



SuDS Drainage Statement

Rustington Golf Centre, Golfers Lane, Angmering BN16 4NB

Client

Rustington Golf Centre
Golfers Lane
Angmering
BN16 4NB
Ref: 13361
Date: November 2025

Consulting Engineers

GTA Civils & Transport Ltd
Maple House
192 – 198 London Road
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Issue	Issue date	Compiled	Checked
Preliminary/First Issues	10 June 2025	JP	FV / MR
Second Issue	19 November 2025	FVV	MR

1 Introduction

- 1.1 GTA Civils Ltd. was appointed by the Client to prepare a SuDS Drainage Statement in relation to the proposed development at Rustington Golf Centre, Golfers Lane, Angmering, Littlehampton, BN16 4NB. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.
- 1.2 The objective of this Statement is to discharge planning conditions #6 and #7, which relate to planning ref A/163/24/PL. These read as follows:-

6. Development shall not commence, other than works of site survey and investigation, until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, and the recommendations of the SuDS Manual produced by CIRIA. Design considerations must take full account of the 'Supplementary Requirements for Surface Water Drainage Proposals' produced by Arun District Council and are an overriding factor in terms of requirements. Winter groundwater monitoring to establish highest annual ground water levels and winter percolation testing to BRE 365, or similar approved, will be required to support the design of any infiltration drainage. No part of the development shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.

Reason: To ensure that the proposed development is satisfactorily drained in accordance with Arun Local Plan policies W SP1, W DM1, W DM2 and W DM3. This is required to be a pre-commencement condition because it is necessary to implement the surface water drainage system prior to commencing any building works.

7 The extension/new building shall not be occupied until full details of the maintenance and management of the surface water drainage system is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the Local Planning Authority. The manual is to include details of financial management and arrangements for the replacement of major components at the end of the manufacturer's recommended design life. Upon completed construction of the surface water drainage system, the owner or management company shall strictly adhere to and implement the recommendations contained within the manual.

Reason: To ensure that the proposed development is satisfactorily drained in accordance with Arun Local Plan policies W DM1, W DM2 and W DM3. It is considered necessary for this to be a pre-commencement condition to ensure that the future maintenance and funding arrangements for the surface water disposal scheme are agreed before construction commences.

2 Existing Site

- 2.1 The application site lies to the north of Rustington, southwest of Angmering. This area is administered by Arun District Council (ADC). It comprises 2 distinct parcels of the Golf Course, which is accessed from Golfers Lane. Site location maps and an aerial view are shown in Appendix A.
- 2.2 Hydrology: the site lies approximately 2.2km north of the English Channel. The site falls within the River Arun's catchment. The nearest rivers lie to the north and south of the golf course – both called Black Ditch. These converge close to the west boundary and discharge into the Arun approximately 4.3km away, northwest of Wick. A ditch watercourse runs southwards along the east boundary.
- 2.3 Topography: a topographic survey was commissioned – refer to Appendix C. The direction of fall is broadly westwards, with levels ranging between 6.3m AOD and 5.2m AOD.
- 2.4 Geology: The BGS's online geology map shows the area is underlain by New Pit Chalk bedrock with River Terrace Deposits (drift of sand, silt and clay) overlying.
- 2.5 Winter soil soakage testing was carried out on site in accordance with BRE Digest 365 on 18/02/25. 3 tests were undertaken in 2 pits (6 in total). The water level fell marginally during the 6 tests – and so all were deemed 'fails' (nil results). Excerpts from the test report are shown in Appendix C. Winter groundwater monitoring was also undertaken with the highest water table level recorded at 3.93m bgl on 25 February '25. The full SI report is available upon request.
- 2.6 A CCTV survey was undertaken on 03 May 2025. The objective was to determine where the surface water runoff from the Golf Club's positively drained surfaces is routed. The network runs westwards ultimately to a large triangular pond. This can be seen in the excerpts from the CCTV report in Appendix C and the aerial view in Appendix A.
- 2.7 The greenfield runoff rates for the contributing area of 0.059ha were calculated using the HR Wallingford online application. The rates for the 4 main storm return periods are as follows:

Event	Catchment Area: 1ha (l/s)
QBAR	0.11
1 in 1 yr	0.094
1 in 30 yrs	0.26
1 in 100 yrs	0.35

- 2.8 Public sewers: Southern Water's sewer records are shown in Appendix B. The site is served by a rising main that runs northwards up Golfers Lane. There are no surface water sewers in this area.

3 Proposed SuDS Strategy & Conclusion

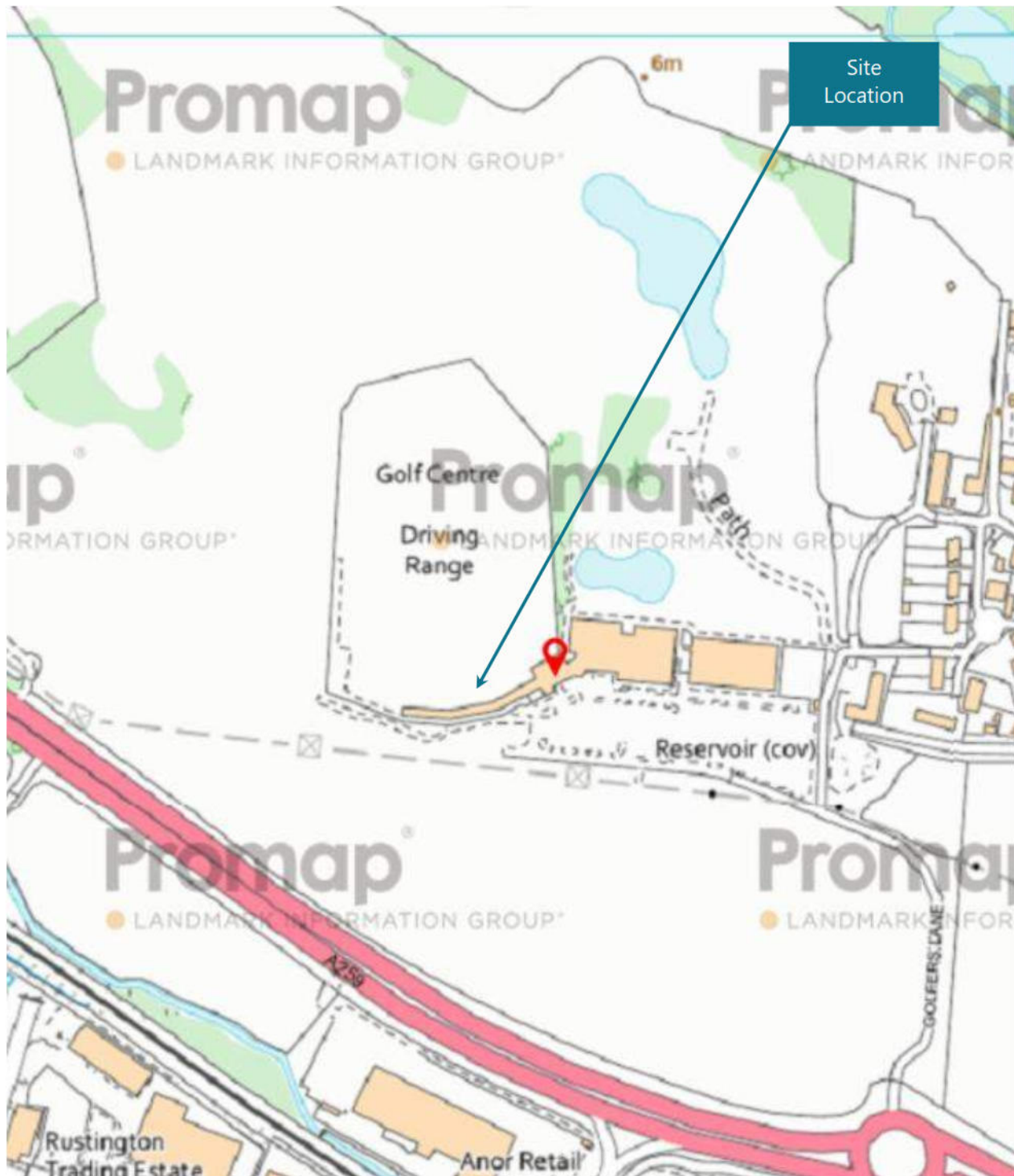
- 3.1 As set out in Section 2.5 above, the nil soakage rate makes the use of infiltration features unfeasible. The chalk stratum is a minimum of 3.0m below ground, so it is not possible to design a working soakaway with 1m standoff (buffer) above the groundwater table.
- 3.2 The surface water from the roofs of the new retail building and the extended driving range will be routed to the existing network that runs west to the north of the driving range area. The proposed SuDS drainage strategy layout and drainage details are shown in Appendix D.
- 3.3 Various sustainable drainage systems were considered to store the excess storm water and mitigate runoff pollution:
- Porous Pavings: all external paths and accesses will be retained as existing or reinstated to drain as per the existing arrangements.
 - Green roofs: not practical for this style of development.
 - Ponds/swales/filter strip: a length of swale is included to the NW of the driving range building.
 - Rainwater harvesting: rainwater harvesting is considered to be impractical and excessively expensive for such a development.
- 3.4 Cellular attenuation tanks are proposed adjacent to orifice control manholes, one next to the retail unit and the other near to the connection manhole – on the existing SW network.
- 3.5 The offsite flow rate will be restricted to a total of 1.0l/s, this being the practical minimum rate achievable on this site with a 25mm diameter orifice.
- 3.6 Full network calculations for the proposed system are shown in Appendix E for the 1 in 2 year, 1 in 30year +40% climate change, and 1 in 100 year +45% climate change event. The required storage volume is provided within the two attenuation tanks and the outfall swale. Causeway Flow has been used with FEH22 hydrological data and CV values of 1.
- 3.7 Flotation risk: The tanks will be lined to prevent groundwater ingress. Anti-flotation calculations are not needed as the highest water table level was measured at 3.93m bgl (approximately 1.32m AOD).
- 3.8 Treatment: The discharge from the roofs will be of low hazard, which the dry swale will provide sufficient treatment for. The paths and access will be of permeable surfaced as existing.
- 3.9 Interception: The unlined dry swale will enable the first flush of rainfall to dissipate into the ground, above the groundwater table, providing interception benefits. The swale size has been maximised within the constraint of the site (no loss of driving range area).

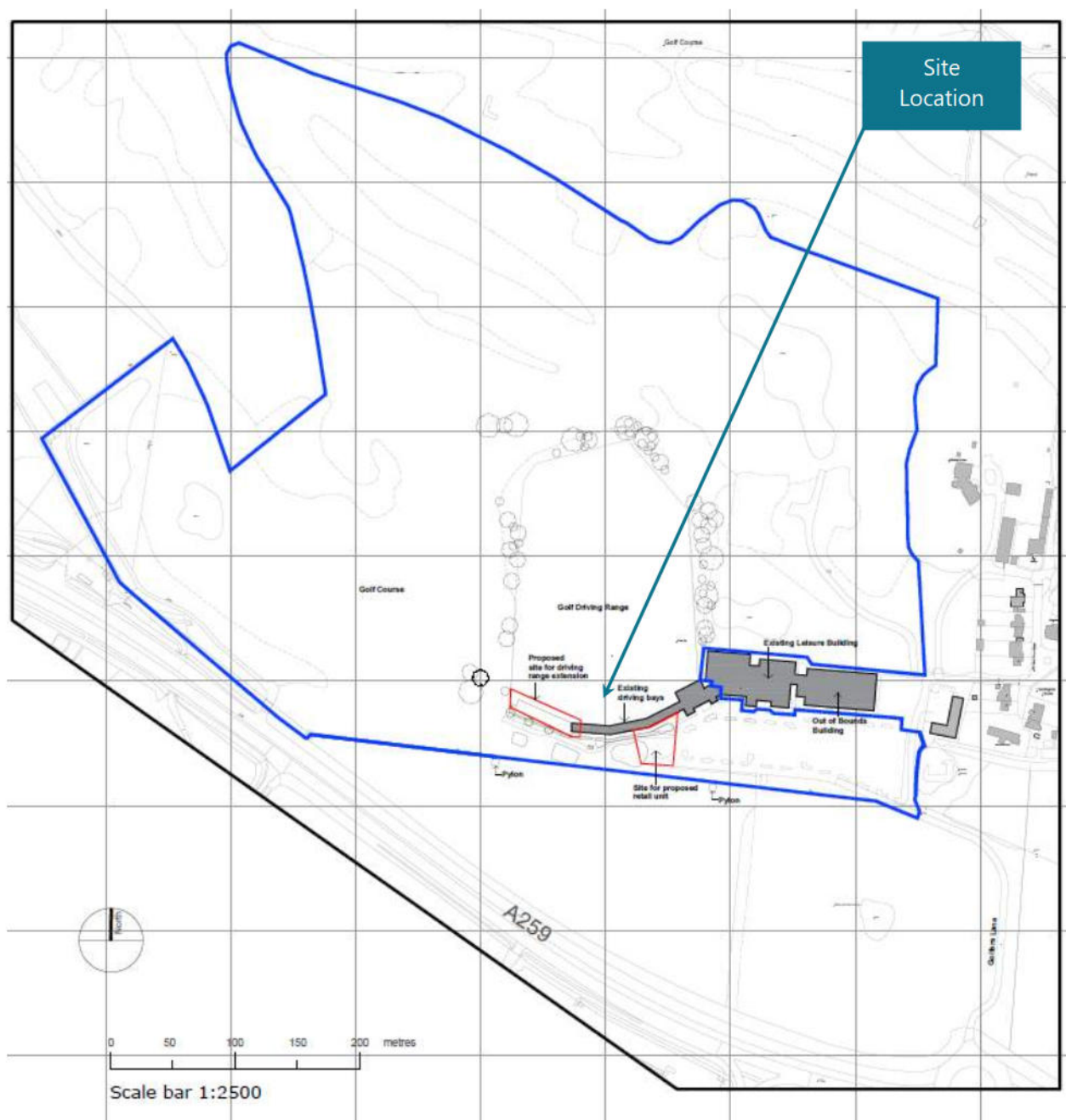
- 3.10 Exceedance flows: exceedance flows in the event of the control manholes overtopping, will be west-northwest into the watercourse away from buildings.
- 3.11 Maintenance of the SuDS system will remain with the Applicant – the Golf Club. The responsibility shall remain with the Club in perpetuity. Appendix F includes a Maintenance Plan for the swale, tanks and control manholes. This has been prepared in accordance with the CIRIA SuDS Manual, which is regarded as the industry standard.
- 3.12 Funding arrangements: A separate sinking fund will be set up and maintained by the Golf Club to provide for the anticipated replacement cost of the major components at the end of the manufacturer's design life. It should be noted that the design life of tanks and control manholes is long - approximately 50 years.
- 3.13 It is contended that this development's SuDS network complies fully with national and local drainage policies. The various items set out in conditions #6 and #7 of the Decision Notice have been addressed in full.

