JOHN WATLER BURKE

Caltragh LRD
at Newtownholmes Road, Caltragh & Cornageeha, Co. Sligo

Civils Design Report

6736-JOD-XX-RP-C-0001 P.02

April 2024

Jennings O'Donovan & Partners Limited,

Consulting Engineers,
Finisklin Business Park,
Sligo.
Tel.: 071 9161416
Fax: 071 9161080
email: info@jodireland.com

JENNINGS O'DONOVAN & PARTNERS LIMITED
Project, Civil and Structural Consulting Engineers,
FINISKLIN BUSINESS PARK,
SLIGO,
IRELAND.

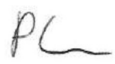
Telephone (071) 9161416
Fax (071) 9161080

Email info@jodireland.com
Web Site www.jodireland.com

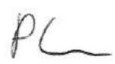
DOCUMENT APPROVAL

PROJECT	Caltragh LRD	
CLIENT / JOB NO	John Walter Burke	6736
DOCUMENT TITLE	Civils Report	

Prepared by **Reviewed/Approved by**

Document	Name	Name
DRAFT	Patrick Carr	Eamon Morrissey
Date	Signature	Signature
March 2024		

Prepared by **Reviewed/Approved by**

Document	Name	Name
FINAL	Patrick Carr	Eamon Morrissey
Date	Signature	Signature
April 2024		

1 INTRODUCTION

This report has been prepared to detail the Civil Works element of the Caltragh LRD at Newtownholmes Rd., Co. Sligo. It should be read in conjunction with the foul and storm design drawings (refer to **Appendix A** for drawings) as outlined and noted herein.

This report details the foul and storm drainage design and watermain details for said development. The proposed development will entail the construction of a residential development consisting of semi-detached dwellings, detached dwellings, terraced dwellings, apartment dwellings and creche.

The proposed site, which consists of approximately 3.796 hectares, is a greenfield site. The site is located in Caltragh Co. Sligo, west of Newtownholmes Rd. It is proposed to access the site directly by vehicle via two entrances on the Newtownholmes Rd, at the eastern boundary of the site. There will be pedestrian permeability on the eastern boundary to the Newtownholmes Rd via a footpath / cycleway that will be in line with an Active Travel route.

It is proposed to direct the foul water from the development to the centre of the site where there is an existing 300mm diameter foul water pipe that crosses the site from east to west. The proposed foul water will discharge under gravity to the existing foul water network.

It is proposed to discharge the storm water generated from the development to a StormTech attenuation / infiltration storage system in the central green area of the development. Storm water generated from the development will discharge under gravity, passing through a petrol interceptor before entering the attenuation / infiltration storage system.

An Uisce Éireann Pre-connection enquiry form was submitted to Uisce Éireann in relation to the proposed development for the required wastewater and water connections. The Confirmation of Feasibility was received showing that both water and wastewater connections are feasible without upgrades from Uisce Éireann.

2 FOUL WATER DRAINAGE DESIGN

2.1 Introduction

The drainage systems including all pipe sizes and gradients have been designed using Flow Drainage Design Software. The details of the Flow Outputs for the pipe designs are outlined in **Appendix B** of this report. The pipework to the drainage system has been designed to provide for six times the dry weather flow (DWF) in accordance with the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). It is proposed that all foul water pipes will be in accordance with Section 3.13 of the Uisce Éireann Code of Practice. The maximum pipe diameter of proposed foul water pipes is to be 225mm, with a maximum and minimum gradient such that all velocities fall within the limits of 0.75 and 2.5m/sec as set out in the "Code of Practice for Wastewater Infrastructure" by Uisce Éireann.

The foul water drainage for the development will be collected throughout the site in the foul pipe network and then directed to the centre of the site where there is an existing 300mm diameter foul water pipe that crosses the site from east to west. The proposed foul water will discharge under gravity. All of the pipe sizes and gradients are clearly indicated on the associated drawings. The typical specification for the proposed pipes is detailed in **Appendix B** and **C.** Details of the development's foul drainage network are shown on Drawing No. 6736-JOD-XX-ZZ-DR-C-200-001.

2.2 Occupancy Figures & Wastewater Flow Rates

The wastewater flow rate for the proposed development is calculated as follows in accordance with the recommendations obtained from Appendix C of the Uisce Éireann Code of Practice for Wastewater Infrastructure. Therefore, a wastewater flow rate of 150 litres/person/day was assumed. For the proposed creche, a wastewater flow rate of 180 litres/occupant/day was assumed. A detailed breakdown of the hydraulic loadings is outlined in Table 1.

Source		Hydraulic Loading (Litres/Day)		
Description	**Total Units**	**Occupancy Per Unit**	**Total (Litres/Day)**	**Total 6 DWF (Litres/Day)**
A1AA – GF Apartment (Two Storey Block)	4	2	1,200	7,200
A1BA – FF Apartment (Two Storey Block)	4	2	1,200	7,200
A2AA – GF Apartment (Two Storey Block)	2	3	900	5,400
A2AB – GF Apartment (Two Storey Block)	8	3	3,600	21,600
A2BA – FF Apartment (Two Storey Block)	2	3	900	5,400
A2BB – FF Apartment (Two Storey Block)	8	3	3,600	21,600
H2CA – Two Bedroom Two Storey	8	4	4,800	28,800
H3AA – Three Bedroom Two Storey	27	5	20,250	121,500
H3AB – Three Bedroom Two Storey	9	5	6,750	40,500
H3CA – Three Bedroom Two Storey	2	4	1,200	7,200
H3CB – Three Bedroom Two Storey	2	4	1,200	7,200
H4AA – Four Bedroom Three Storey	25	7	26,250	157,500
H4AB – Four Bedroom Three Storey	8	7	8,400	50,400
H4BA – Four Bedroom Two Storey	3	6	2,700	16,200
H4BB – Four Bedroom Two Storey	5	6	4,500	27,000
H5AA – Five Bedroom Three Storey	1	9	1,350	8,100
Creche	1	32	5,760	34,560
Total	**118 (+1)**		**94,560**	**567,360**

Table 1 – Summary of Hydraulic Loadings for proposed Dwellings and Creche

The total hydraulic load for the proposed development is 94,560 litres per day and the proposed PE is 624. The proposed development will create an additional average daily amount of 1.095 litres / second on the existing public foul system. As outlined in Section 2.1, the proposed foul network was sized to accommodate 6 times the dry weather flow, 6.567 litres / second.

3 STORM WATER DRAINAGE DESIGN

3.1 Introduction

The storm water drainage system has been designed to cater for the proposed dwelling units' areas of hardstanding (including half-roofs, footways, roadways and car parking). The proposed storm network will collect storm water run-off throughout the development and direct it to the central green area of the development. It is proposed that all storm water generated by the site will discharge by gravity, passing through a Class 1 Klargester NSBE040 Bypass Separator or equal and similar approved, to an appropriately sized StormTech attenuation / infiltration storage system, or equal and similar approved, located within the open space in the central area of the development as shown on Drawing No. 6736-JOD-XX-ZZ-DR-C-200-001. The storm water will then infiltrate from the attenuation / infiltration storage system into the surrounding soil.

The storm drainage for the entire development has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). The details of the pipe designs are outlined in **Appendix B** of this report. The storm water drainage design has been designed to cater for surface water from hard surfaces in the proposed development including roadways, footpaths, and the proposed buildings of the proposed development.

The following parameters form the basis of the design:

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

  $Q = 2.78 \times Cv \times Cr \times I \times A$

  Where,

Q	=	rate of run-off, l/s
Cv	=	Volumetric Run-off Coefficient
Cr	=	Routing Coefficient
I	=	Intensity of Rainfall, mm/hr
A	=	Impermeable Area, hectares

- A design return period of 100 years has been adopted for the sewer network in accordance with good design practice.
- The rainfall intensity is based on rainfall data for Caltragh.
- Minimum self-cleansing velocity of 0.75 m/s.
- Q-bar discharge rate shall be equal to the existing run-off rate.
- The Principles of SuDS to be adopted for the surface water drainage.

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

- Macadam Roadways = 0.45
- Roof Areas = 0.85
- Concrete Areas = 0.85

3.1.1 Site Drainage

Storm water run-off from the hardstanding, parking bays and footpaths will be collected by precast concrete gullies including lockable cast iron grating and frames connected to a piped system. Surface water run-off from roof areas will be collected via downpipe connections to the main network.

Gullies are located as shown on Drawing No. 6736-JOD-XX-ZZ-DR-C-200-001. Gullies are positioned in accordance with the 'Recommendations for Site Development Works.' Gullies are provided at a minimum rate of one gully per 200m^2.

The total storm water run-off calculated is based on the impermeable area of the site that is to be directed towards the attenuation / infiltration storage system of 17,430 m^2.

3.2 Proposed Attenuation

It is proposed to install an attenuation / infiltration storage system after storm manhole S02 as per Drawing No. 6736-JOD-XX-ZZ-DR-C-200-001. The proposed Stormtech attenuation / infiltration storage system is of an area approximately 1200m^2. Calculations for the sizing of the Stormtech attenuation / infiltration storage system are shown in **Appendix E**. Alternative products that are of equal and similar specifications can be submitted for approval prior to construction commencing.

The exact size and dimensions of the attenuation / infiltration storage system have been chosen to limit the discharge rate to an acceptable level and minimise the risk of flooding for all modelled flood events. Trial pits were excavated and tested for filtration rate. The filtration rate of the soil was estimated to be 0.03370 m/hr. At this filtrations rate, the 1 year storm discharge rate from the infiltration system is estimated to be 5.3 l/s. The 100 year storm discharge rate from the infiltration system is estimated to be 5.9 l/s. The Stormtech attenuation / infiltration storage system has a time to half empty of 1419 minutes.

A class 1 bypass petrol interceptor capable of a flowrate of 40 l/s and a drainage area greater than 20,980m^2 is required to be installed upstream of the attenuation tank as per Drawing No. 6736-JOD-XX-ZZ-DR-C-200-001. A Klargester Bypass Separator NSBE040 or equal and similar approved is proposed.

3.3 SuDS Principles

The key SuDS principles that influence the planning and design process, enabling SuDS to mimic natural drainage are:

- Storing runoff and releasing it slowly (attenuation)
- Harvesting and using the rain close to where it falls.
- Allowing water to soak into the ground (infiltration)
- Slowly transporting (conveying) water on the surface.
- Filtering out pollutants.
- Allowing sediments to settle out by controlling the flow of the water.

The proposed drainage scheme takes into account a number of the above listed principles through the following measures:

- The proposed attenuation / infiltration storage system stores runoff and releases it slowly into the surrounding ground via infiltration.
- Proposing water butts and local soakaways to the rear of dwellings to allow for re use and infiltration of roof water for each dwelling.
- Providing public open space green areas allowing rainfall to naturally percolate into the ground.
- Strategic placing of gullies to keep road surface gradients as gentle as possible to cater for the slow transporting of water on the surface.
- Proposing a class 1 petrol/oil interceptor to remove pollutants from the system.

4 WATER MAIN

The water main has been designed in accordance with the Uisce Éireann Code of Practice for Water Infrastructure. A 180mm OD PE connection is proposed to be made to the existing 150mm inside diameter uPVC watermain which is laid across the central area of the proposed site, as shown on Drawing No. 6736-JOD-XX-ZZ-DR-C-200-007, included in **Appendix A**. From the proposed 180mm OD PE watermain, it is proposed to connect 110mm OD PE watermains to serve the branches of the proposed development. A 25mm PE connection will be made to each dwelling/unit.

Hydrants will be positioned within the site such that:

- The distance from each building is not less than 6m or more than 46m,
- The distance from a hydrant to a vehicle access road or hard-standing area for fire appliances is not more than 30m,
- They are distributed around the perimeter of the buildings, having regard for the provision of access for fire appliances, (as per Building Regulations 2006 Technical Guidance Document B)

The hydrants shall be capable of delivering a minimum of 8 litres per second through any single hydrant as per Water UK – National Guidance Document on the Provision of Water for Fire Fighting.

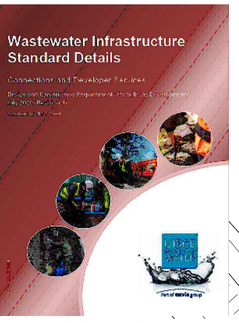
In accordance with Uisce Éireann standards a bulk flow meter and sluice valves are proposed at the connection point of the existing watermain, adjacent to the north eastern entrance of the proposed development. All water mains are to be commissioned and pressure tested to Uisce Éireann Standards. The typical connection details and meter details are shown in Uisce Éireann Water Standard Construction Details IW-CDS-5020-01.

5 CONCLUSION

The Report should be read in conjunction with the associated Drawings, layouts and specifications. The wastewater drainage layout and storm water drainage layout meet the requirements of the proposed development and are in accordance with the relevant codes of practice and standards.

APPENDIX A

DRAWINGS



NOTE: CONTRACTOR IS TO REFER TO REVISION 4 OF THE IRISH WATER STANDARD DETAILS DATED JULY 2020 FOR WASTEWATER INFRASTRUCTURE DETAILS. THIS BOOKLET HAS BEEN INCLUDED IN PART OF THE CIVIL/STRUCTURAL PACKAGE.

ALL WORKS TO BE CARRIED OUT TO IRISH WATER CODE OF PRACTICE DOCUMENT CDS-5030-03

FOUL WASTE WATER LAYOUT TO BE INSTALLED IN ACCORDANCE WITH IRISH WATER STANDARD DETAIL STD-WW-02 REGARDING GENERAL LAYOUT.

ALL FOUL WASTEWATER DRAINAGE PIPE WORK, INCLUDING SERVICE CONNECTIONS TO COMPLY WITH SECTION 3.6 OF I.W. CODE OF PRACTICE REGARDING PIPE WORK GRADIENTS.

ALL FOUL WASTEWATER PIPE WORK MATERIAL TO COMPLY WITH SECTION 3.13 OF THE IRISH WATER CODE OF PRACTICE.

ALL MANHOLES TO BE CONSTRUCTED IN ACCORDANCE WITH I.W. STD-WW-10 and I.W. STD-WW-12.

WHERE FOUL AND SURFACE WATER MANHOLES AREA ADJACENT THEIR POSITIONS SHOULD BE STAGGERED TO ALLOW FOR CROSSING OVER OF SEWERS AS PER SECTION 3.5.13 OF I.W. CODE OF PRACTICE.

WHERE 0.3m SEPERATION DISTANCE CANNOT BE ACHIEVED BETWEEN FOUL AND STORM PIPES, THE PIPES SHALL BE SURROUNDED IN LEAN MIX CONCRETE.

ALL WASTEWATER PIPE WORK SHALL BE INSTALLED IN ACCORDANCE WITH I.W. STD-WW-05, STD-WW-06, AND STD-WW-06A REGARDING SEPARATION DISTANCES.WHERE SEPARATION DISTANCES CANNOT BE ACHIEVED, PIPES SHALL BE SURROUND IN LEAN MIX CONCRETE.

INSPECTION CHAMBERS TO BE INSTALLED ON ALL CONNECTIONS FROM FOUL AND SURFACE WATER SEWER WITHIN INDIVIDUAL PROPERTIES IN ACCORDANCE WITH I.W. STD-WW-03-1 IN COMPLIANCE WITH IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS

FOUL SEWER DROP MANHOLES TO BE INSTALLED TO IW WASTEWATER CODE OF PRACTICE STANDARD DETAIL STD-WW-12.

HDPE TWINWALL PIPES TO BE USED FOR ALL STORM SEWER PIPES UNLESS OTHERWISE SPECIFIED. ALL FOUL SEWER PIPES TO BE IN ACCORDANCE WITH IRISH WATER CODES OF PRACTICE.

PIPES ARE TO BE BBA (BRITISH BOARD OF AGRÉMENT) OR SIMILAR APPROVED AND HAPAS (HIGHWAYS AGENCY PRODUCT APPROVAL SCHEME) OR SIMILAR CERTIFIED.

WHERE 0.9m COVER TO THE ROADWAY CANNOT BE ACHIEVED, PIPES SHALL BE SURROUNDED IN LEAN MIX CONCRETE.

GENERAL NOTES:

1 FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2 ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3 ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4 THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.

LEGEND

SITE BOUNDARY shown thus

PROPOSED 1200MM D400 STORM/FOUL MANHOLE shown thus

PROPOSED DROPPED INVERT 1200MM D400 STORM/FOUL MANHOLE shown thus

PROPOSED CONCRETE SURROUND FOR LOW COVER STORM/FOUL PIPES shown thus

PROPOSED STORM WATER NETWORK shown thus

PROPOSED FOUL NETWORK shown thus

PROPOSED SURFACE WATER CONNECTIONS shown thus

PROPOSED FOUL WATER CONNECTIONS shown thus

PROPOSED STORM/FOUL WATER AJs shown thus

PROPOSED STORM/FOUL WATER BOUNDARY BOX TO IW-STD-WW-13 shown thus

PROPOSED ROAD GULLIES shown thus

EXISTING STORM WATER PIPE shown thus

EXISTING FOUL WATER PIPE shown thus

S03-5
C.L : 43.595
I.L : 42.405

F02-5
C.L : 43.510
I.L : 42.150

S03-3-1
C.L : 40.655
I.L : 39.035

F02-3-1
C.L : 40.440
I.L : 38.700

S03-2
C.L : 41.450
I.L : 38.000

F02-2
C.L : 41.410
I.L : 37.500

Foul Ref. 8401
Ex.C.L : 34.374
I.L : 31.174

Storm Ref 8402
Ex. C.L : 34.371
I.L : 31.491

F01-2
C.L : 36.145
I.L : 34.700

S03-1-2
C.L : 36.135
I.L : 34.975

S03-1-1
C.L : 36.160
I.L : 34.890

F01-1
C.L : 36.130
I.L : 34.510

F01
C.L : 36.315
D.I.L : 34.760
I.L : 34.160

KLARGESTER NSBE040 PETROL INTERCEPTOR OR EQUAL APPROVED

Foul Ref. 8403
Ex.C.L : 35.691
C.L : 36.280
D.I.L : 34.145
I.L : 32.967

Storm Ref 8404
Ex.C.L : 35.659
C.L : 36.260
I.L : 33.362

F02
C.L : 36.470
I.L : 35.175

S03
C.L : 36.530
D.I.L : 35.350
D.I.L : 35.070
I.L : 34.500

S02
C.L : 36.500
I.L : 34.340

Foul Ref. 9302
Ex.C.L :37.593
C.L : 39.070
I.L : 33.926

Storm Ref 9303
Ex C.L : 37.223
C.L : 39.000
I.L : 34.293

S04-2
C.L : 37.350
I.L : 36.190

F03-2
C.L : 37.380
I.L : 36.630

S04-1
C.L : 39.080
I.L : 35.550

F03-1
C.L : 39.180
I.L : 36.045

S07-2
C.L : 43.490
I.L : 40.000

F06-1
C.L : 43.550
I.L : 40.000

S07-3
C.L : 41.895
I.L : 40.580

F06-2
C.L : 41.870
I.L : 40.400

F07-2
C.L : 46.750
I.L : 45.960

S08-2
C.L : 46.770
I.L : 45.935

F07-1
C.L : 46.380
I.L : 45.480

S08-1
C.L : 46.430
I.L : 45.605

Storm Ref 9205
Ex C.L : 49.077
I.L : 46.026

Foul Ref. 9202
Ex.C.L : 49.052
I.L : 45.567

Foul Ref. 9208
Ex.C.L : 50.731
I.L : 46.691

Storm Ref 9207
Ex C.L : 50.641
I.L : 47.031

F02-4
C.L : 45.210
I.L : 41.750

S03-4
C.L : 45.210
I.L : 42.210

S03-3
C.L : 44.760
D.I.L : 42.180
I.L : 38.580

F02-3
C.L : 44.750
D.I.L : 41.690
I.L : 37.710

F02-1
C.L :37.870
I.L : 36.155

S03-1
C.L : 37.740
D.I.L : 36.250
I.L : 35.650

F04-3
C.L : 45.540
I.L : 43.650

S05-3
C.L : 45.500
I.L : 42.890

STORM TECH ATTENUATION TANK
VOLUME = 1026m³
DEPTH = 1.6m
FILTRATION RATE = 0.03370 m/hr
TtHE = 1419 min
C.L. = 36.500m
I.L. = 33.880m

F04-2
C.L : 41.715
I.L : 40.285

S05-2
C.L : 41.640
D.I.L : 40.340
I.L : 39.740

S04
C.L : 39.250
D.I.L : 36.900
I.L : 35.270

F03
C.L : 39.300
D.I.L : 37.415
I.L : 35.920

F04-1
C.L : 40.680
I.L : 39.255

S05-1
C.L : 40.640
I.L : 38.240

F04
C.L : 40.470
I.L : 38.955

S05
C.L : 40.500
D.I.L : 38.240
I.L : 37.700

S06
C.L : 42.370
I.L : 38.470

F05
C.L : 42.750
I.L : 39.245

Foul Ref. 9306
Ex.C.L : 42.730
C.L : 42.730
I.L : 39.925

Storm Ref 9305
Ex C.L : 42.680
C.L : 42.680
I.L : 40.281

S07
C.L : 44.230
I.L : 42.960

F06
C.L : 44.285
D.I.L : 42.620
I.L : 39.410

S07-1
C.L : 43.900
D.I.L : 42.485
I.L : 39.790

Foul Ref. 9201
Ex.C.L : 45.960
C.L : 46.310
I.L : 40.098

Storm Ref 9204
Ex C.L : 46.030
C.L : 46.360
I.L : 40.340

F07
C.L : 46.410
I.L : 45.320

S08
C.L : 46.500
I.L : 45.400

Red Line Area:-
37,960 m² 3.796 Hectares

ITM Co-Ordinates of site:- 568884, 834363

Irish Grid Co-Ordinates: 168926, 334357

Rev.	Modifications	By	Chkd	Aprvd	Date
P.04	Revised Site Layout	PC	EM	EM	29.04.24
P.03	Revised Site Layout	KK	EM	EM	24.04.24
P.02	Issued for PLANNING	PC	EM	EM	22.03.23
P.01	Issued for LRD	PC	EM	EM	05.10.23

