



Salt Box, Bognor Regis

Unit 2 and Access Road

Operation and Maintenance

Drainage

For LandLink Estates

Date: 20 November 2019

Doc ref: SAL-HYD-XX-ZZ-RP-C-0011

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited Merchants House North Wapping Road Bristol BS1 4RW United Kingdom	
Client	LandLink Estates	
Project name	Salt Box, Bognor Regis	
Title	Unit 2 and Access Road Operation and Maintenance Drainage	
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01	S2	11/10/2019	Issued for planning
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05	S2	15/11/2019	Updated to incorporate Arun DC comments
06	S2	20/11/2019	Updated to incorporate Arun DC comments

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Introduction

The key elements of the surface water system will require periodic maintenance to prevent failure of the system and/or a reduction in capacity of the networks as a whole and the following matrix therefore sets out the various drainage items to be maintained, identifies whose is responsible and the frequency of maintenance.

The drainage within the development will be maintained privately by a management company appointed by the owner / occupier as follows:

Unit 2

The occupier (Warburtons) will have direct responsibility for the maintenance and repair of the foul and surface water drainage system within their site boundary including ensuring compliance with any regulatory requirement with regards to the quality of surface water discharge.

Site Wide Drainage (inc Estate Road)

Management of the site wide drainage is the overall responsibility of the Landlords. The overall estate will be owned & managed by a management company who will be funded by the landlord. The management Company will derive income from the service charge obligations placed on the tenants on a due proportion basis.

The intention is that the Estate Road will eventually become adopted by West Sussex Local Authority Highways and all maintenance responsibilities with regards to the associated Estate Road drainage system will be passed over to the Local Authority. Until then, maintenance of the Estate Road drainage will be the responsibility of the Landlords as noted above.

Drainage Strategy Summary

0.1 Surface Water

The surface water drainage for the wider development has been split into 3 no. networks. This Operation and Maintenance document relates to Surface Water Network 1 for Unit 2, and Surface Water Network 2 for the main estate roads.

Surface Water Network 1

Unit 2 surface water run-off is collected by way of drainage channels, gullies, Rain Water Pipes and Permeable Paving (Car Park). Surface water from the yard area is collected by a series of drainage channels which run the length of the yard discharging into a below ground gravity drainage system. Run-off from the yard is treated by a Full Retention Oil Interceptor OI-201. The roof of the building is collected by rain water pipes.

The car park is drained by way of porous paving located in the bays. Each 'strip' of porous paving has a filter drain along its length which collects run-off which permeates through the sub-base before it is discharged into the Unit 2 drainage system.

In order to achieve the permitted discharge rates, flows have been restricted by a HydroBrake flow control at FC-201 and attenuation provided in 2 no. cellular storage tanks, one located beneath the yard and the other beneath the car park.

Upstream of Unit 2, surface water run-off from Unit 3 and Units 4-8 connects into Surface Water Network 1 on the western side of each of their respective plots. A carrier drain then takes flows northwards within the estate road, across the top of Unit 2, before out falling into the existing watercourse via a headwall on the western boundary of the development. Unit 2 surface water connects into Surface Water Network 1 at a location upstream of the outfall.

Surface Water Network 2

Surface water run-off is collected from the estate roads and associated footpaths by way of gullies located within the road channel adjacent to the kerb. Run-off is then discharged into the below ground drainage system 'Surface Water Network 2' located within the road which runs east to west across the development before out falling into the existing watercourse via a headwall on the western boundary.

In order to achieve the permitted discharge rates, flows have been restricted by a HydroBrake flow control at FC-501 and attenuation provided in a concrete culvert which extends along the length of one of the estate roads. Prior to discharge into watercourse, Surface water run-off is treated by a Full Retention Oil Interceptor OI-501.

Drainage Strategy Performance Criteria (both networks)

The surface water drainage for both Unit 2 and the Estate Road has been designed to ensure that:

- No flooding will occur during the 1 in 100-year rainfall event in any part of the building, or in any utility plant susceptible to water.
- Surface water for the 100-year rainfall event is contained within each catchment boundary.
- An allowance for 40% climate change is applied to the 100-year rainfall event and incorporated into the surface water drainage design in accordance with local and national planning policy.

The surface water drainage network has been modelled to take into consideration the effects surcharge should an extreme storm event occur at the same time as high flood levels from the adjacent water course.

The 100 year plus 45% climate change fluvial flood level of **1.85 mAOD** has specified at the outfall of each network and rainfall simulated for all storm events up to and including the 100 year plus 40% climate change.

Should rainfall exceed the 1 in 100-year storm event or the system failure through lack of maintenance, surface water run-off is to be directed via designated exceedance routes away buildings and/or critical infrastructure.

0.2 Foul Water

Foul water drainage from each unit plot will discharge into a new sewer located within the estate roads. Flows will be directed towards the north of the development where they will then be pumped from a new foul pumping station offsite via a rising main into the Southern Water Foul Sewer at Manhole ref 8801 to the north east in Shripney Road.

