

SuDS Maintenance & Management Plan Phases 2-4

Elm Grove, Trowbridge

Report Ref: 1960_010_C_SMP

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Project:

Elm Grove, Trowbridge

Report:

SuDS Maintenance & Management Plan – Phases 2-4

Report Ref:

1960_010_C_SMP_0001

Client

Redrow Homes Ltd

REVISION RECORD					
Rev	Description	Date	Originator	Checked	Approved
P2	ISSUED FOR PLANNING				

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1. INTRODUCTION

- 1.1 This document has been produced by JRC Consulting Engineers Ltd for Redrow Homes primarily to provide a bespoke maintenance regime associated with the provision of SuDS at the residential development known as Elm Grove, Trowbridge. A location plan is provided in Appendix A.
- 1.2 This document will permit appropriate specialist maintenance teams and management companies to appropriately assess and undertake routine maintenance appropriate to the specific SuDS systems on the site and define the frequency with which these tasks should be undertaken.
- 1.3 Sustainable Drainage Systems (SuDS) maximise the opportunities and benefits we can secure from surface water management. SuDS can provide multiple benefits that can meet the requirements of local and national planning policy and guidance. The four main benefits referred to as the four pillars of SuDS design in the Ciria SuDS Manual C753 are:
- Water Quantity - Control the flow, volume and frequency of water leaving a development area
 - Water Quality - Prevent pollution by intercepting silt and cleaning runoff from hard surfaces
 - Amenity - Provide attractive surroundings for the community
 - Biodiversity - Create opportunities for wildlife

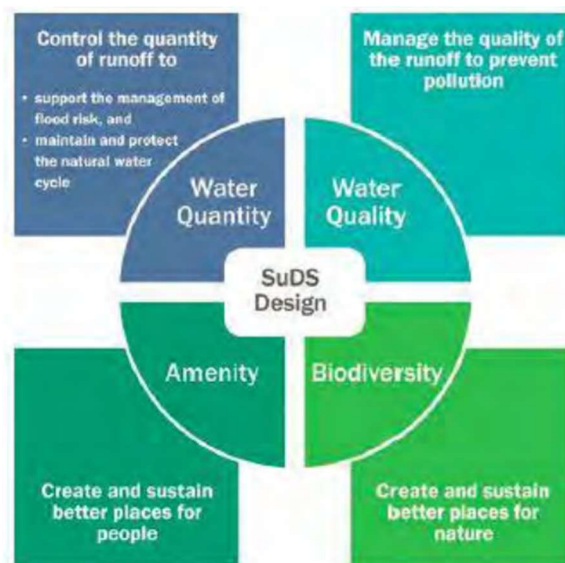


Figure 1 - Four Pillars of SuDS, CIRIA report C753 The SuDS Manual

- 1.4 It is the developers' responsibility to either directly maintain SuDS or to negotiate with, and secure the agreement of, a third party to maintain the SuDS for the life of the development.
- 1.5 It is important that a maintenance management plan is developed for SuDS to ensure that they continue to function effectively in perpetuity. Appropriate maintenance management approaches will:
- Provide for long term maintenance;
 - Identify and secure clear lines of responsibility;
 - Ensure design standards are met and maintained;
 - Support public safety.

2. PROPOSED SUDS FEATURES

2.1 The proposed SuDS have been designed in accordance with planning practice guidance, CIRIA C753 and Local policy and guidance.

2.2 The proposed SuDS features on the site are described below:

- Swales are linear, flat bottomed grassed or vegetated channels that convey water from one place to another. They can also store water and allow it to soak into the ground.
- Basins, ponds and wetlands are depressions in the ground where water is stored and treated. Water levels rise after rain and then drops to the normal level as the excess soaks into the ground or is released slowly to a watercourse or drain. Some water maybe held back as a pond for final treatment, amenity or wildlife interest.
- Bioretention areas are planted areas with engineered topsoil over drainage layers that allow water to soak into the ground.
- Inlets and outlets structures are often conveyance pipes protected with mesh guards. They must be free from obstruction at all times to allow free flow through the SuDS.
- SuDS flow control structures are usually small orifices in control chamber, slots or V notches in weirs. They are usually near the surface so are accessible and easy to maintain. They may be in baskets, in small chambers or in the open.
- Inspection Chambers and rodding eyes are used on bends or where pipes come together. They allow cleaning of the system if necessary.
- Flood routes (exceedance routes) allow water volumes exceeding the capacity of the system to escape from the site without causing damage to property. This route must be clear of obstructions at all times.

2.3 SuDS design usually avoids below ground structures such as gully pots, oil separators and other sumps, which are a wildlife hazard, often ineffective and expensive to maintain. SuDS design also reduces pipework, manholes and interceptors. However, water may be conveyed in surface features like rills and channels with changes in level managed in spouts or cascades. These hard landscape features require standard landscape maintenance.

2.4 The site Drainage Layout, Details and sections have been included in Appendix B.

3. SUSTAINABLE DRAINAGE MAINTENANCE SPECIFICATION

3.1 The SuDS have been designed for easy maintenance to comprise:

- Regular day to day care - litter collection, grass cutting and checking the inlets and outlets where water enters or leaves a SuDS feature
- Occasional tasks - managing pond vegetation and removing any silt that builds up in the SuDS features
- Remedial work - repairing damage where necessary

3.2 Inspections

As part of the on-going management of all SuDS components, there is a need for regular inspections to ensure that blockages, siltation and excess litter are not adversely affecting the performance of the component. It is important that this is carried out regularly and that time is allowed for corrective action to be taken. An inspection Checklist is provided in Section 5 which should be filled in at each inspection as the LPA, LLFA or EA may ask for these.

3.3 Waste management

SuDS generate waste because they are designed to intercept silt and allow the natural breakdown of organic pollutants. Regular maintenance of SuDS, including occasional removal of silt and vegetation that gathers in SuDS, is required to ensure long-term performance. It is usually accepted that the traditional drainage within the site, be it road gullies, ACO's and yard gullies are all trapped and therefore on a traditional residential development much of the silt and debris is trapped at source and subject to standard regular maintenance.

Removal of silt from surface water runoff is important because a large proportion of pollutants are attached to silt particles. If the silt is removed, then most of the pollution will be dealt with. Therefore, the retention of silt in SuDS should not be seen as a problem. If siltation is occurring the SuDS system is doing its job correctly.

Organic waste should be used around the SuDS components to form wildlife piles. If this is not achievable on the site it should be composted or, as a last resort, removed to a licensed landfill.

To form a wildlife pile with the organic waste, you must stack the logs and on top of the logs, you can lay the branches around the logs with the grass clippings and any other green matter laid on top on the logs and branches. The pile must be at least 7m away from any above ground suds system or watercourse, as it could cause blocking and contamination.

3.4 Health & Safety

Task specific risk assessments and method statements where necessary, must be carried out by the appropriate specialist maintenance teams and management companies before carrying out any of the required inspections, maintenance tasks or remedial works. A generic risk assessment template has been provided in Section 6.

3.5 GENERAL REQUIREMENTS

Maintenance activities comprise • Regular Maintenance • Occasional Tasks • Remedial Work	Frequency
Generally Litter Collect all litter or other debris and remove from site at each site visit.	Monthly

- **Avoid** use of weedkillers and pesticides to prevent chemical pollution
- **Avoid** de-icing agents wherever possible to allow bio-remediation of pollutants in permeable surfaces.
- **Protect** all permeable, porous and infiltration surfaces from silt, sand, mulch and other fine particles.

- **Exclusions:**

- Maintenance of rainwater harvesting chambers, pumps, etc.

3.6 FILTER STRIPS AND SWALES

- **Filter strips** are grass verges next to hard surfaces that allow runoff to flow through vegetation removing silt and pollution.
- **Swales** are linear, flat bottomed grassed or vegetated channels that convey water from one place to another which can also store water and allow it to soak into the ground.
- **Underdrained Swales** are free draining swales with stone filled trenches in the bottom covered by engineered sandy soil and turf that clean dirty water and allow it to soak into the ground or lead it to a water storage feature.

FILTER STRIPS AND SWALES	
Regular Maintenance	Frequency
Grass Mow amenity grass access paths and verges surrounding swales and filter strips at 35-50mm minimum and 75mm maximum or as specified. Mow filter strips and swales at 100mm with 150mm maximum to filter and control runoff in normal grass swales removing first and last cut in season if grass is longer than 150mm removing cuttings to wildlife piles on site. Where marsh or wetland develops in the swale due to wet conditions then cut annually, or as required, at 100mm removing cuttings to wildlife piles on site	Monthly or as required Monthly or as required Annual or as required
Occasional Tasks	Frequency
Where there is a build-up of silt on the filter strip, swale, under-drained swale or at inlets, i.e. 50mm or more above the design level, then remove and spread on site. Undertake when ground is damp in autumn or early spring and transplant turf and overseed to original design levels. Spread excavated material on site above SuDS design profile, e.g. top of banks, in accordance with E.A. Waste Exemption Guidance.	As required
Remedial Work	Frequency
All damage to be made good to design profile unless there is a design flaw.	As required

3.7 BASINS, PONDS AND WETLANDS

- **Basins, ponds and wetlands** are depressions in the ground that store water. Water levels rise after rain and then drop to the normal level as the excess soaks into the ground or is released slowly to a watercourse or drain. Some water is often held back in a pond or wetland for final 'polishing' treatment or amenity interest.
- **Basins** are usually dry
- **Ponds** can be permanent or temporary and are mainly open water.
- **Wetlands** are mainly aquatic vegetation but can have small areas of open water like ponds.

BASINS, PONDS AND WETLANDS	
Regular Maintenance	Frequency
Grass Mow grass access paths and verges surrounding basins, ponds and wetlands areas at 35mm-50mm minimum and 75mm maximum or as specified to provide a cared for appearance and allow pedestrian access. Mow rough grass areas for occasional access or habitat reasons at 100mm and maximum 150mm with cuttings removed to wildlife piles Grass areas not required for access may be managed for wildlife interest and to reduce costs. 2 cuts in July and September or 1 cut annually in September or October as specified and cuttings removed to wildlife piles.	Monthly or as required As required 4-6 times annually Annually or as required
Wet woodland management Manage annually as detailed spec. with cuttings left in situ or removed to wildlife piles.	Annually or as required
Wetland vegetation Cut (strim) at 100mm with cuttings removed to wildlife piles September - October or Maintain as a mosaic to be cut 25-30% in any one year at 100mm in September or October with cuttings removed to wildlife pile.	Annually or as required

Occasional Tasks	Frequency
Where silt accumulates on apron or area in front of inlet or outlet then remove and land apply within design profile of SuDS Where silt accumulates more than 150mm in base of wetland undertake a phased removal of silt subject to Client approval. Confirm whether a liner is present to hold water or prevent pollution of groundwater and protect. Remove silt as instructed but not more than 30% of pond or wetland area at any one time and to an agreed depth but not subsoil layer. Retain as much representative existing vegetation as possible to ensure rapid re-colonisation of open areas. Stack excavated material adjacent to wetland to allow de-watering of silt. Undertake silt removal during September-October to minimise damage to protected wildlife and ensure re-growth of aquatic vegetation before winter. Spread excavated material on site above SUDS design profile, e.g. top of banks, in accordance with E.A. Waste Exemption Guidance.	Annually or every 3 years as required
Remedial work	Frequency
Although not usually required this may be needed due to damage to liners or control structures.	Undertake as design details or as required

3.8 INLETS, OUTLETS, CONTROLS, AND INSPECTION CHAMBERS

- **Inlets and outlets structures** may be surface structures or conveyance pipes with guards or headwalls. They must be free from obstruction at all times.
- **SuDS flow control structures** can be protected orifices, slots weirs or other controls at or near the surface to be accessible and easy to maintain. They may be in baskets, in small chambers or in the open.
- **Inspection Chambers** and rodding eyes are used on bends or where pipes come together and allow cleaning of the system if necessary. They should be designed out of the system where possible.

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	Frequency
Inlets, outlets and surface control structures Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage. Trim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly Monthly
Inspection chambers and below ground control chambers Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Annually
Occasional Maintenance	Frequency
Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage	As necessary
Remedial work	Frequency
Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary.	As required
Repair physical damage if necessary.	As required

3.9 OVERFLOWS AND FLOOD ROUTES

- **Overflows** are overland across weirs, through gratings or within chambers and must be kept clear at all times to protect areas from flooding. They allow onward flow when part of the SuDS system is blocked.
- **Flood routes (exceedance routes)** allow water volumes that exceed the capacity of the SuDS system to pass through or round the site without causing damage to property. These routes must be clear of obstructions at all times.

OVERFLOWS AND FLOOD ROUTES	
Regular Maintenance	Frequency
Overflows. Jet pipes leading from overflow structures annually and check by running water through the overflow. Check free flow at next SUDS feature – inlet to basin or chamber.	Annually
Overflows. Remove any accumulated grass cuttings or other debris on top of grass weirs or stone filled baskets overflows.	Monthly
Flood Routes. Make visual inspection. Check route is not blocked by new fences, walls, soil or other rubbish. Remove as necessary.	Monthly
Remedial	Frequency
Overflows. If overflow is not clear then dismantle structure and reassemble to design detail.	As required

3.10 ORNAMENTAL PLANTING AND EXISTING VEGETATION

- **Ornamental Trees** - All ornamental planting to be kept weed free and pruned using secateurs to keep the shrubs to an agreed and reasonable size.
- **Native Trees and Shrubs** - All native planting to be allowed to grow freely removing overhanging branches as required.

