	0.600	59.400	58.793	0.607	70.1	225	5.45	48.4
1.006	MH5C	SOAK	10.068	0.600	59.333	59.291	0.042	239.7	375	7.20	43.2
1.007	SOAK	MH3	17.153	0.600	59.400	59.358	0.042	408.4	375	7.52	42.4
12.000	BASIN3	Out	13.477	0.600	58.700	58.633	0.067	200.0	300	5.20	49.3

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
8.003	0.934	66.0	18.5	0.982	1.103	0.151	0.0	108	0.804
8.004	0.934	66.0	39.4	1.103	1.663	0.338	0.0	167	0.975
8.005	1.041	114.9	57.0	1.588	1.232	0.509	0.0	186	1.038
1.011	1.114	241.0	164.3	1.082	1.071	1.495	0.0	319	1.194
1.012	1.114	241.0	173.3	1.071	1.006	1.595	0.0	330	1.207
7.000	4.513	79.8	9.6	0.850	0.850	0.071	0.0	35	3.052
1.010	1.876	132.6	87.4	1.208	1.307	0.785	0.0	178	2.000
7.001	7.705	136.2	9.6	0.850	1.358	0.071	0.0	27	4.449
9.000	1.564	62.2	14.2	1.025	1.382	0.108	0.0	73	1.270
1.006	1.166	128.7	78.0	1.892	1.734	0.667	0.0	211	1.220
1.007	0.890	98.3	76.6	1.625	1.867	0.667	0.0	249	0.980
12.000	1.108	78.3	0.0	1.100	1.267	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	27.044	29.8	225	Circular	61.650	60.500	0.925	61.300	59.591	1.484
1.003	34.270	220.0	225	Circular	61.300	59.591	1.484	61.600	59.435	1.940
1.004	12.988	250.0	300	Circular	61.600	59.435	1.865	61.700	59.383	2.017
1.005	12.290	250.0	300	Circular	61.700	59.383	2.017	61.600	59.334	1.966
4.001	9.121	200.0	225	Circular	60.900	59.460	1.215	61.200	59.414	1.561
8.000	29.305	65.1	225	Circular	61.200	60.050	0.925	60.600	59.600	0.775
8.001	7.207	55.0	225	Circular	60.600	59.600	0.775	60.470	59.469	0.776
1.000	32.484	200.0	225	Circular	61.800	60.800	0.775	61.900	60.638	1.037

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	MH1C	1200	Manhole	Adoptable	MH2C	1200	Manhole	Adoptable
1.003	MH2C	1200	Manhole	Adoptable	MH3C	1200	Manhole	Adoptable
1.004	MH3C	1200	Manhole	Adoptable	MH4C	1200	Manhole	Adoptable
1.005	MH4C	1200	Manhole	Adoptable	MH5C	1350	Manhole	Adoptable
4.001	MH6C	1200	Manhole	Adoptable	MH7C	1200	Manhole	Adoptable
8.000	MH1D	1200	Manhole	Adoptable	MH2D	1200	Manhole	Adoptable
8.001	MH2D	1200	Manhole	Adoptable	MH3D	1200	Manhole	Adoptable
1.000	BASIN1	1200	Manhole	Adoptable	MH2A	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
10.000	16.186	3.3	100	Circular	67.000	66.000	0.900	61.900	61.050	0.750
10.001	14.640	146.4	225	Circular	61.900	60.800	0.875	61.900	60.700	0.975
11.000	15.181	2.9	150	Circular	67.000	66.050	0.800	61.800	60.800	0.850
5.000	34.992	31.8	225	Circular	61.700	60.500	0.975	61.600	59.400	1.975
4.000	17.515	2.7	150	Circular	67.000	66.050	0.800	60.900	59.460	1.290
4.002	16.287	200.0	225	Circular	61.200	59.414	1.561	61.600	59.333	2.042
1.001	11.060	200.0	225	Circular	61.900	60.638	1.037	61.650	60.583	0.842
2.000	45.883	220.0	225	Circular	60.800	59.800	0.775	61.300	59.591	1.484
3.000	20.358	6.7	100	Circular	67.000	66.050	0.850	64.000	63.000	0.900
3.001	9.245	2.6	100	Circular	64.000	63.000	0.900	61.600	59.435	2.065
1.008	11.274	100.0	300	Circular	61.600	59.358	1.942	60.900	59.245	1.355
1.009	10.637	200.0	300	Circular	60.900	59.245	1.355	60.700	59.192	1.208
6.000	15.900	59.5	100	Circular	64.000	63.100	0.800	64.000	62.833	1.067
6.001	7.247	2.0	100	Circular	64.000	62.833	1.067	60.700	59.192	1.408
8.002	9.383	55.0	225	Circular	60.470	59.469	0.776	60.580	59.298	1.057
8.003	56.204	280.0	300	Circular	60.580	59.298	0.982	60.500	59.097	1.103
8.004	44.940	280.0	300	Circular	60.500	59.097	1.103	60.900	58.937	1.663
8.005	43.242	300.0	375	Circular	60.900	58.937	1.588	60.400	58.793	1.232
1.011	15.765	400.0	525	Circular	60.400	58.793	1.082	60.350	58.754	1.071
1.012	13.896	400.0	525	Circular	60.350	58.754	1.071	60.250	58.719	1.006
7.000	15.159	5.1	150	Circular	67.000	66.000	0.850	64.000	63.000	0.850
1.010	28.088	70.4	300	Circular	60.700	59.192	1.208	60.400	58.793	1.307
7.001	6.619	1.7	150	Circular	64.000	63.000	0.850	60.700	59.192	1.358
9.000	42.525	70.1	225	Circular	60.650	59.400	1.025	60.400	58.793	1.382

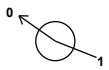
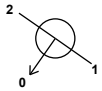
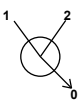
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
10.000	BR1A	1200	Manhole	Adoptable	MH1A	1200	Manhole	Adoptable
10.001	MH1A	1200	Manhole	Adoptable	INLET A	1200	Manhole	Adoptable
11.000	BR1B	1200	Manhole	Adoptable	MH1B	1200	Manhole	Adoptable
5.000	BASIN2	1200	Manhole	Adoptable	MH5C	1350	Manhole	Adoptable
4.000	BR2B	1200	Manhole	Adoptable	MH6C	1200	Manhole	Adoptable
4.002	MH7C	1200	Manhole	Adoptable	MH5C	1350	Manhole	Adoptable
1.001	MH2A	1200	Manhole	Adoptable	MH1C	1200	Manhole	Adoptable
2.000	MH8C	1200	Manhole	Adoptable	MH2C	1200	Manhole	Adoptable
3.000	BR1C	1200	Manhole	Adoptable	MH9C	1200	Manhole	Adoptable
3.001	MH9C	1200	Manhole	Adoptable	MH3C	1200	Manhole	Adoptable
1.008	MH3	1350	Manhole	Adoptable	MH4	1200	Manhole	Adoptable
1.009	MH4	1200	Manhole	Adoptable	MH5	1200	Manhole	Adoptable
6.000	BR2C	1200	Manhole	Adoptable	RWP3	1200	Manhole	Adoptable
6.001	RWP3	1200	Manhole	Adoptable	MH5	1200	Manhole	Adoptable
8.002	MH3D	1200	Manhole	Adoptable	MH4D	1200	Manhole	Adoptable
8.003	MH4D	1200	Manhole	Adoptable	MH5D	1200	Manhole	Adoptable
8.004	MH5D	1200	Manhole	Adoptable	MH6D	1350	Manhole	Adoptable
8.005	MH6D	1350	Manhole	Adoptable	MH7D	1500	Manhole	Adoptable
1.011	MH7D	1500	Manhole	Adoptable	MH8D	1500	Manhole	Adoptable
1.012	MH8D	1500	Manhole	Adoptable	MH9D	1500	Manhole	Adoptable
7.000	BR3C	1200	Manhole	Adoptable	RWP4	1200	Manhole	Adoptable
1.010	MH5	1200	Manhole	Adoptable	MH7D	1500	Manhole	Adoptable
7.001	RWP4	1200	Manhole	Adoptable	MH5	1200	Manhole	Adoptable
9.000	MH10D	1200	Manhole	Adoptable	MH7D	1500	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.006	10.068	239.7	375	Circular	61.600	59.333	1.892	61.400	59.291	1.734
1.007	17.153	408.4	375	Circular	61.400	59.400	1.625	61.600	59.358	1.867
12.000	13.477	200.0	300	Circular	60.100	58.700	1.100	60.200	58.633	1.267

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.006	MH5C	1350	Manhole	Adoptable	SOAK	2100	Manhole	Adoptable
1.007	SOAK	2100	Manhole	Adoptable	MH3	1350	Manhole	Adoptable
12.000	BASIN3	1200	Manhole	Adoptable	Out	1200	Manhole	Adoptable

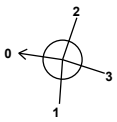
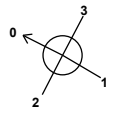
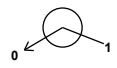
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
BR1A	694852.750	737290.692	67.000	1.000	1200				
						0	10.000	66.000	100
MH1A	694862.842	737303.347	61.900	1.100	1200	1	10.000	61.050	100
									
						0	10.001	60.800	225
BR1B	694830.271	737249.716	67.000	0.950	1200				
						0	11.000	66.050	150
MH1B	694829.760	737234.544	61.800	1.399	1200		1	11.000	60.800	150
BR2B	694778.197	737205.484	67.000	0.950	1200				
						0	4.000	66.050	150
MH1C	694836.379	737269.657	61.650	1.150	1200	1	1.001	60.583	225
									
						0	1.002	60.500	225
MH2C	694814.223	737285.164	61.300	1.709	1200	1	1.002	59.591	225
						2	2.000	59.591	225
									
						0	1.003	59.591	225
MH3C	694794.551	737257.102	61.600	2.165	1200	1	3.001	59.435	100
						2	1.003	59.435	225
									
						0	1.004	59.435	300
MH4C	694803.699	737247.883	61.700	2.317	1200	1	1.004	59.383	300
									
						0	1.005	59.383	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MH7C	694790.504	737222.536	61.200	1.786	1200	1	4.001	59.414	225
						0	4.002	59.414	225
MH6C	694781.385	737222.706	60.900	1.440	1200	1	4.000	59.460	150
						0	4.001	59.460	225
BR1C	694774.727	737278.995	67.000	0.950	1200	0	3.000	66.050	100
MH1D	694815.345	737370.932	61.200	1.150	1200	0	8.000	60.050	225
INLET A	694874.819	737294.928	61.900	1.200	1200	1	10.001	60.700	225
MH3	694773.729	737233.710	61.600	2.242	1350	1	1.007	59.358	375
						0	1.008	59.358	300
MH4	694767.577	737224.262	60.900	1.655	1200	1	1.008	59.245	300
						0	1.009	59.245	300
MH5	694756.942	737224.477	60.700	1.508	1200	1	7.001	59.192	150
						2	6.001	59.192	100
						3	1.009	59.192	300
						0	1.010	59.192	300
BASIN1	694875.980	737279.563	61.800	1.000	1200	0	1.000	60.800	225
MH8C	694776.541	737311.342	60.800	1.000	1200	0	2.000	59.800	225
MH2A	694846.660	737265.580	61.900	1.262	1200	1	1.000	60.638	225
						0	1.001	60.638	225
MH3D	694781.848	737377.957	60.470	1.001	1200	1	8.001	59.469	225
						0	8.002	59.469	225
MH9C	694789.070	737264.547	64.000	1.000	1200	1	3.000	63.000	100
						0	3.001	63.000	100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MH4D	694778.648	737369.136	60.580	1.282	1200		1	8.002	59.298	225
							0	8.003	59.298	300
MH5D	694759.411	737316.327	60.500	1.403	1200		1	8.003	59.097	300
							0	8.004	59.097	300
MH6D	694744.164	737274.053	60.900	1.963	1350		1	8.004	58.937	300
							0	8.005	58.937	375
MH7D	694730.218	737233.122	60.400	1.607	1500		1	9.000	58.793	225
							2	8.005	58.793	375
							3	1.010	58.793	300
							0	1.011	58.793	525
MH8D	694714.624	737235.435	60.350	1.596	1500		1	1.011	58.754	525
							0	1.012	58.754	525
MH9D	694708.925	737222.761	60.250	1.547	1500		1	1.012	58.719	525
BASIN2	694828.125	737219.256	61.700	1.200	1200		0	5.000	60.500	225
MH10D	694727.218	737190.703	60.650	1.250	1200		0	9.000	59.400	225
BASIN3	694701.187	737193.776	60.100	1.400	1200		0	12.000	58.700	300
MH5C	694797.971	737237.010	61.600	2.267	1350		1	5.000	59.400	225
							2	4.002	59.333	225
							3	1.005	59.334	300
							0	1.006	59.333	375
MH2D	694788.057	737381.616	60.600	1.000	1200		1	8.000	59.600	225
							0	8.001	59.600	225
BR2C	694750.858	737245.569	64.000	0.900	1200		0	6.000	63.100	100
RWP3	694758.406	737231.575	64.000	1.167	1200		1	6.000	62.833	100
							0	6.001	62.833	100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
BR3C	694766.175	737205.567	67.000	1.000	1200				
						0	7.000	66.000	150
RWP4	694757.318	737217.869	64.000	1.000	1200		1	7.000	63.000	150
						0	7.001	63.000	150
SOAK	694788.985	737241.551	61.400	2.109	2100		1	1.006	59.291	375
						0	1.007	59.400	375
Out	694700.158	737180.338	60.200	1.567	1200		1	12.000	58.633	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
Rainfall Events	Singular	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	16.200	Additional Storage (m³/ha)	20.0
Ratio-R	0.290	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160
30	120	240	480	720	1440	2880

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	30	0	0
2	30	0	0
10	30	0	0
30	30	0	0
100	30	0	0
100	40	0	0

Node BR1A Online Orifice Control

Flap Valve	x	Design Depth (m)	0.100	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.6		
Invert Level (m)	66.000	Diameter (m)	0.031		

Node BR1B Online Orifice Control

Flap Valve	x	Design Depth (m)	0.100	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.8		
Invert Level (m)	66.050	Diameter (m)	0.036		

Node BR2B Online Orifice Control

Flap Valve	x	Design Depth (m)	0.100	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.8		
Invert Level (m)	66.050	Diameter (m)	0.036		

Node BR1C Online Orifice Control

Flap Valve	x	Design Depth (m)	0.100	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.8		
Invert Level (m)	66.050	Diameter (m)	0.036		

Node BR2C Online Orifice Control

Flap Valve	x	Design Depth (m)	0.100	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.6		
Invert Level (m)	63.100	Diameter (m)	0.031		

Node BR3C Online Orifice Control

Flap Valve	x	Design Depth (m)	0.100	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.8		
Invert Level (m)	66.000	Diameter (m)	0.036		

Node BASIN3 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	58.700	Product Number	CTL-SHE-0109-6600-1800-6600
Design Depth (m)	1.800	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.6	Min Node Diameter (mm)	1200

Node BASIN1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	60.800	Product Number	CTL-SHE-0032-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.5	Min Node Diameter (mm)	1200

Node BASIN2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	60.500	Product Number	CTL-SHE-0030-5000-1300-5000
Design Depth (m)	1.300	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.5	Min Node Diameter (mm)	1200

Node SOAK Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	59.400	Product Number	CTL-SHE-0241-3600-2100-3600
Design Depth (m)	2.100	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	36.0	Min Node Diameter (mm)	2100

Node BR1A Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	66.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.90	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	330.0	0.0	0.100	330.0	0.0	0.101	0.0	0.0

Node BR1B Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	66.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.90	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	385.0	0.0	0.100	385.0	0.0	0.101	0.0	0.0

Node BR2B Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	66.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.90	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	385.0	0.0	0.100	385.0	0.0	0.101	0.0	0.0

Node BR1C Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	66.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.90	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	480.0	0.0	0.100	480.0	0.0	0.101	0.0	0.0

Node BR2C Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	63.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.90	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	310.0	0.0	0.100	310.0	0.0	0.101	0.0	0.0

Node BR3C Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	66.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.90	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	460.0	0.0	0.100	460.0	0.0	0.101	0.0	0.0

Node BASIN3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	30.000
Side Inf Coefficient (m/hr)	0.02280	Invert Level (m)	58.700	Main Channel Slope (1:X)	10000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.015

Inlets

MH9D

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	93.0	93.0	0.400	182.0	571.0	0.401	539.0	928.0	1.400	1100.0	1181.8

Node SOAK Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	58.400	Depth (m)	1.800
Side Inf Coefficient (m/hr)	0.05040	Time to half empty (mins)		Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.500	Number Required	3
Porosity	0.44	Pit Length (m)	17.500		

Node BASIN1 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	20.000
Side Inf Coefficient (m/hr)	0.02340	Invert Level (m)	60.700	Main Channel Slope (1:X)	10000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.015

Inlets

INLET A

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	69.0	69.0	1.100	280.0	306.1

Node BASIN2 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	13.000
Side Inf Coefficient (m/hr)	0.02280	Invert Level (m)	60.400	Main Channel Slope (1:X)	10000.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.015

Inlets

MH1B

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	6.0	6.0	1.300	200.0	203.7

Results for 1 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	BR1A	690	66.036	0.036	0.8	10.8540	0.0000	OK
2880 minute winter	MH1A	1980	61.016	0.216	0.6	0.4206	0.0000	OK
2880 minute winter	10.001:50%	1980	61.016	0.266	0.9	0.0000	0.0000	SURCHARGED
960 minute winter	BR1B	675	66.088	0.038	0.9	13.2038	0.0000	OK
15 minute winter	11.000:50%	10	63.442	0.017	2.6	0.0000	0.0000	OK
960 minute winter	MH1B	780	60.623	0.222	0.6	0.2507	0.0000	OK
960 minute winter	BR2B	675	66.088	0.038	0.9	13.2038	0.0000	OK
15 minute winter	4.000:50%	10	62.770	0.015	2.4	0.0000	0.0000	OK
15 minute winter	MH1C	10	60.543	0.043	7.9	0.0892	0.0000	OK
15 minute winter	MH2C	11	59.806	0.215	38.0	0.6361	0.0000	OK
15 minute winter	1.003:50%	12	59.727	0.214	36.2	0.0000	0.0000	OK
15 minute winter	MH3C	11	59.647	0.212	45.3	0.3750	0.0000	OK
15 minute winter	1.004:50%	11	59.625	0.216	46.1	0.0000	0.0000	OK
15 minute winter	MH4C	11	59.604	0.221	50.7	0.3171	0.0000	OK
360 minute winter	1.005:50%	224	59.593	0.234	11.6	0.0000	0.0000	OK
360 minute winter	MH7C	224	59.593	0.179	2.1	0.2575	0.0000	OK
360 minute winter	MH6C	224	59.593	0.133	1.3	0.1988	0.0000	OK
960 minute winter	BR1C	690	66.087	0.037	1.1	16.2831	0.0000	OK
15 minute winter	MH1D	10	60.082	0.032	2.9	0.0471	0.0000	OK
2880 minute winter	INLET A	1980	61.016	0.316	1.1	0.6464	0.0000	OK
360 minute winter	MH3	224	59.421	0.063	9.8	0.0897	0.0000	OK
360 minute winter	MH4	224	59.319	0.074	9.8	0.0837	0.0000	OK
360 minute winter	MH5	224	59.248	0.056	10.3	0.0634	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
960 minute winter	BR1A	Orifice	MH1A	0.3				
2880 minute winter	MH1A	10.001	10.001:50%	0.8	0.241	0.018	0.2890	
2880 minute winter	MH1A	10.001	INLET A	0.7	0.183	0.016	0.2911	
960 minute winter	BR1B	Orifice	11.000:50%	0.4				
960 minute winter	BR1B	11.000	MH1B	0.6	1.588	0.005	0.0027	
960 minute winter	MH1B	Flow through Pond	BASIN2	0.5	0.008	0.000	5.0492	
960 minute winter	BR2B	Orifice	4.000:50%	0.4				
960 minute winter	BR2B	4.000	MH6C	0.6	0.584	0.005	0.0602	
15 minute winter	MH1C	1.002	MH2C	7.8	0.381	0.081	0.5986	
15 minute winter	MH2C	1.003	1.003:50%	36.0	0.959	1.033	0.6688	
15 minute winter	MH2C	1.003	MH3C	36.2	0.940	1.037	0.6662	
15 minute winter	MH3C	1.004	1.004:50%	45.1	0.842	0.644	0.3495	
15 minute winter	MH3C	1.004	MH4C	45.8	0.834	0.655	0.3575	
15 minute winter	MH4C	1.005	1.005:50%	50.5	0.912	0.722	0.3401	
15 minute winter	MH4C	1.005	MH5C	52.7	0.976	0.754	0.3322	
360 minute winter	MH7C	4.002	MH5C	2.0	0.221	0.056	0.6001	
360 minute winter	MH6C	4.001	MH7C	1.3	0.366	0.035	0.2663	
960 minute winter	BR1C	Orifice	MH9C	0.4				
15 minute winter	MH1D	8.000	MH2D	2.8	0.733	0.044	0.1134	
2880 minute winter	INLET A	Flow through Pond	BASIN1	0.8	0.003	0.000	31.2387	
360 minute winter	MH3	1.008	MH4	9.8	0.815	0.088	0.1361	
360 minute winter	MH4	1.009	MH5	9.8	0.875	0.125	0.1200	
360 minute winter	MH5	1.010	MH7D	10.3	0.214	0.077	1.1164	

