

Foul and Surface Water Drainage Report

Marlpot Meadows, Southwater

Planning Ref: DC/25/0110

For

Martin Varco

Rev P3

Reference C2041

Date 26th August 2025

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P3	01/12/25	Updated to HDC Comments	KCK	CS

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1 Introduction

1.1.1 CGS Civils Ltd has been appointed to undertake a drainage strategy report for a proposed development at Marlpot Meadows, Southwater.

1.1.2 The purpose of this drainage strategy is to demonstrate how the development area can be satisfactorily drained without increasing flood risk onsite and elsewhere in order to clear Condition 3, 4 and 8. This forms part of the overall Water Neutrality strategy for the dwelling. The conditions are in place on Decision Notice from **15/07/2025**, with the planning reference: **DC/25/0110**. The conditions require the following to be included:

- **Condition 3 – Pre-Occupation Condition:**

“No dwelling hereby permitted shall be first occupied until evidence has been submitted to and been approved in writing by the Local Planning Authority that the approved water neutrality strategy for that dwelling has been implemented in full. The evidence shall include the specification of fittings and appliances used, evidence of their installation, details of the rainwater harvesting system installed including a minimum 35 days storage capacity, and completion of the as built Part G water calculator or equivalent. The installed measures shall be retained as such thereafter, or to a similar improved water performance.”

- **Condition 4 – Pre-Occupation Condition:**

“Prior to the occupation of development full details of the rainwater harvesting scheme shall be submitted to and approved in writing by the local planning authority. The scheme shall include:

- *Detail on the likely contaminants associated with the rainwater harvesting system,*
- *Detail on the type of treatment that will be installed on the supply with information clearly indicating that it is appropriate for the amount of water being used and the likely contaminants.*
- *Details of the risk assessment and proposed sampling and testing regime, undertaken in accordance with Private Water Supplies (England) Regulations 2016 (or subsequent superseding equivalent), and taking into account the likely contaminants, as detailed above, along with detail on how any failure of any samples will be investigated and managed.*
- *Detail on the maintenance, servicing and cleaning of the tanks, water treatment equipment, pumps, all pipework etc for the lifetime of the development along with regularity of servicing/maintenance and clarification what steps will be taken in the event of equipment failure. This should include any re-activation of the system after it has been out of use due to lack of rainfall/use.*
- *Details, including a plan or schematic, showing the supply including a site plan and/or schematic showing location of source, chambers, tanks, distribution network including valves, pipes, consumer premises and means to record the total water consumption of each unit*
- *Detail on the continuity of supply during dry periods extending beyond 35 days.*
- *Arrangements for keeping written records of all sampling, results of analysis, inspection, cleaning, and maintenance”*

- **Condition 8 – Pre-Occupation Condition:**

“The development shall not be occupied until details of the proposed means of foul sewerage and surface water disposal have been submitted to and approved in writing by the Local Planning Authority in consultation with Southern Water.”

1.1.3 The existing site consists of an undeveloped area. The proposed development will consist of construction of a dwelling in the land adjacent to the existing Marlpot Meadows. The proposed development is located as OS Grid Reference **TQ 14511 26519** and has the post code **RH13 9BU**.

1.1.4 Proposed Site Plan can be found at **Appendix A**.

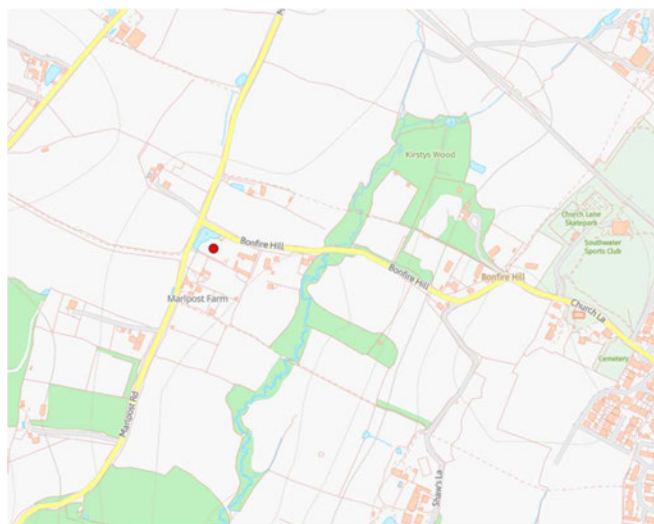


Fig 1. Site Location

2 Executive Summary:

- 2.1.1 Surface water will be discharged into an existing pond located on the premises. All roof areas are to be collected into a positive drainage network before discharging into the existing pond at a restricted rate of 1.0l/s i.e. the accepted minimum. The network will make use of an attenuation tank to cater for the 1 in 100-year +45% storm. A rainwater harvesting tank is to be installed for re-use within the dwelling.
- 2.1.2 Since the proposed site is located in an area not served by public sewers, foul water will be discharged into an on-site foul package treatment plant. The treated effluent will then be discharged into the existing pond located to the west of the site.
- 2.1.3 The design meets planning condition 4 and 8 and part of 3 and is part of the overall water neutrality strategy for the dwelling.

3 Site Geology

3.1 British Geological Survey information

- 3.1.1 The British Geological Survey confirms the bedrock geology to be made up Horsham Stone Member- Sandstone. At the time of writing the British Geological Survey website does not have any recorded information of the Superficial deposits on site.
- 3.1.2 The British Geological survey also holds records of historical boreholes near the site which give some insight into the ground geology.
 - Borehole TQ12NE122 (Located approx. 1150m East of the site) – Ground geology (Gravel, Clay, Weald Clay.)
- 3.1.3 The Borehole Logs can be found in **Appendix B**.

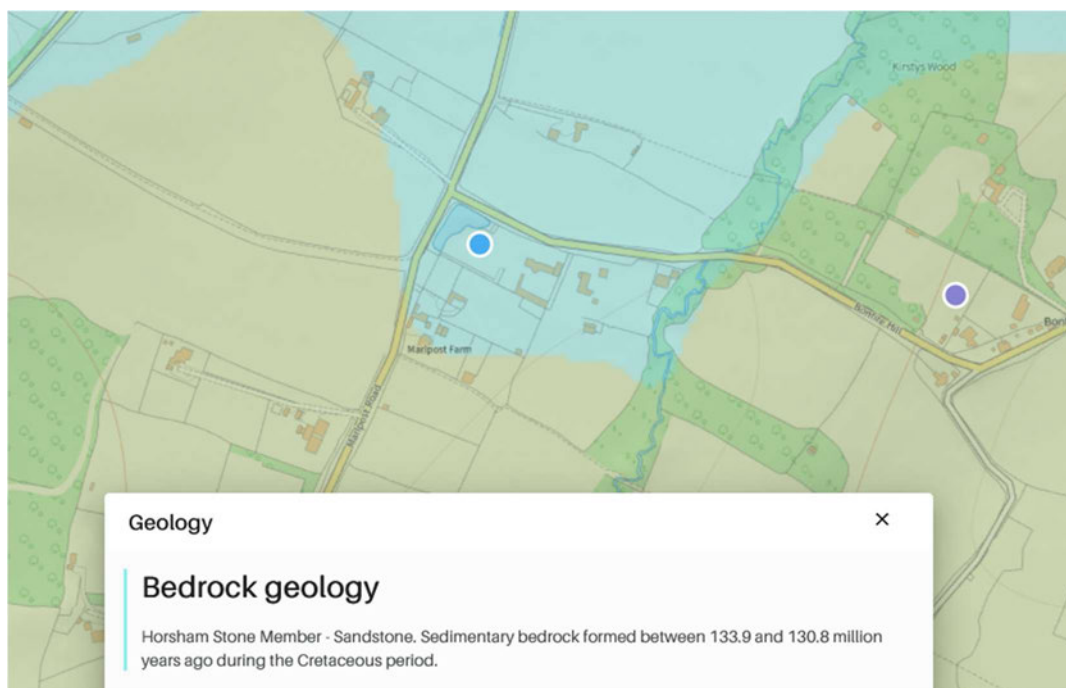


Fig 2. British Geological Survey

Snippet from BGS Website showing Bedrock geology/superficial deposits <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>

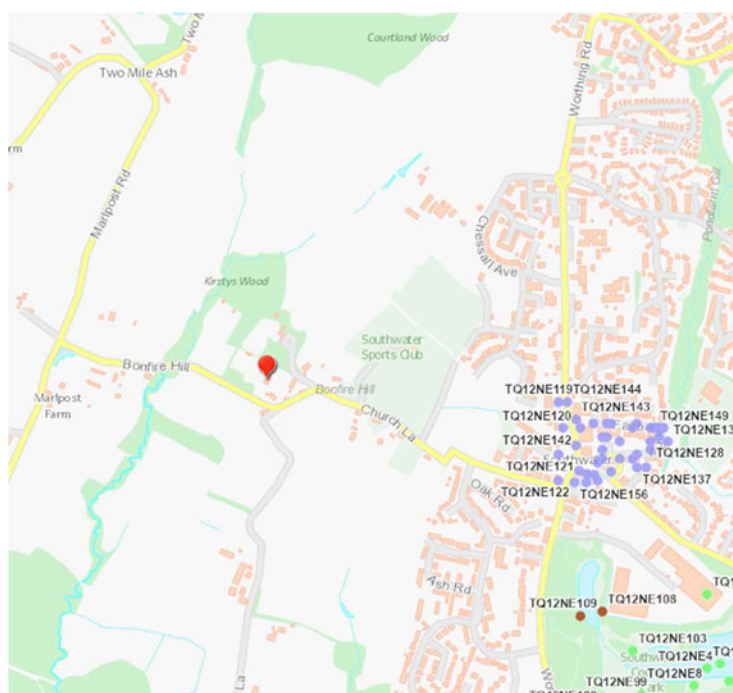


Fig 3. British Geological Survey

Snippet from BGS Website showing the Historical Borehole Log location

3.2 Geological Assessment

- 3.2.1 Site Investigation Report was conducted at the site by W K Elson in February 2025 which consisted of the monitoring of 4no wells installed to a depth of 1.2-1.8mbgl.
- 3.2.2 The Site Investigation Report findings were consistent with the BGS data confirming a brown Clay.
- 3.2.3 Groundwater levels were recorded at 0.78 m BGL in borehole BH1 located to the east of the site.
- 3.2.4 The Site Investigation Report can be found at **Appendix B**.

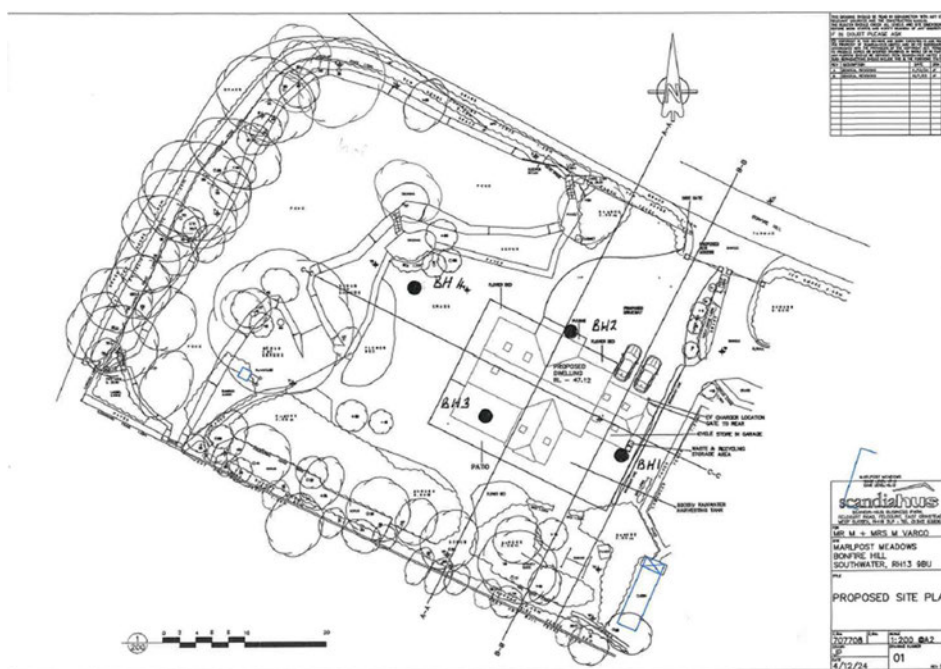


Fig 4. Site Investigation Report Extract

4 Existing Drainage

- 4.1.1 The site is currently undeveloped, so it is assumed that all surface water runoff naturally infiltrates into the ground or flows above ground, following the existing site topography towards an existing pond.



Fig 5. Southern Water Map Extract

5 Proposed Drainage Strategy

5.1 SuDS Hierarchy

- 5.1.1 All options for the destination of run-off generated on site have been assessed in line with the SuDS hierarchy as set out in Building Regulations Part H document and DEFRA's Draft National Standards for SuDS.

Table 1. SuDS Hierarchy

Discharge Destination	
Rainwater Harvesting	4,800 litres of harvesting storage being proposed
Discharge to Ground	N/A
Discharge to Watercourse	Due to the high groundwater level and low permeability surface water runoff is to be attenuated on site and discharged into the existing pond at a restricted rate of 1l/s
Discharge to Surface Water Sewer	N/A
Discharge to Other Sewer	N/A

5.2 Proposed Hydraulic Calculation Specifications:

Table 2. SuDS Hierarchy

Hydraulic Calculations Settings:	
Rainfall Methodology	FEH-22
Volumetric Run-off Coefficient Cv	1
CV Winter and Summer	1
Additional Storage (m ³ / ha)	0.0
Maximum Rainfall (mm/hr)	75
Flow Control	0.80m Head @ 1l/s discharge
Permeable Paving Design (lined sub-base storage)	Base Coefficient (m/hr): 0.00000
	Side Coefficient (m/hr): 0.00000
	Factor of Safety: 2
	Porosity: 30%
	Time to Half Empty (mins): 210

5.3 Surface Water Drainage

- 5.3.1 As infiltration is not feasible due to high groundwater levels confirmed by site testing, temporary surface water drainage during the construction phase will be managed by a system of land drains directing runoff to the existing onsite pond. The discharge will be controlled to prevent flooding and siltation, with appropriate pollution control measures (silt traps and settlement tanks) installed in accordance with the CIRIA SuDS Manual (C753) and CIRIA C532 guidance. The existing pond outfalls to the culvert under Bonfire Lane; therefore, the discharge will consist of clean, treated water and will be subject to the Environment Agency's water discharge permitting regime.
- 5.3.2 Due to the high groundwater levels, infiltration from the roof surfaces is not feasible. However, shallow infiltration for the permeable patio area is achievable.
- 5.3.3 Surface water runoff from the proposed roof areas will be collected, attenuated, and discharged into the existing pond at a restricted rate of 1 l/s. The drainage system will incorporate an attenuation tank and sub-base storage designed to accommodate the 1 in 100-year storm event plus a 45% allowance for climate change, ensuring controlled discharge and flood risk mitigation.
- 5.3.4 In addition, an underground 4,800-litre rainwater harvesting tank is proposed to capture part of surface water runoff from roof area for re-use within the building.
- 5.3.5 It is proposed that the access and parking area is constructed using porous paving with a stone (voided) subbase acting as attenuation for surface water runoff.
- 5.3.6 The proposed drainage drawings and hydraulic calculations can be found at **Appendix C**.
- 5.3.7 EA Magic Map can be found at **Appendix E**.