PLANTING AND EXISTING VEGETATION - Review	
Regular Maintenance	Frequency
Grass maintenance	
Amenity Grass - Mow all grass verges, paths and amenity grass at 35- 50mm with 75mm max. All cuttings to remain in situ	16 visits
Rough grass - Mow at 75-100mm but not to exceed 150mm All cuttings to wildlife piles	4 - 8 visits
Wildflower areas strimmed to 50mm in Sept-Oct or	1 visit
Wildflower areas strimmed to 50mm July and Sept or	2 visits
Wildflower areas strimmed to 50mm on 3 year rotation 30% each year All cuttings to wildlife piles	1 visit
Ornamental tree & shrub planting. Weed all shrub beds as detailed spec as necessary. Cut back planting from lights, paths and visibility sight lines in late autumn and as necessary. Cut hedges slightly tapered back from base with flat top at specified height. Do not mulch planting adjacent to permeable/ porous paving surfaces. Remove stakes and ties from trees when no longer needed for support and within 3 years of planting. Protect from strimmer damage and remove competitive growth until well established.	4 visits
Native trees & shrub planting. Prune to shape in year 1. Protect trees from strimmer damage and remove competitive growth until well established. Remove stakes and ties from trees when no longer needed for support and within 3 years from planting.	1 visit

Existing trees	
Check existing trees for safety.	1 visit
Remedial	Frequency
Replace trees and shrubs which fail in the first five years after planting.	
Carry out tree surgery as necessary.	

3.11 SPILLAGE - EMERGENCY ACTION

Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung(s). (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric.)

Contact the Environment Agency immediately. Whilst the EA PPG3 is no longer current it is still considered most relevant in terms of reference and pollution control. During construction all fuel bowzers should be appropriately bunded in case of leakage.

4. OWNERSHIP AND MAINTENANCE CONTACT DETAILS.

4.1 In the vent of concern over any matter to do with the SuDS please contact:

Maintenance Company contact details:

TBC

Landowner/Developer Details:

David Wilson Redrow South West
Wellington House,
Unit 1, West Point Court,
Great Park Road,
Bradley Stoke,
Bristol,
BS32 4PY
01454 278000

Emergency Contact Details (If different from above):

Designer contact details:

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4 Silverdown Office Park

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5. SITE INSPECTION CHECKLIST

Site Inspection Checklist			
	Y/N	Actions taken	Actions required
General inspection items			
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?			
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?			
Have any health and safety risks been identified to either the public or maintenance operatives?			
Is there any deterioration in the surface of permeable or porous surfaces (e.g. rutting, spreading of blocks or signs of ponding water)?			
Inspection of the exceedance overflow facility to the basin to ensure clear of debris			
Inspection of receiving ditch and ensure clear of debris and excessive vegetation.			
Silt/sediment accumulation			
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)?			
If yes, state depth (mm) and extent.			
Is removal required?			
If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)			
Is surface clogging visible (potentially problematic where water must soak into the underlying construction or ground (e.g. underdrained swale or infiltration basin)?			
System blockages and litter build -up			
Is there evidence of litter accumulation in the system?			
If yes, is this a blockage risk?			
Is there any evidence of any other clogging or blockage of outlets or drainage paths?			
Vegetation			
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)			

Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)			
Is there any evidence of invasive species becoming established?			
If yes, state action required			
Infrastructure			
Is there evidence of any accidental damage to the system (e.g. wheel ruts?)			
Is there any evidence of cross-connections or other unauthorized inflows?			
Is there any evidence of tampering with the flow controls?			
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects?			
Date Inspection carried out			
Next Inspection date			
Signed			

6. HEALTH AND SAFETY

Risk Assessment									
Hazard	Possible events	Risk			Who might be harmed?	Control measures	Residual risk		
		L	S	DR			L	S	DR
Livestock	Stampede								
Livestock feaces	Slips/disease feaces								
Disease	Livestock feaces								
Mowing on a slope	Falling in water Falling off								
Drowning									
Weils Disease	Contracting weil disease								
Slips, trips & falls	Slipping falling over falling down								
Using trimmer on a slope, slip	Chop you up								
Using mower	Roll over/driving into pond								
Flowing water	Fall in / drown / cold water shock								
Unknown waste	Needles / glass								
Uneven footing	Slips into pond Hits head Flowing water								

7. LIMITATIONS

JRC Consulting Engineers Ltd has prepared this Report for the sole use of Redrow Homes Ltd (“Client”) in accordance with the Agreement under which our services were performed October 2024. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by JRC Consulting Engineers Ltd. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of JRC Consulting Engineers Ltd.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by JRC Consulting has not been independently verified by JRC Consulting Engineers Ltd, unless otherwise stated in the Report.

The methodology adopted, and the sources of information used by JRC Consulting Engineers Ltd in providing its services are outlined in this Report. The work described in this Report was undertaken in October 2024 and is based on the conditions encountered and the information available during said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

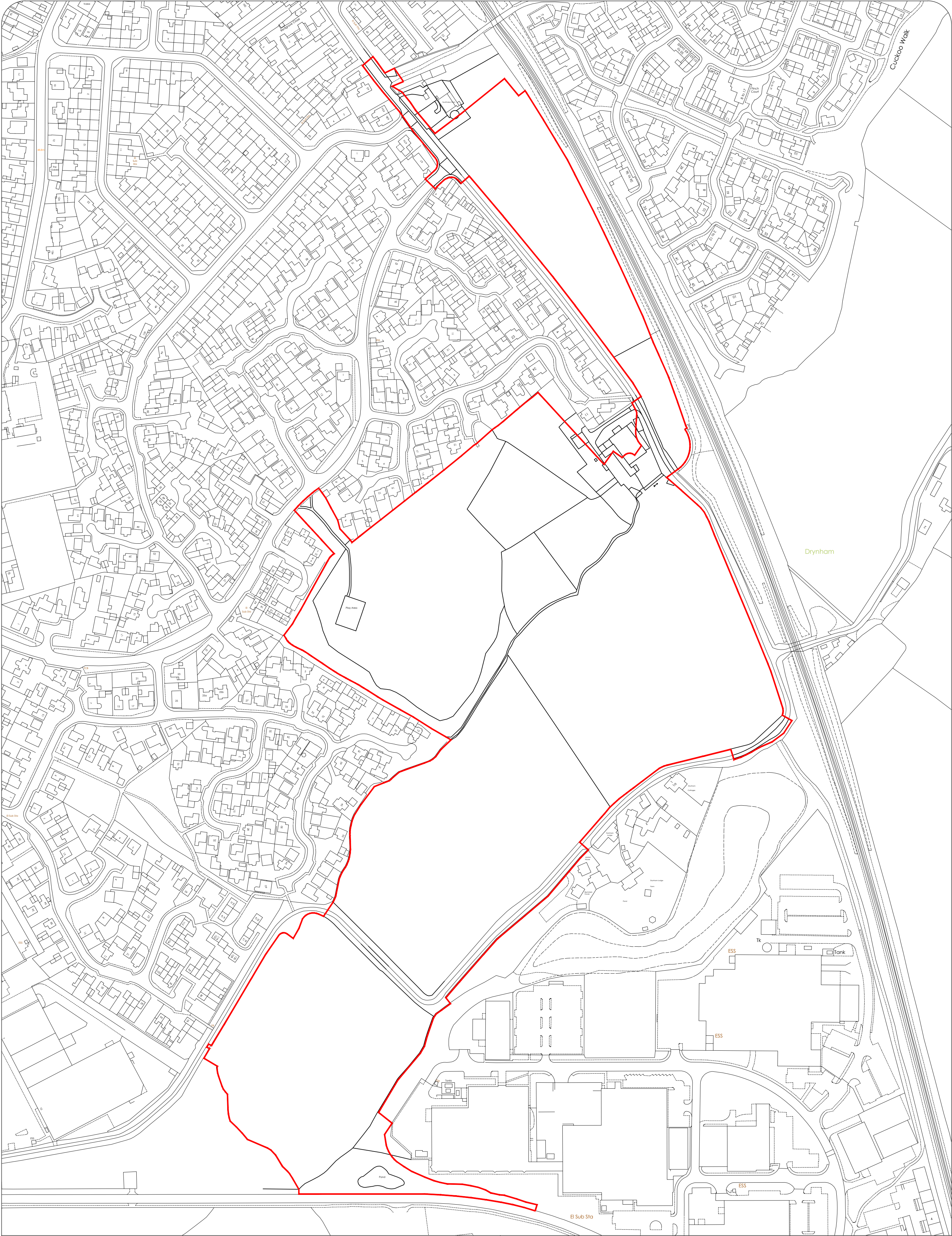
Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

JRC Consulting Engineers Ltd disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to JRC Consulting Engineers Ltd.’s attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. JRC Consulting Engineers Ltd specifically does not guarantee or warrant any estimate or projections contained in this Report.

Where field investigations are carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in issuing this Report.

APPENDIX A – Location Plan



Prepared by:



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Client:



Rev.	Date	Description	Drawn by
A	27.08.21	Title plan overlays	CB
B	26.11.21	Updated title plans	CB
C	08.12.21	Updated redline	CB
D	20.12.22	Updated site boundary/OS base following design team review	TK/CB
.	.	.	.
.	.	.	.
.	.	.	.

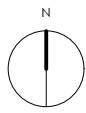
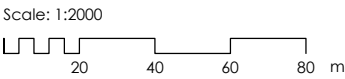
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Drawing:
Location Plan

Project No: 1955	Drawing Status: PRELIMINARY
Dwg No: 1000	Date: 19.07.21
Rev: D	Scale: 1:2000@A2
Drawn by: CB	Checked by: NH

KEY

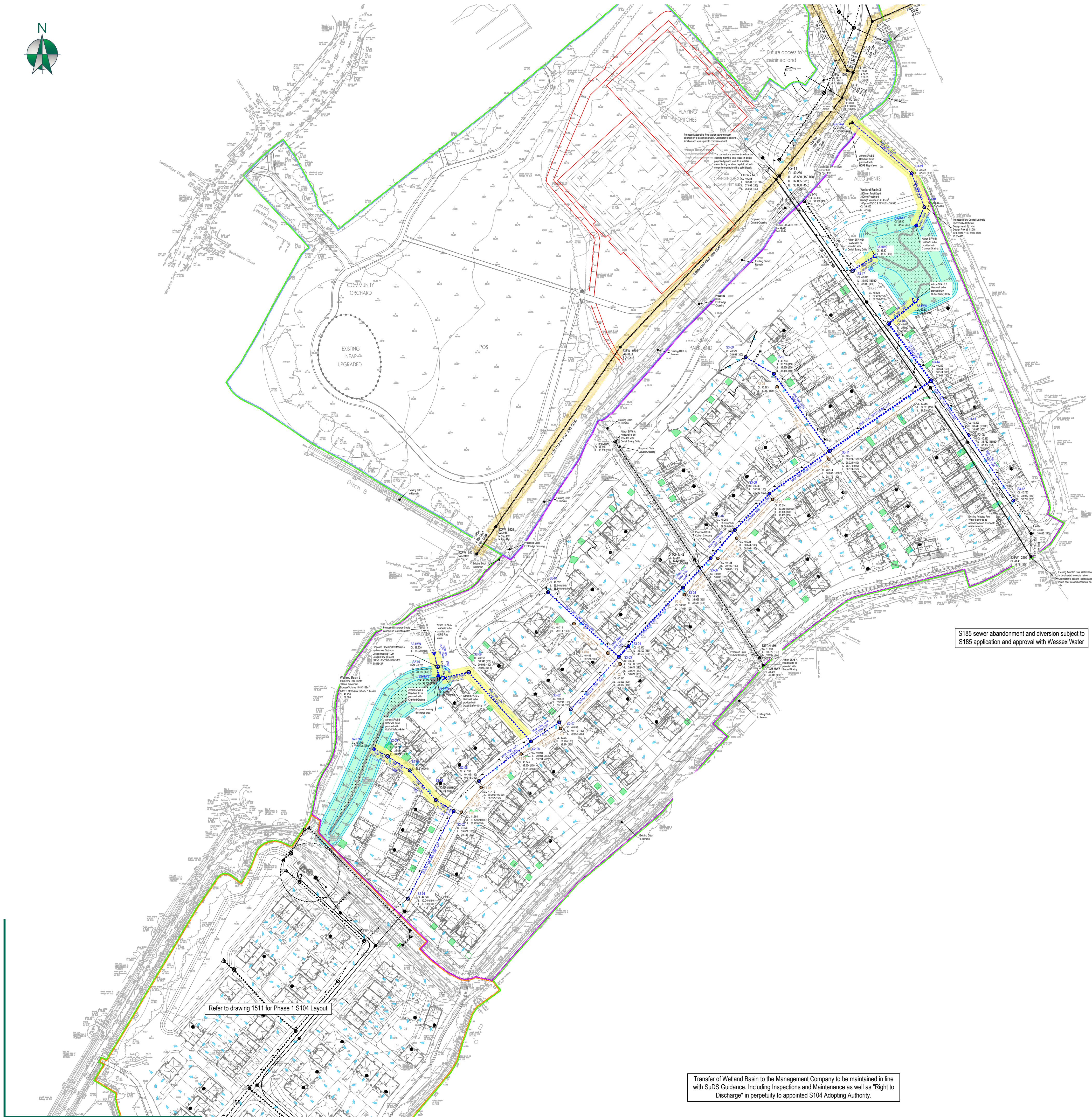
 Application Site

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APPENDIX B - Proposed Drainage Layout, Details & Sections

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Legend

- Existing public foul sewer
Contractor to verify levels, locations and S106 connection approvals prior to commencement of works
- Existing public surface sewer
Contractor to verify levels, locations and S106 connection approvals prior to commencement of works
- Proposed S185 Adoptable foul sewer diversion
- Proposed S185 adoptable precast concrete foul manhole
Refer to annotation and manhole schedule for size and type.
- Proposed S104 adoptable foul sewer
- Proposed S104 adoptable precast concrete foul manhole
Refer to annotation and manhole schedule for size and type.
- Proposed S104 adoptable foul water pumping station exclusion zone (15m)
- Proposed S104 adoptable foul rising main
- Proposed S104 adoptable storm sewer
- Proposed S104 adoptable precast concrete storm manhole
Refer to annotation and manhole schedule for size and type.
- Proposed S104 adoptable headwall (Inlet - Cranked Grating)
Aithon Headwall to be installed, refer to standard detail
- Proposed S104 adoptable headwall (Outlet - Safety Grille or Flap Valve)
Aithon Headwall to be installed, refer to standard detail
- Section 104 easement
- Proposed S38/S278 adoptable storm sewer
Refer to annotation and manhole schedule for size and type.
- Proposed S38/S278 adoptable storm manhole
Refer to annotation and manhole schedule for size and type.
- Proposed S38/S278 adoptable storm gully & spur
Standard highway gully to be offered for adoption by the local highway authority, gullies to have pedestrian safe gratings.
- Proposed Private Ditch Culvert
- Proposed Private Ditch Culvert storm manhole
Refer to annotation and manhole schedule for size and type.
- Proposed ditch / culvert headwall (Inlet - Cranked Grating)
Aithon Headwall to be installed, refer to standard detail
- Proposed ditch / culvert headwall (Outlet - Safety Grille)
Aithon Headwall to be installed, refer to standard detail
- Proposed Flood Failure Route
- Section 104 easement (Existing)

Legend

- Site boundary
- Phase 1 boundary
- Phase 2 boundary
- Phase 3 boundary

CDM: Significant Hazards

Health and Safety hazards are identified by the designer as abnormal in pursuance of the current Construction Design and Management regulations. It is assumed that all works will be carried out by competent & adequately resourced contractor(s) working to safe systems of work.



