



Comhairle Chontae na Gaillimhe
Galway County Council

**Gort Uí Lochlainn,
Proposed Residential Development, Mountain Road,
Maigh Cuilinn**

Engineering Report Planning Stage



Gort Uí Lochlainn – Proposed Residential Development

Engineering Planning Report

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Galway Office Fairgreen House, Fairgreen Road, Galway, H91 AXK8, Ireland. Tel: +353 (0)91 565 211	Dublin Office Block 10-4, Blanchardstown Corporate Park, Dublin 15, D15 X98N, Ireland. Tel: +353 (0)1 803 0406	Castlebar Office Market Square, Castlebar, Mayo, F23 Y427, Ireland. Tel: +353 (0)94 902 1401
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1.0 INTRODUCTION

1.1 GENERAL

Galway County Council intend to develop a new residential development at their lands located at Mountain Road, Maigh Cuilinn, Co Galway. The development will consist of the clearance of the existing greenfield site and construction of 31 No. Houses including access roads & parking spaces, bin store, landscaping, open space and all ancillary site development works.

Tobin Consulting Engineers are the consultants appointed to provide civil engineering design and flood risk assessment services for the planning stage of the project. This report discusses the civil engineering aspects of the project while the Flood Risk Assessment is documented in a separate report included with the planning application submission.

1.2 ENGINEERING INFORMATION

As part of the planning submission for the above proposed development, Tobin Consulting Engineers have prepared this Engineering Report addressing the following design aspects of the proposed development.

- ✓ Storm Water Drainage
- ✓ Wastewater Drainage
- ✓ Water Supply
- ✓ Road Layout
- ✓ Traffic Management

The following drawings are included outlining the design proposals and a Drawing Register is included in **Appendix 1**:

- ✓ Drawing 10578-2100 Rev P1 – Proposed Foul Sewer, Storm Sewer and Watermain Layout
- ✓ Drawing 10578-2101 Rev P1 – Standard Watermain Details
- ✓ Drawing 10578-2102 Rev P1 – Standard Manhole Details (Sheet 1 of 2)
- ✓ Drawing 10578-2103 Rev P1 – Standard Manhole Details (Sheet 2 of 2)
- ✓ Drawing 10578-2104 Rev P1 – Standard Pipe Bedding Details
- ✓ Drawing 10578-2105 Rev P1 – Site Development Details
- ✓ Drawing 10578-2106 Rev P1 – Proposed Roads Layout
- ✓ Drawing 10578-2107 Rev P1 – Proposed Road Longsection
- ✓ Drawing 10578-2108 Rev P1 – Vehicle Swept Path Analysis – Fire Tender
- ✓ Drawing 10578-2109 Rev P1 – Vehicle Swept Path Analysis – Refuse Vehicle & Large Car

2.0 STORM WATER DRAINAGE

Storm water drainage services for the proposed development are considered to include the following:

- ✓ Storm Water Network for footpaths, external paved areas and roofs
- ✓ Flow restriction and soakaway within site
- ✓ Removal of hydrocarbon pollutants

The storm water drainage services have been designed to take account of the requirements of the Department of Environment “Recommendations for Site Development Works for Housing Areas”, 1998 and “Sewers for Adoption” published by WRC, UK.

The storm water drainage network was designed using Innovyze MicroDrainage 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),

$$Q = 2.78 \times C_v \times C_r \times I \times A$$

Where,	Q	=	rate of run-off, l/s
	C _v	=	Volumetric run-off coefficient
	C _r	=	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 Galway City
- Minimum self cleansing velocity of 0.75m/s
- An allowable discharge of 0.1l/s has been used in the model purely for simulation purposes. Additional storage capacity has been provided for in the soakaways to cater for this.

The following impermeability factors were adopted in accordance with good design practice:

- Macadam Roadways = 0.95
- Roof Areas = 0.90
- Concrete Areas = 0.85

2.1 STORM NETWORK

There is an existing storm water drainage network Mountain Road flowing in a north rest direction which then travels through private lands to the north of the proposed site. This existing storm sewer is a 450mm diameter concrete sewer and discharges to an open drain further down stream. Periodic ponding at Mountain rd. outside site area is acknowledged for action via separate proposals underway by Galway Co. Co. Infrastructure & Operations Unit. No surface water discharge from the

development will be permitted to this existing storm sewer. All surface water runoff generated on site will be slowly discharged back to groundwater by means of an infiltration tank.

As noted above, the storm drainage for the entire development has been designed using the Innovyze MicroDrainage Design Software in accordance with the Recommendations for Site Development Works for Housing Areas and also some of the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). The details of the Micro Drainage Outputs for the pipe design, attenuation design and associated long sections are outlined at **Appendix 2** of this report.

There is an existing open drain running along the western boundary of the site which is culverted under the existing yard area and connects into the storm network on Mountain Road. Due to the proposed playground car park and bottle bank it will be necessary to increase the length of culvert. This will be in the form of a new 300mm dia concrete sewer and will include replacement of the existing culvert. As the impermeable areas on the site will have its own dedicated storm drainage network the catchment area of this drain discharging to the public sewer will be decreased and hence will not apply any additional loading.

Please refer to drawing 10578 – 2100 Rev A for details of the existing storm drainage network.

2.2 ATTENUATION/INFILTRATION

As noted above, the existing public storm network is not capable receiving any additional loading therefore it is proposed to infiltrate all stormwater run-off generated on site

An infiltration rate of 0.0104m/hr has been used in sizing the attenuation/infiltration tanks as calculated based on the result of a percolation test carried out on site in accordance with BRE DIGEST 365 .

It is proposed to infiltrate all roof-run via individual infiltration tanks located in the rear garden of each unit. Surface water run-off from roads and footways will discharge to one of two main infiltration tanks, run-off generated in the upper portion of the site will flow into an infiltration tank providing 168m³ of equivalent storage, while run-off generated on the lower portion of the site will discharge to an infiltration tank providing an equivalent storage volume of 245m³. It should be noted that for modelling purposes a an outflow of 0.1L/sec was included, to cater for this volume and additional 8.64m³ (0.1L/sec for a 24hr storm event) of storage is provided in addition to the volumes calculated from modelling. All infiltration tanks have been designed to cater for a 100 year rainfall event with a 20% factor for climate change).

