AMIL PROPERTIES LTD

PROPOSED RESIDENTIAL DEVELOPMENT AT

CREAGH DEMENSE, GOREY, CO WEXFORD

ENGINEERING REPORT – STORMWATER, FOUL & WATER SUPPLY

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

Integrated Engineering Consulting

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1 Introduction

1.1 Site Description

IE Consulting was requested by Strutec Ltd, on behalf of AMIL Properties Ltd., to undertake a foul, stormwater and water main design for a proposed Strategic Housing Development (SHD) at Creagh Demesne, Gorey, Co. Wexford. It is proposed to construct a 297 unit residential development, crèche and all associated infrastructure works at the site. The total area of the site is 13.236 hectares, which is divided into three areas as follows:

- Main Development Site area = 10.376 ha
- Area zoned for Community and Education = 1.818 ha
- Area for proposed foul and storm pipes outside applicant lands = 1.034 ha

These three areas are shown in *Figure 1* below. The main development site area is bounded to the north by (zoned residential lands (currently in agricultural use), to the south by residential properties, to the west by Fort Road and to the east by Coillte forestry lands. Development of the area zoned for 'Community and Education' is not included in this application, however the future cumulative foul and stormwater discharge from this area has been accounted for in the overall drainage infrastructure design. The proposed foul, stormwater and water supply drawings are included in *Appendix A.*

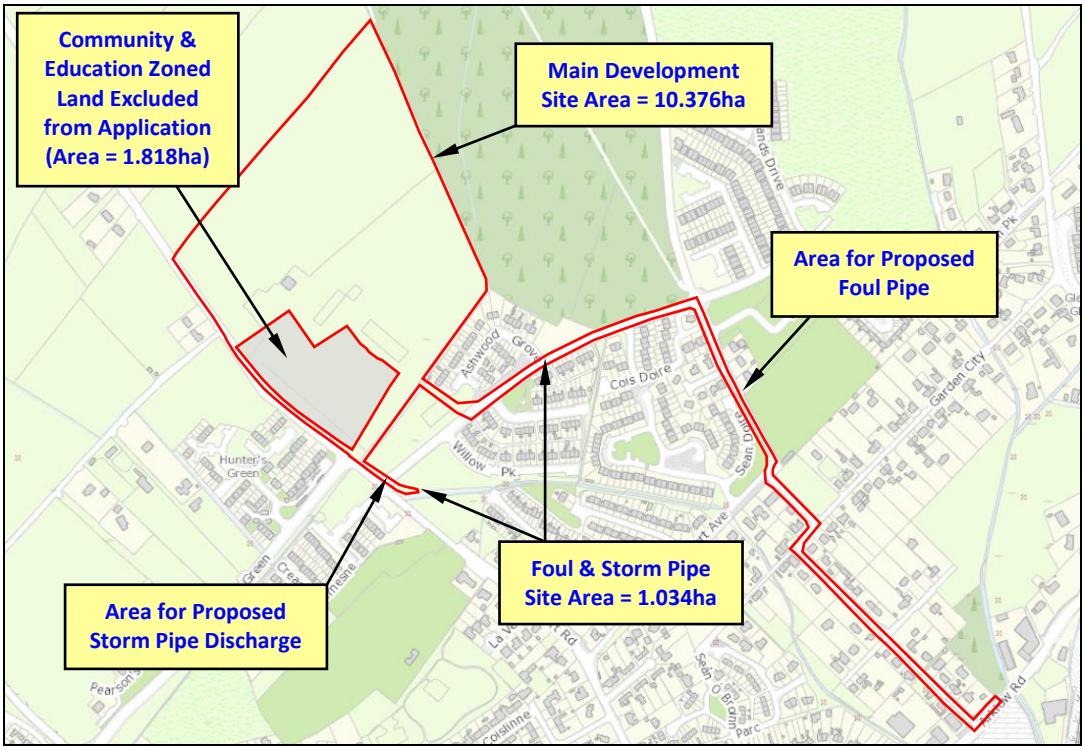

Figure 1 – Site Location

1.2 An Bord Pleanála Inspector's Report on Recommended Opinion

Following the Pre-Application Consultation with An Bord Pleanála on the 28th of May 2018 the Inspector's Report on the Recommended Opinion was provided. In relation to the proposed drainage and water supply the following was included under Point 4 and Point 5 of the Recommended Opinion:

4. Waste water infrastructure

Further consideration/clarification of the documents as they relate to the required extension in the wastewater infrastructural network to serve the proposed development. The prospective applicant is advised to liaise with Irish Water with regard to the nature of works required to address any proposed extension/upgrade to the network to facilitate the development, whether planning permission is required for such works and likely timing for securing such permissions where required. The documentation at application stage should provide details with regard to the network extensions including layout and design details and the timelines involved relative to the construction and completion of the proposed development.

Response to Point 4

In response to the above statement Irish Water and the Wexford County Council have been consulted extensively. As a result the 'red line' boundary for the proposed SHD application has been expanded to include the lands required for the construction of the foul pipe located outside the applicant's ownership. The proposed foul pipe infrastructure required to facilitate this Strategic Housing Development shall therefore be constructed as part of the overall development infrastructure.

The initial proposed foul pipe route has been altered following consultation with Inland Fisheries Ireland (IFI), who was concerned that there would be high potential for the discharge of deleterious matter during these works to the Ballyowen Stream.

Following this consultation with IFI, the proposed pipe route was reconsidered and moved and is now located with the public road for the majority of the route. There is one section which traverses an area of open space which is in the ownership of Wexford County Council. Confirmation of permission from Wexford County Council to construct this section of pipe located out applicant's lands is included in *Appendix G.*

5. Surface Water Management and Risk of Flooding

Further consideration of documents as they relate to the potential for increased risk of flooding in the wider area having particular regard to the potential for displaced waters due to any infrastructural network upgrade works required to facilitate the development. Any surface water management proposals should be considered in tandem with any Flood Risk Assessment, which should In turn accord with the requirements of 'The Planning System and Flood Risk Management Guidelines' (including the associated 'Technical Appendices'). Further consideration of these issues may require an amendment to the documents and/or design proposals submitted. The prospective applicant is advised to liaise with the planning authority regarding surface/storm water proposals prior to making an application.

Response to Point 5

In response to the above statement the proposed storm and foul infrastructure upgrades located outside the applicant's lands have been incorporated into the Site Specific Flood Risk Assessment (prepared by IE Consulting), which is included with the SHD application material). In addition, the potential hydrological impact of the surface water management proposals for the site has also been considered as part of that assessment report. The design proposals have been amended to take account of the potential impact of flood risk on the foul infrastructure proposed. The planning authority has been consulted in relation to the surface water proposals for the site. They have confirmed that they are satisfied with the surface water management proposals.

The Site Specific Flood Risk Assessment has determined that there will be no increase in flood risk as a result of the proposed development. Surface water runoff from the site shall be attenuated to the 'greenfield' runoff rate to protect the hydrological regime of the area including the Ballyowen Stream. The proposed surface water management system shall not result in any displacement of flood waters and is completely separate from the existing drainage infrastructure in the area.

A section of the proposed route of the foul pipe shall be constructed within an area of potential fluvial flood risk. The proposed foul pipe will not result in any loss in flood plain storage as a result of its construction. There will be no local connections to the foul pipe downstream of the main development site area and therefore there is no flood risk posed to any existing or future residents as a result of connection to the foul pipe.

It is proposed to construct a section of the proposed foul pipe under an existing bridge that crosses the Ballyowen Stream, which is approximately 800m from the main development site area. This pipe shall be constructed a minimum of 0.6m below the bed of the stream and so there is no impact of the foul pipe on the hydraulic capacity of the bridge. The OPW and the local authority have been consulted in relation to any potential future flood alleviation works that may be carried out on the stream such as lowering the stream bed levels, which may result in the proposed foul pipe reducing the capacity of the bridge in the future. The OPW have stated that they do not have a maintenance remit for this section of

the Ballyowen Stream and therefore it would be for the planning authority to confirm whether consent is required. Wexford County Council has confirmed that there are no plans to widen or deepen the stream in this location at present or in the future. Wexford County Council has also confirmed that if the OPW are satisfied then consent under Section 47 or Section 50 of the Arterial Drainage Act (1945) is not required.

2 Proposed Stormwater Drainage System

As illustrated in *Figure 2* below, It is proposed to construct a gravity stormwater drainage system that discharges to the nearby Ballyowen Stream, which is located approximately 80m south-east of the main development site area. The proposed stormwater system shall include the main development site area of 10.376 hectares but shall also accommodate the runoff from the future development of the area zoned for 'Community and Education', which is an area of 1.818 hectares. The total area that shall be incorporated in the stormwater design shall therefore be 12.194 hectares.

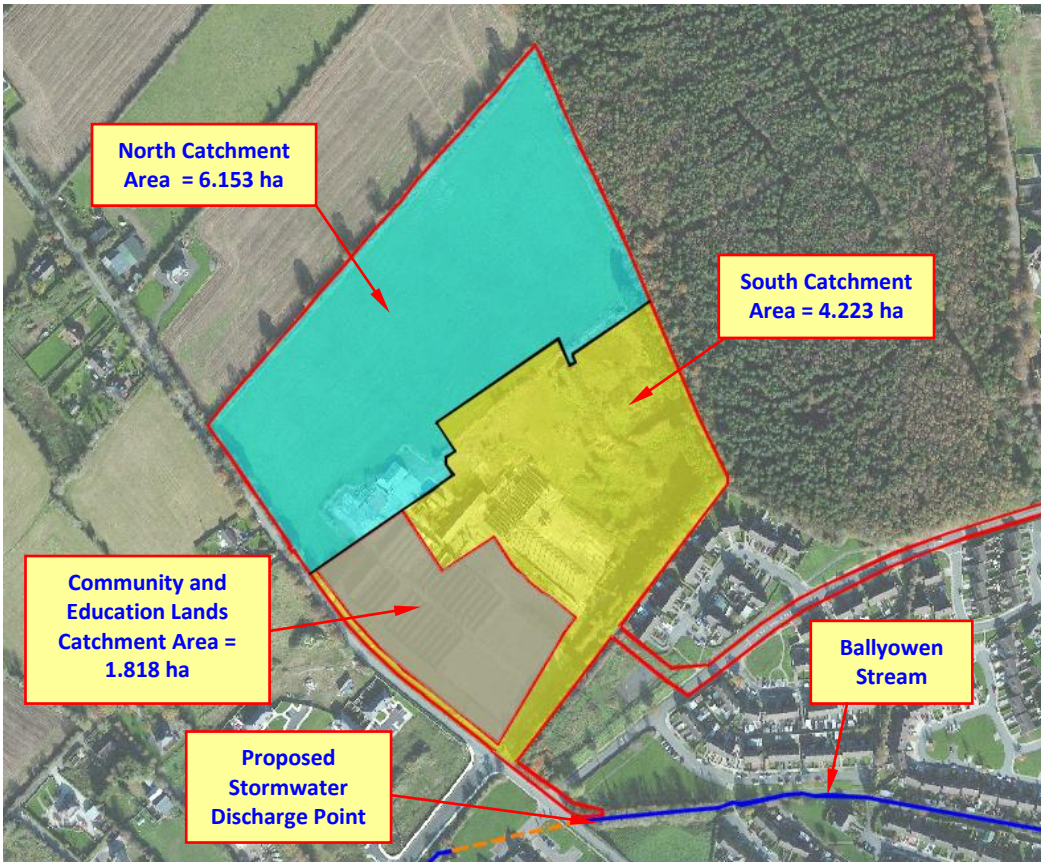

Figure 2 – Stormwater Discharge Point

The main development site area is divided into two catchments to allow the development works to be constructed in phases. The two catchments are sub-divided as follows:

- North Catchment Area = 6.153 hectares
- South Catchment Area + Community & Education Area = 6.041 hectares

2.1 Stormwater Runoff

Hard standing and paved areas within each catchment have been divided into three categories of surface areas, all of which can drain into the proposed stormwater drainage system. The following runoff co-efficents have been applied to hard standing and paved areas:-

- Roof – 90%
- Road & Paved Areas – 85%
- Green Areas – 10%

The green runoff areas account for areas immediately adjacent to the driveways and roadways and the public green open spaces. This excludes rear gardens, which will infiltrate directly to ground.

2.2 Stormwater Network Design

The proposed stormwater drainage network has been designed in accordance with the *Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies*, *Volume 2 New Development*. The proposed stormwater network layout is shown on *Drawing Numbers IE1505-001-E* to *IE1505-006-E, Appendix A*.

The following assumptions have been made as part of the design criteria:

- No pipe surcharge for up to the 1 in 5 year rainfall event including 10% for climate change
- No flooding above ground for up to the 1 in 100 year rainfall event including 10% for climate change

The proposed stormwater network has been designed using the drainage design software Micro Drainage. Refer to the Micro Drainage output sheets enclosed in *Appendix B* for further details.

The following design criteria have been specified in the design:

- Pipe hydraulic roughness 0.6
- Pipe velocities range between 0.75 m/s and 3 m/s
- Pipe minimum cover 1.2m in trafficked areas including footpaths. Trafficked areas where cover is less than 1.2m shall include concrete surrounds.

2.3 Stormwater Attenuation

Rainfall runoff from the proposed development site shall be attenuated to a total Greenfield Runoff rate of 32.5 l/s for the main development site area and the Community and Education area, which is 12.194 hectares.

The proposed stormwater drainage is divided into two catchments with separate attenuation systems proposed in each area. Infiltration was not considered as part of the attenuation design as infiltration rates in Gorey and the wider county are generally poor. The flows from each of the proposed attenuation systems shall be limited by means of a vortex flow control device such as a 'Hydrobrake'. The two catchment areas are attenuated as follows:

- North Area = 16.4 l/s [Catchment Area = 6.153 ha]
- South + Community & Education Area = 16.1 l/s [Catchment Area = 6.041 ha]

A separate attenuation system shall be required within the Community & Education area if developed in the future, which shall be limited to the Greenfield runoff rate of 4.8 l/s. This discharge rate is included in the Greenfield runoff rate of 16.1 l/s. The point of discharge of the attenuated runoff from the 'Community and Education' area is located at proposed stormwater manhole number S59, which is shown on *Drawing Number IE1505-002-E* in *Appendix A.* Details of the greenfield runoff calculations for each area are included in *Appendix C.*

The two attenuation systems have been designed for no flooding up to the 1 in 100 year rainfall event including 10% climate change. A modular Storm Tech attenuation system is proposed for both catchments, the design details of which are summarised in *Table 1* below:

Location	Required Attenuation Volume (m^3)	Storm Tech System Type	Height of Storm Tech System (m)	Maximum Depth of Cover (m)	Allowable Depth of Cover (m)
Northern Catchment	1921	MC-4500	1.525m	3.07	7.0
Southern Catchment	1140	MC-3500	1.140m	1.76	2.4

Table 1 – Proposed Storm Tech Attenuation Systems

The Northern Catchment stormwater attenuation system and associated infrastructure to the outfall pipe to the Ballyowen Stream shall be constructed as part of the first Phase 1 of the development. The overall phasing for the development is shown in *Figure 3* below. Refer to *Appendix D* for details of the Storm Tech attenuation system specifications.

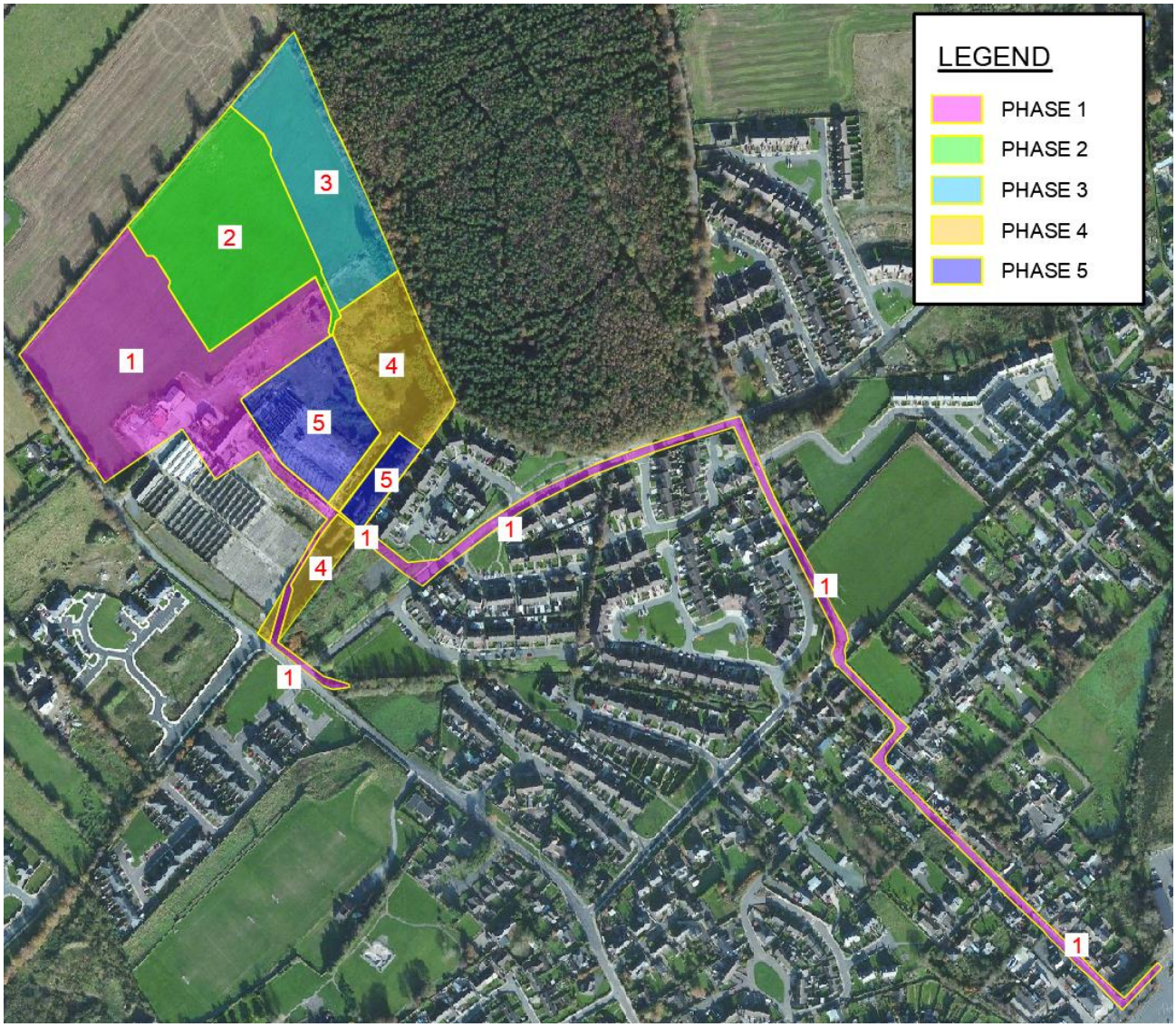

Figure 3 – Project Phasing

2.4 Stormwater Outfall

The proposed stormwater network shall discharge to the Ballyowen Stream at a pipe invert level of 50.300m OD. The stream channel at this location is approximately 4.2m deep and it is not anticipated that the outfall would become surcharged from the stream during a 1 in 100 year event in the watercourse. Extreme flood levels have been derived as part of the South-Eastern CFRAM Study at two node points (*1113BA00019I* and *1113BA00030)* on the Ballyowen Stream in the vicinity of the site as illustrated in *Figure 4* below.

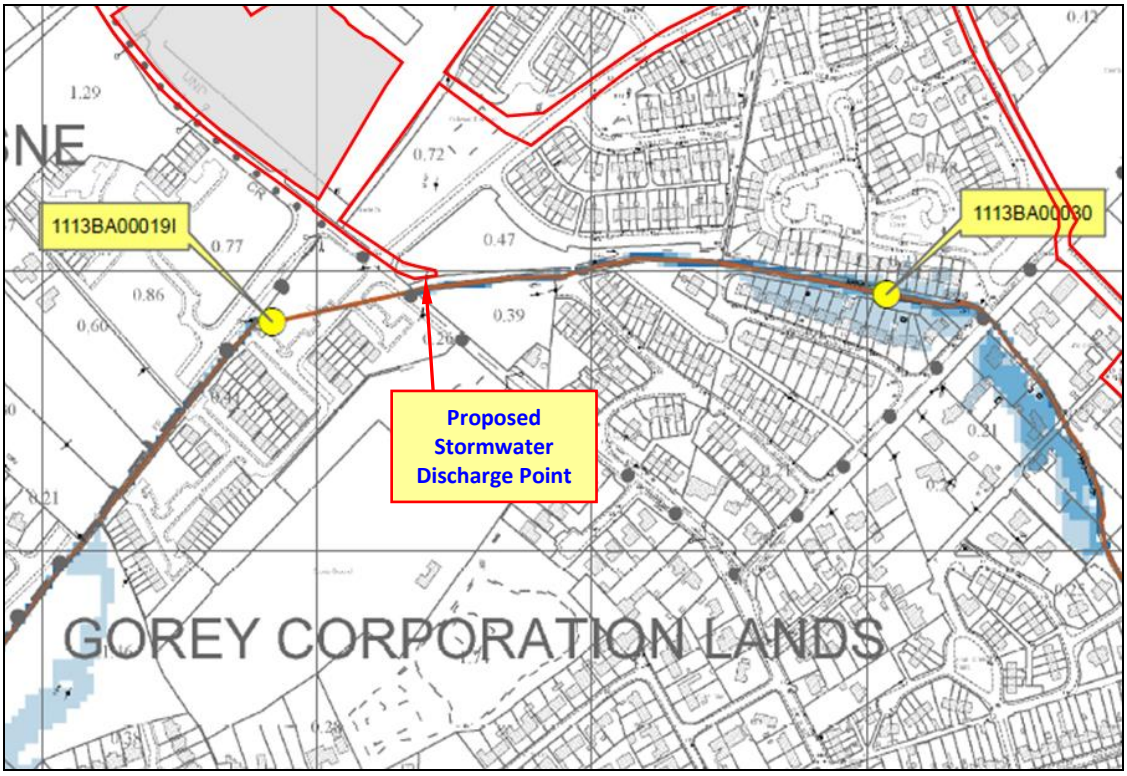

Figure 4 – CFRAMS Fluvial Flood Maps

Utilising this information, the predicted 1 in 100 year flood level has been interpolated at the proposed stormwater discharge point as listed in *Table 2* below. The proposed outfall pipe shall be constructed approximately 0.57m higher than the estimated 1 in 100 year flood level of 49.73m OD in the Ballyowen Stream at this location, therefore the outfall is not predicted to be surcharged up to a 1 in 100 year fluvial flood event in the Ballyowen Stream. The design of the outfall has been undertaken in consultation with the project ecologist. A copy of the CFRAMS flood extents map is included in *Appendix E*.

Return Period	Upstream CFRAMS Node *1113BA00019I* (mOD)	Interpolated Water Level at Discharge Point (mOD)	Upstream CFRAMS Node *1113BA00019I* (mOD)
1 in 100 Years	51.40	49.73	44.80

Table 2 – Ballyowen Stream 1 in 100 year Water Levels

2.5 Stormwater Treatment

A Class 1 bypass interceptor shall be installed upstream of each attenuation system. The bypass interceptor has been sized for a peak flow rate in the incoming pipes and contributing areas as follows:

North Catchment

Peak Flow Rate = 915l/s

Contributing Hard-Standing Area = 3.507Ha

Proposed Class 1 Bypass Separator = Klargester NSBE100

South Catchment

Peak Flow Rate = 522l/s

Contributing Hard-Standing Area = 2.062Ha

Proposed Class 1 Bypass Separator = Klargester NSBE075

Please refer to *Appendix F* for the technical specification of the proposed interceptors.

2.6 Future Development

Future development of the area zoned as 'Community & Education' has been accommodated into the stormwater pipework and attenuation system proposed as described in the *Section 2.3* above.

There is an 85 unit residential development currently proposed to the north of the site as part of a separate application by another land owner. The adjoining applicant is proposing to construct a new separate stormwater pipe within the existing public road (along Fort Road) located adjacent to the western boundary as shown in *Figure 5* below. It is therefore not likely that any future stormwater connections apart from the area zoned as 'Community & Education' would need to be facilitated by this Strategic Housing Development.

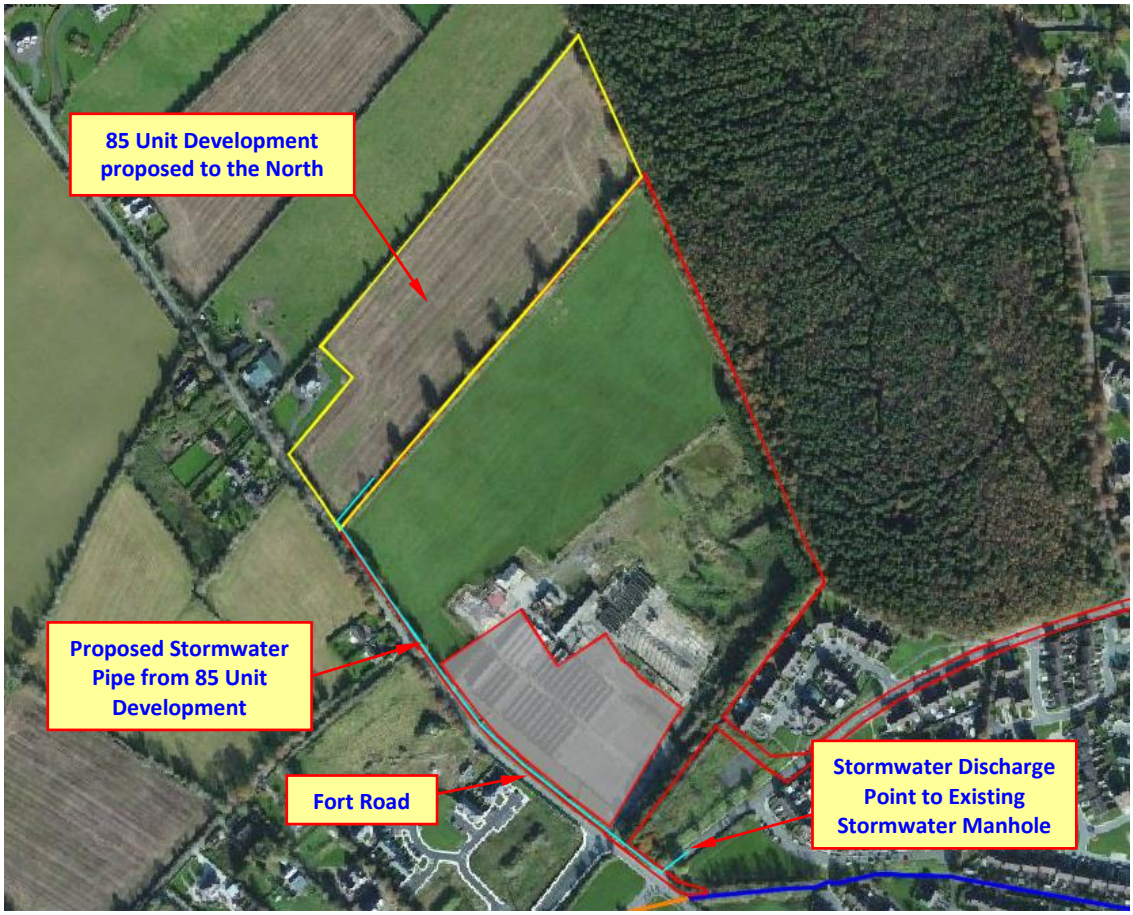

Figure 5 – 85 Unit Development Stormwater Discharge

3 Foul Water Drainage

3.1 Proposed Foul Water Flow Rates

Foul water volumes from the proposed development have been calculated in accordance with the Irish Water '*Code of Practice for Wastewater Infrastructure*' and the Irish Water "*Wastewater Infrastructure Standard Details, Connections and Developer Services*", December 2017 (Revision 03).

The domestic wastewater loading is taken as 200 litres per person per day. A peak flow factor of 6 times Dry Weather Flow has also been applied to account for peak flow rates. The total number of units is 297, which vary from two bedroom apartments to 5 bedroom detached houses. In order to cater for the variation in occupancy rates the likely occupancy rate in each unit was estimated, which is a total of 1211 people. The predicted average domestic occupancy rate was calculated as follows:

- Total maximum estimated occupancy = 1211 people
- Wastewater Loading = 1211 x 200l/p/day = 242,200 l/day
- Average occupancy per unit = 242,200/(297 x 200) = 4.08

The maximum anticipated occupancy in the crèche proposed as part of the development is 90 children and up to 20 staff members. The predicted hydraulic loading rate has been calculated using the '*Wastewater Flow Rates for Design*' included in Appendix D of the Irish Water '*Code of Practice for Wastewater Infrastructure*' for the staff members and children. The predicted loading rate was calculated as follows:

- Staff Loading = 20 x 50l/day = 1000 l/day [School non-resident without canteen]
- Children Loading = 90 x 50l/day = 4500 l/day [School non-resident without canteen]
- Total wastewater loading = 5500 l/day = 0.064 l/s

This flow has been applied to proposed foul pipe F1.006, and is included in the Micro Drainage output in *Appendix B*.

A flow rate of 0.6 litres per second per hectare has been utilised for the future development of the lands zoned for 'Community & Education'. The area is 1.818 hectares, which equates to a flow rate of 1.09 l/s. This flow has been applied to proposed foul manhole F48 (foul pipe F1.009), and is included in the Micro Drainage output in *Appendix B*.

3.2 Proposed Foul Water Sewer Design

The proposed foul water sewer layout is shown on *Drawing Numbers IE1505-001-E* to *IE1505-006-E, Appendix A.* It is proposed to drain all dwellings including the possible future development of the area zoned for 'Community and Education' within the site via a sewer located within the proposed roads and pavements and discharge to an existing 525mm diameter Irish Water sewer located approximately 1km south of the site boundary on the Arklow Road (R772) and opposite the Lidl supermarket. The proposed route was defined following consultation with Wexford County Council, Irish Water, the Office of Public Works and Inlands Fisheries Ireland. Details of the correspondence are included in *Appendix G.* The overall phasing for the development is shown in *Figure 3* above (see *Section 2.3*).

The invert level of the existing 525mm foul at the proposed connection point is approximately 35.042m OD. A new 300mm diameter foul sewer shall be constructed from the site to the point of connection.

Each proposed dwelling will connect to the main foul water sewer lines via individual sewer connections. The proposed foul water drainage network has been designed in accordance with the Irish Water's Code of Practice for Wastewater Infrastructure.

The following design criteria have been specified in the design:

- Pipe hydraulic roughness 1.5
- Pipe velocities range between 0.75 m/s and 3 m/s when flowing full
- Minimum pipe velocities of 0.75 m/s and 3 m/s when flowing at one third full
- Minimum pipe gradient of 1:150 for 150mm pipes, where self-cleansing velocities are not achievable
- Minimum pipe gradient of 1:200 for 225mm pipes, where self-cleansing velocities are not achievable
- Minimum pipe sizes of 150mm diameter for 20 properties or less
- Minimum pipe sizes of 225mm diameter for more than 20 properties
- Pipe minimum cover 1.2m in trafficked areas including footpaths. Trafficked areas where cover is less than 1.2m shall include concrete surrounds.

Refer to the Micro Drainage output sheets enclosed in *Appendix B* for further details.

3.3 Future Development

Future development of the area zoned as 'Community & Education' has been accommodated into the foul pipework and attenuation system proposed as described in the *Section 3.1* above.

There is an 85 unit development proposed to the north (which at the time of writing we are aware is due to be lodged with Wexford County Council) of the site as described in *Section 2.6* above. The 85 unit development also proposed to construct a separate foul water pipe along the public road (along Fort Road) adjacent to the western boundary of this Strategic Housing Development and discharge to a public sewer as shown in *Figure 6* below:

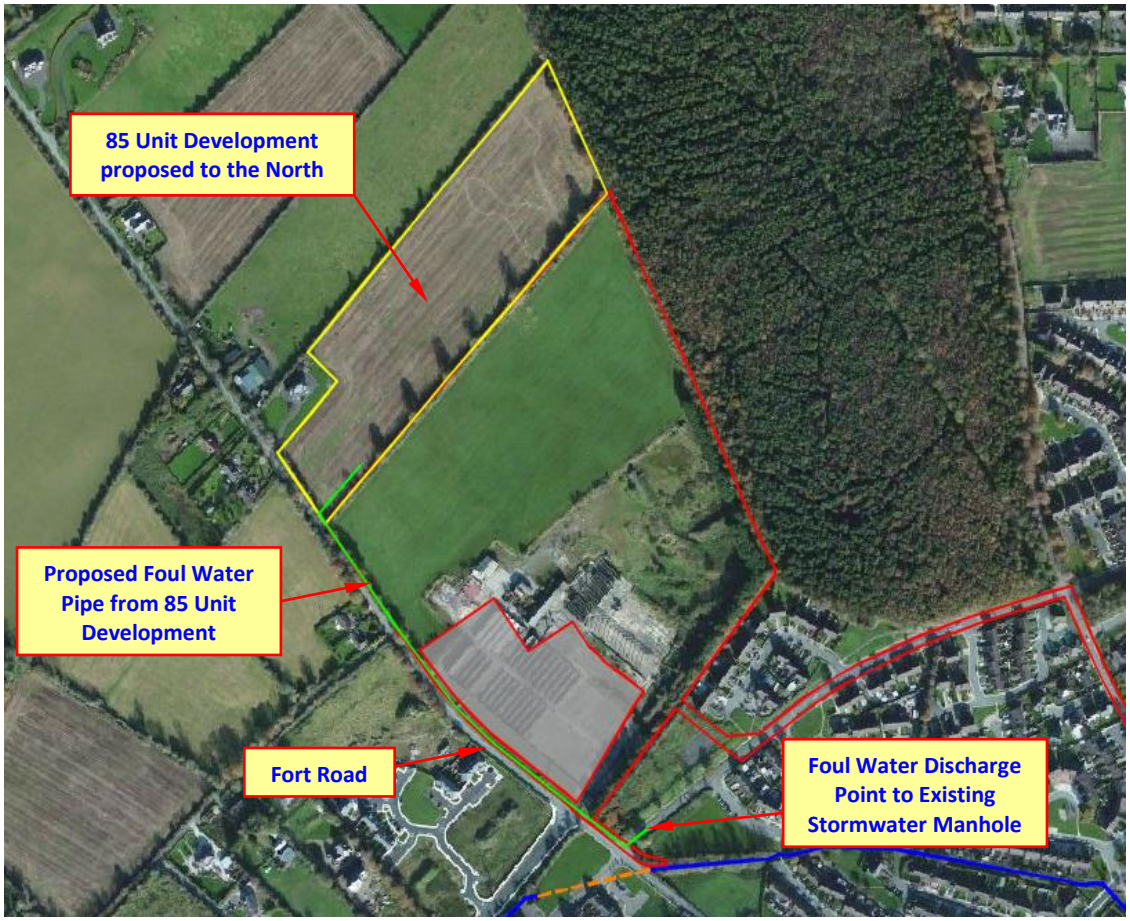

Figure 6 – 85 Unit Development Foul Water Discharge

Once the proposed Strategic Housing Development is constructed it is proposed to divert the foul water from the 85 unit development into the SHD foul drainage network at the proposed development entrance at foul manhole F3 (foul pipe F2.000) as shown in *Figure 7* below.

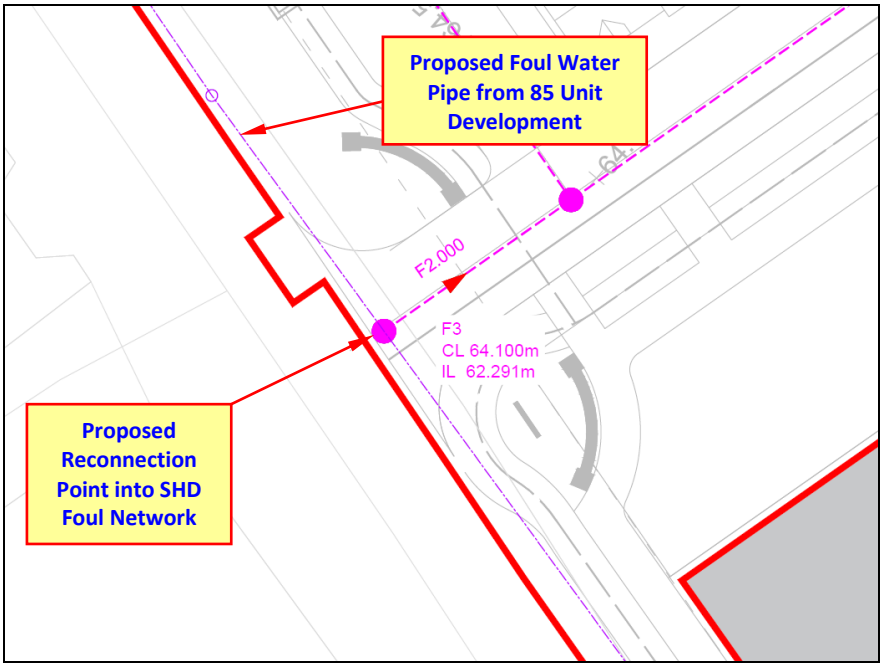

Figure 7 – 85 Unit Development Foul Water Reconnection Point

The proposed foul water drainage system was hydraulically examined in order to determine the ability of the network to accommodate additional foul water discharges from the 85 unit development to the north. The additional loading from the 85 houses has been applied to foul water pipe F2.000 as shown in *Figure 7* above, which is located at the SHD site entrance. There is sufficient capacity in the SHD proposed foul network to cater for the additional loading from the 85 unit development. Refer to the Micro Drainage calculations in *Appendix C* for further details.

The total foul flow including future development and zoned lands is 22.8 l/s. The minimum peak flow in the proposed 300mm pipe located in the public road downstream of the main development site area (foul pipes F1.010 to F1.030) is 69.2 l/s. This allows a potential 46.4 l/s of additional capacity for future foul connections to the 300mm pipe.

3.4 Stormwater Misconnections

The proposed foul network has been designed to take any misconnections of stormwater pipes into the foul system in accordance with Appendix C of the *Irish Water Code of Practice for Wastewater Infrastructure.* An allowance of 1.5% of the 'Gross Site Area' has been included in the foul drainage design including the areas of future development as shown in *Table 3* below:

Location	Gross Site Area (hectares)	1.5% of Gross Site Area (hectares)	Foul Pipe Location
Northern Catchment	6.153	0.092	F1.005
Southern Catchment	4.222	0.063	F1.010
Community & Education Area	1.818	0.027	F1.009
85 Units Development	4.334	0.065	F2.000

Table 3 – Stormwater Misconnections

A separate stormwater simulation has been carried out in Micro Drainage to take these misconnection areas into account. The methodology used is the same as that outlined in Section 2 above for the proposed stormwater drainage network. The Modified Rational Method is utilised with 100% rainfall runoff applied to the areas shown in *Table* 3 above. The foul flows have been input into the Micro Drainage model as a 'base flow' in order to analyse the combined impact of the stormwater misconnections on the foul flows. Refer to the Micro Drainage output sheets enclosed in *Appendix B* for further details.

3.5 Proposed Foul Pipe Located under the Ballyowen Stream

The proposed foul pipe will be constructed under one existing bridge that crosses the Ballyowen Stream, which is approximately 800m from the main development site area as shown in *Figure 8* below. It is proposed to construct the pipe a minimum of 0.6m below the bed of the stream and so there is no impact of the foul pipe on the hydraulic capacity of the bridge.

