



# RIDGE

**BUCKINGHAM GROUP CONTRACTING LIMITED  
BICESTER HERITAGE - NEW TECHNICAL SITE**

**FOUL DRAINAGE DESIGN REPORT**

01 October 2019

**BUCKINGHAM GROUP CONTRACTING LIMITED  
BICESTER HERITAGE - NEW TECHNICAL SITE**

**FOUL DRAINAGE DESIGN REPORT**

**Ref: 5009983-RDG-XX-XX-DOC-C-0590**

01 October 2019

**Prepared for**

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## VERSION CONTROL

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# 1. INTRODUCTION

The Bicester Heritage New Technical Site development comprises of 8 new commercial units which are located in the south west corner of the former RAF Bicester airfield, Bicester, Oxfordshire. The new units are named the 'New Technical Site' and shall be the base for an extension to the existing engineering, sales, office and apprenticeship hub, providing much needed space for skilled businesses in the historic motoring arena.

The development has been granted planning. Planning ref: (18/01333/F). This report provides the additional information requested by Thames Water (Condition 20 Waste Water Upgrades, refer to Section 3), for the discharge of the planning conditions.

Condition 20 is a pre-occupation condition which relates to the wastewater flow rates from the development which has been stipulated due to the limited capacity in the Thames Water foul sewage network in Bicester. The condition is as follows:

*"No buildings shall be bought into use until confirmation has been provided that either:- all wastewater network upgrades required to accommodate the additional flows from the development have been completed; or an infrastructure phasing plan has been agreed with Thames Water to allow additional business units to first be bought into use. Where an infrastructure phasing plan is agreed no use of the business units shall take place other than in accordance with the agreed infrastructure phasing plan.*

*Reason - The development may lead to sewage flooding and network reinforcement works are anticipated to be necessary to ensure that sufficient capacity is made available to accommodate additional flows anticipated from the new development. Any necessary reinforcement works will be necessary in order to avoid sewer flooding and/or potential pollution incidents."*

The following Civil Engineering drawings have been prepared to support this report and can be found in Appendix A:

- 5009983-RDG-XX-ST-PL-C-0501 Foul and Surface Water Drainage Layout Sheet 1 of 2
- 5009983-RDG-XX-ST-PL-C-0502 Foul and Surface Water Drainage Layout Sheet 2 of 2
- 5009983-RDG-XX-XX-SC-C-0503 Foul and Surface Water Drainage Schedules
- 5009983-RDG-XX-XX-DT-C-0510 Foul and Surface Water Drainage Construction Details Sheet 1 of 2
- 5009983-RDG-XX-XX-DT-C-0511 Foul and Surface Water Drainage Construction Details Sheet 2 of 2

## 2. FOUL WATER DRAINAGE (CONDITION 26)

The proposed development has a foul sewer which runs across the western side of the site. Due to level constraints, it is proposed that units 149, 148, 142 and half of unit 145 will drain to the Sewer by gravity whilst the remaining units will drain via a gravity network to a pump chamber where it is pumped up to the Sewer. It is proposed that the rising main will discharge in a private manhole upstream of the proposed sewer. Refer to drainage layouts in Appendix A for details.

Internal fit out of the 8 units is yet to be finalised so to determine the foul flow rate the Sewers for Adoption flow rates for industrial developments have been used which equate to 1.1l/s per Hectare. Refer to Table A below which presents the gravity flow rate from units 149, 148, 142 and 145.

TABLE A – GRAVITY FOUL FLOW RATE TO SEWER				
Unit	Ground Floor Area (m <sup>2</sup> )	Mezzanine Area (m <sup>2</sup> )	Foul Flow Rate (l/s/ha)	Total Design Flow (l/s)
142	550	320	1.1	0.0957
145	243	180	1.1	0.0465
148	570	325	1.1	0.0985
149	90	0	1.1	0.010
Total Foul Flow by Gravity Connection				0.251

The foul pump chamber has been designed to accommodate 24 hour storage based on a 3.8l/s pump rate. The gravity foul flow rates used to calculate the 24 hour storage for the pump chamber has been calculated as presented in Table B below:

TABLE B – GRAVITY FOUL FLOW RATE TO PUMP CHAMBER				
Unit	Ground Floor Area (m <sup>2</sup> )	Mezzanine Area (m <sup>2</sup> )	Foul Flow Rate (l/s/ha)	Total Design Flow (l/s)
138	570	250	1.1	0.0902
139	320	150	1.1	0.0517
140	710	240	1.1	0.105
141	990	600	1.1	0.1749
145	243	180	1.1	0.0465
Total Foul Flow by Gravity Connection				0.468

For details of the proposed foul pumping chamber refer to Appendix B.

Thames Water raised concerns over the capacity of the sewage network in Bicester. They have plans to upgrade their network with a programme of 18 months duration which should have commenced November 2018 based on their Pre-planning Enquiry letter (TW wastewater pre-planning ref: DS6055288) dated 28<sup>th</sup> November 2018.

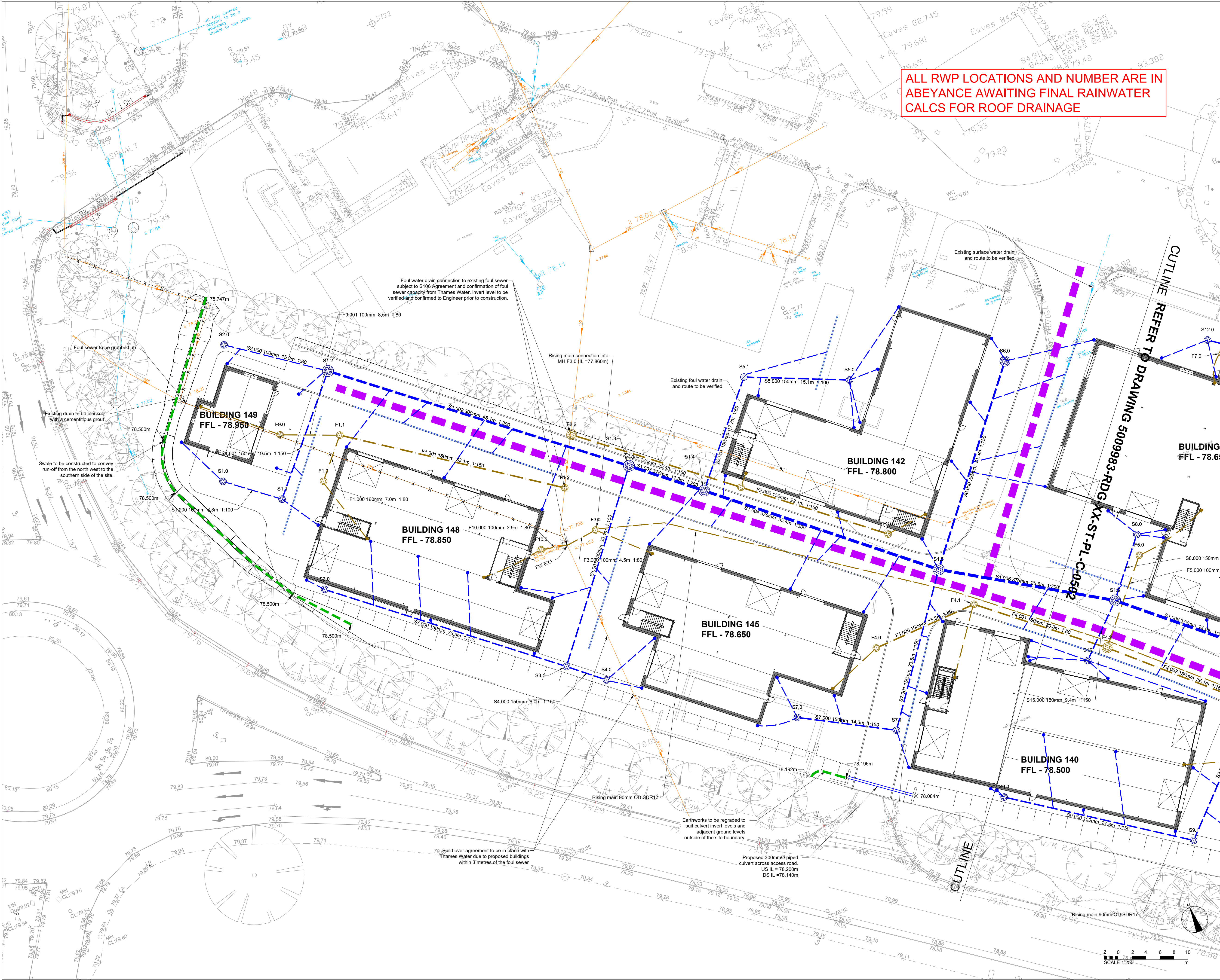
Communication with Thames Water as per the email referenced in Appendix C confirms that upon submission of the drainage strategy detailing the foul drainage proposals and a construction programme, the Thames Water Asset Planning will review the information and recommend the discharge of condition 20. The key milestones from the construction programme are as follows:

- Start on Site – 05/08/2019
- Construction Completion – 16/03/2020
- Early Access (Building 145) – 18/02/2020
- Tenant Fit out (Approx 2 months) – April 2020.
- Earliest Tenant Occupation April 2020

## **APPENDIX A – CIVIL ENGINEERING DRAWINGS**

- 5009983-RDG-XX-ST-PL-C-0501 Foul and Surface Water Drainage Layout Sheet 1 of 2
- 5009983-RDG-XX-ST-PL-C-0502 Foul and Surface Water Drainage Layout Sheet 2 of 2
- 5009983-RDG-XX-XX-SC-C-0503 Foul and Surface Water Drainage Schedules
- 5009983-RDG-XX-XX-DT-C-0510 Foul and Surface Water Drainage Construction Details Sheet 1 of 2
- 5009983-RDG-XX-XX-DT-C-0511 Foul and Surface Water Drainage Construction Details Sheet 2 of 2