Refer to Drawings 10578-2100 Rev A, for details of the proposed storm drainage network. Please refer to **Appendix 2** for details of storm water attenuation / infiltration calculations.

2.3 PETROL INTERCEPTOR

It is proposed to install 2 No. Class 1 Bypass Petrol Interceptor upstream of the connection into the existing open drain. The reasoning for this is that the storm water entering the system will include run-off from the roadways and parking areas throughout the site and therefore may have hydrocarbons within their flow. These hydrocarbon pollutants require removal and are not to be discharged back

into the environment. The separator has been sized to cater for roads, footways and driveway areas of the site.

From the selection tables in the separator product brochure, the NSBP004 & NSBP006 models or similar interceptor size are required to cater for the hydrocarbons which may be present in the storm water.

3.0 WASTEWATER DRAINAGE

3.1 GENERAL

It is proposed to discharge wastewater generated by the proposed development to the existing foul sewer network which runs on the public road to the west of the proposed development. There is currently 2 No. foul sewers running along the Mountain Road outside the proposed site. These existing foul sewers are a 300mm diameter concrete and 150mm uPVC. It is proposed to discharge to this network via gravity via a 225mm dia sewer in accordance with Section 3.6 of The Irish Water Code of Practice for Wastewater Infrastructure.

A Pre-Connection Enquiry for the development has been submitted to Irish Water based on this approach and on the envisaged wastewater discharge volumes from the development. Refer to drawing ref, 10578-2100 Rev A – Proposed Storm, Foul Sewer & Watermain Layout for proposed foul drainage layout.

The drainage systems including all pipe sizes and gradients have been designed in accordance with the Irish Water Code of Practice for Wastewater Infrastructure using Innovyze MicroDrainage Design Software. The details of the Micro Drainage Outputs for the pipe designs and associated long sections are outlined at Appendix 4 of this report. The pipework for the drainage system has been designed to provide for six times the dry weather flow (DWF) in accordance with the recommendations of the Irish Water Code of Practice for Wastewater Infrastructure.

A confirmation of Feasibility for this development has been received from Irish Water – Reference No CDS19007640

3.2 OCCUPANCY FIGURES AND WASTEWATER FLOW RATES

The foul loadings for the sewers have been evaluated in accordance with the Irish Water Code of Practice for Wastewater Supply.

The foul loading for the sewers has been evaluated in accordance with the Irish Water Code of Practice for Wastewater Infrastructure. The occupancy per house type is based on Section 3.6 of the IW Code of Practice for Wastewater Infrastructure, a summary of the total Hydraulic and Organic loadings based on these figures is outlined as follows:

Table 3-1 Summary of Hydraulic and Organic Loadings

Source		Hydraulic Loading (Litres/Day)		BOD ₅ Load (Grams/Day)		P.E.
Description	Total Occupancy	Per Occupancy	Total	Per Occupancy	Total	
Total Occupancy based on Table No. 1	83.7	150	12555	60	5022	84
Total	208		12555		5022	84

Table 3-2 Summary of Total Occupancy

House Type	Number of House Type	Average Occupancy Per House*	Total Occupancy
House Type A - 3 Bed	1	2.7	2.7
House Type B - 2 Bed	27	2.7	72.9
House Type C - 3 Bed	3	2.7	8.1
Total	31		83.7

* Average Occupancy taken from the IW Code of Practice for Wastewater

Therefore, the total Hydraulic load for the proposed development is 12,555 Litres per day and the proposed PE is 84.

4.0 WATER SUPPLY

4.1 GENERAL OVERVIEW

The proposed water supply main has been designed in accordance with the Irish Water Code of Practice for Water Supply and Recommendations for Site Development Works for Housing Areas published by the Department of the Environment and Local Government. There is an existing 250mm & 200mm uPVC public watermain which run along the Mountain road. It is proposed to extend this line to the north along the Ballinruan Road and turn it into the proposed development, as shown in Dwg. 10578-2100 Rev A. The proposed pipe will consist of 100mm dia PE100 SDR17 pipe.

In accordance with Irish Water and Local Authority standards individual boundary boxes with stopcock and meter will be installed on connection pipework to each unit. All water mains are to be commissioned and pressure tested to Irish Water Standards. The typical construction details are shown on Dwg. No. 10537-2005.

A Pre-Connection Enquiry for the proposed development has been submitted to Irish Water based on this approach and on the envisaged water demand volumes.

The “National Guidance Document on the Provision of Water for Fire Fighting”, Water UK, Local Government Association, (3rd Edition, Jan 2007), states that housing developments with units of detached or semidetached houses of not more than two floors should have a water supply capable of delivering a minimum of 8l/s through any single hydrant.

A confirmation of Feasibility for this development has been received from Irish Water – Reference No CDS19007640

5.0 TRAFFIC IMPACT

A Traffic Report is submitted as part of this application. The Report assesses the impact the proposed development will have on the existing signalised junction within Maigh Cuilinn as agreed with Galway County Council. The Report includes a review of the committed development currently granted for the Maigh Cuilinn. Analysis was carried out with and without the Maigh Cuilinn By-pass scenarios. The resulting assessment is summarised as follows:

Junction 1 - Signalised Junction at L1313 Church Road/Clifden Road/L1320 Mountain Road/Clifden Road

The LinSig analysis for the design year 2023 without the Bypass (including the base traffic with growth indices applied and inclusion of current Committed Development traffic) indicates that in the morning peak hour scenarios, Arm 1 is forecast to approach capacity. A slight decrease was recorded for Arm 3 in the morning peak, however, this is a result of the analysis software optimising the delays for all of the Traffic Streams within the junction.

The inclusion of the proposed Development traffic will result in a slight increase in the Degree of Saturation (DoS) for the majority of Traffic Streams and a slight increase in the MMQ for the majority of Traffic Streams (i.e., for Arm 4, Traffic Stream1/2 the DoS increases from 93.7% to 96.3% and the MMQ from 23.8 PCU to 26.1 PCU). The evening peak hour is similar with Arms 1 and 2 forecast to operate above capacity. Again, the inclusion of the proposed development traffic will result in an increase in the DoS and MMQ for these Traffic Streams.