Results for 1 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	BASIN1	1980	61.016	0.216	0.8	0.2546	0.0000	OK
15 minute winter	MH8C	10	59.875	0.075	8.6	0.1722	0.0000	OK
15 minute winter	2.000:50%	12	59.813	0.118	10.4	0.2550	0.0000	OK
480 minute winter	MH2A	384	60.654	0.016	0.3	0.0180	0.0000	OK
15 minute winter	MH3D	10	59.532	0.063	10.6	0.1253	0.0000	OK
15 minute winter	8.002:50%	10	59.457	0.073	13.0	0.1178	0.0000	OK
960 minute winter	MH9C	690	63.007	0.007	0.4	0.0079	0.0000	OK
15 minute winter	MH4D	11	59.414	0.116	21.8	0.2416	0.0000	OK
15 minute winter	MH5D	11	59.289	0.192	48.2	0.7309	0.0000	OK
720 minute winter	MH6D	540	59.241	0.304	9.0	0.9656	0.0000	OK
720 minute winter	MH7D	540	59.241	0.448	19.7	1.3058	0.0000	OK
720 minute winter	MH8D	540	59.240	0.486	20.9	1.4691	0.0000	OK
720 minute winter	MH9D	540	59.240	0.537	21.8	1.4359	0.0000	OK
960 minute winter	BASIN2	780	60.623	0.123	0.5	0.1493	0.0000	OK
15 minute winter	MH10D	10	59.476	0.076	15.9	0.2181	0.0000	OK
720 minute winter	BASIN3	540	59.240	0.540	15.4	0.6112	0.0000	SURCHARGED
360 minute winter	MH5C	224	59.593	0.260	15.0	0.4806	0.0000	OK
15 minute winter	MH2D	11	59.637	0.037	4.3	0.0497	0.0000	OK
960 minute winter	BR2C	675	63.134	0.034	0.7	9.5727	0.0000	OK
960 minute winter	RWP3	675	62.839	0.006	0.3	0.0063	0.0000	OK
1440 minute winter	BR3C	960	66.037	0.037	0.8	15.4677	0.0000	OK
1440 minute winter	RWP4	960	63.006	0.006	0.4	0.0064	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	BASIN1	1.000	MH2A	0.3	0.288	0.009	0.0392	
2880 minute winter	BASIN1	Infiltration		0.2				
15 minute winter	MH8C	2.000	2.000:50%	8.5	0.677	0.244	0.3611	
15 minute winter	MH8C	2.000	MH2C	11.1	0.407	0.318	0.6883	
480 minute winter	MH2A	1.001	MH1C	0.3	0.310	0.009	0.0125	
15 minute winter	MH3D	8.002	8.002:50%	10.5	1.034	0.149	0.0476	
15 minute winter	MH3D	8.002	MH4D	12.9	0.821	0.184	0.0746	
960 minute winter	MH9C	3.001	MH3C	0.4	0.462	0.010	0.0373	
15 minute winter	MH4D	8.003	MH5D	21.5	0.593	0.326	2.0480	
15 minute winter	MH5D	8.004	MH6D	46.6	0.903	0.706	2.3161	
720 minute winter	MH6D	8.005	MH7D	8.3	0.407	0.072	4.4514	
720 minute winter	MH7D	1.011	MH8D	19.2	0.340	0.080	3.1925	
720 minute winter	MH8D	1.012	MH9D	20.6	0.399	0.086	2.9505	
720 minute winter	MH9D	Flow through Pond	BASIN3	15.4	0.022	0.001	133.0113	
960 minute winter	BASIN2	5.000	MH5C	0.3	0.424	0.003	0.5616	
960 minute winter	BASIN2	Infiltration		0.1				
15 minute winter	MH10D	9.000	MH7D	15.6	0.620	0.251	1.0977	
720 minute winter	BASIN3	12.000	Out	6.2	0.655	0.080	0.1281	276.8
720 minute winter	BASIN3	Infiltration		2.8				
360 minute winter	MH5C	1.006	SOAK	14.8	0.750	0.115	0.8889	
15 minute winter	MH2D	8.001	MH3D	4.2	0.650	0.060	0.0482	
960 minute winter	BR2C	Orifice	RWP3	0.3				
960 minute winter	RWP3	6.001	MH5	0.3	0.484	0.006	0.0145	
1440 minute winter	BR3C	Orifice	RWP4	0.4				
1440 minute winter	RWP4	7.001	MH5	0.4	0.493	0.003	0.0151	

Results for 1 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	SOAK	224	59.593	0.302	14.8	69.9192	0.0000	OK
360 minute winter	Out	264	58.690	0.057	6.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	SOAK	1.007	MH3	9.8	0.677	0.100	0.2500	
360 minute winter	SOAK	Infiltration		1.0				

Results for 2 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	BR1A	675	66.042	0.042	0.9	12.5733	0.0000	OK
2880 minute winter	MH1A	2040	61.061	0.261	0.7	0.5096	0.0000	SURCHARGED
2880 minute winter	10.001:50%	2040	61.061	0.311	1.3	0.0000	0.0000	SURCHARGED
960 minute winter	BR1B	675	66.094	0.044	1.1	15.2022	0.0000	OK
15 minute winter	11.000:50%	10	63.443	0.018	3.1	0.0000	0.0000	OK
960 minute winter	MH1B	900	60.670	0.268	0.7	0.3034	0.0000	OK
960 minute winter	BR2B	675	66.094	0.044	1.1	15.2022	0.0000	OK
15 minute winter	4.000:50%	10	62.772	0.017	2.9	0.0000	0.0000	OK
15 minute winter	MH1C	10	60.548	0.048	9.6	0.0983	0.0000	OK
15 minute winter	MH2C	12	59.889	0.298	41.9	0.8844	0.0000	SURCHARGED
15 minute winter	1.003:50%	12	59.778	0.265	39.0	0.0000	0.0000	SURCHARGED
15 minute winter	MH3C	12	59.667	0.232	49.2	0.4094	0.0000	OK
15 minute winter	1.004:50%	12	59.645	0.236	50.3	0.0000	0.0000	OK
240 minute winter	MH4C	156	59.636	0.253	16.8	0.3630	0.0000	OK
240 minute winter	1.005:50%	156	59.635	0.277	17.6	0.0000	0.0000	OK
240 minute winter	MH7C	156	59.635	0.221	3.2	0.3180	0.0000	OK
240 minute winter	MH6C	156	59.635	0.175	2.0	0.2616	0.0000	OK
1440 minute winter	BR1C	990	66.094	0.044	1.0	18.9220	0.0000	OK
15 minute winter	MH1D	10	60.085	0.035	3.5	0.0517	0.0000	OK
2880 minute winter	INLET A	2040	61.061	0.361	1.2	0.7399	0.0000	OK
240 minute winter	MH3	156	59.434	0.076	14.0	0.1092	0.0000	OK
240 minute winter	MH4	156	59.334	0.089	14.0	0.1004	0.0000	OK
720 minute winter	MH5	555	59.323	0.131	11.0	0.1481	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
960 minute winter	BR1A	Orifice	MH1A	0.3				
2880 minute winter	MH1A	10.001	10.001:50%	0.8	0.238	0.018	0.2911	
2880 minute winter	MH1A	10.001	INLET A	0.9	0.271	0.022	0.2911	
960 minute winter	BR1B	Orifice	11.000:50%	0.4				
960 minute winter	BR1B	11.000	MH1B	0.7	1.680	0.007	0.0031	
960 minute winter	MH1B	Flow through Pond	BASIN2	0.5	0.029	0.000	7.0160	
960 minute winter	BR2B	Orifice	4.000:50%	0.4				
960 minute winter	BR2B	4.000	MH6C	0.7	0.611	0.006	0.0699	
15 minute winter	MH1C	1.002	MH2C	9.5	0.391	0.099	0.6205	
15 minute winter	MH2C	1.003	1.003:50%	38.8	0.975	1.112	0.6815	
15 minute winter	MH2C	1.003	MH3C	39.2	0.987	1.125	0.6815	
15 minute winter	MH3C	1.004	1.004:50%	49.3	0.851	0.704	0.3829	
15 minute winter	MH3C	1.004	MH4C	50.6	0.853	0.724	0.3907	
240 minute winter	MH4C	1.005	1.005:50%	16.8	0.712	0.240	0.4036	
240 minute winter	MH4C	1.005	MH5C	17.5	0.728	0.250	0.4249	
240 minute winter	MH7C	4.002	MH5C	3.2	0.250	0.086	0.6463	
240 minute winter	MH6C	4.001	MH7C	2.0	0.419	0.054	0.3320	
1440 minute winter	BR1C	Orifice	MH9C	0.4				
15 minute winter	MH1D	8.000	MH2D	3.4	0.769	0.053	0.1309	
2880 minute winter	INLET A	Flow through Pond	BASIN1	1.1	0.007	0.000	37.3400	
240 minute winter	MH3	1.008	MH4	14.0	0.893	0.126	0.1775	
240 minute winter	MH4	1.009	MH5	14.0	0.973	0.179	0.1543	
720 minute winter	MH5	1.010	MH7D	11.0	0.227	0.083	1.4039	

Results for 2 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	BASIN1	2040	61.061	0.261	1.1	0.3062	0.0000	SURCHARGED
15 minute winter	MH8C	12	59.908	0.108	10.4	0.2469	0.0000	OK
15 minute winter	2.000:50%	12	59.900	0.204	12.5	0.7690	0.0000	OK
240 minute winter	MH2A	224	60.654	0.016	0.3	0.0180	0.0000	OK
15 minute winter	MH3D	10	59.539	0.070	12.8	0.1398	0.0000	OK
15 minute winter	8.002:50%	10	59.466	0.082	15.7	0.1484	0.0000	OK
1440 minute winter	MH9C	990	63.007	0.007	0.4	0.0084	0.0000	OK
15 minute winter	MH4D	11	59.427	0.129	26.4	0.2680	0.0000	OK
720 minute winter	MH5D	555	59.323	0.226	6.9	0.8582	0.0000	OK
720 minute winter	MH6D	555	59.323	0.386	10.4	1.2272	0.0000	SURCHARGED
720 minute winter	MH7D	555	59.323	0.530	24.0	1.5457	0.0000	SURCHARGED
720 minute winter	MH8D	555	59.323	0.569	25.5	1.7173	0.0000	SURCHARGED
720 minute winter	MH9D	555	59.323	0.620	26.6	1.6555	0.0000	OK
960 minute winter	BASIN2	900	60.669	0.169	0.5	0.2020	0.0000	OK
15 minute winter	MH10D	10	59.485	0.085	19.3	0.2418	0.0000	OK
720 minute winter	BASIN3	555	59.323	0.623	18.0	0.7041	0.0000	SURCHARGED
240 minute winter	MH5C	156	59.635	0.302	22.7	0.5580	0.0000	OK
15 minute winter	MH2D	10	59.641	0.041	5.2	0.0551	0.0000	OK
1440 minute winter	BR2C	960	63.140	0.040	0.6	11.1662	0.0000	OK
1440 minute winter	RWP3	960	62.839	0.006	0.3	0.0067	0.0000	OK
1440 minute winter	BR3C	990	66.042	0.042	0.9	17.6220	0.0000	OK
1440 minute winter	RWP4	990	63.006	0.006	0.4	0.0068	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	BASIN1	1.000	MH2A	0.3	0.288	0.009	0.0392	
2880 minute winter	BASIN1	Infiltration		0.2				
15 minute winter	MH8C	2.000	2.000:50%	10.2	0.677	0.292	0.6499	
15 minute winter	MH8C	2.000	MH2C	16.6	0.478	0.476	0.8908	
240 minute winter	MH2A	1.001	MH1C	0.3	0.310	0.009	0.0125	
15 minute winter	MH3D	8.002	8.002:50%	12.6	1.068	0.180	0.0556	
15 minute winter	MH3D	8.002	MH4D	15.6	0.861	0.222	0.0857	
1440 minute winter	MH9C	3.001	MH3C	0.4	0.474	0.011	0.0374	
15 minute winter	MH4D	8.003	MH5D	26.0	0.613	0.393	2.4017	
720 minute winter	MH5D	8.004	MH6D	6.9	0.522	0.104	2.8610	
720 minute winter	MH6D	8.005	MH7D	9.7	0.398	0.084	4.7695	
720 minute winter	MH7D	1.011	MH8D	23.5	0.356	0.098	3.4053	
720 minute winter	MH8D	1.012	MH9D	25.2	0.419	0.105	3.0020	
720 minute winter	MH9D	Flow through Pond	BASIN3	18.0	0.022	0.001	185.4408	
960 minute winter	BASIN2	5.000	MH5C	0.3	0.443	0.003	0.6178	
960 minute winter	BASIN2	Infiltration		0.1				
15 minute winter	MH10D	9.000	MH7D	18.9	0.643	0.304	1.1356	
720 minute winter	BASIN3	12.000	Out	6.2	0.655	0.080	0.1281	288.9
720 minute winter	BASIN3	Infiltration		2.8				
240 minute winter	MH5C	1.006	SOAK	22.0	0.843	0.171	1.0110	
15 minute winter	MH2D	8.001	MH3D	5.1	0.679	0.073	0.0561	
1440 minute winter	BR2C	Orifice	RWP3	0.3				
1440 minute winter	RWP3	6.001	MH5	0.3	0.491	0.007	0.0290	
1440 minute winter	BR3C	Orifice	RWP4	0.4				
1440 minute winter	RWP4	7.001	MH5	0.4	0.505	0.003	0.0450	

Results for 2 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	SOAK	156	59.634	0.343	22.0	72.4637	0.0000	OK
240 minute winter	Out	156	58.690	0.057	6.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SOAK	1.007	MH3	14.0	0.741	0.143	0.3262	
240 minute winter	SOAK	Infiltration		1.0				

Results for 10 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	BR1A	675	66.057	0.057	1.2	16.9397	0.0000	OK
2880 minute winter	MH1A	2160	61.162	0.362	0.8	0.7058	0.0000	SURCHARGED
2880 minute winter	10.001:50%	2160	61.162	0.412	0.9	0.0000	0.0000	SURCHARGED
960 minute winter	BR1B	690	66.109	0.059	1.5	20.4495	0.0000	OK
15 minute winter	11.000:50%	10	63.447	0.022	4.6	0.0000	0.0000	OK
1440 minute winter	MH1B	1350	60.776	0.375	0.8	0.4241	0.0000	OK
960 minute winter	BR2B	690	66.109	0.059	1.5	20.4495	0.0000	OK
15 minute winter	4.000:50%	10	62.775	0.020	4.3	0.0000	0.0000	OK
15 minute winter	MH1C	10	60.557	0.057	13.9	0.1183	0.0000	OK
15 minute winter	MH2C	12	60.106	0.515	54.3	1.5270	0.0000	SURCHARGED
15 minute winter	1.003:50%	12	59.931	0.418	49.7	0.0000	0.0000	SURCHARGED
120 minute winter	MH3C	80	59.772	0.337	33.0	0.5958	0.0000	SURCHARGED
120 minute winter	1.004:50%	80	59.769	0.360	33.5	0.0000	0.0000	SURCHARGED
120 minute winter	MH4C	80	59.766	0.383	36.6	0.5484	0.0000	SURCHARGED
120 minute winter	1.005:50%	80	59.761	0.403	37.9	0.0000	0.0000	SURCHARGED
120 minute winter	MH7C	82	59.759	0.345	6.5	0.4963	0.0000	SURCHARGED
120 minute winter	MH6C	82	59.760	0.300	4.1	0.4471	0.0000	SURCHARGED
1440 minute winter	BR1C	1020	66.109	0.059	1.3	25.5056	0.0000	OK
15 minute winter	MH1D	10	60.092	0.042	5.1	0.0622	0.0000	OK
2880 minute winter	INLET A	2160	61.162	0.462	1.5	0.9459	0.0000	OK
960 minute winter	MH3	750	59.512	0.154	12.4	0.2205	0.0000	OK
960 minute winter	MH4	750	59.512	0.267	12.4	0.3020	0.0000	OK
960 minute winter	MH5	750	59.512	0.320	13.1	0.3618	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
960 minute winter	BR1A	Orifice	MH1A	0.4				
2880 minute winter	MH1A	10.001	10.001:50%	0.8	0.241	0.019	0.2911	
2880 minute winter	MH1A	10.001	INLET A	1.0	0.183	0.023	0.2911	
960 minute winter	BR1B	Orifice	11.000:50%	0.5				
960 minute winter	BR1B	11.000	MH1B	0.9	1.813	0.008	0.0037	
1440 minute winter	MH1B	Flow through Pond	BASIN2	0.6	0.009	0.000	12.7850	
960 minute winter	BR2B	Orifice	4.000:50%	0.5				
960 minute winter	BR2B	4.000	MH6C	0.8	0.643	0.008	0.0790	
15 minute winter	MH1C	1.002	MH2C	13.7	0.479	0.144	0.6456	
15 minute winter	MH2C	1.003	1.003:50%	49.4	1.242	1.416	0.6815	
15 minute winter	MH2C	1.003	MH3C	50.3	1.265	1.442	0.6815	
120 minute winter	MH3C	1.004	1.004:50%	32.8	0.800	0.470	0.4573	
120 minute winter	MH3C	1.004	MH4C	33.4	0.787	0.477	0.4573	
120 minute winter	MH4C	1.005	1.005:50%	36.2	0.844	0.517	0.4327	
120 minute winter	MH4C	1.005	MH5C	37.8	0.891	0.540	0.4327	
120 minute winter	MH7C	4.002	MH5C	6.4	0.269	0.175	0.6478	
120 minute winter	MH6C	4.001	MH7C	4.0	0.439	0.110	0.3628	
1440 minute winter	BR1C	Orifice	MH9C	0.5				
15 minute winter	MH1D	8.000	MH2D	5.0	0.839	0.078	0.1755	
2880 minute winter	INLET A	Flow through Pond	BASIN1	1.0	0.003	0.000	52.2027	
960 minute winter	MH3	1.008	MH4	12.4	0.858	0.112	0.5788	
960 minute winter	MH4	1.009	MH5	12.4	0.925	0.158	0.7268	
960 minute winter	MH5	1.010	MH7D	12.9	0.259	0.097	1.9779	

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Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	BASIN1	2160	61.162	0.362	1.0	0.4201	0.0000	SURCHARGED
15 minute winter	MH8C	12	60.135	0.335	15.0	0.7665	0.0000	SURCHARGED
15 minute winter	2.000:50%	13	60.128	0.432	20.5	3.4496	0.0000	SURCHARGED
120 minute summer	MH2A	114	60.654	0.016	0.3	0.0180	0.0000	OK
15 minute winter	MH3D	11	59.558	0.089	18.5	0.1774	0.0000	OK
15 minute winter	8.002:50%	12	59.553	0.169	22.7	0.6258	0.0000	OK
1440 minute winter	MH9C	1020	63.008	0.008	0.5	0.0094	0.0000	OK
15 minute winter	MH4D	12	59.532	0.234	38.1	0.4861	0.0000	OK
960 minute winter	MH5D	750	59.511	0.414	7.7	1.5750	0.0000	SURCHARGED
960 minute winter	MH6D	750	59.511	0.574	11.0	1.8273	0.0000	SURCHARGED
960 minute winter	MH7D	750	59.511	0.718	28.0	2.0962	0.0000	SURCHARGED
960 minute winter	MH8D	750	59.511	0.757	30.0	2.2870	0.0000	SURCHARGED
960 minute winter	MH9D	750	59.511	0.808	31.4	2.1595	0.0000	OK
1440 minute winter	BASIN2	1350	60.776	0.276	0.6	0.3226	0.0000	SURCHARGED
960 minute winter	MH10D	750	59.511	0.111	2.5	0.3182	0.0000	OK
960 minute winter	BASIN3	750	59.511	0.811	20.2	0.9175	0.0000	SURCHARGED
120 minute winter	MH5C	82	59.758	0.425	48.7	0.7861	0.0000	SURCHARGED
15 minute winter	MH2D	10	59.652	0.051	7.6	0.0685	0.0000	OK
960 minute winter	BR2C	690	63.154	0.054	1.1	15.1335	0.0000	OK
960 minute winter	RWP3	690	62.840	0.007	0.4	0.0075	0.0000	OK
960 minute winter	BR3C	690	66.057	0.057	1.6	23.8730	0.0000	OK
960 minute winter	RWP4	690	63.007	0.007	0.5	0.0076	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	BASIN1	1.000	MH2A	0.3	0.288	0.009	0.0392	
2880 minute winter	BASIN1	Infiltration		0.3				
15 minute winter	MH8C	2.000	2.000:50%	12.6	0.689	0.363	0.9124	
15 minute winter	MH8C	2.000	MH2C	24.5	0.672	0.702	0.9124	
120 minute summer	MH2A	1.001	MH1C	0.3	0.310	0.009	0.0125	
15 minute winter	MH3D	8.002	8.002:50%	18.3	1.137	0.261	0.1053	
15 minute winter	MH3D	8.002	MH4D	26.8	0.930	0.381	0.1684	
1440 minute winter	MH9C	3.001	MH3C	0.5	0.585	0.014	0.0376	
15 minute winter	MH4D	8.003	MH5D	36.7	0.637	0.556	3.6337	
960 minute winter	MH5D	8.004	MH6D	7.1	0.503	0.107	3.1646	
960 minute winter	MH6D	8.005	MH7D	10.7	0.378	0.093	4.7695	
960 minute winter	MH7D	1.011	MH8D	27.7	0.364	0.115	3.4058	
960 minute winter	MH8D	1.012	MH9D	29.8	0.418	0.124	3.0020	
960 minute winter	MH9D	Flow through Pond	BASIN3	20.2	0.023	0.001	320.6380	
1440 minute winter	BASIN2	5.000	MH5C	0.3	0.429	0.003	0.6329	
1440 minute winter	BASIN2	Infiltration		0.2				
960 minute winter	MH10D	9.000	MH7D	2.5	0.174	0.040	1.2621	
960 minute winter	BASIN3	12.000	Out	6.2	0.655	0.080	0.1281	361.5
960 minute winter	BASIN3	Infiltration		3.0				
120 minute winter	MH5C	1.006	SOAK	48.4	1.035	0.376	1.1105	
15 minute winter	MH2D	8.001	MH3D	7.4	0.709	0.106	0.0771	
960 minute winter	BR2C	Orifice	RWP3	0.4				
960 minute winter	RWP3	6.001	MH5	0.4	0.493	0.009	0.0291	
960 minute winter	BR3C	Orifice	RWP4	0.5				
960 minute winter	RWP4	7.001	MH5	0.5	0.491	0.004	0.0592	

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Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	SOAK	82	59.755	0.464	48.4	79.8550	0.0000	OK
60 minute winter	Out	42	58.690	0.057	6.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SOAK	1.007	MH3	27.3	0.859	0.277	0.5465	
120 minute winter	SOAK	Infiltration		1.1				

