

Project Name:	Land at Bayards, Eastergate (Miller Homes)
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Document Name:	SuDS Verification Report – Area 6
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Checked By:	Meagan Weedon
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Revision Record				
Rev	Date	By	Summary of Changes	Aprvd
1	30/04/2026	SF	First issue (Draft)	MDW
2	01/05/2026	MDW	Second Issue	JS

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1. INTRODUCTION

- 1.1 This Sustainable urban Drainage Strategy (SuDS) Verification Report – Area 6, has been prepared by Paul Basham Associates on behalf of Miller Homes to support the 'As-Built' verification report to Arun District Council in relation to Land at Bayards, Eastergate.
- 1.2 This Verification Report has been prepared to support the discharge of Planning Condition 24. The report authors are Paul Basham Associates Ltd. Paul Basham Associates were established in 2009 and are a multi-disciplinary Transport Planning, Civil and Structural Engineering Consultancy, employing a team of Civil Engineers.
- 1.3 The development is located to the north of Fontwell Farm, west of Northfield Farmhouse. The nearest postcode to the site is PO20 3SA, Grid reference SU 94608 06305. The outline application number is AL/113/21/OUT and the reserved matters application is AL/122/22/DOC.
- 1.4 The total site development is approximately 2.31ha and development comprises of 67 dwellings with associated hardstanding and landscaping.
- 1.5 The Surface Water Management for the development comprises of a series of localised infiltration / soakaway systems which for the purposes of Verification have been divided into discrete local areas as work progresses throughout the site with each area being dealt with separately for the purposes of Verification of the Surface Water Management.

- 1.6 The development must comply with Condition 24 outlined by Arun district council: *“Immediately following implementation of the approved surface water drainage system and prior to occupation of any part of the development, the developer/applicant shall provide the local planning authority with as-built drawings of the implemented scheme together with a completion report prepared by an independent engineer that confirms that the scheme was built in accordance with the approved drawing/s and is fit for purpose. The scheme shall thereafter be maintained in perpetuity.”*
- 1.7 **Figure 1** outlines the total site area however, the site will be subdivided and assessed independently of each other due to each section being self-contained.



Figure 1- Total site Area

- 1.8 Submitting discrete independently assessed local areas allows the verification process to align with the plot construction and completion process for the site.
- 1.9 An independent company, OST Engineering has been appointed to conduct inspections of the surface water network design construction.
- 1.10 **Figure 2** shows the extent of Verification Area 6, comprising of 6 dwellings.
- 1.11 See **Appendix A** for the location of all the discrete verification areas as show on drawing number 091.5016.0578.

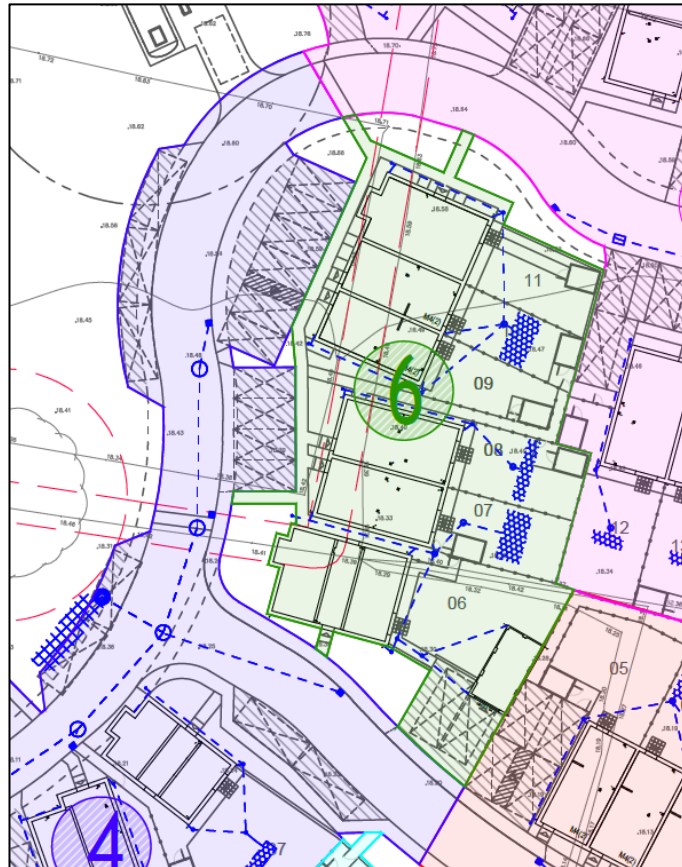


Figure 2- Site extent of Area 6

- 1.12 The relevant Drainage Layout drawings that cover the extent of Area 6 are included as **Appendix B**.

2. INSPECTIONS

- 2.1 Site staff and OST, see 1.8 above, have carried out inspection of the works although some sections of Area 6 have been inspected retroactively by exposing soakaways and pipelines.