Layout Ref.:
File P:\Jod-jobs\6736 Burkes Cornageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-001-SWFW Layout.dwg

Client
JOHN WALTER BURKE

Project
CALTRAGH LRD

Stage
PLANNING

Title
PROPOSED STORM AND FOUL WATER LAYOUT

Scale
1:400 @ A1

Surveyed	Drawn	Checked	Date
OSI	PC	EM	OCT '23

JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

Drawing No. 6736-JOD-XX-ZZ-DR-C-200-001

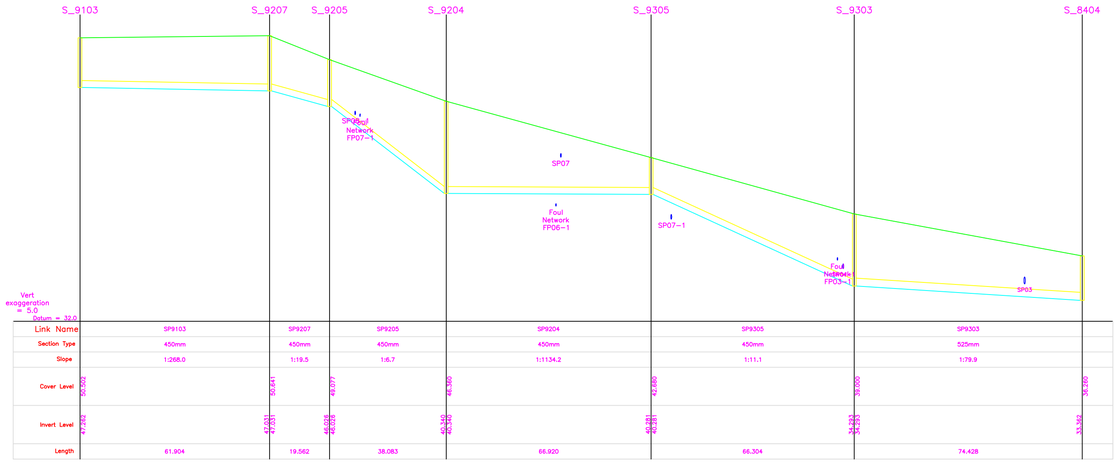
Revision P.04

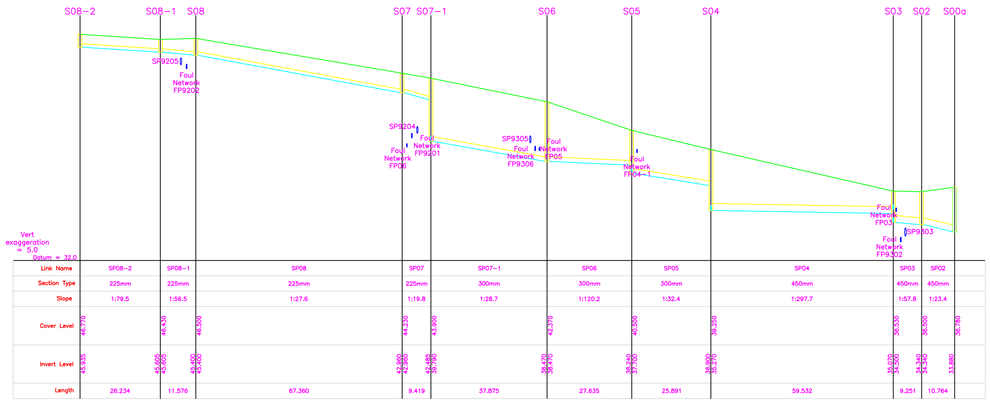
STORM NETWORK

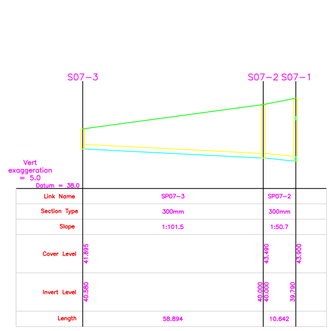
PIPE ID	UPSTREAM NODE	DOWNSTREAM NODE	LENGTH (m)	US IL (mOD)	DS IL (mOD)	SLOPE (1:X)	DIA (mm)
P9103	S_9103	S_9207	61.904	47.262	47.031	268	450
P9207	S_9207	S_9205	19.562	47.031	46.026	19.5	450
P9205	S_9205	S_9204	38.083	46.026	40.340	6.7	450
P9204	S_9204	S_9305	66.920	40.340	40.281	1134.2	450
P9305	S_9305	S_9303	66.304	40.281	34.293	11.1	450
P9303	S_9303	S_8404	74.428	34.293	33.362	79.9	525
P08-2	S08-2	S08-1	26.234	45.935	45.605	79.5	225
P08-1	S08-1	S08	11.576	45.605	45.400	56.5	225
P08	S08	S07	67.360	45.400	42.960	27.6	225
P07	S07	S07-1	11.671	42.960	42.485	24.6	225
P07-3	S07-3	S07-2	58.894	40.580	40.000	101.5	300
P07-2	S07-2	S07-1	8.390	40.000	39.790	40	300
P07-1	S07-1	S06	36.703	39.790	38.470	27.8	300
P06	S06	S05	28.135	38.470	38.240	122.3	300
P05-3	S05-3	S05-2	50.919	42.890	40.340	20	225
P05-2	S05-2	S05-1	51.965	39.740	38.240	34.6	300
P05-1	S05-1	S05	15.191	38.240	37.700	25.3	300
P05	S05	S04	25.891	37.700	36.900	35	300
P04-2	S04-2	S04-1	47.190	36.190	35.550	73.7	300
P04-1	S04-1	S04	8.547	35.550	35.270	30.5	300
P04	S04	S03	59.532	35.270	35.070	297.7	450
P03-5	S03-5	S03-4	57.572	42.405	42.210	295.2	225
P03-4	S03-4	S03-3	8.359	42.210	42.180	278.6	225
P03-3-1	S03-3-1	S03-3	60.192	39.035	38.580	132.3	225
P03-3	S03-3	S03-2	42.932	38.580	38.000	74	300
P03-2	S03-2	S03-1	48.570	38.000	36.250	27.8	300
P03-1	S03-1	S03	17.773	35.650	35.350	59.2	300
P03-1-2	S03-1-2	S03-1-1	8.432	34.975	34.890	99.2	225
P03-1-1	S03-1-1	S03	44.581	34.890	34.500	114.3	225
P03	S03	S02 (Infiltration tank)	9.251	34.500	34.340	57.8	450

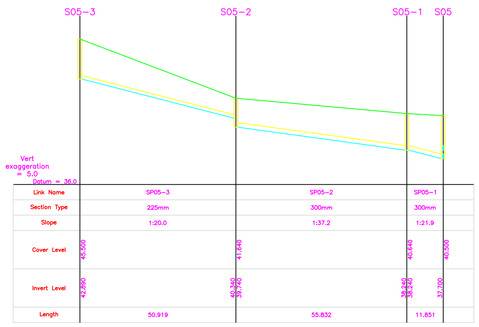
FOUL NETWORK

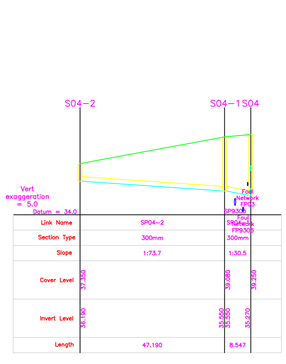
PIPE ID	UPSTREAM NODE	DOWNSTREAM NODE	LENGTH (m)	US IL (mOD)	DS IL (mOD)	SLOPE (1:X)	DIA (mm)
FP9105	9105	9208	62.396	46.962	46.691	230.2	300
FP9208	9208	9202	19.190	46.691	45.567	17.1	300
FP9202	9202	9201	38.529	45.567	40.098	7	300
FP9201	9201	9306	66.091	40.098	39.925	382	300
FP9306	9306	9302	66.931	39.925	33.926	11.2	300
FP9302	9302	8403	75.754	33.926	32.967	79	300
FP07-2	F07-2	F07-1	28.879	45.960	45.48	60.2	150
FP07-1	F07-1	F07	9.740	45.480	45.32	60.9	150
FP07	F07	F06	64.396	45.320	42.62	23.9	150
FP06-2	F06-2	F06-1	59.146	40.400	40	147.9	150
FP06-1	F06-1	F06	18.630	40.000	39.41	31.6	150
FP06	F06	F05	31.809	39.410	39.245	192.8	225
FP05	F05	F04	41.213	39.245	38.955	142.1	225
FP04-3	F04-3	F04-2	50.849	43.650	40.285	15.1	150
FP04-2	F04-2	F04-1	52.015	40.285	39.255	50.5	225
FP04-1	F04-1	F04	16.241	39.255	38.955	54.1	225
FP04	F04	F03	22.425	38.955	37.415	14.6	225
FP03-2	F03-2	F03-1	49.835	36.630	36.045	85.2	150
FP03-1	F03-1	F03	7.334	36.045	35.92	58.7	150
FP03	F03	F02	63.484	35.920	35.175	85.2	225
FP02-5	F02-5	F02-4	57.654	42.150	41.75	144.1	150
FP02-4	F02-4	F02-3	9.054	41.750	41.69	150.9	150
FP02-3-1	F02-3-1	F02-3	59.520	38.700	37.71	60.1	150
FP02-3	F02-3	F02-2	42.282	37.710	37.5	201.3	225
FP02-2	F02-2	F02-1	46.361	37.500	36.155	34.5	225
FP02-1	F02-1	F02	18.547	36.155	35.175	18.9	225
FP02	F02	F01	20.161	35.175	34.76	48.6	225
FP01-2	F01-2	F01-1	11.459	34.700	34.51	60.3	150
FP01-1	F01-1	F01	21.163	34.510	34.16	60.5	150
FP01	F01	8403	3.294	34.160	34.145	219.6	225
8403 EXG	8403	8401	92.235	32.967	31.174	51.4	300

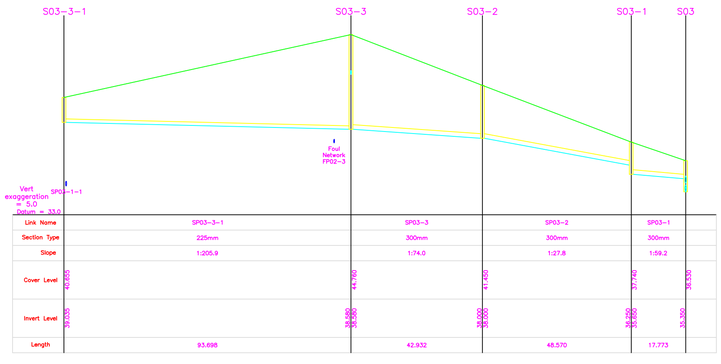


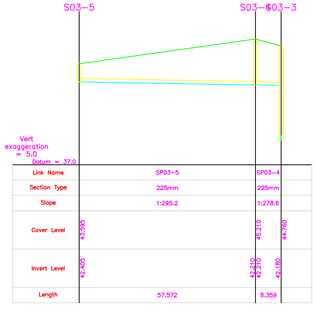


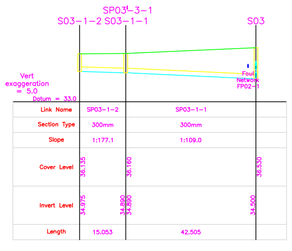






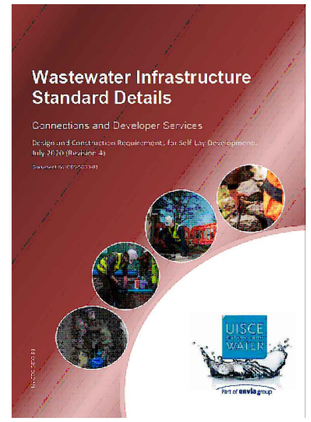






GENERAL NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS. CONTRACTOR TO VERIFY THE ACCURACY OF THIS PROPOSAL TO THE ENGINEER AND ALLOW FOR MINOR CORRECTIONS AS DEEMED NECESSARY WITH A REASONABLE TIMEFRAME.



NOTE: CONTRACTOR IS TO REFER TO REVISION 4 OF THE IRISH WATER STANDARD DETAILS DATED JULY 2020 FOR WASTEWATER INFRASTRUCTURE DETAILS.

rev.	modifications	by	chkd	date
P.02	Issued for PLANNING	PC	EM	22.03.24
P.01	Issued for LRD	PC	EM	05.10.23

Layout Ref.:

file: P:\Jod-jobs\6736 Burkes Carnageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-002-003-SWFW Longsections.dwg

client: JOHN WALTER BURKE

project: CALTRAGH LRD

stage: PLANNING

title: PROPOSED STORM SEWER SECTIONS

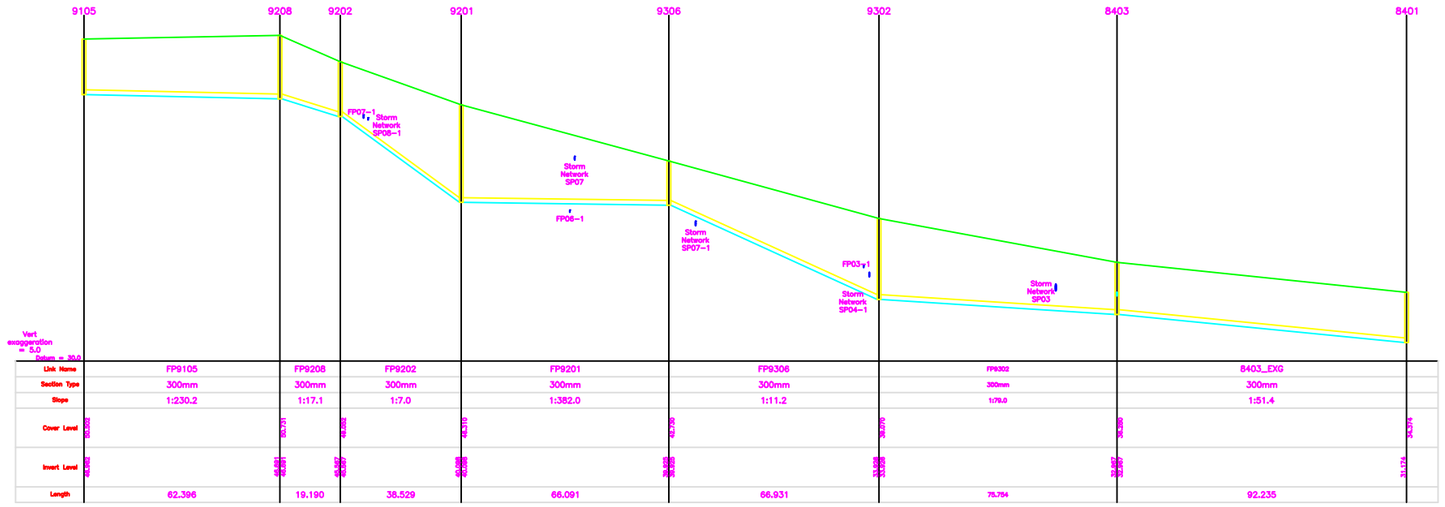
scale: HORIZ: 1:1000, VERT: 1:200 @ A1

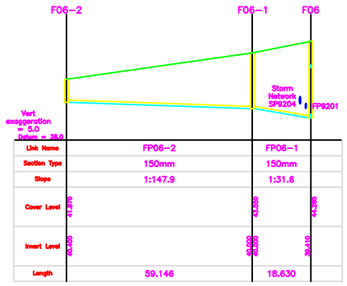
surveyed	drawn	checked	date
	PC	EM	OCT '23

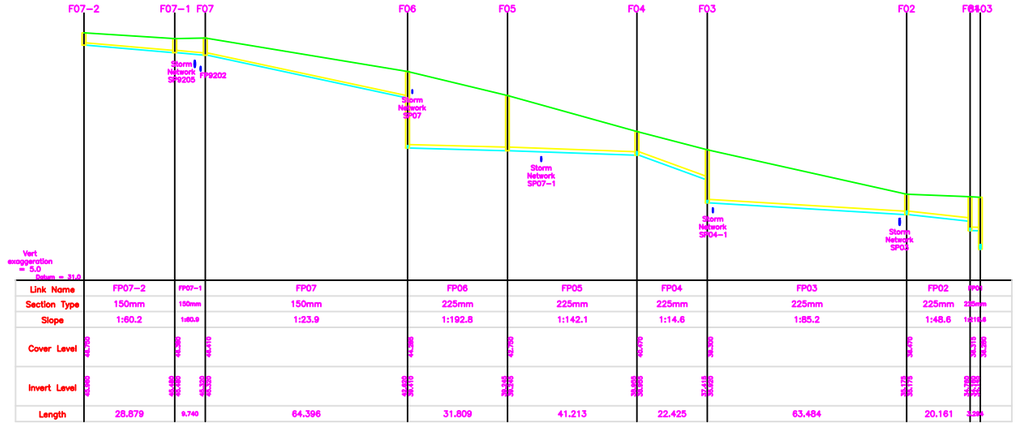
JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

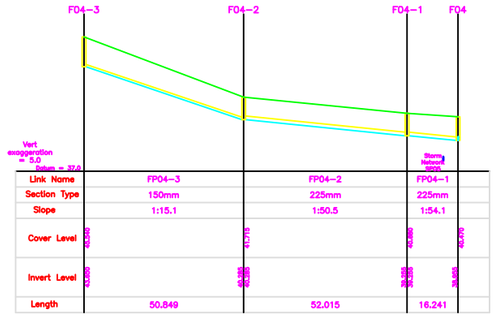
drawing no.: 6736-JOD-XX-ZZ-DR-C-200-002

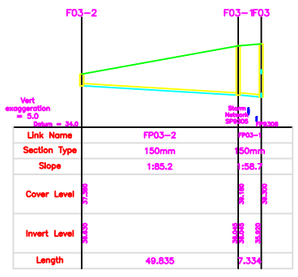
revision: P.02

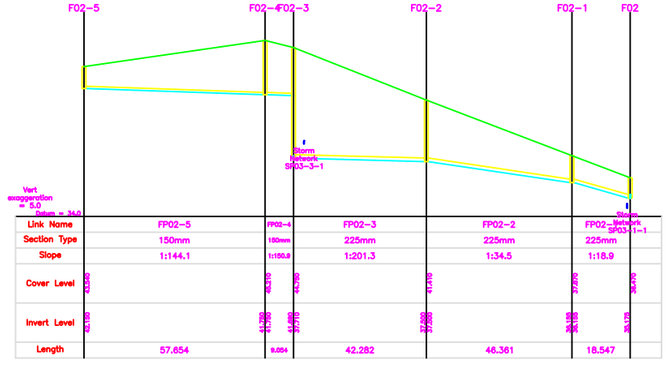


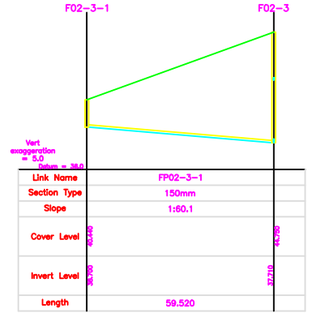


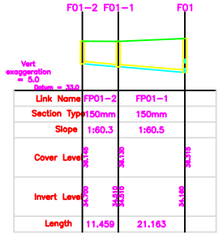






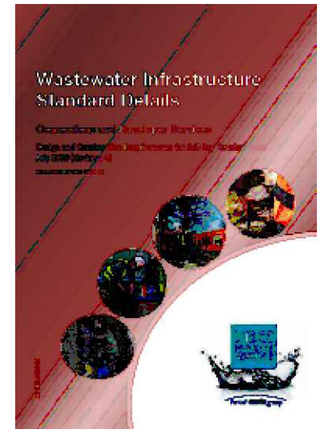






GENERAL NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS. CONTRACTOR TO VERIFY THE ACCURACY OF THIS PROPOSAL TO THE ENGINEER AND ALLOW FOR MINOR CORRECTIONS AS DEEMED NECESSARY WITH A REASONABLE TIMEFRAME.



NOTE: CONTRACTOR IS TO REFER TO REVISION 4 OF THE IRISH WATER STANDARD DETAILS DATED JULY 2020 FOR WASTEWATER INFRASTRUCTURE DETAILS.

rev.	modifications	by	chkd	date
P.02	Issued for PLANNING	PC	EM	22.03.24
P.01	Issued for LRD	PC	EM	05.10.23

Layout Ref.:

file P:\Jod-jobs\6736 Burkes Cornageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-002-003-SWFW Longsections.dwg

client
JOHN WALTER BURKE

project
CALTRAGH LRD

stage
PLANNING

title
PROPOSED FOUL SEWER SECTIONS

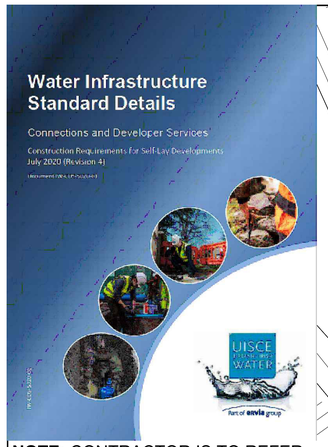
scale
HORIZ: 1:1000, VERT: 1:200 @ A1

surveyed	drawn	checked	date
	PC	EM	OCT '23

JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

drawing no. 6736-JOD-XX-ZZ-DR-C-200-003

revision P.02



NOTE: CONTRACTOR IS TO REFER TO REVISION 4 OF THE IRISH WATER STANDARD DETAILS DATED JULY 2020 FOR WATER INFRASTRUCTURE DETAILS. THIS BOOKLET HAS BEEN INCLUDED AS PART OF THE CIVIL/STRUCTURAL PACKAGE.