The OPW and the local authority have been consulted in relation to any potential future flood alleviation works that may be carried out on the stream such as lowering the stream bed levels, which may result in the proposed foul pipe reducing the capacity of the bridge in the future. The OPW have stated that they do not have a maintenance remit for this section of the Ballyowen Stream and therefore it would be for the planning authority to confirm whether consent is required. Wexford County Council has confirmed that there are no plans to widen or deepen the stream in this location at present or in the future. Wexford County Council has also confirmed that if the OPW are satisfied then consent under Section 47 or Section 50 of the Arterial Drainage Act (1945) is not required. Details of the correspondence with the OPW and Wexford County Council are included in *Appendix G.*

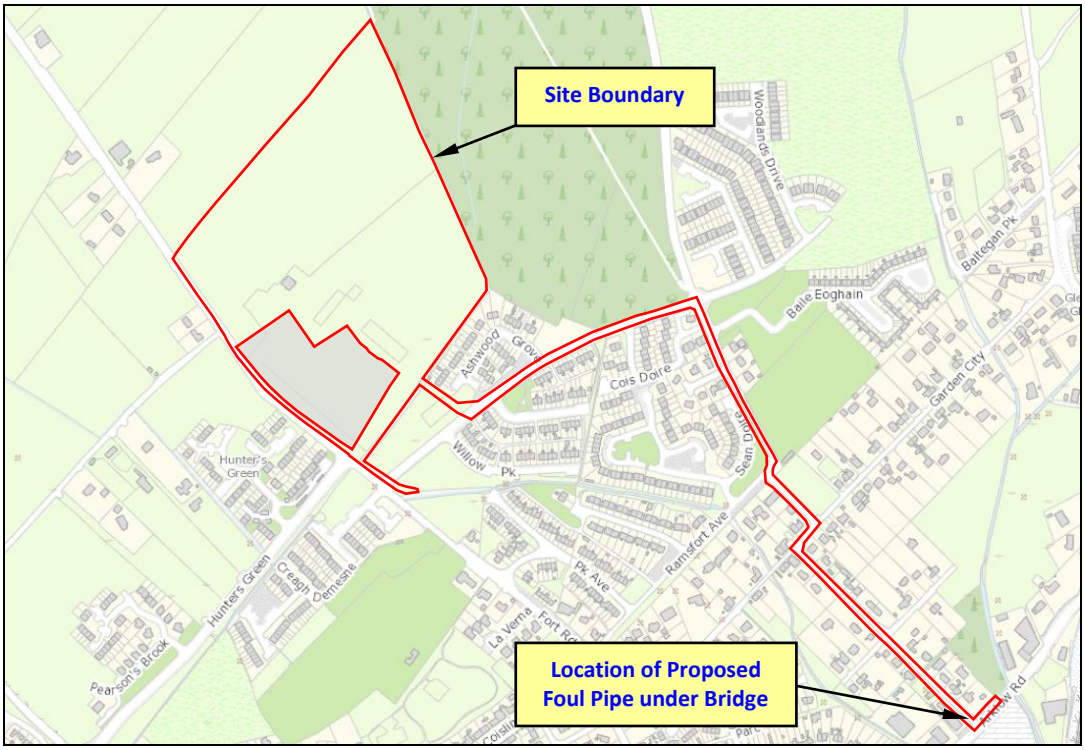

Figure 8 – Location of Proposed Foul under Ballyowen Stream Bridge

It is proposed to construct the section of pipe under the bridge using horizontal directional drilling over a short length. This shall ensure that there is no disturbance to the bridge structure and also that there will be no impact on the stream. The pipe shall be constructed of HDPE or a similar rigid material to the satisfaction of Irish Water. The construction methodology proposed is included in the Construction and Environmental Management Plan prepared for this application.

4 Proposed Water Supply

4.1 Proposed Water Supply

The proposed water supply mains have been designed in accordance Irish Water's Code of Practice for Waste Infrastructure and the Irish Water "*Water Infrastructure Standard Details, Connections and Developer Services*", December 2017 (Revision 03). The proposed water supply layout is shown on Drawing Numbers *IE1505-007-E* and *IE1505-008-E*, Appendix A.

The following general criteria have been accounted for in the design:

- Water mains are in general laid under footpaths or grass margins where possible;
- Water mains are not laid within 3m of a proposed residential property;
- Water mains are located no closer than 1m from property boundaries;
- Water mains are constructed with looped ends and shall have a minimum of four connections and one hydrant per loop;
- The minimum pipe size shall be 100mm internal diameter;
- Each property shall have its own service connection and the maximum service connection length is more greater than 15m
- A hydrant is located with 46m of each proposed dwelling and within 20m of each water main junction. No hydrant is located within 6m of a proposed dwelling.
- Water mains shall be MDPE material when laid in footpaths and grass verges. Water mains laid in trafficked areas shall be Ductile Iron.
- Water Mains in general shall avoid crossing stormwater or foul sewers, but where unavoidable the crossings are at 90 degree angles or close to it.
- Minimum vertical and horizontal clearances from other services is a minimum of 0.3m

5 Consultation with Statutory Bodies

As part of the overall design process and following the Pre-Application Consultation a number of Statutory Bodies have been consulted as follows:

- Irish Water
- Inland Fisheries
- Office of Public Works
- Wexford County Council

Details of correspondence with these bodies are included in Appendix G.

5.1 Irish Water Consultation

Irish Water has confirmed the following under the Pre-Connection Enquiry Confirmation of Feasibility letter dated July 4th 2018 and the Statement of Design Acceptance letter dated February 6th 2019. Please note the comment in relation to the wastewater network in the letter from July 4th 2018 has been superseded by the Statement of Design Acceptance letter from 6th February 2019.

Pre-Connection Enquiry - Confirmation of Feasibility (July 4th 2018)

Water Treatment:

Gorey water supply if from Creagh WTP and a number of borehole wells. IW have a project out to tender to increase the production of these borehole wells to increase the water supply into Gorey. This project is expected to be completed early to mid 2019.

Water Network:

No upgrades are required here.

Wastewater Treatment:

No upgrades are required here.

Statement of Design Acceptance (February 6th 2019)

Wastewater Network:

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, Irish Water has no objection to your proposals.

5.2 Inland Fisheries Ireland Consultation

Inland Fisheries Ireland has confirmed the following:

Inland Fisheries Ireland welcome the proposal to reroute the sewer line along an alternative route that does not follow the line of the Ballyowen Stream.

With regard to the proposals to modify and pipe the drainage channel along the eastern boundary of the site, we note that this channel conveys water for much of the year. IFI have no objections to the modification/piping of this channel, we do however request that these works are timed to be carried out over the Summer Months when rainfall is less likely and be undertaken only when this channel is fully dry.

IFI have long-term concerns relating to missed connections to surface water lines and ask that the difficulties in tracing discharges of deleterious matter from missed connections to these surface water drains and fisheries waters downstream be considered if any surface water drains are to be piped.

It is noted that while misconnections may occur during the construction stage all pipework will have a CCTV condition and inspection survey carried out on completion of the works. This is required as part of the taking in charge of the drainage infrastructure with Wexford County Council and Irish Water.

5.3 The Office of Public Works

The Office of Public Works has confirmed that they do not have a maintenance remit for the Ballyowen Stream and therefore any possible consent required under Section 47 or Section 50 of the Arterial Drainage Act (1945) for the constructed of the proposed foul pipe under the stream bridge is a matter for the planning authority.

5.4 Wexford County Council Consultation

Wexford County Council has confirmed the following:

- The Area Engineer has stated that he is satisfied with the proposed foul, storm and water supply designs.
- They have confirmed consent for the construction of the proposed foul pipe located in the public road the open space within the ownership of Wexford County Council.
- They have confirmed that there are no plans to widen or deepen the Ballyowen where the proposed foul pipe crosses under the bridge at present or in the future and consent under Section 47 or Section 50 of the Arterial Drainage Act (1945) is not required.

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

APPENDIX A

IE1505-000-E PROPOSED FOUL, STORMWATER & WATER MAINS KEY PLAN

IE1505-001-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 1

IE1505-002-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 2

IE1505-003-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 3

IE1505-004-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 4

IE1505-005-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 5

IE1505-006-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 6

IE1505-007-E PROPOSED WATER MAINS LAYOUT PLAN SHEET 1

IE1505-008-E PROPOSED WATER MAINS LAYOUT PLAN SHEET 2

IE1505-009-E STORMWATER LONG SECTIONS SHEET 1 OF 2

IE1505-010-E STORMWATER LONG SECTIONS SHEET 2 OF 2

IE1505-011-E FOUL WATER LONG SECTIONS SHEET 1 OF 2

IE1505-012-E FOUL WATER LONG SECTIONS SHEET 2 OF 2

IE1505-013-E PROPOSED STORMWATER DRAINAGE STANDARD DETAILS

IE1505-014-E PROPOSED FOUL & STORMWATER DRAINAGE REINSTATEMENT LAYOUT PLANS SHEET 1 OF 3

IE1505-015-E PROPOSED FOUL & STORMWATER DRAINAGE REINSTATEMENT LAYOUT PLANS SHEET 2 OF 3

IE1505-016-E PROPOSED FOUL & STORMWATER DRAINAGE REINSTATEMENT LAYOUT PLANS SHEET 3 OF 3

IE1505-017-E PROPOSED FOUL & STORMWATER REINSTATEMENT STANDARD DETAILS

LEGEND

PROPOSED SITE BOUNDARY

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL, STORMWATER & WATER MAINS

KEY PLAN

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

TELEPHONE: 059 91 33084
FAX: 059 91 40499
EMAIL: i□o□ i□□□i□

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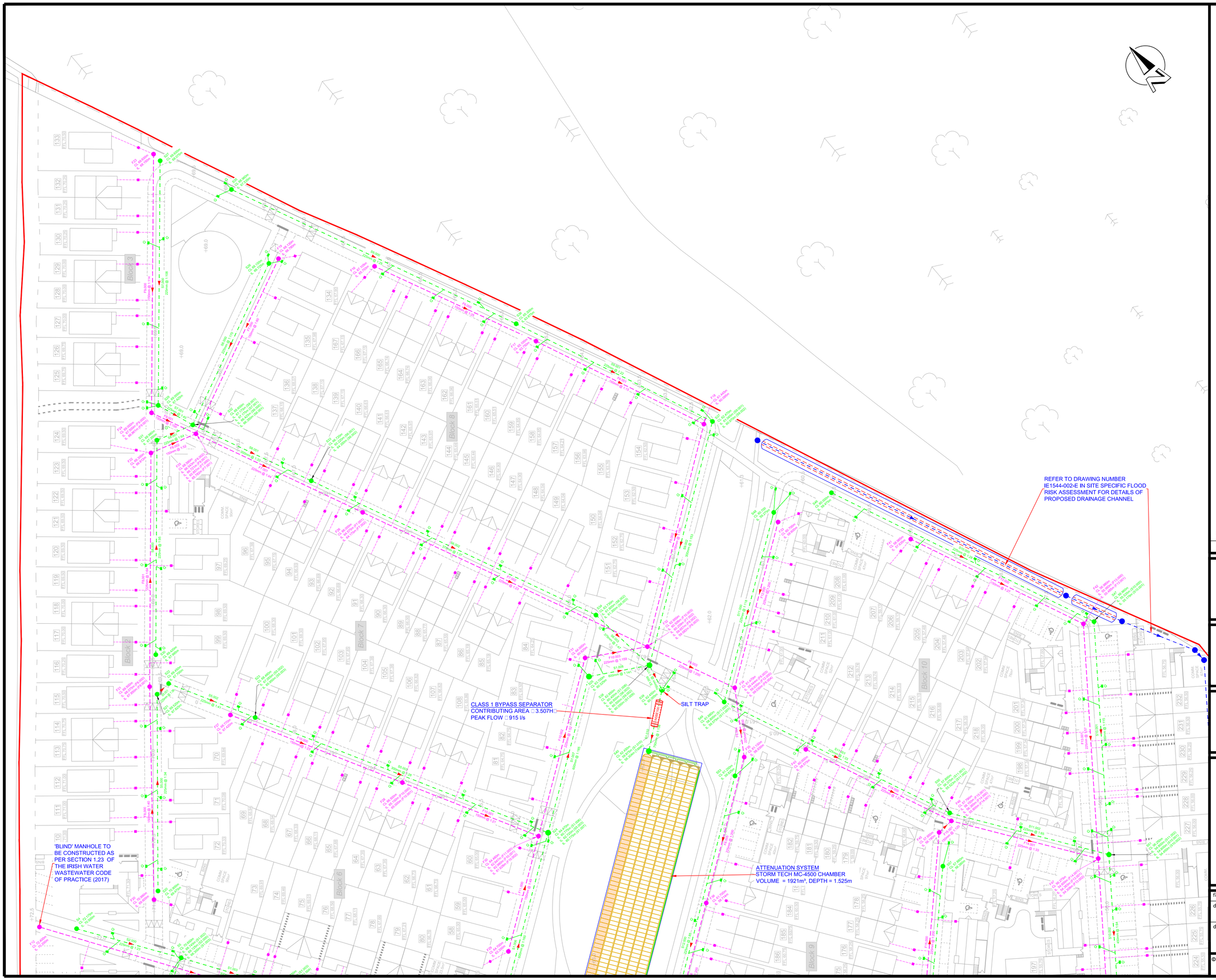

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER MANHOLE
- PROPOSED STORMWATER SILT TRAP/CATCH PIT
- PROPOSED VORTEX FLOW CONTROL DEVICE & MANHOLE CHAMBER
- PROPOSED ROAD GULLY
- EXISTING ROAD GULLY
- EXISTING STORMWATER
- PROPOSED FOUL MANHOLE
- PROPOSED FOUL GRAVITY PIPE
- PROPOSED FOUL SERVICE CONNECTION PIPE & INSPECTION CHAMBER
- PROPOSED DRAINAGE PIPE & CHANNEL
- EXISTING FOUL
- EXISTING WATER MAIN
- STORM PROPOSED FOR ADJACENT 85 UNIT DEVELOPMENT
- FOUL PROPOSED FOR ADJACENT 85 UNIT DEVELOPMENT

NOTES

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   - IRISH WATER 'CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE' DECEMBER 2017 (REVISION 03)
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   CLASS B125 IN FOOTPATHS & LANDSCAPED AREAS
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5. PETROL INTERCEPTOR SHALL BE A CLASS 1 BYPASS INTERCEPTOR/SEPARATOR IN ACCORDANCE WITH BS EN 858-1:2002 □:d BS EN 858-2:2003.
6. REFER TO REFER TO DRAWING NUMBER IE1544-002-E IN SITE SPECIFIC FLOOD RISK ASSESSMENT FOR DETAILS OF PROPOSED DRAINAGE CHANNEL.
7. FOUL SEWER PIPE MATERIALS SHALL BE AS FOLLOWS:
   - 150mm Ø SEWER PIPE AND 100mm SERVICE CONNECTIONS SHALL BE uPVC TO IS EN 1401 2009/2012
   - 225mm TO 300mm Ø PIPE SHALL BE CONCRETE SPIGOT & SOCKET RUBBER RING JOINT, CLASS C120.
8. STORM PIPE MATERIALS SHALL BE AS FOLLOWS:
   - 225mm TO 450mm Ø PIPE SHALL BE HDPE HDPE TWINWALL
   - 600mm TO 750mm Ø PIPE SHALL BE CONCRETE SPIGOT & SOCKET RUBBER RING JOINT, CLASS C120.

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PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

LAYOUT PLAN
SHEET 1

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL
INNOVATION CENTRE
GREEN ROAD
CARLOW
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'BLIND' MANHOLE TO BE CONSTRUCTED AS PER SECTION 1.23 OF THE IRISH WATER WASTEWATER CODE OF PRACTICE (2017)

ATTENUATION SYSTEM
STORM TECH MC-4500 CHAMBER
VOLUME = 1921m³, DEPTH = 1.525m

VORTEX FLOW CONTROL DEIVCE
PEAK FLOW = 16.4 l/s
DESIGN HEAD = 1.525m

PROPOSED FOUL CONNECTION POINT FOR FUTURE COMMUNITY & EDUCATION ZONED LANDS

PROPOSED STORM CONNECTION POINT FOR FUTURE COMMUNITY & EDUCATION ZONED LANDS

SILT TRAP

ATTENUATION SYSTEM
STORM TECH MC-3500 CHAMBER
VOLUME = 1140m³, DEPTH = 1.14m

VORTEX FLOW CONTROL DEIVCE
PEAK FLOW = 16,1 l/s
DESIGN HEAD = 1.14m

COMMUNITY & EDUCATION ZONED LANDS
FUTURE DEVELOPMENT OF THIS AREA SHALL REQUIRE STORMWATER RUNOFF TO BE ATTENUATED WITHIN THIS AREA TO 4.8 l/s.

PROPOSED FOUL CONNECTION POINT FOR PROPOSED 85 UNIT DEVELOPMENT TO THE NORTH

Proposed Creche

Proposed Contractor Construction Site Compound

NEW ENTRANCE ROAD

BUS STOP

Block 1 Block 2 Block 3 Block 4 Block 5 Block 6 Block 7

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER MANHOLE
- PROPOSED STORMWATER SILT TRAP/CATCH PIT
- PROPOSED VORTEX FLOW CONTROL DEVICE & MANHOLE CHAMBER
- PROPOSED ROAD GULLY
- EXISTING ROAD GULLY
- EXISTING STORMWATER
- PROPOSED FOUL MANHOLE
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- STORM PROPOSED FOR ADJACENT 85 UNIT DEVELOPMENT
- FOUL PROPOSED FOR ADJACENT 85 UNIT DEVELOPMENT

NOTES

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PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

LAYOUT PLAN
SHEET 2

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

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REFER TO DRAWING NUMBER
IE1544-002-E IN SITE SPECIFIC FLOOD
RISK ASSESSMENT FOR DETAILS OF
PROPOSED DRAINAGE CHANNEL

PROPOSED FOUL
CONNECTION POINT FOR
FUTURE COMMUNITY &
EDUCATION ZONED LANDS

CLASS 1 BYPASS SEPARATOR
CONTRIBUTING AREA □2.044H□
PEAK FLOW □522 l/s

PROPOSED STORM
CONNECTION POINT FOR
FUTURE COMMUNITY &
EDUCATION ZONED LANDS

SILT TRAP

ATTENUATION SYSTEM
STORM TECH MC-3500 CHAMBER
VOLUME = 1140m³, DEPTH = 1,14m

VORTEX FLOW CONTROL DEIVCE
PEAK FLOW = 16,1 l/s
DESIGN HEAD = 1.14m

BALLYOWEN STREAM

HEADWALL AT OUTFALL TO STREAM

LEGEND

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PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

LAYOUT PLAN
SHEET 3

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

TELEPHONE: 059 91 33084
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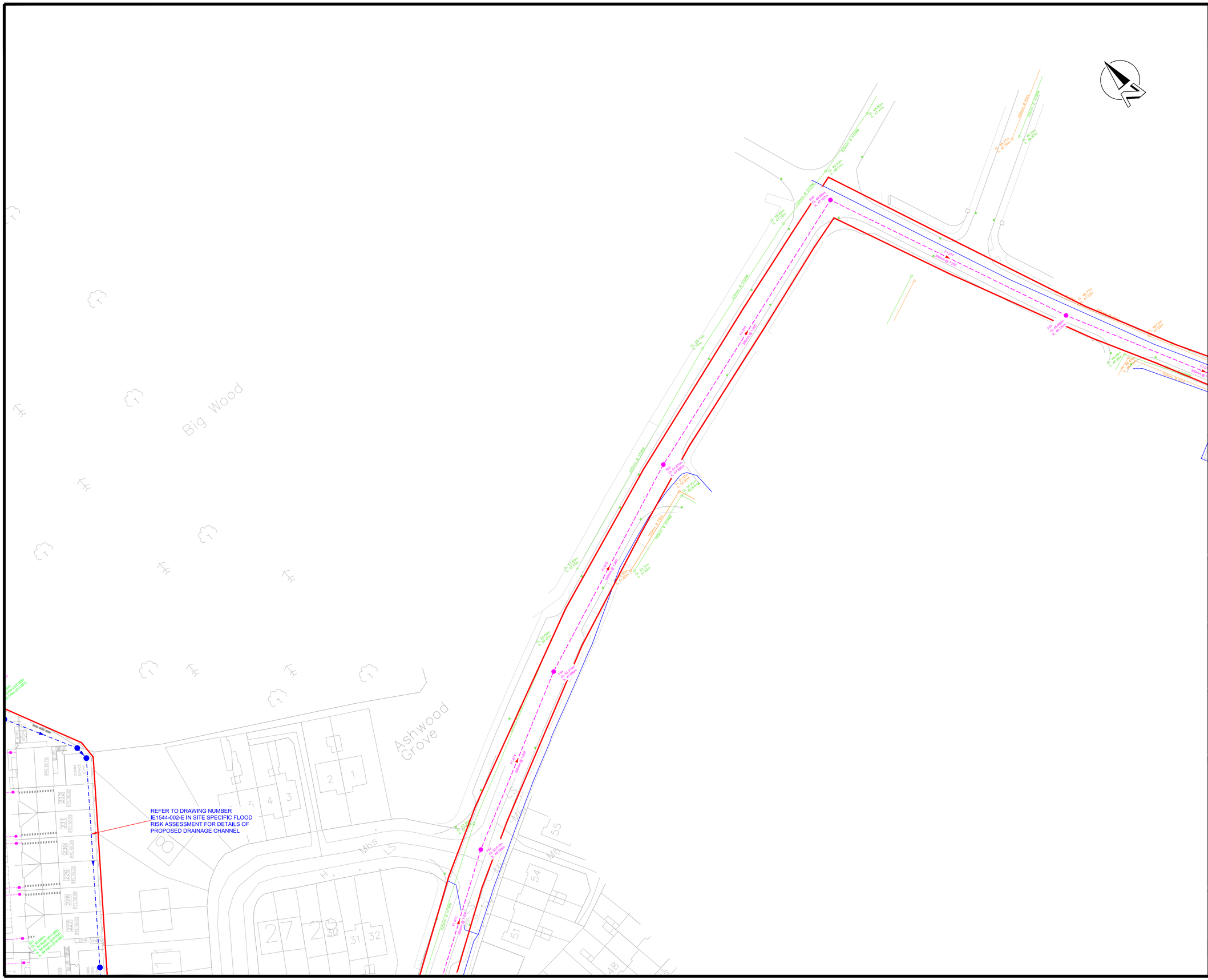

LEGEND

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- PROPOSED DRAINAGE PIPE & CHANNEL
- EXISTING FOUL
- EXISTING WATER MAIN
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- FOUL PROPOSED FOR ADJACENT 85 UNIT DEVELOPMENT

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PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

LAYOUT PLAN
SHEET 4

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
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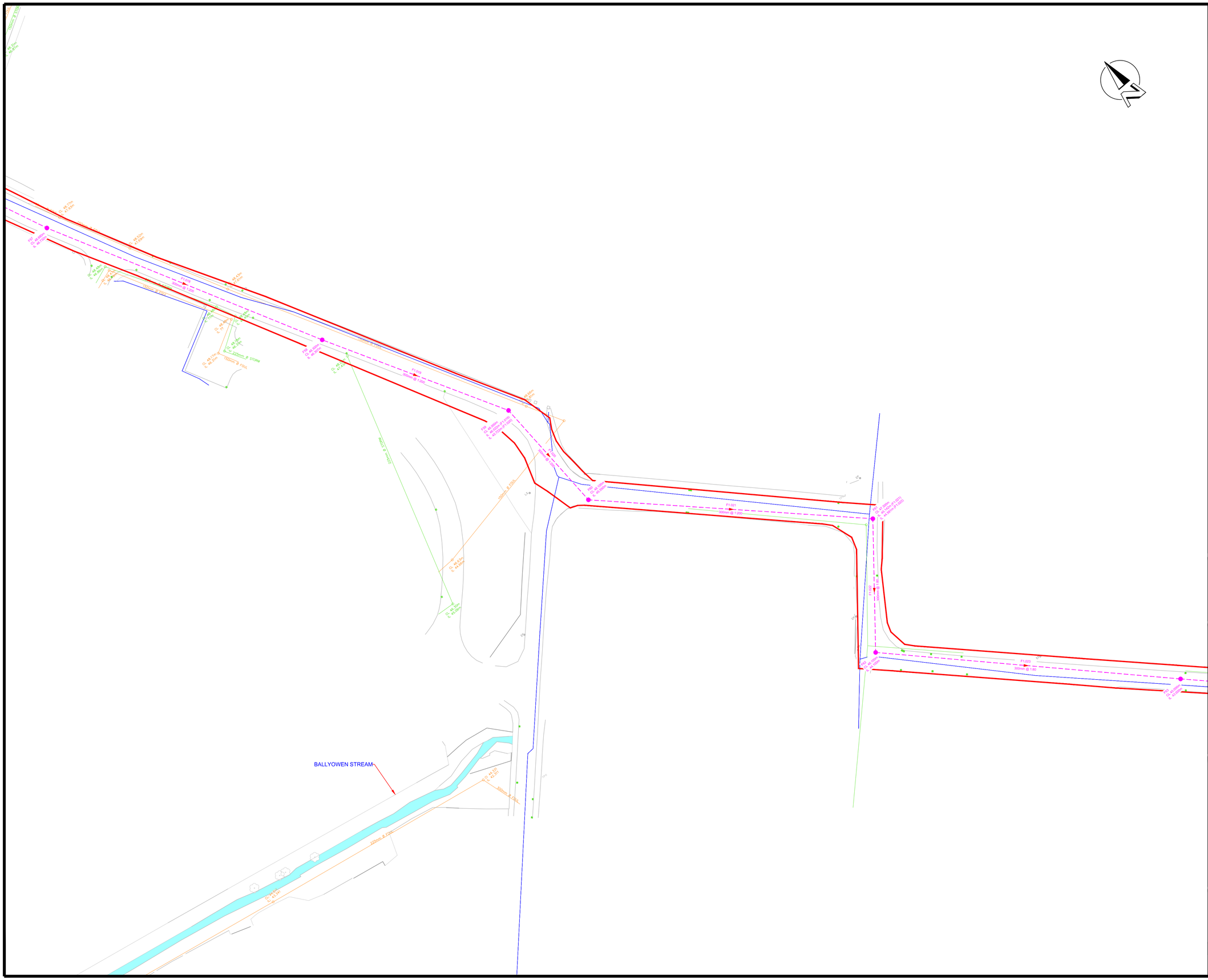

LEGEND

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PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

LAYOUT PLAN
SHEET 5

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

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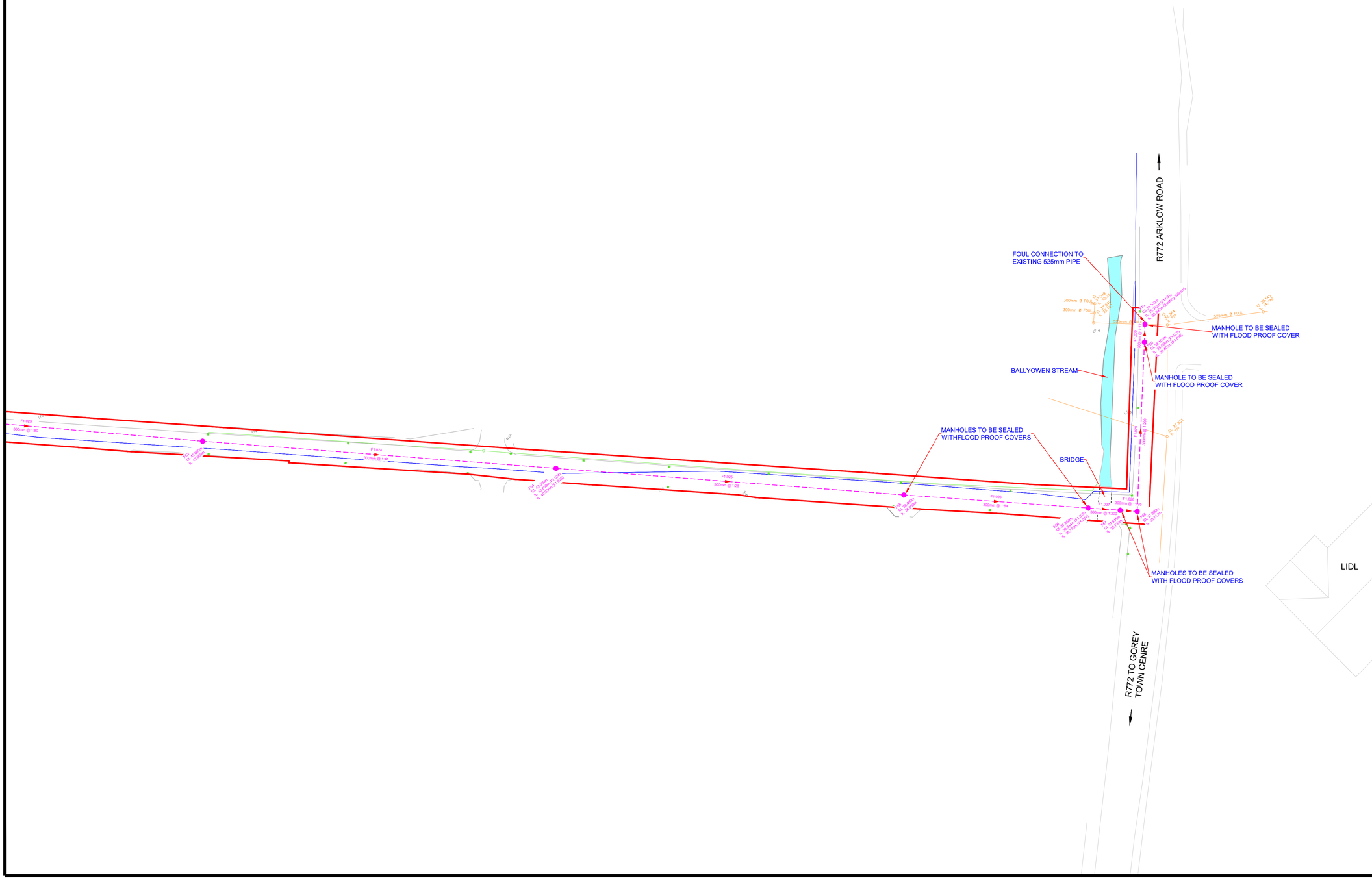

LEGEND

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- EXISTING WATER MAIN
- STORM PROPOSED FOR ADJACENT 85 UNIT DEVELOPMENT
- FOUL PROPOSED FOR ADJACENT 85 UNIT DEVELOPMENT

NOTES

1. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH:
   - "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY" 7TH EDITION,
   - IRISH WATER 'CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE' DECEMBER 2017 (REVISION 03)
2. MANHOLE FRAME & COVER TO BE:
   CLASS D400 IN TRAFFICKED AREAS
   CLASS B125 IN FOOTPATHS & LANDSCAPED AREAS
3. REFER TO IRISH WATER 'WASTEWATER INFRASTRUCTURE STANDARD DETAILS' DECEMBER 2017 (REVISION 03) FOR FOUL WATER STANDARD DETAILS.
4. REFER TO DRAWING IE1505-013-E FOR STORMWATER STANDARD DETAILS.
5. REFER TO DRAWINGS IE1505-009-E, IE1505-010-E, IE1505-011-E, IE1505-012-E, FOR FOUL AND STORMWATER LONG SECTIONS
4. REFER TO DRAWINGS IE1505-014-E, IE1505-015-E, IE1505-016-E, IE1505-017-E, FOR FOUL AND STORMWATER REINSTATEMENT DRAWINGS.
5. PETROL INTERCEPTOR SHALL BE A CLASS 1 BYPASS INTERCEPTOR/SEPARATOR IN ACCORDANCE WITH BS EN 858-1:2002 □:d BS EN 858-2:2003.
6. REFER TO REFER TO DRAWING NUMBER IE1544-002-E IN SITE SPECIFIC FLOOD RISK ASSESSMENT FOR DETAILS OF PROPOSED DRAINAGE CHANNEL.
7. FOUL SEWER PIPE MATERIALS SHALL BE AS FOLLOWS:
   - 150mm Ø SEWER PIPE AND 100mm SERVICE CONNECTIONS SHALL BE uPVC TO IS EN 1401 2009/2012
   - 225mm TO 300mm Ø PIPE SHALL BE CONCRETE SPIGOT & SOCKET RUBBER RING JOINT, CLASS C120.
8. STORM PIPE MATERIALS SHALL BE AS FOLLOWS:
   - 225mm TO 450mm Ø PIPE SHALL BE HDPE HDPE TWINWALL
   - 600mm TO 750mm Ø PIPE SHALL BE CONCRETE SPIGOT & SOCKET RUBBER RING JOINT, CLASS C120.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

LAYOUT PLAN
SHEET 6

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

TELEPHONE: 059 91 33084
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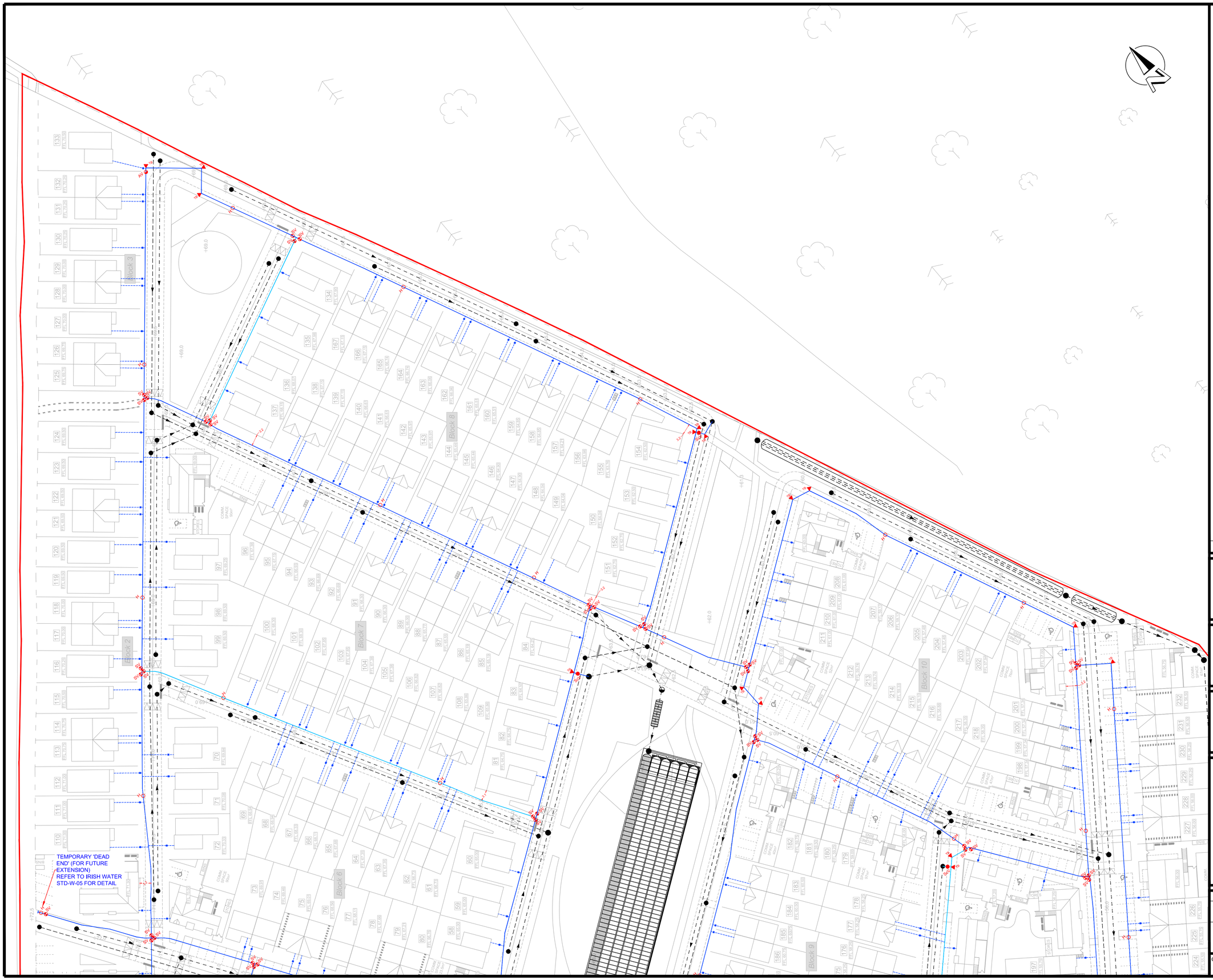

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED 150mm ID MDPE WATER MAIN PIPE
- PROPOSED 100mm ID MDPE WATER MAIN PIPE
- PROPOSED WATER SERVICE PIPE & BOUNDARY BOX
- S:V PROPOSED SCOUR VALVE
- H PROPOSED HYDRANT
- SV PROPOSED SLUICE VALVE
- AV PROPOSED AIR VALVE
- TB PROPOSE THRUST BLOCK
- M:: PROPOSED BULK WATER METER
- PROPOSED STORMWATER
- PROPOSED FOUL
- EXISTING WATER MAIN

NOTES

1. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH:
   - 'CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY' 7TH EDITION,
   - IRISH WATER 'CODE OF PRACTICE FOR WATER INFRASTRUCTURE', DECEMBER 2017
2. ALL CONNECTIONS AND FITTINGS TO BE IN ACCORDANCE WITH IRISH WATER STANDARD DETAILS. REFER TO IRISH WATER DOCUMENT 'WATER INFRASTRUCTURE STANDARD DETAILS: CONNECTIONS AND DEVELOPER SERVICES', DECEMBER 2017.
3. THRUST BLOCKS TO BE PROVIDED AT JUNCTIONS, HYDRANTS AND BENDS (>11.25°).
4. PE-80 SDR17 BLUE PIPES TO BE USED FOR WATER MAINS.
5. PIPES TO SCOUR CHAMBER SHALL BE PROVIDED WITH A NON-RETURN VALVE TO PREVENT BACKFLOW AND AGREED WITH THE LOCAL AUTHORITY.
6. WHERE A MANIFOLD CHAMBER IS USED TO PROVIDE A COMMUNIAL BOX, EACH DWELLING UNIT SHALL HAVE ITS OWN SUPPLY PIPE, METER AND STOP VALVE. ALL METERS IN THE MANIFOLD SHALL BE TAGGED TO INDICATE INDIVIDUAL PROPERTIES. UNUSED OUTLETS SHALL BE BLANKED OFF. REFER TO SECTION 3.15.3 OF THE IRISH WATER CODE OF PRACTICE FOR DETAILS.
7. WATER MAIN "T" JUNCTIONS TO BE CONSTRUCTED AT 90° ANGLES AS PER IRISH WATER STD-W-07.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED WATER MAINS

LAYOUT PLAN
SHEET 1

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

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TEMPORARY 'DEAD END' (FOR FUTURE EXTENSION) REFER TO IRISH WATER STD-W-05 FOR DETAIL

EXISTING 225mm uPVC WATER MAIN

CONNECT TO EXISTING 225mm uPVC WATER MAIN

EXISTING 225mm uPVC WATER MAIN

Proposed Creche

Drop-off (16 no. bollards at 6m c/c)

Proposed Location of Construction Site Compound

NEW ENTRANCE ROAD

BUS STOP

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED 150mm ID MDPE WATER MAIN PIPE
- PROPOSED 100mm ID MDPE WATER MAIN PIPE
- PROPOSED WATER SERVICE PIPE & BOUNDARY BOX
- S:V PROPOSED SCOUR VALVE
- H PROPOSED HYDRANT
- SV PROPOSED SLUICE VALVE
- AV PROPOSED AIR VALVE
- TB PROPOSE THRUST BLOCK
- M PROPOSED BULK WATER METER
- PROPOSED STORMWATER
- PROPOSED FOUL
- EXISTING WATER MAIN

NOTES

1. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH:
   - 'CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY' 7TH EDITION,
   - IRISH WATER 'CODE OF PRACTICE FOR WATER INFRASTRUCTURE', DECEMBER 2017
2. ALL CONNECTIONS AND FITTINGS TO BE IN ACCORDANCE WITH IRISH WATER STANDARD DETAILS. REFER TO IRISH WATER DOCUMENT 'WATER INFRASTRUCTURE STANDARD DETAILS: CONNECTIONS AND DEVELOPER SERVICES', DECEMBER 2017.
3. THRUST BLOCKS TO BE PROVIDED AT JUNCTIONS, HYDRANTS AND BENDS (>11.25°).
4. PE-80 SDR17 BLUE PIPES TO BE USED FOR WATER MAINS.
5. PIPES TO SCOUR CHAMBER SHALL BE PROVIDED WITH A NON-RETURN VALVE TO PREVENT BACKFLOW AND AGREED WITH THE LOCAL AUTHORITY.
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7. WATER MAIN "T" JUNCTIONS TO BE CONSTRUCTED AT 90° ANGLES AS PER IRISH WATER STD-W-07.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED WATER MAINS