3. AS-BUILT SURVEY

- 3.1 As-Built surveys of the site area and drainage systems have been carried out, these surveys are included as **Appendix C**
- 3.1 These levels have been reviewed against the design levels shown in 091.5016.0501 C08, 091.5016.0502 C05 and 092.5016.0503 C06 the design drawings can be found in **Appendix B**.
- 3.2 A tabulated summary of invert levels for chambers constructed within Area 6 is given below.

Area	Ref No	As-Built CL	Design IL	As-Built IL	Comments
6	PS5289	18.34	17.726	17.79	
6	PS174	18.31	17.710	17.75	
6	PS5288	18.31	17.696	17.71	
6	RE175	18.35	17.900	18.05	
6	PS169	18.32	17.602	17.61	
6	PSCP170	18.30	17.559	17.56	Whilst the design invert level indicates this is be lower than the SA6-7 which the as-built levels match, the pipe gradient indicates a required gradient of 1:80. however CCTV footage suggest the pipe is falling towards the crates.
6	SA6-7	18.30	17.656	17.64	
6	RE22	18.35	17.925	17.95	
6	PS23	18.32	17.795	17.81	
6	PSCP165	18.31	17.73	17.74	
6	SA8	18.31	17.682	17.67	
6	RE5278	18.43	18.238	18.21	
6	PS5279	18.30	18.109	18.08	
6	PSCP160	18.35	18.00	17.99	
6	PS159	18.70	18.112	18.15	
6	RE158	18.75	18.236	18.30	
6	SA09-11	18.36	17.782	17.95	

Table 1: As Built levels against design levels

- 3.3 The comparison between the design and as built levels shown that the invert levels are generally within normal building site tolerances and fall in the correct directions, unless otherwise noted within the comments provided in Table 1 above.
- 3.4 Cross checks of raised invert levels appear to show that no backfalls have been created.

4. MATERIALS AND CONSTRUCTION RECORDS

- 4.1 The list of materials suppliers is contained within **Appendix D**.
- 4.2 The materials selected for inclusion in the works have Manufacturers confirmation that the materials selected meet the required national standards.
- 4.3 **No photographic evidence of the materials used during construction works has been provided therefore the installation of the crates in line with the manufacturer's specifications cannot be guaranteed or verified.**

5. CCTV SURVEY OF PIPELINES

- 5.1 CCTV Surveys of most pipelines in Area 6 have been carried out to confirm the as-built conditions. The video files have been examined in detail with pipe conditions and a report assessing the condition of the pipe produced by the contractor is included in **Appendix E**. Copies of the CCTV media files are listed below and are appended to this report as **Appendix E**.
- pscp165-sa08
 - pscp160- ps5279
 - pscp170-sa06-07
 - pscp160-sa9-11
 - pscp160-ps159
 - pscp170-ps169
 - ps23-pscp165
- 5.2 Each video has been reviewed and comments relating to specific pipes are listed below.
- 5.3 The general quality of the CCTV surveys is incomplete, the videos do not start looking up at the chamber at the head of the run, so there is no way to guarantee the position in the pipe, equally they do not finish looking up at the downstream chamber. There are also several videos where the footage is blocked due to obstructions in the pipe.

Ref	Defect Images	Comments
PSCP170-PS169		Pipe appears to have no visible major defects. End of survey appears to be upstream manhole as not a catchpit which should be installed immediately upstream of connection to soakaway.
PSCP170-SA6-7		Pipe appears to have no visible major defects and connects into side of crates as designed
PS23-PSCP165		Significant sediment build up at the end of pipe, suggesting that the pipe may flatten out at connection into downstream manhole.
PSCP165-SA08		Footage is incomplete and it appears the full pipe has not been surveyed

PSCP160-PS5297		Significant amount of sediment build up and potential root intrusion. Pipe requires jetting and resurveying to determine if there is an intrusion.
PSCP160-SA09		The footage appears to be the same pipe as the footage for SA08 and only 2 minutes apart in terms of time stamp. SA09-11 and SA08 would both need to be resurveyed.
PSCP160-PS159		No visible major defects, although unclear if the upstream chamber was installed.

6. VARIATIONS TO THE APPROVED DESIGN

- 6.1 The design levels have in certain areas been subject to minor amendments, these are shown in 3.2 (Table 1) above.
- 6.2 For the most part the level changes to the Surface Water Drainage Systems within Area 2 are not likely to prevent the systems from performing adequately. However, the CCTV footage indicates general workmanship issues.
- 6.3 As pictures of the materials used were not provided we were therefore unable to confirm if the size and shape of the soakaways were in line with the proposed design.