NOTES:-

ALL WORKS TO BE CARRIED OUT TO IRISH WATER CODE OF PRACTICE DOCUMENT CDS-5020-03 AND STANDARD DETAILS CDS-5020-01

FOUL WASTE WATER LAYOUT TO BE INSTALLED IN ACCORDANCE WITH IRISH WATER STANDARD DETAIL STD-WW-02 REGARDING GENERAL LAYOUT.

ALL FOUL WASTEWATER DRAINAGE PIPE WORK, INCLUDING SERVICE CONNECTIONS TO COMPLY WITH SECTION 3.6 OF I.W. CODE OF PRACTICE REGARDING PIPE WORK GRADIENTS.

ALL FOUL WASTEWATER PIPE WORK MATERIAL TO COMPLY WITH SECTION 3.13 OF THE IRISH WATER CODE OF PRACTICE.

ALL MANHOLES TO BE CONSTRUCTED IN ACCORDANCE WITH I.W. STD-WW-10 and I.W. STD-WW-12.

WHERE FOUL AND SURFACE WATER MANHOLES AREA ADJACENT THEIR POSITIONS SHOULD BE STAGGERED TO ALLOW FOR CROSSING OVER OF SEWERS AS PER SECTION 3.5.13 OF I.W. CODE OF PRACTICE.

WHERE 0.3m SEPERATION DISTANCE CANNOT BE ACHIEVED BETWEEN FOUL AND STORM PIPES, THE PIPES SHALL BE SURROUNDED IN LEAN MIX CONCRETE.

ALL WASTEWATER PIPE WORK SHALL BE INSTALLED IN ACCORDANCE WITH I.W. STD-WW-05, STD-WW-06, AND STD-WW-06A REGARDING SEPARATION DISTANCES.WHERE SEPARATION DISTANCES CANNOT BE ACHIEVED, PIPES SHALL BE SURROUND IN LEAN MIX CONCRETE.

INSPECTION CHAMBERS TO BE INSTALLED ON ALL CONNECTIONS FROM FOUL AND SURFACE WATER SEWER WITHIN INDIVIDUAL PROPERTIES IN ACCORDANCE WITH I.W. STD-WW-03-1 IN COMPLIANCE WITH IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS

FOUL SEWER DROP MANHOLES TO BE INSTALLED TO IW WASTEWATER CODE OF PRACTICE STANDARD DETAIL STD-WW-12.

HDPE TWINWALL PIPES TO BE USED FOR ALL STORM SEWER PIPES UNLESS OTHERWISE SPECIFIED. ALL FOUL SEWER PIPES TO BE IN ACCORDANCE WITH IRISH WATER CODES OF PRACTICE.

WHERE 0.9m COVER TO THE ROADWAY CANNOT BE ACHIEVED, PIPES SHALL BE SURROUNDED IN LEAN MIX CONCRETE.

NOTES

GENERAL NOTES:

1 FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2 ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3 ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4 THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.

LEGEND

LEGEND

SITE BOUNDARY shown thus

PROPOSED ON-LINE FIRE HYDRANT (IW-STD-W-18) shown thus

PROPOSED SLUICE VALVE (IW-STD-W-15) shown thus

PROPOSED SCOUR VALVE (IW-STD-W-30B) shown thus

PROPOSED DOUBLE AIR VALVE (IW-STD-W-22) shown thus

PROPOSED BULK WATER METER TO INCL. KIOSK TO STD-W-36 AND METER CHAMBER TO STD-W-26 shown thus

WATERMAIN SUPPLY Ø 110mm OUTSIDE DIAMETER PE100, PIPE MATERIAL SHALL BE IN COMPLIANCE WITH IRISH WATER SECTION 3.9 OF THE CODE OF PRACTICE shown thus

WATERMAIN SUPPLY Ø 180mm OUTSIDE DIAMETER PE100, PIPE MATERIAL SHALL BE IN COMPLIANCE WITH IRISH WATER SECTION 3.9 OF THE CODE OF PRACTICE shown thus

EXISTING Ø 150MM INSIDE DIAMETER uPVC WATERMAIN shown thus

PROPOSED WATER SUPPLY CONNECTION (25mm O.D. PE PIPE) shown thus — Public / Private

PROPOSED LEVELS shown thus

46M HYDRANT RADIUS shown thus

Red Line Area:-
37,960 m^2 3.796 Hectares

ITM Co-Ordinates of site:- 568884, 834363

Irish Grid Co-Ordinates: 168926, 334357

Rev.	Modifications	By	Chkd	Aprvd	Date
P.05	Revised Site Layout	PC	EM	EM	29.04.24
P.04	Revised Site Layout	KK	EM	EM	24.04.24
P.03	Issued for PLANNING	PC	EM	EM	22.03.24
P.02	Air valve label added	PC	EM	EM	14.11.23
P.01	Issued for LRD	PC	EM	EM	05.10.23

Layout Ref.:

File P:\Jod-jobs\6736 Burkes Cornageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-007-Watermain Layout.dwg

Client
JOHN WALTER BURKE

Project
CALTRAGH LRD

Stage
PLANNING

Title
PROPOSED WATERMAIN LAYOUT

Scale
1:400 @ A1

Surveyed	Drawn	Checked	Date
OSI	PC	EM	OCT '23

JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

Drawing No.	Revision
6736-JOD-XX-ZZ-DR-C-200-007	P.05

YIELD

YIELD SIGN RUS 028 TO 5.3.1 TO 5.3.10 DTTS TRAFFIC SIGNS MANUAL AUG 2019
LOCATED OFF FOOTWAY MIN 2.3M HIGH

YIELD SIGN MARKING M 115 TO 7.5.4 DTTS TRAFFIC SIGNS MANUAL FEB 2019

YIELD LINE MARKING RRM 018 TO 7.2.13 DTTS TRAFFIC SIGNS MANUAL FEB 2019

STOP

STOP SIGN RUS 027 TO 5.2.1 TO 5.2.9 DTTS TRAFFIC SIGNS MANUAL AUG 2019
LOCATED OFF FOOTWAY MIN 2.3M HIGH

STOP LINE MARKING RRM 017 TO 7.2.2 DTTS TRAFFIC SIGNS MANUAL AUG 2019

STOP

STOP SIGN MARKING M 114 TO 7.5.3 DTTS TRAFFIC SIGNS MANUAL AUG 2019

30 km/h
Crios Mall
SLOW ZONE

30KM/H SLOW ZONE SIGN F 403 TO 4.5 DTTS TRAFFIC SIGNS MANUAL AUG 2019

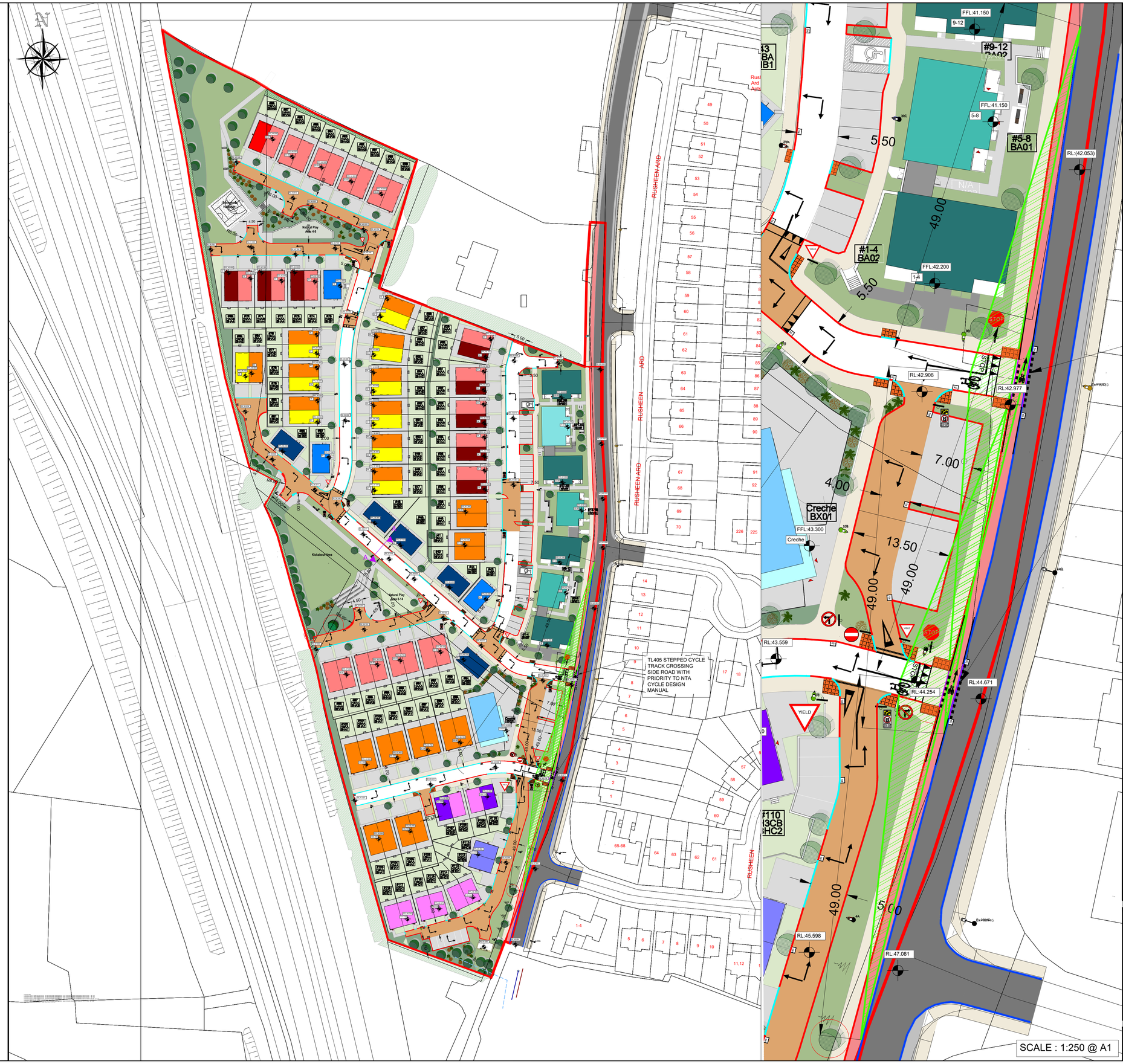
TRAFFIC CALMING TRIANGLES M 112 TO 7.17.3 DTTS TRAFFIC SIGNS MANUAL ON ALL RAMPS

NO ENTRY LINE RRM 019 TO 7.2.19 DTTS TRAFFIC SIGNS MANUAL

NO LEFT TURN RUS 013 TO 5.10 DTTS TRAFFIC SIGNS MANUAL

NO RIGHT TURN RUS 012 TO 5.10 DTTS TRAFFIC SIGNS MANUAL

NO ENTRY SIGN RUS 050 TO 5.9 DTTS TRAFFIC SIGNS MANUAL



SCALE : 1:250 @ A1

NOTES

GENERAL NOTES:

1 FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2 ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3 ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4 THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.

LEGEND

SITE BOUNDARY shown thus
PROPOSED ROAD GULLEY shown thus
PROPOSED BUFF COLOURED TACTILE PAVING (400MMX400MM) (See TII CC-SCD-05030) shown thus
PROPOSED DIRECTION OF CAMBER shown thus
PROPOSED HOMEZONE OUTLINE shown thus
PROPOSED ROAD KERB shown thus
PROPOSED DROP KERB shown thus
PROPOSED HOMEZONE AREA. FINISH AND COLOR OF ASPHALT TO ARCHITECTS SPECIFICATION shown thus
SIGHT LINE shown thus
ROAD EDGE shown thus

NOTES :

All YIELD and STOP signage line markings are to be thermo plastic and conform with the Department of Transport, Tourism and Sport Traffic Sign Manual.

All line markings are to be thermo plastic and in accordance with the Department of Transport, Tourism and Sport Traffic Sign Manual.

All signage to conform with the with the Department of Transport, Tourism and Sport Traffic Sign Manual.

Red Line Area:-
37,960 m^2 3.796 Hectares

ITM Co-Ordinates of site:- 568884, 834363
Irish Grid Co-Ordinates: 168926, 334357

Rev.	Modifications	By	Chkd	Aprvd	Date
P.05	Site Layout Revised	PC	EM	EM	29.04.24
P.05	Site Layout Revised	KK	EM	EM	24.04.24
P.04	updated to Architects revisions	AW	EM	EM	08.04.24
P.03	Issued for PLANNING	PC	EM	EM	22.03.24
P.02	Amended creche road to one way	PC	EM	EM	10.10.23

Layout Ref.:

File P:\Jod-jobs\6736 Burkes Cornageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-008-Road Layout.dwg

Client
JOHN WALTER BURKE

Project
CALTRAGH LRD

Stage
PLANNING

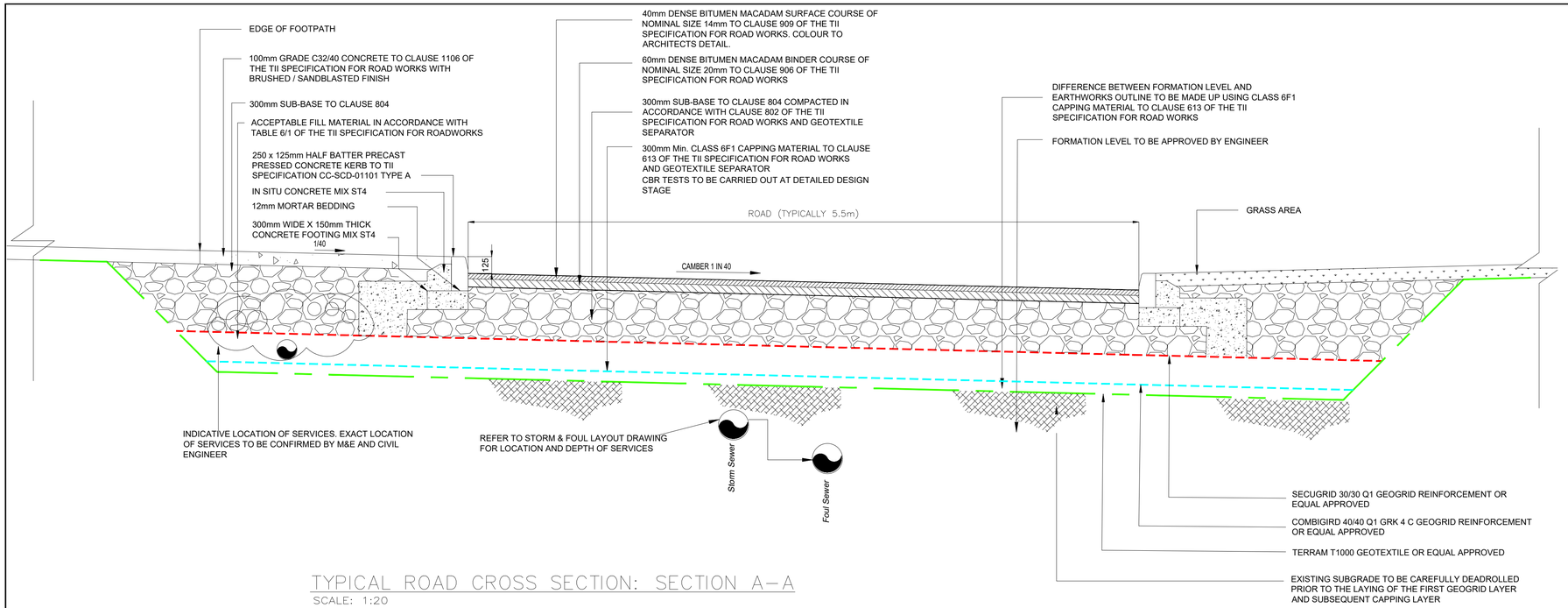
Title
PROPOSED ROAD LAYOUT

Scale
1:400 @ A1

Surveyed	Drawn	Checked	Date
OSI	PC	EM	OCT '23

JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

Drawing No. 6736-JOD-XX-ZZ-DR-C-200-008
Revision P.06

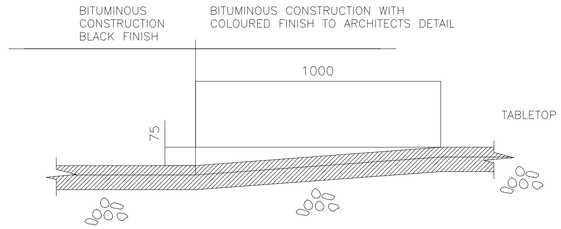


TYPICAL ROAD CROSS SECTION: SECTION A–A
SCALE: 1:20

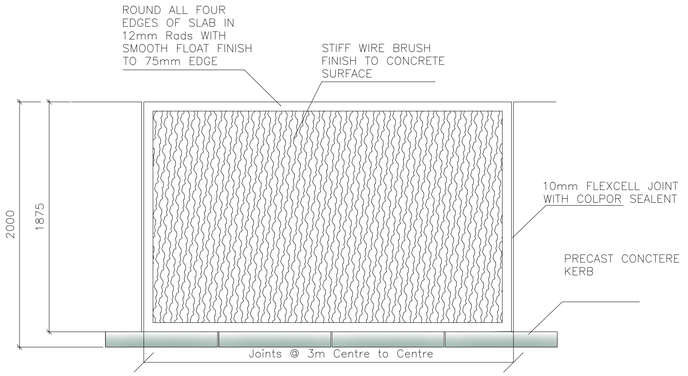
NOTES

GENERAL NOTES:

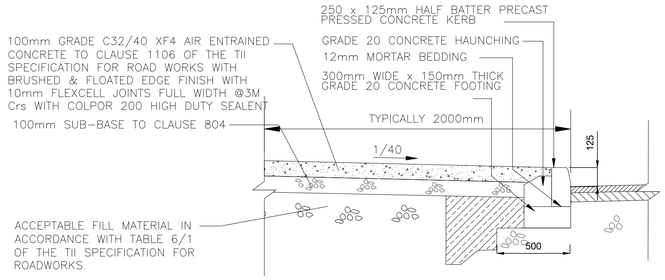
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS. CONTRACTOR TO VERIFY THE ACCURACY OF THIS PROPOSAL TO THE ENGINEER AND ALLOW FOR MINOR CORRECTIONS AS DEEMED NECESSARY WITH A REASONABLE TIMEFRAME.



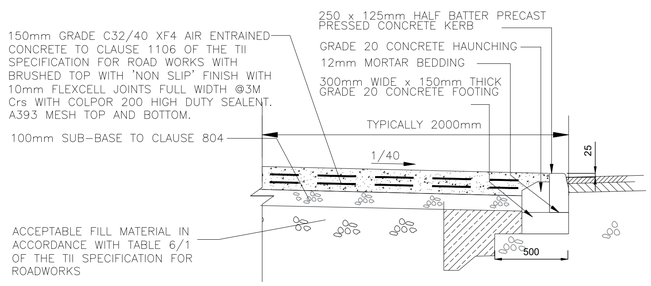
TRANSITION RAMP
SCALE: 1:12.5



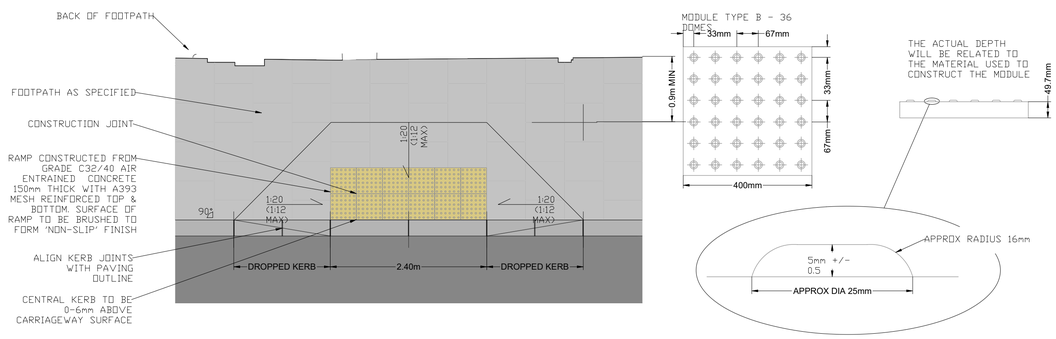
TYPICAL FOOTPATH PLAN CONCRETE
SCALE: 1:25



TYPICAL CONCRETE FOOTPATH CROSS SECTION
SCALE: 1:20



TYPICAL CONCRETE FOOTPATH CROSS SECTION AT DRIVEWAY ENTRANCES
SCALE: 1:20



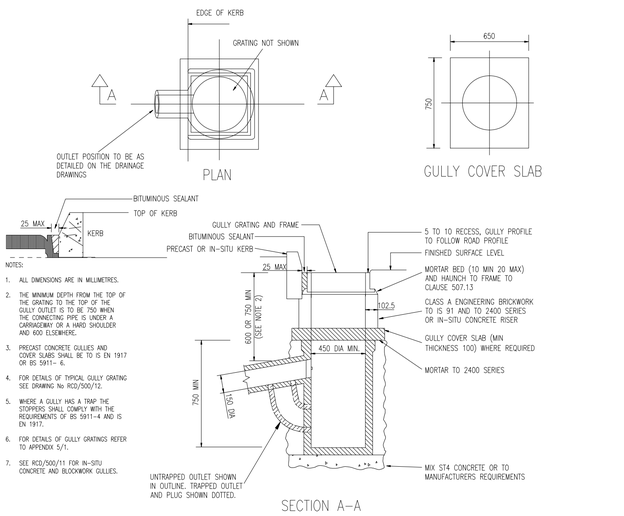
NOTES:

1. THE TACTILE DOMES ON THE TILES MUST BE LINED UP TO GIVE THE DIRECTION OF TRAVEL IN ORDER TO CROSS THE CARRIAGEWAY STRAIGHT
2. UTILITY CABINETS/CHAMBERS MUST NOT BE LOCATED WITHIN THE TACTILE PAVING AREA
3. REFER TO TACTILE PAVING GUIDANCE DOCUMENTATION
4. TACTILE BLISTER PAVING SHALL BE BEDDED ON 25 MM MOIST SAND/CEMENT MORTAR (3:1), JOINTS FILLED WITH 4:1 MIX WITHIN 2mm OF THE PAVING SURFACE

