PROPOSED IMPERMEABLE AREAS

IMPERMEABLE HARDSTANDING AREA (EXCLUDING PERMEABLE SURFACES) = 5975m²

ROOF AREA = 6745m²

OPEN SUDS AREA = 1730m²

PERMEABLE SURFACES AREA = 3597m²

TOTAL IMPERMEABLE AREA (HARDSTANDING + ROOF AREAS = 12720m²

TOTAL CATCHMENT AREA TO BE DRAINED = 18047m²

NOTE: PERMEABLE SURFACES TO BE LINED AND OPEN SUDS TO RECEIVE PRECIPITATION HENCE INCLUDED IN THE TOTAL CATCHMENT AREA

NOTES

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3. All work to comply with the relevant British Standards, Codes of Practice and the Building Regulations.
4. Any discrepancies between all working drawings, specifications and schedules of all disciplines to be immediately notified to CTP for clarification/correction prior to construction of relevant structure

NOTES:

1. ALL VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO DETAILED LEVEL DESIGN

2. VOLUMES QUOTED INCLUDE AREAS COLOURED ONLY. ANY AREAS WITH NO COLOUR ARE EXCLUDED FROM THE DIGITAL MODEL.

3. SOIL BULKING OR COMPACTION FACTORS HAVE NOT BEEN APPLIED.

4. VOLUMES QUOTED ASSUME THAT EXCAVATED SOILS ARE SUITABLE FOR RE-USE AS FILL MATERIAL SUBJECT TO TESTING.

5. VOLUMES QUOTED ARE BASED ON THE FORMATION DEPTHS DETAILED ON THIS DRAWING ONLY.

PRELIMINARY

	Revision	Amendments	Date	Rev'd	Check
P4	Landscape Update		10.12.24	AM	LB
P3	Layout Updated		29.11.24	SP	LB
P2	Redline Boundary Updated		25.04.24	SP	LB
P1	Preliminary Issue		19.04.24	SM	LB

Compiled by: SM | Date created: April 2024 | Discipline: CIVILS

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Sevenoaks Kent TN13 1XE UK
UK: +44 (0)1732 740195
www.ctp-ltd.com

Project Title:
Hook Meadows
Westergate

Drawing Title:
Impermeable Area Plan

Drawing Number: B0457-1707
Scale: NTS @A1 (Unless Noted Otherwise)
Revision: - P4

NOTES

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4. Any discrepancies between all working drawings, specifications and schedules of all disciplines to be immediately notified to CTP for clarification/correction prior to construction of relevant structure.
5. All private drainage works shall be constructed in accordance with Building Regulations Approved Document H (latest edition)' and BS EN 752.
6. Prior to commencement of the works the contractor shall liaise with all relevant authorities to obtain their requirements, work method approval and where appropriate the intended choice of materials.
7. Refer to topographical survey for details of existing site conditions and bench marks.
8. Prior to commencement of the works the contractor shall liaise with all relevant authorities to locate, protect and where necessary divert all existing services affected by the works.
9. The contractor shall ensure the stability of all excavations is maintained at all times and all excavations shall be kept free of standing water.
10. All works in, or adjacent to, the public highway shall be in accordance with the requirements of the Highway Authority. The contractor shall obtain all necessary licenses required to carry out the works within the public highway.
11. All works to new or existing public sewers shall be to the approval of the local water authority and in accordance with 'Sewerage Sector Guidance' - Latest Edition.
12. Prior to commencement of the works all drainage outfall points, whether existing sewer, drain or watercourse, shall be verified on site by the contractor. If the outfall point is found to be higher or significantly lower than shown on the drawings then the design engineer shall be notified immediately (significant redesign of drainage and levels may be necessary). Prior to commencement of construction on-site the contractor shall install all off-site drainage connections, or satisfy himself that there are no obstructions or other reasons why the drain connections can not be made.
13. All cover levels shown on this drawing are approximate, exact levels of new covers and frames are to be determined on site to match level and profile of finished surface.
14. The construction of all existing chambers, gullies and their covers, gratings and frames to be improved, repaired or replaced as necessary to suit their location within the finished development.
15. All covers, gratings and frames to chambers, gullies, channels etc, shall be of the correct load class to suit their location.
    Load Class A15- Pedestrian areas (not accessible by vehicles)
    Load Class B125- Private drives
    Load Class C250- Basements / parking bays / lightly trafficked roads
    Load Class D400- Main roads
16. All existing chambers, gully channels, pipes and other drainage apparatus shall be protected from damage during the works. The contractor shall take all necessary measures to ensure that no material enters the drains (other than that which they are designed to carry).
17. Refer to site investigation report for existing ground conditions and any special requirements for buried concrete (special requirements for buried concrete shall include all pre-cast and in-situ concrete and mortars). Where appropriate refer to contamination reports for details of chemicals affecting choice of materials and other additional requirements.
18. All pre-cast and in-situ concrete and mortars used in the construction of foul drains and sewers shall be made from sulphate resisting cement.
19. Unless noted otherwise all pipework shall be constructed from 'super strength' vitrified clay to BS 65, BS EN 295 or UPVC to BS EN 1401 bedded and backfilled as per the manufacturer's recommendations and the above listed publications.
20. The contractor's attention is drawn to Diagrams 7 and 8 of 'The Building Regulations Approved Document H' showing details of drains laid below and near to buildings. Where ground beams are used, their level shall be set to avoid clashing with drain connections.
21. Exact location of gullies to be determined on site to suit low points. the contractor shall ensure that all finished surfaces are laid to falls that are sufficient for all surface water to drain without surface ponding.
22. For the exact location of soil pipes, stubstacks, W.C.'s and other drainage connections refer to the large scale architectural building plans.
23. Rainwater downpipes that do not connect directly to an access point, shall be fitted with a rodding access.
24. All drainage channels to be by ACO or similar and to be of a type, size and capacity suitable for their location.
25. Private access fittings, inspection chambers and manholes shall be constructed to the dimensions shown in Tables 11 and 12 of 'The Building Regulations Approved Document H' and from the materials listed in Table 14. Access points, inspection chambers and manholes shall be constructed from products designed/rated for the location in which they are to be used. They shall be installed in accordance with the manufacturer's/supplier's recommendations.
26. Prior to commencement of any works the existing drainage must be traced to ensure that no 'live' connections remain, any such connections must be reported to the contract administrator, prior to diversion into the new drains.
27. Pipes at manholes to be soffit to soffit unless noted otherwise.
28. Pipes shall be at a min. gradient 1:40 (1:80 if minimum 1 WC is connected), unless proposed invert levels indicate otherwise.

Key:

→ Exceedance route from surcharging of the surface water network for events more severe than a 1:100 year event + 45% climate change allowance.

FOR APPROVAL

Revision	Amendments	Date	Rev'd	Chk'd
P3	Landscape Update	10.12.24	AM	LB
P2	Layout Updated	29.11.24	SP	LB
P1	Preliminary Issue	07.08.24	AM	LB

Created by: AM | Date created: AUG 2024 | Discipline: CIVILS

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UK: +44 (0)1732 740195
www.ctp-llp.com

Project Title:

Hook Meadows Westergate

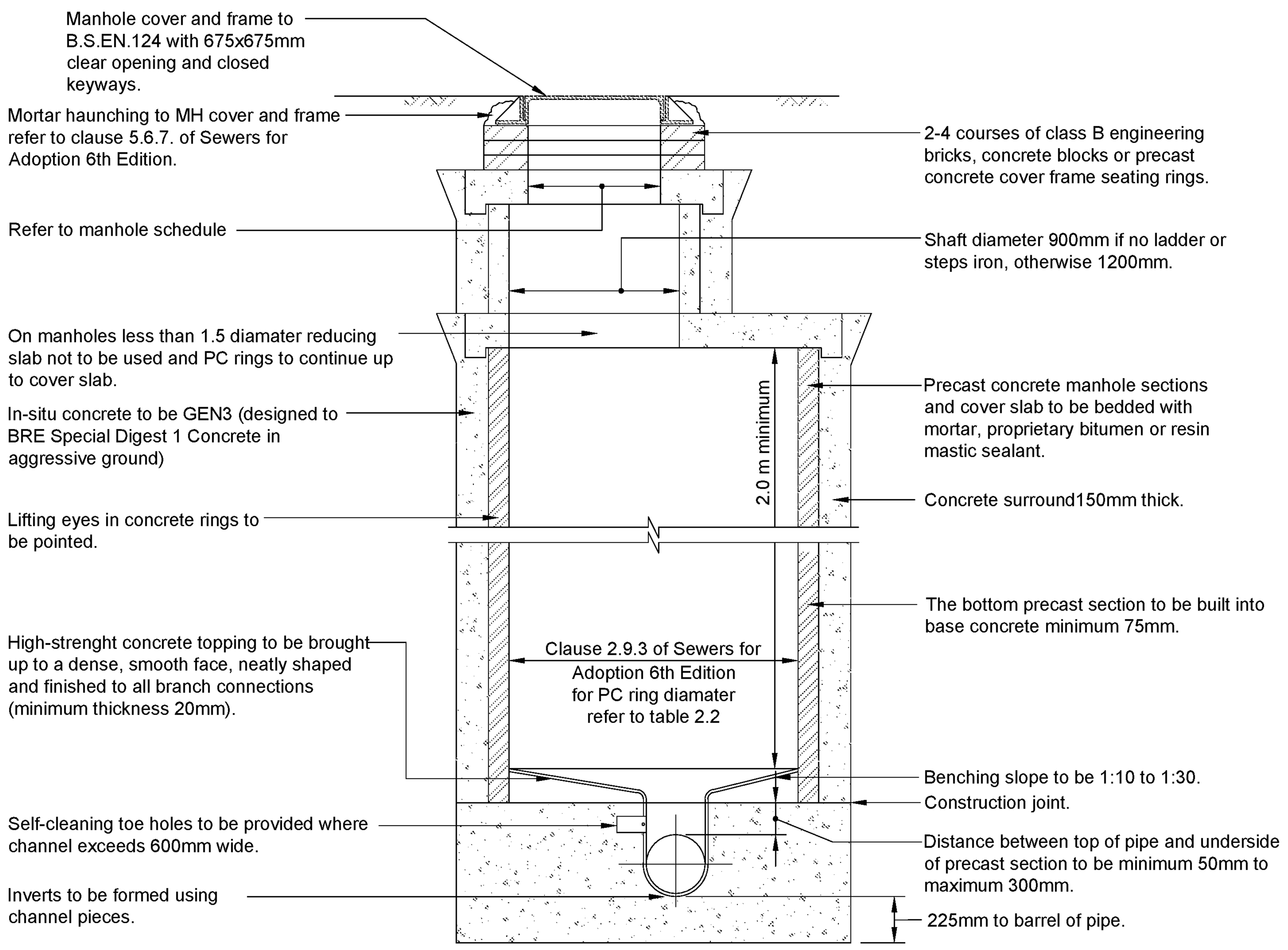
Drawing Title:

Drainage Exceedance Plan

Drawing Number: B0457-1550 - P3

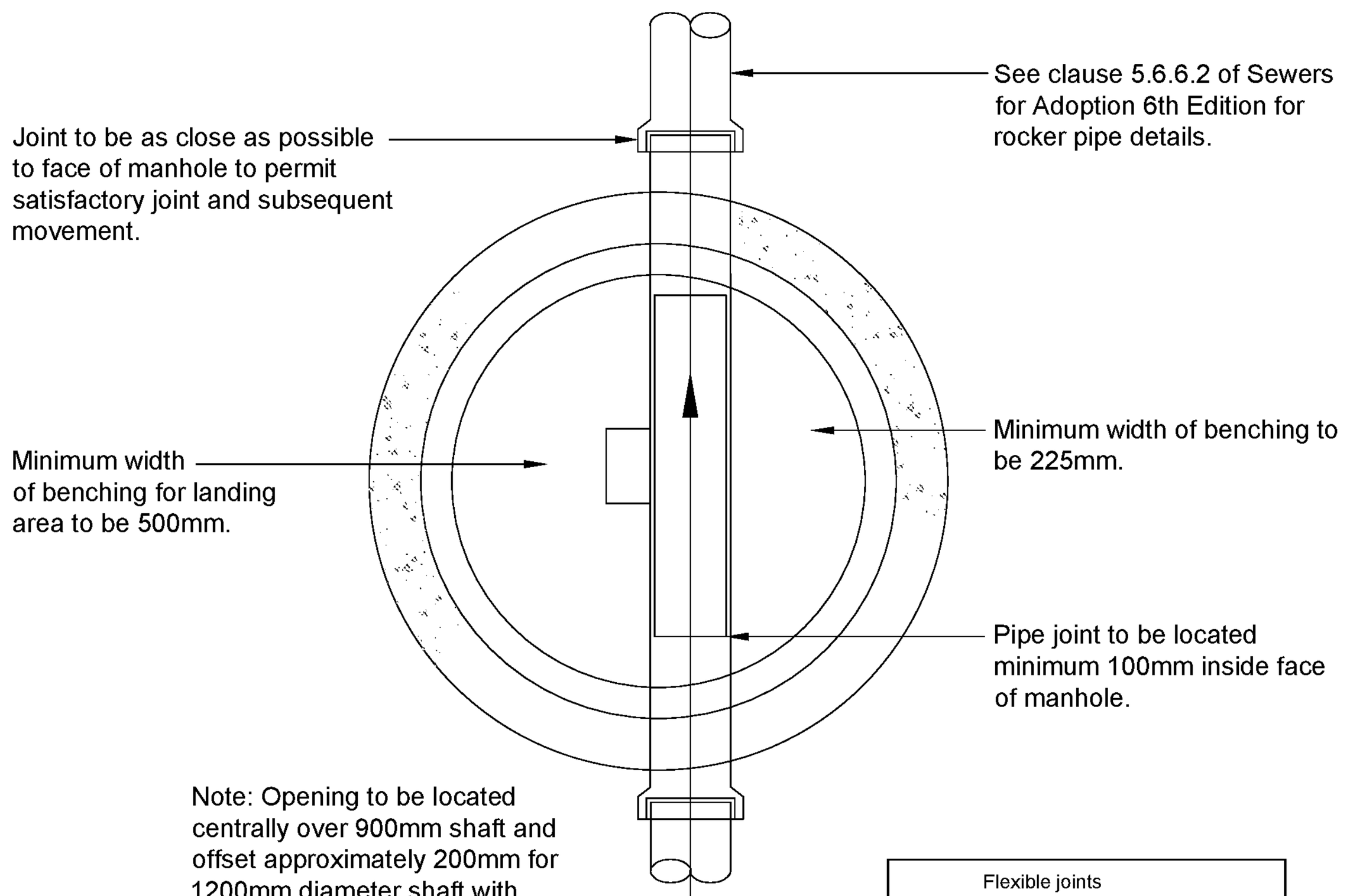
Scale: NTS @A1 Unless Noted Otherwise

Revision: P3



Depth from cover level to soffit of pipe 3m to 6m. For steps and access arrangements see table 2.3 of Sewers for Adoption 6th Edition.