LAYOUT PLAN
SHEET 2

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

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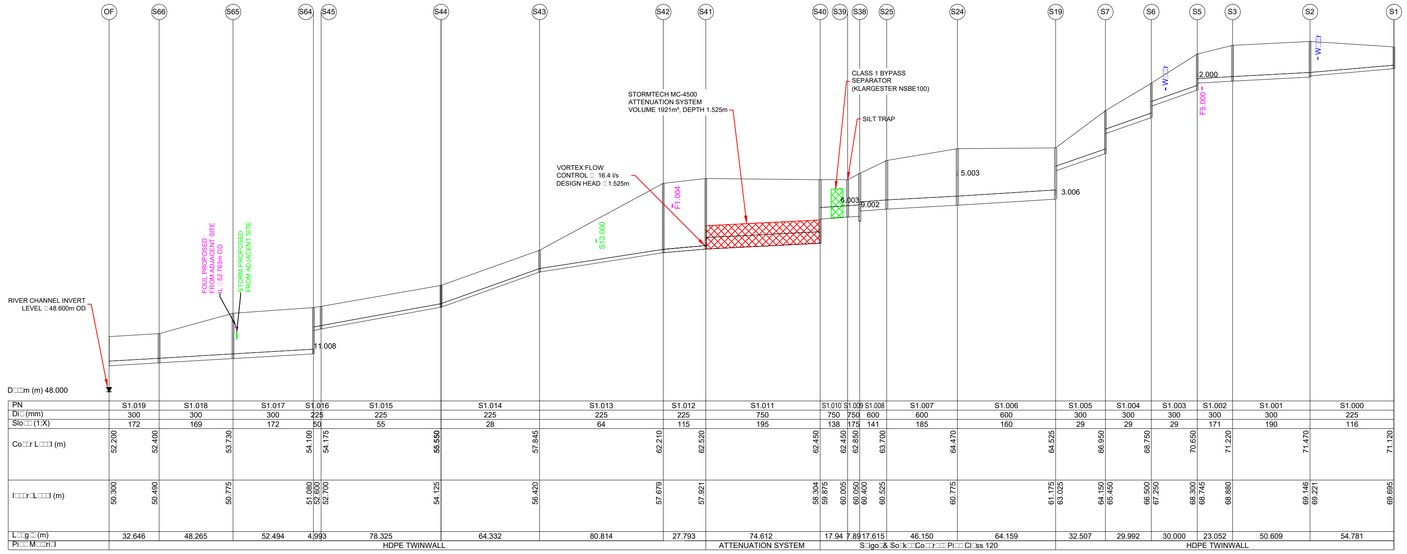


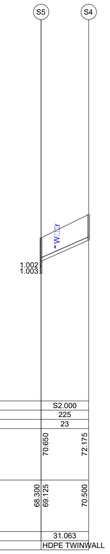
D□□m (m) 48.000

PN	S1.019	S1.018	S1.017	S1.016	S1.015	S1.014	S1.013	S1.012	S1.011	S1.010	S1.009	S1.008	S1.007	S1.006	S1.005	S1.004	S1.003	S1.002	S1.001	S1.000
Di□ (mm)	300	300	300	225	225	225	225	225	750	750	750	600	600	600	300	300	300	300	300	225
Slo□□ (1:X)	172	169	172	50	55	28	64	115	195	138	175	141	185	160	29	29	29	171	190	116
Co□r L□□□ (m)	52.200	52.400	53.730	54.100	54.175	55.550	57.845	62.210	62.520	62.450	62.450	62.850	63.750	64.470	64.525	66.950	68.750	70.650	71.220	71.470	71.120
I□□□r□L□□□ (m)	50.300	50.490	50.775	51.090	52.000	52.700	54.125	56.420	57.679	57.921	58.304	59.875	60.005	60.250	60.400	60.525	60.775	61.175	63.025	64.150	65.450	66.500	67.250	68.300	68.745	68.860	69.146	69.221	69.695
L□□g□□ (m)	32.646	48.265	52.494	4.993	78.325	64.332	80.814	27.793	74.612	17.94	7.89	17.615	46.150	64.159	32.507	29.992	30.000	23.052	50.609	54.781
Pi□□M□□n□]	HDPE TWINWALL								ATTENUATION SYSTEM	S□rgo□& So□k□□Co□r□□□ Pi□□□Cl□ss 120					HDPE TWINWALL					

STORMWATER PIPES S1.000 - S1.019

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



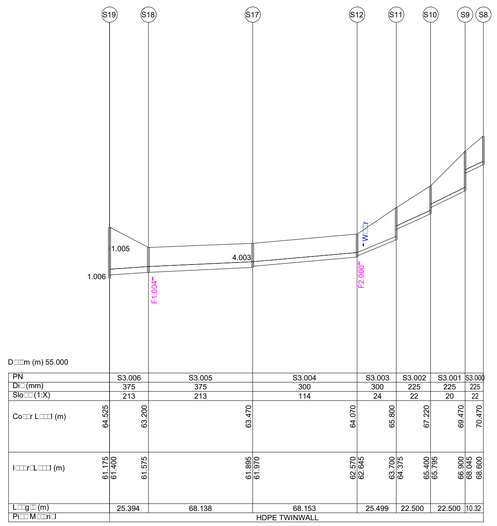
D□□m (m) 60.000

PN	S2.000
Di□ (mm)	225
Slo□□ (1:X)	23
Co□r L□□□ (m)	70.650 72.175
I□□□r□L□□□ (m)	68.300 69.125 70.500
L□□g□□ (m)	31.063
Pi□□M□□n□]	HDPE TWINWALL

STORMWATER PIPE S2.000

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



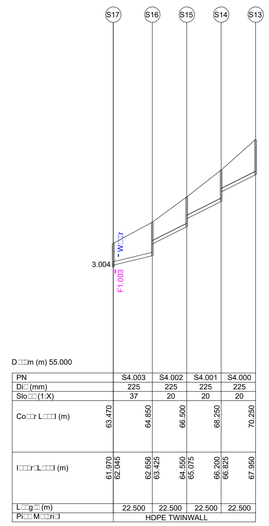
D□□m (m) 55.000

PN	S3.006	S3.005	S3.004	S3.003	S3.002	S3.001	S3.000
Di□ (mm)	375	375	300	300	225	225	225
Slo□□ (1:X)	213	213	114	24	22	20	22
Co□r L□□□ (m)	64.525	63.200	63.470	64.070	65.800	67.200	69.470	70.470
I□□□r□L□□□ (m)	61.175 61.400	61.575	61.895 61.970	62.570 62.645	63.700 64.375	66.400 66.475	68.900 68.945	68.6000
L□□g□□ (m)	25.394	68.138	68.153	25.499	22.500	22.500	10.32
Pi□□M□□n□]	HDPE TWINWALL						

STORMWATER PIPES S3.000 - S3.006

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



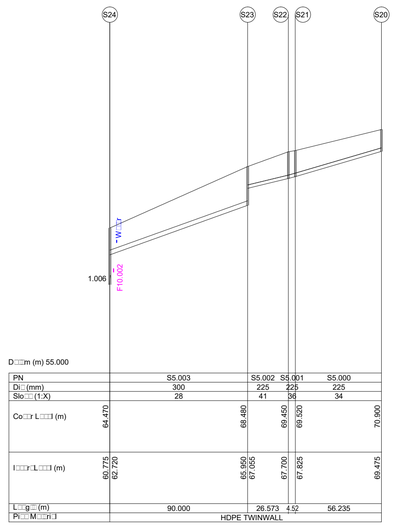
D□□m (m) 55.000

PN	S4.003	S4.002	S4.001	S4.000
Di□ (mm)	225	225	225	225
Slo□□ (1:X)	37	20	20	20
Co□r L□□□ (m)	63.470	64.850	66.500	69.250	70.250
I□□□r□L□□□ (m)	61.970 62.045	62.695 62.745	64.550 65.075	66.900 66.925	67.950
L□□g□□ (m)	22.500	22.500	22.500	22.500
Pi□□M□□n□]	HDPE TWINWALL			

STORMWATER PIPES S4.000 - S4.003

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



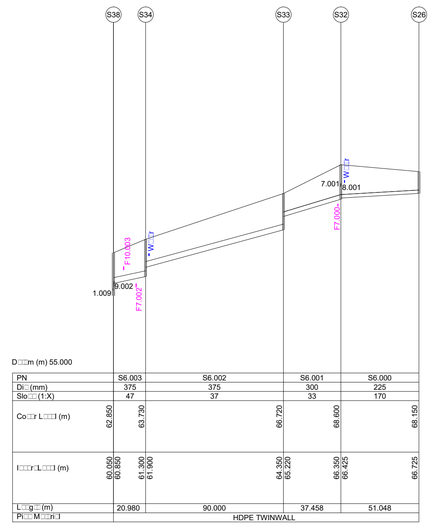
D□□m (m) 55.000

PN	S5.003	S5.002	S5.001	S5.000
Di□ (mm)	300	225	225	225
Slo□□ (1:X)	28	41	36	34
Co□r L□□□ (m)	64.470	68.480	69.450	69.520	70.900
I□□□r□L□□□ (m)	60.775 62.720	65.950 67.055	67.700	67.825	69.475
L□□g□□ (m)	90.000	26.573	4.52	56.235
Pi□□M□□n□]	HDPE TWINWALL			

STORMWATER PIPES S5.000 - S5.003

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



D□□m (m) 55.000

PN	S6.003	S6.002	S6.001	S6.000
Di□ (mm)	375	375	300	225
Slo□□ (1:X)	47	37	33	170
Co□r L□□□ (m)	62.850	63.730	66.720	68.600	68.150
I□□□r□L□□□ (m)	60.050 60.850	61.300 61.900	64.350 65.220	66.350 66.425	66.725
L□□g□□ (m)	20.980	90.000	37.458	51.048
Pi□□M□□n□]	HDPE TWINWALL			

STORMWATER PIPES S6.000 - S6.003

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

NOTES

1. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY" 7TH EDITION.
2. MANHOLE FRAME & COVER TO BE:
   CLASS D400 IN TRAFFICKED AREAS
   CLASS B125 IN FOOTPATHS & LANDSCAPED AREAS
3. REFER TO DRAWING IE1505-013-E FOR STORMWATER STANDARD DETAILS.
4. REFER TO DRAWINGS IE1505-002-E TO IE1505-004-E, FOR STORMWATER LAYOUT PLANS

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT

CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

STORMWATER LONG SECTIONS

SHEET 1 OF 2

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

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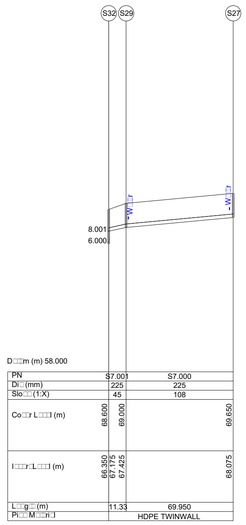


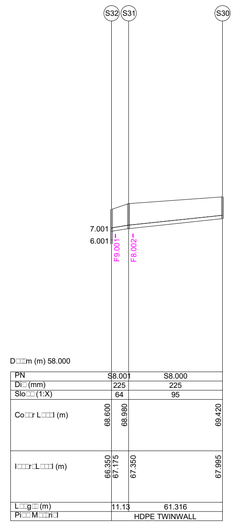
D□□m (m) 58.000

PN	S7.001	S7.000
Di□ (mm)	225	225
Slo□□ (1:X)	45	108
Co□r L□□□ (m)	68.600 69.000	69.650
I□□□r□L□□□ (m)	66.350 67.175 67.425	68.075
L□g□□ (m)	11.33	69.950
Pi□□ M□□n□	HDPE TWINWALL	

STORMWATER PIPES S7.000 - S7.001

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



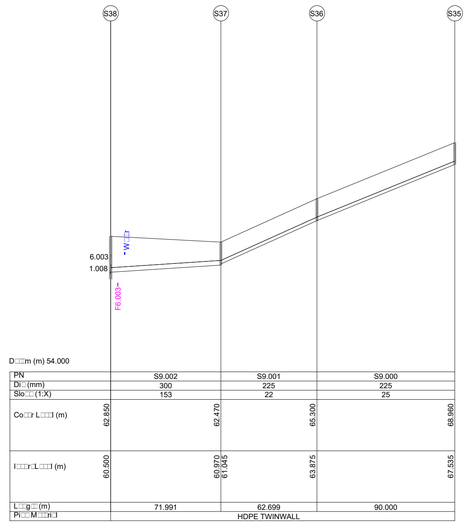
D□□m (m) 58.000

PN	S8.001	S8.000
Di□ (mm)	225	225
Slo□□ (1:X)	64	95
Co□r L□□□ (m)	68.600 68.990	69.420
I□□□r□L□□□ (m)	66.350 67.175 67.350	67.995
L□g□□ (m)	11.13	61.316
Pi□□ M□□n□	HDPE TWINWALL	

STORMWATER PIPES S8.000 - S8.001

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



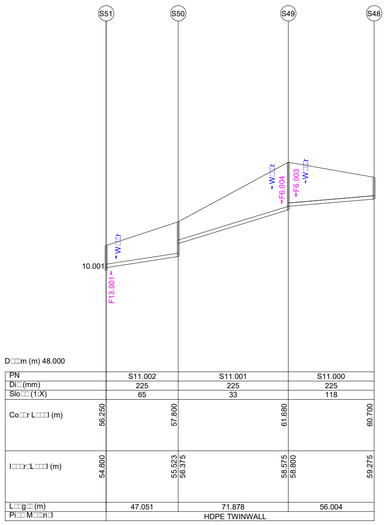
D□□m (m) 54.000

PN	S9.002	S9.001	S9.000
Di□ (mm)	300	225	225
Slo□□ (1:X)	153	22	25
Co□r L□□□ (m)	62.850	62.470 65.300	68.960
I□□□r□L□□□ (m)	60.500	60.970 61.045 63.875	67.535
L□g□□ (m)	71.991	62.699	90.000
Pi□□ M□□n□	HDPE TWINWALL		

STORMWATER PIPES S9.000 - S9.002

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



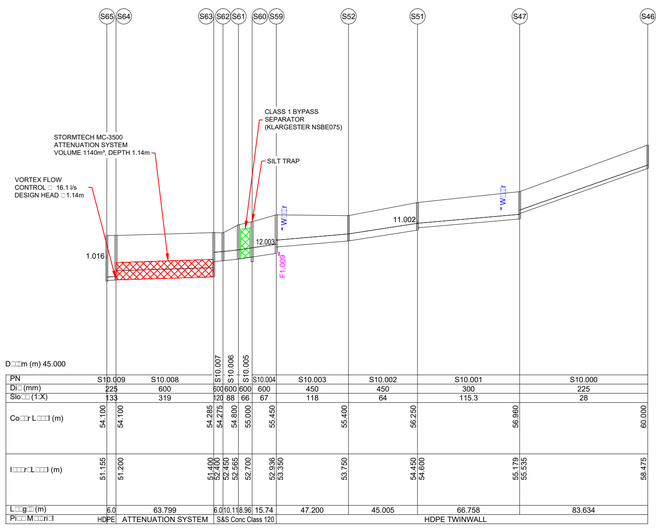
D□□m (m) 48.000

PN	S11.002	S11.001	S11.000
Di□ (mm)	225	225	225
Slo□□ (1:X)	65	33	118
Co□r L□□□ (m)	56.250	57.800 61.680	60.700
I□□□r□L□□□ (m)	54.800	55.523 56.375 58.575 58.800	59.275
L□g□□ (m)	47.051	71.878	56.004
Pi□□ M□□n□	HDPE TWINWALL		

STORMWATER PIPES S11.000 - S11.002

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



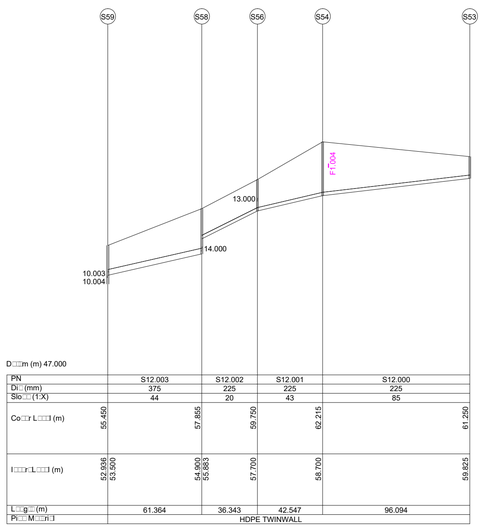
D□□m (m) 45.000

PN	S10.009	S10.008	S10.007	S10.006	S10.005	S10.004	S10.003	S10.002	S10.001	S10.000
Di□ (mm)	225	600	600	600	600	600	450	450	300	225
Slo□□ (1:X)	133	319	20	88	66	67	118	64	115.3	28
Co□r L□□□ (m)	54.100	54.100	54.295	54.270	54.800	55.000	55.450	55.490	56.250	56.960 60.000
I□□□r□L□□□ (m)	51.155	51.200	51.400	52.400	52.565	52.700	52.936 53.300	53.750	54.450 54.600	55.179 55.535 58.475
L□g□□ (m)	6.0	63.799	6.010	18.96	15.74	47.200	45.005		66.758	83.634
Pi□□ M□□n□	HDPE	ATTENUATION SYSTEM	S&S Conc Class 120			HDPE TWINWALL				

STORMWATER PIPES S10.000 - S10.009

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



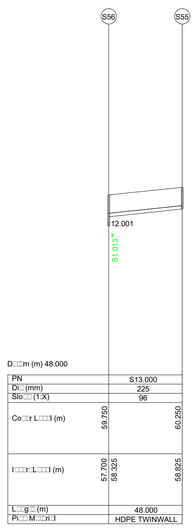
D□□m (m) 47.000

PN	S12.003	S12.002	S12.001	S12.000
Di□ (mm)	375	225	225	225
Slo□□ (1:X)	44	20	43	85
Co□r L□□□ (m)	55.450	57.855	59.750	62.215 61.290
I□□□r□L□□□ (m)	52.936 53.500	54.900 55.883	57.700	58.700 59.825
L□g□□ (m)	61.364	36.343	42.547	96.094
Pi□□ M□□n□	HDPE TWINWALL			

STORMWATER PIPES S12.000 - S12.003

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



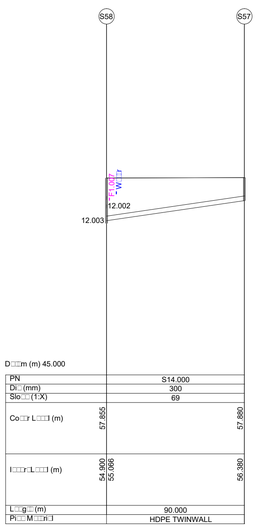
D□□m (m) 48.000

PN	S13.000
Di□ (mm)	225
Slo□□ (1:X)	96
Co□r L□□□ (m)	59.750 60.250
I□□□r□L□□□ (m)	57.700 58.325 58.825
L□g□□ (m)	48.000
Pi□□ M□□n□	HDPE TWINWALL

STORMWATER PIPE S13.000

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



D□□m (m) 45.000

PN	S14.000
Di□ (mm)	300
Slo□□ (1:X)	69
Co□r L□□□ (m)	57.855 57.880
I□□□r□L□□□ (m)	54.900 55.090 56.380
L□g□□ (m)	90.000
Pi□□ M□□n□	HDPE TWINWALL

STORMWATER PIPE S14.000

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

LEGEND

NOTES

1. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY" 7TH EDITION.
2. MANHOLE FRAME & COVER TO BE:
   CLASS D400 IN TRAFFICKED AREAS
   CLASS B125 IN FOOTPATHS & LANDSCAPED AREAS
3. REFER TO DRAWING IE1505-013-E FOR STORMWATER STANDARD DETAILS.
4. REFER TO DRAWINGS IE1505-002-E TO IE1505-004-E, FOR STORMWATER LAYOUT PLANS

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

STORMWATER LONG SECTIONS
SHEET 2 OF 2

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL
INNOVATION CENTRE
GREEN ROAD
CARLOW
TELEPHONE: 059 91 33084
FAX: 059 91 40499
EMAIL: i□o□ i□□□i□

file location:	N:\IE1505\DRAWINGS
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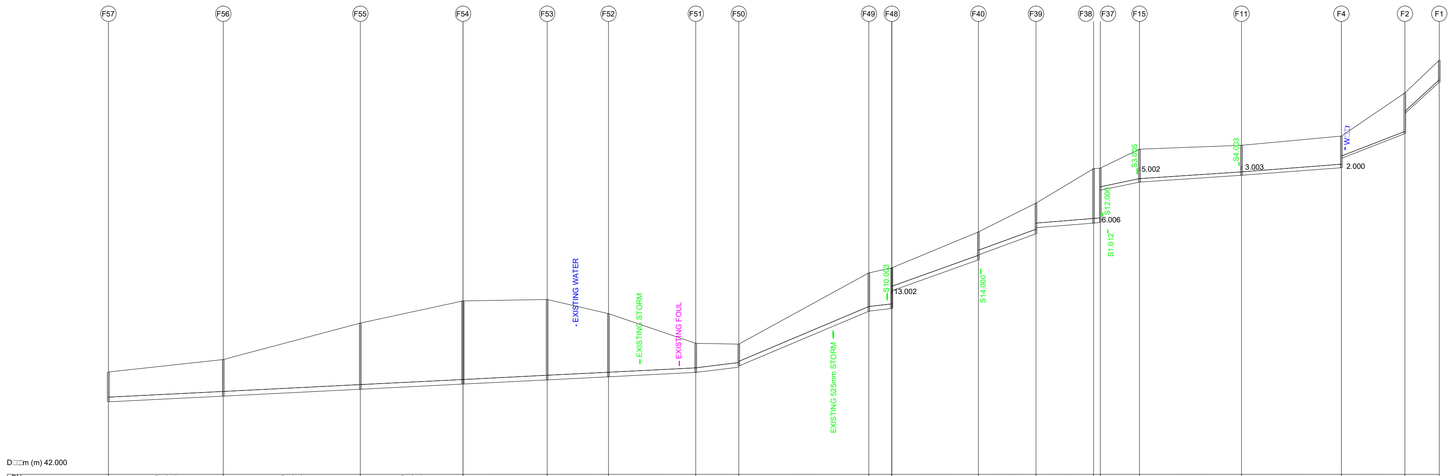
drawing no.	IE1505-010
rev	E
scale:	AS SHOWN
A1	
datum:	MALIN
drawn:	NOM
checked:	PMS
approved:	PMS
date:	11.01.2019



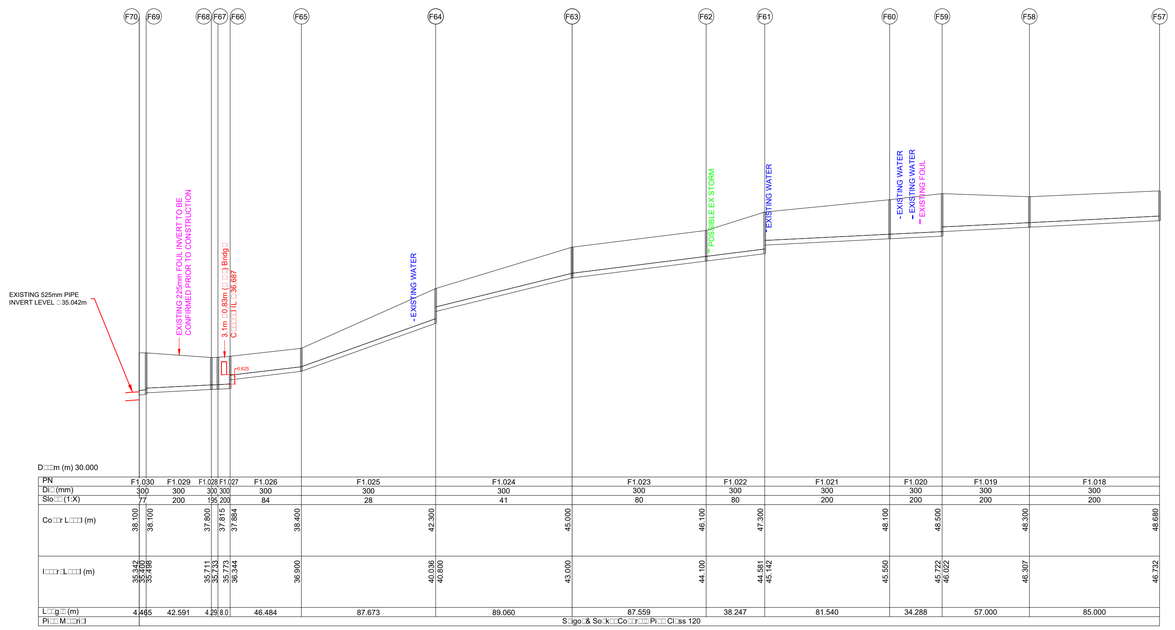
D□□m (m) 42.000

PN	F1.017	F1.016	F1.015	F1.014	F1.013	F1.012	F1.011	F1.010	F1.009	F1.008	F1.007	F1.006	F1.005	F1.004	F1.003	F1.002	F1.001	F1.000
Di□ (mm)	300	300	300	300	300	300	300	300	300	300	300	300	300	225	225	225	150	150
Slo□ (1:X)	200	200	200	200	200	200	82	24	86	28	27	125	110	48	150	131	26	11
Co□r L□□l (m)	48.680	49.490	51.870	53.315	53.410	52.485	50.560	50.485	55.150	55.475	57.825	59.700	61.960	61.985	63.225	63.475	64.075	64.900	69.035
I□□r□L□□l (m)	46.722	47.107	47.555	47.890	48.165	48.365	48.650	48.995	49.070	52.650	52.825	53.975	56.000	56.325	57.700	58.100	58.400	58.540	60.545	61.076	61.520	62.016	62.025	64.726	65.550	67.000
L□□g□ (m)	75.052	89.500	67.000	55.000	40.000	57.000	28.131	84.895	15.000	56.570	37.600	37.600	4.38	25.592	66.594	65.174	41.466	22.496
Pi□□ M□□n□l	S□lgo□& So□k□□Co□r□□□ Pi□□ Cl□ss 120																□PVC	

FOUL WATER PIPES F1.000 - F1.017

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



D□□m (m) 30.000

PN	F1.030	F1.029	F1.028	F1.027	F1.026	F1.025	F1.024	F1.023	F1.022	F1.021	F1.020	F1.019	F1.018
Di□ (mm)	300	300	300	300	300	300	300	300	300	300	300	300	300
Slo□ (1:X)	77	200	195	200	84	28	41	80	80	200	200	200	200
Co□r L□□l (m)	38.100	38.100	37.800	37.815	37.884	38.400	42.300	45.000	46.100	47.300	48.100	48.500	48.300	48.680
I□□r□L□□l (m)	35.247	35.498	35.711	35.723	36.344	36.900	40.036	40.800	43.000	44.100	44.561	45.142	45.550	45.722	46.022	46.307	46.792
L□□g□ (m)	4.465	42.591	4.29	8.0	46.484	87.673	89.060	87.559	38.247	81.540	34.288	57.000	85.000
Pi□□ M□□n□l	S□lgo□& So□k□□Co□r□□□ Pi□□ Cl□ss 120												

FOUL WATER PIPES F1.017 - F1.030

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

LEGEND

NOTES

1. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH:
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   - IRISH WATER "CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE", DECEMBER 2017 (REVISION 03)
2. MANHOLE FRAME & COVER TO BE:
   CLASS D400 IN TRAFFICKED AREAS
   CLASS B125 IN FOOTPATHS & LANDSCAPED AREAS
3. FOUL PIPES CROSSING ABOVE STORMWATER PIPES SHALL BE SURROUNDED IN CONCRETE 2m ON EITHER SIDE OR HAVE NO PIPE JOINTS WITHIN 2m EITHER SIDE OF THE CROSSING POINT.
4. REFER TO DRAWING IE1505-013-E FOR ADDITIONAL STANDARD DETAILS.
5. REFER TO DRAWINGS IE1505-002-E TO IE1505-006-E, FOR FOUL WATER LAYOUT PLANS
6. BACKDROP MANHOLES SHALL BE A MAXIMUM OF 2.5m IN DEPTH. BACKDROPS GREATER THAN 1.7m SHALL COMPLY TO IRISH WATER STANDARD DETAIL STD-WW-12 TYPE 1.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

FOUL WATER LONG SECTIONS
SHEET 1 OF 2

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL
INNOVATION CENTRE
GREEN ROAD
CARLOW
TELEPHONE: 059 91 33084
FAX: 059 91 40499
EMAIL: i□o□ i□□□i□

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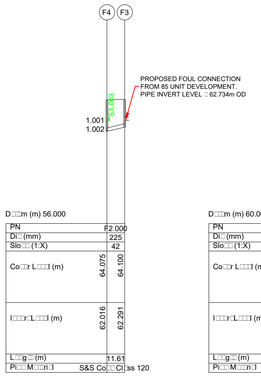


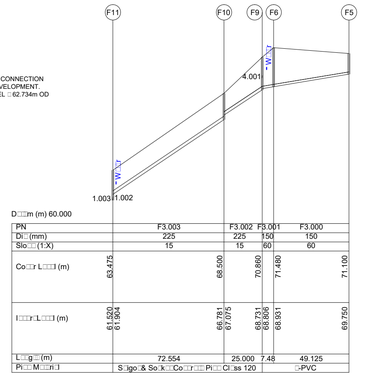
D:□□m (m) 56.000

PN	F2.000
Di□ (mm)	225
Slo□□ (1:X)	42
Co□r L□□□ (m)	64.075 / 64.100
I□□□r L□□□ (m)	62.016 / 62.291
L□□g□□ (m)	11.61
Pi□□M□□n□	S&S Co□□Cl□ss 120

FOUL WATER PIPE F2.000

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



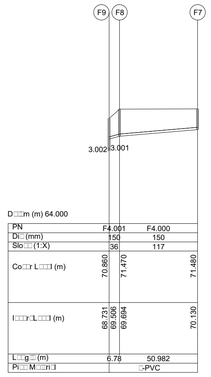
D:□□m (m) 60.000

PN	F3.003	F3.002	F3.001	F3.000
Di□ (mm)	225	225	150	150
Slo□□ (1:X)	15	15	60	60
Co□r L□□□ (m)	63.475 / 68.500	70.860	71.480	71.100
I□□□r L□□□ (m)	61.520 / 61.804	66.781 / 67.075	68.731 / 68.988	68.931	69.750
L□□g□□ (m)	72.554	25.000	7.48	49.125
Pi□□M□□n□	S□lgo□& So□k□□Co□r□□□ Pi□□Cl□ss 120			-PVC

FOUL WATER PIPES F3.000 - F3.003

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



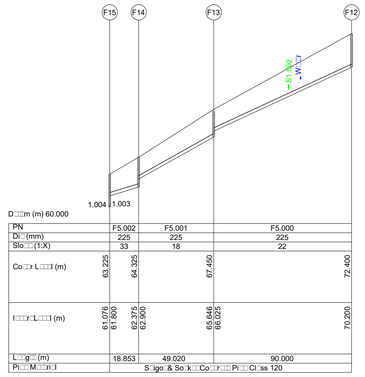
D:□□m (m) 64.000

PN	F4.001	F4.000
Di□ (mm)	150	150
Slo□□ (1:X)	36	117
Co□r L□□□ (m)	70.860	71.480
I□□□r L□□□ (m)	68.731 / 69.566	69.684	70.130
L□□g□□ (m)	6.78	50.982
Pi□□M□□n□		-PVC

FOUL WATER PIPES F4.000 - F4.001

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



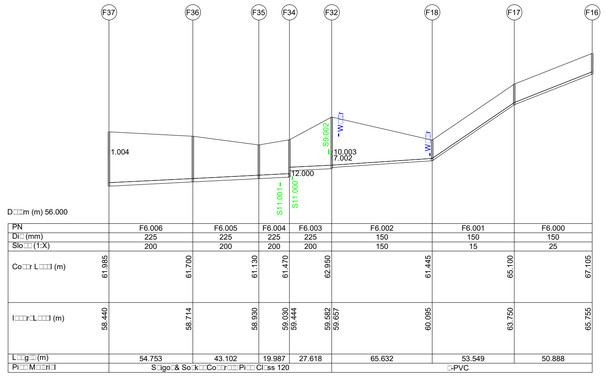
D:□□m (m) 60.000

PN	F5.002	F5.001	F5.000
Di□ (mm)	225	225	225
Slo□□ (1:X)	33	18	22
Co□r L□□□ (m)	63.225 / 64.325	67.450	72.400
I□□□r L□□□ (m)	61.076 / 61.800	62.275 / 62.800	65.646 / 66.025	70.200
L□□g□□ (m)	18.853	49.020	90.000
Pi□□M□□n□	S□lgo□& So□k□□Co□r□□□ Pi□□Cl□ss 120		

FOUL WATER PIPES F5.000 - F5.002

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



D:□□m (m) 56.000

PN	F6.006	F6.005	F6.004	F6.003	F6.002	F6.001	F6.000
Di□ (mm)	225	225	225	225	150	150	150
Slo□□ (1:X)	200	200	200	200	150	15	25
Co□r L□□□ (m)	61.985	61.700	61.130	61.470	62.950	61.445	65.100	67.105
I□□□r L□□□ (m)	58.440	58.714	58.930	59.000 / 59.444	59.582 / 59.657	60.095	63.750	65.755
L□□g□□ (m)	54.753	43.102	19.987	27.618	65.632	53.549	50.888
Pi□□M□□n□	S□lgo□& So□k□□Co□r□□□ Pi□□Cl□ss 120				-PVC		

FOUL WATER PIPES F6.000 - F6.006

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

D:□□m (m) 58.000

PN	F7.002	F7.001	F7.000
Di□ (mm)	225	225	150
Slo□□ (1:X)	21	44	60
Co□r L□□□ (m)	62.950	66.000	68.580	68.130
I□□□r L□□□ (m)	59.582 / 60.209	64.575 / 64.775	65.782 / 66.607	66.780
L□□g□□ (m)	90.000	52.721	55.359
Pi□□M□□n□	S□lgo□& So□k□□Co□r□□□ Pi□□Cl□ss 120		-PVC

FOUL WATER PIPES F7.000 - F7.002

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

D:□□m (m) 62.000

PN	F8.002	F8.001	F8.000
Di□ (mm)	225	225	150
Slo□□ (1:X)	52	64	40
Co□r L□□□ (m)	68.580	69.300	69.500	70.990
I□□□r L□□□ (m)	65.782 / 66.445	66.812	67.560 / 68.075	69.600
L□□g□□ (m)	13.985	66.828	60.915
Pi□□M□□n□	S&S Co□□r□□□ Pi□□Cl□ss 120		-PVC

FOUL WATER PIPES F8.000 - F8.002

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

D:□□m (m) 62.000

PN	F9.001	F9.000
Di□ (mm)	150	150
Slo□□ (1:X)	100	114
Co□r L□□□ (m)	68.580	69.000	69.650
I□□□r L□□□ (m)	66.721	66.981 / 67.600	68.150
L□□g□□ (m)	14.03	73.976
Pi□□M□□n□		-PVC

FOUL WATER PIPES F9.000 - F9.001

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

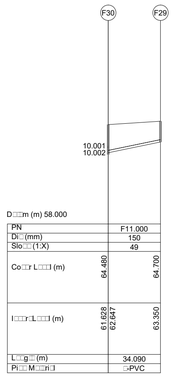
D:□□m (m) 59.000

PN	F10.003	F10.002	F10.001	F10.000
Di□ (mm)	225	225	150	150
Slo□□ (1:X)	159	52	21	23
Co□r L□□□ (m)	62.950	64.000	64.480	66.500	68.770
I□□□r L□□□ (m)	59.582 / 60.506	60.620	61.928 / 62.080	65.000 / 65.150	67.420
L□□g□□ (m)	18.107	52.656	41.839	52.843
Pi□□M□□n□	S&S Co□□C-120		-PVC	

FOUL WATER PIPES F10.000 - F10.003

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



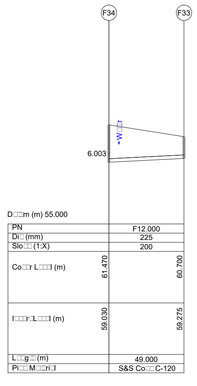
D:□□m (m) 58.000

PN	F11.000
Di□ (mm)	150
Slo□□ (1:X)	49
Co□r L□□□ (m)	64.480 / 64.700
I□□□r L□□□ (m)	61.628 / 62.647	63.350
L□□g□□ (m)	34.090
Pi□□M□□n□	-PVC

FOUL WATER PIPE F11.000

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



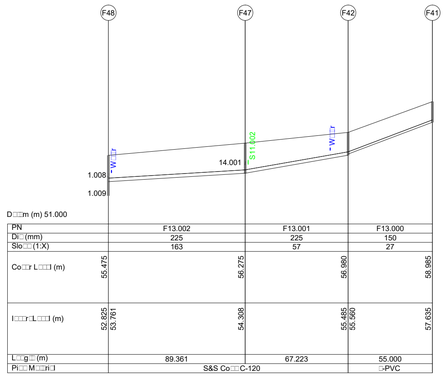
D:□□m (m) 55.000

PN	F12.000
Di□ (mm)	225
Slo□□ (1:X)	200
Co□r L□□□ (m)	61.470 / 60.700
I□□□r L□□□ (m)	59.030 / 59.275
L□□g□□ (m)	49.000
Pi□□M□□n□	S&S Co□□C-120

FOUL WATER PIPE F12.000

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



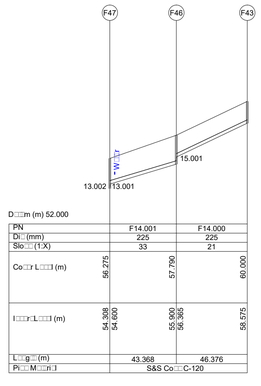
D:□□m (m) 51.000

PN	F13.002	F13.001	F13.000
Di□ (mm)	225	225	150
Slo□□ (1:X)	163	57	27
Co□r L□□□ (m)	55.475 / 56.275	56.980	58.985
I□□□r L□□□ (m)	52.825 / 53.761	54.308	55.485 / 55.960	57.635
L□□g□□ (m)	89.361	67.223	55.000
Pi□□M□□n□	S&S Co□□C-120		-PVC

FOUL WATER PIPES F13.000 - F13.002

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



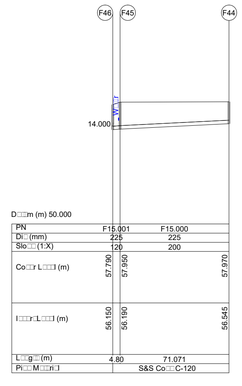
D:□□m (m) 52.000

PN	F14.001	F14.000
Di□ (mm)	225	225
Slo□□ (1:X)	33	21
Co□r L□□□ (m)	56.275 / 57.790	60.000
I□□□r L□□□ (m)	54.308 / 54.600	55.900 / 56.365	58.575
L□□g□□ (m)	43.368	46.376
Pi□□M□□n□	S&S Co□□C-120	

FOUL WATER PIPES F14.000 - F14.001

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200



D:□□m (m) 50.000

PN	F15.001	F15.000
Di□ (mm)	225	225
Slo□□ (1:X)	120	200
Co□r L□□□ (m)	57.790 / 57.950	57.970
I□□□r L□□□ (m)	56.150	56.190	56.545
L□□g□□ (m)	4.80	71.071
Pi□□M□□n□	S&S Co□□C-120	

FOUL WATER PIPES F15.000 - F15.001

HORIZONTAL SCALE 1:2000

VERTICAL SCALE 1:200

LEGEND

NOTES

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5. REFER TO DRAWINGS IE1505-002-E TO IE1505-006-E, FOR FOUL WATER LAYOUT PLANS
6. BACKDROP MANHOLES SHALL BE A MAXIMUM OF 2.5m IN DEPTH. BACKDROPS GREATER THAN 1.7m SHALL COMPLY TO IRISH WATER STANDARD DETAIL STD-WW-12 TYPE 1.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT

CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

FOUL WATER LONG SECTIONS

SHEET 2 OF 2

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

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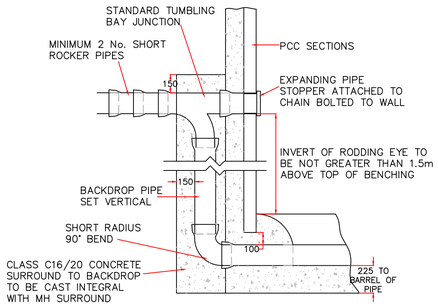

BACKDROP MANHOLE

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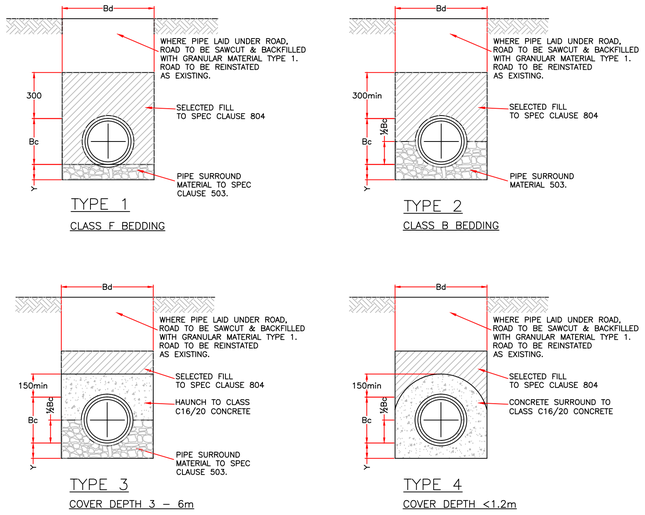