General Notes

- DO NOT SCALE FROM THIS DRAWING FOR CONSTRUCTION. Scaling from this drawing or obtaining dimensions electronically may not provide accurate information and should be avoided. Therefore work only from figured dimensions and contact JRC Consulting Engineers.
- This drawing is to be read in conjunction with all other relevant Architect's, Engineers & Specialist drawings, details, Specification and the relevant Health and Safety Plan (as appropriate to the project). All discrepancies to be reported to the Engineer immediately for verification.

Drainage Notes

- The planning, design and construction of sewers shall be in accordance with Sewers Sector Guidance (SSG) a design and construction guide for developers.
- The minimum size of sewer where guide bars, safety chains, or other safety devices are required in manholes shall be 375mm diameter.
- All type A & B manholes should have a concrete surround. Concrete rings shall be sealed using 'tikitrip' and lifting eyes pointed with resin modified mortar.
- Compliance with health & safety matters on any trench/manhole is obligatory and a permit to enter a confined space is required when connecting site drainage to the existing public sewerage system. A permit to enter a confined space will be obtained from SWW Ltd prior to the works commencing on any public sewerage system.
- Where the proposed site drainage connects to the public sewerage system either by new junction, new manhole or at an existing manhole, it will require the submission of an application for sewer connection form to SWW Ltd prior to works commencing.
- MH covers and frames shall be ductile iron with a minimum square opening of 675x675mm. Covers shall be double triangle for 675mm square openings and be provided with loose bolted connections. Frame depth shall be 150mm. Covers to PPIC'S shall be in accordance with SSG. Type C manholes to be provided with 1220 x 585mm covers and opening.
- The use of ladders or steps in manholes, wet wells and valve chambers shall comply with the following: steel plastic encapsulated MH single steps shall not be used in MHS of a greater depth than 1.0m. Steel plastic encapsulated double steps may be provided in MHS up to 3.0m deep. Ladders shall be provided in accordance with BS 4211 in MHS between 3.0m & 6.0m deep. MHS greater than 6.0m deep shall be specially designed and have intermediate landings. Access holes in intermediate landings shall be provided with galvanised mild steel gratings to prevent persons falling through. The design of deep manholes shall permit the use of a winch or lifting gear mounted at ground level in case of emergencies.
- Only low carbon steel or stainless-steel ladders for vertical fixing to manholes will be acceptable.
- Proposed adoptable sewers are only permitted to have other sewer/gully connections and other services laid at an angle of between 45 degrees and 90 degrees across the line with a vertical clearance more than 300mm.
- All ironwork to be kile marked by BSI or certified by equal inspection authority.
- Red coloured plastic marker tape at least 150mm wide shall be laid at a minimum of 200mm above the soffit of the pipe. The tape shall be printed with the words 'gravelly sewer' in bold capital letters throughout its length and at intervals not exceeding 700mm and shall incorporate a corrosion resistant tracing system for non-metallic pipes.
- Minimum backdrop height shall be 1m.
- On new drainage schemes, the first manhole upstream from the connection to the existing foul water sewer shall be fitted with a suitable screen, which will remain in place until the new sewer becomes live.

TA4	04.12.25	Updated S2-01 Cover Level. Removed Plastic Pipe Material in Legend.	DWJP	DWJP
TA3	13.10.25	Updated to suit Icos comments	JDC	DWJP
TA2	28.08.25	Updated to single A1 Sheet	DWJP	DWJP
TA1	18.07.25	First Issue	JDC	DWJP
REV.	DATE	DETAILS	BY	CHKD.

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Bideford Office: 01237 520330

DRAWING STATUS

FOR TECHNICAL APPROVAL

PROJECT

ELM GROVE
TROWBRIDGE

CLIENT

REDROW

DRAWING TITLE

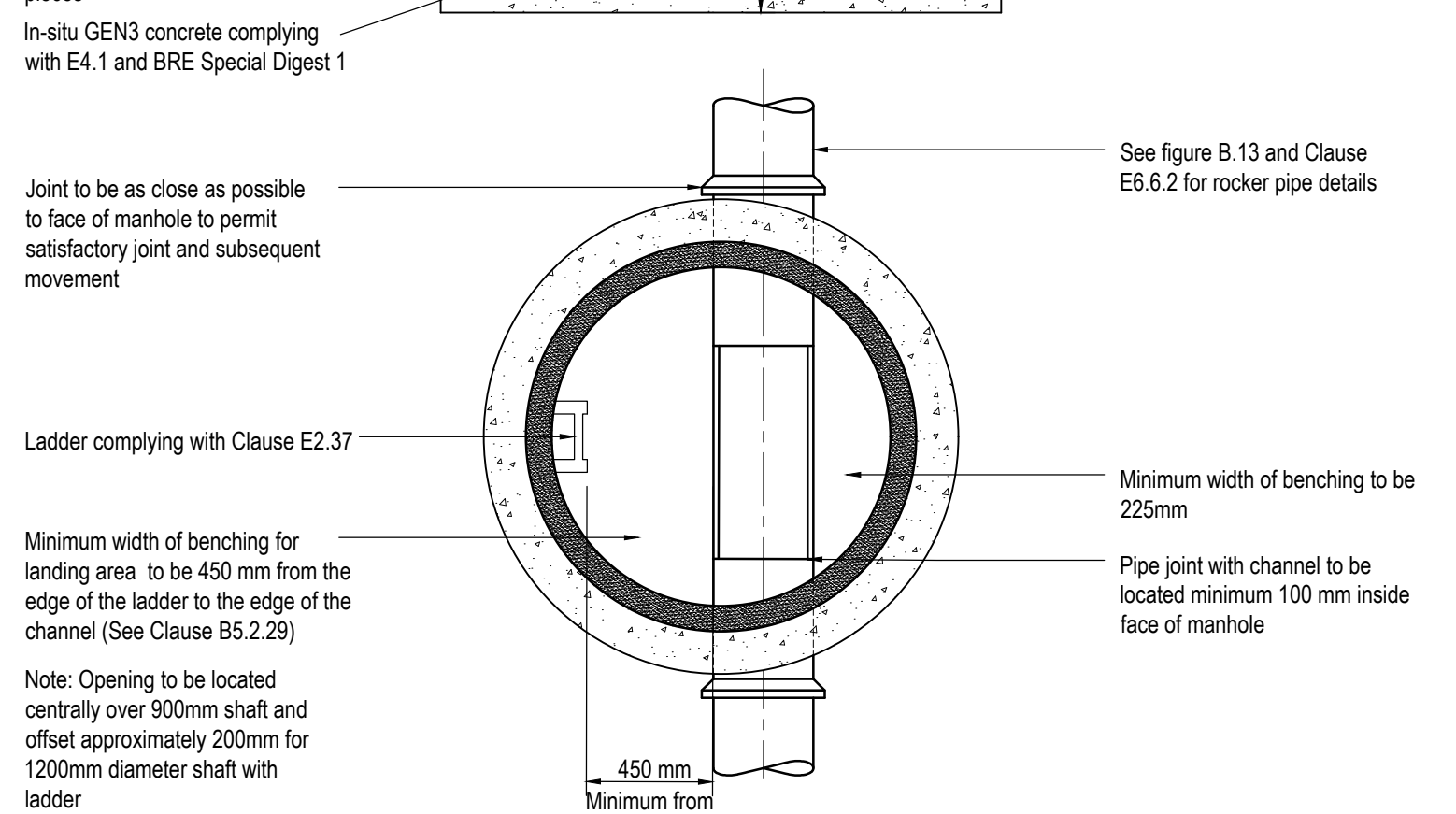
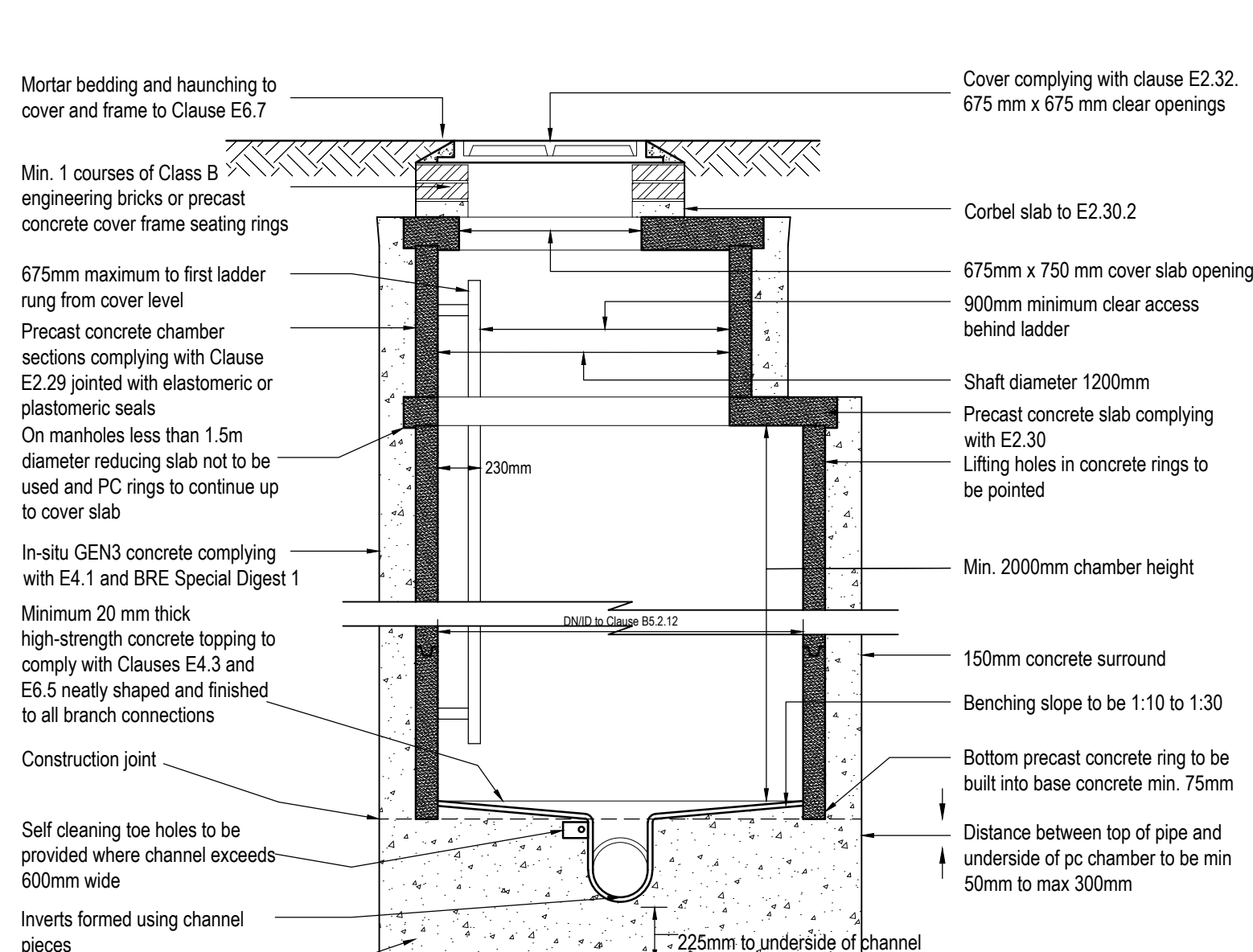
S104 DRAINAGE LAYOUT
PHASE 2