LEGEND

TACTILE PAVIOUR 400x400 BUFF FINISH (5mm JOINT) TACTILE TO BE LAID SO BLISTER PATTERN IS IN LINE WITH CROSSING

DROPPED KERB GEOMETRY AND EXCERPT FROM TII -TACTILE AND PAVING DETAILS AND RECOMMENDED GRADIENTS AT UNCONTROLLED PEDESTRIAN CROSSING CC-SCD-05136



Rev.	Modifications	By	Chkd	Aprvd	Date
P.03	Added transition ramp detail	PC	EM	EM	29.04.24
P.02	Issued for PLANNING	PC	EM	EM	22.03.24
P.01	Issued for LRD	PC	EM	EM	05.10.23

Layout Ref.:
File P:\Jod-jobs\6736 Burkes Cornageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-008-Road Layout.dwg

Client
JOHN WALTER BURKE

Project
CALTRAGH LRD

Stage
PLANNING

Title
PROPOSED ROAD SECTION A-A AND ROAD CONSTRUCTION DETAILS

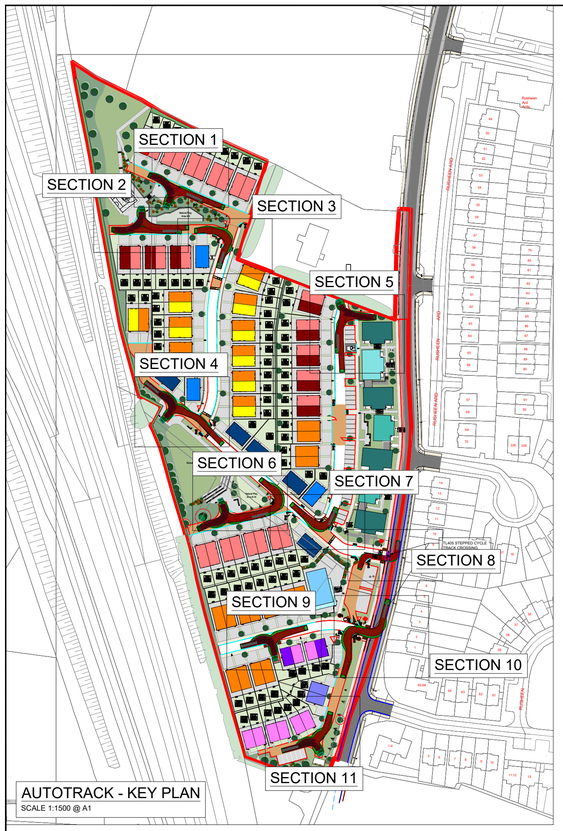
Scale
As Shown @ A1

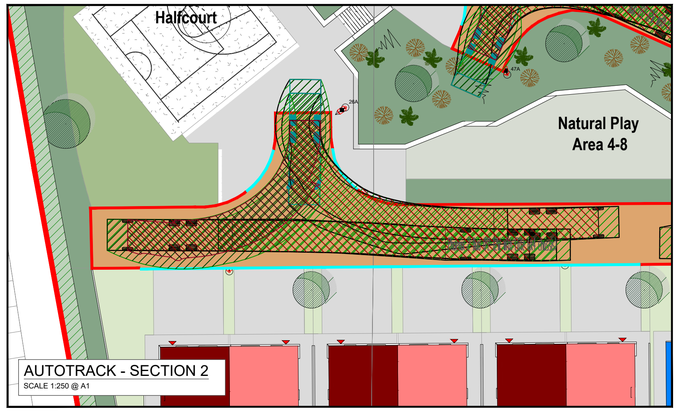
Surveyed	Drawn	Checked	Date
	PC	EM	OCT '23

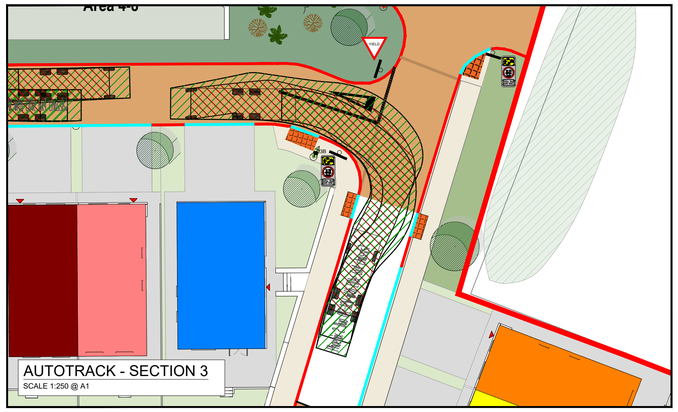
JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

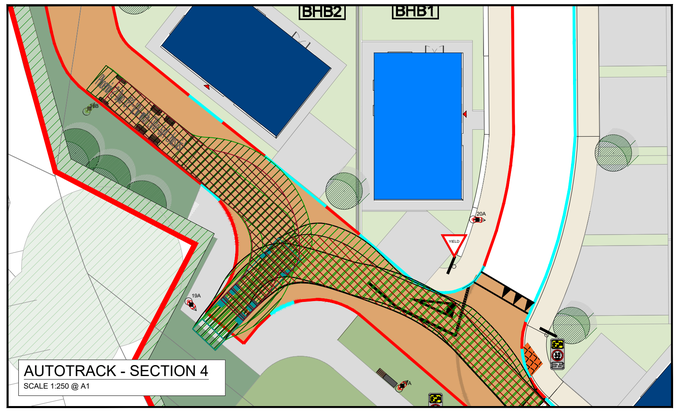
Drawing No. 6736-JOD-XX-ZZ-DR-C-200-009

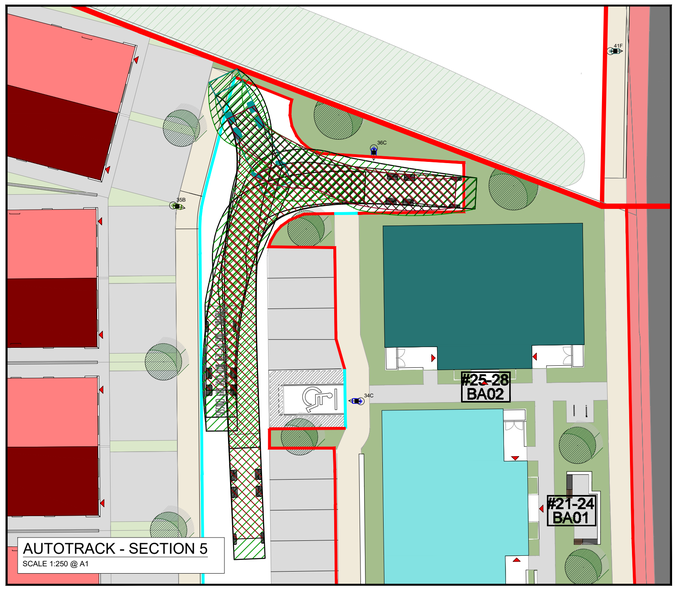
Revision P.02

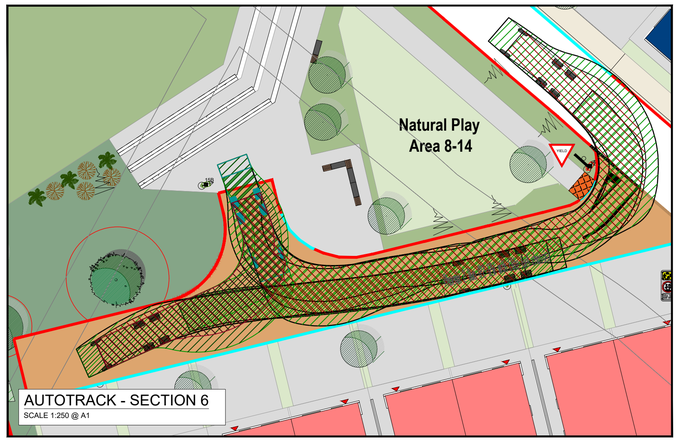


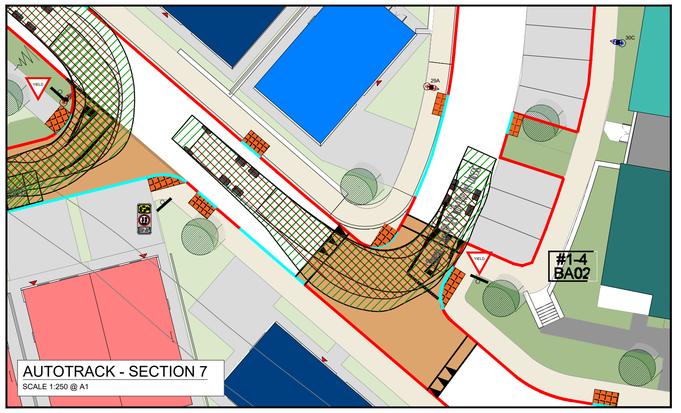










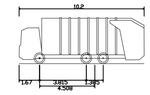


NOTES

GENERAL NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.

LEGEND



Phoenix 2 Duo (P2-12W with Elite 6x4 chassis)

Overall Length	10.200m
Overall Width	2.530m
Overall Body Height	3.745m
Min Body Ground Clearance	0.304m
Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.800m

CHASSIS PATH shown thus

BODY PATH shown thus

Red Line Area:-
37,960 m^2 3.796 Hectares

ITM Co-Ordinates of site:-
568884, 834363

Irish Grid Co-Ordinates:
168926, 334357

Rev.	Modifications	By	Chkd	Aprvd	Date
P.04	Amended site layout	PC	EM	EM	29.04.24
P.03	Issued for PLANNING	PC	EM	EM	22.03.24
P.02	Amended creche road to one way	PC	EM	EM	10.10.23
P.01	Issued for LRD	PC	EM	EM	05.10.23

Layout Ref.:

File: P:\Jod-jobs\6736 Burkes Comageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-011-012-Autotrack Analysis.dwg

Client
JOHN WALTER BURKE

Project
CALTRAGH LRD

Stage
PLANNING

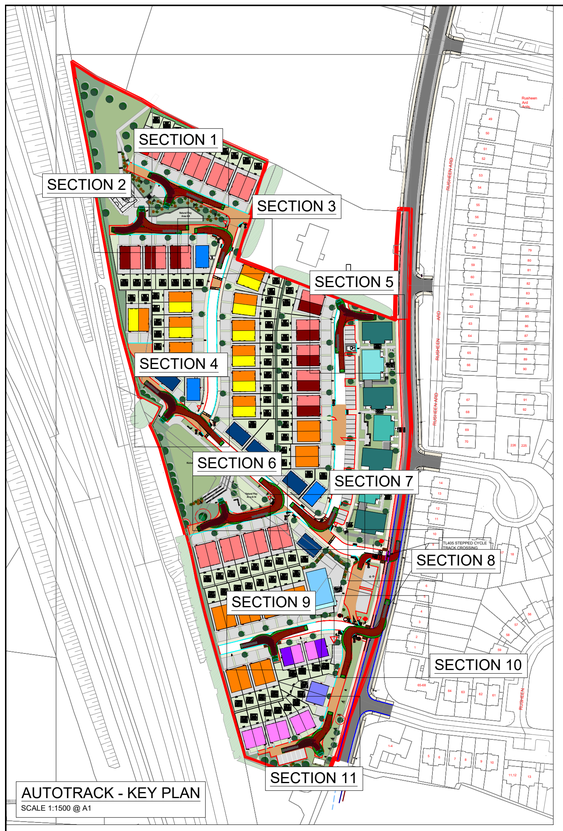
Title
PROPOSED ROAD LAYOUT - SWEPT PATH ANALYSIS SHEET 1 OF 2

Scale
AS SHOWN @ A1

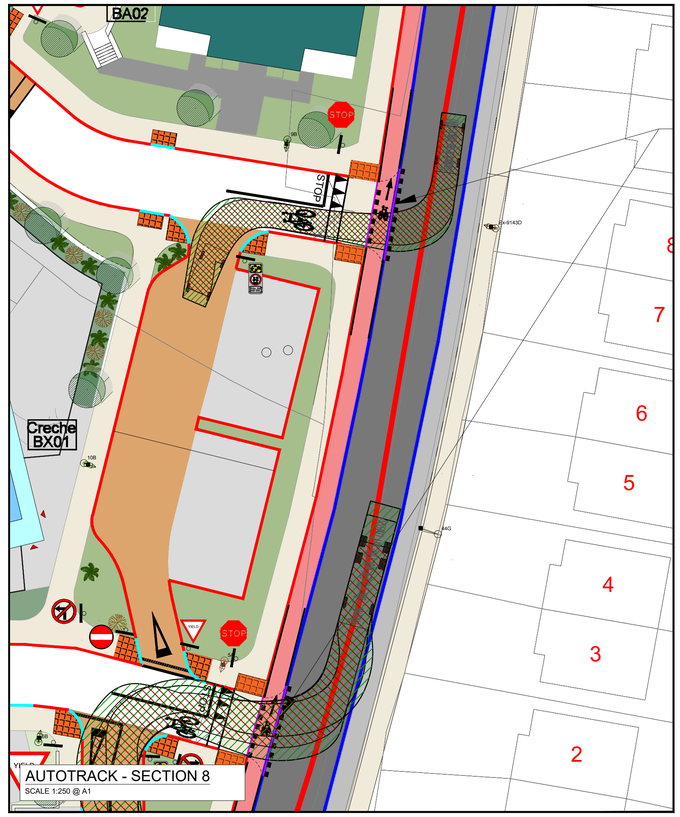
Surveyed	Drawn	Checked	Date
	PC	EM	OCT '23

JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

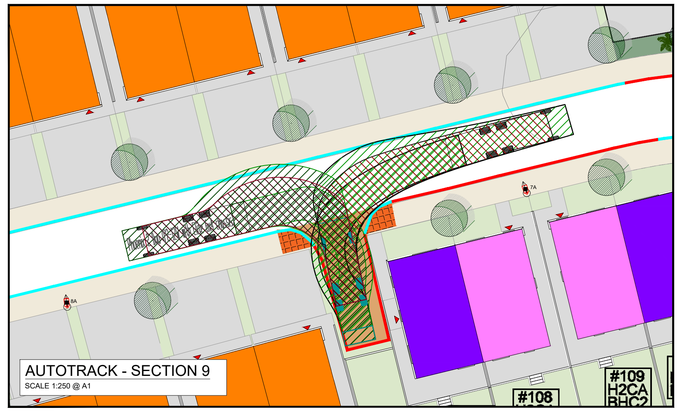
Drawing No.	Revision
6736-JOD-XX-ZZ-DR-C-200-011	P.04



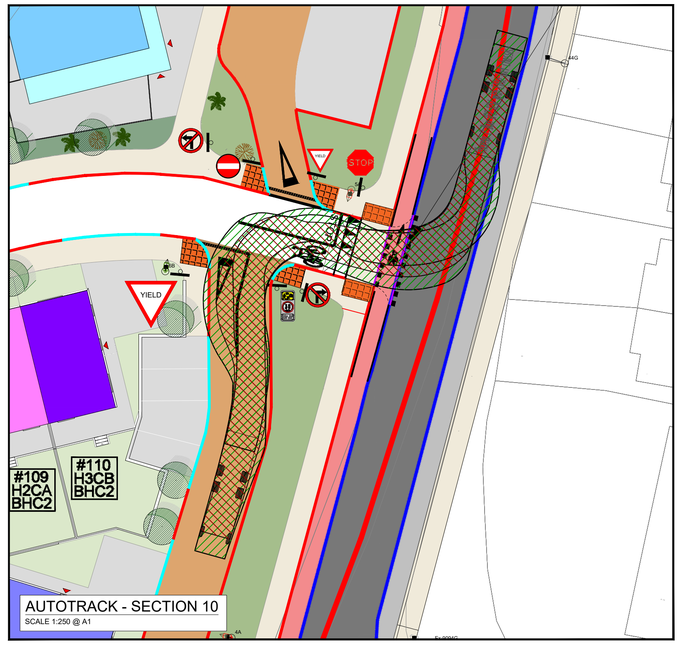
AUTOTRACK - KEY PLAN
SCALE 1:1500 @ A1



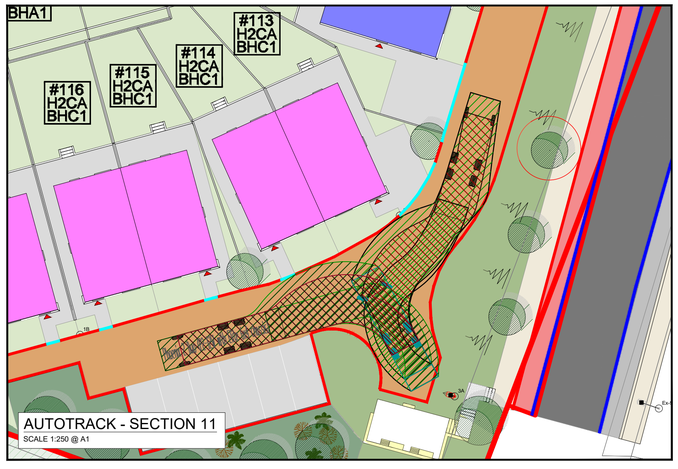
AUTOTRACK - SECTION 8
SCALE 1:250 @ A1



AUTOTRACK - SECTION 9
SCALE 1:250 @ A1



AUTOTRACK - SECTION 10
SCALE 1:250 @ A1



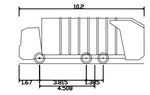
AUTOTRACK - SECTION 11
SCALE 1:250 @ A1

NOTES

GENERAL NOTES:

1 FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2 ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3 ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4 THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.

LEGEND



Phoenix 2 Duo (P2-12W with Elite 6x4 chassis)	
Overall Length	10.200m
Overall Width	2.530m
Overall Body Height	3.745m
Min Body Ground Clearance	0.304m
Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.800m

CHASSIS PATH shown thus

BODY PATH shown thus

Red Line Area:-
37,960 m^2 3.796 Hectares

ITM Co-Ordinates of site:-
568884, 834363

Irish Grid Co-Ordinates:
168926, 334357

Rev.	Modifications	By	Chkd	Aprvd	Date
P.04	Amended site layout	PC	EM	EM	29.04.24
P.03	Issued for PLANNING	PC	EM	EM	22.03.24
P.02	Amended creche road to one way	PC	EM	EM	10.10.23
P.01	Issued for LRD	PC	EM	EM	05.10.23

Layout Ref.:
File P:\Jod-jobs\6736 Burkes Cornageeha\700 Drawings\703 Planning\01 WIP\6736-JOD-XX-ZZ-DR-C-200-011-012-Autotrack Analysis.dwg

Client
JOHN WALTER BURKE

Project
CALTRAGH LRD

Stage
PLANNING

Title
PROPOSED ROAD LAYOUT - SWEPT PATH ANALYSIS SHEET 2 OF 2

Scale
AS SHOWN @ A1

Surveyed	Drawn	Checked	Date
	PC	EM	OCT '23

JENNINGS O'DONOVAN & PARTNERS
CONSULTING ENGINEERS,
FINISKLIN,
SLIGO,
IRELAND.
TEL. +353 (0)71 916 1416
FAX. +353 (0)71 916 1080
Email: info@jodireland.com

Drawing No.	Revision
6736-JOD-XX-ZZ-DR-C-200-012	P.04

APPENDIX B

DESIGN CALCULATIONS

Design Settings

Frequency of use (kDU)	0.50	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	450	Connection Type	Level Inverts
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.600
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	1.200
Additional Flow (%)	0	Include Intermediate Ground	✓

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Dwellings	Cover Level (m)	Manhole Type	Easting (m)	Northing (m)	Depth (m)
9105		50.502	Adoptable	568901.588	834150.658	3.540
9208		50.731	Adoptable	568916.525	834211.240	4.040
9202		49.052	Adoptable	568900.367	834221.592	3.485
9201		46.310	Adoptable	568911.763	834258.397	6.212
9306		42.730	Adoptable	568930.626	834321.739	2.805
9302		39.070	Adoptable	568879.840	834365.334	5.144
F07-2	4	46.750	Adoptable	568867.260	834225.090	0.790
F07-1	6	46.380	Adoptable	568895.148	834232.591	0.900
F07	8	46.410	Adoptable	568904.424	834229.622	1.090
F06-2	16	41.870	Adoptable	568847.420	834280.612	1.470
F06-1	17	43.550	Adoptable	568904.886	834294.610	3.550
F06	25	44.285	Adoptable	568923.205	834291.218	4.875
F05	26	42.750	Adoptable	568932.622	834321.601	3.505
F04-3	12	45.540	Adoptable	568912.000	834465.350	1.890
F04-2	20	41.715	Adoptable	568911.621	834414.502	1.430
F04-1	22	40.680	Adoptable	568909.517	834358.247	1.425
F04	48	40.470	Adoptable	568901.481	834348.597	1.515
F03-2	8	37.380	Adoptable	568831.326	834345.901	0.750
F03-1	8	39.180	Adoptable	568879.733	834357.746	3.135
F03	59	39.300	Adoptable	568884.537	834363.287	3.380
F02-5	10	43.540	Adoptable	568802.513	834541.774	1.390
F02-4	10	45.210	Adoptable	568855.221	834518.411	3.460
F02-3-1	7	40.440	Adoptable	568793.259	834509.218	1.740
F02-3	22	44.750	Adoptable	568852.777	834509.693	7.040
F02-2	33	41.410	Adoptable	568841.978	834468.813	3.910

Nodes

Name	Dwellings	Cover Level (m)	Manhole Type	Easting (m)	Northing (m)	Depth (m)
F02-1	36	37.870	Adoptable	568842.524	834422.455	1.715
F02	95	36.470	Adoptable	568836.581	834404.886	1.295
F01-2	3	36.145	Adoptable	568801.338	834447.071	1.445
F01-1	2	36.130	Adoptable	568804.667	834431.126	1.620
F01	98	36.315	Adoptable	568823.495	834416.093	2.155
8403		36.280	Adoptable	568822.647	834415.009	3.313
8401		34.374	Adoptable	568750.538	834472.521	3.200