7. REMEDIAL WORKS TO BE UNDERTAKEN AND PLANNED

- 7.1 Although the photos have not been provided for all the soakaways, common workmanship issues identified across the whole site necessitate all air vents to the soakaways require investigation and resolution.
- 7.2 The remedial works required within Area 6 is as listed below:
- As photos have not been provided, the soakaways should be exposed on site to verify that they have the required storage volume. If it is found that they are smaller, the contractor is to either install additional infiltration crates to achieve the previously specified storage volume, or provide supporting hydraulic modelling to demonstrate that the as-built storage is adequate.
 - Investigate the CCTV footage to determine why SA8 & SA9-11 have been allocated to the same sewer and resurvey.
 - Jet the sewer which showed signs of root ingress and resurvey.
 - Once remedial works have been carried out the system will need to be re-CCTV surveyed.

8. CONCLUSION

- 8.1 The records and details contained within this report reference 091.5016/SVR6 “SuDS Verification Report Area 6 and Appendices” show that the Surface Water Systems within Area 6 have not been constructed completely to the design and that the surface water network cannot be signed off without several remedial actions.

Appendix A Verification Areas (Dwg 091.5016.0578)



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1. Existing services present
- 2.
- 3.

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- — STORM WATER SEWER, Ø AS NOTED
- ○ SURFACE WATER MANHOLE (CUL/SILT/TYPE AS SHOWN)
- ○ SURFACE WATER INSPECTION CHAMBER/CATCHPIT
- ○ SURFACE WATER RODDING EYE
- ■ ROAD GULLY
- ⊙ DOWNSTREAM DEFENDER VORTEX PLUS
- ▨ GRAVEL INFILTRATION TRENCH (SEE 091.5016.551 FOR FULL DETAILS)
- ▨ INFILTRATION CRATES (SEE 091.5016.551 FOR FULL DETAILS)
- ▨ PERMEABLE PAVING

FOR
CONSTRUCTION

C02	UPDATED TO SUIT CLIENT COMMENT	03.08.2023	OJT	JM
C01	FIRST ISSUE	31.07.2023	OJT	JM
Rev	Description	Date	By	Chkd