5.4 Water Quality

- 5.4.1 A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution.
- 5.4.2 Frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals, and various organic and inorganic contaminants) Therefore the first 5-10mm of rainfall should be adequately treated with SuDS.
- 5.4.3 The new SuDS Manual (Ciria C753, November 2015) introduces slightly different approach compared to the previous version for the water quality management of surface water. The Manual describes risks posed by the surface water runoff to the receiving environment as a function of:
- The pollution hazard at a particular site (i.e., the pollution source)
 - The effectiveness of SuDS treatment components in reducing levels of pollutants to environmentally acceptable levels
 - The sensitivity of the receiving environment
- 5.4.4 The EA website indicates that the site does not lie within a Source Protection Zone.
- 5.4.5 The recommended approaches for water quality risk management are given in the SuDS Manual Table 26.1.

Table 26.1 from SuDS manual. Approaches to Water Quality Risk Management

Table 26.1 Approaches to Water Quality Risk Management			
Design method	Hazard Characterisation	Risk Reduction	
		For Surface Water	For Groundwater
Simple Index Approach	Simple pollution hazard indices based on land use (Table 26.2)	Simple SuDS hazard mitigation indices (Table 26.3)	Simple SuDS hazard mitigation indices (Table 26.4)
Risk Screening	Factors characterising traffic density and extent of infiltration likely to occur (Table 26.5)	N/A	Factors characterising unsaturated soil depth and type, and predominant flow type through the soils (Table 26.5)
Detailed Risk Assessment	Site specific information used to define likely pollutants and their significance	More detailed, component specific performance information used to demonstrate that the proposed SuDS components reduce the hazard to acceptable levels	
Process-based treatment modelling	Time series rainfall used with generic pollution characteristics to determine statistical distributions of likely concentrations and loadings in the runoff	Models that represent the treatment processes in the proposed SuDS components give estimates of reductions in even mean discharge concentrations and total annual load reductions delivered by the system	

5.4.6 As per Table 26.1 Simple Index approach will be used as a design method for this site.

5.4.7 Table 26.2 will provide hazard classification of different land uses. The land uses for the surface water drainage for this site are.

- Residential Roofs
- Individual Property driveways and residential car parks

5.4.8 To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index for each contaminant type that equals or exceeds the pollution hazard index for each contaminant type. Therefore, the following must be achieved for the surface running off the site.

Total SuDS mitigation index $\geq$ pollution hazard index

5.4.9 Pollution Hazard Indices are given for different land uses in Table 26.2 of the SuDS manual;

Table 26.2 from SuDS manual. Pollution Hazard Indices for Different Land Use Classifications

Table 26.2 Pollution hazard indices for different land use classifications				
Land Use	Pollution Hazard Level	Total Suspended solids (TSS)	Metals	Hydro-Carbons
Residential roofs	Very Low	0.2	0.2	0.05
Other roofs (Typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g., cul-de-sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g., hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g., haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways	High	0.8	0.8	0.9

5.4.10 From Table 26.2 the following information is tabulated in Table 1

Table 3: Pollution hazard index and destination of runoff for the proposed site

Table 3: Pollution Hazard Index and Destination of runoff for the proposed Site					
Land Use	Destination of Runoff	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Residential Roof	Ground Water	Very Low	0.2	0.2	0.05
Individual driveways, residential car parks and low traffic roads	Ground water	Low	0.5	0.4	0.4

5.4.11 The SuDS mitigation index will be obtained from Table 26.4 (for groundwater) of the SuDS manual.

Table 26.4 from SuDS manual. Indicative SuDS Mitigation Indices for discharges to ground waters.

5.4.12 SuDS mitigation index are tabulated in Table 5 as followed.

Table 26.4 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS Components	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area		

Table 4: SuDS mitigation index

Table 4 Mitigation Indices						
Runoff Source	Destination of Runoff	Mitigation Index Source	Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Car park	Surface water	Table 26.3 (for surface waters)	Permeable Pavement	0.7	0.6	0.7
Residential Roof	Surface water	Table 26.3 (for surface waters)	Bioretention System	0.8	0.8	0.8

5.4.13 The above analysis demonstrates that the SuDS devices within the design will mitigate any pollution present within the surface water system.

5.5 Foul water drainage

5.5.1 As the proposed development is located in an area not served by public sewers, foul water will be discharged into an on-site package treatment plant, with treated effluent being discharged into the existing pond.

6 Summary and Conclusions

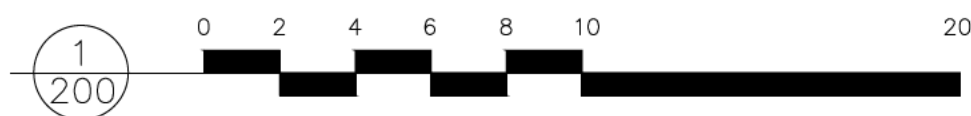
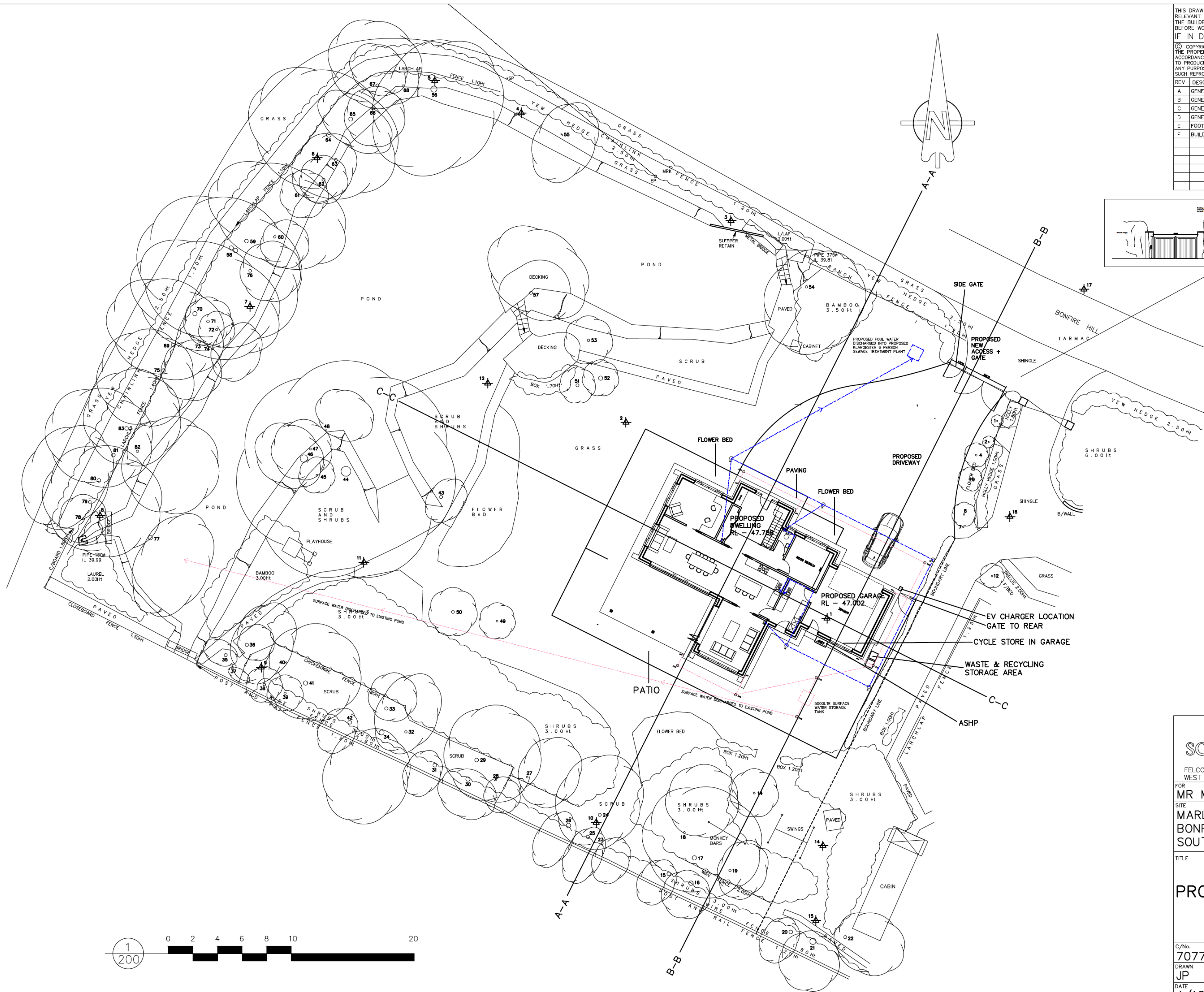
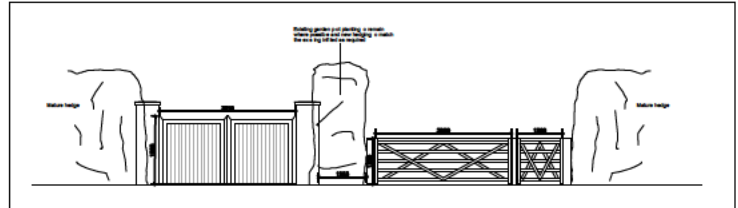
- 6.1.1 CGS Civils has been instructed to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the building regulations and the pre-occupation planning conditions and is a key component of the Water Neutrality strategy for the dwelling. The preceding foul water and surface water design meets planning conditions 4 and 8, in addition to part of condition 3 and is part of the overall water neutrality strategy for the dwelling.
- 6.1.2 The Surface Water is to be discharged into an existing pond at a restricted discharge rate of 1 l/s. Surface water drainage has been designed to cater for the critical 1in100 + 45% climate change event.
- 6.1.3 Foul water will be discharged into an on-site modern package treatment plant, with treated effluent subsequently discharged into the existing pond.
- 6.1.4 The report has demonstrated that the proposed drainage measures ensure that suitable means of surface water and foul drainage can be achieved for the proposed development.
- 6.1.5 A maintenance schedule has been written up for the drainage network including the SuDS features and can be found within Appendix D.

7 Appendices

7.1 Appendix A – Site Plan

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B	GENERAL REVISIONS	16/1/25	JP	
C	GENERAL REVISIONS	5/2/25	JP	
D	GENERAL REVISIONS	12/2/25	JP	
E	FOOTPRINT UPDATED	25/04/25	CC	
F	BUILDING REGS	28/7/25	JP	



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FOR
MR M + MRS M VARCO
SITE
MARLPOST MEADOWS
BONFIRE HILL
SOUTHWATER, RH13 9BU

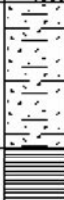
TITLE _____

PROPOSED SITE PLAN

C/No. 707708	O/No.	SCALE 1: 200 @A2
DRAWN JP	DRAWING NUMBER	
DATE 4/12/24	01	
		REV F

REV F

7.2 **Appendix B – BGS Borehole Logs and Site Investigation Report**

 British Geological Survey NATIONAL RESEARCH INSTITUTION FOR GEOSCIENCES					Site Southwater Village - The Downlink Centre		Borehole Number BH04			
Boring Method Cable Percussion		Casing Diameter		Ground Level (mOD) 44.50		Client Miller Construction (UK) Ltd.		Job Number P3071		
		Location 515632 E 126247 N		Dates 12/03/2004		Engineer		Sheet 1/1		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.25-0.25	D01			1,1/1,2,3,3	44.45	0.05 (0.25)	Dark brown, slightly sandy SILT. (TOPSOIL)			
0.60-0.60	D02				44.20	0.30	MADE GROUND : White chalk, coarse GRAVEL in a fine to medium sandy matrix.			
1.20-1.65	CPT N=9					(1.60)	MADE GROUND : Red brick GRAVEL with silty fine sand and orange/yellow-brown, a little grey mottled, slightly friable, slightly sandy clay, becoming less friable (more plastic) with depth and occasional medium to coarse angular gravel sized mudstone lithorelicts.			
1.30-1.30	I01									
1.35-1.35	I02			2,3/4,4,3,5	42.60	1.90	Firm to stiff, thinly laminated, orange-brown and grey mottled, friable CLAY with fine to medium gravel sized angular mudstone lithorelicts. (WEALD CLAY)			
1.40-1.40	I03					(1.10)				
1.45-1.45	I04									
1.50-1.50	D03									
1.55-1.55	I05									
1.60-1.60	I06									
1.65-1.65	I07									
1.70-1.70	I08									
2.30-2.75	CPT N=16									
1.75-1.75	I09									
1.80-1.80	D04					41.50	3.00			Very weak, thinly laminated, brown and dark red-brown MUDSTONE. (WEALD CLAY)
1.80-1.80	I10									
1.85-1.85	I11									
1.90-1.90	I12									
2.10-2.10	D05			5,8/10,15,15,20 12/03/2004			Complete at 3.45m			
3.00-3.44	CPT 60/285									
2.50-2.50	D06					41.05				3.45
2.90-2.90	D07									
3.10-3.10	D08									
Remarks 1. Hand dug service inspection pit from ground level to 1.20m bgl. 2. Borehole remained dry during excavation. 3. Mexicone CBR test at 0.65m bgl : 2,2,3,3,3,3,4,3. 4. Borehole backfilled with arisings on completion.								Scale (approx) 1:50	Logged By ANT/JPW	
								Figure No.		

SITE INVESTIGATION REPORT

**Marlpot Meadows, Bonfire Lane, Southwater,
West Sussex, RH13 9BU.**

February 2025

Client:

Scandia Hus Ltd
Scandia Hus Business Park
Felcourt Road, Felcourt
East Grinstead
West Sussex
RH19 2LP

Geotechnical Engineer:

W K Elson
PhD, CEng, MICE
7 Finches Court
Hickmans Lane
Lindfield, Sussex
RH16 2PG

Site Investigation Report

**Marlpot Meadows, Bonfire Lane, Southwater
West Sussex RH13 9BU**

1. Introduction

A Scandia Hus is to be constructed on land adjacent to Marlpot Meadows, Bonfire Lane, Southwater, West Sussex. The site was part of the garden to Marlpot Meadows and the western end is occupied by a large pond. The pond was believed to be a marl pit and searches had identified a risk of contamination with the former quarry, hence samples of soil were assayed for a range of common contaminants.

The 1/50,000 geological map, Sheet 302, indicates the area to be underlain by the Weald Clay (Grid reference TQ 145 265). An outcrop of the upper bed of Horsham Stone, a sandstone within the Weald Clay, is shown to pass through the site. To explore the area three hand augered boreholes were drilled on 23rd January 2025 and logs of the soils encountered are given in Appendix B.

2. Soil Conditions

The boreholes demonstrated the site to be underlain by brown grey calcareous clays of a firm consistency. Hard or weakly cemented clays were encountered at a shallow depth and the boreholes could not be drilled to the planned depth of 2m. Perth penetrometer tests were undertaken in the base of the boreholes and this equipment reached virtual refusal at a depth of about 1.7m, possibly on the Horsham Stone. In Borehole No. 2 fill to a depth of 0.50m was noted. The fill comprised brown yellowish clay, typical of the area.

Ground water was recorded at a depth of 0.78m in Borehole No. 1 and the water level was noted to be stable at this depth. Seepages at a depth of about 1.0m were noted in the other boreholes, however the at rest water depth was not recorded.

The clays classified as soils of a high plasticity with a plasticity index in the range 24 to 27 percent. Such soils are defined to be of a medium risk to seasonal drying shrinkage by the NHBC Specifications. In-situ vane tests demonstrated the clay at a

depth of about 1.0m to be of a firm consistency with an undrained shear strength of about 50 KN/m². Perth penetrometer tests below a depth of 1.5m gave 'N' values of 50 blows/300mm or more, hence a much higher bearing capacity could be adopted in the deeper soils.

3. Foundation Design

The clays underlying the site are of a medium shrinkability and various shrubs and hedges are too far from the proposed house to influence the depth of the foundations. Should any trees be of concern the foundations should be deepened locally to bear in the dense soil at a depth of about 1.5m. For soils of a medium shrinkability the NHBC Specifications Chapter 4.2 allow a minimum foundation depth of 0.90m.