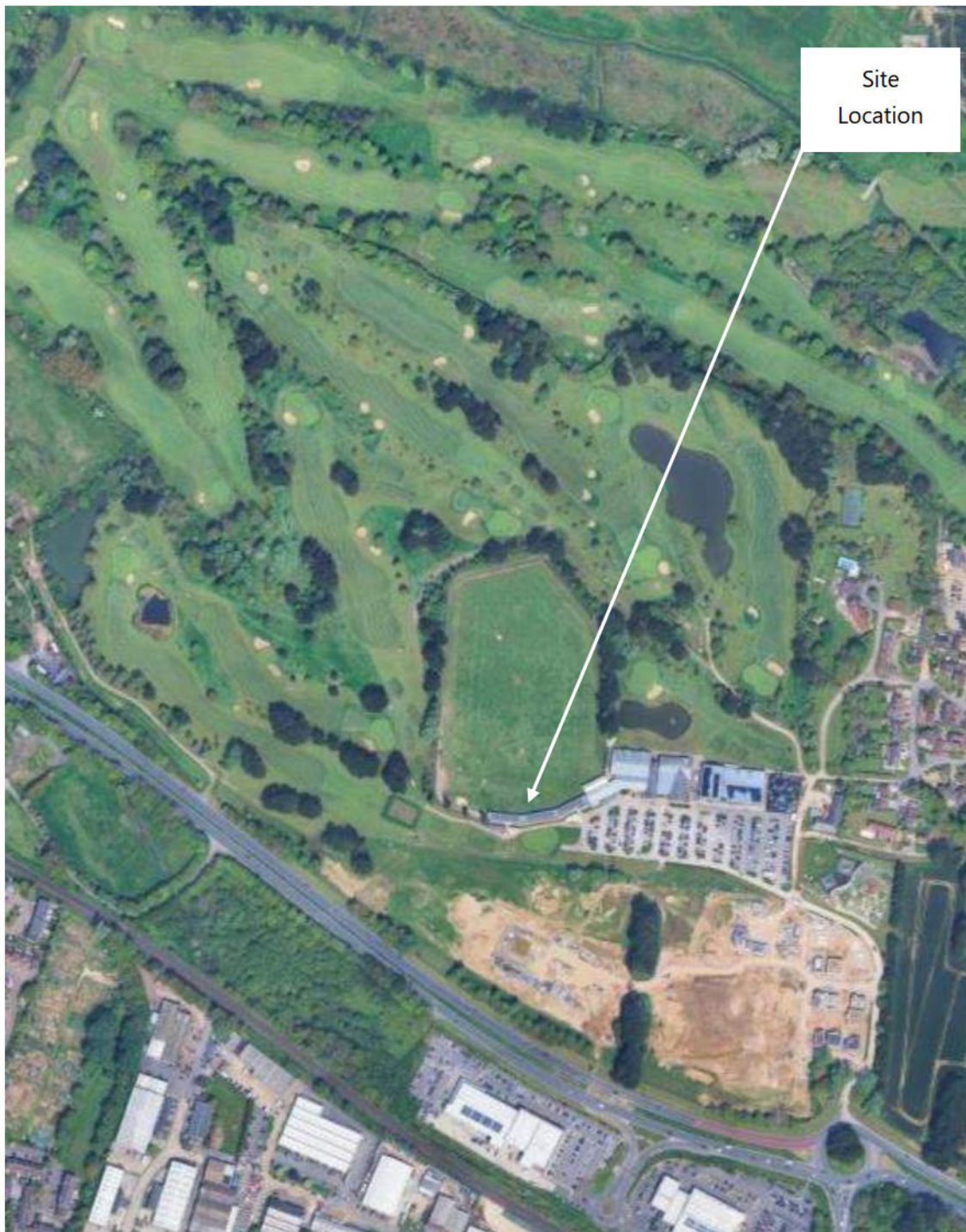
- End of Report -

Appendix A

Site Location Maps & Aerial Photo

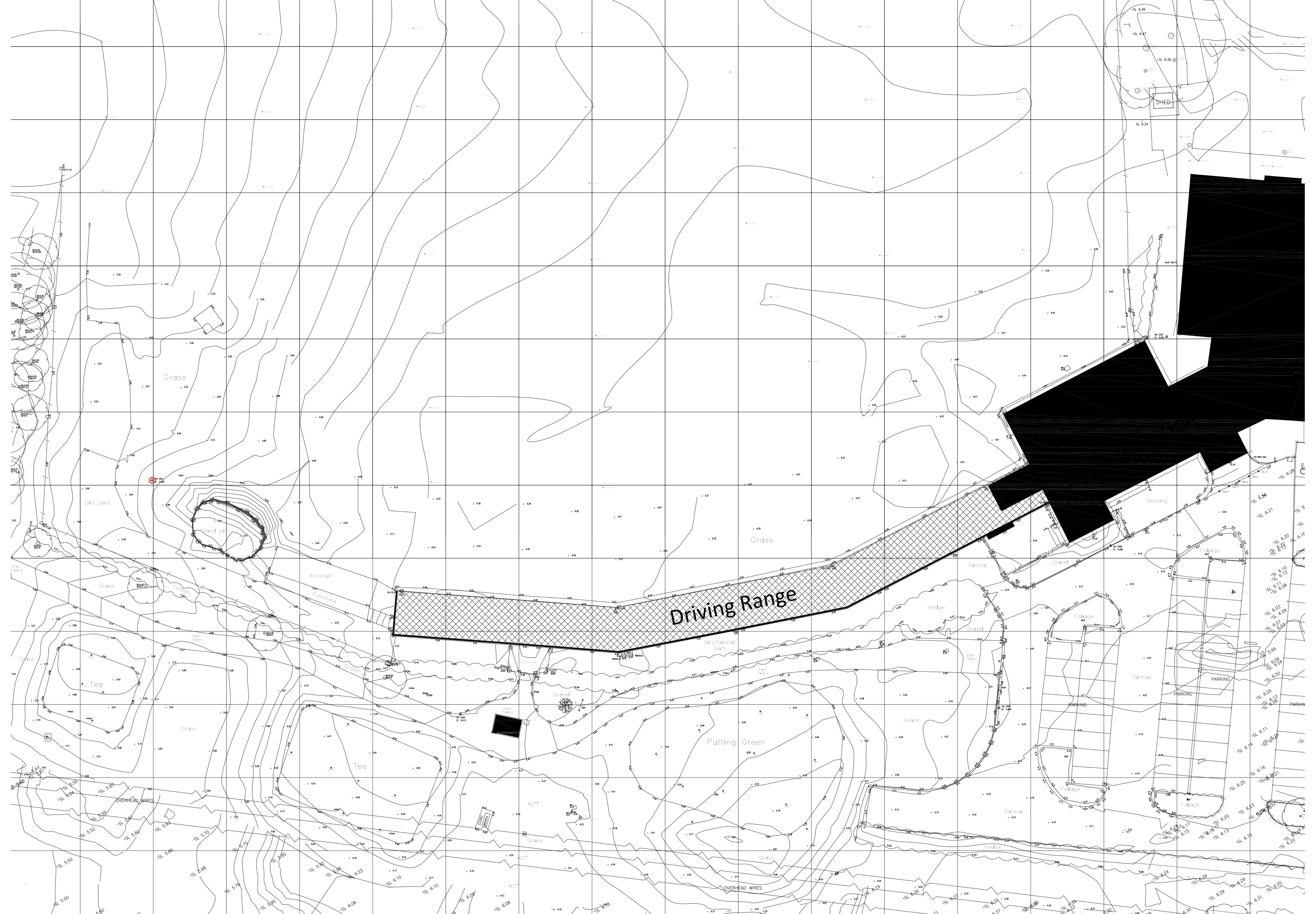


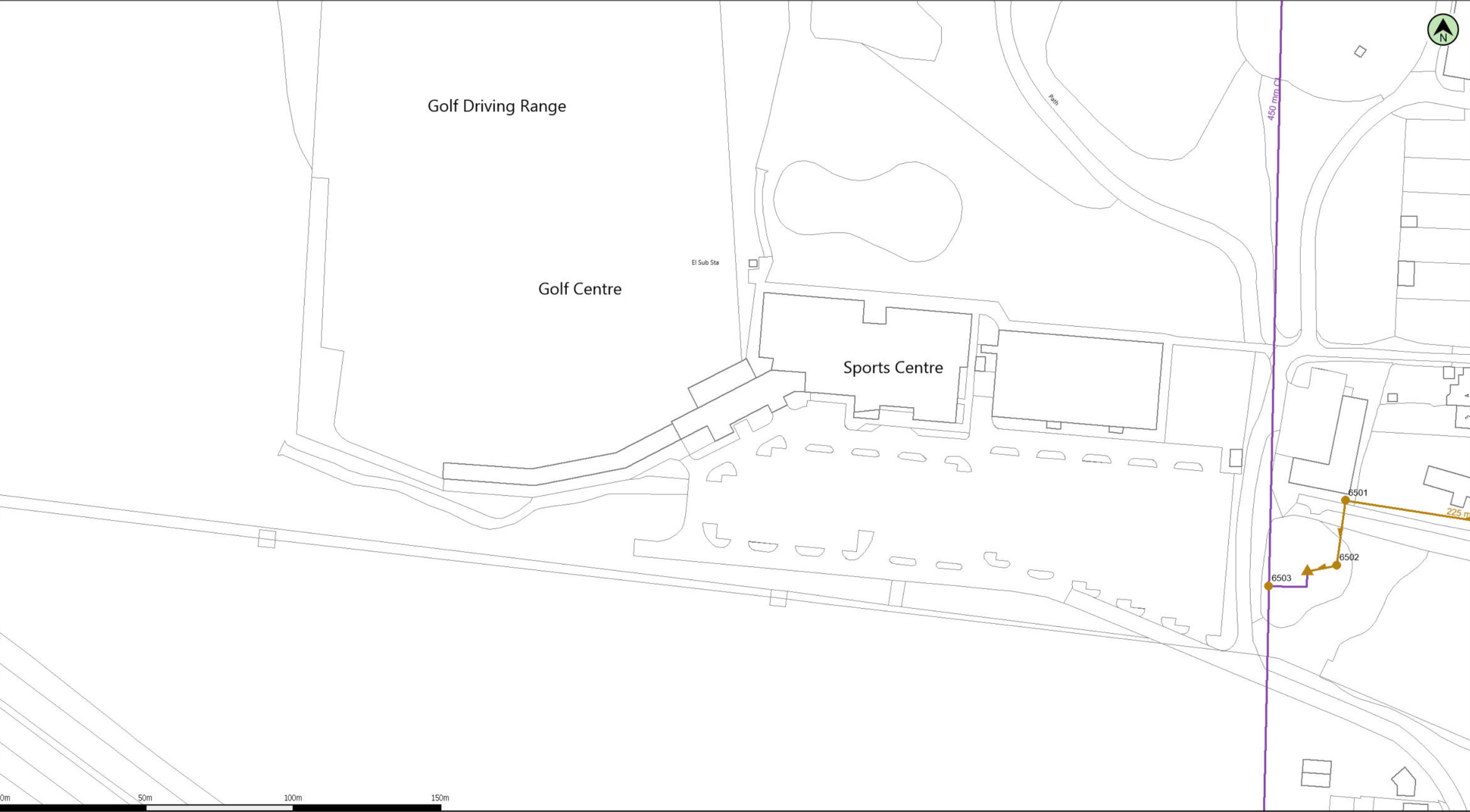




Appendix B

Topographic Survey & Sewer Records





(c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122

Date: 05/02/25

Scale: 1:1250

Map Centre: 505472,103584

Data updated: 21/01/25

Our Ref: 1681342 - 1

Wastewater Plan A3
Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

kdaines@gtacivils.co.uk

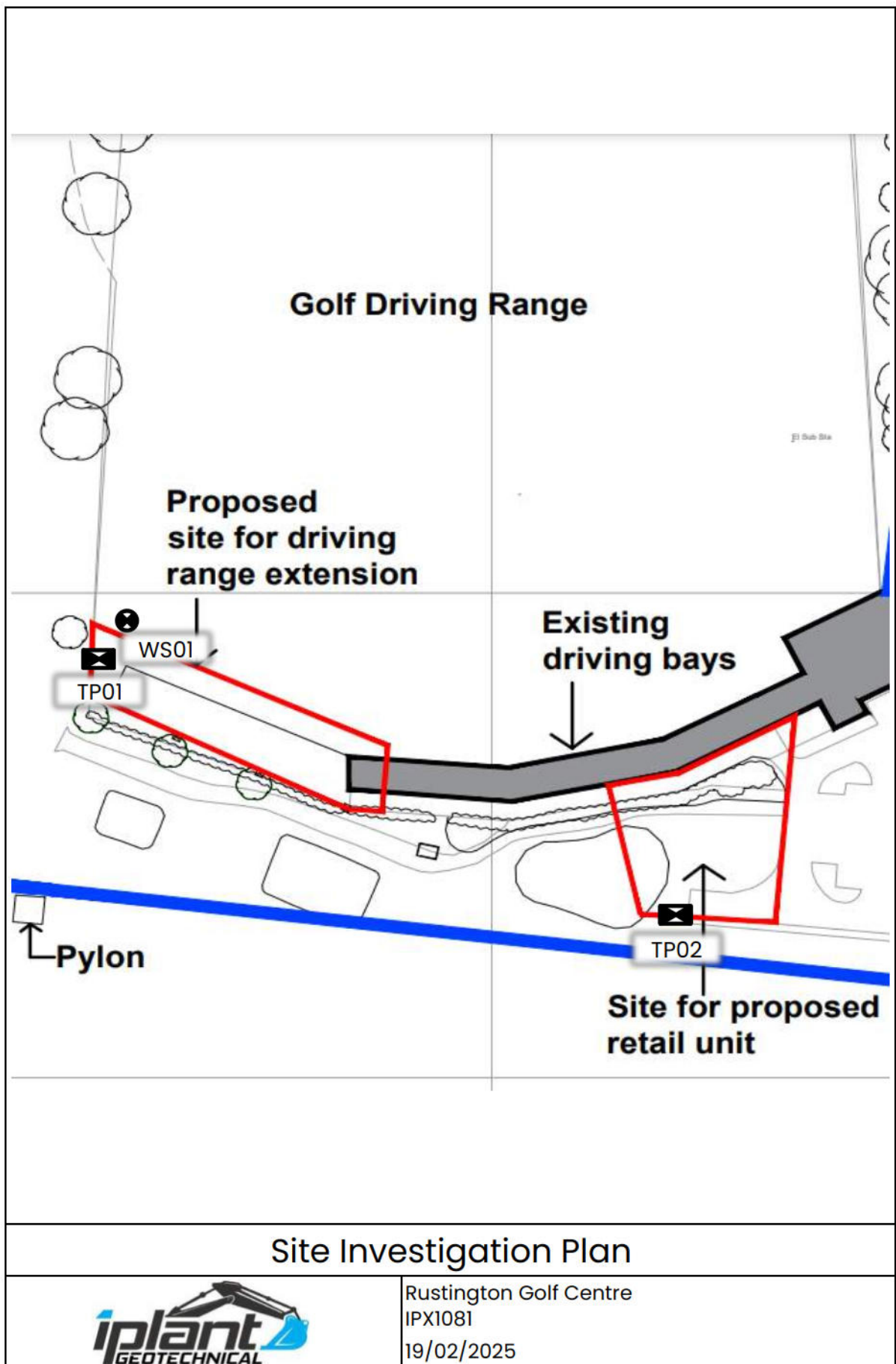
13361/JP



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Appendix C

Excerpts from Site Investigation & CCTV Survey



Infiltration Testing

During the soakaway tests the water failed to achieve a fall from 75% to 25% of the effective depth of the storage volume in both pits. The results obtained from the soakaway tests are summarised below:

TP and Test Number	Dimensions (m)	Depth (m)	Infiltration Rate (m/sec)	Drainage Characteristics
TP01 Test 1	2.0 x 0.4	1.50	N/A	Poor
TP01 Test 2	2.0 x 0.4	1.50	N/A	Poor
TP01 Test 3	2.0 x 0.4	1.50	N/A	Poor
TP02 Test 1	2.0 x 0.4	1.50	N/A	Poor
TP02 Test 2	2.0 x 0.4	1.50	N/A	Poor
TP02 Test 3	2.0 x 0.4	1.50	N/A	Poor

Conclusion

The soils encountered beneath the site at shallow depth were found to be gravelly sandy Clay. The soakage rates obtained during the investigation were found to be poor. Given the data from the tests no infiltration rate could be calculated, it is considered that the use of soakaways within the shallow Clay strata is not suitable.

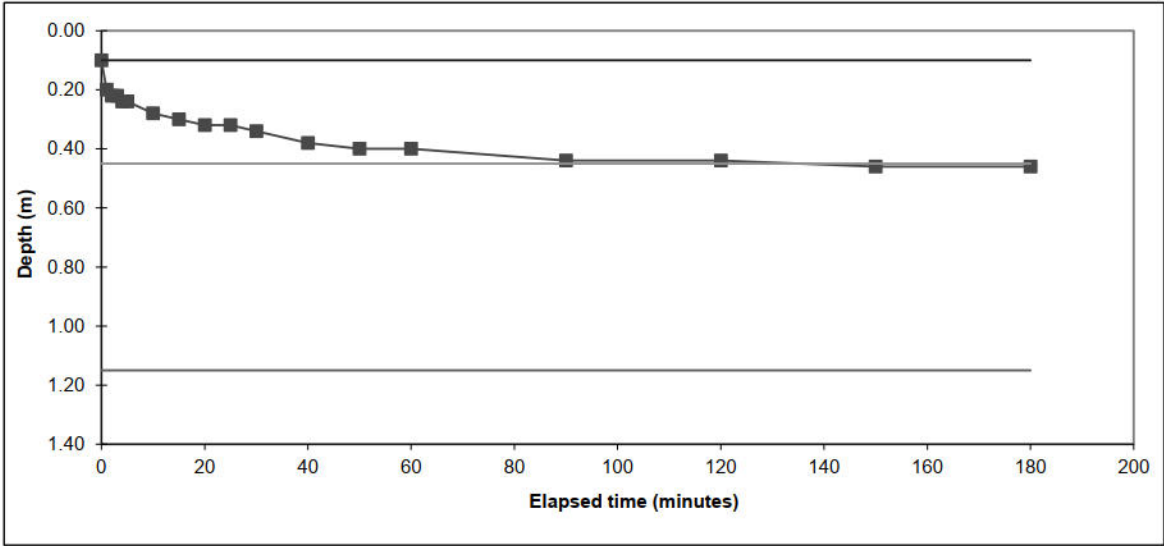
Additional deeper testing within the underlying Chalk bedrock from 3.00m bgl is recommended to ascertain infiltration rates for an alternative deeper soakaway design.

The detailed soil infiltration test results can be reviewed within Appendix F.

iPlant Geotechnical

Soakaway Test

Trial Pit No:	TP01	Test No:	1	Date:	18/02/2025
Length (m):	2.000	Datum Height:			0.00 m agl
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.50	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.100	90	0.440	
	1	0.200	120	0.440	
	2	0.220	150	0.460	
	3	0.220	180	0.460	
	4	0.240			
	5	0.240			
	10	0.280			
	15	0.300			
	20	0.320			
	25	0.320			
	30	0.340			
	40	0.380			
	50	0.400			
	60	0.400			



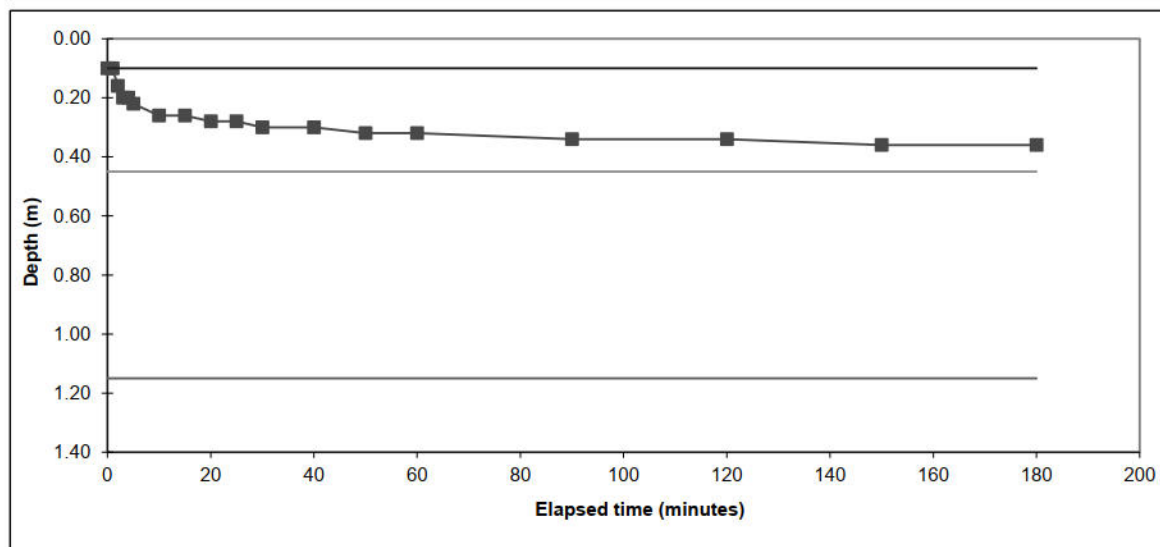
Start water depth for analysis (mbgl):	0.10		
75% effective depth (mbgl):	0.45	Elapsed time (mins):	135.0
50% effective depth (mbgl):	0.80		
