

SuDS MAINTENANCE SCHEDULE – PHASE 2

REPORT REF: JL/183249-02A

DOCUMENT CONTROL

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	Issued for information	JL	MJR	JEC	22.05.24
A	Updated to suit LPA comments	MJR	MJR	JEC	29.11.24

DISTRIBUTION

This briefing note has been prepared for the exclusive use of **Vistry South East**. It should not be reproduced in whole or in part by third parties, without the express written authority of Ardent Consulting Engineers.

1.0 INTRODUCTION

This report is intended to outline the proposed maintenance regime of the surface water drainage network and Sustainable Drainage System (SuDS) pertinent to Phase 2 of the development at the Land East of Tye Lane, Walberton.

Reference should be made to:

- i) **Appendix A** for the location of the proposed SuDS within the main drainage system in the *Main Drainage Plan* (drawing number LHS240-1202).
- ii) **Appendix B** for the locations of the proposed SUDS within the Plot Drainage system in Phase 2 within the *Plot Drainage General Arrangement* (drawing numbers LHS240-1217/1218).
- iii) **Appendix C** for a Surface Water Drainage Phasing Plan (drawing number LHS240-1240).
- iv) **Appendix D** for Drainage Operation and Maintenance Log (pro-forma)
- v) **Appendix E** Conveyance plan demonstrating maintenance responsibility
- vi) **Appendix F** ACE Drainage Construction Details (LHS240-1221-1223)
- vii) **Appendix G** Potential pollution Action Plan

It is worth noting that the drawings provided relate to Phase 2 of the development (as shown in Appendix C). All drawings relating to Phase 1 of the development are detailed within a separate report.

2.0 SCOPE

This report considers whole life design & maintenance criteria for the SuDS features proposed as part of the development. These features include permeable block paving, swales (lined, piped and conventional) and headwalls. The design and management of these features needs to consider all the following issues to ensure that risks to performance

SuDS MAINTENANCE SCHEDULE – PHASE 2

are minimised:

- Hydraulic design objectives of the scheme;
- Amenity objectives;
- Ecological benefits;
- Health and safety issues, e.g. effective inlet and outlet structures that are easy to maintain.

Regular inspection, monitoring and maintenance will be required to ensure the effective long-term operation of the SuDS on-site. This will be included as part of the overall site management company contract and would form part of the non-adopted estate road maintenance regime.

A management company will be in place, which will employ suitable landscape contractors to maintain the SuDS. They should have a comprehensive knowledge of the development and visit the site on a regular basis to undertake routine care such as cleaning of inlet and outlet pipework, grass cutting, tree and shrub maintenance, sweeping and litter picking.

Such attendance will ensure regular monitoring of the drainage system, a rapid response to maintenance needs, and a feeling of ownership of the SuDS features.

As part of the management company contract, the following landscape maintenance procedures will be applied:

- **Management Plan** - describing the management objectives for a site over time, and the management strategies that will be employed to both realise these objectives and reconcile any potential conflicts that may arise.
- **Specification** - detailing the conditions under which the work will be done, the materials to be used and the standard of work required.
- **Schedule of Work** – itemising the tasks to be undertaken and the frequency at which they will be performed.

As landscape maintenance contract periods are usually 1 or 3 years duration, this is a convenient starting point for SuDS maintenance contracts. The frequency of regular maintenance tasks in a contract period will vary from fortnightly to monthly periods, unless in situations where grass or weed growth requires a higher frequency of work.

Maintenance tasks which suit a performance approach commonly include plant growth, grass cutting, pruning and tree maintenance. However, work tasks such as sweeping paths, regular litter collection and cleaning road surfaces will require work at an agreed frequency with a more specific timing such as weekly, monthly or annually. Where the frequency and timing of tasks is critical then a mixture of performance and frequency specification is necessary to ensure effective maintenance. This type of specification is useful where SuDS features require regular attention.

SuDS maintenance tends towards a frequency requirement to ensure a predictable standard of care which can be recorded on site and which provides a reasonable basis for pricing work. A convenient frequency for many tasks is at a monthly inspection as this is

SuDS MAINTENANCE SCHEDULE – PHASE 2

the usual minimum site attendance required in a landscape specification. The monthly frequency provides for an inspection of all SuDS features and checking of all inlets and outlets.

It is recommended that SuDS are not handed over to those responsible for maintenance until upstream construction has ceased, the contributing catchment has stabilised, and any necessary rehabilitation of downstream components has been undertaken by the construction contractor. However, if maintenance agreements have to be put in place in advance of this time, and the level of construction activity in the contributing catchment is still high, bespoke temporary maintenance specifications should be prepared that take account of high sediment accumulation rates and the increased risks of potential spillages.

3.0 SURFACE WATER DRAINAGE OWNERSHIP PROPOSALS

It is the intention that ownership and responsibility of all various surface water drainage elements will be managed and maintained by the private management company. This will receive annual contributions from all residents.

4.0 SUDS MAINTENANCE PROPOSALS

The proposed drainage strategy utilises sustainable drainage techniques to ensure that the site can accommodate all storm events up to and including the 1 in 100-year storm event with allowances for future climate change.

It is the intention that all SuDS features including; permeable block paving, swales (lined, piped and conventional), headwalls and an infiltration basin are to be maintained by a private management company. The tables below outline the maintenance requirements of the SuDS components throughout the drainage strategy. These have been informed by the guidance outlined within CIRIA C753 and best practice guidance. The following information would be supplemented by manufacturer's specifications where applicable and be obviously dependent on the type of system involved.

Details of the SuDS operation and maintenance requirements are provided in the tables below, with drainage operation and maintenance log (pro-forma) in **Appendix D**.

Maintenance Regime for Grassed Swales (lined, conventional and piped)



Description:

Swales are linear vegetated drainage features in which surface water can be stored or conveyed. Phase 2 contains 3 types of swales – conventional, piped and lined swales. Lined swales store water before enabling surface water to drain naturally to an endpoint. Conventional swales are similar except for allowance of infiltration during surface water conveyance, while piped swales enable direct conveyance of surface water through pipes directly through their centre.

The swales act to convey surface water runoff from the catchment to the south-eastern infiltration ponds on the site.

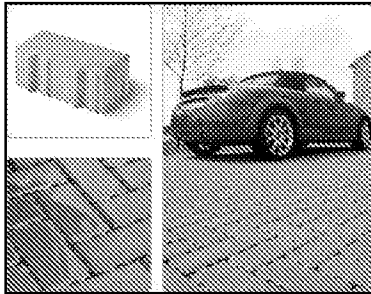
Locations (refer to APPENDIX A):

Along the northern boundary of the site and adjacent to the main spine road and adjacent to the infiltration basin.

MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
Regular Maintenance	Litter and debris removal	Monthly
	Grass cutting at 75-100mm, not to exceed 150mm. Cuttings not to be left within the swale.	Monthly (or as required)
Occasional Maintenance	Remove leaves in autumn to prevent damage to grass	As required
	Cut back overhanging branches to allow dense grass growth	As required
Remedial Actions	Repair erosion, level uneven surfaces or damage by re-turfing or seeding	As required
	Reinstate cobbles in riffle areas if any have become dislodged	As required
	Remove silt and spread locally outside design profile and reinstate surface	As required

SuDS MAINTENANCE SCHEDULE – PHASE 2

Maintenance Regime for Lined Permeable Paving Areas



Description:

Lined blocked permeable paving that allow rainwater to infiltrate through its surface course to underlying open graded aggregate. The permeable paving across the site is lined with an impermeable liner (non-filtrating) and discharges un-restricted to strategically placed manholes in proximity to the permeable paving.

Locations (refer to APPENDIX B):

Private drives including Holy Lane.

MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after Autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – particular attention is to be paid to areas where water runs on to pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements.
Remedial Actions	Repair/rehabilitation of inlets, outlet, overflows and vents.	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance of the pavement or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper sub-structure by remedial sweeping	Every 10-15 years or as required
Monitoring	Initial inspection	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action	3-monthly, 48 hours after large storm
	Inspect silt accumulation rates and establish appropriate brushing rates	Annually
	Monitor inspection chambers	Annually

SuDS MAINTENANCE SCHEDULE – PHASE 2

Maintenance Regime for Headwalls and Pipes

Description:

Headwalls – Bespoke structures, open to the air, which provide a formal pipe outfall or inlet.

Location (refer to APPENDIX A):

Headwalls – located at the inlet/outlet of swales and the inlet of the basin.

MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
<i>Regular Maintenance</i>	Remove sediment and debris from chambers	Annually
	Remove sediment and debris from headwall aprons and rip-rap	Annually
	Remove any root ingress from chambers/pipework	As required
	Remove vegetation blocking sight of and access to headwalls	As required
<i>Occasional Maintenance</i>	CCTV survey of drains to check alignment, cracking and joint displacement	10 year intervals
<i>Remedial Actions</i>	Repair/rehabilitation of inlets, outlet, overflows and railings.	As required
<i>Monitoring</i>	Initial inspection	Monthly for 3 months after installation
	Inspect for evidence of poor operation, weed growth and/or excessive sediment build-up. If required take remedial action	3-monthly, 48 hours after large storm
	Inspect silt accumulation rates and establish appropriate clearance rates	Annually
	Monitor chambers and headwalls	Annually

SuDS MAINTENANCE SCHEDULE – PHASE 2

Maintenance Regime for the Infiltration Pond



Description:

A pond with wetland planting for the storage, treatment and infiltration of runoff prior to attenuated discharge to Swale A. The pond will retain a permanent water volume; aiding biodiversity and water quality treatment purposes. A section of the pond is non-infiltrating with a geomembrane.

