

BANNERS GATE

CIVIL, STRUCTURAL AND
TRANSPORTATION ENGINEERS

Persimmon Homes

Land at Dappers Lane Angmering

Drainage Maintenance Manual

March 2022



PERSIMMON

Together, we make a home

Revision Schedule

Land at Dappers Lane, Angmering Drainage Maintenance Manual

20079_DMM

Rev	Date	Details	Prepared by	Reviewed by	Approved by
00	04/10/2021	PRELIMINARY	Scott Marshall BSc (Hons), MCIWEM	David Allbright Associate Director	Steve Foxall Managing Director
01	25/10/2021	-	Scott Marshall BSc (Hons), MCIWEM	David Allbright Associate Director	Steve Foxall Managing Director
02	29/03/2022	-	Scott Marshall BSc (Hons), MCIWEM	David Allbright Associate Director	Steve Foxall Managing Director

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Table of Contents

1	INTRODUCTION	2
2	DRAINAGE LAYOUT	2
3	RESPONSIBILITIES.....	2
4	INSPECTION AND MAINTENANCE	3
4.1	Introduction.....	3
4.2	Porous Block Paving.....	3
4.3	Cellular Storage Tanks	3
4.4	Attenuation Basin	4
4.5	Piped Drainage Network.....	4
4.6	Ordinary Watercourses (open and culverted).....	4
4.7	Summary of Responsibilities.....	4
5	FINANCIAL MANAGEMENT	5
	Appendix I Inspection Template	
	Appendix II Drawings	

1 INTRODUCTION

- 1.1 This Report has been produced to support the discharging of a planning condition¹ associated with the construction of 84 dwellings on land to for the construction of 91 dwellings on land to the west of Dappers Lane in Angmering.
- 1.2 The information contained herein is intended to serve as a general guide. It may be necessary to vary the recommended frequency of inspection and maintenance activities to suit local conditions.
- 1.3 Maintenance regimes should be periodically assessed to ensure the approach remains appropriate.

2 DRAINAGE LAYOUT

- 2.1 The 'Master Drainage Layout Plans'² included in Appendix I depict the primary foul and surface water drainage networks and sustainable drainage features.
- 2.2 Specific details of the Attenuation Basin are shown on the 'Attenuation Basin Cross Sections'³
- 2.3 Foul and surface water flows are ultimately connected, by gravity, to the sewerage within Arundel Road to the west.
- 2.4 All private drives, shared parking areas, and unadopted roads will be pervious paved.
- 2.5 Adoptable roads will be served by a gully and pipe system.
- 2.6 The attenuation basin in the southwest corner of the Site provides most of the surface water attenuation for the development. Surface Water flows are restricted using a Hydro-Brake® vortex flow control located within a chamber adjacent to western edge of the basin. The flow control chamber includes a high-level overflow to cater for extreme storms that that exceed the design event, additionally a secondary overflow is provided from the basin into the ordinary watercourse that flows along the southern site boundary.

3 RESPONSIBILITIES

- 3.1 Initially, Persimmon Homes will be responsible for all drainage.
- 3.2 The primary foul and surface water drainage networks are to be offered to Icosca Water Limited under a Section 104, Water Industry Act, Agreement. The extent of the adoptable drainage networks is shown on the 'Section 104 Agreement Plan'⁴ and 'Section 98 Agreement Plan'⁵ drawings included in Appendix II.
- 3.3 Drainage infrastructure serving individual properties will be owned and maintained by the property owners.
- 3.4 Shared sustainable drainage features will either be offered to Icosca Water Limited or be included within the remit of resident funded Management Company; this will be clarified at the appropriate time. Persimmon Homes will form the Management Company; specific details will be included within a future update.
- 3.5 Highway gullies will be the responsibility of West Sussex County Council.