SCALE @ A1

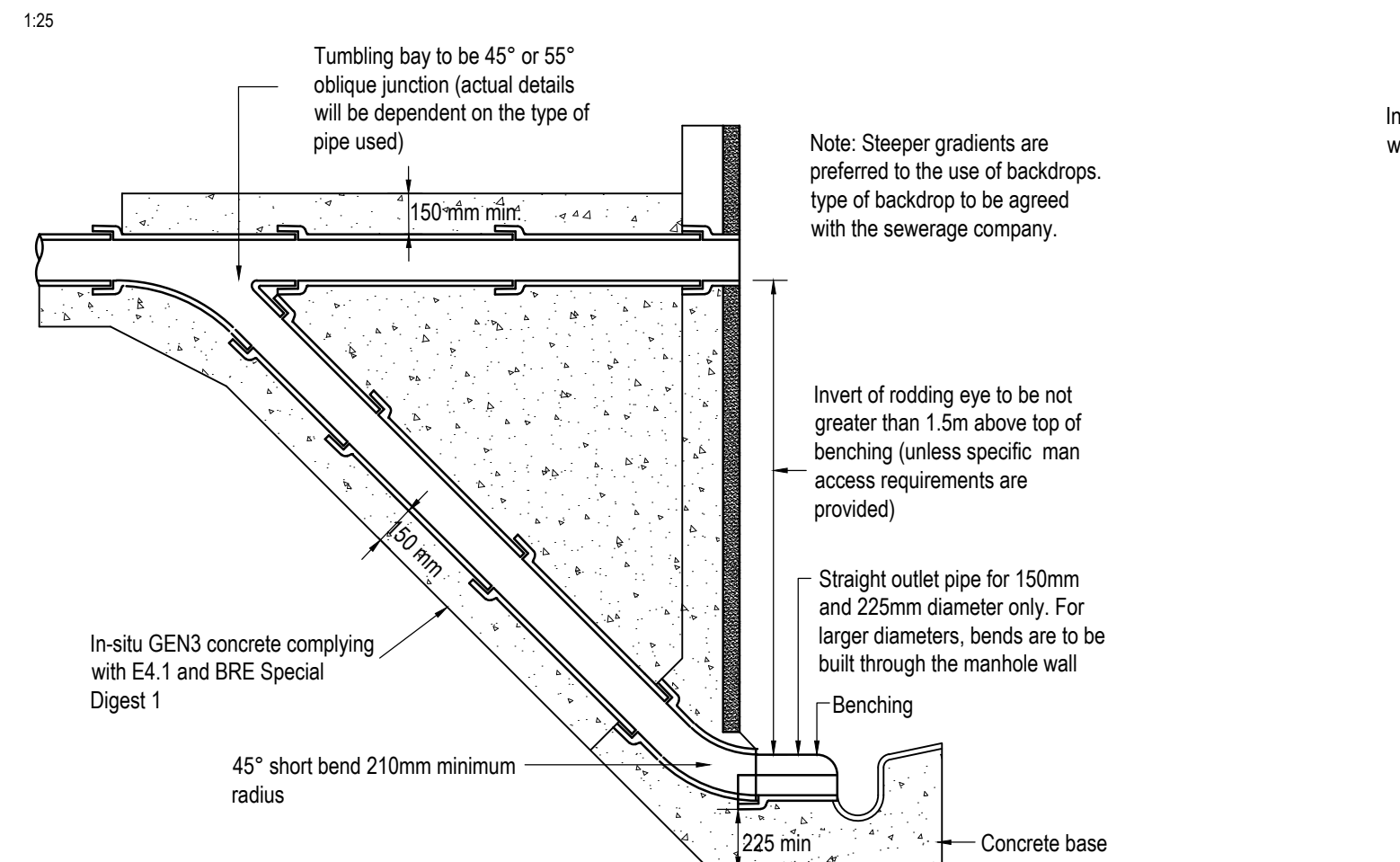
0m 1:1000 50m

SIZE A1 DATE JUL 25

PROJECT NUMBER	DRAWING NUMBER	REVISION
1960	2511	TA4

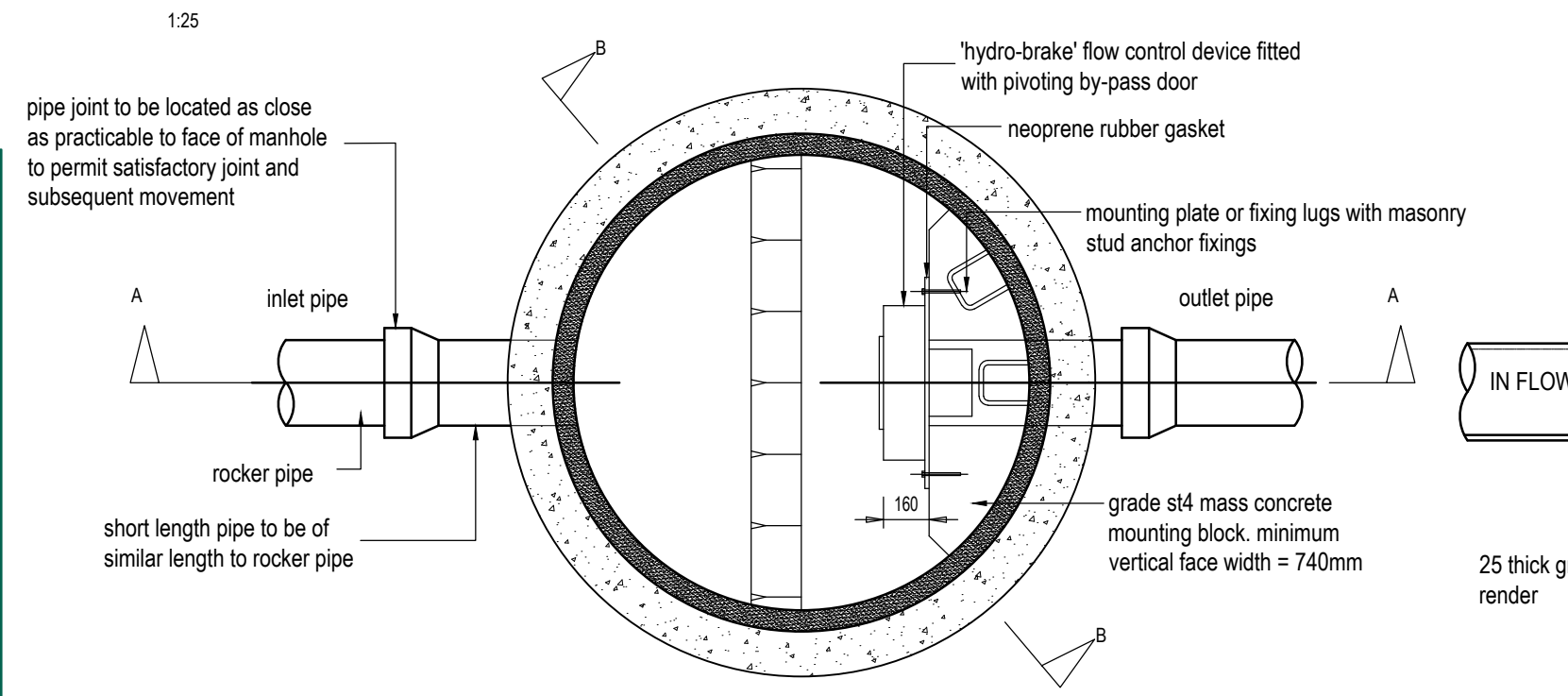


TYPICAL MANHOLE DETAIL - TYPE A1
(DEPTH FROM COVER TO SOFFIT OF PIPE 3m TO 6m WITH LADDER AND REDUCING SLAB)
RIGID MATERIAL CONSTRUCTION WITH CONCRETE SURROUND

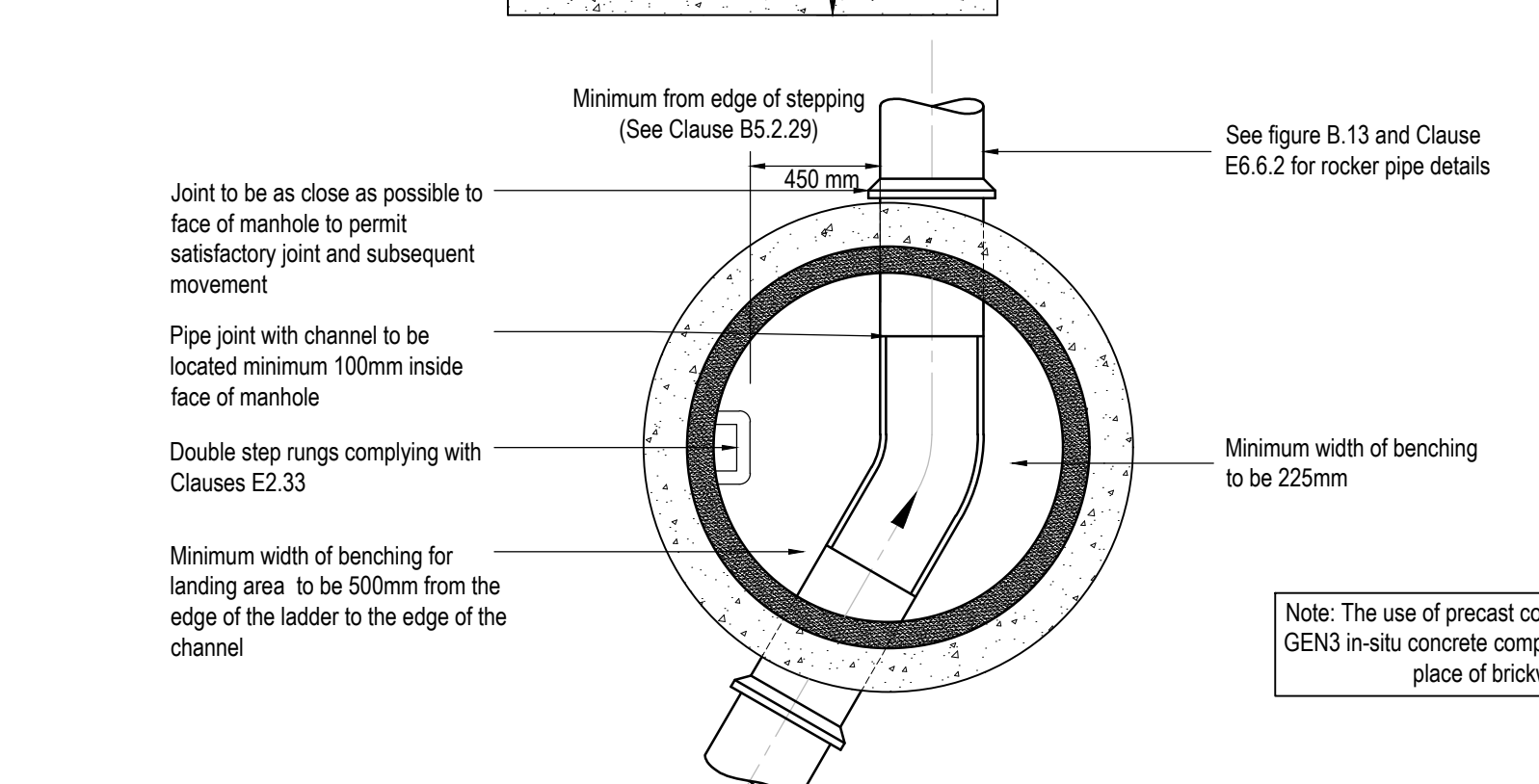
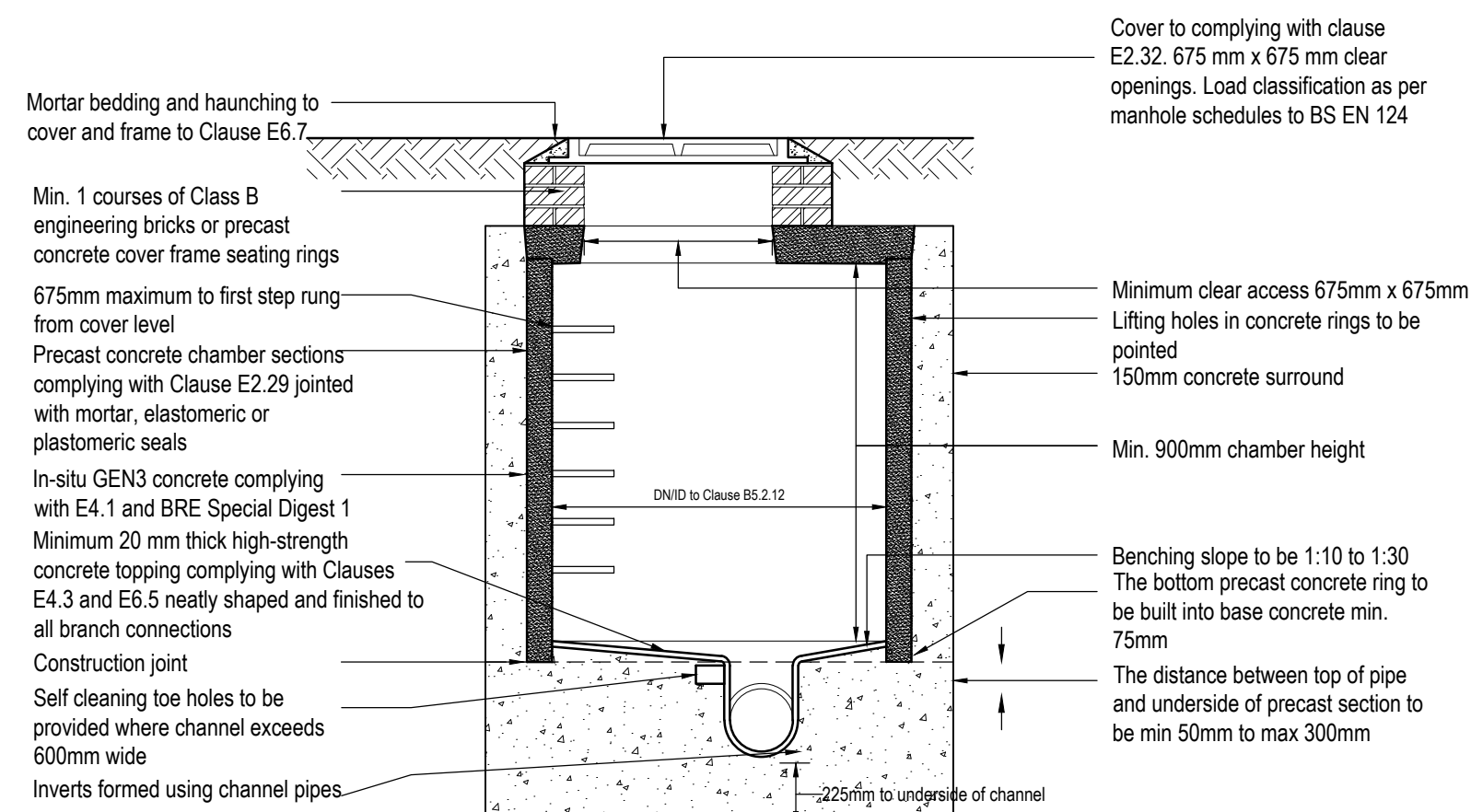