Location (refer to APPENDIX A):

Located to the south of Plots 94/95.

MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
Regular Maintenance	Litter and debris removal	Monthly (or as required)
	Grass cutting to access routes and side slopes at 75-100mm, not to exceed 150mm. Cuttings not to be left within the pond.	As required
	Inspect inlets, banksides, structures, pipework etc. for evidence of blockage and/or physical damage.	Monthly
	Trimming any roots that may be causing blockages	Annually (or as required)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect water body for signs of poor water quality	Monthly (May-October)
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season	Every 1-5 years, or as required
Occasional Maintenance	Remove leaf accumulation	As required
	Cut back overhanging branches to allow dense vegetation growth	As required
	Cut aquatic vegetation back to design area to maintain open water	As required
	Remove sediments from inlets and main body of pond when pool volume is reduced by 20%	As required
Remedial Actions	Inspect and repair damage to inlets. Clear if required	As required
	Replace topsoil if infiltration performance deteriorates or failure occurs	As required
	Repair erosion or other damage	As required
	Replant, where necessary	As required

SuDS MAINTENANCE SCHEDULE – PHASE 2

	Aerate pond when signs of eutrophication are detected	As required
Monitoring	Inspect sediment accumulation within basin grassed base ensuring topsoil consists of a sand: soil mix ratio of 40:60.	As required
	Check pond to ensure infiltration is occurring	As required

Proposed Action Plan

It is considered that the risk of spillage across this site is very low, however an action plan has been considered with regards to potential spill of pollutants on the main access road though the development.

Drainage of the access road on Phase 2 is split between traditional gully drainage into gravity sewers which discharge to an infiltration basin, and some areas have been designed to drain directly into the roadside swales (0mm upstand channel kerbs) and these swales are then piped to the infiltration basin to the south. In the event of a spillage on the access road that is discharging directly into the swales, it is proposed that the downstream swale outfall will be blocked so that the potential pollutants are not able to discharge into the infiltration basin. Any spillage contained in the swale will then be pumped out and taken offsite to a designed waste management facility.

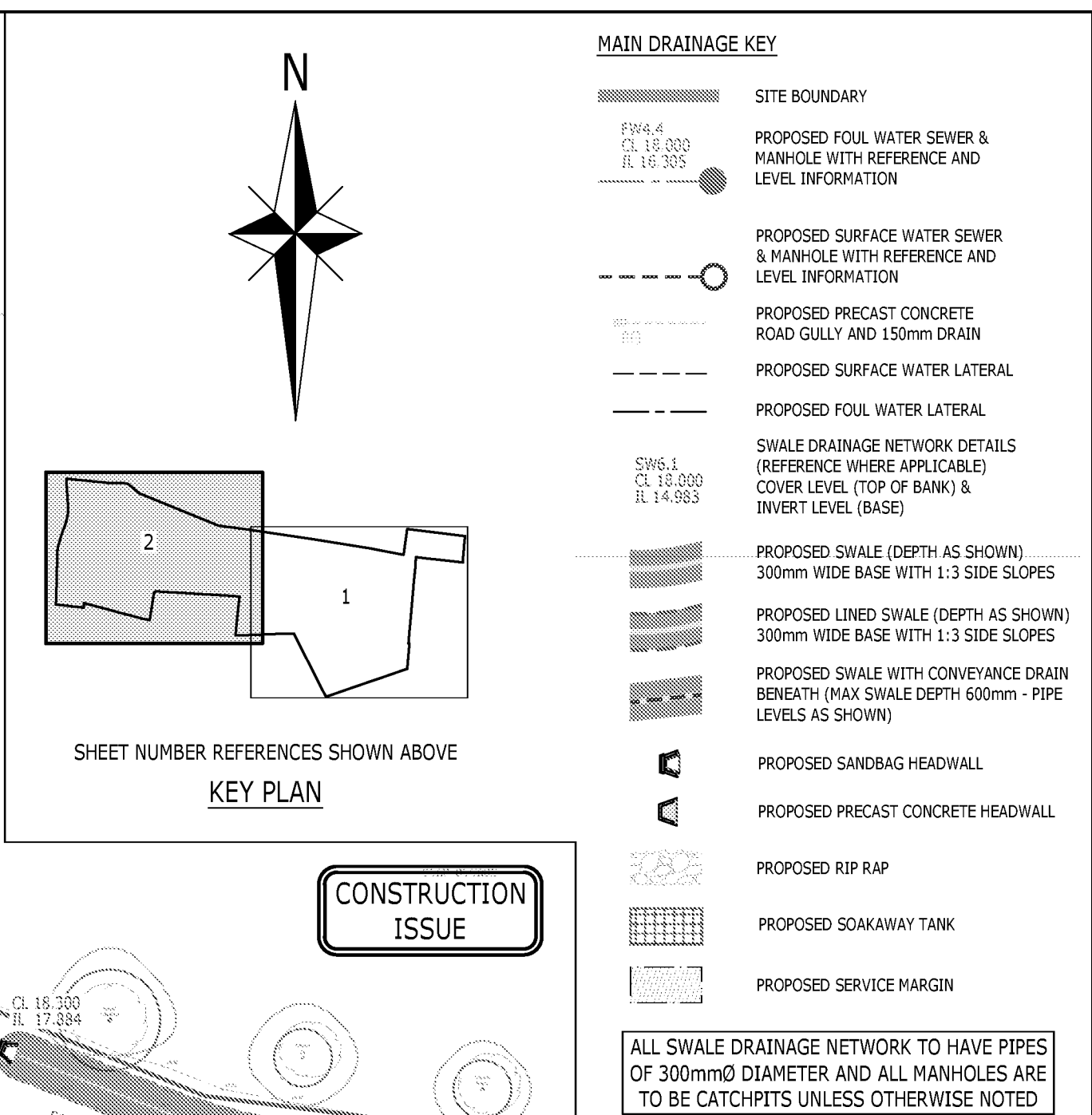
Other sections of the access road utilise more traditional gully drainage which discharged into a gravity piped network that either discharges into the infiltration basin or the soakaway to the north of the site. In this instance, an expanding pipe stopper would be used to bung the downstream manhole to prevent pollutants reaching the infiltration basin/soakaway. The manhole cover will need to be lifted so that the pipe stopper can be placed on the outgoing pipe and once secured, the polluted water can be pumped out of the manhole and taken offsite to a designed waste management facility. The manhole in question will be SW9.9 (450mm diameter) to the infiltration basin. Management company to ensure they have expanding pipe stoppers of the correct diameter to hand on-site in case of such spillages.

It is to be noted that there are elements of the current design that are there to treat the runoff prior to infiltrating into the ground such as the wetland planting and sediment forebay in the infiltration basins, and rip-rap aprons in the basins and swales.

A sketch demonstrating the proposed Action Plan items can be found in **Appendix G**.

APPENDIX A

Main Drainage Plan (Drawing number LHS240-1202)



- CMD NOTES:**
1. THE ATTENTION OF THE CLIENT AND THE PRINCIPAL CONTRACTOR IS DRAWN TO THE FOLLOWING POTENTIAL RISKS IN CONNECTION WITH THE PROPOSED ON-SITE AND OFF-SITE WORKS AS DESIGNED FOR THIS PROJECT:
 2. WORKS IN THE VICINITY OF LIVE SERVICES WILL BE NECESSARY AND THE ADVICE OF ALL STATUTORY SERVICE COMPANIES MUST BE SOUGHT BEFORE ANY WORKS COMMENCE.
 3. WORKS WITHIN AND ABOUTING THE EXISTING HIGHWAY WILL ENTAIL TRAFFIC HAZARDS AND ALL APPROPRIATE SAFETY MEASURES INCLUDING BARRIERS AND LIGHTING MUST BE PUT IN PLACE IN ACCORDANCE WITH THE APPROVAL OF THE LOCAL AUTHORITY, THE HIGHWAY AUTHORITY AND THE POLICE.
 4. HAZARDOUS MATERIALS INCLUDING CEMENT AND BITUMINOUS MATERIALS ARE SPECIFIED AND THE MANUFACTURER'S ADVICE ON SAFE HANDLING PROCEDURES MUST BE OBTAINED AND MADE CLEAR TO ALL OPERATIVES.
 5. THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES WITHIN THE VICINITY OF THE WORKS AND ENSURE THESE ARE PROTECTED THROUGHOUT THE DURATION OF THE WORKS. ALL UTILITY PLANT SHOULD BE CLEARLY MARKED ON THE GROUND PRIOR TO COMMENCEMENT OF THE WORKS.
 6. THE CONTRACTOR MUST ENSURE ALL WORKING AREAS ARE FULLY SECURE.