Based on the in-situ vane tests it would be reasonable to adopt nett allowable bearing capacity of 75 KN/m² for the design of the foundations. As noted above a very much higher bearing capacity would be applicable to foundations formed below a depth of 1.50m, say 300 KN/m².

4. Site Drainage

Although seepage occurred into the boreholes soakaways to disperse storm run-off are not considered practicable on account of the high at rest water table.

It is proposed storm run-off be discharged to the large pond on the site as this would act as an attenuation basin. The outlet to the pond is to a culvert under Bonfire Lane.

5. Contamination

The name of the adjacent road, 'Marlpost Lane' would indicate the pond was formerly used to dig marl. The clays are calcareous and would be suitable for such a purpose.

The marl would have been removed to spread on agricultural land and little over-burden would have been left on the site. Photographs of the pond and the surrounding garden show the land to be approximately level with the adjacent roads. Little fill was also noted in the various boreholes.

Samples of the near surface soils, 0.2 to 0.30m in depth, were assayed for a range of common contaminants. The results of the assays are given in Analytical Test Report 25-00712 by Chemtech Environmental, Appendix D. The concentrations of the various determinands have been compared to published screening values for residential occupation with plant uptake (Table 1)

5.1 Metals

None of the heavy metals are at concentrations that exceed the corresponding screening value. The soil, a strongly alkaline with a pH of more than 8.5, hence most metals will be almost insoluble and will not be available to plants.

5.2 Poly-aromatic Hydrocarbons

The concentration of all the compounds tested in this group are low. In particular the concentration of benzo- α -pyrene, a carcinogenic compound, is below published screening value.

5.3 Risk Assessment

The material dug from the pond and used as marl was believed to have been removed from the area. Assays of samples of soil from the garden showed no evidence of significant contamination and no risk to human health was present. It was noted the pond contained koi carp, and these fish would not survive in polluted water.

There was no evidence of risk to human health or to the general environment from the past excavation of marl from the site and no remediation will be necessary.

6 Conclusions

The site at Marlpost Meadows proved to be underlain by a firm grey brown clay, believed to be a Head deposit, over a bed of sandstone within the Weald Clay. The surface clays are of a medium shrinkability and the proposed dwelling may be founded on mass concrete trench fill footings with a minimum depth of 0.9m. The ground floors of the property should be of a suspended form of construction.

The risk of contamination on the site which arose as there was a quarry recorded in the area was investigated. The quarry, now a pond on the site, was believed to be a marl pit. The clays proved to be calcareous and would be suitable for marling agricultural soils. The marl would have been removed from the area with little waste left to be dumped. Assays of the topsoil in the garden demonstrated that no significant contamination is present and that there is no risk to human health.

(W K Elson)
PhD, CEng, MICE

7th February 2025

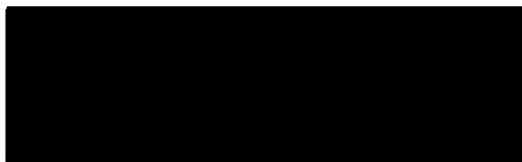


TABLE 1**Site Screening Values for Soils****Residential with Plant Uptake****Metals**

Determinand	Screening Value	Reference
Arsenic	37 mg/kg	DEFRA SP1010 ¹
Beryllium	1.7 mg/kg	LQM/CIEH ²
Boron (water soluble)	3 mg/kg 290 mg/kg	MAFF (1998) ³ LQM/CIEH ²
Cadmium	17 mg/kg	DEFRA SP1010 (2014) ¹
Chromium	910 mg/kg	LQM/CIEH ²
Copper	130 mg/kg 2400 mg/kg	MAFF (1998) ³ LQM/CIEH ²
Lead	200 mg/kg	DEFRA SP1010 ¹
Mercury (inorganic)	40 mg/kg	LQM/CIEH ²
Nickel	130 mg/kg	LQM/CIEH ²
Selenium	250 mg/kg	LQM/CIEH ²
Vanadium	410 mg/kg	LQM/CIEH ²
Zinc	300 mg/kg 3700 mg/kg	MAFF (1998) ³ LQM/CIEH ²

cont.....

Site Screening Values for Soils

Residential with Plant Uptake

Organic Compounds

Determinand	Screening Value	Reference
Total PAH	50 mg/kg	WRAS Paper 9-04-03 ⁴
Benzo- α -pyrene	2.5 mg/kg	DEFRA SP1010 (2014) ¹
Fluorene	400 mg/kg	LQM/CIEH ²
Dibenzo (a,h) Anthracene	0.3 mg/kg	LQM/CIEH ²
Naphthalene	5.6 mg/kg	LQM/CIEH ²

¹ DEFRA Category 4 Screening Values SP1010 July 2014

² Generic Assessment Criteria for Human Health Assessment by Land Quality Management and Chartered Institute of Environmental Health, 2015 (S4UL).

³ The Soil Code MAFF 1998. Phyto-toxic criteria for plant growth.

⁴ Selection of Materials for Water Supply Pipes to be Laid in Contaminated Lane, WRSA Paper 9-04-03, October 2002.

APPENDIX A

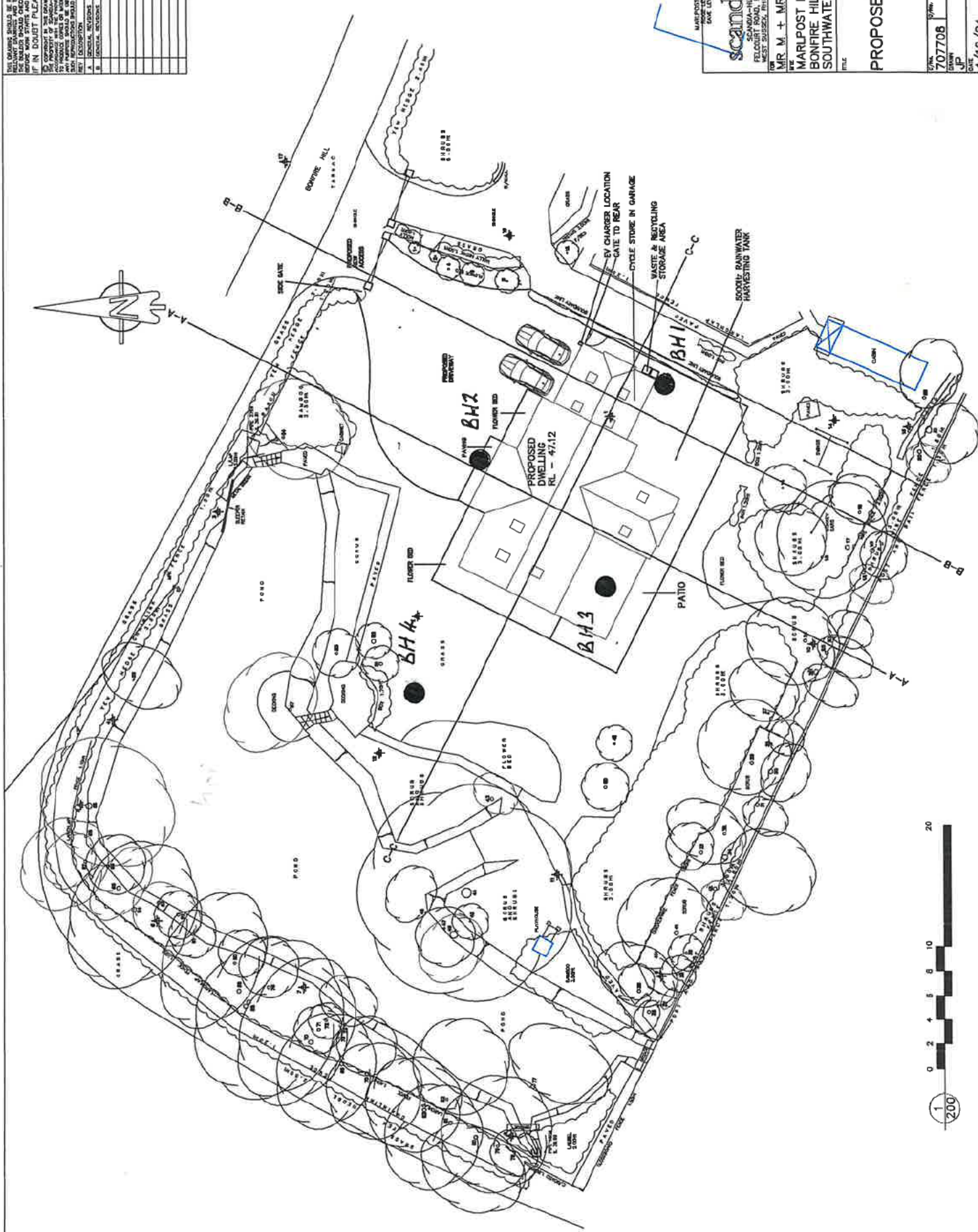
**Marlpost Meadows, Bonfire Lane, Southwater,
West Sussex, RH13 9BU.**

Site Plan

THIS DRAWING SHOULD BE MADE IN CONJUNCTION WITH ANY OTHER RELEVANT DRAWINGS AND THE CONTINUED DRAWING. THE DRAWING SHOULD BE MADE IN CONJUNCTION WITH ANY OTHER RELEVANT DRAWINGS AND THE CONTINUED DRAWING. THE DRAWING SHOULD BE MADE IN CONJUNCTION WITH ANY OTHER RELEVANT DRAWINGS AND THE CONTINUED DRAWING.

IF IN DOUBT PLEASE ASK

REV	DESCRIPTION	DRAWN	DATE
A	GENERAL REVISIONS	11/17/74	#
B	GENERAL REVISIONS	11/17/74	#



 scandiahus SCANDIA-HUS BUSINESS PARK 10000 10TH AVE. S. • TEL. 634-8300 WEST SUDBURY, ONT. L3R 9B1	MARG POST MEADOWS SAME LEVEL AS IS		MR. M + MRS M. VARCO MARL POST MEADOWS BONFIRE HILL SOUTHWATER, RH13 9BU	FILE	PROPOSED SITE PLAN
	DATE 4/13/24	DRAWN JP	SCALE 707708	SHEET NO. 01	INDEX 1:200 @A2 (SEE INDEX)



APPENDIX B

**Marlpot Meadows, Bonfire Lane, Southwater,
West Sussex, RH13 9BU.**

Borehole Logs

Project Title : MARLPST MEADOWS SOUTH WATER							Project No.:
TRIAL PIT RESULTS							Pit No. & Location
Date : 23 - 01 - 2025		Engineer : [REDACTED]			BHI		
Ground Level							
Description	Legend	water Level	Depth	Reduced Level	Samples	In situ Tests	Remarks
TOPSOIL			0m				
			0.30				
Brown grey mottled CLAY, ferruginous concretions.			0.78		D		
Firm consistency.							
Calcareous reaction			1m		D		
Light grey brown cemented CLAY.			1.45 1.47		D	V	$S_u = 50 \text{ kN/m}^2$
Too dense to auger						P	$N = 50 \text{ blows/300mm}$
			2m				
			3m				
			4m				
			5m				
KEY:-					INSITU TESTS :-		
D Disturbed sample					Shear strength in K Pa		
B Bulk sample					P Penetrometer (PERTH)		
W Water sample					V Vane test		
U U100 Undisturbed							

Project Title : MARLPOST MEADOWS SOUTHWATER							Project No.:	
TRIAL PIT RESULTS							Pit No. & Location	
Date : 23 - 01 - 2025			Engineer : XXXXXXXXXX				BH 2	
Ground Level								
Description	Legend	water Level	Depth	Reduced Level	Samples	In situ Tests	Remarks	
TOPSOIL			0m					
			0.15					
FILL, brown yellowish clay			0.50		D			
Original TOPSOIL			0.65					
Brown grey yellowish CLAY, black ferruginous nodules			Seepage 1.00		D			
Brown grey jointed CLAY			1m 1.15			V	Su = 55 kN/m ²	
Fawn cemented CLAY hard			1.20					
			1.45			V	Su > 130 kN/m ²	
Grey CLAY, orange ferruginous deposits						P	N = 31 blows for 160mm	
Fawn cemented CLAY, too hard to auger							(Refusal)	
			2m					
			3m					
			4m					
			5m					

KEY:-

D Disturbed sample

B Bulk sample

W Water sample

U U100 Undisturbed

INSITU TESTS :-

Shear strength in K Pa

P Penetrometer (PERTH)

V Vane test

[illegible]

APPENDIX C

**Marlpot Meadows, Bonfire Lane, Southwater,
West Sussex, RH13 9BU.**

Laboratory Test Results

Water Content

Borehole No	1	1	2	3	3
Depth (m)	0.50	1.00	1.00	0.50	0.90
Water content (%)	24.4	23.4	24.6	22.2	24.2

Atterberg Limits

Sample reference	Liquid limit (%)	Plastic limit (%)	Plasticity index (%)	Soil classification
BH 1 1.00m	49	22	27	CI/CH
BH 2 1.00m	45	21	24	CI

APPENDIX D

**Marlpot Meadows, Bonfire Lane, Southwater,
West Sussex, RH13 9BU.**

Contamination Assays



ANALYTICAL TEST REPORT

Report Number 25-00712, issue number 1
Contract name: Marlpost Meadow South Water
Client reference: -
Clients name: WK Elson
Clients address: WK Elson
Orchard End
7 Finches Court
Sussex
RH16 2PG
Samples received: 28/01/2025
Analysis started: 28/01/2025
Analysis completed: 31/01/2025
Report issued: 03/02/2025

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
U/S	Sample not suitable for testing
NAD	No Asbestos Detected



Approved by: Abbie Neasham-Bourn
Senior Reporting Administrator

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample ID	Depth (m)	Sample description	Material removed	% Removed	% Moisture
32423	BH2	0.20	Brown Clay sandy loam with Gravel and Vegetation.	-	-	21.7
32424	BH3	0.20	Brown Clay sandy loam with Gravel and Vegetation.	-	-	21.9
32425	BH4	0.30	Brown Clay sandy loam with Gravel and Vegetation.	-	-	26.6

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

- a Sampling date not provided
- b Sampling time not provided (waters only)
- c Sample not received in appropriate containers
- d Storage Temperature
- e Headspace present in sample container
- f Sample exceeded sampling to receipt
- g Sample exceeded holding time(s)

Lab ref	Sample ID	Depth (m)	Deviating	Tests (Reason for deviation)
32423	BH2	0.20	N	
32424	BH3	0.20	N	
32425	BH4	0.30	N	