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Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	BR1A	690	66.071	0.071	1.5	21.1326	0.0000	OK
2880 minute winter	MH1A	2220	61.236	0.436	1.0	0.8505	0.0000	SURCHARGED
2880 minute winter	10.001:50%	2220	61.236	0.486	1.1	0.0000	0.0000	SURCHARGED
960 minute winter	BR1B	690	66.123	0.073	1.8	25.3141	0.0000	OK
15 minute winter	11.000:50%	10	63.449	0.024	5.8	0.0000	0.0000	OK
1440 minute winter	MH1B	1410	60.840	0.439	0.9	0.4965	0.0000	OK
960 minute winter	BR2B	690	66.123	0.073	1.8	25.3141	0.0000	OK
15 minute winter	4.000:50%	10	62.777	0.022	5.4	0.0000	0.0000	OK
15 minute winter	MH1C	10	60.565	0.065	17.6	0.1335	0.0000	OK
15 minute winter	MH2C	13	60.287	0.696	68.8	2.0634	0.0000	SURCHARGED
15 minute winter	1.003:50%	12	60.064	0.551	56.2	0.0000	0.0000	SURCHARGED
120 minute winter	MH3C	80	59.931	0.496	39.4	0.8763	0.0000	SURCHARGED
120 minute winter	1.004:50%	80	59.926	0.517	39.6	0.0000	0.0000	SURCHARGED
120 minute winter	MH4C	80	59.920	0.537	42.9	0.7698	0.0000	SURCHARGED
120 minute winter	1.005:50%	82	59.914	0.556	43.8	0.0000	0.0000	SURCHARGED
120 minute winter	MH7C	82	59.911	0.497	7.7	0.7136	0.0000	SURCHARGED
120 minute winter	MH6C	82	59.911	0.451	5.2	0.6729	0.0000	SURCHARGED
1440 minute winter	BR1C	1020	66.121	0.071	1.6	30.8530	0.0000	OK
15 minute winter	MH1D	10	60.097	0.047	6.4	0.0695	0.0000	OK
2880 minute winter	INLET A	2220	61.236	0.536	1.8	1.0979	0.0000	OK
720 minute winter	MH3	690	59.667	0.309	18.3	0.4428	0.0000	SURCHARGED
720 minute winter	MH4	690	59.667	0.422	18.4	0.4776	0.0000	SURCHARGED
720 minute winter	MH5	690	59.667	0.475	18.9	0.5373	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
960 minute winter	BR1A	Orifice	MH1A	0.5				
2880 minute winter	MH1A	10.001	10.001:50%	1.0	0.238	0.023	0.2911	
2880 minute winter	MH1A	10.001	INLET A	1.1	0.271	0.025	0.2911	
960 minute winter	BR1B	Orifice	11.000:50%	0.6				
960 minute winter	BR1B	11.000	MH1B	1.0	1.903	0.010	0.0072	
1440 minute winter	MH1B	Flow through Pond	BASIN2	0.7	0.010	0.000	17.0839	
960 minute winter	BR2B	Orifice	4.000:50%	0.6				
960 minute winter	BR2B	4.000	MH6C	1.0	0.443	0.009	0.0793	
15 minute winter	MH1C	1.002	MH2C	17.4	0.592	0.182	0.6654	
15 minute winter	MH2C	1.003	1.003:50%	55.9	1.407	1.604	0.6815	
15 minute winter	MH2C	1.003	MH3C	57.1	1.436	1.637	0.6815	
120 minute winter	MH3C	1.004	1.004:50%	38.7	0.818	0.554	0.4573	
120 minute winter	MH3C	1.004	MH4C	38.9	0.806	0.557	0.4573	
120 minute winter	MH4C	1.005	1.005:50%	41.8	0.868	0.598	0.4327	
120 minute winter	MH4C	1.005	MH5C	43.1	0.910	0.616	0.4327	
120 minute winter	MH7C	4.002	MH5C	7.3	0.273	0.198	0.6478	
120 minute winter	MH6C	4.001	MH7C	4.7	0.445	0.129	0.3628	
1440 minute winter	BR1C	Orifice	MH9C	0.6				
15 minute winter	MH1D	8.000	MH2D	6.3	0.906	0.098	0.4769	
2880 minute winter	INLET A	Flow through Pond	BASIN1	1.2	0.007	0.000	64.3659	
720 minute winter	MH3	1.008	MH4	18.4	0.923	0.165	0.7939	
720 minute winter	MH4	1.009	MH5	18.2	0.985	0.232	0.7491	
720 minute winter	MH5	1.010	MH7D	18.6	0.326	0.140	1.9779	

Results for 30 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	BASIN1	2220	61.236	0.436	1.2	0.5040	0.0000	SURCHARGED
15 minute winter	MH8C	13	60.324	0.524	19.0	1.2008	0.0000	SURCHARGED
15 minute winter	2.000:50%	13	60.315	0.619	28.4	7.0744	0.0000	SURCHARGED
60 minute summer	MH2A	64	60.654	0.016	0.3	0.0180	0.0000	OK
15 minute winter	MH3D	13	59.749	0.280	23.9	0.5563	0.0000	SURCHARGED
15 minute winter	8.002:50%	12	59.741	0.357	26.4	2.7992	0.0000	SURCHARGED
1440 minute winter	MH9C	1020	63.009	0.009	0.6	0.0100	0.0000	OK
15 minute winter	MH4D	12	59.735	0.437	43.9	0.9081	0.0000	SURCHARGED
15 minute winter	MH5D	12	59.672	0.575	89.0	2.1847	0.0000	SURCHARGED
720 minute winter	MH6D	690	59.667	0.730	16.5	2.3208	0.0000	SURCHARGED
720 minute winter	MH7D	690	59.666	0.873	41.6	2.5488	0.0000	SURCHARGED
720 minute winter	MH8D	690	59.666	0.912	44.7	2.7555	0.0000	SURCHARGED
720 minute winter	MH9D	690	59.666	0.963	46.9	2.5740	0.0000	OK
1440 minute winter	BASIN2	1410	60.840	0.340	0.7	0.3951	0.0000	SURCHARGED
720 minute winter	MH10D	690	59.667	0.267	3.7	0.7614	0.0000	SURCHARGED
720 minute winter	BASIN3	690	59.666	0.966	28.8	1.0929	0.0000	SURCHARGED
120 minute winter	MH5C	82	59.909	0.576	55.6	1.0645	0.0000	SURCHARGED
15 minute winter	MH2D	13	59.749	0.149	11.7	0.1985	0.0000	OK
960 minute winter	BR2C	690	63.165	0.065	1.3	18.4122	0.0000	OK
960 minute winter	RWP3	690	62.840	0.007	0.4	0.0080	0.0000	OK
960 minute winter	BR3C	705	66.071	0.071	2.0	29.5568	0.0000	OK
960 minute winter	RWP4	705	63.007	0.007	0.6	0.0081	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	BASIN1	1.000	MH2A	0.3	0.288	0.009	0.0392	
2880 minute winter	BASIN1	Infiltration		0.4				
15 minute winter	MH8C	2.000	2.000:50%	14.4	0.702	0.413	0.9124	
15 minute winter	MH8C	2.000	MH2C	31.8	0.799	0.911	0.9124	
60 minute summer	MH2A	1.001	MH1C	0.3	0.310	0.009	0.0125	
15 minute winter	MH3D	8.002	8.002:50%	21.0	1.168	0.300	0.1866	
15 minute winter	MH3D	8.002	MH4D	36.3	0.948	0.516	0.1866	
1440 minute winter	MH9C	3.001	MH3C	0.6	0.128	0.016	0.0377	
15 minute winter	MH4D	8.003	MH5D	46.9	0.697	0.710	3.9578	
15 minute winter	MH5D	8.004	MH6D	77.9	1.106	1.179	3.1646	
720 minute winter	MH6D	8.005	MH7D	16.2	0.412	0.141	4.7695	
720 minute winter	MH7D	1.011	MH8D	41.3	0.409	0.171	3.4058	
720 minute winter	MH8D	1.012	MH9D	44.5	0.451	0.185	3.0020	
720 minute winter	MH9D	Flow through Pond	BASIN3	28.8	0.039	0.002	446.5872	
1440 minute winter	BASIN2	5.000	MH5C	0.3	0.430	0.003	0.7055	
1440 minute winter	BASIN2	Infiltration		0.2				
720 minute winter	MH10D	9.000	MH7D	3.7	0.198	0.059	1.6913	
720 minute winter	BASIN3	12.000	Out	6.2	0.655	0.080	0.1281	286.1
720 minute winter	BASIN3	Infiltration		3.1				
120 minute winter	MH5C	1.006	SOAK	52.9	1.051	0.411	1.1105	
15 minute winter	MH2D	8.001	MH3D	9.8	0.718	0.140	0.2440	
960 minute winter	BR2C	Orifice	RWP3	0.4				
960 minute winter	RWP3	6.001	MH5	0.4	0.474	0.010	0.0292	
960 minute winter	BR3C	Orifice	RWP4	0.6				
960 minute winter	RWP4	7.001	MH5	0.6	0.533	0.005	0.0593	

Results for 30 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	SOAK	82	59.903	0.612	52.9	88.9475	0.0000	SURCHARGED
60 minute summer	Out	38	58.690	0.057	6.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SOAK	1.007	MH3	34.1	0.906	0.347	0.6656	
120 minute winter	SOAK	Infiltration		1.3				

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Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	BR1A	705	66.088	0.088	1.8	26.4593	0.0000	OK
2160 minute winter	MH1A	1980	61.338	0.538	1.3	1.0492	0.0000	SURCHARGED
2160 minute winter	10.001:50%	1980	61.338	0.588	1.5	0.0000	0.0000	SURCHARGED
960 minute winter	BR1B	705	66.141	0.091	2.2	31.7189	0.0000	OK
15 minute winter	11.000:50%	10	63.453	0.028	7.5	0.0000	0.0000	OK
2160 minute winter	MH1B	2040	60.920	0.518	1.0	0.5863	0.0000	OK
960 minute winter	BR2B	705	66.141	0.091	2.2	31.7189	0.0000	OK
15 minute winter	4.000:50%	10	62.780	0.025	6.9	0.0000	0.0000	OK
15 minute winter	MH1C	10	60.574	0.074	22.8	0.1528	0.0000	OK
15 minute winter	MH2C	13	60.512	0.921	89.3	2.7299	0.0000	SURCHARGED
60 minute winter	1.003:50%	43	60.272	0.759	49.4	0.0000	0.0000	SURCHARGED
120 minute winter	MH3C	84	60.227	0.792	43.0	1.4004	0.0000	SURCHARGED
120 minute winter	1.004:50%	84	60.221	0.812	42.6	0.0000	0.0000	SURCHARGED
120 minute winter	MH4C	84	60.215	0.832	47.1	1.1928	0.0000	SURCHARGED
120 minute winter	1.005:50%	84	60.208	0.850	49.1	0.0000	0.0000	SURCHARGED
120 minute winter	MH7C	86	60.204	0.790	9.9	1.1347	0.0000	SURCHARGED
120 minute winter	MH6C	86	60.204	0.744	6.7	1.1103	0.0000	SURCHARGED
960 minute winter	BR1C	720	66.141	0.091	2.6	39.3602	0.0000	OK
15 minute winter	MH1D	10	60.104	0.054	8.3	0.0792	0.0000	OK
2160 minute winter	INLET A	1980	61.338	0.638	2.6	1.3067	0.0000	OK
960 minute winter	MH3	915	59.872	0.514	17.9	0.7354	0.0000	SURCHARGED
960 minute winter	MH4	915	59.872	0.627	17.9	0.7088	0.0000	SURCHARGED
960 minute winter	MH5	915	59.872	0.680	18.5	0.7686	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
960 minute winter	BR1A	Orifice	MH1A	0.5				
2160 minute winter	MH1A	10.001	10.001:50%	1.3	0.285	0.030	0.2911	
2160 minute winter	MH1A	10.001	INLET A	1.5	0.271	0.035	0.2911	
960 minute winter	BR1B	Orifice	11.000:50%	0.7				
960 minute winter	BR1B	11.000	MH1B	1.2	2.002	0.012	0.0431	
2160 minute winter	MH1B	Flow through Pond	BASIN2	0.7	0.004	0.000	23.2175	
960 minute winter	BR2B	Orifice	4.000:50%	0.7				
960 minute winter	BR2B	4.000	MH6C	1.2	0.445	0.011	0.0795	
15 minute winter	MH1C	1.002	MH2C	22.6	0.743	0.236	0.6916	
15 minute winter	MH2C	1.003	1.003:50%	63.5	1.596	1.820	0.6815	
15 minute winter	MH2C	1.003	MH3C	64.9	1.632	1.861	0.6815	
120 minute winter	MH3C	1.004	1.004:50%	41.6	0.822	0.595	0.4573	
120 minute winter	MH3C	1.004	MH4C	41.9	0.811	0.599	0.4573	
120 minute winter	MH4C	1.005	1.005:50%	46.5	0.877	0.664	0.4327	
120 minute winter	MH4C	1.005	MH5C	48.6	0.932	0.695	0.4327	
120 minute winter	MH7C	4.002	MH5C	9.2	0.276	0.252	0.6478	
120 minute winter	MH6C	4.001	MH7C	5.8	0.451	0.159	0.3628	
960 minute winter	BR1C	Orifice	MH9C	0.7				
15 minute winter	MH1D	8.000	MH2D	8.2	0.963	0.127	0.6869	
2160 minute winter	INLET A	Flow through Pond	BASIN1	1.6	0.007	0.000	82.8753	
960 minute winter	MH3	1.008	MH4	17.9	0.892	0.161	0.7939	
960 minute winter	MH4	1.009	MH5	17.7	0.958	0.226	0.7491	
960 minute winter	MH5	1.010	MH7D	18.2	0.291	0.137	1.9779	

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute winter	BASIN1	1980	61.338	0.538	1.6	0.6194	0.0000	SURCHARGED
15 minute winter	MH8C	13	60.554	0.754	24.7	1.7267	0.0000	FLOOD RISK
15 minute winter	2.000:50%	13	60.537	0.842	51.2	13.0763	0.0000	SURCHARGED
2160 minute winter	MH2A	1980	60.655	0.017	0.4	0.0188	0.0000	OK
15 minute winter	MH3D	13	60.000	0.531	28.7	1.0567	0.0000	SURCHARGED
15 minute winter	8.002:50%	13	59.991	0.607	36.8	8.0839	0.0000	SURCHARGED
960 minute winter	MH9C	720	63.010	0.010	0.7	0.0108	0.0000	OK
15 minute winter	MH4D	13	59.972	0.674	52.9	1.4026	0.0000	SURCHARGED
15 minute winter	MH5D	12	59.908	0.811	98.1	3.0834	0.0000	SURCHARGED
960 minute winter	MH6D	915	59.871	0.934	16.7	2.9710	0.0000	SURCHARGED
960 minute winter	MH7D	930	59.871	1.078	41.4	3.1454	0.0000	SURCHARGED
960 minute winter	MH8D	930	59.871	1.117	44.5	3.3730	0.0000	SURCHARGED
960 minute winter	MH9D	930	59.871	1.168	47.0	3.1204	0.0000	OK
2160 minute winter	BASIN2	2040	60.919	0.419	0.7	0.4849	0.0000	SURCHARGED
960 minute winter	MH10D	930	59.871	0.471	3.8	1.3455	0.0000	SURCHARGED
960 minute winter	BASIN3	930	59.871	1.171	30.4	1.3242	0.0000	FLOOD RISK
120 minute winter	MH5C	86	60.202	0.869	65.1	1.6058	0.0000	SURCHARGED
15 minute winter	MH2D	13	60.003	0.403	12.9	0.5362	0.0000	SURCHARGED
960 minute winter	BR2C	705	63.184	0.084	1.6	23.5718	0.0000	OK
960 minute winter	RWP3	705	62.841	0.008	0.5	0.0086	0.0000	OK
960 minute winter	BR3C	705	66.088	0.088	2.5	36.7364	0.0000	OK
960 minute winter	RWP4	705	63.008	0.008	0.7	0.0086	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2160 minute winter	BASIN1	1.000	MH2A	0.4	0.296	0.010	0.0417	
2160 minute winter	BASIN1	Infiltration		0.4				
15 minute winter	MH8C	2.000	2.000:50%	19.5	0.710	0.558	0.9124	
15 minute winter	MH8C	2.000	MH2C	38.6	0.970	1.106	0.9124	
2160 minute winter	MH2A	1.001	MH1C	0.4	0.316	0.010	0.0133	
15 minute winter	MH3D	8.002	8.002:50%	21.9	1.181	0.311	0.1866	
15 minute winter	MH3D	8.002	MH4D	48.2	1.211	0.685	0.1866	
960 minute winter	MH9C	3.001	MH3C	0.7	0.149	0.019	0.0379	
15 minute winter	MH4D	8.003	MH5D	56.2	0.799	0.851	3.9578	
15 minute winter	MH5D	8.004	MH6D	90.7	1.289	1.374	3.1646	
960 minute winter	MH6D	8.005	MH7D	16.6	0.414	0.145	4.7695	
960 minute winter	MH7D	1.011	MH8D	41.1	0.399	0.170	3.4058	
960 minute winter	MH8D	1.012	MH9D	44.6	0.464	0.185	3.0020	
960 minute winter	MH9D	Flow through Pond	BASIN3	30.4	0.034	0.002	633.3265	
2160 minute winter	BASIN2	5.000	MH5C	0.3	0.423	0.003	0.7058	
2160 minute winter	BASIN2	Infiltration		0.2				
960 minute winter	MH10D	9.000	MH7D	3.7	0.195	0.059	1.6913	
960 minute winter	BASIN3	12.000	Out	6.2	0.655	0.080	0.1281	350.5
960 minute winter	BASIN3	Infiltration		3.3				
120 minute winter	MH5C	1.006	SOAK	63.4	1.074	0.492	1.1105	
15 minute winter	MH2D	8.001	MH3D	12.2	0.721	0.174	0.2866	
960 minute winter	BR2C	Orifice	RWP3	0.5				
960 minute winter	RWP3	6.001	MH5	0.5	0.492	0.012	0.0293	
960 minute winter	BR3C	Orifice	RWP4	0.7				
960 minute winter	RWP4	7.001	MH5	0.7	0.485	0.005	0.0594	

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	SOAK	86	60.196	0.905	63.4	106.8429	0.0000	SURCHARGED
60 minute summer	Out	35	58.690	0.057	6.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SOAK	1.007	MH3	36.0	0.908	0.366	1.6553	
120 minute winter	SOAK	Infiltration		1.5				

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	BR1A	555	66.096	0.096	2.4	28.6828	0.0000	OK
2880 minute winter	MH1A	2280	61.377	0.577	1.2	1.1242	0.0000	SURCHARGED
2880 minute winter	10.001:50%	2280	61.377	0.627	1.4	0.0000	0.0000	SURCHARGED
720 minute winter	BR1B	540	66.148	0.098	3.0	34.3574	0.0000	OK
15 minute winter	11.000:50%	10	63.454	0.029	8.1	0.0000	0.0000	OK
2160 minute winter	MH1B	2040	60.952	0.550	1.0	0.6223	0.0000	OK
720 minute winter	BR2B	540	66.148	0.098	3.0	34.3574	0.0000	OK
15 minute winter	4.000:50%	10	62.781	0.026	7.5	0.0000	0.0000	OK
15 minute winter	MH1C	12	60.586	0.086	24.5	0.1763	0.0000	OK
15 minute winter	MH2C	13	60.575	0.984	96.1	2.9157	0.0000	SURCHARGED
120 minute winter	1.003:50%	86	60.489	0.976	35.1	0.0000	0.0000	SURCHARGED
120 minute winter	MH3C	84	60.464	1.029	44.3	1.8188	0.0000	SURCHARGED
120 minute winter	1.004:50%	84	60.459	1.050	44.5	0.0000	0.0000	SURCHARGED
120 minute winter	MH4C	84	60.454	1.071	49.6	1.5354	0.0000	SURCHARGED
120 minute winter	1.005:50%	84	60.448	1.090	51.8	0.0000	0.0000	SURCHARGED
120 minute winter	MH7C	84	60.445	1.031	10.7	1.4819	0.0000	SURCHARGED
120 minute winter	MH6C	84	60.446	0.986	7.2	1.4710	0.0000	SURCHARGED
960 minute winter	BR1C	705	66.147	0.097	2.8	42.2118	0.0000	OK
15 minute winter	MH1D	10	60.106	0.056	9.0	0.0825	0.0000	OK
2880 minute winter	INLET A	2280	61.377	0.677	2.3	1.3854	0.0000	OK
960 minute winter	MH3	930	59.944	0.586	18.7	0.8392	0.0000	SURCHARGED
960 minute winter	MH4	930	59.944	0.699	18.4	0.7908	0.0000	SURCHARGED
960 minute winter	MH5	930	59.944	0.752	19.0	0.8506	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute winter	BR1A	Orifice	MH1A	0.6				
2880 minute winter	MH1A	10.001	10.001:50%	1.2	0.241	0.029	0.2911	
2880 minute winter	MH1A	10.001	INLET A	1.4	0.271	0.033	0.2911	
720 minute winter	BR1B	Orifice	11.000:50%	0.8				
720 minute winter	BR1B	11.000	MH1B	1.4	2.103	0.014	0.0450	
2160 minute winter	MH1B	Flow through Pond	BASIN2	0.7	0.004	0.000	25.9655	
720 minute winter	BR2B	Orifice	4.000:50%	0.8				
720 minute winter	BR2B	4.000	MH6C	1.4	0.474	0.012	0.0798	
15 minute winter	MH1C	1.002	MH2C	24.3	0.792	0.254	0.7249	
15 minute winter	MH2C	1.003	1.003:50%	65.7	1.653	1.884	0.6815	
15 minute winter	MH2C	1.003	MH3C	67.0	1.684	1.920	0.6815	
120 minute winter	MH3C	1.004	1.004:50%	43.3	0.827	0.619	0.4573	
120 minute winter	MH3C	1.004	MH4C	43.9	0.817	0.628	0.4573	
120 minute winter	MH4C	1.005	1.005:50%	48.9	0.888	0.699	0.4327	
120 minute winter	MH4C	1.005	MH5C	51.3	0.936	0.733	0.4327	
120 minute winter	MH7C	4.002	MH5C	9.9	0.270	0.271	0.6478	
120 minute winter	MH6C	4.001	MH7C	6.3	0.444	0.172	0.3628	
960 minute winter	BR1C	Orifice	MH9C	0.8				
15 minute winter	MH1D	8.000	MH2D	8.9	0.993	0.137	0.6956	
2880 minute winter	INLET A	Flow through Pond	BASIN1	1.5	0.007	0.000	90.3418	
960 minute winter	MH3	1.008	MH4	18.4	0.899	0.165	0.7939	
960 minute winter	MH4	1.009	MH5	18.1	0.951	0.232	0.7491	
960 minute winter	MH5	1.010	MH7D	19.0	0.297	0.143	1.9779	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	BASIN1	2280	61.377	0.577	1.5	0.6629	0.0000	SURCHARGED
15 minute winter	MH8C	13	60.623	0.823	26.6	1.8844	0.0000	FLOOD RISK
15 minute winter	2.000:50%	14	60.604	0.909	57.2	15.2350	0.0000	SURCHARGED
2880 minute winter	MH2A	2280	60.655	0.017	0.4	0.0190	0.0000	OK
15 minute winter	MH3D	13	60.077	0.608	30.1	1.2089	0.0000	SURCHARGED
15 minute winter	8.002:50%	13	60.067	0.683	60.5	10.2218	0.0000	SURCHARGED
960 minute winter	MH9C	705	63.010	0.010	0.8	0.0110	0.0000	OK
15 minute winter	MH4D	13	60.049	0.751	56.3	1.5629	0.0000	SURCHARGED
15 minute winter	MH5D	12	59.980	0.883	95.6	3.3548	0.0000	SURCHARGED
960 minute winter	MH6D	930	59.943	1.006	17.9	3.2016	0.0000	SURCHARGED
960 minute winter	MH7D	930	59.943	1.150	43.5	3.3570	0.0000	SURCHARGED
960 minute winter	MH8D	930	59.943	1.189	47.5	3.5919	0.0000	SURCHARGED
960 minute winter	MH9D	930	59.943	1.240	50.1	3.3141	0.0000	OK
2160 minute winter	BASIN2	2040	60.951	0.451	0.7	0.5208	0.0000	SURCHARGED
960 minute winter	MH10D	930	59.943	0.543	4.1	1.5527	0.0000	SURCHARGED
960 minute winter	BASIN3	930	59.943	1.243	32.9	1.4062	0.0000	FLOOD RISK
120 minute winter	MH5C	84	60.443	1.110	69.2	2.0510	0.0000	SURCHARGED
15 minute winter	MH2D	13	60.079	0.479	13.5	0.6380	0.0000	SURCHARGED
960 minute winter	BR2C	690	63.192	0.092	1.8	25.7669	0.0000	OK
960 minute winter	RWP3	690	62.841	0.008	0.6	0.0088	0.0000	OK
960 minute winter	BR3C	705	66.096	0.096	2.7	40.0563	0.0000	OK
960 minute winter	RWP4	705	63.008	0.008	0.8	0.0088	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	BASIN1	1.000	MH2A	0.4	0.299	0.011	0.0425	
2880 minute winter	BASIN1	Infiltration		0.5				
15 minute winter	MH8C	2.000	2.000:50%	20.7	0.715	0.594	0.9124	
15 minute winter	MH8C	2.000	MH2C	39.0	0.981	1.119	0.9124	
2880 minute winter	MH2A	1.001	MH1C	0.4	0.318	0.011	0.0136	
15 minute winter	MH3D	8.002	8.002:50%	29.8	1.198	0.424	0.1866	
15 minute winter	MH3D	8.002	MH4D	51.4	1.293	0.732	0.1866	
960 minute winter	MH9C	3.001	MH3C	0.8	0.156	0.020	0.0380	
15 minute winter	MH4D	8.003	MH5D	59.6	0.847	0.903	3.9578	
15 minute winter	MH5D	8.004	MH6D	93.9	1.334	1.422	3.1646	
960 minute winter	MH6D	8.005	MH7D	17.8	0.422	0.155	4.7695	
960 minute winter	MH7D	1.011	MH8D	43.7	0.409	0.181	3.4058	
960 minute winter	MH8D	1.012	MH9D	47.5	0.470	0.197	3.0020	
960 minute winter	MH9D	Flow through Pond	BASIN3	32.9	0.036	0.002	705.1415	
2160 minute winter	BASIN2	5.000	MH5C	0.3	0.430	0.003	0.7060	
2160 minute winter	BASIN2	Infiltration		0.3				
960 minute winter	MH10D	9.000	MH7D	3.8	0.192	0.061	1.6913	
960 minute winter	BASIN3	12.000	Out	6.2	0.655	0.080	0.1281	357.6
960 minute winter	BASIN3	Infiltration		3.3				
120 minute winter	MH5C	1.006	SOAK	67.2	1.068	0.522	1.1105	
15 minute winter	MH2D	8.001	MH3D	12.1	0.727	0.172	0.2866	
960 minute winter	BR2C	Orifice	RWP3	0.6				
960 minute winter	RWP3	6.001	MH5	0.6	0.493	0.013	0.0294	
960 minute winter	BR3C	Orifice	RWP4	0.8				
960 minute winter	RWP4	7.001	MH5	0.8	0.516	0.006	0.0594	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	SOAK	84	60.436	1.145	67.2	107.9483	0.0000	SURCHARGED
30 minute winter	Out	20	58.690	0.057	6.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SOAK	1.007	MH3	35.8	0.910	0.364	1.8567	
120 minute winter	SOAK	Infiltration		1.5				