C7	GULLY TO SUBSTATION ADDED	MJR	MJR	JEC	16.05.23
C8	GULLY POSITION UPDATED TO SUIT REVISED TURNING HEAD FOLLOWING CLIENT COMMENTS	UN	MJR	JEC	27.05.22
C9	WH4 IS PH4-001 UPDATED TO SUIT RFI	JM	JM	CH	01.07.20
C10	UPDALES AS PER REV CLOUDS TO SUIT RFFs	JM	JM	GH	16.06.20
C11	SWALES UPDATED SEE REV CLOUD	UN	JM	GH	28.11.19
C12	REVISED TO SUIT COMBINED SERVICES LAYOUT	JM	JM	GH	22.08.19
C13	ISSUED FOR CONSTRUCTION	MJR	JM	GH	09.08.19
T3	RCPs REVISED TO LATEST PLANNING LAYOUT	JM	JM	GH	01.08.19
Rev	Description	Drn	Chk	App	Date

ARDENT CONSULTING ENGINEERS

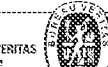
Third Floor
The Hallmark Building
52-56 Leadenhall Street
London
EC3M 5JE

Tel: 020 7680 4088
Web: www.ardent-ce.co.uk
E-mail: enquiries@ardent-ce.co.uk

worksafe
consultant
www.sm-audit.com

SSIP SAFETY
SPECIALIST
INSTITUTE

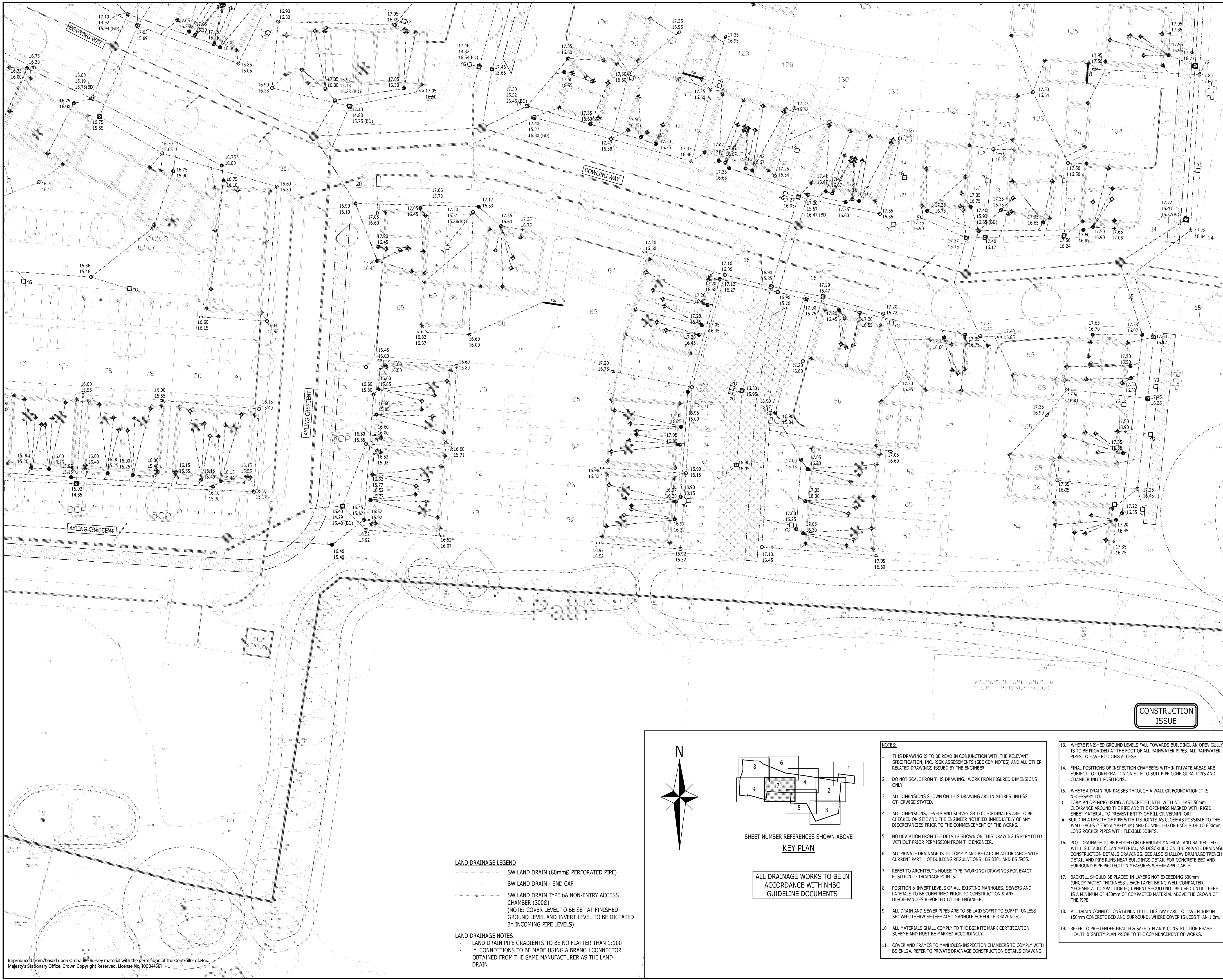
2001
SUPERIOR
VERIFICATION
MEMBER



Client			
LINDEN HOMES SOUTH			
Project Title: LAND EAST OF TYE LANE, WALBERTON			
Drawing Title: MAIN DRAINAGE PLAN (SHEET 2 OF 2)			
At Scale 1:500	Date 18.04.2019	Designed by JM	
Drawn by JM	Checked by JM	Approved by CH	
Drawing Number LHS240-1202			Rev C7

APPENDIX B

Plot Drainage General Arrangement (Drawing numbers LHS240-1217 & 1218)



KEY (SURFACE WATER):

- MAIN SW SEWER & MAINHOLE (WITH REFERENCE) REFER TO MH SCHEDULE FOR FURTHER DETAILS
- PLOT SW DRAIN (100mmØ UNLESS NOTED OTHERWISE)
- SW TYPE 4 NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 3m ØR TEGRA NON-ENTRY ACCESS CHAMBER (6000) FOR DEPTHS >3m BUT <5m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- SW TYPE 5 NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 1m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- ST (WHERE SHOWN) INDICATES SILT TRAP - ALL SILT TRAPS TO BE 750mm DEEP FROM COVER TO INVERT
- 49.85 47.55 48.75(BD) DRAINAGE INSPECTION CHAMBER; COVER LEVEL INVERT LEVEL (OF OUTGOING PIPE) b6 (WHERE SHOWN) INDICATES BACK DROP
- SW RODDING EYE TYPICAL DEPTH TO INVERT 0.45-0.6m MAX LOADING - LIGHT VEHICULAR, FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- RAIN WATER DOWNPIPE (100mmØ DRAIN CONNECTION)
- 100mmØ PERMEABLE PAVING OUTFALL PIPE (PPO) DEPTH TO INVERT LEVEL: 635mm (HEAVY DUTY CONSTRUCTION)
- 150mmØ PERMAVOID SUB-BASE OUTFALL PIPE (PSO) DEPTH TO INVERT LEVEL: 740mm
- DIRECT SW CONNECTION TO SWALE (ACO INLET)
- 150mmØ PERFORATED PIPE
- POROUS PAVING
- 800 LINEAR DRAIN (ACO TYPE)
- 100 PROPRIETARY LINEAR THRESHOLD DRAIN TO FRONT DOOR OF PROPERTY
- ROAD GULLY (D400 COVER)
- YG YARD GULLY (C250 COVER)

IMPORTANT
WHERE MORE THAN 1 PROPERTY IS CONNECTED TO A SW DRAIN, THE PIPE DIAMETER SHALL BE INCREASED TO 150mm.

KEY (FOUL WATER):

- MAIN FW SEWER & MAINHOLE (WITH REFERENCE) REFER TO MH SCHEDULE FOR FURTHER DETAILS
- INDICATIVE EXISTING SOUTHERN WATER PUBLIC FOUL SEWER
- PLOT FW DRAIN (100mmØ UNLESS NOTED OTHERWISE)
- FW TYPE 4 NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 3m ØR TEGRA NON-ENTRY ACCESS CHAMBER (6000) FOR DEPTHS >3m BUT <5m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- FW TYPE 5 NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 1m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- FW TYPE 6A MINI INSPECTION CHAMBER (<3000) MAX DEPTH TO INVERT 0.6m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- 49.85 47.55 48.75(BD) DRAINAGE INSPECTION CHAMBER; COVER LEVEL INVERT LEVEL (OF OUTGOING PIPE) b6 (WHERE SHOWN) INDICATES BACK DROP
- DOMESTIC FOUL WASTE OUTLET POSITION

IMPORTANT
WHERE MORE THAN 9 PROPERTIES ARE CONNECTED TO A FW DRAIN, THE PIPE DIAMETER SHALL BE INCREASED TO 150mm.

Rev	Description	Drn	Chk	App	Date
C5	LAND DRAINAGE ADDED FOLLOWING COMMENTS	MJR	MJR	JEC	15.03.24
C4	DRAINAGE AMENDED TO SUIT REVISED LAYOUTS AND LAND DRAINAGE ADDED TO CLIENT COMMENTS	MJR	MJR	JEC	07.08.23
C3	PLOT 67 DRAINAGE ADDED TO CLIENT REQUEST	MJR	MJR	JEC	25.07.23
C2	RPI 26 - PIPE SIZE NOTE UPDATED	MJR	MJR	JEC	24.01.22
C1	CONSTRUCTION ISSUE		JS	JM	09.08.19
T3	PERMAVOID OUTLETS UPDATES		JM	JM	01.08.19

ARDENT CONSULTING ENGINEERS

Third Floor,
The Hailmark Building
52-56 Leadenhall Street
London
EC3M 5JE

Tel: 020 7680 4088
Web: www.ardent-ce.co.uk
E-mail: enquiries@ardent-ce.co.uk

Client

LINDEN HOMES SOUTH

Project Title:

LAND EAST OF TYE LANE, WALBERTON

Drawing Title:

PLOT DRAINAGE GA (SHEET 7 OF 9)