The LinSig analysis for the design year 2023 with the inclusion of the Bypass (including the base traffic with growth indices applied and inclusion of current Committed Development traffic) indicates that for both the morning and evening peak hour scenarios, the junction is forecast to operate within capacity.

The inclusion of the proposed Development traffic will result in a slight increase in the Degree of Saturation (DoS) for each Stream and a slight increase in the MMQ for each Stream for the morning and evening peak hour scenarios, however the inclusion of the proposed Development traffic is forecast to have minimal effect on the operation of the signalised junction.

The inclusion of the proposed Development traffic will result in a slight increase in the Degree of Saturation (DoS) for each Stream and a slight increase in the MMQ for each Stream for the morning and evening peak hour scenarios, (the largest impact forecast is for Arm 1, Traffic Stream1/2 for which the Dos increases from 94.0% to 96.8% and the MMQ from 20.9 PCU to 23.1 PCU in the morning peak hour). A slight decrease was recorded for Arm 3 in the morning peak; however, this is a result of the analysis software optimising the delays for all of the traffic Streams within the junction.

Note that the above analysis was carried out with a cycle time of 120 seconds. An increase in the cycle time to 150 seconds results in as increase in the Practical Reserve Capacity for the junction from -7.5% to 5.3% in the morning peak hour and -3.7% to 0.1% in the evening peak hour. The MMQ is also reduced for all Traffic Streams for both scenarios.

It should also be noted a new pedestrian crossing on Mountain Road is proposed under a separate works contract by Galway Co. Co. Infrastructure & Operations Unit, the location of this has been shown indicatively on drawing 10578-2106.

5.1 *TRAFFIC CONCLUSION*

It should be noted that the inclusion of the proposed development traffic (this application) has minimal impact on the existing signalised junction. The project trip numbers generated in the morning and evening peaks are small and have little to no change in the performance of the junction for the With Development Scenarios.

A Stage 1/2 Road Safety Audit has been carried out and is submitted as part of this application.

Appendix 1 – Drawing Register

10578 Gort Uí Lochlainn, Moycullen, Co. Galway

Document Issue Sheet

Issue No: 5
Date: 13 May 2021
Issued By: Shane Byrne

Copy For Galway County Council Planning Department
Issue Notes: Issue for Planning

Drawings

Drawing No.	Title	Revision	Renditions	Issue Reason
10578-2100	Proposed Services	P1	pdf	For Information
10578-2101	Watermain Details	P1	pdf	For Information
10578-2102	Manhole Details Sht 1	P1	pdf	For Information
10578-2103	Manhole Details Sht 2	P1	pdf	For Information
10578-2104	Pipe bedding Details	P1	pdf	For Information
10578-2105	Site Development Details Sht 1	P1	pdf	For Information
10578-2106	Proposed Roads Layout	P1	pdf	For Information
10578-2107	Proposed Road Longsection	P1	pdf	For Information
10578-2108	Vehicle Swept Path Analysis - Fire Tender	P1	pdf	For Information
10578-2109	Vehicle Swept Path Analysis - Refuse & Car	P1	pdf	For Information

Recipients

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Appendix 2 – Microdrainage – Proposed Storm Water Network

TOBIN Consulting Engineers		Page 1
Fairgreen House Fairgreen Road Galway	10578 Moycullen Housing Development Rev C	
Date 13/05/2021 09:35 File Microdrainage Storm - Rev C.MDX	Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	1	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	16.300	Volumetric Runoff Coeff.	0.850	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.224	PIMP (%)	100	Min Vel for Auto Design only (m/s)	0.75
Maximum Rainfall (mm/hr)	55	Add Flow / Climate Change (%)	0	Min Slope for Optimisation (1:X)	250
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Inverts

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	75.000	0.333	225.2	0.087	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	32.94	6.44	37.770	0.087	0.0	0.0	0.0	0.87	34.5	8.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow	k (l/s)	HYD SECT	DIA (mm)	Section	Type	Auto Design
1.001	50.000	0.222	225.2	0.118	0.00		0.0 0.600	o	300	Pipe/Conduit		🟢
1.002	5.000	0.022	227.3	0.000	0.00		0.0 0.600	o	300	Pipe/Conduit		🟡
1.003	5.000	0.022	227.3	0.000	0.00		0.0 0.600	o	300	Pipe/Conduit		🔴
2.000	65.000	0.464	140.0	0.138	5.00		0.0 0.600	o	225	Pipe/Conduit		🟡
2.001	47.000	0.940	50.0	0.061	0.00		0.0 0.600	o	225	Pipe/Conduit		🟢
2.002	20.000	0.400	50.0	0.050	0.00		0.0 0.600	o	225	Pipe/Conduit		🟢
2.003	10.000	0.044	225.0	0.031	0.00		0.0 0.600	o	225	Pipe/Conduit		🟡
2.004	3.000	0.013	230.8	0.000	0.00		0.0 0.600	o	225	Pipe/Conduit		🟡

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.001	31.53	7.24	37.437	0.205	0.0	0.0	0.0	1.04	73.8	19.8
1.002	31.40	7.32	37.215	0.205	0.0	0.0	0.0	1.04	73.4	19.8
1.003	31.27	7.40	37.090	0.205	0.0	0.0	0.0	1.04	73.4	19.8
2.000	33.83	5.98	38.080	0.138	0.0	0.0	0.0	1.10	43.9	14.3
2.001	33.01	6.40	37.616	0.199	0.0	0.0	0.0	1.85	73.7	20.2
2.002	32.67	6.58	36.676	0.249	0.0	0.0	0.0	1.85	73.7	25.0
2.003	32.33	6.78	36.276	0.280	0.0	0.0	0.0	0.87	34.5	27.8
2.004	32.22	6.83	36.132	0.280	0.0	0.0	0.0	0.86	34.1	27.8

