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Our Reference: 2017-025-Report-REV A

Date: 16/05/17

Joe Jenkins
Head of Planning and Building Control
Barnsley Metropolitan Borough Council

Drainage Strategy to Discharge Planning Condition No14 Ref:2016/1381 **The Former 3 Horseshoe Pub, Barnsley Road, Brierley S72 9JT**

Flood Risk Consultancy Ltd have been commissioned by Paragram Ltd to undertake a Drainage Design and Calculation Report to discharge planning condition 14 associated with the residential development at the above location.

Condition 14

No development shall take place until full foul and surface water drainage details, have been submitted to and approved in writing by the Local Planning Authority. Thereafter no part of the development shall be occupied or brought into use until the approved scheme has been fully implemented. The scheme shall be retained throughout the life of the development.

Reason: To ensure proper drainage of the area in accordance with Core Strategy Policy CSP 40, Pollution Control and Protection.

1. Surface Water Runoff

a. General

The gross area of the site approximates 0.27 Hectares and comprises of an existing pub and associated car parking.

Current proposals include conversion of former public house into 7 apartments and erection of 2 detached dwellings.

The site slopes from south to north with a range in levels of approximately 5 metres.

b. Existing Drainage Regime

At present the pub building is positively drained, a CCTV Survey has been undertaken which identifies that the pub directs surface water to the 225mm combined sewer within Church Street to the east of the site via two existing manholes.

c. Existing Runoff Rates

On receipt of the topographical survey it has come to our attention that the existing car parking area does not appear to be positively drained, as such runoff rates for the redline boundary (minus the pub building) have been calculated as greenfield runoff with a percentage urban to account for the areas of hardstanding i.e. car parking.

The pubs drainage currently discharges into the Yorkshire Water sewer and following development this will remain unchanged; the areas are broken down below:

- Total site area = 0.27Ha
- Pub Roof area = 0.033Ha
- Total area of hardstanding's (not including pub roof) = 0.151Ha

As such the total area used for greenfield runoff equates to 0.237Ha with 64% applied to account for percentage urban, the runoff rates have been calculated using ICP SUDS Method for a range of return periods below:

Greenfield Runoff Rates

Return Period	Discharge Rate (l/s)
1 in 1 Year	2.1
1 in 30 Year	3.7
1 in 100 Year	4.0

If flows are to be directed to the YW sewer it is recommended that flows are restricted to no more than the 1 in 1 year event post development up to and including the 100 year plus climate change event.

See attached area pre-development area plan for details.

d. Hierarchy of Disposal

The hierarchy for disposal of surface water from new development is outlined within The Building Regulations Approved Document H; and the National Standards for Sustainable Drainage Systems (2011) and specifies the following methods in order of preference:

- Infiltration via soakaway or other suitable infiltration device
- Discharge to watercourse
- Discharge to public sewer

(i) Infiltration

A review of boreholes logs taken from the BGS web service southeast and southwest of the site identify that the underlying ground comprises of clay down to a depth of at least 1.5m bgl with mud stone beyond that.

Percolation testing was undertaken by Sub Scan on the 25th April, 2No tests where undertaken which resulted in no infiltration past the 60 mins with both pits remaining stagnant following a 24 hour period, as such half drain down within 24 hours was not achieved.

Taking into account directing of surface water to ground via infiltration methods is considered unfeasible.

Percolation tests are provided as an attachment.

(ii) Watercourse

There are no watercourses within the local vicinity of the development that are viable to connect into without crossing Barnsley Road and third party land.

(iii) Sewer

The nearest sewer to the site is a Yorkshire Water combined sewer located within Church Street to the east of the site there is also a YW combined sewer within Ket Hill Lane to the north west.

It is recommended that flows are connected to the existing manhole within the north east of the site, which ultimately discharges surface water to the 225mm diameter combined sewer within Church Street.

e. Climate Change

To account for increased rainfall over the lifetime of the development 30% climate change has been modelled within this system to ensure that the attenuation will be sufficient, in accordance with the latest requirements from Barnsley Metropolitan Borough Council.

f. Proposed Discharge Rates

Post development flows have been restricted to the 1 in 1 year greenfield runoff rate i.e. 2.1l/s up to and including the 1 in 100 year plus 30% climate change event.

g. Sustainable Urban Drainage Systems (SUDS)

In accordance with the Flood Water and Management Act 2010; there is a requirement to incorporate sustainable drainage systems i.e. SUDS into new development.

SUDS act to reduce the impact of surface water runoff from the development by limiting runoff volumes and rates from leaving the site.

Undertaking an assessment using the SUDS Planner Module within Micro Drainage Windes revealed that a number of different methods would be suitable for inclusion within the proposed drainage strategy for the development. A summary of the results is tabulated below:

SUDS Planner Results

SUDS Criteria	Rank 1	Rank 2	Rank 3
Hydrological	Green Roof	Green Roof	Permeable Paving
Land Use	Green Roof	On/offline Storage	On/offline Storage
Site Features	Permeable Paving	Soakaway	Permeable Paving
Community & Environment	On/offline Storage	On/offline Storage	Bio Retention Area
Economics & Maintenance	Wet Ponds	Green Roof	Grassed Filter Strip
Total	Green Roof	On/offline Storage	Permeable Paving

Due to the scale and nature of the development green roofs are considered unfeasible and the issues surrounding adoption of permeable paving rendered it impracticable, a such on/offline storage ahs been developed within the drainage strategy.

2. Proposed Drainage Strategy

a. Surface Water

Development proposals for the impermeable area attributed to roof, road and hardstanding within the site boundary is shown to decrease from 0.237 Hectares to 0.092 Hectares, this equates to 40% of the total site area.

b. Layout

Surface water from the roof area of the 7No apartments will be collected via gutters and rainwater down pipes reutilising the existing drainage infrastructure currently serving the pub building.

Surface water from the 2No residential properties and the car parking area will be directed to a geocellular tank located within the car parking area, with flows restricted via means of an Hydrobrake or similar flow control device to no more than 2.1l/s.

c. Post Development Runoff Rates

Post development runoff rates have been simulated using Micro Drainage software, these are tabulated below for a range of return periods with the application of climate change.

Return Period	Discharge Rate (l/s)
1 in 1 Year + 30% Climate Change	2.1
1 in 30 Year + 30% Climate Change	2.1
1 in 100 Year + 30% Climate Change	2.0

d. Pollution Controls

Due to the scale and nature of the development site no pollution control measures are required by the Statutory Authorities.

However, silt traps have been used to prevent silt from entering the watercourse.

3. Foul Flows

Yorkshire Water have stated the following via the Pre-Application Enquiry:

'Foul water domestic waste may discharge to the 225mm diameter public combined sewer recorded in Church Street, at a point approximately 5 metres from the east of the site or the 225mm diameter public combined sewer in Barnsley Road, at a point approximately 10 metres from the north-west section of the site.'

It is proposed that foul flows are directed to the existing combined sewer onsite that ultimately directs flows to the 225mm diameter combined sewer within Church Street.

4. Management and Maintenance

It is anticipated that the drainage elements within the redline boundary of the development site will remain private, however they will be managed and maintained by a private maintenance contractor funded by an annual levee from the residents.

Some basic maintenance requirements are identified below:

Flow Control Chamber

- Annual removal of silt from sump of chamber

Silt Traps

- Annual removal of silt from sump of chamber

Geo Cellular General Maintenance Requirements		
Maintenance schedule	Required action	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre-treatment structures i.e catchpits	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlets, 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 or after large storms.

Source: Kingston.gov.uk

Note: Runoff should be prevented from entering the modular blocks during construction.

Alternatively, and only if the design allows, a flushing operation may be required prior to commissioning to ensure all sediments have been removed from the system.

All storage tanks should be sealed in accordance with waterproofing standards (i.e welded joints rather than adhesive taped) and the integrity of the seal checked through the use of non-destructive testing, to ensure it is leak-proof. Care needs to be taken during installation

against damage of both the modular structure and the geotextile and /or geomembrane wrapping.

I trust that the above is sufficient to discharge condition No14, if you have any further queries please don't hesitate to contact myself.

Yours Sincerely,



Chris Vose

For and on behalf of
Flood Risk Consultancy Limited

Enclosures

Existing Areas Plan

Existing Runoff Calcs

Borehole Logs and Soil Scape Map

Drainage Layout Drawing

Micro Drainage Calculation Results

CCTV Survey

Percolation Test



20 Church Street
Colne
Lancashire BB8 0LG

HORSESHOES
GRF



Date 16-05-2017
File

Designed by CV
Checked by

XP Solutions Source Control 2016.1

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	SAAR (mm)	669	Urban	0.640
Area (ha)	0.237	Soil	0.450	Region Number	Region 3

Results 1/s

QBAR Rural 1.0
QBAR Urban 2.4

Q1 year 2.1

Q1 year 2.1
Q30 years 3.7
Q100 years 4.0

SE 41 SW 188

Holst Soil Engineering Limited

BOREHOLE LOG

Borehole No. 1

Contract No. SI1540/F2775
 Location Brierley School
 Client W.R.C.A.
 Method of Boring Percussion
 Diameter of Borehole 0.20m

Sheet 1 of 1
 Chainage _____
 Ground Level _____
 Date 18/1/74

Description of Strata	Legend	Depth below G.L.(m)	Thickness of Strata(m)	Type of Sample	c KN/sq.m	φ deg	m.c. %	γ Kg/cum	N	
TOPSOIL		0.25	0.25							
Firm light brown grey very sandy silty CLAY with occasional sandstone fragments (completely weathered silty sandstone)				0.45 	41	8	18.2	2010		
Highly weathered light grey/brown laminated muddy SILTSTONE with occasional sandstone laminations.		1.50	1.25	1.50 	125	29	12.5	2100		
				2.70 	83	30	11.1	2150		
				3.30 						
		3.45	1.95	3.30 						99 for 0.15m

Type of Sample
 Undisturbed Sample φ Angle of Friction
 Disturbed Sample m.c. Moisture Content
 Water Sample γ Bulk Density
 Penetration Test N S.P.T. Value
 Apparent Cohesion c

Remarks (Observations of Ground Water etc)

Borehole dry
 Water levels are subject to seasonal or tidal variations and should not be taken as constant

SE 41 SW 189

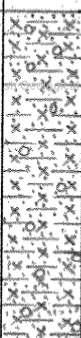


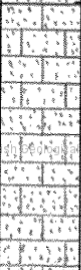

Holst Soil Engineering Limited

BOREHOLE LOG

Borehole No. 2

Contract No. SI1540/F2775
 Location Brierley School
 Client W.R.C.A.
 Method of Boring Percussion
 Diameter of Borehole 0.20m

Sheet 1 of 1
 Chainage
 Ground Level
 Date 28.1.74

Description of Strata	Legend	Depth below G.L.(m)	Thickness of Strata(m)	Type of Sample	c KN/sq.m	φ deg	m.c. %	γ Kg/cum	N
TOPSOIL									
Firm light brown/grey very sandy silty CLAY with occasional sandstone fragments (completely weathered sandstone)		0.35	0.35	0.40 	41	9	19.6	2030	
		1.80	1.45	1.50 	76	31	11.3	2135	
Highly weathered light brown/grey fine SANDSTONE with occasional siltstone laminations		3.05	1.25	2.90 					87 for 0.15m

- Type of Sample**
- Undisturbed Sample
 - Disturbed Sample
 - Water Sample
 - Penetration Test
 - Apparent Cohesion
- φ Angle of Friction
 m.c. Moisture Content
 γ Bulk Density
 N S.P.T. Value

Remarks (Observations of Ground Water etc)

Borehole logs

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Form P70

Section of Cliff Lane

Purpose - Prove Coal Measures

Exact Site - E 440 365.596
N 410 814.4

Level at which B/H commenced relative to O.D. 77.95m AOD

Date of sinking or boring - March 1985

Sinker or borer - Kenting Drilling

Cores other than coal examined by D. M. Ringer

6 inch Map	
(County Sheet and Quarter)	263 SW
(Nat. Grid Sheet and Quarter)	SE 41 SW/61
Attach tracing from a map or sketch map if possible	













Geological Classification	Nature of Strata	Thickness		Depth	
		m	cm	m	cm
	CORES START			203	92
	Mudstone: medium grey, silty, occasional micaceous sandy laminae, some comminuted plant debris horizons becoming predominantly siltstone with sandy laminae below 204.57m.		87	204	79
	Mudstone: medium grey, slightly silty firm, moderately well bedded, becoming silty below 205.00m; occasional plant fragment horizons and comminuted plant bands passing to		59	205	38
	Mudstone: medium grey, slightly silty, firm well bedded, some comminuted plant debris horizons, occasional large well preserved plant fragments becoming slightly iron bearing and stronger below 205.00m, rare sandy laminations below 205.33m.		18	205	56
	Mudstone: medium grey, smooth to slightly silty, firm, well bedded, finely micaceous with only rare plant fragments below 207.20m, barren above.	1	36	206	92
	Siltstone: fine grained, micaceous, iron rich and strong with numerous comminuted plant debris horizons.		27	207	19
	Mudstone: medium grey silty finely micaceous with abundant comminuted plant debris horizons passing quickly to		18	207	37
	Mudstone: medium grey, smooth firm, well bedded, some diffuse, buff coloured ironstone bands becoming slightly fissile below 208.40m, generally barren throughout and featureless, very weak and friable at base passing to	2	42	209	79
	continued				