SOILS

Lab Number					32423	32424	32425
Client Reference					SOIL	SOIL	SOIL
Sample ID					BH2	BH3	BH4
Depth (m)					0.20	0.20	0.30
Sampling Date					23/01/2025	23/01/2025	23/01/2025
Test	Method	Accred	LoD	Units			
Metals							
Water Soluble Boron	CE063	N	0.5	mg/kg	1.40	0.91	1.16
Arsenic	CE264	U	1.8	mg/kg	20.5	18.8	19.6
Cadmium	CE264	M	1.6	mg/kg	< 1.6	< 1.6	< 1.6
Chromium	CE264	U	2	mg/kg	31.0	35.0	43.1
Copper	CE264	M	1.6	mg/kg	23.2	25.9	34.3
Lead	CE264	U	2.3	mg/kg	49.8	55.5	56.8
Mercury	CE264	U	0.7	mg/kg	< 0.7	< 0.7	< 0.7
Nickel	CE264	M	2.1	mg/kg	25.9	27.9	36.2
Selenium	CE264	U	3	mg/kg	< 3.0	< 3.0	< 3.0
Zinc	CE264	M	4	mg/kg	93.8	131	173
Colourimetric							
Water Soluble Chromium VI	CE263	N	0.04	mg/kg	< 0.040	< 0.040	< 0.040
Combustion							
Moisture Content	CE001	N	0.1	%	21.7	21.9	26.6
Polyaromatic hydrocarbons							
Naphthalene	CE087	M	0.016	mg/kg	< 0.016	< 0.016	< 0.016
Acenaphthylene	CE087	M	0.015	mg/kg	< 0.015	0.025	0.033
Acenaphthene	CE087	M	0.013	mg/kg	< 0.013	0.018	0.033
Fluorene	CE087	U	0.013	mg/kg	< 0.013	0.020	0.028
Phenanthrene	CE087	M	0.014	mg/kg	0.142	0.308	0.485
Anthracene	CE087	U	0.017	mg/kg	0.030	0.063	0.141
Fluoranthene	CE087	M	0.017	mg/kg	0.476	0.931	1.72
Pyrene	CE087	M	0.016	mg/kg	0.422	0.853	1.53
Benzo(a)anthracene	CE087	U	0.012	mg/kg	0.202	0.418	0.693
Chrysene	CE087	M	0.028	mg/kg	0.248	0.522	0.863
Benzo(b)fluoranthene	CE087	M	0.02	mg/kg	0.260	0.535	0.879
Benzo(k)fluoranthene	CE087	M	0.025	mg/kg	0.112	0.212	0.367
Benzo(a)pyrene	CE087	U	0.019	mg/kg	0.248	0.523	0.877
Indeno(1,2,3-cd)pyrene	CE087	M	0.019	mg/kg	0.177	0.355	0.576
Dibenzo(a,h)anthracene	CE087	M	0.017	mg/kg	0.041	0.083	0.137



SOILS

Lab Number					32423	32424	32425
Client Reference					SOIL	SOIL	SOIL
Sample ID					BH2	BH3	BH4
Depth (m)					0.20	0.20	0.30
Sampling Date					23/01/2025	23/01/2025	23/01/2025
Benzo(g,h,i)perylene	CE087	M	0.019	mg/kg	0.196	0.383	0.600
Total PAH(16)	CE087	N	0.28	mg/kg	2.55	5.25	8.96
Wet Chem							
pH	CE004	M	0.1	pH units	9.1	8.6	8.5

METHOD DETAILS

METHOD	TESTNAME	METHOD SUMMARY	ANALYSIS BASIS
CE004	pH of Solids	Potentiometric	As submitted sample
CE063	Water soluble boron	ICPOES	Air dried sample
CE264	Metals by ICP in Soil	ICPOES	Air dried sample
CE263	ChromiumVI by Discrete Analyser in Solid	Gallery	Air dried sample
CE087	PAH in Soil	DCM Extraction and GCMS	As submitted sample

REPORT INFORMATION

Report No.:25-00712, issue number 1

Key

U	ISO17025 Accredited Result
M	ISO17025 and MCERTS Accredited Result
N	Do not currently hold accreditation
^	MCERTS accreditation not applicable for sample matrix
*	ISO17025 accreditation not applicable for sample matrix
S	Subcontracted
I/S	Insufficient Sample
U/S	Unsuitable sample
N/T	Not tested
<	Means "less than"
>	Means "greater than"

LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.

This report shall not be reproduced except in full, without prior written approval.

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

The results relate only to the sample received.

Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Moisture Content Calculated on a Wet Weight basis

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Sampling was undertaken by Chemtech Environmental Limited and is outside the UKAS accreditation scope.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying

For soils and solids, analytical results are inclusive of stones, where applicable.

Sample Retention and Disposal

All soil samples will be retained for a period of 4 weeks from the point of receipt

All water samples will be retained for a period of 2 weeks from the point of Reporting

Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

APPENDIX E

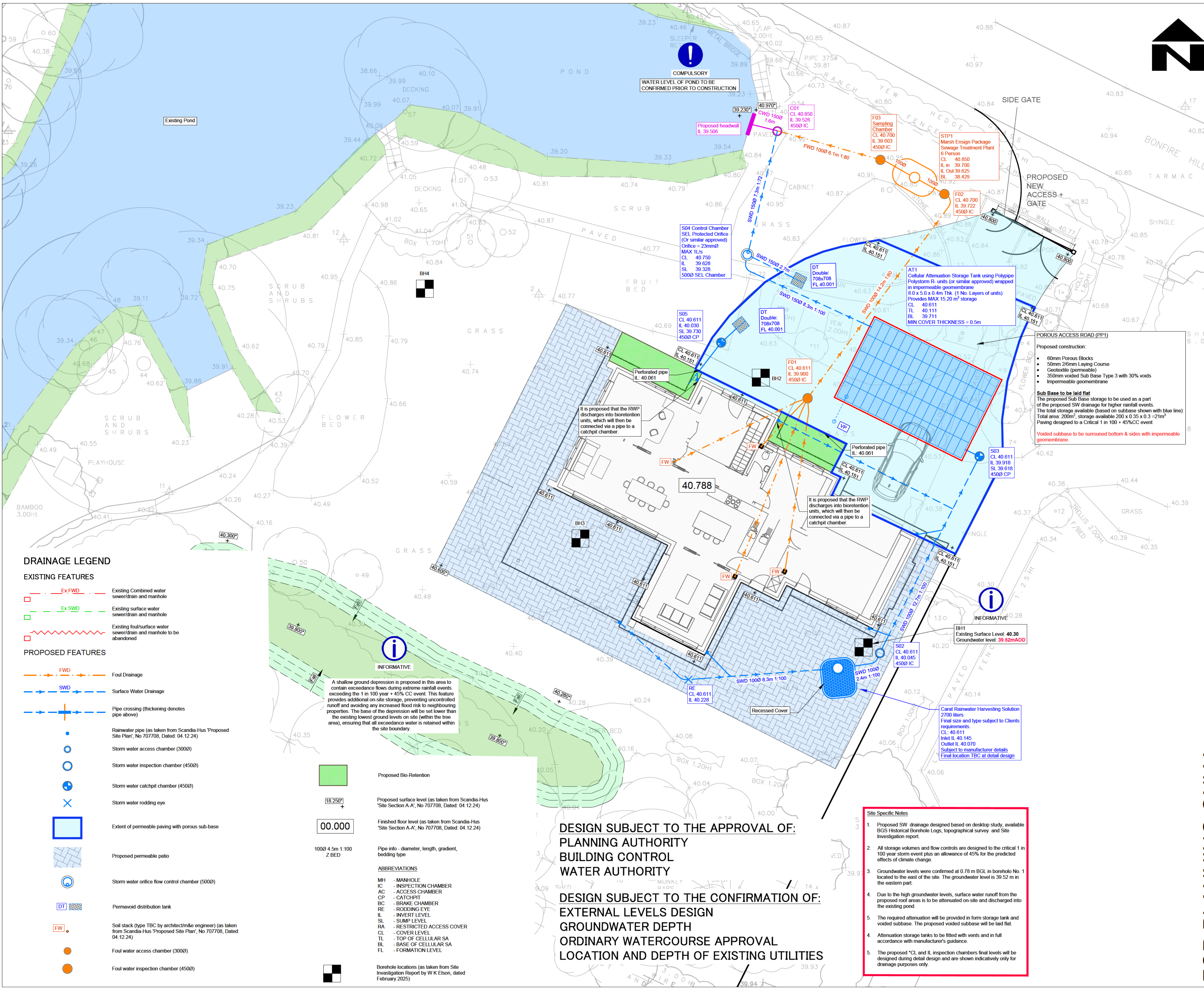
**Marlpost Meadows, Bonfire Lane, Southwater,
West Sussex, RH13 9BU.**

Photographs





7.3 **Appendix C – Proposed Drainage Drawings, Hydraulic Calculations**



DRAINAGE LEGEND

- EXISTING FEATURES
- Ex FWD Existing Combined water sewer/drain and manhole
 - Ex SWD Existing surface water sewer/drain and manhole
 - Existing foul/surface water sewer/drain and manhole to be abandoned

- PROPOSED FEATURES
- FWD Foul Drainage
 - SWD Surface Water Drainage
 - Pipe crossing (thickening denotes pipe above)
 - Rainwater pipe (as taken from Scandia-Hus 'Proposed Site Plan', No 707708, Dated: 04.12.24)
 - Storm water access chamber (3000)
 - Storm water inspection chamber (4500)
 - Storm water catchpit chamber (4500)
 - Storm water rodding eye
 - Extent of permeable paving with porous sub-base
 - Proposed permeable patio
 - Storm water orifice flow control chamber (5000)
 - Permavoid distribution tank
 - Sail stack (type TBC by architect/m&e engineer) (as taken from Scandia-Hus 'Proposed Site Plan', No 707708, Dated: 04.12.24)
 - Foul water access chamber (3000)
 - Foul water inspection chamber (4500)

A shallow ground depression is proposed in this area to contain exceedance flows during extreme rainfall events exceeding the 1 in 100 year + 45% CC event. This feature provides additional on-site storage, preventing uncontrolled runoff and avoiding any increased flood risk to neighbouring properties. The base of the depression will be set lower than the existing lowest ground levels on site (within the tree area), ensuring that all exceedance water is retained within the site boundary.

- Proposed Bio-Retention
 - Proposed surface level (as taken from Scandia-Hus 'Site Section A-A', No 707708, Dated: 04.12.24)
 - Finished floor level (as taken from Scandia-Hus 'Site Section A-A', No 707708, Dated: 04.12.24)
 - Pipe info - diameter, length, gradient, bedding type
- ABBREVIATIONS
- MH - MANHOLE
 - IC - INSPECTION CHAMBER
 - AC - ACCESS CHAMBER
 - CP - CATCHPIT
 - BC - BRAKE CHAMBER
 - RE - RODDING EYE
 - IL - INVERT LEVEL
 - SL - SUMP LEVEL
 - RA - RESTRICTED ACCESS COVER
 - CL - COVER LEVEL
 - TL - TOP OF CELLULAR SA
 - BL - BASE OF CELLULAR SA
 - FL - FORMATION LEVEL
- Borehole locations (as taken from Site Investigation Report by W K Elson, dated February 2025)

DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL
WATER AUTHORITY

DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
GROUNDWATER DEPTH
ORDINARY WATERCOURSE APPROVAL
LOCATION AND DEPTH OF EXISTING UTILITIES

- Site Specific Notes
- Proposed SW drainage designed based on desktop study, available BGS Historical Borehole Logs, topographical survey and Site Investigation report.
 - All storage volumes and flow controls are designed to the critical 1 in 100 year storm event plus an allowance of 45% for the predicted effects of climate change.
 - Groundwater levels were confirmed at 0.78 m BGL in borehole No. 1 located to the east of the site. The groundwater level is 39.52 m in the eastern part.
 - Due to the high groundwater levels, surface water runoff from the proposed roof areas is to be attenuated on-site and discharged into the existing pond.
 - The required attenuation will be provided in form storage tank and voided subbase. The proposed voided subbase will be laid flat.
 - Attenuation storage tanks to be fitted with vents and in full accordance with manufacturer's guidance.
 - The proposed *CL and IL inspection chambers final levels will be designed during detail design and are shown indicatively only for drainage purposes only.



- STANDARD DRAINAGE NOTES
- DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
 - ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 - THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
 - ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
 - BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SEWERS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
 - ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT. THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
 - COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
 - ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA.
 - ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 205 AND BS85 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
 - ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
 - ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAD DOWN DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
 - ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
 - THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
 - STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 - IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
 - NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.
 - ALL EXISTING MANHOLE COVERS, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
 - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT.
 - UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FLOW SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION.
 - PROPRIETARY PRODUCTS TO BE INSTALLED IN FULL ACCORDANCE WITH MANUFACTURER'S GUIDANCE.
 - MANHOLE AND CHAMBER COVER GRADES:
 - 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
 - 'B125' IN ALL DRIVEWAYS
 - 'C250' IN PRIVATE PARKING AREAS
 - 'D400' IN CARRIAGEWAY/ACCESS ROAD

Prefix to drawing numbers shall signify the following:-

PL = PLANNING	Shall not be used for contract or construction purposes
P = PRELIMINARY	Shall not be used for contract or construction purposes
T = TENDER	Shall not be used for construction purposes
C = CONSTRUCTION	These are the only drawings that shall be used for construction purposes
R = RECORD	Record of actual completed work

P3	01.12.25	UPDATED TO HDC COMMENTS	KCK	CS	CS
P2	26.08.25	REVISED HEADWALL LOCATION	LH	CS	CS
P1	20.08.25	UPDATED TO CLIENT COMMENTS	KCK	CS	CS
P	07.08.25	PRELIMINARY ISSUE	KCK	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

 Consulting Civil Engineers					
CLIENT MARTIN VARCO					
ARCHITECT SCANDIA-HUS BUSSINESS PARK					
JOB TITLE MARLPOST MEADOWS, SOUTHWATER, RH13 9BU					
DRAWING TITLE PROPOSED DRAINAGE DESIGN					
DRAWN	KCK	ENGINEER	CS	CHECKED	CS
DATE	AUGUST 2025		SCALE @ A1	1:100	
JOB No.	C2041	STATUS	P	DRAWING No.	101
				REV.	P3

FOR PLANNING ONLY



- STANDARD DRAINAGE NOTES
- DO NOT SCALE FROM THIS DRAWING, REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
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 - UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEILLANCE OF THE DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION.
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 - MANHOLE AND CHAMBER COVER GRADES:
 - 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
 - 'B125' IN ALL DRIVEWAYS
 - 'C250' IN PRIVATE PARKING AREAS
 - 'D400' IN CARRIAGEWAY/ACCESS ROAD

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Greenfield Runoff (Method FEH statistical)	
Calculated based on proposed impermeable areas	0.0449 ha
SAAR (mm)	775
QMed-QBar conversion	1.136
QMed (l/s)	0.24
QBar (FEH Statistical) (l/s)	0.28

In accordance with SuDS policy, the proposed discharge rate has been set at 2.0 l/s to reduce the risk of blockages.