25% effective depth (mbgl):	1.15	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.50		
Volume outflow between 75% and 25% effective depth (m³):			
Mean surface area of outflow (m²):			4.16
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			
Soil infiltration rate (m/s):		Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.	
Remarks	Results processed following BRE 365 (2007).		

Client:	GTA Civils and Transport	
Site:	Rustington Golf Club	TP01

iPlant Geotechnical

Soakaway Test

Trial Pit No:	TP01	Test No:	2	Date:	18/02/2025
Length (m):	2.000	Datum Height:		0.00 m agl	
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.50	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.100	90	0.340	
	1	0.100	120	0.340	
	2	0.160	150	0.360	
	3	0.200	180	0.360	
	4	0.200			
	5	0.220			
	10	0.260			
	15	0.260			
	20	0.280			
	25	0.280			
	30	0.300			
	40	0.300			
	50	0.320			
	60	0.320			



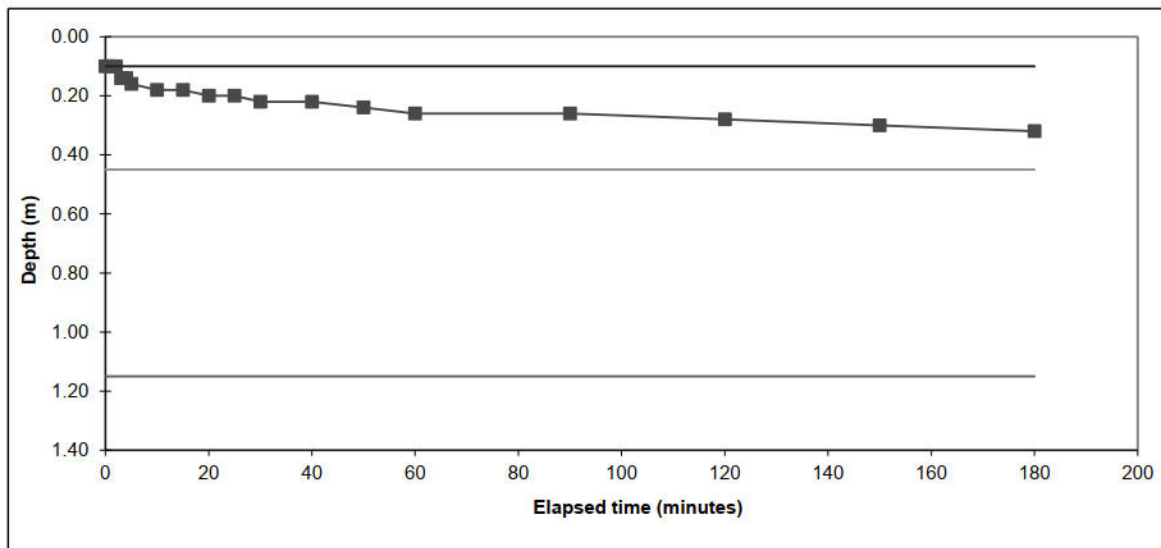
Start water depth for analysis (mbgl)	0.10		
75% effective depth (mbgl):	0.45	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	0.80		
25% effective depth (mbgl):	1.15	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.50		
Volume outflow between 75% and 25% effective depth (m ³):			
Mean surface area of outflow (m ²):			4.16
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			
Soil infiltration rate (m/s):	Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.		
Remarks	Results processed following BRE 365 (2007).		

Client:	GTA Civils and Transport	
Site:	Rustington Golf Club	TP01

iPlant Geotechnical

Soakaway Test

Trial Pit No:	TP01	Test No:	3	Date:	18/02/2025
Length (m):	2.000	Datum Height:		0.00 m agl	
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.50	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.100	90	0.260	
	1	0.100	120	0.280	
	2	0.100	150	0.300	
	3	0.140	180	0.320	
	4	0.140			
	5	0.160			
	10	0.180			
	15	0.180			
	20	0.200			
	25	0.200			
	30	0.220			
	40	0.220			
	50	0.240			
	60	0.260			



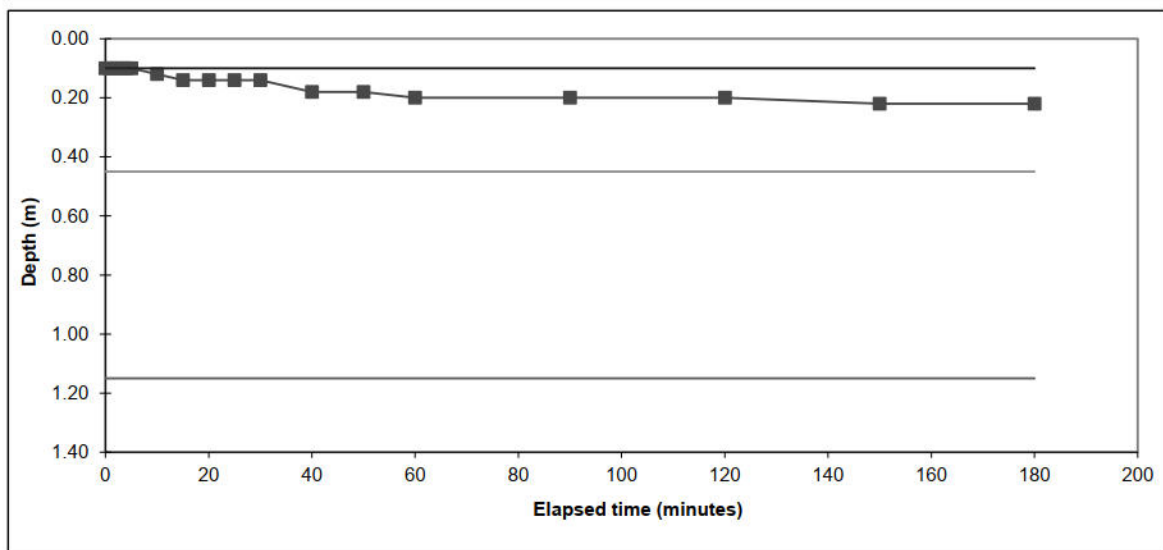
Start water depth for analysis (mbgl)	0.10		
75% effective depth (mbgl):	0.45	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	0.80		
25% effective depth (mbgl):	1.15	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.50		
Volume outflow between 75% and 25% effective depth (m ³):			
Mean surface area of outflow (m ²):		4.16	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			
Soil infiltration rate (m/s):		Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.	
Remarks		Results processed following BRE 365 (2007).	