L1612EP, 1

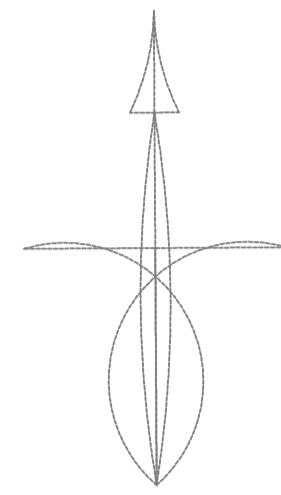
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- UN-ADOPTED FW & SW DRAINAGE IS TO BE CONSTRUCTED IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS, INCLUDING APPROVED DOCUMENT H (UPDATED 2015); BS EN 752:2008 AND OTHER RELEVANT STANDARDS AND AGREEMENT CERTIFICATES.
- ALL ADOPTABLE DRAINAGE TO COMPLY WITH THE REQUIREMENTS OF YORKSHIRE WATER AND SEWERS FOR ADOPTION (7TH EDITION), UNLESS OTHERWISE SPECIFIED.
- THE LOCATION AND LEVELS OF EXISTING DRAINAGE PIPES AND CULVERTS MUST BE CHECKED ON-SITE PRIOR TO CONSTRUCTION.
- ALL EXISTING SERVICES TO BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS ARE TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORKS.
- DRAINS ARE TO BE CONSTRUCTED USING FLEXIBLY JOINTED VITRIFIED CLAY PIPES TO BS 65 (1991) AND BS EN 295 (2012/2013); OR PVC BUILDING DRAINAGE SYSTEM PIPEWORK TO BS 4660 (2000); BS EN 13598-1 (2011); BS EN 1401-1 (2009); BEDDED & BACKFILLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
- BACKFILLING OF DRAIN TRENCHES ADJACENT TO DWELLINGS OR OTHER STRUCTURES TO BE IN ACCORDANCE WITH BS EN 1610 (1998).
- ACCESS FITTINGS & INSPECTION CHAMBERS <1.2m DEEP ARE TO BE CLAYWARE OR PRE-FORMED POLYPROPYLENE AS APPROPRIATE TO THE NUMBER OF CONNECTIONS. POLYPROPYLENE CHAMBERS CAN BE USED UP TO 3.0m DEEP BUT REQUIRE A MAX 350mm DIAMETER REDUCED COVER TO PREVENT MAN ENTRY. INSPECTION CHAMBER SIZES ARE TO BE CONSTRUCTED IN ACCORDANCE WITH BS EN 752 (2008).
- MANHOLE CHAMBERS ARE TO BE OF PRECAST CONCRETE CONSTRUCTION WITH 150mm INSITU CONCRETE SURROUND WITH A CLEAR OPENING OF 600mm.
- COVER LEVELS INDICATED ON THE DRAWING OR WITHIN THE MANHOLE SCHEDULE ARE NOMINAL AND MAY BE ADJUSTED TO SUIT FINISHED LEVELS AS NECESSARY. INSPECTION CHAMBER COVERS SHOULD BE GRADE A15 FOR PEDESTRIAN AREAS ONLY; B125 FOR AREAS WITH OCCASIONAL VEHICLE ACCESS; AND D400 WITHIN THE PUBLIC HIGHWAY.
- WHERE DRAINS PASS THROUGH FOUNDATIONS OR OTHER RIGID STRUCTURES, A LINTEL OR SLEEVE IS TO BE USED & PROVISION FOR FLEXIBILITY IS TO BE MADE WITH ROCKER PIPES.
- ANY EXISTING LAND DRAINS SEVERED BY SITE OPERATIONS SHOULD BE DIVERTED AROUND ANY PROPERTIES/BUILDINGS AND RECONNECTED TO THE EXISTING LAND DRAINAGE SYSTEM VIA A SILT TRAP.
- GULLIES SITUATED IN AREAS ACCESSIBLE TO WHEELED VEHICLES ARE TO BE OF A SUITABLE CONSTRUCTION (e.g. CPM GROUP CONCRETE GULLY POTS TO BS 5911:4 (2010) OR HEPWORTH CODE RGR3 GULLY POT, WITH INSITU CONCRETE BED AND SURROUND, FITTED WITH DRAINAGE CASTINGS CODE TD651 GRATING AND FRAME TO BS EN 124).
- DRAINS WITHIN AREAS OF MADE GROUND TO BE CONSTRUCTED BY FIRST MAKING UP THE AREA TO APPROXIMATE FINISHED LEVEL AND THEN EXCAVATING THROUGH THE FILL MATERIAL INTO UNDISTURBED GROUND. THE DRAIN TRENCH IS THEN TO BE BACKFILLED TO FINISH LEVEL USING SUITABLE GRANULAR FILL MATERIAL, WELL COMPACTED IN LAYERS NOT EXCEEDING 225mm.
- CONCRETE PROTECTION TO PIPES WHERE DEPTH OF PIPE FROM GROUND LEVEL TO BARREL IS <0.35m WITHIN NON-TRAFFICKED AREAS; <0.5m WITHIN DOMESTIC DRIVEWAYS; <0.9m PARKING AREAS; AND <1.2m WITHIN THE PUBLIC HIGHWAY, OTHERWISE SEWERS TO BE LAID IN CLASS 5 BEDDING (150mm GRANULAR BED & SURROUND).
- SEWERS MUST HAVE 5m CLEARANCE FROM TREES AND HEDGES.
- BEDDING AND BACKFILL TO CONFORM TO THE REQUIREMENT OF THE WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
- THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
- THE POSITIONS OF SVP'S, STUB-STACKS, WC OUTLETS AND RAINWATER DOWNPIPES ARE TO BE ACCURATELY LOCATED FROM THE ARCHITECTS DRAWINGS.
- CATCHPIT CHAMBERS ARE REQUIRED TO HAVE A MINIMUM 300mm SUMP.

KEY:

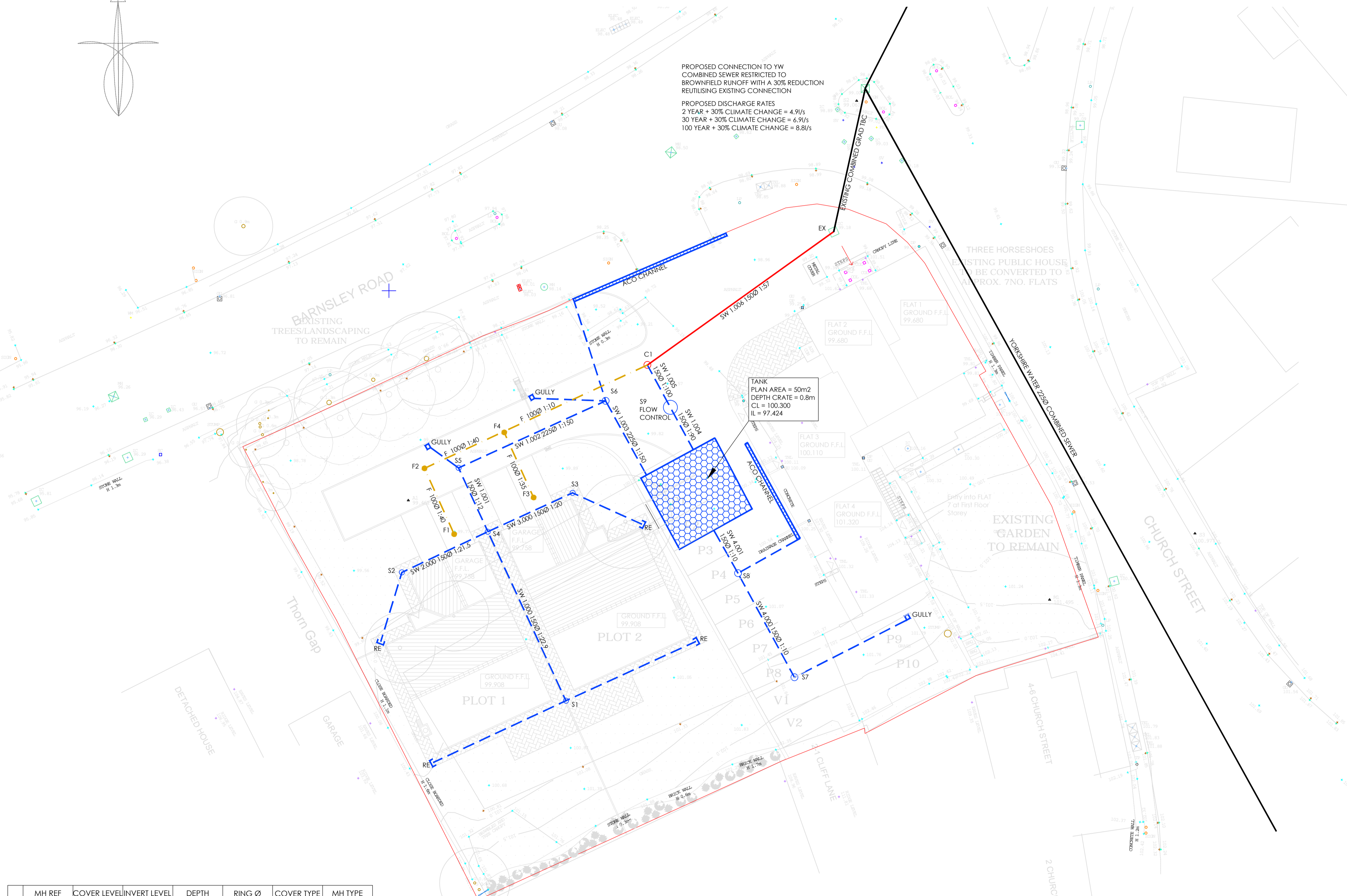
-  PRIVATE FOUL MANHOLE
-  PRIVATE SURFACE WATER MANHOLE
-  PRIVATE COMBINED MANHOLE
-  EXISTING MANHOLE
-  EXISTING YW COMBINED PUBLIC SEWER
-  PRIVATE FOUL SEWER
-  PRIVATE SURFACE WATER SEWER
-  PRIVATE COMBINED SEWER
-  GEO-CELLULAR ATTENUATION
-  ACO CHANNEL
-  ROAD GULLY
-  RODDING EYE

North



PROPOSED CONNECTION TO YW COMBINED SEWER RESTRICTED TO BROWNFIELD RUNOFF WITH A 30% REDUCTION REUTILISING EXISTING CONNECTION
 PROPOSED DISCHARGE RATES
 2 YEAR + 30% CLIMATE CHANGE = 4.9l/s
 30 YEAR + 30% CLIMATE CHANGE = 6.9l/s
 100 YEAR + 30% CLIMATE CHANGE = 8.8l/s

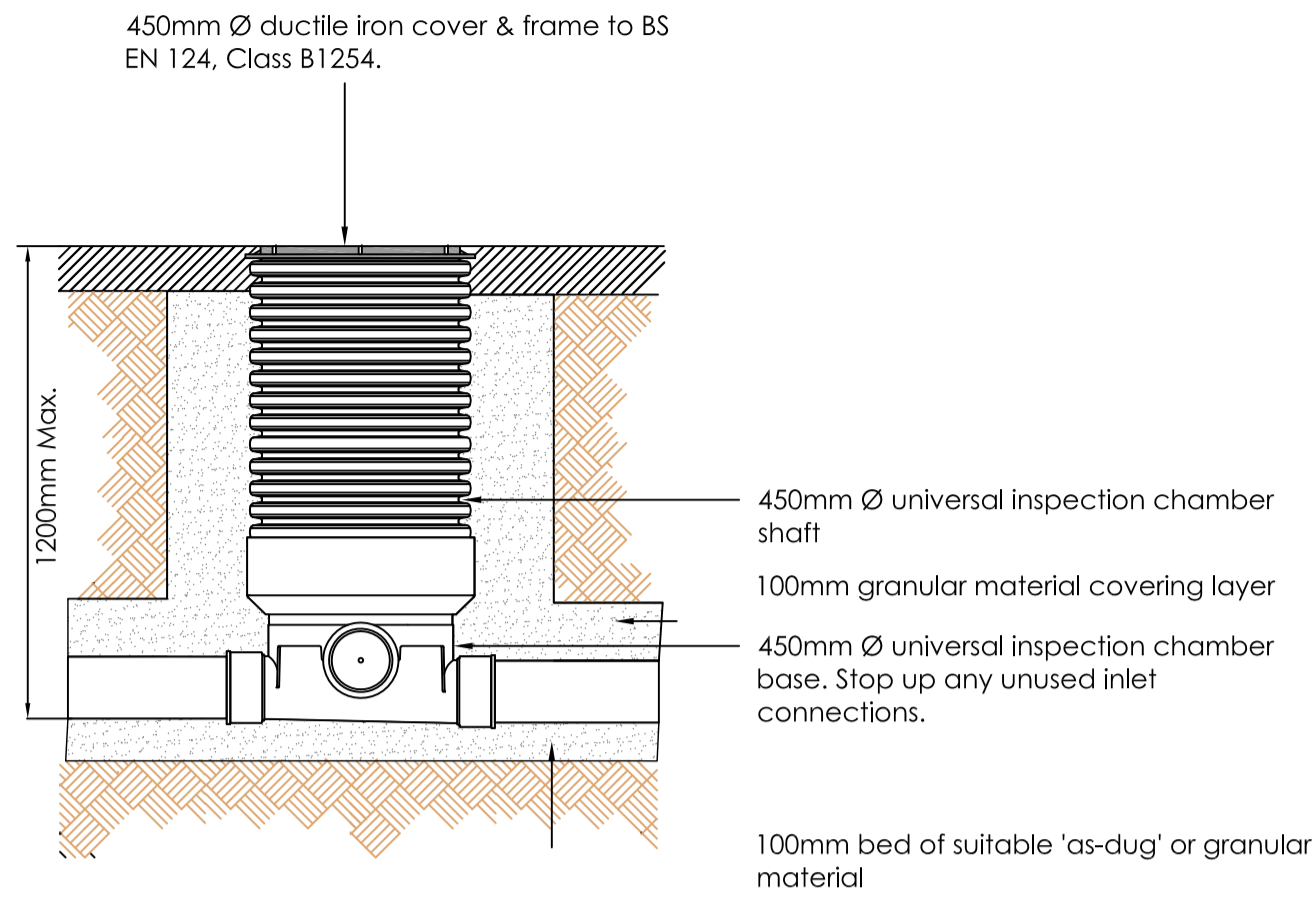
TANK
 PLAN AREA = 50m²
 DEPTH CRATE = 0.8m
 CL = 100.300
 IL = 97.424



	MH REF	COVER LEVEL	INVERT LEVEL	DEPTH	RING Ø	COVER TYPE	MH TYPE
S.W.	S1	99.750	99.250	0.500m	600mm	A15	PPIC
	S2	99.750	98.950	0.800m	600mm	A15	PPIC
	S3	99.750	98.950	0.800m	600mm	A15	PPIC
	S4	99.750	98.550	1.200m	600mm	A15	PPIC
	S5	99.400	97.975	1.425m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	S6	99.600	97.878	1.722m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	S7	101.610	99.339	2.271m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	S8	100.500	98.319	2.181m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	S9	99.560	97.334	2.226m	1200mm	D400	TYPE R FLOW CONTROL
F.W.	F1	99.770	98.47	1.300m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	F2	99.500	98.315	1.185m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	F3	99.710	98.470	1.240m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	F4	99.400	98.296	1.104m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
EX C	C1	99.560	97.270	2.290m	600mm	D400	WAVY TEGRA 400 (OR SIMILAR)
	EXISTING	99.140	96.910	2.230m	-	-	AS EXISTING