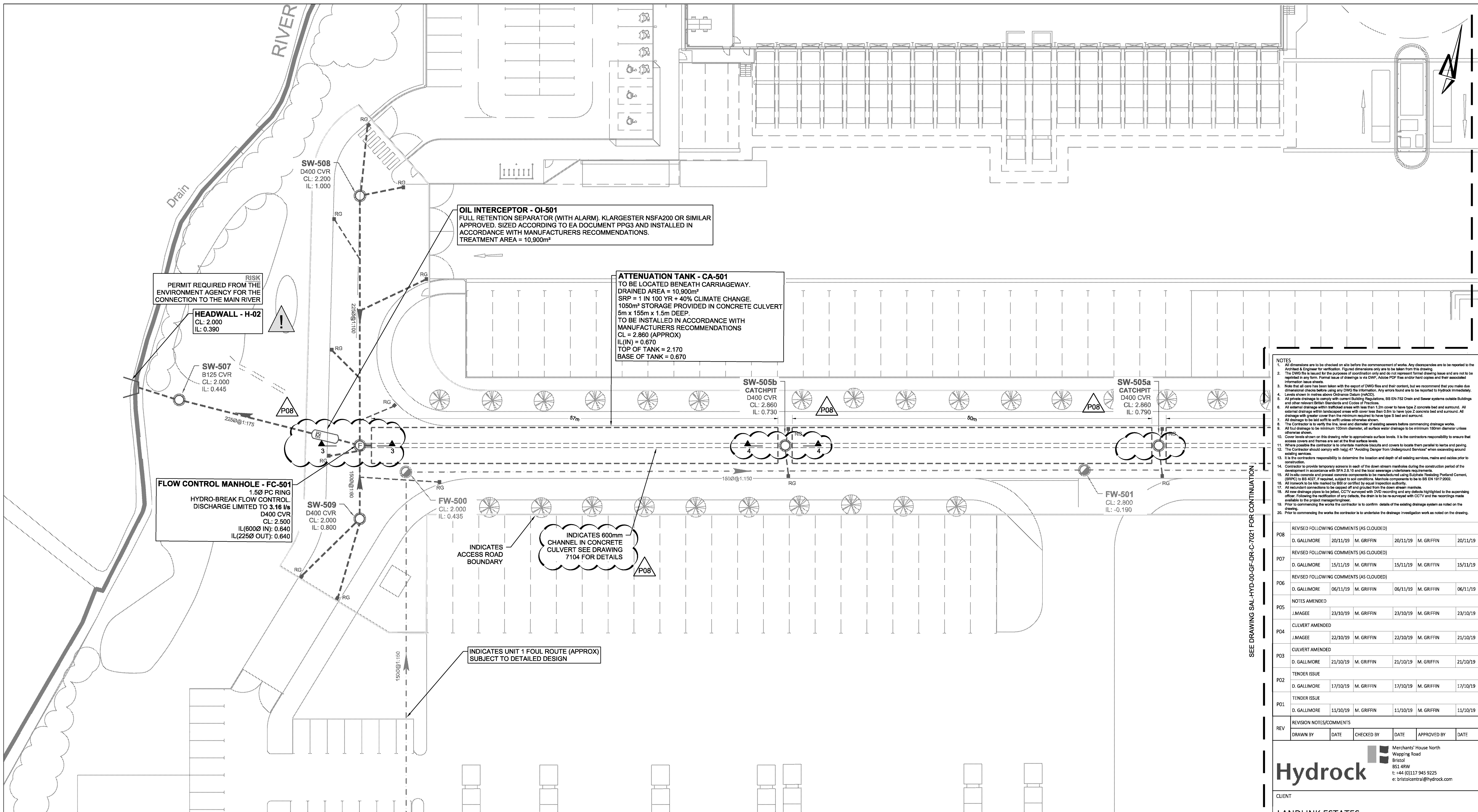
Ownership & Maintenance Responsibility Matrix

Responsibility	Feature	Maintenance	Frequency
Owner / Occupier Appointed Management Company	Private Drains	Inspection	CCTV survey every 5-10 years.
		Regular Maintenance	Jet clean system fully every 5-10 years. (Recommend prior to CCTV drainage survey is)
		Remedial / Occasional Maintenance	Carry out remedial works as identified in CCTV survey.
	Outfall pipes, non-return pipe flaps, and anti-scour mat flow channel	Inspection	Quarterly
		Regular Maintenance	Remove silt and debris as necessary to prevent build up.
		Remedial / Occasional Maintenance	Damage to pipes and headwall to be repaired as necessary
	Discharge orifice manholes/flow control devices	Inspection	Monthly
		Regular Maintenance	Remove silt and debris as necessary to prevent build up.
	Gullies / Drainage Channels	Inspection	Quarterly
		Regular Maintenance	Remove silt and debris as necessary to prevent build up.
	Permeable Paving (Refer to specialist)	Inspection	Within 3 months of installation then every 6 months
		Regular Maintenance	Sweep surface to remove debris and contamination 1-2 times a year, and typically after leaf fall in autumn.
		Occasional Maintenance	Removal of weeds. As required.
		Remedial Measures	Remediate areas of rutting and depressions. As required. Replace broken / damaged blocks. As required. Rehabilitate surface with sweeping and reapplication of clean gritstone. As required.
	Attenuation tank	Inspection	Annually
		Occasional Maintenance	Remove silt and debris as necessary to prevent build up.
	Catchpits	Inspection	Every 6 months
		Occasional Maintenance	Remove silt and debris as necessary to prevent build up.
	Oil Interceptor	Inspection	Monthly
		Regular Maintenance	Jet clean system fully every 5-10 years. (Recommend prior to CCTV drainage survey)
		Remedial / Occasional Maintenance	Carry out remedial works as identified in CCTV survey.