KAVANAGH BURKE
CONSULTING ENGINEERS

Appendix B
Infiltration Tests Report

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Ulick Burke & Associates Limited.
Registered in Ireland No: 233579.
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IGSL Limited

Montane Developments

Rail Park Maynooth

Infiltration Test Report

Report No. 25691

November 2024

Report

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Project: Rail Park Maynooth

Project No. 25691

Revision	**Date**	**Title**		
Rev 0	08/11/2024	Infiltration Test Report		
	Copies	Document Format	Prepared By	Reviewed By
		PDF	Brian Green Chartered Engineer	David Green Chartered Engineer
	To	Montane Developments		
Revision	**Date**	**Title**		
Rev 1				
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FOREWORD

The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

Standards
The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (1999), BS 1377 (Parts 1 to 9) and Engineers Ireland Specification & Related Documents for Ground Investigation in Ireland (2006). A new National Annex for use in the Republic of Ireland is currently in circulation for comment and will be adopted in the near future. In the meantime, the following Irish (IS) and European Standards or Norms are referenced:

- IS EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- IS EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- IS EN ISO 14688-1:2002 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- IS EN ISO 14688-2:2004 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles
- IS EN ISO 14689-1:2004 Geotechnical Investigation and Testing - Identification & Classification of Rock, Part 1: Identification & Description

Reporting
Recommendations made and opinions expressed in this report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points.

This report has been prepared for Montane Developments, and the information should not be used without prior written permission. The recommendations developed in this report specifically relate to the proposed development. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

In-Situ Testing

Standard penetration tests were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 and the Energy Ratio (E_r). A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The measured number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

Groundwater

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Engineering Logging

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004. Rock weathering classification conforms to IS EN ISO 14689-1:2003 while discontinuities (bedding planes, joints, cleavages, faults etc) are classified in accordance with 4.3.3 of IS EN ISO 14689-1:2003. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Retention of Samples

Samples shall be retained for a period of 60 days following approval of the final factual report, as detailed in the Scope of Works.

1.0 Introduction

The residential development at Rail Park, Maynooth will include provision for the storage and discharge of storm water. An investigation of ground conditions was, therefore, carried out to assess the suitability of the sub-soils for soakaway purposes.

This report contains the fieldwork records, and discusses the sub-soil conditions in relation to soakaway design.

The site location is approximately outlined in Figure 1.

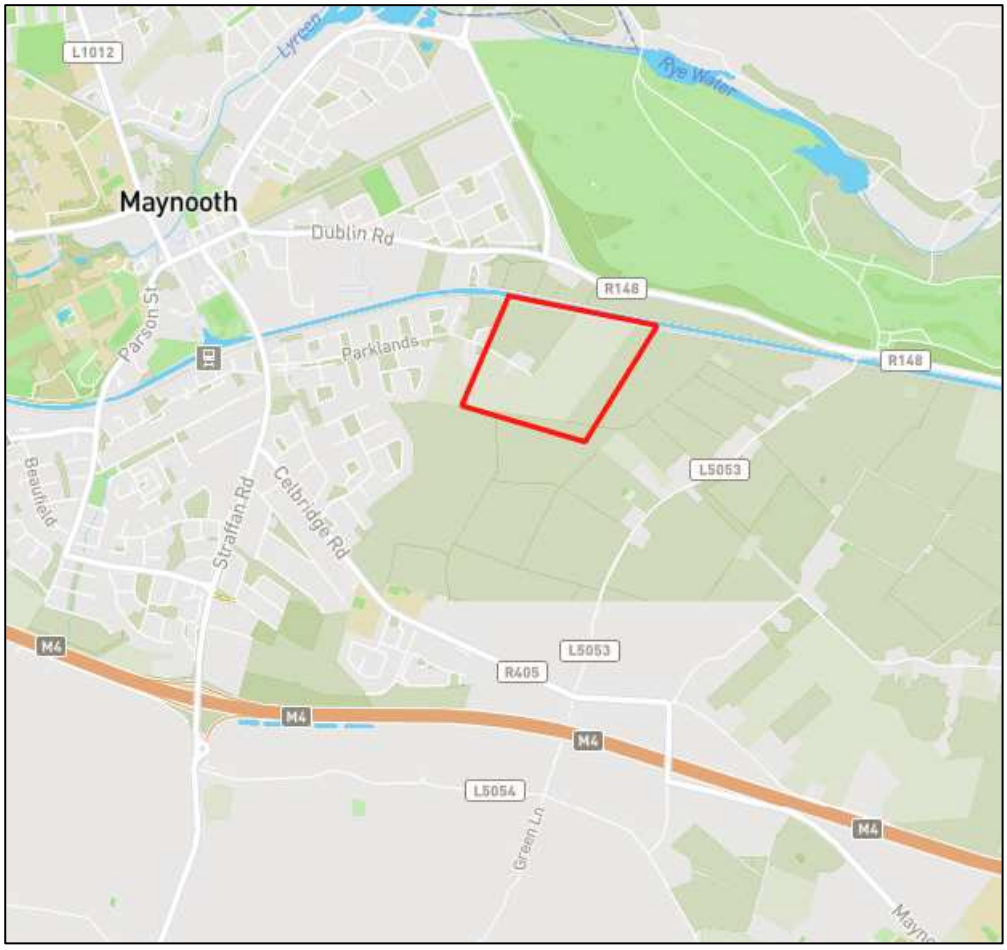

Figure 1 – Site Location

2.0 Subsoil Conditions

Trial pits were excavated in a total of fourteen locations as indicated on the site plan enclosed in Appendix 3. The descriptions and depths of the sub-soils encountered are shown on the trial pit records enclosed in Appendix 2.

The trial pits revealed topsoil overlying brown sandy gravelly clay which was in a soft condition, becoming soft to firm with depth. Further excavation showed an increase in the gravel content, and the presence of sub-rounded to sub-angular cobbles and boulders of limestone and shale. The pits achieved depths ranging from 1.1 metres to 1.8 metres, and were terminated on obstructions which had the appearance of fragmented rock.

There was no evidence of groundwater ingress to the excavated depths.

3.0 Infiltration Testing

The infiltration tests were performed in accordance with BRE Digest 365 'Soakaway Design'. To ensure saturation of the sub-soils, water was poured into each test pit, and records taken of the fall in water level against time. Following the saturation stages the pits were refilled and the fall in water level against time was monitored. The results are enclosed in Appendix 2 and are summarised in Table 1. This table also shows the test zones which represent the properties of the sub-soils.

The infiltration rate is the volume of water dispersed per unit exposed area per unit of time, and is generally expressed as metres/minute or metres/second.

The field tests recorded f-values ranging from 0.00018 m/min to 0.00090 m/min.

Location	Excavated Depth (mbgl)	f-value (m/min)	Obstruction (m/bgl)
SA01	1.80	0.00038	1.80
SA02	1.20	0.00038	1.20
SA03	2.00	0.00084	2.00
SA04	1.20	0.00039	1.20
SA05	1.70	0.00029	1.70
SA06	1.10	0.00030	1.10
SA07	1.10	0.00090	1.10
SA08	1.10	0.00161	1.10
SA09	1.40	0.00179	1.40
SA10	1.30	0.00024	1.30
SA11	1.30	0.00030	1.30
SA12	1.40	0.00018	1.40
SA13	1.50	0.00038	1.50
SA14	1.40	0.00019	1.40

4.0 Principles of Soakaway Design

Soakaways are generally designed in accordance with "BRE Digest 365 - Design of soakaways".

The digest suggests that a soakaway should be designed to accommodate the immediate storm-water run-off and permit infiltration into the surrounding ground sufficiently quickly to provide the necessary capacity to receive run-off from a subsequent storm.

The required soakaway capacity is obtained by calculating the inflow and outflow for a range of storm durations and choosing the storm period which gives the maximum storage requirement. Rainfall statistics are obtained from Met Eireann and calculations are usually carried out for a 30-year return period. However, the local authority may stipulate a storm return period which takes into account climate change.

5.0 Conclusions

The test results indicate relatively low infiltration rates, likely reflecting the clay dominant soils to the excavated depths. In addition, obstructions were encountered at shallow depths, limiting the depth of the soakaway pits.

In these conditions, consideration can be given to the use of permeable pavement, narrow trenches or modular systems.

If the design of a soakaway system is not considered practical, it will be necessary to discharge storm water to an existing surface water system, using attenuation techniques to regulate the flow.

It should be noted that while the obstructions at the base of the trial pits had the appearance of weathered bedrock, this should not be assumed, and the obstructions could instead represent large boulders. If a knowledge of the bedrock level is required, then further investigation in the form of rotary coring would be required.

Appendix 3 Site Plan

25691 Railpark , Maynooth

50 0 50 100 150 200 250 300 350 400 450 500 550 600 m

Scale: 1 : 3000.

MN

1°34'

KAVANAGH BURKE
CONSULTING ENGINEERS

Appendix C
Geotechnical Report

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IGSL Limited

Montane Developments

Rail Park – Phase 1
Maynooth
Co. Kildare

Geotechnical Report

Report No. 25777-1

April 2025

Report

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Project: Rail Park Maynooth – Phase 1

Project No. 25777

Revision	Date	Title		
Rev 0	10/04/2025	Ground Investigation Report		
	Copies	Document Format	Prepared By	Reviewed By
		PDF	Brian Green Chartered Engineer	David Green Chartered Engineer
	To	Montane Developments		
Revision	**Date**	**Title**		
Rev 1	28/04/2025	Ground Investigation Report		
	Copies	Document Format	Prepared By	Reviewed By
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	To	Montane Developments		
Revision	**Date**	**Title**		
	Copies	Document Format	Prepared By	Reviewed By
	To			
Revision	**Date**	**Title**		
	Copies	Document Format	Prepared By	Reviewed By
	To			

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FOREWORD

The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

Standards

The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (1999), BS 1377 (Parts 1 to 9) and Engineers Ireland Specification & Related Documents for Ground Investigation in Ireland (2006). A new National Annex for use in the Republic of Ireland is currently in circulation for comment and will be adopted in the near future. In the meantime, the following Irish (IS) and European Standards or Norms are referenced:

- IS EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- IS EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- IS EN ISO 14688-1:2002 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- IS EN ISO 14688-2:2004 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles
- IS EN ISO 14689-1:2004 Geotechnical Investigation and Testing - Identification & Classification of Rock, Part 1: Identification & Description

Reporting

Recommendations made and opinions expressed in this report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points.

This report has been prepared for Montane Developments and the information should not be used without prior written permission. The recommendations developed in this report specifically relate to the proposed development. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

In-Situ Testing

Standard penetration tests were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 and the Energy Ratio (E_r). A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The measured number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

Groundwater
The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Engineering Logging
Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004. Rock weathering classification conforms to IS EN ISO 14689-1:2003 while discontinuities (bedding planes, joints, cleavages, faults etc) are classified in accordance with 4.3.3 of IS EN ISO 14689-1:2003. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Retention of Samples
Samples shall be retained for a period of 60 days following approval of the final factual report, as detailed in the Scope of Works.

1.0 Introduction

A site investigation was scheduled for the proposed residential development at Rail Park, Maynooth.

The development area is sub-divided into Phase 1 and Phase 2 as shown in Figure 1. This report presents an assessment of the ground conditions with respect to the proposed development of Phase 1.

The environmental elements of the investigation were interpreted by environmental specialists O'Callaghan Moran and discussed in their Waste Characterisation Assessment, which is presented under separate cover.

Figure 1 – Phase 1 and Phase 2 Locations

2.0 Scope of Investigation

Fieldwork for Phase 1 of the investigation entailed the following elements:

- Trial pits were excavated in 12 locations (TP101 to TP112) to permit close examination of the upper soils
- Dynamic probing techniques were employed in 25 locations (DP101 to DP125) to obtain a soil resistance profile.
- Rotary coring techniques were employed in 4 locations (RC101 to RC104) to ascertain the depth, composition and condition of bedrock to the scheduled depths.
- Plate bearing tests were performed in 8 locations (CBR101 to CBR108) and adjacent to trial pits to provide information for pavement design purposes.
- A programme of groundwater monitoring comprising manual dips and interrogation of data loggers

3.0 Ground Conditions

3.1 Trial Pits

Trial pits were excavated in 12 locations to facilitate close examination of the upper soils. The descriptions and depths of the various soils encountered are shown on the trial pit records enclosed in Appendix 1.

The pits revealed an upper layer of soft brown sandy clay overlying firm to stiff grey/brown sandy gravelly clay with cobbles and boulders. The pits were terminated in large angular boulders, possibly fragmented bedrock, at depths ranging from 1.4 to 2.5 metres below ground level. The trial pit findings are summarised in Table.

Water ingress was limited to a slight seepage at the base of TP202 (1.9 metres). In addition, the trial pits remained stable during the period of excavation (typically 45 minutes).

Location	Topsoil	Soft brown sandy clay with gravel	Firm/stiff grey/brown gravelly clay with cobbles and boulders	large boulders or fragmented rock
TP101	0.20	0.20 to 1.10	1.10 to 2.10	2.10
TP102	0.20	0.20 to 0.70	0.70 to 1.80	1.80
TP103	0.20	0.20 to 1.20	1.20 to 1.40	1.40
TP104	0.10	0.10 to 0.70	0.70 to 2.50	2.50
TP105	0.20	0.20 to 0.70	0.70 to 1.40	1.40
TP106	0.20	0.20 to 0.60	0.60 to 2.20	2.20
TP107	0.20	0.20 to 0.90	0.90 to 2.10	2.10
TP108	0.20	0.20 to 0.90	0.90 to 1.80	1.80
TP109	0.20	0.20 to 0.90	0.90 to 1.90	1.90
TP110	0.20	0.20 to 0.90	0.90 to 1.90	1.90
TP111	0.20	0.20 to 0.80	0.6 0 to 2.30	2.30
TP112	0.20	0.20 to 0.90	0.90 to 2.20	2.20

Table 1

3.2 Dynamic Probing

Dynamic probing was performed in 25 locations.

The dynamic probe utilised by IGSL Ltd complies with the requirements of ISO 22476-2: 2005+A1: 2011 – Geotechnical Investigation and testing – Field testing - Part 2: Dynamic probing. DPH probing comprises a 50 kg drop weight, 500mm drop height and a 43.7mm diameter (90°) cone.

In accordance with the standards, the number of blows required to drive the probe through each 100mm increment of penetration is recorded. Probing is generally terminated when blow counts, N100 values, exceed 25, in order to avoid damage to equipment. Detailed probe records are provided on which the blow counts are recorded both numerically and graphically.

Probe results are used primarily in conjunction with known information on soil composition and stratification, to define more accurately the soil profile, and to detect any soft or loose zones.

Apart from the upper metre, where blow-counts (N_{100} values) were typically low and erratic, the probes recorded high resistance, with refusal at depths ranging from 0.9 metres to 1.3 metres.

3.3 Rotary Drilling and Coring

Rotary techniques were employed in four locations to ascertain the depth, composition and condition of bedrock. Open-hole (Symmetrix) drilling techniques were used to penetrate the overburden soils, identifying the soil type from the flush returns. On the first indications of bedrock, coring techniques were employed.

Standpipes were installed in all coreholes in order to permit long-term groundwater monitoring.

The depths to bedrock are shown in Table 2. While the general depth to bedrock varied from 2.2 metres to 2.9 metres, the exception was RC102 (near the eastern site boundary) where very stiff sandy gravelly clay persisted to a depth of 10.6 metres before reaching bedrock.

Location	Depth to bedrock (m bgl)	Cored Depth (m bgl)	Depth to water (end of drilling) (m bgl)
RC101	2.70	7.70	3.10
RC102	10.60	13.60	5.10
RC103	2.90	7.90	5.80
RC104	2.20	7.20	5.60

Table2

The principal bedrock mass ("intact bedrock") was identified as predominately medium strong to very strong fine-grained LIMESTONE, which was fresh to locally slightly weathered.

Total Core Recovery (TCR) was 100% for all coreholes, while Solid Core Recovery (SCR) was typically more than 70%. RQD values showed similar values.

Photo 1 shows recovery of the upper bedrock at RC01 (west of site). The predominately fresh and largely intact condition of the Limestone is clearly evident.

Photo 1 – Core recovery at RC01 (2.7 to 5.7 m)

Photo 2 shows the core recovery of the overburden at RC02 (east of the site). The upper Limestone is evidently a very large boulder, which was penetrated to reveal extensive deposits of very high strength sandy gravely clay, most likely Glacial Till.

Photo 2 – Core recovery at RC02 (3.6 to 9.6 m)

3.4 Plate Bearing Tests

Plate bearing tests were performed at selected trial pits to obtain a measure of the CBR values. A 450 mm diameter plate was used, and tests were performed at a depth of 0.5 metres below existing ground level. Tests were performed in accordance with BS 1377 Part 9: 1990. "In-situ Tests". The incremental loading test (4.1.6.4.2) was used.

The maximum applied load was estimated on the basis of obtaining an accumulative displacement of at least 1.25 mm. The load was then applied in five approximately equal increments to the design load. To measure recovery the load was removed in three increments. A second phase of loading and unloading was performed to assess the benefits of further compaction.

The settlement under each increment was measured against time until movement had effectively ceased and the results are presented as graphs of applied pressure against settlement. Calculation of Modulus of Sub-grade Reaction (k) and CBR values are in accordance with NRA HD25-26/10 Volume7: Pavement Design and Maintenance.

The plate test records from the initial and reload stages are enclosed in Appendix 4 and the results are summarised in Table 3.

Location	Test No.	Depth (m bgl)	CBR (%)	
			Cycle 1	Cycle 2
TP101	CBR101	0.5	6.3	6.3
TP102	CBR102	0.5	2.2	2.2
TP105	CBR103	0.5	2.4	3.6
TP106	CBR104	0.5	5.9	5.3

Table 3

3.5 Groundwater Monitoring

Data loggers were installed in the standpipes to facilitate continuous monitoring of water levels.

The site was revisited and the depth to water was measured in each standpipe using an electronic dip metre. The data loggers were interrogated and the results are presented graphically in Appendix 5.

This report contains data logger records for the period min-December 2024 to min-March 2025. All data loggers reported a rise in water level of approximately 1 metre in early January 2025, with some fluctuations occurring thereafter. The shallowest water levels were recorded in early March 2025, rising to 2.2 metres at BH101, 2.7 metres at BH102, 2.3 metres at BH103 and 3.3 metres at BH104.

The results of the most recent groundwater monitoring undertaken using the electronic dip meter are summarised on Table 1.

Location	Hole Depth (m BGL)	Top of Response Zone (m BGL)	Base of Response Zone (m BGL)	Groundwater Depth 13/03/2025 (m BGL)
BH101	7.7	1.0	7.7	2.54
BH102	13.6	1.0	13.6	3.48
BH103	7.9	1.0	7.9	2.83
BH104	7.2	1.0	7.2	4.09

Table 4

The data loggers remain in-situ and in accordance with the specification, will remain in place until May 2025.

3.6 Waste Characterisation Assessment

The results of environmental laboratory analyses were issued to environmental specialists O'Callaghan Moran (OCM), who have used this data to produce a detailed Waste Characterisation Assessment (WCA).

Their report, which is presented under separate cover, classifies the samples as either Hazardous or Non-Hazardous and assigns the appropriate List of Waste (LoW) code to each. Also included are recommended waste receptors for landfill disposal purposes.

4.0 Laboratory Testing (Geotechnical)

4.1 Particle Size Distributions

Grading curves for selected samples show that these soils are well-graded, with fines content values ranging from 14% to 33%.

4.2 Index Properties

The results of plastic and liquid limit tests generally classify the fines fraction as non-plastic.

4.3 Chemical analysis

The results of chemical testing showed low concentrations of soluble sulphates with associated near-neutral pH levels

4.4 Rock Testing

Rock core samples were tested using the Point Load Test apparatus, while selected larger specimens were subjected to Uniaxial Compression Strength (UCS) tests.

The UCS tests produced compressive strengths in the range 76 to 102 MPa. The results of the Point Load Index Tests are indicative of equivalent UCS values ranging from 45 to 118 MPa.

Overall, the strength tests indicate the rock to be mostly Strong to Very Strong in accordance with Table 5 of EN ISO 14689.

5.0 Laboratory Testing (Environmental)

Environmental testing was scheduled on samples recovered from the trial pits in order to screen for inherent contamination and to assess their suitability for disposal to an inert landfill.

Samples were tested in accordance with the RILTA Suite, which is used to determine the suitability of soils for disposal to a landfill. The RILTA suite includes Heavy Metals, Polycyclic Aromatic Hydrocarbons (PAH), TPH-CWG, BTEX, PCB and Total Organic Carbon (TOC) carried out on dry soil samples. Also included are leachate analyses, whereby leachate is generated in accordance with CEN 10:1 specification and this is tested for the presence of recognised contaminants including Heavy Metals, Dissolved Organic Carbon (DOC) and Total Dissolved Solids (TDS). An Asbestos Screen is also included in the RILTA Suite.