EXTERNAL RAMPED BACKDROP DETAIL

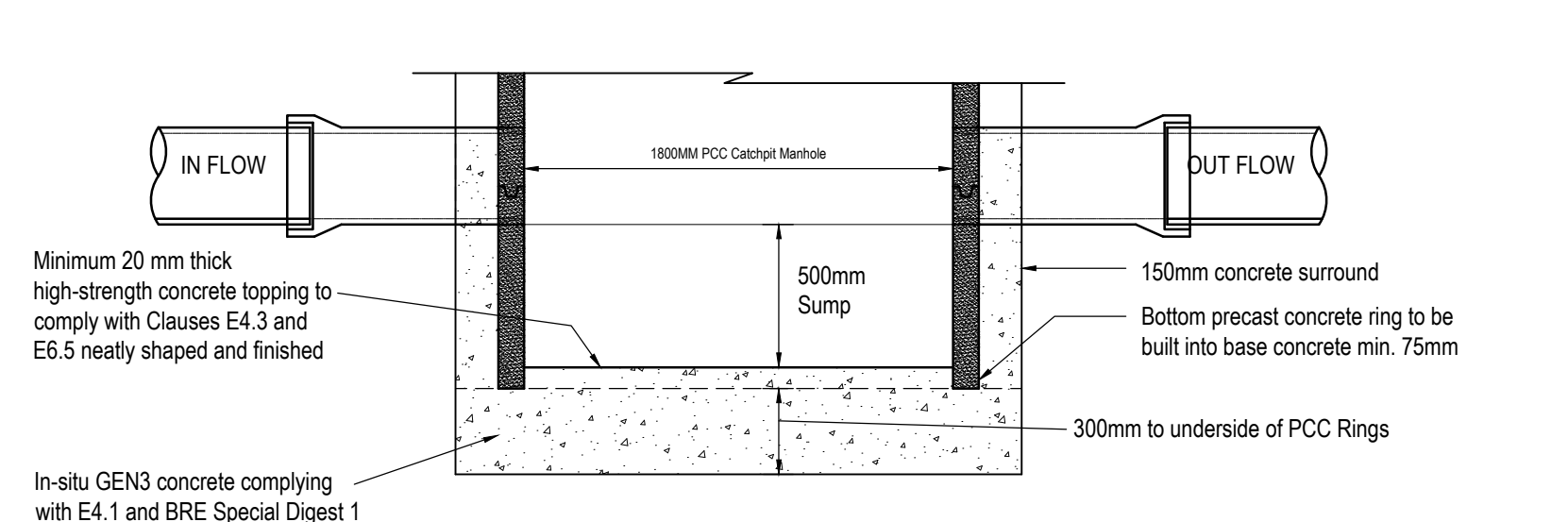
RIGID MATERIALS



TYPICAL FLOW CONTROL MANHOLE DETAIL



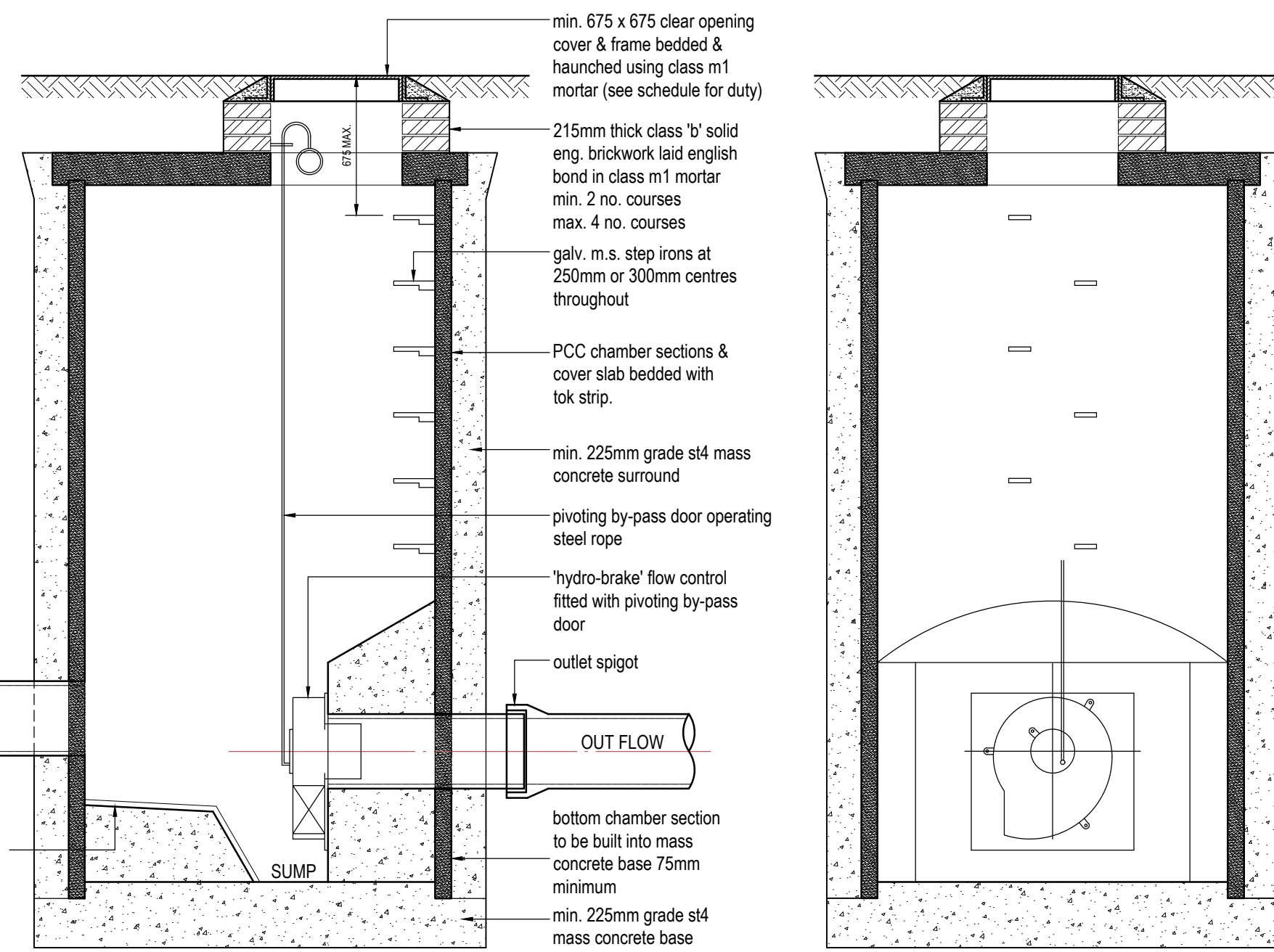
TYPICAL MANHOLE DETAIL - TYPE B
(DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 1.5 m TO 3 m)
RIGID MATERIAL CONSTRUCTION WITH CONCRETE SURROUND



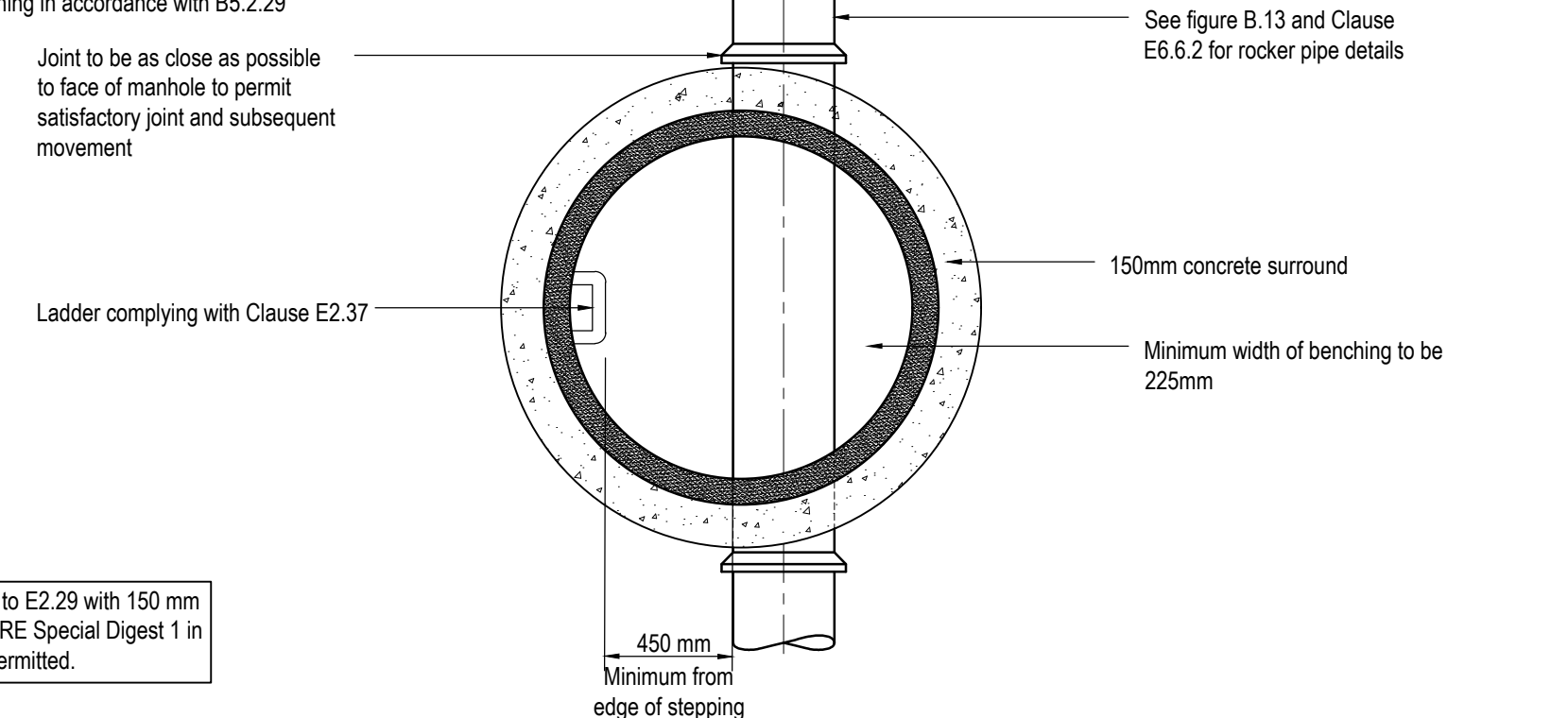
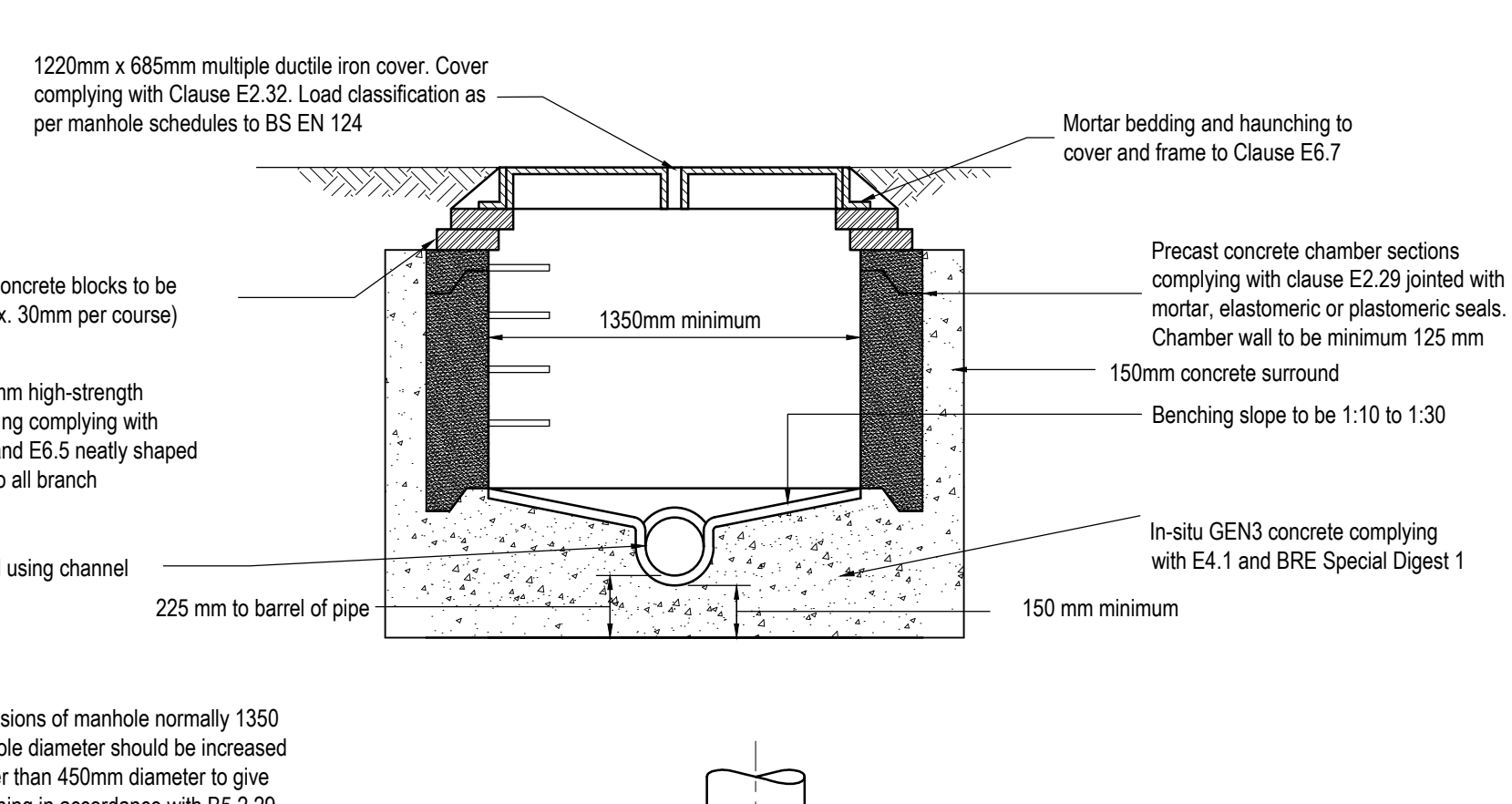
TYPICAL CATCHPIT DETAIL -
(REFER TO DRAINAGE LAYOUT AND SCHEDULE
FOR LOCATIONS AND MANHOLE SIZING)

HYDROBRAKE SPECIFICATION

All Hydrobrake works to be in strict accordance with Hydro International Specifications and details. Bespoke Arrangement for each flow control chamber and unit to be confirmed prior to commencement of work.