MANHOLE SCHEDULE

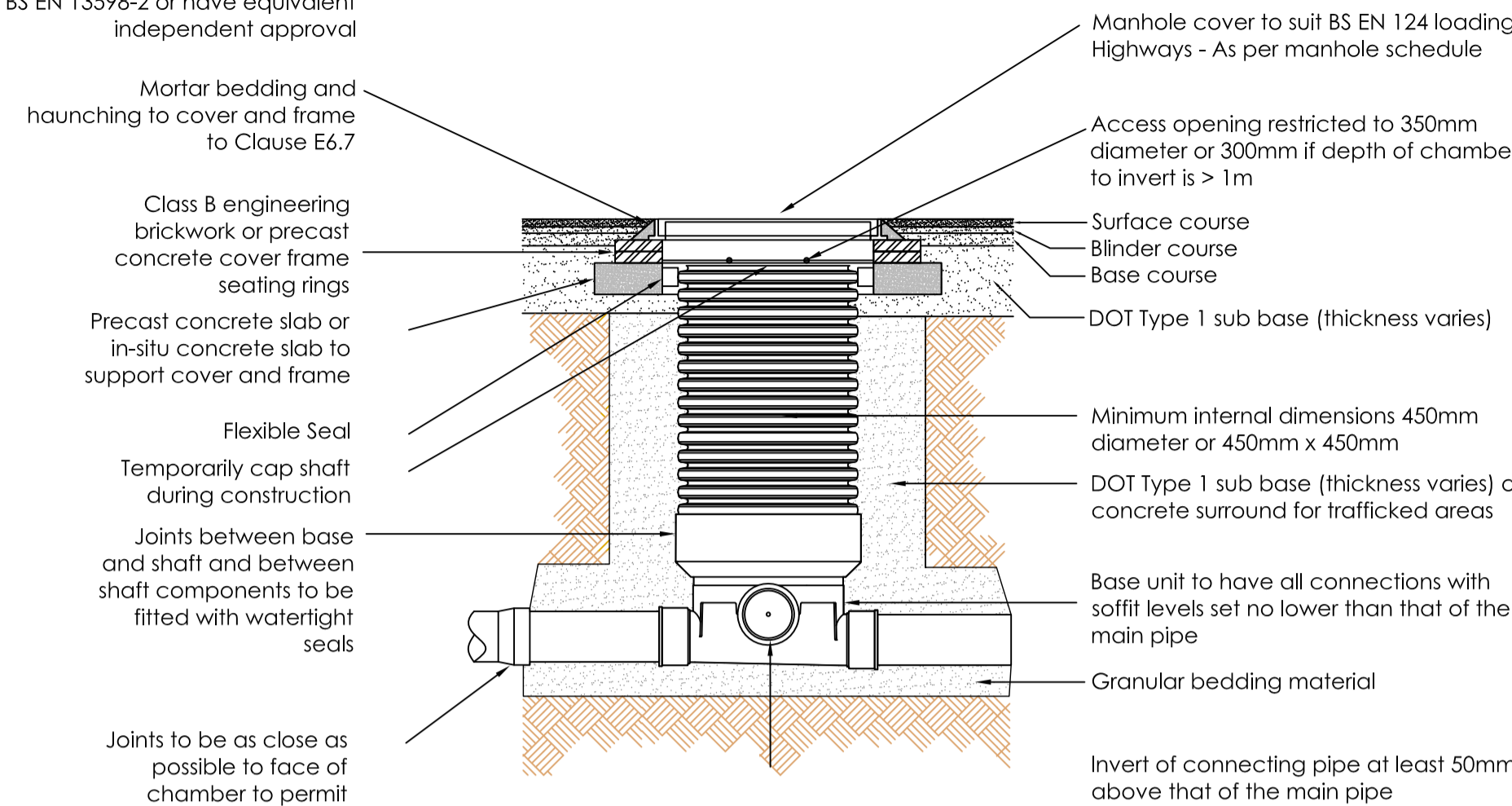
A	REVISED TO REFLECT GREENFIELD RUNOFF SET @ 1 YEAR EVENT	16/05/2017	CV
REVISION	COMMENT	DATE	BY
 APPRAISING, MANAGING & REDUCING FLOOD RISK FLOOD RISK CONSULTANCY LTD Office C54 Northbridge House Elm Street Business Park Burnley, BB10 1PD TEL: 01282 792591 EMAIL: INFO@FLOODRISKCONSULT.COM WEBSITE: WWW.FLOODRISKCONSULT.COM		CLIENT: Paragram Ltd DATE: 08.05.17 DRAWN BY: CV SCALE: 1:200 SIZE: A1 REVISION: /	PROJECT: Former Horseshoes Pub Barnsley Road DRAWING TITLE: Drainage Strategy DRAWING REFERENCE: 2017-025-01



Inlet/Outlet & 4 branch connections for 1000Ø pipes
 Inlet/Outlet & 2 branch connections for 1500Ø pipes
 Note: Chambers in lightly trafficked areas to have to have 150mm ST4 concrete surround.

Typical Polypropylene Inspection Chamber
 Max. 1.2m Deep
 Scale 1:20
 (for use in soft areas, driveways and parking bays only)

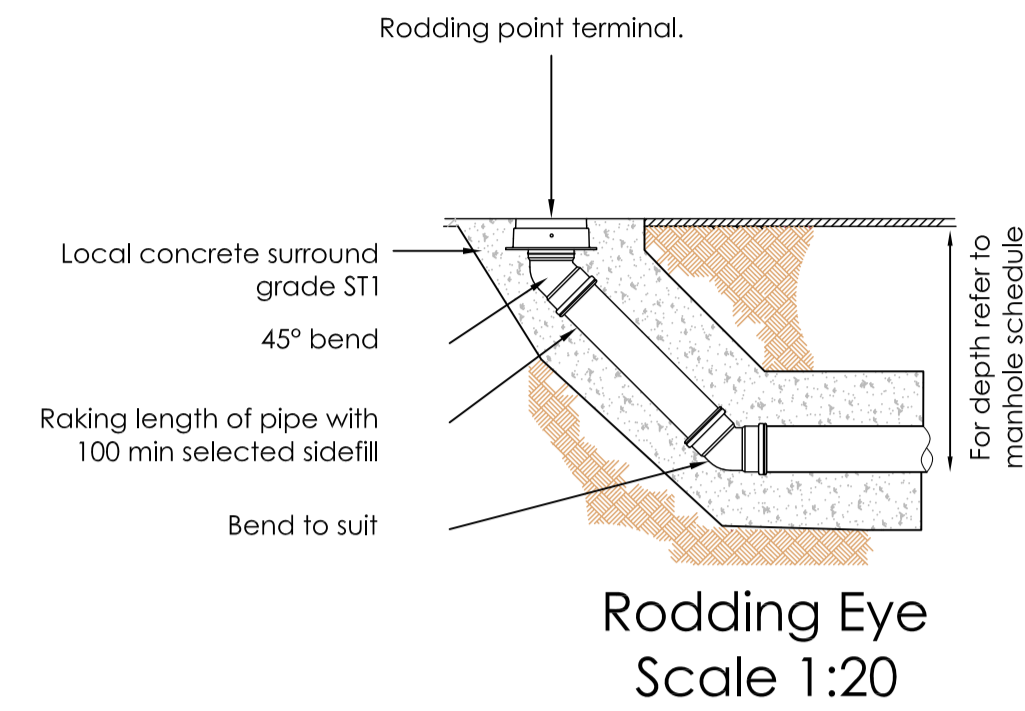
Plastic chambers and rings shall comply with BS EN 13598-1 and BS EN 13598-2 or have equivalent independent approval



Joints to be as close as possible to face of chamber to permit satisfactory joint and subsequent movement

Note: Where the access chamber is in the highway the Highway Authority can have specific requirements

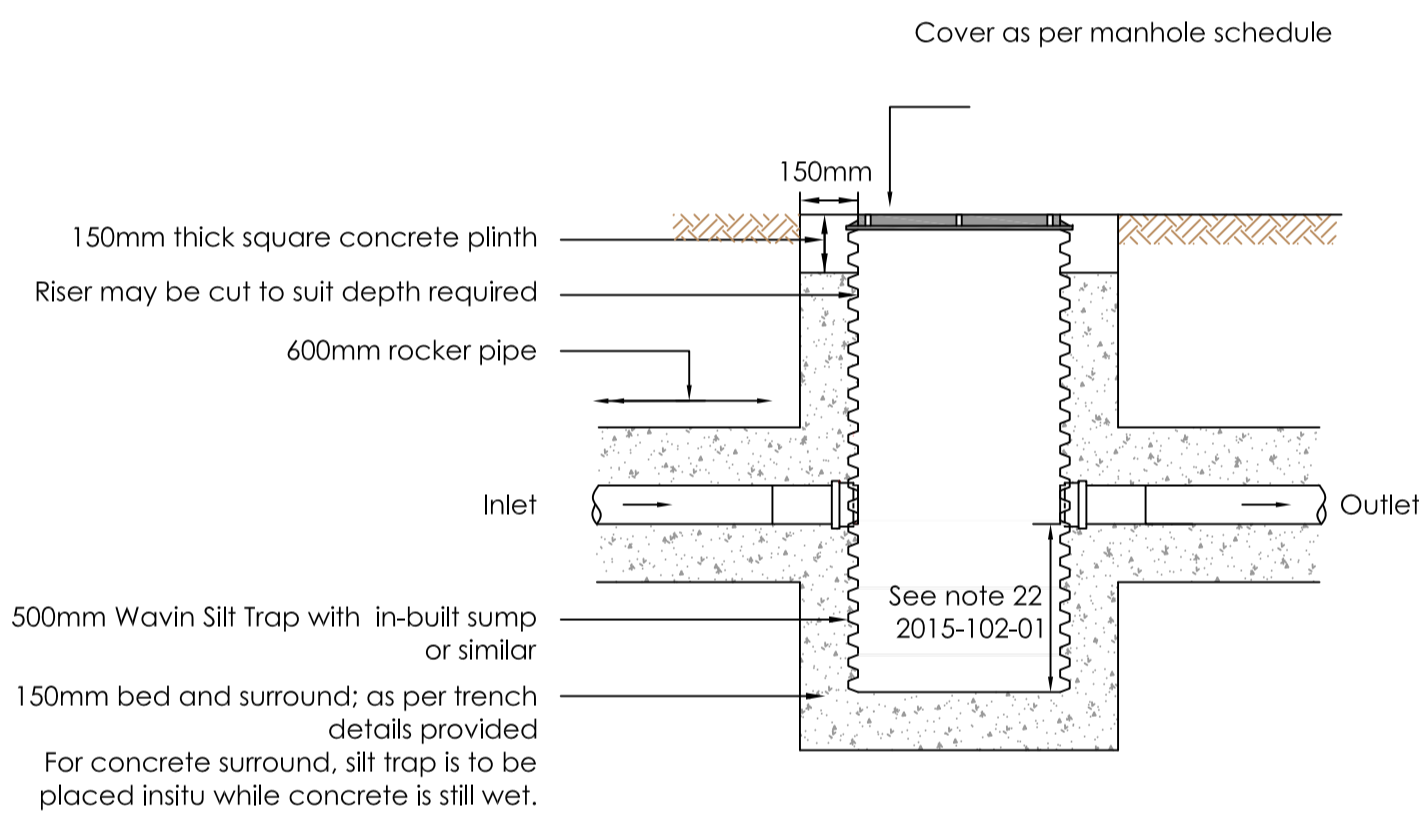
Typical Inspection Chamber
 Max. 3m Deep Non Entry
 Scale 1:20