The analyses were carried out by Eurofins Chemtest Laboratory and their reports are presented in Appendix 7. The results are also included in the Waste Characterisation Assessment, which is presented by OCM under separate cover.

6.0 Discussion

The dynamic probing recorded generally low soil resistance through the upper metre. Below this zone high resistance was sustained to refusal at nominal depths.

The trial pits identified the upper soils as brown sandy clay with gravel and cobbles. This material became firm to stiff with depth. These soils had the appearance and condition of glacial till.

Very coarse material (large boulders embedded in sandy gravel and cobbles) at the base of the trial pits had the appearance of a highly weathered and fragmented bedrock.

The rotary holes confirmed the transition to structured limestone bedrock, which occurred in 3 coreholes within the depth range of 2 to 3 metres. Most notable was the increase in the overburden thickness to 10.6 metres at RC102.

No water ingress was observed in the trial pits, although the coreholes recorded standing water at depths of between 3 and 6 metres at the end of drilling. Groundwater monitoring has shown that the groundwater rose to a shallowest depth of 2.2 metres at BH101 during the period December 2024 to March 2025.

6.1 Structural Foundations

The investigation revealed brown sandy gravelly clay directly underlying the topsoil. This material was in a soft and variable condition and is considered unsuitable for founding purposes.

The underlying deposits were in a firm to stiff condition, with a presumed bearing resistance of 150 to 175kN/m^2. Based on the resistance profiles in the dynamic probes, a founding depth of c. 1 metre should be sufficient to reach the firm to stiff soils. The transition to this material should be evident by a change in colour from brown to grey-brown, an increase in the cobble and boulder content and also by a marked increase in the resistance to excavation.

At depths ranging from 1.4 metres to 2.5 metres, the trial pits terminated within coarse granular material, grading to fragmented Limestone. For foundations placed on this material, the bearing resistance could be increased to c.200 to 250 kN/m^2.

Where foundation pressures are transferred to the Limestone bedrock, a bearing pressure of c.400 kPa could be assumed at the highly weathered and fractured bedrock horizon, increasing to c. 1 MPa for the fresh “intact” bedrock. However, it should be noted that conventional foundations on bedrock will not be possible in the vicinity of RC102, where the overburden soils are significantly thicker. If a knowledge of the bedrock level in this part of the site is critical, then a Geophysical survey in conjunction with additional coreholes would likely be required to profile the variations.

For deep foundations, trench-fill techniques may be required, bringing up the levels with lean mix concrete.

6.2 Groundwater and Trench Stability

While the trial pits remained dry and stable, data loggers were installed to permit long-term monitoring of water levels. These have shown that water levels have risen to a shallowest depth of c.2.2 metres below existing ground level. It is therefore expected that shallow foundation excavations to the firm / stiff sandy gravelly clay will remain dry. However, provision should be made for the control of surface water ingress during periods of sustained rainfall.

Any water ingress into foundation pits will cause softening or loosening of silt or clay soils at the pit base. Therefore, it will be imperative to minimise the delay between excavation and blinding of silt/clay soils with lean mix concrete. Ideally, foundation excavation and blinding of silt/clay soils should be carried out as one continuous operation.

The trial pits remained stable, indicating that shallow foundation trenches to the trial pit excavation depths should remain stable in the short-term. Where deep temporary trenches are unavoidable (e.g. drainage trenches), provision should be made for trench control measures (e.g. trench boxes) to temporarily retain the sidewalls.

6.3 Floor Slabs

The upper soils have been shown by dynamic probing to be of low resistance. To ensure stability of the floor slabs, it is recommended that these are supported on the underlying firm or stiff gravelly clay soils, using additional granular fill (hardcore) as necessary to bring up the levels.

Additional plate bearing tests should be conducted on the formation soils to verify the moduli of subgrade reaction (ks values) for slab design.

Imported granular fill ‘hardcore’ used in any foundation application or under concrete floor slabs should meet the requirements of Annex E of SR 21:2014+A1:2016. Both T0 and T1 hardcore fills should be rigorously tested (independent of the quarry source) to ensure that they meet the physical, durability, chemical and mineralogical characteristics as set out in the aforementioned Annex E of SR 21:2014+A1:2016.

6.4 Pavements and Hard Standings

Plate bearing tests performed on the upper soils produced CBR values in the range 2.2% to 6.3% for the initial load cycle (Cycle 1), with some improvements when the plate was reloaded (Cycle 2).

The sub-base requirements should be determined in accordance with NRA HD25-26/10 Volume7: Pavement Design and Maintenance. Figure 4.1 of this document shows sub-base requirements in relation to the CBR value of the sub-grade. Designs can be sub-base only or sub-base in conjunction with a capping layer. The minimum permitted design CBR is 2.5%.

More relevant design CBR values of the subgrade should be obtained from the results of plate bearing tests conducted on the prepared subgrade.

Close inspection of the prepared formation in conjunction with plate bearing tests will be essential to verify the design CBR value and to identify any residual soft or loose zones. Any residual zones of soft subgrade should be removed and replaced with 6F capping or starter layer material (Class 6A / 6B).

To cater for variations in the strength and composition of the subgrade soils, a geotextile separator at subgrade level and geogrid reinforcement within the capping layer would be recommended to enhance the stiffness of the pavement make-up.

It is important that argillaceous sedimentary rocks (i.e. muddy limestone, calcareous mudstone, shale, etc.) are not used in sub-base, capping or as a starter layer. These have high potential to give rise to degradation (i.e. poor durability and soundness) and slaking and therefore would not be suitable. All granular fills (particularly Series 600 and 800 material) should be thoroughly examined, tested and approved in advance of being used in the pavement construction.

6.5 Chemical Attack on Buried Concrete

The results of Sulphate and pH testing showed low Sulphate and near-neutral pH levels.

With reference to Table C1 of BRE Special Digest 1: 2005, the level of Sulphate suggests a design Sulphate Class of DS-1. Assuming a static groundwater table, an ACEC (Aggressive Chemical Environment for Concrete) Classification of AC-1s is applicable, since the pH levels are greater than 5.5.

In terms of concrete to I.S. EN 206-1:2013, the chemical testing demonstrates that concrete could be manufactured to Class XA1.

Appendix 3 Rotary Corehole Records

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 25777

CONTRACT	Rail Park Maynooth - Phase 1	**DRILLHOLE NO**	**RC101**
		SHEET	Sheet 1 of 1
CO-ORDINATES	694,748.23 E 737,314.63 N	**DATE DRILLED**	06/12/2024
GROUND LEVEL (mOD)	60.31	**DATE LOGGED**	06/12/2024
RIG TYPE	GEO-405		
FLUSH	Air/Mist		
CLIENT	Montane Developments	**DRILLED BY**	IGSL - AK
ENGINEER	DQA	**LOGGED BY**	D. O'Shea
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm)	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of cobbly CLAY				
1		0	0	0					1.50	58.81		
								SYMMETRIX DRILLING: No recovery, observed by driller as returns of COBBLES with clay				N = 78 (12, 9, 21, 17, 21, 19)
2	2.70								2.70	57.61		
3		100	73	71	600			Strong to very strong, thickly to thinly bedded, light to dark blue/grey, fine-grained LIMESTONE (locally fossiliferous, locally dolomitised, local chert layers, local stromatactic structure), fresh to locally slightly weathered. Discontinuities are widely to closely spaced, smooth to locally rough, fractures are planar to undulose. Apertures are tight to moderately open, locally clay smeared and filled (at 5.33-5.40m), calcite veined (1-20mm thick), slight iron oxide staining. Dips are subhorizontal to locally 30° & 60°.				
4	4.20											
5		100	87	85								
	5.70											
6		100	77	62								
	6.70											
7		100	72	74								
	7.70								7.70	52.61		
8								End of Borehole at 7.70 m				
9												

REMARKS

Hole cased from 0.00-2.70m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
06-12-24	7.70	1.00	7.70	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
06-12-24	7.70	2.70	3.10	Water levels recorded 5 mins after end of drilling

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 25777

CONTRACT Rail Park Maynooth - Phase 1

DRILLHOLE NO RC102
SHEET Sheet 1 of 2

CO-ORDINATES 694,851.92 E
737,284.69 N
GROUND LEVEL (mOD) 61.63

RIG TYPE GEO-405
FLUSH Air/Mist
INCLINATION (deg) -90
CORE DIAMETER (mm) 78

DATE DRILLED 09/12/2024
DATE LOGGED 09/12/2024

CLIENT Montane Developments
ENGINEER DQA

DRILLED BY IGSL - AK
LOGGED BY D. O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of sandy CLAY				
1									1.50	60.13		
2		0	0	0				SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY				
3	3.60								3.60	58.03		
4		100	0	0	300			Proabable large BOULDER				
	4.70								4.70	56.93		
5								Firm, light brown/dark brown/orange mottled silty, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine subangular to subrounded of limestone.				N = 50/40 mm (25, 50)
6												N = 50/50 mm (25, 50)
7		100	27	26								
8												N = 50/40 mm (25, 50)
9												N = 50/30 mm (25, 50)

REMARKS

Hole cased from 0.00-3.60m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
09-12-24	13.60	1.00	13.60	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
09-12-24	13.60	3.60	5.10	Water levels recorded 5 mins after end of drilling

IGSL_RC FI 10M 25777.GPJ IGSL.GDT 28/4/25

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 25777

CONTRACT	Rail Park Maynooth - Phase 1	**DRILLHOLE NO**	**RC102**
		SHEET	Sheet 2 of 2
CO-ORDINATES	694,851.92 E 737,284.69 N	**DATE DRILLED**	09/12/2024
GROUND LEVEL (mOD)	61.63	**DATE LOGGED**	09/12/2024
CLIENT	Montane Developments	**DRILLED BY**	IGSL - AK
ENGINEER	DQA	**LOGGED BY**	D. O'Shea
RIG TYPE	GEO-405		
FLUSH	Air/Mist		
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10	10.60								10.60	51.03		N = 50/10 mm (25, 50)
11		100	81	77				Strong to very strong, thickly to thinly bedded, light to dark blue/grey, fine-grained LIMESTONE (locally fossiliferous, locally dolomitised, local chert layers, local stromatactic structure), fresh to locally slightly weathered. Discontinuities are widely to closely spaced, smooth to locally rough, fractures are planar to undulose. Apertures are tight to moderately open, locally clay smeared and filled (at5.33-5.40m) calcite veined (1-10mm thick), slight iron oxide staining. Dips are subhorizontal to locally 30° & 60°.				
12	12.60											
13		100	89	60		560			13.60	48.03		
14	13.60							End of Borehole at 13.60 m				
15												
16												
17												
18												
19												

REMARKS

Hole cased from 0.00-3.60m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
09-12-24	13.60	1.00	13.60	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
09-12-24	13.60	3.60	5.10	Water levels recorded 5 mins after end of drilling

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 25777

CONTRACT	Rail Park Maynooth - Phase 1	**DRILLHOLE NO**	**RC103**
		SHEET	Sheet 1 of 1
CO-ORDINATES	694,711.04 E 737,212.57 N	**DATE DRILLED**	09/12/2024
GROUND LEVEL (mOD)	59.97	**DATE LOGGED**	09/12/2024
RIG TYPE	GEO-405		
FLUSH	Air/Mist		
CLIENT	Montane Developments	**DRILLED BY**	IGSL - AK
INCLINATION (deg)	-90		
ENGINEER	DQA	**LOGGED BY**	D. O'Shea
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly cobbly CLAY				
1		0	0	0					1.50	58.47		N = 28 (1, 1, 4, 7, 9, 8)
2	2.90							SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY	2.90	57.07		
3		100	69	65				Medium strong to very strong, thickly to thinly bedded, light to dark blue/grey, fine-grained LIMESTONE (locally fossiliferous, locally dolomitised, local chert layers, local stromatactic structure), fresh to locally slightly weathered. Discontinuities are widely to closely spaced, smooth to locally rough, fractures are planar to curviplanar. Apertures are tight to moderately open, locally clay smeared and filled (at 3.65-4.00m & 5.33-5.40m) calcite veined (1-10mm thick), slight iron oxide staining. Dips are subhorizontal, 30° & 60°.				
4	4.40											
5		100	77	73								
6	5.90	100	63	60								
7	6.90	100	77	67	750				7.90	52.07		
8	7.90							End of Borehole at 7.90 m				
9												

REMARKS

Hole cased from 0.00-2.90m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
09-12-24	7.90	1.00	7.90	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
09-12-24	7.90	2.90	5.60	Water levels recorded 5 mins after end of drilling

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 25777

CONTRACT	Rail Park Maynooth - Phase 1	**DRILLHOLE NO**	**RC104**
		SHEET	Sheet 1 of 1
CO-ORDINATES	694,809.19 E 737,212.22 N	**DATE DRILLED**	10/12/2024
GROUND LEVEL (mOD)	61.74	**DATE LOGGED**	10/12/2024
RIG TYPE	GEO-405		
FLUSH	Air/Mist		
CLIENT	Montane Developments	**DRILLED BY**	IGSL - AK
INCLINATION (deg)	-90		
ENGINEER	DQA	**LOGGED BY**	D. O'Shea
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of gravelly CLAY				
1		0	0	0					1.50	60.24		
								SYMMETRIX DRILLING: No recovery, observed by driller as returns of cobbly CLAY				N = 42 (7, 11, 18, 4, 9, 11)
2	2.20								2.20	59.54		
		100	63	43				Medium strong to very strong, thickly to thinly bedded, light to dark blue/grey, fine-grained LIMESTONE (locally fossiliferous, locally dolomitised, local chert layers, local stromatactic structure), fresh to locally slightly weathered. Discontinuities are widely to closely spaced, smooth to locally rough, fractures are planar to curviplanar. Apertures are tight to moderately open, locally clay smeared, calcite veined (1-20mm thick), slight iron oxide staining. Dips are subhorizontal to locally 30° & 60°.				
3	3.70											
		100	91	81								
4												
5	5.20				510							
		100	94	86								
6	6.20											
		100	98	91								
7	7.20								7.20	54.54		
								End of Borehole at 7.20 m				
8												
9												

REMARKS

Hole cased from 0.00-2.20m

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

INSTALLATION DETAILS

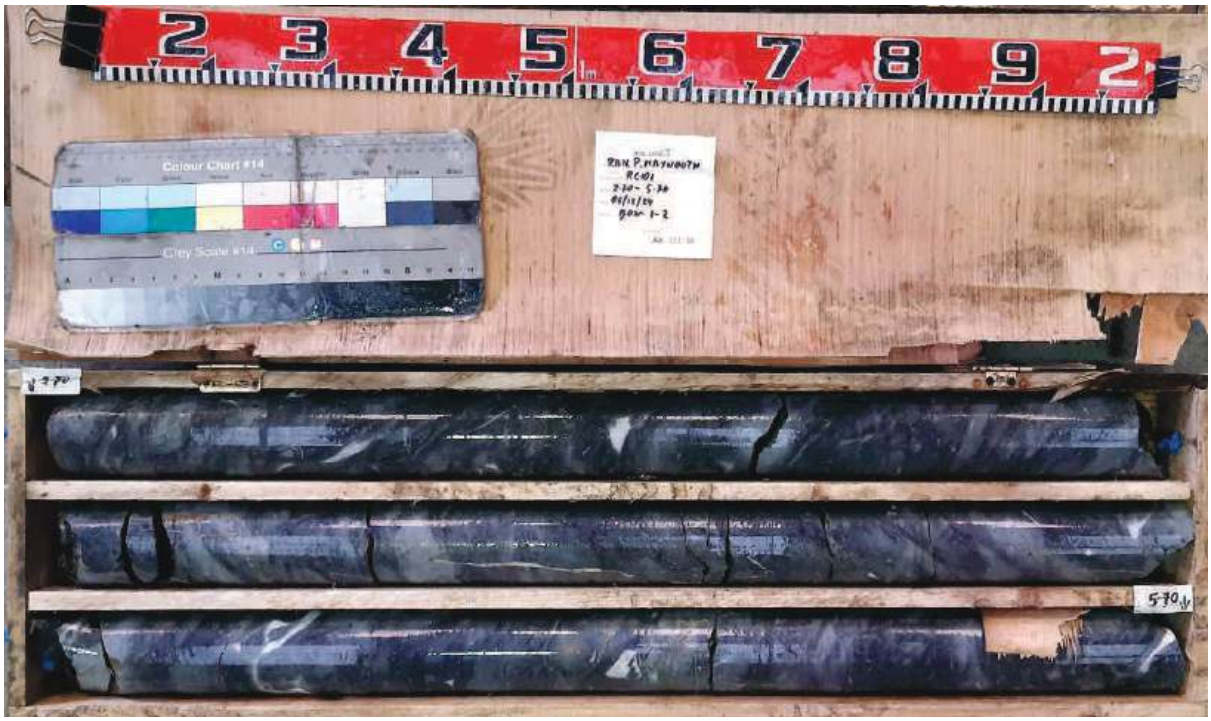
Date	Tip Depth	RZ Top	RZ Base	Type
10-12-24	7.20	1.00	7.20	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
10-12-24	7.20	2.20	5.10	Water levels recorded 5 mins after end of drilling