		In addition to the above, the following is a list of tasks associated with the maintenance of an interceptor. This should be read in conjunction with the manufacturers own specific maintenance requirements and only carried out by a fully trained operative. • Inspect the integrity of the separator and all mechanical parts. • Inspect all filters and replace or repair as required. • Assess the amount of collected contaminants (oil and fuel) and silt. • Service any electrical systems including volume alarms and any interceptor management systems. • Conduct safe silt/contaminant removal in accordance with waste transit and disposal regulations. • Maintain industry standard documentation. • Maintain logs of inspections, maintenance, incidents, services and contaminant removal
		<u>Interceptor Alarms:</u> Each interceptor will have a visual alarm indicator local to the interceptor as well as an alarm (visual or audible) linked either back to the adjacent building if maintenance responsibility resides with the tenant or to a remote supervisory point when maintenance responsibility resides with the estate management team. Alarm sounds to inform to take corrective action ensuring the safe and economic operation of separators preventing oil passing through the separator. When alarm sounds, empty tank as necessary. Factory trained engineers are available for site visits as part of a planned maintenance contract or on a one-off call out basis.
	Reference should be made to the manufacturer recommendations where applicable	

Appendix A Drainage Layouts

- SAL-HYD-00-ZZ-DR-C-7010 Unit 2 Drainage layout
- SAL-HYD-00-ZZ-DR-C-7020 Access Road Drainage Layout Sheet 1
- SAL-HYD-00-ZZ-DR-C-7021 Access Road Drainage Layout Sheet 2
- SAL-HYD-00-ZZ-DR-C-7022 Access Road Drainage Layout Sheet 3



NOTES:

- All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Engineer and Engineer for confirmation. Figured dimensions only are to be taken from the drawing.
- The DWSR is to be issued for the purposes of coordination only and does not represent formal design documents and are not to be used for construction. The Contractor is to ensure that the design is fully coordinated with the Contractor and that all design information takes account of the latest information.
- All dimensions are to be taken from the centre of DWSR lines and not the corner, but we acknowledge that you make due dimensional clearance before using any of the DWSR's information. Any errors found are to be reported to Hydrotek immediately.
- All dimensions are to be taken from the centre of the DWSR lines and not the corner, but we acknowledge that you make due dimensional clearance before using any of the DWSR's information. Any errors found are to be reported to Hydrotek immediately.
- All private drainage to comply with current Building Regulations, BS EN752 Drain and Sewer systems outside Buildings and BS EN759 Surface water drainage.
- All external drainage within trafficked areas with less than 1.2m cover to have 500c concrete bed and surround. All external drainage within trafficked areas with more than 1.2m cover to have 1000c concrete bed and surround. All external drainage within trafficked areas with more than 1.2m cover to have 1000c concrete bed and surround. All drainage with greater cover than the minimum requirement to have 1500c bed and surround.
- All drainage to be installed in accordance with the relevant standards and specifications.
- The Contractor is to verify the line, level and diameter of existing sewerage and stormwater drainage works.
- All foul drainage to be minimum 100mm diameter, all surface water drainage to be minimum 150mm diameter unless otherwise stated.
- Cover levels shown in this drawing refer to approximate surface levels. It is the contractors responsibility to ensure that the correct levels are achieved.
- Where possible the contractor is to orientate manholes and access covers to locate them parallel to the kerb and paving and to be located in the footway or on the verge. Where this is not possible, the contractor is to ensure that the manhole is located in the footway or on the verge.
- The contractor is responsible to determine the location and depth of all existing services, mains and cables prior to construction.
- The contractor is to provide temporary sumps to the full of storm drain manholes during the construction period of the construction in accordance with BS A2.3.2.8 and local sewerage undertakers requirements.
- The contractor is to ensure that all drainage works are completed in accordance with the relevant standards and specifications (SPPC) to BS 6247, BS 5945, BS 5946 and local sewerage undertakers requirements. Manhole covers to be BS EN 12187 2002.
- It is the responsibility of the contractor to ensure that all drainage works are completed in accordance with the relevant standards and specifications (SPPC) to BS 6247, BS 5945, BS 5946 and local sewerage undertakers requirements.
- All recordant connections to be capped off and drawn from the down stream manhole.
- The contractor is to ensure that all drainage works are completed in accordance with the relevant standards and specifications (SPPC) to BS 6247, BS 5945, BS 5946 and local sewerage undertakers requirements.
- Following the notification of any defects, the ground is to be re-surveyed with CCTV and the recordings made available to the Engineer for confirmation.
- Prior to commencing the works the contractor is to confirm details of the existing drainage systems as noted on the drawing.
- Following the commencing the works the contractor is to undertake the existing drainage investigation works as noted on the drawing.