SECTIONAL ELEVATION A-A



TYPICAL MANHOLE DETAIL - TYPE C
 DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE LESS THAN 1.5 m
 MAXIMUM PIPE SIZE 450 mm DIAMETER
 RIGID MATERIAL CONSTRUCTION

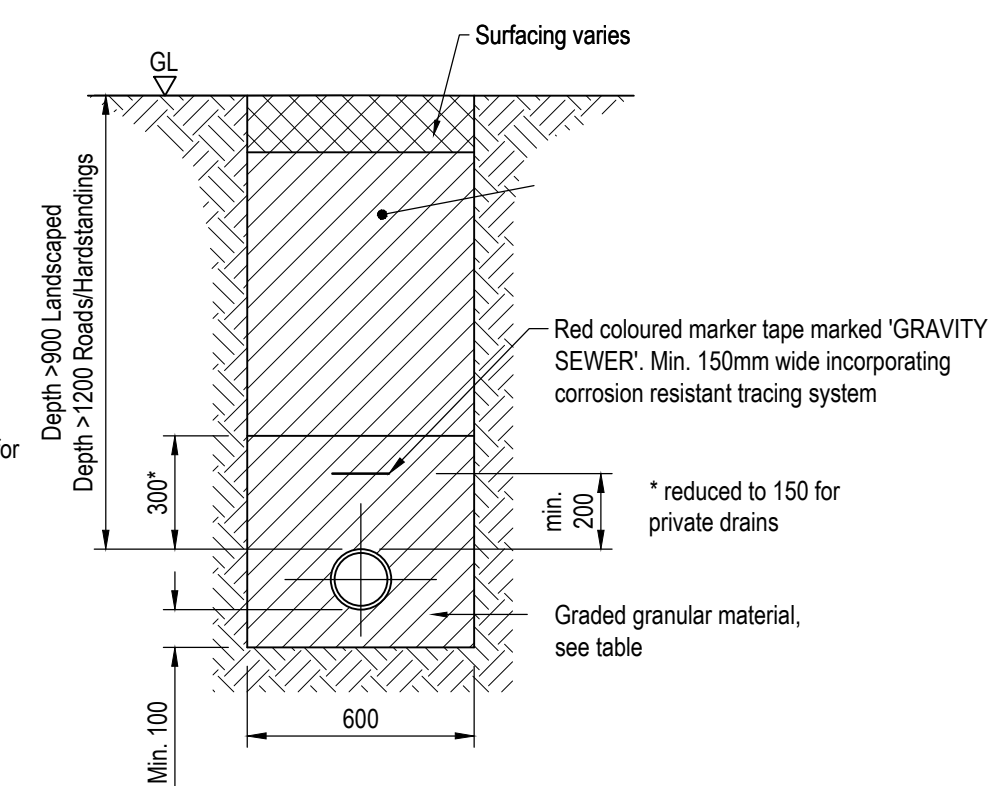
CLASS S

Trench Backfill

Adoptable Highway Areas
Type 1 Clause 803 SHW series 0800.

Private Vehicular Areas
Type 1 Clause 803 SHW series 0800
or
Type 6F1 Clause 613 & Table 6/1 SHW
series 0600 (subject to engineers app
specific application).

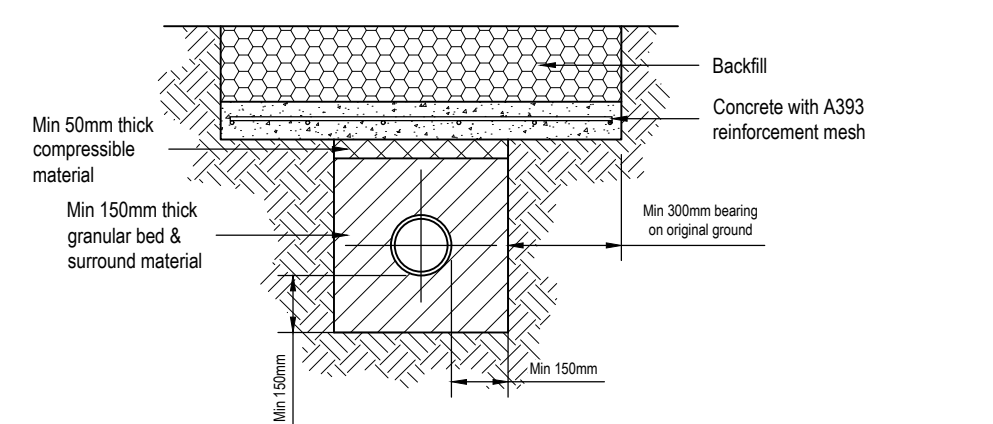
Pedestrian/Soft Landscaped Areas
Class 8 (SHW-Class 1, 2 or 3) Selected fill free of clay and stone >40mm material in accordance with SHW Series 600.



Typical Sewer/Drain Section
Class S granular bed and surround

1:20

Graded Granular Material	
Pipe dia Bc	Suitable Material
100	10mm nominal single size
150	10-14mm nominal 5mm graded
225-525	10, 14, or 20mm nominal single size, or 14 - 5mm graded, or 20 - 5mm graded



Typical Sewer/Drain Section

Class S with concrete slab protection

1:20

CDM: Significant Hazards

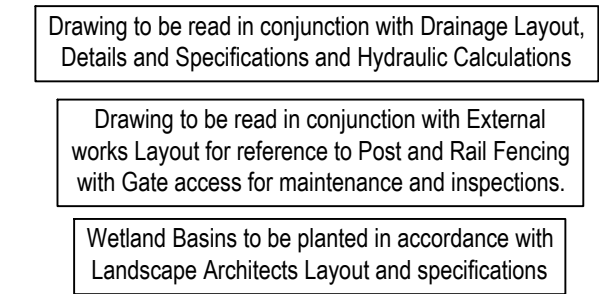
Health and Safety hazards are identified by the designer as abnormal in pursuance of the current Construction Design and Management regulations. It is assumed that all works will be carried out by competent & adequately resourced contractor(s) working to safe systems of work.

General Notes

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Drainage Notes

1. The planning, design and construction of sewers shall be in accordance with Sewers Section Guidelines (SSG) as design and construction guide for developers.
2. The minimum size of sewer where gully bans, safety chains, or safety devices are required shall be 150mm.
3. All type A & B manholes should have a concrete surround. Concrete rings shall be sealed using tskolky® and comply with patent with resin modified mortar.
4. Lifting with health & safety matters on any trench/manhole is obligatory and a permit to work shall be obtained from the relevant authority prior to the existing public sewerage system. A permit to enter a confined space will be obtained from SSWH ID prior to the works commencing on any public sewerage system.
5. Where the proposed site drainage connects to the public sewerage system either by new junction, new manhole or an existing manhole, I will require the submission of an application for a permit to work from the relevant authority.
6. MH covers and frames shall be ductile iron with a minimum square opening of 615x765mm. Covers shall be double trussed for 75mm square openings and be provided with loose bolted connections. Frame depth shall be 150mm. Covers to FIPIC'S shall be in accordance with SSG.
7. Where the proposed site drainage connects to the public sewerage system, the following shall be observed:
 - a. The use of ladder steps or ladders, man wells and valve chambers shall comply with the following: steel plastic encapsulated MH single steps shall not be used in MHS of a greater depth than 1.0m. Steel plastic encapsulated double steps may be provided in MHS up to 3.0m deep.
 - b. Where the depth of the manhole is greater than 1.0m and less than 3.0m a 6.0m deep, MHS greater than 6.0m deep shall be specially designed and have intermediate landings.
 - c. Access holes in intermediate landings shall be provided with galvanised mild steel gratings to prevent persons falling through. The design of deep manholes shall permit the use of a winch or lifting gear attached at ground level in case of emergencies.
8. Only cast iron step or stainless-steel landings for vertical lifting to manholes will be acceptable.
9. Proposed adoptable sewers are only permitted to have other sewer/gully connections and other services laid at an angle of between 45 degrees and 90 degrees across the line with a minimum depth of 300mm.
10. All innwork to be linked by BSI or certified by equal inspection authority.
11. Red coloured plastic marker tape shall be at least 150mm wide shall be laid at a minimum of 200mm above the soffit of the pipe. The tape shall be printed with the words 'gravi sewer' in bold capital letters at 100mm intervals along its length. It shall extend 100mm and shall incorporate a corrosion resistant tracing system for non-metallic pipes.
12. Minimum backdrop height shall be 1m.
13. On new drainage schemes, the first manhole upstream from the connection to the existing foul water main shall be fitted with a suitable screen, which will remain in place until the new sewer becomes live.



1:50

JRC

2. This drawing is to be read in conjunction with all other relevant Architect's, Engineers & Specialist drawings, details, Specification and the relevant Health and Safety Plan (as appropriate to the project). All discrepancies to be reported to the Engineer immediately for verification.

PROJECT NUMBER	DRAWING NUMBER	REVISION
1960	2595	TA1

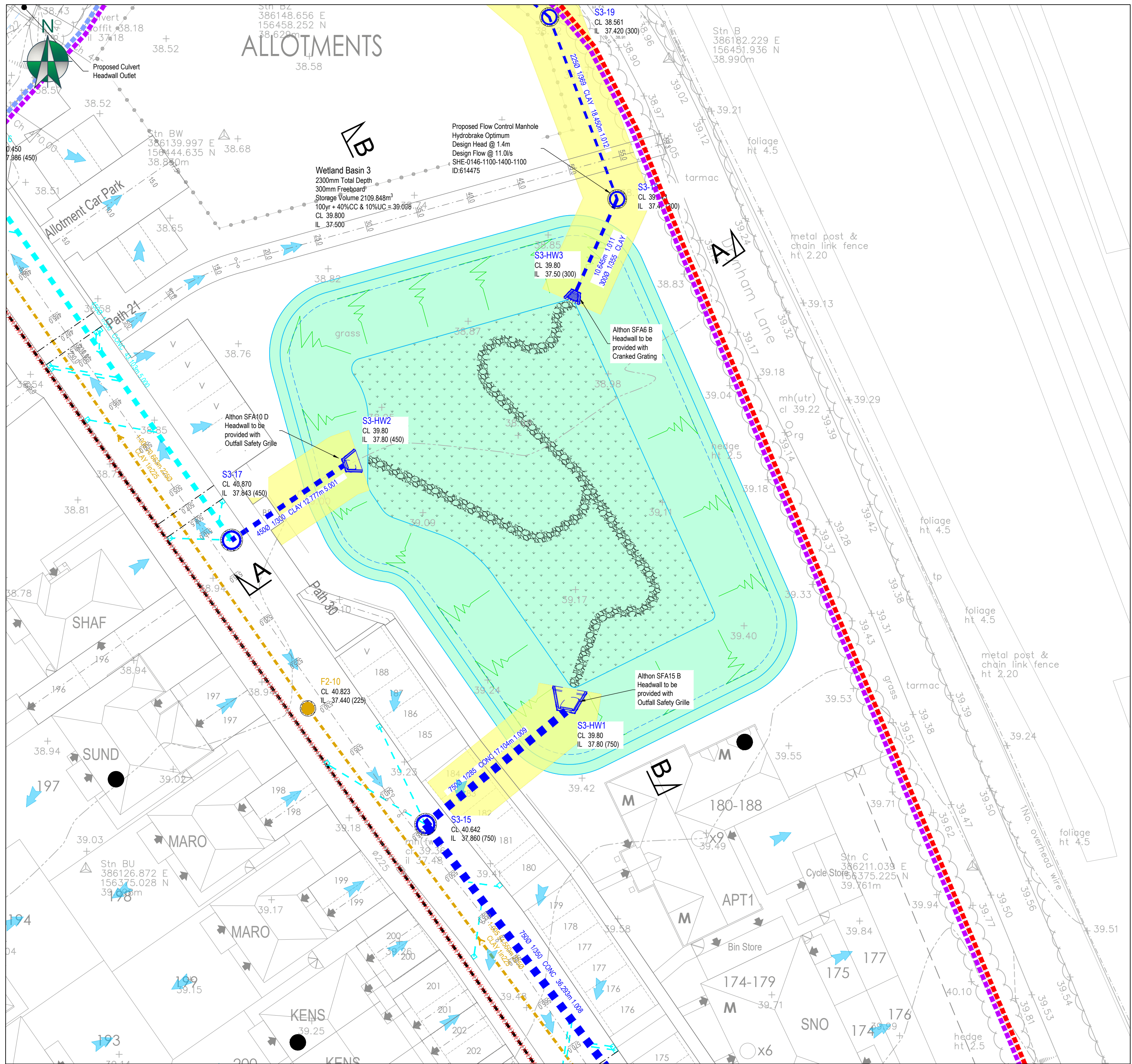
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CDM: Significant Hazards

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Drawing to be read in conjunction with Drainage Layout, Details and Specifications and Hydraulic Calculations

Drawing to be read in conjunction with External works Layout for reference to Post and Rail Fencing with Gate access for maintenance and inspections.