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Client

millershomes

Project Name
LAND AT BAYARDS,
EASTERGATE

Title
SURFACE WATER
VERIFICATION AREAS

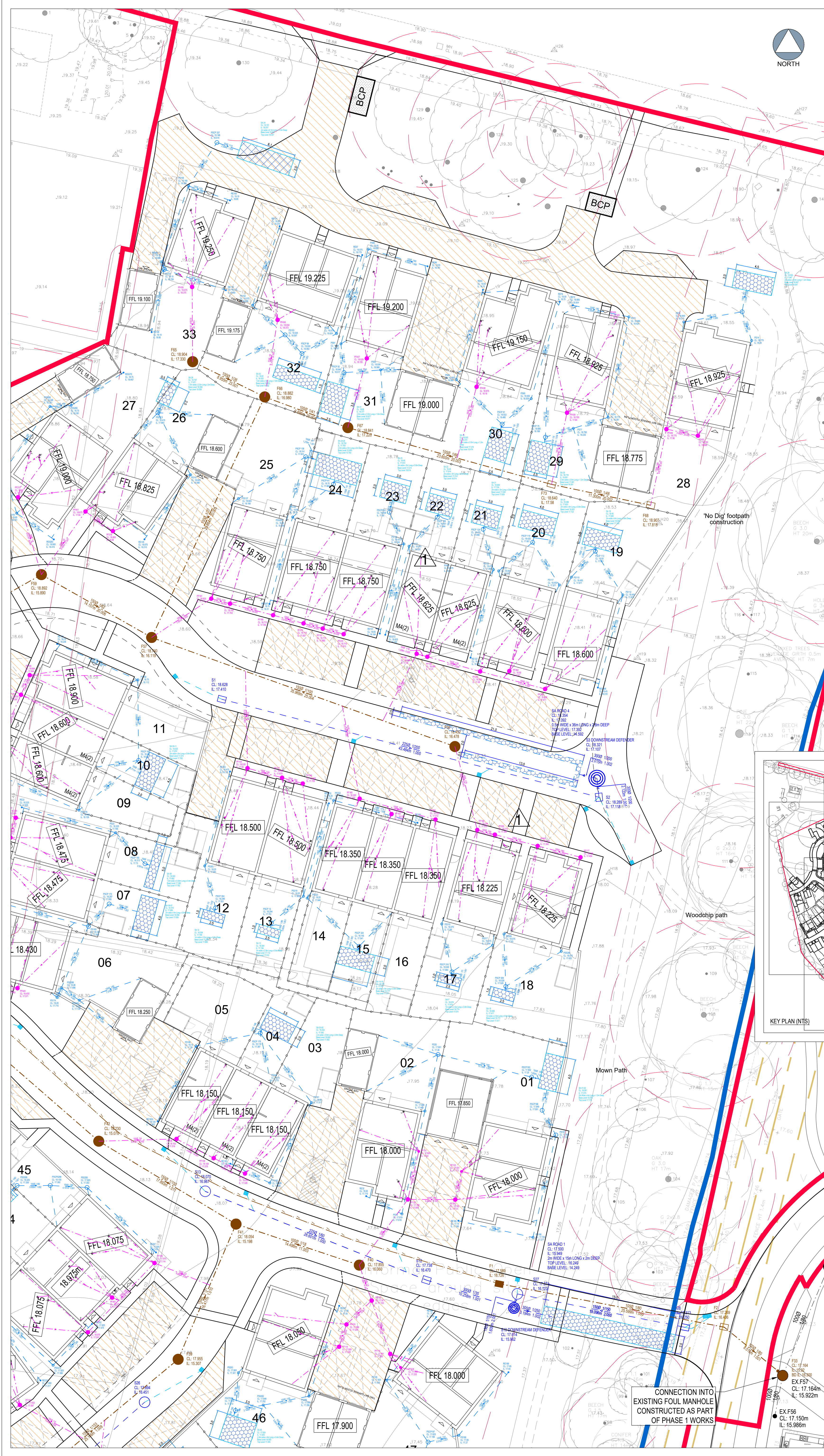
Project Phase

FOR CONSTRUCTION

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JM	31.07.2023	OJT	31.07.2023
Client Drawing No.	Scale	(AT A1 SIZE)	
-	1:500		

PBA Drawing No.	Revision
091.5016.0578	C02

Appendix B Relevant Drainage Layout Drawings



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2	
3	

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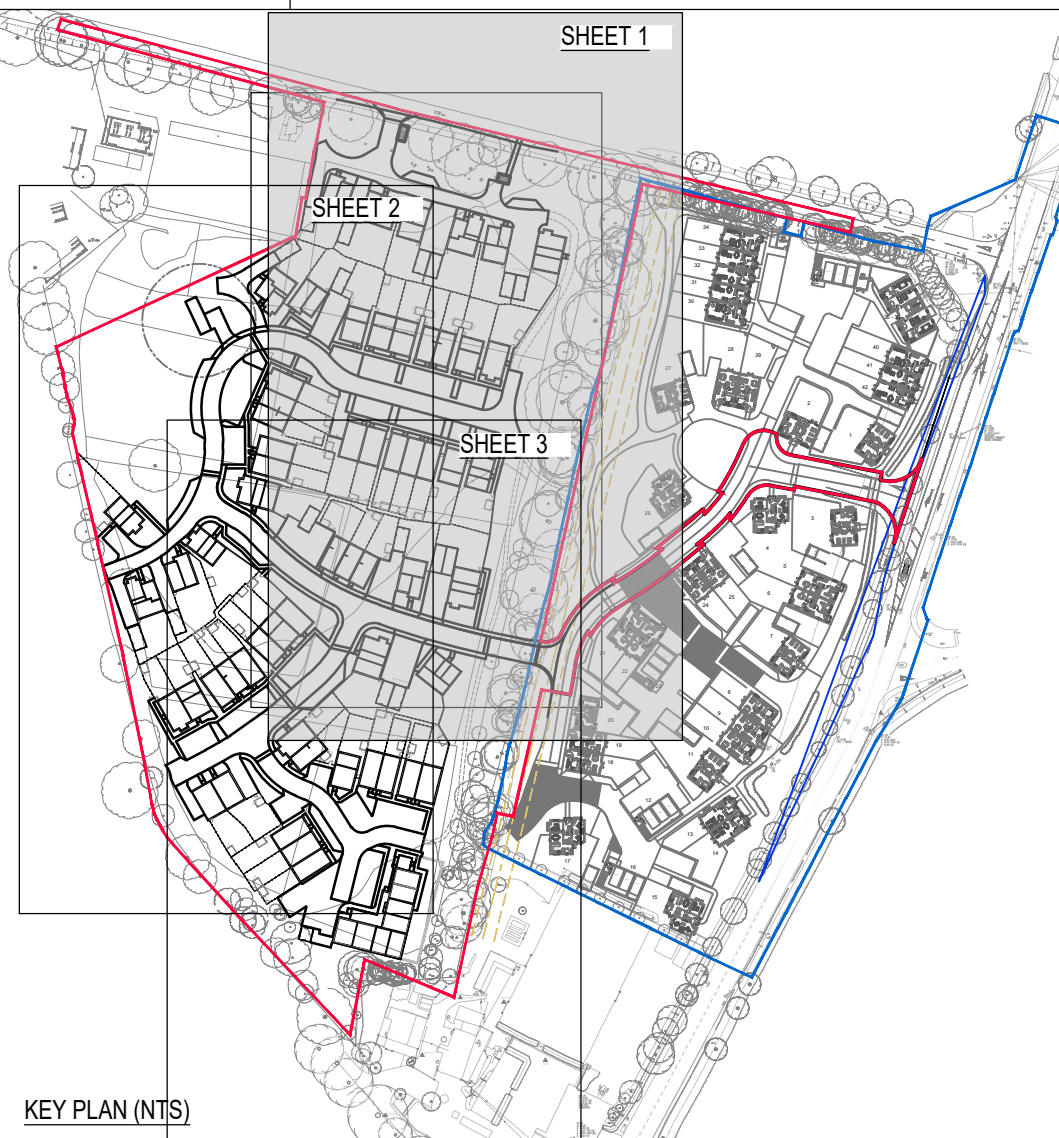
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- MAXIMUM OUTFLOW RATE FOR FOUL PUMP STATION TO BE 4.0 l/s