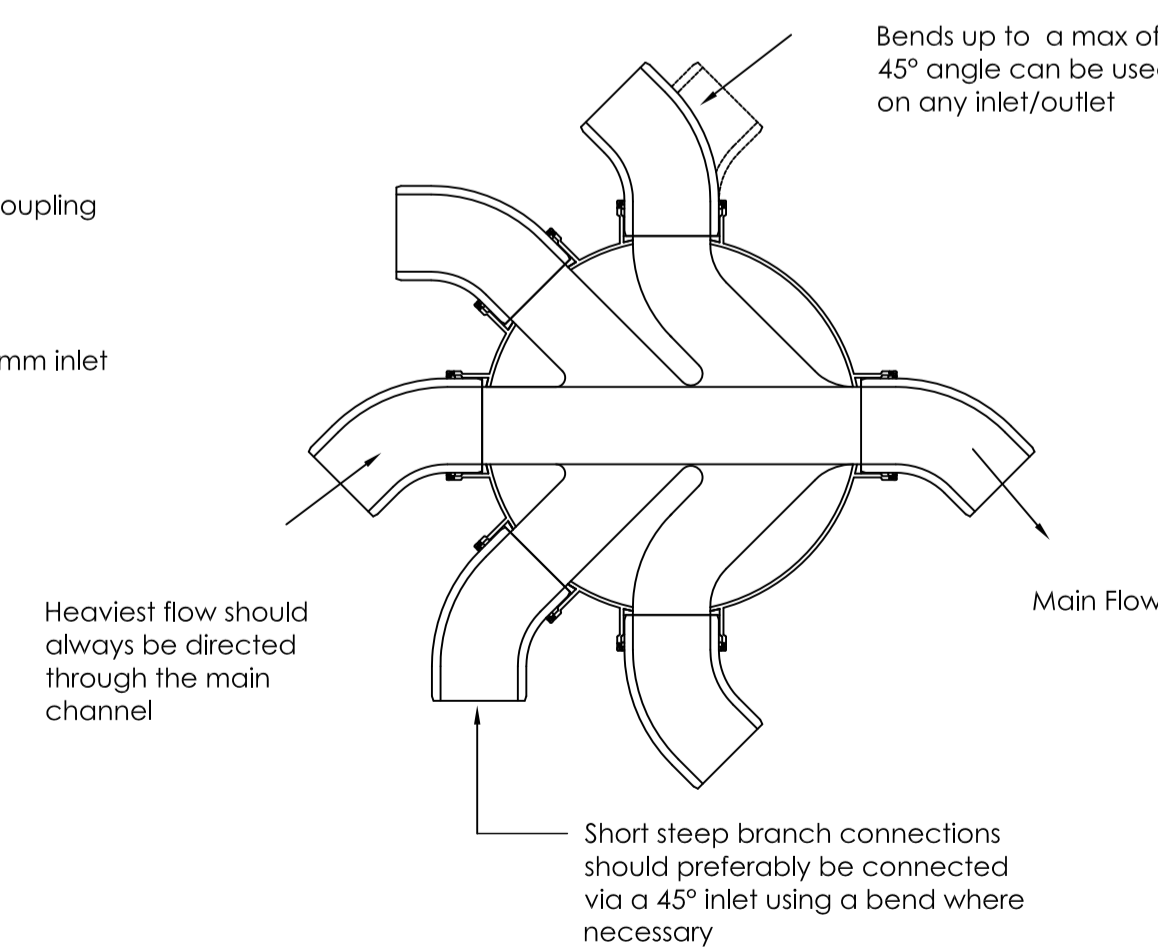
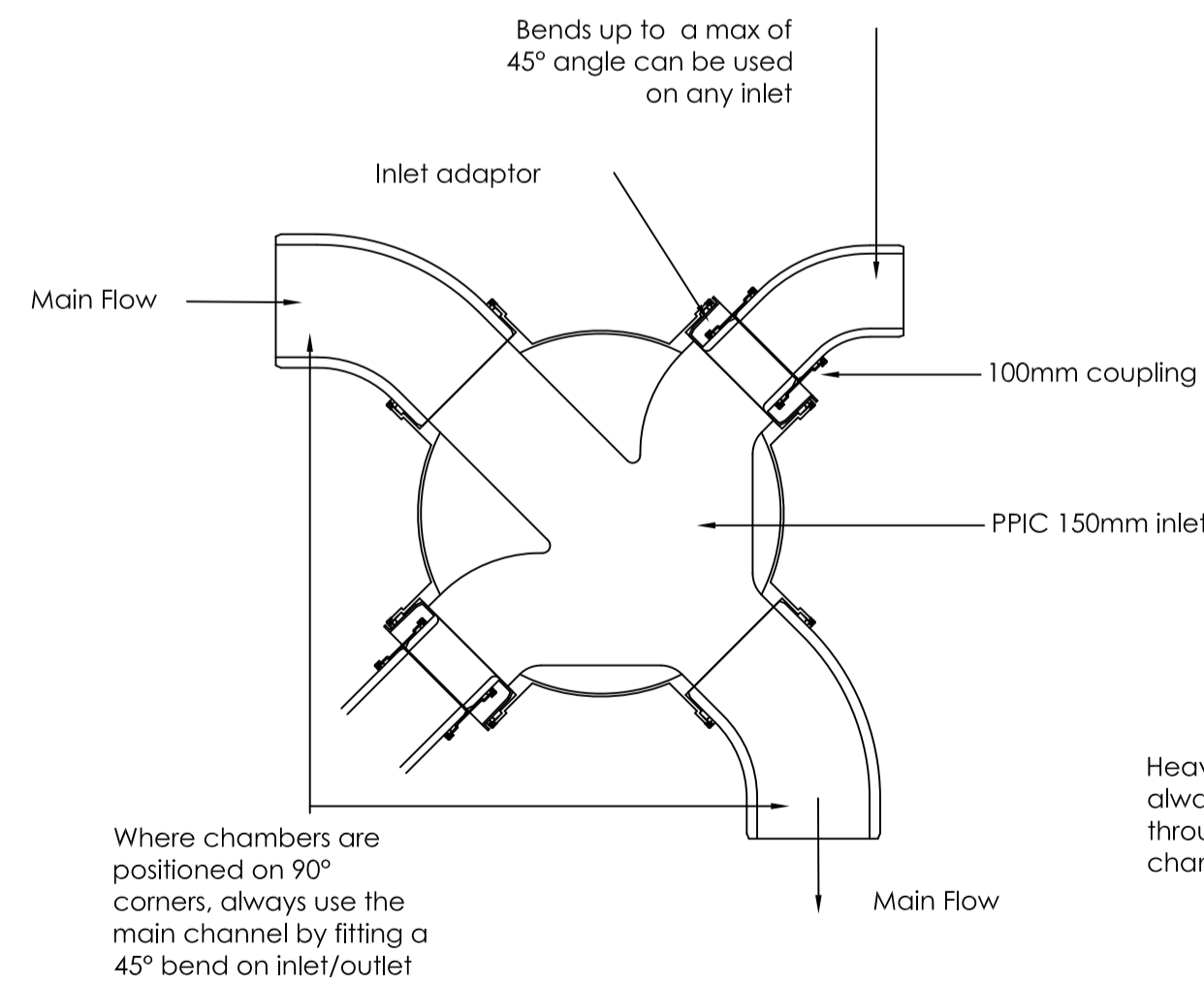
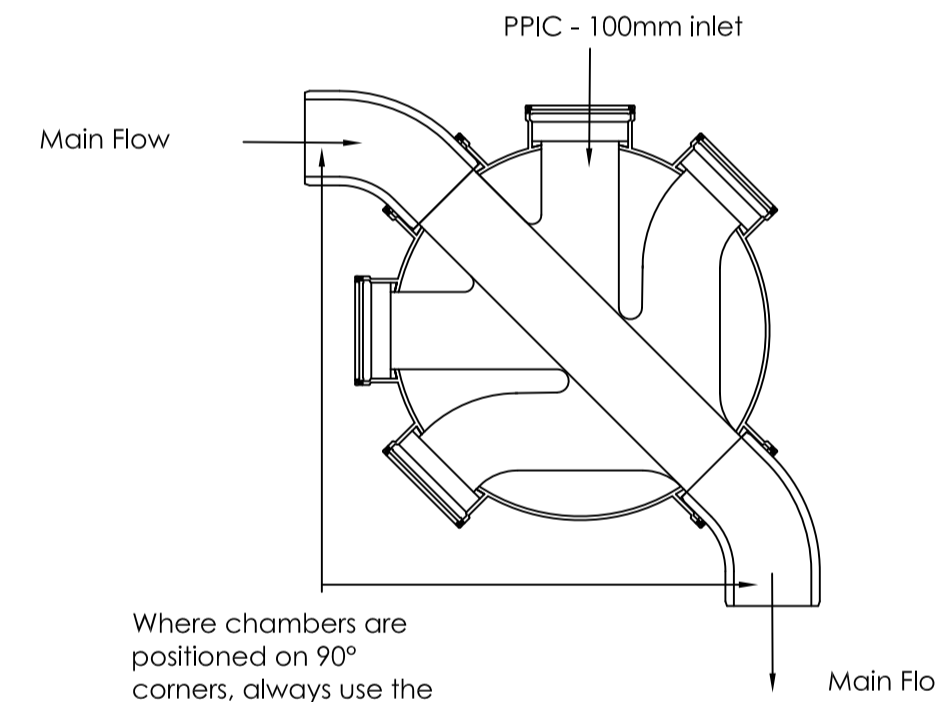
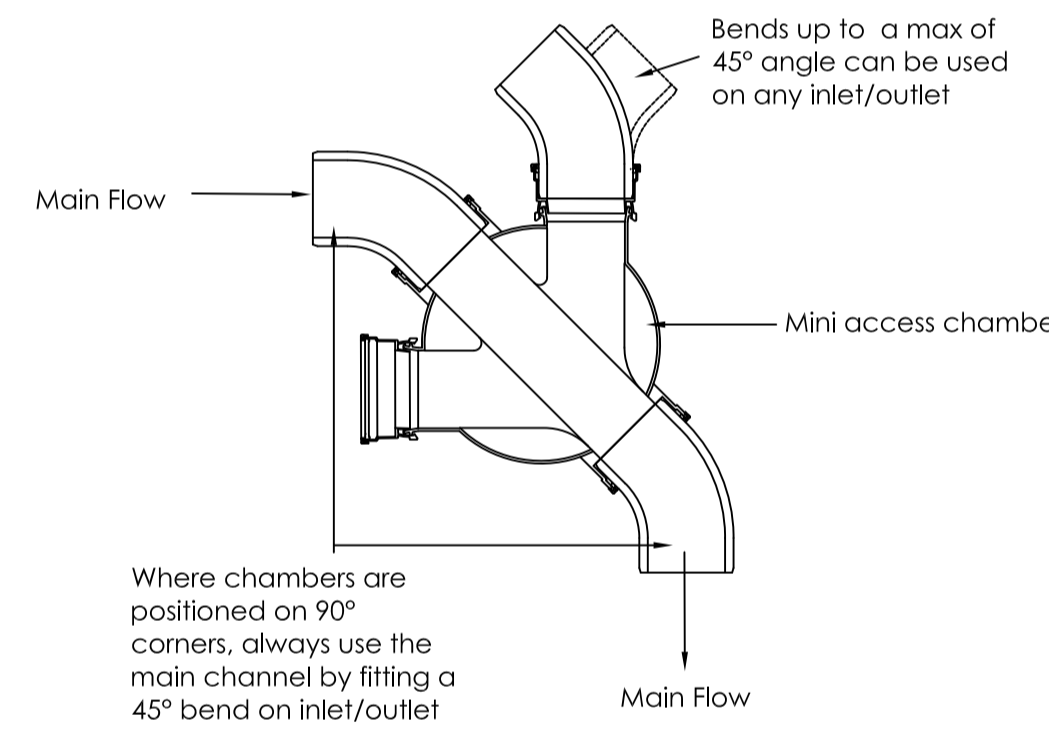
Rodding Eye
 Scale 1:20

NOTES:

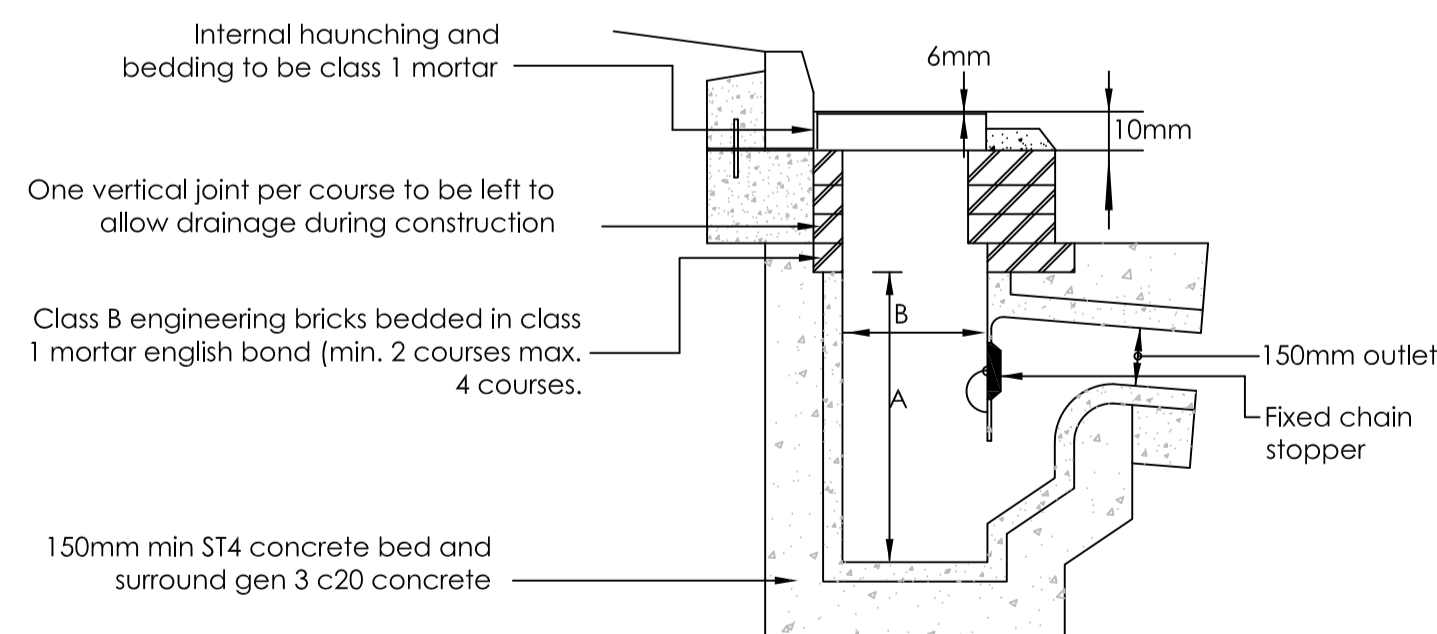
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- CATCHPIT CHAMBERS ARE REQUIRED TO HAVE A MINIMUM 300mm SUMP.