ALL RWP LOCATIONS AND NUMBER ARE IN ABEYANCE AWAITING FINAL RAINWATER CALCS FOR ROOF DRAINAGE

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- KEY:
- PROPOSED PRIVATE SURFACE WATER DRAIN
  - PROPOSED PRIVATE FOUL WATER DRAIN
  - PROPOSED PRIVATE FOUL WATER RISING MAIN
  - DIVERTED PRIVATE SURFACE WATER SEWER
  - EXISTING PRIVATE SURFACE WATER SEWER
  - EXISTING ADOPTED FOUL WATER SEWER
  - EXISTING SEWER/DRAIN TO BE ABANDONED
  - ANTICIPATED CORRIDOR FOR PROPOSED SERVICES
  - PROPOSED LINEAR DRAIN (D400)
  - PROPOSED SWALE
  - MANHOLE/CATCHPIT (REFER TO MANHOLE SCHEDULE FOR DETAILS)
  - SURFACE AND FOUL ABOVE GROUND DRAINAGE POINTS. LOCATION TO BE VERIFIED BY ARCHITECTS

- NOTES:
1. REFER TO DRAWING 5009983-RDG-XX-XX-DT-C-0510 & 0511 FOR DRAINAGE CONSTRUCTION DETAILS
  2. REFER TO DRAWING 5009983-RDG-XX-XX-SC-C-0503 FOR MANHOLE AND PIPE SCHEDULE
  3. FOUL POP UP AND RWP TO BE SET OUT BY ARCHITECT DRAWINGS
  4. ALL DRAINS CONNECTING TO FOUL POP UPS AND RWPS SHALL BE 100mmØ UNLESS OTHERWISE STATED.
  5. ABANDONED SEWERS/ DRAINS SHALL BE GRUBBED UP OR GROUTED UP WITH FOAMED CONCRETE.
  6. INVERT LEVELS AT CONNECTIONS TO AND CROSSINGS OF EXISTING SEWERS/DRAINS SHALL BE REPORTED TO THE CIVIL ENGINEER FOR VERIFICATION PRIOR TO INSTALLATION OF PROPOSED DRAINAGE RUNS.

C01	ISSUED FOR CONSTRUCTION	26/09/2019	MG
P03	F1.1, F1.2, F4.0, F4.1 & F6.0 MANHOLES CHANGE TO PPIC. SW DRAIN 14.001 AMENDED	13/09/2019	EP
P02	SURFACE WATER DRAINAGE UPDATE	12/09/2019	EP
P01	PRELIMINARY ISSUE	09/07/2019	MG
REV	DESCRIPTION	DATE	DRAWN

ORIGINATOR:



PROPERTY & CONSTRUCTION CONSULTANTS

THE COWYARDS  
BLENHEIM PARK  
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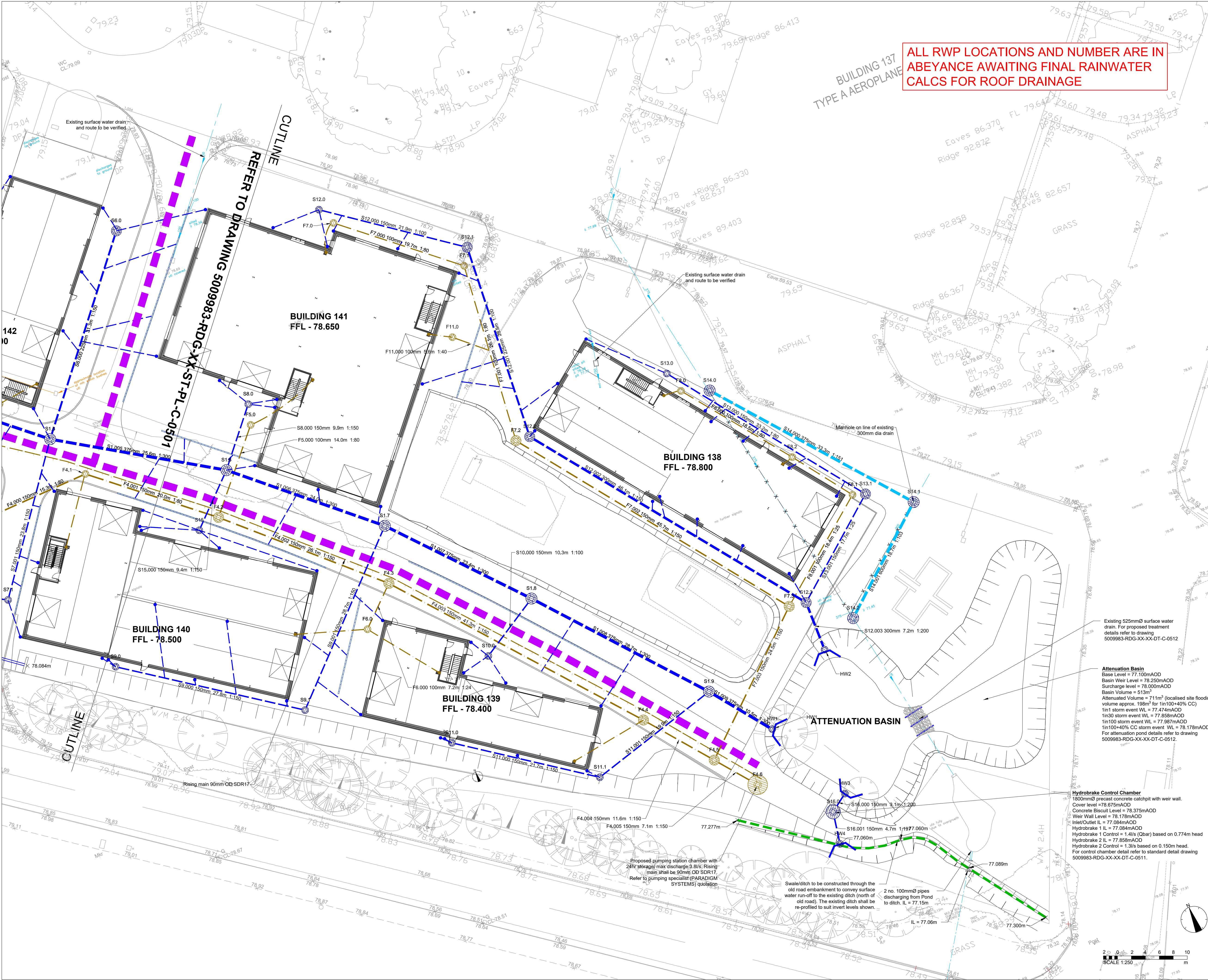
TITLE:  
**SURFACE AND FOUL WATER  
DRAINAGE LAYOUT  
SHEET 1 OF 2**

ENG:	MG	CSE:	SW	ICSE:	SCALE:	1:250	@	A1
					INITIAL ISSUE:	09/07/2019		

STATUS:  
**CONSTRUCTION**

DRAWING No:	PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5009983	RDG	XX	ST	PL	C	0501	C01	





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**BICESTER HERITAGE  
NEW TECHNICAL SITE**

TITLE:  
**SURFACE AND FOUL WATER  
DRAINAGE LAYOUT  
SHEET 2 OF 2**

ENG: MG	CSE: SW	ICSE:	SCALE: 1:250	@ A1
			INITIAL ISSUE:	09/07/2019

STATUS:  
**CONSTRUCTION**

DRAWING No:	PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5009983	RDG	XX	ST	PL	C	0502	C01	



FOUL WATER NETWORK MANHOLE SCHEDULE									
MANHOLE REF.	INCOMING INVERT LEVEL	OUTGOING INVERT LEVEL	COVER LEVEL	MANHOLE TYPE					
F1.0		78.087 (100mmØ)	78.826	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F1.1	77.999 (100mmØ) 77.999 (100mmØ)	77.949 (150mmØ)	78.831	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F1.2	77.729 (150mmØ)		78.783	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F2.0		78.068 (150mmØ)	78.771	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F2.1	77.921 (150mmØ)	77.921 (150mmØ)	78.775	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F2.2	77.752 (150mmØ)		79.116	Precast Concrete (PCC) Manhole 1200mmØ - D400 Cover and Frame					
F3.0		77.864 (100mmØ)	78.693	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F4.0		77.618 (150mmØ)	78.614	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F4.1	77.427 (150mmØ)	77.427 (150mmØ)	78.473	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F4.2	77.176 (150mmØ) 77.226 (100mmØ)	77.176 (150mmØ)	78.419	Precast Concrete (PCC) Manhole 1200mmØ - D400 Cover and Frame					
F4.3	77.002 (150mmØ) 77.052 (100mmØ)	77.002 (150mmØ)	78.330	Precast Concrete (PCC) Manhole 1200mmØ - D400 Cover and Frame					
F4.4	76.727 (150mmØ)	76.727 (150mmØ)	78.221	Precast Concrete (PCC) Manhole 1200mmØ - D400 Cover and Frame					
F4.5	76.649 (150mmØ) 76.649 (150mmØ)	76.649 (150mmØ)	78.144	Precast Concrete (PCC) Manhole 1200mmØ - D400 Cover and Frame					
F4.6	76.601 (150mmØ)		78.232	Pumping Chamber - GRP holding Tank 2,500mm Ø x 4,200mm deep					
F5.0		77.401 (100mmØ)	78.630	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F6.0		77.357 (100mmØ)	78.375	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F7.0		77.739 (100mmØ)	78.650	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F7.1	77.493 (100mmØ)	77.493 (100mmØ)	78.681	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F7.2	77.167 (100mmØ)	77.117 (150mmØ)	78.710	Precast Concrete (PCC) Manhole 1200mmØ - D400 Cover and Frame					
F7.3	76.812 (150mmØ) 76.862 (100mmØ)	76.812 (150mmØ)	78.618	Precast Concrete (PCC) Manhole 1200mmØ - D400 Cover and Frame					
F8.0		77.950 (100mmØ)	78.792	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F8.1	77.591 (100mmØ)	77.591 (100mmØ)	78.770	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F8.2	77.718 (100mmØ)	77.718 (100mmØ)	78.800	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F9.0		78.106 (100mmØ)	78.889	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F10.0		77.856 (100mmØ)	78.825	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
F11.0		77.470 (100mmØ)	78.619	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
FW EX1	77.808 (100mmØ) 77.808 (100mmØ)		77.918	Existing Thames Water Sewer Manhole					
Junction	77.330 (100mmØ)		77.440	Y Junction					