CONTRIBUTING AREA PLAN (1:100)

- Proposed roof area : 0.0249 ha
- Proposed permeable areas: 0.0227 ha
- Proposed permeable footpath area (self-draining area- excluded from drainage calculations)
- Proposed Bio-Retention

FOR PLANNING ONLY

P2	01.12.25	UPDATED TO HDC COMMENTS	KCK	CS	CS
P1	26.08.25	REVISED TO SUIT DRAINAGE LAYOUT	LH	CS	CS
P	07.08.25	PRELIMINARY ISSUE	KCK	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

Consulting Civil Engineers

CLIENT

MARTIN VARCO

ARCHITECT

SCANDIA-HUS BUSSINESS PARK

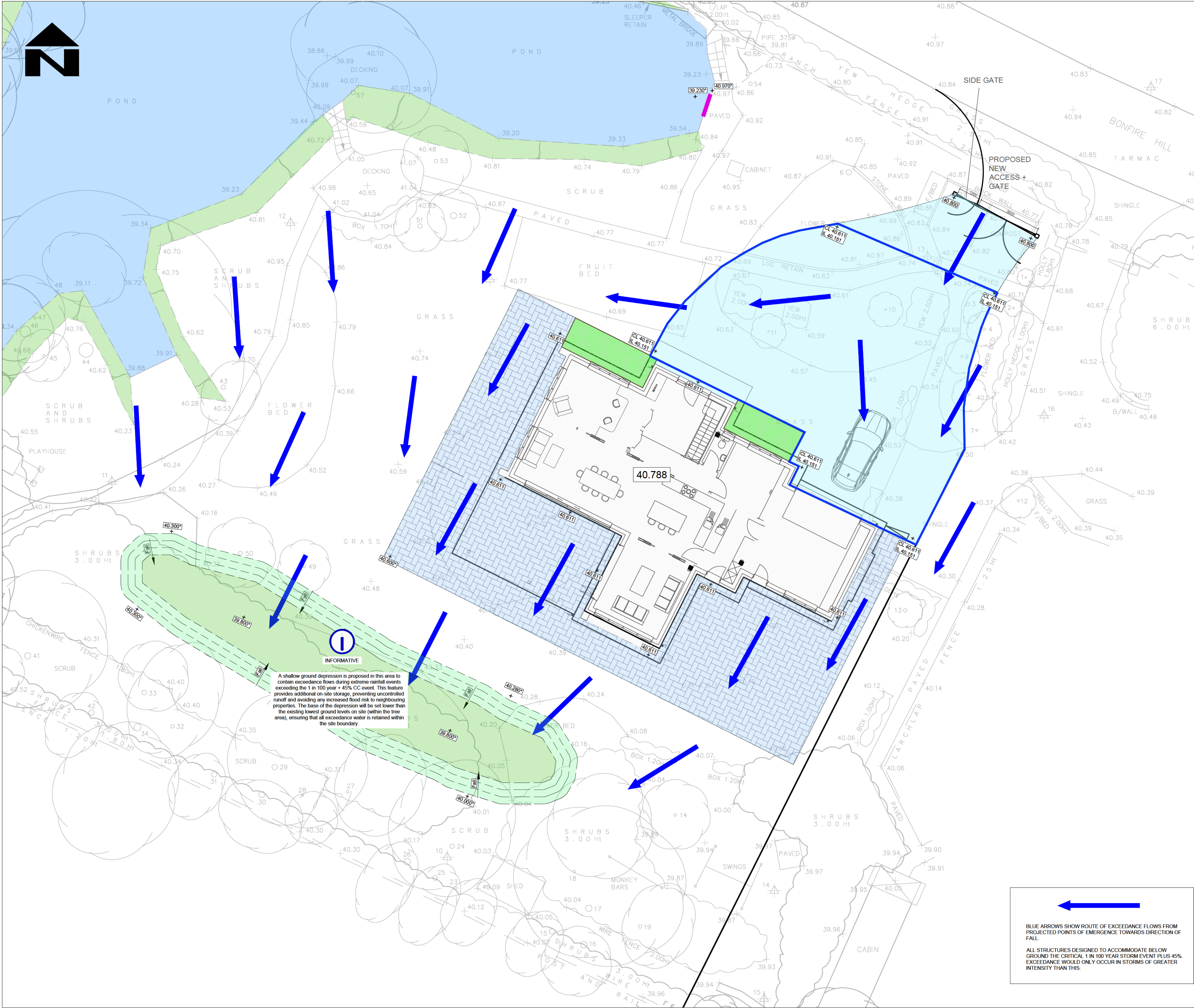
JOB TITLE

MARLPOST MEADOWS,
SOUTHWATER, RH13 9BU

DRAWING TITLE

PROPOSED CONTRIBUTING AREA

DRAWN	KCK	ENGINEER	CS	CHECKED	CS	APPROVED	CS
DATE	AUGUST 2025			SCALE @ A1			1:100
JOB No.	C2041	STATUS	P	DRAWING No.	201	REV.	P2



- STANDARD DRAINAGE NOTES
- DO NOT SCALE FROM THIS DRAWING, REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
 - ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 - THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
 - ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
 - BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SEWERS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
 - ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT. THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
 - COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
 - ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA.
 - ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS85 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
 - ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
 - ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAD DOWN DOWN IN SEWERS FOR ADOPTION 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
 - ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
 - THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWINGS CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
 - STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 - IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
 - NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.
 - ALL EXISTING MANHOLE COVERS, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
 - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT.
 - UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION.
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P1	26.08.25	REVISED TO SUIT DRAINAGE LAYOUT	LH	CS	CS
P	07.08.25	PRELIMINARY ISSUE	KCK	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

Consulting Civil Engineers

CLIENT
MARTIN VARCO

ARCHITECT
SCANDIA-HUS BUSSINESS PARK

JOB TITLE
MARLPOST MEADOWS,
SOUTHWATER, RH13 9BU

DRAWING TITLE
EXCEEDANCE FLOW

DRAWN KCK	ENGINEER CS	CHECKED CS	APPROVED CS
DATE AUGUST2025		SCALE @ A1 1:100	
JOB No. C2041	STATUS P	DRAWING No. 301	REV. P2

FOR PLANNING ONLY

BLUE ARROWS SHOW ROUTE OF EXCEEDANCE FLOWS FROM PROJECTED POINTS OF EMERGENCE TOWARDS DIRECTION OF FALL.

ALL STRUCTURES DESIGNED TO ACCOMMODATE BELOW GROUND THE CRITICAL 1 IN 100 YEAR STORM EVENT PLUS 45% EXCEEDANCE WOULD ONLY OCCUR IN STORMS OF GREATER INTENSITY THAN THIS.

FIGURE B 23
TYPICAL INSPECTION CHAMBER DETAIL - TYPE E

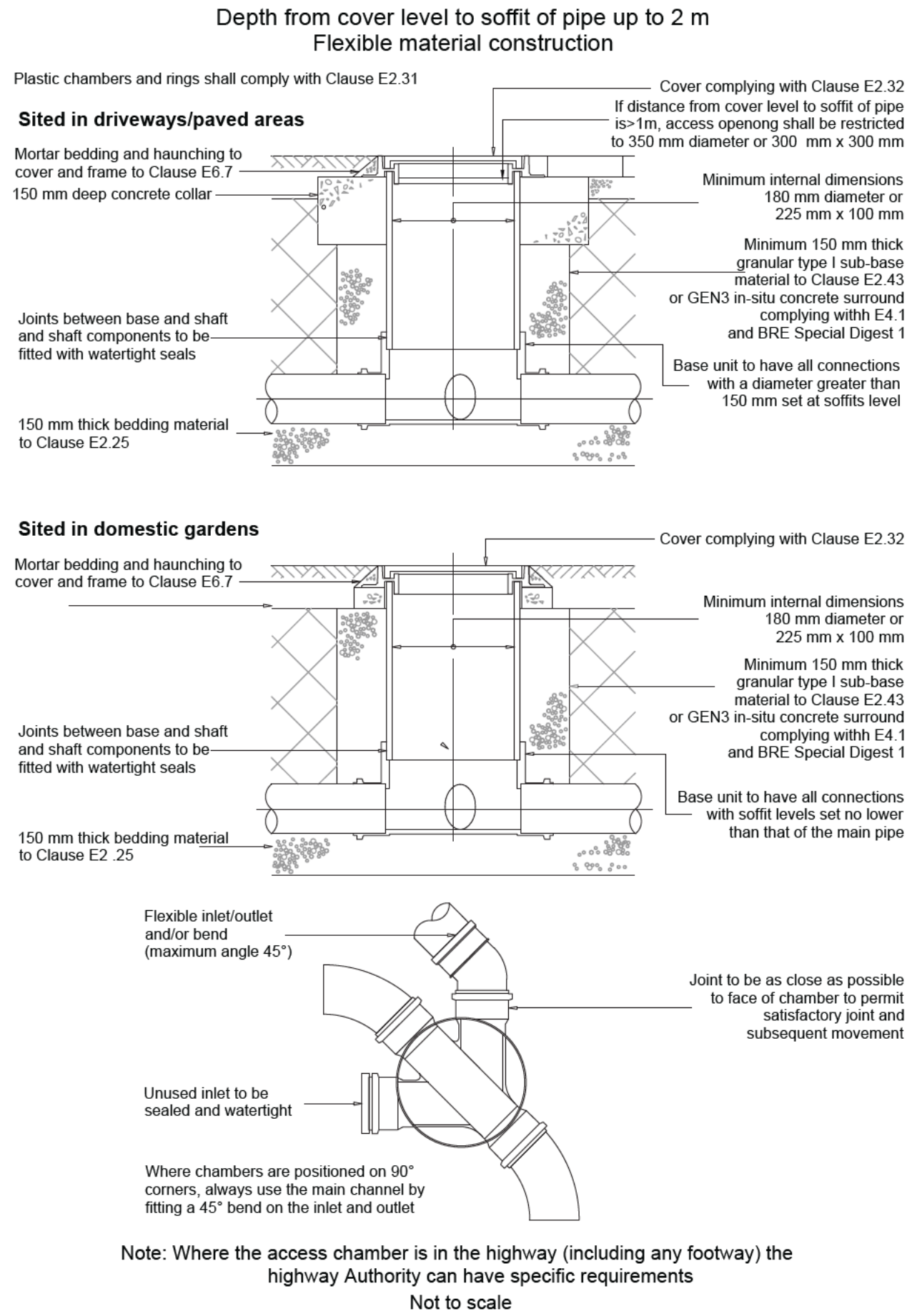
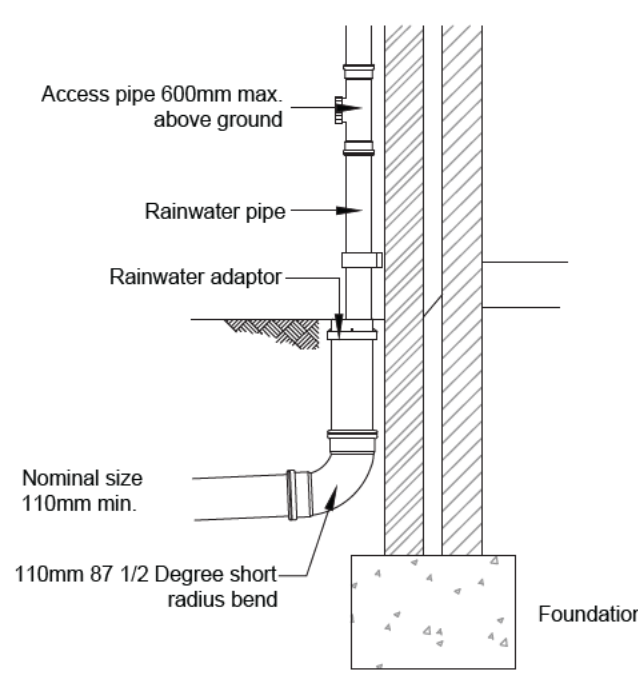
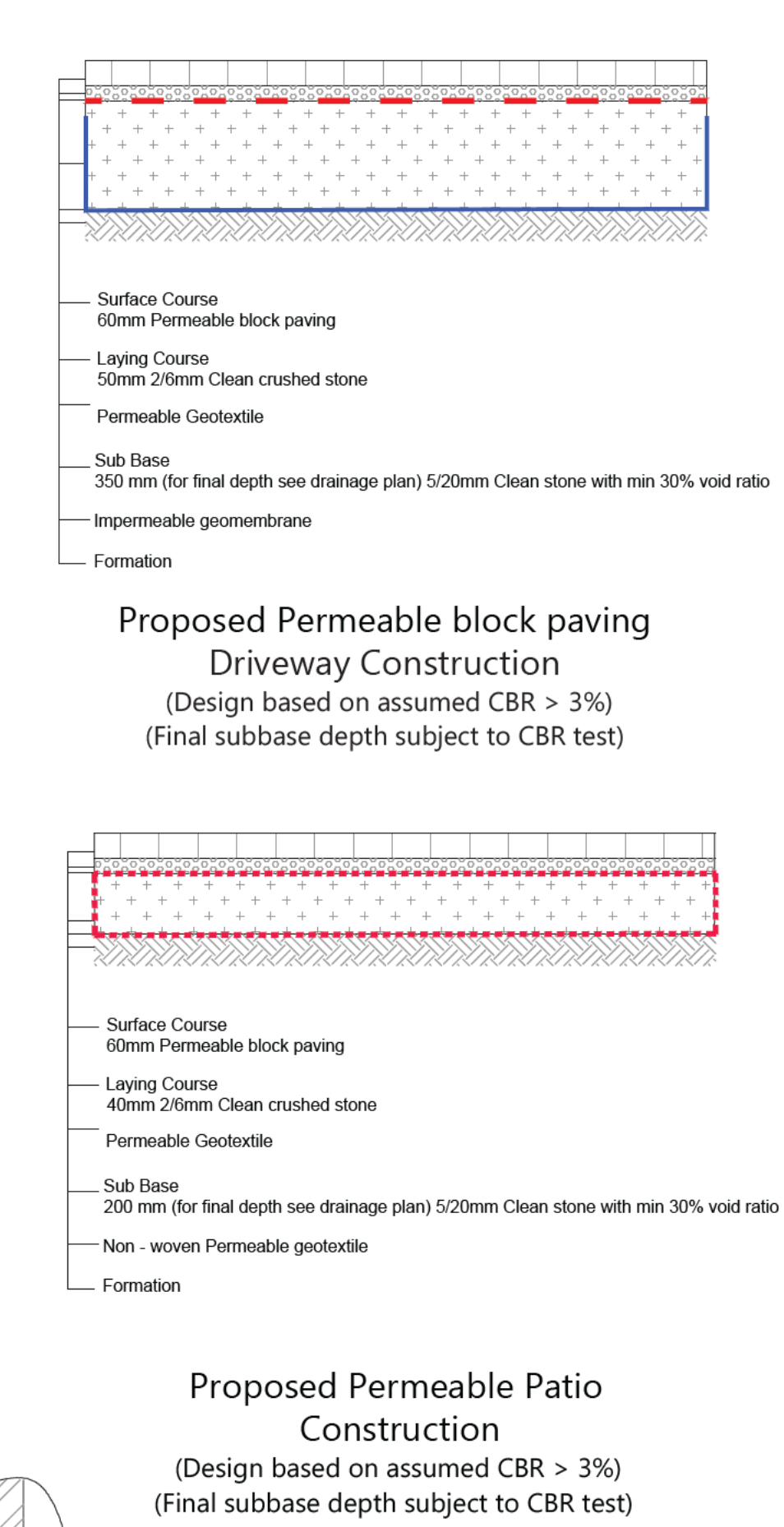
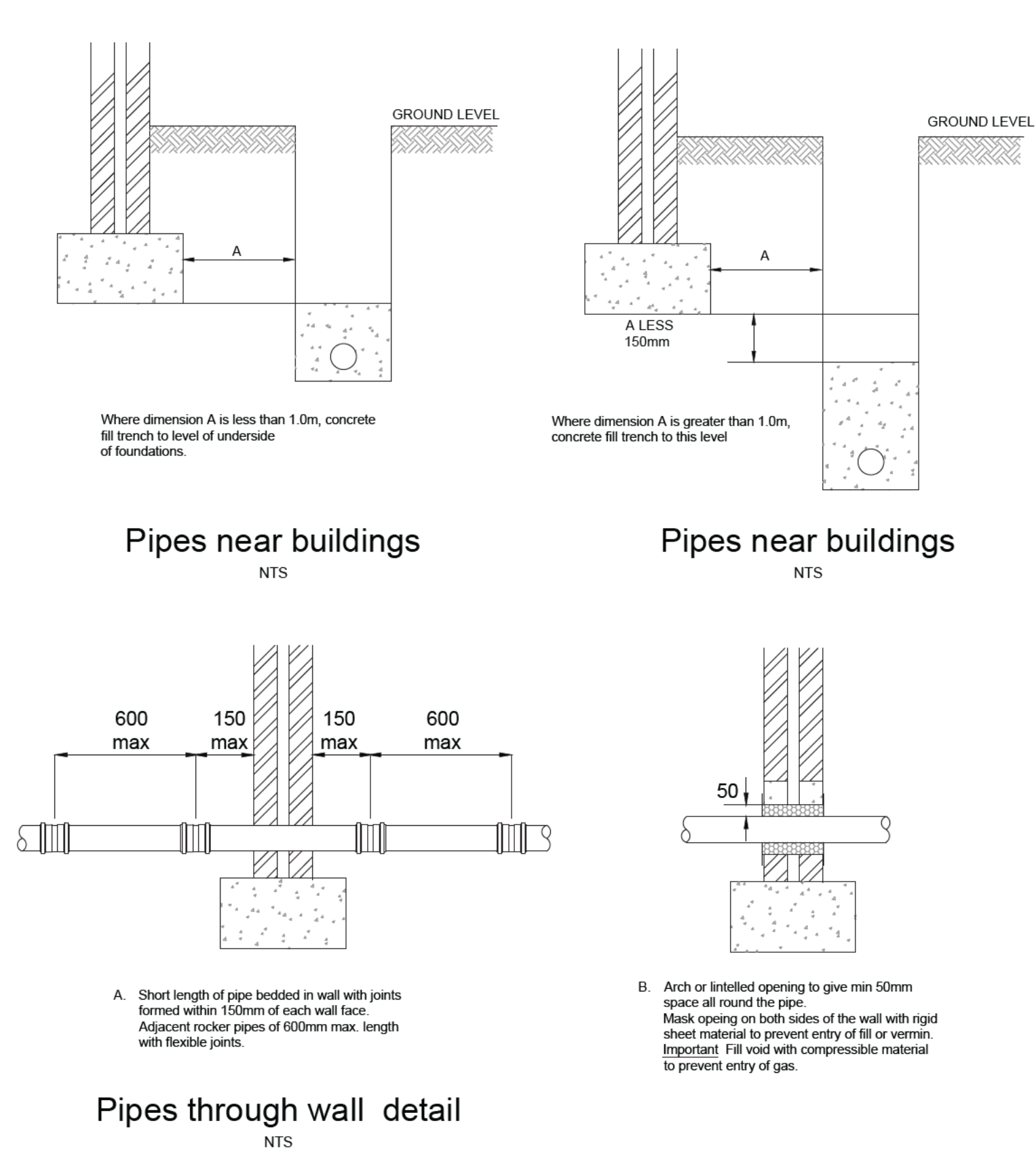
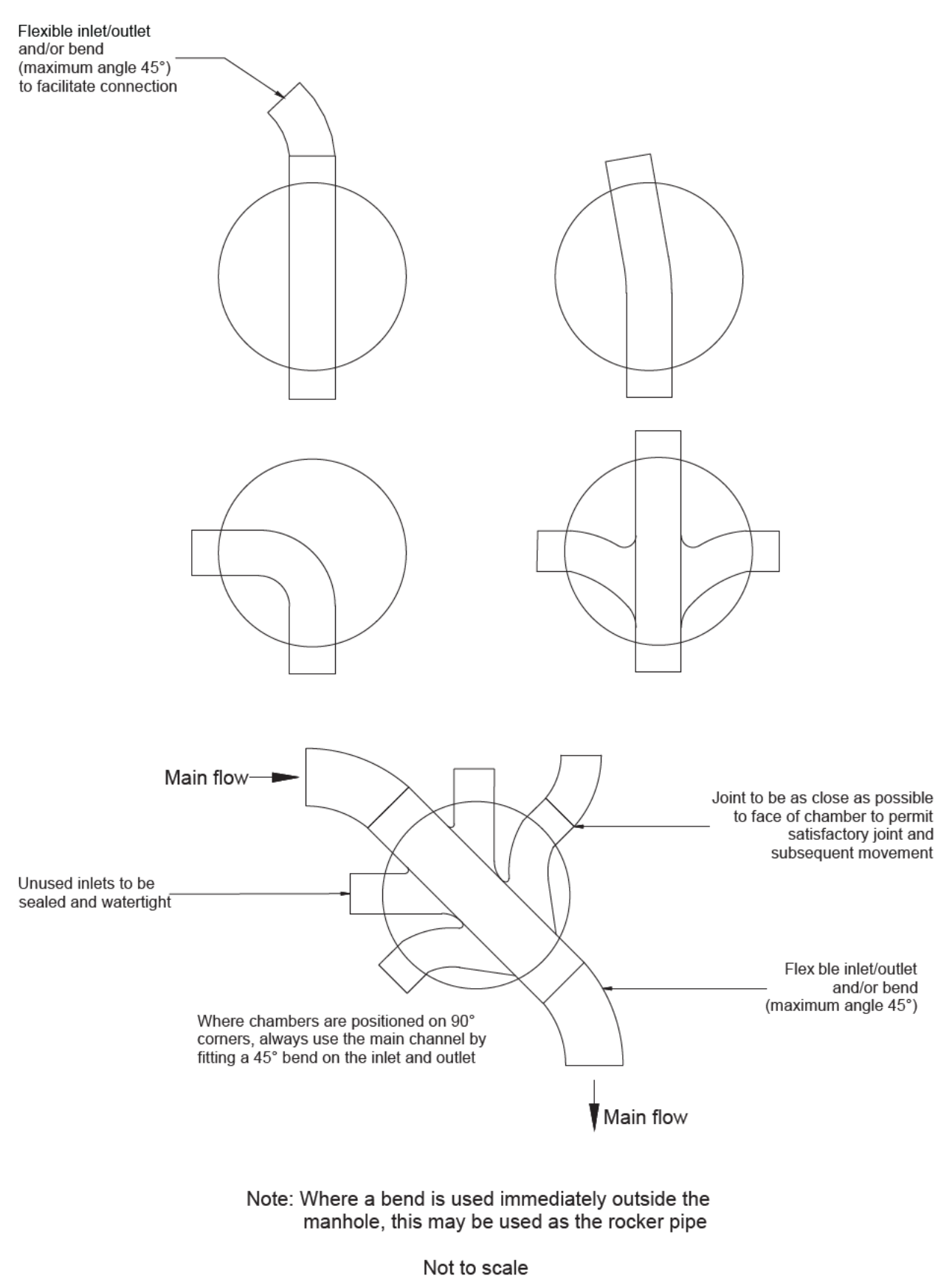
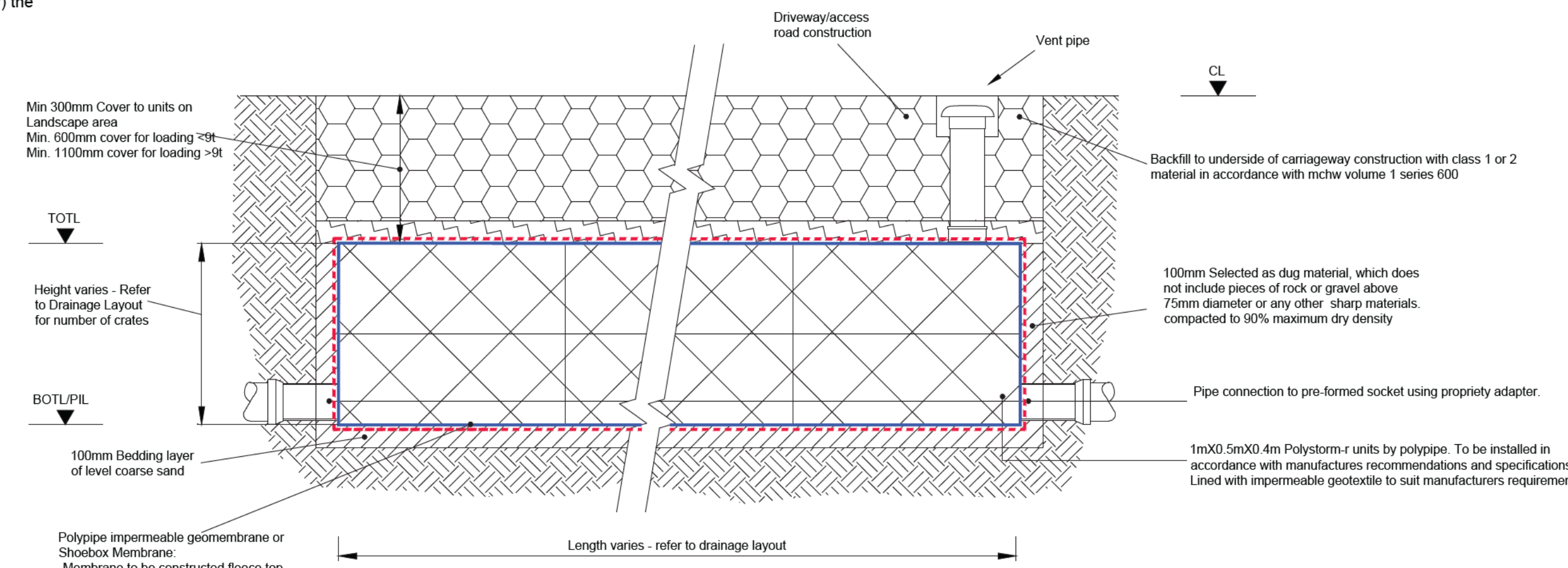