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
FP9105	9105	9208	62.396	1.500	46.962	46.691	0.271	230.2	300
FP9208	9208	9202	19.190	1.500	46.691	45.567	1.124	17.1	300
FP9202	9202	9201	38.529	1.500	45.567	40.098	5.469	7.0	300
FP9201	9201	9306	66.091	1.500	40.098	39.925	0.173	382.0	300
FP9306	9306	9302	66.931	1.500	39.925	33.926	5.999	11.2	300
FP9302	9302	8403	75.754	1.500	33.926	32.967	0.959	79.0	300
FP07-2	F07-2	F07-1	28.879	1.500	45.960	45.480	0.480	60.2	150
FP07-1	F07-1	F07	9.740	1.500	45.480	45.320	0.160	60.9	150
FP07	F07	F06	64.396	1.500	45.320	42.620	2.700	23.9	150
FP06-2	F06-2	F06-1	59.146	1.500	40.400	40.000	0.400	147.9	150
FP06-1	F06-1	F06	18.630	1.500	40.000	39.410	0.590	31.6	150
FP06	F06	F05	31.809	1.500	39.410	39.245	0.165	192.8	225
FP05	F05	F04	41.213	1.500	39.245	38.955	0.290	142.1	225
FP04-3	F04-3	F04-2	50.849	1.500	43.650	40.285	3.365	15.1	150
FP04-2	F04-2	F04-1	52.015	1.500	40.285	39.255	1.030	50.5	225
FP04-1	F04-1	F04	16.241	1.500	39.255	38.955	0.300	54.1	225
FP04	F04	F03	22.425	1.500	38.955	37.415	1.540	14.6	225
FP03-2	F03-2	F03-1	49.835	1.500	36.630	36.045	0.585	85.2	150

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
FP9105	0.000	0.912	64.5	0.0	3.240	3.740	0.000	0	0.0	0.0	0	0.000
FP9208	0.000	3.363	237.7	0.0	3.740	3.185	0.000	0	0.0	0.0	0	0.000
FP9202	0.000	5.239	370.3	0.0	3.185	5.912	0.000	0	0.0	0.0	0	0.000
FP9201	0.000	0.707	50.0	0.0	5.912	2.505	0.000	0	0.0	0.0	0	0.000
FP9306	0.000	4.162	294.2	0.0	2.505	4.844	0.000	0	0.0	0.0	0	0.000
FP9302	0.000	1.561	110.3	0.0	4.844	3.013	0.000	0	0.0	0.0	0	0.000
FP07-2	0.113	1.130	20.0	0.0	0.640	0.750	0.000	4	0.0	0.0	4	0.154
FP07-1	0.153	1.124	19.9	0.1	0.750	0.940	0.000	10	0.0	0.0	6	0.225
FP07	0.248	1.799	31.8	0.1	0.940	1.515	0.000	18	0.0	0.0	6	0.363
FP06-2	0.132	0.719	12.7	0.1	1.320	3.400	0.000	16	0.0	0.0	9	0.192
FP06-1	0.291	1.562	27.6	0.2	3.400	4.725	0.000	33	0.0	0.0	9	0.421
FP06	0.194	0.825	32.8	0.4	4.650	3.280	0.000	76	0.0	0.0	18	0.277
FP05	0.227	0.962	38.2	0.5	3.280	1.290	0.000	102	0.0	0.0	19	0.334
FP04-3	0.273	2.261	40.0	0.1	1.740	1.280	0.000	12	0.0	0.0	5	0.388
FP04-2	0.235	1.617	64.3	0.2	1.205	1.200	0.000	32	0.0	0.0	8	0.314
FP04-1	0.253	1.562	62.1	0.3	1.200	1.290	0.000	54	0.0	0.0	11	0.371
FP04	0.635	3.016	119.9	1.1	1.290	1.660	0.000	204	0.0	0.0	15	0.915
FP03-2	0.129	0.949	16.8	0.0	0.600	2.985	0.000	8	0.0	0.0	6	0.175

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
FP03-1	F03-1	F03	7.334	1.500	36.045	35.920	0.125	58.7	150
FP03	F03	F02	63.484	1.500	35.920	35.175	0.745	85.2	225
FP02-5	F02-5	F02-4	57.654	1.500	42.150	41.750	0.400	144.1	150
FP02-4	F02-4	F02-3	9.054	1.500	41.750	41.690	0.060	150.9	150
FP02-3-1	F02-3-1	F02-3	59.520	1.500	38.700	37.710	0.990	60.1	150
FP02-3	F02-3	F02-2	42.282	1.500	37.710	37.500	0.210	201.3	225
FP02-2	F02-2	F02-1	46.361	1.500	37.500	36.155	1.345	34.5	225
FP02-1	F02-1	F02	18.547	1.500	36.155	35.175	0.980	18.9	225
FP02	F02	F01	20.161	1.500	35.175	34.760	0.415	48.6	225
FP01-2	F01-2	F01-1	11.459	1.500	34.700	34.510	0.190	60.3	150
FP01-1	F01-1	F01	21.163	1.500	34.510	34.160	0.350	60.5	150
FP01	F01	8403	3.294	1.500	34.160	34.145	0.015	219.6	225
8403_EXG	8403	8401	92.235	1.500	32.967	31.174	1.793	51.4	300

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
FP03-1	0.176	1.145	20.2	0.1	2.985	3.230	0.000	16	0.0	0.0	7	0.262
FP03	0.390	1.244	49.5	1.5	3.155	1.070	0.000	279	0.0	0.0	27	0.548
FP02-5	0.110	0.729	12.9	0.1	1.240	3.310	0.000	10	0.0	0.0	7	0.165
FP02-4	0.141	0.712	12.6	0.1	3.310	2.910	0.000	20	0.0	0.0	10	0.208
FP02-3-1	0.134	1.131	20.0	0.0	1.590	6.890	0.000	7	0.0	0.0	5	0.192
FP02-3	0.167	0.807	32.1	0.3	6.815	3.685	0.000	49	0.0	0.0	15	0.233
FP02-2	0.351	1.959	77.9	0.4	3.685	1.490	0.000	82	0.0	0.0	12	0.493
FP02-1	0.475	2.645	105.2	0.6	1.490	1.070	0.000	118	0.0	0.0	13	0.703
FP02	0.557	1.649	65.6	2.6	1.070	1.330	0.000	492	0.0	0.0	30	0.789
FP01-2	0.090	1.129	20.0	0.0	1.295	1.470	0.000	3	0.0	0.0	4	0.154
FP01-1	0.112	1.128	19.9	0.0	1.470	2.005	0.000	5	0.0	0.0	4	0.173
FP01	0.354	0.773	30.7	3.1	1.930	1.910	0.000	595	0.0	0.0	49	0.497
8403_EXG	0.566	1.935	136.8	3.1	3.013	2.900	0.000	595	0.0	0.0	31	0.793

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
FP9105	62.396	230.2	300	Circular	50.502	46.962	3.240	50.731	46.691	3.740
FP9208	19.190	17.1	300	Circular	50.731	46.691	3.740	49.052	45.567	3.185
FP9202	38.529	7.0	300	Circular	49.052	45.567	3.185	46.310	40.098	5.912
FP9201	66.091	382.0	300	Circular	46.310	40.098	5.912	42.730	39.925	2.505
FP9306	66.931	11.2	300	Circular	42.730	39.925	2.505	39.070	33.926	4.844
FP9302	75.754	79.0	300	Circular	39.070	33.926	4.844	36.280	32.967	3.013
FP07-2	28.879	60.2	150	Circular	46.750	45.960	0.640	46.380	45.480	0.750

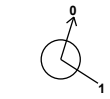
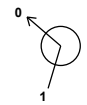
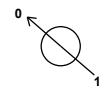
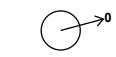
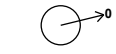
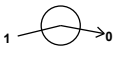
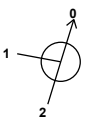
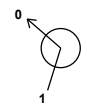
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
FP9105	9105	1200	Manhole	Adoptable	9208	1200	Manhole	Adoptable
FP9208	9208	1200	Manhole	Adoptable	9202	1200	Manhole	Adoptable
FP9202	9202	1200	Manhole	Adoptable	9201	1200	Manhole	Adoptable
FP9201	9201	1200	Manhole	Adoptable	9306	1200	Manhole	Adoptable
FP9306	9306	1200	Manhole	Adoptable	9302	1200	Manhole	Adoptable
FP9302	9302	1200	Manhole	Adoptable	8403	1200	Manhole	Adoptable
FP07-2	F07-2	1200	Manhole	Adoptable	F07-1	1200	Manhole	Adoptable

Pipeline Schedule

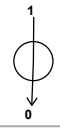
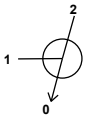
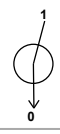
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
FP07-1	9.740	60.9	150	Circular	46.380	45.480	0.750	46.410	45.320	0.940
FP07	64.396	23.9	150	Circular	46.410	45.320	0.940	44.285	42.620	1.515
FP06-2	59.146	147.9	150	Circular	41.870	40.400	1.320	43.550	40.000	3.400
FP06-1	18.630	31.6	150	Circular	43.550	40.000	3.400	44.285	39.410	4.725
FP06	31.809	192.8	225	Circular	44.285	39.410	4.650	42.750	39.245	3.280
FP05	41.213	142.1	225	Circular	42.750	39.245	3.280	40.470	38.955	1.290
FP04-3	50.849	15.1	150	Circular	45.540	43.650	1.740	41.715	40.285	1.280
FP04-2	52.015	50.5	225	Circular	41.715	40.285	1.205	40.680	39.255	1.200
FP04-1	16.241	54.1	225	Circular	40.680	39.255	1.200	40.470	38.955	1.290
FP04	22.425	14.6	225	Circular	40.470	38.955	1.290	39.300	37.415	1.660
FP03-2	49.835	85.2	150	Circular	37.380	36.630	0.600	39.180	36.045	2.985
FP03-1	7.334	58.7	150	Circular	39.180	36.045	2.985	39.300	35.920	3.230
FP03	63.484	85.2	225	Circular	39.300	35.920	3.155	36.470	35.175	1.070
FP02-5	57.654	144.1	150	Circular	43.540	42.150	1.240	45.210	41.750	3.310
FP02-4	9.054	150.9	150	Circular	45.210	41.750	3.310	44.750	41.690	2.910
FP02-3-1	59.520	60.1	150	Circular	40.440	38.700	1.590	44.750	37.710	6.890
FP02-3	42.282	201.3	225	Circular	44.750	37.710	6.815	41.410	37.500	3.685
FP02-2	46.361	34.5	225	Circular	41.410	37.500	3.685	37.870	36.155	1.490
FP02-1	18.547	18.9	225	Circular	37.870	36.155	1.490	36.470	35.175	1.070
FP02	20.161	48.6	225	Circular	36.470	35.175	1.070	36.315	34.760	1.330
FP01-2	11.459	60.3	150	Circular	36.145	34.700	1.295	36.130	34.510	1.470
FP01-1	21.163	60.5	150	Circular	36.130	34.510	1.470	36.315	34.160	2.005
FP01	3.294	219.6	225	Circular	36.315	34.160	1.930	36.280	34.145	1.910
8403_EXG	92.235	51.4	300	Circular	36.280	32.967	3.013	34.374	31.174	2.900

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
FP07-1	F07-1	1200	Manhole	Adoptable	F07	1200	Manhole	Adoptable
FP07	F07	1200	Manhole	Adoptable	F06	1200	Manhole	Adoptable
FP06-2	F06-2	1200	Manhole	Adoptable	F06-1	1200	Manhole	Adoptable
FP06-1	F06-1	1200	Manhole	Adoptable	F06	1200	Manhole	Adoptable
FP06	F06	1200	Manhole	Adoptable	F05	1200	Manhole	Adoptable
FP05	F05	1200	Manhole	Adoptable	F04	1200	Manhole	Adoptable
FP04-3	F04-3	1200	Manhole	Adoptable	F04-2	1200	Manhole	Adoptable
FP04-2	F04-2	1200	Manhole	Adoptable	F04-1	1200	Manhole	Adoptable
FP04-1	F04-1	1200	Manhole	Adoptable	F04	1200	Manhole	Adoptable
FP04	F04	1200	Manhole	Adoptable	F03	1200	Manhole	Adoptable
FP03-2	F03-2	1200	Manhole	Adoptable	F03-1	1200	Manhole	Adoptable
FP03-1	F03-1	1200	Manhole	Adoptable	F03	1200	Manhole	Adoptable
FP03	F03	1200	Manhole	Adoptable	F02	1200	Manhole	Adoptable
FP02-5	F02-5	1200	Manhole	Adoptable	F02-4	1200	Manhole	Adoptable
FP02-4	F02-4	1200	Manhole	Adoptable	F02-3	1200	Manhole	Adoptable
FP02-3-1	F02-3-1	1200	Manhole	Adoptable	F02-3	1200	Manhole	Adoptable
FP02-3	F02-3	1200	Manhole	Adoptable	F02-2	1200	Manhole	Adoptable
FP02-2	F02-2	1200	Manhole	Adoptable	F02-1	1200	Manhole	Adoptable
FP02-1	F02-1	1200	Manhole	Adoptable	F02	1200	Manhole	Adoptable
FP02	F02	1200	Manhole	Adoptable	F01	1200	Manhole	Adoptable
FP01-2	F01-2	1200	Manhole	Adoptable	F01-1	1200	Manhole	Adoptable
FP01-1	F01-1	1200	Manhole	Adoptable	F01	1200	Manhole	Adoptable
FP01	F01	1200	Manhole	Adoptable	8403	1200	Manhole	Adoptable
8403_EXG	8403	1200	Manhole	Adoptable	8401	1200	Manhole	Adoptable

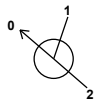
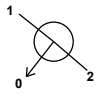
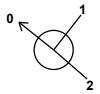
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
9105	568901.588	834150.658	50.502	3.540	1200				
						0	FP9105	46.962	300
9208	568916.525	834211.240	50.731	4.040	1200				
						1	FP9105	46.691	300
						0	FP9208	46.691	300
9202	568900.367	834221.592	49.052	3.485	1200				
						1	FP9208	45.567	300
						0	FP9202	45.567	300
9201	568911.763	834258.397	46.310	6.212	1200				
						1	FP9202	40.098	300
						0	FP9201	40.098	300
9306	568930.626	834321.739	42.730	2.805	1200				
						1	FP9201	39.925	300
						0	FP9306	39.925	300
9302	568879.840	834365.334	39.070	5.144	1200				
						1	FP9306	33.926	300
						0	FP9302	33.926	300
F07-2	568867.260	834225.090	46.750	0.790	1200				
						0	FP07-2	45.960	150
F07-1	568895.148	834232.591	46.380	0.900	1200				
						1	FP07-2	45.480	150
						0	FP07-1	45.480	150
F07	568904.424	834229.622	46.410	1.090	1200				
						1	FP07-1	45.320	150
						0	FP07	45.320	150
F06-2	568847.420	834280.612	41.870	1.470	1200				
						0	FP06-2	40.400	150
F06-1	568904.886	834294.610	43.550	3.550	1200				
						1	FP06-2	40.000	150
						0	FP06-1	40.000	150
F06	568923.205	834291.218	44.285	4.875	1200				
						1	FP06-1	39.410	150
						2	FP07	42.620	150
						0	FP06	39.410	225
F05	568932.622	834321.601	42.750	3.505	1200				
						1	FP06	39.245	225
						0	FP05	39.245	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F04-3	568912.000	834465.350	45.540	1.890	1200				
						0	FP04-3	43.650	150
F04-2	568911.621	834414.502	41.715	1.430	1200				
						1	FP04-3	40.285	150
						0	FP04-2	40.285	225
F04-1	568909.517	834358.247	40.680	1.425	1200				
						1	FP04-2	39.255	225
						0	FP04-1	39.255	225
F04	568901.481	834348.597	40.470	1.515	1200				
						1	FP04-1	38.955	225
						2	FP05	38.955	225
						0	FP04	38.955	225
F03-2	568831.326	834345.901	37.380	0.750	1200				
						0	FP03-2	36.630	150
F03-1	568879.733	834357.746	39.180	3.135	1200				
						1	FP03-2	36.045	150
						0	FP03-1	36.045	150
F03	568884.537	834363.287	39.300	3.380	1200				
						1	FP03-1	35.920	150
						2	FP04	37.415	225
						0	FP03	35.920	225
F02-5	568802.513	834541.774	43.540	1.390	1200				
						0	FP02-5	42.150	150
F02-4	568855.221	834518.411	45.210	3.460	1200				
						1	FP02-5	41.750	150
						0	FP02-4	41.750	150
F02-3-1	568793.259	834509.218	40.440	1.740	1200				
						0	FP02-3-1	38.700	150
F02-3	568852.777	834509.693	44.750	7.040	1200				
						1	FP02-3-1	37.710	150
						2	FP02-4	41.690	150
						0	FP02-3	37.710	225
F02-2	568841.978	834468.813	41.410	3.910	1200				
						1	FP02-3	37.500	225
						0	FP02-2	37.500	225
F02-1	568842.524	834422.455	37.870	1.715	1200				
						1	FP02-2	36.155	225
						0	FP02-1	36.155	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
F02	568836.581	834404.886	36.470	1.295	1200		1	FP02-1	35.175	225
							2	FP03	35.175	225
							0	FP02	35.175	225
F01-2	568801.338	834447.071	36.145	1.445	1200		0	FP01-2	34.700	150
F01-1	568804.667	834431.126	36.130	1.620	1200		1	FP01-2	34.510	150
							0	FP01-1	34.510	150
F01	568823.495	834416.093	36.315	2.155	1200		1	FP01-1	34.160	150
							2	FP02	34.760	225
							0	FP01	34.160	225
8403	568822.647	834415.009	36.280	3.313	1200		1	FP01	34.145	225
							2	FP9302	32.967	300
							0	8403_EXG	32.967	300
8401	568750.538	834472.521	34.374	3.200	1200		1	8403_EXG	31.174	300

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	20	Minimum Velocity (m/s)	0.75
FSR Region	Scotland and Ireland	Connection Type	Level Inverts
M5-60 (mm)	16.200	Minimum Backdrop Height (m)	0.600
Ratio-R	0.265	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S_9103		5.00	50.502	1200	568899.732	834150.354	3.240
S_9207			50.641	1200	568914.681	834210.426	3.610
S_9205			49.077	1200	568898.307	834221.130	3.051
S_9204			46.360	1200	568909.462	834257.543	6.020
S_9305			42.680	1200	568928.844	834321.595	2.399
S_9303			39.000	1200	568877.627	834363.702	4.707
S08-2	0.036	5.00	46.770	1200	568868.924	834223.994	0.835
S08-1	0.021	5.00	46.430	1200	568894.260	834230.799	0.825
S08	0.051	5.00	46.500	1200	568905.473	834227.921	1.100
S07	0.077	5.00	44.230	1200	568925.150	834292.343	1.270
S07-3	0.179	5.00	41.895	1200	568848.350	834282.383	1.315
S07-2	0.011	5.00	43.490	1200	568905.526	834296.505	3.490
S07-1	0.011	5.00	43.900	1200	568915.936	834294.297	4.110
S06	0.053	5.00	42.370	1200	568925.098	834331.047	3.900
S05-3	0.251	5.00	45.500	1200	568913.516	834464.046	2.610
S05-2	0.212	5.00	41.640	1200	568913.075	834413.129	1.900
S05-1	0.065	5.00	40.640	1200	568911.016	834357.335	2.400
S05	0.027	5.00	40.500	1200	568903.445	834348.218	2.800
S04-2	0.104	5.00	37.350	1200	568832.254	834347.672	1.160
S04-1			39.080	1200	568878.092	834358.888	3.530
S04	0.076	5.00	39.250	1200	568883.881	834365.176	3.980
S03-5	0.122	5.00	43.595	1200	568804.362	834542.538	1.190

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S03-4	0.015	5.00	45.210	1200	568857.017	834519.258	3.000
S03-3-1	0.094	5.00	40.655	1200	568794.570	834510.728	1.620
S03-3	0.087	5.00	44.760	1200	568854.760	834511.209	6.180
S03-2	0.139	5.00	41.450	1200	568843.766	834469.709	3.450
S03-1	0.045	5.00	37.740	1200	568844.031	834421.140	2.090
S03-1-2	0.031	5.00	36.135	1200	568803.434	834446.484	1.160
S03-1-1	0.036	5.00	36.160	1200	568806.563	834431.760	1.270
S03			36.530	1200	568838.866	834404.134	2.030
S02			36.500	1200	568833.100	834396.900	2.160
S_8404			36.260	1200	568822.455	834413.658	2.898
S01			36.780	1200	568832.682	834386.144	2.630