IGSL_RC FI 10M 25777.GPJ IGSL.GDT 28/4/25

RC101 - Box 1 of 2 - 2.70-5.70m



RC101 - Box 2 of 2 - 5.70-7.70m

RC102 - Box 1 of 4 - 3.60-5.60m

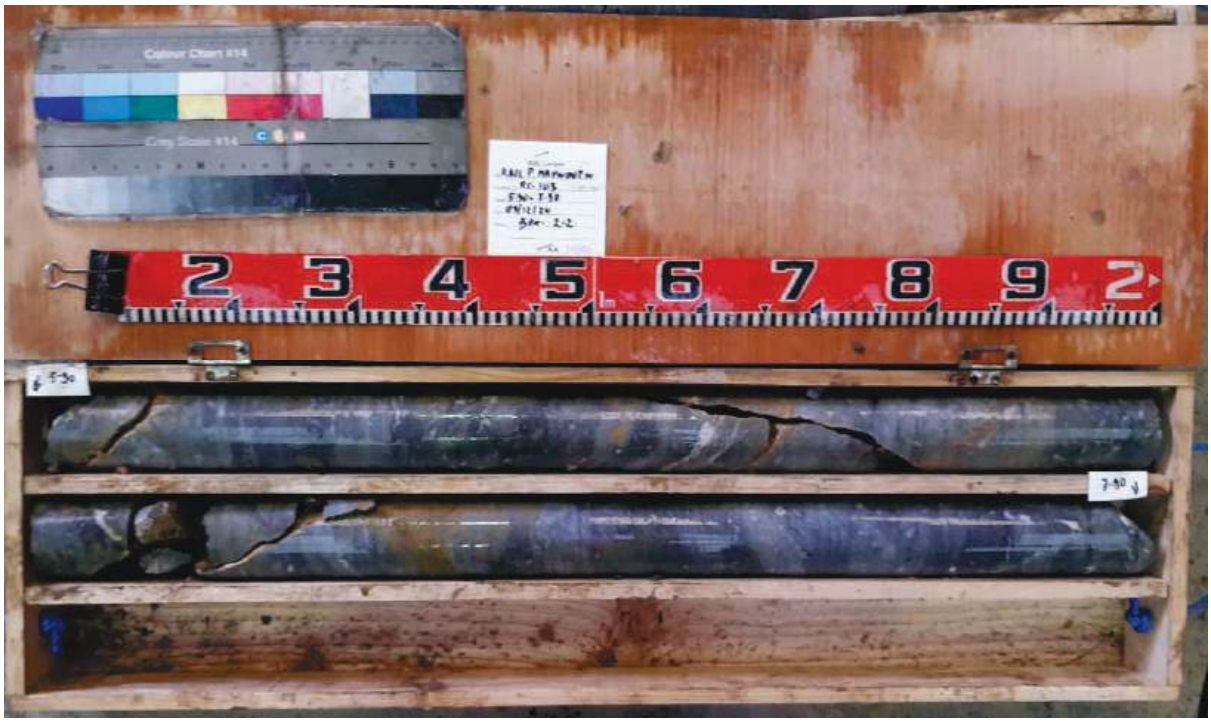
RC102 - Box 2 of 4 - 5.60-9.60m

RC102 - Box 3 of 4 - 9.60-12.60m

RC102 - Box 4 of 4 - 12.60-13.60m

RC103 - Box 1 of 2 - 2.90-5.90m

RC103 - Box 2 of 2 - 5.90-7.90m



RC104 - Box 1 of 2 - 2.20-5.20m

RC104 - Box 2 of 2 - 5.20-7.70m

Appendix 5 Groundwater Monitoring Records

Project No. 25777	**GROUNDWATER MONITORING DATA SHEET**

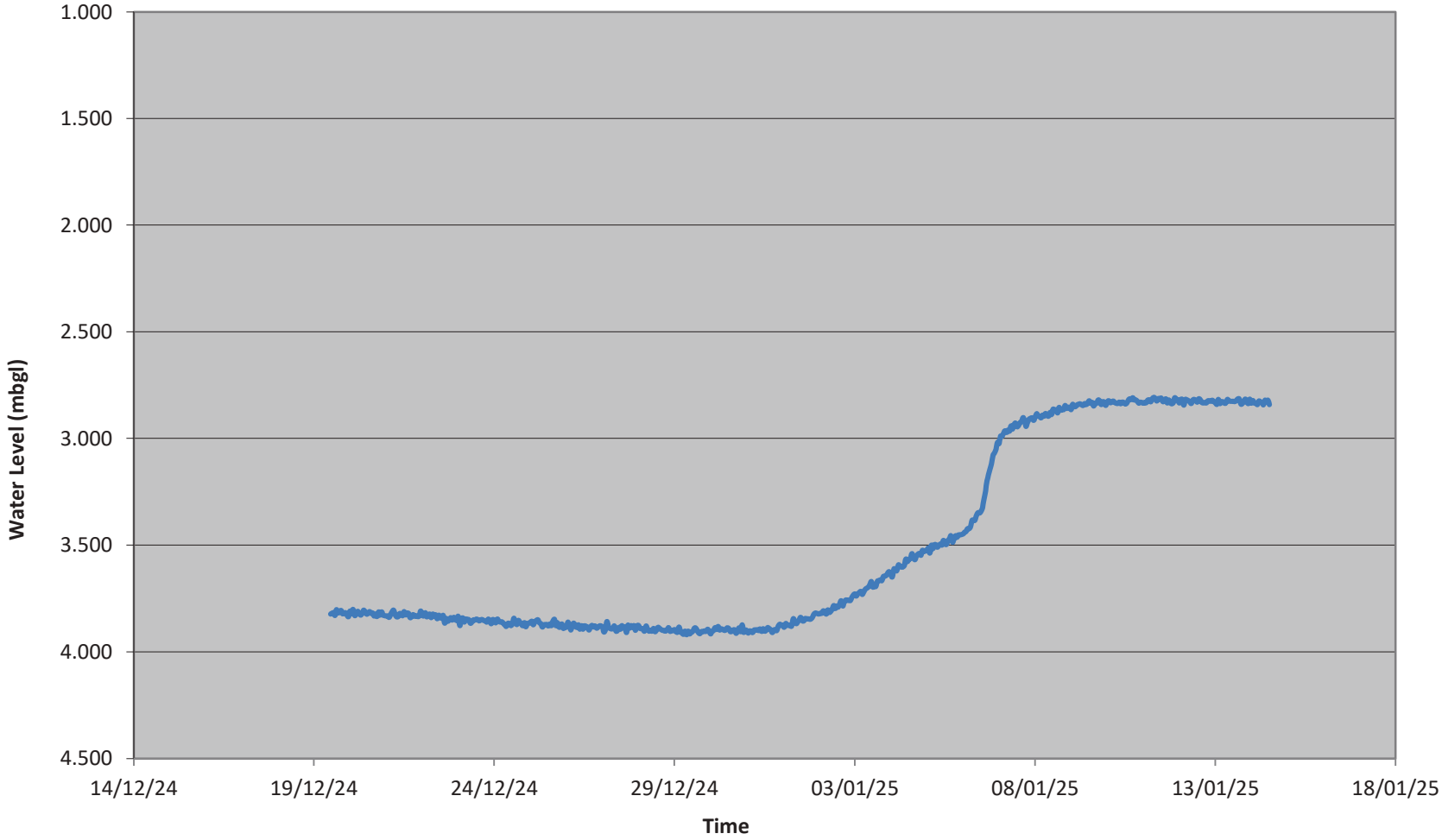
Project: Rail Park Maynooth - Site 1

Engineer: DQA

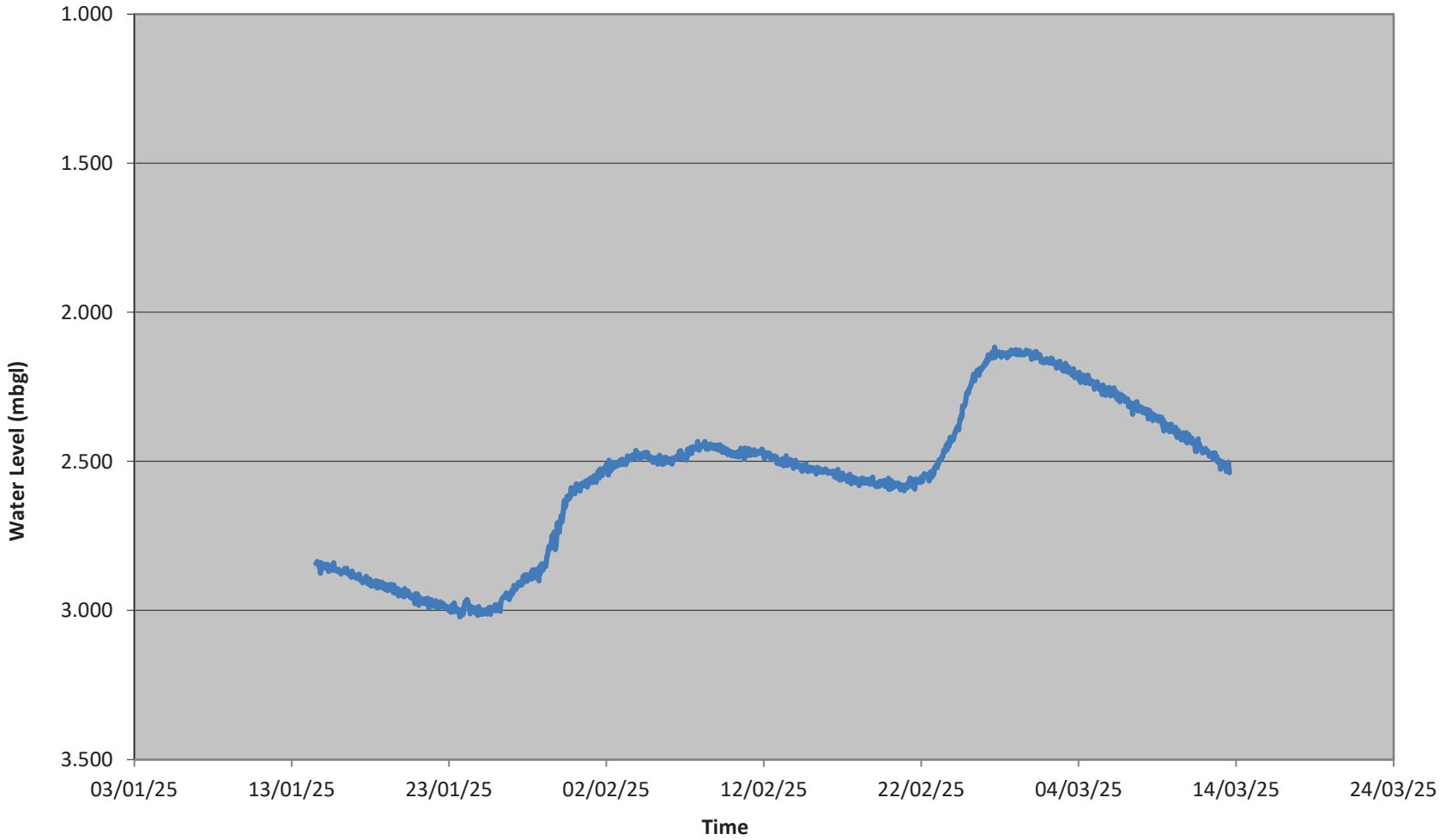
Exploratory Hole No.	Ground Elevation (m OD)	19/12/2024		14/01/2025		13/03/2025		-	
		m bgl	m OD	m bgl	m OD	m bgl	m OD	m bgl	m OD
BH101	60.31	3.82	56.49	2.84	57.47	2.54	57.77		
BH102	61.63	5.17	56.46	3.74	57.89	3.48	58.15		
BH103	59.97	3.98	55.99	3.13	56.84	2.83	57.14		
BH104	61.74	5.42	56.32	4.24	57.51	4.09	57.65		