LEGEND:

- ADOPTABLE/PRIVATE FOUL WATER SEWER, Ø AS NOTED
- PRIVATE FOUL WATER DRAIN, 100mm Ø U.N.O
- PRIVATE/ADOPTABLE STORM WATER SEWER, Ø AS NOTED
- PRIVATE STORM WATER DOMESTIC DRAIN, 100mm Ø, U.N.O.
- FOUL RISING MAIN
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- INFILTRATION CRATES (SEE 091.5016.551 FOR FULL DETAILS)
- GRAVEL INFILTRATION TRENCH (SEE 091.5016.551 FOR FULL DETAILS)
- PERMEABLE PAVING
- SITE BOUNDARY
- EXISTING FOUL WATER SEWER
- TREE ROOT PROTECTION AREAS
- TREE ROOT PROTECTION AREAS CALCULATED AND SPECIFIED IN ACCORDANCE WITH BS 5827:2012 - 'TREES IN RELATION TO DESIGN, DEMOLITION AND CONSTRUCTION - RECOMMENDATIONS'



FOR CONSTRUCTION

Rev	Description	Date	By	Chkd
C08	LEGEND REVERTED TO REV. C05	16.02.2024	RL	RW
C07	COVER LEVELS UPDATED TO SUIT V.E. / PART M REVISIONS	08.08.2023	RL	RW
C06	SITE LAYOUT UPDATED	21.04.2023	RL	RW
C05	PLOT 19: PS115 LOCALLY RELOCATED	24.02.2023	RL	RW
C04	FW: Mh's F1, F2 & F33 AMENDED	08.02.2023	RL	RW
C03	ROAD 4 SOAKAWAY SIZED AMD.	07.02.2023	RL	RW
C02	ROAD 1/4 SOAKAWAY INFORMATION ADDED	02.02.2023	RL	RW
C01	ISSUED FOR CONSTRUCTION	20.01.2023	RL	RW

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Project Name
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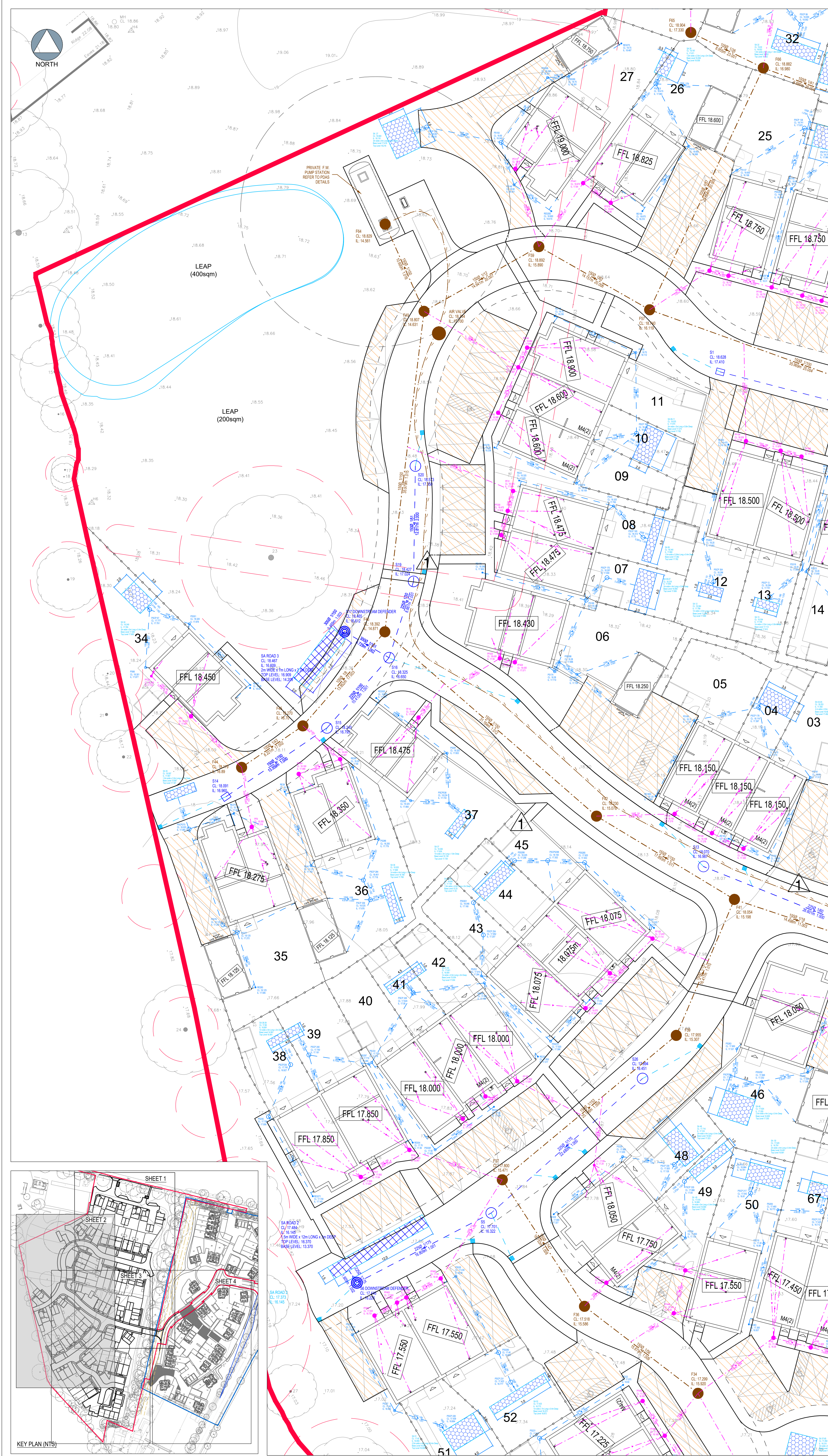
From
ENGINEERING LAYOUT DRAINAGE SHEET 1