P08	REVISED FOLLOWING COMMENTS (AS CLOUDED)					
	D. GALLIMORE	20/11/19	M. GRIFFIN	20/11/19	M. GRIFFIN	20/11/19
P07	REVISED FOLLOWING COMMENTS (AS CLOUDED)					
	D. GALLIMORE	15/11/19	M. GRIFFIN	15/11/19	M. GRIFFIN	15/11/19
P06	REVISED FOLLOWING COMMENTS (AS CLOUDED)					
	D. GALLIMORE	06/11/19	M. GRIFFIN	06/11/19	M. GRIFFIN	06/11/19
P05	NOTES AMENDED					
	J. MAGEE	23/10/19	M. GRIFFIN	23/10/19	M. GRIFFIN	23/10/19
P04	CULVERT AMENDED					
	J. MAGEE	22/10/19	M. GRIFFIN	22/10/19	M. GRIFFIN	21/10/19
P03	CULVERT AMENDED					
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P02	TENDER ISSUE					
	D. GALLIMORE	17/10/19	M. GRIFFIN	17/10/19	M. GRIFFIN	17/10/19
P01	TENDER ISSUE					
	D. GALLIMORE	11/10/19	M. GRIFFIN	11/10/19	M. GRIFFIN	11/10/19

REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT

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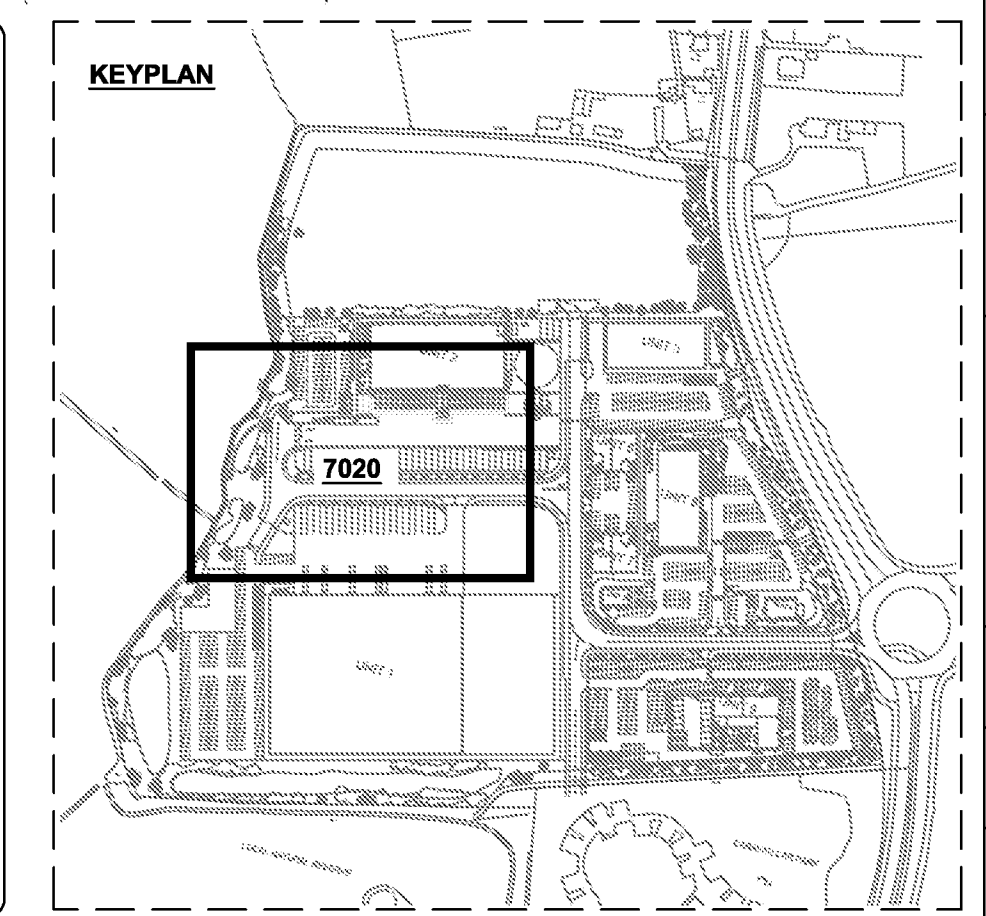
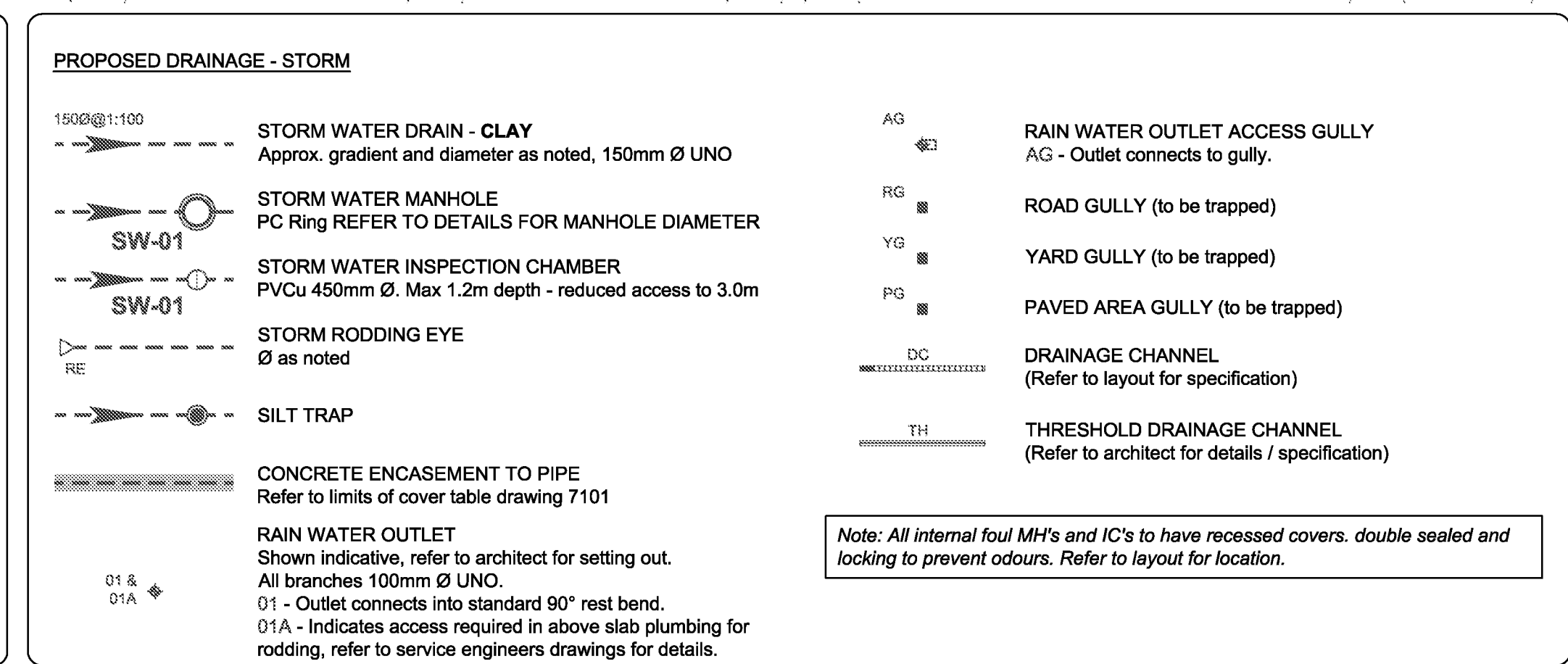
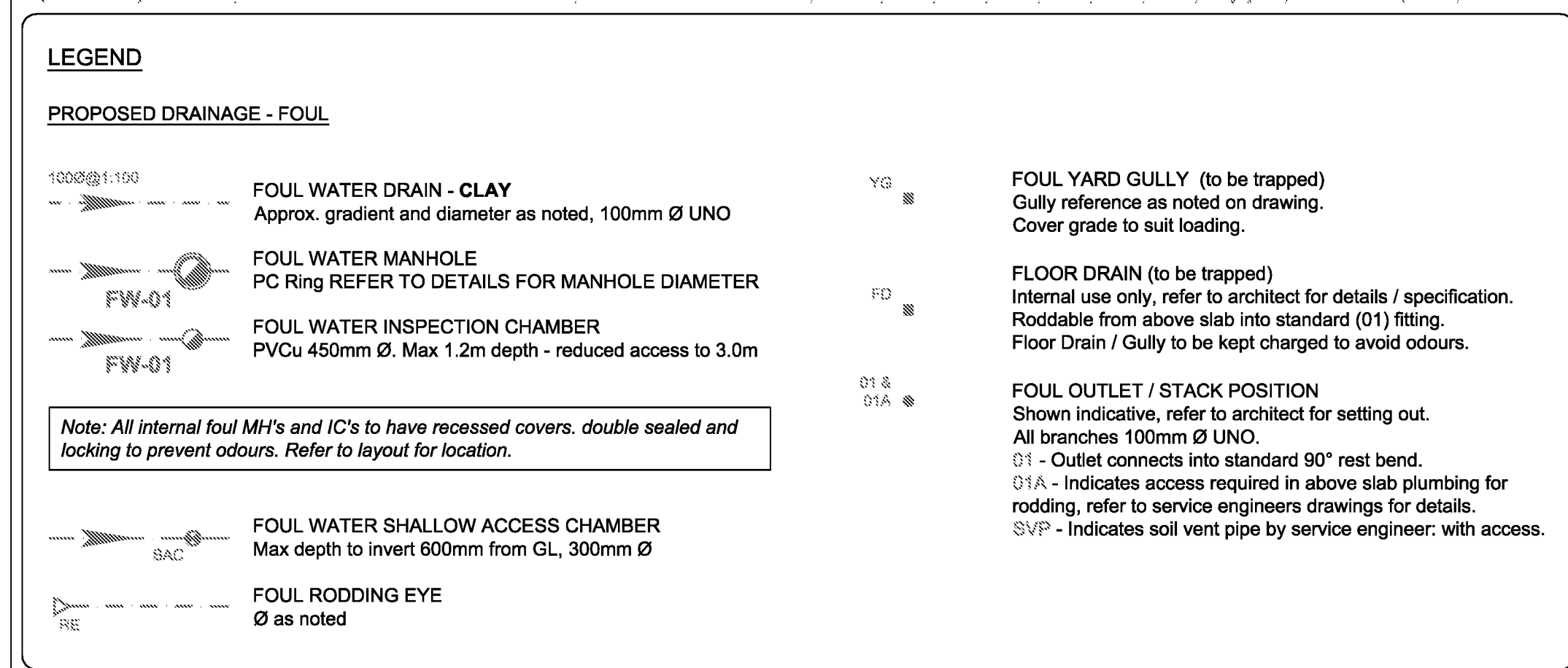
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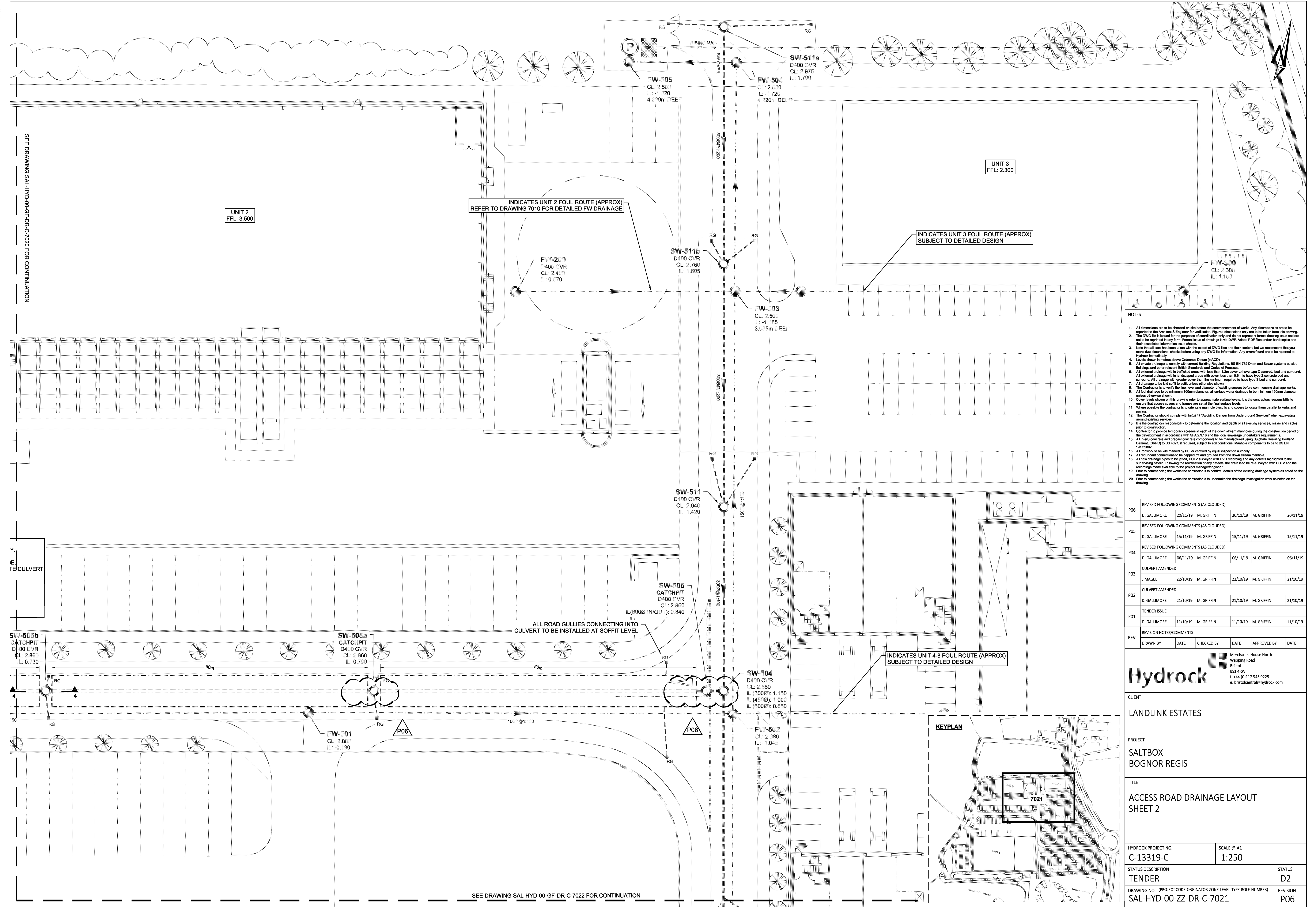
SALTBOX
BOGNOR REGIS