Client:	GTA Civils and Transport	TP01
Site:	Rustington Golf Club	

iPlant Geotechnical

Soakaway Test

Trial Pit No:	TP02	Test No:	1	Date:	18/02/2025
Length (m):	2.000	Datum Height:		0.00 m agl	
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.50	Porosity of infill:	1	(assumed)	
Elapsed time (minutes)		Water Depth (m below datum)			
0		0.100		90	
1		0.100		120	
2		0.100		150	
3		0.100		180	
4		0.100			
5		0.100			
10		0.120			
15		0.140			
20		0.140			
25		0.140			
30		0.140			
40		0.180			
50		0.180			
60		0.200			



Start water depth for analysis (mbgl)	0.10		
75% effective depth (mbgl):	0.45	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	0.80		
25% effective depth (mbgl):	1.15	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.50		
Volume outflow between 75% and 25% effective depth (m³):			
Mean surface area of outflow (m²):		4.16	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			
Soil infiltration rate (m/s):		Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.	
Remarks		Results processed following BRE 365 (2007).	

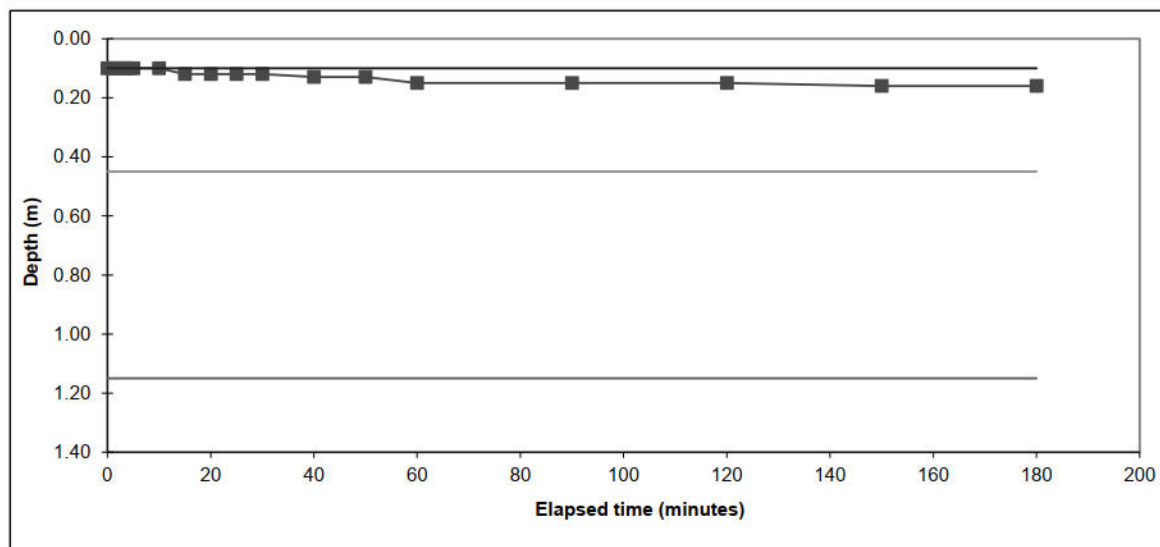
Client:	GTA Civils and Transport	TP02
Site:	Rustington Golf Club	

iPlant Geotechnical

Soakaway Test

Trial Pit No:	TP02	Test No:	2	Date:	18/02/2025
Length (m):	2.000	Datum Height:		0.00 m agl	
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.50	Porosity of infill:	1	(assumed)	

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.100	90	0.150
1	0.100	120	0.150
2	0.100	150	0.160
3	0.100	180	0.160
4	0.100		
5	0.100		
10	0.100		
15	0.120		
20	0.120		
25	0.120		
30	0.120		
40	0.130		
50	0.130		
60	0.150		



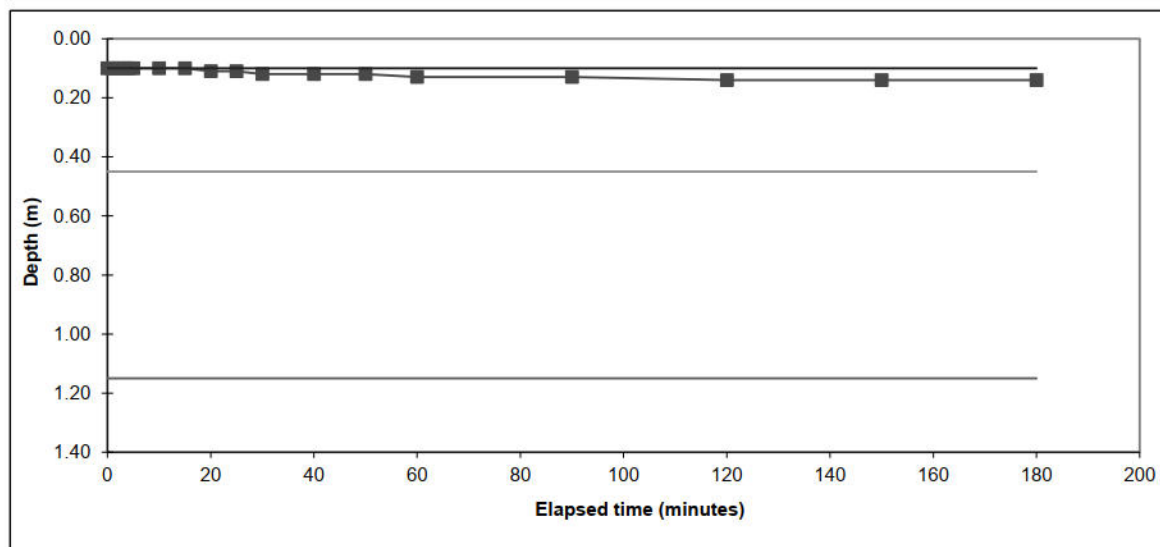
Start water depth for analysis (mbgl)	0.10		
75% effective depth (mbgl):	0.45	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	0.80		
25% effective depth (mbgl):	1.15	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.50		
Volume outflow between 75% and 25% effective depth (m ³):			
Mean surface area of outflow (m ²):		4.16	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			
Soil infiltration rate (m/s):		Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.	
Remarks		Results processed following BRE 365 (2007).	

Client:	GTA Civils and Transport	TP02
Site:	Rustington Golf Club	

iPlant Geotechnical

Soakaway Test

Trial Pit No:	TP02	Test No:	3	Date:	18/02/2025
Length (m):	2.000	Datum Height:		0.00 m agl	
Width (m):	0.40	Granular infill:	None		
Depth (m):	1.50	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.100	90	0.130	
	1	0.100	120	0.140	
	2	0.100	150	0.140	
	3	0.100	180	0.140	
	4	0.100			
	5	0.100			
	10	0.100			
	15	0.100			
	20	0.110			
	25	0.110			
	30	0.120			
	40	0.120			
	50	0.120			
	60	0.130			



Start water depth for analysis (mbgl)	0.10		
75% effective depth (mbgl):	0.45	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	0.80		
25% effective depth (mbgl):	1.15	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.50		
Volume outflow between 75% and 25% effective depth (m ³):			
Mean surface area of outflow (m ²):		4.16	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			
Soil infiltration rate (m/s):		Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.	
Remarks		Results processed following BRE 365 (2007).	

Client:	GTA Civils and Transport	TP02
Site:	Rustington Golf Club	

Project Information

Project Name
Rustington Golf Course

Project Number

Project Date
03/05/2025

Project Drawing, Page 'Rustington Golf Course'



Section Inspection - 03/05/2025 - OF5X

Item No. 5	Insp. No. 1	Date 03/05/25	Time 10:13	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR OF5X
Operator JY		Vehicle FV73 RZB		Camera P540	Preset Length Not Specified	Legal Status Private Drain	Alternative ID Not Specified

Section Drawing OF5X, Page OF5X



Appendix D

Proposed Drainage Layout & Drainage Construction Details

- DESIGN NOTES**
1. STORAGE DESIGN BASED ON 1 IN 100 YR STORM + 45 %.
 2. DRAIN POINTS AND LOCATIONS TO BE CONFIRMED BY ARCHITECT.
 3. CONTRACTOR TO ESTABLISH LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCING.
 4. EXISTING TREES TO BE PROTECTED WHERE EXCAVATIONS RUN CLOSE. ANY DRAIN ROUTE THROUGH ROOT PROTECTION AREAS TO BE INSTALLED IN ACCORDANCE WITH ARBORICULTURAL SPECIALIST REQUIREMENTS.
 5. REFER TO DRAWING 1701-1702 FOR DETAILS

- GENERAL NOTES**
1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non-intrusive observations, record drawings or the file. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. Any discrepancies shall be notified to gta prior to works commencing.
 2. Tender or billing drawings shall not be used for construction or the ordering of materials.
 3. Do not scale. All dimensions and levels to be site confirmed.
 4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements.
 5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
 6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made shorter due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.
 7. If viewing this drawing as an Autocad file (.dwg) in digital format then it is done so with this Disclaimer due to the fact that it can be altered and manipulated following its issue by GTA Civils & Transport and therefore, any alteration or modification of DWG data files provided by GTA Civils & Transport, by you or a third party, without GTA Civils and Transport's express written approval is done so entirely at your own risk. Modification includes (but is not limited to) turning layers on and off, unfreezing layers and relocking, turning on and off point functions and subediting a vext.
 8. Your attention is also drawn to the fact that the information contained within this file may be subject to alteration at any time, pending technical approval from an approving authority or at the client's instruction. It is therefore strongly recommended that multiple and regular cross-checks are made against the current contract drawings.
 9. It is your responsibility to ensure that the correct issue or revision of the DWG data file is being used and requests for updated information made accordingly.
 9. Should any apparent discrepancies between the data contained within the DWG file and the current contract drawings become evident, it must be reported back to GTA Civils & Transport as soon as reasonably practicable. Precedence should be given to the current contract drawings (PDF) unless advised otherwise.

SPECIFICATION NOTES

All drainage shall be constructed and commissioned in accordance with BS EN 295 & BS EN752. Babling Regulations Doc. H and any particular requirements of the Building Control Officer.

Drainage pipelines shall be in PVC-U below ground as Halsey or similar approved, or vitrified clay.

All sewer pipelines to be VC only.

This drawing shall be read in conjunction with all other relevant drainage drawings, architectural drawings and structural drawings.

For manhole details, gully details, bedding etc., refer to gta detail sheets.

All foul water drain runs shall have a fall of 1:40 or steeper, unless noted otherwise.

All current used for concrete drainage installations shall be sulphate resistant to class 3 of BRE Digest 303 (Grade S75)

The use of short radius or 90° bends for changes in direction is not permitted, only long or medium radius 45° bends shall be used. All junctions shall be 45°.

All drains shall have granular bed and surround as class 'S' bedding, unless noted otherwise.

All drainage works shall commence from the downstream end first, unless agreed otherwise. Detail level to be checked by contractor prior to any works commencing and any discrepancy identified to engineer prior to laying and drainage.

ABBREVIATIONS

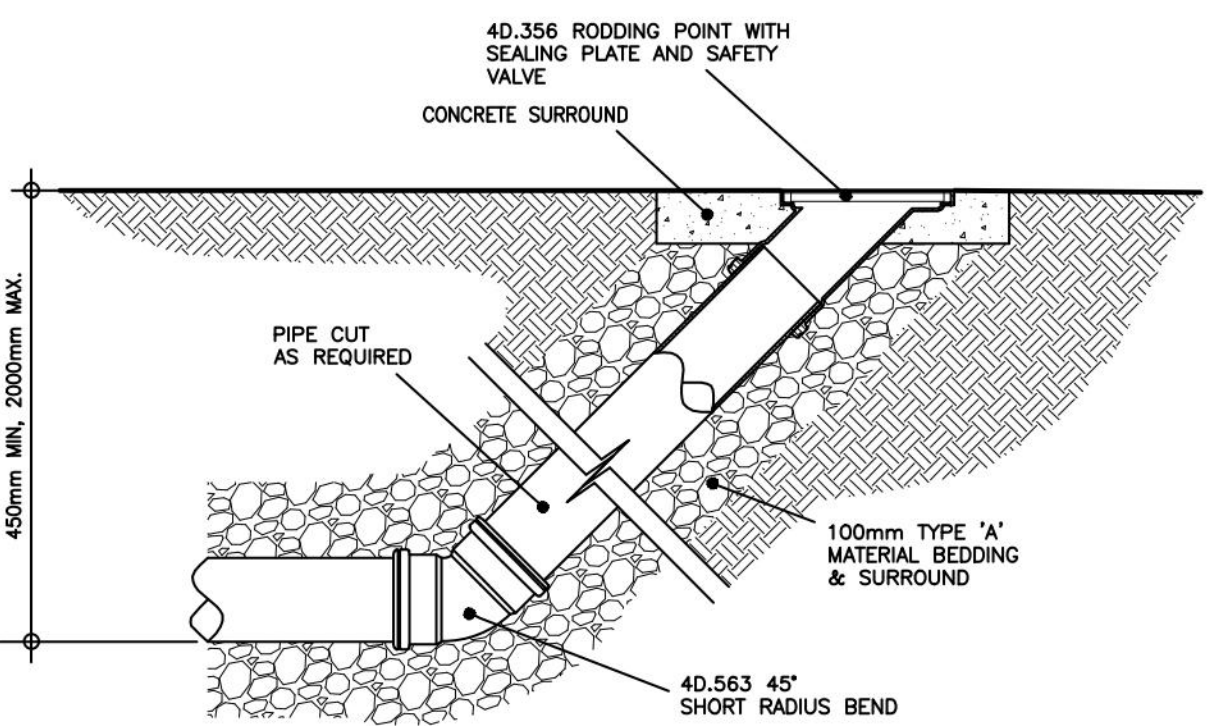
FD	FULL DRAIN
SWD	SURFACE WATER DRAIN
FWS	ADOPTABLE FOWL WATER SEWER
SWS	ADOPTABLE SURFACE WATER SEWER
MH	MANHOLE
IC	INSPECTION CHAMBER
SA	SOAKAWAY
RIC	450mm DIA. FOWL INSPECTION CHAMBER
SIC	450mm DIA. SURFACE WATER INSPECTION CHAMBER
RAC	300mm DIA. FOWL ACCESS CHAMBER
SAC	300mm DIA. SURFACE WATER ACCESS CHAMBER
CT	CAST IRON
VC	VITRIFIED CLAY
CONC	CONCRETE
PVC-U	POLYVINYL CHLORIDE - UNPLASTICISED
G	GRASS
VE	VEGETATION
RG	ROAD GULLY
CPS	CAR PARK GULLY
DP	BELOW GROUND DRAIN POINT
SP	SOIL VENT PIPE DROP
EP	EXTERNAL WOODING POINT
DT	SURFACE WATER DISTRIBUTION TANK
FTL	FINISHED FLOOR LEVEL
SL	STRUCTURAL SLAB LEVEL
QL	GROUND LEVEL
CL	COVER LEVEL
PL	PAVEMENT LEVEL
SL	SUMP LEVEL
HL	HIGH LEVEL
HL	HIGH LEVEL
RD	ROAD
CS	CONCRETE BED & SURROUND
CS	CONCRETE BED & SURROUND
CS	CONCRETE BED & SURROUND
CS	CONCRETE BED & SURROUND