A1 Scale	Date	Designed by
1:250	08.05.19	JM

Drawn by	Checked by	Approved by
MJR	JM	GH

Drawing Number

LHS240-1217

Rev

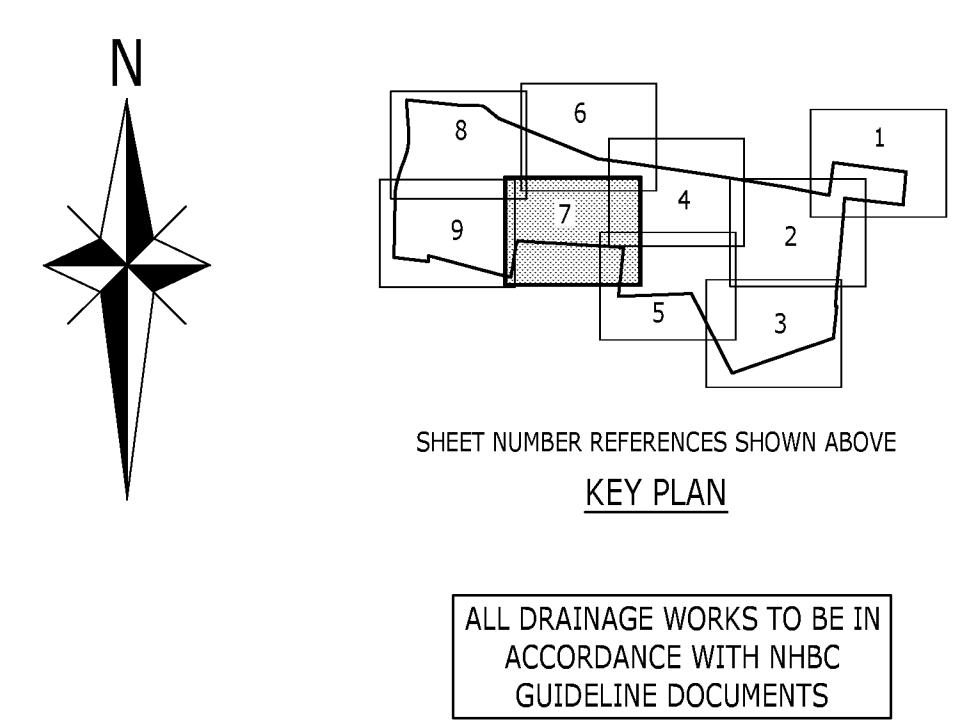
C5

LAND DRAINAGE LEGEND

- SW LAND DRAIN (80mmØ PERFORATED PIPE)
- SW LAND DRAIN - END CAP
- SW LAND DRAIN TYPE 6A NON-ENTRY ACCESS CHAMBER (3000) (NOTE: COVER LEVEL TO BE SET AT FINISHED GROUND LEVEL AND INVERT LEVEL TO BE DICTATED BY INCOMING PIPE LEVELS)

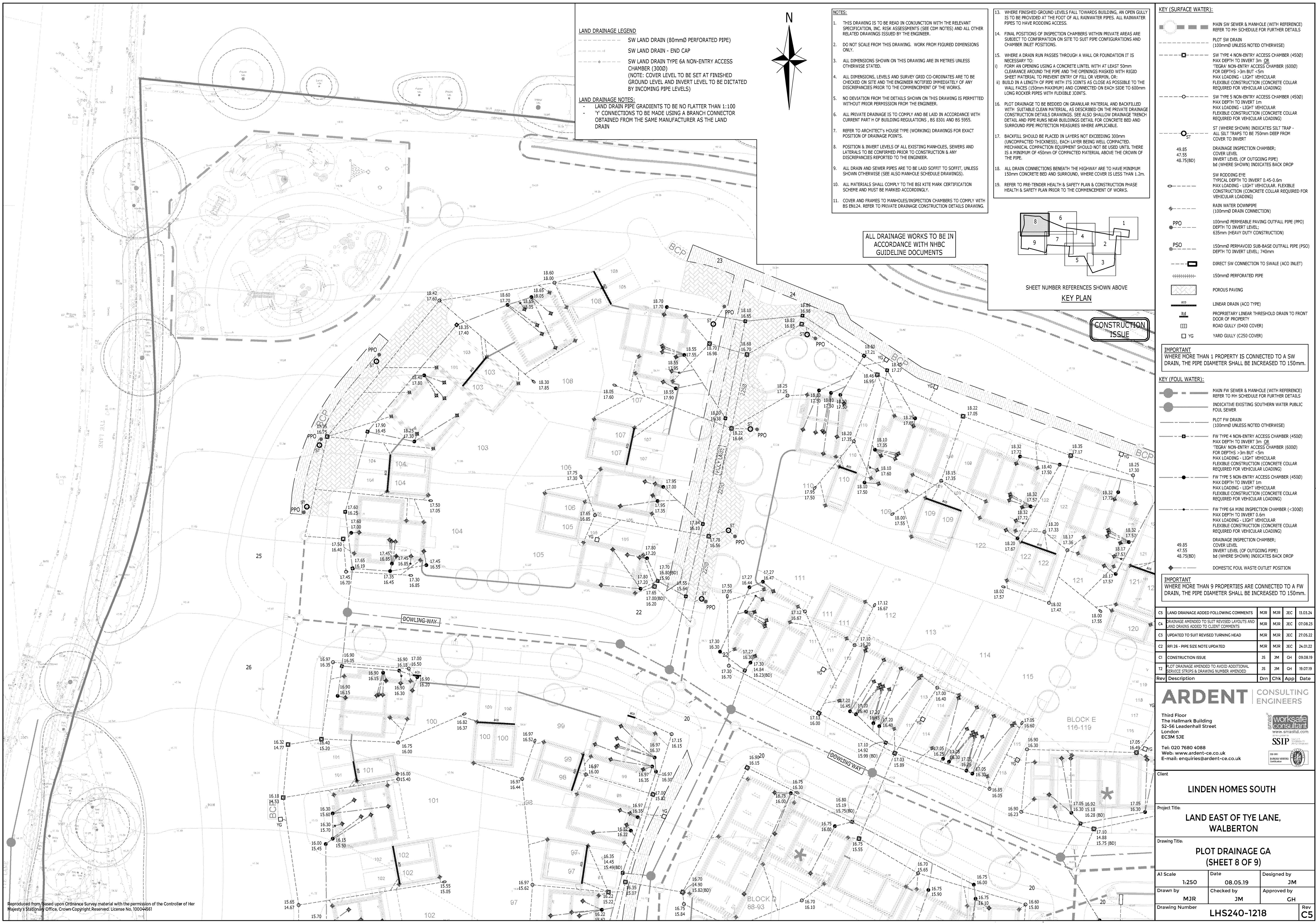
LAND DRAINAGE NOTES:

- LAND DRAIN PIPE GRADIENTS TO BE NO FLATTER THAN 1:100
- CONNECTIONS TO BE MADE USING A BRANCH CONNECTOR OBTAINED FROM THE SAME MANUFACTURER AS THE LAND DRAIN



- NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION, INC. RISK ASSESSMENTS (SEE CDM NOTES) AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
 - DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
 - ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES UNLESS OTHERWISE STATED.
 - ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
 - NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PRIOR PERMISSION FROM THE ENGINEER.
 - ALL PRIVATE DRAINAGE IS TO COMPLY AND BE LAID IN ACCORDANCE WITH CURRENT PART H OF BUILDING REGULATIONS, BS 8301 AND BS 5955.
 - REFER TO ARCHITECT'S HOUSE TYPE (WORKING) DRAWINGS FOR EXACT POSITION OF DRAINAGE POINTS.
 - POSITION & INVERT LEVELS OF ALL EXISTING MANHOLES, SEWERS AND LATERALS TO BE CONFIRMED PRIOR TO CONSTRUCTION & ANY DISCREPANCIES REPORTED TO THE ENGINEER.
 - ALL DRAIN AND SEWER PIPES ARE TO BE LAID SOFFIT TO SOFFIT, UNLESS SHOWN OTHERWISE (SEE ALSO MANHOLE SCHEDULE DRAWINGS).
 - ALL MATERIALS SHALL COMPLY TO THE BSI KITE MARK CERTIFICATION SCHEME AND MUST BE MARKED ACCORDINGLY.
 - COVER AND FRAMES TO MANHOLES/INSPECTION CHAMBERS TO COMPLY WITH BS EN124. REFER TO PRIVATE DRAINAGE CONSTRUCTION DETAILS DRAWING.

- WHERE FINISHED GROUND LEVELS FALL TOWARDS BUILDING, AN OPEN GULLY IS TO BE PROVIDED AT THE FOOT OF ALL RAINWATER PIPES. ALL RAINWATER PIPES TO HAVE RODDING ACCESS.
- FINAL POSITIONS OF INSPECTION CHAMBERS WITHIN PRIVATE AREAS ARE SUBJECT TO CONFIRMATION ON SITE TO SUIT PIPE CONFIGURATIONS AND CHAMBER INLET POSITIONS.
- WHERE A DRAIN RUN PASSES THROUGH A WALL OR FOUNDATION IT IS NECESSARY TO:
 - FORM AN OPENING USING A CONCRETE LINTEL WITH AT LEAST 50mm CLEARANCE AROUND THE PIPE AND THE OPENINGS MASKED WITH RIGID SHEET MATERIAL TO PREVENT ENTRY OF FILL OR VERMIN, OR;
 - BUILD IN A LENGTH OF PIPE WITH ITS JOINTS AS CLOSE AS POSSIBLE TO THE WALL FACES (150mm MAXIMUM) AND CONNECTED ON EACH SIDE TO 600mm LONG ROCKER PIPES WITH FLEXIBLE JOINTS.
- PLOT DRAINAGE TO BE BEDDED ON GRANULAR MATERIAL AND BACKFILLED WITH SUITABLE CLEAN MATERIAL, AS DESCRIBED ON THE PRIVATE DRAINAGE CONSTRUCTION DETAILS DRAWINGS. SEE ALSO SHALLOW DRAINAGE TRENCH DETAIL AND PIPE RUNS NEAR BUILDINGS DETAIL FOR CONCRETE BED AND SURROUND PIPE PROTECTION MEASURES WHERE APPLICABLE.
- BACKFILL SHOULD BE PLACED IN LAYERS NOT EXCEEDING 300mm (UNCOMPACTED THICKNESS), EACH LAYER BEING WELL COMPACTED. MECHANICAL COMPACTION EQUIPMENT SHOULD NOT BE USED UNTIL THERE IS A MINIMUM OF 450mm OF COMPACTED MATERIAL ABOVE THE CROWN OF THE PIPE.
- ALL DRAIN CONNECTIONS BENEATH THE HIGHWAY ARE TO HAVE MINIMUM 150mm CONCRETE BED AND SURROUND, WHERE COVER IS LESS THAN 1.2m.
- REFER TO PRE-TENDER HEALTH & SAFETY PLAN & CONSTRUCTION PHASE HEALTH & SAFETY PLAN PRIOR TO THE COMMENCEMENT OF WORKS.