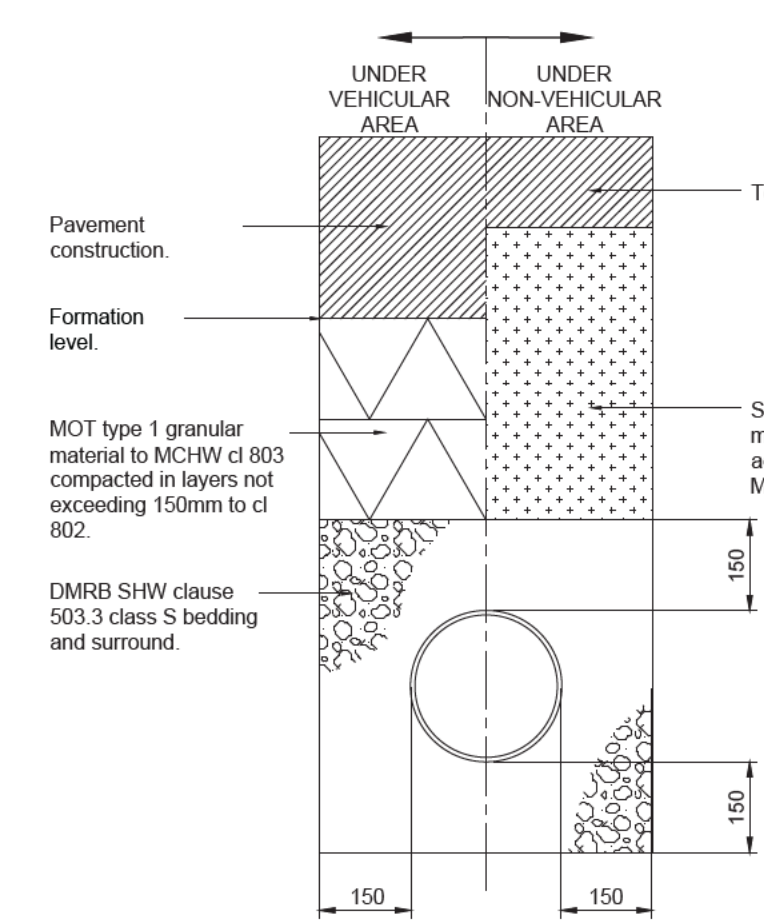
FIGURE B 22
TYPICAL BASE LAYOUTS FOR TYPE D CHAMBERS



External Rainwater Pipe to Drain
1:20

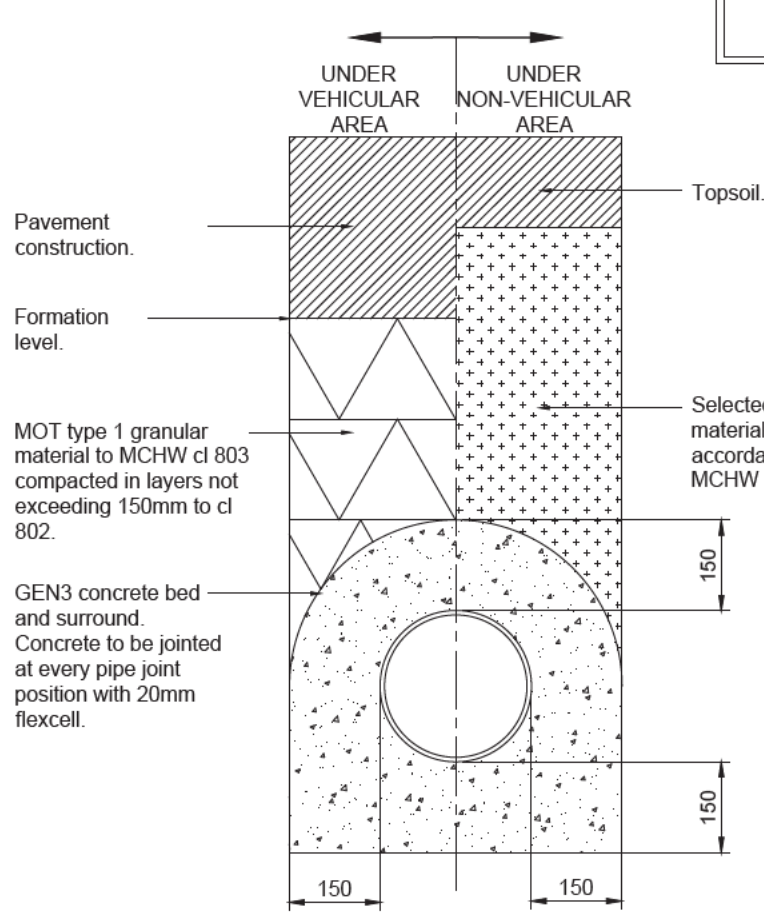


Attenuation tank using Polystorm-R Geomodular units



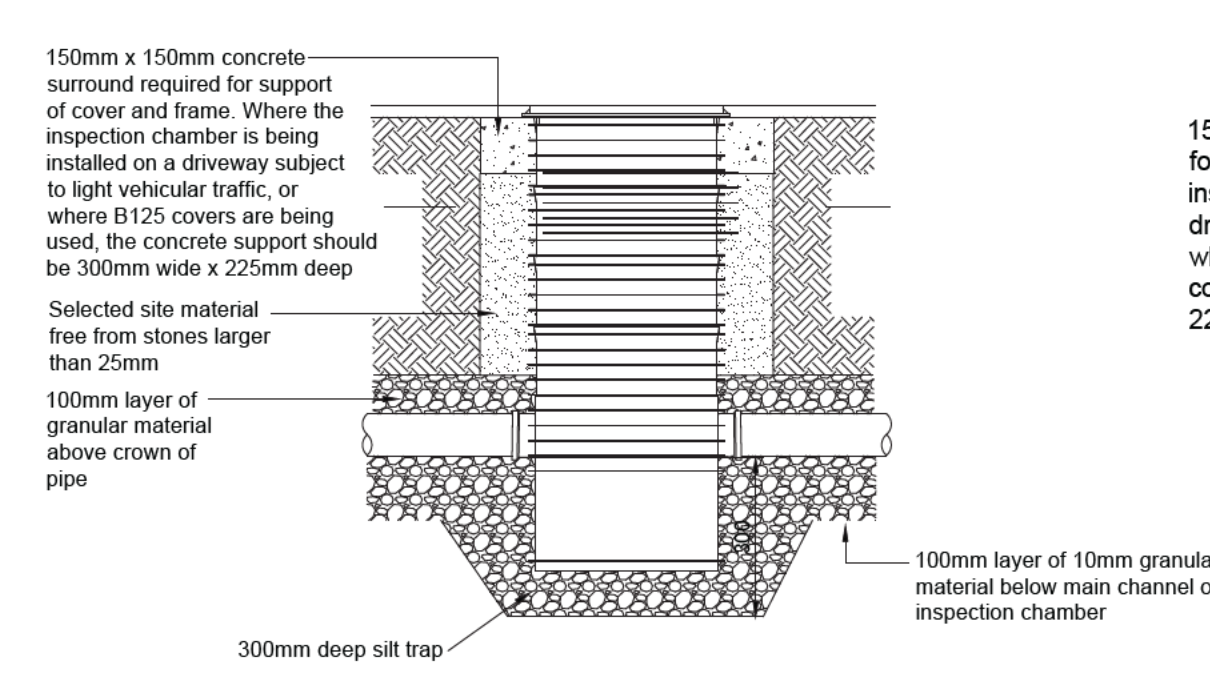
Class S granular pipe bed and surround
To be used for plastic, vitrified and concrete pipework where cover to crown is greater than 900mm.