Remarks: Water levels measured using electric dipmeter

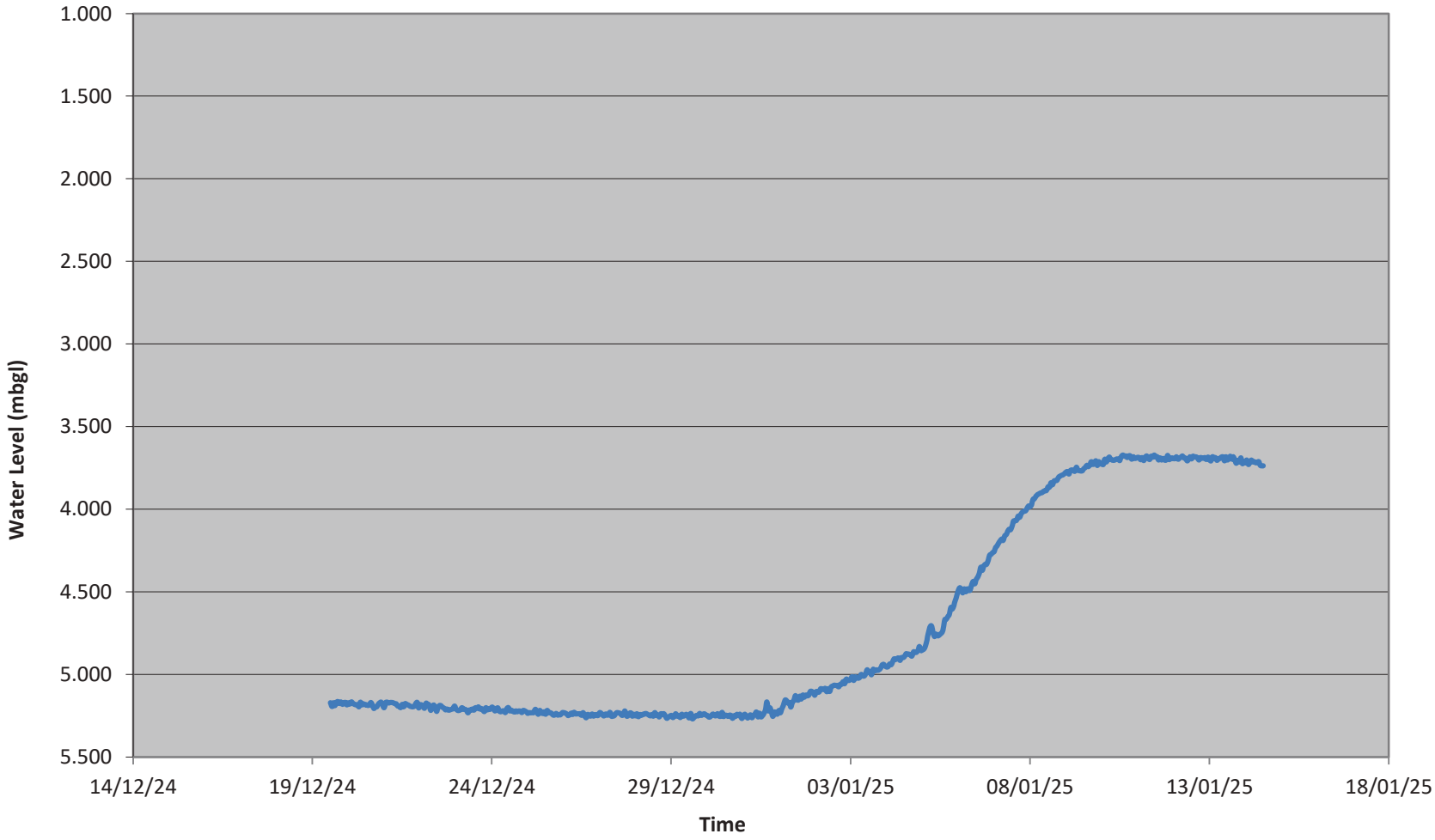
25777 - BH 101 Rail Park Maynooth



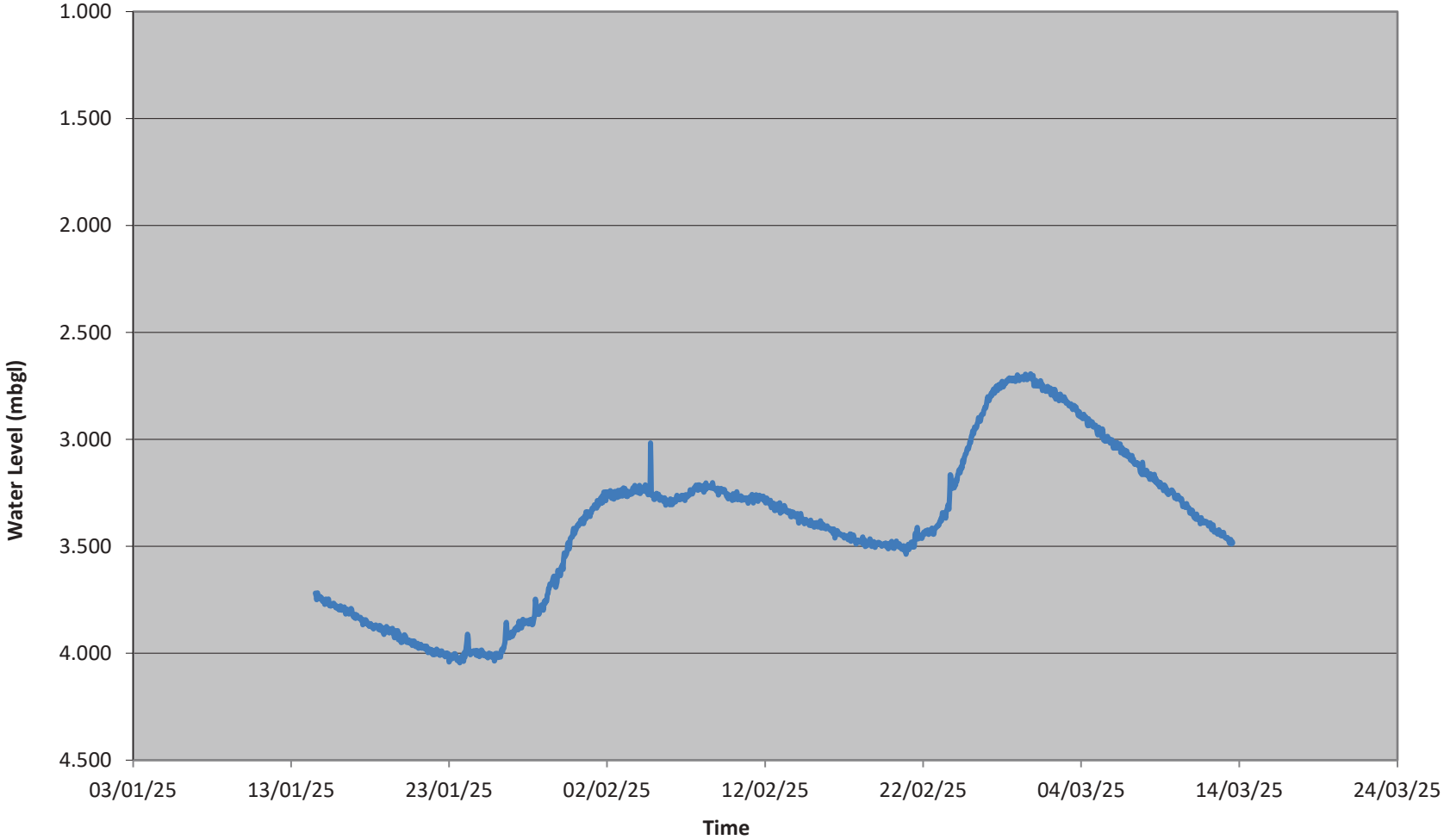
25777 - BH 101 Rail Park Maynooth



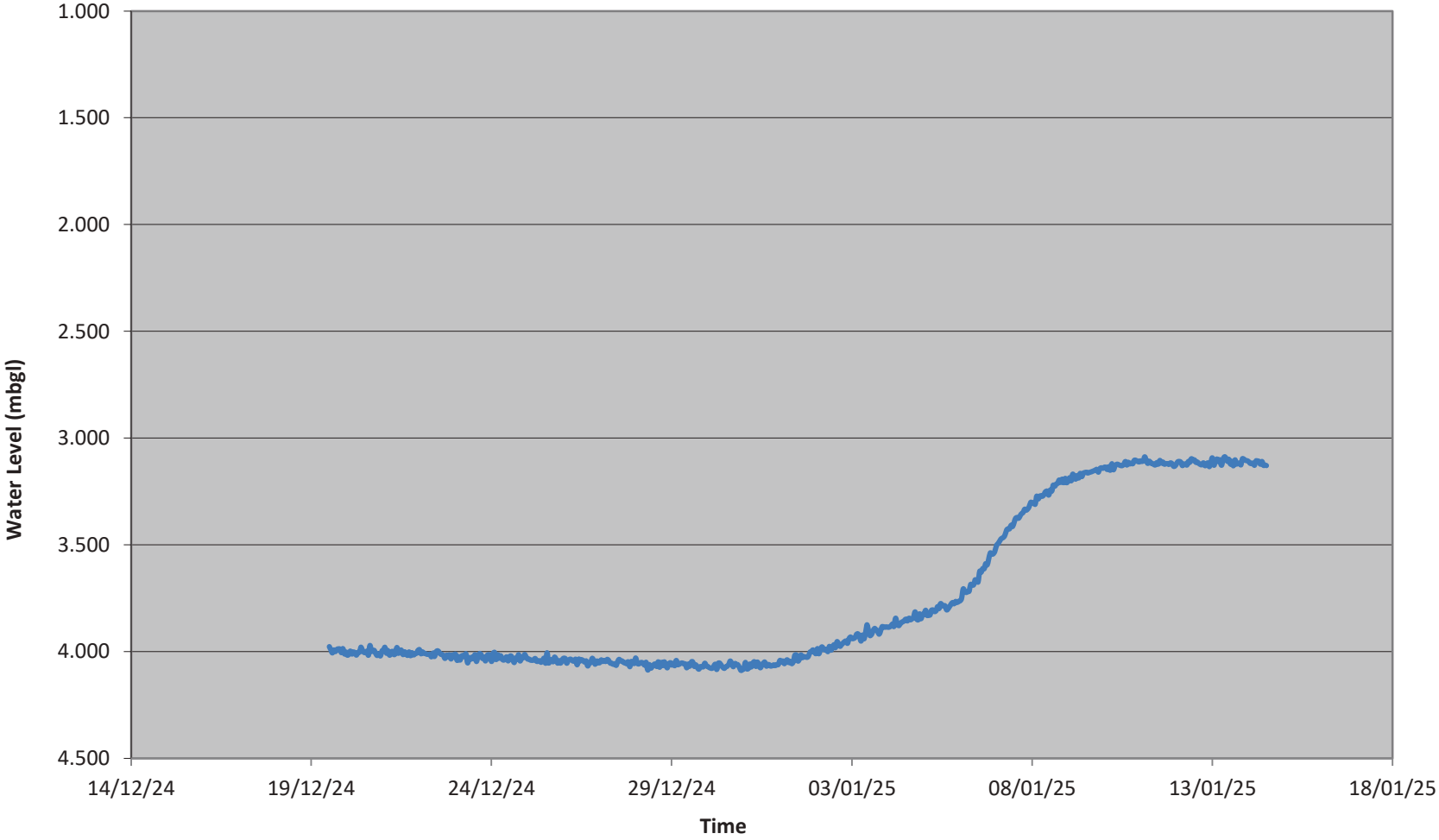
25777 - BH 102 Rail Park Maynooth



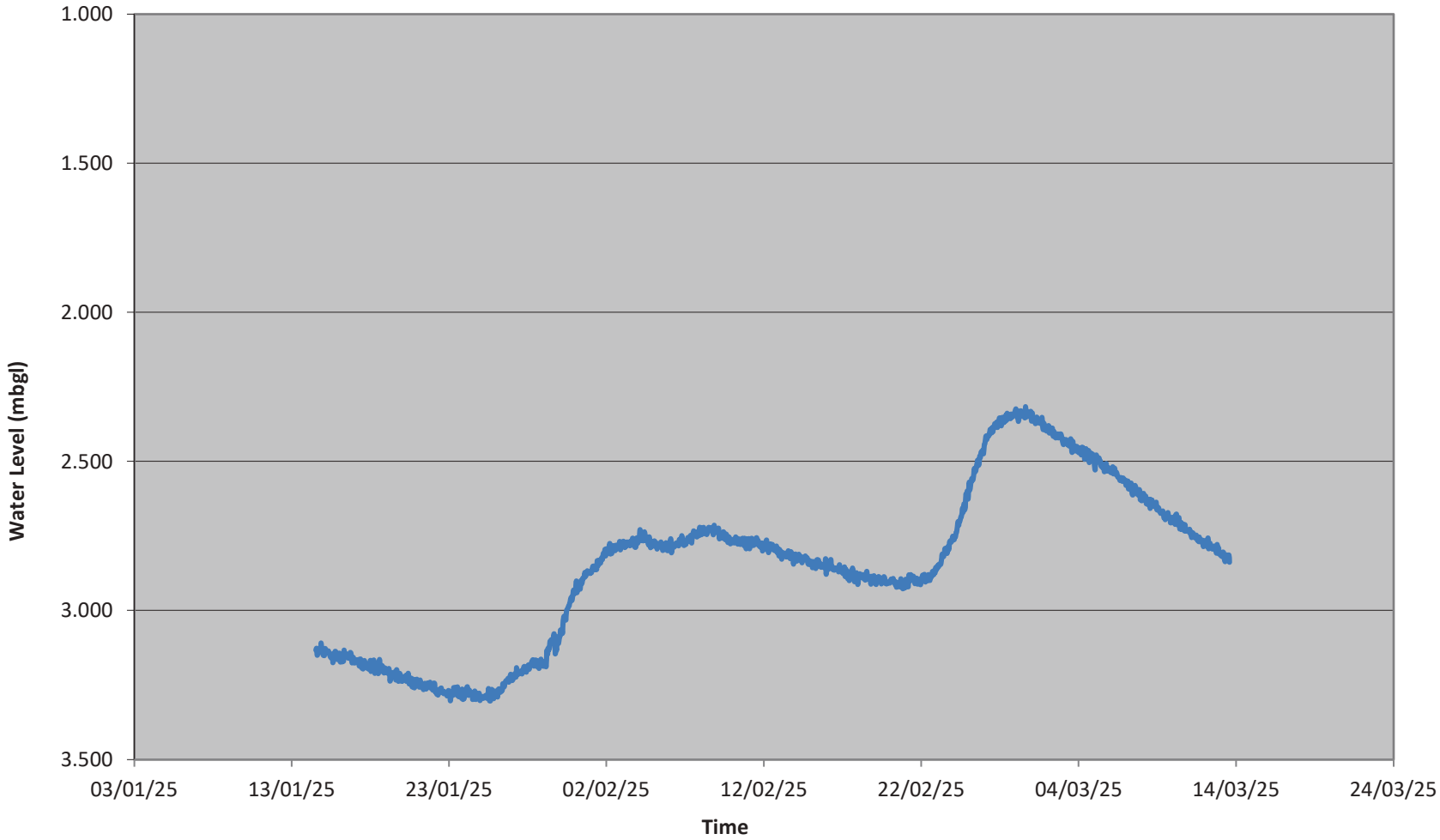
25777 - BH 102 Rail Park Maynooth



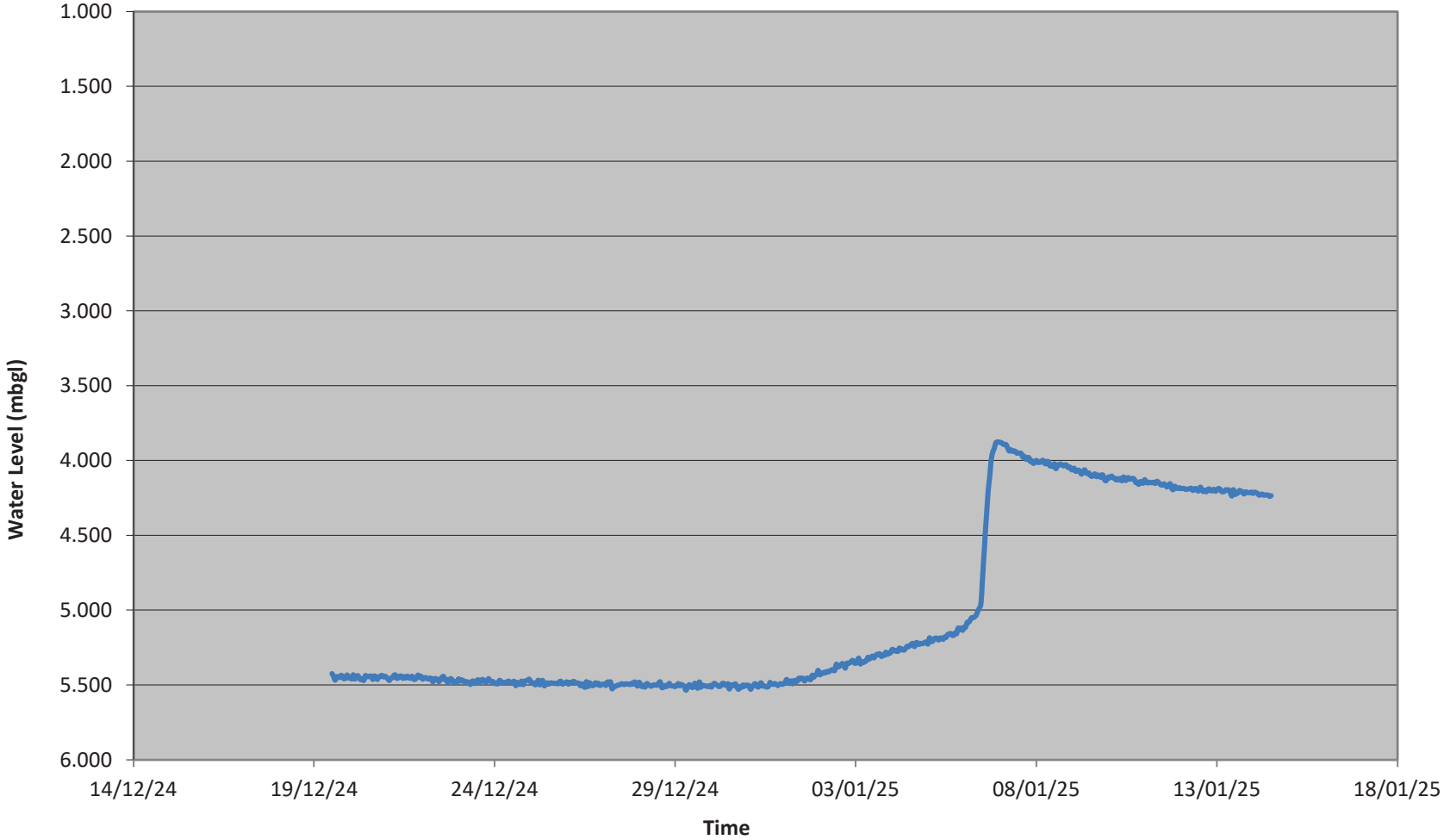
25777 - BH 103 Rail Park Maynooth



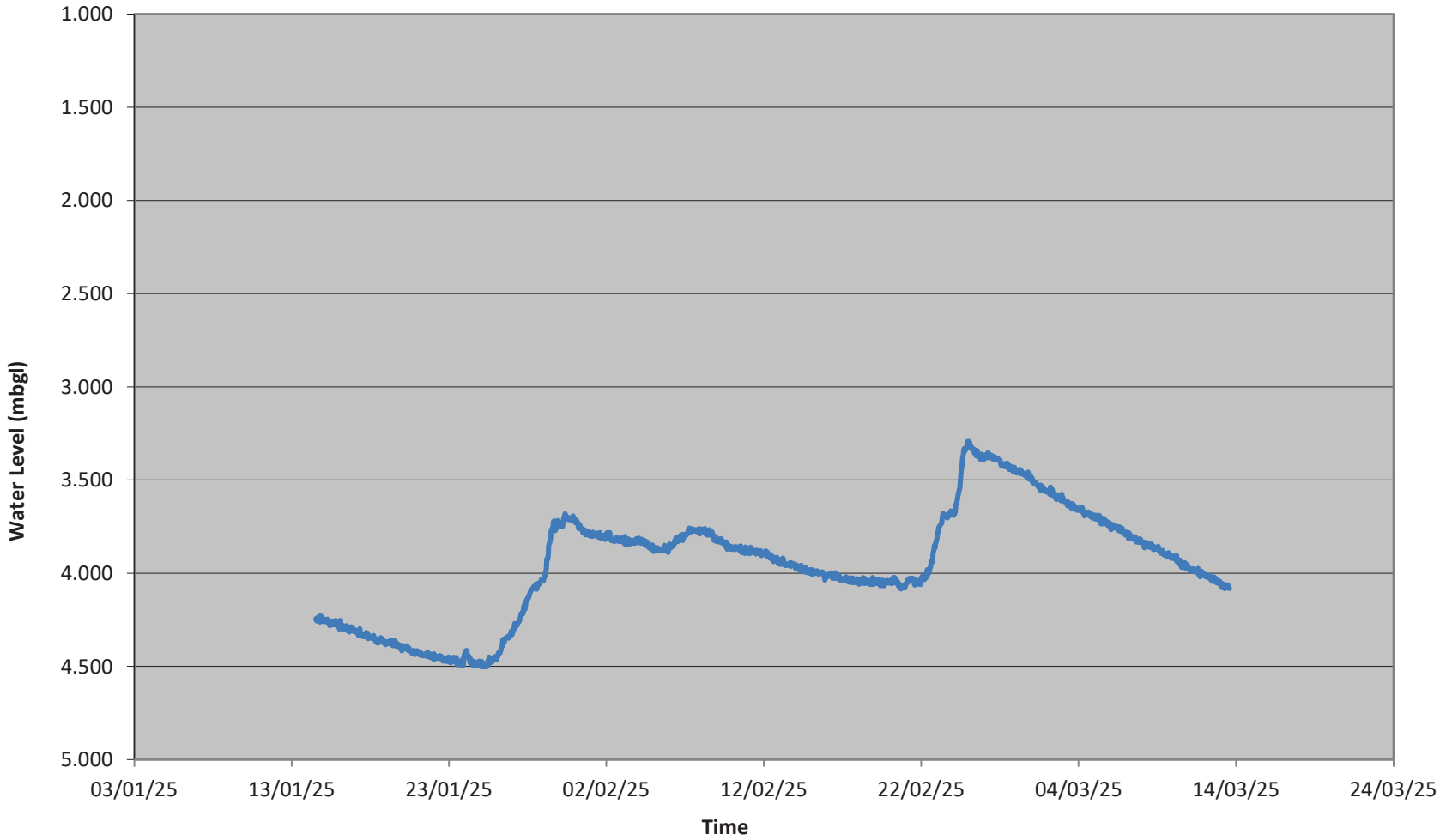
25777 - BH 103 Rail Park Maynooth



25777 - BH 104 Rail Park Maynooth



25777 - BH 104 Rail Park Maynooth



Appendix 8 Site Plan

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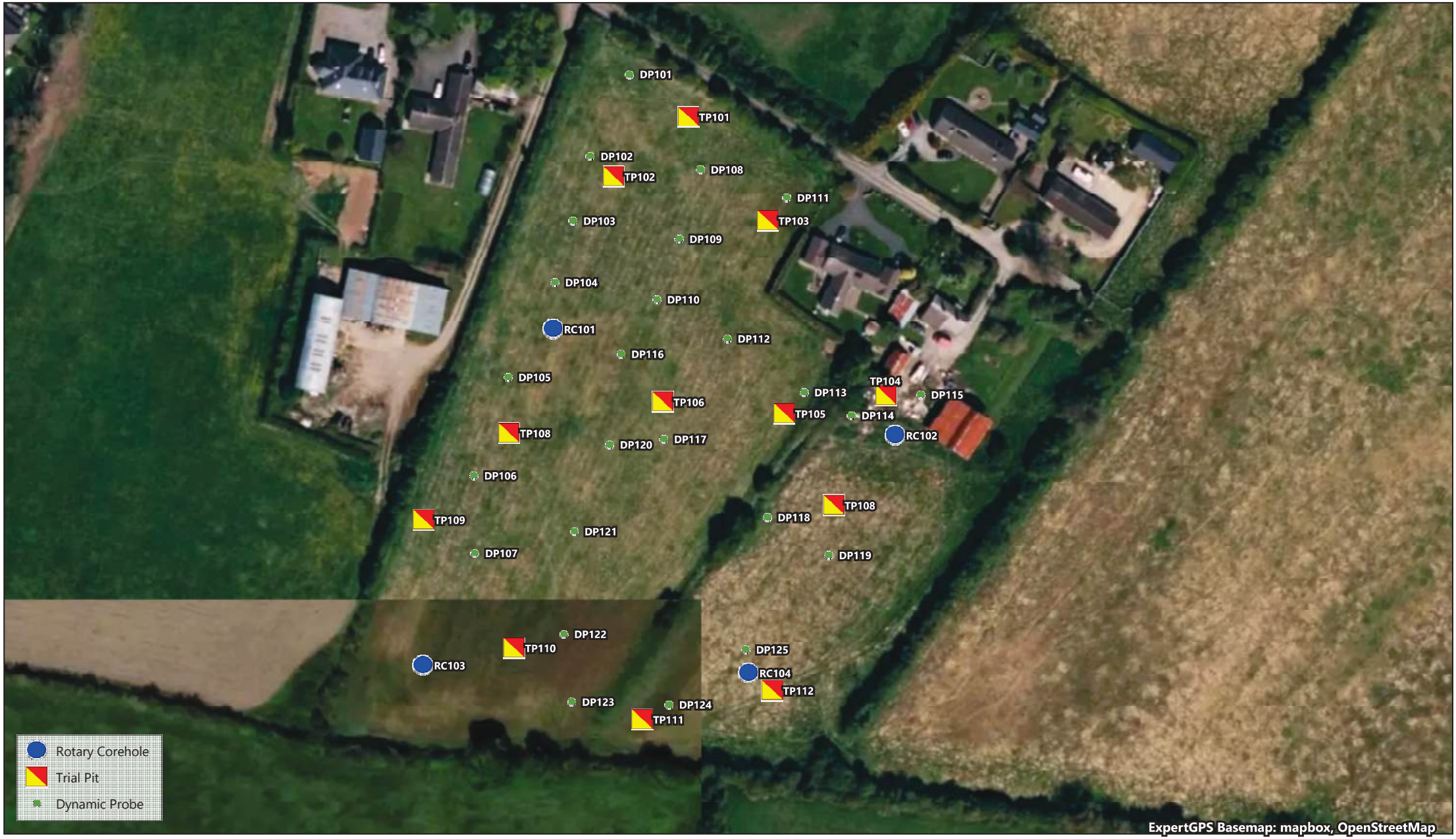


25777 Rail Park Maynooth - Site 1

25 0 25 50 75 100 125 150 175 200 225 250 275 300 m

Scale: 1 : 1500.

MN

1°36'

KAVANAGH BURKE
CONSULTING ENGINEERS

Appendix D
Confirmation of Feasibility

Calmont Park, Ballymount, Dublin 12.

Tel: 353 1 4500694
Fax: 353 1 4264340

www.kavanaghburke.ie

Ulick Burke & Associates Limited.
Registered in Ireland No: 233579.
V.A.T. Registration No: IE 82335791

Registered Address: Unit g3, Calmont Park, Ballymount, Dublin 12.
Directors: U.Burke, R.Burke, P.Kavanagh

CONFIRMATION OF FEASIBILITY

Declan O'Sullivan
Kavanagh Burke
F3 Calmount Business Park
Ballymount
Dublin

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

18 August 2025

Our Ref: CDS25004498 Pre-Connection Enquiry
Railpark, Maynooth, Kildare

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Multi/Mixed Use Development of 146 unit(s) at Site At, Railpark, Maynooth, Kildare, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

Water Connection	- Feasible Subject to upgrades - To facilitate this development, the main site connection shall be made to the Eastern Link Main following completion of the Maynooth East Relief Road (MERR) road project. - Network upgrades may be required based on connection uptake by other developments. These upgrades would consist of approx. 600m of existing 400mm main to be upsized to 450mm. This requirement will be further determined at Connection Application stage.
Wastewater Connection	- Feasible Subject to upgrades - In order to accommodate the proposed connection for this development, upgrade works are required to increase the capacity of the wastewater network in Maynooth. Uisce Éireann currently has a project on our current investment plan which will provide the necessary upgrade and capacity. This upgrade project (Maynooth Transfer Pipeline) is scheduled to be completed by Q2 2027 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date. - To facilitate this development, the main site connection shall be made to the Eastern Link Infrastructure following completion of the Maynooth East Relief Road (MERR) road project. Currently the scope of the MERR project is to deliver works within the MERR only, the required strategic WWPS is not currently on the Uisce Éireann investment plan therefore, the applicant

would be required to fund this infrastructure at Connection Application stage. The Applicant shall note that this would require:

  - Construction of new strategic WWPS and associated rising main to serve the entire area
  - Provision of 24 hour storage and telemetry link to the Maynooth PS
  - Completion of the MERR by third parties.
- Connection to the network can be facilitated prior to completion of the Upgrade Project subject to construction and commissioning of the strategic WWPS and rising main being completed.
- Applicant shall coordinate the drainage strategy with adjacent sites to ensure gravity connection can be achieved.
- Network upgrades may also be required based on connection uptake by other developments. These upgrades would consist of existing gravity sewer upsizing works. This requirement will be further determined at Connection Application stage.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Uisce Éireann's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Uisce Éireann's network(s). This is not a connection offer and capacity in Uisce Éireann's network(s) may only be secured by entering into a connection agreement with Uisce Éireann.

For any further information, visit **www.water.ie/connections**, **email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

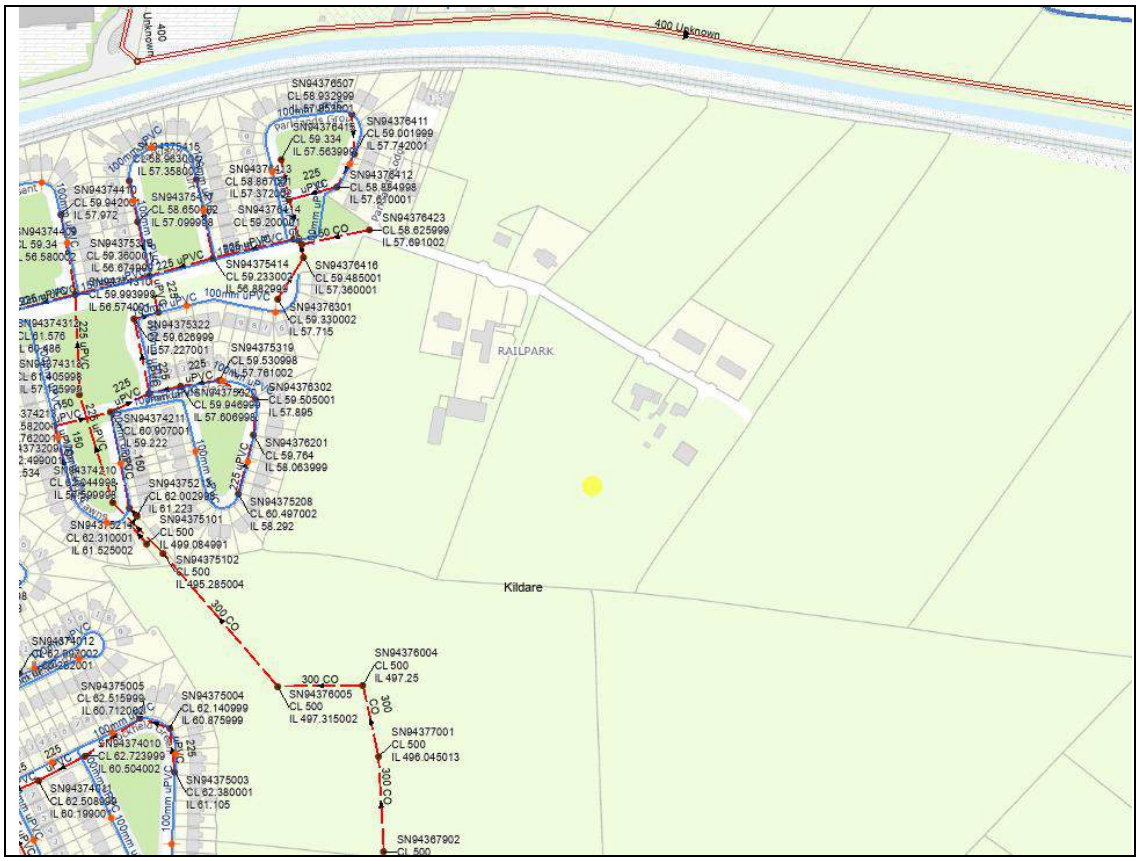
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s). • Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Uisce Éireann connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Uisce Éireann's network(s)?	• Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Uisce Éireann's Network(s)

The map included below outlines the current Uisce Éireann infrastructure adjacent the Development: To access Uisce Éireann Maps email datarequests@water.ie



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Note: The information provided on the included maps as to the position of Uisce Éireann's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Uisce Éireann.

Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Uisce Éireann's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

KAVANAGH BURKE
CONSULTING ENGINEERS

Appendix E
Foul Calculations

Calmont Park, Ballymount, Dublin 12.

Tel: 353 1 4500694
Fax: 353 1 4264340

www.kavanaghburke.ie

Ulick Burke & Associates Limited.
Registered in Ireland No: 233579.
V.A.T. Registration No: IE 82335791

Registered Address: Unit g3, Calmont Park, Ballymount, Dublin 12.
Directors: U.Burke, R.Burke, P.Kavanagh

Design Settings

Frequency of use (kDU)	0.50	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	2700	Connection Type	Level Inverts
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	0.800
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

Name	Dwellings	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
FS3	4	60.550	1200	694784.332	737377.843	0.996
FS2	2	60.600	1200	694788.514	737381.358	0.955
FS5	15	60.600	1200	694762.979	737315.958	1.775
FS14	10	60.800	1200	694744.964	737265.597	1.618
FS13	6	60.500	1200	694736.522	737241.998	0.900
FS1	2	61.200	1200	694816.604	737369.958	1.050
FS16	10	61.700	1200	694836.519	737271.670	1.500
FS7	10	61.300	1200	694813.631	737287.850	2.867
FS15	2	62.000	1200	694845.373	737308.836	1.400
FS17		61.430	1200	694825.169	737279.691	2.249
FS6	10	60.900	1200	694780.098	737311.558	2.193
FS10		61.500	1200	694797.524	737240.706	3.449
FS9	10	61.700	1200	694800.260	737247.235	3.602
FS8	12	61.600	1200	694792.140	737257.248	3.416
FS18	18	61.000	1200	694769.805	737224.204	1.300
FS19	18	61.200	1200	694786.324	737224.809	1.900
FS11		61.300	1200	694808.596	737235.465	3.331
FS12		61.700	1200	694823.862	737224.994	3.834
FSOUT		61.800	1200	694830.810	737205.869	4.044
FS4	6	60.750	1200	694775.121	737351.148	1.667

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.002	FS3	FS4	28.239	1.500	59.554	59.083	0.471	60.0	150
2.001	FS14	FS5	53.486	1.500	59.182	58.825	0.357	150.0	225
2.000	FS13	FS14	25.064	1.500	59.600	59.182	0.418	60.0	150
1.000	FS1	FS2	30.315	1.500	60.150	59.645	0.505	60.0	150
4.000	FS16	FS17	13.898	1.500	60.200	59.644	0.556	25.0	150
3.001	FS17	FS7	14.131	1.500	59.181	58.616	0.565	25.0	150
1.005	FS6	FS7	41.067	1.500	58.707	58.433	0.274	150.0	225

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	1.132	20.0	0.3	0.846	1.517	0.000	8	0.0	0.0	12	0.372
2.001	0.936	37.2	0.5	1.393	1.550	0.000	16	0.0	0.0	19	0.325
2.000	1.132	20.0	0.2	0.750	1.468	0.000	6	0.0	0.0	11	0.346
1.000	1.132	20.0	0.1	0.900	0.805	0.000	2	0.0	0.0	7	0.243
4.000	1.757	31.0	0.3	1.350	1.636	0.000	10	0.0	0.0	11	0.539
3.001	1.757	31.0	0.4	2.099	2.534	0.000	12	0.0	0.0	12	0.580
1.005	0.936	37.2	1.7	1.968	2.642	0.000	55	0.0	0.0	33	0.471

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.004	FS5	FS6	17.675	1.500	58.825	58.707	0.118	150.0	225
1.008	FS9	FS10	7.079	1.500	58.098	58.051	0.047	150.0	225
1.007	FS8	FS9	12.892	1.500	58.184	58.098	0.086	150.0	225
1.006	FS7	FS8	37.394	1.500	58.433	58.184	0.249	150.0	225
5.000	FS18	FS19	16.530	1.500	59.700	59.300	0.400	41.3	225
1.001	FS2	FS3	5.463	1.500	59.645	59.554	0.091	60.0	150
3.000	FS15	FS17	35.463	1.500	60.600	59.181	1.419	25.0	150
5.001	FS19	FS10	19.446	1.500	59.300	58.522	0.778	25.0	225
1.009	FS10	FS11	12.250	1.500	58.051	57.969	0.082	150.0	225
1.010	FS11	FS12	18.512	1.500	57.969	57.866	0.103	180.0	225
1.011	FS12	FSOUT	20.348	1.500	57.866	57.756	0.110	185.0	225
1.003	FS4	FS5	37.226	1.500	59.083	58.835	0.248	150.0	225

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.004	0.936	37.2	1.4	1.550	1.968	0.000	45	0.0	0.0	30	0.447
1.008	0.936	37.2	3.1	3.377	3.224	0.000	99	0.0	0.0	44	0.568
1.007	0.936	37.2	2.8	3.191	3.377	0.000	89	0.0	0.0	42	0.547
1.006	0.936	37.2	2.4	2.642	3.191	0.000	77	0.0	0.0	39	0.526
5.000	1.788	71.1	0.6	1.075	1.675	0.000	18	0.0	0.0	15	0.519
1.001	1.132	20.0	0.1	0.805	0.846	0.000	4	0.0	0.0	9	0.304
3.000	1.757	31.0	0.1	1.250	2.099	0.000	2	0.0	0.0	6	0.328
5.001	2.301	91.5	1.1	1.675	2.753	0.000	36	0.0	0.0	18	0.778
1.009	0.936	37.2	4.2	3.224	3.106	0.000	135	0.0	0.0	51	0.621
1.010	0.854	34.0	4.2	3.106	3.609	0.000	135	0.0	0.0	54	0.584
1.011	0.842	33.5	4.2	3.609	3.819	0.000	135	0.0	0.0	54	0.576
1.003	0.936	37.2	0.4	1.442	1.540	0.000	14	0.0	0.0	17	0.304

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	28.239	60.0	150	Circular	60.550	59.554	0.846	60.750	59.083	1.517
2.001	53.486	150.0	225	Circular	60.800	59.182	1.393	60.600	58.825	1.550
2.000	25.064	60.0	150	Circular	60.500	59.600	0.750	60.800	59.182	1.468
1.000	30.315	60.0	150	Circular	61.200	60.150	0.900	60.600	59.645	0.805
4.000	13.898	25.0	150	Circular	61.700	60.200	1.350	61.430	59.644	1.636
3.001	14.131	25.0	150	Circular	61.430	59.181	2.099	61.300	58.616	2.534
1.005	41.067	150.0	225	Circular	60.900	58.707	1.968	61.300	58.433	2.642
1.004	17.675	150.0	225	Circular	60.600	58.825	1.550	60.900	58.707	1.968

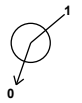
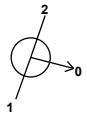
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	FS3	1200	Manhole	Adoptable	FS4	1200	Manhole	Adoptable
2.001	FS14	1200	Manhole	Adoptable	FS5	1200	Manhole	Adoptable
2.000	FS13	1200	Manhole	Adoptable	FS14	1200	Manhole	Adoptable
1.000	FS1	1200	Manhole	Adoptable	FS2	1200	Manhole	Adoptable
4.000	FS16	1200	Manhole	Adoptable	FS17	1200	Manhole	Adoptable
3.001	FS17	1200	Manhole	Adoptable	FS7	1200	Manhole	Adoptable
1.005	FS6	1200	Manhole	Adoptable	FS7	1200	Manhole	Adoptable
1.004	FS5	1200	Manhole	Adoptable	FS6	1200	Manhole	Adoptable