APPENDIX C

Surface Water Drainage Phasing Plan (Drawing numbers LHS240-1240)

APPENDIX D

Drainage Operation and Maintenance Log (pro-forma)

Site Maintenance Supervisor: _____ Date: _____

☐ Routine ☐ Response to rainfall event Other: ☐ _____

BMP	Frequency	Date Performed	Comments
Gullies and Manholes	Monthly inspections		
	Maintenance quarterly and as necessary		
Headwalls	Inspect and identify areas not operating properly every 3 months (for the first 3 months) and every 6 months after.		
	Monthly safety grille inspection and remove debris		
Pavement Areas (parking, driveways, service areas)	Monthly sweeping		
	Rubbish & litter removal as necessary		
Landscaped and Vegetated Areas	Maintenance as necessary		
Swale	Monthly grass cutting and litter removal		
Pipework	Sediment and litter removal monthly		
	Root ingress removed as necessary		

APPENDIX E

Conveyancing Estate Plan (Sheet 2 of 2) (Drawing number LHS240-5201)



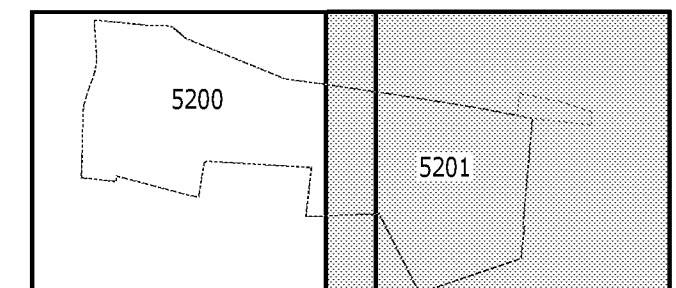
- KEY**
- TITLE BOUNDARY - WSK314358
 - TITLE BOUNDARY - WSK267804
 - PLOT BOUNDARY AND T MARK
 - ADOPTED LAND (SECTIONAL AGREEMENTS)
 - MANAGEMENT LAND (ROAD/ PATHS)
 - MANAGEMENT LAND (LANDSCAPE/ OPEN SPACE)
 - VISITOR PARKING SPACE
 - UTILITY SERVICE MARGIN (RIGHT TO ACCESS GRANTED TO UTILITIES COMPANY WHERE SERVICE MARGIN LAYS WITHIN PLOT BOUNDARY)
 - SW ATTENUATION BASIN (PRIVATE)
 - ELECTRIC SUB-STATION
 - 0.5m RANSOM STRIP
 - AFFORDABLE HOUSING
 - PREFIX TO PLOT GARAGE
 - P23 PREFIX TO PLOT PARKING SPACE
 - LEAP PLAY EQUIPMENT AREA
 - SW SW SWALE
 - CS CYCLE STORE
 - BCR/CP REFUSE COLLECTION POINT
 - STREET LIGHTING COLUMN
 - PORTSMOUTH WATER EASEMENT (2m)
 - 3.7m TRACK/PROW AS PER 1984 DEED OF GIFT
 - PARISH LAND

HIGHWAYS ENGLAND KEY

LAND TO BE RETAINED

TEMPORARY LAND REQUIRED FOR CONSTRUCTION

HIGHWAYS ENGLAND INFORMATION TRANSCRIBED FROM DRAWING NUMBER GH-125724007-HMLR-0001 REV P01 RECEIVED DECEMBER 2021.



SHEET NUMBER REFERENCES SHOWN ABOVE
KEY PLAN

FOR INFORMATION ONLY

P17	LOCATED IN LINE WITH CLIENT COMMENTS	6	MJR	JEC	26.10.24
P16	HATCH ADDED FOR PARISH LAND	MJR	MJR	JEC	05.06.24
P15	PLOT 40 & 41 BOUNDARIES UPDATED	MJR	MJR	JEC	05.02.24
P14	PLOT ONE UPDATED TO SUIT LANDSCAPING	MJR	MJR	JEC	06.12.21
P13	BLUE OUTLINE REMOVED FROM VISITOR PARKING	UN	MJR	JEC	01.08.22
P12	UPDATED TO SUIT CLIENT COMMENTS	UN	MJR	JEC	18.05.23
P11	SITE BOUNDARY UPDATED TO SUIT TITLE PLANS FOLLOWING COMMENTS	MJR	MJR	JEC	23.12.21
P10	HIGHWAYS ENGLAND KEY AND KEY PLAN UPDATED FOLLOWING COMMENTS	MJR	MJR	JEC	14.12.21
P9	PORTSMOUTH WATER EASEMENT AND HIGHWAYS ENGLAND INFORMATION ADDED	MJR	MJR	JEC	14.12.21
P8	PLOT 16 BOUNDARY ADDED	MJR	JM	JEC	19.02.20
P7	UPDATED FOLLOWING SOLICITORS COMMENTS	UN	JM	GH	24.10.19
P6	UPDATED FOLLOWING CLIENT COMMENTS	JS	JM	GH	12.09.19
P5	UPDATED FOLLOWING CLIENT COMMENTS	JS	JM	GH	10.07.19
P4	UPDATED FOLLOWING CLIENT COMMENTS	JS	JM	GH	19.07.19
P3	PLOT BOUNDARIES UPDATED FOR APARTMENT BLOCKS AND PARKING COLOURS FOLLOWING COMMENTS	MJR	DP	TSP	10.06.19
P2	DRAWING NUMBER CHANGED	MJR	JM	GH	11.05.19
P1	UPDATED FOLLOWING CLIENT COMMENTS	MJR	MJR	JEC	03.05.19
Rev	Description	Drn	Chk	App	Date