Project Phase
CONSTRUCTION

Checked By	Checked Date	Drawn By	Drawn Date
RW	21.03.2022	CP	21.03.2022

Client Drawing No. - Scale 1:200 (AT A1 SIZE)

PBA Drawing No. 091.5016.0501 Revision C08



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C05	LEGEND REVERTED TO REV. C02	16.02.2024	RL	RW
C04	COVER LEVELS UPDATED TO SUIT V.E./PART M REVISIONS	08.08.2023	RL	RW
C03	SITE LAYOUT UPDATED	21.04.2023	RL	RW
C02	ROAD 2/3 SOAKAWAY INFORMATION ADDED	02.02.2023	RL	RW
C01	ISSUED FOR CONSTRUCTION	20.01.2023	RL	RW
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Client

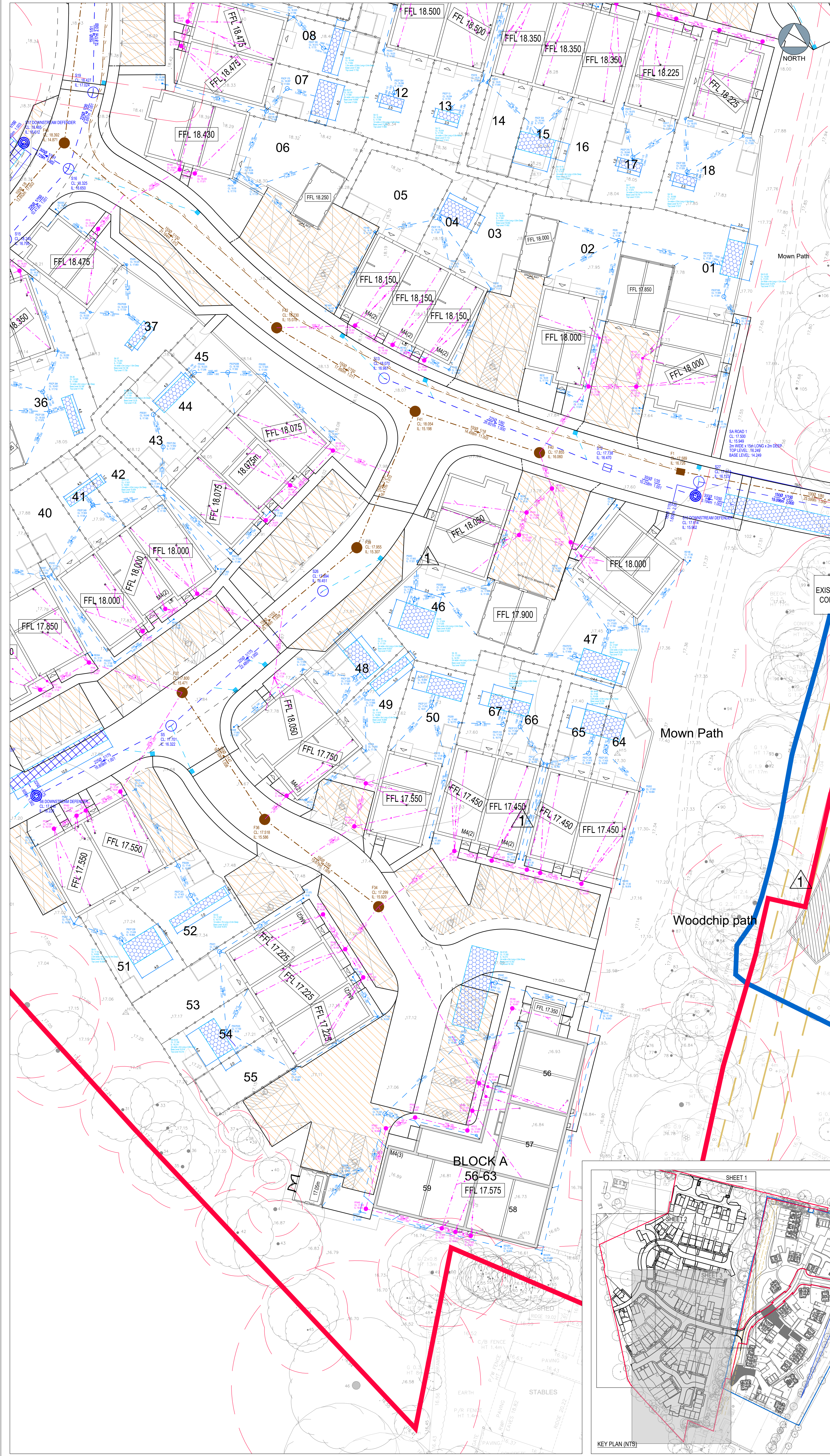
Project Name
LAND AT BAYARDS, EASTERGATE