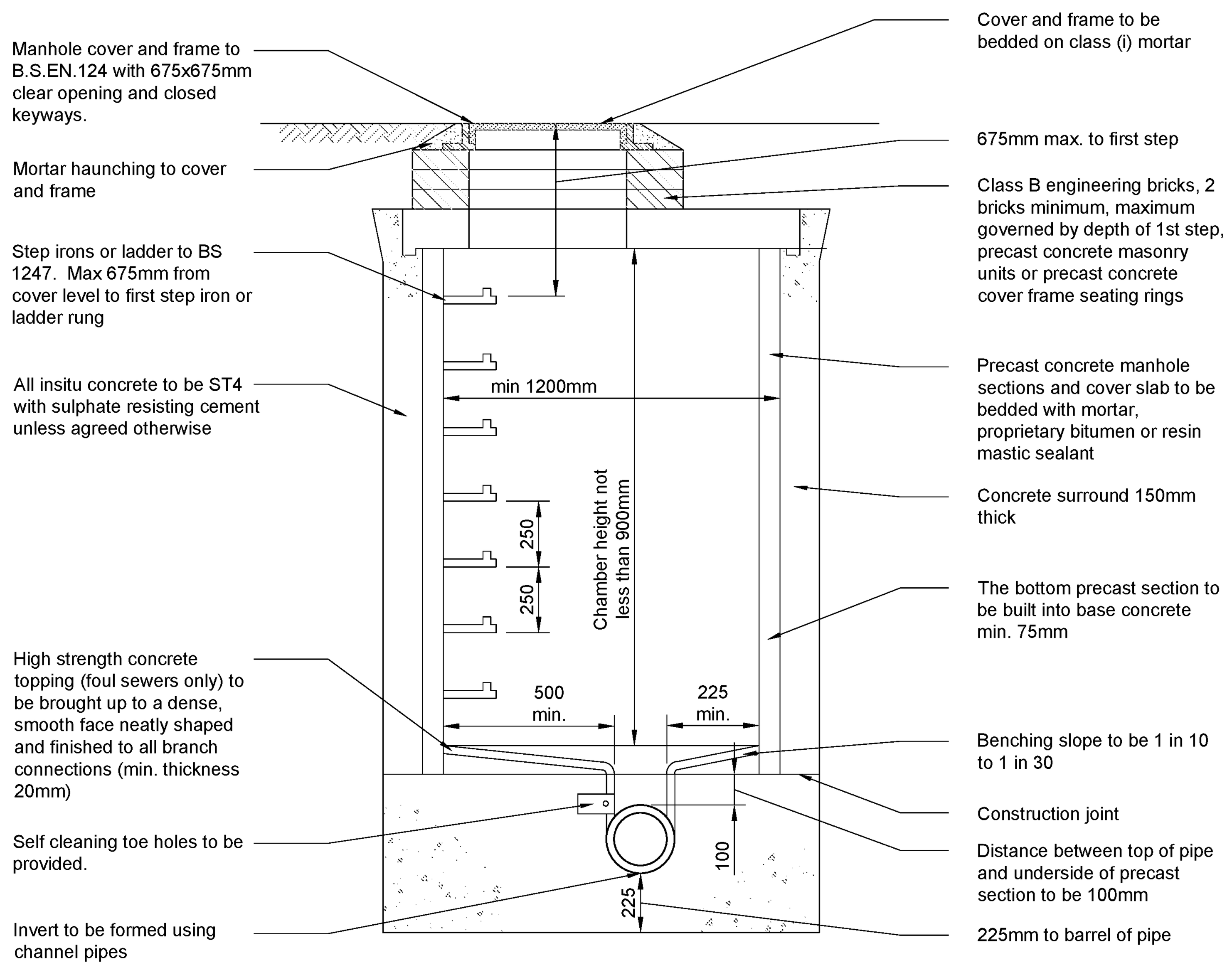
Table 2.2	
Diameter of largest pipe in manhole (mm)	Internal diameter of manhole (mm)
Less than 375	1200
375 - 700	1500
750 - 900	1800
Greater than 900	Consult undertaker

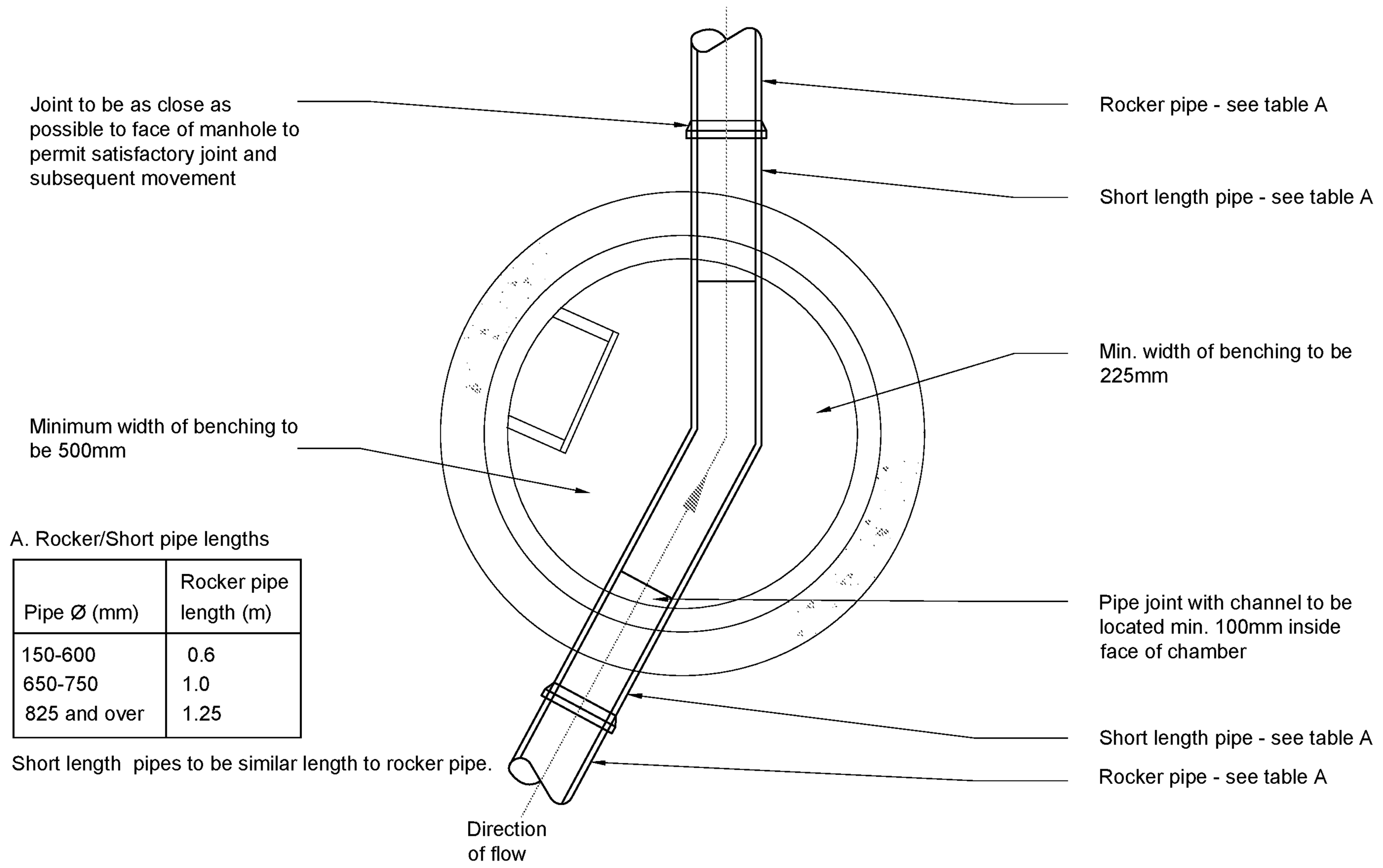


Note: Opening to be located centrally over 900mm shaft and offset approximately 200mm for 1200mm diameter shaft with rungs/ladder.

Flexible joints	
pipe diameter	max. length rocket pipes
100 & 150 (all spigot)	300mm
150 - 600	625mm
675 - 900	1250mm