ARDENT CONSULTING ENGINEERS

Third Floor
The Hallmark Building
52-56 Leadenhall Street
London
EC3M 5JE

Tel: 020 7680 4088
Web: www.ardent-ce.co.uk
E-mail: enquiries@ardent-ce.co.uk

Worskale CONSULTING

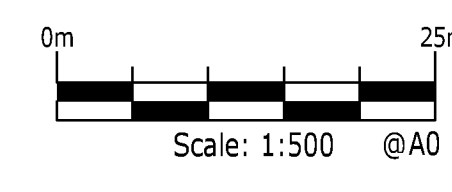
SSIP

Client: **VISTRY SOUTH EAST**

Project Title: **LAND EAST OF TYE LANE, WALBERTON**

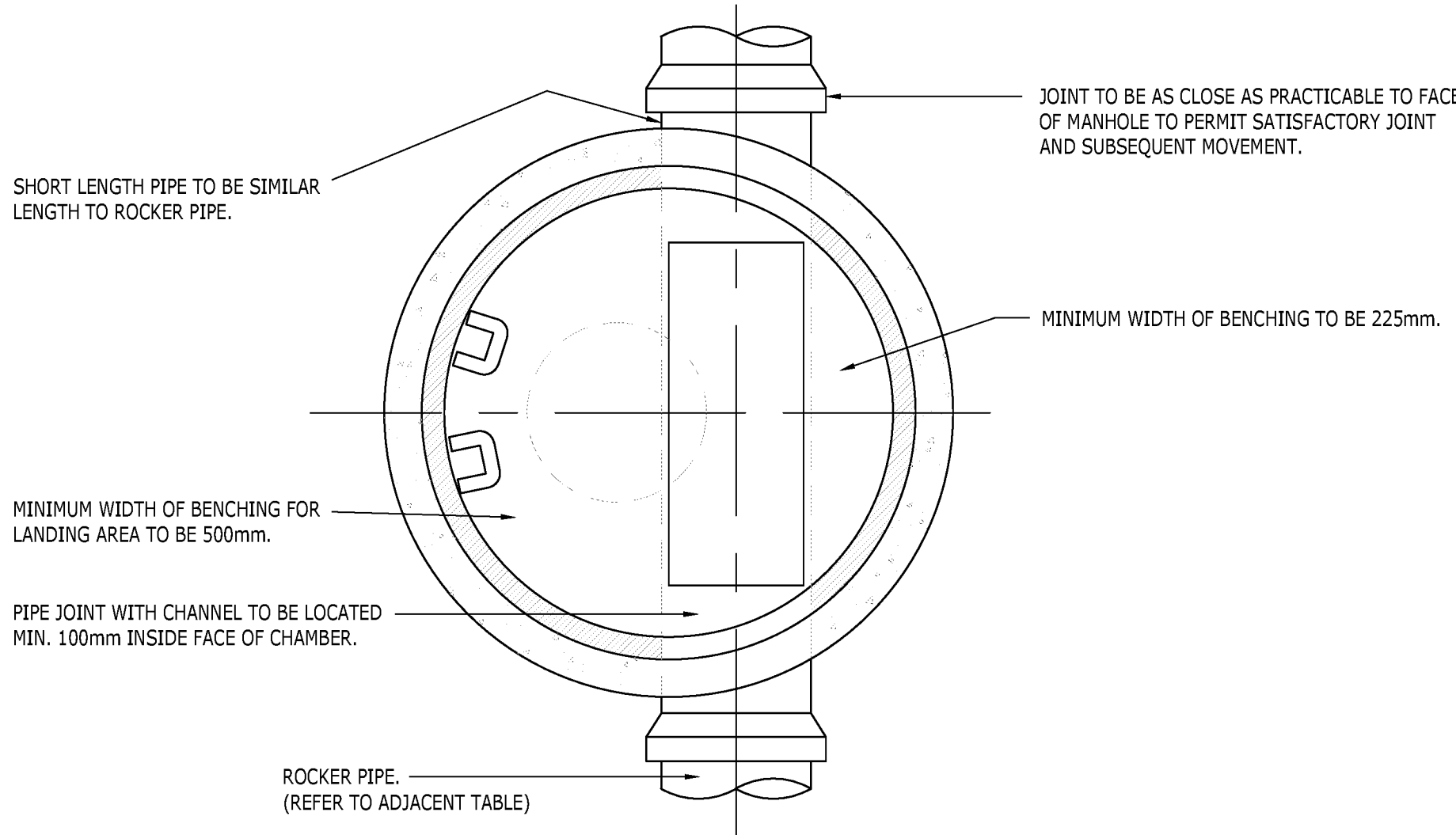
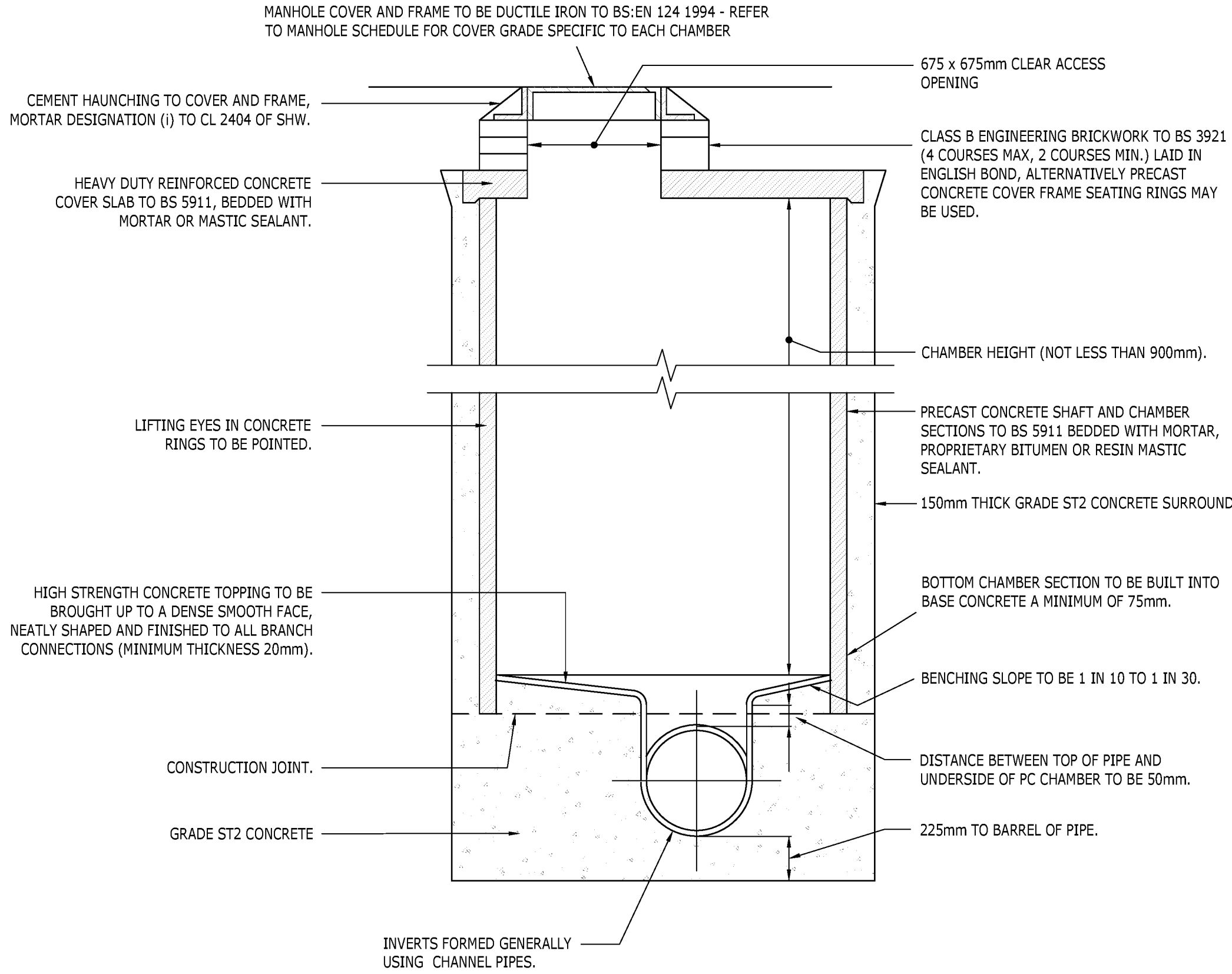
Drawing Title: **ESTATE PLAN (SHEET 2 OF 2)**

AO Scale	Date	Designed by
1:500	26.04.19	MJR
Drawn by	Checked by	Approved by
MJR	DP	
Drawing Number	LHS240-5201	Rev P17