Wetland Basins to be planted in accordance with Landscape Architects Layout and specifications

TA1	18.07.25	First Issue	JDC	DWJP
REV.	DATE	DETAILS	BY	CHK.

JRC CONSULTING

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DRAWING STATUS: FOR TECHNICAL APPROVAL

PROJECT: RESIDENTIAL DEVELOPMENT
ELM GROVE
TROWBRIDGE

CLIENT: REDROW

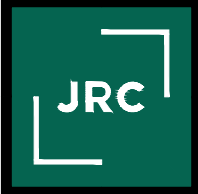
DRAWING TITLE: WETLAND BASIN 3

SCALE @ A1 0m 15m 25m	SIZE A1	DATE JUL 25
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PROJECT NUMBER 1960	DRAWING NUMBER 2596	REVISION TA1
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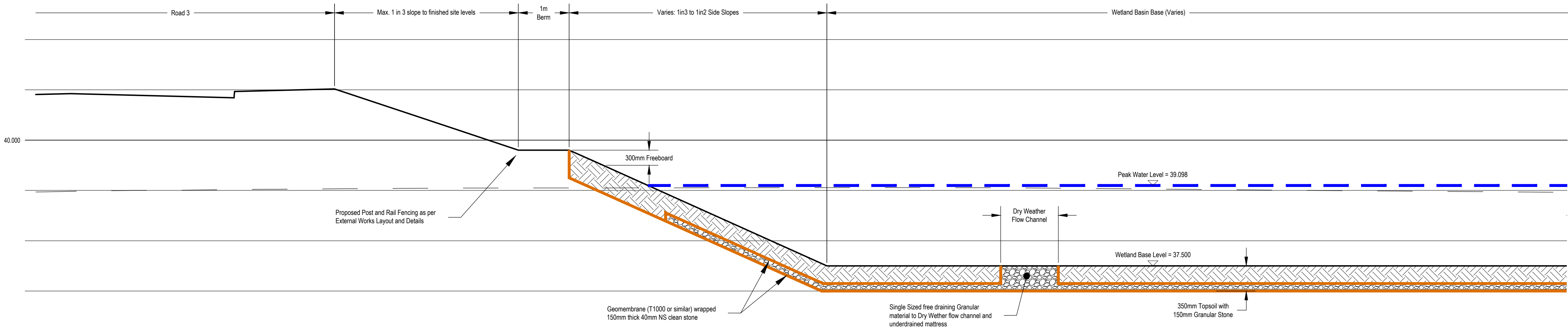
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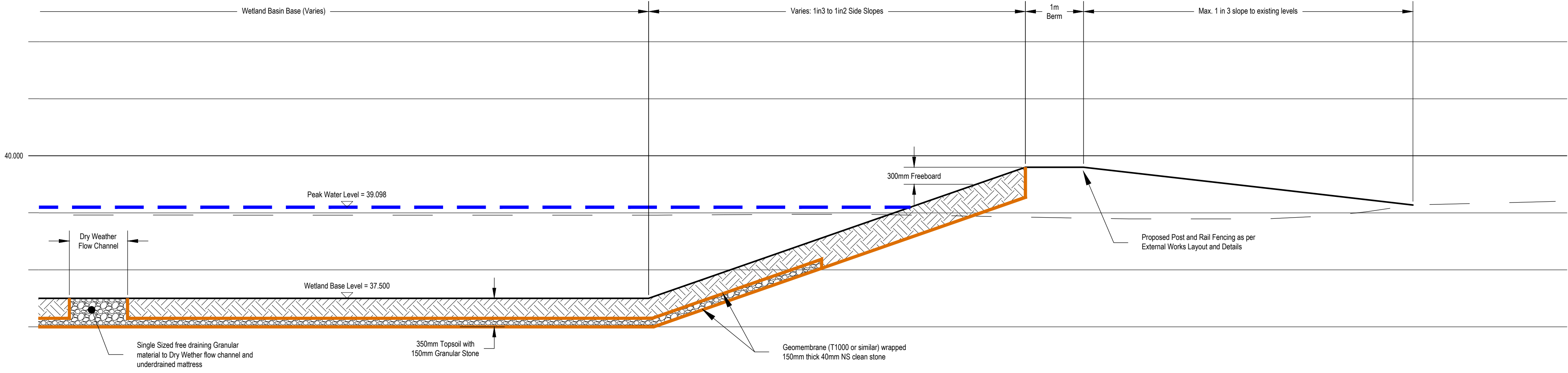


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WETLAND BASIN 3 SECTION A-A
1:50



WETLAND BASIN 3 SECTION A-A CONTINUATION
1:50

Drawing to be read in conjunction with Drainage Layout, Details and Specifications and Hydraulic Calculations

Drawing to be read in conjunction with External works Layout for reference to Post and Rail Fencing with Gate access for maintenance and inspections.

Wetland Basins to be planted in accordance with Landscape Architects Layout and specifications

TA1	18.07.25	First Issue	JDC	DWJP
REV.	DATE	DETAILS	BY	CHK.



DRAWING STATUS
FOR TECHNICAL APPROVAL

PROJECT
RESIDENTIAL DEVELOPMENT
ELM GROVE
TROWBRIDGE



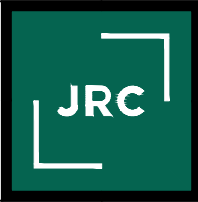
DRAWING TITLE
WETLAND BASIN 3
SECTIONS
SHEET 1

SCALE @ A1 0m 1:50 2.5m	SIZE A1	DATE JUL 25
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PROJECT NUMBER 1960	DRAWING NUMBER 2597	REVISION TA1
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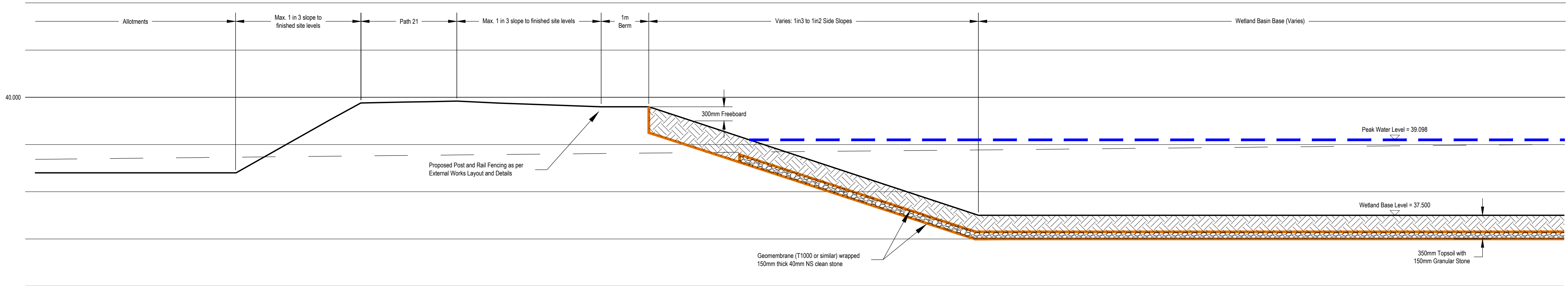
CDM: Significant Hazards

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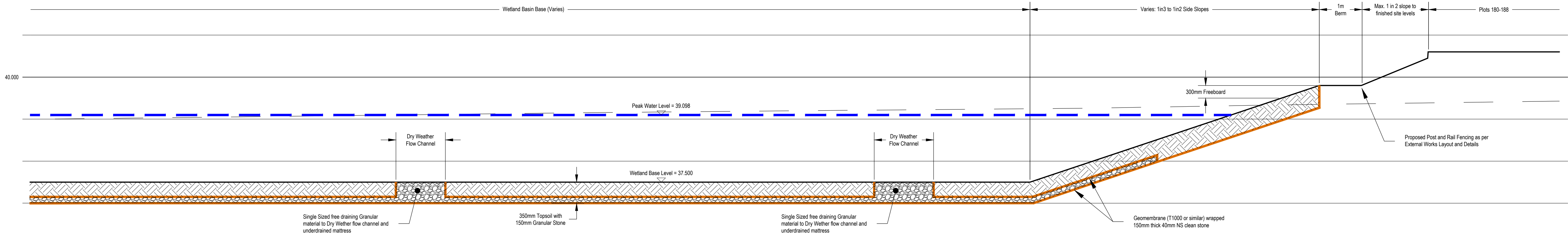
General Notes

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WETLAND BASIN 3 SECTION B-B

1:50



WETLAND BASIN 3 SECTION B-B CONTINUATION

1:50

Drawing to be read in conjunction with Drainage Layout, Details and Specifications and Hydraulic Calculations

Drawing to be read in conjunction with External works Layout for reference to Post and Rail Fencing with Gate access for maintenance and inspections.

Wetland Basins to be planted in accordance with Landscape Architects Layout and specifications

TA1	18.07.25	First Issue	JDC	DWJP
REV.	DATE	DETAILS	BY	CHK.



FOR TECHNICAL APPROVAL

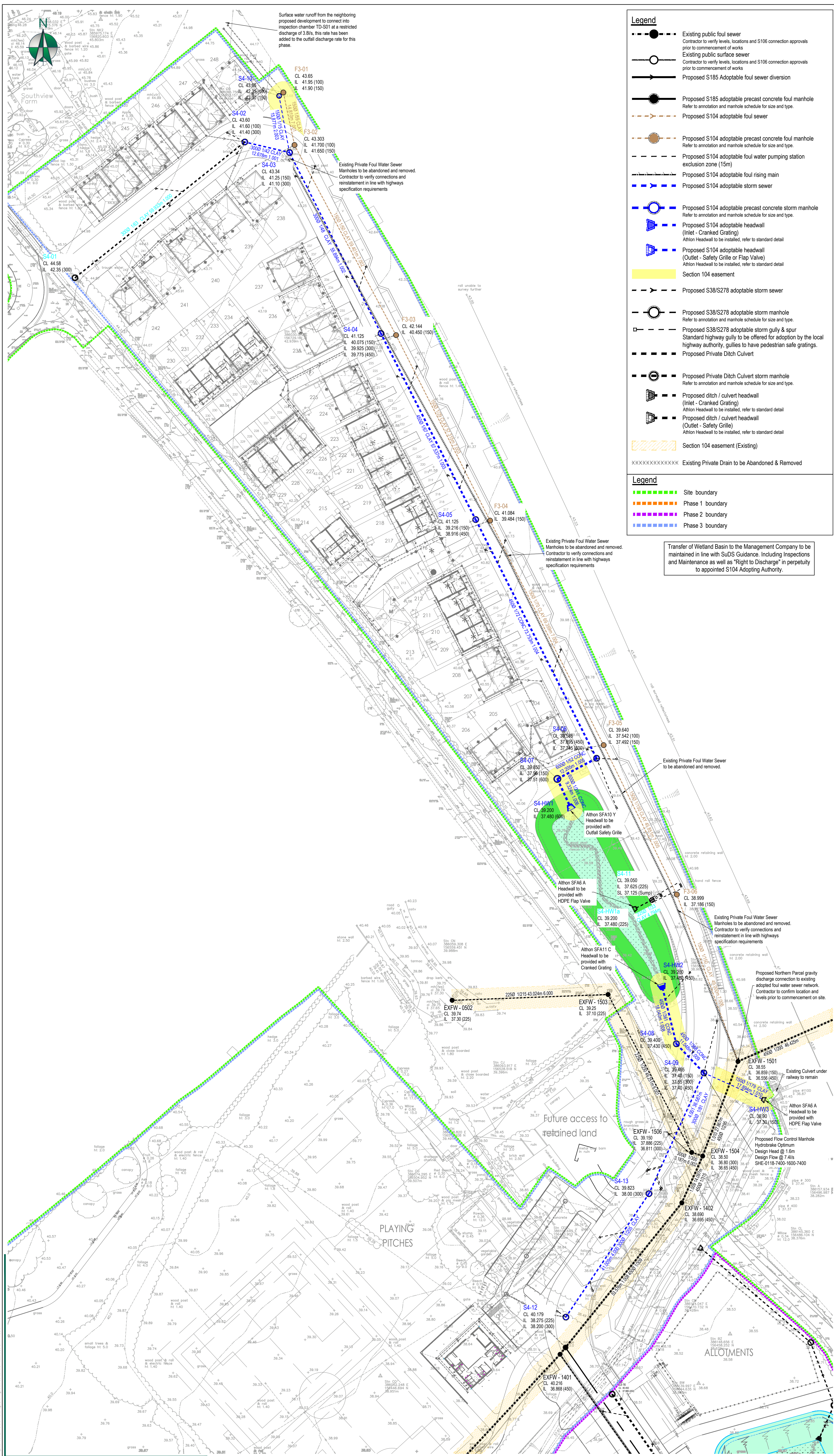
PROJECT
RESIDENTIAL DEVELOPMENT
ELM GROVE
TROWBRIDGE