FOUL WATER NETWORK PIPE SCHEDULE									
PIPE NAME	PIPE DIAMETER (mm)	LENGTH (m)	SLOPE	UPSTREAM STRUCTURE REF:	DOWNSTREAM STRUCTURE REF:	UPSTREAM INVERT LEVEL (m)	DOWNSTREAM INVERT LEVEL (m)	UPSTREAM DEPTH TO SOFFIT (m)	DOWNSTREAM DEPTH TO SOFFIT (m)
F1.000	100	7.002	1:80	F1.0	F1.1	78.087	77.999	0.629	0.721
F1.001	150	33.059	1:150	F1.1	F1.2	77.949	77.729	0.717	0.890
F2.000	150	22.101	1:150	F2.0	F2.1	78.068	77.921	0.539	0.690
F2.001	150	25.352	1:150	F2.1	F2.2	77.921	77.752	0.690	0.997
F3.000	100	4.503	1:80	F3.0	FW EX1	77.864	77.808	0.724	0.843
F4.000	150	15.305	1:80	F4.0	F4.1	77.618	77.427	0.831	0.882
F4.001	150	20.038	1:80	F4.1	F4.2	77.427	77.176	0.883	1.078
F4.002	150	26.141	1:150	F4.2	F4.3	77.176	77.002	1.079	1.164
F4.003	150	41.348	1:150	F4.3	F4.4	77.002	76.727	1.164	1.330
F4.004	150	11.639	1:150	F4.4	F4.5	76.727	76.649	1.339	1.339
F4.005	150	7.148	1:150	F4.5	F4.6	76.649	76.601	1.340	1.476
F5.000	100	14.016	1:80	F5.0	F4.2	77.401	77.226	1.118	1.082
F6.000	100	7.244	1:24	F6.0	F4.3	77.357	77.052	0.906	1.167
F7.000	100	19.662	1:80	F7.0	F7.1	77.739	77.493	-0.055	1.083
F7.001	100	26.099	1:80	F7.1	F7.2	77.493	77.167	1.082	1.438
F7.002	150	45.730	1:150	F7.2	F7.3	77.117	76.812	1.439	1.651
F7.003	150	24.470	1:150	F7.3	F4.5	76.812	76.649	1.651	1.340
F8.000	100	18.532	1:80	F8.0	F8.2	77.950	77.718	0.737	0.977
F8.000 (1)	100	10.173	1:80	F8.2	F8.1	77.718	77.591	0.977	1.074
F8.001	100	18.368	1:25	F8.1	F7.3	77.591	76.862	1.074	1.651
F9.001	100	8.531	1:80	F9.0	F1.1	78.106	77.999	0.679	0.727
F10.000	100	3.880	1:80	F10.0	FW EX1	77.856	77.808	0.864	0.843
F11.000	100	5.599	1:40	F11.0	Junction	77.470	77.330	1.044	1.181

SURFACE WATER DRAINAGE 1 MANHOLE SCHEDULE									
MANHOLE REF.	INCOMING INVERT LEVEL	OUTGOING INVERT LEVEL	COVER LEVEL	MANHOLE TYPE					
HW1	77.157 (375mmØ)		77.840	Precase Concrete Headwall					
S1.0		78.468 (100mmØ)	78.916	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S1.1	78.380 (100mmØ)	78.330 (150mmØ)	78.805	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S1.2	78.200 (150mmØ) 78.250 (100mmØ)	78.050 (300mmØ)	78.958	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S1.3	77.900 (300mmØ) 77.692 (150mmØ)	77.692 (375mmØ)	78.800	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S1.4	77.649 (375mmØ) 77.649 (150mmØ)	77.649 (375mmØ)	78.729	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S1.5	77.531 (375mmØ) 77.776 (150mmØ) 77.681 (225mmØ)	77.531 (375mmØ)	78.616	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S1.6	77.446 (375mmØ) 77.671 (150mmØ) 77.671 (150mmØ)	77.446 (375mmØ)	78.539	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S1.7	77.366 (375mmØ) 77.591 (150mmØ)	77.366 (375mmØ)	78.488	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S1.8	77.288 (375mmØ) 77.513 (150mmØ)	77.288 (375mmØ)	78.192	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S1.9	77.192 (375mmØ) 77.417 (150mmØ)	77.192 (375mmØ)	78.075	Precast Concrete (PCC) Catchpit 1350mmØ - D400 Cover and Frame					
S2.0		78.442 (100mmØ)	79.350	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S3.0		78.134 (150mmØ)	78.826	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S3.1	77.892 (150mmØ) 77.892 (150mmØ)	77.892 (150mmØ)	78.773	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S4.0		77.932 (150mmØ)	78.692	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S5.0		78.051 (150mmØ)	78.754	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S5.1	77.900 (150mmØ)	77.900 (150mmØ)	79.100	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S6.0		77.889 (225mmØ)	78.768	Precast Concrete (PCC) Catchpit 1200mmØ - D400 Cover and Frame					
S7.0		78.029 (150mmØ)	78.623	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S7.1	77.934 (150mmØ)	77.934 (150mmØ)	78.537	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S8.0		77.737 (150mmØ)	78.646	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S9.0		77.967 (150mmØ)	78.522	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					
S9.1	77.782 (150mmØ)	77.782 (150mmØ)	78.449	Polypropylene Inspection Chamber (PPIC) 600mmØ - D400 Cover and Frame					

SURFACE WATER DRAINAGE 1 PIPE SCHEDULE									
PIPE NAME	PIPE DIAMETER (mm)	LENGTH (m)	SLOPE	UPSTREAM STRUCTURE REF:	DOWNSTREAM STRUCTURE REF:	UPSTREAM INVERT LEVEL (m)	DOWNSTREAM INVERT LEVEL (m)	UPSTREAM DEPTH TO SOFFIT (m)	DOWNSTREAM DEPTH TO SOFFIT (m)
S1.000	100	8.819	1:100	S1.0	S1.1	78.468	78.380	0.343	0.320
S1.001	150	19.483	1:150	S1.1	S1.2	78.330	78.200	0.320	0.603
S1.002	300	45.138	1:300	S1.2	S1.3	78.050	77.900	0.601	0.593
S1.003	375	11.326	1:263	S1.3	S1.4	77.692	77.649	0.725	0.697
S1.004	375	35.387	1:300	S1.4	S1.5	77.649	77.531	0.697	0.702
S1.005	375	25.611	1:300	S1.5	S1.6	77.531	77.446	0.702	0.710
S1.006	375	24.024	1:300	S1.6	S1.7	77.446	77.366	0.710	0.739
S1.007	375	23.425	1:300	S1.7	S1.8	77.366	77.288	0.739	0.521
S1.008	375	28.688	1:300	S1.8	S1.9	77.288	77.192	0.521	0.483
S1.009	375	10.522	1:300	S1.9	HW1	77.192	77.157	0.484	0.163
S2.000	100	15.326	1:80	S2.0	S1.2	78.442	78.250	0.426	0.603
S3.000	150	36.308	1:150	S3.0	S3.1	78.134	77.892	0.537	0.726
S3.001	150	30.074	1:150	S3.1	S1.3	77.892	77.692	0.726	0.953
S4.000	150	6.041	1:150	S4.0	S3.1	77.932	77.892	0.605	0.726
S5.000	150	15.100	1:100	S5.0	S5.1	78.051	77.900	0.548	0.945
S5.001	150	17.229	1:69	S5.1	S1.4	77.900	77.649	0.945	0.925
S6.000	225	31.280	1:150	S6.0	S1.5	77.889	77.681	0.646	0.703
S7.000	150	14.320	1:150	S7.0	S7.1	78.029	77.934	0.439	0.448
S7.001	150	23.791	1:150	S7.1	S1.5	77.934	77.776	0.448	0.685
S8.000	150	9.945	1:150	S8.0	S1.6	77.737	77.671	0.754	0.713
S9.000	150	27.816	1:150	S9.0	S9.1	77.967	77.782	0.350	0.512
S9.001	150	28.735	1:150	S9.1	S1.7	77.782	77.591	0.512	0.742
S10.000	150	10.281	1:100	S10.0	S1.8	77.616	77.513	0.570	0.524
S11.000	150	21.736	1:150	S11.0	S11.1	77.694	77.549	0.528	0.442
S11.001	150	19.863	1:150	S11.1	S1.9	77.549	77.417	0.442	0.487
S15.000	150	9.442	1:150	S15	S1.6	77.734	77.671	0.548	0.713



NON ADOPTABLE DRAINAGE NOTES

Generally non-adoptable drainage shall comply with the DTLR Building Regulations approved document H (April 2002)

1. Any changes made from the drainage design shown on this drawing shall be reported to the Engineer.

2. The Contractor must confirm the invert levels and positions of all outfalls/connections to existing drainage prior to commencing work on-site.