Project Phase
CONSTRUCTION

Checked By	Checked Date	Drawn By	Drawn Date
RW	21.03.2022	CP	21.03.2022

Client Drawing No. - Scale: 1:250 (AT A1 SIZE)

PBA Drawing No.	Revision
091.5016.0502	C05



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 - MAXIMUM OUTFLOW RATE FOR FOUL PUMP STATION TO BE 4.0 l/s

- LEGEND:**
- ADOPTABLE/PRIVATE FOUL WATER SEWER, Ø AS NOTED
 - PRIVATE FOUL WATER DRAIN, 100mm Ø U.N.O
 - PRIVATE/ADOPTABLE STORM WATER SEWER, Ø AS NOTED
 - PRIVATE STORM WATER DOMESTIC DRAIN, 100mm Ø, U.N.O.
 - FOUL RISING MAIN
 - FOUL WATER MANHOLE (CL/ULS/TYPE AS SHOWN)
 - SURFACE WATER MANHOLE (CL/ULS/TYPE AS SHOWN)
 - FOUL WATER CATCHPIT/INSPECTION CHAMBER
 - SURFACE WATER INSPECTION CHAMBER/CATCHPIT
 - SURFACE WATER ROOING EYE
 - FOUL GULLY
 - ROAD GULLY
 - FINISHED FLOOR LEVELS
 - DOWNSIDE DEFENDER
 - VORTEX PLUS
 - INFILTRATION CRATES (SEE 091.5016.551 FOR FULL DETAILS)
 - GRAVEL INFILTRATION TRENCH (SEE 091.5016.551 FOR FULL DETAILS)
 - PERMEABLE PAVING
 - SITE BOUNDARY
 - EXISTING FOUL WATER SEWER
 - TREE ROOT PROTECTION AREAS
 - TREE ROOT PROTECTION AREAS CALCULATED AND SPECIFIED IN ACCORDANCE WITH BS 5837:2012 - 'TREES IN RELATION TO DESIGN, DEMOLITION AND CONSTRUCTION - RECOMMENDATIONS'

FOR CONSTRUCTION

C06	LEGEND REVERTED TO REV. C03	16.02.2024	RL	RW
C05	COVER LEVELS UPDATED TO SUIT V.E. / PART M REVISIONS	08.08.2023	RL	RW
C04	SITE LAYOUT UPDATED	21.04.2023	RL	RW
C03	FW Mths F1, F2 & F33 AMENDED	08.02.2023	RL	RW
C02	ROAD 1 SOAKAWAY INFORMATION ADDED	02.02.2023	RL	RW
C01	ISSUED FOR CONSTRUCTION	20.01.2023	RL	RW
Rev	Description	Date	By	Chkd