TITLE

ACCESS ROAD DRAINAGE LAYOUT
SHEET 1

HYDROCK PROJECT NO. C-13319-C		SCALE @ A1 1:250	
STATUS DESCRIPTION TENDER			STATUS D2
DRAWING NO. (PROJECT CODE-ORG/NATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) SAL-HYD-00-ZZ-DR-C-7020			REVISION P08





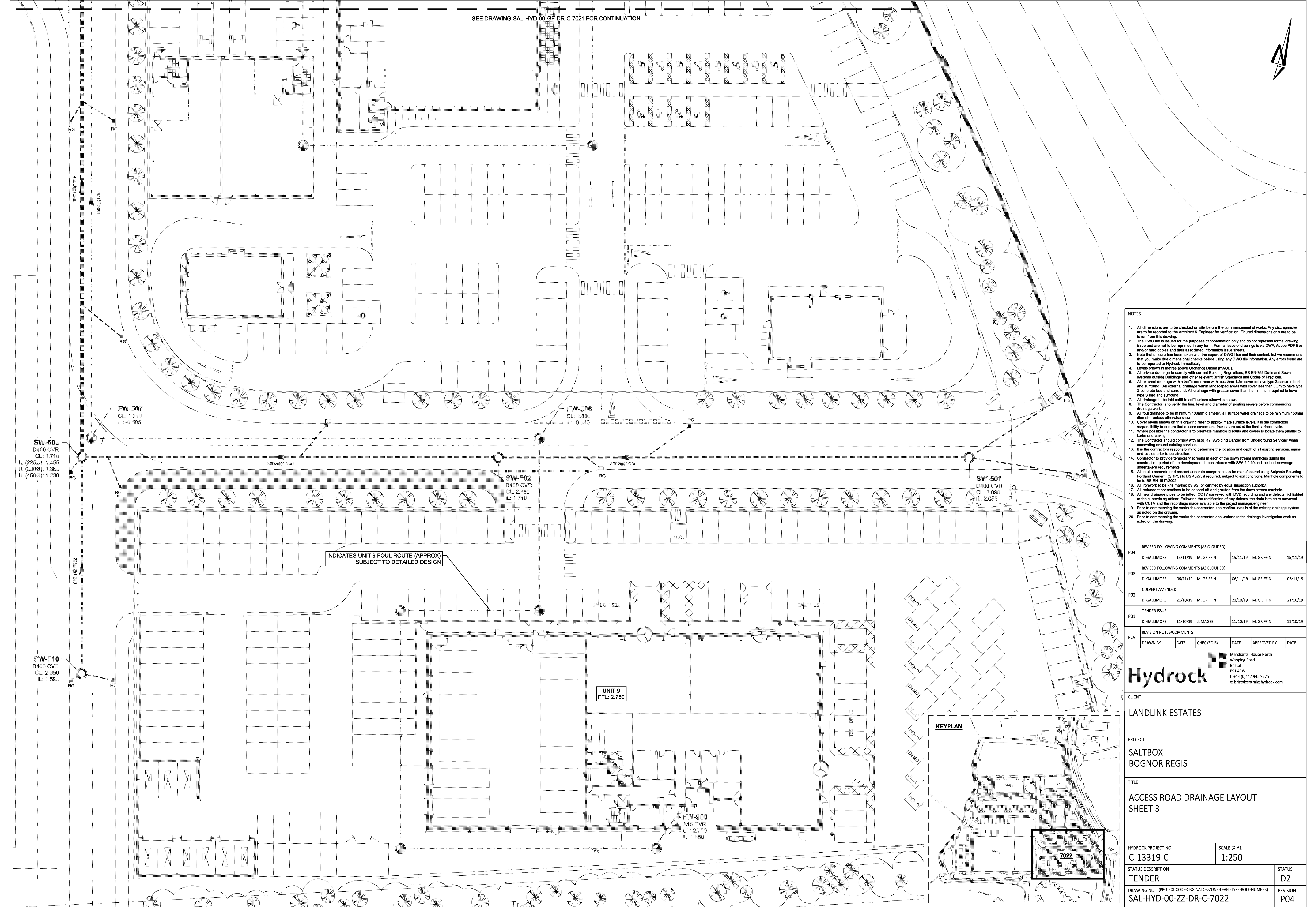
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 - Levels shown in metres above Ordnance Datum (mAO).
 - All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practice.
 - All external drainage within trafficked areas with less than 1.2m cover to have type Z concrete bed and surround. All external drainage within landscaped areas with cover less than 0.6m to have type Z concrete bed and surround. All drainage with greater cover than the minimum required to have type S bed and surround.
 - All drainage to be laid soft to soft unless otherwise shown.
 - The Contractor is to verify the line, level and diameter of existing sewers before commencing drainage works.
 - All four drainage to be minimum 100mm diameter, all surface water drainage to be minimum 150mm diameter unless otherwise shown.
 - Cover levels shown on this drawing refer to approximate surface levels. It is the contractors responsibility to ensure that access covers and frames are set at the final surface levels.
 - Where possible the contractor is to orientate manhole biscuits and covers to locate them parallel to kerbs and paving.
 - The Contractor should comply with hsig 47 "Avoiding Danger from Underground Services" when excavating around existing services.
 - It is the contractors responsibility to determine the location and depth of all existing services, mains and cables prior to construction.
 - Contractor to provide temporary screens in each of the down stream manholes during the construction period of the development in accordance with SFA 2.9.10 and the local sewerage undertakers requirements.
 - All in situ concrete and precast concrete components to be manufactured using Supalite Redding Portland Cement, (SRPC) to BS 4027, if required, subject to soil conditions. Manhole components to be to BS EN 1917:2002.
 - All ironwork to be kils marked by BSI or certified by equal inspection authority.
 - All redundant connectors to be capped off and ground from the down stream manhole.
 - All new drainage pipes to be jacked, CCTV surveyed with DVC recording and any defects highlighted to the supervising officer. Following the rectification of any defects, the drain is to be re-surveyed with CCTV and the recordings made available to the project manager/ingrno.
 - Prior to commencing the works the contractor is to confirm details of the existing drainage system as noted on the drawing.
 - Prior to commencing the works the contractor is to undertake the drainage investigation work as noted on the drawing.