3. Non-adoptable chambers shall be :-

depth to invert	chamber size and type
0.325m to 0.6m	shallow access chamber 300mmØ
0.4m to 1.25m	Inspection chamber 475mm Ø (polyprop) 600mmx450mm Brick/P.C.C units
1.35 to 1.5	Manhole1050mmØ P.C.C. ring 1200mmx750mm Brick/P.C.C. units
1.50 to 3.0	Manhole 1200mm Ø P.C.C ring (ring diameter increased if sewer dia greater than 475mm Ø)

4. All manholes shall have a flexible joint within 150mm of the face of the structure and a "rocker pipe " which should not exceed 600mm in length.

5. Non-adoptable drainage to be either :-  
concrete to BS GN 1916 : 2002  
vitrified clayware to BS EN 295-1 : 2013  
Grey iron to BS437 : 2003  
UPVC to BS EN 1401-2012  
PP to BS EN 1852-1 : 2009  
Structure wall to BS EN 13476 : 2007  
Confirm plastic pipes acceptable to Client.

6. For private drains, pipes with less than 0.9m cover beneath carriageways & hardstanding or 600mm in other areas shall have 100mm thick concrete slab with mesh reinforcement and 150mm bearing each side of the trench. Where the depth of cover at any location is less than 450mm it is recommended that a concrete surround with flexible joints is provided.

7. Trenches within 1m of load bearing walls should be filled with concrete at least to the underside of the foundation. Where the distance is more than 1m from the foundations the concrete should be taken at least up to a 45degree line from the bottom of the foundations. Alternatively, the foundations could be taken to a deeper level to avoid undermining by the drainage trench (check with the Engineer where this is required).

8. Pipe bed and surround to be Type S granular unless otherwise noted in item 7.

9. Drains passing through walls or foundations should have either an arched or lintelled opening to give 50mm clearance around the pipe. The opening shall be masked both sides with a rigid non perishable material, or alternatively a short length of pipe may be built in solid if it is connected within 150mm to rocker pipes (max 600mm long) with flexible joints.

10. Drains under buildings should be surrounded by at least 100mm of granular or other flexible filling.

11. Unless otherwise stated all non-adoptable drainage shall be 100mmØ (see drainage schedules).

12. Road gully connections to be 150mmØ.  
Yard gully connections 100mmØ.

13. New connections to existing public sewers should be carried out as required and under the supervision of the Water Authority The appropriate sewer connection notice should be applied for where appropriate.

14. Covers shall be to B.S. EN 124:2005 Class A15 access covers and gratings capable of withstanding a 1.5 T load. For use in areas where only pedestrians have access. Class B125 access covers and frames capable of withstanding a 12.5T load. For use in car parks and pedestrian areas where occasional vehicular access is likely. Class C250 access covers and frames capable of withstanding a 25T load. For use in areas where not extending more than 500mm from kerb face into the carriageway Class D400 access covers and gratings capable of withstanding a 40T load. For use in areas where cars and lorries have access including carriageways, hard shoulders and pedestrian areas.

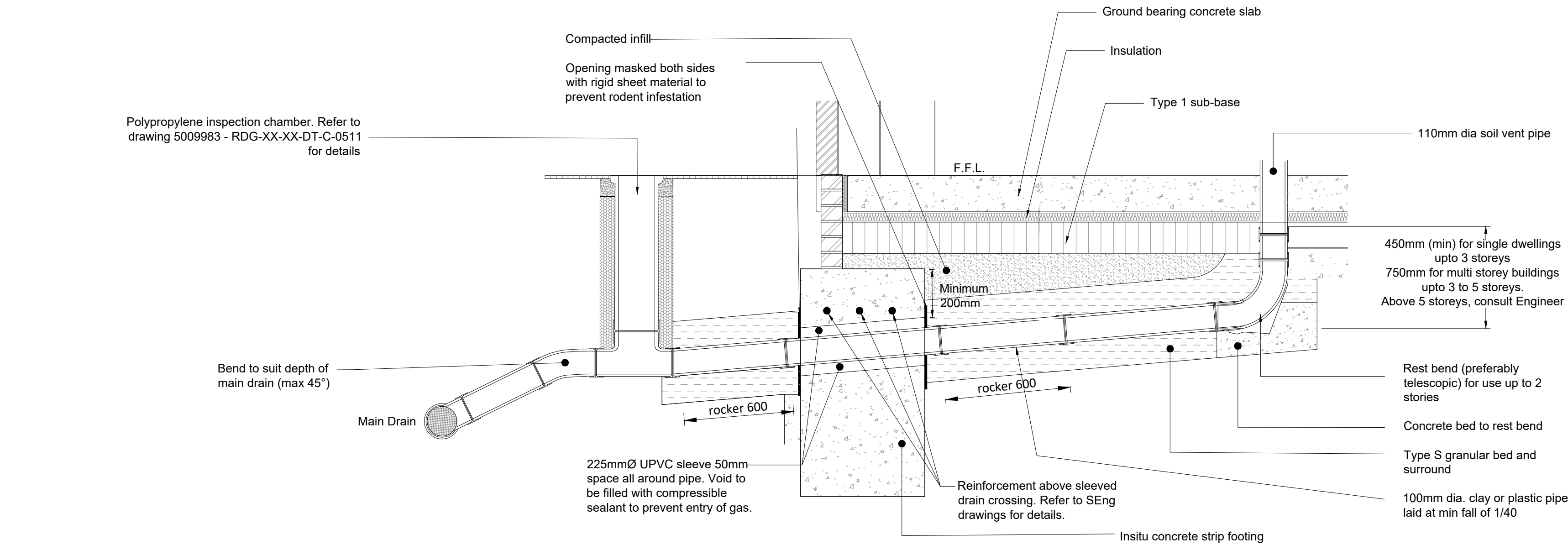
Cover and frames to be increased to 150 deep when located within the following areas:

- Trunk roads and dual carriageways
- All other A roads
- Bus Routes
- All other roads except residential cul-de-sacs

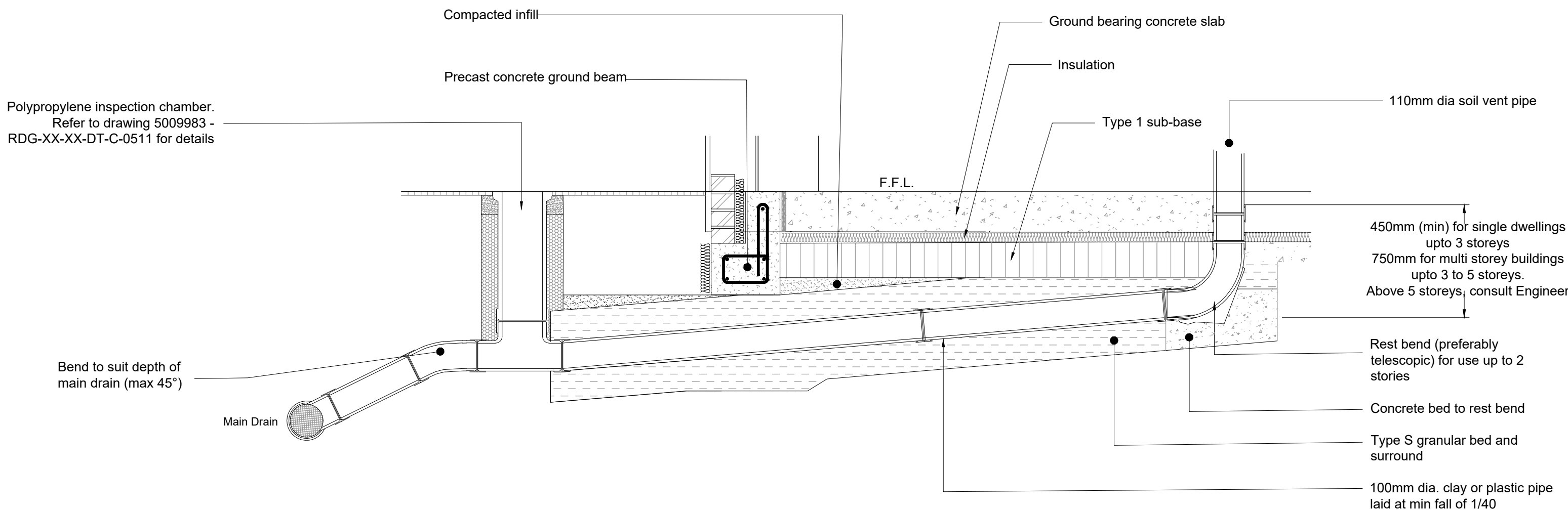
15. It is recommended that where possible the Contractor should ensure that all drainage is commenced at the outfall and laid into the site and not vice versa, especially where the outfall depth is shallow.

16. Shallow pipelines may need to be protected when laid at an early stage of a contract and are subject to construction traffic loadings.