10578
Moycullen Housing
Development Rev C

Designed by SB

Checked by MG



Network 2018.1.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
Soakaway 1	1	39.000	1.230	Open Manhole	1200	1.000	37.770	225			
	2	39.430	1.993	Open Manhole	1200	1.001	37.437	300	1.000	37.437	225
	3	39.400	2.185	Open Manhole	1200	1.002	37.215	300	1.001	37.215	300
	4	39.400	2.310	Open Manhole	1200	1.003	37.090	300	1.002	37.193	300
	5	38.800	1.732	Open Manhole	0		OUTFALL		1.003	37.068	300
	6	39.550	1.470	Open Manhole	1200	2.000	38.080	225			
	7	39.100	1.484	Open Manhole	1200	2.001	37.616	225	2.000	37.616	225
	8	37.950	1.274	Open Manhole	1200	2.002	36.676	225	2.001	36.676	225
	9	37.700	1.424	Open Manhole	1200	2.003	36.276	225	2.002	36.276	225
Soakaway 2	10	37.500	1.368	Open Manhole	1200	2.004	36.132	225	2.003	36.232	225
	11	37.400	1.281	Open Manhole	0		OUTFALL		2.004	36.119	225

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Fairgreen House Fairgreen Road Galway	10578 Moycullen Housing Development Rev C	
Date 13/05/2021 09:35 File Microdrainage Storm - Rev C.MDX	Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.087	0.087	0.087
1.001	-	-	100	0.118	0.118	0.118
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.138	0.138	0.138
2.001	-	-	100	0.061	0.061	0.061
2.002	-	-	100	0.050	0.050	0.050
2.003	-	-	100	0.031	0.031	0.031
2.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.485	0.485	0.485

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	Soakaway 1	38.800	37.068	0.000	0	0

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Fairgreen House Fairgreen Road Galway	10578 Moycullen Housing Development Rev C	
Date 13/05/2021 09:35 File Microdrainage Storm - Rev C.MDX	Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
2.004	Soakaway 2	37.400	36.119	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.850	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	2	Number of Storage Structures	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.300	Cv (Summer)	0.850
Return Period (years)	1	Ratio R	0.224	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer Storm	Duration (mins)	30