Typical Silt Trap
 Scale 1:20



Mini Access Chamber & PPIC
 Installation Details
 Scale 1:10



Pre-Cast Concrete Road Gully
 (1:20)

Gully grated to be BS EN 124 class 250.
 Ductile iron with captive hinge size 325 x 312mm clear opening.
 Pedestrian friendly mesh type gravel to be fitted in shared access ways.
 Gully Dimensions:
 A = 750mm B = 375mm
 Trapping p.conc gully pot to BS 5911 PA4-2

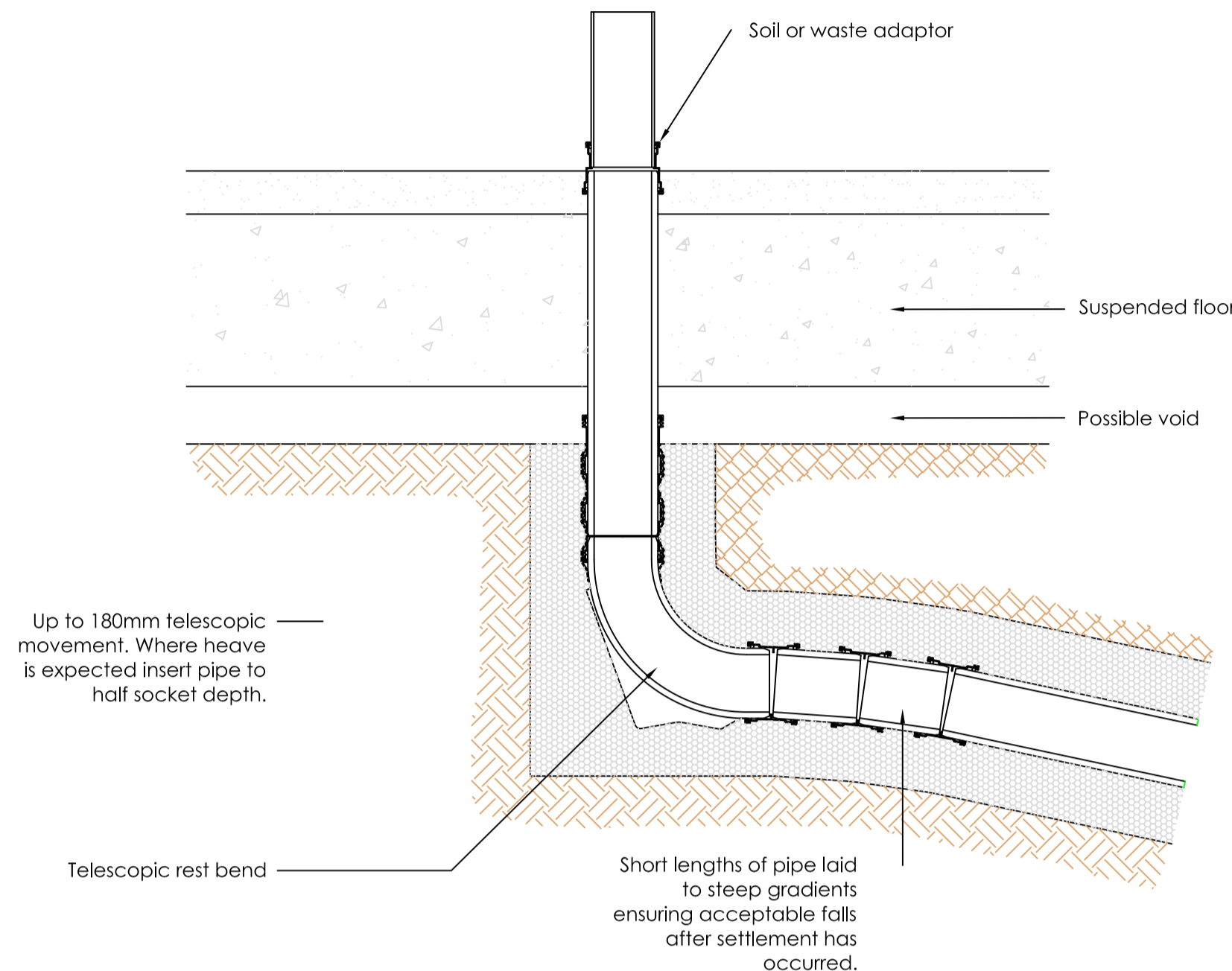
REVISION	COMMENT	DATE	BY
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CLIENT:	Paragram Ltd	DATE:	08.05.17
PROJECT:	Former Horseshoes Pub Barnsley Road	DRAWN BY:	CV
DRAWING TITLE:	Proposed Drainage General Construction Details Sheet 1 of 4	SCALE:	AS SHOWN
DRAWING REFERENCE:	2017-025-02	SIZE:	A1
		REVISION:	/

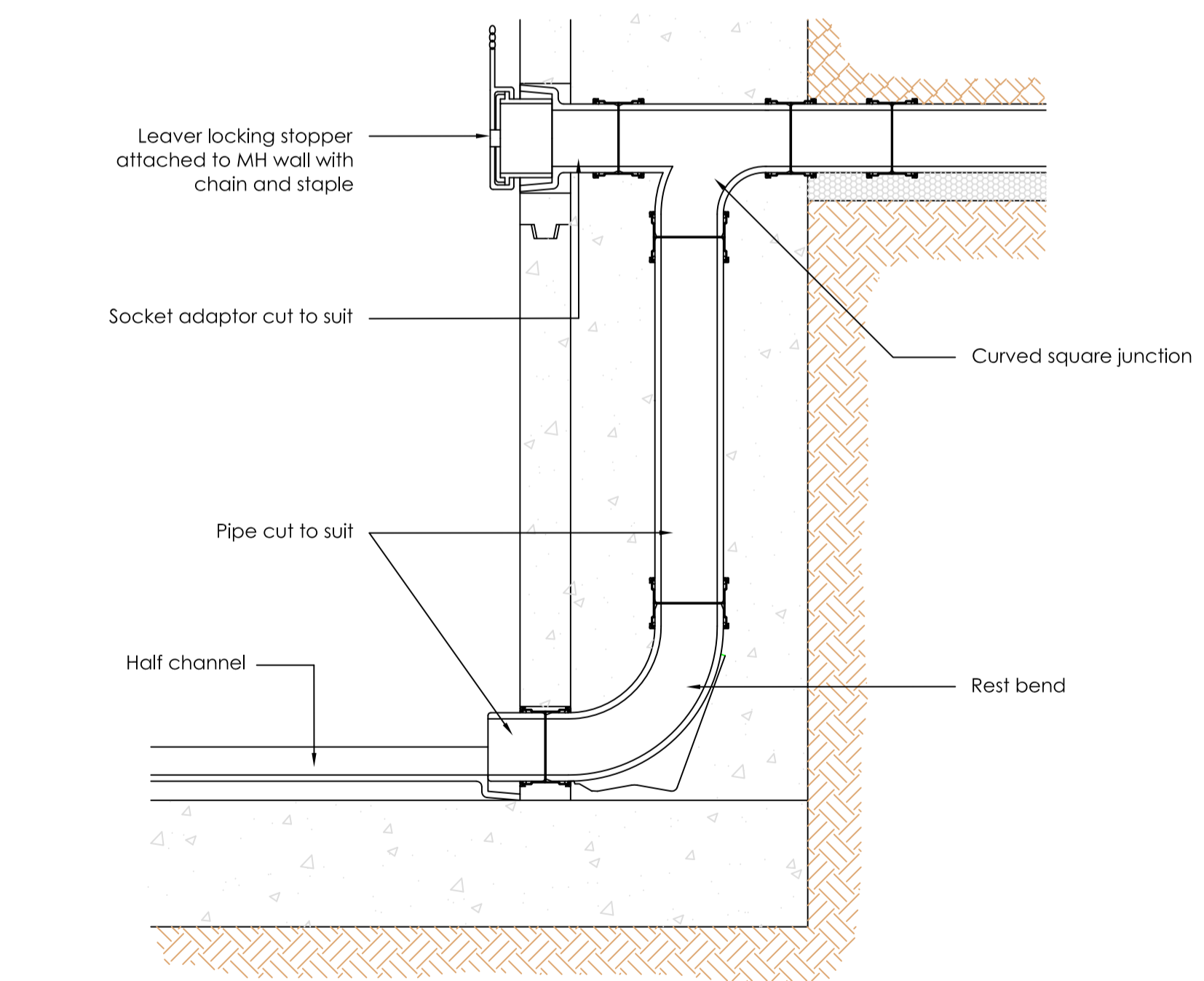
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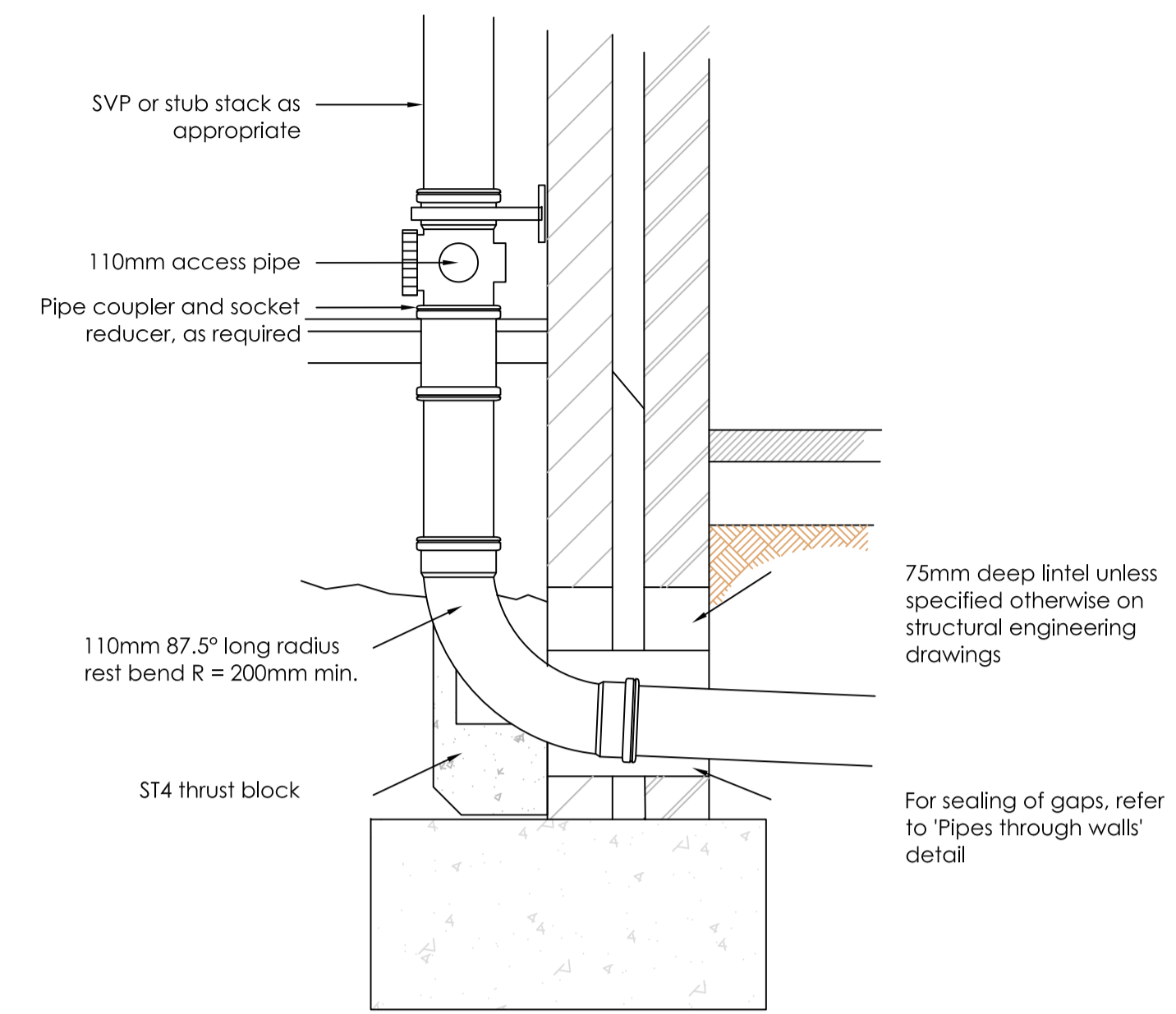
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22. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
23. THE POSITIONS OF SVPs, STUB-STACKS, WC OUTLETS AND RAINWATER DOWNPIPES ARE TO BE ACCURATELY LOCATED FROM THE ARCHITECTS DRAWINGS.
24. CATCHPIT CHAMBERS ARE REQUIRED TO HAVE A MINIMUM 300mm SUMP.