KEY

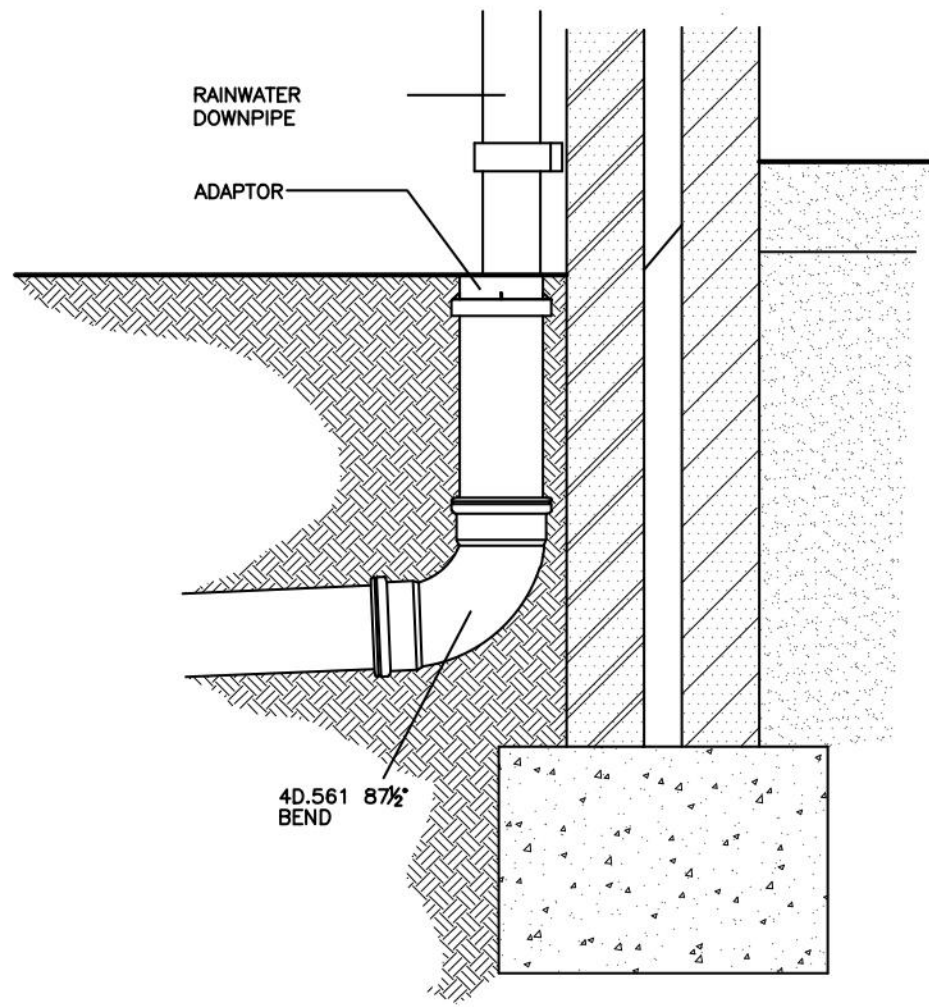
- Existing surface water drain
- Private surface water drain
- Private Surface Water Manhole
- SIC 450mm dia. Surface Water Inspection Chamber
- SAC 300mm diameter Surface Water Access Chamber
- RP Road point

P3	ADDITIONAL DETAILS ADDED	18.11.25	PW	MR
P2	TO CLIENT'S COMMENTS	05.06.25	PW	MR
P1	FIRST ISSUE	27.05.25	PW	MR
Rev	Amendments	Date	Drawn	Checked

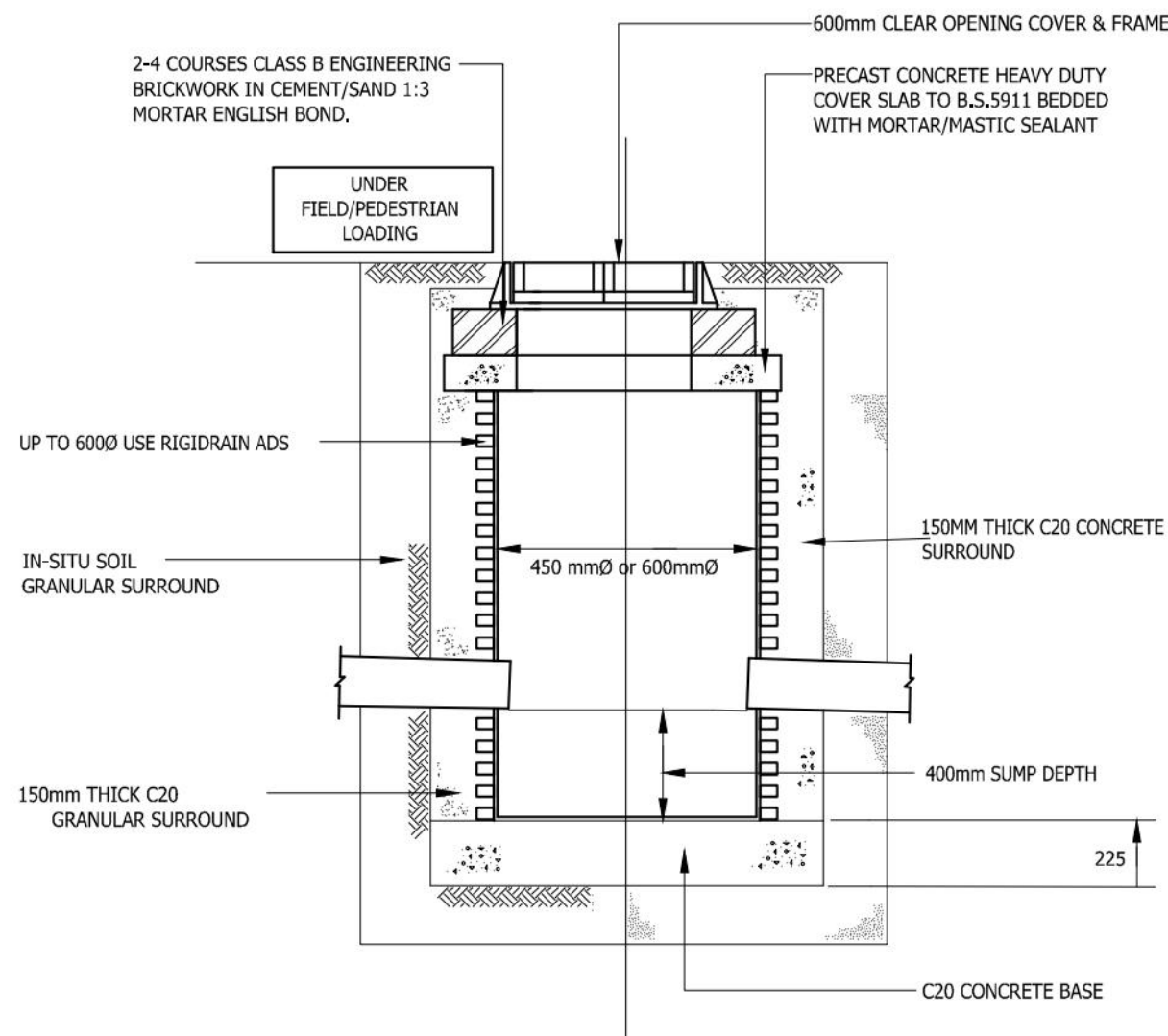
Status	FOR CONDITION DISCHARGE
Client	RUSTINGTON GOLF CENTRE LTD
Architect	BRIAN HEAP
Project	RUSTINGTON GOLF CENTRE GOLFERS LANE, ANGMERING
Title	DRAINAGE STRATEGY
Date	MAY 2025
Scale @ A0	1:200
Client Ref	Project Ref
	13361
 Mable House, 100-108 London Road, Burgess Hill, West Sussex, BN15 9BD Tel: 01444 871444 Web: www.gtacivils.co.uk	
Drawing Number	13361/1101
Rev	P3



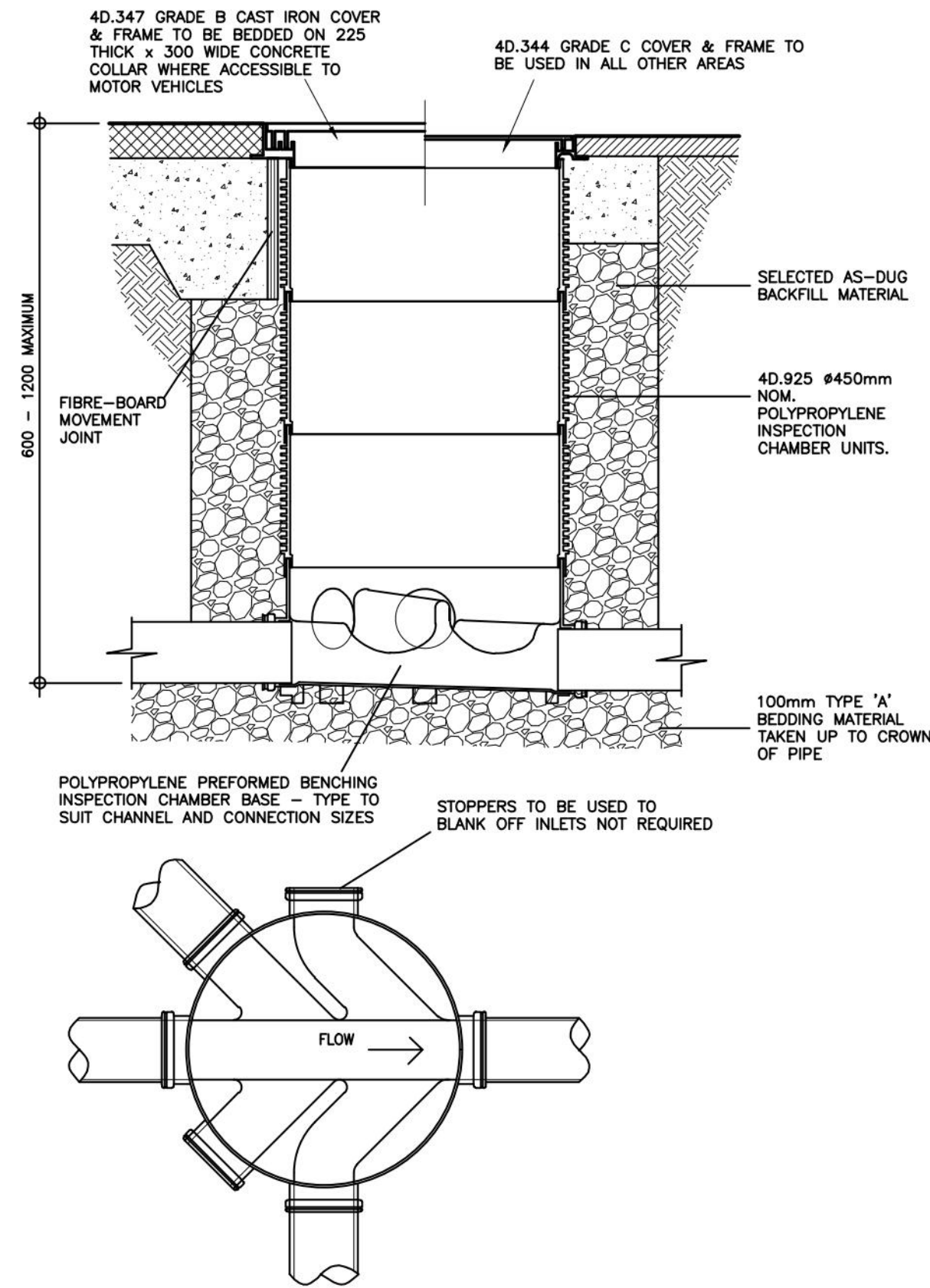
(1:10 typical)
TYPICAL RODDING POINT DETAIL