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Fairgreen House Fairgreen Road Galway	10578 Moycullen Housing Development Rev C										
Date 13/05/2021 09:35 File Microdrainage Storm - Rev C.MDX	Designed by SB Checked by MG										
Micro Drainage	Network 2018.1.1										
<u>Online Controls for Storm</u>											
<u>Hydro-Brake® Optimum Manhole: 4, DS/PN: 1.003, Volume (m³): 2.9</u>											
Unit Reference MD-SHE-0013-1000-1200-1000		Sump Available	Yes								
Design Head (m)	1.200	Diameter (mm)	13								
Design Flow (l/s)	0.1	Invert Level (m)	37.090								
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	75								
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200								
Application	Surface										
Control Points		Head (m)	Flow (l/s)								
Design Point (Calculated)	1.200	0.1									
Flush-Flo™	0.050	0.0									
Control Points		Head (m)	Flow (l/s)								
	Kick-Flo®	0.115	0.0								
	Mean Flow over Head Range	-	0.1								
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated											
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.600	0.1	1.600	0.1	2.600	0.1	5.000	0.2	7.500	0.2
0.200	0.0	0.800	0.1	1.800	0.1	3.000	0.1	5.500	0.2	8.000	0.2
0.300	0.1	1.000	0.1	2.000	0.1	3.500	0.2	6.000	0.2	8.500	0.2
0.400	0.1	1.200	0.1	2.200	0.1	4.000	0.2	6.500	0.2	9.000	0.2
0.500	0.1	1.400	0.1	2.400	0.1	4.500	0.2	7.000	0.2	9.500	0.2
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TOBIN Consulting Engineers		Page 9																																																																																																																		
Fairgreen House Fairgreen Road Galway	10578 Moycullen Housing Development Rev C																																																																																																																			
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Micro Drainage		Network 2018.1.1																																																																																																																		
<u>Hydro-Brake® Optimum Manhole: 9, DS/PN: 2.004, Volume (m³): 1.9</u> <table border="0"> <tr> <td>Unit Reference</td> <td>MD-SHE-0013-1000-1200-1000</td> <td>Sump Available</td> <td>Yes</td> </tr> <tr> <td>Design Head (m)</td> <td>1.200</td> <td>Diameter (mm)</td> <td>13</td> </tr> <tr> <td>Design Flow (l/s)</td> <td>0.1</td> <td>Invert Level (m)</td> <td>36.132</td> </tr> <tr> <td>Flush-Flo™</td> <td>Calculated</td> <td>Minimum Outlet Pipe Diameter (mm)</td> <td>75</td> </tr> <tr> <td>Objective</td> <td>Minimise upstream storage</td> <td>Suggested Manhole Diameter (mm)</td> <td>1200</td> </tr> <tr> <td>Application</td> <td>Surface</td> <td></td> <td></td> </tr> </table> <table border="0"> <thead> <tr> <th>Control Points</th> <th>Head (m)</th> <th>Flow (l/s)</th> <th>Control Points</th> <th>Head (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr> <td>Design Point (Calculated)</td> <td>1.200</td> <td>0.1</td> <td>Kick-Flo®</td> <td>0.115</td> <td>0.0</td> </tr> <tr> <td>Flush-Flo™</td> <td>0.050</td> <td>0.0</td> <td>Mean Flow over Head Range</td> <td>-</td> <td>0.1</td> </tr> </tbody> </table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr> <td>0.100</td> <td>0.0</td> <td>0.600</td> <td>0.1</td> <td>1.600</td> <td>0.1</td> <td>2.600</td> <td>0.1</td> <td>5.000</td> <td>0.2</td> <td>7.500</td> <td>0.2</td> </tr> <tr> <td>0.200</td> <td>0.0</td> <td>0.800</td> <td>0.1</td> <td>1.800</td> <td>0.1</td> <td>3.000</td> <td>0.1</td> <td>5.500</td> <td>0.2</td> <td>8.000</td> <td>0.2</td> </tr> <tr> <td>0.300</td> <td>0.1</td> <td>1.000</td> <td>0.1</td> <td>2.000</td> <td>0.1</td> <td>3.500</td> <td>0.2</td> <td>6.000</td> <td>0.2</td> <td>8.500</td> <td>0.2</td> </tr> <tr> <td>0.400</td> <td>0.1</td> <td>1.200</td> <td>0.1</td> <td>2.200</td> <td>0.1</td> <td>4.000</td> <td>0.2</td> <td>6.500</td> <td>0.2</td> <td>9.000</td> <td>0.2</td> </tr> <tr> <td>0.500</td> <td>0.1</td> <td>1.400</td> <td>0.1</td> <td>2.400</td> <td>0.1</td> <td>4.500</td> <td>0.2</td> <td>7.000</td> <td>0.2</td> <td>9.500</td> <td>0.2</td> </tr> </tbody> </table>			Unit Reference	MD-SHE-0013-1000-1200-1000	Sump Available	Yes	Design Head (m)	1.200	Diameter (mm)	13	Design Flow (l/s)	0.1	Invert Level (m)	36.132	Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	75	Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200	Application	Surface			Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	0.1	Kick-Flo®	0.115	0.0	Flush-Flo™	0.050	0.0	Mean Flow over Head Range	-	0.1	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	0.0	0.600	0.1	1.600	0.1	2.600	0.1	5.000	0.2	7.500	0.2	0.200	0.0	0.800	0.1	1.800	0.1	3.000	0.1	5.500	0.2	8.000	0.2	0.300	0.1	1.000	0.1	2.000	0.1	3.500	0.2	6.000	0.2	8.500	0.2	0.400	0.1	1.200	0.1	2.200	0.1	4.000	0.2	6.500	0.2	9.000	0.2	0.500	0.1	1.400	0.1	2.400	0.1	4.500	0.2	7.000	0.2	9.500	0.2
Unit Reference	MD-SHE-0013-1000-1200-1000	Sump Available	Yes																																																																																																																	
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0.400	0.1	1.200	0.1	2.200	0.1	4.000	0.2	6.500	0.2	9.000	0.2																																																																																																									
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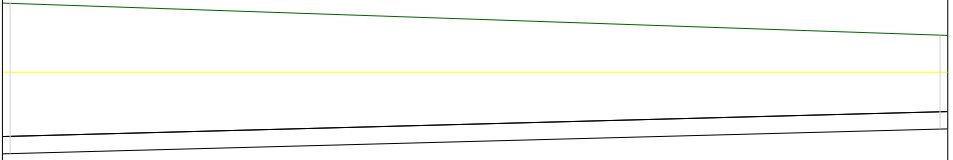
TOBIN Consulting Engineers		Page 10																																				
Fairgreen House Fairgreen Road Galway	10578 Moycullen Housing Development Rev C																																					
Date 13/05/2021 09:35 File Microdrainage Storm - Rev C.MDX	Designed by SB Checked by MG																																					
Micro Drainage Network 2018.1.1																																						
<u>Storage Structures for Storm</u> <u>Cellular Storage Manhole: 4, DS/PN: 1.003</u> Invert Level (m) 37.350 Infiltration Coefficient Side (m/hr) 0.01020 Porosity 0.60 Infiltration Coefficient Base (m/hr) 0.01020 Safety Factor 2.0 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>220.0</td><td>220.0</td><td>1.200</td><td>220.0</td><td>296.8</td><td>1.300</td><td>0.0</td><td>296.8</td></tr></table> <u>Cellular Storage Manhole: 9, DS/PN: 2.004</u> Invert Level (m) 36.132 Infiltration Coefficient Side (m/hr) 0.01020 Porosity 0.60 Infiltration Coefficient Base (m/hr) 0.01020 Safety Factor 2.0 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>315.0</td><td>315.0</td><td>1.200</td><td>315.0</td><td>401.4</td><td>1.300</td><td>0.0</td><td>401.4</td></tr></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	220.0	220.0	1.200	220.0	296.8	1.300	0.0	296.8	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	315.0	315.0	1.200	315.0	401.4	1.300	0.0	401.4
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																														
0.000	220.0	220.0	1.200	220.0	296.8	1.300	0.0	296.8																														
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0.000	315.0	315.0	1.200	315.0	401.4	1.300	0.0	401.4																														
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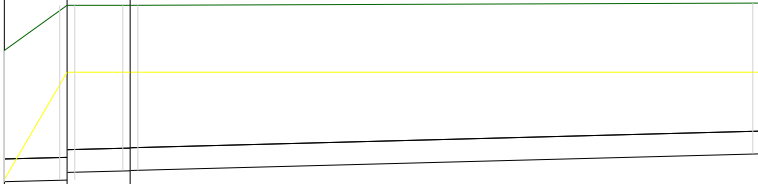
TOBIN Consulting Engineers			Page 12																				
Fairgreen House Fairgreen Road Galway	10578 Moycullen Housing Development Rev C																						
Date 13/05/2021 09:35 File Microdrainage Storm - Rev C.MDX	Designed by SB Checked by MG																						
Micro Drainage	Network 2018.1.1																						
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																							
	<table><tr><th></th><th>US/MH</th><th></th><th>Level</th></tr><tr><th>PN</th><th>Name</th><th>Status</th><th>Exceeded</th></tr><tr><td>1.000</td><td>1</td><td>SURCHARGED</td><td></td></tr><tr><td>1.001</td><td>2</td><td>SURCHARGED</td><td></td></tr><tr><td>1.002</td><td>3</td><td>SURCHARGED</td><td></td></tr></table>		US/MH		Level	PN	Name	Status	Exceeded	1.000	1	SURCHARGED		1.001	2	SURCHARGED		1.002	3	SURCHARGED			
	US/MH		Level																				
PN	Name	Status	Exceeded																				
1.000	1	SURCHARGED																					
1.001	2	SURCHARGED																					
1.002	3	SURCHARGED																					

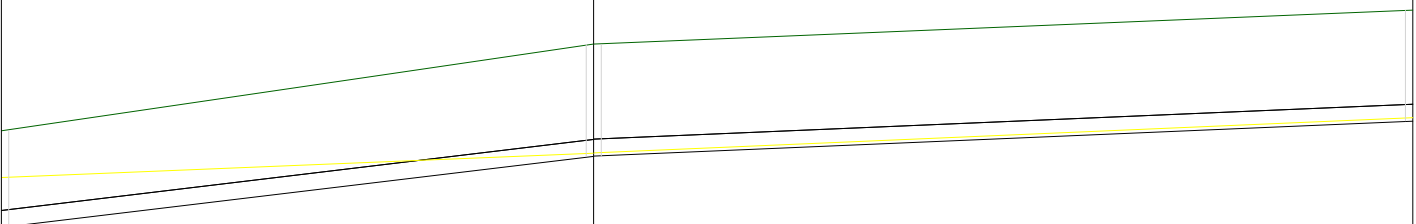
Summary of Critical Results by Maximum Level (Rank 1) for Storm