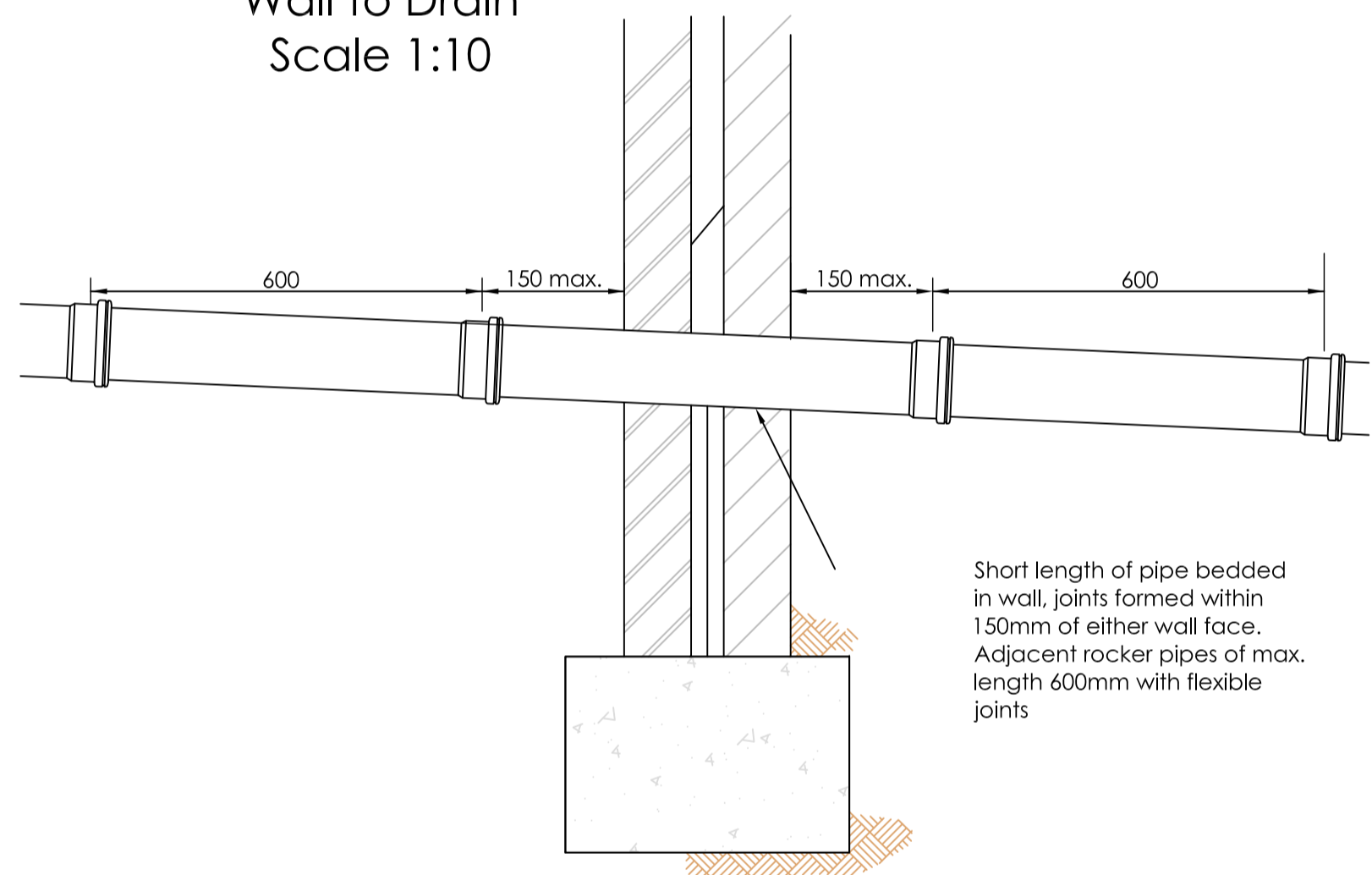
Telescopic Rest Bend Detail
Scale 1:10



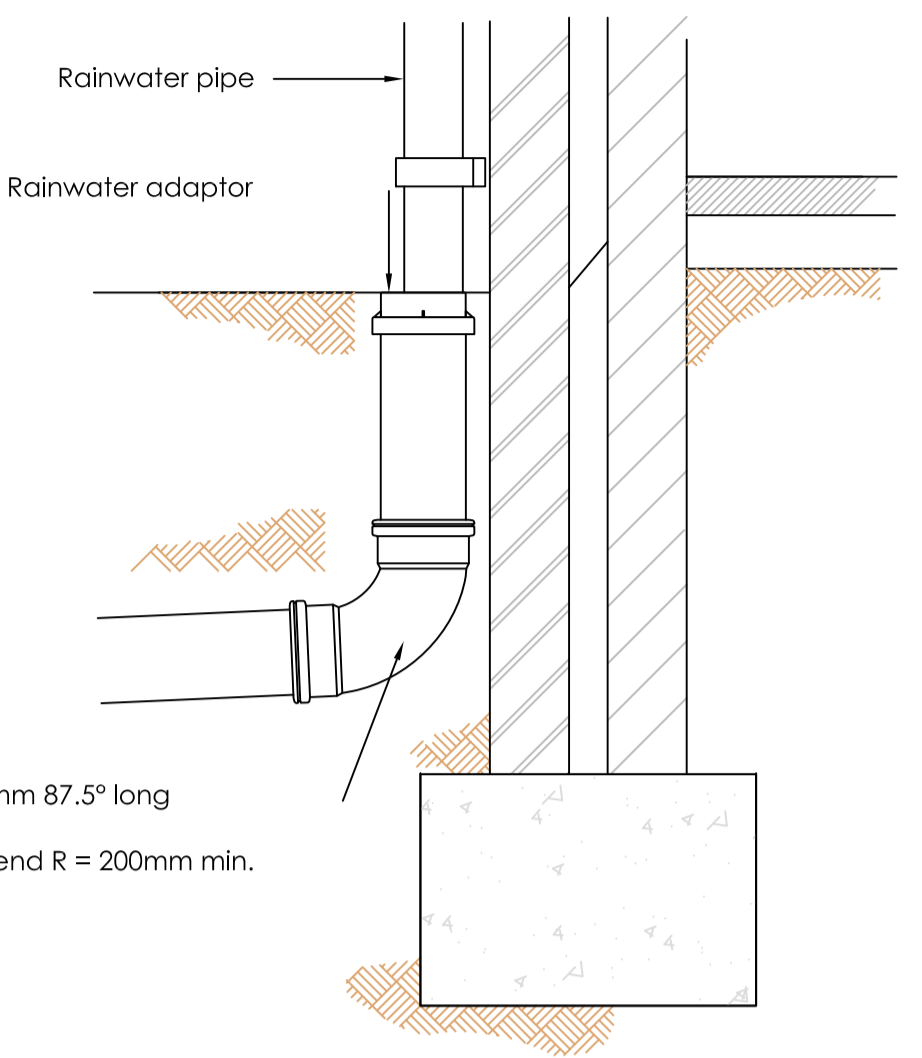
Typical Backdrop Connection
Scale 1:10



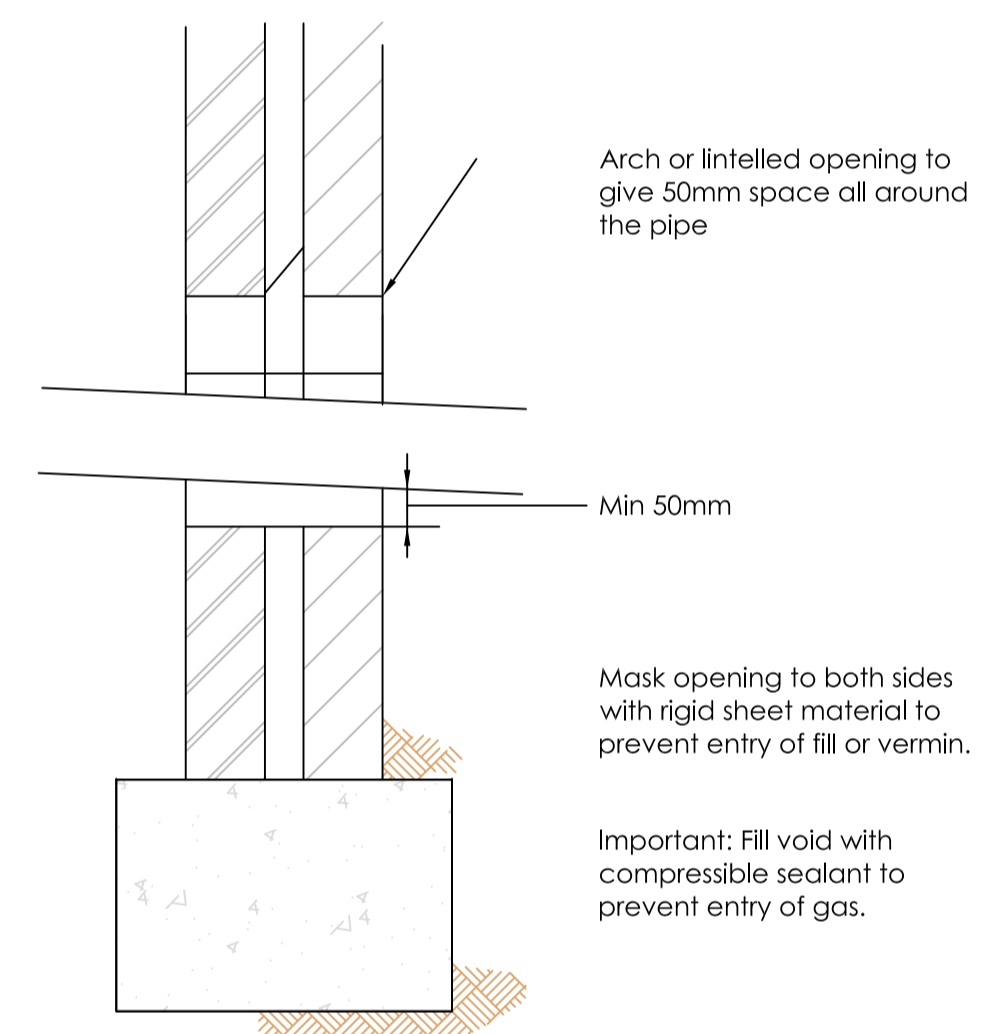
Internal SVP/Stub Stack
Connection Through External
Wall to Drain
Scale 1:10



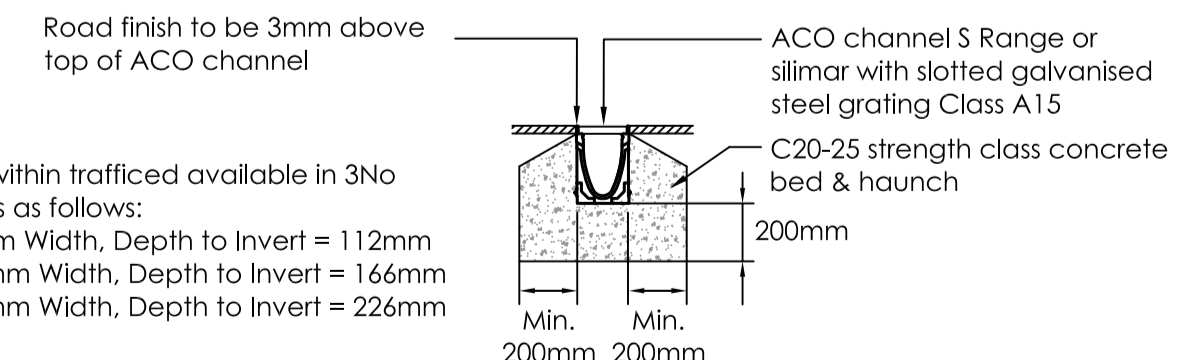
Pipes Through Walls (a)
Scale 1:10



External RWP to Drain
Scale 1:10



Pipes Through Walls (b)
Scale 1:10



Typical Aco Channel
Scale 1:20

S Series ACO channel within trafficked available in 3 No different section depths as follows:
 S100 S01 Width = 100mm Width, Depth to Invert = 112mm
 S100 S010 Width = 100mm Width, Depth to Invert = 166mm
 S100 S020 Width = 100mm Width, Depth to Invert = 226mm

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DRAWING TITLE:	Proposed Drainage General Construction Details Sheet 2 of 4	SCALE:	AS SHOWN
DRAWING REFERENCE:	2017-025-03	SIZE:	A1
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Extract from Table A2 WIS 4-08-02
Processed granular bedding & sidefill materials for flexible pipes

Pipe nominal bore (mm) (see note D)	Nominal Maximum particle size (mm)	Materials specified in British Standards (see note A)
100	10	10mm nominal single size
Over 100 to 150	15	10 or 14mm nominal single size or 14mm to 5mm graded
Over 150 to 300	20	10-14mm or 20mm nominal single size or 14-5mm graded or 20-5mm graded
Over 300 to 500	20	14 or 20mm nominal single size or 14-5mm graded or 20-5mm graded
Over 500	40	14 or 20mm or 40mm nominal single size or 14-5mm graded or 20-5mm graded or 40-5mm graded

- Notes:
- Processed granular materials to include aggregates and air cooled blast furnace slag to BS EN 12620:220 + A1:2008; and lightweight aggregates to BS EN 13101:2002.
 -
 - For the purpose of this table, PE pipe of 630mm OD can be regarded as having nominal bores of over 550mm, irrespective of wall thickness.
 - Nominal bore is used in preference to DN because of the different nominal size classifications for flexible pipes.

Minimum Recommended Trench Widths for Structured Wall Pipes in Poor Ground Conditions.

Native soil modulus between 3 & 4 MPA
Typical soil Classifications: Very loose gravel, loose sand, medium dense clayey silty sand, firm clay

Nominal pipe diameter (mm)	150	225	300	375	450	525	600	750	900
Minimum trench width (mm)*	450	525	600	750	900	1050	1200	1500	1800

* A vertical trench face has been assumed to allow a modulus of 7MPa to be achieved for the pipe bedding and sidefill material.

Other assumed values:
Depth of cover = 6m (max)
Traffic loading = main road
Pipe stiffness = 5NB

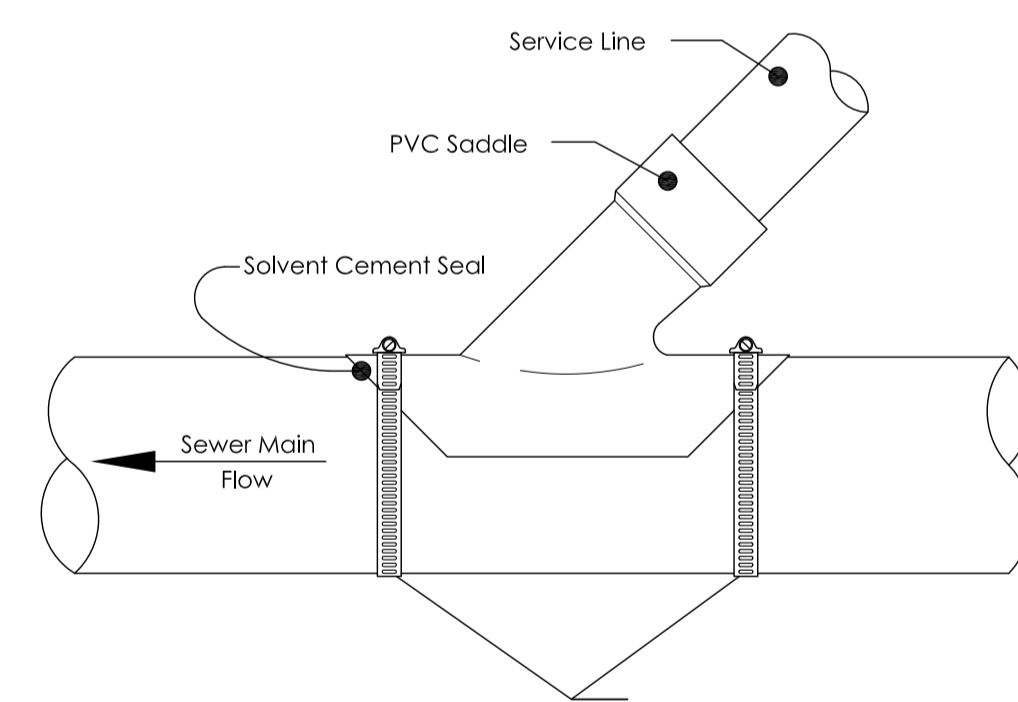
Note: Where the native soil modulus is below 3MPa or the depth of cover exceeds 6m, guidance should be sought from the pipe manufacturer regarding structural design and installation details.

TYPE	DEPTH TO INVERT FROM COVER LEVEL (m)	INTERNAL SIZES		COVER SIZES	
		RECTANGULAR LENGTH & WIDTH AS DRAIN FITTING 100mm	CIRCULAR DIAMETER	RECTANGULAR LENGTH & WIDTH	CIRCULAR DIAMETER
RODDING EYE					
ACCESS FITTINGS					
SMALL	1500 150x100	0.4 OR LESS, EXCEPT WHERE SITUATED IN A CHAMBER	150x100	150	150x100 (SEE NOTE 1)
LARGE	225x100		225x100	225	225x100 (SEE NOTE 1)
INSPECTION CHAMBER					
SHALLOW		0.4 OR LESS 1.2 OR LESS	225x100 450x450	190 (SEE NOTE 2) 450	MIN 430x430 480
DEEP		>1.2 BUT <3.0	450x450	450	ACCESS RESTRICTED TO MAX 350 (SEE NOTE 3)

- NOTES:
- THE CLEAR OPENING MAY BE REDUCED BY 20mm IN ORDER TO PROVIDE PROPER SUPPORT FOR THE COVER & FRAME.
 - DRAINS UP TO 150mm
 - A LARGER CLEAR OPENING MAY BE USED IN CONJUNCTION WITH RESTRICTED ACCESS. THE SIZE IS RESTRICTED FOR HEALTH & SAFETY REASONS TO ENTER.