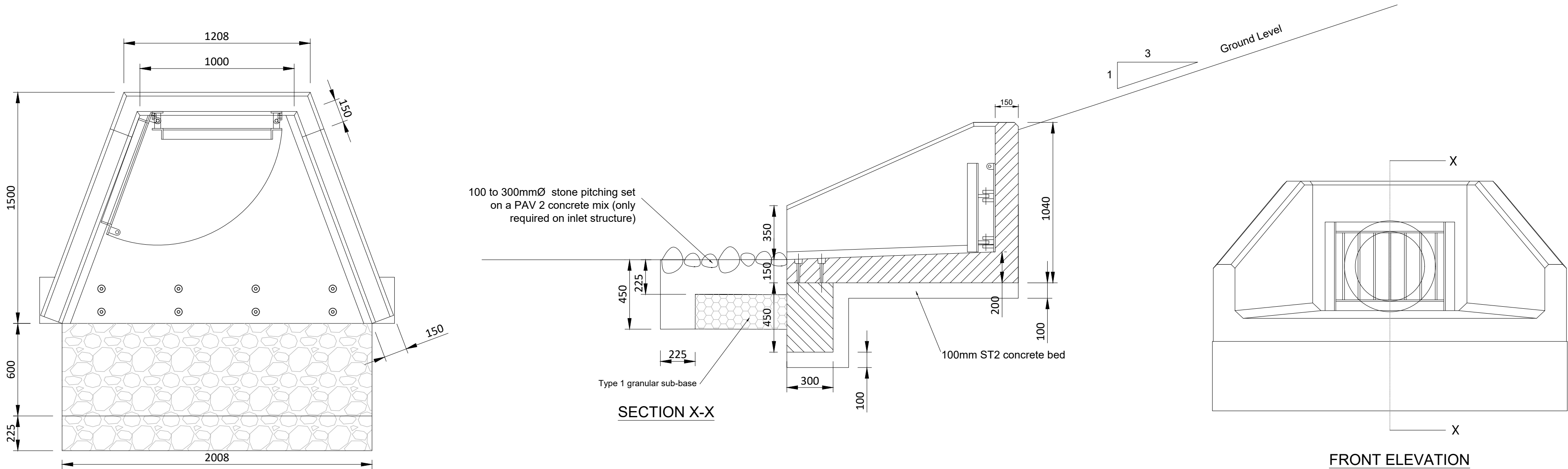
17. In buildings up to 3 storeys the rest bend at the base of the soil stack should be 450mm below the invert of the lowest incoming drain. In buildings over 3 storeys this should be increased to 750mm. In buildings over 5 storeys the ground floor drainage connections should have their own connections to the external drain.



SOIL PIPE CONNECTION-GROUND BEARING FLOOR SLAB WITH STRIP FOOTING



SOIL PIPE CONNECTION-GROUND BEARING FLOOR SLAB WITH GROUND BEAM



HEADWALL CONSTRUCTION DETAILS (Althon SFA10b or similar approved)

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⚠

CO1	CONSTRUCTION ISSUE, SOIL PIPE DETAILS AMMENDED TO SUIT BUILDING FOUNDATIONS.	24/09/2019	BN	MG
PO1	PRELIMINARY ISSUE	09/07/2019	MG	SW
REV	DESCRIPTION	DATE	BY	CHKD

ORIGINATOR:

**RIDGE**  
PROPERTY & CONSTRUCTION CONSULTANTS

THE COWYARDS  
BLENHEIM PARK  
OXFORD ROAD  
WOODSTOCK, OX20 1QR

TEL: 01993 815000  
WWW.RIDGE.CO.UK

CLIENT:  
**BUCKINGHAM GROUP CONTRACTING LIMITED**

IN ASSOCIATION WITH:

PROJECT:  
**BICESTER HERITAGE NEW TECHNICAL SITE**

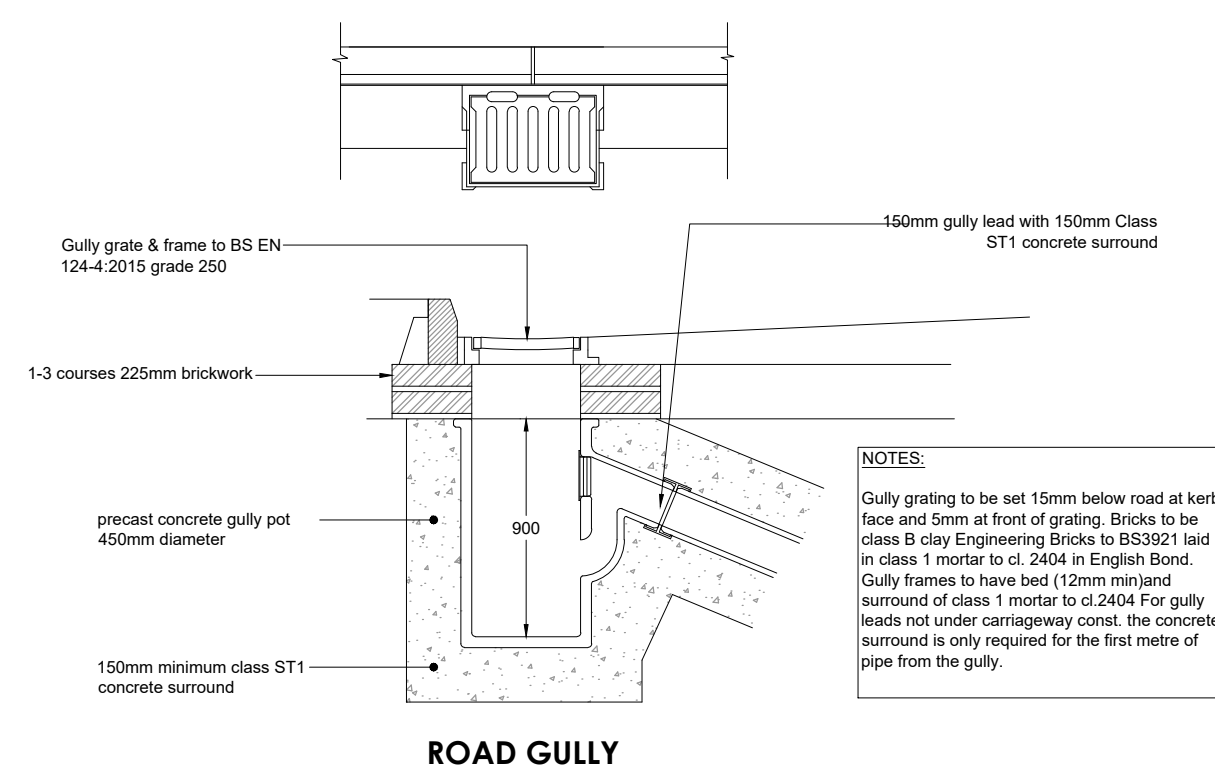
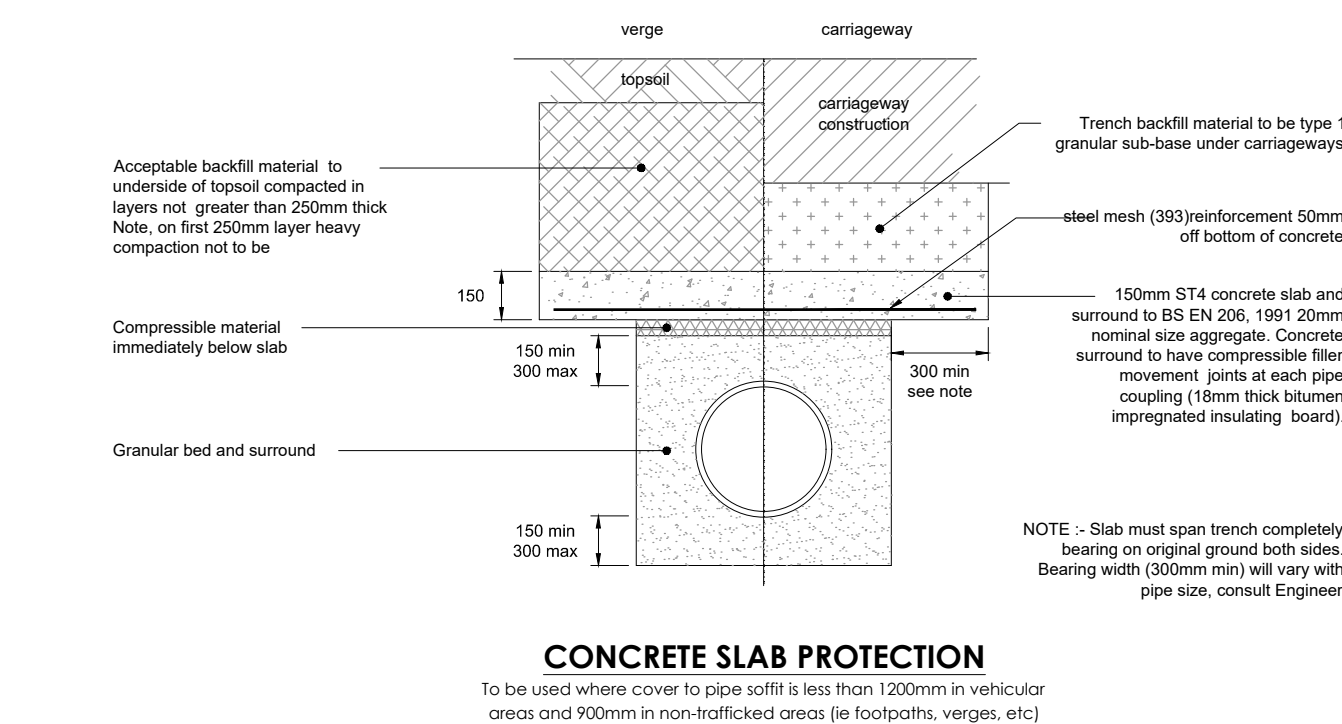
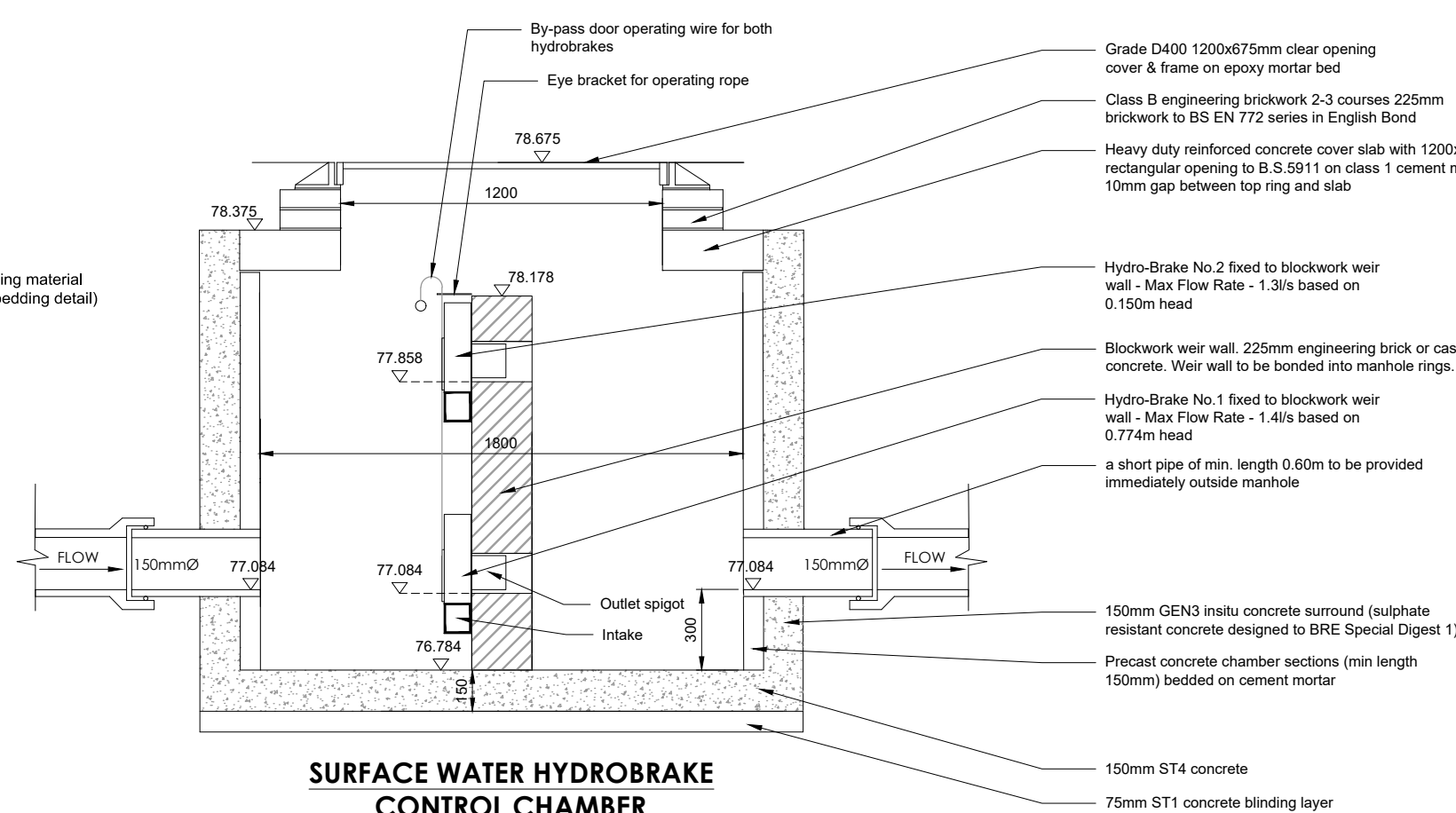
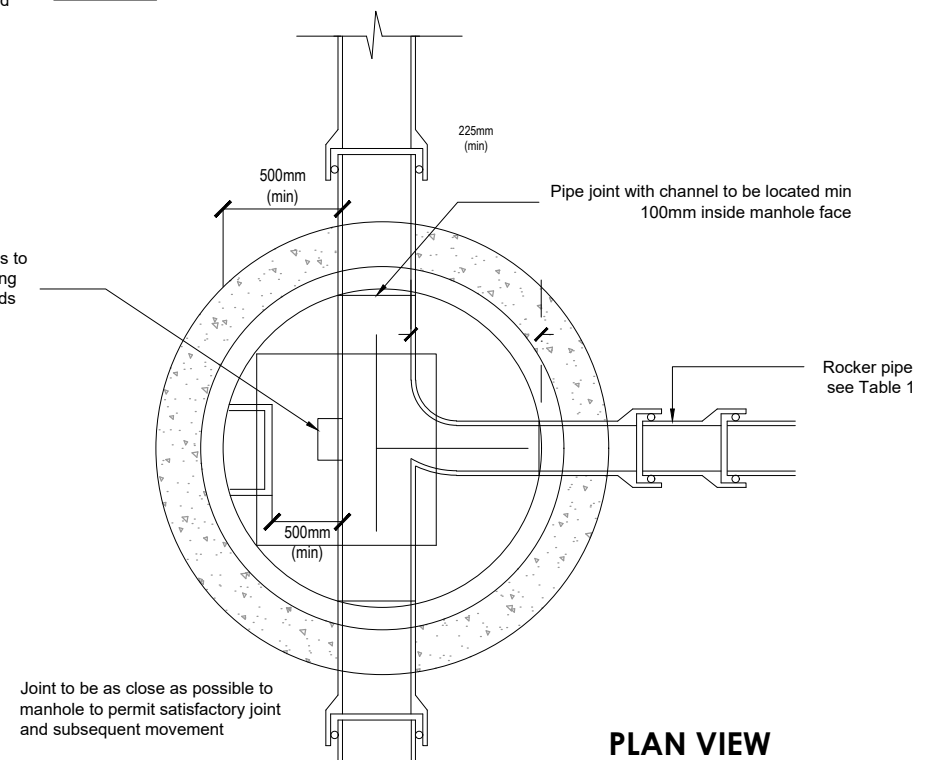
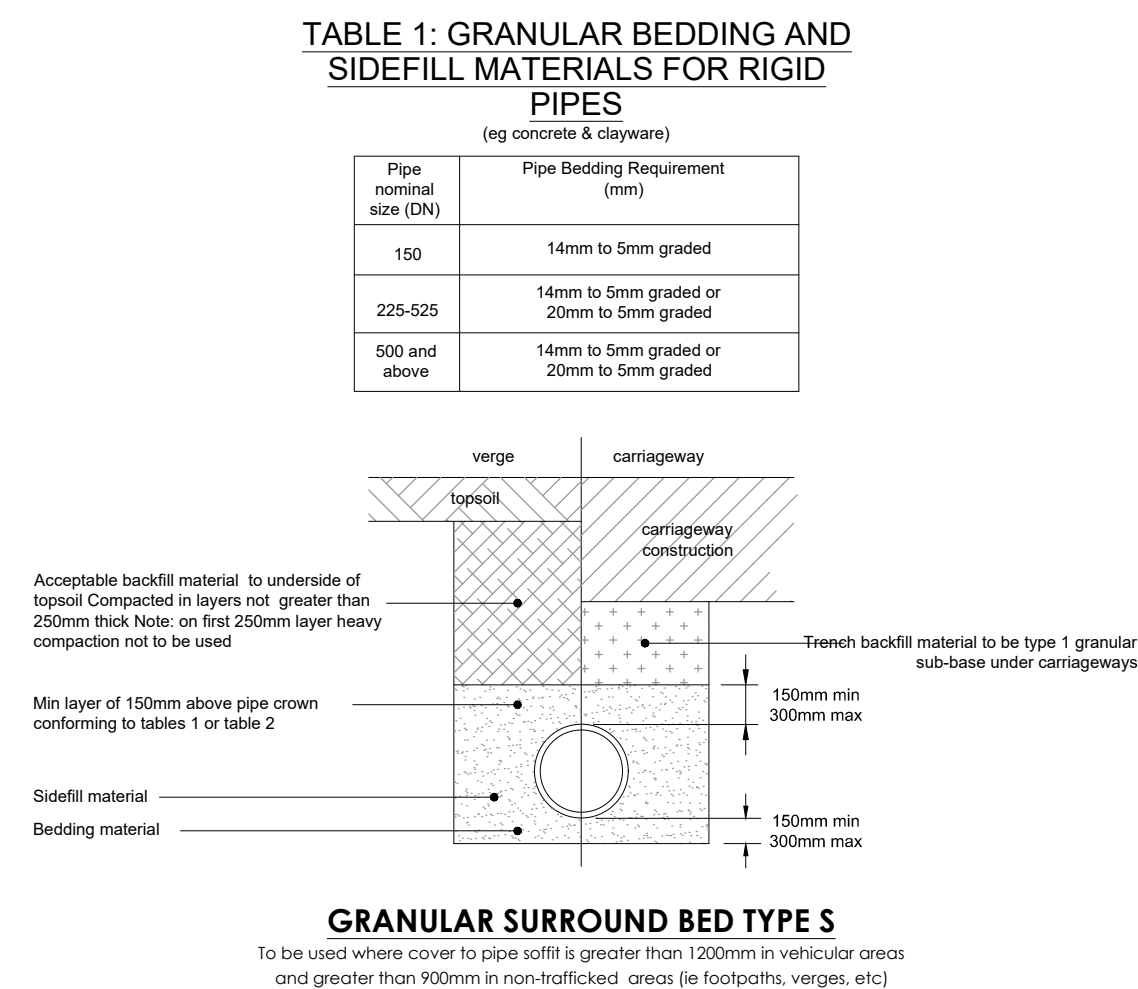
TITLE:  
**DRAINAGE CONSTRUCTION DETAILS (SHEET 1 OF 2)**