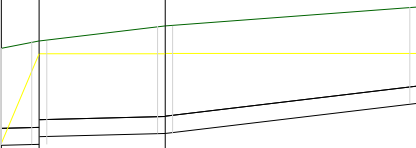
										Water	Surcharged	Flooded			Pipe	
	US/MH			Return	Climate	First (X)		First (Y)	First (Z)	Overflow	Level	Depth	Volume	Flow /	Overflow	Flow
PN	Name	Storm	Period	Change		Surcharge		Flood	Overflow	Act.	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)
1.003	4	1440	Winter	100	+20%	30/30	Summer				38.516	1.126	0.000	0.00		0.1
2.000	5	30	Summer	100	+20%	100/30	Summer				38.364	0.059	0.000	1.03		43.6
2.001	6	30	Summer	100	+20%	100/30	Summer				37.877	0.036	0.000	0.82		58.0
2.002	7	1440	Winter	100	+20%	30/30	Summer				37.333	0.432	0.000	0.11		7.1
2.003	8	1440	Winter	100	+20%	30/30	Summer				37.332	0.831	0.000	0.27		7.9
2.004	9	1440	Winter	100	+20%	30/30	Winter				37.331	0.974	0.000	0.00		0.1

	US/MH	Level
PN	Name	Status Exceeded
1.003	4	SURCHARGED
2.000	5	SURCHARGED
2.001	6	SURCHARGED
2.002	7	SURCHARGED
2.003	8	SURCHARGED
2.004	9	FLOOD RISK

TOBIN Consulting Engineers		Page 1	
Fairgreen House Fairgreen Road Galway		10578 Moycullen Housing Development Rev C	
Date 13/05/2021 09:36 File Microdrainage Storm - Rev C.MDX		Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1	
MH Name	2	1	
Hor Scale 600 Ver Scale 100 Datum (m) 35.000			
PN		1.000	
Dia (mm)		225	
Slope (1:X)		225.2	
Cover Level (m)	39.430		39.000
Invert Level (m)	37.437		37.770
Length (m)		75.000	
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Fairgreen House Fairgreen Road Galway		10578 Moycullen Housing Development Rev C			
Date 13/05/2021 09:36 File Microdrainage Storm - Rev C.MDX		Designed by SB Checked by MG			
Micro Drainage		Network 2018.1.1			
MH Name	Soakaway 1			2	
Hor Scale 600 Ver Scale 100 Datum (m) 35.000					
PN				1.001	
Dia (mm)				300	
Slope (1:X)				225.2	
Cover Level (m)		38.800	39.400	39.400	39.430
Invert Level (m)		37.068	37.090	37.193	37.215
Length (m)				50.000	
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Fairgreen House Fairgreen Road Galway		10578 Moycullen Housing Development Rev C		
Date 13/05/2021 09:36 File Microdrainage Storm - Rev C.MDX		Designed by SB Checked by MG		
Micro Drainage		Network 2018.1.1		
MH Name	7	6	5	
Hor Scale 600 Ver Scale 100 Datum (m) 35.000				
PN		2.001	2.000	
Dia (mm)		225	225	
Slope (1:X)		50.0	140.0	
Cover Level (m)	37.950	39.100	39.550	
Invert Level (m)	36.676	37.616 37.616	38.080	
Length (m)		47.000	65.000	
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Fairgreen House Fairgreen Road Galway		10578 Moycullen Housing Development Rev C			
Date 13/05/2021 09:36 File Microdrainage Storm - Rev C.MDX		Designed by SB Checked by MG			
Micro Drainage		Network 2018.1.1			
MH Name	Soakaway 2		8	7	
Hor Scale 600 Ver Scale 100 Datum (m) 33.000					
PN			2.003	2.002	
Dia (mm)			225	225	
Slope (1:X)			225.0	50.0	
Cover Level (m)		37.400 37.500	37.700	37.950	
Invert Level (m)		36.132 36.232	36.276 36.276	36.676	
Length (m)			10.000	20.000	
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Appendix 3 – Microdrainage – Proposed Foul Drainage Network

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
2.000	32.000	0.640	50.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.002	22.000	0.147	149.7	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.003	65.000	0.433	150.1	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
3.000	27.000	0.450	60.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
3.001	21.000	0.350	60.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
3.002	11.000	0.220	50.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.000	37.500	0.000	0.0	4	0.0	8	0.31	1.24	21.9	0.1
1.002	36.785	0.000	0.0	20	0.0	20	0.33	0.94	37.3	0.6
1.003	36.638	0.000	0.0	20	0.0	20	0.33	0.94	37.2	0.6
3.000	37.210	0.000	0.0	5	0.0	9	0.31	1.13	20.0	0.1
3.001	36.760	0.000	0.0	8	0.0	12	0.36	1.13	20.0	0.2
3.002	36.410	0.000	0.0	12	0.0	13	0.44	1.24	21.9	0.3

10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage
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Designed by SB

Checked by MG

Network 2018.1.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.004	40.000	0.276	144.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.005	46.000	0.317	145.1	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.004	36.115	0.000	0.0	32	0.0	24	0.39	0.95	37.9	0.9
1.005	35.839	0.000	0.0	32	0.0	24	0.39	0.95	37.9	0.9

10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage
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Designed by SB