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
SP9103	S_9103	S_9207	61.904	0.600	47.262	47.031	0.231	268.0	450	5.83	50.0
SP9207	S_9207	S_9205	19.562	0.600	47.031	46.026	1.005	19.5	450	5.90	50.0
SP9205	S_9205	S_9204	38.083	0.600	46.026	40.340	5.686	6.7	450	5.99	50.0
SP9204	S_9204	S_9305	66.920	0.600	40.340	40.281	0.059	1134.2	450	7.86	50.0
SP9305	S_9305	S_9303	66.304	0.600	40.281	34.293	5.988	11.1	450	8.04	50.0
SP9303	S_9303	S_8404	74.428	0.600	34.293	33.362	0.931	79.9	525	8.53	50.0
SP08-2	S08-2	S08-1	26.234	0.600	45.935	45.605	0.330	79.5	225	5.30	50.0
SP08-1	S08-1	S08	11.576	0.600	45.605	45.400	0.205	56.5	225	5.41	50.0
SP08	S08	S07	67.360	0.600	45.400	42.960	2.440	27.6	225	5.86	50.0
SP07	S07	S07-1	9.419	0.600	42.960	42.485	0.475	19.8	225	5.91	50.0
SP07-3	S07-3	S07-2	58.894	0.600	40.580	40.000	0.580	101.5	300	5.63	50.0
SP07-2	S07-2	S07-1	10.642	0.600	40.000	39.790	0.210	50.7	300	5.71	50.0
SP07-1	S07-1	S06	37.875	0.600	39.790	38.470	1.320	28.7	300	6.13	50.0
SP06	S06	S05	27.635	0.600	38.470	38.240	0.230	120.2	300	6.45	50.0
SP05-3	S05-3	S05-2	50.919	0.600	42.890	40.340	2.550	20.0	225	5.29	50.0
SP05-2	S05-2	S05-1	55.832	0.600	39.740	38.240	1.500	37.2	300	5.65	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
SP9103	1.237	196.7	0.0	2.790	3.160	0.000	0.0	0	0.000
SP9207	4.624	735.4	0.0	3.160	2.601	0.000	0.0	0	0.000
SP9205	7.892	1255.1	0.0	2.601	5.570	0.000	0.0	0	0.000
SP9204	0.595	94.6	0.0	5.570	1.949	0.000	0.0	0	0.000
SP9305	6.135	975.7	0.0	1.949	4.257	0.000	0.0	0	0.000
SP9303	2.506	542.6	0.0	4.182	2.373	0.000	0.0	0	0.000
SP08-2	1.468	58.4	5.9	0.610	0.600	0.036	0.0	48	0.946
SP08-1	1.744	69.3	9.3	0.600	0.875	0.057	0.0	55	1.217
SP08	2.499	99.4	17.6	0.875	1.045	0.108	0.0	64	1.895
SP07	2.951	117.4	30.1	1.045	1.190	0.185	0.0	78	2.487
SP07-3	1.560	110.3	29.1	1.015	3.190	0.179	0.0	105	1.321
SP07-2	2.213	156.5	30.9	3.190	3.810	0.190	0.0	90	1.734
SP07-1	2.946	208.2	62.8	3.810	3.600	0.386	0.0	113	2.591
SP06	1.433	101.3	71.4	3.600	1.960	0.439	0.0	186	1.548
SP05-3	2.941	116.9	40.8	2.385	1.075	0.251	0.0	92	2.689
SP05-2	2.585	182.7	75.3	1.600	2.100	0.463	0.0	134	2.463

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
SP05-1	S05-1	S05	11.851	0.600	38.240	37.700	0.540	21.9	300	5.71	50.0
SP05	S05	S04	25.891	0.600	37.700	36.900	0.800	32.4	300	6.60	50.0
SP04-2	S04-2	S04-1	47.190	0.600	36.190	35.550	0.640	73.7	300	5.43	50.0
SP04-1	S04-1	S04	8.547	0.600	35.550	35.270	0.280	30.5	300	5.48	50.0
SP04	S04	S03	59.532	0.600	35.270	35.070	0.200	297.7	525	7.37	50.0
SP03-5	S03-5	S03-4	57.572	0.600	42.405	42.210	0.195	295.2	225	6.27	50.0
SP03-4	S03-4	S03-3	8.359	0.600	42.210	42.180	0.030	278.6	225	6.45	50.0
SP03-3-1	S03-3-1	S03-3	60.192	0.600	39.035	38.580	0.455	132.3	225	5.88	50.0
SP03-3	S03-3	S03-2	42.932	0.600	38.580	38.000	0.580	74.0	300	6.84	50.0
SP03-2	S03-2	S03-1	48.570	0.600	38.000	36.250	1.750	27.8	300	7.11	50.0
SP03-1	S03-1	S03	17.773	0.600	35.650	35.350	0.300	59.2	300	7.26	50.0
SP03-1-2	S03-1-2	S03-1-1	15.053	0.600	34.975	34.890	0.085	177.1	300	5.21	50.0
SP03-1-1	S03-1-1	S03	42.505	0.600	34.890	34.500	0.390	109.0	300	5.68	50.0
SP03	S03	S02	9.251	0.600	34.500	34.340	0.160	57.8	450	7.43	50.0
SP02	S02	S01	10.764	0.600	34.340	34.150	0.190	56.7	450	7.49	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
SP05-1	3.370	238.2	85.9	2.100	2.500	0.528	0.0	125	3.108
SP05	2.773	196.0	161.7	2.500	2.050	0.994	0.0	208	3.083
SP04-2	1.833	129.5	16.9	0.860	3.230	0.104	0.0	73	1.280
SP04-1	2.856	201.9	16.9	3.230	3.680	0.104	0.0	58	1.757
SP04	1.293	279.9	190.9	3.455	0.935	1.174	0.0	319	1.387
SP03-5	0.756	30.0	19.8	0.965	2.775	0.122	0.0	134	0.807
SP03-4	0.778	30.9	22.3	2.775	2.355	0.137	0.0	142	0.846
SP03-3-1	1.135	45.1	15.3	1.395	5.955	0.094	0.0	90	1.027
SP03-3	1.829	129.3	51.7	5.880	3.150	0.318	0.0	132	1.729
SP03-2	2.995	211.7	74.3	3.150	1.190	0.457	0.0	122	2.738
SP03-1	2.046	144.6	81.6	1.790	0.880	0.502	0.0	161	2.106
SP03-1-2	1.178	83.3	5.0	0.860	0.970	0.031	0.0	50	0.655
SP03-1-1	1.505	106.4	10.9	0.970	1.730	0.067	0.0	64	0.977
SP03	2.677	425.8	283.5	1.580	1.710	1.743	0.0	269	2.858
SP02	2.705	430.2	283.5	1.710	2.180	1.743	0.0	268	2.881

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
SP9103	61.904	268.0	450	Circular	50.502	47.262	2.790	50.641	47.031	3.160
SP9207	19.562	19.5	450	Circular	50.641	47.031	3.160	49.077	46.026	2.601
SP9205	38.083	6.7	450	Circular	49.077	46.026	2.601	46.360	40.340	5.570
SP9204	66.920	1134.2	450	Circular	46.360	40.340	5.570	42.680	40.281	1.949
SP9305	66.304	11.1	450	Circular	42.680	40.281	1.949	39.000	34.293	4.257

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
SP9103	S_9103	1200	Manhole	Adoptable	S_9207	1200	Manhole	Adoptable
SP9207	S_9207	1200	Manhole	Adoptable	S_9205	1200	Manhole	Adoptable
SP9205	S_9205	1200	Manhole	Adoptable	S_9204	1200	Manhole	Adoptable
SP9204	S_9204	1200	Manhole	Adoptable	S_9305	1200	Manhole	Adoptable
SP9305	S_9305	1200	Manhole	Adoptable	S_9303	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
SP9303	74.428	79.9	525	Circular	39.000	34.293	4.182	36.260	33.362	2.373
SP08-2	26.234	79.5	225	Circular	46.770	45.935	0.610	46.430	45.605	0.600
SP08-1	11.576	56.5	225	Circular	46.430	45.605	0.600	46.500	45.400	0.875
SP08	67.360	27.6	225	Circular	46.500	45.400	0.875	44.230	42.960	1.045
SP07	9.419	19.8	225	Circular	44.230	42.960	1.045	43.900	42.485	1.190
SP07-3	58.894	101.5	300	Circular	41.895	40.580	1.015	43.490	40.000	3.190
SP07-2	10.642	50.7	300	Circular	43.490	40.000	3.190	43.900	39.790	3.810
SP07-1	37.875	28.7	300	Circular	43.900	39.790	3.810	42.370	38.470	3.600
SP06	27.635	120.2	300	Circular	42.370	38.470	3.600	40.500	38.240	1.960
SP05-3	50.919	20.0	225	Circular	45.500	42.890	2.385	41.640	40.340	1.075
SP05-2	55.832	37.2	300	Circular	41.640	39.740	1.600	40.640	38.240	2.100
SP05-1	11.851	21.9	300	Circular	40.640	38.240	2.100	40.500	37.700	2.500
SP05	25.891	32.4	300	Circular	40.500	37.700	2.500	39.250	36.900	2.050
SP04-2	47.190	73.7	300	Circular	37.350	36.190	0.860	39.080	35.550	3.230
SP04-1	8.547	30.5	300	Circular	39.080	35.550	3.230	39.250	35.270	3.680
SP04	59.532	297.7	525	Circular	39.250	35.270	3.455	36.530	35.070	0.935
SP03-5	57.572	295.2	225	Circular	43.595	42.405	0.965	45.210	42.210	2.775
SP03-4	8.359	278.6	225	Circular	45.210	42.210	2.775	44.760	42.180	2.355
SP03-3-1	60.192	132.3	225	Circular	40.655	39.035	1.395	44.760	38.580	5.955
SP03-3	42.932	74.0	300	Circular	44.760	38.580	5.880	41.450	38.000	3.150
SP03-2	48.570	27.8	300	Circular	41.450	38.000	3.150	37.740	36.250	1.190
SP03-1	17.773	59.2	300	Circular	37.740	35.650	1.790	36.530	35.350	0.880
SP03-1-2	15.053	177.1	300	Circular	36.135	34.975	0.860	36.160	34.890	0.970
SP03-1-1	42.505	109.0	300	Circular	36.160	34.890	0.970	36.530	34.500	1.730
SP03	9.251	57.8	450	Circular	36.530	34.500	1.580	36.500	34.340	1.710

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
SP9303	S_9303	1200	Manhole	Adoptable	S_8404	1200	Manhole	Adoptable
SP08-2	S08-2	1200	Manhole	Adoptable	S08-1	1200	Manhole	Adoptable
SP08-1	S08-1	1200	Manhole	Adoptable	S08	1200	Manhole	Adoptable
SP08	S08	1200	Manhole	Adoptable	S07	1200	Manhole	Adoptable
SP07	S07	1200	Manhole	Adoptable	S07-1	1200	Manhole	Adoptable
SP07-3	S07-3	1200	Manhole	Adoptable	S07-2	1200	Manhole	Adoptable
SP07-2	S07-2	1200	Manhole	Adoptable	S07-1	1200	Manhole	Adoptable
SP07-1	S07-1	1200	Manhole	Adoptable	S06	1200	Manhole	Adoptable
SP06	S06	1200	Manhole	Adoptable	S05	1200	Manhole	Adoptable
SP05-3	S05-3	1200	Manhole	Adoptable	S05-2	1200	Manhole	Adoptable
SP05-2	S05-2	1200	Manhole	Adoptable	S05-1	1200	Manhole	Adoptable
SP05-1	S05-1	1200	Manhole	Adoptable	S05	1200	Manhole	Adoptable
SP05	S05	1200	Manhole	Adoptable	S04	1200	Manhole	Adoptable
SP04-2	S04-2	1200	Manhole	Adoptable	S04-1	1200	Manhole	Adoptable
SP04-1	S04-1	1200	Manhole	Adoptable	S04	1200	Manhole	Adoptable
SP04	S04	1200	Manhole	Adoptable	S03	1200	Manhole	Adoptable
SP03-5	S03-5	1200	Manhole	Adoptable	S03-4	1200	Manhole	Adoptable
SP03-4	S03-4	1200	Manhole	Adoptable	S03-3	1200	Manhole	Adoptable
SP03-3-1	S03-3-1	1200	Manhole	Adoptable	S03-3	1200	Manhole	Adoptable
SP03-3	S03-3	1200	Manhole	Adoptable	S03-2	1200	Manhole	Adoptable
SP03-2	S03-2	1200	Manhole	Adoptable	S03-1	1200	Manhole	Adoptable
SP03-1	S03-1	1200	Manhole	Adoptable	S03	1200	Manhole	Adoptable
SP03-1-2	S03-1-2	1200	Manhole	Adoptable	S03-1-1	1200	Manhole	Adoptable
SP03-1-1	S03-1-1	1200	Manhole	Adoptable	S03	1200	Manhole	Adoptable
SP03	S03	1200	Manhole	Adoptable	S02	1200	Manhole	Adoptable

Pipeline Schedule

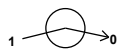
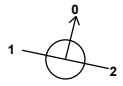
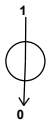
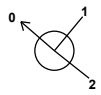
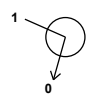
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
SP02	10.764	56.7	450	Circular	36.500	34.340	1.710	36.780	34.150	2.180

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
SP02	S02	1200	Manhole	Adoptable	S01	1200	Manhole	Adoptable

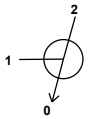
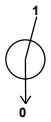
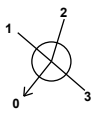
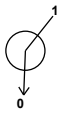
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S_9103	568899.732	834150.354	50.502	3.240	1200	 0	SP9103	47.262	450
S_9207	568914.681	834210.426	50.641	3.610	1200	1  0	SP9103 SP9207	47.031 47.031	450 450
S_9205	568898.307	834221.130	49.077	3.051	1200	1  0	SP9207 SP9205	46.026 46.026	450 450
S_9204	568909.462	834257.543	46.360	6.020	1200	1  0	SP9205 SP9204	40.340 40.340	450 450
S_9305	568928.844	834321.595	42.680	2.399	1200	1  0	SP9204 SP9305	40.281 40.281	450 450
S_9303	568877.627	834363.702	39.000	4.707	1200	1  0	SP9305 SP9303	34.293 34.293	450 525
S08-2	568868.924	834223.994	46.770	0.835	1200	 0	SP08-2	45.935	225
S08-1	568894.260	834230.799	46.430	0.825	1200	1  0	SP08-2 SP08-1	45.605 45.605	225 225
S08	568905.473	834227.921	46.500	1.100	1200	1  0	SP08-1 SP08	45.400 45.400	225 225
S07	568925.150	834292.343	44.230	1.270	1200	1  0	SP08 SP07	42.960 42.960	225 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S07-3	568848.350	834282.383	41.895	1.315	1200				
						0	SP07-3	40.580	300
S07-2	568905.526	834296.505	43.490	3.490	1200				
						1	SP07-3	40.000	300
						0	SP07-2	40.000	300
S07-1	568915.936	834294.297	43.900	4.110	1200				
						1	SP07-2	39.790	300
						2	SP07	42.485	225
						0	SP07-1	39.790	300
S06	568925.098	834331.047	42.370	3.900	1200				
						1	SP07-1	38.470	300
						0	SP06	38.470	300
S05-3	568913.516	834464.046	45.500	2.610	1200				
						0	SP05-3	42.890	225
S05-2	568913.075	834413.129	41.640	1.900	1200				
						1	SP05-3	40.340	225
						0	SP05-2	39.740	300
S05-1	568911.016	834357.335	40.640	2.400	1200				
						1	SP05-2	38.240	300
						0	SP05-1	38.240	300
S05	568903.445	834348.218	40.500	2.800	1200				
						1	SP05-1	37.700	300
						2	SP06	38.240	300
						0	SP05	37.700	300
S04-2	568832.254	834347.672	37.350	1.160	1200				
						0	SP04-2	36.190	300
S04-1	568878.092	834358.888	39.080	3.530	1200				
						1	SP04-2	35.550	300
						0	SP04-1	35.550	300
S04	568883.881	834365.176	39.250	3.980	1200				
						1	SP04-1	35.270	300
						2	SP05	36.900	300
						0	SP04	35.270	525
S03-5	568804.362	834542.538	43.595	1.190	1200				
						0	SP03-5	42.405	225
S03-4	568857.017	834519.258	45.210	3.000	1200				
						1	SP03-5	42.210	225
						0	SP03-4	42.210	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S03-3-1	568794.570	834510.728	40.655	1.620	1200				
						0	SP03-3-1	39.035	225
S03-3	568854.760	834511.209	44.760	6.180	1200		1	SP03-3-1	38.580	225
							2	SP03-4	42.180	225
							0	SP03-3	38.580	300
S03-2	568843.766	834469.709	41.450	3.450	1200		1	SP03-3	38.000	300
							0	SP03-2	38.000	300
S03-1	568844.031	834421.140	37.740	2.090	1200		1	SP03-2	36.250	300
							0	SP03-1	35.650	300
S03-1-2	568803.434	834446.484	36.135	1.160	1200					
						0	SP03-1-2	34.975	300
S03-1-1	568806.563	834431.760	36.160	1.270	1200		1	SP03-1-2	34.890	300
							0	SP03-1-1	34.890	300
S03	568838.866	834404.134	36.530	2.030	1200		1	SP03-1-1	34.500	300
							2	SP03-1	35.350	300
							3	SP04	35.070	525
							0	SP03	34.500	450
S02	568833.100	834396.900	36.500	2.160	1200		1	SP03	34.340	450
							0	SP02	34.340	450
S_8404	568822.455	834413.658	36.260	2.898	1200		1	SP9303	33.362	525
S01	568832.682	834386.144	36.780	2.630	1200		1	SP02	34.150	450

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	Scotland and Ireland	Additional Storage (m³/ha)	20.0
M5-60 (mm)	16.200	Check Discharge Rate(s)	✓
Ratio-R	0.265	1 year (l/s)	6.5
Summer CV	0.750	30 year (l/s)	13.0
Winter CV	0.840	100 year (l/s)	15.4
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	x		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
1	20	0	0
30	0	0	0
30	20	0	0
100	0	0	0
100	20	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.65
Greenfield Method	IH124	Growth Factor 100 year	1.96
Positively Drained Area (ha)	2.098	Betterment (%)	0
SAAR (mm)	1297	QBar	7.9
Soil Index	2	Q 1 year (l/s)	6.5
SPR	0.30	Q 30 year (l/s)	13.0
Region	11	Q 100 year (l/s)	15.4
Growth Factor 1 year	0.83		

Node S01 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.03370	Invert Level (m)	33.880	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.03370	Time to half empty (mins)		Depth (m)	1.700
Safety Factor	2.0	Width (m)	21.500	Inf Depth (m)	
Porosity	0.60	Length (m)	50.000		

APPECNDIX C

TYPICAL PIPE SPECIFICATION

HAPAS
Roads and Bridges

JFC Plastics Ltd
Unit 6
Goldicote Business Park
Ettington
Stratford-upon-Avon
Warwickshire CV37 7NB
Tel: 01789 740102 Fax: 01789 740037
e-mail: info@jfc.ie
website: www.jfc.ie

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
02/H069
Product Sheet 1

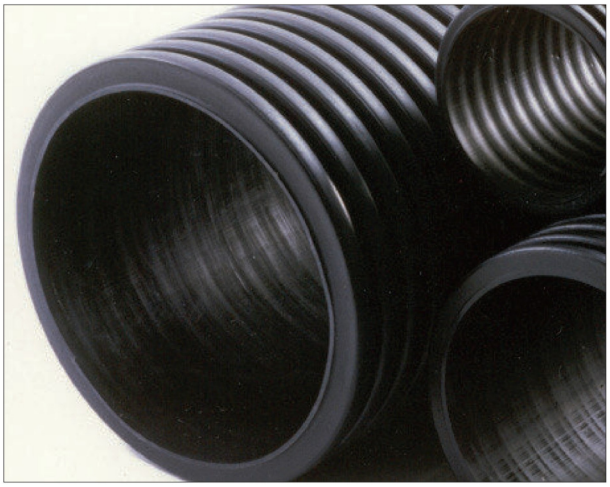
JFC CORRIPIPE TWINWALL DRAINAGE SYSTEM

JFC CORRIPIPE TWINWALL HIGH-DENSITY POLYETHYLENE FILTER AND CARRIER PIPES AND COUPLINGS

This Certificate is issued under the Highway Authorities' Product Approval Scheme (HAPAS) by the British Board of Agrément (BBA) in conjunction with the Highways Agency (HA) (acting on behalf of the overseeing organisations of the Department for Transport; the Scottish Executive; the Welsh Assembly Government and the Department for Regional Development, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers' Group and industry bodies. HAPAS Agrément Certificates are normally each subject to a review every five years.

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to JFC CorriPipe Twinwall High-Density Polyethylene Filter and Carrier Pipes and Couplings, in a range of sizes for use in highway drainage for the collection and disposal of surface and sub-surface water.



AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal five-yearly review.

KEY FACTORS ASSESSED

Strength — the fittings have adequate strength to resist loads associated with installation and service (see section 5).

Performance of joints — the system will remain watertight under normal service conditions (see section 6).

Durability — the system will have a service life in excess of 50 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 18 July 2011

Brian Chamberlain
Head of Approvals — Engineering

Greg Cooper
Chief Executive

Originally certificated on 28 March 2002 (150 mm, 225 mm and 300 mm) and on 23 December 2005 (375 mm, 450 mm and 600 mm).

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

HAPAS Requirements

Requirements

The general requirements for drains are contained in the Manual of Contract Documents for Highway Works (MCHW), Volume 1.

The general requirements for structural wall pipes and fittings are contained in the MCHW, Volume 1, Clause 518.

Further information and guidance is given in the MCHW, Volume 2 and Volume 3 (Drawing Numbers F1 and F2).

Additional site requirements may be included on particular contracts.

Regulations

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.3), 2 *Delivery and site handling* (2.1), 3 *General* and 11 *General* of the *Installation* part of this Certificate.

General

This Certificate relates to JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm High-Density Polyethylene Filter and Carrier Pipes and Couplings.

The system is for use in highway drainage for the collection and disposal of surface and sub-surface water in accordance with Highways Agency (HA) requirements, *Manual of Contract Documents for Highway Works* (MCHW), Volume 1, Clause 518, and Volume 2, and the conditions set out in the *Design Considerations* and *Installation* parts of this Certificate.

Technical Specification

1 Description

1.1 JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings are manufactured from a blended, black polyethylene by a twin extrusion process. The two high-density polyethylene pipes are extruded simultaneously, one inside the other, and heat-welded together in one continuous process.

1.2 The products tested and covered by this Certificate are manufactured from material with the specification given in Table 1.