¹ Arun District Council Application Reference: A/76/20/PL Condition 19

² Banners Gate Drawings: 20079/116-118

³ Banners Gate Drawings: 20079/211-213

⁴ Banners Gate Drawing Number: 20079-100S104

⁵ Banners Gate Drawing Number: 20079-100S98

4 INSPECTION AND MAINTENANCE

4.1 Introduction

- 4.1.1 All inspection and maintenance activities of proprietary products are to be carried out in strict accordance with the manufacturer's instructions/guidelines.
- 4.1.2 The need to protect habitats and ecology must be considered when planning maintenance activities.
- 4.1.3 During the first year of operation inspections should be undertaken monthly, and following any significant rainfall events, to monitor performance.
- 4.1.4 It must be recognised that the service life of the drainage features will be dependent on several factors including, but not limited to, the maintenance regime. However, as with all drainage systems the refurbishment and/or replacement of features will eventually be necessary and appropriate allowances and contingencies should therefore be made within any financial forecasting.

4.2 Porous Block Paving

Schedule	Action	Recommended Frequency
Monitoring	General inspection	Monthly for 6 months post-construction
	Inspect for evidence of poor performance	24-48hrs following large storms during the first-year post-construction
	Inspect silt accumulation	Annually
Regular Maintenance	Standard Brushing and vacuuming (porous paving)	Annually following the autumn leaf fall for the first three years and thereafter as required based upon site-specific observations
	Weed removal	As required
Occasional Maintenance	Repairs to depressions, rutting and broken blocks	As required
	Rehabilitation of surface and sub-base	As required

4.3 Cellular Storage Tanks

Schedule	Action	Recommended Frequency
Monitoring	Inspect inlets, outlets, vents and overflows	Monthly for 12 months post-construction, then annually
	Survey inside of tank for sediment	Every 5 years or as required.
Regular Maintenance	Remove silt/debris from upstream catchpits	Annually or as required.
Occasional Maintenance	Repair inlets, outlets, vents and overflows	As required

4.4 Attenuation Basin

Schedule	Action	Recommended Frequency
Monitoring	Inspect banksides and structures for physical damage	Monthly
	Inspect inlets and outlets for blockages	Monthly
	Inspect forebay for silt accumulation	Annually
	Inspect flow control device	Annually
Regular Maintenance	Remove litter and debris	Monthly
	Cut grass	Bi-annually, spring (before nesting season) and autumn
	Remove nuisance plants	Monthly for 12 months post-construction, then as required
	Remove sediment from forebay	As required
Occasional Maintenance	Reseed areas of poor growth	As required
	Repair erosion/rip-rap	As required
	Relevel uneven surfaces	As required

4.5 Piped Drainage Network

Schedule	Action	Recommended Frequency
Monitoring	Inspect gullies, drainage channels and inspection chambers	Monthly for 12 months post-construction, then annually
Regular Maintenance	Remove sediment	As required
Occasional Maintenance	Jetting and CCTV	If blockage occurs

4.6 Ordinary Watercourses (open and culverted)

Schedule	Action	Recommended Frequency
Monitoring	Inspect channel, vegetation coverage, grips and headwalls	Monthly for 12 months post-construction, then bi-annually
Regular Maintenance	Remove litter and debris from channel and screens	As required
Occasional Maintenance	Repair erosion	As required
	Remove vegetation, nuisance plants and silt	As required

4.7 Summary of Responsibilities

Drainage Component	Responsibility
S104 Network	Icosa Water
S38 Network	West Sussex County Council
Private Access Gullies (single drive)	Homeowner
Private Access Gullies (shared drive)	Management Company
Porous Block Paving (single drive)	Homeowner
Porous Block Paving (shared drive)	Management Company
Cellular Storage Tanks	Management Company
Attenuation Basin	Management Company
Basin Headwalls and Flow Control	Icosa Water
Ordinary Watercourse	Management Company

5 FINANCIAL MANAGEMENT

- 5.1 Preliminary capital cost estimates⁶ for the primary drainage features are included within the following table for information.