Checked by MG

Network 2018.1.1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
F7	39.000	1.070	Open Manhole	1200	1.000	37.930	150				
F6	39.430	2.220	Open Manhole	1200	1.001	37.210	150	1.000	37.210	150	
F9	38.800	1.300	Open Manhole	1200	2.000	37.500	150				
F5	39.450	2.665	Open Manhole	1200	1.002	36.785	225	1.001	36.860	150	
								2.000	36.860	150	
F4	39.500	2.862	Open Manhole	1200	1.003	36.638	225	1.002	36.638	225	
F10	39.550	2.340	Open Manhole	1200	3.000	37.210	150				
F9a	39.250	2.490	Open Manhole	1200	3.001	36.760	150	3.000	36.760	150	
F8	39.100	2.690	Open Manhole	1200	3.002	36.410	150	3.001	36.410	150	
F3	39.100	2.985	Open Manhole	1200	1.004	36.115	225	1.003	36.205	225	90
								3.002	36.190	150	
F2	38.050	2.211	Open Manhole	1200	1.005	35.839	225	1.004	35.839	225	
	37.150	1.628	Open Manhole	0		OUTFALL		1.005	35.522	225	

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Fairgreen House Fairgreen Road Galway	10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage	
Date 13/05/2021 09:51 File 10578 - Microdrainage Foul Rev B.MDX	Designed by SB Checked by MG	
Micro Drainage	Network 2018.1.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

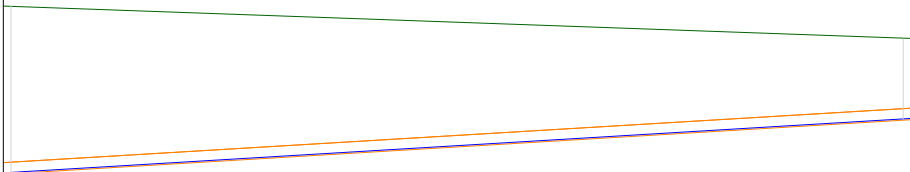
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.001	o	150	F9a	39.250	36.760	2.340	Open Manhole	1200
3.002	o	150	F8	39.100	36.410	2.540	Open Manhole	1200
1.004	o	225	F3	39.100	36.115	2.760	Open Manhole	1200
1.005	o	225	F2	38.050	35.839	1.986	Open Manhole	1200

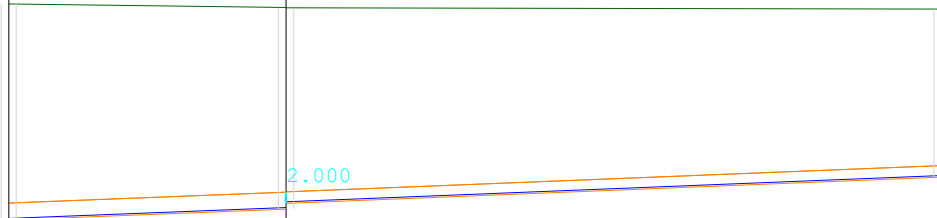
Downstream Manhole

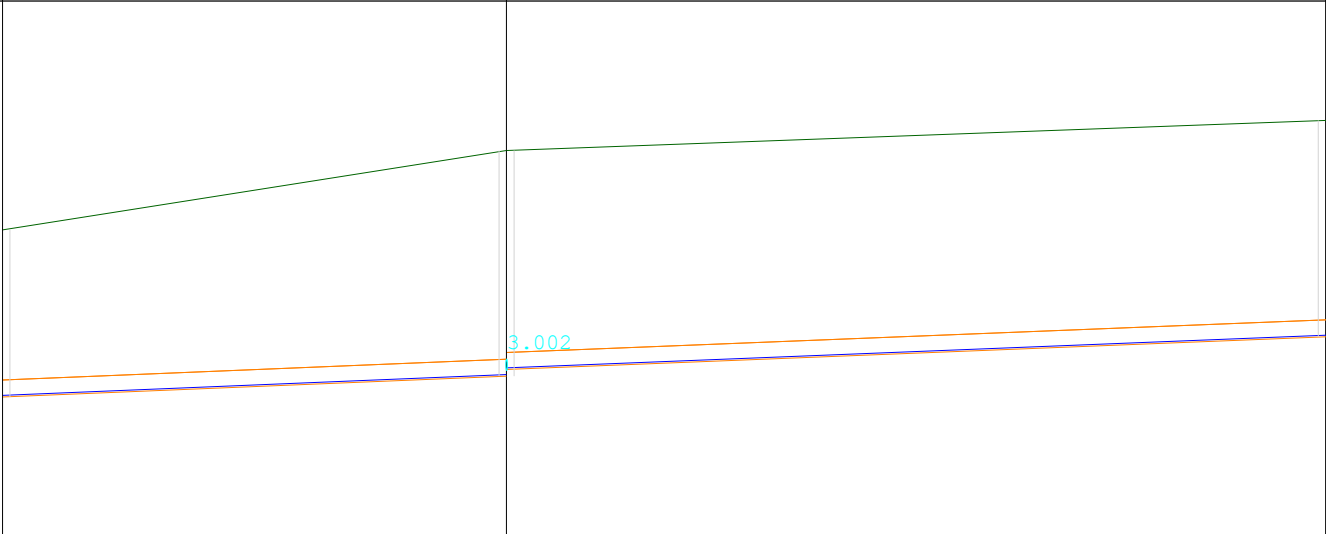
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.001	21.000	60.0	F8	39.100	36.410	2.540	Open Manhole	1200
3.002	11.000	50.0	F3	39.100	36.190	2.760	Open Manhole	1200
1.004	40.000	144.9	F2	38.050	35.839	1.986	Open Manhole	1200
1.005	46.000	145.1		37.150	35.522	1.403	Open Manhole	0