PIPE BEDDING & SURROUND TYPES

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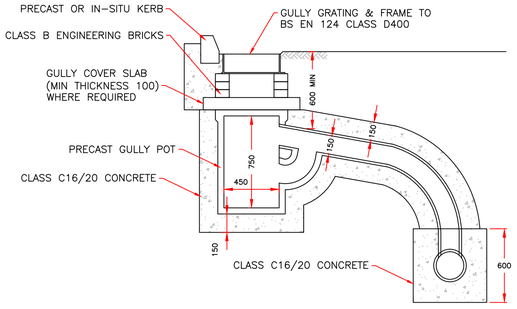

GULLY & CONNECTION DETAIL

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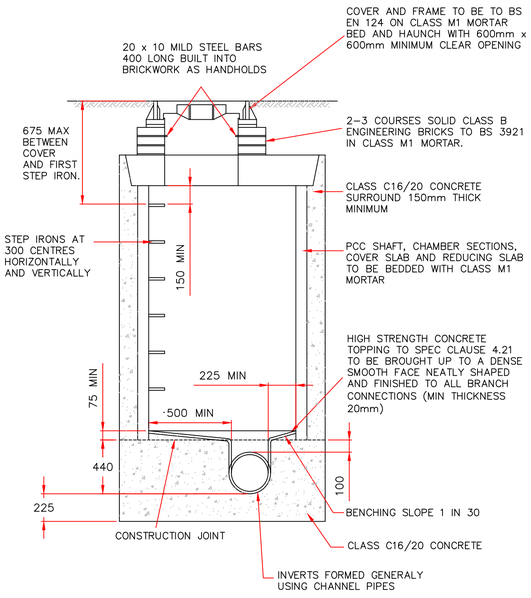

MANHOLE TYPE B

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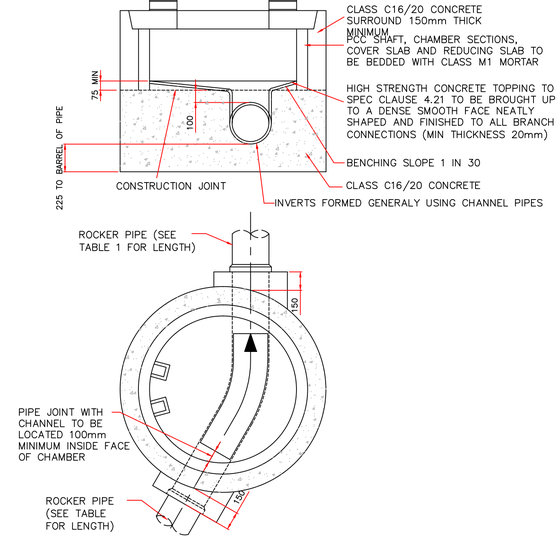

MANHOLE TYPE E

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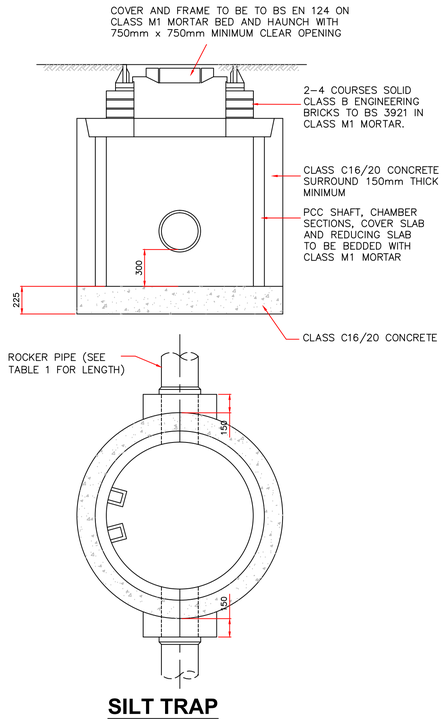

SILT TRAP

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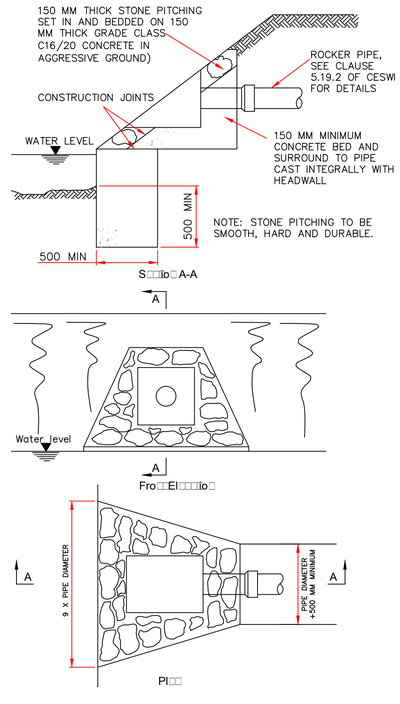

STORMWATER OUTFALL DETAIL

SCALE 1:25

NOTES

ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY" 7TH EDITION

MANHOLE NOTES

1. MANHOLE FRAME & COVER TO BE:
   - CLASS D400 IN TRAFFICKED AREAS
   - CLASS B125 IN FOOTPATHS & LANDSCAPED AREAS
2. ROCKER PIPE LENGTHS SHALL BE AS DETAILED IN TABLE 1 BELOW

TABLE 1: ROCKER PIPE LENGTHS

NOMINAL INT PIPE DIA	ROCKER PIPE LENGTH
150 –600	0.6
675–750	1.0

PIPE BEDDING DETAIL NOTES

1. ALL DIMENSIONS IN MILLIMETERS.
2. Y1 SHALL BE USED ON ALL OCCASIONS EXCEPT AS BELOW OR WHERE Y2 IS SPECIFIED BY THE ENGINEER.
3. DIMENSION Y SHALL BE INCREASED BY 40 FOR EACH ADDITIONAL 1000 COVER IN EXCESS OF 5000.
4. DIMENSION Y2 SHALL BE USED.
5. WHERE EXCAVATION IS IN ROCK OR MIXED SOILS CONTAINING ROCK BEDS, BOULDERS, LARGE FLINTS, STONE OR OTHER IRREGULAR HARD SPOTS.
5. SPECIFICATION REFERS TO "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7TH EDITION".

TABLE 3: PIPE BEDDING TRENCH WIDTHS

NOMINAL INT PIPE DIA	DIMENSION Y1 EVEN TRENCH BOTTOM (MIN)	DIMENSION Y2 ROCK OR UNEVEN TRENCH BOTTOM	MAX PERMITTED TRENCH WIDTH
<400	100	200	Bc + 600
400–700	150	250	Bc + 675
701–900	200	300	Bc + 750
901–1200	250	350	Bc + 1025

NOTE:
Bc = OUTSIDE DIAMETER OF PIPE
Bd = WIDTH OF TRENCH AT 300mm ABOVE CROWN OF PIPE

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E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED STORMWATER DRAINAGE

STANDARD DETAILS

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

NEWRY OFFICE:
1 RDC HOUSE
WIN BUSINESS PARK
NEWRY BT35 6PH

CARLOW OFFICE:
INNOVATION CENTRE
GREEN ROAD
CARLOW R93 W248

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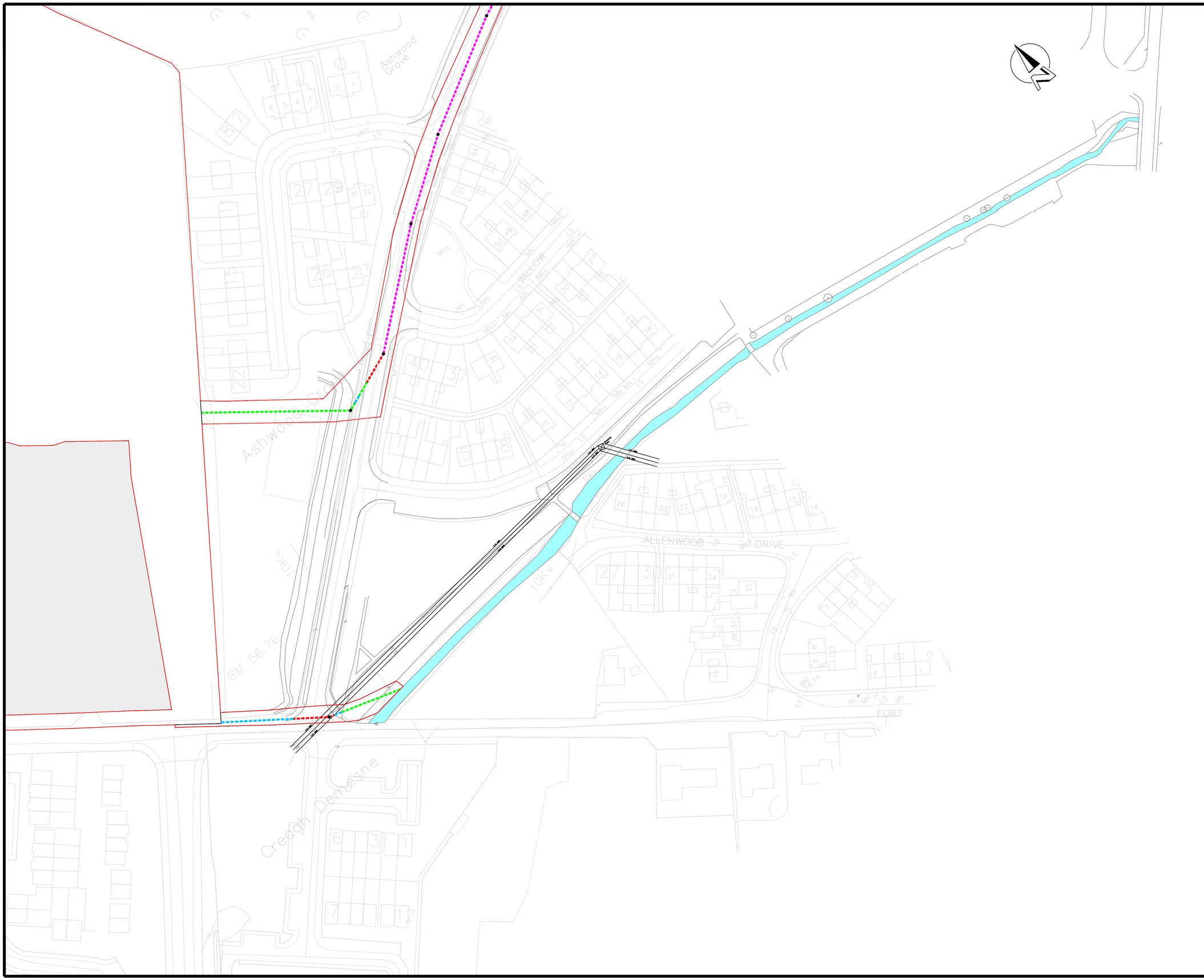

LEGEND

- PROPOSED SITE BOUNDARY
- REINSTATEMENT TYPE 1
- REINSTATEMENT TYPE 2
- REINSTATEMENT TYPE 3
- REINSTATEMENT TYPE 4
- REINSTATEMENT TYPE 5

NOTES

1. FOR REINSTATEMENT DETAILS REFER TO DRAWING NO. IE1505-017-E.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL &
STORMWATER DRAINAGE

REINSTATEMENT LAYOUT PLAN
SHEET 1 OF 3

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		date: 11.01.2019	

LEGEND

- PROPOSED SITE BOUNDARY
- REINSTATEMENT TYPE 1
- REINSTATEMENT TYPE 2
- REINSTATEMENT TYPE 3
- REINSTATEMENT TYPE 4
- REINSTATEMENT TYPE 5

NOTES

1. FOR REINSTATEMENT DETAILS REFER TO DRAWING NO. IE1505-017-E.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL &
STORMWATER DRAINAGE

REINSTATEMENT LAYOUT PLAN
SHEET 2 OF 3

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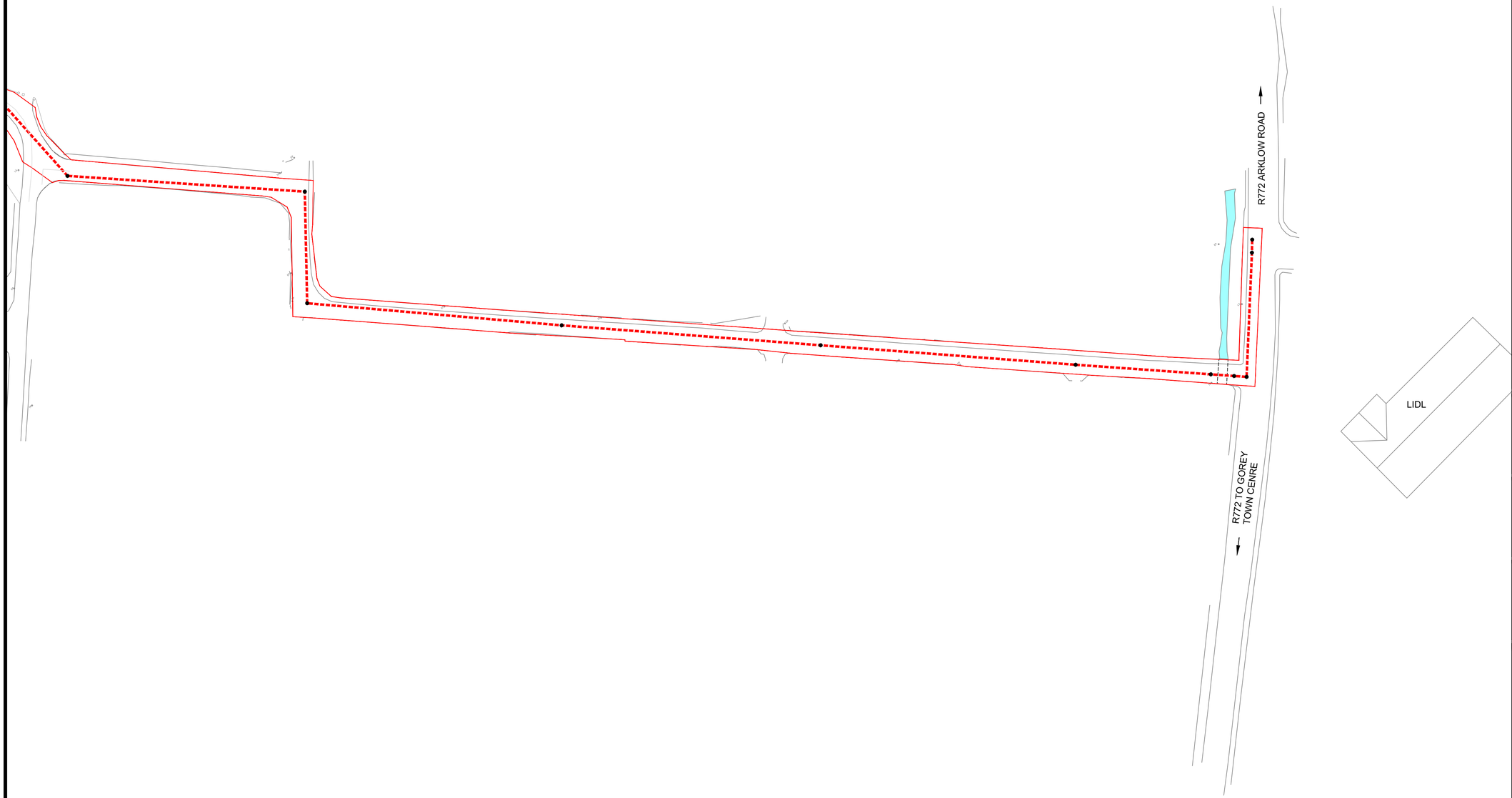

LEGEND

- PROPOSED SITE BOUNDARY
- REINSTATEMENT TYPE 1
- REINSTATEMENT TYPE 2
- REINSTATEMENT TYPE 3
- REINSTATEMENT TYPE 4
- REINSTATEMENT TYPE 5

NOTES

1. FOR REINSTATEMENT DETAILS REFER TO DRAWING NO. IE1505-017-E.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL & STORMWATER DRAINAGE

REINSTATEMENT LAYOUT PLAN
SHEET 3 OF 3

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WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

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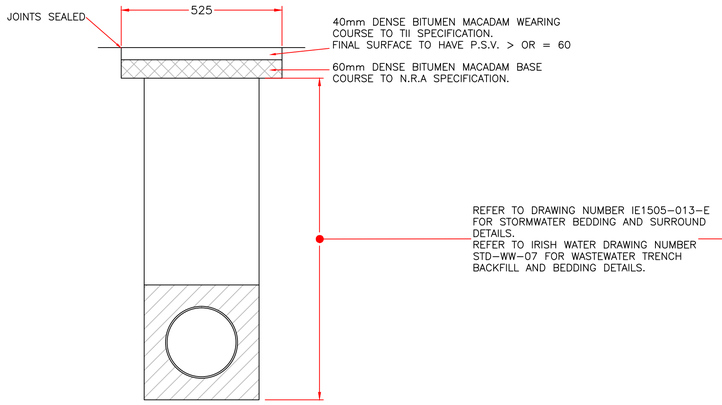
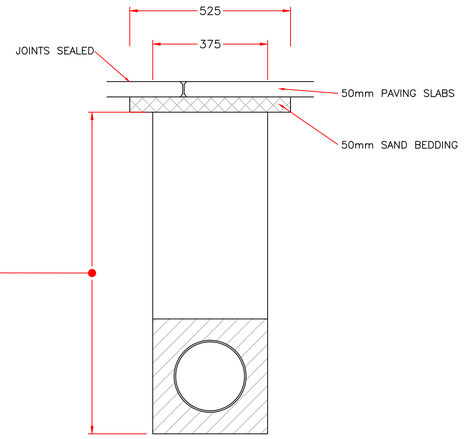


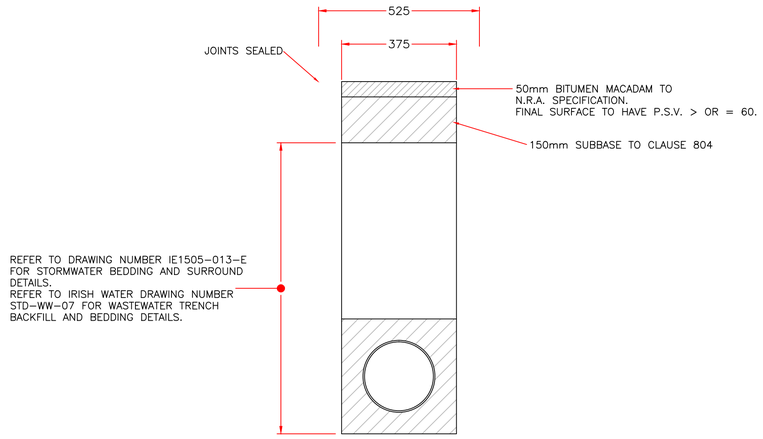
TRENCH DETAIL IN REGIONAL, COUNTY AND URBAN ROADS
(INCLUDING EXCAVATIONS WITHIN 1M OF C/WAY)

REINSTATEMENT TYPE 1
SCALE 1:10



TRENCH DETAIL IN PAVED FOOTPATH
(FOOTPATH SURFACE SHALL BE REPLACED TO FULL WIDTH)

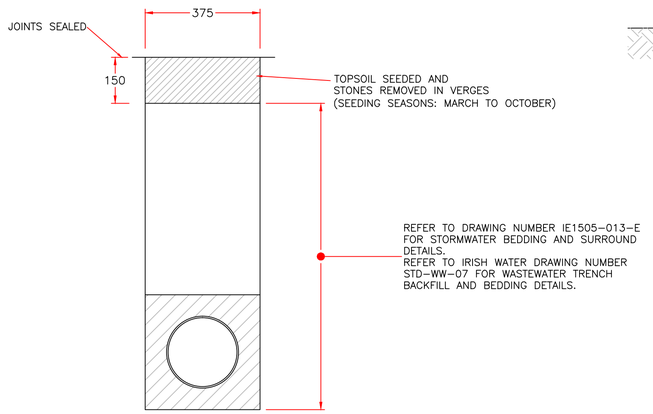
REINSTATEMENT TYPE 2
SCALE 1:10



TRENCH DETAIL OF PIPE IN BITUMINOUS FOOTPATH
(FOOTPATH SURFACE SHALL BE REPLACED TO FULL WIDTH)

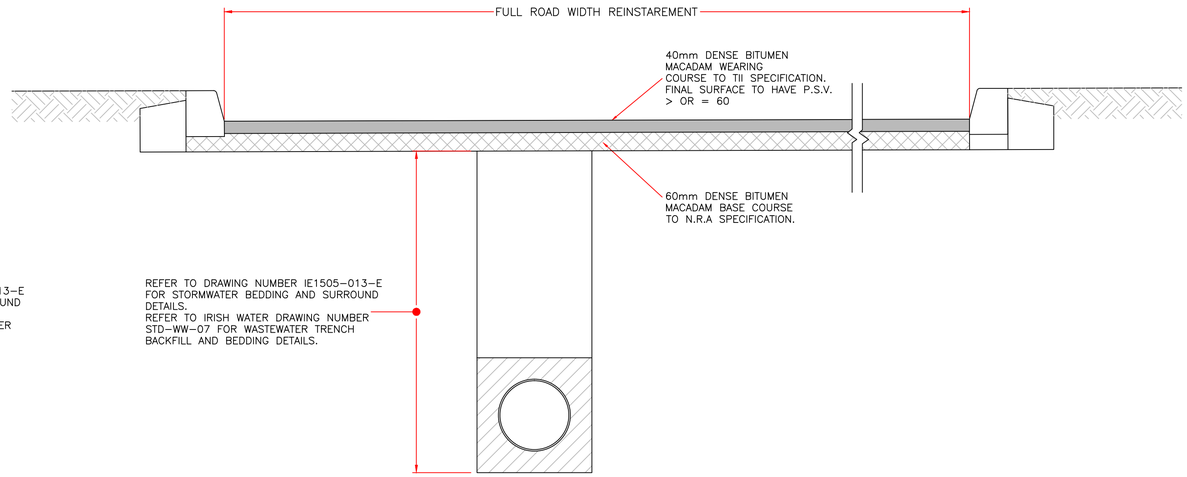
REINSTATEMENT TYPE 3
SCALE 1:10

IN GREEN AREAS, PARKS AND PUBLIC AMENITY AREAS, SOD TO BE REMOVED WITH SODCUTTER AND REPLACED ON REINSTATEMENT



TRENCH DETAIL IN GRASSED AREA WHERE PIPE IS LAID IN ROAD MARGIN
(DISTANCED TO PAVED AREA GREATER THAN 1 METRE))

REINSTATEMENT TYPE 4
SCALE 1:10



TRENCH DETAIL IN REGIONAL, COUNTY AND URBAN ROADS
(FULL CARRIAGEWAY WIDTH)

REINSTATEMENT TYPE 5
SCALE 1:10

NOTES

ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY" 7TH EDITION, IRISH WATER "CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE", DECEMBER 2017 (REVISION 03) AND IRISH WATER "CODE OF PRACTICE FOR WATER INFRASTRUCTURE", DECEMBER 2017 (REVISION 03)

REINSTATEMENT DETAIL NOTES

1. THE EXISTING SURFACE SHALL BE CUT TO ITS FULL DEPTH WITH A SUITABLE SAW TO FORM A CLEAN VERTICAL EDGE TO EACH SIDE OF THE TRENCH

   THE CONTRACTOR SHALL MAKE AN ADDITIONAL SAW CUT OF 75mm TO THE TRENCH SIDES BEFORE LAYING REINSTATEMENT COURSES.
2. CUT EDGE TO BE PAINTED WITH HOT MASTIC ASPHALT IN THE CASE OF MACADAM REINSTATEMENT.
3. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT CLAUSES OF THE N.R.A. SPECIFICATION FOR ROAD WORKS PUBLISHED IN 2000.
4. EXISTING SERVICES IN ROADS SHALL BE WRAPPED IN 12mm NEOPRENE RUBBER OR SIMILAR BEFORE BACKFILLING.
5. CLEARANCE BETWEEN SERVICES SHALL BE A MINIMUM OF 300mm, BOTH HORIZONTAL AND VERTICAL.
6. IT IS THE RESPONSIBILITY OF THE APPLICANT TO LOCATE AND SAFEGUARD ALL EXISTING SERVICES DURING THE COURSE OF CONSTRUCTION. THE CONTRACTOR SHALL BE LIABLE FOR ALL DAMAGE AND CONSEQUENTIAL DAMAGE TO SAME.
7. THE 75mm DEPTH O SAND BEDDING TO THE PIPE SHALL BE INCREASED TO 150mm IN ROCK.
8. PAVING SLABS TO BE REMOVED INDIVIDUALLY AS REQUIRED. CUTTING OF PAVING SLABS SHALL NOT BE PERMITTED.
9. MARKER RIBBON TO BE COMPLETE WITH STAINLESS STEEL TRACER WIRE.
10. N.B. EXCAVATIONS WITHIN ONE METRE OF THE CARRIAGEWAY SHALL BE BACKFILLED AS PER CARRIAGEWAY REINSTATEMENT.
    THE UPPER LAYERS OF REINSTATEMENT FOR A TRENCH WITHIN 1m OF A CARRIAGEWAY MAY BE AMENDED WITH THE PRIOR APPROVAL OF KILKENNY COUNTY COUNCIL.
11. REFER TO DRAWING NUMBER IE1505-013-E FOR STORMWATER BEDDING AND SURROUND DETAILS.
12. REFER TO IRISH WATER DRAWING NUMBER STD-WW-07 FOR WASTEWATER TRENCH BACKFILL AND BEDDING DETAILS.

rev.	date	amendment	drn	ckd
E	11.01.19	PLANNING	NOM	PMS

PROPOSED HOUSING DEVELOPMENT
CREAGH, GOREY, CO. WEXFORD

PROPOSED FOUL AND STORMWATER

REINSTATEMENT
STANDARD DETAILS

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

NEWRY OFFICE:
1 RDC HOUSE
WIN BUSINESS PARK
NEWRY BT35 6PH

CARLOW OFFICE:
INNOVATION CENTRE
GREEN ROAD
CARLOW R93 W248

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APPENDIX B

Micro Drainage Output

Proposed Stormwater

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)	100	PIMP (%)	100
M5-60 (mm)	16.000	Add Flow / Climate Change (%)	0
Ratio R	0.250	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	175

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

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
S1.000	54.781	0.474	115.6	0.211	3.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	50.609	0.266	190.3	0.183	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	23.052	0.135	170.8	0.046	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	31.063	1.375	22.6	0.101	3.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	30.000	1.050	28.6	0.114	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	29.992	1.050	28.6	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	32.507	1.125	28.9	0.128	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	11.961	0.555	21.6	0.048	3.00	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)
S1.000	50.00	3.75	69.695	0.211	0.0	0.0	0.0	1.22	48.3	28.6
S1.001	50.00	4.49	69.146	0.394	0.0	0.0	0.0	1.14	80.3	53.3
S1.002	50.00	4.81	68.880	0.439	0.0	0.0	0.0	1.20	84.8	59.5
S2.000	50.00	3.19	70.500	0.101	0.0	0.0	0.0	2.76	109.9	13.6
S1.003	50.00	4.98	68.300	0.654	0.0	0.0	0.0	2.95	208.7	88.6
S1.004	50.00	5.15	66.500	0.714	0.0	0.0	0.0	2.95	208.7	96.7
S1.005	50.00	5.34	64.150	0.841	0.0	0.0	0.0	2.94	207.5	113.9
S3.000	50.00	3.07	68.600	0.048	0.0	0.0	0.0	2.83	112.6	6.5

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
S3.001	22.500	1.105	20.4	0.050	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	22.500	1.025	22.0	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	25.499	1.055	24.2	0.043	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.004	68.153	0.600	113.6	0.130	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	22.500	1.125	20.0	0.061	3.00	0.0	0.600	o	225	Pipe/Conduit	
S4.001	22.500	1.125	20.0	0.077	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.002	22.500	1.125	20.0	0.095	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.003	25.500	0.611	41.7	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.005	68.138	0.320	212.9	0.140	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.006	25.394	0.175	145.1	0.030	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.006	64.159	0.400	160.4	0.087	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.000	56.235	1.650	34.1	0.176	3.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	4.521	0.125	36.2	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.002	26.573	0.645	41.2	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.003	90.000	3.230	27.9	0.270	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	46.150	0.250	184.6	0.077	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.008	17.615	0.125	140.9	0.011	0.00	0.0	0.600	o	600	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)
S3.001	50.00	3.20	66.900	0.099	0.0	0.0	0.0	2.91	115.8	13.3
S3.002	50.00	3.33	65.400	0.154	0.0	0.0	0.0	2.81	111.5	20.8
S3.003	50.00	3.49	63.700	0.197	0.0	0.0	0.0	2.67	106.3	26.6
S3.004	50.00	4.26	62.570	0.327	0.0	0.0	0.0	1.47	104.2	44.2
S4.000	50.00	3.13	67.950	0.061	0.0	0.0	0.0	2.94	116.9	8.3
S4.001	50.00	3.26	66.200	0.138	0.0	0.0	0.0	2.94	116.9	18.7
S4.002	50.00	3.38	64.550	0.234	0.0	0.0	0.0	2.94	116.9	31.7
S4.003	50.00	3.59	62.656	0.256	0.0	0.0	0.0	2.03	80.7	34.7
S3.005	50.00	5.18	61.895	0.723	0.0	0.0	0.0	1.24	136.7	97.9
S3.006	50.00	5.46	61.575	0.753	0.0	0.0	0.0	1.50	165.9	101.9
S1.006	50.00	6.02	61.175	1.681	0.0	0.0	0.0	1.92	542.9	227.7
S5.000	50.00	3.42	69.475	0.176	0.0	0.0	0.0	2.25	89.4	23.8
S5.001	50.00	3.45	67.825	0.191	0.0	0.0	0.0	2.18	86.8	25.8
S5.002	50.00	3.67	67.700	0.224	0.0	0.0	0.0	2.04	81.3	30.3
S5.003	50.00	4.17	65.950	0.494	0.0	0.0	0.0	2.99	211.4	66.9
S1.007	50.00	6.45	60.775	2.252	0.0	0.0	0.0	1.79	505.9	305.0
S1.008	50.00	6.59	60.525	2.264	0.0	0.0	0.0	2.05	579.5	306.5

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
S6.000	51.048	0.300	170.2	0.088	3.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	69.950	0.650	107.6	0.168	3.00	0.0	0.600	o	225	Pipe/Conduit	
S7.001	11.334	0.250	45.3	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.000	61.316	0.645	95.1	0.213	3.00	0.0	0.600	o	225	Pipe/Conduit	
S8.001	11.132	0.175	63.6	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.001	37.458	1.130	33.1	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.002	90.000	2.450	36.7	0.299	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.003	20.980	0.450	46.6	0.010	0.00	0.0	0.600	o	375	Pipe/Conduit	
S9.000	90.000	3.660	24.6	0.117	3.00	0.0	0.600	o	225	Pipe/Conduit	
S9.001	62.699	2.830	22.2	0.113	0.00	0.0	0.600	o	225	Pipe/Conduit	
S9.002	71.991	0.470	153.2	0.100	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.009	7.894	0.045	175.4	0.003	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.010	17.936	0.130	138.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.011	74.612	0.383	194.8	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.012	27.793	0.242	114.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.013	80.814	1.259	64.2	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)
S6.000	50.00	3.85	66.725	0.088	0.0	0.0	0.0	1.00	39.7	11.9
S7.000	50.00	3.93	68.075	0.168	0.0	0.0	0.0	1.26	50.1	22.7
S7.001	50.00	4.02	67.425	0.190	0.0	0.0	0.0	1.95	77.5	25.7
S8.000	50.00	3.76	67.995	0.213	0.0	0.0	0.0	1.34	53.3	28.8
S8.001	50.00	3.87	67.350	0.244	0.0	0.0	0.0	1.64	65.3	33.0
S6.001	50.00	4.25	66.350	0.602	0.0	0.0	0.0	2.74	193.7	81.5
S6.002	50.00	4.75	64.350	0.900	0.0	0.0	0.0	3.00	331.1	121.9
S6.003	50.00	4.88	61.300	0.910	0.0	0.0	0.0	2.66	293.7	123.2
S9.000	50.00	3.57	67.535	0.117	0.0	0.0	0.0	2.65	105.3	15.8
S9.001	50.00	3.94	63.875	0.230	0.0	0.0	0.0	2.79	111.0	31.2
S9.002	50.00	4.89	60.970	0.330	0.0	0.0	0.0	1.27	89.6	44.7
S1.009	50.00	6.65	60.050	3.507	0.0	0.0	0.0	2.11	932.2	475.0
S1.010	50.00	6.78	60.005	3.507	0.0	0.0	0.0	2.38	1051.8	475.0
S1.011	50.00	7.40	58.304	3.507	0.0	0.0	0.0	2.00	884.2	475.0
S1.012	50.00	7.78	57.921	3.507	0.0	0.0	0.0	1.22	48.5«	475.0
S1.013	50.00	8.60	57.679	3.507	0.0	0.0	0.0	1.64	65.0«	475.0

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
S1.014	64.332	2.295	28.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.015	78.325	1.425	55.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.016	4.993	0.100	49.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.000	83.634	2.940	28.4	0.144	3.00	0.0	0.600	o	225	Pipe/Conduit	
S10.001	66.758	0.579	115.3	0.219	0.00	0.0	0.600	o	300	Pipe/Conduit	
S11.000	56.004	0.475	117.9	0.110	3.00	0.0	0.600	o	225	Pipe/Conduit	
S11.001	71.878	2.200	32.7	0.197	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.002	47.051	0.723	65.1	0.080	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.002	45.005	0.700	64.3	0.305	0.00	0.0	0.600	o	450	Pipe/Conduit	
S10.003	47.200	0.400	118.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S12.000	96.094	1.125	85.4	0.233	3.00	0.0	0.600	o	225	Pipe/Conduit	
S12.001	42.547	1.000	42.5	0.143	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.000	48.000	0.500	96.0	0.097	3.00	0.0	0.600	o	225	Pipe/Conduit	
S12.002	36.343	1.817	20.0	0.089	0.00	0.0	0.600	o	225	Pipe/Conduit	
S14.000	90.000	1.314	68.5	0.271	3.00	0.0	0.600	o	300	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)
S1.014	50.00	9.04	56.420	3.507	0.0	0.0	0.0	2.48	98.6«	475.0
S1.015	50.00	9.78	54.125	3.507	0.0	0.0	0.0	1.77	70.3«	475.0
S1.016	50.00	9.82	52.700	3.507	0.0	0.0	0.0	1.86	73.8«	475.0
S10.000	50.00	3.57	58.475	0.144	0.0	0.0	0.0	2.46	97.9	19.4
S10.001	50.00	4.33	55.179	0.362	0.0	0.0	0.0	1.46	103.4	49.1
S11.000	50.00	3.78	59.275	0.110	0.0	0.0	0.0	1.20	47.8	14.9
S11.001	50.00	4.30	58.575	0.307	0.0	0.0	0.0	2.30	91.3	41.6
S11.002	50.00	4.78	55.523	0.388	0.0	0.0	0.0	1.62	64.6	52.5
S10.002	50.00	5.08	54.450	1.055	0.0	0.0	0.0	2.54	403.8	142.8
S10.003	50.00	5.50	53.750	1.055	0.0	0.0	0.0	1.87	297.5	142.8
S12.000	50.00	4.13	59.825	0.233	0.0	0.0	0.0	1.42	56.3	31.5
S12.001	50.00	4.48	58.700	0.375	0.0	0.0	0.0	2.01	80.0	50.8
S13.000	50.00	3.60	58.825	0.097	0.0	0.0	0.0	1.33	53.1	13.1
S12.002	50.00	4.69	57.700	0.561	0.0	0.0	0.0	2.94	116.9	76.0
S14.000	50.00	3.79	56.380	0.271	0.0	0.0	0.0	1.90	134.5	36.7

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
S12.003	61.364	1.400	43.8	0.111	0.00	4.8	0.600	o	375	Pipe/Conduit	
S10.004	15.742	0.236	66.7	0.050	0.00	0.0	0.600	o	600	Pipe/Conduit	
S10.005	8.961	0.135	66.4	0.013	0.00	0.0	0.600	o	600	Pipe/Conduit	
S10.006	10.105	0.115	87.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S10.007	6.000	0.050	120.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S10.008	63.799	0.200	319.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S10.009	5.996	0.045	133.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.017	52.494	0.305	172.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.018	48.265	0.285	169.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.019	32.646	0.190	171.8	0.000	0.00	0.0	0.600	o	300	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)
S12.003	50.00	5.06	54.900	0.944	4.8	0.0	0.0	2.74	303.0	132.6
S10.004	50.00	5.58	52.936	2.048	4.8	0.0	0.0	2.98	843.9	282.1
S10.005	50.00	5.63	52.700	2.061	4.8	0.0	0.0	2.99	846.0	284.0
S10.006	50.00	5.70	52.565	2.061	4.8	0.0	0.0	2.60	734.8	284.0
S10.007	50.00	5.74	52.450	2.061	4.8	0.0	0.0	2.22	628.3	284.0
S10.008	50.00	6.53	51.400	2.061	4.8	0.0	0.0	1.36	384.0	284.0
S10.009	50.00	6.62	51.200	2.061	4.8	0.0	0.0	1.13	45.0«	284.0
S1.017	50.00	10.55	51.080	5.569	4.8	0.0	0.0	1.20	84.5«	758.9
S1.018	50.00	11.22	50.775	5.569	4.8	0.0	0.0	1.21	85.2«	758.9
S1.019	50.00	11.67	50.490	5.569	4.8	0.0	0.0	1.20	84.6«	758.9

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Roof	90	0.015	0.013	0.013
	Classification	Roof	90	0.008	0.007	0.020
	Classification	Roof	90	0.008	0.007	0.027
	Classification	Roof	90	0.008	0.007	0.035
	Classification	Roof	90	0.008	0.007	0.042
	Classification	Roof	90	0.008	0.007	0.049
	Classification	Roof	90	0.008	0.007	0.056
	Classification	Roof	90	0.010	0.009	0.065
	Classification	Roof	90	0.009	0.008	0.073
	Classification	Roof	90	0.009	0.008	0.082
	Classification	Roof	90	0.009	0.008	0.090
	Classification	Road	85	0.111	0.095	0.184
	Classification	Road	85	0.031	0.027	0.211
1.001	Classification	Roof	90	0.008	0.007	0.007
	Classification	Roof	90	0.008	0.007	0.015
	Classification	Roof	90	0.008	0.007	0.022
	Classification	Roof	90	0.008	0.007	0.029
	Classification	Roof	90	0.008	0.007	0.036
	Classification	Roof	90	0.008	0.007	0.044
	Classification	Roof	90	0.008	0.007	0.051
	Classification	Roof	90	0.009	0.008	0.059
	Classification	Roof	90	0.009	0.008	0.067
	Classification	Roof	90	0.009	0.008	0.076
	Classification	Road	85	0.126	0.107	0.183
1.002	Classification	Roof	90	0.015	0.013	0.013
	Classification	Roof	90	0.015	0.013	0.027
	Classification	Road	85	0.022	0.019	0.046
2.000	Classification	Roof	90	0.015	0.013	0.013
	Classification	Road	85	0.103	0.087	0.101
1.003	Classification	Roof	90	0.010	0.009	0.009
	Classification	Roof	90	0.005	0.005	0.014
	Classification	Roof	90	0.005	0.005	0.019
	Classification	Roof	90	0.005	0.005	0.023
	Classification	Road	85	0.107	0.091	0.114
1.004	Classification	Roof	90	0.005	0.005	0.005
	Classification	Roof	90	0.008	0.007	0.012
	Classification	Roof	90	0.008	0.007	0.018
	Classification	Roof	90	0.005	0.005	0.023
	Classification	Roof	90	0.008	0.007	0.030
	Classification	Roof	90	0.008	0.007	0.037
	Classification	Roof	90	0.008	0.007	0.043
	Classification	Roof	90	0.005	0.005	0.048
	Classification	Roof	90	0.005	0.005	0.053
	Classification	Roof	90	0.008	0.007	0.060
1.005	Classification	Roof	90	0.008	0.007	0.007
	Classification	Roof	90	0.005	0.005	0.012
	Classification	Roof	90	0.008	0.007	0.018
	Classification	Roof	90	0.008	0.007	0.025
	Classification	Roof	90	0.005	0.005	0.030
	Classification	Roof	90	0.005	0.005	0.035