Drainage Component	Preliminary Capital Cost	Approximate Service Life
Pervious Paving	£92.50 per m ²	30 years
Cellular Storage (CS01)	£80,480	50 years
Cellular Storage (CS02)	£45,295	50 years
Attenuation Basin	£56,088 (£45,634*)	100 years

*Estimated Future Reconstruction Cost

- 5.2 Persimmon Homes initially recommend an annual maintenance budget at 3% of the capital cost. This is based upon recent experience and is in-line with a DEFRA commissioned study where a WSP-led consortium estimated the annual average maintenance costs at 0.5% of the drainage construction capital cost.

⁶ Courtesy of Persimmon Homes

APPENDIX I – INSPECTION TEMPLATE

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Appendix B: Maintenance inspection checklist



Table B.25 SuDS maintenance inspection checklist			
General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference(s)	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection date								
	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date Completed
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

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Appendix B: Maintenance inspection checklist



Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?)								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (eg wheel ruts?)								

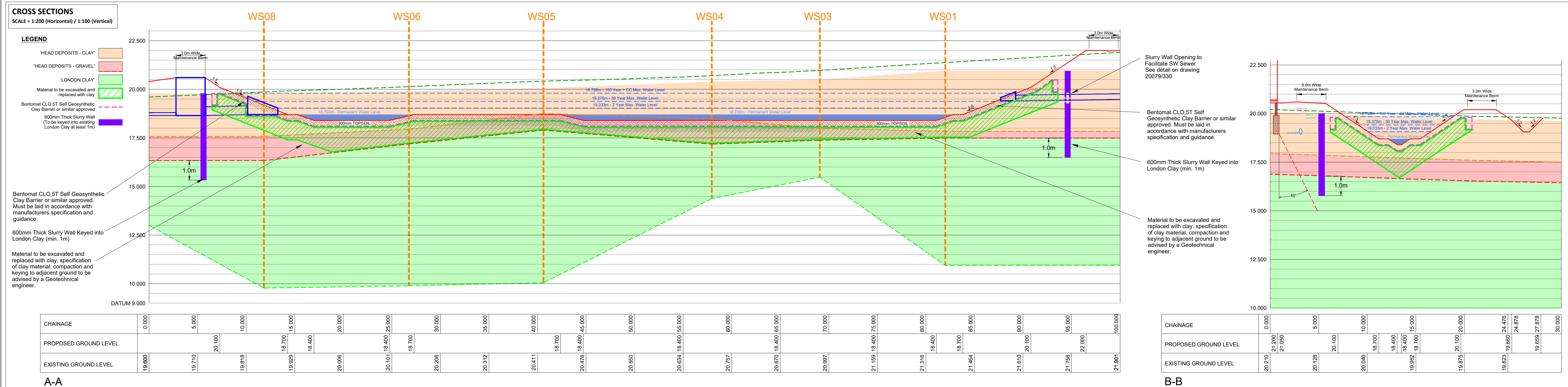
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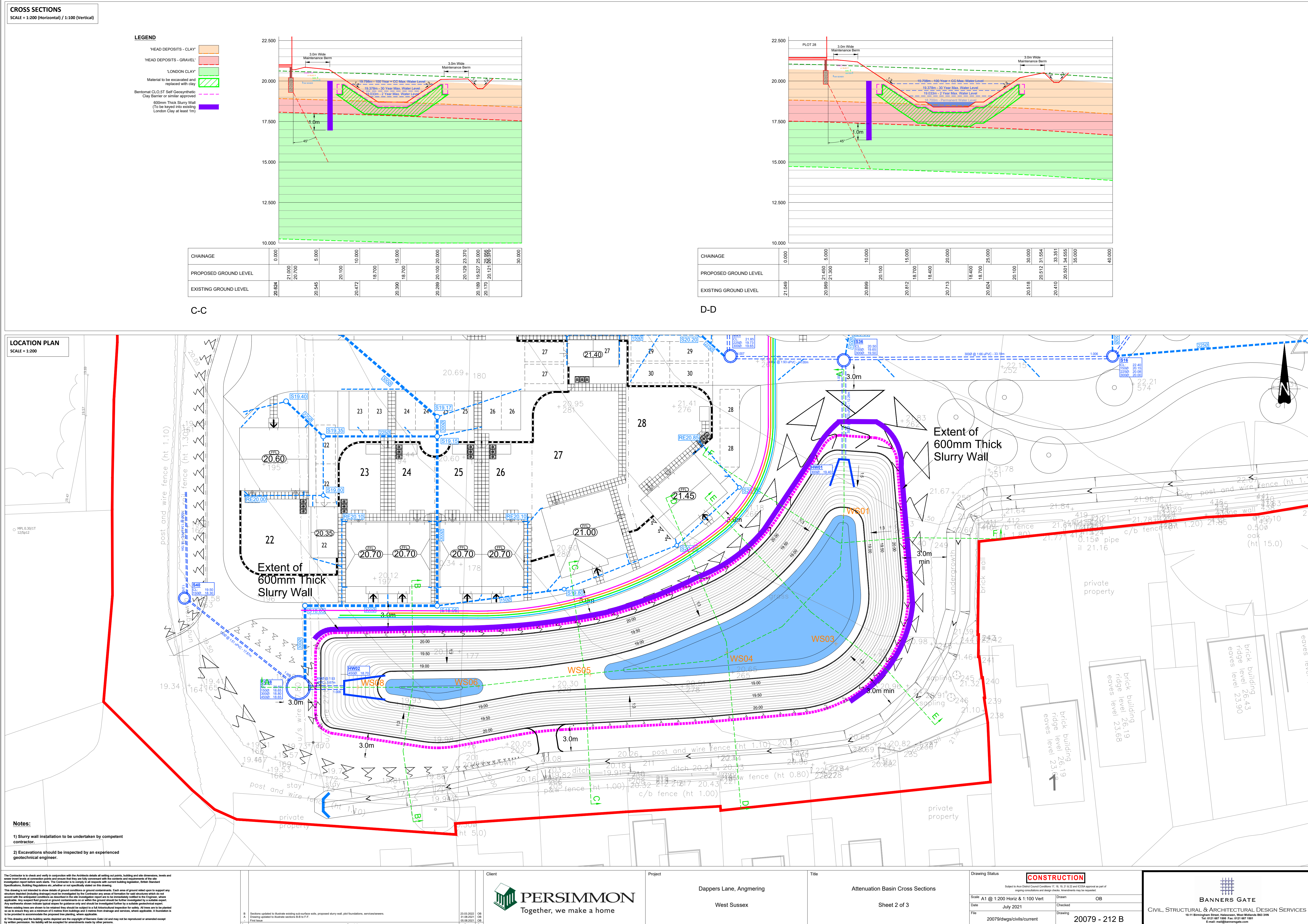
Appendix B: Maintenance inspection checklist