TYPICAL MANHOLE DETAIL - TYPE A





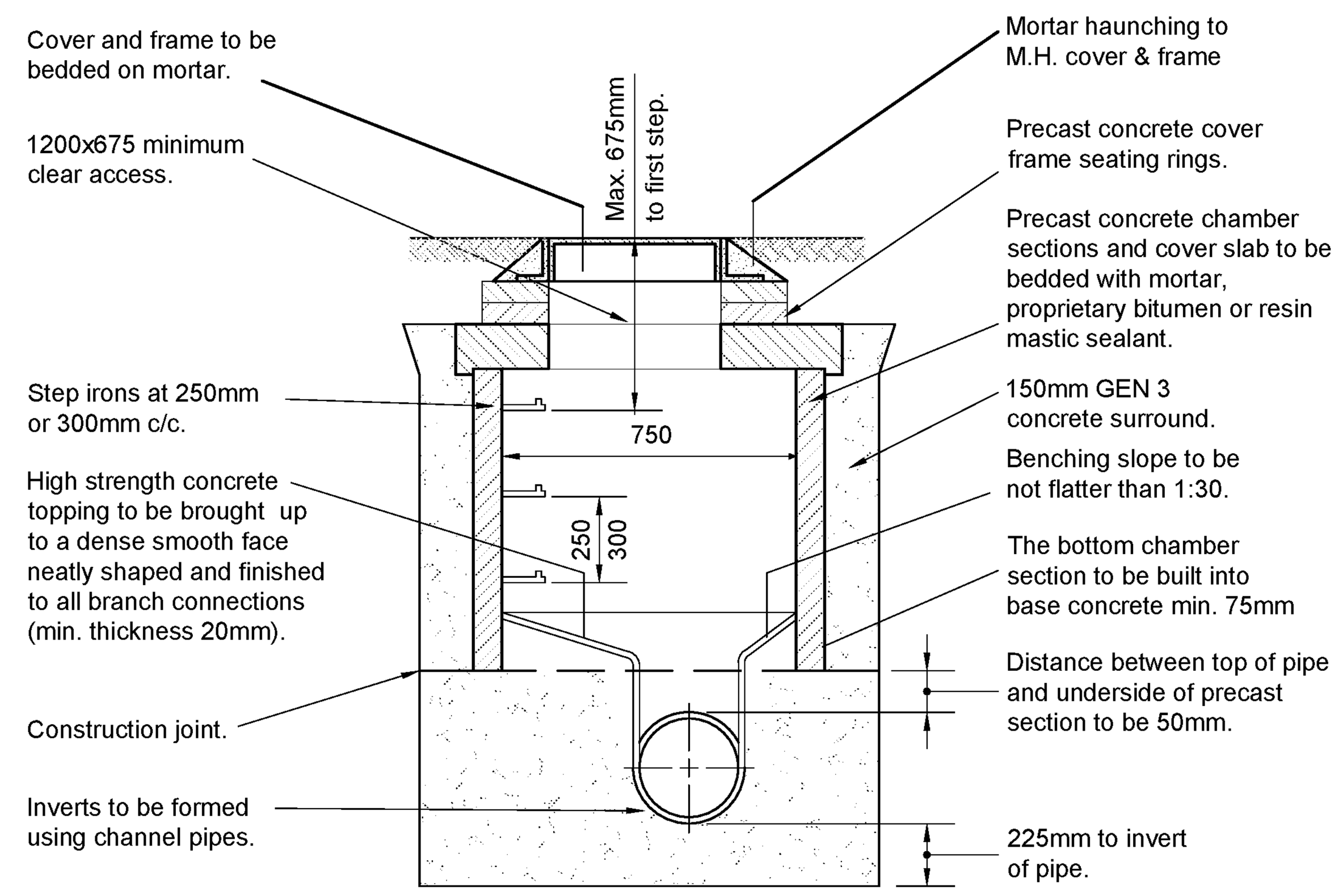
A. Rocker/Short pipe lengths

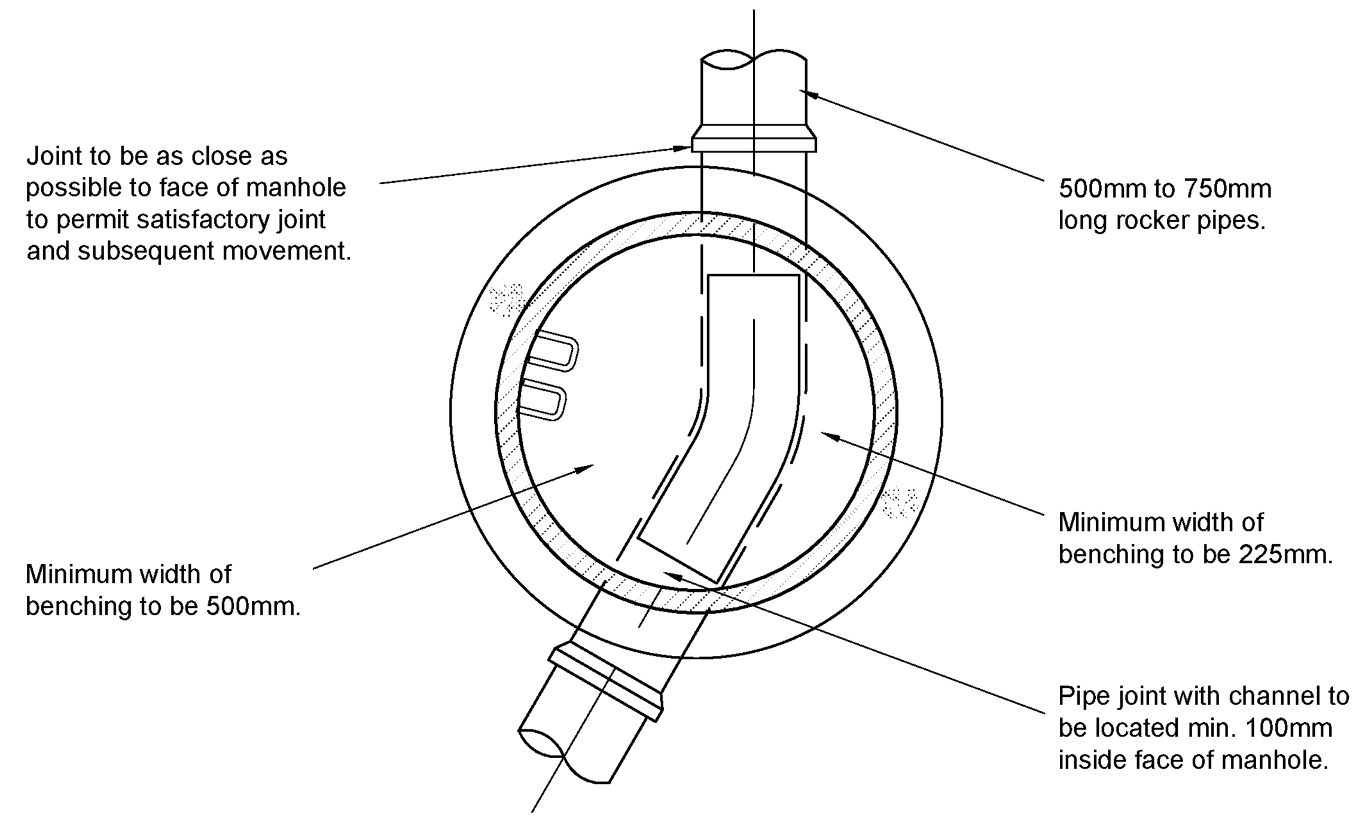
Pipe Ø (mm)	Rocker pipe length (m)
150-600	0.6
650-750	1.0
825 and over	1.25

Short length pipes to be similar length to rocker pipe.

TYPICAL MANHOLE TYPE B

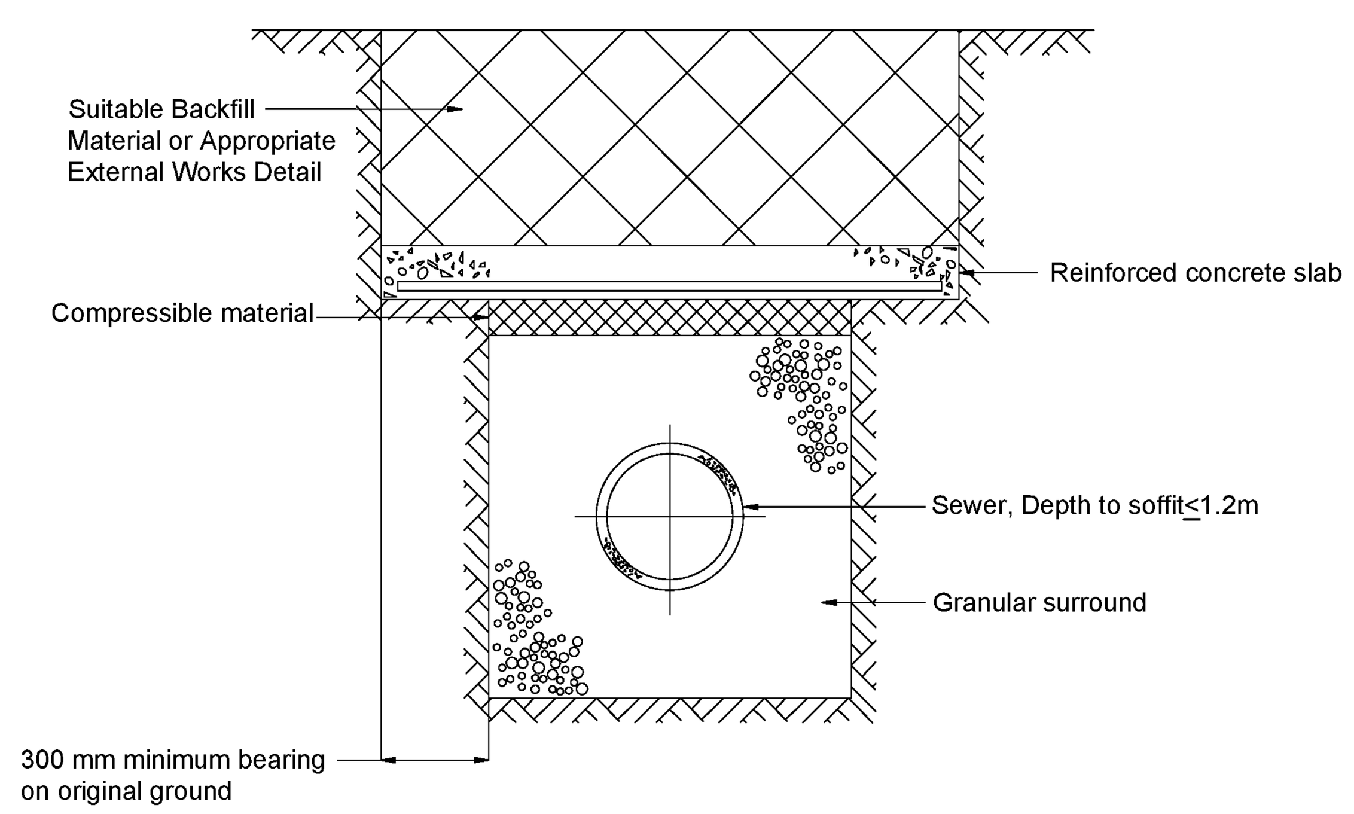
Max depth from cover level to soffit of pipe 3.0m





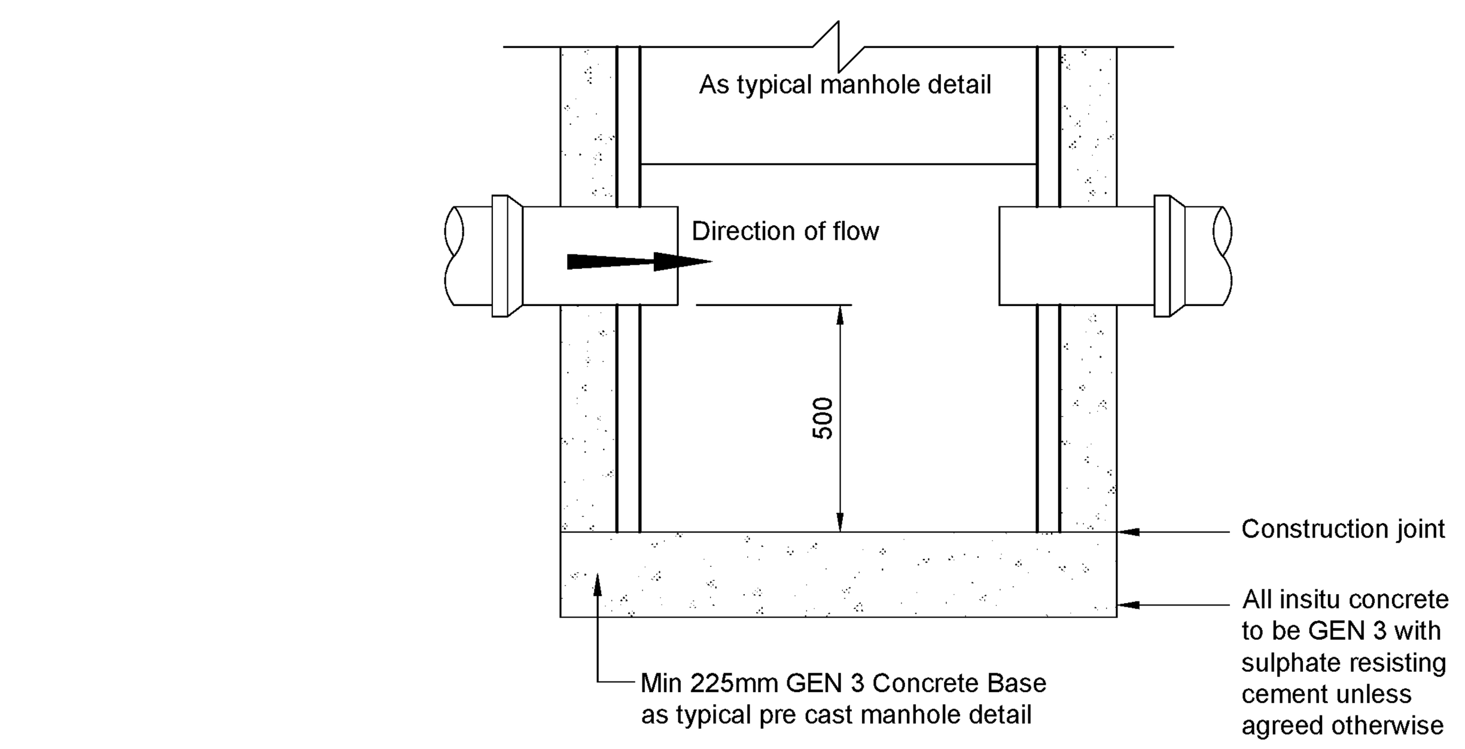
Typical Manhole Detail - Type C

(Depth to invert 1.0 to 1.5m below ground level).