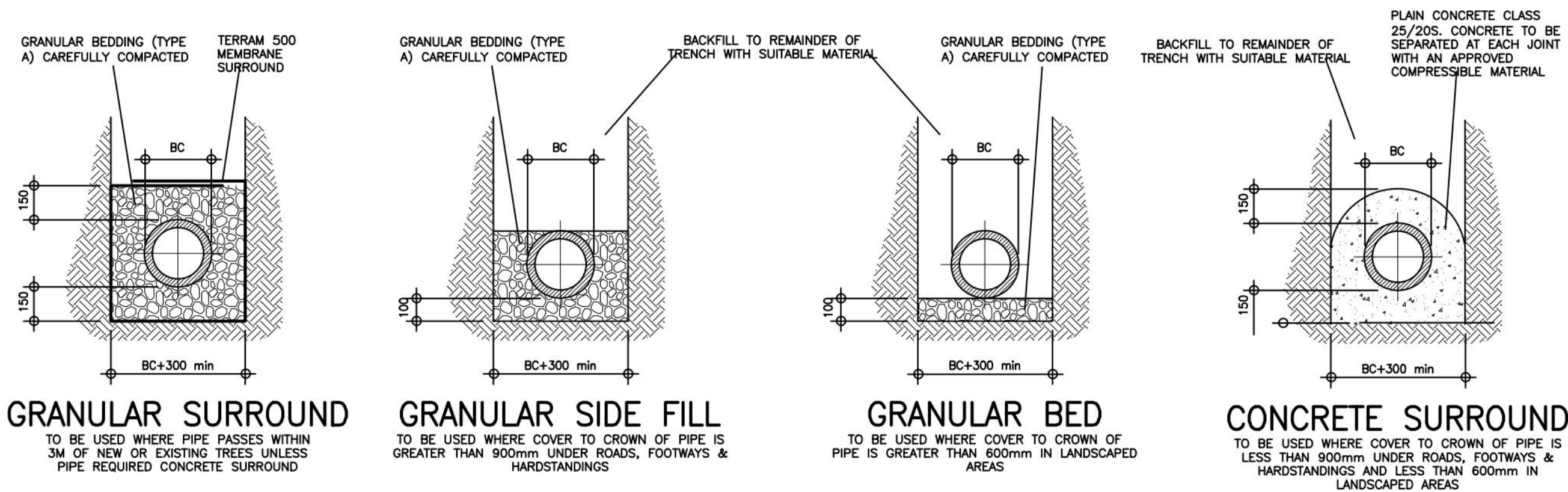
EXTERNAL RAINWATER DOWNPIPE TO DRAIN (1:10 typical)



TYPICAL POLYPROPYLENE CATCHPIT (1:20 typical)



TYPICAL INSPECTION CHAMBER (1:10 typical)



GRANULAR SURROUND
TO BE USED WHERE PIPE PASSES WITHIN 3M OF NEW OR EXISTING TREES UNLESS PIPE REQUIRED CONCRETE SURROUND

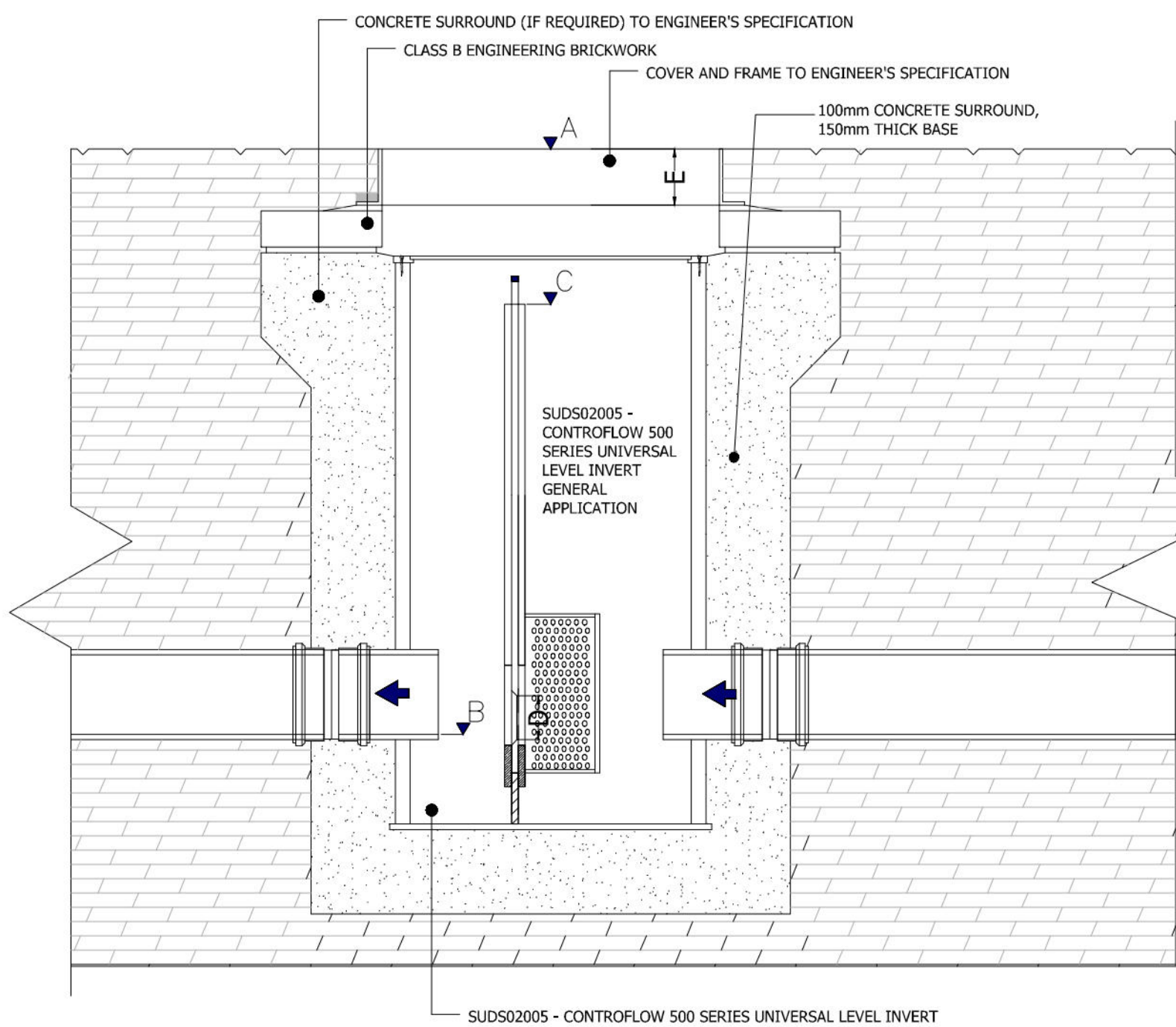
GRANULAR SIDE FILL
TO BE USED WHERE COVER TO CROWN OF PIPE IS GREATER THAN 900mm UNDER ROADS, FOOTWAYS & HARDSTANDINGS

GRANULAR BED
TO BE USED WHERE COVER TO CROWN OF PIPE IS GREATER THAN 600mm IN LANDSCAPED AREAS

CONCRETE SURROUND
TO BE USED WHERE COVER TO CROWN OF PIPE IS LESS THAN 900mm UNDER ROADS, FOOTWAYS & HARDSTANDINGS AND LESS THAN 600mm IN LANDSCAPED AREAS

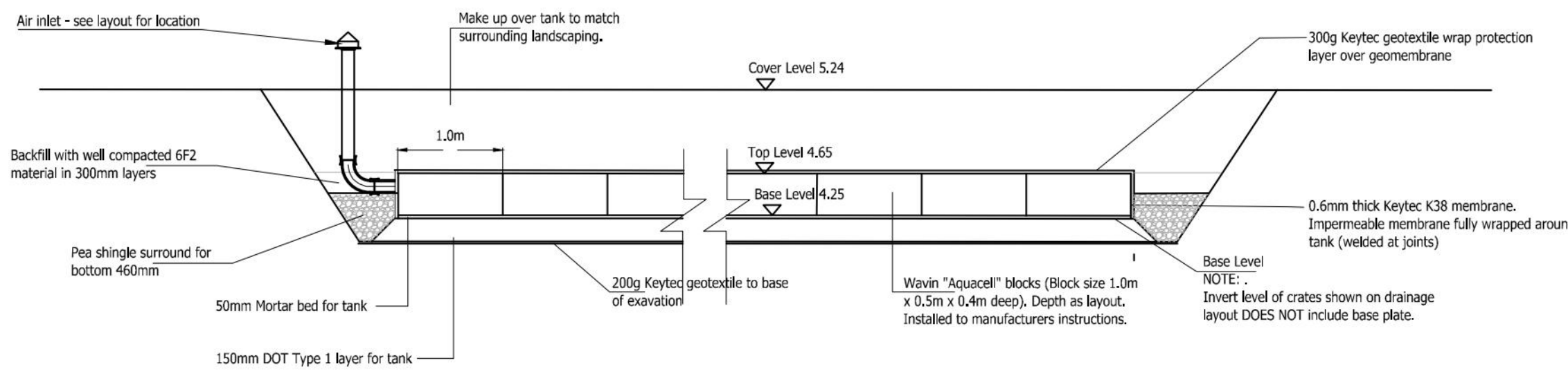
GRANULAR BEDDING TYPE A - SHALL CONSIST OF AGGREGATES FROM NATURAL SOURCES OR SINTERED PULVERISED FUELSH COMPLYING WITH THE RELEVANT PROVISIONS OF BS 882 AND BS 3797 PART 2 RESPECTIVELY. TO BE SIZED ACCORDING TO PIPE DIAMETER TO APPROVED DOCUMENT H OF THE BUILDING REGULATIONS: 5mm TO 10mm SIZE MATERIAL FOR 100mm PIPES, 14mm FOR 150mm PIPES & 20mm FOR PIPES 150-600mm.

PIPE BEDDING DETAILS (Scale 1:20)

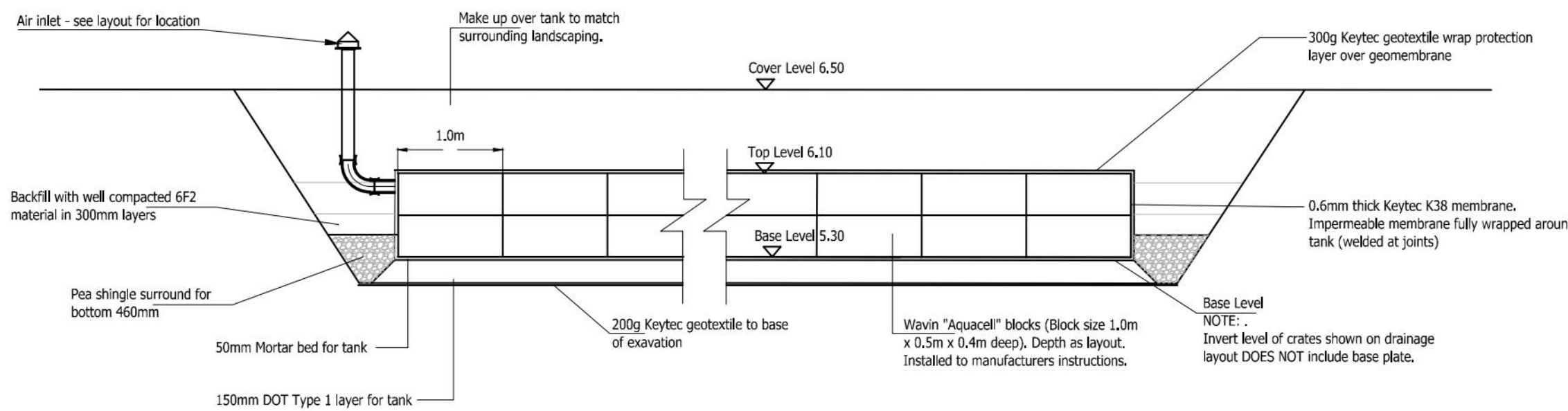


SEL CONTROL CHAMBER CONTOFLOW 500 SERIES

- A - COVER LEVEL: PPCP 1 - 6.30m AOD; PPCP3 - 5.50m AOD
B - PIPE INVERT LEVEL: PPCP 1 - 5.25m AOD; PPCP 3 - 4.13m AOD
C - WEIR LEVEL: PPCP 1 - 6.05m AOD; PPCP 3 - 5.25m AOD
D - ORIFICE DIAMETER: PPCP 1 - 40mm; PPCP 3 - 25mm
E - DEPTH OF COVER AND FRAME TO BE USED (100mm)



SECTION THROUGH RETENTION TANK 2



SECTION THROUGH RETENTION TANK 1

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations , record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. Any discrepancies shall be notified to gta prior to works commencing.
2. Tender or billing drawings shall not be used for construction or the ordering of materials.
3. Do not scale. All dimensions and levels to be site confirmed.
4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements.
5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

PRODUCT REFERENCE CODES SHOWN ON DETAILS ARE TO WAVIN OSMO RANGE UNLESS OTHERWISE STATED

P2	ADDITIONAL DETAILS ADDED	19.11.25	AE	FV
P1	INITIAL ISSUE	09.06.25	AE	FV
Rev	Amendments	Date	Dsn	Chk

Status	PRELIMINARY			
Client	BRIAN HEAP			
Architect				
Project	RUSTINGTON GOLF CENTRE GOLFERS LANE, ANGMERING			
Title	DRAINAGE CONSTRUCTION DETAILS - SHEET 1			
Date	JUNE 2025	Scale @ A1	NTS	
Clients Ref.		Project Ref.	13361	

gta Civils & Transport Maple House, 192-198 London Road, Burgess Hill, West Sussex, RH15 9RD Tel 01444 871444 Web: www.gtacivils.co.uk	
Drawing Number	Rev.
13361/1701	P2

Swale 1
Longsection

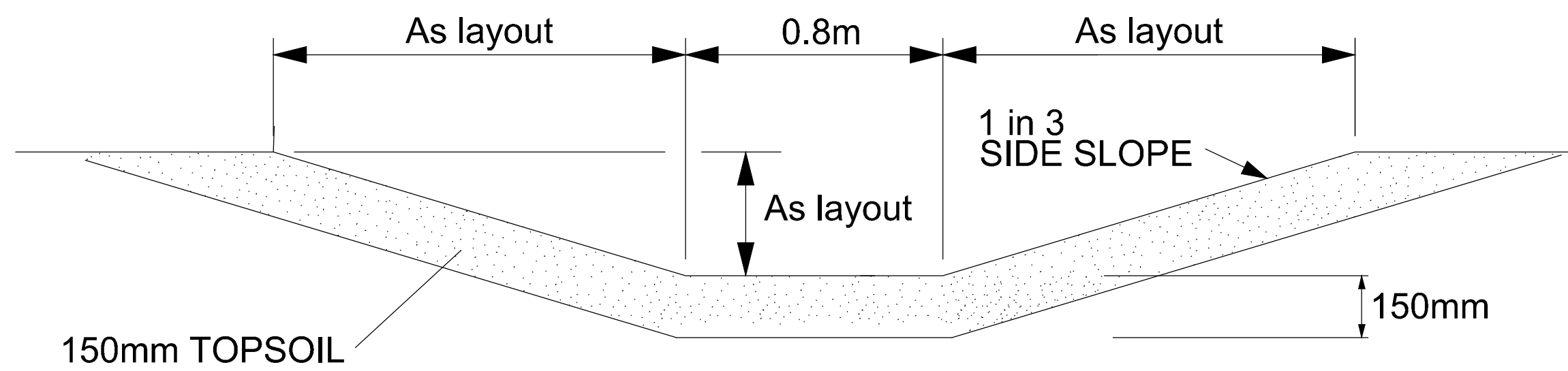
Vertical Exaggeration: 5
Datum: 0.000M AOD