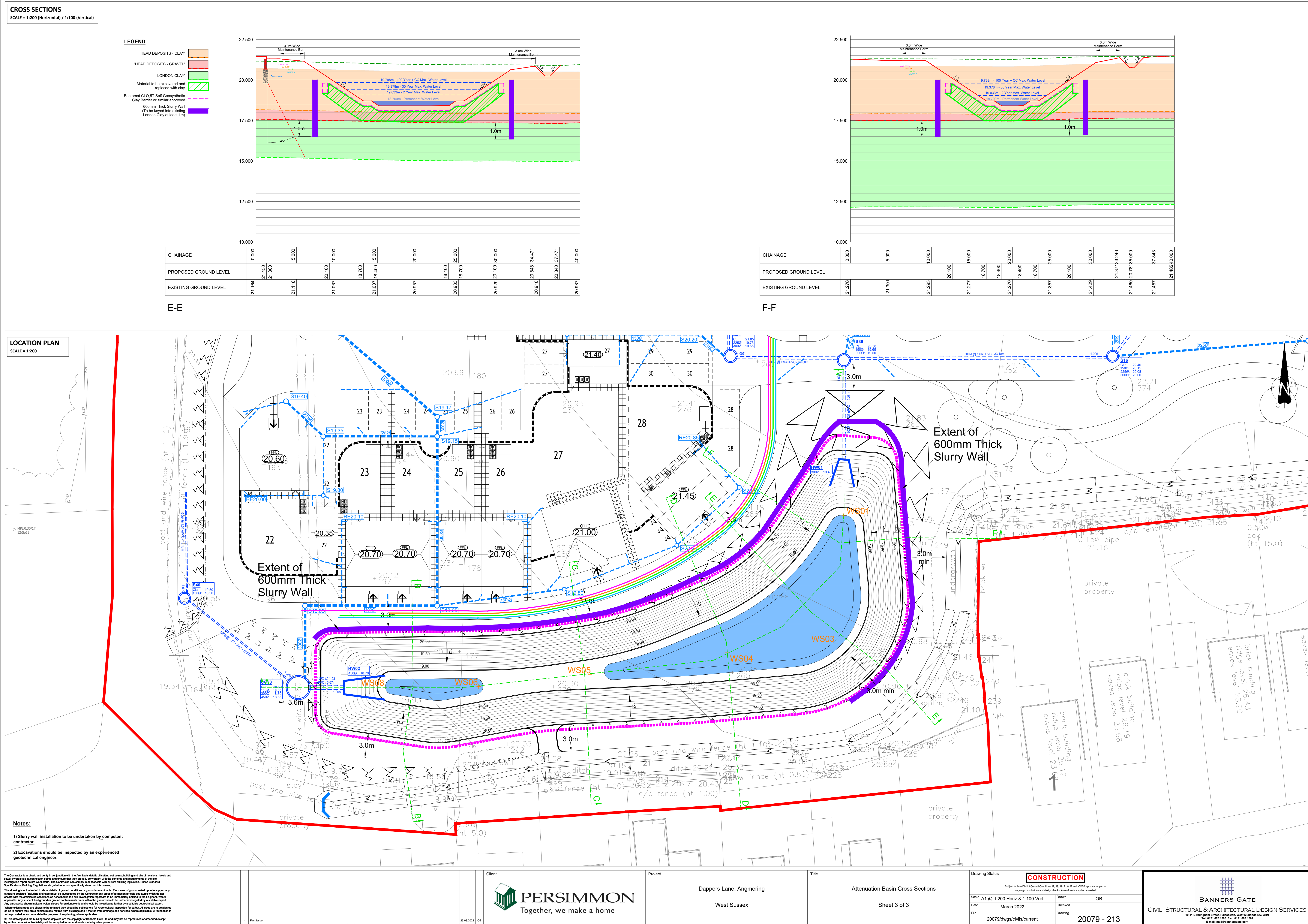


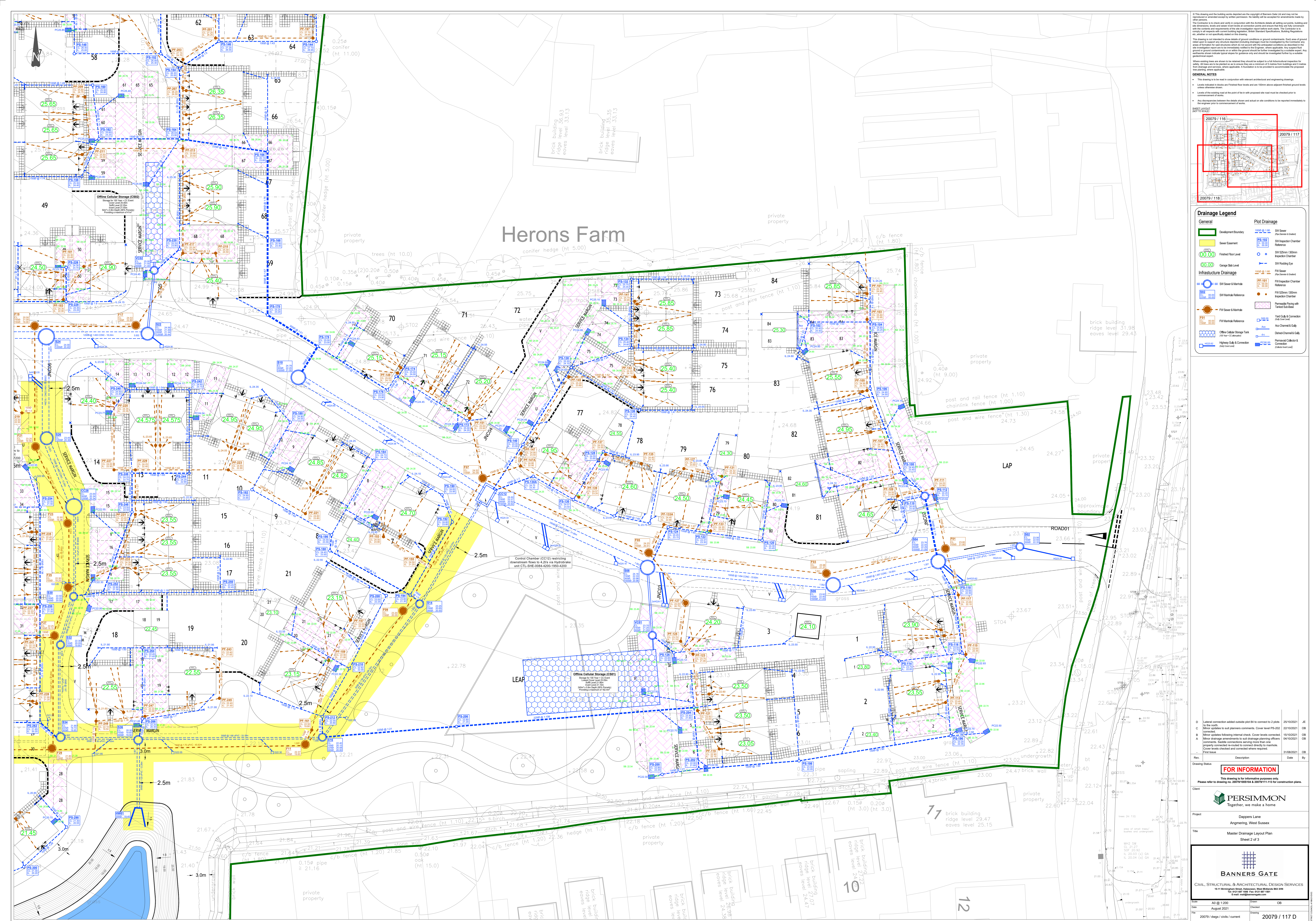
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next inspection								
Proposed date for next inspection								