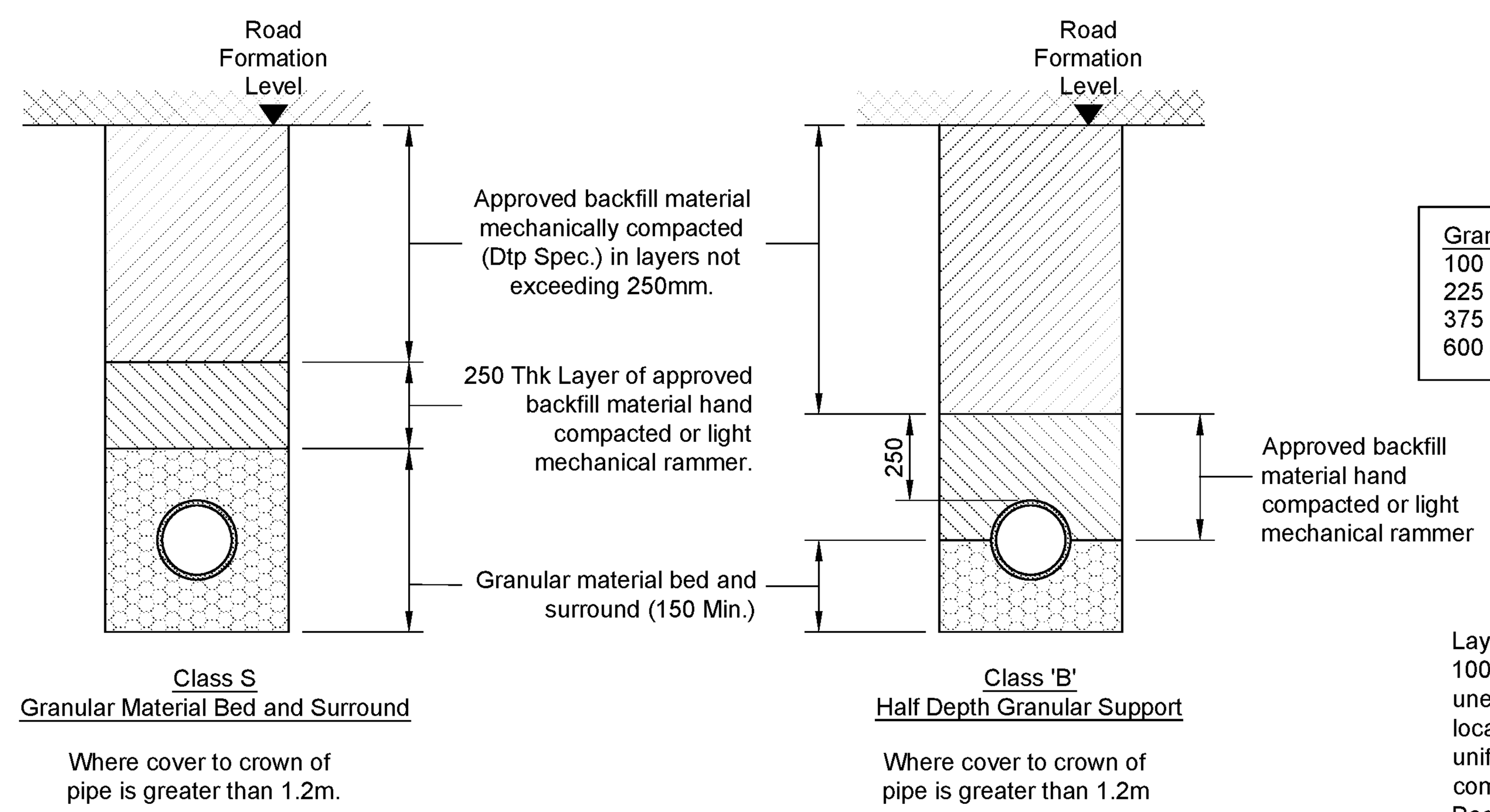


Protection of Pipes Laid at Shallow Depths

Protection For Pipes Laid at Shallow Depths
(Depth to soffit≤1.2m)
nts



Typical Catchpit Manhole Detail



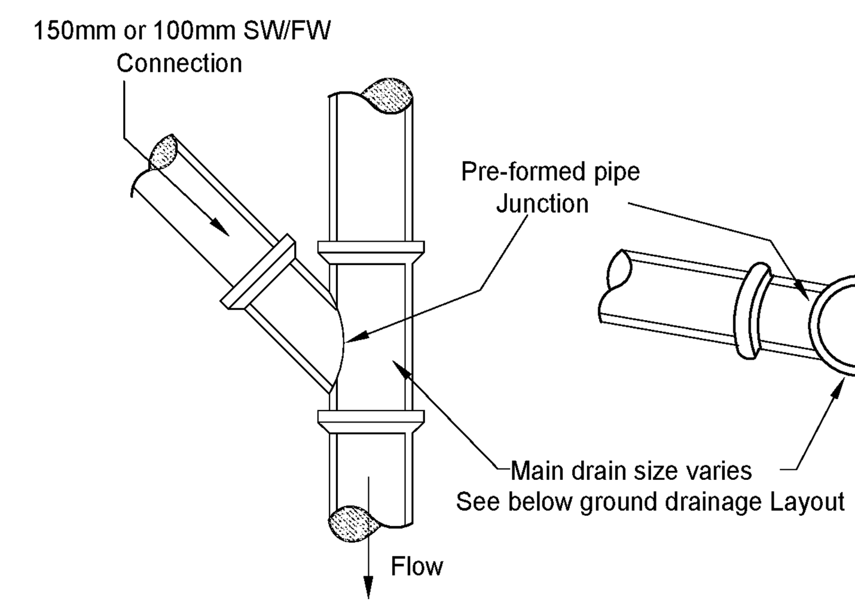
Typical Pipe Bedding Details

Granular bedding and sidefill material to be:-

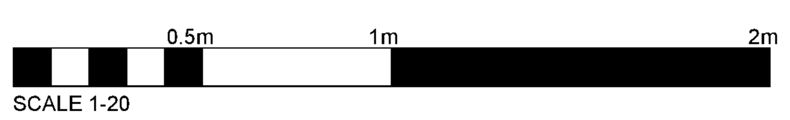
100 & 150 dia.	- 10 single size stone	(graded not permitted).
225 & 300 dia.	- 10 or 20 single size stone	(or 20 to 5 graded).
375 to 500 dia	- 20 single size stone	(or 20 to 5 graded).
600 dia. +	- 20 or 50 single size stone	(or 20 or 40 to 5 graded).

Approved backfill material to be DTp Type 1 or selected, as-raised, readily compactable material free from organic matter, frozen soil, builders rubbish, clay lumps larger than 75mm and stones larger than 35mm. (Water industry C.E. Spec. Cl. 2.50.3 - Type B.)

Lay & compact to a thickness of not less than 50mm for sleeve jointed pipes, 100mm for socket jointed pipes, over full width of trench. Where trench bottom is uneven due to hard spots or other reason, increase depth by 100mm. Scoop out locally at couplings/sockets and lay pipes digging slightly into bed & resting uniformly on thier barrels. Adjust to line & gradient. After initial testing, lay & compact more granular material uniformly to halfway up each side of pipe. Backfill (250mm for adoptable sewers) above crown of pipe with protective cushion of Dtp Type 1 or selected fill, free from vegetable matter, rubbish, frozen soil & material retained on a 40mm sieve. Compact by hand (or light mechanical rammer) in 100mm layers.



Typical 'Y' Junction Connection



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28. Pipes shall be at a min. gradient 1:40 (1:80 if minimum 1 WC is connected), unless proposed invert levels indicate otherwise.

PRELIMINARY

Revision	Amendments	Date	Rev'd	Chk'd
P1	Preliminary Issue	10.04.24	SF	LB

Created by:	Date created:	Discipline:
SF	April 2024	CIVILS

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UK: +44 (0)1732 740195
www.ctp-llp.com

Project Title:

Hook Meadows Westergate

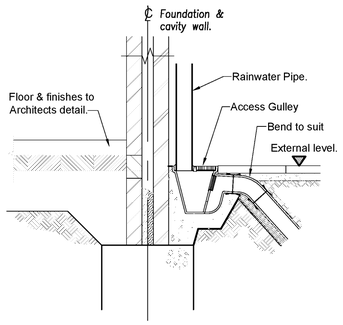
Drawing Title:

Drainage Details Sheet 1 of 3

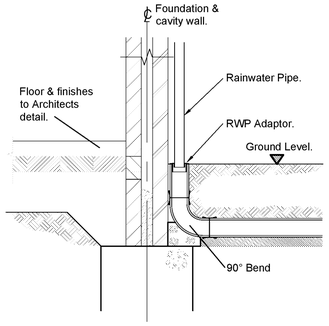
Drawing Number: B0457-1505

Scale: 1:250 @A1 Unless Noted Otherwise

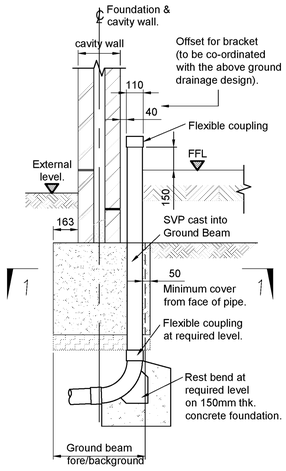
Revision: - P1



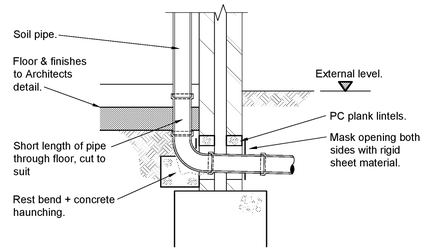
Typical RWP Connection with Trapped Gully (rwp T)



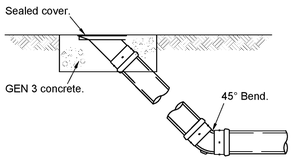
Typical RWP Connection Detail (rwp)



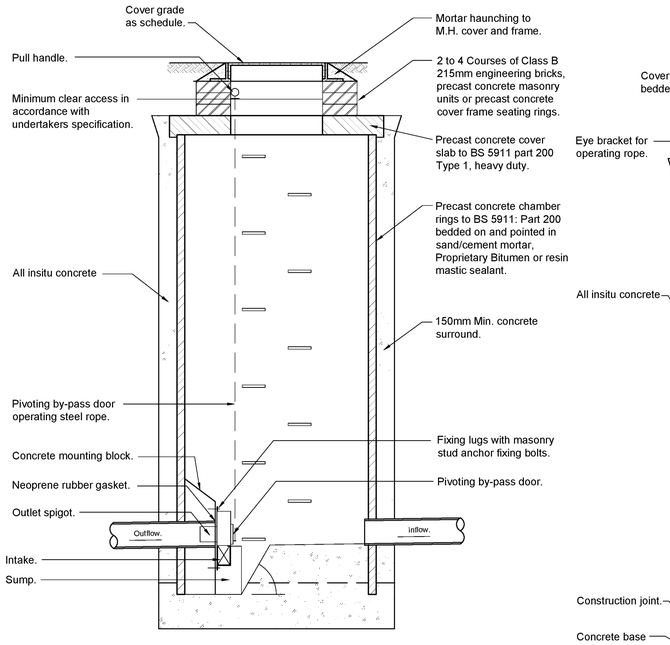
Ground Beam/SVP Penetration Detail.



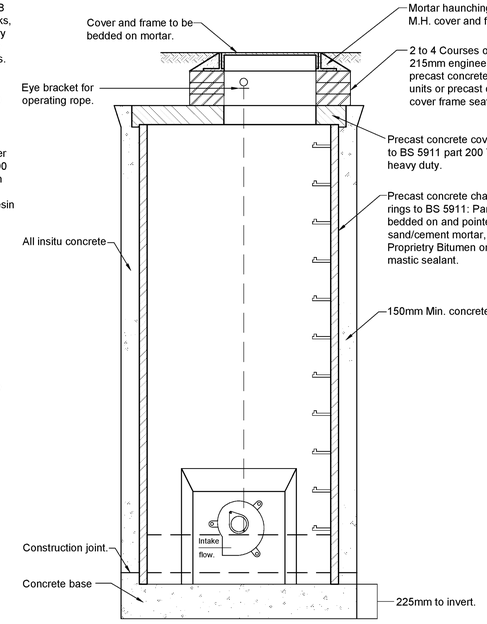
Typical SVP Detail (svp)



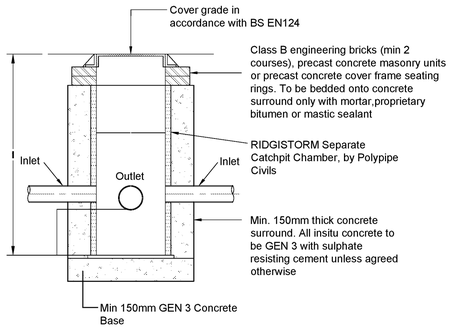
Rodding Eye Detail.



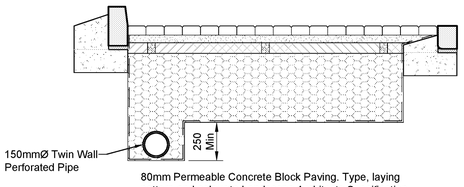
Section A-A.



Section B-B.
Proposed Hydro-Brake Manhole Details.



Typical Catchpit Chamber Detail - PPIC



80mm Permeable Concrete Block Paving. Type, laying pattern and colour to Landscape Architects Specification.

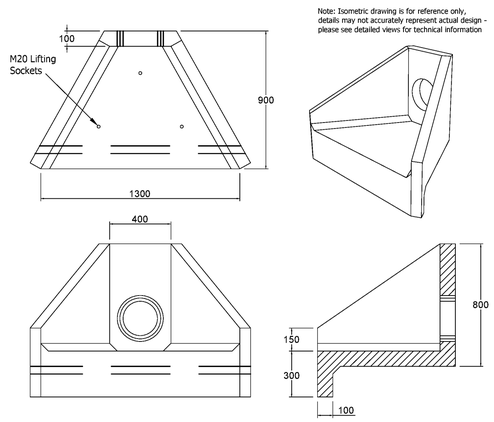
50mm bedding layer, single sized 5mm clean crushed stone to Table D.6 BS 7533-3, or as Block Manufacturer's recommendations. 70mm of 20mm dense bitumen macadam binder course (100/150 pen binder) to BS en 13108 (2006) PT1. (AC 20 dense bin 100/150 REC B/S) - to be punched through with 50mm ø holes @ 1m centres prior to installing laying course and block paving. (holes to be filled with 6mm pea-shingle)

Type 4/20 Open Graded clean granular sub-base material (thickness varies, refer to Engineering Layout for specific depths) to BS EN 13242 and CL 505 Specification for Highway Works.

Heavy Duty Impermeable Membrane, Visqueen.