CHAINAGE ON CENTRELINE (m)	0.000	10.000	20.000	23.030
LEVELS ON CENTRELINE OF SWALE (m)	4.425	4.376	4.318	4.300
LEVELS ON LEFT HAND CHANNEL (m)	4.429	4.380	4.322	4.304
LEVELS ON RIGHT HAND CHANNEL (m)	4.429	4.380	4.322	4.304
VERTICAL DESIGN ON SWALE CENTRELINE	GRADIENT -0.6% (1 in 171) LENGTH = 23.033m			
HORIZONTAL DESIGN ON SWALE CENTRELINE	STRAIGHT LENGTH = 23.033m			
EXISTING LEVELS (m)	5.410	5.368	5.344	5.296

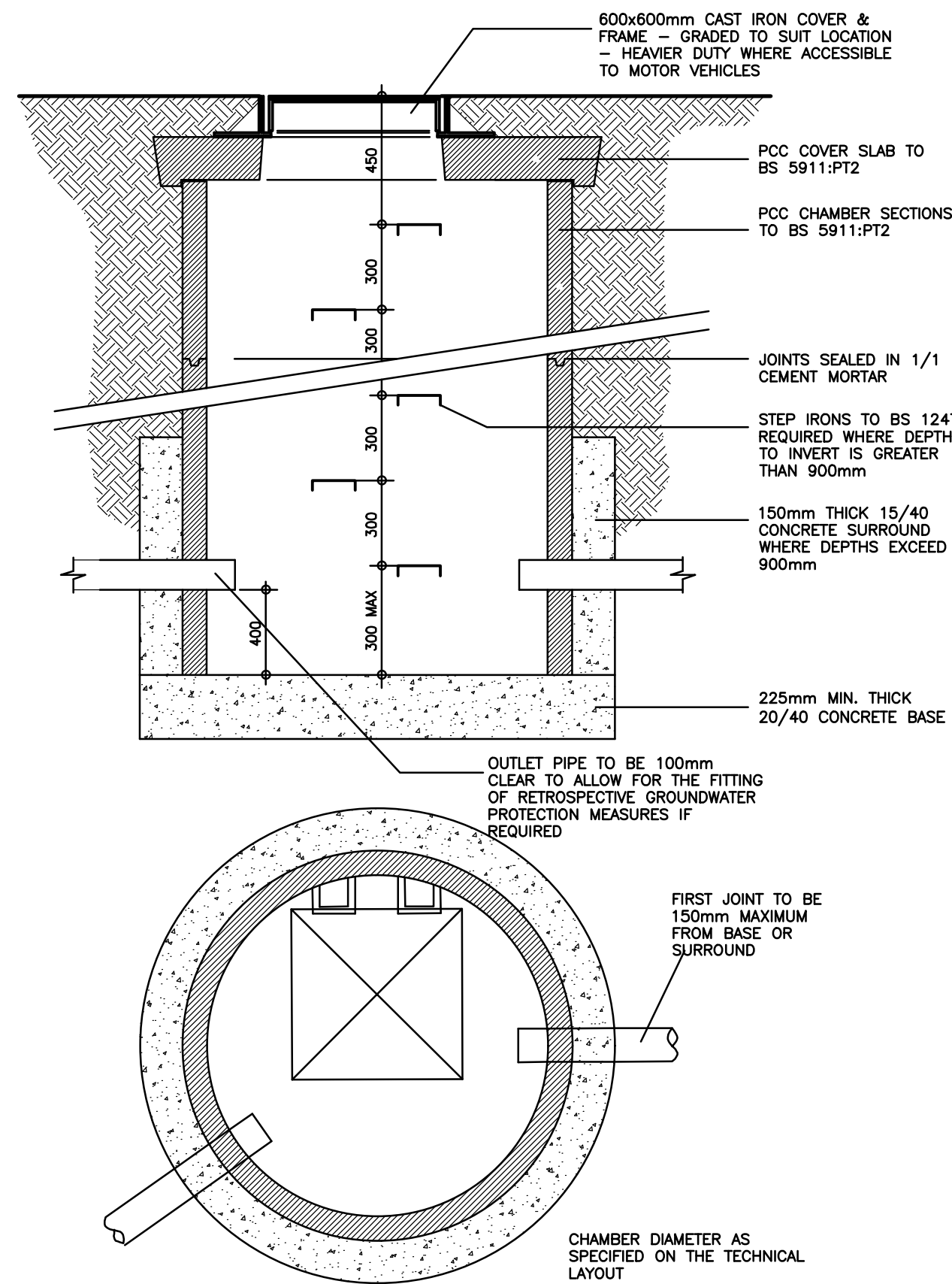
Swale 1
Cross-section

Vertical Exaggeration: 1
Datum: 0.000M AOD

EXISTING LEVELS (m)	5.410 5.368 5.344 5.296
PROPOSED LEVELS (m)	5.351 5.309 5.285 5.237



TYPICAL SWALE DETAIL



TYPICAL PRECAST CONCRETE
CATCHPIT (1:20 typical)

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations , record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. any discrepancies shall be notified to gta prior to works commencing.
2. Tender or billing drawings shall not be used for construction or the ordering of materials.
3. Do not scale. All dimensions and levels to be site confirmed.
4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements.
5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

PRODUCT REFERENCE CODES
SHOWN ON DETAILS ARE TO
WAVIN OSMO RANGE UNLESS
OTHERWISE STATED

P1	INITIAL ISSUE	19.11.25	AE	PW		
Rev	Amendments	Date	Dsn	Chk		
Status						
CONDITION DISCHARGE						
Client						
BRIAN HEAP						
Architect						
Project						
RUSTINGTON GOLF CENTRE GOLFERS LANE, ANGMERING						
Title						
DRAINAGE CONSTRUCTION DETAILS - SHEET 2						
Date	NOVEMBER 2025	Scale @ A1	NTS			
Clients Ref.	Project Ref.		13361			
 Maple House, 192-198 London Road, Burgess Hill, West Sussex, RH15 9RD Tel:01444 871444 Web: www.gtacivils.co.uk						
Drawing Number			Rev.			
13361/1702			P1			

Appendix E

Drainage Calculation Sheets

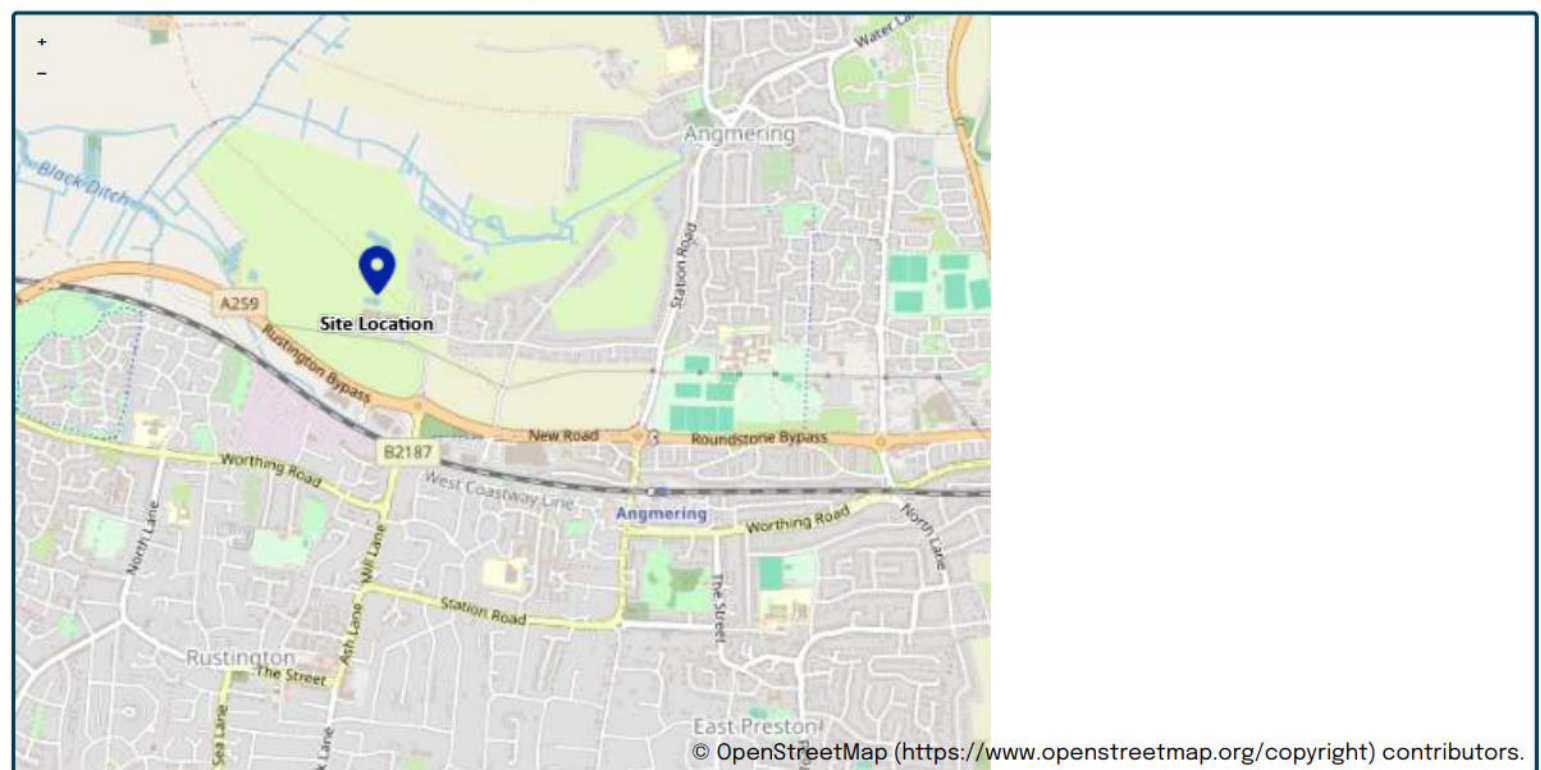
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	27/05/2025
Calculated by	FVV
Reference	13361
Model version	2.0.1

Location

Site name	Rustington Golf Centre
Site location	Angmering



Site easting	505541
Site northing	103595

Site details

Total site area (ha)	0.059	ha
----------------------	-------	----

Greenfield runoff

Method

Method	IH124	
IH124		
SAAR (mm)	My value 720mm	Map value 720
How should SPR be derived?	WRAP soil type	
WRAP soil type	2	2
SPR	0.3	
QBar (IH124) (l/s)	0.11	l/s

Growth curve factors

Hydrological region	My value 7	Map value 7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	IH124	
Flow rate 1 year (l/s)	0.094	l/s
Flow rate 2 year (l/s)	0.098	l/s
Flow rate 10 years (l/s)	0.18	l/s
Flow rate 30 years (l/s)	0.26	l/s
Flow rate 100 years (l/s)	0.35	l/s
Flow rate 200 years (l/s)	0.42	l/s

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.1) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
RP1	0.028	5.00	6.274	180	505450.055	103558.449	0.524	5.750
Tank 1		5.00	6.439		505430.709	103553.951	1.139	5.300
PPCP1			6.292	450	505431.334	103560.396	1.036	5.256
SIC1			6.293	450	505404.180	103554.767	1.222	5.071
SIC2	0.014	5.00	6.204	450	505371.977	103557.167	1.349	4.855
SIC3	0.013	5.00	5.479	450	505325.817	103576.717	0.959	4.520
PPCP2	0.004	5.00	5.477	450	505326.625	103585.280	1.015	4.462
Swale In 1			5.300		505326.940	103588.958	0.864	4.436
Swale Out 1			5.250		505328.586	103611.932	0.950	4.300
Tank 2		5.00	5.241		505331.699	103614.864	0.991	4.250
PPCP3			5.239	600	505328.786	103614.889	1.039	4.200
SCP1			5.227	1350	505328.066	103617.330	1.096	4.131

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)
1.000	RP1	PPCP1	18.822	0.600	5.750	5.256	0.494	38.1	150	5.19	50.0
2.000	Tank 1	PPCP1	6.475	0.600	5.300	5.256	0.044	147.2	150	5.13	50.0
1.001	PPCP1	SIC1	27.731	0.600	5.256	5.071	0.185	149.9	150	5.76	50.0
1.002	SIC1	SIC2	32.292	0.600	5.071	4.855	0.216	149.5	150	6.41	50.0
1.003	SIC2	SIC3	50.129	0.600	4.855	4.520	0.335	149.6	150	7.43	50.0
1.004	SIC3	PPCP2	8.601	0.600	4.520	4.462	0.058	148.3	150	7.61	50.0
1.005	PPCP2	Swale In 1	3.692	0.600	4.462	4.436	0.026	142.0	150	7.68	50.0
1.006	Swale In 1	Swale Out 1	23.033	0.030	4.436	4.300	0.136	169.4	800	7.94	50.0
1.007	Swale Out 1	PPCP3	2.963	0.600	4.300	4.200	0.100	29.6	225	7.96	50.0
3.000	Tank 2	PPCP3	2.913	0.600	4.250	4.200	0.050	58.3	225	5.03	50.0
1.008	PPCP3	SCP1	2.545	0.600	4.200	4.131	0.069	36.9	225	7.98	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.635	28.9	7.3	0.374	0.886	0.028	0.0	51	1.366
2.000	0.826	14.6	0.0	0.989	0.886	0.000	0.0	0	0.000
1.001	0.818	14.5	7.3	0.886	1.072	0.028	0.0	76	0.822
1.002	0.819	14.5	7.3	1.072	1.199	0.028	0.0	76	0.823
1.003	0.819	14.5	11.0	1.199	0.809	0.042	0.0	98	0.900
1.004	0.823	14.5	14.4	0.809	0.865	0.055	0.0	122	0.936
1.005	0.841	14.9	15.5	0.865	0.714	0.059	0.0	130	0.952
1.006	1.475	3775.4	15.5	0.064	0.150	0.059	0.0	51	0.316
1.007	2.412	95.9	15.5	0.725	0.814	0.059	0.0	61	1.787
3.000	1.716	68.2	0.0	0.766	0.814	0.000	0.0	0	0.000
1.008	2.161	85.9	15.5	0.814	0.871	0.059	0.0	65	1.650