Table 1 Material properties/specification

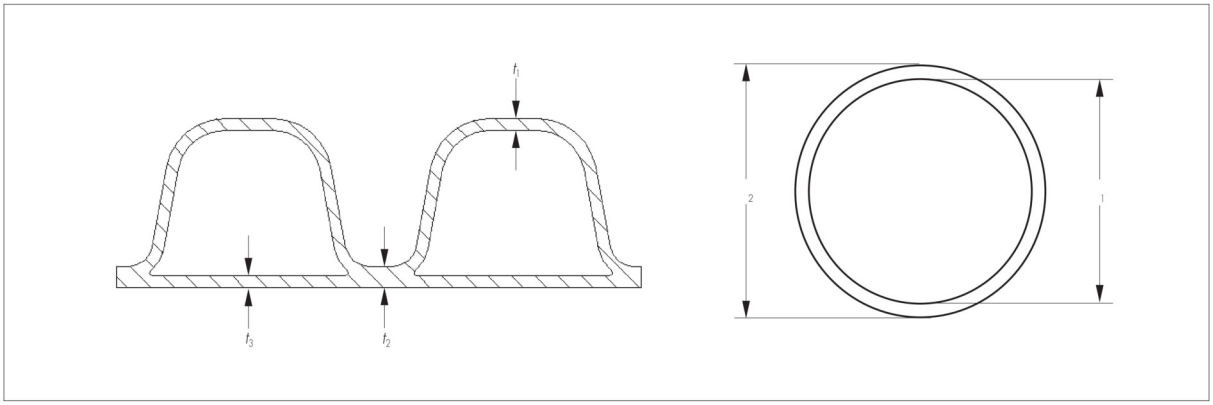
Property	Test method reference	Specification
Tensile properties	EN 638, ISO 527-2	≥18 MPa
Oxygen induction time	EN 728	≥4 mins
Melt flow rate	ISO 1133	≤0.75 g (10 mins) 2.16 kg at 190°C
Density	ISO 1183-3	≥935 kg·m^{-3}
Heat reversion	ISO 12091	N/A

1.3 The outer wall is corrugated and the inner wall is smooth finished. Details and dimensions are given in Table 2 and Figure 1.

Table 2 Pipe dimensions

Nominal internal pipe diameter d_1 (mm)	External pipe diameter d_2 (mm)	t_1 min (mm)	t_2 min (mm)	t_3 min (mm)	Nominal length (m)	Nominal weight (kg·m^{-1})	Pitch (mm)
150	178 ± 1.5	0.8	1.8	1.0	6	1.4	20.0
225	265 ± 2	0.9	2.6	1.2	6	3.0	25.5
300	354 ± 2.5	1.2	3.0	1.5	6	5.0	31.0
375	426 ± 3	1.5	3.5	1.5	6	6.0	39.9
450	512 ± 3	1.8	4.0	1.5	6	8.5	50.1
600	680 ± 4	2.1	4.3	1.8	6	14.5	66.9

Figure 1 Twinwall pipe



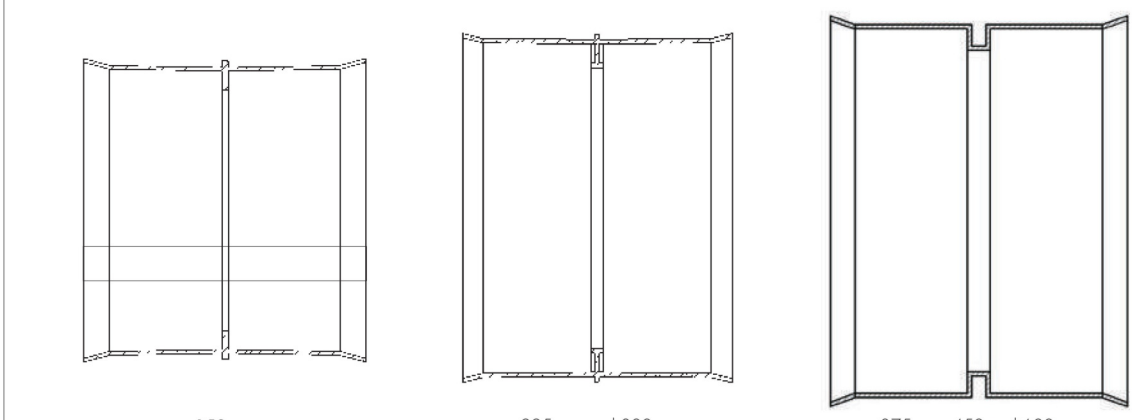
1.4 Black polypropylene couplings are available for the 150 mm, 225 mm and 300 mm sizes of pipe and black polyethylene for the 375 mm, 450 mm and 600 mm sizes (see Table 3 and Figure 2).

Table 3 Coupling dimensions

Nominal internal/external pipe diameter (mm)	Internal diameter		Nominal length (mm)	Nominal seal height (mm)
	at first dwell (mm)	at second dwell (mm)		
150/178	178	179	180	17.0
225/265	268	269	220	25.5
300/354	356	356.5	245	32.0
375/426	429	429	321	32.5
450/512	514	514	390	36.9
600/680	686	686	675	49.0

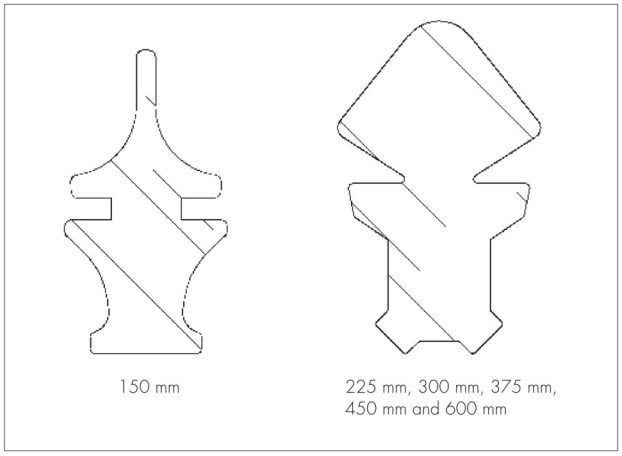
(1) Tapered along coupling length.

Figure 2 Couplings



1.5 Each coupling requires two rubber seals which are manufactured to BS EN 681-1 : 1996 (see Figure 3). The seals must be fitted in accordance with the installation instructions to ensure a watertight joint.

Figure 3 Seals

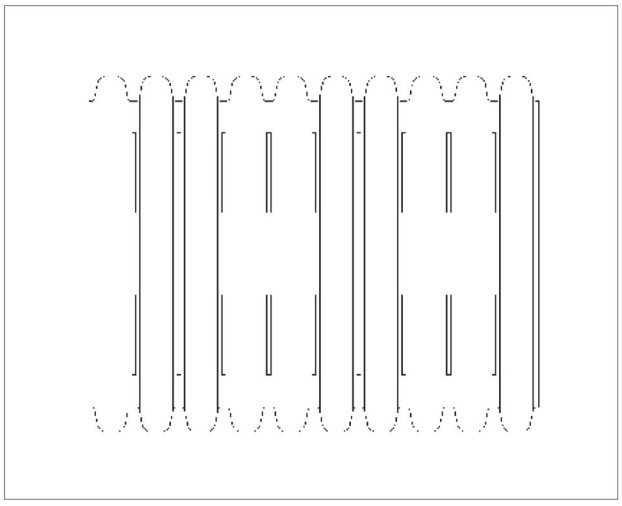


1.6 Pipes can be supplied either slotted or unslotted. Slotted pipe is available with the slots in the dwell between corrugations equally spaced around the circumference (see Table 4 and Figure 4).

Table 4 Slotted pipe details

Internal pipe diameter (nominal) (mm)	No of slots per alternate dwell	No of dwells per metre	Slot length (mm)	Slot width (mm)	Permeable area (minimum) ($mm^2 \cdot m^{-1}$)
150	4	51	15 to 20	2.0 to 2.5	6120
225	4	39	15 to 30	2.0 to 2.5	4680
300	4	32	20 to 40	2.0 to 2.5	5120
375	3	25	42 to 85	2.7 to 3.3	4263
450	3	20	48 to 85	2.8 to 3.5	4024
600	3	15	76 to 106	2.9 to 3.5	4942

Figure 4 Details of slots (optional)



1.7 Continuous quality control is exercised during manufacture. Checks include:

Pipes

- dimensional accuracy
- impact resistance
- short-term stiffness

Couplings

- dimensional accuracy/visual check.

1.8 A label bearing the BBA identification mark is attached to each pipe length and fitting or to each pack of pipes.

2 Delivery and site handling

2.1 Handling, storage and transportation should be in accordance with BS 5955-6 : 1980.

2.2 When long-term storage is envisaged, JFC CorriPipe twinwall slotted and unslotted pipes and couplings should be protected from direct sunlight. If protection cannot be provided, consideration must be given to the effects of daily exposure to direct sunlight:

- up to 3 months — negligible UV degradation but possible extreme surface temperatures of up to 80°C may cause some localised distortion
- 3 months to 12 months — may have significant effect on the impact resistance and physical properties
- over 12 months — damage will occur unless protection provided.

2.3 The manufacturer has the option of adding chemicals to provide enhanced UV stability on request.

2.4 Pipes are generally delivered in prepacked bundles and should be retained in their packaging until installation.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings.

Design Considerations

3 General

JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings comply with the requirements of the Highways Agency (HA) *Manual of Contract Documents for Highway Works* (MCHW), Volume 1, Clause 518.5 for pipe, Clause 518.6 for couplings and Clause 518.7 for the system, and is suitable for use in highways for the collection and disposal of surface and sub-surface water.

4 Practicability of installation

The pipes are installed using traditional drain-laying methods in accordance with HA requirements and the MCHW, Volume 1, Clauses 503, 505, 518.7 and 518.8. Due to the lightweight nature of the pipe material, handling and jointing are easily performed.

5 Strength

5.1 The pipes have a ring stiffness in excess of 6 $kN \cdot m^{-2}$, a creep ratio of less than 4 and adequate resistance to static loads.

5.2 The pipes have adequate resistance to impact loads to which they may be subjected during installation and in service.

6 Performance of joints

6.1 Joints on filter pipes made from pipe and couplings without the rubber seals are not partially watertight as defined in the MCHW, Volume 1, Clause 504.3.

6.2 Correctly made, the joints constructed from pipe and couplings with rubber seals remain watertight when subjected to deflection and distortion, and comply with the MCHW, Volume 1, Clauses 504.3 and 518.7 (see section 14).

7 Water infiltration

The slot area for the pipes exceeds the minimum requirement of 1000 mm^2 per metre length as given in the MCHW, Volume 1, Clause 518.3 (see Table 3).

8 Flow characteristics

8.1 The pipes will have normal flow characteristics associated with thermoplastics pipes.

8.2 Full-bore velocities are available from the *Tables for the Hydraulic Design of Pipes, Sewers and Channels*, Volume 2, 8th Edition, by H R Wallingford and D I H Barr. Appropriate values are based on the Colebrook-White equation. An appropriate value of roughness coefficient should be selected when designing the drainage system. For new pipes, a value of 0.006 is applicable, but for designs a value of 0.6 is generally used.

9 Maintenance

9.1 The slots are designed to restrict the ingress of silt into the drains.

9.2 Access to the system for cleaning should be provided by conventional methods.

9.3 The system can be rodded using flexible drain rods. In common with other standard plastic drainage systems, toothed root cutters and rods with metal ferrules, as used with some mechanical clearing systems, could damage the pipes and couplings and should not be used.

9.4 Tests indicate that the pipes have adequate resistance to cleansing using pressure jetting equipment (see section 13.1). It is recommended that low-pressure, high-volume systems are utilised in accordance with MCHW, Clause 520.

10 Durability

In the opinion of the BBA, the material from which the pipes and couplings are manufactured will not significantly deteriorate and the anticipated life of the system will be in excess of 50 years.

Installation

11 General

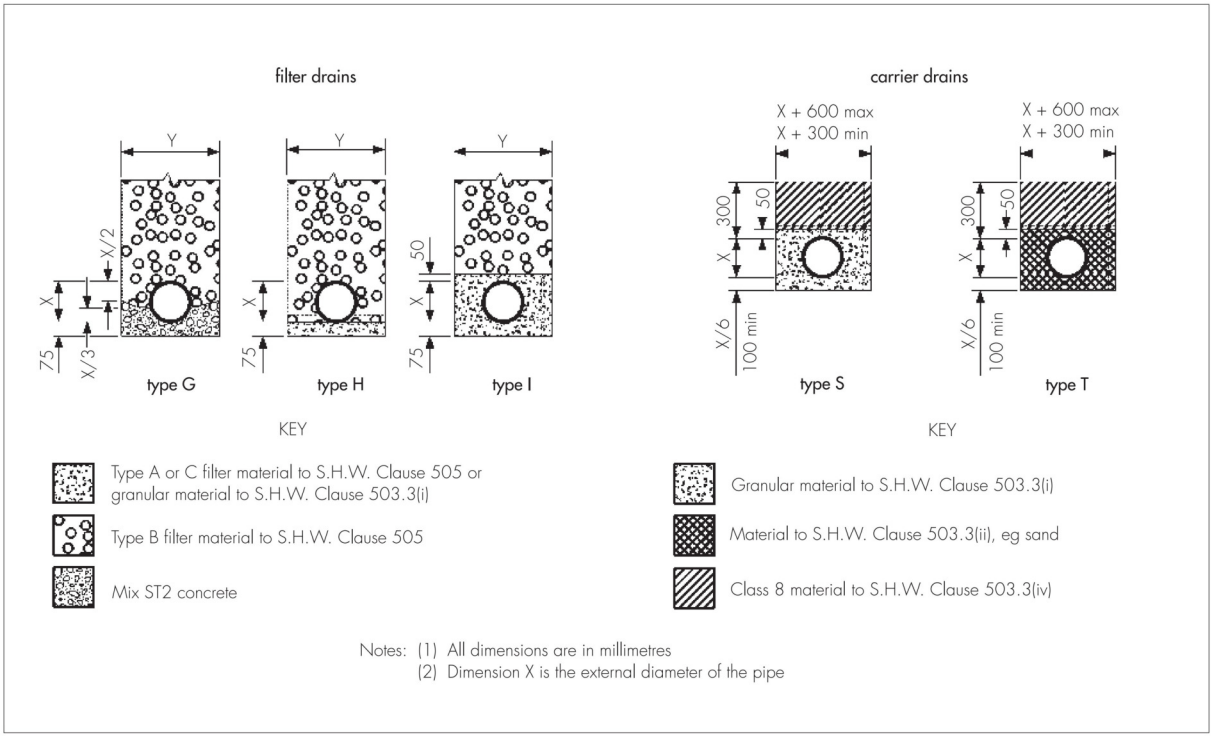
11.1 JFC CorriPipe Twinwall 150 mm, 225 mm, 300 mm, 375 mm, 450 mm and 600 mm Diameter High-Density Polyethylene Filter and Carrier Pipes and Couplings must be installed in accordance with HA requirements and the MCHW, Volume 1, Clauses 503, 505, 518.7 and 518.8.

11.2 The pipes and couplings must be protected against damage from site construction traffic.

12 Procedures

12.1 For typical laying, trench and backfilling specification details, reference should be made to Figure 5 and the MCHW, Volume 3, Drawings No F1 (Type T and S) and No F2 (Type G, H and I).

Figure 5 Installation details



12.2 Pipes are cut easily using conventional hand tools, and should be cut square between the corrugations.

12.3 For a watertight joint, the pipe ends and coupling should be cleaned and the rubber seal fitted externally in the first or second dwell. The seal and inside of the coupling should be lubricated and the pipe pushed fully home to the central register either by hand, or using a lever if necessary.

12.4 Care should be taken during backfill to maintain the line and level of the pipeline. If necessary, the pipe should be restrained to prevent uplift.

Technical Investigations

13 Tests

13.1 Tests were carried out on the pipe in accordance with the MCHW, Volume 1, Clause 518.5 to determine:

- ring stiffness to BS EN ISO 9969 : 1995
- creep ratio to BS EN ISO 9967 : 1995
- longitudinal bending to the MCHW, Volume 1, Clause 518.11
- rodding resistance to the MCHW, Volume 1, Clause 518.12
- impact resistance at 0°C and 23°C to BS EN 1411 : 1996 with a striker of 1.0 kg mass and 25 mm diameter conical head
- water jetting WRc method.

13.2 Tests were carried out on the system to establish:

- leaktightness of joint to BS EN 1277 : 2003, Method 4, Conditions A, B and C
- insertion force (ease of jointing).

13.3 Tests were carried out to establish the dimensional accuracy of the pipe, coupling and ring seal.

14 Investigations

14.1 An examination was made of data in relation to the effect of the production tolerances on the performance of the products.

14.2 An evaluation of existing data was made to assess material properties, chemical resistance and durability.

14.3 Calculations were carried out to determine slot area.

14.4 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 5955-6 : 1980 *Plastics pipework (thermoplastics materials) — Code of practice for the installation of unplasticized PVC pipework for gravity drains and sewers*

BS EN 681-1 : 1996 *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Vulcanized rubber*

BS EN 763 : 1995 *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Test method for visually assessing effects of heating*

BS EN 1277 : 2003 *Plastics piping systems — Thermoplastics piping systems for buried non-pressure applications — Test methods for leaktightness of elastomeric sealing ring type joints*

BS EN 1411 : 1996 *Plastics piping and ducting systems — Thermoplastics pipes — Determination of resistance to external blows by the staircase method*

BS EN ISO 9967 : 1995 *Thermoplastics pipes — Determination of creep ratio*

BS EN ISO 9969 : 1995 *Thermoplastics pipes — Determination of ring stiffness*

EN 638 : 1994 *Plastics piping and ducting systems — Thermoplastics pipes — Determination of tensile properties*

EN 728 : 1997 *Plastics piping and ducting systems — Polyolefin pipes and fittings — Determination of oxidation induction time*

ISO 527-2 : 1993 *Plastics — Determination of tensile properties — Test conditions for moulding and extrusion plastics*

ISO 1133 : 1997 *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

ISO 1183-3 : 1999 *Plastics — Methods for determining the density of non-cellular plastics — Gas pyknometer method*

ISO 4440-1 : 1994 *Thermoplastics pipes and fittings — Determination of melt mass-flow rate — Test method*

ISO 4451 : 1980 *Polyethylene (PE) pipes and fittings — Determination of reference density of uncoloured and black polyethylenes*

ISO 12091 : 1995 *Structural wall thermoplastics pipes — Oven test*

Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, August 1998 (as amended)

Manual of Contract Documents for Highway Works, Volume 2 Notes for Guidance on the Specification for Highway Works, August 1998 (as amended)

Manual of Contract Documents for Highway Works, Volume 3 Highway Construction Details, March 1998 (as amended)

15 Conditions

15.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

15.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

15.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate
- remain in accordance with the requirements of Highway Authorities' Product Approval Scheme.

15.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

15.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal.

15.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA

tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

CorriPipe™
Technical Specification

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No 02/H069

CIWM awards FOR ENVIRONMENTAL EXCELLENCE

www.jfc.ie

CorriPipe™ Technical Specification

1. Introduction

CorriPipe™ is a twin wall high density polyethylene pipe manufactured from a blended black polyethylene by a twin extrusion process.

Two high density polyethylene walls are extruded simultaneously, one inside the other, and heat-welded together in one continuous process. The outer wall is corrugated and the inner wall is smooth finished.

It is a combination of the corrugations, and the heat-welding of the two walls, that give CorriPipe™ its excellent structural strength while its smooth inner wall ensures increased flow capacity.

Its applications include surface and storm water drainage in civil engineering, construction, sports amenity, agricultural and other sub-soil applications.

CorriPipe™ is fully BBA (British Board of Agrément) approved and HAPAS (Highways Agency Product Approval Scheme) certified.

Figure 1. – CorriPipe™

2. Dimensions

CorriPipe™ comes in a complete range between 100m and 600mm and is available in either carrier of filter pipe. CorriPipe™ also has a complete range of fittings and junctions as detailed below.

Nominal Size (mm)	Inside Diameter (mm)	Outside Diameter (mm)	Pipe Length (m)
94	94	110	6
150	149	176	6
225	221	265	6
300	295	354	6
375	370	426	6
450	445	512	6
600	590	680	6

Table 1. – CorriPipe™ Dimensions

Nominal Size (mm)	No. of slots per alternate dwell	Nom. Slot Width (mm)	Pefrorated Area (mm²/m)
94	4	1.5	7920
150	4	2	6120
225	4	2	4680
300	4	2	5120
375	3	3	4263
450	3	3	4024
600	3	3	4942

Table 2. – Perforated Pipe Detail

Note: CorriPipe also available in various perforation specification. e.g. half perforated, double perforated.

Nominal Size (mm)	Code	Fitting Type
150	150TB30	30° Bend
150	150TB45	45° Bend
150	150TB90	90° Bend
150	150TT90	Equal Tee
150	150TY45	Equal Wye
150	150SWSTT90	Single Wall Tee
225	225TB30	30° Bend
225	225TB45	45° Bend
225	225TB90	90° Bend
225	225TT90	Equal Tee
225	225TY45	Equal Wye
225	225/150TT90	Unequal Tee 150
225	225/150TY45	Unequal Wye 150
225	225SWSTT90	Single Wall Tee
300	300TB30	30° Bend
300	300TB45	45° Bend
300	300TB90	90° Bend
300	300TT90	Equal Tee
300	300TY45	Equal Wye
300	300/150TT90	Unequal Tee 150
300	300/150TY45	Unequal Wye 150
300	300/225TT90	Unequal Tee 225
300	300/225TY45	Unequal Wye 225
300	300SWSTT90	Single Wall Tee

Table 3. – CorriPipe™ Fittings

Note: Larger fitting sizes fabricated on request

CorriPipe™ Technical Specification

3. Hydraulic Capacity

There are two main formulas used in hydraulic calculations of gravity flow pipelines – Manning's and Colebrook-White:

Manning's

Manning's is the most popular equation for stormwater design because it is simple to apply and it generally provides an acceptable level of accuracy.

$$Q = \frac{1}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

Q = Water Discharge [m^3/s]

n = Manning's roughness factor [s/m1/3]]

A = Cross-sectional area [m2]

R = Hydraulic radius [m]

S = Surface Water Slope [m/m]

Colebrook-White

A more accurate method for calculations involving FRC™ pipes is to utilize the Colebrook-White formula. The Colebrook-White design chart for FRC™ should allow quick and easy estimates without involved calculations.

$$V = -2\sqrt{2gDS}\log\left(\frac{k}{3.7D} + \frac{2.51v}{d\sqrt{2gDS}}\right)$$

V = Velocity (m/s)

S = Hydraulic gradient (m/m)

k = Hydraulic roughness (m)

R = Hydraulic radius = D/4 (m)

D = Pipe internal diameter (m)

g = Gravitational acceleration (m/s2)

v = Kinematic viscosity of water (m2/s)

4. Cover Depths

Minimum Cover Depths

JFC Manufacturing Limited recommends the following minimum cover depths.