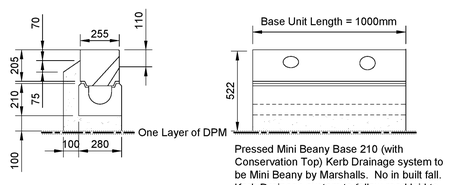
Tanked Block Paving Parking Bay Construction

Scale 1-20



Althorn H3C Headwall for Pipes up to 300Ø

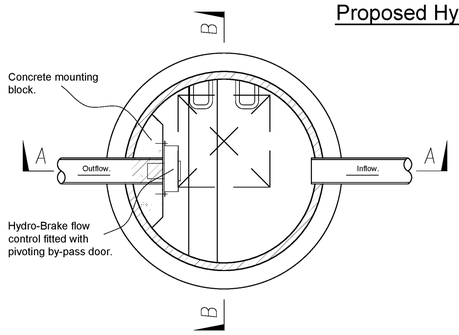
Scale 1-20



Pressed Mini Beany Base 210 (with Conservation Top) Kerb Drainage system to be Mini Beany by Marshalls. No in built fall. Kerb Drainage system to follow road laid to fall of 1:400 and 1:200 as shown on plan.

Beany Block

Scale 1-20



Plan on Hydro-Brake Manhole.

0.5m 1m 2m

SCALE 1-20

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16. All existing chambers, gully channels, pipes and other drainage apparatus shall be protected from damage during the works. The contractor shall take all necessary measures to ensure that no material enters the drains (other than that which they are designed to carry).
17. Refer to site investigation report for existing ground conditions and any special requirements for buried concrete (special requirements for buried concrete shall include all pre-cast and in-situ concrete and mortars). Where appropriate refer to contamination reports for details of chemicals affecting choice of materials and other additional requirements.
18. All pre-cast and in-situ concrete and mortars used in the construction of foul drains and sewers shall be made from sulphate resisting cement.
19. Unless noted otherwise all pipework shall be constructed from 'super strength' vitrified clay to BS 65, BS EN 295 or UPVC to BS EN 1401 bedded and backfilled as per the manufacturer's recommendations and the above listed publications.
20. The contractor's attention is drawn to Diagrams 7 and 8 of 'The Building Regulations Approved Document H' showing details of drains laid below and near to buildings. Where ground beams are used, their level shall be set to avoid clashing with drain connections.
21. Exact location of gullies to be determined on site to suit low points. the contractor shall ensure that all finished surfaces are laid to falls that are sufficient for all surface water to drain without surface ponding.
22. For the exact location of soil pipes, stubstacks, W.C.'s and other drainage connections refer to the large scale architectural building plans.
23. Rainwater downpipes that do not connect directly to an access point, shall be fitted with a rodding access.
24. All drainage channels to be by ACO or similar and to be of a type, size and capacity suitable for their location.
25. Private access fittings, inspection chambers and manholes shall be constructed to the dimensions shown in Tables 11 and 12 of 'The Building Regulations Approved Document H' and from the materials listed in Table 14. Access points, inspection chambers and manholes shall be constructed from products designed/rated for the location in which they are to be used. They shall be installed in accordance with the manufacturer's/supplier's recommendations.
26. Prior to commencement of any works the existing drainage must be traced to ensure that no 'live' connections remain, any such connections must be reported to the contract administrator, prior to diversion into the new drains.
27. Pipes at manholes to be soffit to soffit unless noted otherwise.
28. Pipes shall be at a min. gradient 1:40 (1:80 if minimum 1 WC is connected), unless proposed invert levels indicate otherwise.

PRELIMINARY

Revision	Amendment	Date	Revis	Chkd
P1	Preliminary Issue	10.04.24	SF	LB

Created by: SF | Date created: April 2024 | Discipline: CIVILS

consulting engineers
Suffolk House 154 High Street
Sevenoaks Kent TN13 1XE UK
UK: +44 (0)1732 740155
www.ctp-lp.com

Project Title:

Hook Meadows
Westergate

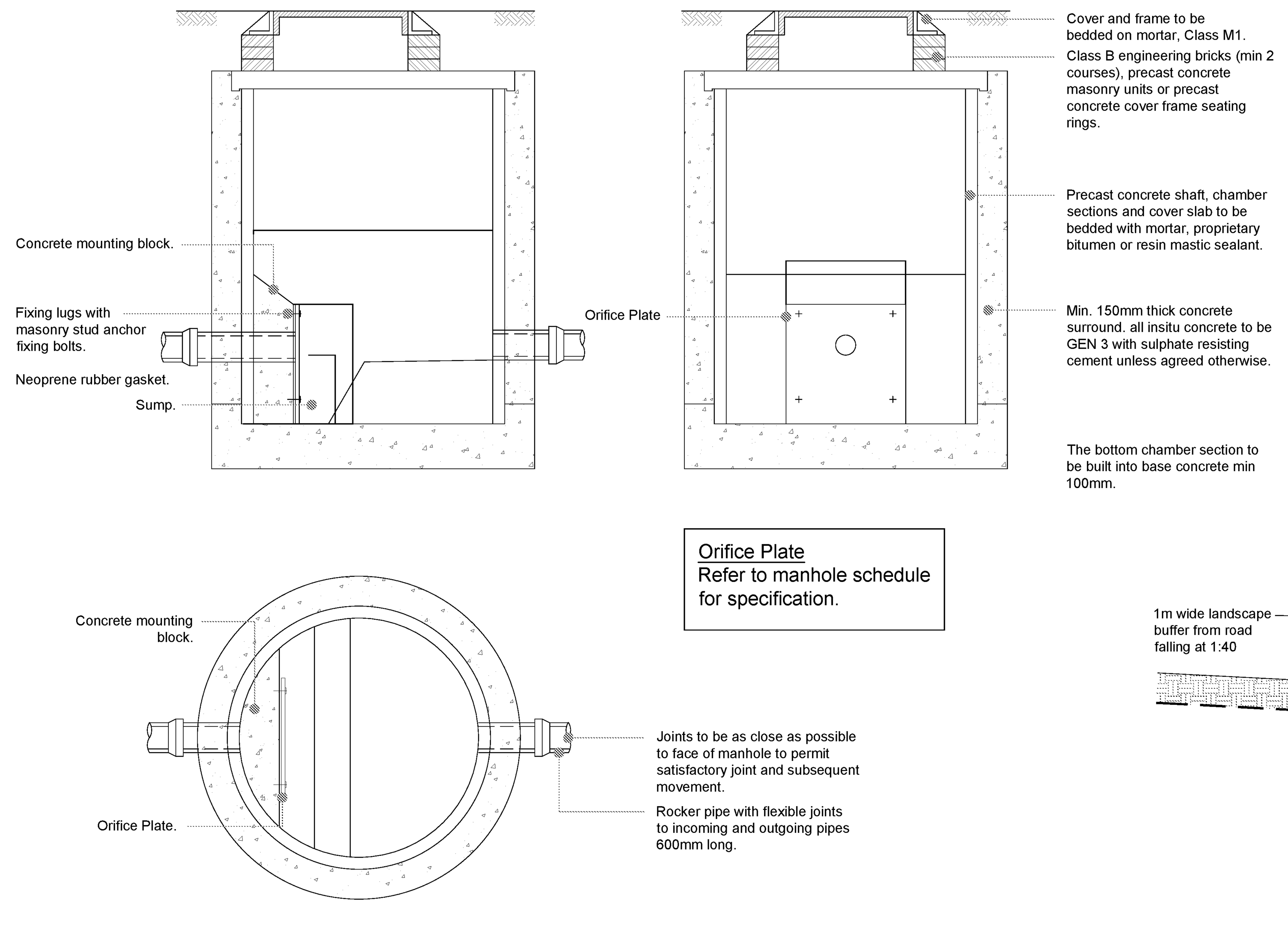
Drawing Title:

Drainage Details
Sheet 2 of 3

Drawing Number: B0457-1506

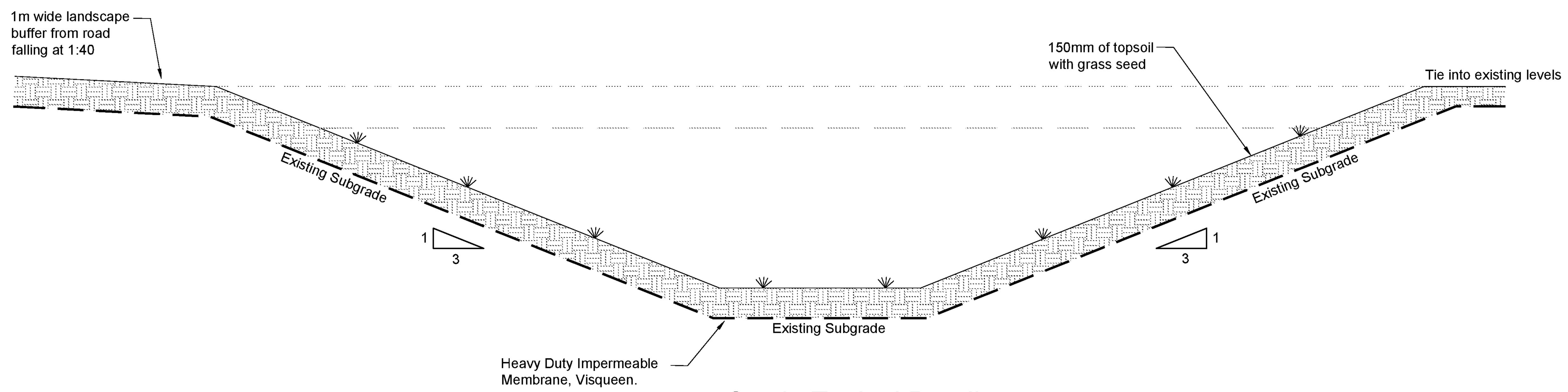
Scale: 1:250 @A1 Unless Noted Otherwise

Revision: - P1



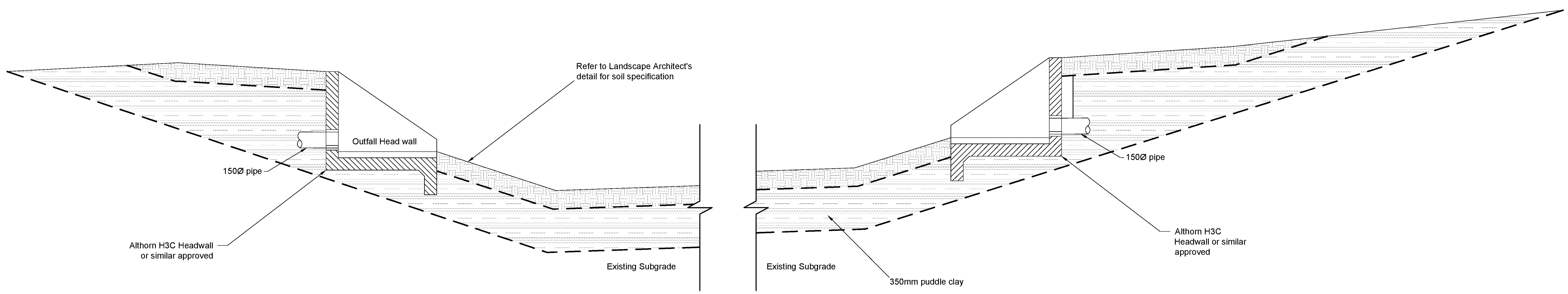
Typical Orifice Plate Manhole

Refer to Plan for Location
Scale 1-20



Swale Typical Detail

(Lined Sides and Base)
Scale 1:20



Lined attenuation Pond

(Lined Sides and Base)
Scale 1:20

0.5m 1m 2m
SCALE 1-20

NOTES

1. DO NOT SCALE THIS DRAWING.
   WORK TO FIGURED DIMENSIONS ONLY.
   ALL DIMENSIONS ARE IN MILLIMETRES (mm)
   UNLESS NOTED OTHERWISE.
2. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and Specialist's drawings and their respective Specifications.
3. All work to comply with the relevant British Standards, Codes of Practice and the Building Regulations.
4. Any discrepancies between all working drawings, specifications and schedules of all disciplines to be immediately notified to CTP for clarification/correction prior to construction of relevant structure.
5. All private drainage works shall be constructed in accordance with Building Regulations Approved Document H (latest edition)' and BS EN 752.
6. Prior to commencement of the works the contractor shall liaise with all relevant authorities to obtain their requirements, work method approval and where appropriate the intended choice of materials.
7. Refer to topographical survey for details of existing site conditions and bench marks.
8. Prior to commencement of the works the contractor shall liaise with all relevant authorities to locate, protect and where necessary divert all existing services affected by the works.
9. The contractor shall ensure the stability of all excavations is maintained at all times and all excavations shall be kept free of standing water.
10. All works in, or adjacent to, the public highway shall be in accordance with the requirements of the Highway Authority. The contractor shall obtain all necessary licenses required to carry out the works within the public highway.
11. All works to new or existing public sewers shall be to the approval of the local water authority and in accordance with 'Sewerage Sector Guidance' - Latest Edition.
12. Prior to commencement of the works all drainage outfall points, whether existing sewer, drain or watercourse, shall be verified on site by the contractor. If the outfall point is found to be higher or significantly lower than shown on the drawings then the design engineer shall be notified immediately (significant redesign of drainage and levels may be necessary). Prior to commencement of construction on-site the contractor shall install all off-site drainage connections, or satisfy himself that there are no obstructions or other reasons why the drain connections can not be made.
13. All cover levels shown on this drawing are approximate, exact levels of new covers and frames are to be determined on site to match level and profile of finished surface.
14. The construction of all existing chambers, gullies and their covers, gratings and frames to be improved, repaired or replaced as necessary to suit their location within the finished development.
15. All covers, gratings and frames to chambers, gullies, channels etc, shall be of the correct load class to suit their location.
    Load Class A15- Pedestrian areas (not accessible by vehicles)
    Load Class B125- Private drives
    Load Class C250- Basements / parking bays / lightly trafficked roads
    Load Class D400- Main roads
16. All existing chambers, gully channels, pipes and other drainage apparatus shall be protected from damage during the works. The contractor shall take all necessary measures to ensure that no material enters the drains (other than that which they are designed to carry).
17. Refer to site investigation report for existing ground conditions and any special requirements for buried concrete (special requirements for buried concrete shall include all pre-cast and in-situ concrete and mortars). Where appropriate refer to contamination reports for details of chemicals affecting choice of materials and other additional requirements.
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PRELIMINARY