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	0.1
Rainfall Events	Singular	Drain Down Time (mins)	1440	30 year (l/s)	0.3
Summer CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	0.4
Winter CV	1.000	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	40	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.059	Betterment (%)	0
SAAR (mm)	731	QBar	0.1
Soil Index	2	Q 2 year (l/s)	0.1
SPR	0.30	Q 30 year (l/s)	0.3
Region	7	Q 100 year (l/s)	0.4
Growth Factor 2 year	0.88		

Node PPCP1 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.040
Downstream Link	1.001	Invert Level (m)	5.256	Discharge Coefficient	0.600

Node PPCP3 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.025
Downstream Link	1.008	Invert Level (m)	4.200	Discharge Coefficient	0.600

Node Tank 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	5.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	50

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	15.0	15.0	0.800	15.0	26.0	0.810	0.0	26.0

Node Tank 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	488

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	60.0	60.0	0.400	60.0	71.0	0.410	0.0	71.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RP1	10	5.793	0.043	5.3	0.0011	0.0000	OK
120 minute summer	Tank 1	76	5.397	0.097	1.5	1.3859	0.0000	OK
120 minute summer	PPCP1	76	5.397	0.141	2.6	0.0225	0.0000	OK
120 minute summer	SIC1	78	5.099	0.028	1.1	0.0045	0.0000	OK
15 minute summer	SIC2	11	4.905	0.050	3.5	0.0079	0.0000	OK
15 minute summer	SIC3	11	4.590	0.070	5.8	0.0111	0.0000	OK
15 minute summer	PPCP2	11	4.531	0.069	6.5	0.0109	0.0000	OK
15 minute summer	Swale In 1	12	4.466	0.030	6.5	0.0000	0.0000	OK
240 minute winter	Swale Out 1	192	4.382	0.082	5.0	0.0000	0.0000	OK
240 minute winter	Tank 2	196	4.380	0.130	10.3	7.4059	0.0000	OK
240 minute winter	PPCP3	204	4.380	0.180	11.7	0.0510	0.0000	OK
240 minute winter	SCP1	196	4.144	0.013	0.5	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)
15 minute summer	RP1	1.000	PPCP1	5.3	0.716	0.182	0.1804	
120 minute summer	Tank 1	2.000	PPCP1	-1.5	-0.196	-0.103	0.0948	
120 minute summer	PPCP1	1.001	SIC1	1.1	0.487	0.078	0.0638	
120 minute summer	SIC1	1.002	SIC2	1.1	0.447	0.077	0.0932	
15 minute summer	SIC2	1.003	SIC3	3.5	0.527	0.239	0.3296	
15 minute summer	SIC3	1.004	PPCP2	5.8	0.723	0.396	0.0686	
15 minute summer	PPCP2	1.005	Swale In 1	6.5	1.278	0.435	0.0192	
15 minute summer	Swale In 1	1.006	Swale Out 1	6.3	0.206	0.002	0.7215	
240 minute winter	Swale Out 1	1.007	PPCP3	11.7	0.573	0.122	0.0699	
240 minute winter	Tank 2	3.000	PPCP3	-10.3	-0.386	-0.152	0.0840	
240 minute winter	PPCP3	1.008	SCP1	0.5	0.585	0.006	0.0023	13.9

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RP1	11	5.855	0.105	19.1	0.0026	0.0000	OK
60 minute summer	Tank 1	45	5.846	0.546	10.3	7.7874	0.0000	SURCHARGED
60 minute summer	PPCP1	45	5.846	0.590	13.0	0.0939	0.0000	SURCHARGED
60 minute summer	SIC1	46	5.113	0.042	2.5	0.0066	0.0000	OK
15 minute summer	SIC2	11	4.951	0.096	11.0	0.0153	0.0000	OK
15 minute summer	SIC3	11	4.737	0.217	19.3	0.0345	0.0000	SURCHARGED
360 minute summer	PPCP2	352	4.637	0.175	6.0	0.0278	0.0000	SURCHARGED
360 minute summer	Swale In 1	360	4.637	0.201	6.0	0.0000	0.0000	OK
360 minute summer	Swale Out 1	360	4.637	0.337	9.9	0.0000	0.0000	SURCHARGED
360 minute summer	Tank 2	360	4.637	0.387	4.9	22.0503	0.0000	SURCHARGED
360 minute summer	PPCP3	360	4.637	0.437	7.3	0.1236	0.0000	SURCHARGED
360 minute summer	SCP1	360	4.147	0.016	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)
15 minute summer	RP1	1.000	PPCP1	18.8	1.144	0.651	0.2890	
60 minute summer	Tank 1	2.000	PPCP1	-10.3	-0.588	-0.709	0.1140	
60 minute summer	PPCP1	1.001	SIC1	2.5	0.611	0.171	0.1123	
60 minute summer	SIC1	1.002	SIC2	2.5	0.597	0.171	0.2140	
15 minute summer	SIC2	1.003	SIC3	10.9	0.667	0.751	0.7410	
15 minute summer	SIC3	1.004	PPCP2	19.3	1.099	1.331	0.1502	
360 minute summer	PPCP2	1.005	Swale In 1	6.0	1.246	0.401	0.0650	
360 minute summer	Swale In 1	1.006	Swale Out 1	5.9	0.106	0.002	10.2697	
360 minute summer	Swale Out 1	1.007	PPCP3	-6.5	0.430	-0.068	0.1178	
360 minute summer	Tank 2	3.000	PPCP3	7.3	0.256	0.108	0.1159	
360 minute summer	PPCP3	1.008	SCP1	0.8	0.669	0.010	0.0032	46.2

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	RP1	19	6.155	0.405	22.9	0.0101	0.0000	FLOOD RISK
60 minute summer	Tank 1	47	6.055	0.755	13.1	10.7654	0.0000	SURCHARGED
60 minute summer	PPCP1	47	6.055	0.799	16.4	0.1271	0.0000	FLOOD RISK
15 minute summer	SIC1	12	5.119	0.048	2.5	0.0077	0.0000	OK
15 minute summer	SIC2	11	5.102	0.247	14.2	0.0393	0.0000	SURCHARGED
15 minute summer	SIC3	11	4.828	0.308	23.2	0.0490	0.0000	SURCHARGED
360 minute winter	PPCP2	360	4.780	0.318	5.6	0.0506	0.0000	SURCHARGED
360 minute winter	Swale In 1	360	4.780	0.344	5.6	0.0000	0.0000	OK
360 minute winter	Swale Out 1	360	4.780	0.480	11.4	0.0000	0.0000	SURCHARGED
360 minute winter	Tank 2	360	4.780	0.530	2.9	23.0850	0.0000	SURCHARGED
360 minute winter	PPCP3	360	4.780	0.580	7.7	0.1641	0.0000	SURCHARGED
360 minute winter	SCP1	360	4.148	0.017	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)
30 minute summer	RP1	1.000	PPCP1	21.4	1.217	0.741	0.3314	
60 minute summer	Tank 1	2.000	PPCP1	-13.1	-0.743	-0.896	0.1140	
60 minute summer	PPCP1	1.001	SIC1	2.9	0.639	0.200	0.1259	
15 minute summer	SIC1	1.002	SIC2	2.6	0.608	0.180	0.3631	
15 minute summer	SIC2	1.003	SIC3	12.5	0.711	0.865	0.8825	
15 minute summer	SIC3	1.004	PPCP2	22.7	1.290	1.562	0.1514	
360 minute winter	PPCP2	1.005	Swale In 1	5.6	1.170	0.374	0.0650	
360 minute winter	Swale In 1	1.006	Swale Out 1	4.7	0.112	0.001	19.6387	
360 minute winter	Swale Out 1	1.007	PPCP3	-8.3	-0.383	-0.087	0.1178	
360 minute winter	Tank 2	3.000	PPCP3	7.7	0.306	0.112	0.1159	
360 minute winter	PPCP3	1.008	SCP1	1.0	0.698	0.011	0.0036	59.3

Appendix F

SuDS Maintenance Plan

1. Introduction, Ownership & Maintenance Responsibilities

This Plan sets out the framework for the maintenance of the sustainable drainage system (SuDS).

Responsibility for the maintenance of the drainage system will remain with the Golf Club (Applicant).

The following sections show schedules detailing the maintenance requirements for each of the main drainage features. The Golf Club will undertake the inspections and maintenance activities in accordance with these schedules.

Additional reference has been made to currently established best practice and guidance documents such as The SuDS Manual (CIRIA C753, 2015) and other resources available at the susdrain website (www.susdrain.org).

This Plan is to be a live document. The frequency of maintenance intervals may need to be increased or decreased based on the observed performance of the drainage systems over time. Changes are to be agreed with the drainage authority (LFA) and recorded and dated in the Plan.

Important safety information is set out in the next section.

2. Health and Safety

All those responsible for and involved in the maintenance of the site drainage systems should be safety-conscious and comply with the relevant health and safety legislation. This includes:

- The Health and Safety at Work etc Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Workplace (Health, Safety and Welfare) Regulations 1992

The Golf Club is responsible for suitable risk assessment and management to ensure safe working conditions and practices. Measures to protect potential visitors must also be drawn up.

Specialist contractors used should work to industry guidelines and be able to demonstrate safe working practices.

Employers have a duty to employees to inform them about the risks of their work environment and to decrease the risk as far as reasonably practicable. Appropriate personal protective equipment (PPE) should be provided and practices/policies implemented based on risk assessments.

Operatives should be trained for working near water. Risks of contaminated water should be considered. Checking for open cuts and using nitrile gloves, waterproof plasters etc is advised.

Entry of pipes, chambers and culverts should be avoided. Work should be carried out from the surface using appropriate equipment. In the event that entry cannot be avoided to perform a critical task, the required safety training, protection measures and precautions must be implemented prior to entry. Lone working should never be attempted.

For further information refer to Section 36 of The SuDS Manual (CIRIA C753).

3. Schedule A – Sewers & Manholes

Regular inspection and maintenance are required to ensure the effective long-term operation of private drains, manholes, gullies & channel drains.

Post Completion: a CCTV survey to be carried out on all new and retained existing drainage systems and any downstream receiving systems, prior to connection with adopted sewers.

The survey report will be used to prove the integrity of the as-built drainage system prior to issue of practical completion certificate and will be handed over to the Client & Management Company for future reference.

Operation and maintenance requirements for all sewers, manholes, gullies and channel drains are described in the following table:

Schedule	Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	6 Monthly intervals
	Common yard & car park & other hard standing areas to be swept clear of debris, to prevent possibility of blockages to the receiving drainage systems	Monthly
	Debris removal from gullies & channel drains (where may cause risks to performance)	Monthly intervals, after autumn leaf fall, or as required based on specific

	Lift and inspect receiving manholes to check for any blockages	observations Monthly
Remedial Actions	Repair any damaged gully or channel drain gratings. Replace / fix any loose channel drain covers	As required As required
Monitoring	Carry out full CCTV survey to confirm ongoing integrity of all drains. Inspect all gullies and silt pits & drainage channels during the survey	10-yearly intervals

Where appropriate refer also to specialist drainage manufacturer's information and maintenance requirements.

In all instances, inspection and cleaning should be carried out only by a specialist contractor and in accordance with the guidelines given in 'Safe Working in Sewers and at Sewage Works' published by National Joint Health and Safety Committee for the Water Services. Further information on safety is set out in Section 3.

4. Schedule B - Swale

Inspection Frequency and Maintenance Requirements: as per table below:

Schedule	Action	Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
	Inspect inlets, outlets & overflows for blockages and clear if required	Monthly
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record where water is ponding for > 48 hours	Monthly, or when required
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required.	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Actions	Repair erosion or other damage by re-turfing or reseeded	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

5. Schedule C - Attenuation Tanks

The tanks are designed offline to accommodate the 1 in 100 year storm.

The tanks have been specified with an impermeable liner which functions both to hold the water, and also to prevent groundwater ingress.

Inspection Frequency and Maintenance Requirements: as per table below.

Schedule	Action	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 pre-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

6. Schedule D - Control Manholes/Orifice Chambers

Inspection Frequency: 6 months

Function: To restrict surface water flows

Maintenance Requirements: Open all control chambers every 6 months and check that each orifice plate and hydrobrake is clean and free of debris. Clean out as necessary. Check hydrobrake bypass door opens and closes smoothly and the control wire can be secured just below the manhole cover.

Carefully check for blockage each of the orifice openings on the control chambers noted on the SUDS maintenance drawing, which control flow from areas of permeable paving. The sump to the control chambers should be free of silt and the orifice should be clearly seen and unobstructed.

It is vitally important to the smooth running of the drainage system and to prevent flooding that all control manholes are regularly checked as above and free flowing.

7. Contamination or Dilution of Spillage

In the event of a spillage, it is the responsibility of the landowner to clear up any spillage before it enters the drainage system. The primary method of dealing with any spillage of hydrocarbons should be using sand to soak up the leak and prevent any hydrocarbons entering the drainage system. Once sand has been contaminated it should not be washed into the drainage system but disposed of by a Licensed Contractor.

Environment Agency – Emergency Contact Number

In the event of a spillage the Environment Agency should be contacted to notify the event and seek advice. The Environment Agency Incident Hotline [REDACTED] Freephone 24hrs).



Civil Engineering - Transport Planning - Flood Risk

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