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	Classification	Road	85	0.109	0.093	0.128
3.000	Classification	Green	10	0.031	0.003	0.003
	Classification	Road	85	0.053	0.045	0.048
	Classification	Green	10	0.002	0.000	0.048
3.001	Classification	Green	10	0.013	0.001	0.001
	Classification	Roof	90	0.007	0.006	0.007
	Classification	Roof	90	0.007	0.006	0.013
	Classification	Roof	90	0.006	0.006	0.019
	Classification	Road	85	0.037	0.031	0.050
3.002	Classification	Roof	90	0.006	0.006	0.006
	Classification	Roof	90	0.008	0.007	0.013
	Classification	Roof	90	0.008	0.007	0.020
	Classification	Road	85	0.041	0.035	0.055
3.003	Classification	Green	10	0.031	0.003	0.003
	Classification	Roof	90	0.011	0.010	0.013
	Classification	Road	85	0.035	0.030	0.043
3.004	Classification	Green	10	0.069	0.007	0.007
	Classification	Roof	90	0.009	0.008	0.015
	Classification	Roof	90	0.009	0.008	0.023
	Classification	Roof	90	0.009	0.008	0.031
	Classification	Road	85	0.116	0.099	0.130
4.000	Classification	Roof	90	0.008	0.007	0.007
	Classification	Roof	90	0.006	0.006	0.013
	Classification	Road	85	0.056	0.047	0.060
	Classification	Green	10	0.002	0.000	0.061
	Classification	Green	10	0.004	0.000	0.061
4.001	Classification	Roof	90	0.008	0.007	0.007
	Classification	Roof	90	0.008	0.007	0.014
	Classification	Roof	90	0.006	0.006	0.020
	Classification	Roof	90	0.006	0.006	0.026
	Classification	Roof	90	0.006	0.006	0.031
	Classification	Roof	90	0.006	0.006	0.037
	Classification	Road	85	0.047	0.040	0.077
4.002	Classification	Roof	90	0.006	0.006	0.006
	Classification	Roof	90	0.007	0.006	0.012
	Classification	Roof	90	0.007	0.006	0.018
	Classification	Roof	90	0.007	0.006	0.024
	Classification	Roof	90	0.007	0.006	0.030
	Classification	Roof	90	0.007	0.006	0.036
	Classification	Roof	90	0.007	0.006	0.042
	Classification	Roof	90	0.008	0.007	0.049
	Classification	Road	85	0.054	0.046	0.095
4.003	Classification	Road	85	0.026	0.022	0.022
3.005	Classification	Green	10	0.063	0.006	0.006
	Classification	Roof	90	0.009	0.008	0.015
	Classification	Roof	90	0.009	0.008	0.023
	Classification	Roof	90	0.009	0.008	0.031
	Classification	Roof	90	0.011	0.010	0.041
	Classification	Road	85	0.117	0.099	0.140
3.006	Classification	Road	85	0.035	0.030	0.030

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.006	Classification	Roof	90	0.010	0.009	0.009
	Classification	Roof	90	0.009	0.008	0.017
	Classification	Roof	90	0.009	0.008	0.025
	Classification	Roof	90	0.009	0.008	0.034
	Classification	Road	85	0.063	0.053	0.087
5.000	Classification	Roof	90	0.008	0.007	0.007
	Classification	Roof	90	0.008	0.007	0.015
	Classification	Roof	90	0.008	0.007	0.022
	Classification	Roof	90	0.008	0.007	0.029
	Classification	Roof	90	0.008	0.007	0.036
	Classification	Roof	90	0.009	0.008	0.044
	Classification	Roof	90	0.009	0.008	0.053
	Classification	Roof	90	0.009	0.008	0.061
	Classification	Roof	90	0.008	0.007	0.068
	Classification	Road	85	0.127	0.108	0.176
5.001	Classification	Road	85	0.017	0.015	0.015
5.002	Classification	Roof	90	0.008	0.007	0.007
	Classification	Road	85	0.030	0.025	0.033
	Classification	Green	10	0.002	0.000	0.033
5.003	Classification	Roof	90	0.008	0.007	0.007
	Classification	Roof	90	0.008	0.007	0.014
	Classification	Roof	90	0.006	0.006	0.020
	Classification	Roof	90	0.006	0.006	0.026
	Classification	Roof	90	0.006	0.006	0.031
	Classification	Roof	90	0.007	0.006	0.037
	Classification	Roof	90	0.007	0.006	0.043
	Classification	Roof	90	0.006	0.006	0.049
	Classification	Roof	90	0.006	0.006	0.055
	Classification	Roof	90	0.008	0.007	0.062
	Classification	Roof	90	0.006	0.006	0.068
	Classification	Roof	90	0.006	0.006	0.074
	Classification	Roof	90	0.007	0.006	0.080
	Classification	Roof	90	0.007	0.006	0.086
	Classification	Roof	90	0.006	0.006	0.092
	Classification	Roof	90	0.006	0.006	0.097
	Classification	Roof	90	0.007	0.006	0.103
	Classification	Roof	90	0.007	0.006	0.109
	Classification	Road	85	0.189	0.161	0.270
1.007	Classification	Roof	90	0.009	0.008	0.008
	Classification	Roof	90	0.009	0.008	0.016
	Classification	Roof	90	0.009	0.008	0.025
	Classification	Roof	90	0.009	0.008	0.033
	Classification	Road	85	0.052	0.044	0.077
1.008	Classification	Road	85	0.013	0.011	0.011
6.000	Classification	Roof	90	0.009	0.008	0.008
	Classification	Roof	90	0.009	0.008	0.016
	Classification	Roof	90	0.009	0.008	0.025
	Classification	Roof	90	0.009	0.008	0.033
	Classification	Road	85	0.065	0.055	0.088
7.000	Classification	Roof	90	0.009	0.008	0.008

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	Classification	Roof	90	0.008	0.007	0.015
	Classification	Roof	90	0.008	0.007	0.022
	Classification	Roof	90	0.008	0.007	0.030
	Classification	Roof	90	0.008	0.007	0.037
	Classification	Roof	90	0.008	0.007	0.044
	Classification	Roof	90	0.008	0.007	0.051
	Classification	Roof	90	0.008	0.007	0.058
	Classification	Roof	90	0.008	0.007	0.065
	Classification	Road	85	0.120	0.102	0.168
7.001	Classification	Road	85	0.026	0.022	0.022
8.000	Classification	Roof	90	0.008	0.007	0.007
	Classification	Roof	90	0.008	0.007	0.014
	Classification	Roof	90	0.008	0.007	0.021
	Classification	Roof	90	0.008	0.007	0.029
	Classification	Roof	90	0.008	0.007	0.036
	Classification	Roof	90	0.009	0.008	0.044
	Classification	Roof	90	0.009	0.008	0.053
	Classification	Roof	90	0.009	0.008	0.061
	Classification	Roof	90	0.015	0.013	0.074
	Classification	Roof	90	0.008	0.007	0.081
	Classification	Roof	90	0.008	0.007	0.088
	Classification	Roof	90	0.008	0.007	0.096
	Classification	Roof	90	0.008	0.007	0.103
	Classification	Road	85	0.129	0.110	0.213
8.001	Classification	Road	85	0.036	0.031	0.031
6.001	Classification	Roof	90	0.007	0.006	0.006
	Classification	Roof	90	0.007	0.006	0.012
	Classification	Roof	90	0.007	0.006	0.018
	Classification	Roof	90	0.007	0.006	0.024
	Classification	Road	85	0.065	0.055	0.079
	Classification	Green	10	0.008	0.001	0.080
6.002	Classification	Roof	90	0.007	0.006	0.006
	Classification	Roof	90	0.006	0.006	0.012
	Classification	Roof	90	0.006	0.006	0.018
	Classification	Roof	90	0.006	0.006	0.023
	Classification	Roof	90	0.006	0.006	0.029
	Classification	Roof	90	0.007	0.006	0.035
	Classification	Roof	90	0.007	0.006	0.041
	Classification	Roof	90	0.007	0.006	0.047
	Classification	Roof	90	0.007	0.006	0.053
	Classification	Roof	90	0.006	0.006	0.059
	Classification	Roof	90	0.006	0.006	0.065
	Classification	Roof	90	0.007	0.006	0.071
	Classification	Roof	90	0.007	0.006	0.077
	Classification	Roof	90	0.006	0.006	0.082
	Classification	Roof	90	0.006	0.006	0.088
	Classification	Roof	90	0.006	0.006	0.094
	Classification	Roof	90	0.007	0.006	0.100
	Classification	Roof	90	0.006	0.006	0.106
	Classification	Roof	90	0.006	0.006	0.111

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	Classification	Roof	90	0.007	0.006	0.117
	Classification	Roof	90	0.009	0.008	0.126
	Classification	Road	85	0.204	0.173	0.299
6.003	Classification	Road	85	0.010	0.009	0.009
	Classification	Green	10	0.006	0.001	0.010
9.000	Classification	Green	10	0.019	0.002	0.002
	Classification	Roof	90	0.007	0.006	0.008
	Classification	Roof	90	0.007	0.006	0.014
	Classification	Roof	90	0.006	0.006	0.020
	Classification	Roof	90	0.006	0.006	0.025
	Classification	Roof	90	0.007	0.006	0.032
	Classification	Roof	90	0.007	0.006	0.038
	Classification	Road	85	0.094	0.080	0.117
9.001	Classification	Green	10	0.016	0.002	0.002
	Classification	Roof	90	0.006	0.006	0.007
	Classification	Roof	90	0.006	0.006	0.013
	Classification	Roof	90	0.007	0.006	0.019
	Classification	Roof	90	0.007	0.006	0.025
	Classification	Roof	90	0.006	0.006	0.031
	Classification	Roof	90	0.006	0.006	0.037
	Classification	Roof	90	0.006	0.006	0.042
	Classification	Road	85	0.083	0.071	0.113
9.002	Classification	Roof	90	0.009	0.008	0.008
	Classification	Roof	90	0.009	0.008	0.016
	Classification	Roof	90	0.009	0.008	0.025
	Classification	Roof	90	0.009	0.008	0.033
	Classification	Road	85	0.080	0.068	0.100
1.009	Classification	Road	85	0.004	0.003	0.003
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
10.000	Classification	Green	10	0.073	0.007	0.007
	Classification	Roof	90	0.006	0.006	0.013
	Classification	Roof	90	0.006	0.006	0.019
	Classification	Roof	90	0.007	0.006	0.025
	Classification	Roof	90	0.007	0.006	0.031
	Classification	Roof	90	0.006	0.006	0.037
	Classification	Roof	90	0.006	0.006	0.042
	Classification	Road	85	0.119	0.101	0.144
10.001	Classification	Roof	90	0.010	0.009	0.009
	Classification	Roof	90	0.005	0.004	0.013
	Classification	Roof	90	0.005	0.004	0.018
	Classification	Roof	90	0.005	0.004	0.022
	Classification	Roof	90	0.005	0.004	0.027
	Classification	Roof	90	0.012	0.011	0.038
	Classification	Roof	90	0.008	0.007	0.044

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	Classification	Roof	90	0.008	0.007	0.051
	Classification	Roof	90	0.008	0.007	0.058
	Classification	Roof	90	0.008	0.007	0.065
	Classification	Roof	90	0.008	0.007	0.071
	Classification	Roof	90	0.008	0.007	0.078
	Classification	Road	85	0.165	0.141	0.219
11.000	Classification	Green	10	0.126	0.013	0.013
	Classification	Roof	90	0.010	0.009	0.022
	Classification	Roof	90	0.005	0.004	0.026
	Classification	Roof	90	0.005	0.004	0.030
	Classification	Roof	90	0.005	0.004	0.035
	Classification	Roof	90	0.005	0.004	0.039
	Classification	Roof	90	0.010	0.009	0.048
	Classification	Road	85	0.073	0.062	0.110
11.001	Classification	Roof	90	0.006	0.006	0.006
	Classification	Roof	90	0.006	0.006	0.011
	Classification	Roof	90	0.007	0.006	0.018
	Classification	Roof	90	0.007	0.006	0.024
	Classification	Roof	90	0.007	0.006	0.030
	Classification	Roof	90	0.006	0.006	0.035
	Classification	Roof	90	0.006	0.006	0.041
	Classification	Roof	90	0.005	0.004	0.045
	Classification	Roof	90	0.005	0.004	0.050
	Classification	Roof	90	0.005	0.004	0.054
	Classification	Roof	90	0.005	0.004	0.059
	Classification	Road	85	0.153	0.130	0.189
	Classification	Road	85	0.009	0.007	0.197
	Classification	Green	10	0.000	0.000	0.197
	Classification	Green	10	0.002	0.000	0.197
11.002	Classification	Roof	90	0.010	0.009	0.009
	Classification	Road	85	0.084	0.071	0.080
10.002	Classification	Roof	90	0.015	0.013	0.013
	Classification	Roof	90	0.005	0.004	0.018
	Classification	Roof	90	0.005	0.004	0.022
	Classification	Roof	90	0.005	0.004	0.027
	Classification	Roof	90	0.005	0.004	0.031
	Classification	Roof	90	0.005	0.004	0.036
	Classification	Roof	90	0.005	0.004	0.040
	Classification	Roof	90	0.015	0.013	0.053
	Classification	Roof	90	0.012	0.011	0.064
	Classification	Roof	90	0.008	0.007	0.071
	Classification	Roof	90	0.008	0.007	0.078
	Classification	Roof	90	0.008	0.007	0.085
	Classification	Roof	90	0.008	0.007	0.092
	Classification	Roof	90	0.008	0.007	0.098
	Classification	Roof	90	0.008	0.007	0.105
	Classification	Roof	90	0.008	0.007	0.112
	Classification	Roof	90	0.008	0.007	0.119
	Classification	Road	85	0.219	0.186	0.305
10.003	-	-	100	0.000	0.000	0.000

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
12.000	Classification	Green	10	0.514	0.051	0.051
	Classification	Roof	90	0.010	0.009	0.060
	Classification	Roof	90	0.007	0.006	0.066
	Classification	Roof	90	0.007	0.006	0.072
	Classification	Roof	90	0.006	0.006	0.078
	Classification	Roof	90	0.006	0.006	0.084
	Classification	Roof	90	0.007	0.006	0.090
	Classification	Roof	90	0.007	0.006	0.096
	Classification	Road	85	0.161	0.137	0.233
12.001	Classification	Roof	90	0.010	0.009	0.009
	Classification	Roof	90	0.005	0.004	0.013
	Classification	Roof	90	0.005	0.004	0.018
	Classification	Roof	90	0.005	0.004	0.022
	Classification	Roof	90	0.005	0.004	0.027
	Classification	Roof	90	0.066	0.059	0.086
	Classification	Road	85	0.067	0.057	0.143
13.000	Classification	Road	85	0.102	0.086	0.086
	Classification	Green	10	0.099	0.010	0.096
	Classification	Green	10	0.005	0.000	0.097
12.002	Classification	Roof	90	0.005	0.004	0.004
	Classification	Roof	90	0.015	0.013	0.018
	Classification	Road	85	0.083	0.071	0.089
14.000	Classification	Roof	90	0.010	0.009	0.009
	Classification	Roof	90	0.007	0.006	0.015
	Classification	Roof	90	0.007	0.006	0.021
	Classification	Roof	90	0.006	0.006	0.027
	Classification	Roof	90	0.006	0.006	0.032
	Classification	Roof	90	0.007	0.006	0.039
	Classification	Roof	90	0.007	0.006	0.045
	Classification	Roof	90	0.011	0.010	0.054
	Classification	Roof	90	0.011	0.010	0.064
	Classification	Roof	90	0.011	0.010	0.074
	Classification	Road	85	0.231	0.197	0.271
	Classification	Green	10	0.001	0.000	0.271
	Classification	Green	10	0.000	0.000	0.271
12.003	Classification	Roof	90	0.011	0.010	0.010
	Classification	Roof	90	0.005	0.004	0.014
	Classification	Roof	90	0.005	0.004	0.018
	Classification	Roof	90	0.005	0.004	0.023
	Classification	Road	85	0.104	0.088	0.111
10.004	Classification	Road	85	0.059	0.050	0.050
10.005	Classification	Roof	90	0.015	0.013	0.013
10.006	-	-	100	0.000	0.000	0.000
10.007	-	-	100	0.000	0.000	0.000
10.008	-	-	100	0.000	0.000	0.000
10.009	-	-	100	0.000	0.000	0.000
1.017	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
				Total	Total	Total

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
				7.391	5.569	5.569

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)
S1.019	S	52.200	50.300	48.600	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	120
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.000	Storm Duration (mins)	60
Ratio R	0.250		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S41, DS/PN: S1.012, Volume (m³): 37.6

Unit Reference	MD-SHE-0174-1640-1525-1640
Design Head (m)	1.525
Design Flow (l/s)	16.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	174
Invert Level (m)	57.921
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.525	16.4
Flush-Flo™	0.452	16.4
Kick-Flo®	0.978	13.3
Mean Flow over Head Range	-	14.2

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)
0.100	6.2	1.200	14.6	3.000	22.6	7.000	34.0
0.200	14.7	1.400	15.7	3.500	24.4	7.500	35.2
0.300	15.9	1.600	16.8	4.000	26.0	8.000	36.3
0.400	16.3	1.800	17.7	4.500	27.5	8.500	37.4
0.500	16.4	2.000	18.6	5.000	28.9	9.000	38.4
0.600	16.2	2.200	19.5	5.500	30.3	9.500	39.4
0.800	15.4	2.400	20.3	6.000	31.6		
1.000	13.4	2.600	21.1	6.500	32.8		

Hydro-Brake® Optimum Manhole: S64, DS/PN: S10.009, Volume (m³): 22.7

Unit Reference	MD-SHE-0179-1610-1140-1610
Design Head (m)	1.140
Design Flow (l/s)	16.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	179
Invert Level (m)	51.200
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Hydro-Brake® Optimum Manhole: S64, DS/PN: S10.009, Volume (m³): 22.7

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.140	16.1
Flush-Flo™	0.355	16.1
Kick-Flo®	0.781	13.5
Mean Flow over Head Range	-	13.8

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)
0.100	6.3	1.200	16.5	3.000	25.5	7.000	38.4
0.200	15.2	1.400	17.7	3.500	27.5	7.500	39.7
0.300	16.0	1.600	18.9	4.000	29.3	8.000	41.0
0.400	16.0	1.800	20.0	4.500	31.0	8.500	42.2
0.500	15.8	2.000	21.0	5.000	32.6	9.000	43.4
0.600	15.4	2.200	22.0	5.500	34.2	9.500	44.5
0.800	13.6	2.400	22.9	6.000	35.7		
1.000	15.1	2.600	23.8	6.500	37.1		

Storage Structures for Storm

Cellular Storage Manhole: S41, DS/PN: S1.012

Invert Level (m) 57.921 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1259.0	0.0	1.525	1259.0	0.0

Cellular Storage Manhole: S64, DS/PN: S10.009

Invert Level (m) 51.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1000.0	0.0	1.140	1000.0	0.0

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	100.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160
Return Period(s) (years)	5, 30, 100
Climate Change (%)	10, 10, 10

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+10%	30/15 Summer				70.704
S1.001	S2	15 Winter	100	+10%	30/15 Summer				69.963
S1.002	S3	15 Winter	100	+10%	30/15 Summer				69.381
S2.000	S4	15 Summer	100	+10%					70.600
S1.003	S5	15 Winter	100	+10%					68.534
S1.004	S6	15 Winter	100	+10%	100/15 Winter				66.865
S1.005	S7	15 Winter	100	+10%	100/15 Summer				65.033
S3.000	S8	15 Summer	100	+10%					68.669
S3.001	S9	15 Summer	100	+10%					66.993
S3.002	S10	15 Summer	100	+10%					65.521
S3.003	S11	15 Winter	100	+10%					63.887
S3.004	S12	15 Winter	100	+10%	30/15 Summer				63.593
S4.000	S13	15 Summer	100	+10%					68.024
S4.001	S14	15 Summer	100	+10%					66.312
S4.002	S15	15 Summer	100	+10%					64.705
S4.003	S16	15 Winter	100	+10%	30/15 Summer				63.662
S3.005	S17	15 Winter	100	+10%	30/15 Summer				63.238
S3.006	S18	15 Winter	100	+10%	30/15 Summer				62.644
S1.006	S19	15 Winter	100	+10%	100/15 Summer				62.335
S5.000	S20	15 Summer	100	+10%					69.635

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.784	0.000	1.27		59.0	SURCHARGED	
S1.001	S2	0.517	0.000	1.44		108.9	SURCHARGED	
S1.002	S3	0.201	0.000	1.60		120.5	SURCHARGED	
S2.000	S4	-0.125	0.000	0.40		40.7	OK	
S1.003	S5	-0.066	0.000	0.93		176.9	OK	
S1.004	S6	0.065	0.000	1.03		195.8	SURCHARGED	
S1.005	S7	0.583	0.000	1.23		234.1	SURCHARGED	
S3.000	S8	-0.156	0.000	0.20		19.5	OK	
S3.001	S9	-0.132	0.000	0.34		36.4	OK	
S3.002	S10	-0.104	0.000	0.55		56.6	OK	
S3.003	S11	-0.038	0.000	0.72		70.6	OK	
S3.004	S12	0.723	0.000	0.97		96.7	SURCHARGED	
S4.000	S13	-0.151	0.000	0.23		24.8	OK	
S4.001	S14	-0.113	0.000	0.48		50.9	OK	
S4.002	S15	-0.070	0.000	0.80		85.7	OK	
S4.003	S16	0.781	0.000	1.17		87.1	SURCHARGED	
S3.005	S17	0.968	0.000	1.50		192.8	SURCHARGED	
S3.006	S18	0.694	0.000	1.34		192.4	SURCHARGED	
S1.006	S19	0.560	0.000	0.86		421.4	SURCHARGED	
S5.000	S20	-0.065	0.000	0.78		67.6	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S5.001	S21	15 Summer	100	+10%	30/15 Summer			
S5.002	S22	15 Summer	100	+10%	100/15 Summer			
S5.003	S23	15 Summer	100	+10%				
S1.007	S24	15 Winter	100	+10%	30/15 Summer			
S1.008	S25	15 Winter	100	+10%	30/15 Summer			
S6.000	S26	15 Summer	100	+10%				
S7.000	S27	15 Summer	100	+10%	30/15 Summer			
S7.001	S29	15 Summer	100	+10%				
S8.000	S30	15 Summer	100	+10%	30/15 Summer			
S8.001	S31	15 Winter	100	+10%	30/15 Summer			
S6.001	S32	15 Winter	100	+10%	100/15 Summer			
S6.002	S33	15 Winter	100	+10%				
S6.003	S34	15 Summer	100	+10%	100/15 Summer			
S9.000	S35	15 Summer	100	+10%				
S9.001	S36	15 Summer	100	+10%				
S9.002	S37	15 Winter	100	+10%	30/15 Summer			
S1.009	S38	15 Winter	100	+10%	30/15 Summer			
S1.010	S39	15 Winter	100	+10%	30/15 Summer			
S1.011	S40	1440 Winter	100	+10%	100/15 Summer			
S1.012	S41	1440 Winter	100	+10%	5/30 Summer			
S1.013	S42	240 Winter	5	+10%				
S1.014	S43	480 Winter	5	+10%				
S1.015	S44	960 Winter	5	+10%				
S1.016	S45	240 Winter	5	+10%				
S10.000	S46	15 Summer	100	+10%				
S10.001	S47	15 Summer	100	+10%	30/15 Summer			
S11.000	S48	15 Summer	100	+10%				
S11.001	S49	15 Winter	100	+10%	100/15 Summer			
S11.002	S50	15 Winter	100	+10%	30/15 Summer			
S10.002	S51	15 Winter	100	+10%	100/15 Summer			
S10.003	S52	15 Winter	100	+10%	100/15 Summer			
S12.000	S53	15 Winter	100	+10%	30/15 Summer			
S12.001	S54	15 Winter	100	+10%	30/15 Summer			
S13.000	S55	15 Summer	100	+10%				
S12.002	S56	15 Winter	100	+10%	30/15 Summer			
S14.000	S57	15 Summer	100	+10%				
S12.003	S58	15 Winter	100	+10%				
S10.004	S59	15 Winter	100	+10%	30/15 Summer			
S10.005	S60	15 Winter	100	+10%	30/15 Summer			
S10.006	S61	15 Winter	100	+10%	30/15 Summer			
S10.007	S62	15 Winter	100	+10%	30/15 Summer			
S10.008	S63	1440 Winter	100	+10%	30/15 Summer			
S10.009	S64	1440 Winter	100	+10%	5/60 Summer			
S1.017	S65	120 Summer	100	+10%				
S1.018	S66	120 Winter	100	+10%				
S1.019	S67	180 Summer	100	+10%				

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S5.001	S21	68.280	0.230	0.000	1.42		70.7	SURCHARGED	
S5.002	S22	68.036	0.111	0.000	1.07		80.6	SURCHARGED	
S5.003	S23	66.167	-0.083	0.000	0.85		173.0	OK	
S1.007	S24	62.021	0.646	0.000	1.27		555.8	SURCHARGED	
S1.008	S25	61.603	0.478	0.000	1.59		562.4	SURCHARGED	
S6.000	S26	66.900	-0.050	0.000	0.87		33.1	OK	
S7.000	S27	68.619	0.319	0.000	1.17		56.7	SURCHARGED	
S7.001	S29	67.603	-0.047	0.000	0.97		63.9	OK	
S8.000	S30	68.835	0.615	0.000	1.28		65.8	SURCHARGED	
S8.001	S31	67.708	0.133	0.000	1.33		73.7	SURCHARGED	
S6.001	S32	66.726	0.076	0.000	1.03		184.8	SURCHARGED	
S6.002	S33	64.629	-0.096	0.000	0.89		281.2	OK	
S6.003	S34	61.819	0.144	0.000	1.15		285.9	SURCHARGED	
S9.000	S35	67.644	-0.116	0.000	0.44		44.9	OK	
S9.001	S36	64.029	-0.071	0.000	0.80		85.5	OK	
S9.002	S37	61.872	0.602	0.000	1.19		101.9	SURCHARGED	
S1.009	S38	61.281	0.481	0.000	1.84		911.7	SURCHARGED	
S1.010	S39	60.936	0.181	0.000	1.51		915.2	SURCHARGED	
S1.011	S40	59.382	0.328	0.000	0.11		84.9	SURCHARGED	
S1.012	S41	59.380	1.234	0.000	0.36		16.3	SURCHARGED	
S1.013	S42	57.756	-0.148	0.000	0.26		16.3	OK	
S1.014	S43	56.482	-0.163	0.000	0.17		16.3	OK	
S1.015	S44	54.199	-0.151	0.000	0.24		16.3	OK	
S1.016	S45	52.794	-0.131	0.000	0.37		16.3	OK	
S10.000	S46	58.604	-0.096	0.000	0.58		55.4	OK	
S10.001	S47	55.851	0.372	0.000	1.24		122.5	SURCHARGED	
S11.000	S48	59.487	-0.013	0.000	0.91		41.9	OK	
S11.001	S49	59.311	0.511	0.000	1.00		88.7	SURCHARGED	
S11.002	S50	57.223	1.475	0.000	1.74		107.3	SURCHARGED	
S10.002	S51	54.976	0.076	0.000	0.85		307.7	SURCHARGED	
S10.003	S52	54.547	0.347	0.000	1.07		286.6	SURCHARGED	
S12.000	S53	61.040	0.990	0.000	1.04		57.2	SURCHARGED	
S12.001	S54	59.957	1.032	0.000	1.13		86.3	SURCHARGED	
S13.000	S55	58.977	-0.073	0.000	0.75		38.1	OK	
S12.002	S56	58.666	0.741	0.000	1.19		131.1	SURCHARGED	
S14.000	S57	56.596	-0.084	0.000	0.79		102.8	OK	
S12.003	S58	55.195	-0.080	0.000	0.94		265.9	OK	
S10.004	S59	54.093	0.557	0.000	1.09		529.9	SURCHARGED	
S10.005	S60	53.817	0.517	0.000	1.45		532.2	SURCHARGED	
S10.006	S61	53.536	0.371	0.000	1.53		530.7	SURCHARGED	
S10.007	S62	53.253	0.203	0.000	1.59		530.6	SURCHARGED	
S10.008	S63	52.252	0.252	0.000	0.16		54.7	SURCHARGED	
S10.009	S64	52.247	0.822	0.000	0.54		16.0	SURCHARGED	
S1.017	S65	51.212	-0.168	0.000	0.41		32.3	OK	
S1.018	S66	50.907	-0.168	0.000	0.40		32.3	OK	
S1.019	S67	50.625	-0.165	0.000	0.42		32.3	OK	

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

Proposed Foul

FOUL SEWERAGE DESIGN Design

Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.100
Flow Per Person (l/per/day)	200.00	Maximum Backdrop Height (m)	1.500
Persons per House	4.08	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	150

Designed with Level Soffits

Network Design Table for Foul - Main

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
F1.000	22.496	2.050	11.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F1.001	41.466	1.611	25.7	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F2.000	11.606	0.275	42.2	0.065	85	0.0	1.500	o	225	Pipe/Conduit	
F1.002	65.174	0.496	131.4	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
F3.000	49.125	0.819	60.0	0.000	13	0.0	1.500	o	150	Pipe/Conduit	
F3.001	7.479	0.125	59.8	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F4.000	50.982	0.436	116.9	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
F4.001	6.784	0.188	36.1	0.000	1	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)
F1.000	67.600	0.000	0.0	4	0.0	8	0.64	2.65	46.9	0.2
F1.001	64.236	0.000	0.0	8	0.0	13	0.61	1.73	30.6	0.5
F2.000	62.291	0.065	0.0	85	0.0	40	1.01	1.77	70.4	4.8
F1.002	62.016	0.065	0.0	96	0.0	56	0.70	1.00	39.8	5.4
F3.000	69.750	0.000	0.0	13	0.0	20	0.53	1.13	20.0	0.7
F3.001	68.931	0.000	0.0	14	0.0	21	0.54	1.13	20.0	0.8
F4.000	70.130	0.000	0.0	12	0.0	22	0.41	0.81	14.3	0.7
F4.001	69.694	0.000	0.0	13	0.0	18	0.63	1.46	25.8	0.7

Network Design Table for Foul - Main

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
F3.002	25.000	1.656	15.1	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F3.003	72.554	4.877	14.9	0.000	15	0.0	1.500	o	225	Pipe/Conduit	
F1.003	66.594	0.444	150.0	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
F5.000	90.000	4.175	21.6	0.000	15	0.0	1.500	o	225	Pipe/Conduit	
F5.001	49.020	2.746	17.9	0.000	10	0.0	1.500	o	225	Pipe/Conduit	
F5.002	18.853	0.575	32.8	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.004	25.592	0.531	48.2	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F6.000	50.888	2.005	25.4	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
F6.001	53.549	3.655	14.7	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F6.002	65.632	0.438	149.8	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F7.000	55.359	0.923	60.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F8.000	60.915	1.525	39.9	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
F8.001	66.828	1.038	64.4	0.000	14	0.0	1.500	o	225	Pipe/Conduit	
F8.002	13.985	0.269	52.0	0.000	1	0.0	1.500	o	225	Pipe/Conduit	
F9.000	73.976	0.650	113.8	0.000	9	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)
F3.002	68.731	0.000	0.0	28	0.0	18	1.02	2.96	117.8	1.6
F3.003	66.781	0.000	0.0	43	0.0	23	1.18	2.98	118.7	2.4
F1.003	61.520	0.065	0.0	144	0.0	72	0.75	0.94	37.2	8.2
F5.000	70.200	0.000	0.0	15	0.0	15	0.74	2.48	98.5	0.9
F5.001	65.646	0.000	0.0	25	0.0	18	0.93	2.72	108.3	1.4
F5.002	62.375	0.000	0.0	25	0.0	21	0.75	2.01	79.9	1.4
F1.004	61.076	0.065	0.0	169	0.0	58	1.18	1.66	65.8	9.6
F6.000	65.755	0.000	0.0	8	0.0	13	0.61	1.74	30.8	0.5
F6.001	63.750	0.000	0.0	13	0.0	14	0.86	2.30	40.6	0.7
F6.002	60.095	0.000	0.0	17	0.0	28	0.42	0.71	12.6	1.0
F7.000	66.780	0.000	0.0	4	0.0	12	0.36	1.13	20.0	0.2
F8.000	69.600	0.000	0.0	12	0.0	17	0.59	1.39	24.5	0.7
F8.001	67.850	0.000	0.0	26	0.0	25	0.61	1.43	56.9	1.5
F8.002	66.812	0.000	0.0	27	0.0	24	0.66	1.59	63.4	1.5
F9.000	68.150	0.000	0.0	9	0.0	20	0.38	0.82	14.5	0.5

Network Design Table for Foul - Main

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
F9.001	14.030	0.140	100.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F7.001	52.721	1.207	43.7	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
F7.002	90.000	3.966	22.7	0.000	17	0.0	1.500	o	225	Pipe/Conduit	
F10.000	52.843	2.270	23.3	0.000	14	0.0	1.500	o	150	Pipe/Conduit	
F10.001	41.839	2.020	20.7	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F11.000	34.090	0.703	48.5	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F10.002	52.656	1.008	52.2	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F10.003	18.107	0.114	158.8	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F6.003	27.618	0.138	200.1	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F12.000	49.000	0.245	200.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
F6.004	19.987	0.100	199.9	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F6.005	43.102	0.216	199.5	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F6.006	54.753	0.274	199.8	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F1.005	4.382	0.040	109.6	0.092	0	0.0	1.500	o	300	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)
F9.001	66.861	0.000	0.0	9	0.0	19	0.39	0.87	15.5	0.5
F7.001	65.782	0.000	0.0	48	0.0	31	0.84	1.74	69.2	2.7
F7.002	64.175	0.000	0.0	65	0.0	30	1.16	2.42	96.0	3.7
F10.000	67.420	0.000	0.0	14	0.0	16	0.75	1.82	32.2	0.8
F10.001	65.000	0.000	0.0	19	0.0	19	0.86	1.93	34.1	1.1
F11.000	63.350	0.000	0.0	3	0.0	10	0.36	1.26	22.3	0.2
F10.002	61.628	0.000	0.0	26	0.0	24	0.65	1.59	63.2	1.5
F10.003	60.620	0.000	0.0	26	0.0	31	0.44	0.91	36.2	1.5
F6.003	59.582	0.000	0.0	108	0.0	66	0.62	0.81	32.2	6.1
F12.000	59.275	0.000	0.0	8	0.0	19	0.28	0.81	32.2	0.5
F6.004	59.030	0.000	0.0	116	0.0	69	0.64	0.81	32.2	6.6
F6.005	58.930	0.000	0.0	120	0.0	70	0.64	0.81	32.2	6.8
F6.006	58.714	0.000	0.0	124	0.0	71	0.65	0.81	32.2	7.0
F1.005	58.440	0.157	0.0	293	0.0	85	1.00	1.32	93.6	16.6

Network Design Table for Foul - Main

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
F1.006	37.600	0.300	125.3	0.000	6	0.1	1.500	o	300	Pipe/Conduit	
F1.007	37.600	1.375	27.3	0.000	4	0.0	1.500	o	300	Pipe/Conduit	
F1.008	56.570	2.025	27.9	0.000	5	0.0	1.500	o	300	Pipe/Conduit	
F13.000	55.000	2.075	26.5	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F13.001	67.223	1.177	57.1	0.000	15	0.0	1.500	o	225	Pipe/Conduit	
F14.000	46.376	2.210	21.0	0.000	11	0.0	1.500	o	225	Pipe/Conduit	
F15.000	71.071	0.355	200.2	0.000	12	0.0	1.500	o	225	Pipe/Conduit	
F15.001	4.801	0.040	120.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F14.001	43.368	1.300	33.4	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
F13.002	89.361	0.547	163.4	0.000	23	0.0	1.500	o	225	Pipe/Conduit	
F1.009	15.000	0.175	85.7	0.027	3	1.1	1.500	o	300	Pipe/Conduit	
F1.010	84.895	3.580	23.7	0.063	0	0.0	1.500	o	300	Pipe/Conduit	
F1.011	28.131	0.345	81.5	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.012	57.000	0.285	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.013	40.000	0.200	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.014	55.000	0.275	200.0	0.000	0	0.0	1.500	o	300	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)
F1.006	58.400	0.157	0.1	299	0.0	90	0.96	1.24	87.5	17.0
F1.007	57.700	0.157	0.1	303	0.0	61	1.66	2.66	187.8	17.3
F1.008	56.000	0.157	0.1	308	0.0	62	1.66	2.63	185.8	17.6
F13.000	57.635	0.000	0.0	6	0.0	12	0.55	1.71	30.2	0.3
F13.001	55.485	0.000	0.0	21	0.0	22	0.59	1.52	60.5	1.2
F14.000	58.575	0.000	0.0	11	0.0	13	0.68	2.51	99.9	0.6
F15.000	56.545	0.000	0.0	12	0.0	23	0.32	0.81	32.2	0.7
F15.001	56.190	0.000	0.0	12	0.0	20	0.38	1.05	41.6	0.7
F14.001	55.900	0.000	0.0	27	0.0	22	0.77	1.99	79.2	1.5
F13.002	54.308	0.000	0.0	71	0.0	51	0.59	0.90	35.7	4.0
F1.009	52.825	0.184	1.2	382	0.0	95	1.20	1.50	105.9	22.8
F1.010	52.650	0.247	1.2	382	0.0	68	1.90	2.85	201.7	22.8
F1.011	48.995	0.247	1.2	382	0.0	93	1.22	1.54	108.6	22.8
F1.012	48.650	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.013	48.365	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.014	48.165	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8

Network Design Table for Foul - Main

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
F1.015	67.000	0.335	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.016	89.500	0.448	199.8	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.017	75.052	0.375	200.1	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.018	85.000	0.425	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.019	57.000	0.285	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.020	34.288	0.172	199.3	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.021	81.540	0.408	199.9	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.022	38.247	0.481	79.5	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.023	87.559	1.100	79.6	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.024	89.060	2.200	40.5	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.025	87.673	3.136	28.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.026	46.484	0.556	83.6	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.027	8.000	0.040	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.028	4.285	0.022	194.8	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.029	42.591	0.213	200.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
F1.030	4.465	0.058	77.0	0.000	0	0.0	1.500	o	300	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)
F1.015	47.890	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.016	47.555	0.247	1.2	382	0.0	119	0.88	0.98	69.3	22.8
F1.017	47.107	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.018	46.732	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.019	46.307	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.020	45.722	0.247	1.2	382	0.0	118	0.88	0.98	69.3	22.8
F1.021	45.550	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.022	44.581	0.247	1.2	382	0.0	93	1.23	1.56	110.0	22.8
F1.023	44.100	0.247	1.2	382	0.0	93	1.23	1.56	109.9	22.8
F1.024	43.000	0.247	1.2	382	0.0	78	1.57	2.18	154.3	22.8
F1.025	40.036	0.247	1.2	382	0.0	71	1.79	2.63	185.7	22.8
F1.026	36.900	0.247	1.2	382	0.0	94	1.21	1.52	107.3	22.8
F1.027	35.773	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.028	35.733	0.247	1.2	382	0.0	118	0.89	0.99	70.1	22.8
F1.029	35.711	0.247	1.2	382	0.0	119	0.88	0.98	69.2	22.8
F1.030	35.400	0.247	1.2	382	0.0	92	1.24	1.58	111.8	22.8

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Proposed Foul with Stormwater Misconnections

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	16.000	Add Flow / Climate Change (%)	0
Ratio R	0.250	Minimum Backdrop Height (m)	0.100
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	150

Designed with Level Soffits

Network Design Table for Foul - Main

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
F1.000	22.496	2.050	11.0	0.000	3.00	0.2	1.500	o	150	Pipe/Conduit	
F1.001	41.466	1.611	25.7	0.000	0.00	0.2	1.500	o	150	Pipe/Conduit	
F2.000	11.606	0.275	42.2	0.065	3.00	4.8	1.500	o	225	Pipe/Conduit	
F1.002	65.174	0.496	131.4	0.000	0.00	0.2	1.500	o	225	Pipe/Conduit	
F3.000	49.125	0.819	60.0	0.000	3.00	0.7	1.500	o	150	Pipe/Conduit	
F3.001	7.479	0.125	59.8	0.000	0.00	0.1	1.500	o	150	Pipe/Conduit	
F4.000	50.982	0.436	116.9	0.000	3.00	0.7	1.500	o	150	Pipe/Conduit	
F4.001	6.784	0.188	36.1	0.000	0.00	0.1	1.500	o	150	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)
F1.000	50.00	3.14	67.600	0.000	0.2	0.0	0.0	2.65	46.9	0.2
F1.001	50.00	3.54	64.236	0.000	0.4	0.0	0.0	1.73	30.6	0.4
F2.000	50.00	3.11	62.291	0.065	4.8	0.0	0.0	1.77	70.4	13.6
F1.002	50.00	4.63	62.016	0.065	5.4	0.0	0.0	1.00	39.8	14.2
F3.000	50.00	3.72	69.750	0.000	0.7	0.0	0.0	1.13	20.0	0.7
F3.001	50.00	3.83	68.931	0.000	0.8	0.0	0.0	1.13	20.0	0.8
F4.000	50.00	4.05	70.130	0.000	0.7	0.0	0.0	0.81	14.3	0.7
F4.001	50.00	4.13	69.694	0.000	0.8	0.0	0.0	1.46	25.8	0.8