- 0.6m for non trafficked green areas
- 0.9m to finished surface for trafficked areas not subject to Highways Agency or National Roads Authority requirements
- 1.2m to finished surface for trafficked areas subject to Highways Agency or National Roads Authority requirements.

In certain circumstances lower minimum cover levels may be allowed. e.g. installation with rigid pavement, concrete surround etc. Please contact JFC for more information.

Maximum Cover Depths

The maximum cover depth for CorriPipe™ is normally between 6-10 meters when installed in accordance with series 500 of the MCDHW Volume 1 as detailed in the CorriPipe™ BBA certificate.

The actual maximum allowable cover level is dependent on the following installation parameters and is often well in excess of 6-10 meters:

- The native soil stiffness
- The pipe bed and surround stiffness
- The size of the trench
- The density of the overburden
- Hydrostatic loading
- Factor of Safety
- Maximum allowable deflection limit

For specific site conditions JFC can calculate the maximum pipe deflection based on the above parameters. Contact JFC for more details.

CorriPipe™ Technical Specification

4. Installation

JFC CorriPipe is to be installed in accordance with the following national guidelines. In countries outside that specified contact JFC for more details.

Ireland

The Manual of Contract Documents for Road Works, Volume 1 series 500, clauses 503 and 505 as published by the NRA.

United Kingdom

The Manual of Contract Documents for Highway Works, Volume 1 series 500, clauses 503, 505, 518.7 and 518.8 as published by the Highways Agency

Trench Preparation

The trench width is generally between OD+300mm and OD+600mm but larger trenches are permissible. The trench should provide for a minimum of 150mm pipe bed and local soft spots must be removed and replaced with hardcore. The pipe must sit evenly on the bed and must be free of voids under the pipe. The trench should not be excavated too far in advance of pipe installation. All trenches are to be excavated in accordance with national health and safety regulations and local building regulations.

Sidefill

CorriPipe™ is to backfilled as described in the MCDHW, Volume 1, Series 500. Sidefill material is dependent on specification but is normally a well graded granular material or small single size aggregate. The pipe surround material must fully support the pipe. Compaction may be required depending on ground conditions and sidefill material used. If compaction is required the compaction equipment must not come in contact with the pipe. The sidefill material should extend to 100mm over the crown of the pipe.

Backfill

Backfill is to continue to a minimum of 300mm above the crown of the pipe with suitable material as per specification. The material should be free of any stone particles greater than 50mm. Compaction should not be carried out until a minimum cover of 300mm is achieved. Compaction equipment should be sized so as not to exert any undue stress in the pipe. Further backfill to the required level should be carried out in layer no greater than 300mm.

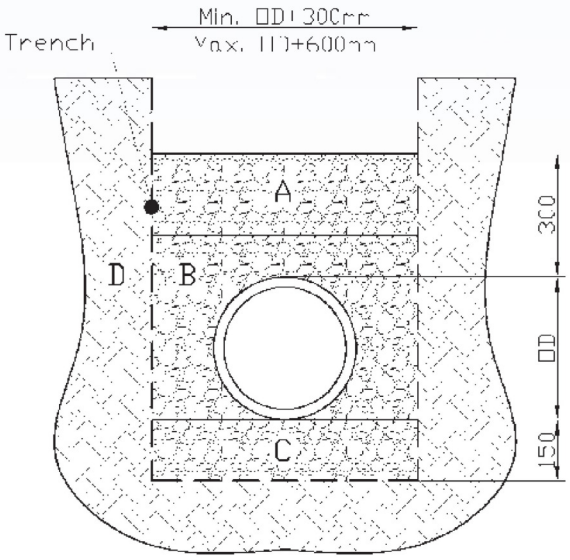


Figure 2. – Typical Installation Details

A = Backfill

B = Sidefill

C = Bed

D = Earth

OD = Outside Diameter of Pipe

CorriPipe™ Technical Specification

5. Jointing

CorriPipe™ is manufactured in 6 meter lengths and is joined with straight couplers or suitable fittings (e.g. tees, wyes, bends etc.)

CorriPipe™ provides a fully watertight seal when installed in accordance with JFC recommendations.

Leak tightness is in accordance with BS EN 1277:1997. The maximum permitted angular deflection is 2°.

Rubber seals used in watertight applications are in accordance with BS EN 681-1:1996

JFC recommends the following procedure for joining CorriPipe™ and associated fittings / couplers.

- Cut the pipe to the require length with a conventional handsaw.
- Clean the end of the pipe and accompanying coupler / fitting.
- Install a ring seal in the first dwell of the pipe for watertight joints.
- Ring seals are bi directional
- Lubricate the ring seal and accompanying coupler / fitting.
- Offer the fitting / coupler up to the pipe
- Lever the fitting / coupler onto the pipe with a piece of timber ensuring not to damage the pipe. Larger pipes may require mechanical assistance.
- Ensure the fitting / coupler is butted fully against the pipe.
- For joining pipes to the opposite side of the fitting / coupler follow the same steps as outlined above.

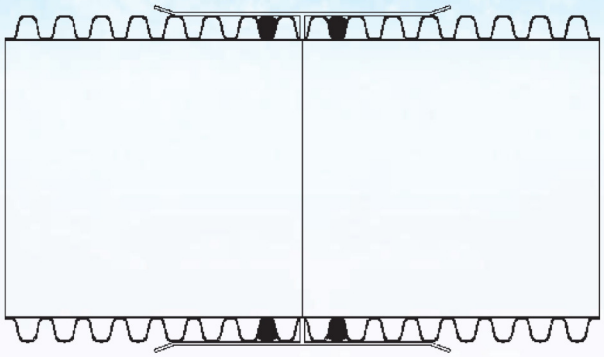


Figure 3. – Typical Joint Details

6. Pressure Testing

There are two methods of pressure testing, the air test method and the water test method. The most common method is the air test method and the test procedure is outlined below.

- Block the ends of the pipe / fitting with a suitable expanding stopper, ensuring both plug and pipe are cleaned prior to fitting.
- Fill a U-Tube manometer with water to the correct level, ensuring there are no trapped air bubbles in the water.
- Connect the u-tube to the fitting on the expandable stopper.
- Increase the pressure in the pipe until a head of water of 100mm is reached.
- Allow the pressure to stabilise for a number of minutes, increasing the pressure if it drops.
- Record the pressure drop over a five minute period.
- To pass the test the pressure should not drop below a 75mm head of water.

Note: Temperature has a critical effect on the test, a 1°C change in air temperature inside the pipe is sufficient for the test to fail.

6. Transportation, Handling and Storage

General

Handling should be done carefully and in accordance with national health and safety guidelines. Dragging of pipes and fittings must be avoided. HDPE pipes and fittings become slippery in wet or in cold weather and extra precautions may be necessary.

Pipes up to 450mm in size are palletised with wooden frames and steel straps. 600mm pipes are generally steel banded in two's but can also be supplied loose.

Nominal Size (mm)	Number of Pipes per Pallet
100	100
150	33
225	14
300	8
375	5
450	4
600	2 / steel banded

Table 4. – CorriPipe™ Pallet Quantities

Storage

All materials should be carefully inspected at the time of delivery and any defects should be notified and reported immediately. All pipe stacks should be made on firm, flat ground to support the weight of the pipes and lifting equipment. For safety and Pipes and fittings should be transported and stored in their packaging.

Delivery vehicles should be provided with a clean, flat bed, free from sharp objects. Care must be taken to prevent slippage or excessive bowing of the pipes. Tie the load well to prevent rubbing. Use nylon straps, not chains or ropes.

The stacking height for pipes should be limited to not more than 3 meters. Pipes should be not be stored in open areas subject to high winds.

It is recommended that CorriPipe™ is not stored in direct sunlight for more than 3 months.

Contact Details

Head Office Ireland
JFC Manufacturing Co Ltd
Weir Road, Tuam
Co Galway
Ireland
Tel: (+) 353 93 24066
Fax: (+) 353 93 24923
Email: info@jfc.ie
Web: www.jfc.ie

UK Sales Office
JFC Manufacturing (Europe) Ltd
Maes Y Clawdd Industrial Estate,
Maesbury Road, Oswestry,
Shropshire, SY10 8NN, UK
Tel: (+) 44 (0) 1691 659226
Fax: (+) 44 (0) 1691 659344
Email: info@jfcuk.com
Web: www.jfcuk.com

Dutch Sales Office
JFC Manufacturing (Europe) Ltd
De Kamp 2A,
9231 Br Surhuisterveen,
Holland
Tel: (+) 31 (0) 512 366440
Fax: (+) 31 (0) 512 360420
Email: info@jfceurope.com
Web: www.jfceurope.com

JFC Plastics Ltd
Unit 6, Goldicote Business Park
Ettington, Nr Stratford-upon-Avon, Warweickshire, CV37 7NB, UK
Tel: (+) 44 (0) 1789 740102
Fax: (+) 44 (0) 1789 740037
Email: info@jfcuk.com
Web: www.jfcuk.com

JFC Recycling Division
JFC Plastics
Hardwick Road, Astmoor Ind. Estate, Runcorn, Cheshire
WA7 1PH
Tel: + 44 (0) 1928 5833 90
Fax: + 44 (0) 1928 580 941
Email: info@jfcplastics.com
Web: www.jfcplastics.com

Polish Sales Office
JFC Polska
Trojany-Karpin 1A
05-520 Drabowka
Poland
Tel: (+) 48 (0) 297 578377
Fax: (+) 48 (0) 297 578201
Email: info@jfceurope.com
Web: www.jfcpolska.com

APPENDIX D

OIL INTERCEPTOR DETAILS

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

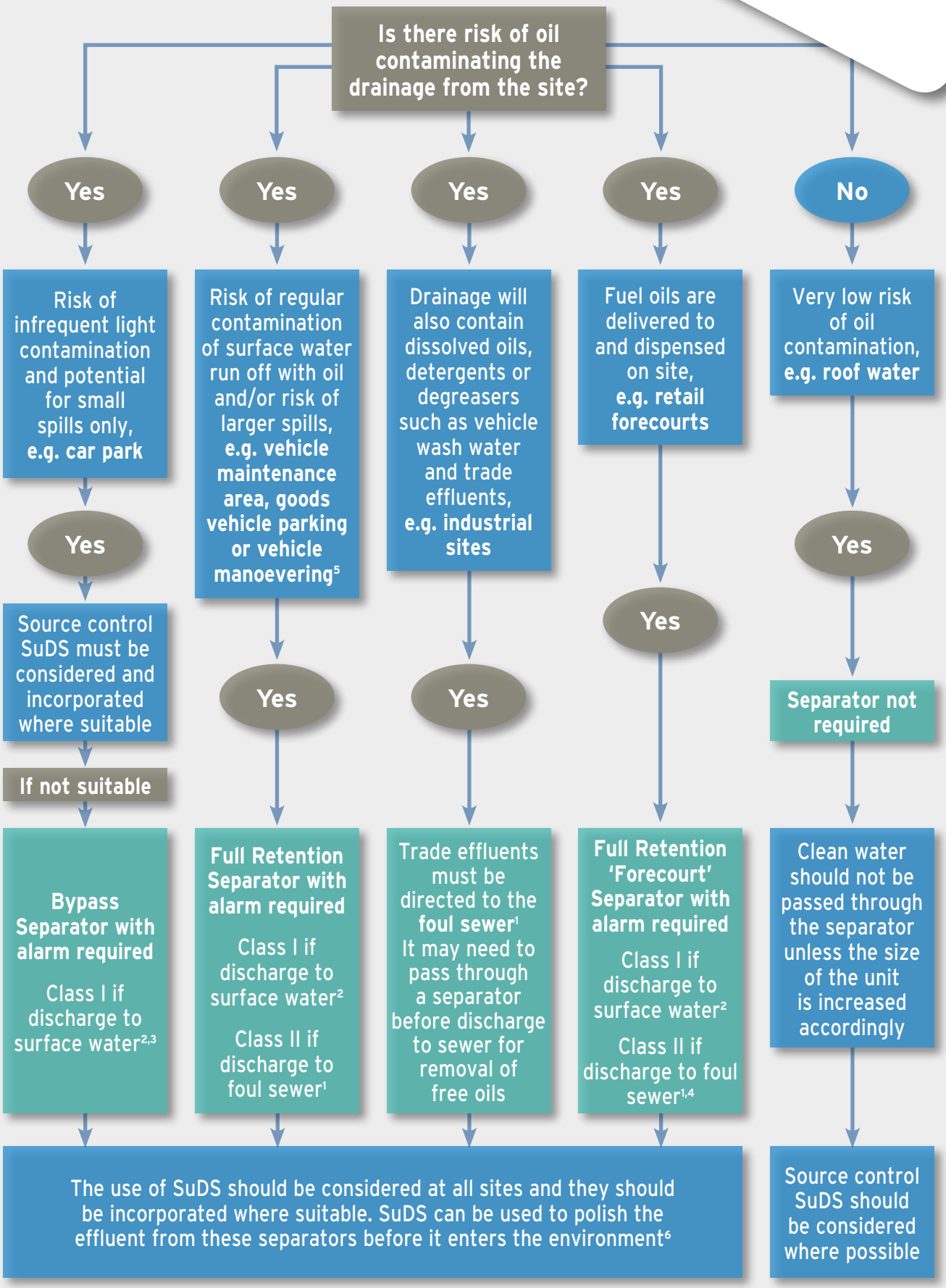
Forecourt separators are full retention separators specified to retain on site the maximum spillage likely to occur on a petrol filling station. They are required for both safety and environmental reasons and will treat spillages occurring during vehicle refuelling and road tanker delivery. The size 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.

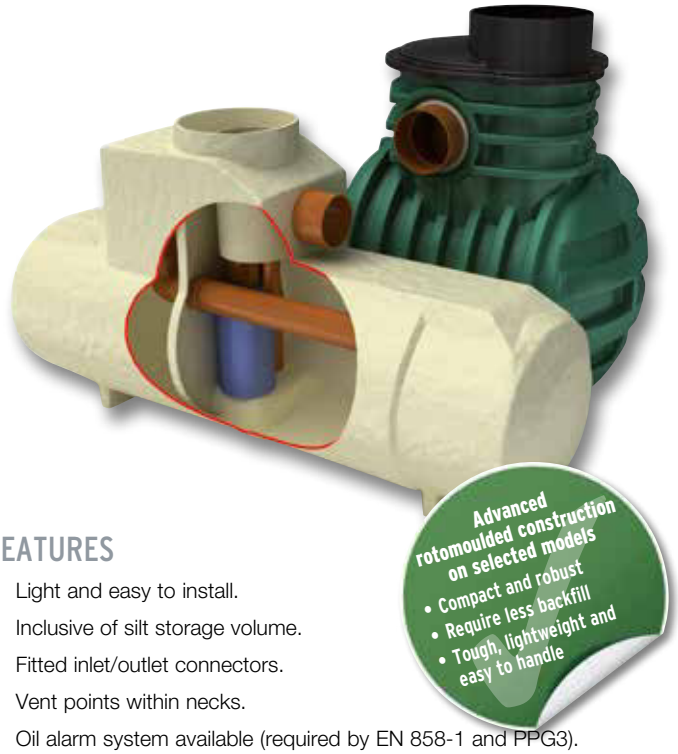
For further detailed information, please consult the Environment Agency Pollution Prevention Guideline 03 (PPG 3) 'Use and design of oil separators in surface water drainage systems' available from their website.

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.

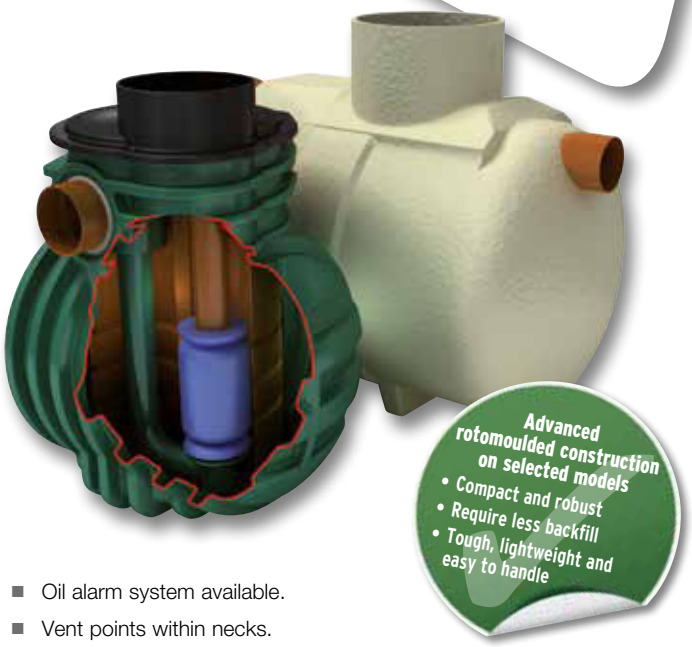
Each full retention separator design includes the necessary volume requirements for:

- 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:-

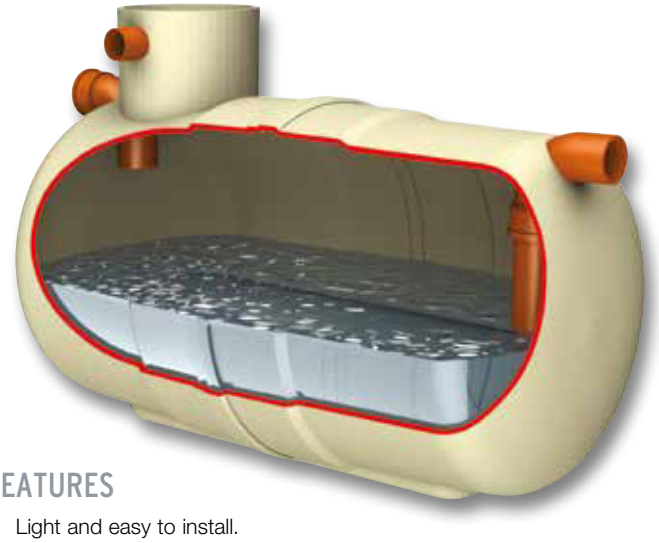
- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the influent is not pumped.
- The required discharge standard. This will decide whether 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

Discover more about the Accredited Installers and locate your local expert online.

www.kingspanenviro.com/klargester

CARE & MAINTENANCE

Kingspan Environmental Services
Who better to look after your treatment plant than the people who designed and built it?

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

COMMERCIAL WASTEWATER SOLUTIONS

- **BIODISC® & ENVIROSAFE**
  HIGH PERFORMANCE SEWAGE TREATMENT SYSTEMS
- 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

UK: College Road North, Aston Clinton, Aylesbury, Buckinghamshire HP22 5EW

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

Ireland: Unit 1a, Derryboy Road, Carnbane Business Park, Newry, Co. Down BT35 6QH

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

Certificate No. FM 575486

Certificate No. OHS 575489

Issue No. 21: September 2015

APPENDIX E

STORMTECH CALCULATIONS

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 1419 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Winter	0.490	0.490	5.6	335.3	O K
30 min Winter	0.664	0.664	5.8	454.2	O K
60 min Winter	0.839	0.839	5.9	573.6	O K
120 min Winter	1.024	1.024	6.0	700.3	O K
180 min Winter	1.134	1.134	6.1	775.7	O K
240 min Winter	1.211	1.211	6.1	828.6	O K
360 min Winter	1.316	1.316	6.2	899.9	O K
480 min Winter	1.383	1.383	6.2	945.8	O K
600 min Winter	1.428	1.428	6.2	976.7	O K
720 min Winter	1.459	1.459	6.3	997.9	O K
960 min Winter	1.493	1.493	6.3	1021.4	O K
1440 min Winter	1.500	1.500	6.3	1025.8	O K
2160 min Winter	1.452	1.452	6.3	993.1	O K
2880 min Winter	1.403	1.403	6.2	959.5	O K
4320 min Winter	1.285	1.285	6.2	879.2	O K
5760 min Winter	1.155	1.155	6.1	790.3	O K
7200 min Winter	1.024	1.024	6.0	700.6	O K
8640 min Winter	0.897	0.897	5.9	613.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Winter	93.730	0.0	26
30 min Winter	63.708	0.0	41
60 min Winter	40.649	0.0	70
120 min Winter	25.298	0.0	128
180 min Winter	19.019	0.0	186
240 min Winter	15.498	0.0	244
360 min Winter	11.587	0.0	360
480 min Winter	9.415	0.0	476
600 min Winter	8.010	0.0	592
720 min Winter	7.017	0.0	706
960 min Winter	5.693	0.0	932
1440 min Winter	4.238	0.0	1364
2160 min Winter	3.154	0.0	1720
2880 min Winter	2.556	0.0	2188
4320 min Winter	1.897	0.0	3112
5760 min Winter	1.535	0.0	3984
7200 min Winter	1.301	0.0	4832
8640 min Winter	1.137	0.0	5704

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Winter	0.776	0.776	5.8	530.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
10080 min Winter	1.015	0.0	6464

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	17.300	Shortest Storm (mins)	15
Ratio R	0.300	Longest Storm (mins)	10080
Summer Storms	No	Climate Change %	+20

Time Area Diagram

Total Area (ha) 1.739

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.580	4	8	0.580	8	12	0.580

Model Details

Storage is Online Cover Level (m) 2.000

Cellular Storage Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.03370 Porosity 0.60
Infiltration Coefficient Side (m/hr) 0.03370

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1140.0	1140.0	1.700	0.0	1357.6
1.600	1140.0	1357.6			