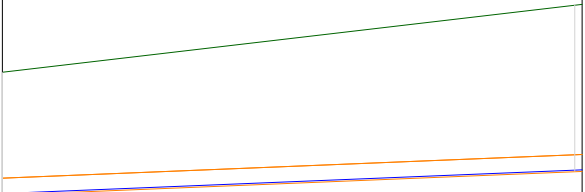
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Fairgreen House Fairgreen Road Galway	10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage				
Date 13/05/2021 09:51 File 10578 - Microdrainage Foul Rev B.MDX	Designed by SB Checked by MG				
Micro Drainage					
		Network 2018.1.1			
<u>Area Summary for Storm</u>					
	Pipe Number	Gross Area (ha)	Pipe Total (ha)		
	1.000	0.000	0.000		
	1.001	0.000	0.000		
	2.000	0.000	0.000		
	1.002	0.000	0.000		
	1.003	0.000	0.000		
	3.000	0.000	0.000		
	3.001	0.000	0.000		
	3.002	0.000	0.000		
	1.004	0.000	0.000		
	1.005	0.000	0.000		
		Total	Total		
		0.000	0.000		
<u>Free Flowing Outfall Details for Storm</u>					
Outfall Pipe Number	Outfall C. Level Name (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	37.150	35.522	0.000	0	0
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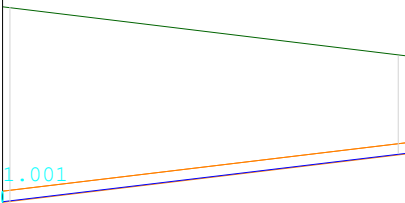
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Fairgreen House Fairgreen Road Galway	10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage	
Date 13/05/2021 09:51 File 10578 - Microdrainage Foul Rev B.MDX	Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.750 Manhole Headloss Coeff (Global) 0.500 Inlet Coefficient 0.800 Areal Reduction Factor 1.000 Foul Sewage per hectare (l/s) 0.000 Flow per Person per Day (l/per/day) 0.000 Hot Start (mins) 0 Additional Flow - % of Total Flow 0.000 Run Time (mins) 60 Hot Start Level (mm) 0 MADD Factor * 10m³/ha Storage 2.000 Output Interval (mins) 1 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> Rainfall Model FSR M5-60 (mm) 0.000 Cv (Summer) 0.750 Return Period (years) 0 Ratio R 0.000 Cv (Winter) 0.840 Region England and Wales Profile Type Summer Storm Duration (mins) 30		
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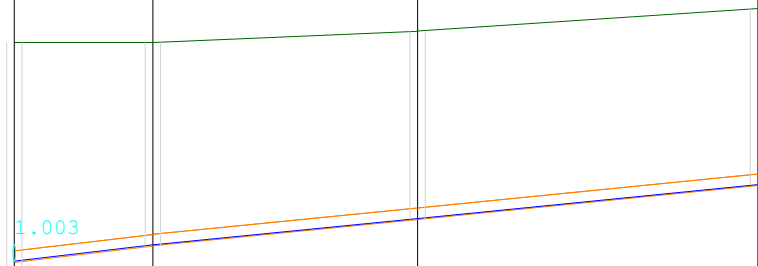
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Fairgreen House Fairgreen Road Galway		10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage	
Date 13/05/2021 09:50 File 10578 - Microdrainage Foul Rev B.MDX		Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1	
MH Name	F6	F7	
Hor Scale 600 Ver Scale 100 Datum (m) 35.000			
PN		1.000	
Dia (mm)		150	
Slope (1:X)		100.0	
Cover Level (m)	39.430		39.000
Invert Level (m)	37.210		37.930
Length (m)		72.000	
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Fairgreen House Fairgreen Road Galway		10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage		
Date 13/05/2021 09:50 File 10578 - Microdrainage Foul Rev B.MDX		Designed by SB Checked by MG		
Micro Drainage		Network 2018.1.1		
MH Name	F4	F5	F6	
Hor Scale 600 Ver Scale 100 Datum (m) 35.000				
PN		1.002	1.001	
Dia (mm)		225	150	
Slope (1:X)		149.7	148.6	
Cover Level (m)	39.500	39.450	39.430	
Invert Level (m)	36.638	36.785 36.860	37.210	
Length (m)		22.000	52.000	
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Fairgreen House Fairgreen Road Galway		10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage	
Date 13/05/2021 09:50 File 10578 - Microdrainage Foul Rev B.MDX		Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1	
MH Name	F2	F3	F4
Hor Scale 600 Ver Scale 100 Datum (m) 34.000			
PN		1.004	1.003
Dia (mm)		225	225
Slope (1:X)		144.9	150.1
Cover Level (m)	38.050	39.100	39.500
Invert Level (m)	35.839	36.115 36.205	36.638
Length (m)		40.000	65.000
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Fairgreen House Fairgreen Road Galway		10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage	
Date 13/05/2021 09:50 File 10578 - Microdrainage Foul Rev B.MDX		Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1	
MH Name		F2	
Hor Scale 600 Ver Scale 100 Datum (m) 33.000			
PN		1.005	
Dia (mm)		225	
Slope (1:X)		145.1	
Cover Level (m)	37.150	38.050	
Invert Level (m)	35.522	35.839	
Length (m)		46.000	
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Fairgreen House Fairgreen Road Galway		10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage	
Date 13/05/2021 09:50 File 10578 - Microdrainage Foul Rev B.MDX		Designed by SB Checked by MG	
Micro Drainage		Network 2018.1.1	
MH Name	F5	F9	
Hor Scale 600 Ver Scale 100 Datum (m) 35.000			
PN		2.000	
Dia (mm)		150	
Slope (1:X)		50.0	
Cover Level (m)	39.450	38.800	
Invert Level (m)	36.860	37.500	
Length (m)		32.000	
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Fairgreen House Fairgreen Road Galway		10578 - Gort Ui Lochlainn Mountain Road, Moycullen Foul Drainage			
Date 13/05/2021 09:50 File 10578 - Microdrainage Foul Rev B.MDX		Designed by SB Checked by MG			
Micro Drainage		Network 2018.1.1			
MH Name	F3	F8	F9a	F10	
Hor Scale 600 Ver Scale 100 Datum (m) 34.000					
PN		3.002	3.001	3.000	
Dia (mm)		150	150	150	
Slope (1:X)		50.0	60.0	60.0	
Cover Level (m)	39.100	39.100	39.250	39.550	
Invert Level (m)	36.190	36.410 36.410	36.760 36.760	37.210	
Length (m)		11.000	21.000	27.000	
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TOBIN Consulting Engineers



@tobinengineers

Galway

Fairgreen House,
Fairgreen Road,
Galway,
H91 AXK8,
Ireland.
Tel: +353 (0)91 565 211

Dublin

Block 10-4,
Blanchardstown Corporate Park,
Dublin 15,
D15 X98N,
Ireland.
Tel: +353 (0)1 803 0406

Castlebar

Market Square,
Castlebar,
Mayo,
F23 Y427,
Ireland.
Tel: +353 (0)94 902 1401