Network Design Table for Foul - Main

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
F3.002	25.000	1.656	15.1	0.000	0.00	0.1	1.500	o	225	Pipe/Conduit	
F3.003	72.554	4.877	14.9	0.000	0.00	0.8	1.500	o	225	Pipe/Conduit	
F1.003	66.594	0.444	150.0	0.000	0.00	0.3	1.500	o	225	Pipe/Conduit	
F5.000	90.000	4.175	21.6	0.000	3.00	0.8	1.500	o	225	Pipe/Conduit	
F5.001	49.020	2.746	17.9	0.000	0.00	0.6	1.500	o	225	Pipe/Conduit	
F5.002	18.853	0.575	32.8	0.000	0.00	0.0	1.500	o	225	Pipe/Conduit	
F1.004	25.592	0.531	48.2	0.000	0.00	0.0	1.500	o	225	Pipe/Conduit	
F6.000	50.888	2.005	25.4	0.000	3.00	0.4	1.500	o	150	Pipe/Conduit	
F6.001	53.549	3.655	14.7	0.000	0.00	0.3	1.500	o	150	Pipe/Conduit	
F6.002	65.632	0.438	149.8	0.000	0.00	0.2	1.500	o	150	Pipe/Conduit	
F7.000	55.359	0.923	60.0	0.000	3.00	0.2	1.500	o	150	Pipe/Conduit	
F8.000	60.915	1.525	39.9	0.000	3.00	0.7	1.500	o	150	Pipe/Conduit	
F8.001	66.828	1.038	64.4	0.000	0.00	0.8	1.500	o	225	Pipe/Conduit	
F8.002	13.985	0.269	52.0	0.000	0.00	0.1	1.500	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)
F3.002	50.00	4.27	68.731	0.000	1.7	0.0	0.0	2.96	117.8	1.7
F3.003	50.00	4.67	66.781	0.000	2.5	0.0	0.0	2.98	118.7	2.5
F1.003	50.00	5.86	61.520	0.065	8.2	0.0	0.0	0.94	37.2	17.0
F5.000	50.00	3.61	70.200	0.000	0.8	0.0	0.0	2.48	98.5	0.8
F5.001	50.00	3.91	65.646	0.000	1.4	0.0	0.0	2.72	108.3	1.4
F5.002	50.00	4.06	62.375	0.000	1.4	0.0	0.0	2.01	79.9	1.4
F1.004	50.00	6.12	61.076	0.065	9.6	0.0	0.0	1.66	65.8	18.4
F6.000	50.00	3.49	65.755	0.000	0.4	0.0	0.0	1.74	30.8	0.4
F6.001	50.00	3.87	63.750	0.000	0.7	0.0	0.0	2.30	40.6	0.7
F6.002	50.00	5.41	60.095	0.000	0.9	0.0	0.0	0.71	12.6	0.9
F7.000	50.00	3.81	66.780	0.000	0.2	0.0	0.0	1.13	20.0	0.2
F8.000	50.00	3.73	69.600	0.000	0.7	0.0	0.0	1.39	24.5	0.7
F8.001	50.00	4.51	67.850	0.000	1.5	0.0	0.0	1.43	56.9	1.5
F8.002	50.00	4.66	66.812	0.000	1.6	0.0	0.0	1.59	63.4	1.6

Network Design Table for Foul - Main

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
F9.000	73.976	0.650	113.8	0.000	3.00	0.5	1.500	o	150	Pipe/Conduit	
F9.001	14.030	0.140	100.2	0.000	0.00	0.0	1.500	o	150	Pipe/Conduit	
F7.001	52.721	1.207	43.7	0.000	0.00	0.5	1.500	o	225	Pipe/Conduit	
F7.002	90.000	3.966	22.7	0.000	0.00	0.9	1.500	o	225	Pipe/Conduit	
F10.000	52.843	2.270	23.3	0.000	3.00	0.8	1.500	o	150	Pipe/Conduit	
F10.001	41.839	2.020	20.7	0.000	0.00	0.3	1.500	o	150	Pipe/Conduit	
F11.000	34.090	0.703	48.5	0.000	3.00	0.2	1.500	o	150	Pipe/Conduit	
F10.002	52.656	1.008	52.2	0.000	0.00	0.2	1.500	o	225	Pipe/Conduit	
F10.003	18.107	0.114	158.8	0.000	0.00	0.0	1.500	o	225	Pipe/Conduit	
F6.003	27.618	0.138	200.1	0.000	0.00	0.0	1.500	o	225	Pipe/Conduit	
F12.000	49.000	0.245	200.0	0.000	3.00	0.5	1.500	o	225	Pipe/Conduit	
F6.004	19.987	0.100	199.9	0.000	0.00	0.0	1.500	o	225	Pipe/Conduit	
F6.005	43.102	0.216	199.5	0.000	0.00	0.2	1.500	o	225	Pipe/Conduit	
F6.006	54.753	0.274	199.8	0.000	0.00	0.2	1.500	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)
F9.000	50.00	4.50	68.150	0.000	0.5	0.0	0.0	0.82	14.5	0.5
F9.001	50.00	4.77	66.861	0.000	0.5	0.0	0.0	0.87	15.5	0.5
F7.001	50.00	5.27	65.782	0.000	2.8	0.0	0.0	1.74	69.2	2.8
F7.002	50.00	5.90	64.175	0.000	3.7	0.0	0.0	2.42	96.0	3.7
F10.000	50.00	3.48	67.420	0.000	0.8	0.0	0.0	1.82	32.2	0.8
F10.001	50.00	3.84	65.000	0.000	1.1	0.0	0.0	1.93	34.1	1.1
F11.000	50.00	3.45	63.350	0.000	0.2	0.0	0.0	1.26	22.3	0.2
F10.002	50.00	4.40	61.628	0.000	1.5	0.0	0.0	1.59	63.2	1.5
F10.003	50.00	4.73	60.620	0.000	1.5	0.0	0.0	0.91	36.2	1.5
F6.003	50.00	6.46	59.582	0.000	6.1	0.0	0.0	0.81	32.2	6.1
F12.000	50.00	4.01	59.275	0.000	0.5	0.0	0.0	0.81	32.2	0.5
F6.004	50.00	6.88	59.030	0.000	6.6	0.0	0.0	0.81	32.2	6.6
F6.005	50.00	7.76	58.930	0.000	6.8	0.0	0.0	0.81	32.2	6.8
F6.006	50.00	8.89	58.714	0.000	7.0	0.0	0.0	0.81	32.2	7.0

Network Design Table for Foul - Main

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
F1.005	4.382	0.040	109.6	0.092	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.006	37.600	0.300	125.3	0.000	0.00	0.4	1.500	o	300	Pipe/Conduit	
F1.007	37.600	1.375	27.3	0.000	0.00	0.2	1.500	o	300	Pipe/Conduit	
F1.008	56.570	2.025	27.9	0.000	0.00	0.3	1.500	o	300	Pipe/Conduit	
F13.000	55.000	2.075	26.5	0.000	3.00	0.3	1.500	o	150	Pipe/Conduit	
F13.001	67.223	1.177	57.1	0.000	0.00	0.9	1.500	o	225	Pipe/Conduit	
F14.000	46.376	2.210	21.0	0.000	3.00	0.6	1.500	o	225	Pipe/Conduit	
F15.000	71.071	0.355	200.2	0.000	3.00	0.7	1.500	o	225	Pipe/Conduit	
F15.001	4.801	0.040	120.0	0.000	0.00	0.0	1.500	o	225	Pipe/Conduit	
F14.001	43.368	1.300	33.4	0.000	0.00	0.2	1.500	o	225	Pipe/Conduit	
F13.002	89.361	0.547	163.4	0.000	0.00	1.3	1.500	o	225	Pipe/Conduit	
F1.009	14.997	0.175	85.7	0.027	0.00	1.3	1.500	o	300	Pipe/Conduit	
F1.010	84.898	3.580	23.7	0.063	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.011	28.131	0.345	81.5	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.012	57.000	0.285	200.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.013	40.000	0.200	200.0	0.000	0.00	0.0	1.500	o	300	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)
F1.005	50.00	8.94	58.440	0.157	16.6	0.0	0.0	1.32	93.6	37.9
F1.006	50.00	9.45	58.400	0.157	17.0	0.0	0.0	1.24	87.5	38.3
F1.007	50.00	9.68	57.700	0.157	17.2	0.0	0.0	2.66	187.8	38.5
F1.008	50.00	10.04	56.000	0.157	17.5	0.0	0.0	2.63	185.8	38.8
F13.000	50.00	3.54	57.635	0.000	0.3	0.0	0.0	1.71	30.2	0.3
F13.001	50.00	4.27	55.485	0.000	1.2	0.0	0.0	1.52	60.5	1.2
F14.000	50.00	3.31	58.575	0.000	0.6	0.0	0.0	2.51	99.9	0.6
F15.000	50.00	4.46	56.545	0.000	0.7	0.0	0.0	0.81	32.2	0.7
F15.001	50.00	4.54	56.190	0.000	0.7	0.0	0.0	1.05	41.6	0.7
F14.001	50.00	4.90	55.900	0.000	1.5	0.0	0.0	1.99	79.2	1.5
F13.002	50.00	6.56	54.308	0.000	4.0	0.0	0.0	0.90	35.7	4.0
F1.009	50.00	10.21	52.825	0.184	22.8	0.0	0.0	1.50	105.9	47.7
F1.010	50.00	10.71	52.650	0.247	22.8	0.0	0.0	2.85	201.7	56.2
F1.011	50.00	11.01	48.995	0.247	22.8	0.0	0.0	1.54	108.6	56.2
F1.012	50.00	11.98	48.650	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.013	50.00	12.66	48.365	0.247	22.8	0.0	0.0	0.98	69.2	56.2

Network Design Table for Foul - Main

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
F1.014	55.000	0.275	200.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.015	67.000	0.335	200.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.016	89.500	0.448	199.8	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.017	75.052	0.375	200.1	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.018	85.000	0.425	200.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.019	57.000	0.285	200.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.020	34.288	0.172	199.3	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.021	81.540	0.408	199.9	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.022	38.247	0.481	79.5	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.023	87.559	1.100	79.6	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.024	89.060	2.200	40.5	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.025	87.673	3.136	28.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.026	46.484	0.556	83.6	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.027	8.000	0.040	200.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.028	4.285	0.022	194.8	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.029	42.591	0.213	200.0	0.000	0.00	0.0	1.500	o	300	Pipe/Conduit	
F1.030	4.465	0.058	77.0	0.000	0.00	0.0	1.500	o	300	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)
F1.014	50.00	13.60	48.165	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.015	50.00	14.74	47.890	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.016	50.00	16.26	47.555	0.247	22.8	0.0	0.0	0.98	69.3	56.2
F1.017	50.00	17.54	47.107	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.018	50.00	18.99	46.732	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.019	50.00	19.96	46.307	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.020	50.00	20.54	45.722	0.247	22.8	0.0	0.0	0.98	69.3	56.2
F1.021	50.00	21.93	45.550	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.022	50.00	22.34	44.581	0.247	22.8	0.0	0.0	1.56	110.0	56.2
F1.023	50.00	23.27	44.100	0.247	22.8	0.0	0.0	1.56	109.9	56.2
F1.024	50.00	23.95	43.000	0.247	22.8	0.0	0.0	2.18	154.3	56.2
F1.025	50.00	24.51	40.036	0.247	22.8	0.0	0.0	2.63	185.7	56.2
F1.026	50.00	25.02	36.900	0.247	22.8	0.0	0.0	1.52	107.3	56.2
F1.027	50.00	25.16	35.773	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.028	50.00	25.23	35.733	0.247	22.8	0.0	0.0	0.99	70.1	56.2
F1.029	50.00	25.95	35.711	0.247	22.8	0.0	0.0	0.98	69.2	56.2
F1.030	50.00	26.00	35.400	0.247	22.8	0.0	0.0	1.58	111.8	56.2

Area Summary for Foul - Main

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.065	0.065	0.065
1.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.000	0.000	0.000
4.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.000	0.000	0.000
3.003	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.000	0.000	0.000
5.001	-	-	100	0.000	0.000	0.000
5.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.000	0.000	0.000
6.001	-	-	100	0.000	0.000	0.000
6.002	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
8.001	-	-	100	0.000	0.000	0.000
8.002	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.000	0.000	0.000
9.001	-	-	100	0.000	0.000	0.000
7.001	-	-	100	0.000	0.000	0.000
7.002	-	-	100	0.000	0.000	0.000
10.000	-	-	100	0.000	0.000	0.000
10.001	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.000	0.000	0.000
10.002	-	-	100	0.000	0.000	0.000
10.003	-	-	100	0.000	0.000	0.000
6.003	-	-	100	0.000	0.000	0.000
12.000	-	-	100	0.000	0.000	0.000
6.004	-	-	100	0.000	0.000	0.000
6.005	-	-	100	0.000	0.000	0.000
6.006	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.092	0.092	0.092
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
13.000	-	-	100	0.000	0.000	0.000
13.001	-	-	100	0.000	0.000	0.000
14.000	-	-	100	0.000	0.000	0.000
15.000	-	-	100	0.000	0.000	0.000
15.001	-	-	100	0.000	0.000	0.000
14.001	-	-	100	0.000	0.000	0.000
13.002	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.027	0.027	0.027
1.010	-	-	100	0.063	0.063	0.063
1.011	-	-	100	0.000	0.000	0.000

Area Summary for Foul - Main

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
1.017	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000
1.021	-	-	100	0.000	0.000	0.000
1.022	-	-	100	0.000	0.000	0.000
1.023	-	-	100	0.000	0.000	0.000
1.024	-	-	100	0.000	0.000	0.000
1.025	-	-	100	0.000	0.000	0.000
1.026	-	-	100	0.000	0.000	0.000
1.027	-	-	100	0.000	0.000	0.000
1.028	-	-	100	0.000	0.000	0.000
1.029	-	-	100	0.000	0.000	0.000
1.030	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.247	0.247	0.247

Summary of Critical Results by Maximum Level (Rank 1) for Foul - Main

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	100.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160
Return Period(s) (years)	5, 30, 100
Climate Change (%)	10, 10, 10

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
F1.000	F1	15 Summer	5	+10%					67.603
F1.001	F2	180 Summer	100	+10%					64.245
F2.000	F3	15 Summer	100	+10%					62.405
F1.002	F4	15 Summer	100	+10%					62.174
F3.000	F5	60 Winter	100	+10%					69.768
F3.001	F6	15 Summer	5	+10%					68.951
F4.000	F7	360 Summer	30	+10%					70.151
F4.001	F8	15 Summer	5	+10%					69.712
F3.002	F9	15 Summer	5	+10%					68.748
F3.003	F10	240 Winter	5	+10%					66.804
F1.003	F11	15 Summer	100	+10%					61.683
F5.000	F12	180 Winter	100	+10%					70.209
F5.001	F13	180 Summer	100	+10%					65.660
F5.002	F14	60 Summer	5	+10%					62.396
F1.004	F15	15 Winter	100	+10%					61.188
F6.000	F16	60 Winter	30	+10%					65.764
F6.001	F17	360 Summer	30	+10%					63.762
F6.002	F18	180 Winter	30	+10%					60.121
F7.000	F19	180 Winter	30	+10%					66.787
F8.000	F20	180 Winter	5	+10%					69.617

Summary of Critical Results by Maximum Level (Rank 1) for Foul - Main

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
F1.000	F1	-0.147	0.000	0.00		0.2	OK	
F1.001	F2	-0.141	0.000	0.01		0.4	OK	
F2.000	F3	-0.111	0.000	0.50		31.1	OK	
F1.002	F4	-0.067	0.000	0.74		28.8	OK	
F3.000	F5	-0.132	0.000	0.04		0.7	OK	
F3.001	F6	-0.130	0.000	0.04		0.8	OK	
F4.000	F7	-0.129	0.000	0.05		0.7	OK	
F4.001	F8	-0.132	0.000	0.04		0.8	OK	
F3.002	F9	-0.208	0.000	0.02		1.7	OK	
F3.003	F10	-0.202	0.000	0.02		2.5	OK	
F1.003	F11	-0.062	0.000	0.79		28.8	OK	
F5.000	F12	-0.216	0.000	0.01		0.8	OK	
F5.001	F13	-0.211	0.000	0.01		1.4	OK	
F5.002	F14	-0.204	0.000	0.02		1.4	OK	
F1.004	F15	-0.113	0.000	0.50		30.7	OK	
F6.000	F16	-0.141	0.000	0.01		0.4	OK	
F6.001	F17	-0.138	0.000	0.02		0.7	OK	
F6.002	F18	-0.124	0.000	0.07		0.9	OK	
F7.000	F19	-0.143	0.000	0.01		0.2	OK	
F8.000	F20	-0.133	0.000	0.03		0.7	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Foul - Main

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
F8.001	F21	60 Summer	5	+10%				
F8.002	F22	15 Summer	5	+10%				
F9.000	F23	360 Summer	100	+10%				
F9.001	F24	120 Summer	100	+10%				
F7.001	F25	120 Winter	30	+10%				
F7.002	F26	240 Summer	30	+10%				
F10.000	F27	360 Summer	100	+10%				
F10.001	F28	60 Winter	30	+10%				
F11.000	F29	180 Summer	100	+10%				
F10.002	F30	60 Winter	5	+10%				
F10.003	F31	180 Winter	5	+10%				
F6.003	F32	180 Summer	30	+10%				
F12.000	F33	480 Summer	100	+10%				
F6.004	F34	360 Winter	30	+10%				
F6.005	F35	360 Summer	30	+10%				
F6.006	F36	480 Summer	30	+10%				
F1.005	F37	15 Winter	100	+10%				
F1.006	F38	15 Winter	100	+10%				
F1.007	F39	30 Summer	100	+10%				
F1.008	F40	15 Winter	100	+10%				
F13.000	F41	60 Winter	30	+10%				
F13.001	F42	180 Summer	100	+10%				
F14.000	F43	15 Summer	5	+10%				
F15.000	F44	120 Winter	5	+10%				
F15.001	F45	360 Winter	30	+10%				
F14.001	F46	480 Winter	5	+10%				
F13.002	F47	480 Winter	5	+10%				
F1.009	F48	15 Winter	100	+10%				
F1.010	F49	15 Winter	100	+10%				
F1.011	F50	30 Summer	100	+10%	100/15 Summer			
F1.012	F51	30 Summer	100	+10%	30/15 Summer			
F1.013	F52	30 Winter	100	+10%	30/15 Winter			
F1.014	F53	30 Winter	100	+10%	100/15 Summer			
F1.015	F54	30 Winter	100	+10%	100/15 Winter			
F1.016	F55	30 Winter	100	+10%				
F1.017	F56	30 Winter	100	+10%				
F1.018	F57	30 Winter	100	+10%				
F1.019	F58	30 Winter	100	+10%				
F1.020	F59	60 Summer	100	+10%				
F1.021	F60	30 Winter	100	+10%				
F1.022	F61	30 Winter	100	+10%				
F1.023	F62	30 Winter	100	+10%				
F1.024	F63	30 Winter	100	+10%				
F1.025	F64	30 Winter	100	+10%				
F1.026	F65	30 Winter	100	+10%				
F1.027	F66	30 Winter	100	+10%	30/15 Summer			
F1.028	F67	30 Winter	100	+10%	30/30 Winter			
F1.029	F68	30 Winter	100	+10%				

Summary of Critical Results by Maximum Level (Rank 1) for Foul - Main

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
F8.001	F21	67.875	-0.200	0.000	0.03		1.5	OK	
F8.002	F22	66.837	-0.200	0.000	0.03		1.6	OK	
F9.000	F23	68.168	-0.132	0.000	0.03		0.5	OK	
F9.001	F24	66.879	-0.132	0.000	0.03		0.5	OK	
F7.001	F25	65.811	-0.196	0.000	0.04		2.8	OK	
F7.002	F26	64.204	-0.196	0.000	0.04		3.7	OK	
F10.000	F27	67.436	-0.134	0.000	0.03		0.8	OK	
F10.001	F28	65.018	-0.132	0.000	0.03		1.1	OK	
F11.000	F29	63.357	-0.143	0.000	0.01		0.2	OK	
F10.002	F30	61.652	-0.201	0.000	0.02		1.5	OK	
F10.003	F31	60.651	-0.194	0.000	0.05		1.5	OK	
F6.003	F32	59.650	-0.157	0.000	0.20		6.1	OK	
F12.000	F33	59.292	-0.208	0.000	0.02		0.5	OK	
F6.004	F34	59.102	-0.153	0.000	0.22		6.6	OK	
F6.005	F35	59.002	-0.153	0.000	0.22		6.8	OK	
F6.006	F36	58.787	-0.152	0.000	0.22		7.0	OK	
F1.005	F37	58.722	-0.018	0.000	1.00		61.4	OK	
F1.006	F38	58.595	-0.105	0.000	0.75		61.8	OK	
F1.007	F39	57.822	-0.178	0.000	0.35		61.9	OK	
F1.008	F40	56.122	-0.178	0.000	0.35		62.3	OK	
F13.000	F41	57.642	-0.143	0.000	0.01		0.3	OK	
F13.001	F42	55.507	-0.203	0.000	0.02		1.2	OK	
F14.000	F43	58.582	-0.218	0.000	0.01		0.6	OK	
F15.000	F44	56.568	-0.202	0.000	0.02		0.7	OK	
F15.001	F45	56.213	-0.202	0.000	0.02		0.7	OK	
F14.001	F46	55.921	-0.204	0.000	0.02		1.5	OK	
F13.002	F47	54.358	-0.175	0.000	0.11		4.0	OK	
F1.009	F48	53.033	-0.092	0.000	0.81		74.6	OK	
F1.010	F49	52.797	-0.153	0.000	0.47		92.1	OK	
F1.011	F50	49.406	0.111	0.000	0.87		87.4	SURCHARGED	
F1.012	F51	49.174	0.224	0.000	1.24		82.7	SURCHARGED	
F1.013	F52	48.788	0.123	0.000	1.16		75.7	SURCHARGED	
F1.014	F53	48.532	0.067	0.000	1.11		73.6	SURCHARGED	
F1.015	F54	48.219	0.029	0.000	1.06		70.6	SURCHARGED	
F1.016	F55	47.849	-0.006	0.000	1.00		67.4	OK	
F1.017	F56	47.355	-0.052	0.000	1.00		67.0	OK	
F1.018	F57	46.971	-0.061	0.000	0.99		66.9	OK	
F1.019	F58	46.553	-0.054	0.000	1.00		66.4	OK	
F1.020	F59	46.022	0.000	0.000	1.01		65.7	OK	
F1.021	F60	45.788	-0.062	0.000	0.99		66.4	OK	
F1.022	F61	44.756	-0.125	0.000	0.64		66.4	OK	
F1.023	F62	44.271	-0.129	0.000	0.62		66.4	OK	
F1.024	F63	43.139	-0.161	0.000	0.44		66.4	OK	
F1.025	F64	40.161	-0.175	0.000	0.37		66.4	OK	
F1.026	F65	37.077	-0.123	0.000	0.65		66.4	OK	
F1.027	F66	36.149	0.076	0.000	1.22		66.2	SURCHARGED	
F1.028	F67	36.080	0.047	0.000	1.38		66.2	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Foul - Main

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
F1.029	F68	36.011	0.000	0.000	1.00		65.8	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Foul - Main

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
F1.030	F69	60 Winter	100	+10%					35.700

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
F1.030	F69	0.000	0.000	1.05		64.5	OK	

APPENDIX C

Greenfield Runoff Rate

Project: Gorey Housing	IE CONSULTING WATER-ENVIRONMENTAL-CIVIL	**Project No:** IE1505
Element: Greenfield Runoff Rate - North Catchment		**Calc Sheet No:** 1 of 1
Drawing Ref:	**Produced By:** N O'Malley **Checked By:** P McShane	**Date:** 23-Oct-18

Calculations

Design Parameters

Location Of Catchment (Pick from List)	Ireland		**11**	
Regional Co-efficient (This value is Calculated)		**C**	**0.0172**	
Catchment Area		**AREA**	**0.500**	km^2
Soil Run Off Potential		**SOIL**	**0.3**	SOIL Maps
Standard Average Annual Rainfall		**SAAR**	**966.25**	Met Office

Mean Annual Flood (Qbar) Based on 50ha Catchment as Detailed In the Flood Studies Report

Qbar =0.00108(AREA^0.89 SAAR^1.17 SOIL^2.17)

Qbar = **0.133** m^3/s

Permissible Discharge	= (Qbar / 50) x Site Area	Site Area =	**6.153**	ha
Permissible Discharge	**=** **0.016**	m^3/s		
	= **16.4**	l/s		

Project: Gorey Housing	IE CONSULTING WATER-ENVIRONMENTAL-CIVIL	**Project No:** IE1505
Element: Greenfield Runoff Rate - South Catchment		**Calc Sheet No:** 1 of 1
Drawing Ref:	**Produced By:** N O'Malley **Checked By:** P McShane	**Date:** 23-Oct-18

Calculations

Design Parameters

Location Of Catchment (Pick from List)	Ireland		**11**	
Regional Co-efficient (This value is Calculated)		**C**	**0.0172**	
Catchment Area		**AREA**	**0.500**	km^2
Soil Run Off Potential		**SOIL**	**0.3**	SOIL Maps
Standard Average Annual Rainfall		**SAAR**	**966.25**	Met Office

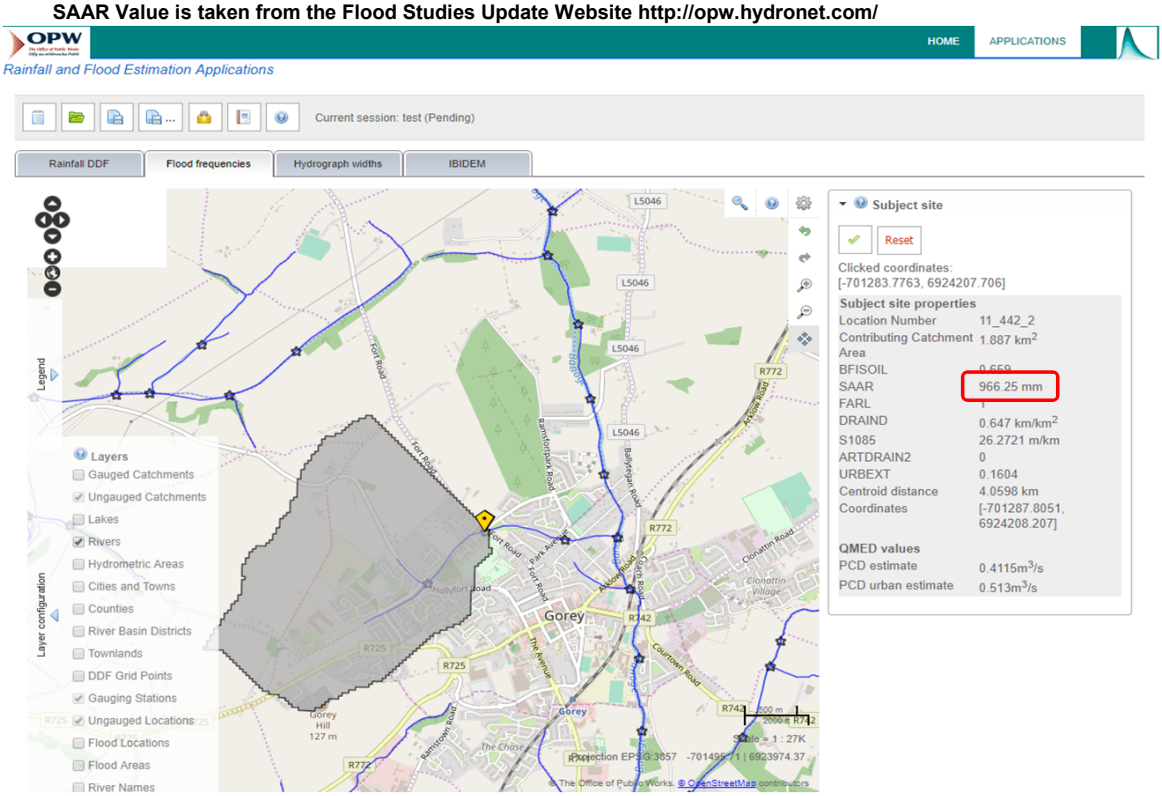
Mean Annual Flood (Qbar) Based on 50ha Catchment as Detailed In the Flood Studies Report

Qbar =0.00108(AREA^0.89 SAAR^1.17 SOIL^2.17)

Qbar = **0.133** m^3/s

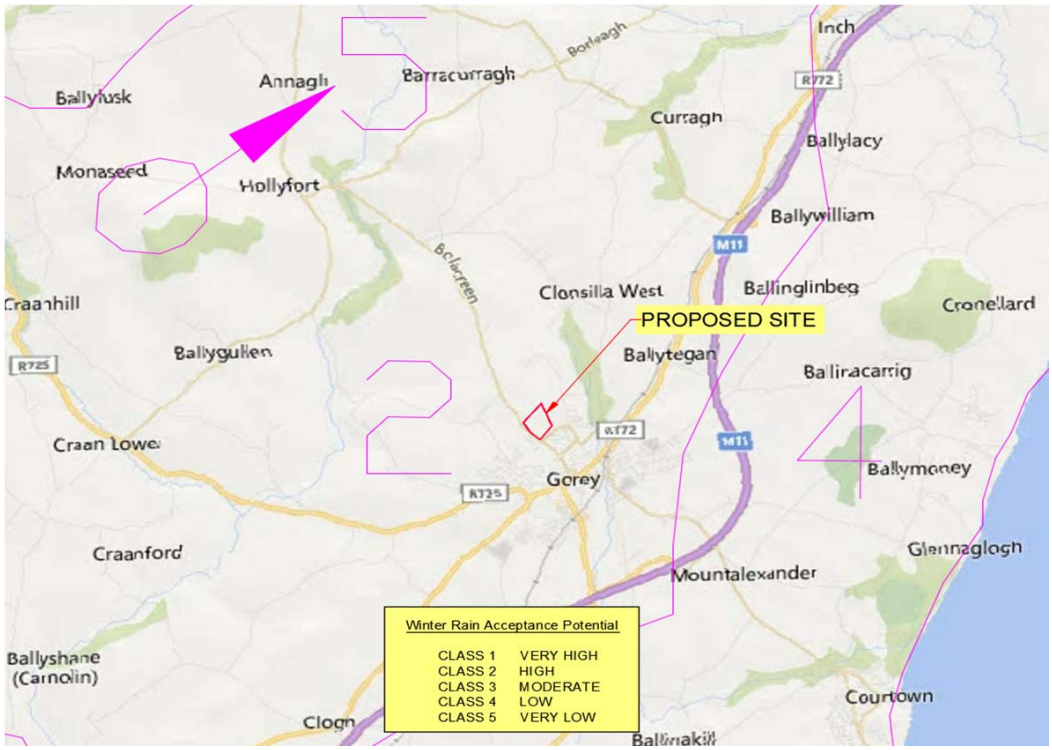
Permissible Discharge	= (Qbar / 50) x Site Area	Site Area =	**6.041**	ha
Permissible Discharge	**=** **0.016**	m^3/s		
	= **16.1**	l/s		

SAAR Value is taken from the Flood Studies Update Website http://opw.hydronet.com/



SOIL Value is taken from Flood Studies Report Map "Winter Rainfall Acceptance Potential"

SOIL = 0.15(S1) + 0.3(S2) + 0.40(S3) + 0.45(S4) + 0.5(S5)



APPENDIX D

Attenuation System Specifications

ADVANCED DRAINAGE SYSTEMS, INC.

IE1505

North Catchment, Creagh, Gorey, Co. Wexford

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTITIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS.

   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

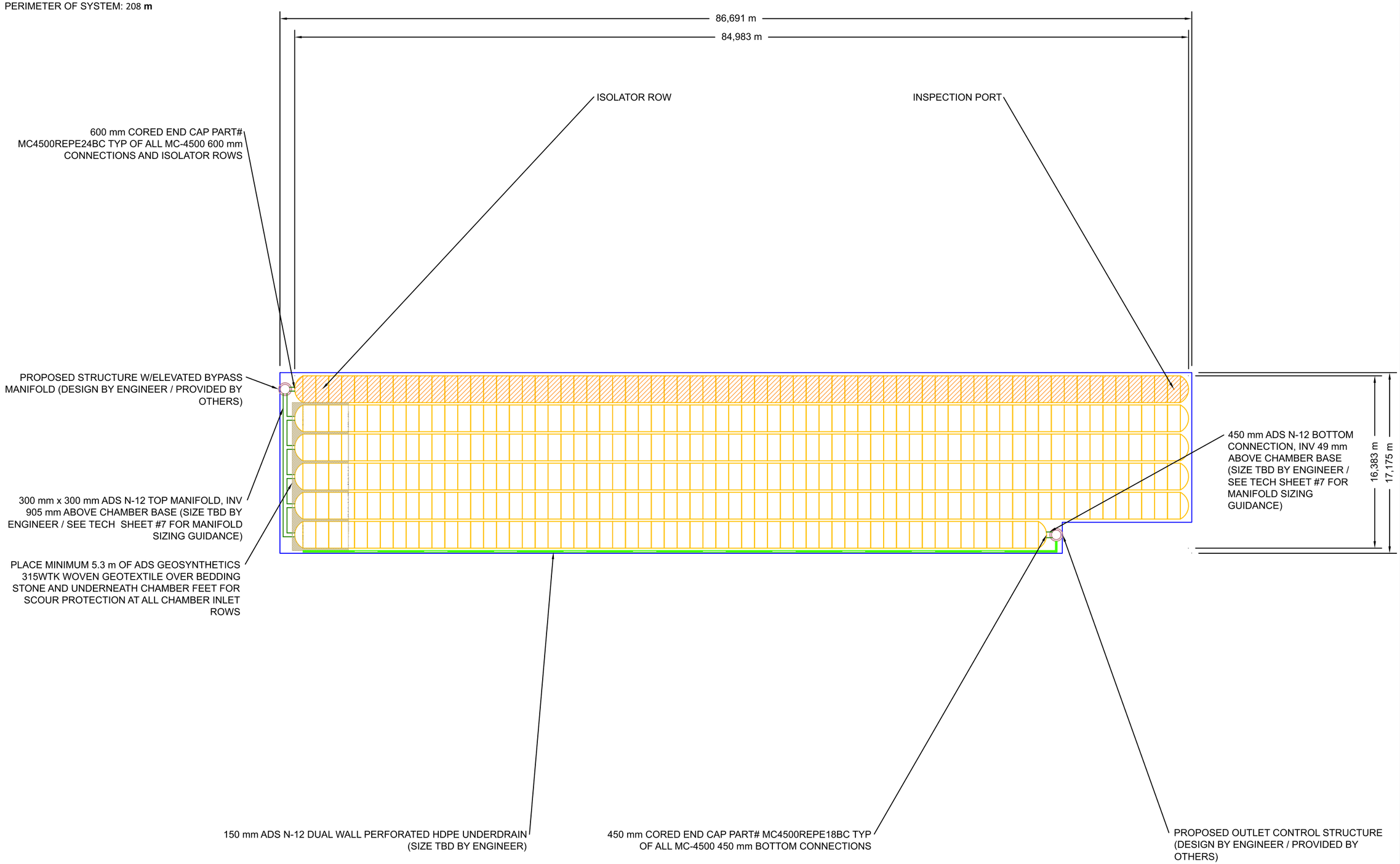
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT

(397) STORMTECH MC-4500 CHAMBERS
(12) STORMTECH MC-4500 END CAPS
INSTALLED WITH 305 mm COVER STONE, 229 mm BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 1921 m³
AREA OF SYSTEM: 1453 **m²**
PERIMETER OF SYSTEM: 208 **m**

COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION



IE1505
Catchment, Creagh, Gorey, Co. Wexford
DATE: 11/14/2018 | DRAWN: NO | CHECKED: ---
PROJECT #: Tool

REV	DRW	CHK	DESCRIPTION
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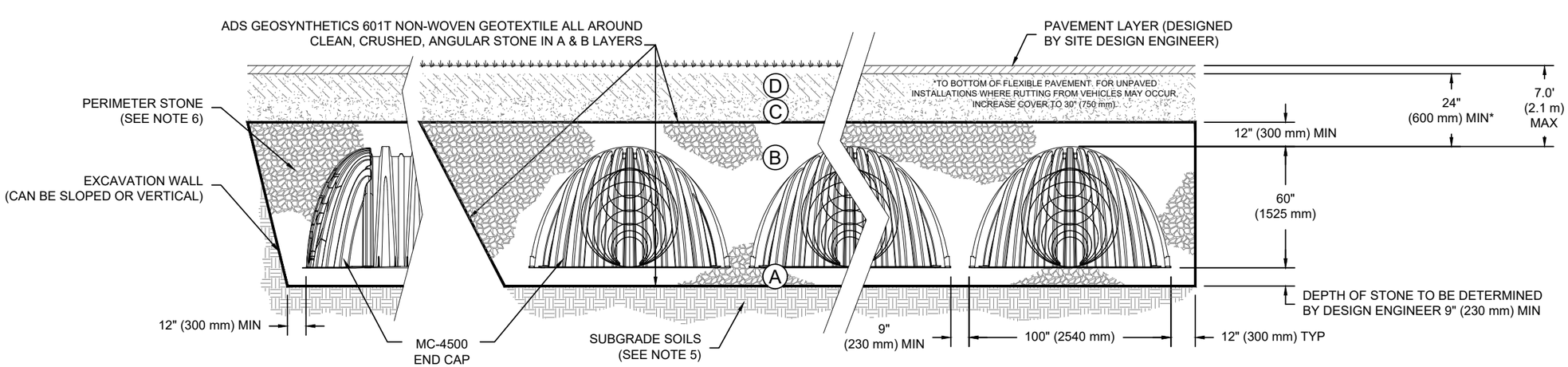
NOT TO SCALE

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2] [3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. MC-4500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

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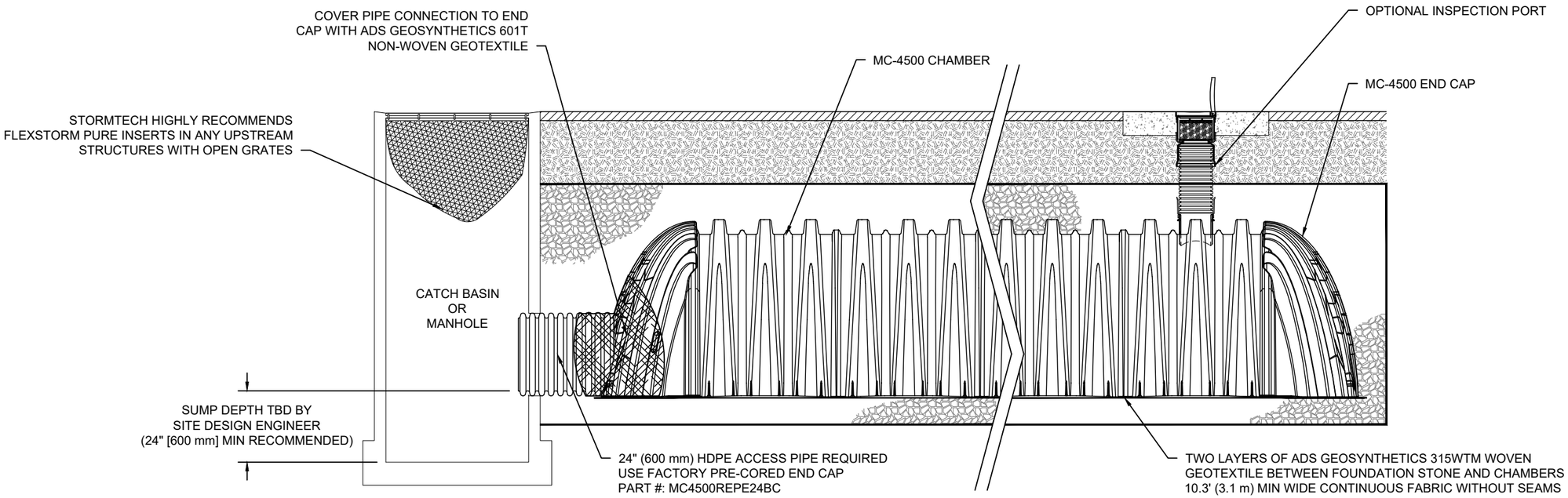