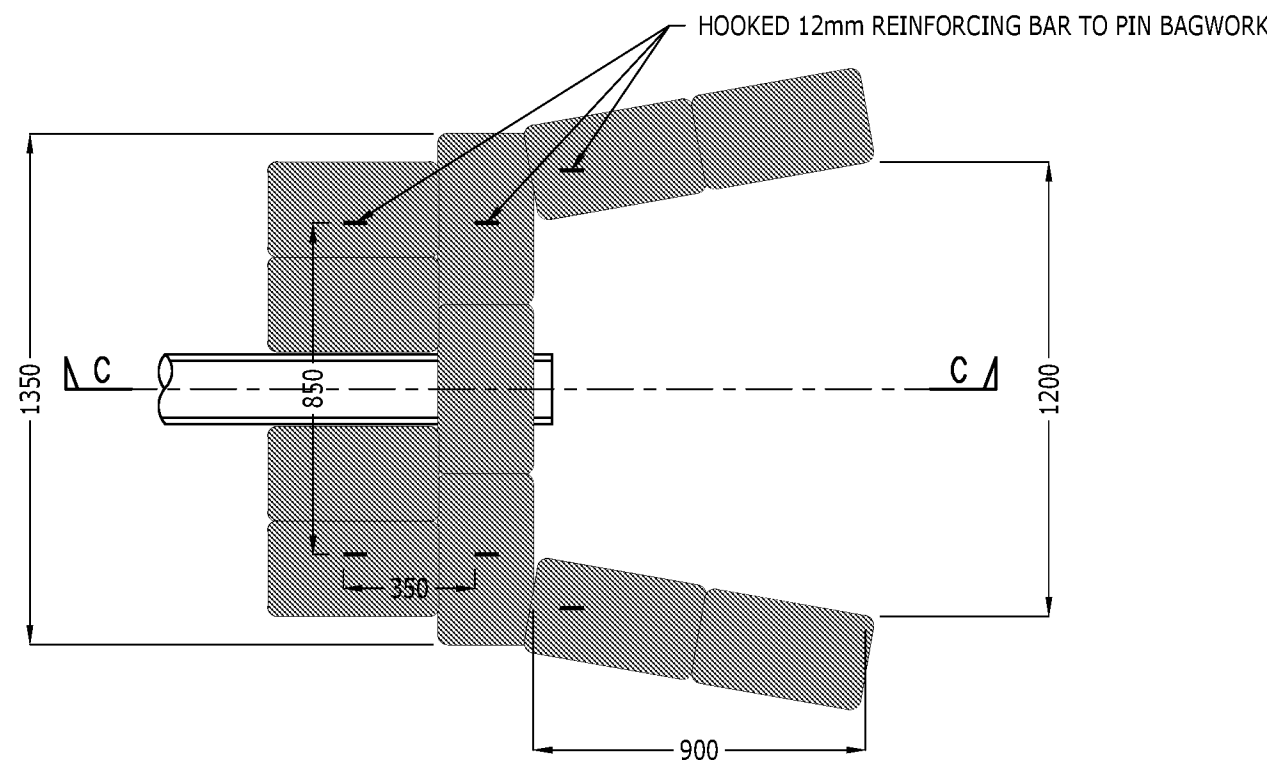


APPENDIX F

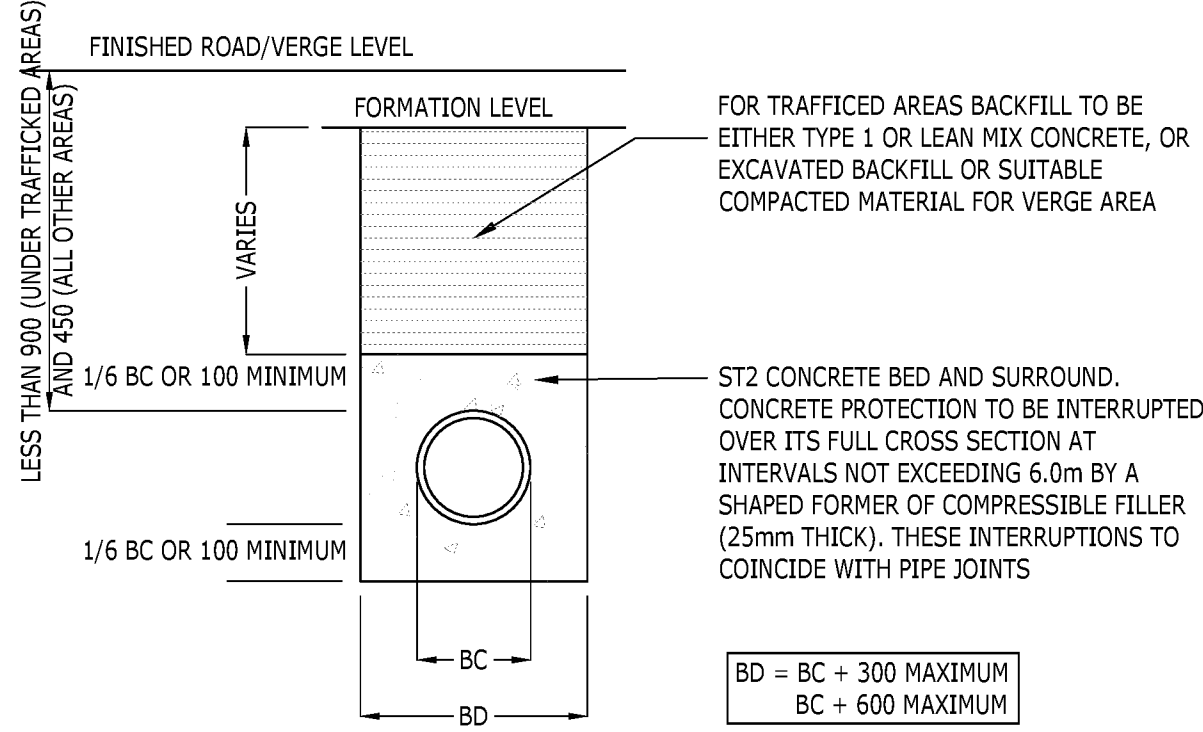
Drainage Construction Details (Drawing numbers LHS240-1221-1223)



PRIVATE MANHOLE TYPE B
(MAX DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3.0m)



INLET/OUTLET SWALE HEADWALL PLAN

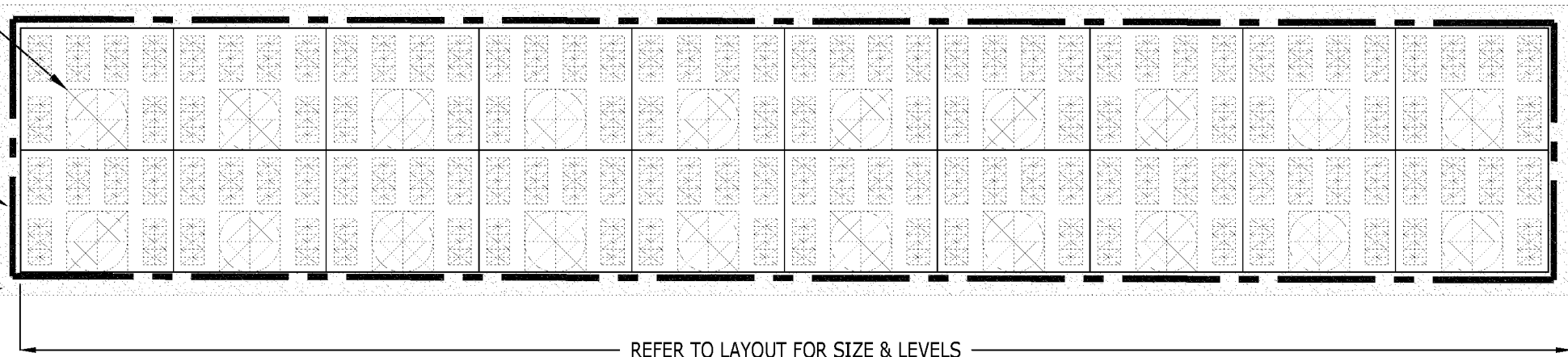


SHALLOW TRENCH DETAIL

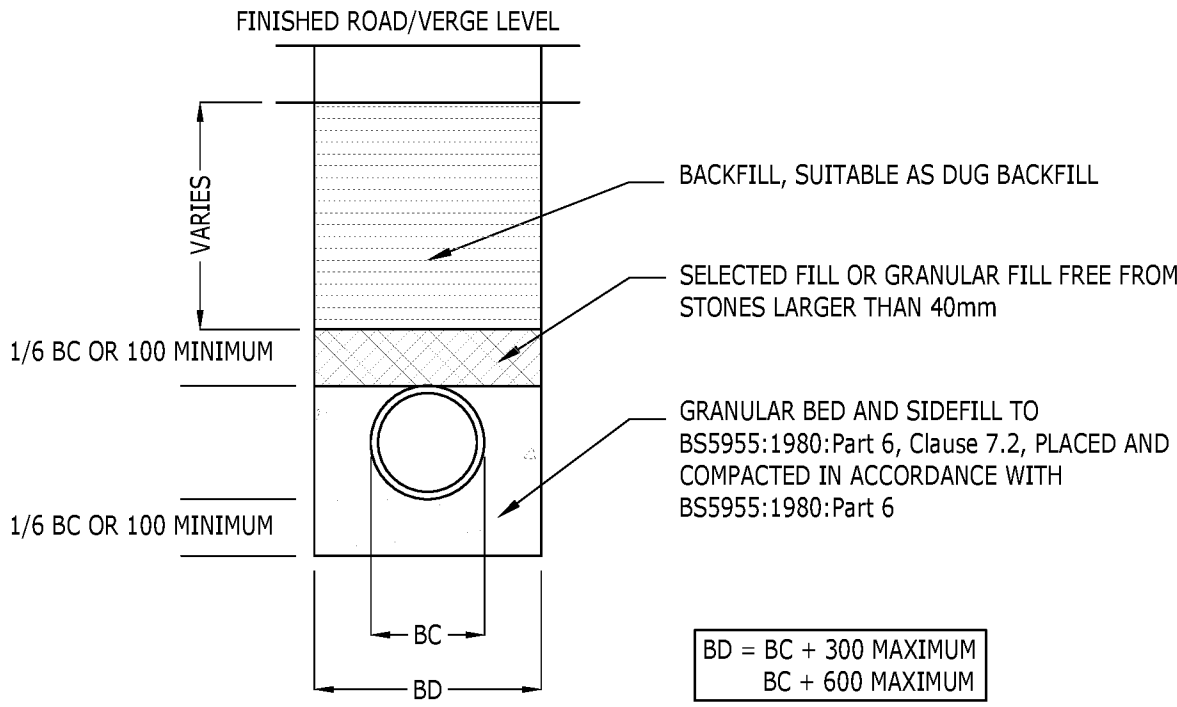
1.0m x 0.5m x 0.4m(D) WAVIN AQUACELL PLUS GEO-CELLULAR PLASTIC STORAGE CRATES OR SIMILAR APPROVED TO SUIT DEPTH OF CRATE INVERT - INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS

WRAPPED IN PERMEABLE GEOMEMBRANE - INSTALLED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS AND DETAILS

100mm MIN. WELL COMPACTED COARSE SAND CUSHION LAYER



TYPICAL CELLULAR SOAKAWAY DETAIL
(1:20)



TYPICAL TRENCH DETAIL

ALL PIPES ENTERING OR LEAVING MANHOLES SHALL HAVE A FLEXIBLE JOINT WITHIN 600mm OF THE INSIDE FACE OF THE MANHOLE. THE NEXT PIPE SHALL BE A SHORT "ROCKER PIPE" WITH LENGTH AS TABLE BELOW.

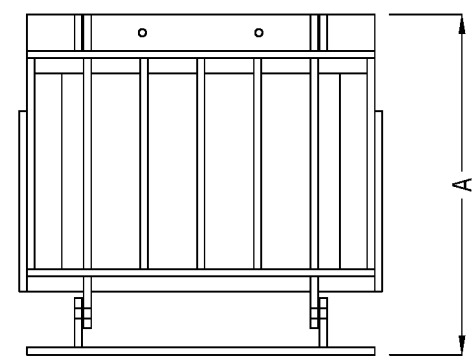
ROCKER PIPES	
SEWER DIAMETER (mm)	EFFECTIVE LENGTH (mm)
150 TO 600	600
675 TO 750	1000
825 AND OVER	1250