Revision	Amendments	Date	Rev'd	Chk'd
P1	Preliminary Issue	10.04.24	SF	LB

Created by:	Date created:	Discipline:
SF	April 2024	CIVILS

ctp consulting engineers
Suffolk House 154 High Street
Sevenoaks Kent TN13 1XE UK
UK: +44 (0)1732 740195
www.ctp-llp.com

Project Title:

Hook Meadows
Westergate

Drawing Title:

Drainage Details
Sheet 3 of 3

Drawing Number: B0457-1506

Scale: 1:250 @A1
Unless Noted Otherwise

Revision: - P1

Appendix D – Hydraulic Calculations

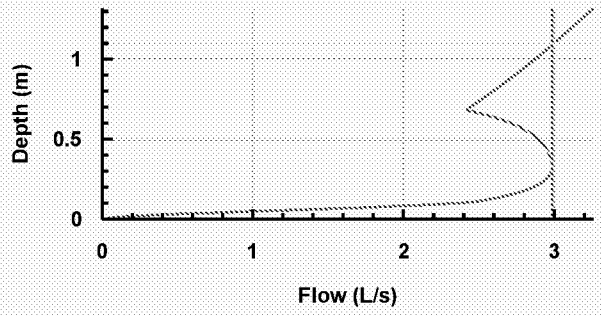
Company:	Date:		
Colin Toms & Partners Suffolk House, 154 High Street Sevenoaks, TN13 1XE	29/11/2024		
	Designed by:	Checked by:	Approved By:
	SP	LB	LB
Report Details: Type: Junctions Storm Phase: Phase	B0457 - Hook Meadows, Westergate: SW Storage Estimate - Surcharged Outfall Att Pond + Swale + Permeable Paving + Att Tank 100Yr+45% CC Event, 3.0l/s Discharge Rate		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
Final Control Chamber (Hydrobrake)	Manhole	493754.088	104789.953	8.800	1.210	7.590	Circular	1.200

Name	Lock
Final Control Chamber (Hydrobrake)	None

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Final Control Chamber (Hydrobrake)	Outlet	(None)	Hydro-Brake®
	Invert Level (m)	7.590	
	Design Depth (m)	1.100	
	Design Flow (L/s)	3.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☑	
	Unit Reference	SHE-0081-3000-1100-3000	



Attenuation Pond Type : Pond

Dimensions

Exceedance Level (m)	9.000
Depth (m)	1.400
Base Level (m)	7.600
Freeboard (mm)	300
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	3.021
Total Volume (m³)	1209.141

Depth (m)	Area (m²)	Volume (m³)
0.000	910.00	0.000
1.100	1300.00	1209.141

Outlets

Outlet

Outgoing Connection	Sewer (Att Pond -> Swale))
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	63.770
Friction Scheme	Manning's n
n	0.035

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Porous Paving

Type : Porous Paving

Dimensions

Exceedance Level (m)	9.770
Depth (m)	0.730
Base Level (m)	9.040
Paving Layer Depth (mm)	130
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	10.000
Long. Slope (1:X)	100.00
Width (m)	359.700
Total Volume (m³)	647.584

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Outlets

Outlet

Outgoing Connection	Sewer (Porous Paving -> Att Pond)
Outlet Type	Orifice
Diameter (m)	0.051
Coefficient of Discharge	0.600
Invert Level (m)	9.040

Advanced

Conductivity (m/hr)	500.0

Swale

Type : Swale

Swale

Exceedance Level (m)	9.000
Depth (m)	1.400
Base Level (m)	7.600
Top Width (m)	10.176
Side Slope (1:X)	2.49
Base Width (m)	3.200
Freeboard (mm)	300
Length (m)	42.000
Long. Slope (1:X)	1000.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.035
Total Volume (m³)	274.454

Outlets

Outlet

Outgoing Connection	Sewer (Swale -> Hydrobrake Outlet)
Outlet Type	Free Discharge

Advanced

Swale

Porosity (%)	100

Attenuation Tank

Type : Cellular Storage

Dimensions

Exceedance Level (m)	8.750
Depth (m)	0.400
Base Level (m)	7.700
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	10
Crate Width (m)	18
Crate Height (m)	0.4
Total Volume (m³)	69.050

Outlets

Outlet

Outgoing Connection	Sewer (Att Tank -> Att Pond)
Outlet Type	Free Discharge

Company:	Date:		
Colin Toms & Partners Suffolk House, 154 High Street Sevenoaks, TN13 1XE	29/11/2024		
	Designed by:	Checked by:	Approved By:
	SP	LB	LB
Report Details: Type: Connections Storm Phase: Phase	B0457 - Hook Meadows, Westergate: SW Storage Estimate - Surcharged Outfall Att Pond + Swale + Permeable Paving + Att Tank 100Yr+45% CC Event, 3.0l/s Discharge Rate		

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
Sewer (Att Pond -> Swale))	8.338	Pipe	0.000		0.6	525	9.000	7.600
Sewer (Porous Paving -> Att Pond)	17.183	Pipe	11.932		0.6	150	9.870	9.040
Sewer (Swale -> Hydrobrake Outlet)	8.071	Pipe	807.075		0.6	525	9.042	7.600
Sewer (Att Tank -> Att Pond)	10.591	Pipe	105.913		0.6	375	8.750	7.700

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)	Velocity (m/s)
Sewer (Att Pond -> Swale))	9.042	7.600		None		
Sewer (Porous Paving -> Att Pond)	9.000	7.600		None	4.1	
Sewer (Swale -> Hydrobrake Outlet)	8.800	7.590		None		
Sewer (Att Tank -> Att Pond)	9.042	7.600		None		

Company:	Date:		
Colin Toms & Partners Suffolk House, 154 High Street Sevenoaks, TN13 1XE	29/11/2024		
	Designed by:	Checked by:	Approved By:
	SP	LB	LB
Report Details: Type: Manhole Schedule Storm Phase: Phase	B0457 - Hook Meadows, Westergate: SW Storage Estimate - Surcharged Outfall Att Pond + Swale + Permeable Paving + Att Tank 100Yr+45% CC Event, 3.0l/s Discharge Rate		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
Final Control Chamber (Hydrobrake)	8.800 7.590	Diameter / Length: 1.200	{1} Sewer (Swale -> Hydrobrake Outlet)	Pipe	7.590	Diam/Width:525	Manhole
E:493754.088 N:104789.953	1.210						
							Not Applicable

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Inflow Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Access Raod	Attenuation Tank		Time of Concentration	0.061	100	10	110	0.067
Att Pond Catchment	Attenuation Pond		Time of Concentration	0.130	100	10	110	0.143
Catchment Area 1	Attenuation Pond		Time of Concentration	0.932	100	10	110	1.025
Catchment Area 2	Porous Paving		Time of Concentration	0.639	100	10	110	0.703
Swale Catchment	Swale		Time of Concentration	0.043	100	10	110	0.047
TOTAL		**0.0**		**1.805**				**1.986**

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Network Design Criteria	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Outfall Details	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Final Control Chamber (Hydrobrake)	Fixed Surcharged Level	8.410	
FEH : 2 years: +0 %: 15 mins: Summer		8.410	
FEH : 2 years: +0 %: 15 mins: Winter		8.410	
FEH : 10 years: +0 %: 15 mins: Summer		8.410	
FEH : 10 years: +0 %: 15 mins: Winter		8.410	
FEH : 30 years: +0 %: 15 mins: Summer		8.410	
FEH : 30 years: +0 %: 15 mins: Winter		8.410	
FEH : 30 years: +35 %: 15 mins: Summer		8.410	
FEH : 30 years: +35 %: 15 mins: Winter		8.410	
FEH : 100 years: +0 %: 15 mins: Summer		8.410	
FEH : 100 years: +0 %: 15 mins: Winter		8.410	
FEH : 100 years: +45 %: 15 mins: Summer		8.410	
FEH : 100 years: +45 %: 15 mins: Winter		8.410	
FEH : 2 years: +0 %: 30 mins: Summer		8.410	
FEH : 2 years: +0 %: 30 mins: Winter		8.410	
FEH : 10 years: +0 %: 30 mins: Summer		8.410	
FEH : 10 years: +0 %: 30 mins: Winter		8.410	
FEH : 30 years: +0 %: 30 mins: Summer		8.410	
FEH : 30 years: +0 %: 30 mins: Winter		8.410	
FEH : 30 years: +35 %: 30 mins: Summer		8.410	
FEH : 30 years: +35 %: 30 mins: Winter		8.410	
FEH : 100 years: +0 %: 30 mins: Summer		8.410	
FEH : 100 years: +0 %: 30 mins: Winter		8.410	
FEH : 100 years: +45 %: 30 mins: Summer		8.410	
FEH : 100 years: +45 %: 30 mins: Winter		8.410	
FEH : 2 years: +0 %: 60 mins: Summer		8.410	
FEH : 2 years: +0 %: 60 mins: Winter		8.410	
FEH : 10 years: +0 %: 60 mins: Summer		8.410	
FEH : 10 years: +0 %: 60 mins: Winter		8.410	
FEH : 30 years: +0 %: 60 mins: Summer		8.410	
FEH : 30 years: +0 %: 60 mins: Winter		8.410	
FEH : 30 years: +35 %: 60 mins: Summer		8.410	
FEH : 30 years: +35 %: 60 mins: Winter		8.410	

FEH : 100 years: +0 %: 60 mins: Summer		8.410	
FEH : 100 years: +0 %: 60 mins: Winter		8.410	
FEH : 100 years: +45 %: 60 mins: Summer		8.410	
FEH : 100 years: +45 %: 60 mins: Winter		8.410	
FEH : 2 years: +0 %: 120 mins: Summer		8.410	
FEH : 2 years: +0 %: 120 mins: Winter		8.410	
FEH : 10 years: +0 %: 120 mins: Summer		8.410	
FEH : 10 years: +0 %: 120 mins: Winter		8.410	
FEH : 30 years: +0 %: 120 mins: Summer		8.410	
FEH : 30 years: +0 %: 120 mins: Winter		8.410	
FEH : 30 years: +35 %: 120 mins: Summer		8.410	
FEH : 30 years: +35 %: 120 mins: Winter		8.410	
FEH : 100 years: +0 %: 120 mins: Summer		8.410	
FEH : 100 years: +0 %: 120 mins: Winter		8.410	
FEH : 100 years: +45 %: 120 mins: Summer		8.410	
FEH : 100 years: +45 %: 120 mins: Winter		8.410	
FEH : 2 years: +0 %: 240 mins: Summer		8.410	
FEH : 2 years: +0 %: 240 mins: Winter		8.410	
FEH : 10 years: +0 %: 240 mins: Summer		8.410	
FEH : 10 years: +0 %: 240 mins: Winter		8.410	
FEH : 30 years: +0 %: 240 mins: Summer		8.410	
FEH : 30 years: +0 %: 240 mins: Winter		8.410	
FEH : 30 years: +35 %: 240 mins: Summer		8.410	
FEH : 30 years: +35 %: 240 mins: Winter		8.410	
FEH : 100 years: +0 %: 240 mins: Summer		8.410	
FEH : 100 years: +0 %: 240 mins: Winter		8.410	
FEH : 100 years: +45 %: 240 mins: Summer		8.410	
FEH : 100 years: +45 %: 240 mins: Winter		8.410	
FEH : 2 years: +0 %: 360 mins: Summer		8.410	
FEH : 2 years: +0 %: 360 mins: Winter		8.410	
FEH : 10 years: +0 %: 360 mins: Summer		8.410	
FEH : 10 years: +0 %: 360 mins: Winter		8.410	
FEH : 30 years: +0 %: 360 mins: Summer		8.410	
FEH : 30 years: +0 %: 360 mins: Winter		8.410	