MC-4500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

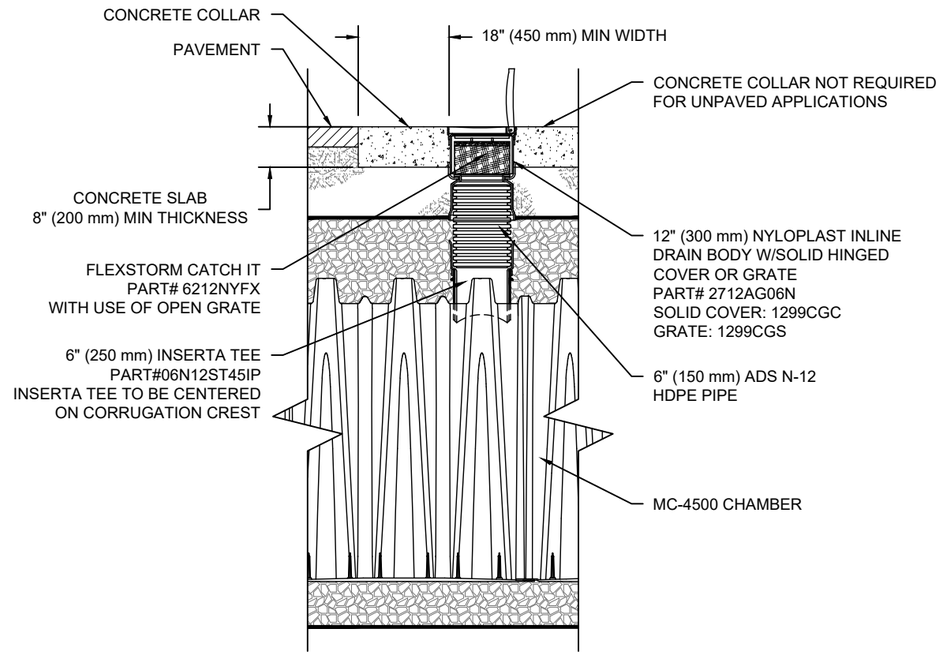
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-4500 6" INSPECTION PORT DETAIL
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UNDERDRAIN DETAIL

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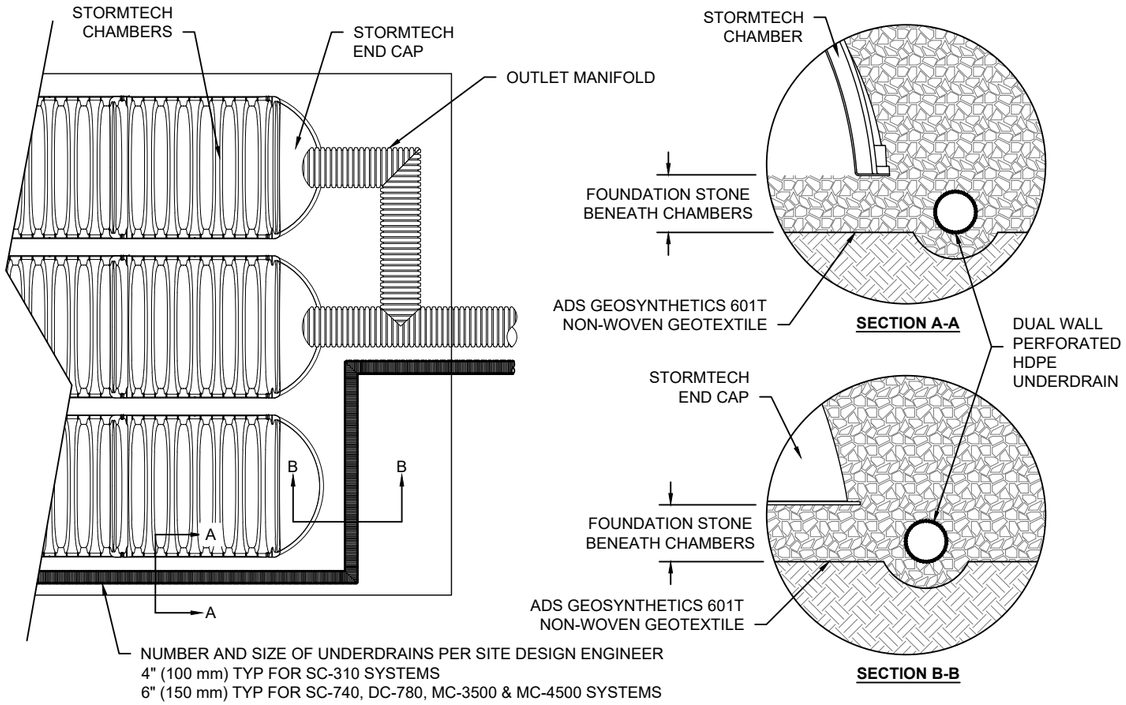
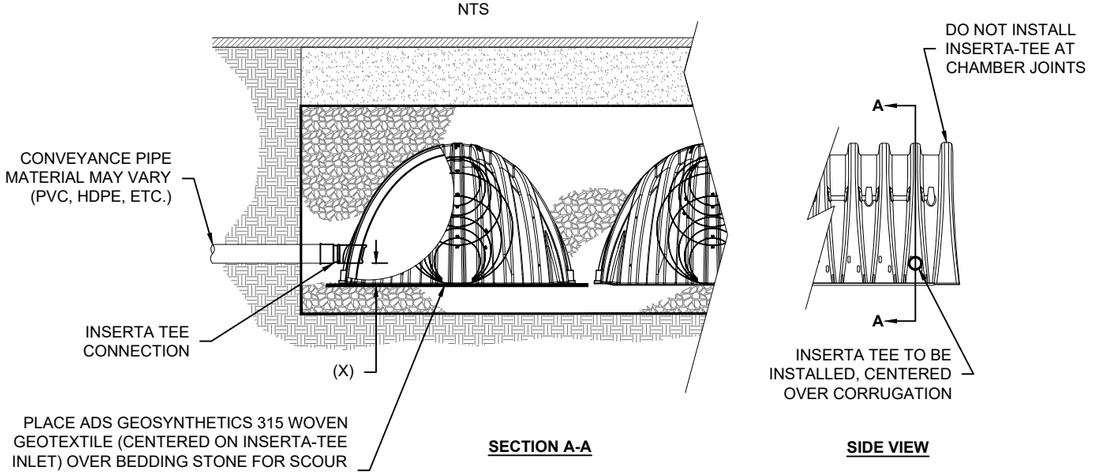


INSERTA TEE DETAIL

NTS



NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS.
CONTACT STORMTECH FOR MORE INFORMATION.

CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

MC-4500 TECHNICAL SPECIFICATION

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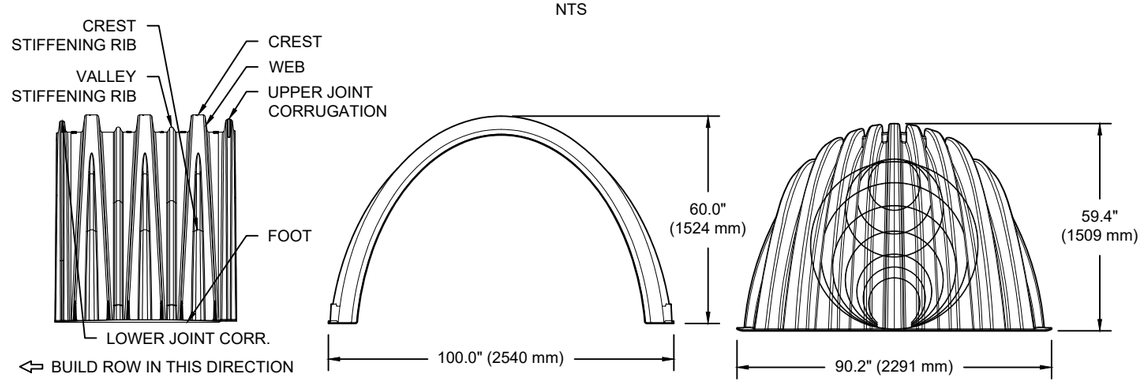


NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT	130.0 lbs.	(59.0 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	90.2" X 59.4" X 30.7"	(2291 mm X 1509 mm X 781 mm)
END CAP STORAGE	35.7 CUBIC FEET	(1.01 m³)
MINIMUM INSTALLED STORAGE*	108.7 CUBIC FEET	(3.08 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

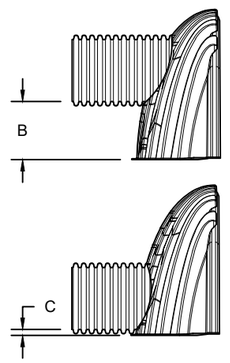
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	B	C
MC4500REPE06T	6" (150 mm)	42.54" (1.081 m)	---
MC4500REPE06B		---	0.86" (22 mm)
MC4500REPE08T	8" (200 mm)	40.50" (1.029 m)	---
MC4500REPE08B		---	1.01" (26 mm)
MC4500REPE10T	10" (250 mm)	38.37" (975 mm)	---
MC4500REPE10B		---	1.33" (34 mm)
MC4500REPE12T	12" (300 mm)	35.69" (907 mm)	---
MC4500REPE12B		---	1.55" (39 mm)
MC4500REPE15T	15" (375 mm)	32.72" (831 mm)	---
MC4500REPE15B		---	1.70" (43 mm)
MC4500REPE18TC	18" (450 mm)	29.36" (746 mm)	---
MC4500REPE18BC		---	1.97" (50 mm)
MC4500REPE24TC	24" (600 mm)	23.05" (585 mm)	---
MC4500REPE24BC		---	2.26" (57 mm)
MC4500REPE30BC	30" (750 mm)	---	2.95" (75 mm)
MC4500REPE36BC	36" (900 mm)	---	3.25" (83 mm)
MC4500REPE42BC	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS.
CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm)
THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHTEST POSSIBLE FOR THE PIPE SIZE.



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MC-SERIES END CAP INSERTION DETAIL

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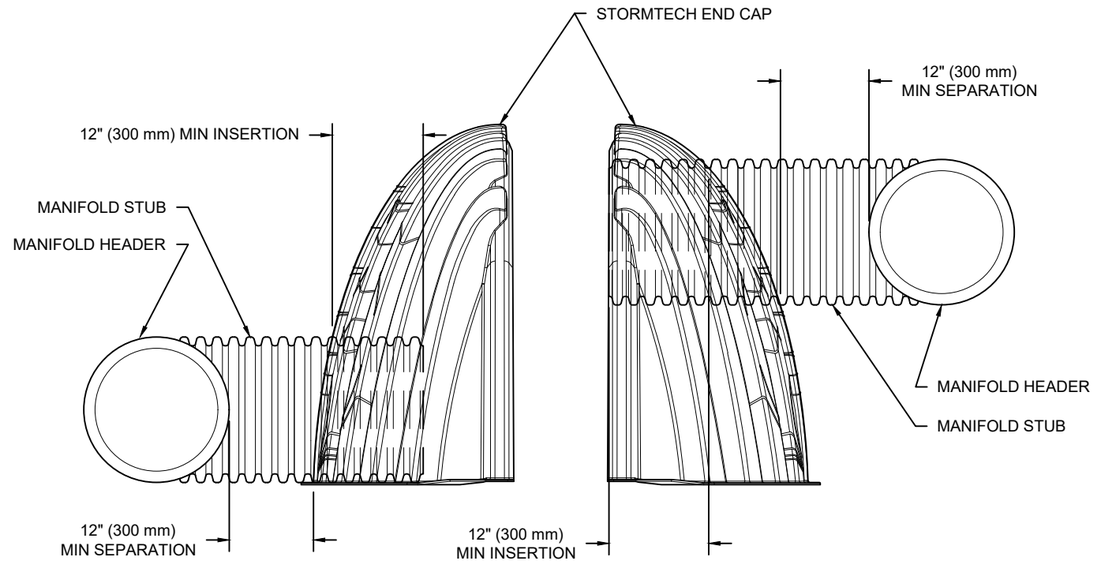

NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL
FOR A PROPER FIT IN END CAP OPENING.

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IE1505

South Catchment, Creagh, Gorey, Co. Wexford

STORMTECH CHAMBER SPECIFICATIONS

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   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING..
10. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

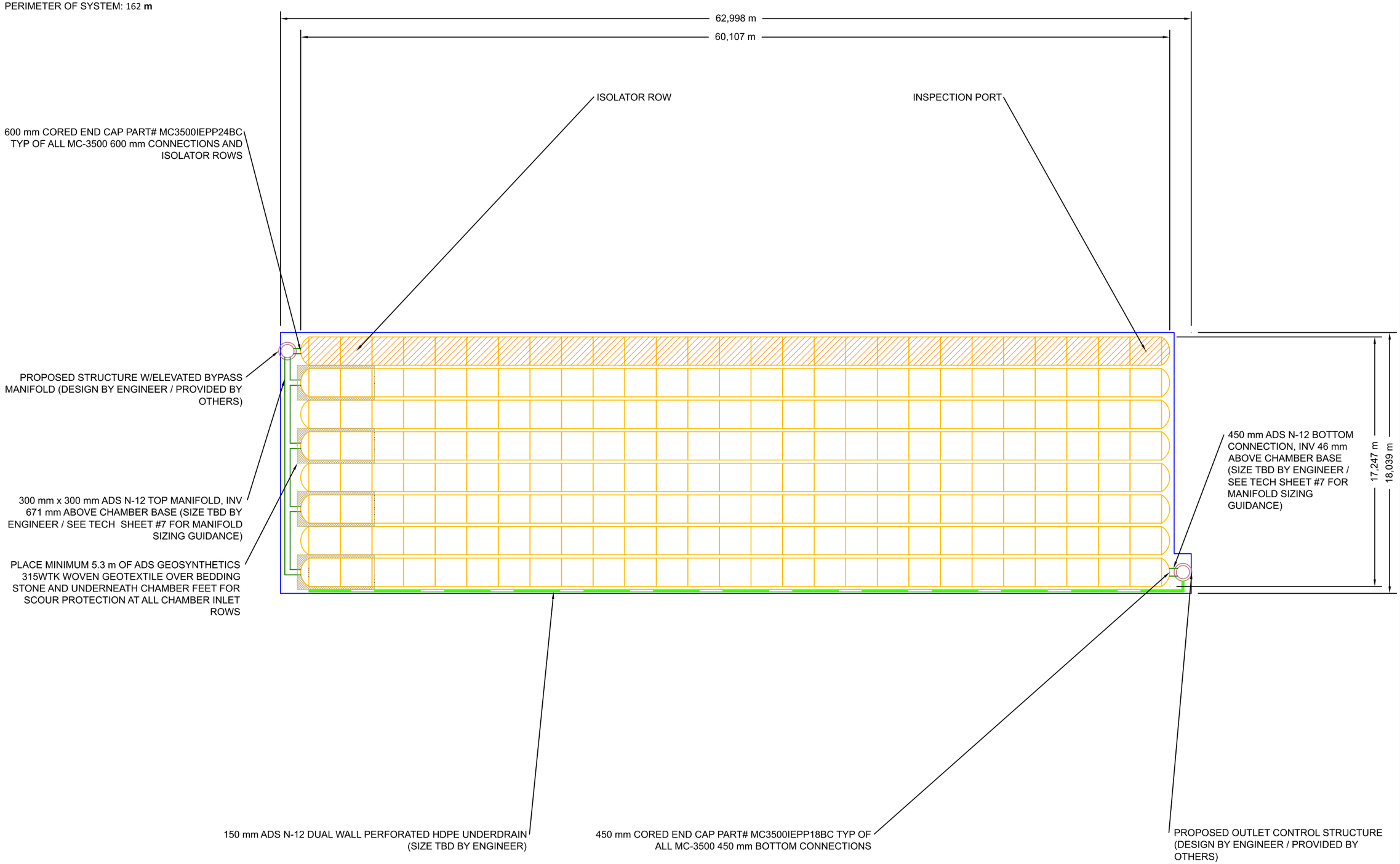
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT

(216) STORMTECH MC-3500 CHAMBERS
(16) STORMTECH MC-3500 END CAPS
INSTALLED WITH 305 mm COVER STONE, 229 mm BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 1158 m³
AREA OF SYSTEM: 1118 **m²**
PERIMETER OF SYSTEM: 162 **m**

COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION



IE1505
South Catchment, Creagh, Gorey, Co. Wexford

DATE: 10/01/2018 | DRAWN: NO | CHECKED: ---
PROJECT #: Tool

REV	DRW	CHK	DESCRIPTION

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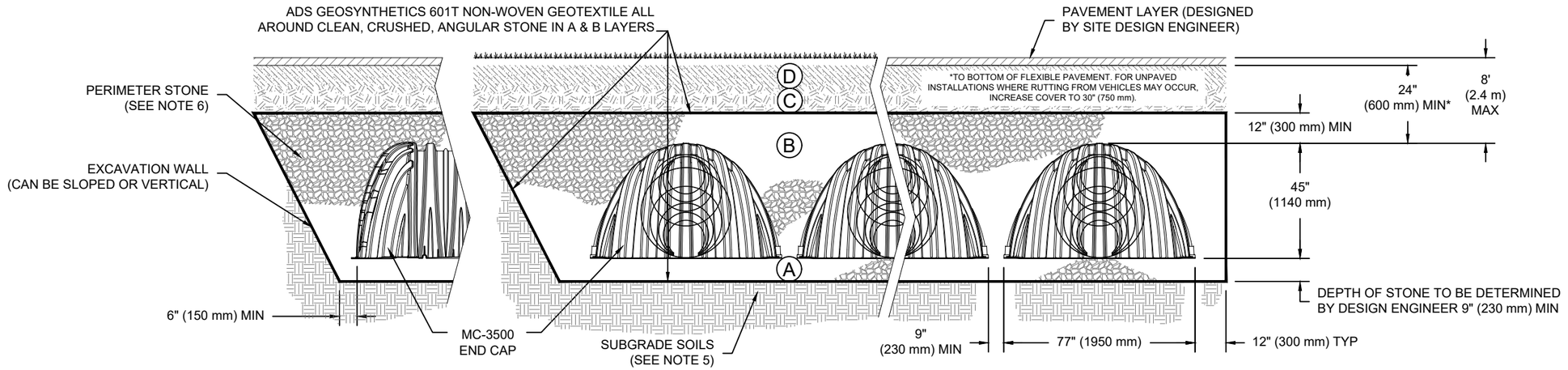
NOT TO SCALE

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2] [3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. MC-3500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

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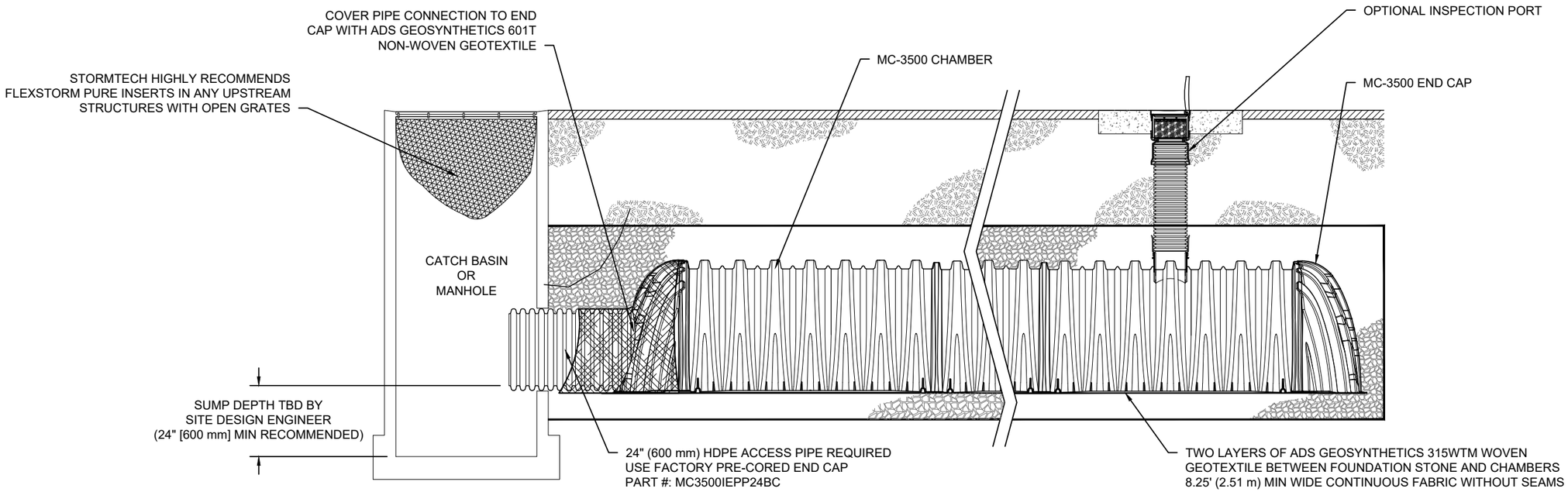


MC-3500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

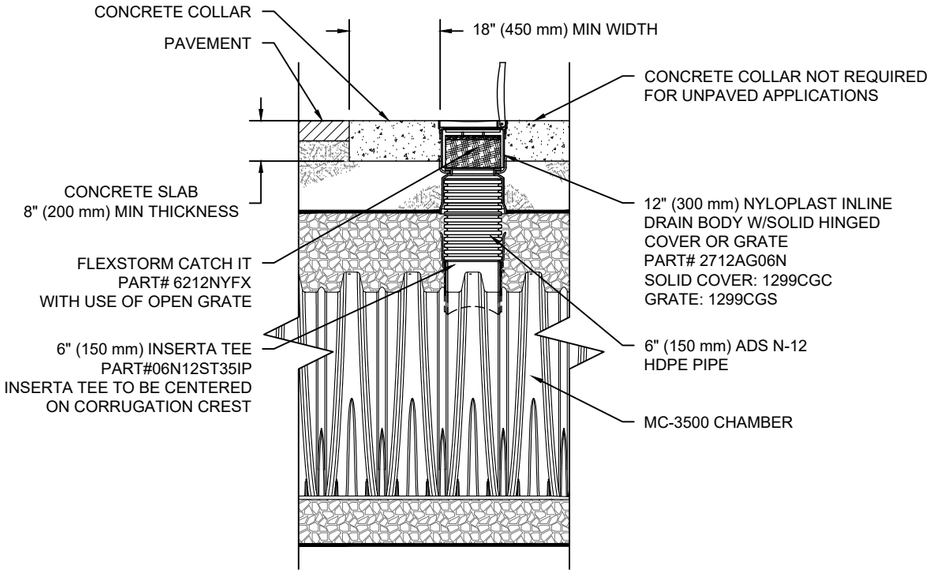
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-3500 6" INSPECTION PORT DETAIL
NTS

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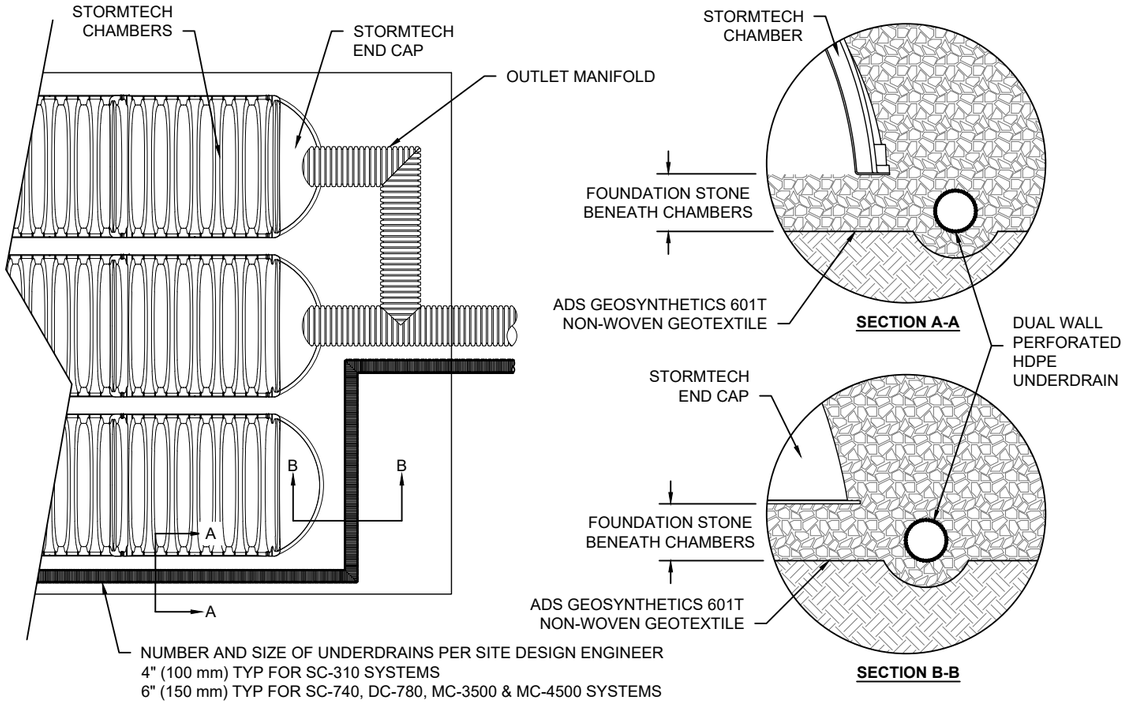
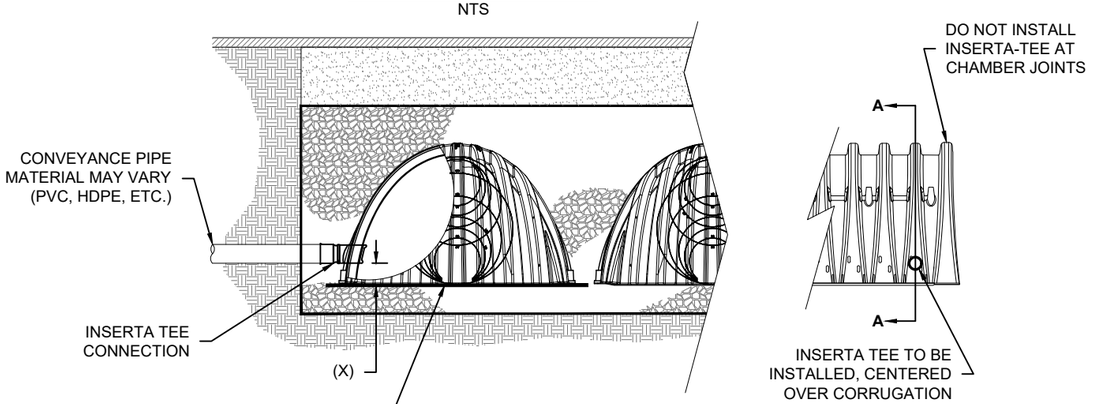
UNDERDRAIN DETAIL

NTS



INSERTA TEE DETAIL

NTS

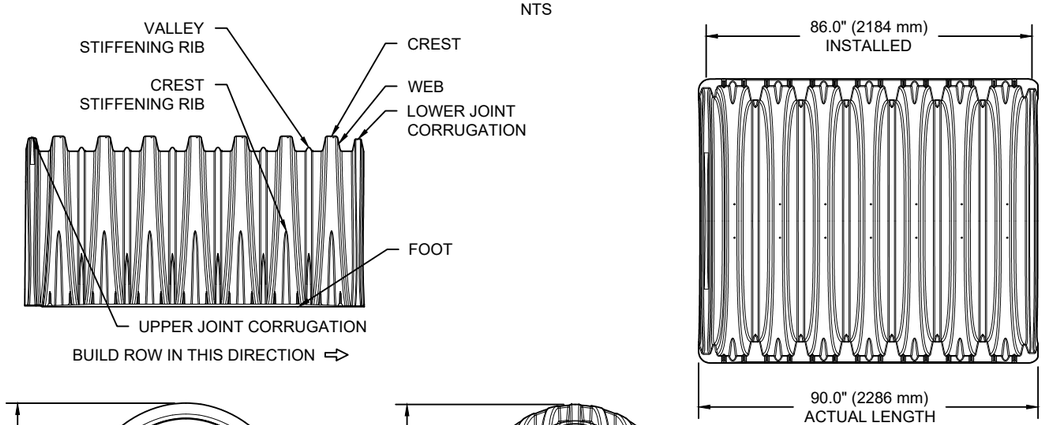


NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

MC-3500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	178.9 CUBIC FEET	(5.06 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 22.5"	(1956 mm X 1143 mm X 571 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	46.0 CUBIC FEET	(1.30 m³)
WEIGHT	50.0 lbs.	(22.7 kg)

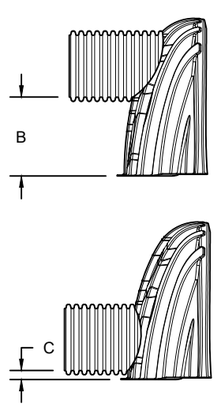
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP30BC	30" (750 mm)	---	

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS.
CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm)
THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHTEST POSSIBLE FOR THE PIPE SIZE.



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MC-SERIES END CAP INSERTION DETAIL

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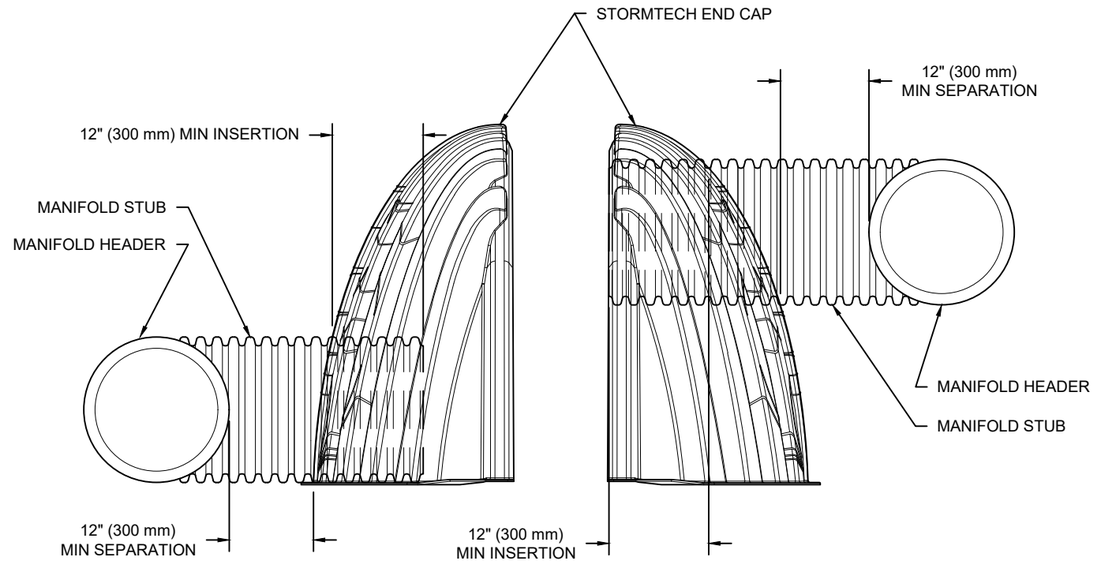

NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL
FOR A PROPER FIT IN END CAP OPENING.

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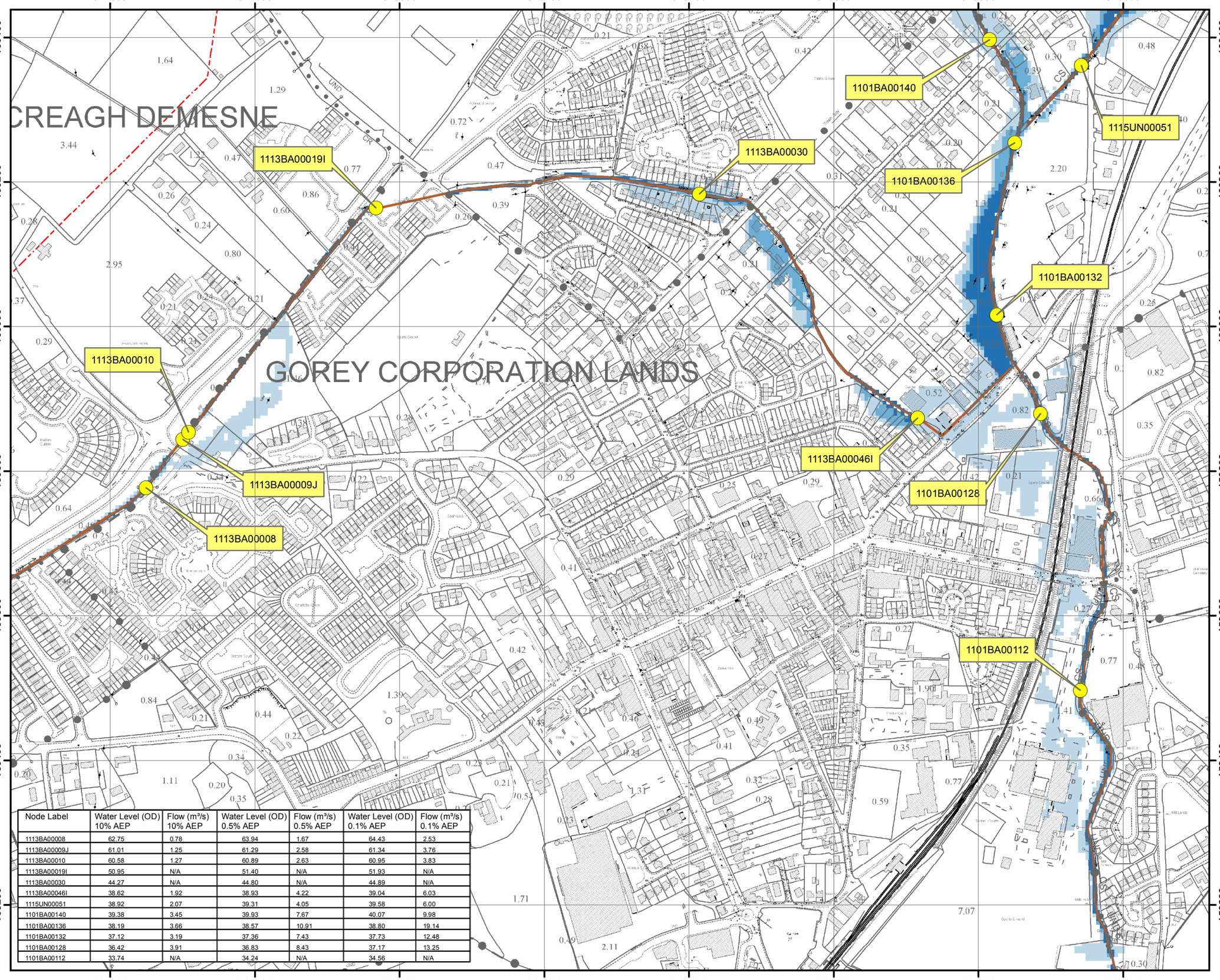
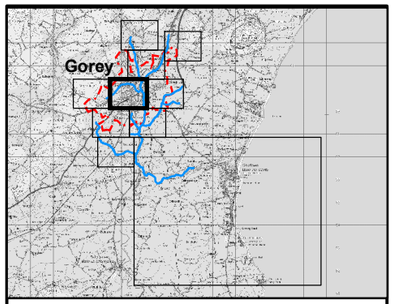
APPENDIX E

South Eastern CFRAMS Flood Extent Map



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
1113BA00008	62.75	0.78	63.94	1.67	64.43	2.53
1113BA00009J	61.01	1.25	61.29	2.58	61.34	3.76
1113BA00010	60.58	1.27	60.89	2.63	60.95	3.83
1113BA00019I	50.95	N/A	51.40	N/A	51.93	N/A
1113BA00030	44.27	N/A	44.80	N/A	44.89	N/A
1113BA00046I	38.62	1.92	38.93	4.22	39.04	6.03
1115UN00051	38.92	2.07	39.31	4.05	39.58	6.00
1101BA00140	39.38	3.45	39.93	7.67	40.07	9.98
1101BA00136	38.19	3.66	38.57	10.91	38.80	19.14
1101BA00132	37.12	3.19	37.36	7.43	37.73	12.48
1101BA00128	36.42	3.91	36.83	8.43	37.17	13.25
1101BA00112	33.74	N/A	34.24	N/A	34.56	N/A



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

SOUTH EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Map: Gorey Fluvial Flood Extents

Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : F.M.C.	Date : 15 July 2016
Checked By : E.H.	Date : 15 July 2016
Approved By : S.P.	Date : 15 July 2016
Drawing No. :	O11GOR_EXFCD_F0_05
Map Series :	Page 5 of 10
Drawing Scale : 1:5,000	@A3

APPENDIX F

Klargester Bypass Separator Technical Specification

SEPARATORS

A RANGE OF FUEL/OIL SEPARATORS
FOR PEACE OF MIND

Kingspan

Klargester

60 YEARS OF
Expertise &
1955–2015 Innovation

Separators

A RANGE OF FUEL/OIL SEPARATORS FOR PEACE OF MIND

Surface water drains normally discharge to a watercourse or indirectly into underground waters (groundwater) via a soakaway. Contamination of surface water by oil, chemicals or suspended solids can cause these discharges to have a serious impact on the receiving water.

The Environment Regulators, Environment Agency, England and Wales, SEPA, Scottish Environmental Protection Agency in Scotland and Department of Environment & Heritage in Northern Ireland, have published guidance on surface water disposal, which offers a range of means of dealing with pollution both at source and at the point of discharge from site (so called 'end of pipe' treatment). These techniques are known as 'Sustainable Drainage Systems' (SuDS).

Where run-off is draining from relatively low risk areas such as car-parks and non-operational areas, a source control approach, such as permeable surfaces or infiltration trenches, may offer a suitable means of treatment, removing the need for a separator.

Oil separators are installed on surface water drainage systems to protect receiving waters from pollution by oil, which may be present due to minor leaks from vehicles and plant, from accidental spillage.

Effluent from industrial processes and vehicle washing should normally be discharged to the foul sewer (subject to the approval of the sewerage undertaker) for further treatment at a municipal treatment works.

SEPARATOR STANDARDS AND TYPES

A British (and European) standard (EN 858-1 and 858-2) for the design and use of prefabricated oil separators has been adopted. New prefabricated separators should comply with the standard.

SEPARATOR CLASSES

The standard refers to two 'classes' of separator, based on performance under standard test conditions.

CLASS I

Designed to achieve a concentration of less than 5mg/l of oil under standard test conditions, should be used when the separator is required to remove very small oil droplets.

CLASS II

Designed to achieve a concentration of less than 100mg/l oil under standard test conditions and are suitable for dealing with discharges where a lower quality requirement applies (for example where the effluent passes to foul sewer).

Both classes can be produced as full retention separators. The oil concentration limits of 5 mg/l and 100 mg/l are only applicable under standard test conditions. It should not be expected that separators will comply with these limits when operating under field conditions.

FULL RETENTION SEPARATORS

Full retention separators treat the full flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

On large sites, some short term flooding may be an acceptable means of limiting the flow rate and hence the size of full retention systems.

BYPASS SEPARATORS

Bypass separators fully treat all flows generated by rainfall rates of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, for example where the risk of a large spillage and heavy rainfall occurring at the same time is small.