Pipe Bedding Details

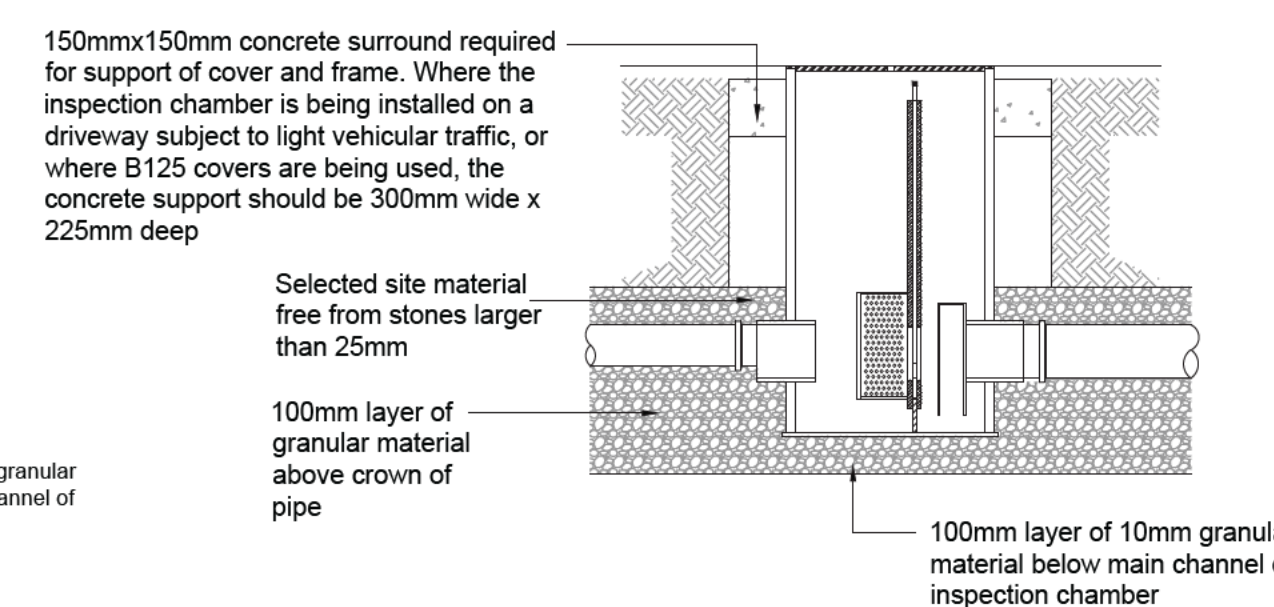


Class Z concrete pipe bed and surround
To be used for plastic, vitrified and concrete pipework where cover to crown is less than 900mm.

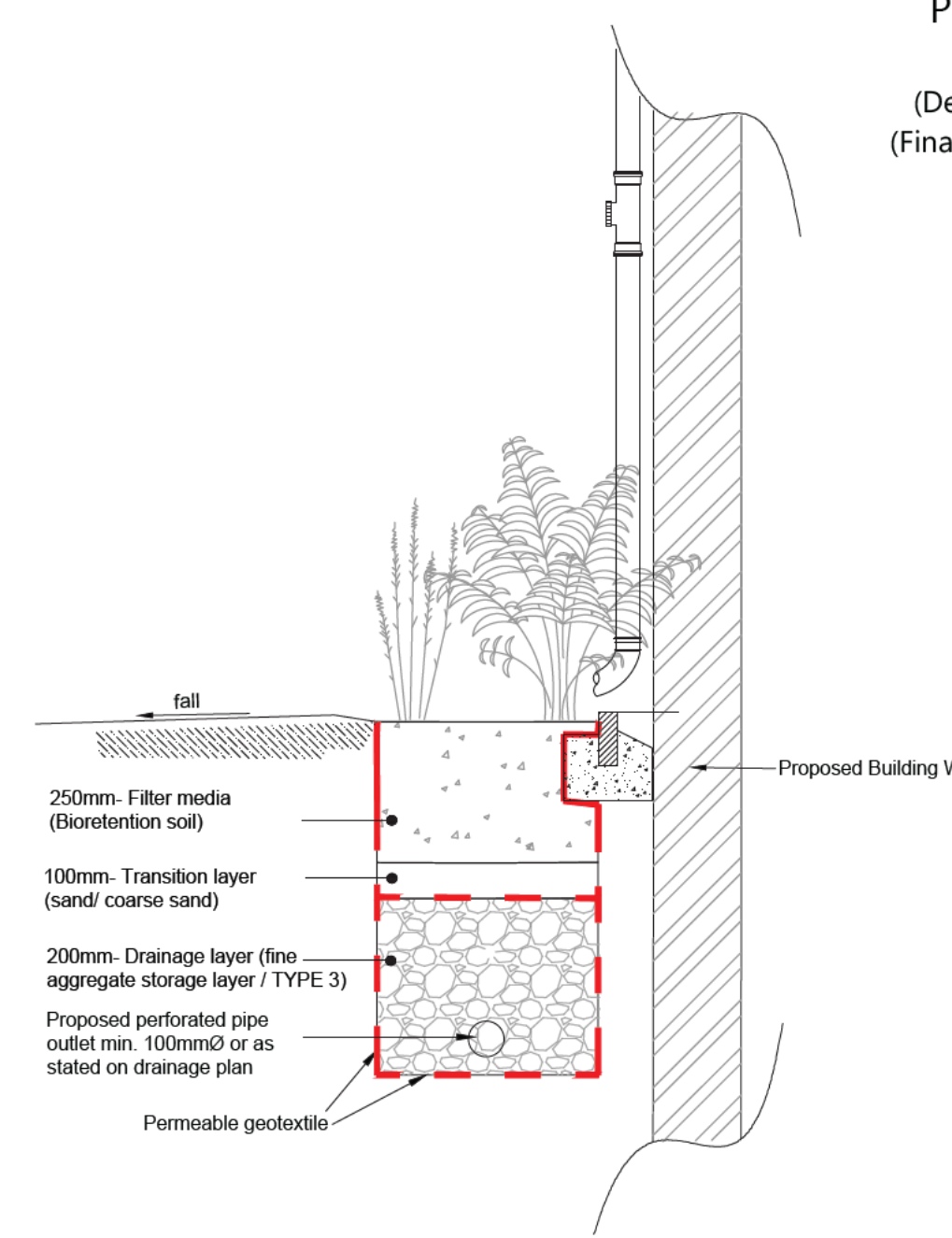
All storage tank drainage works shall be carried out in accordance with the specifications, method statements and recommendations of Polypipe



460mmØ Polypipe basic silt trap detail
SCALE 1:20



Conraflow 500 with foul air trap
SCALE 1:20



Proposed Bio-retention Unit
Typical Detail
(Scale 1:20)

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P-	07.08.25	PRELIMINARY ISSUE	KCK	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

 Consulting Civil Engineers					
CLIENT MARTIN VARCO					
ARCHITECT SCANDIA-HUS BUSSINESS PARK					
JOB TITLE MARLPOST MEADOWS, SOUTHWATER, RH13 9BU					
DRAWING TITLE PROPOSED TYPICAL CONSTRUCTION DETAILS					
DRAWN KCK	ENGINEER CS	CHECKED CS	APPROVED CS		
DATE AUGUST2025	SCALE @ A1 AS SHOWN				
JOB No. C2041	STATUS P	DRAWING No. 501	REV. P1		

FOR PLANNING ONLY

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	4.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
FLOW_S04			40.750	450	514518.432	126513.685	1.122
PP	0.023	4.00	40.611	450	514527.962	126512.990	0.460
RE		4.00	40.611	300	514521.043	126496.839	0.383
S02			40.611	450	514532.070	126498.377	0.566
S03			40.611	450	514537.808	126509.699	0.693
ATT	0.025	4.00	40.611		514533.427	126509.354	0.900
Existing Pond			40.840	450	514512.548	126516.174	1.293

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)
2.000	PP	FLOW_S04	9.555	0.600	40.151	39.628	0.523	18.3	150	4.07	54.4
1.000	RE	S02	11.134	0.600	40.228	40.065	0.163	68.3	100	4.20	54.4
1.001	S02	S03	12.693	0.600	40.045	39.918	0.127	99.9	100	4.47	54.4
1.002	S03	ATT	1.000	0.600	39.918	39.711	0.207	4.8	100	4.48	54.4
1.003	ATT	FLOW_S04	8.300	0.600	39.711	39.628	0.083	100.0	150	4.62	54.4
1.004	FLOW_S04	Existing Pond	6.389	0.600	39.628	39.547	0.081	78.9	150	4.71	54.4

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)
2.000	2.367	41.8	4.5	0.310	0.972	0.023	0.0	33	1.552
1.000	0.933	7.3	0.0	0.283	0.446	0.000	0.0	0	0.000
1.001	0.769	6.0	0.0	0.466	0.593	0.000	0.0	0	0.000
1.002	3.542	27.8	0.0	0.593	0.800	0.000	0.0	0	0.000
1.003	1.005	17.8	4.9	0.750	0.972	0.025	0.0	54	0.858
1.004	1.133	20.0	9.4	0.972	1.143	0.048	0.0	72	1.116

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)
2.000	9.555	18.3	150	Circular	40.611	40.151	0.310	40.750	39.628	0.972
1.000	11.134	68.3	100	Circular	40.611	40.228	0.283	40.611	40.065	0.446
1.001	12.693	99.9	100	Circular	40.611	40.045	0.466	40.611	39.918	0.593
1.002	1.000	4.8	100	Circular	40.611	39.918	0.593	40.611	39.711	0.800
1.003	8.300	100.0	150	Circular	40.611	39.711	0.750	40.750	39.628	0.972
1.004	6.389	78.9	150	Circular	40.750	39.628	0.972	40.840	39.547	1.143

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	PP	450	Manhole	Adoptable	FLOW_S04	450	Manhole	Adoptable
1.000	RE	300	Manhole	Adoptable	S02	450	Manhole	Adoptable
1.001	S02	450	Manhole	Adoptable	S03	450	Manhole	Adoptable
1.002	S03	450	Manhole	Adoptable	ATT		Junction	
1.003	ATT		Junction		FLOW_S04	450	Manhole	Adoptable
1.004	FLOW_S04	450	Manhole	Adoptable	Existing Pond	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
FLOW_S04	514518.432	126513.685	40.750	1.122	450		1	2.000	39.628	150
						2	1.003	39.628	150	
						0	1.004	39.628	150	
PP	514527.962	126512.990	40.611	0.460	450		0	2.000	40.151	150
RE	514521.043	126496.839	40.611	0.383	300		0	1.000	40.228	100
S02	514532.070	126498.377	40.611	0.566	450		1	1.000	40.065	100
S03	514537.808	126509.699	40.611	0.693	450		1	1.001	39.918	100
						0	1.002	39.918	100	
ATT	514533.427	126509.354	40.611	0.900			1	1.002	39.711	100
Existing Pond	514512.548	126516.174	40.840	1.293	450		0	1.003	39.711	150
						1	1.004	39.547	150	

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Node FLOW S04 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.800	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	39.628	Diameter (m)	0.023		

Node PP Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	40.151	Slope (1:X)	9999.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.350
Safety Factor	2.0	Width (m)	20.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node ATT Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	39.711	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	5.000	Number Required	1
Porosity	0.95	Pit Length (m)	8.000		

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	FLOW_S04	172	40.042	0.414	2.0	0.0658	0.0000	SURCHARGED
30 minute summer	PP	20	40.188	0.037	8.6	2.2143	0.0000	OK
15 minute summer	RE	1	40.228	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S02	1	40.045	0.000	0.0	0.0000	0.0000	OK
180 minute winter	S03	172	40.042	0.124	0.1	0.0197	0.0000	SURCHARGED
180 minute winter	ATT	172	40.042	0.331	3.6	12.5658	0.0000	SURCHARGED
180 minute winter	Existing Pond	172	39.566	0.019	0.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	FLOW_S04	1.004	Existing Pond	0.7	0.523	0.035	0.0085	13.5
30 minute summer	PP	2.000	FLOW_S04	5.7	0.448	0.135	0.1004	
15 minute summer	RE	1.000	S02	0.0	0.000	0.000	0.0000	
15 minute summer	S02	1.001	S03	0.0	0.000	0.000	0.0000	
180 minute winter	S03	1.002	ATT	-0.1	-0.015	-0.003	0.0078	
180 minute winter	ATT	1.003	FLOW_S04	-1.3	0.118	-0.076	0.1461	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.31%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	FLOW_S04	172	40.184	0.556	2.6	0.0884	0.0000	SURCHARGED
30 minute summer	PP	19	40.196	0.045	11.4	2.6722	0.0000	OK
15 minute summer	RE	1	40.228	0.000	0.0	0.0000	0.0000	OK
180 minute winter	S02	176	40.183	0.138	0.5	0.0220	0.0000	SURCHARGED
180 minute winter	S03	172	40.184	0.266	0.8	0.0422	0.0000	SURCHARGED
180 minute winter	ATT	172	40.184	0.473	4.7	15.2190	0.0000	SURCHARGED
180 minute winter	Existing Pond	172	39.568	0.021	0.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	FLOW_S04	1.004	Existing Pond	0.8	0.547	0.040	0.0094	15.5
30 minute summer	PP	2.000	FLOW_S04	8.1	0.618	0.194	0.1053	
15 minute summer	RE	1.000	S02	0.0	0.000	0.000	0.0000	
180 minute winter	S02	1.001	S03	-0.5	-0.067	-0.087	0.0993	
180 minute winter	S03	1.002	ATT	-0.8	-0.104	-0.029	0.0078	
180 minute winter	ATT	1.003	FLOW_S04	-1.9	0.151	-0.105	0.1461	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	FLOW_S04	228	40.317	0.689	3.6	0.1096	0.0000	SURCHARGED
240 minute winter	PP	228	40.317	0.166	5.7	9.9623	0.0000	FLOOD RISK
240 minute winter	RE	224	40.317	0.089	0.1	0.0063	0.0000	OK
240 minute winter	S02	228	40.317	0.272	0.2	0.0433	0.0000	FLOOD RISK
240 minute winter	S03	228	40.317	0.399	0.3	0.0635	0.0000	FLOOD RISK
240 minute winter	ATT	228	40.317	0.606	5.3	15.2190	0.0000	FLOOD RISK
240 minute winter	Existing Pond	228	39.569	0.022	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	FLOW_S04	1.004	Existing Pond	0.9	0.564	0.045	0.0102	20.7
240 minute winter	PP	2.000	FLOW_S04	2.9	0.247	0.070	0.1682	
240 minute winter	RE	1.000	S02	-0.1	-0.012	-0.008	0.0847	
240 minute winter	S02	1.001	S03	0.3	0.033	0.042	0.0993	
240 minute winter	S03	1.002	ATT	0.5	0.058	0.016	0.0078	
240 minute winter	ATT	1.003	FLOW_S04	3.6	0.205	0.204	0.1461	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.10%