FEH : 30 years: +35 %: 360 mins: Summer		8.410	
FEH : 30 years: +35 %: 360 mins: Winter		8.410	
FEH : 100 years: +0 %: 360 mins: Summer		8.410	
FEH : 100 years: +0 %: 360 mins: Winter		8.410	
FEH : 100 years: +45 %: 360 mins: Summer		8.410	
FEH : 100 years: +45 %: 360 mins: Winter		8.410	
FEH : 2 years: +0 %: 480 mins: Summer		8.410	
FEH : 2 years: +0 %: 480 mins: Winter		8.410	
FEH : 10 years: +0 %: 480 mins: Summer		8.410	
FEH : 10 years: +0 %: 480 mins: Winter		8.410	
FEH : 30 years: +0 %: 480 mins: Summer		8.410	
FEH : 30 years: +0 %: 480 mins: Winter		8.410	
FEH : 30 years: +35 %: 480 mins: Summer		8.410	
FEH : 30 years: +35 %: 480 mins: Winter		8.410	
FEH : 100 years: +0 %: 480 mins: Summer		8.410	
FEH : 100 years: +0 %: 480 mins: Winter		8.410	
FEH : 100 years: +45 %: 480 mins: Summer		8.410	
FEH : 100 years: +45 %: 480 mins: Winter		8.410	
FEH : 2 years: +0 %: 960 mins: Summer		8.410	
FEH : 2 years: +0 %: 960 mins: Winter		8.410	
FEH : 10 years: +0 %: 960 mins: Summer		8.410	
FEH : 10 years: +0 %: 960 mins: Winter		8.410	
FEH : 30 years: +0 %: 960 mins: Summer		8.410	
FEH : 30 years: +0 %: 960 mins: Winter		8.410	
FEH : 30 years: +35 %: 960 mins: Summer		8.410	
FEH : 30 years: +35 %: 960 mins: Winter		8.410	
FEH : 100 years: +0 %: 960 mins: Summer		8.410	
FEH : 100 years: +0 %: 960 mins: Winter		8.410	
FEH : 100 years: +45 %: 960 mins: Summer		8.410	
FEH : 100 years: +45 %: 960 mins: Winter		8.410	
FEH : 2 years: +0 %: 1440 mins: Summer		8.410	
FEH : 2 years: +0 %: 1440 mins: Winter		8.410	
FEH : 10 years: +0 %: 1440 mins: Summer		8.410	
FEH : 10 years: +0 %: 1440 mins: Winter		8.410	

FEH : 30 years: +0 %: 1440 mins: Summer		8.410	
FEH : 30 years: +0 %: 1440 mins: Winter		8.410	
FEH : 30 years: +35 %: 1440 mins: Summer		8.410	
FEH : 30 years: +35 %: 1440 mins: Winter		8.410	
FEH : 100 years: +0 %: 1440 mins: Summer		8.410	
FEH : 100 years: +0 %: 1440 mins: Winter		8.410	
FEH : 100 years: +45 %: 1440 mins: Summer		8.410	
FEH : 100 years: +45 %: 1440 mins: Winter		8.410	

Company:	Date:		
Colin Toms & Partners Suffolk House, 154 High Street Sevenoaks, TN13 1XE	29/11/2024		
	Designed by:	Checked by:	Approved By:
	SP	LB	LB
Report Title:	B0457 - Hook Meadows, Westergate:		
Rainfall Analysis Criteria	SW Storage Estimate - Surcharged Outfall Att Pond + Swale + Permeable Paving + Att Tank 100Yr+45% CC Event, 3.0l/s Discharge Rate		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	10
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 493591 104811 SU 93591 04811
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
10.0	0.000
30.0	0.000
30.0	35.000
100.0	0.000
100.0	45.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Junctions Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Status
Final Control Chamber (Hydrobrake)	FEH: 2 years: +0 %: 1440 mins: Winter	8.800	7.590	8.108	0.518	0.0	0.586	0.000	0.0	0.544	OK

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Junctions Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 10 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Status
Final Control Chamber (Hydrobrake)	FEH: 10 years: +0 %: 1440 mins: Winter	8.800	7.590	8.286	0.696	0.2	0.788	0.000	0.0	1.261	OK

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Junctions Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Status
Final Control Chamber (Hydrobrake)	FEH: 30 years: +0 %: 1440 mins: Winter	8.800	7.590	8.412	0.822	0.4	0.930	0.000	0.0	1.473	OK

FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Status
Final Control Chamber (Hydrobrake)	FEH: 30 years: +35 %: 1440 mins: Winter	8.800	7.590	8.545	0.955	22.2	1.080	0.000	2.5	209.559	Flood Risk

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Junctions Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Status
Final Control Chamber (Hydrobrake)	FEH: 100 years: +0 %: 1440 mins: Winter	8.800	7.590	8.503	0.913	19.6	1.032	0.000	2.2	125.623	Flood Risk

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Junctions Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Status
Final Control Chamber (Hydrobrake)	FEH: 100 years: +45 %: 1440 mins: Winter	8.800	7.590	8.746	1.156	34.7	1.308	0.000	3.0	374.439	Flood Risk

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Attenuation Pond	FEH: 2 years: +0 %: 1440 mins: Winter	8.108	8.108	0.508	0.508	13.5	505.139	0.000	0.000	2.7	121.148	1627	58.223
Swale	FEH: 2 years: +0 %: 1440 mins: Winter	8.108	8.108	0.466	0.508	3.2	90.261	0.000	0.000	0.0	51.174	24323	67.113
Porous Paving	FEH: 2 years: +0 %: 480 mins: Winter	9.234	9.232	0.094	0.192	16.6	154.700	0.000	0.000	2.2	93.518	775	76.111
Attenuation Tank	FEH: 2 years: +0 %: 1440 mins: Winter	8.108	8.108	0.408	0.408	1.9	68.468	0.000	0.000	0.3	3.584		0.843

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Status
OK
OK
OK
OK

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 10 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Attenuation Pond	FEH: 10 years: +0 %: 1440 mins: Winter	8.287	8.287	0.687	0.687	18.3	703.941	0.000	0.000	3.7	152.017	1675	41.782
Swale	FEH: 10 years: +0 %: 1440 mins: Winter	8.287	8.287	0.645	0.687	4.4	135.801	0.000	0.000	0.2	46.454		50.519
Porous Paving	FEH: 10 years: +0 %: 480 mins: Winter	9.304	9.302	0.164	0.262	23.9	230.022	0.000	0.000	2.6	113.945	904	64.480
Attenuation Tank	FEH: 10 years: +0 %: 1440 mins: Winter	8.287	8.287	0.587	0.587	2.5	68.638	0.000	0.000	0.4	6.612		0.597

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Status
OK
OK
OK
OK

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Attenuation Pond	FEH: 30 years: +0 %: 1440 mins: Winter	8.412	8.412	0.812	0.812	22.2	850.812	0.000	0.000	4.5	176.097	1666	29.635
Swale	FEH: 30 years: +0 %: 1440 mins: Winter	8.412	8.412	0.770	0.812	5.4	171.865	0.000	0.000	0.3	45.638	8513	37.379
Porous Paving	FEH: 30 years: +0 %: 480 mins: Winter	9.360	9.358	0.220	0.318	29.7	290.060	0.000	0.000	2.9	128.010	1031	55.209
Attenuation Tank	FEH: 30 years: +0 %: 1440 mins: Winter	8.412	8.412	0.712	0.712	3.0	68.757	0.000	0.000	1.2	12.364		0.424

Status
OK
OK
OK
OK

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Attenuation Pond	FEH: 30 years: +35 %: 1440 mins: Winter	8.506	8.506	0.906	0.906	29.6	963.623	0.000	0.000	12.9	391.097	859	20.305
Swale	FEH: 30 years: +35 %: 1440 mins: Winter	8.511	8.517	0.869	0.917	16.1	201.147	0.000	0.000	22.2	285.351	147	26.710
Porous Paving	FEH: 30 years: +35 %: 480 mins: Winter	9.462	9.459	0.322	0.419	40.1	399.546	0.000	0.000	3.4	150.472	1165	38.302
Attenuation Tank	FEH: 30 years: +35 %: 1440 mins: Winter	8.509	8.509	0.809	0.809	3.8	68.848	0.000	0.000	2.3	26.969	4296	0.292

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Status
OK
OK
OK
OK

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Attenuation Pond	FEH: 100 years: +0 %: 1440 mins: Winter	8.490	8.490	0.890	0.890	27.4	944.733	0.000	0.000	13.1	307.717	857	21.867
Swale	FEH: 100 years: +0 %: 1440 mins: Winter	8.490	8.490	0.848	0.890	14.5	195.861	0.000	0.000	19.1	179.067	172	28.636
Porous Paving	FEH: 100 years: +0 %: 480 mins: Winter	9.431	9.428	0.291	0.388	37.0	366.464	0.000	0.000	3.3	144.034	1107	43.411
Attenuation Tank	FEH: 100 years: +0 %: 1440 mins: Winter	8.490	8.490	0.790	0.790	7.7	68.832	0.000	0.000	1.3	22.259		0.316

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Status
OK
OK
OK
OK

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Attenuation Pond	FEH: 100 years: +45 %: 1440 mins: Winter	8.677	8.677	1.077	1.077	56.4	1178.861	0.000	0.000	53.0	589.635	361	2.504
Swale	FEH: 100 years: +45 %: 1440 mins: Winter	8.677	8.683	1.035	1.083	81.5	258.511	0.000	0.000	34.7	475.821	126	5.809
Porous Paving	FEH: 100 years: +45 %: 960 mins: Winter	9.602	9.600	0.462	0.560	30.4	551.565	0.000	0.000	4.0	349.973	1377	14.827
Attenuation Tank	FEH: 100 years: +45 %: 1440 mins: Winter	8.677	8.677	0.977	0.977	4.7	69.009	0.000	0.000	5.2	47.174	384	0.059

Company:	Date:		
Colin Toms & Partners	29/11/2024		
Suffolk House, 154 High Street	Designed by:	Checked by:	Approved By:
Sevenoaks, TN13 1XE	SP	LB	LB
Report Details:	B0457 - Hook Meadows, Westergate:		
Type: Stormwater Controls Summary	SW Storage Estimate - Surcharged Outfall		
Storm Phase: Phase	Att Pond + Swale + Permeable Paving + Att Tank		
	100Yr+45% CC Event, 3.0l/s Discharge Rate		

Status
OK
OK
OK
OK

Appendix E - Arun District Council Surface Water Drainage Proposals Checklist

Surface Water Drainage Proposal Checklist

During the planning process, applicants are often required to submit surface water drainage proposals for appraisal by the Local Planning Authority's (LPA's) Drainage Engineers. This 'Surface Water Drainage Proposal Checklist' has been designed to clearly define the expectations and requirements that proposals, submitted to LPA's within West Sussex, need to satisfy.

It is recommended that applicants take time, at the outset of the planning process, to familiarise themselves with the requirements set out in this checklist.

The expectation is that applicants will include a completed checklist in the supporting documentation they submit to the LPA, during the planning process.

Applicants should be aware that:

- It is in an applicant's interest to provide all the information requested by the checklist, to enable the LPA's Engineers to quickly and efficiently appraise their proposals.
- The omission of information may lead to delays in the planning process.

However, if this checklist requests information that an applicant does not consider to be relevant to their application:

- In the first instance the applicant should discuss this with the LPA's Drainage Engineer. (The Planning Officer dealing with the application will be able to provide applicants with the appraising Engineer's contact details).
- Alternatively, the applicant can provide an explanation as to why they have omitted certain information in the 'Additional Information' section at the end of the checklist, quoting the relevant 'requirement number'. However, be aware; the decision whether or not certain information is required ultimately lies with the appraising Engineer (hence the above advice to consult them before omitting information).

The Town and Country Planning Regulations now require pre-commencement conditions to have the prior agreement of the applicant regarding their wording and use. Therefore, to avoid pre-commencement conditions relating to surface water drainage, applicants will need to submit proposals that provide the information requested in this checklist, and also align with the requirements of the following documents:

- The West Sussex Policy for the Management of Surface Water
- Any supplementary planning guidance issued by the respective LPA.

If surface water drainage conditions have been applied to a planning permission; this document will also help applicants prepare a 'Discharge of Conditions' application'.

Version 5.3 (30.09.2022)

Surface Water Drainage Proposal Checklist

Ground Investigation Results						
No.	**Requirement**	**Results/Information Provided?**				
1	**Winter groundwater monitoring results** Please refer to guidance note 'a' below.	**Yes**	X	**No**		
2	**Period of winter groundwater monitoring** Note 'a'	**From**	17/10/2022			
		To	08/06/2023			
3	**Maximum recorded groundwater level** Note 'a'	10.68 **mAOD**				
		0.05 **mBGL**				
4	**Winter infiltration test results** Notes 'b' and 'c'	**Yes**		**No**	X	
5	**Date of winter infiltration testing** Note 'b'	DD/MM/YYYY N/A				
6	**Details of the location and depth of the infiltration testing** Notes 'b' and 'c'	**Yes**		**No**	N/A	
7	**Minimum infiltration rate** Note 'd'	N/A **m/s**				

Guidance Notes

a. Groundwater monitoring should be undertaken during the winter period (October to March inclusive) to enable the peak annual groundwater levels to be established. The duration of monitoring required for smaller developments (e.g. those consisting of less than 10 properties) can be discussed with the LPA's Engineers as; for some locations, a shorter duration may be acceptable. However, unless dispensation is agreed in advance with the LPA's Engineers, a full winter season of monitoring should be undertaken. Groundwater on sites near the coast may be influenced by tidal conditions and therefore this consideration needs to be factored into the monitoring programme.

b. Infiltration testing should be undertaken during the wet winter months (typically January or February) and in line with BRE365 or a similar approved method, such as CIRIA R156. Infiltration testing needs to be carried out at the locations and depths of proposed infiltration structures, this must also be at a depth above the maximum recorded groundwater level in the vicinity of the test pit. Tests must be repeated 3 times consecutively, to replicate saturated ground conditions.

c. Deep-bore Soakaways: Where it is not possible to undertake conventional BRE365 or CIRIA R156 testing due to depth; advice should be sought from the Council's engineers. Please note that; deep-bore soakaways are generally resisted unless there is no alternative. Evidence of the Environment Agency's agreement with the principle of using deep-bore methods to drain the site must be provided within the submission.

d. The minimum infiltration rate obtained at the location and depth of the proposed infiltration structures should be used to inform the design of the infiltration structures. Please use the 'additional information' section at the end of this checklist if multiple infiltration structures are proposed, which utilise different minimum rates.