FORECOURT SEPARATORS

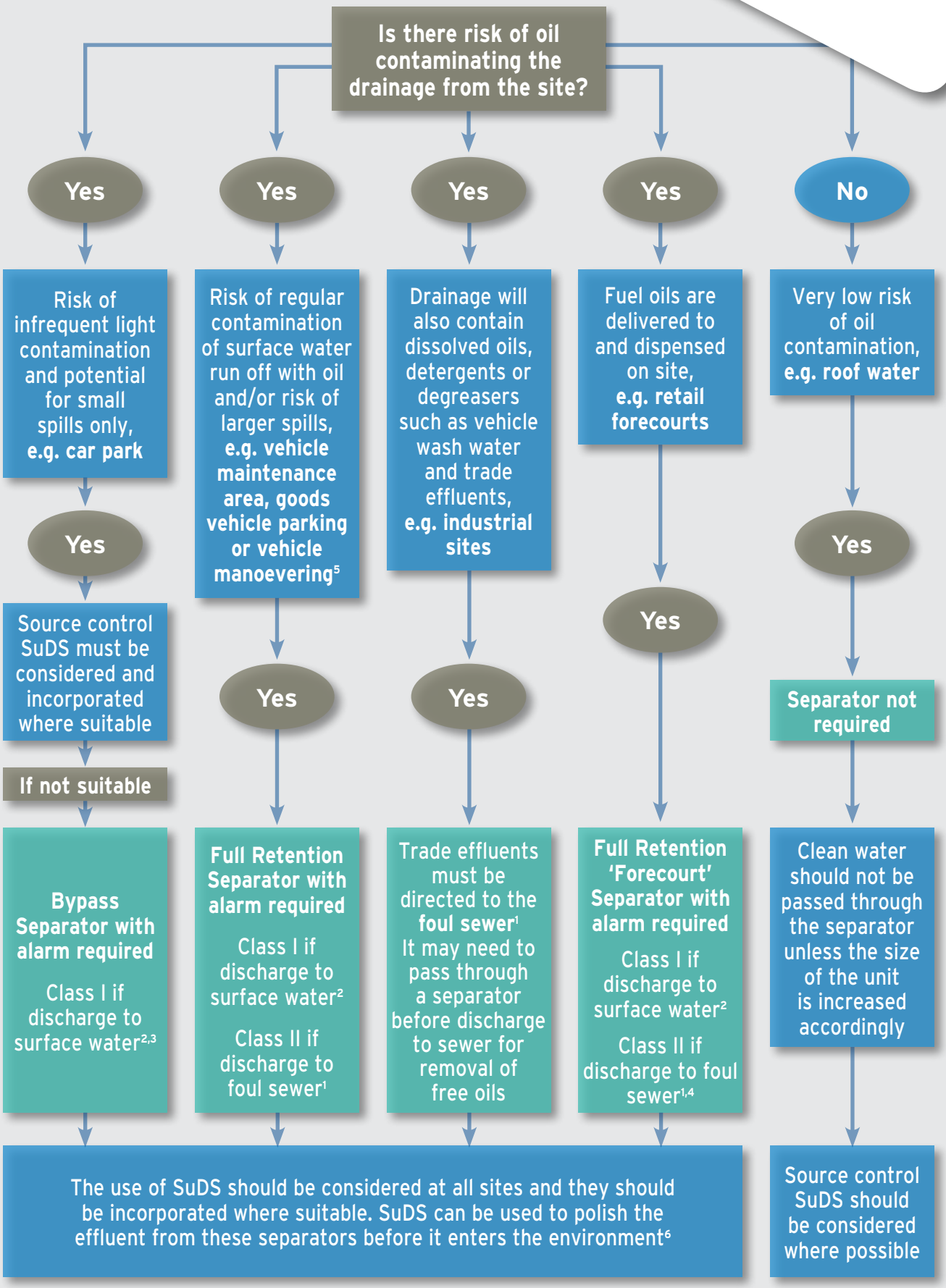
Forecourt separators are full retention separators specified to retain on site the maximum spillage likely to occur on a petrol filling station. They are required for both safety and environmental reasons and will treat spillages occurring during vehicle refuelling and road tanker delivery. The size of the separator is increased in order to retain the possible loss of the contents of one compartment of a road tanker, which may be up to 7,600 litres.

SELECTING THE RIGHT SEPARATOR

The chart on the following page gives guidance to aid selection of the appropriate type of fuel/oil separator for use in surface water drainage systems which discharge into rivers and soakaways.

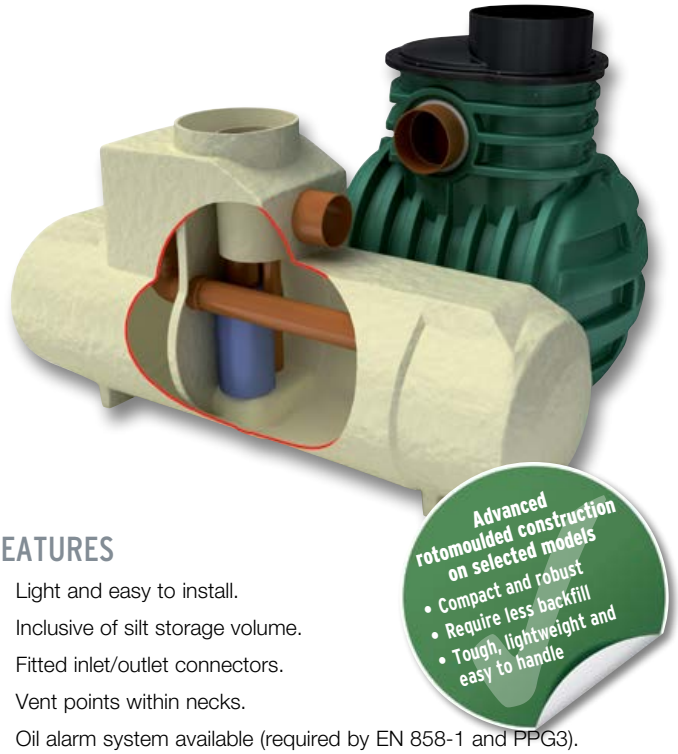
For further detailed information, please consult the Environment Agency Pollution Prevention Guideline 03 (PPG 3) 'Use and design of oil separators in surface water drainage systems' available from their website.

Kingspan Klargester has a specialist team who provide technical assistance in selecting the appropriate separator for your application.



1 You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.
2 You must seek prior permission from the relevant environmental body before you decide which separator to install.
3 In this case, if it is considered that there is a low risk of pollution a source control SuDS scheme may be appropriate.
4 In certain circumstances, the sewer provider may require a Class 1 separator for discharges to sewer to prevent explosive atmospheres from being generated.
5 Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.
6 In certain circumstances, a separator may be one of the devices used in the SuDS scheme. Ask us for advice.

Bypass NSB RANGE



APPLICATION

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g.

- Surface car parks.
- Roadways.
- Lightly contaminated commercial areas.

PERFORMANCE

Klargester were one of the first UK manufacturers to have separators tested to EN 858-1. Klargester have now added the NSB bypass range to their portfolio of certified and tested models. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan Klargester Bypass separators and certified their performance in relation to their flow and process performance assessing the effluent qualities to the requirements of EN 858-1. Klargester bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Oil storage volume.
- Silt storage capacity.
- Coalescer.

The unit is designed to treat 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 NSB = 0.0018A(m2). Flows generated by higher rainfall rates will pass through part of the separator and bypass the main separation chamber.

Class I separators are designed to achieve a concentration of 5mg/litre of oil under standard test conditions.

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size bypass separator, the following information is needed:-

- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the flow is not pumped.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	PEAK FLOW RATE (l/s)	DRAINAGE AREA (m²)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	STANDARD FALL ACROSS (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA.
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

Rotomoulded chamber construction GRP chamber construction * Some units have more than one access shaft – diameter of largest shown.

Full Retention NSF RANGE

APPLICATION

Full retention separators are used in high risk spillage areas such as:

- Fuel distribution depots.
- Vehicle workshops.
- Scrap Yards

PERFORMANCE

Kingspan Klargester were the first UK manufacturer to have the required range (3-30 l/sec) certified to EN 858-1 in the UK. The NSF number denotes the flow at which the separator operates.

The British Standards Institute (BSI) have witnessed the performance tests of the required range of separators and have certified their performance, in relation to their flow and process performance to ensure that they met the effluent quality requirements of EN 858-1. Larger separator designs have been determined using the formulas extrapolated from the test range.

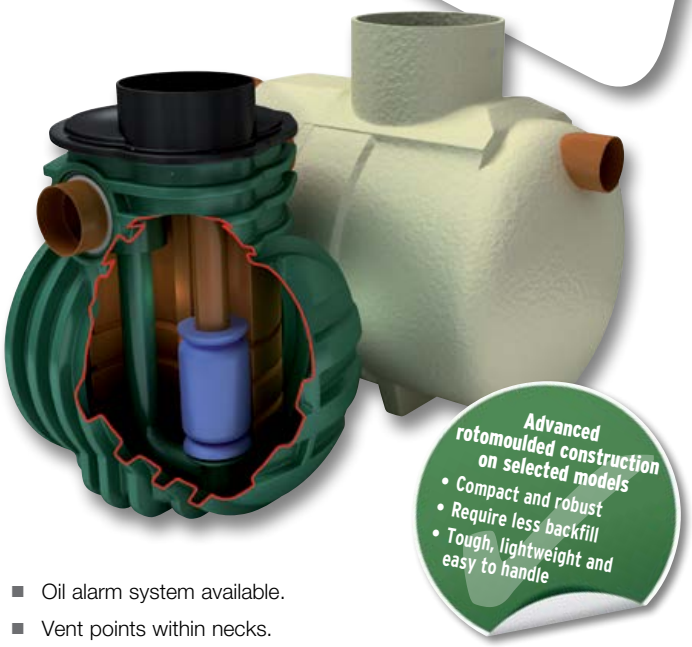
Each full retention separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Silt storage capacity.
- Automatic closure device.
- Oil storage volume.
- Coalescer (Class I units only).

Klargester full retention separators treat the whole of the specified flow.

FEATURES

- Light and easy to install.
- Class I and Class II designs.
- 3-30 l/sec range independently tested and performance sampled, certified by the BSI.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.



- Oil alarm system available.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size full retention separator, the following information is needed:-

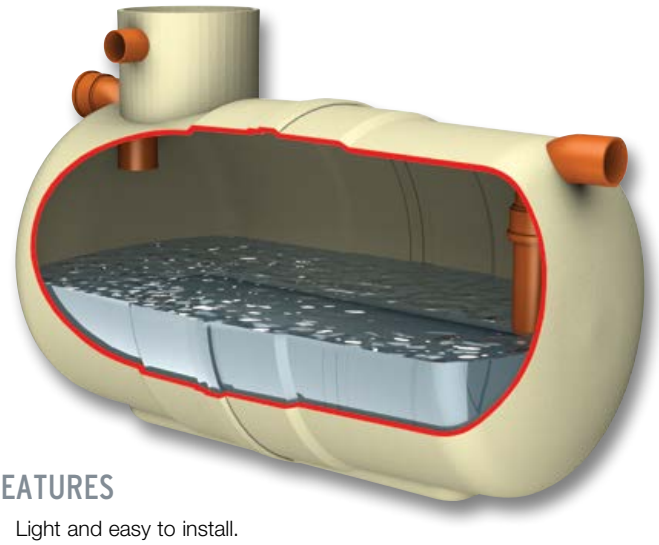
- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the influent is not pumped.
- The required discharge standard. This will decide whether a Class I or Class II unit is required.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	DRAINAGE AREA (m^2) PPG-3 (0.018)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	MIN. INLET INLET (mm)	STANDARD PIPEWORK DIA. (mm)
NSFP003	3	170	300	30	1700	1350	1420	1345	500	160
NSFP006	6	335	600	60	1700	1350	1420	1345	500	160
NSFA010	10	555	1000	100	2610	1225	1050	1000	500	200
NSFA015	15	835	1500	150	3910	1225	1050	1000	500	200
NSFA020	20	1115	2000	200	3200	2010	1810	1760	1000	315
NSFA030	30	1670	3000	300	3915	2010	1810	1760	1000	315
NSFA040	40	2225	4000	400	4640	2010	1810	1760	1000	315
NSFA050	50	2780	5000	500	5425	2010	1810	1760	1000	315
NSFA065	65	3610	6500	650	6850	2010	1810	1760	1000	315
NSFA080	80	4445	8000	800	5744	2820	2500	2450	1000	300
NSFA100	100	5560	10000	1000	6200	2820	2500	2450	1000	400
NSFA125	125	6945	12500	1250	7365	2820	2500	2450	1000	450
NSFA150	150	8335	15000	1500	8675	2820	2550	2450	1000	525
NSFA175	175	9725	17500	1750	9975	2820	2550	2450	1000	525
NSFA200	200	11110	20000	2000	11280	2820	2550	2450	1000	600

Rotomoulded chamber construction GRP chamber construction

Washdown & Silt



APPLICATION

This unit can be used in areas such as car wash and other cleaning facilities that discharge directly into a foul drain, which feeds to a municipal treatment facility.

If emulsifiers are present the discharge must not be allowed to enter an NS Class I or Class II unit.

- Car wash.
- Tool hire depots.
- Truck cleansing.
- Construction compounds cleansing points.

PERFORMANCE

Such wash down facilities must not be allowed to discharge directly into surface water but must be directed to a foul connection leading to a municipal treatment works as they utilise emulsifiers, soaps and detergents, which can dissolve and disperse the oils.

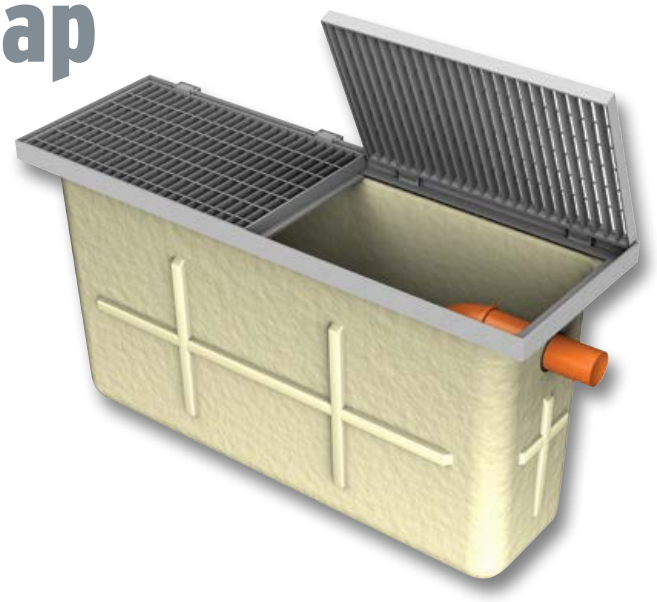
FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.

SIZES AND SPECIFICATIONS

REF.	TOTAL CAPACITY (litres)	MAX. REC. SILT	MAX. FLOW RATE (l/s)	LENGTH (mm)	DIAMETER (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT (mm)	STANDARD FALL ACROSS UNIT (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA. (mm)	APPROX EMPTY (kg)
W1/010	1000	500	3	1123	1225	460	1150	1100	50	500	160	60
W1/020	2000	1000	5	2074	1225	460	1150	1100	50	500	160	120
W1/030	3000	1500	8	2952	1225	460	1150	1100	50	500	160	150
W1/040	4000	2000	11	3898	1225	460	1150	1100	50	500	160	180
W1/060	6000	3000	16	4530	1440	600	1360	1310	50	500	160	320
W1/080	8000	4000	22	3200	2020	600	2005	1955	50	500	160	585
W1/100	10000	5000	27	3915	2020	600	2005	1955	50	500	160	680
W1/120	12000	6000	33	4640	2020	600	2005	1955	50	500	160	770
W1/150	15000	7500	41	5435	2075	600	1940	1890	50	500	160	965
W1/190	19000	9500	52	6865	2075	600	1940	1890	50	500	160	1200

Car Wash Silt Trap



APPLICATION

Car Wash silt trap is designed for use before a separator in car wash applications to ensure effective silt removal.

FEATURES

- FACTA Class B covers.
- Light and easy to install.
- Maintenance from ground level.

Forecourt

APPLICATION

The forecourt separator is designed for installation in petrol filling station forecourts and similar applications. The function of the separator is to intercept hydrocarbon pollutants such as petroleum and oil and prevent their entry to the drainage system, thus protecting the environment against hydrocarbon contaminated surface water run-off and gross spillage.

PERFORMANCE

Operation ensures that the flow cannot exit the unit without first passing through the coalescer assembly.

In normal operation, the forecourt separator has sufficient capacity to provide storage for separated pollutants within the main chamber, but is also able to contain up to 7,600 litres of pollutant arising from the spillage of a fuel delivery tanker compartment on the petrol forecourt. The separator has been designed to ensure that oil cannot exit the separator in the event of a major spillage, subsequently the separator should be emptied immediately.

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- Class I and Class II design.
- Oil storage volume.
- Coalescer (Class I unit only).
- Automatic closure device.
- Oil alarm system available.

INSTALLATION

The unit should be installed on a suitable concrete base slab and surrounded with concrete or pea gravel backfill. See sales drawing for installation.

If the separator is to be installed within a trafficked area, then a suitable cover slab must be designed to ensure that loads are not transmitted to the unit.

The separator should be installed and vented in accordance with Health and Safety Guidance Note HS(G)41 for filling stations, subject to Local Authority requirements.

SIZES AND SPECIFICATIONS

ENVIROCEPTOR CLASS	TOTAL CAP. (litres)	DRAINAGE AREA (m^2)	MAX. FLOW RATE (l/s)	LENGTH (mm)	DIAMETER (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT (mm)	STD. FALL ACROSS UNIT (mm)	MIN. INLET INVERT (mm)	STD. PIPEWORK (mm)	EMPTY WEIGHT (kg)
I	10000	555	10	3963	1920	600	2110	2060	50	400	160	500
II	10000	555	10	3963	1920	600	2110	2060	50	400	160	500
I	10000	1110	20	3963	1920	600	2110	2060	50	400	200	500
II	10000	1110	20	3963	1920	600	2110	2060	50	400	200	500

Alarm Systems

British European Standard EN 858-1 and Environment Agency Pollution Prevention Guideline PPG3 requires that all separators are to be fitted with an oil level alarm system and that it should be installed and calibrated by a suitably qualified technician so that it will respond to an alarm condition when the separator requires emptying.

- Easily fitted to existing tanks.
- Excellent operational range.
- Visual and audible alarm.
- Additional telemetry option.

PROFESSIONAL INSTALLERS

Kingspan Klargester Accredited Installers
Experience shows that correct installation is a prerequisite for the long-lasting and successful operation of any wastewater treatment product. This is why using an installer with the experience and expertise to install your product is highly recommended.

Services include :

- Site survey to establish ground conditions and soil types
- Advice on system design and product selection
- Assistance on gaining environmental consents and building approvals
- Tank and drainage system installation
- Connection to discharge point and electrical networks
- Waste emptying and disposal

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www.kingspanenviro.com/klargester

Kingspan Klargester Accredited Installer

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Kingspan Environmental have a dedicated service division providing maintenance for wastewater products.

Factory trained engineers are available for site visits as part of a planned maintenance contract or on a one-off call out basis.

To find out more about protecting your investment and ensuring peace of mind, call us on:

0844 846 0500

or visit us online:
www.kingspanenvservice.com

Kingspan Environmental Services

Kingspan Klargester

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- PACKAGE PUMP STATIONS
- **PUMPSTOR24** PUMPING SYSTEMS
- OIL/WATER SEPARATORS
- BELOW GROUND STORAGE TANKS
- GREASE & SILT TRAPS

RAINWATER SOLUTIONS

- BELOW GROUND RAINWATER HARVESTING SYSTEMS
- ABOVE GROUND RAINWATER HARVESTING SYSTEMS

Klargester
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Tel: +44 (0) 1296 633000 Fax: +44 (0) 1296 633001 Scottish Office: Tel: +44 (0) 1355 248484
email: klargester@kingspan.com

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NI Tel : +44 (0) 28 302 66799 Fax: +44 (0) 28 302 60046 ROI Tel: 048 302 66799 Fax: 048 302 60046
email: klargesterinfo@kingspan.com

Visit our website **www.kingspanenviro.com/klargester**

Part of Kingspan Environmental

bsi. ISO 9001 Quality Management
bsi. OHSAS 18001 Occupational Health and Safety Management
RIBA NETWORK · CPD PROVIDERS
BRITISH WATER
UK GREEN BUILDING COUNCIL Founding Member
CIBSE CPD

Issue No. 21: September 2015

APPENDIX G

Correspondence with Statutory Bodies

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

Irish Water

Letter Ref: CDSCOF2 - CDSCOF5

Amil Properties Ltd C/O Damien Murphy
Strutec Ltd,
Garryhill,
Bagenalstown,
Co.Carlow

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

04 July 2018

Dear Sir/Madam,

Re: 8042651993 pre-connection enquiry - Subject to contract | Contract denied
[Water and wastewater connection for 326 houses at Ballyownen/Ramsfort Park, Gorey, Co.Wexford]

Irish Water has reviewed your pre-connection enquiry in relation to water and wastewater connections at Ballyownen/Ramsfort Park, Gorey, Co.Wexford. Based upon the details you have provided with your pre-connection enquiry and on the capacity currently available as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network can be facilitated.

Water Treatment:
Gorey water supply if from Creagh WTP and a number of borehole wells. IW have a project out to tender to increase the production of these borehole wells to increase the water supply into Gorey. This project is expected to be completed early to mid 2019.

Water Network:
No upgrades are required here.

Wastewater Treatment:
No upgrades are required here.

Wastewater Network:
IW have modelled the impact this development will have on the existing sewer network. The model prediction shows that the proposed Ballyowen development would increase predicted surcharging and flooding volume along the main trunk sewer in the vicinity of Ramsfort Avenue during peak design dry weather flows. The assessment also evaluated the option of upsizing some 225mm sewers to 375mm in an effort to alleviate flooding during the 1-in-5 year storm event. Details of this upsizing are included with this letter.

The water and wastewater infrastructure within the proposed development shall be designed in accordance with the Irish Water standard details and codes of practice. Prior to submitting your planning application, you are required to submit these detailed design drawing to Irish Water for review.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Energy Regulation.

If you have any further questions, please contact PJ Murphy from the design team on 022 52267 or email pjmurphy@water.ie. For further information, visit **www.water.ie/connections**

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Letter Ref: CDSSDA1

Amil Properties Limited C/O Damien Murphy,
Strutec Ltd,
Garryhill,
Bagenalstown,
Co.Carlow

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

Irish Water
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

06 February 2019

Re: Design Submission for (Ballyownen/Ramsfort Park, Gorey, Co.Wexford)(the "Development")(the "Design Submission")/Customer Reference No. 8042651993

Dear Sir/Madam,

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, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to an our network you must sign a connection agreement with Irish Water.This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water'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 Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:

Name: PJ Murphy
Phone: 022 52267
Email: pjmurphy@water.ie

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Appendix A

Document Title & Revision

1. ***IE1505-007-E PROPOSED WATER MAINS LAYOUT PLAN SHEET 1***
2. ***IE1505-008-E PROPOSED WATER MAINS LAYOUT PLAN SHEET 2***
3. ***IE1505-011-E FOUL WATER LONG SECTIONS SHEET 1 OF 2***
4. ***IE1505-012-E FOUL WATER LONG SECTIONS SHEET 2 OF 2***
5. ***IE1505-000-D PROPOSED FOUL, STORMWATER & WATER MAINS KEY PLAN***
6. ***IE1505-001-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 1***
7. ***IE1505-002-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 2***
8. ***IE1505-003-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 3***
9. ***IE1505-004-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 4***
10. ***IE1505-005-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 5***
11. ***IE1505-006-E PROPOSED FOUL & STORMWATER LAYOUT PLAN SHEET 6***

Standard Details/Code of Practice Exemption:

N/A

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 Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

Inland Fisheries Ireland

Niamh O'Malley

From: Lorraine (Panther Environmental Solutions Ltd.) <lorraine@pantherwms.com>
Sent: Tuesday 30 October 2018 14:08
To: Rory Kunz
Cc: Niamh O'Malley; Damien Murphy; Liam Minogue; Dan O'Sullivan
Subject: FW: Planning Application Consultation - Proposed Development at Creagh, Gorey, Co. Wexford

Hi all,

Please see below for the response received from Inland Fisheries with regards the alternative foul sewer route.

Kind regards,
Lorraine

From: Donnachadh Byrne <Donnachadh.Byrne@fisheriesireland.ie>
Sent: Tuesday 30 October 2018 11:50
To: Lorraine (Panther Environmental Solutions Ltd.) <lorraine@pantherwms.com>
Subject: RE: Planning Application Consultation - Proposed Development at Creagh, Gorey, Co. Wexford

Hi Lorraine,

My apologies for the delay in getting back to you.

Inland Fisheries Ireland welcome the proposal to reroute the sewer line along an alternative route that does not follow the line of the Ballyowen Stream.

With regard to the proposals to modify and pipe the drainage channel along the eastern boundary of the site, we note that this channel conveys water for much of the year.
IFI have no objections to the modification/piping of this channel, we do however request that these works are timed to be carried out over the Summer Months when rainfall is less likely and be undertaken only when this channel is fully dry.

IFI have long-term concerns relating to missed connections to surface water lines and ask that the difficulties in tracing discharges of deleterious matter from missed connections to these surface water drains and fisheries waters downstream be considered if any surface water drains are to be piped.

Kind regards,

Donnachadh Byrne

Senior Fisheries Environmental Officer

Iascach Intíre Éireann
Inland Fisheries Ireland

Tel +353 (0)1 8842600
Email donnachadh.byrne@fisheriesireland.ie
Web www.fisheriesireland.ie

3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

From: Lorraine (Panther Environmental Solutions Ltd.) [mailto:lorraine@pantherwms.com]
Sent: 26 October 2018 08:47
To: Donnachadh Byrne
Cc: Rory Kunz; Damien Murphy; Liam Minogue; Dan O'Sullivan
Subject: FW: Planning Application Consultation - Proposed Development at Creagh, Gorey, Co. Wexford

Hi Donnachadh,

Had you any comments or observations on the new proposed pipeline route, and our letter in response to IFI concerns for the development at Gorey, Co. Wexford?

Should you have any queries, please do not hesitate to contact me.

Kind regards,
Lorraine

From: Lorraine (Panther Environmental Solutions Ltd.)
Sent: Tuesday 25 September 2018 14:14
To: 'donnachadh.byrne@fisheriesireland.ie' <donnachadh.byrne@fisheriesireland.ie>
Cc: 'Rory Kunz' <RKunz@johnspainassociates.com>; 'Damien Murphy' <Damien@strutec.ie>; 'Liam Minogue' <Liam@strutec.ie>; Dan O'Sullivan <Dan@strutec.ie>
Subject: RE: Planning Application Consultation - Proposed Development at Creagh, Gorey, Co. Wexford

Hi Donnachadh,

Thank you for your response with regards my letter outlining the proposed construction of residential units and a childcare facility at Gorey, Co. Wexford. We have taken the concerns of Inland Fisheries Ireland into consideration, and I now attach our response to your concerns, in addition to maps of the proposed alternative pipeline route.

We would welcome any further comments or observations which Inland Fisheries Ireland may have in relation to the proposed development.

Should you have any queries, please do not hesitate to contact me.

Kind regards,
Lorraine

From: Donnachadh Byrne <Donnachadh.Byrne@fisheriesireland.ie>
Sent: Monday 27 August 2018 09:55
To: Lorraine (Panther Environmental Solutions Ltd.) <lorraine@pantherwms.com>
Subject: RE: Planning Application Consultation - Proposed Development at Creagh, Gorey, Co. Wexford

Hi Lorraine,

Please find attached a copy of a letter highlighting our concerns.

I have sent on a hard copy on headed paper by post.

Kind regards,

Donnachadh Byrne

Senior Fisheries Environmental Officer

Iascach Intíre Éireann
Inland Fisheries Ireland

Tel +353 (0)1 8842600
Email donnachadh.byrne@fisheriesireland.ie
Web www.fisheriesireland.ie

3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

From: Lorraine (Panther Environmental Solutions Ltd.) [mailto:lorraine@pantherwms.com]
Sent: 07 August 2018 12:29
To: Donnachadh Byrne
Cc: Rory Kunz; Damien Murphy; Liam Minogue; Dan O'Sullivan
Subject: Planning Application Consultation - Proposed Development at Creagh, Gorey, Co. Wexford

Hi Donnachadh,

I spoke with a colleague of yours this morning in relation to a planning application to An Bord Pleanála with regards the proposed construction of residential units and a childcare facility at Gorey, Co. Wexford.

Please find attached our letter detailing the proposed development, in addition to a Site Location Map and a draft Proposed Pipeline Route (to be finalised). We would welcome any comments or observations which Inland Fisheries Ireland may have to highlight any particular concerns in relation to the proposed development.

Should you have any queries, or require any further information, please do not hesitate to contact me.

Kind regards,
Lorraine

PANTHER ENVIRONMENTAL SOLUTIONS LTD
Lorraine Wyse
059-9134222
lorraine@pantherwms.com
www.pantherwms.com
Units 3 & 4, Innovation Centre
Institute of Technology
Green Road
Carlow, Ireland

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

Office of Public Works

Niamh O'Malley

From: Cyril McCarthy <cyril.mccarthy@opw.ie>
Sent: Tuesday 12 June 2018 13:50
To: Niamh O'Malley
Subject: Fwd: Re: Foul Pipe to be contructed under a bridge - Gorey, Co. Wexford

Niamh,

- Given that the correspondence is to be included in the application as per below it is important for me to clarify that comments made are generic.

- None of the comment made are to be taken as a comment upon the specific proposals or the broader development to which they may be connected.

Regards,
Cyril.

-------- Forwarded Message --------
Subject: Re: Foul Pipe to be contructed under a bridge - Gorey, Co. Wexford
Date: Tue, 12 Jun 2018 13:26:18 +0100
From: Cyril McCarthy <cyril.mccarthy@opw.ie>
To: Niamh O'Malley <nomalley@iece.ie>

That's OK Niamh,
Regards,
Cyril.

On 12/06/2018 10:19, Niamh O'Malley wrote:

> Cyril
>
> Ok thanks, I understand. An Bord Pleanala requested that I engage and consult with the OPW so would it be ok for me to include this correspondence in the planning application?
>
> Regards
>
> Niamh
>
> ---
>
> **From:** Cyril McCarthy [mailto:cyril.mccarthy@opw.ie]
> **Sent:** Tuesday 12 June 2018 09:59
> **To:** Niamh O'Malley
> **Subject:** Re: Foul Pipe to be contructed under a bridge - Gorey, Co. Wexford
>
> Niamh,
> I couldn't comment on use of siphon - beyond OPW remit. As I said the stipulation/recommendation pertains to schemes maintained by the OPW. I would say that it is for the designer to weigh up. Where 'the bridge' is not being altered then section 50 would not be relevant. It is a matter for the planning authority.
> Regards,
> Cyril.
>
> On 12/06/2018 09:46, Niamh O'Malley wrote:

Cyril

Thanks for getting back to me. If I used a siphon under the stream to ensure the pipe and surround is more than 600mm below the bed of the stream would this be acceptable? I understand from your previous email that I need to make that call but given there is no room for error or omissions in regards to the design details submitted with the Strategic Housing application to An Bord Pleanala I need some certainty that everything is covered. I would therefore appreciate your view on using a siphon.

Kind Regards

Niamh O'Malley | **Senior Project Engineer**
IE Consulting

Carlow Office - Innovation Centre, Green Road, Carlow
Newry Office - 1 RDC House, WIN Business Park, Newry BT35 6PH
T: +353 59 91 33084 (Carlow) +44 28 3025 7974 (Newry) | E: nomalley@iece.ie | W: www.iece.ie

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From: Cyril McCarthy [mailto:cyril.mccarthy@opw.ie]
Sent: Friday 8 June 2018 10:22
To: Niamh O'Malley
Subject: Re: Foul Pipe to be contructed under a bridge - Gorey, Co. Wexford

Niamh,
I attach sections 47 and 50 which may be applicable to such a proposal. The OPW do not have a maintenance remit for this section of channel - where we do we typically seek to have such pipelines surrounded in concrete placed with the top of the surround at about 500-600mm below channel bed. It is accepted that gradient limitations may be a factor here. This is to avoid it being broken by any channel maintenance works. Some markers on the banks to alert people to presence also useful. On the face of it you're not altering the bridge but could limit future capacity increase - is such work likely to be required? The proposal does not appear to constitute a weir but may become one if the channel were to be lowered. It is a matter for the proposers to assess the proposal in light of the specific sections of the Act and decide whether the proposal requires consent.
Regards,
Cyril.
On 29/05/2018 10:47, Niamh O'Malley wrote:

> Cyril
>
> I have prepared a design for a new foul pipe to be constructed in the public road as part of a new housing development project in Creagh, Gorey, Co. Wexford. The line of the pipe crosses the Ballyowen Stream and I am proposing to put the pipe underneath the stream/bridge as the stream is relatively shallow at the proposed crossing location - see the pdf's attached for details. This includes the planning stage design drawings (refer to pipe F1.029).
>
> The proposed housing development is to be submitted directly to An Bord Pleanála as part of a Strategic Housing Application. This process is a bit different to the normal applications submitted to the planning authorities in that there is no Further Information stage allowed and therefore all design issues and consents need to be

resolved before the application is submitted. I was at a pre-application meeting yesterday with ABP and they mentioned the possible need to consult with the OPW in relation to the foul pipe to be constructed under the stream/bridge. The foul pipe proposed shall be constructed under the bridge with approximately 300mm clearance from the base of the stream – see the attached long section drawing for details.

Can you confirm if I would need to prepare a section 50 application for this? If not I would need a letter on headed notepaper if that is ok? I can send you a letter with all the details if you would prefer in order for you to prepare an official response?

Kind Regards

Niamh O'Malley | **Senior Project Engineer**
IE Consulting

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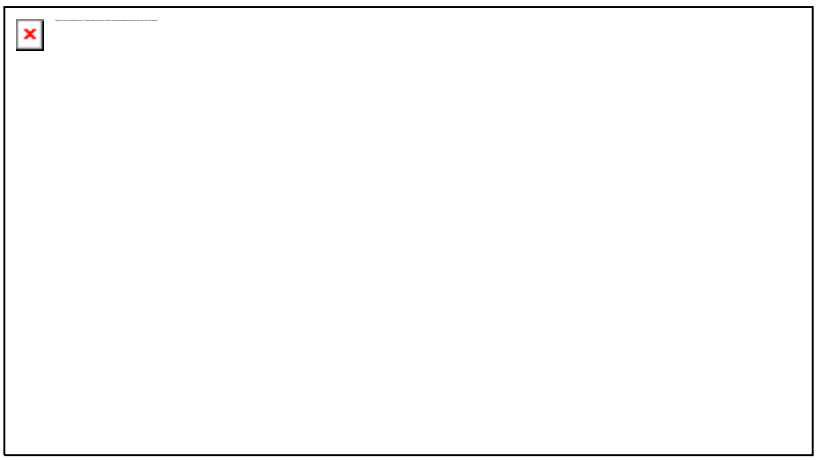
Newry Office - 1 RDC House, WIN Business Park, Newry BT35 6PH
T: +353 59 91 33084 (Carlow) +44 28 3025 7974 (Newry) | E: nomalley@iece.ie | W: www.iece.ie

--

Cyril McCarthy,
Chartered Engineer,
Office of Public Works,
Government Buildings,
Hebron Road,
Kilkenny,
Co. Kilkenny.

https://filetransfer.opw.ie/filedrop/cyril.mccarthy@opw.ie



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Cyril McCarthy,
Chartered Engineer,
Office of Public Works,
Government Buildings,
Hebron Road,
Kilkenny,
Co. Kilkenny.

https://filetransfer.opw.ie/filedrop/cyril.mccarthy@opw.ie

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Cyril McCarthy,
Chartered Engineer,
Office of Public Works,
Government Buildings,
Hebron Road,
Kilkenny,
Co. Kilkenny.

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IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

Wexford County Council

Niamh O'Malley

From: Neville Shaw <neville.shaw@wexfordcoco.ie>
Sent: Wednesday 29 August 2018 15:56
To: Niamh O'Malley
Subject: RE: IE1505: Creagh Foul Pipe - New Route

Follow Up Flag: Follow up
Flag Status: Flagged

Niamh,
We have no plans to widen or deepen the river at this point either now or in the near future and accordingly if the OPW are happy a section 50 or section 47 may not be required.

I trust this is in order.

Regards

Neville Shaw | Senior Executive Engineer | Gorey Municipal District
Wexford County Council, The Avenue, Gorey, Co.Wexford, Y25 V1W5.

Tel +353 53 9483801
e-mail Neville.shaw@wexfordcoco.ie
Web www.wexford.ie

Comhairle Contae Loch Garman
Wexford County Council

From: Niamh O'Malley [mailto:nomalley@iece.ie]
Sent: 29 August 2018 13:37
To: Neville Shaw
Cc: Tony Quirke; Alan Walsh
Subject: RE: IE1505: Creagh Foul Pipe - New Route

Neville

As discussed attached is drawing of the proposed foul pipe under the bridge.

Kind Regards

Niamh O'Malley | Senior Engineer & Company Associate
IE Consulting

Carlow Office - Innovation Centre, Green Road, Carlow
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From: Niamh O'Malley [mailto:nomalley@iece.ie]
Sent: Wednesday 29 August 2018 13:00
To: 'Neville Shaw'

Cc: 'Tony Quirke'; Alan Walsh (alan@walshgroup.info)
Subject: RE: IE1505: Creagh Foul Pipe - New Route

Neville

Thanks for getting back to me. I will proceed with a design for Option 1. If the pipes are a lot shallower than the original design along that section at Ramsfort Park/Garden City do you still require full road width reinstatement? I will send you updated drawings once they are ready and the reinstatement proposed if you prefer to decide then on this issue?

In relation to Section 50 or Section 47 consent where the foul pipe goes under the stream can you confirm whether this would be required if future regrading works were likely to be carried out on the stream? The pipe will be 500-600mm below the current stream/bridge bed level but if the stream was ever deepened then the pipe could restrict future capacity. I spoke to Tony Quirke about this some weeks ago and he said he would check if any works are ever likely to be carried out on that stream but I still have not heard back. I have attached the emails I sent to Tony.

Kind Regards

Niamh O'Malley | **Senior Engineer & Company Associate**
IE Consulting

Carlow Office - Innovation Centre, Green Road, Carlow
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From: Neville Shaw [mailto:neville.shaw@wexfordcoco.ie]
Sent: Wednesday 29 August 2018 12:43
To: Niamh O'Malley
Cc: Tony Quirke
Subject: RE: IE1505: Creagh Foul Pipe - New Route

Niamh,

If option one is your preferred option and it can be designed to flow at a suitable self cleansing velocity without the need for pumping, I am happy for you to proceed with this model. Most of this route is in public roads and the roads are to be reinstated as agreed.

I trust this is in order.

Regards

Neville Shaw | Senior Executive Engineer | Gorey Municipal District
Wexford County Council, The Avenue, Gorey, Co.Wexford, Y25 V1W5.

Tel **+353 53 9483801**
e-mail Neville.shaw@wexfordcoco.ie
Web www.wexford.ie

Comhairle Contae Loch Garman
Wexford County Council

From: Niamh O'Malley [mailto:nomalley@iece.ie]
Sent: 29 August 2018 09:02
To: Neville Shaw
Cc: Tony Quirke
Subject: IE1505: Creagh Foul Pipe - New Route

Neville

The proposed foul pipe route for the Creagh development needs to be changed from the original agreed route as Inland Fisheries have objected to the section that is proposed beside the Ballyowen Stream – see attached. I have come up with a number of alternatives and ranked accordingly. Can you please review these and let me know which one you wish to proceed with. I will also have to get approval from Irish Water.

Option 1
This is the best option in my opinion as it avoids having to cross the stream (apart from in the lower section) and the need for pumping. It also will avoid having very deep sections of pipe compared to the original proposed route.

Option 2
This is my 2nd preference as some of the route is located in green open space and is the shortest route. It does have 2 river/bridge crossings and probably will require pumping to get under these.

Option 3
This is my 3rd preference as most of the route requires digging up roads along narrow streets and is a longer route than Option 2. It does have 2 river/bridge crossings and probably will require pumping to get under these.

Option 4
This is my least favourite option as it will definitely require pumping and crossing under the river/bridge. The is crossing under the river/bridge would be about 4m below the road level. The road then rises along Fort Road by about 4m so the only solution is a pump station.

Can you also get back to me in relation to the potential Section 50 issue at the lower section of the original route? This may also apply at other locations in options 2-4.

Kind Regards

Niamh O'Malley | **Senior Engineer & Company Associate**
IE Consulting

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Comhairle Contae
Loch Garman

Wexford
County Council

6th November 2018

Mr. Rory Kunz
Executive Director
John Spain Associates
39 Fitzwilliam Place
Dublin 2
D02 ND61

Re: Letter of Consent to Planning Application

Site: Planning Application for residential development on lands at Creagh, Gorey, Co Wexford

To Whom It May Concern,

I refer to the above intended planning application, the site of which includes lands in the control of Wexford County Council, specifically lands (e.g. within the footpath and roadway as indicated hatched on attached drawing/map).

I wish to confirm that the Council has no objection to the inclusion of these lands for the purpose of making a planning application. This is without prejudice to the outcome of the planning application process.

In the event that planning permission is granted and the development requires acquisition of Wexford County Council property including air rights, disposal will be subject to terms and conditions agreed and also subject to Council approval under Section 183 of the Local Government Act 2001.

Yours faithfully,

Anthony Bailey

Property Management Unit

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