REV	REVISION NOTES/COMMENTS					
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P06	D. GALLIMORE	20/11/19	M. GRIFFIN	20/11/19	M. GRIFFIN	20/11/19
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CLIENT		LANDLINK ESTATES	
PROJECT			
SALTBOX BOGNOR REGIS			
TITLE			
ACCESS ROAD DRAINAGE LAYOUT SHEET 2			
HYDROCK PROJECT NO. C-13319-C		SCALE @ A1 1:250	
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DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) SAL-HYD-00-ZZ-DR-C-7021		REVISION P06	



SEE DRAWING SAL-HYD-00-GF-DR-C-7021 FOR CONTINUATION

- NOTES
- All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
 - The DWG file is issued for the purposes of coordination only and does not represent formal drawing issue and are not to be reprinted in any form. Formal issue of drawings is via DWG, Adobe PDF files and/or hard copies and their associated information issue sheets.
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 - Levels shown in metres above Ordnance Datum (mAOD).
 - All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practices.
 - All external drainage within trafficked areas with less than 1.2m cover to have type Z concrete bed and surround. All external drainage within landscaped areas with cover less than 0.6m to have type Z concrete bed and surround. All drainage with greater cover than the minimum required to have type S bed and surround.
 - All drainage to be laid soffit to soffit unless otherwise shown.
 - The Contractor is to verify the line, level and diameter of existing sewers before commencing drainage works.
 - All foul drainage to be minimum 100mm diameter, all surface water drainage to be minimum 150mm diameter unless otherwise shown.
 - Cover levels shown on this drawing refer to approximate surface levels. It is the contractors responsibility to ensure that access covers and frames are set at the first surface levels.
 - Where possible the contractor is to orientate manhole biscuits and covers to locate them parallel to kerbs and paving.
 - The Contractor should comply with h(a)g) 47 'Avoiding Danger from Underground Services' when excavating around existing services.
 - It is the contractors responsibility to determine the location and depth of all existing services, mains and cables prior to construction.
 - Contractor to provide temporary screens in each of the down stream manholes during the construction period of the development in accordance with SFA 2.9.10 and the local sewerage undertakers requirements.
 - All in-situ concrete and precast concrete components to be manufactured using Sulphate Resisting Portland Cement (SRPC) to BS 4027, if required, subject to soil conditions. Manhole components to be to BS EN 1917:2002.
 - All ironwork to be kile marked by BSI or certified by equal inspection authority.
 - All redundant connections to be capped off and grouted from the down stream manhole.
 - All new drainage pipes to be jetted, CCTV surveyed with DVD recording and any defects highlighted to the supervising officer. Following the rectification of any defects, the drain is to be re-surveyed with CCTV and the recordings made available to the project manager/engineer.
 - Prior to commencing the works the contractor is to confirm details of the existing drainage system as noted on the drawing.
 - Prior to commencing the works the contractor is to undertake the drainage investigation work as noted on the drawing.

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HYDROCK PROJECT NO. C-13319-C			SCALE @ A1 1:250		
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DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) SAL-HYD-00-ZZ-DR-C-7022					REVISION P04