Pipeline Schedule

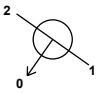
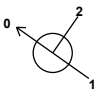
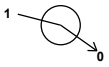
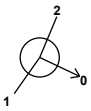
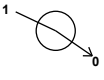
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.008	7.079	150.0	225	Circular	61.700	58.098	3.377	61.500	58.051	3.224
1.007	12.892	150.0	225	Circular	61.600	58.184	3.191	61.700	58.098	3.377
1.006	37.394	150.0	225	Circular	61.300	58.433	2.642	61.600	58.184	3.191
5.000	16.530	41.3	225	Circular	61.000	59.700	1.075	61.200	59.300	1.675
1.001	5.463	60.0	150	Circular	60.600	59.645	0.805	60.550	59.554	0.846
3.000	35.463	25.0	150	Circular	62.000	60.600	1.250	61.430	59.181	2.099
5.001	19.446	25.0	225	Circular	61.200	59.300	1.675	61.500	58.522	2.753
1.009	12.250	150.0	225	Circular	61.500	58.051	3.224	61.300	57.969	3.106
1.010	18.512	180.0	225	Circular	61.300	57.969	3.106	61.700	57.866	3.609
1.011	20.348	185.0	225	Circular	61.700	57.866	3.609	61.800	57.756	3.819
1.003	37.226	150.0	225	Circular	60.750	59.083	1.442	60.600	58.835	1.540

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.008	FS9	1200	Manhole	Adoptable	FS10	1200	Manhole	Adoptable
1.007	FS8	1200	Manhole	Adoptable	FS9	1200	Manhole	Adoptable
1.006	FS7	1200	Manhole	Adoptable	FS8	1200	Manhole	Adoptable
5.000	FS18	1200	Manhole	Adoptable	FS19	1200	Manhole	Adoptable
1.001	FS2	1200	Manhole	Adoptable	FS3	1200	Manhole	Adoptable
3.000	FS15	1200	Manhole	Adoptable	FS17	1200	Manhole	Adoptable
5.001	FS19	1200	Manhole	Adoptable	FS10	1200	Manhole	Adoptable
1.009	FS10	1200	Manhole	Adoptable	FS11	1200	Manhole	Adoptable
1.010	FS11	1200	Manhole	Adoptable	FS12	1200	Manhole	Adoptable
1.011	FS12	1200	Manhole	Adoptable	FSOUT	1200	Manhole	Adoptable
1.003	FS4	1200	Manhole	Adoptable	FS5	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
FS3	694784.332	737377.843	60.550	0.996	1200		1	1.001	59.554	150
							0	1.002	59.554	150
FS2	694788.514	737381.358	60.600	0.955	1200		1	1.000	59.645	150
							0	1.001	59.645	150
FS5	694762.979	737315.958	60.600	1.775	1200		1	2.001	58.825	225
							2	1.003	58.835	225
							0	1.004	58.825	225
FS14	694744.964	737265.597	60.800	1.618	1200		1	2.000	59.182	150
							0	2.001	59.182	225
FS13	694736.522	737241.998	60.500	0.900	1200		0	2.000	59.600	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
FS1	694816.604	737369.958	61.200	1.050	1200		0	1.000	60.150	150
FS16	694836.519	737271.670	61.700	1.500	1200		0	4.000	60.200	150
FS7	694813.631	737287.850	61.300	2.867	1200		1 2 0	3.001 1.005 1.006	58.616 58.433 58.433	150 225 225
FS15	694845.373	737308.836	62.000	1.400	1200		0	3.000	60.600	150
FS17	694825.169	737279.691	61.430	2.249	1200		1 2 0	4.000 3.000 3.001	59.644 59.181 59.181	150 150 150
FS6	694780.098	737311.558	60.900	2.193	1200		1 0	1.004 1.005	58.707 58.707	225 225
FS10	694797.524	737240.706	61.500	3.449	1200		1 2 0	5.001 1.008 1.009	58.522 58.051 58.051	225 225 225
FS9	694800.260	737247.235	61.700	3.602	1200		1 0	1.007 1.008	58.098 58.098	225 225
FS8	694792.140	737257.248	61.600	3.416	1200		1 0	1.006 1.007	58.184 58.184	225 225
FS18	694769.805	737224.204	61.000	1.300	1200		0	5.000	59.700	225
FS19	694786.324	737224.809	61.200	1.900	1200		1 0	5.000 5.001	59.300 59.300	225 225
FS11	694808.596	737235.465	61.300	3.331	1200		1 0	1.009 1.010	57.969 57.969	225 225
FS12	694823.862	737224.994	61.700	3.834	1200		1 0	1.010 1.011	57.866 57.866	225 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
FSOUT	694830.810	737205.869	61.800	4.044	1200		1	1.011	57.756	225
FS4	694775.121	737351.148	60.750	1.667	1200		1	1.002	59.083	150
							0	1.003	59.083	225

KAVANAGH BURKE
CONSULTING ENGINEERS

Appendix F
Irish Water Statement of Design Acceptance

Calmont Park, Ballymount, Dublin 12.

Tel: 353 1 4500694
Fax: 353 1 4264340

www.kavanaghburke.ie

Ulick Burke & Associates Limited.
Registered in Ireland No: 233579.
V.A.T. Registration No: IE 82335791

Registered Address: Unit g3, Calmont Park, Ballymount, Dublin 12.
Directors: U.Burke, R.Burke, P.Kavanagh

Declan O'Sullivan
Kavanagh Burke Consulting Engineers
F3 Calmount Business Park
Ballymount
Dublin

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

27 November 2025

Re: Design Submission for Site At, Railpark, Maynooth, Kildare (the "Development") (the "Design Submission") / Connection Reference No: CDS25004498

Dear Kavanagh Burke,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Uisce Éireann has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before you can connect to our network you must sign a connection agreement with Uisce Éireann. This can be applied for by completing the connection application form at www.water.ie/connections. Uisce Éireann's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Uisce Éireann's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Uisce Éireann does not, in any way, render Uisce Éireann liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Uisce Éireann representative:
Name: Antonio Garzón Mielgo
Email: antonio.garzonmielgo@water.ie

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

Appendix A

Document Title & Revision

- D1824-KB-XX-XX-DR-C-0001 - Drainage and Foul planning_PL2
- D1824-KB-XX-XX-DR-C-0003 - Watermain Layout_PL2
- Sewer LS

Additional Comments

The design submission will be subject to further technical review at connection application stage.

Uisce Éireann cannot guarantee that its Network in any location will have the capacity to deliver a particular flow rate and associated residual pressure to meet the requirements of the relevant Fire Authority, see Section 1.17 of Water Code of Practice.

*For further information, visit **www.water.ie/connections***

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Uisce Éireann will not, in any way, render Uisce Éireann liable for any elements of the design and/or construction of the Self-Lay Works.

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING SERVICES REPORT.
2. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
3. ALL SURFACE WATER DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH GREATER DUBLIN REGIONAL CODE OF PRACTICE FOR DRAINAGE WORKS AND LOCAL AUTHORITY REQUIREMENTS.
4. SURFACE WATER ATTENUATION AND PROPOSED SUDS SHALL COMPRISE OF PERMEABLE PAVING, DETENTION BASINS, SOAKAWAY, BLUE/GREEN ROOFS, TREE PITS, BIO RETENTION AREAS AND FLOW CONTROLS.
5. FOUL SEWER PIPE MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 3.13 OF THE UISCE EIREANN CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE.
6. RUNOFF FROM THE PROPOSED DEVELOPMENTS SHALL BE RESTRICTED TO QBAR = 6.6l/s.
7. ATTENUATED RUNOFF FROM DEVELOPMENT TO DISCHARGE TO PROPOSED MERR SURFACE WATER DRAINAGE NETWORK.
8. WHERE MANHOLE COVERS ARE TO BE LOCATED IN SOFT LANDSCAPED / GRASS AREAS, TO ENSURE THAT MANHOLE COVERS ARE IDENTIFIABLE, ACCESSIBLE AND WILL NOT BECOME OVERGROWN, COVERS ARE TO BE SURROUNDED BY A CONCRETE PLINTH, 200mm ALL ROUND AND 100mm DEEP FORMED WITH C20/C25 CONCRETE, 20mm AGGREGATE SIZE, BEDDED IN CLAUSE 804 MATERIAL.
9. ROOT BARRIERS (RE-ROOT 1000 BY GREENLEAF OR EQUIVALENT) ARE TO BE INSTALLED WHERE EXISTING OR PROPOSED SERVICES ARE ADJACENT TO A TREE PIT.
10. ALL FOUL DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH UISCE EIREANN CODE OF PRACTICE AND STANDARD DETAILS FOR WASTEWATER INFRASTRUCTURE.
11. INDIVIDUAL BUILDING FOUL CONNECTIONS (OMITTED FOR CLARITY) SHALL COMPRISE 100Ø (MIN) PIPES @ 1:60, TO THE NEAREST PROPOSED FOUL SEWER IN ACCORDANCE WITH THE UISCE EIREANN CODE OF PRACTICE AND STANDARD DETAILS STD-WW-02 AND STD-WW-03. INSPECTION CHAMBERS (OMITTED FOR CLARITY) SHALL BE LOCATED WITHIN 1M OF THE BOUNDARY WITHIN THE PRIVATE PROPERTY BOUNDARY. INSPECTION CHAMBERS WILL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.
12. FOUL SEWER PIPE MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 3.13 OF THE UISCE EIREANN CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE.
13. FOR PIPES WHERE DEPTH OF COVER IS LESS THAN 1.2m CONCRETE SURROUNDS SHALL BE INSTALLED IN ACCORDANCE WITH UISCE EIREANN STANDARD DETAIL STD-WW-08.
14. ALL TREES, SHRUBS AND HEDGES TO HAVE APPROPRIATE ROOT BARRIER PROTECTION AS PER STD-W-12A FROM IRISH WATER STANDARD WATERMAIN DETAILS.

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.

GENERAL NOTES

LEGEND

- SITE RED LINE BOUNDRY
- EXISTING SURFACE WATER DRAINAGE (EX. SW MH)
- PROPOSED SURFACE WATER DRAINAGE (SW MH)
- PROPOSED OUTFALL SURFACE WATER PIPE (OUTFALL SW MH)
- PROPOSED MERR FOUL SEWER (MH9)
- PROPOSED FOUL SEWER (FS MH)
- PROPOSED 100Ø PRIVATE FOUL DRAIN WITH INSPECTION CHAMBER
- PROPOSED LEVELS (+100.00 F.F.L. +102.00)

LEGEND

- DENOTES ASPHALT TO ACCESS ROAD
- DENOTES PERMEABLE PAVING TO DRIVEWAYS
- DENOTES CONCRETE FOOTPATHS
- DENOTES CYCLE PATH
- DENOTES LANDSCAPE - PUBLIC OPEN SPACE
- DENOTES LANDSCAPE - PRIVATE GARDENS
- DENOTES PROPOSED DWELLINGS / DUPLEXES
- DENOTES PROPOSED TREE PITS / BIO-RETENTION AREAS
- DENOTES PROPOSED GREEN/BLUE ROOF AREAS
- DENOTES PROPOSED SOAKAWAY
- DENOTES PROPOSED VERTICAL SOAKAWAY
- DENOTES PROPOSED INSPECTION CHAMBER (IC)
- DENOTES PROPOSED WATER BUTT
- DENOTES PROPOSED DISTRIBUTION BOX (DB)
- DENOTES PROPOSED ACCESS JUNCTION (A)

PL2	27.11.2025	Stage 3 LRD Issue	HvdW	DOS
PL1	14.11.2025	Stage 3 LRD Issue	HvdW	DOS
P5	22.05.25	Stage 2 LRD Issue	HvdW	DOS
P4	14.05.25	Stage 2 LRD Issue	HvdW	DOS
P3	02.05.25	Preliminary Issue	HVDW	DOS
P2	25.04.25	Preliminary Issue	HvdW	DOS
Status	Date	Description	By	Chk

Amendments

Project
RESIDENTIAL DEVELOPMENT AT RAILPARK WEST MAYNOOTH MONTANE

Title
DRAINAGE & FOUL
GENERAL LAYOUT

Client
MONTANE DEVELOPMENTS

KAVANAGH BURKE CONSULTING ENGINEERS
Unit F3, Block F, Calmount Park
Calmount Avenue, Dublin 12. D12 PX28
E-mail: reception@kavanaghburke.ie
Tel: 01 450 0694

Issue
STAGE 2 LRD ISSUE

Designed By	Checked By	KB Ref.
HVDW	DOS	D1824
Drawn By	Date	Scales @ A1
HVDW	May 2025	1:500

Project - Originator - Volume - Level - Type - Role - Number: D1824-KB-XX-XX-DR-C-0001
Revision: PL2

A1

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING SERVICES REPORT.
2. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
3. ALL WATERMAINS TO BE CONSTRUCTED IN ACCORDANCE WITH UISCE EIREANN CODE OF PRACTICE AND STANDARD DETAILS.
4. HYDRANTS TO BE CONSTRUCTED IN ACCORDANCE WITH UISCE EIREANN DETAILS STD-W-18 AND STD-W-19.
5. SLUICE VALVES TO BE CONSTRUCTED IN ACCORDANCE WITH UISCE EIREANN DETAIL STD-W-15.
6. PIPE BEDDING AND BACKFILL TO BE CONSTRUCTED IN ACCORDANCE WITH UISCE EIREANN DETAIL STD-W-13.
7. WATERMAIN PIPE MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 3.9 OF UISCE EIREANN WATER SUPPLY CODE OF PRACTICE.
8. ALL HYDRANT COVERS, WHERE LOCATED IN GRASS AREAS, SHALL BE SURROUNDED BY A CONCRETE PLINTH, 200mm ALL ROUND AND 100mm DEEP FORMED WITH C20/25 CONCRETE, IN ACCORDANCE WITH SECTION 3.18 OF UISCE EIREANN WATER SUPPLY CODE OF PRACTICE.
9. AIR VALVES (WHERE REQUIRED) TO BE CONSTRUCTED IN ACCORDANCE WITH UISCE EIREANN DETAIL STD-W-22 AND STD-W-23.
10. SCOUR CHAMBERS (WHERE REQUIRED) TO BE CONSTRUCTED IN ACCORDANCE WITH UISCE EIREANN DETAIL STD-W-30B. THE SCOUR CHAMBER IS TO BE PROVIDED WITH A NON-RETURN VALVE TO PREVENT BACKFLOW TO THE WATER SUPPLY NETWORK SYSTEM, AND IS TO BE AGREED WITH THE LOCAL AUTHORITY. A SCOUR VALVE TO A WASHOUT HYDRANT IN ACCORDANCE WITH STANDARD DETAIL STD-W-30A IS ALSO ACCEPTABLE. SCOUR VALVES TO CONNECT TO NEAREST SURFACE WATER MANHOLE.
11. WHERE A 25mm SERVICE CONNECTION EXCEEDS 15m IN LENGTH, THE SERVICE CONNECTION SHALL BE 32mm WHERE A DISTANCE OF 30m OR LESS CAN BE ACHIEVED.
12. SERVICE CONNECTIONS TO APARTMENT BLOCKS SHOULD BE 100mm DIAMETER.
13. ROOT BARRIERS (RE-ROOT 1000 BY GREENLEAF OR EQUIVALENT) ARE TO BE INSTALLED WHERE EXISTING OR PROPOSED SERVICES ARE ADJACENT TO A TREE PIT.
14. ALL TREES, SHRUBS AND HEDGES TO HAVE APPROPRIATE ROOT BARRIER PROTECTION AS PER STD-W-12A FROM IRISH WATER STANDARD WATERMAIN DETAILS.

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.

GENERAL NOTES

LEGEND

- SITE RED LINE BOUNDRY
- PROPOSED EASTERN RING ROAD WATER SUPPLY NETWORK
- PROPOSED 150mm HDPE WATERMAIN
- PROPOSED WATER METER, FIRE HYDRANTS AND SLUICE VALVE
- 25mm SDR 17 PE80 PRIVATE CONNECTIONS WITH PROPOSED BOUNDARY BOXES (to STD-W-03)
- PROPOSED AIR VALVE AND SCOUR VALVE
- PROPOSED LEVELS (+100.00, F.F.L. +102.00)

LEGEND

- DENOTES ASPHALT TO ACCESS ROAD
- DENOTES PERMEABLE PAVING TO DRIVEWAYS
- DENOTES CONCRETE FOOTPATHS
- DENOTES CYCLE PATH
- DENOTES LANDSCAPE - PUBLIC OPEN SPACE
- DENOTES LANDSCAPE - PRIVATE GARDENS
- DENOTES PROPOSED DWELLINGS / DUPLEXES

PL2	27.11.2025	STAGE 3 LRD PLANNING ISSUE	HvdW	DOS
PL1	14.11.2025	STAGE 3 LRD PLANNING ISSUE	HvdW	DOS
Status	Date	Description	By	Chk

Amendments

Project
RESIDENTIAL DEVELOPMENT AT RAILPARK WEST MAYNOOTH MONTANE

Title
WATERMAIN
LAYOUT

Client
MAYNOOTH MONTANE LIMITED

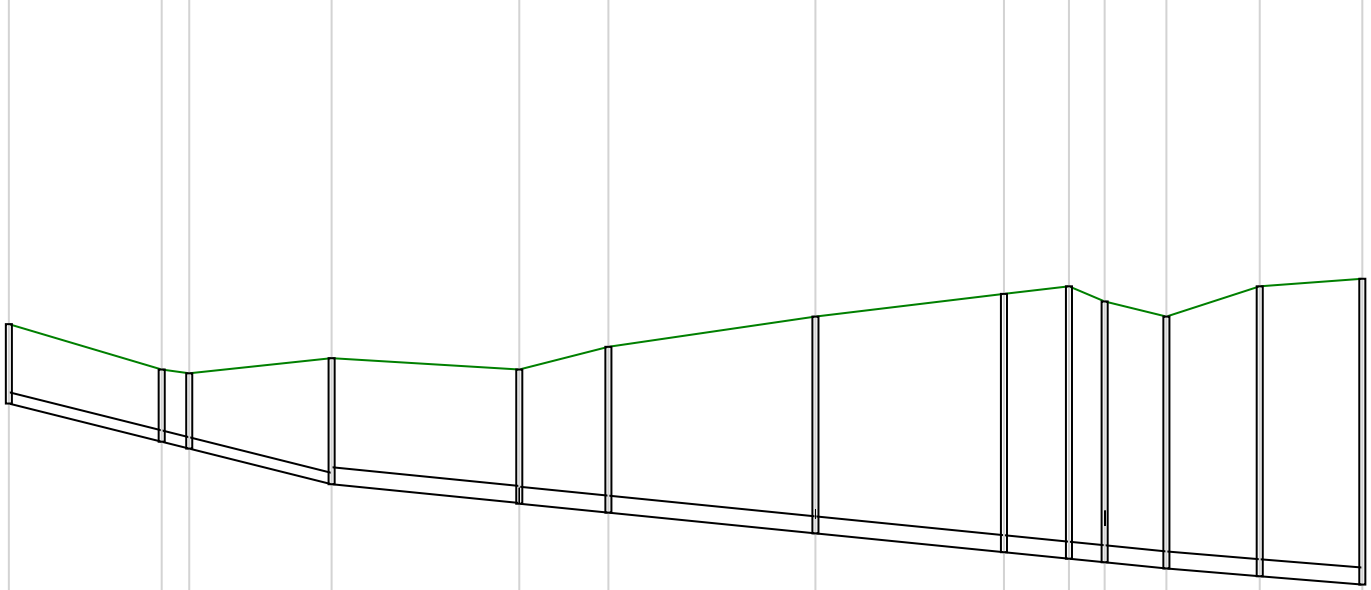
KAVANAGH BURKE CONSULTING ENGINEERS
Unit F3, Block F, Calmount Park
Calmount Avenue, Dublin 12. D12 PX28
E-mail: reception@kavanaghburke.ie
Tel: 01 450 0694

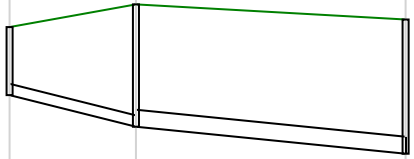
Issue
STAGE 3 LRD ISSUE

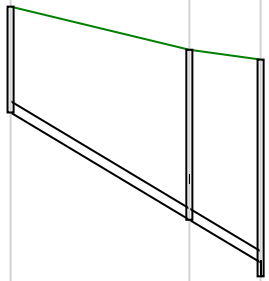
Designed By HVDW	Checked By DOS	KB Ref. D1824
Drawn By HVDW	Date October 2025	Scales @ A1 1:500

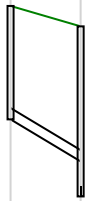
Project - Originator - Volume - Level - Type - Role - Number: D1824-KB-XX-XX-DR-C-0003
Revision: PL2

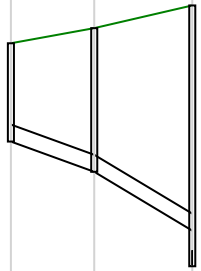
A1

Node Name	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8	FS9	FS10	FS11	FS12	FSOUT
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 54.000													
Link Name	1.000	1.0	1.002	1.003	1.004	1.005	1.006	1.007	1.0	1.009	1.010	1.011	
Section Type	150mm	15	150mm	225mm	225mm	225mm	225mm	225m	225	225m	225mm	225mm	
Slope (1:X)	60.0	60	60.0	150.0	150.0	150.0	150.0	150.0	150	150.0	180.0	185.0	
Cover Level (m)	61.200	60.600	60.550	60.750	60.600	60.900	61.300	61.600	61.700	61.500	61.300	61.700	61.800
Invert Level (m)	60.150	59.645	59.554	59.083	58.835	58.707	58.433	58.184	58.098	58.051	57.969	57.866	57.756
Length (m)	30.315	5.4	28.239	37.226	17.675	41.067	37.394	12.89	7.0	12.25	18.512	20.348	

Node Name		FS13	FS14	FS5
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 54.000				
Link Name		2.000	2.001	
Section Type		150mm	225mm	
Slope (1:X)		60.0	150.0	
Cover Level (m)		60.500	60.800	60.600
Invert Level (m)		59.600 / 59.182	59.182	58.825
Length (m)		25.064	53.486	

Node Name		FS15	FS17	FS7
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 54.000				
Link Name		3.000	3.001	
Section Type		150mm	150mr	
Slope (1:X)		25.0	25.0	
Cover Level (m)		62.000	61.430	61.300
Invert Level (m)		60.600 / 59.181	59.181	58.616
Length (m)		35.463	14.131	

Node Name	FS16	FS17
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 55.000		
Link Name	4.000	
Section Type	150mr	
Slope (1:X)	25.0	
Cover Level (m)	61.700	61.430
Invert Level (m)	60.200	59.644
Length (m)	13.898	

Node Name		FS18	FS19	FS10
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 54.000				
Link Name		5.000	5.001	
Section Type		225mm	225mm	
Slope (1:X)		41.3	25.0	
Cover Level (m)		61.000	61.200	61.500
Invert Level (m)		59.700 / 59.300	59.300 / 58.522	
Length (m)		16.530	19.446	