DRAWN BY:	MG	SCALE:	NTS	@	A1
CHECKED BY:	SW	DATE:	09/07/2019		


STATUS:  
**CONSTRUCTION**

DRAWING No:	PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5009983	RDG	XX	XX	DT	C	0510	CO1	





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P03	PCC CATCHPIT MANHOLE DETAIL UPDATED	13/09/2019	EP	MG
P02	HYDROBRAKE DETAIL ADDED	10/09/2019	EP	MG
P01	PRELIMINARY ISSUE	09/07/2019	MG	SW
REV	DESCRIPTION	DATE	BY	CHKD
ORIGINATOR:				

**RIDGE**  
PROPERTY & CONSTRUCTION CONSULTANTS

THE COWYARDS  
BLENHEIM PARK  
OXFORD ROAD  
WOODSTOCK, OX20 1QR

TEL: 01993 815000

WWW.RIDGE.CO.UK

CLIENT:  
BUCKINGHAM GROUP CONTRACTING  
LIMITED

IN ASSOCIATION WITH:

PROJECT:  
BICESTER HERITAGE  
NEW TECHNICAL SITE

TITLE:  
DRAINAGE CONSTRUCTION  
DETAILS  
(SHEET 2 OF 2)

DRAWN BY: MG	SCALE: NTS @ A1
CHECKED BY: SW	DATE: 09/07/2019

## PLANNING

DRAWING No:							
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5009983	RDG	XX	XX	DT	C	0511	C0

## **APPENDIX B – FOUL PUMPING CHAMBER SPECIALIST QUOTATION**



Reference: PS2146 QV2  
Date: 16<sup>th</sup> January 2019

Matthew Gardner  
Ridge & Partners LLP  
The Cowyards  
Blenheim Park  
Oxford Road  
Woodstock  
OX20 1QR

Dear Matthew,

**RE: Bicester Heritage, new Technical Site**

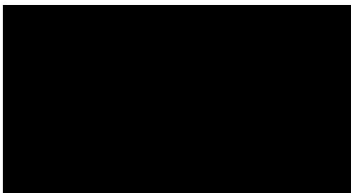
Thank you for your valued enquiry for a packaged pumping station at the above project. We take pleasure in supplying a costing proposal for a Non Adoptable pumping station to handle waste water discharge from the site.

The pumping station detailed in the following costing proposal, has been designed using the information forwarded to Paradigm on 10/01/2019.

As experienced pump station technicians and manufacturers, we ensure you are provided with the most cost effective solution for your project requirement. Our systems are built in accordance with BS EN 752-6: 1998. Further project specific calculation documents can be supplied upon request.

I trust that this equipment proposal meets your requirements, if you need any clarification or additional information, please do not hesitate to contact me.

Yours sincerely



Glen Gulley  
Technical Design Consultant

E. [glen.g@pump.net](mailto:glen.g@pump.net)  
T. 0118 986 6101  
M. 07881 311 904



**System Type** : **Foul Water Pump Station**  
**Invert Depth** : **2.012m**

1. **Pump Chamber** - 1 no GRP holding tank 2,500mm diameter x 4,200mm deep fitted with 1,10mm x 900mm opening and SWL 10 Tonne cover (supplied loose). Chamber is manufactured with external heavy duty reinforcement ribs. One loose wall seal for inlet supplied for contractor to install unless otherwise agreed. The calculated storage volume in this chamber is 6,800 litres.

*Design Notes: Due to the depth of excavation and ground pressures present, this pumping station has been designed with reinforcement ribs.*

2. **Submersible Pumps** – 2no three phase 1.5kW heavy duty 80-200 submersible pumps, 3.8 l/sec on duty/standby configuration with multi-vane vortex impeller facilitating an 74mm clear passage for solids (see attached specification sheet). Pumps are fitted with quick release couplings and lifting chains and shackles for easy maintenance removal and include 10m cable.

*Design Notes: 80mm solids handling has been selected to reduce the risk of blockages in the pumping system and to ensure hydraulic efficiency.*

3. **Pipework** - Set of dual high pressure 80mm pipework with dual GG25 Cast Iron epoxy coated non-return valves and sluice valves, dual pump auto couplings and guiderails to be pre-installed in the chamber terminating in a 90mm compression outlet for connection by contractor.

*Design Notes: Class 7 U-PVC has been selected for this pumping station due to the durability and chemical resistance qualities.*

4. **Control Panel** - 1no 415V Dual Pump Control Panel with automatic duty changeover to ensure consistent pump operation. Control Panel is built to the following Specification;

- Wall mounted enclosure with a lockable door for internal installation
- Compartments with door interlocked 'ON LOAD' isolator
- Contactor starter(s) with timers where appropriate, incorporating thermal overload and single phasing protection
- Hand/Off/Auto selection switches
- Automatic duty pump alternator
- Indicator lamps for Supply On, Run and Tripped conditions
- High Level Alarm circuit operating from a separate float switch
- Audible & Visual High Level alarm
- Set of volt free contacts for External Contractor's BMS

*Design Notes: This is a standard Heavy Duty 5kW specification Paradigm panel selected because of its capacity to support an external BMS system as well as having integral audible & visual alarms. Contractor will need to mount and power panel prior to commissioning.*

5. **Level Controls** - 4no 10m Heavy duty mercury-free float switches with counter-weights to be installed and set by Paradigm Engineers at point of commissioning.
6. **Commissioning** - Electrical and Mechanical commissioning and pump installation to be carried out by Paradigm Engineers (when required) with reports and 'as built' drawings to be supplied with comprehensive O&M Manual.
7. **Rising Main Specification** - The rising main for this system is to be a 90mm OD Black HDPE SDR17 and is to be supplied, fitted and tested by others.

**Total Project Cost for Above**

**£10,521.00 + VAT**

*Including Commissioning & Free Set of Universal Manhole Keys*



## Optional Extras

### Inlet Kits

Heavy duty DART HSS Bi-Metal Hole Saw & Arbor for cutting inlets in GRP or HDPE pumping station chambers prior to inserting the self-expanding inlet seals. Wall Seals are suitable for standard 4" & 6" drainage connections



6" (150mm) Inlet Kit (Including 1 Seal)	£56.00 ea
4" (100mm) Inlet Kit (Including 1 Seal)	£42.00 ea
6" (150mm) Additional Inlet Seal	£11.50 ea
4" (110mm) Additional Inlet Seal	£9.50 ea

### Anti-Back-up Universal Drain Valve – NEW FOR 2018

Universal fit water, odour and rodent non-return valve **for pump station inlets** designed to **prevent foul water flowing back in to the sewage system** in the event of a pump failure **reducing the risk of flooding** the property. Can be installed in Clay and Plastic 4"/110mm & 6"/150mm pipes and WRc Tested with a 5 year guarantee.



4"/100mm	£58.00 ea
6"/150mm	£143.00 ea

### Control Panel Kiosk

Green Mild steel roadside kiosk 1250mm high x 750mm wide x 400mm deep with locking door, and warning beacon. Standard colour is Dark Green Shade RAL 6005.

**Value** **£375.00**



### Telemetry SMS Alarm Unit

Wireless SMS alarm system for early warnings of power failure, pump failure and high level in the pumping chamber. The system comes free with 12 months of data usage to cover warranty period. It is incorporated directly into Paradigm control panel and can be accessed remotely for historic data by a smartphone device or PC.

**Price Each** **£511.00**



## **Scope of Works**

The following displays the typical scope of works for a packaged pumping station from design to commissioning also outlining responsibilities covered;

1. **System proposed**
2. **Proposal approved by client/engineer/contractor**
3. **Order placed with Paradigm**
4. **Site levels confirmed prior to manufacture**
5. **Delivery arranged**
6. **Pumping Station and control panel offloaded**
7. **Pumping station installed, cable duct(s) inc. draw rope(s), vent and pipework connection(s) complete**
8. **Control panel mounted and powered**
9. **Pre-commissioning checklist to be returned to Paradigm**
10. **Pull cables from pumping station to control panel**
11. **Install pumps and level controls**
12. **Commission pumping station**
13. **Supply O&M Manual with Commissioning Certification**

## **Key**

**By Paradigm**

**By Others**

## **Pumping Station Warranty**

Warranty is limited to replacement or repair, at Manufacturer's discretion, of any parts or equipment without removal and reinstallation cost for a period of twelve months from date of invoice, provided such part of equipment that is deemed by the respective manufacturer to be faulty.

Any work done on site to inspect or remedy faults that are subsequently not accepted as being under warranty by the manufacturer, or are caused by misuse, fair wear or operating procedures, will be charged at parts and labour and travelling time rates applicable at the time.

If the buyer requires our services in respect of site inspection or service outside of what is covered by Manufacturers' warranties, then Buyer should enter into a separate agreement with Paradigm Systems in respect to the same. In the event of no such separate agreement, all operations, calibrating, cleaning and maintenance of plant are the responsibility of the buyer.

Paradigm Systems have not acted as a consultant nor charged design fees on this project, and are in no way responsible for, nor guarantee any particular level or performance of the pumping station unless such guarantee is specially given in writing.