NOTES:

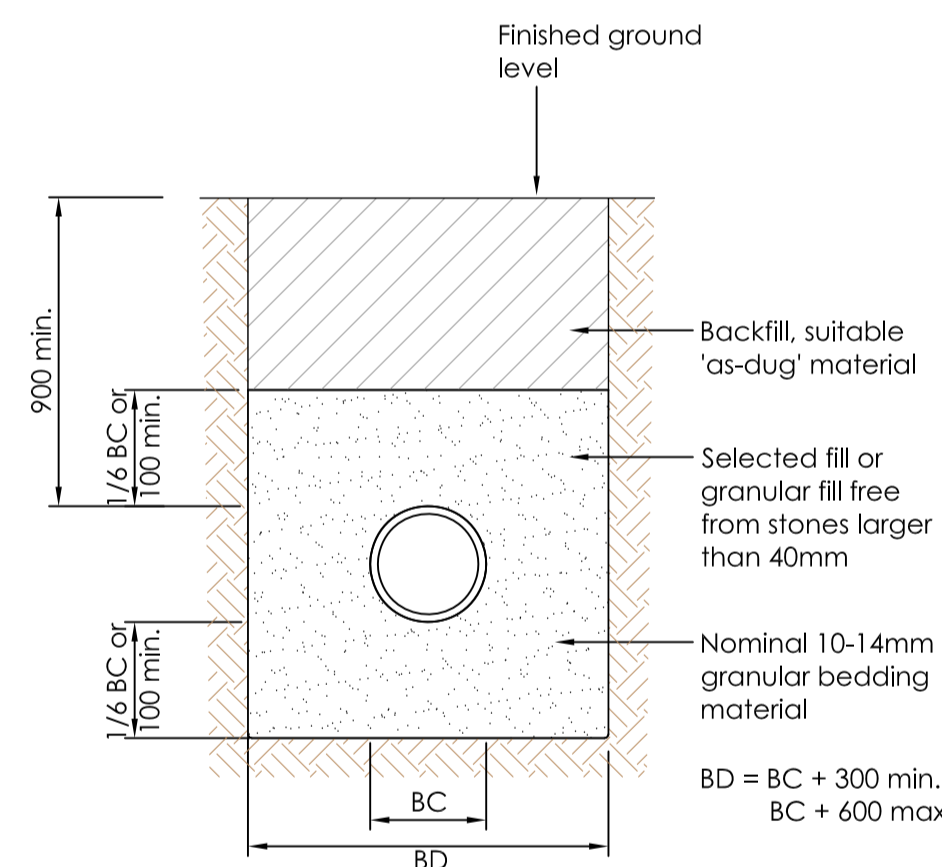
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PVC Main

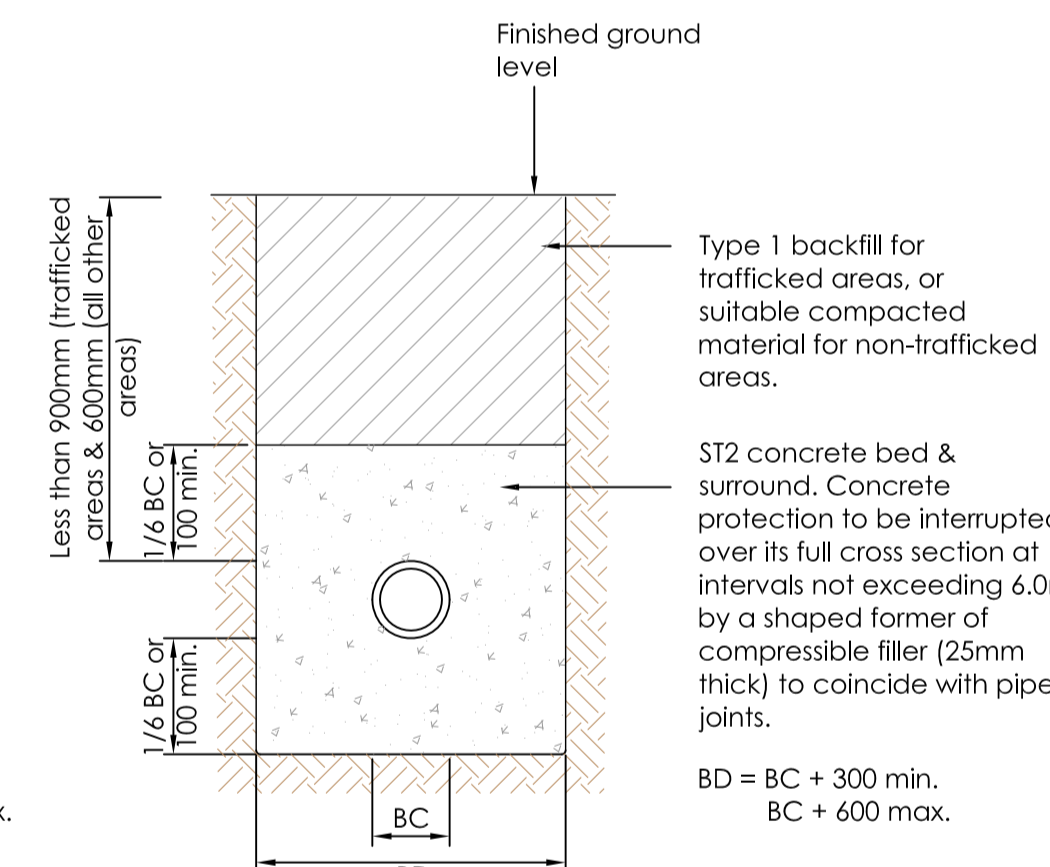
- Notes:
- PVC solvent cement shall be used for saddle.
 - Truss saddle shall be used with truss pipe.
 - li-line WYE fitting to be provided with new construction.

Saddle Connection
Scale 1:10



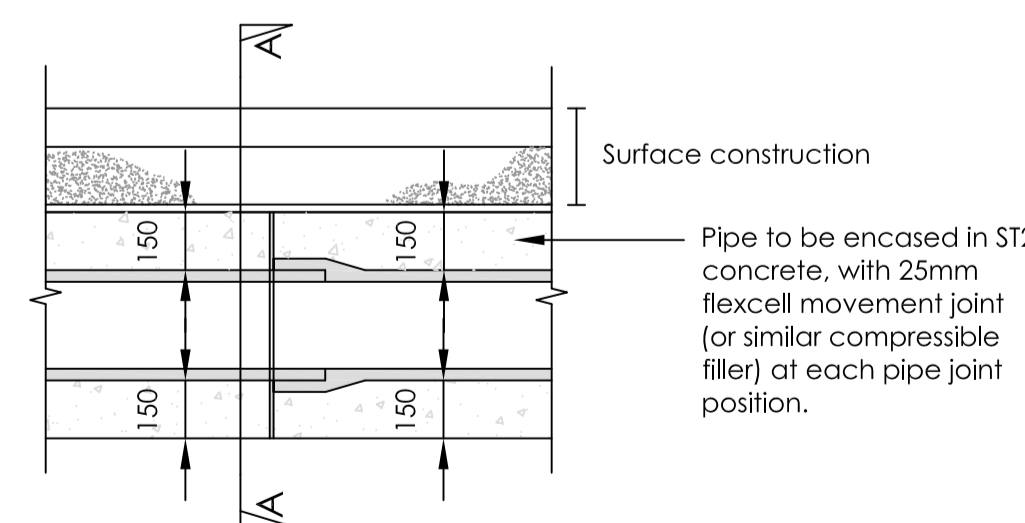
Typical Trench Detail
Scale 1:10

- NOTE: To be used where cover depth:
- >0.6m fields & gardens
 - >0.9m lightly trafficked areas e.g. light roads & drives



Shallow Trench Detail
Scale 1:10

- NOTE: To be used where cover depth:
- <0.6m fields & gardens
 - <0.9m lightly trafficked areas e.g. light roads & drives



Joints for Concrete
Encased Pipes
Scale 1:10

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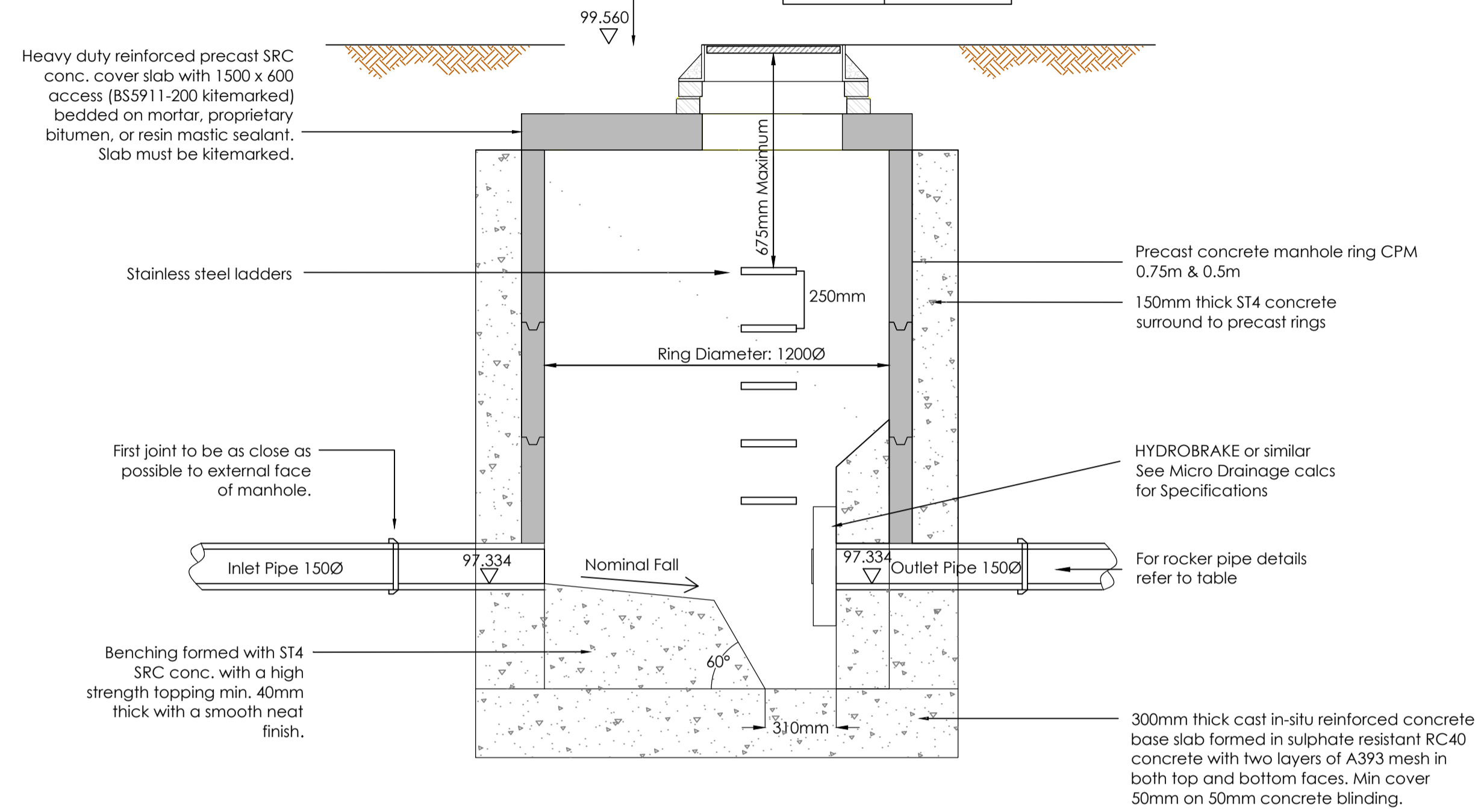
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- THE LOCATION AND LEVELS OF EXISTING DRAINAGE PIPES AND CULVERTS MUST BE CHECKED ON-SITE PRIOR TO CONSTRUCTION.
- ALL EXISTING SERVICES TO BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS ARE TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORKS.
- DRAINS ARE TO BE CONSTRUCTED USING FLEXIBLY JOINTED VITRIFIED CLAY PIPES TO BS 65 (1991) AND BS EN 295 (2012/2013); OR UPVC BUILDING DRAINAGE SYSTEM PIPEWORK TO BS 4660 (2000), BS EN 13598-1 (2010) & BS EN 1401-1 (2009); BEDDED & BACKFILLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
- BACKFILLING OF DRAIN TRENCHES ADJACENT TO DWELLINGS OR OTHER STRUCTURES TO BE IN ACCORDANCE WITH BS EN 1610 (1998).
- ACCESS FITTINGS & INSPECTION CHAMBERS <1.2m DEEP ARE TO BE CLAYWARE OR PRE-FORMED POLYPROPYLENE AS APPROPRIATE TO THE NUMBER OF CONNECTIONS. POLYPROPYLENE CHAMBERS CAN BE USED UP TO 3.0m DEEP BUT REQUIRE A MAX 350mm DIAMETER REDUCED COVER TO PREVENT MAN ENTRY. INSPECTION CHAMBER SIZES ARE TO BE CONSTRUCTED IN ACCORDANCE WITH BS EN 752 (2008).
- MANHOLE CHAMBERS ARE TO BE OF PRECAST CONCRETE CONSTRUCTION WITH 150mm INSITU CONCRETE SURROUND WITH A CLEAR OPENING OF 600mm.
- COVER LEVELS INDICATED ON THE DRAWING OR WITHIN THE MANHOLE SCHEDULE ARE NOMINAL AND MAY BE ADJUSTED TO SUIT FINISHED LEVELS AS NECESSARY. INSPECTION CHAMBER COVERS SHOULD BE GRADE AS IS FOR PEDESTRIAN AREAS ONLY; B125 FOR AREAS WITH OCCASIONAL VEHICLE ACCESS; AND D400 WITHIN THE PUBLIC HIGHWAY.
- WHERE DRAINS PASS THROUGH FOUNDATIONS OR OTHER RIGID STRUCTURES, A LINTEL OR SLEEVE IS TO BE USED & PROVISION FOR FLEXIBILITY IS TO BE MADE WITH ROCKER PIPES.
- ANY EXISTING LAND DRAINS SEVERED BY SITE OPERATIONS SHOULD BE DIVERTED AROUND ANY PROPERTIES/BUILDINGS AND RECONNECTED TO THE EXISTING LAND DRAINAGE SYSTEM VIA A SILT TRAP.
- GULLIES SITUATED IN AREAS ACCESSIBLE TO WHEELED VEHICLES ARE TO BE OF A SUITABLE CONSTRUCTION (e.g. CPM GROUP CONCRETE GULLY POTS TO BS 5911:6 (2010) OR HEPWORTH CODE RGR3 GULLY POT, WITH INSITU CONCRETE BED AND SURROUND, FITTED WITH DRAINAGE CASTINGS CODE TD651 GRATING AND FRAME TO BS EN 124).
- DRAINS WITHIN AREAS OF MADE GROUND TO BE CONSTRUCTED BY FIRST MAKING UP THE AREA TO APPROXIMATE FINISHED LEVEL AND THEN EXCAVATING THROUGH THE FILL MATERIAL INTO UNDISTURBED GROUND. THE DRAIN TRENCH IS THEN TO BE BACKFILLED TO FORMATION LEVEL USING SUITABLE GRANULAR FILL MATERIAL, WELL COMPACTED IN LAYERS NOT EXCEEDING 225mm.
- CONCRETE PROTECTION TO PIPES WHERE DEPTH OF PIPE FROM GROUND LEVEL TO BARREL IS <0.35m WITHIN NON-TRAFFICKED AREAS; <0.5m WITHIN DOMESTIC DRIVEWAYS; <0.9m PARKING AREAS; AND <1.2m WITHIN THE PUBLIC HIGHWAY, OTHERWISE SEWERS TO BE LAID IN CLASS S BEDDING (150mm GRANULAR BED & SURROUND).
- SEWERS MUST HAVE 5m CLEARANCE FROM TREES AND HEDGES.
- BEDDING AND BACKFILL TO CONFORM TO THE REQUIREMENT OF THE WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
- THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
- THE POSITIONS OF SVP'S, STUB-STACKS, WC OUTLETS AND RAINWATER DOWNPIPES ARE TO BE ACCURATELY LOCATED FROM THE ARCHITECTS DRAWINGS.
- CATCHPIT CHAMBERS ARE REQUIRED TO HAVE A MINIMUM 300mm SUMP.