APPENDIX II – DRAWINGS







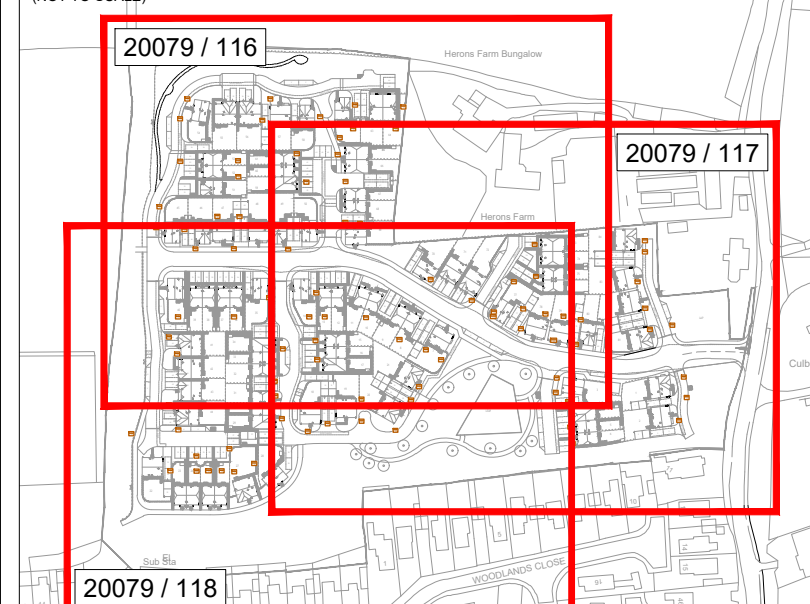


This drawing and the checking notes appended are the property of CH2M HILL and are not to be reproduced or used in any form without the written permission of CH2M HILL. The drawings are to be used only in conjunction with the As-Built details at setting out points, building and site dimensions, levels and sewer invert levels at connection points and ensure that they are fully consistent with the contents and requirements of the site investigation report before work starts. The Contractor is to ensure that the building is constructed in accordance with British Standard Specifications, Building Regulations etc, whether or not specifically stated on this drawing.

This drawing is not intended to show details of ground conditions or ground contaminants. Details of ground conditions and ground contaminants are to be obtained from the Contractor's own investigation and from the site investigation report. The Contractor is to ensure that any areas of formation for built structures which do not accord with the anticipated conditions shown on the site investigation report are to be immediately notified to the Engineer, where applicable. Any suspected build up of contaminants or other ground conditions are to be further investigated by a suitable expert. Any earthworks shown indicate typical slopes for guidance only and should be investigated further by a suitable geotechnical expert.

GENERAL NOTES

- This drawing is to be read in conjunction with relevant architectural and engineering drawings.
- Levels indicated in blocks are Finished floor levels and are 150mm above adjacent finished ground levels unless otherwise shown.
- Levels of the existing road at the point of tie-in with proposed site road must be checked prior to commencement of works.
- Any discrepancies between the details shown and actual on site conditions to be reported immediately to the engineer prior to commencement of works.



Drainage Legend

General	Plot Drainage
Development Boundary	SW Sewer (Plan Developer & Designer)
Sewer Easement	PS 192 (Inspector)
Finished Floor Level	SW 525mm (300mm Inspector Chamber)
Garage Slab Level	SW Pudding Eye
Infrastructure Drainage	SW 525mm x 190 (Plan Developer & Designer)
SW Sewer & Mainline	PS 192 (Inspector)
SW 525mm (300mm Inspector Chamber)	SW 525mm x 190mm Inspector Chamber
SW Sewer & Mainline	Permeable Paving with Tarped Sub-Sewer
PS 192 (Inspector)	Yard Gully & Connection (Gully Cover Level)
PS 192 (Inspector)	Acc
PS 192 (Inspector)	Acc
Off-Road Culvert Storage Tank (Off-Road VCC Approved)	Acc
H202.61 (Highway Gully & Connection (Gully Cover Level))	PS 192 (Inspector)
	Drainage Collector & Gully
	Collector (Not for Use)

D	Lateral connection added outside plot 84 to connect to 2 plots to the north.	25/10/2021	JE
C	Minor updates to suit planners comments. Cover level PS-202 corrected.	22/10/2021	OB
B	Minor updates following internal check. Cover levels corrected.	15/10/2021	OB
A	Minor drainage amendments to suit drainage planning officers comments. Saddle connections serving more than one property corrected re-routed to connect directly to manhole. Cover levels checked and corrected where required.	04/10/2021	OB
-	First Issue	31/08/2021	OB

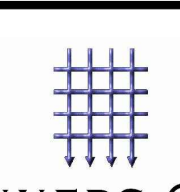
FOR INFORMATION

Please refer to drawing no. 20079/1005104 & 20079/111-113 for construction plans.



Project	Dappers Lane
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Angmering, West Sussex	
Title	Master Drainage Layout Plan Sheet 2 of 3



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