Under no circumstances is Paradigm Systems liable for any direct or consequential loss or damage to persons or properties of any nature due to any cause whatsoever. Application of warranties is conditional on Paradigm Systems having received in cash the total contract price. Furthermore, Paradigm Systems reserves the right to withdraw any code compliance, British/European Standard compliance or selection compliance, should the contract not be paid in full.

***Paradigm would like to confirm their keenest interest in working with you on your Bicester Heritage project and please don't hesitate to contact us should you require any further information.***



## **PARADIGM SYSTEMS TERMS & CONDITIONS OF SUB-CONTRACT**

These Terms & Conditions shall apply to all orders placed with the Sub-Contractor, and any stipulations or conditions in a Contractor's order which conflict with, qualify or seek to negate any of these Terms & Conditions shall be inapplicable and have no force or effect.

### **1. Definitions**

- (a) "Sub-Contractor" Paradigm Systems
- (b) "Contractor" means the Sub-Contractor's Customer for the Works.
- (c) "Works" means the building works the subject of the contract, in accordance with the Quotation.
- (d) "Quotation" means the quotation issued by the Sub-Contractor.

### **2. The Works**

- (a) The Sub-Contractor will carry out and complete the Works in accordance with the Quotation in a good and workmanlike manner.
- (b) The Sub-Contractor is entitled to rely on the accuracy and completeness of Contractors plans, specifications and reports provided to the Sub-Contractor.
- (c) Unless expressly agreed the Sub-Contractor will not carry out any form of design for these Works. Insofar as the Sub-Contractor will use best endeavours to comply with current legislation, Building Regulations and best practice, no warranty or other liability on the part of the Sub-Contractor shall be created or implied in regard to the suitability or fitness for purpose of components or systems recommended or any calculations undertaken. Structural and other calculations shall be undertaken by the Contractor
- (d) In the case where design forms part of the works, the Contractor shall allow a period of 4 weeks from the date of instruction for the Sub-Contractor to complete the design and produce design drawings required by the Contractor and shall allow a further 6-8 weeks from the date upon which the Contractor approves design drawings to manufacture the Works. Copyright in all design drawings or documents prepared by the Sub-Contractor shall remain vested in the Sub-Contractor.

### **3. Materials**

Samples submitted for approval show substance and general character only. Colour, size, thickness or shape cannot be guaranteed.

### **4. Title**

All materials will remain the Sub-Contractor's property with title fully vested in the Sub-Contractor until the Contractor has paid for the Works in full.

### **5. Variations and Extras**

- (a) The prices quoted are based upon dimensions, quantities, drawings and specifications given at time of tender. The Sub-Contractor reserves the right to require re-calculation and apply supplemental charges if any of these parameters change or to increase the contract price to reflect increases in the cost of materials or labour between the end of the fixed price period specified in the Quotation and the date of completion.
- (b) If additional work is requested by the Contractor a quotation will be submitted and the additional work will not be started until the Contractor has placed an order and agreed the price to be paid for the additional works. The Sub-Contractor shall not be liable for the consequences of late acceptance.

### **6. Payment**

- (a) The Sub-Contractor may invoice or provide applications for payment for interim payments each month as the Works proceed. The sums on each interim invoice or application become due upon the date of issue. The payment mechanism and timetable shall be in accordance with the Scheme for Construction Contracts (England & Wales) Regulations 1998, (As amended from time to time), (The Scheme). (1) 40% on Design, 55% on Delivery, 5% on Commissioning, (2) Account holders 30 days end of month following. Non account holding customers, payment on pro-forma.
- (b) The Contractor will not be entitled to withhold payment in whole or in part of any sum due unless and until he issues a valid Pay-less Notice in accordance with The Scheme. No set-off or abatement will be permitted by reference to any sum due under one or more other contracts.
- (c) The Contractor will not be entitled to make any retention unless agreed in writing. The Sub-contractor retains the entitlement to issue a Retention Bond in lieu of cash retentions. It is a condition precedent that the first moiety of retention is to be released in full together with VAT upon practical completion of the Sub-Contractors works. The second moiety of retention shall be released 12 calendar months later.
- (d) If any payment is not made by the Contractor by the expiry of its respective Final date for Payment the Sub-Contractor will be entitled to statutory compensation and to charge interest pursuant to the Late Payment of Commercial Debt Regulations 2013. The applicable rate is 8% per annum above Bank of England base rate. In addition the Sub-Contractor will after the expiry of seven days from the giving of written notice to this effect to the Contractor, be entitled to suspend the Works and any works under any other contract with the Contractor until such outstanding sum is paid. The sub-contractors reasonable costs incurred by such suspension will be reimbursed by the Contractor.
- (e) The Sub-Contractor reserves the right to refuse to execute any order or contract if the arrangements for payment of the Contractor's credit are not satisfactory. In the case of non-payment of any account by its Final date for Payment or in the case of death, incapacity, bankruptcy or insolvency of the Contractor or when the Contractor is a Limited Company in the case of liquidation or the appointment of a receiver the purchase price of all goods delivered to date and/or any sums already due from the Contractor shall become payable immediately from the Contractor and in addition the Sub-Contractor has the right to cancel every contract made with the Contractor or to cancel, suspend or discontinue delivery of goods and materials for same. This provision acts without prejudice to the Sub-Contractor's right to recover any loss sustained, caused by the above circumstances.

### **7. Time for Completion**

Time shall not be of the essence. The Sub-Contractor will use reasonable endeavours to ensure that the Works are completed within the time (if any) stated in the Sub-contractors Quotation, otherwise completion shall be within a reasonable time. The Contractor expressly waives all claims for delay charges or Liquidated Damages.

### **8. Defects**

The Sub-Contractor will rectify at its own cost any defects or faults which appear and are notified by the Contractor to the Sub-Contractor in writing within 12 months of completion of the Works and are due to defective workmanship by the Sub-Contractor or defective materials supplied by the Sub-Contractor. The Sub-Contractor shall be afforded reasonable opportunity and facilities to investigate such claims.

### **9. Consequential Damage**

The Contractor expressly waives all claims for special, incidental, or consequential damages it may have against the Sub-Contractor, including without limitation damages for principal office expenses, financing costs, loss of business and reputation, and loss of use.

### **10. Liability**

The Sub-Contractor's liability for death or personal injury to any individual caused by negligence of the Sub-Contractor or its Sub-Sub-Contractors or agents is not limited. Without prejudice to the above, the maximum liability of the Sub-Contractor for all other events shall not exceed the contract price.

### **11. Disputes**

- (a) The Sub-Contractor and Contractor agree that either party may refer a dispute to adjudication at any time, following the rules and procedures of the Scheme for Construction Contracts Part 1 (the Scheme). The Decision of the Adjudicator shall be binding on the parties until the dispute is finally resolved through agreement or by Arbitration under the CIMAR rules
- (b) Save in the circumstances provided for below, the parties shall each bear their own legal costs and other expenses incurred in the adjudication.
- (c) Where the referring party is awarded in the aggregate a sum more than 50% of the amount claimed, the non-referring party shall reimburse the referring party's legal costs and other expenses which the referring party incurred in the adjudication process
- (d) The adjudicator shall decide how his fee and reasonable expenses are to be apportioned between the parties
- (e) The adjudicator shall be permitted to correct his decision so as to remove clerical or typographical errors arising by accident or omission

### **12. Jurisdiction**

This contract is governed by the law of England and Wales.

## APPENDIX C – COMMUNICATION WITH THAMES WATER

## Matthew Gardner

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**From:** DEVELOPER.SERVICES@THAMESWATER.CO.U  
<DEVELOPER.SERVICES@THAMESWATER.CO.UK>  
**Sent:** 08 April 2019 12:09  
**To:** Matthew Gardner  
**Cc:** zaid.kazi@thameswater.co.uk; james.hern@thameswater.co.uk; swats@ridge.co.uk; ja@bicesterheritage.co.uk; Iris Michailou  
**Subject:** Bicester Heritage - New Technical Site - Thames Water Network Capacity Discussion

Matthew,

As per our telephone conversation last week;

- Based on feedback to the LPA from Thames Water Development Control during the consultation period on the Bicester Heritage planning application, we would anticipate a planning condition to be attached.
- If a foul water drainage condition is attached, we have requested that the latest drainage strategy and construction programme, particularly referencing the designed pump rate, is submitted to the LPA to request discharge of the condition. The pump rate and programme were not submitted with the planning application. As there is a wider ongoing project in Bicester to deal with all proposed growth in the catchment, the Asset Planner wanted to understand this information in more detail to understand risks to our existing network.
- The LPA will then submit the latest drainage strategy and construction programme to Thames Water Development Control for consultation. The Asset Planner will be able to review this information and recommend discharge of condition.
- Once discharged, your development will be able to discharge to our network.
- A S106 application can be made at any time. This provides permission to communicate with our sewer network (i.e. review the method of connection). The S106 application does not provide permission to discharge flow into our network; this is dependent upon planning status of the development. I would recommend referencing the DS number DS6055288 in your S106 application, which will give the engineer dealing with your application background information.

Please let me know if you require any further information or clarification.

Regards

James

James Hern

Developer Services – Senior Project Engineer

Mobile 07747 645236

[james.hern@thameswater.co.uk](mailto:james.hern@thameswater.co.uk)

Clearwater Court, Vastern Road, Reading, RG1 8DB

Find us online at [developers.thameswater.co.uk](http://developers.thameswater.co.uk)

Visit us online [www.thameswater.co.uk](http://www.thameswater.co.uk) , follow us on twitter [www.twitter.com/thameswater](https://www.twitter.com/thameswater) or find us on [www.facebook.com/thameswater](https://www.facebook.com/thameswater). We're happy to help you 24/7.

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