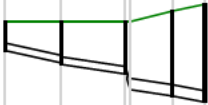
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	FLOW_S04	224	40.263	0.635	3.0	0.1010	0.0000	SURCHARGED
240 minute winter	PP	224	40.263	0.112	4.5	6.7180	0.0000	OK
240 minute winter	RE	224	40.264	0.036	0.0	0.0025	0.0000	OK
240 minute winter	S02	224	40.264	0.219	0.1	0.0348	0.0000	SURCHARGED
240 minute winter	S03	224	40.263	0.345	0.2	0.0549	0.0000	SURCHARGED
240 minute winter	ATT	224	40.263	0.552	4.7	15.2190	0.0000	SURCHARGED
240 minute winter	Existing Pond	224	39.568	0.021	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	FLOW_S04	1.004	Existing Pond	0.9	0.558	0.043	0.0099	19.6
240 minute winter	PP	2.000	FLOW_S04	2.6	0.224	0.063	0.1516	
240 minute winter	RE	1.000	S02	0.0	-0.005	-0.003	0.0575	
240 minute winter	S02	1.001	S03	0.2	0.031	0.040	0.0993	
240 minute winter	S03	1.002	ATT	0.4	0.053	0.015	0.0078	
240 minute winter	ATT	1.003	FLOW_S04	3.0	0.169	0.168	0.1461	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 97.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	FLOW_S04	232	40.461	0.833	4.1	0.1324	0.0000	FLOOD RISK
240 minute winter	PP	232	40.461	0.310	7.0	18.6088	0.0000	FLOOD RISK
240 minute winter	RE	232	40.461	0.233	0.1	0.0165	0.0000	FLOOD RISK
240 minute winter	S02	232	40.461	0.416	0.2	0.0662	0.0000	FLOOD RISK
240 minute winter	S03	232	40.461	0.543	0.4	0.0863	0.0000	FLOOD RISK
240 minute winter	ATT	232	40.461	0.750	6.7	15.2190	0.0000	FLOOD RISK
240 minute winter	Existing Pond	232	39.570	0.023	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	FLOW_S04	1.004	Existing Pond	1.0	0.581	0.050	0.0109	23.1
240 minute winter	PP	2.000	FLOW_S04	3.5	0.293	0.085	0.1682	
240 minute winter	RE	1.000	S02	-0.1	-0.024	-0.015	0.0871	
240 minute winter	S02	1.001	S03	0.3	0.039	0.051	0.0993	
240 minute winter	S03	1.002	ATT	-0.4	-0.046	-0.013	0.0078	
240 minute winter	ATT	1.003	FLOW_S04	4.1	0.233	0.231	0.1461	

Node Name	RE	S02	S03	Flow	Flow Pond
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 34.000					
	Link Name	1.000	1.001	1.001	1.0
	Section Type	100m	100m	150m	150m
	Slope (1:X)	68.3	99.9	100	78.3
	Cover Level (m)	40.611	40.611	40.611	40.750
	Invert Level (m)	40.228	40.065	40.045	39.918
	Length (m)	11.1	12.69	8.3	6.3

Node Name	PP	FLOW_S04
A4 drawing Hor Scale 1500 Ver Scale 100 Datum (m) 34.000		
Link Name	2.00	
Section Type	150r	
Slope (1:X)	18.3	
Cover Level (m)	40.611	40.750
Invert Level (m)	40.151	39.628
Length (m)	9.55	

7.4 **Appendix D – Maintenance schedule**

Maintenance Schedule

Marlpot Meadows, Southwater

For

Martin Varco

Rev P1

Reference C2041

Date 07th August 2025

Revision	Date of Issue	Comments	Prepared By	Checked By
P	07/08/2025	Initial Issue	KCK	CS
P1	01/12/2025	Updated to HDC Comments	KCK	CS



Contents

1 MAINTENANCE..... 3

1 Maintenance

1.1 Introduction

- 1.1.1 During construction, the Contractor will be responsible for maintaining the drainage and SuDS (Sustainable Drainage Systems). The occupier will take on the responsibility of these duties as laid out in this report.
- 1.1.2 The maintenance schedule for the proposed development will be split down into two separate categories; SuDS features and regular private drainage.

1.2 SuDS at Marlpot Meadows, Southwater

- 1.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be **Attenuation tank, Bio-retention and Permeable Paving**
- 1.2.2 The SuDS features have been designed for easy maintenance and comprise:
- Regular Day-to-Day care – litter collection, regular gardening to control vegetation growth and checking inlets where water enters the SuDS features
 - Occasional tasks – checking the SuDS features and removing any silt that builds up in the SuDS feature
 - Remedial work – repairing damage where necessary

1.3 SuDS Drainage Maintenance Specification

1.3.1 Rainwater Harvesting Tank

In order to maintain the functioning of the rainwater harvesting tanks, the following maintenance requirements should be adhered to:

Operation and maintenance requirements for rainwater harvesting tanks		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Ensure that all inlets and outlets are clear of debris and blockage	Weekly
	Remove debris inlets and outlets	Weekly
	Inspect first flush diverter to ensure it is working correctly and not clogged	Weekly – Clean if necessary
	Clean Filter screens	Monthly – Replace if damaged
	Inspect the tank for sediment build-up and any signs of algae	Monthly
	Inspect roof and gutters and clear of all debris	Every 3 months
	Inspect pump for any signs of wear or damage and test to ensure it is functioning correctly	Every 3 months
	Check bottom of the tank for sediment build-up and clear if necessary	Every 6 months
	Ensure all downpipes are clear and functioning correctly and clear if necessary	Every 6 months
	Test water	Every 6 months
	Thorough tank cleaning – drain tank, scrub interior and rinse	Annually or as required
	Service the pump and filtration system and replace any worn parts	Annually
	Inspect overflow to ensure it is working correctly and clear any obstructions	Annually
Monitoring	Monitor Water levels	Annually
	Inspect for pests e.g mosquitoes and take measures to prevent	As required

1.3.2 Attenuation Tank

In order to maintain the functioning of the attenuation tanks, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for attenuation storage tanks		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from per-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents, and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

1.3.3 Permeable Paving

In order to maintain the functioning of the permeable paving, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for permeable paving		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rate and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

1.3.4 Bio retention systems

In order to maintain the functioning of the bio retention systems, the following maintenance requirements should be adhered to:

Table 18.3 Operation and maintenance requirements for bio retention systems		
Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspection infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockages	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

1.4 General Drainage Maintenance Specification

1.4.1 Inlet Structures and Inspection Chambers

- Inlet structures such as rainwater downpipes, road gullies and channel drains should be free from obstruction at all times to allow free flow through the SuDS
- Inspection Chambers and Rodding Eyes are used on bends or where pipes come together. They allow access and cleaning to the system if necessary.

Inlet Structures and Inspection Chambers	
Regular Maintenance	Frequency
Inlet Structures Inspect rainwater downpipes, channel drains and road gullies, removing obstructions and silt as necessary. Check that there is no physical damage. Trim vegetation 1m min surround to structures and keep area free from silt and debris	Monthly
Inspection Chambers and below ground control chambers. Remove cover and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in Autumn	Annually
Occasional Maintenance Check topsoil levels are 20mm above edges of chambers to avoid mower damage.	As necessary
Remedial Work Repair physical damage if necessary	As required

1.4.2 Below ground drainage pipes

- Below ground drainage pipes convey water to the SuDS system. They should always be free from obstruction to allow free flow.

Below Ground Drainage Pipes	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually or as required
Maintain vegetation to designed limits within the vicinity of below ground drainage pipes and tanks.	Monthly or as required
Remedial Work	
Repair physical damage if necessary	As required
Monitoring	
Inspect all inlets, outlets and vents to ensure that they are in good conditions and operating as designed.	Annually
Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years or as required

7.5 **Appendix E – EA Magic Maps**

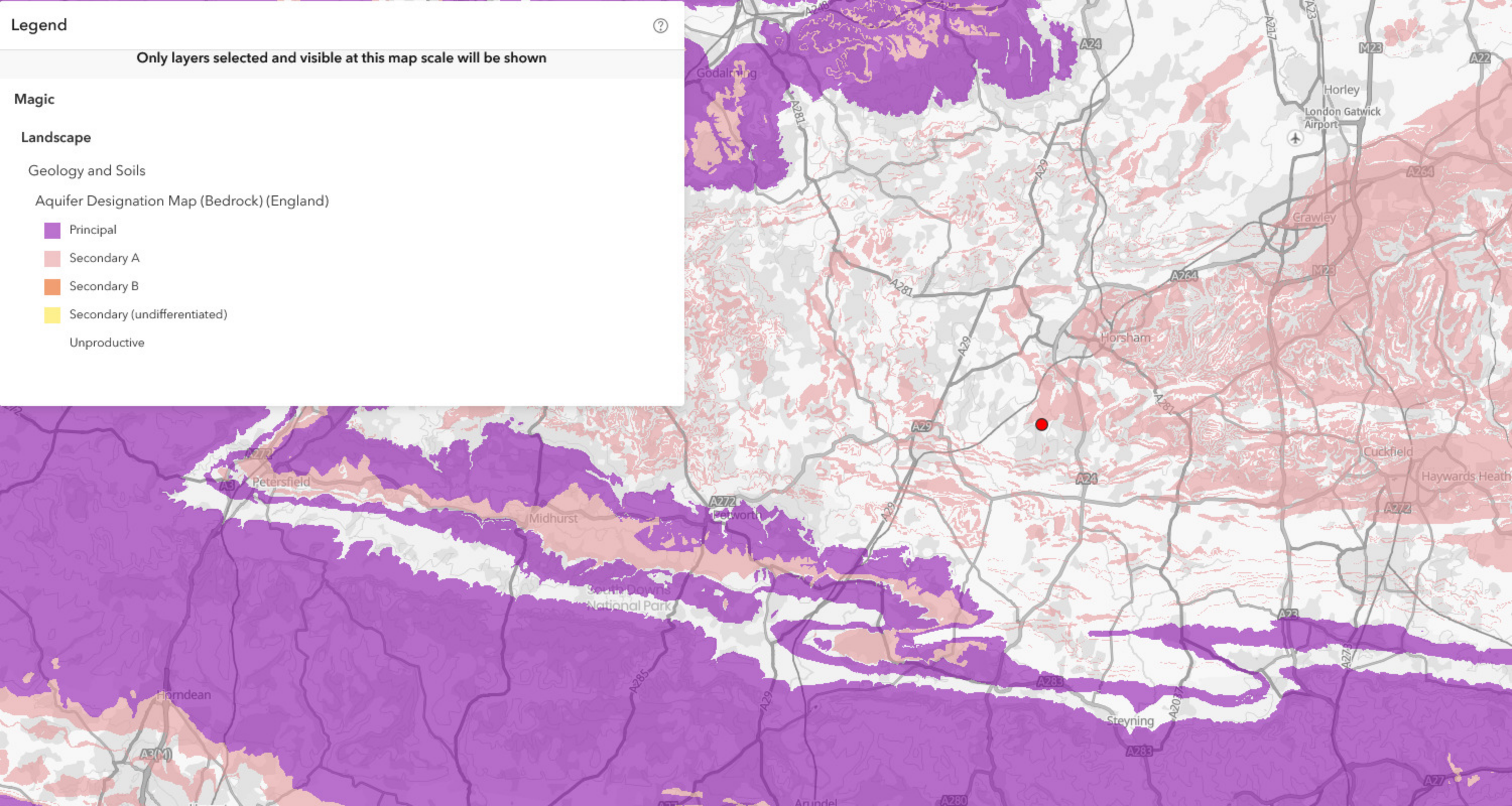
②

Magic

Geology and Soils

Aquifer Designation Map (Bedrock) (England)

-  Principal
-  Secondary A
-  Secondary B
-  Secondary (undifferentiated)
-  Unproductive

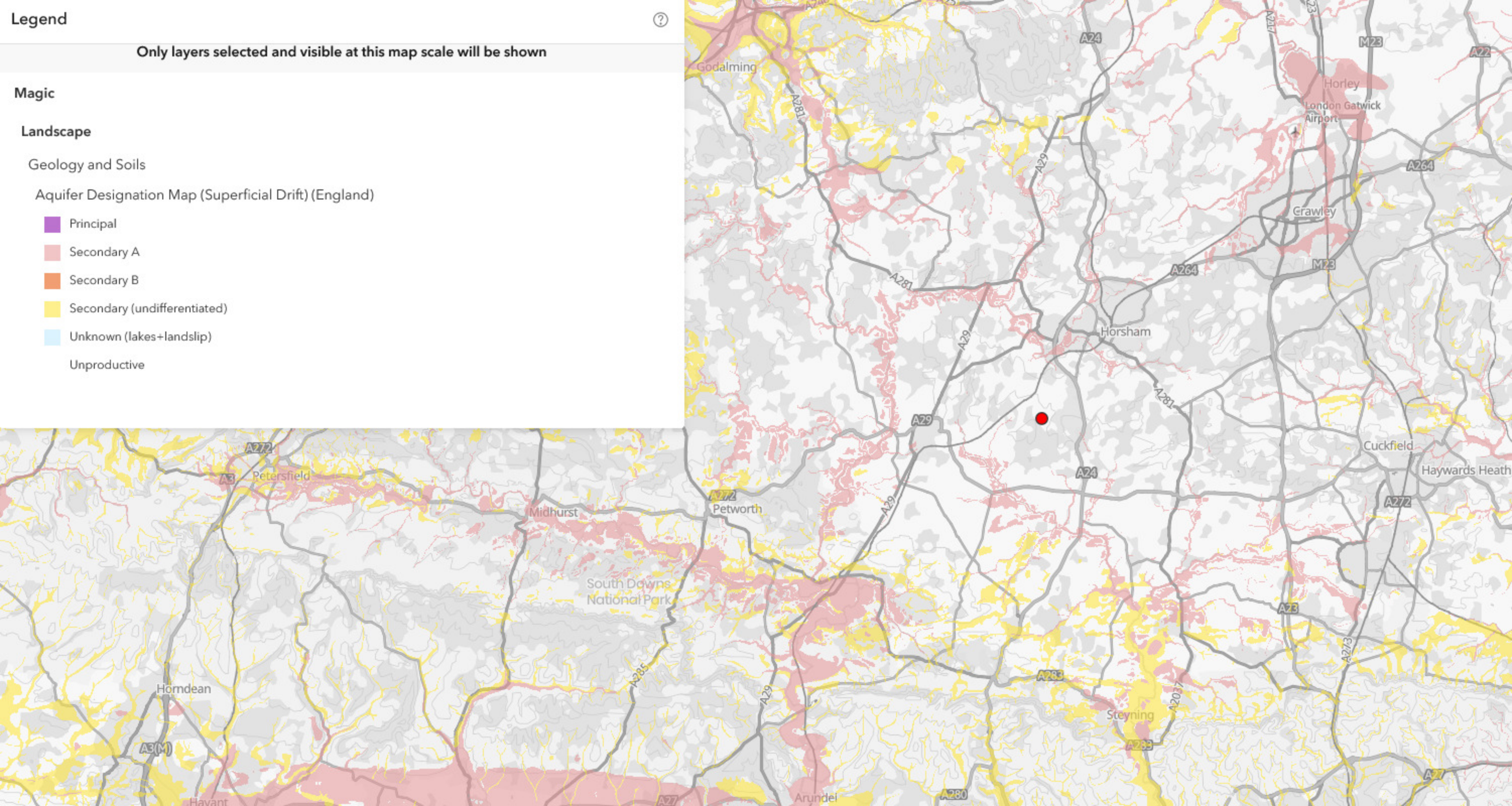


②

Magic

Geology and Soils

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unknown (lakes+landslip)
- Unproductive



Legend

Only layers selected and visible at this map scale will be shown

Magic

Landscape

Geology and Soils

Groundwater Vulnerability Map (England)

Local Information

Soluble Rock Risk

High

Medium - High

Medium

Medium - Low

Low

Unproductive

Legend

?

Only layers selected and visible at this map scale will be shown

Magic

Designations

Land-Based Designations

Non-statutory

Source Protection Zones merged (England)

Zone I - Inner Protection Zone

Zone I - Subsurface Activity

Zone II - Outer Protection Zone

Zone II - Subsurface Activity

Zone III - Total Catchment

Zone III - Subsurface Activity

Zone of Special Interest