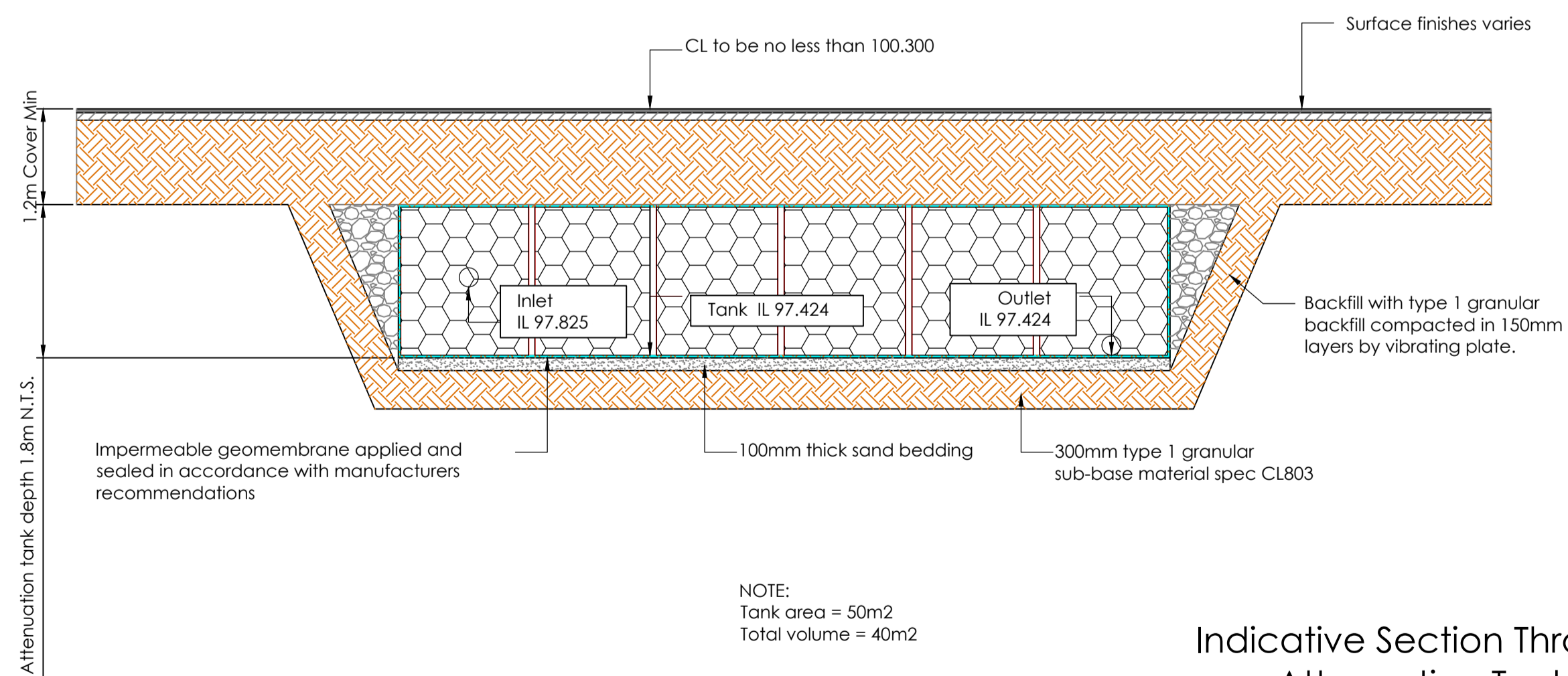
Note: Cover slab to be installed after the control device has been fully fitted into the manhole.

600 x 600 clear opening ductile iron cover and frame to be BS EN124-200 kitemarked, class B125 and 150mm deep in car park. Bedded on class M1, M2 or epoxy mortar. Approved packing material may be used if required. Manufacturers name to be clearly visible.

ROCKER PIPE TABLE	
NOMINAL DIAMETER (mm)	EFFECTIVE LENGTH (m)
150-600	0.6
675-750	1.0
OVER 750	1.25



Flow Control Manhole Detail
Scale 1:20




Installation Method:

- Specialist supplier to prepare and submit appropriate layouts, schedules and details to enable fully compliant installation of geo-cellular crate units
- Excavate
- Install sub-base
- Install impermeable geo-membrane (in accordance with manufacturers recommendations)
- Install geo-cellular crate units + connections (in accordance with manufactures recommendations)
- Install inspection chambers as required
- Install geo-cellular crate end plates
- Cover sides and top with geo-textile membrane (note: care taken not to rip, tear or puncture membrane)
- Lateral backfilling
- Cover and backfill

NOTE:
Tank area = 50m²
Total volume = 40m³

Indicative Section Through
Attenuation Tank
Not to Scale

REVISION	COMMENT	DATE	BY
A	UPDATED TO REFLECT HYDROBRAKE FLOW CONTROL	16/05/2017	CV

 <p>FLOOD RISK CONSULTANCY LTD Office C54 Northbridge House Elm Street Business Park Burnley, BB10 1PD TEL: 01282 792591 EMAIL: INFO@FLOODRISKCONSULT.COM WEBSITE: WWW.FLOODRISKCONSULT.COM</p>	CLIENT:	Paragram Ltd	DATE:	08.05.17
	PROJECT:	Former Horseshoes Pub Barnsley Road	DRAWN BY:	CV
	DRAWING TITLE:	Proposed Drainage General Construction Details Sheet 4 of 4	SCALE:	AS SHOWN
	DRAWING REFERENCE:	2017-025-05	SIZE:	A1
			REVISION:	/

Percolation Test Results

Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	Job No:	7851
Title	Calculation – Percolation Test	Sheet:	1 of 5
Name:	Brendan McHale	Checked by:	RSJ

Background:

These calculations have been undertaken to assess the viability of disposal of surface water from soft ground.

Percolation testing was undertaken by Subscan UDS Limited in accordance with the requirements set out within BRE Digest 365. Based upon the size of the development a single test pit was utilised to undertake the percolation test.

Date test undertaken:	25 April 2017			
Weather Conditions:	Dry, overcast			
Number of tests:	1			
Test pit dimensions:	Length	Width	Depth	Plan Area
	1.8m	1.2m	1.1m	2.16m ²

Summary of Results:

Average infiltration rate = 0.269736482 m/hr

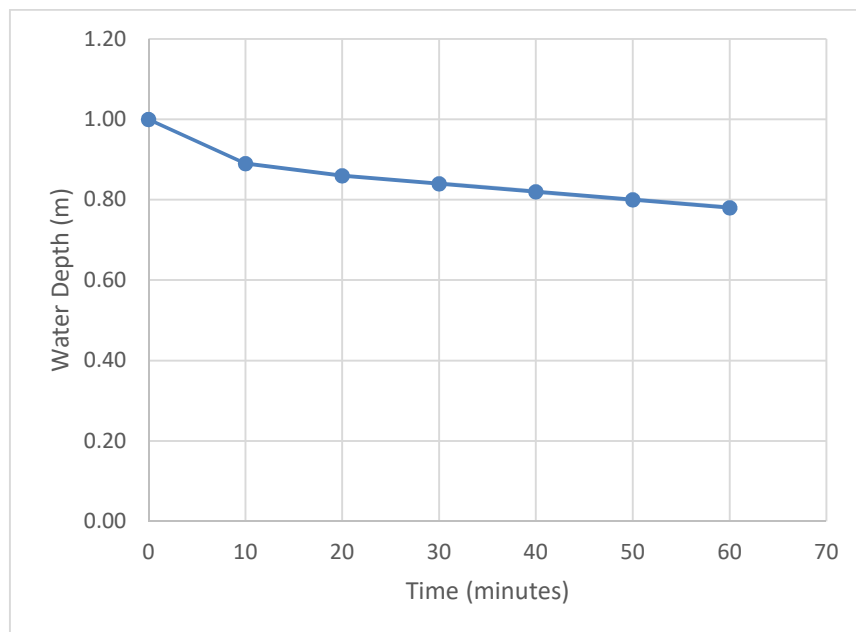


Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	Job No:	7851
Title	Calculation – Percolation Test	Sheet:	2 of 5
Name:	Brendan McHale	Checked by:	RSJ

Percolation Test Results:

Test 1: Approximate time to discharge water into the test pit: 100 seconds. Depth of water after filling: 1000 mm

Time (mins)	Depth (m)	Notes
0	1.00	Start
10	0.89	
20	0.86	
30	0.84	
40	0.82	
50	0.80	
60	0.78	

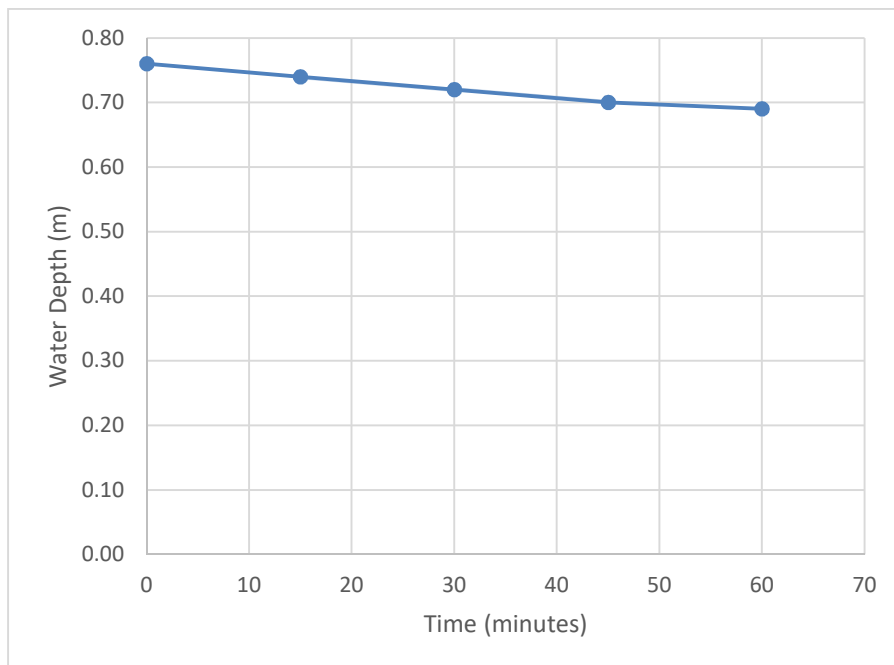


Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	Job No:	7851
Title	Calculation – Percolation Test	Sheet:	3 of 5
Name:	Brendan McHale	Checked by:	RSJ

Percolation Test Results:

Test 2: Approximate time to discharge water into the test pit: 100 seconds. Depth of water after filling: 1000 mm

Time (mins)	Depth (m)	Notes
0	0.76	Start
15	0.74	
30	0.72	
45	0.70	
60	0.69	



Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	Job No:	7851
Title	Calculation – Percolation Test	Sheet:	4 of 5
Name:	Brendan McHale	Checked by:	RSJ



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Project:	The Three Horseshoes, Barnsley Road, Brierley, Barnsley S72 9JT		
Date:	25 April 2017	Job No:	7851
Title	Calculation – Percolation Test	Sheet:	5 of 5
Name:	Brendan McHale	Checked by:	RSJ

Infiltration Rate - Calculations:

Equation 1: $f = V_{p75-25} / (A_{p50} \times T_{p75-25})$

Where;

V_{p75-25} = effective storage volume of water in trial pit between 75% and 25% effective depth

A_{p50} = internal surface area of the trial pit up to 50% effective depth and including the base area

T_{p75-25} = time for the water level to fall from 75% to 25% effective depth

Test pit dimensions:	Length	Width	Depth	Plan Area
	1m	1m	1m	1m ²

Test 1:

V_{p75-25} 0.738 m³

A_{p50} 4.56 m²

T_{p75-25} 0.5 hours

f 0.323684211 meters / per hour

Test 2:

V_{p75-25} 0.738 m³

A_{p50} 4.56 m²

T_{p75-25} 0.75 hours

f 0.215789474 meters / per hour



UVDB
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