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Client



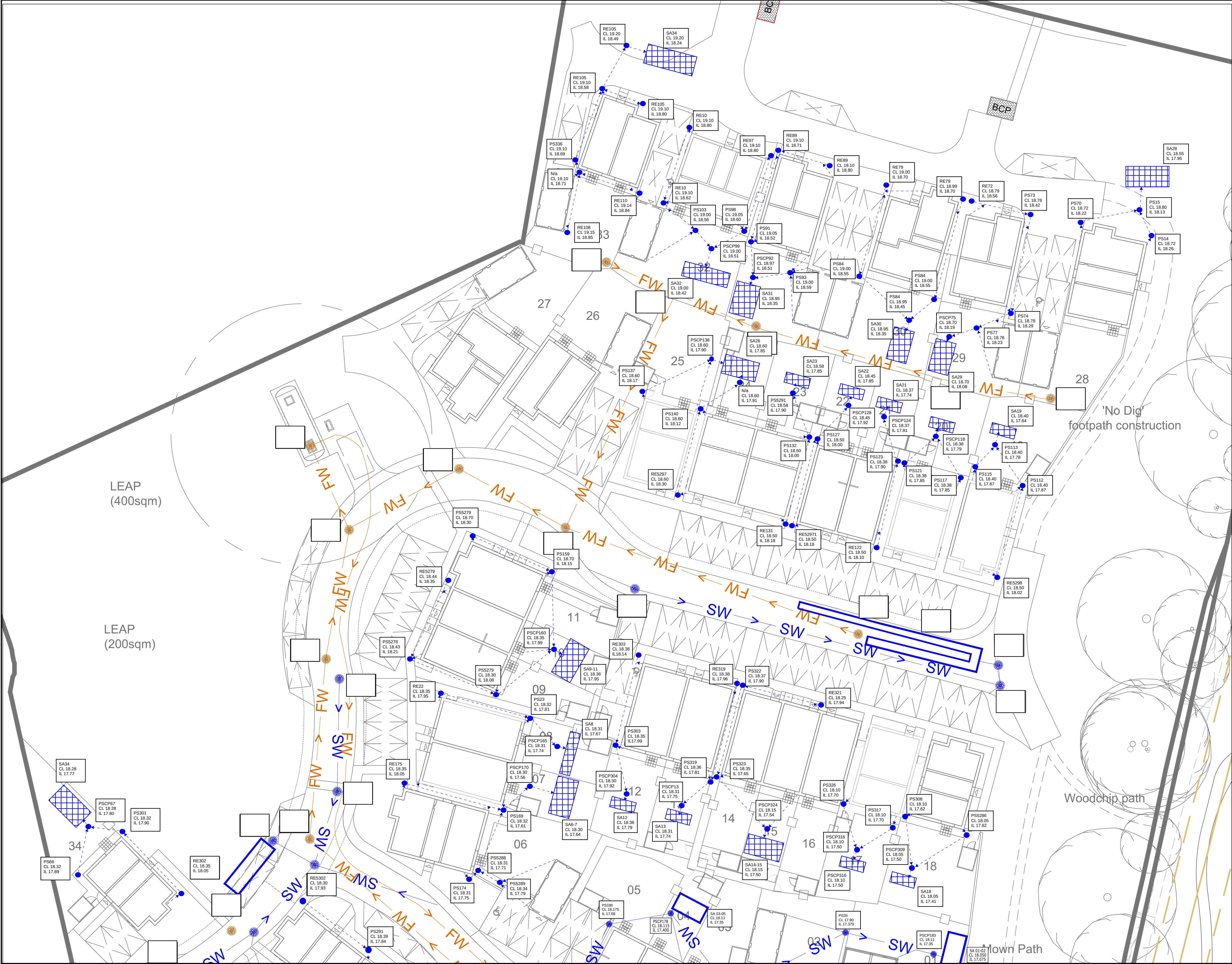
Project Name
LAND AT BAYARDS, EASTERGATE

Draw
ENGINEERING LAYOUT DRAINAGE SHEET 3

Project Phase
CONSTRUCTION

Checked By	Checked Date	Drawn By	Drawn Date
RW	21.03.2022	CP	21.03.2022
Client Drawing No.	-	Scale	(AT A1 SIZE)
		1:250	
PBA Drawing No.	091.5016.0503	Revision	C06

Appendix C As Built Survey



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Notes

- DO NOT SCALE FROM THIS DRAWING.
- ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE.
- ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS SHOWN OTHERWISE.

— SW — SURFACE WATER

— FW — FOUL WATER

MANHOLE/INSPECTION CHAMBER/RODDING EYE

FOUL WATER MANHOLE

101	FOR INFORMATION	22/08	RU	RU
Rev	Description	Date	By	App
			CHK	

FOR INFORMATION

BAYARDS LANE
EASTERGATE

HI-ACRE CONSTRUCTION

AS BUILT DRAINAGE
LAYOUT PLAN
SHEET 1 OF 2

Project No:	Scale (BA1):	BT	Date:
EASTERGATE	1:200	-----	AUG 23
Drawing No:			Rev:
EASTERGATE-HA-XX-DR-C-00001			101

Appendix D Materials

Appendix E CCTV Survey of Pipelines and CCTV Video Files