Proposed Method of Surface Water Disposal					
8	**Infiltration on-site**, via soakaway structures.	**Yes**		**No**	X
9	**If on-site infiltration is not to be used, has justification for this decision been provided?** Note 'e'	**Yes**	X	**No**	
10	**Attenuation** (on-site) with a **restricted discharge to a watercourse** on, or adjacent to, the site.	**Yes**	X	**No**	
11	**Attenuation** (on-site) with a **restricted discharge to a surface water sewer** on, or adjacent to, the site.	**Yes**		**No**	X
12	**Attenuation** (on-site) with a **restricted discharge to a foul water or combined sewer** on, or adjacent to, the site.	**Yes**		**No**	X

Guidance Note

e. If on-site infiltration is deemed unviable; evidence supporting the move to the next step(s) of the drainage hierarchy must be provided, to the satisfaction of the LPA's Engineer.

Drainage Design: Supporting Calculations						
	No.	**Requirement**	**Provided?**			
Infiltration Structures	13	**Calculations demonstrating the 1 in 10 year event, plus climate change allowance (CCA), can be accommodated below the lowest incoming pipe within each structure.** Notes 'f' and 'g'.	**Yes**		**No**	N/A
	14	**Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site.** Notes 'f' and 'g'.	**Yes**		**No**	N/A
	15	**Lowest base level of any infiltration structure**	N/A			**mAOD mBGL**
	16	**Half-drain time for 10 year event (plus CCA)**	**Yes**		**No**	N/A
			N/A			**Hours**
	17	**Half-drain time for 100 year event (plus CCA)**	**Yes**		**No**	N/A
			N/A			**Hours**
	18	**Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.**	**Yes**		**No**	N/A
Attenuation / Restricted Discharge	19	**Pre-development run-off rate calculations** Note 'h'	**Yes**	X	**No**	
			2.96			**l/s**
	20	**Proposed discharge rate** Note 'h'	3.0			**l/s**
	21	**Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site.** Note 'g' and 'h'	**Yes**	X	**No**	
	22	**Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.**	**Yes**	X	**No**	
	23	**If the proposed scheme incorporates any impermeable lined attenuation features; calculations are required to demonstrate that appropriate resistance to floatation (due to groundwater levels) is catered for in the design.**	**Yes**		**No**	X
	24	**Is a discharge into, or an alteration to, an ordinary watercourse is proposed? (If so, Ordinary Watercourse/ Land Drainage Consent will be required).** Note 'i'	**Yes**	X	**No**	
	25	**If discharging to a watercourse, piped system or the sea, has the proposed drainage network been modelled against predicted top water levels for the 1 in 100 year storm event, plus CCA, within the existing system?** Note 'j'	**Yes**		**No**	X

Guidance Notes

f. The appropriate factor of safety from the table below must be applied to calculations to ensure the design is fully in accordance with CIRIA R156/CIRIA C753. This is applicable to plane/blanket infiltration systems which utilise the base area only in calculations. Note: not relevant for BRE DG 365 method for calculating soakaway capacity where the design rate is applied to the sides only. Three-dimensional infiltration systems are not permitted without agreement from an LPA engineer.

Factor of Safety Table						
Size of Area to be Drained	Consequences of failure					
	No damage or inconvenience		Minor inconvenience, e.g. surface water on car park		Damage to buildings, structures or roads.	
	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75
<100 m^2	1.5	2	2	3	10	13
100m^2 to 1000m^2	1.5	2	3	4	10	13
>1000m^2	1.5	2	5	6.5	10	13

g. Climate change allowance on peak rainfall intensities or stored volumes must take into account the lifetime of the development.

h. Calculations of Qbar are to be based upon the area to be positively drained. It is advised that agreement is sought with the LPA's Engineer, at an early stage, regarding the area to be considered for this calculation. Unless otherwise agreed; the minimum acceptable discharge rate is 2l/s when using formal flow control devices. For lower flow rates; evidence must be provided that adequate measures are in place to protect the flow control device from blockage. **For Greenfield sites**; run-off must be restricted to the Greenfield Qbar runoff rate during all events up to and including the 1 in 100 year rainfall event, including climate change allowance. **For Brownfield sites**; infiltration should be investigated as the first option, but where evidence can be provided that this is unviable, off-site flows from all events should also be restricted to Greenfield Qbar. If that is not possible; flow should be restricted to as close to Qbar as is achievable, with a minimum requirement of 50% betterment. Applicants are expected to provide fully detailed plans of the site's existing surface water drainage arrangements, including impermeable areas, gullies, outfalls, pipes & diameters, manholes, etc., to prove the extent of the existing positively drained areas and their associated points of discharge.

i. Ordinary Watercourse/Land Drainage Consent will need to be sought, ideally in parallel with planning permission, if the proposals incorporate discharge into, culverting or altering a watercourse.

j. Modelling is required to ensure that the effects of surcharged outfalls are taken into account.

Plans/Drawings/Diagrams						
No.	Requirement	Provided?				
26	**Plan detailing the location of groundwater monitoring and infiltration testing**	Yes	X	No		
27	**Detailed drainage layout plan** Note 'k'	Yes	X	No		
28	**Construction detail plans** Note 'l'	Yes	X	No		
29	**Exceedance flow route plans** Note 'm'	Yes	X	No		
30	**Impermeable area plan**	Yes	X	No		
31	**If ground levels are being raised ≥ 300mm above existing levels and is unavoidable, have fully detailed plans been provided, together with drainage proposals, to address any potential drainage related issues.**	Yes		No	N/A	

Guidance Notes

k. Drainage layout plans should include:
- All surface water drainage pipes labelled with: diameters, pipe materials, gradients and invert levels.
- All infiltrating and attenuating structures (including permeable paving) labelled with; dimensions, invert/base and cover levels.
- All manholes labelled with: a reference number, cover levels, invert levels, cover loading grade.
- All silt traps clearly labelled with sump depths.
- Control structures with discharge rates, hydraulic head and invert levels.
- Proposed/existing levels of any areas subject to ground raising, together with suitable measures/detailed drawings for the associated management of surface water runoff**. Please note that ground raising should be avoided unless there are exceptional circumstances**. In any instances where this is envisaged early consultation with the Council Engineer is recommended.

l. Site specific construction detail plans should be supplied. The following elements must be included (where applicable): infiltrating structures; attenuating structures; manholes; catch-pits/silt traps; flow control devices; permeable paving; headwalls; channel drains; gullies; pipe bedding and surround, etc.

m. Unless specifically requested by the Council's drainage Engineers 'Exceedance Flow Route Plans' are only required for developments of more than 10 residential properties or more than 0.5ha of commercial development.

Additional Information

The space below can be used to provide an explanation for any required information that has been omitted in the submission of this form or to raise specific queries seeking clarification. Please enter the appropriate line entry number to which the comments relate in the box at the left-hand side of the form.

4	Infiltration testing was only conducted within the month of September returning poor to moderate infiltration rates. However with the presence of a high groundwater table during the winter months the method of infiltration for surface water discharge was deemed unviable.
23	Flotation calculations of the lined attenuation features are to be developed at the detailed design stage of the project.
24	Ordinary Watercourse/ Land Drainage Consent is to be sought a the detailed design stage of the project. Currently insufficient detail and information is available to apply for the consent approval.
31	The site is located within Flood Zone 1 and therefore has a lower susceptibility to flooding.

Appendix F – SuDs Indices Matrix Worksheet

SIMPLE INDEX APPROACH: TOOL

SEPA · HR Wallingford

[illegible]

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).

2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.

3. Relevant design examples are included in the SuDS Manual Appendix C.

4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

DROP DOWN LIST — RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

USER ENTRY — USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the runoff area, either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

[illegible]

	Runoff Area Land Use Description	Pollution Hazard	Total Suspended Solids	Metals	Hydrocarbons	DESIGN CONDITIONS 1	2
Select land use type from the drop down list (or 'Other' if none applicable):	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)	Low	0.5	0.4	0.4		
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:							
	Landuse Pollution Hazard Index	Low	0.5	0.4	0.4		

(Pollution Hazard Indices: Total Suspended Solids, Metals, Hydrocarbons)

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

[illegible]

If you have fewer than 3 components, select 'None' for the components that are not required.

[illegible]

	SuDS Component Description	Total Suspended Solids	Metals	Hydrocarbons	DESIGN CONDITIONS 1	2	3
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:	Pervious pavement (where the pavement is not designed as an infiltration component)	0.7	0.6	0.7	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:	Pond or wetland	0.7	0.7	0.5	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events	
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:	Swale	0.5	0.6	0.6	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:							
	Aggregated Surface Water Pollution Mitigation Index	>0.95	>0.95	>0.95	[illegible]		

(Pollution Mitigation Indices: Total Suspended Solids, Metals, Hydrocarbons)

Is the runoff now discharged to an infiltration component?

Yes ? Go to Step 2B
No ? Go to Step 2C

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

[illegible]

	Description	Total Suspended Solids	Metals	Hydrocarbons	DESIGN CONDITIONS 1	2	3	4
Select type of groundwater protection from the drop down list:	None							
If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:								
	Groundwater Protection Pollution Mitigation Index	0	0	0				

(Pollution Mitigation Indices: Total Suspended Solids, Metals, Hydrocarbons)

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

	Total Suspended Solids	Metals	Hydrocarbons	
Combined Pollution Mitigation Indices for the Runoff Area	>0.95	>0.95	>0.95	[illegible]

(Combined Pollution Mitigation Indices)

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

[illegible]

Total Suspended Solids	Metals	Hydrocarbons	DESIGN CONDITIONS 1
Sufficient	Sufficient	Sufficient	[illegible]

(Sufficiency of Pollution Mitigation Indices)

Appendix G – WSCC Pre-application Response

Eleanor Read
Flood Risk Management Officer
Highways, Transport and Planning,
Place Services

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Ground Floor
Northleigh
County Hall
Chichester
PO19 1RH
03302 227048

BY EMAIL ONLY

Samuel Pilling
CTP Consulting Engineers
Suffolk House
154 High Street
Sevenoaks
Kent
TN14 1XE

18th November 2024

Dear Samuel,

WSCC-656687789 – Land to the rear of Meadow Way, Meadow Way, Westergate, West Sussex, PO20 3QT

WSCC Flood Risk Management Team Level 2 Pre-Application Advice has been sought for a 3.8ha site in Westergate, Arun District. The application will be for reserved matters (RM) approval. The FRM team previously provided detailed comments (objection) for an application for reserved matters, so the pre-app is to resolve the issues raised in the objection. Following a MS Teams meeting on 6th November, we have the following comments to make following discussions of the current proposals:

1. For any ordinary watercourses within/along the red line boundary, a 3m easement from the top of bank must be drawn on all approved plans at RM stage. This is for maintenance access. No structures or planting is allowed within these easements. Our mapping suggests there is an open watercourse along the northern and eastern boundary. The watercourses need to be clearly drawn in layouts (including the masterplan).

2. As discussed in the meeting, I'm happy for our team to condition construction management plan as part of RM comments.

3. As it will not affect the layout of the site, and therefore the approval of this RM application, the investigation into the ditch's connection to the wider watercourse network can be submitted as part of the discharge of condition 11. We are happy to discuss the extent of the investigations once the RM has been approved. Please contact me when required.

4. As there have been high groundwater levels during site investigations, these will need to be considered in detailed design, particularly in terms of lining and buoyancy. It is suggested that the groundwater levels are considered when setting finished floor levels, to ensure property is not affected by groundwater flooding. Please note wholesale ground raising is to be avoided as it alters natural flows and can increase flood risk elsewhere.

5. It is difficult to be sure but it looks like the watercourse/ditch is an open feature where the access road is located. We are against culverting open watercourses

unless there is no other alternative. Ordinary watercourse consent will be required for this and it is suggested this is considered at Reserved Matters stage as it could affect the layout of the site. Information on applying for consent can be found here: Ordinary watercourse land drainage consent - West Sussex County Council

6. There are some areas where the levels/features etc in the drainage layout do not match the calculations. These must match to ensure the calculations reflect the drainage layout properly, otherwise flood risk could increase elsewhere (for example if a cover level is lower in drawing compared to calculations or if the sub base for the permeable paving is deeper in calculations than drawings).

7. Before submission, drawings cannot be in preliminary for RM application as the layout will be set.

I am happy to review final Drainage Strategy as part of pre-app service before it is submitted to Arun District Council, to ensure outstanding issues have been addressed.

Yours sincerely,

Ellie Read
Flood Risk Management Team

Documents Reviewed:
Letter from CTP Consulting Engineers addressing comments for previous RM application, dated 30th July 2024
FRA by Motion, 23/11/2022
Drainage Exceedance Plan by CTP Consulting Engineers, 7th August 2024, revision P1
Calculations (Free Discharge Outfall and Surcharged Outfall), 7th August 2024
Phase 2 Geo-Environmental Ground Investigation by BRD Environmental Ltd, June 2023
Site Layout by Eric Cole Architecture, March 2024, revision 8
Drainage Strategy by CTP Consulting Engineers, 7th August 2024, revision P4

cc: Luke Bacon (CTP Consulting Engineers), Tilly Whishaw (Redrow), Hannah Knowles (Redrow), Peter Cleveland (Henry Adams)