TABLE 1

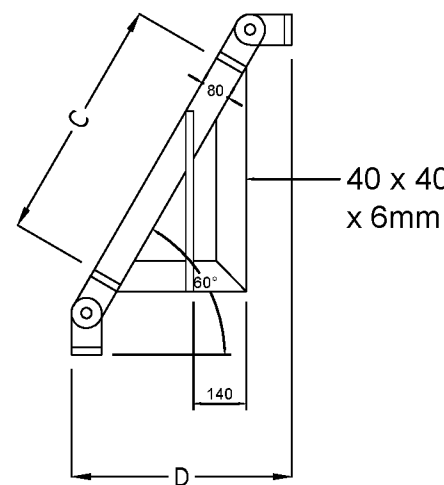
NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION, INC. RISK ASSESSMENTS (SEE COM NOTES) AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
- DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
- ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES UNLESS OTHERWISE STATED.
- ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
- NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PRIOR PERMISSION FROM THE ENGINEER.
- ALL PRIVATE DRAINAGE IS TO COMPLY AND BE LAID IN ACCORDANCE WITH CURRENT PART H OF BUILDING REGULATIONS, BS 8301 AND BS 5955.
- REFER TO ARCHITECT'S HOUSE TYPE (WORKING) DRAWINGS FOR EXACT POSITION OF DRAINAGE POINTS.
- POSITION & INVERT LEVELS OF ALL EXISTING MANHOLES, SEWERS AND LATERALS TO BE CONFIRMED PRIOR TO CONSTRUCTION & ANY DISCREPANCIES REPORTED TO THE ENGINEER.
- ALL DRAIN AND SEWER PIPES ARE TO BE LAID SOFFIT TO FIT, UNLESS SHOWN OTHERWISE (SEE ALSO MANHOLE SCHEDULE DRAWINGS).
- ALL PLOT DRAINAGE TO BE 100mm Ø UNLESS SHOWN OTHERWISE, LAID IN ACCORDANCE WITH BS 8301.
- ALL MATERIALS SHALL COMPLY TO THE BS1 KITE MARK CERTIFICATION SCHEME AND MUST BE MARKED ACCORDINGLY.
- COVER AND FRAMES TO MANHOLES/INSPECTION CHAMBERS TO COMPLY WITH BS EN124. REFER TO PRIVATE DRAINAGE CONSTRUCTION DETAILS DRAWING.
- WHERE FINISHED GROUND LEVELS FALL TOWARDS BUILDING, AN OPEN GILLY IS TO BE PROVIDED AT THE FOOT OF ALL RAINWATER PIPES. ALL RAINWATER PIPES TO HAVE RODDING ACCESS.
- FINAL POSITIONS OF INSPECTION CHAMBERS WITHIN PRIVATE AREAS ARE SUBJECT TO CONFIRMATION ON SITE TO SUIT PIPE CONFIGURATIONS AND CHAMBER INLET POSITIONS.
- WHERE A DRAIN RUN PASSES THROUGH A WALL OR FOUNDATION IT IS NECESSARY TO:
 - FORM AN OPENING USING A CONCRETE LINTEL WITH AT LEAST 50mm CLEARANCE AROUND THE PIPE AND THE OPENINGS MASKED WITH RIGID SHEET MATERIAL TO PREVENT ENTRY OF FILL OR VERMIN, OR;
 - BUILD IN A LENGTH OF PIPE WITH ITS JOINTS AS CLOSE AS POSSIBLE TO THE WALL FACES (150mm MAXIMUM) AND CONNECTED ON EACH SIDE TO 600mm LONG ROCKER PIPES WITH FLEXIBLE JOINTS.
- PLOT DRAINAGE TO BE BEDDED ON GRANULAR MATERIAL AND BACKFILLED WITH SUITABLE CLEAN MATERIAL, AS DESCRIBED ON THE PRIVATE DRAINAGE CONSTRUCTION DETAILS DRAWINGS. SEE ALSO SHALLOW DRAINAGE TRENCH DETAIL AND PIPE RUNS NEAR BUILDINGS DETAIL FOR CONCRETE BED AND SURROUND PIPE PROTECTION MEASURES WHERE APPLICABLE.
- BACKFILL SHOULD BE PLACED IN LAYERS NOT EXCEEDING 300mm (UNCOMPACTED THICKNESS), EACH LAYER BEING WELL COMPACTED. MECHANICAL COMPACTION EQUIPMENT SHOULD NOT BE USED UNTIL THERE IS A MINIMUM OF 450mm OF COMPACTED MATERIAL ABOVE THE CROWN OF THE PIPE.
- ALL DRAIN CONNECTIONS BENEATH THE HIGHWAY ARE TO HAVE MINIMUM 150mm CONCRETE BED AND SURROUND, WHERE COVER IS LESS THAN 1.2m.
- REFER TO PRE-TENDER HEALTH & SAFETY PLAN & CONSTRUCTION PHASE HEALTH & SAFETY PLAN PRIOR TO THE COMMENCEMENT OF WORKS.

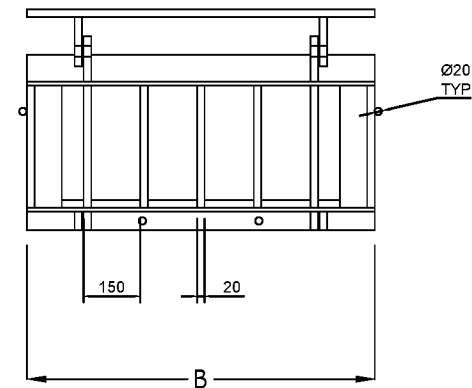
CONSTRUCTION
ISSUE



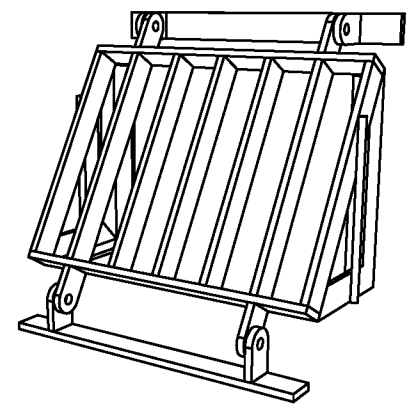
FRONT
ELEVATION



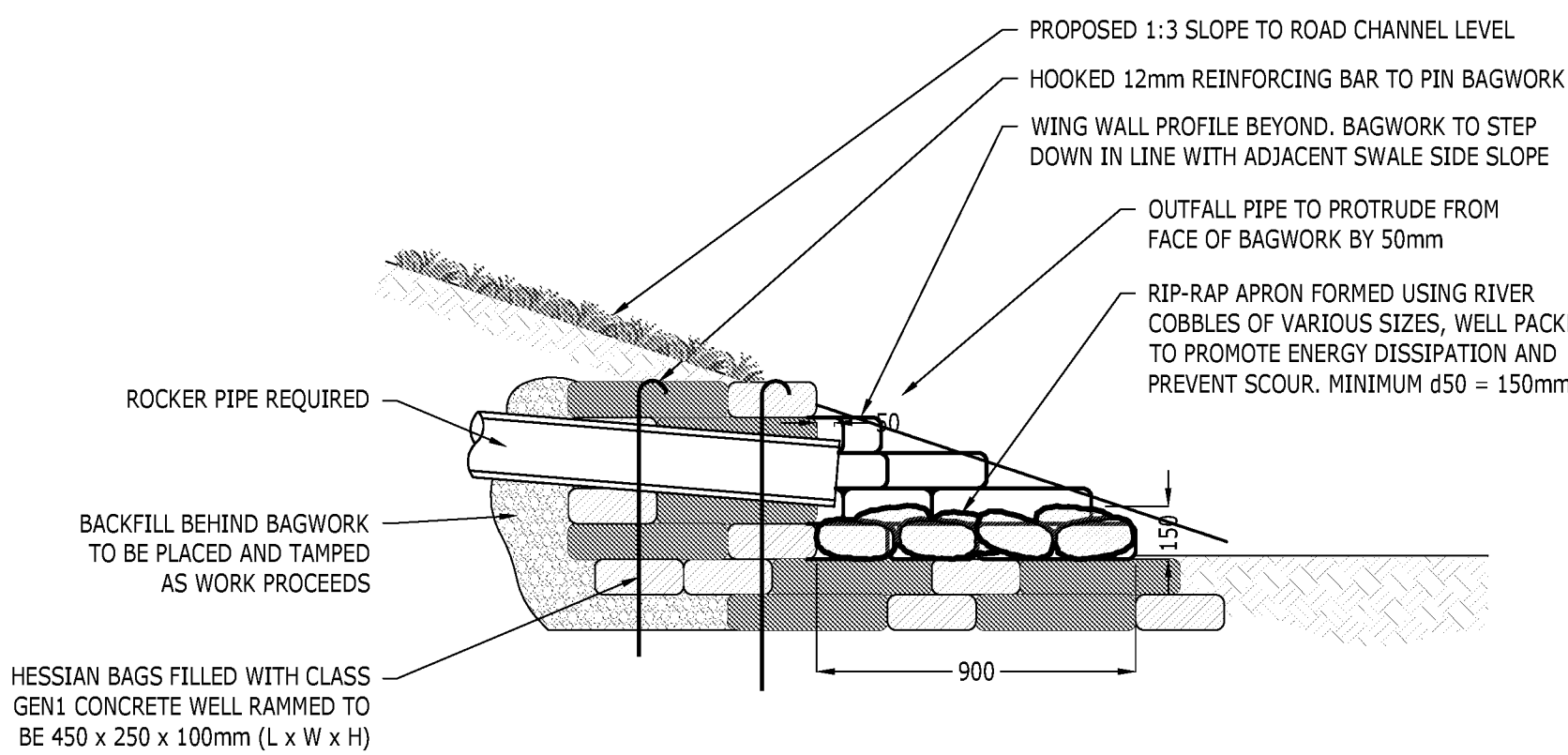
SIDE ELEVATION



PLAN



DEBRIS SCREEN DIMENSIONS						
HEADWALL	PIPE Ø	DIMENSION 'A'	DIMENSION 'B'	DIMENSION 'C'	DIMENSION 'D'	ALTHON LTD PRODUCT NAME
SWALE	300	600	610	496	378	300mm SLOPED TRASH SCREEN & SIDES (60° RAKE)



HEADWALL : SECTION C-C