CLIENT

DRAWING TITLE
WETLAND BASIN 3
SECTIONS
SHEET 2

SCALE @ A1 0m 1:50 2.5m	SIZE A1	DATE JUL 25
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PROJECT NUMBER 1960	DRAWING NUMBER 2598	REVISION TA1
------------------------	------------------------	-----------------



Legend

- | | |
|--|---|
| | Existing public foul sewer
Contractor to verify levels, locations and S106 connection approvals prior to commencement of works |
| | Existing public surface sewer
Contractor to verify levels, locations and S106 connection approvals prior to commencement of works |
| | Proposed S185 Adoptable foul sewer diversion |
| | Proposed S185 adoptable precast concrete foul manhole
Refer to annotation and manhole schedule for size and type. |
| | Proposed S104 adoptable foul sewer |
| | Proposed S104 adoptable precast concrete foul manhole
Refer to annotation and manhole schedule for size and type. |
| | Proposed S104 adoptable foul water pumping station exclusion zone (15m) |
| | Proposed S104 adoptable foul rising main |
| | Proposed S104 adoptable storm sewer |
| | Proposed S104 adoptable precast concrete storm manhole
Refer to annotation and manhole schedule for size and type. |
| | Proposed S104 adoptable headwall
(Inlet - Cranked Grating)
Athion Headwall to be installed, refer to standard detail |
| | Proposed S104 adoptable headwall
(Outlet - Safety Grille or Flap Valve)
Athion Headwall to be installed, refer to standard detail |
| | Section 104 easement |
| | Proposed S38/S278 adoptable storm sewer |
| | Proposed S38/S278 adoptable storm manhole
Refer to annotation and manhole schedule for size and type. |
| | Proposed S38/S278 adoptable storm gully & spur
Standard highway gully to be offered for adoption by the local highway authority, gullies to have pedestrian safe gratings. |
| | Proposed Private Ditch Culvert |
| | Proposed Private Ditch Culvert storm manhole
Refer to annotation and manhole schedule for size and type. |
| | Proposed ditch / culvert headwall
(Inlet - Cranked Grating)
Athion Headwall to be installed, refer to standard detail |
| | Proposed ditch / culvert headwall
(Outlet - Safety Grille)
Athion Headwall to be installed, refer to standard detail |
| | Section 104 easement (Existing) |
| | Existing Private Drain to be Abandoned & Removed |

- Site boundary
 Phase 1 boundary
 Phase 2 boundary
 Phase 3 boundary

CDM: Significant Hazards

General Notes

Drainage Notes

TA1	31.03.26	FIRST ISSUE	JDC	DWJF
REV.	DATE	DETAILS	BY	CKD.



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DRAWING STATUS

PROJECT
ELM GROVE
TROWBRIDGE



DRAWING TITLE
S104 DRAINAGE LAYOUT
PHASE 3



PROJECT NUMBER	DRAWING NUMBER	REVISION
1960	3511	TA1

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Drainage Notes

1. The planning, design and construction of sewers shall be in accordance with *Sewerage Standards (SSG)* a design and construction guide for developers.
2. The minimum size of sewer where gully pads, safety chains, or other safety devices are required in manholes shall be 375mm.
3. All type A & B manholes should have a concrete surround. Concrete rings shall be sealed using 'torkseal' and lifting with safety mesh on trench/mantle.
4. Compliance with health & safety powered on any modified manhole is obligatory and a permit to excavate must be obtained from the relevant authority. The existing public sewerage system. A permit to enter a confined space will be obtained from SSWH prior to the works commencing on any public sewerage system.
5. Where the proposed site drainage connects to the public sewerage system either by new form, new manhole or at an existing manhole, it will require the submission of an application for a new manhole or manhole extension to the local authority.
6. MH covers and frames shall be ductile iron with a minimum square opening of 675x675mm. Covers shall be double trussed for 675mm square openings and be provided with loose bolted connections. Frame depth shall be 150mm. Covers to PPCS shall be in compliance with SSG. The maximum depth of the product shall not exceed 421mm.
7. The use of ledgers or steps in manholes, wet wells and valve chambers shall accord with the following: steel plastic encapsulated MH single steps shall not be used in MH's of a greater depth than 1.0m. Steel plastic encapsulated double steps may be provided in MH's up to 3.0m deep. If a double step is used in a MH, the depth of the MH shall be between 2.0m & 6.0m deep. MH's greater than 6.0m deep shall be specially designed and have intermediate landings. Access holes in intermediate landings shall be provided with galvanised mild steel gratings to prevent persons falling through. The design of deep manholes shall permit the use of a winch or lifting gear attached at ground level in case of emergencies.
8. Only low cation steel or stainless-steel ladders for vertical lifting to manholes will be acceptable.
9. Proposed adoptable sewers are only permitted to have other sewerly connections and other services laid at an angle of between 45 degrees and 90 degrees across the line with a maximum depth of 300mm.
10. All ironwork to be knight marked by BSI or certified by independent security authority.
11. Red coloured plastic marker tape at least 150mm wide shall be laid at a minimum of 200mm above the soffit of the pipe. The tape shall be printed with the words 'gravelly sewer' in bold capital letters. The length of the tape shall be at least 700mm and shall incorporate a corrosion resistant tracing system for non-metallic pipes.
12. Minimum backup height shall be 1m.
13. On new drainage schemes, the first manhole upstream from the connection to the existing foul water sewer shall be fitted with a suitable screen, which will remain in place until the sewer becomes live.



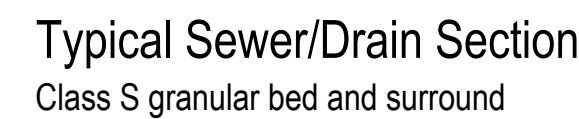
CLASS S

Trench Backfill

Adoptable Highway Areas
Type 1 Clause 803 SHW series 0800

Private Vehicular Areas
Type 1 Clause 803 SHW series 0800
or
Type 6F1 Clause 613 & Table 6/1 SHW
series 0600 (subject to engineers approval
specific application).

Pedestrian/Soft Landscaped Areas
Class 8 (SHW-Class 1, 2 or 3) Selected fill
free of clay and stone >40mm material in
accordance with SHW Series 600.

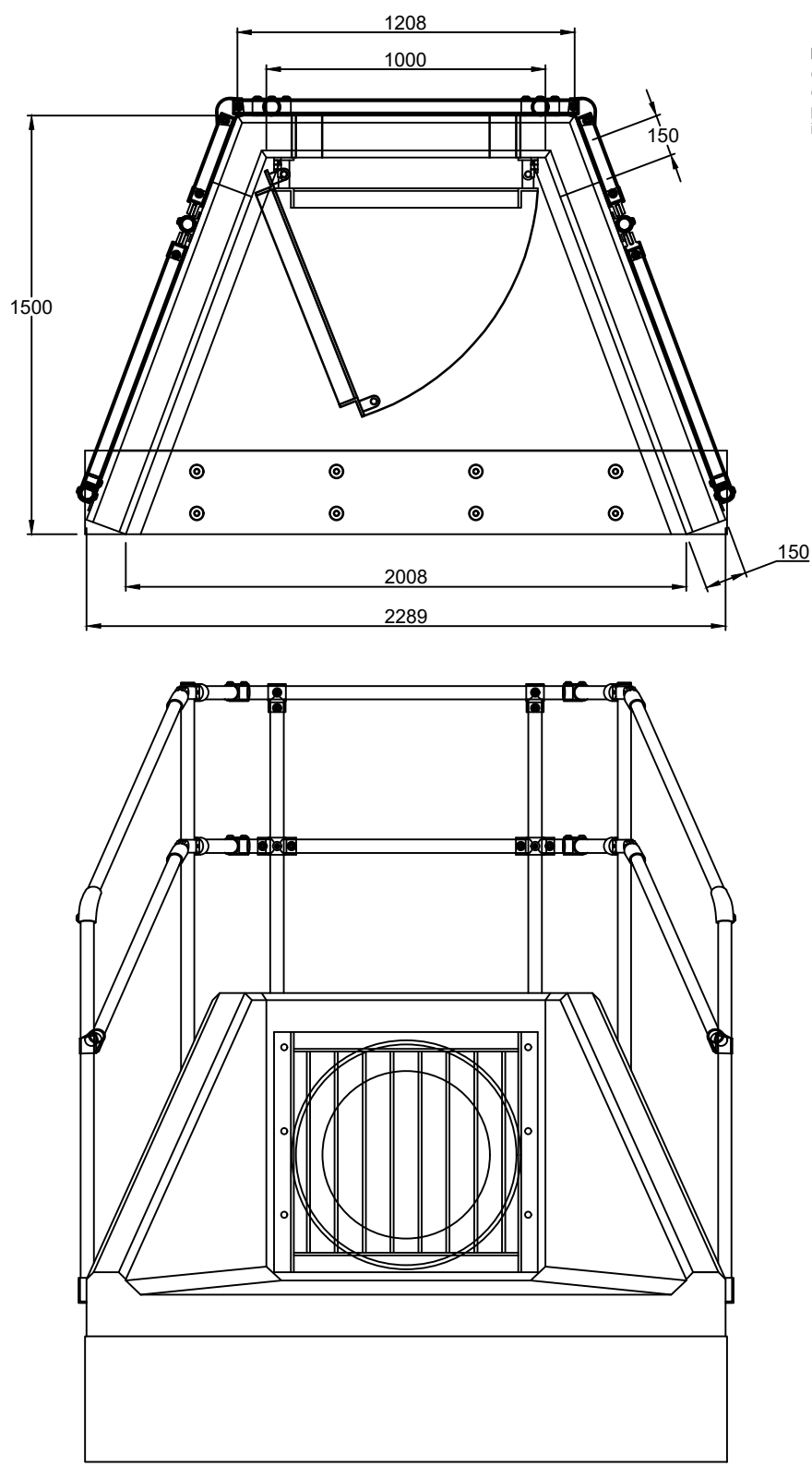


1:20

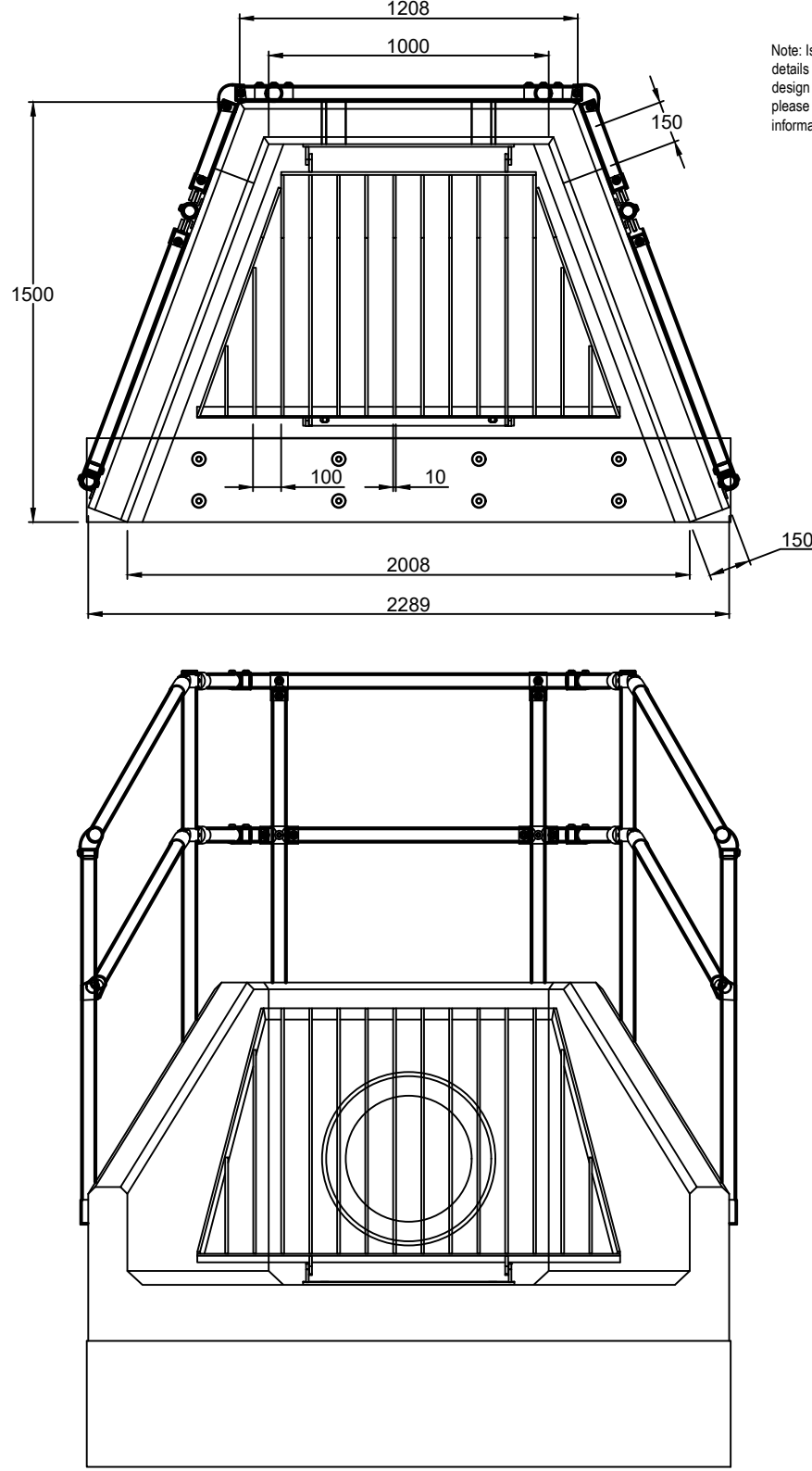
Typical Sewer/Drain Section

Class S with concrete slab protection

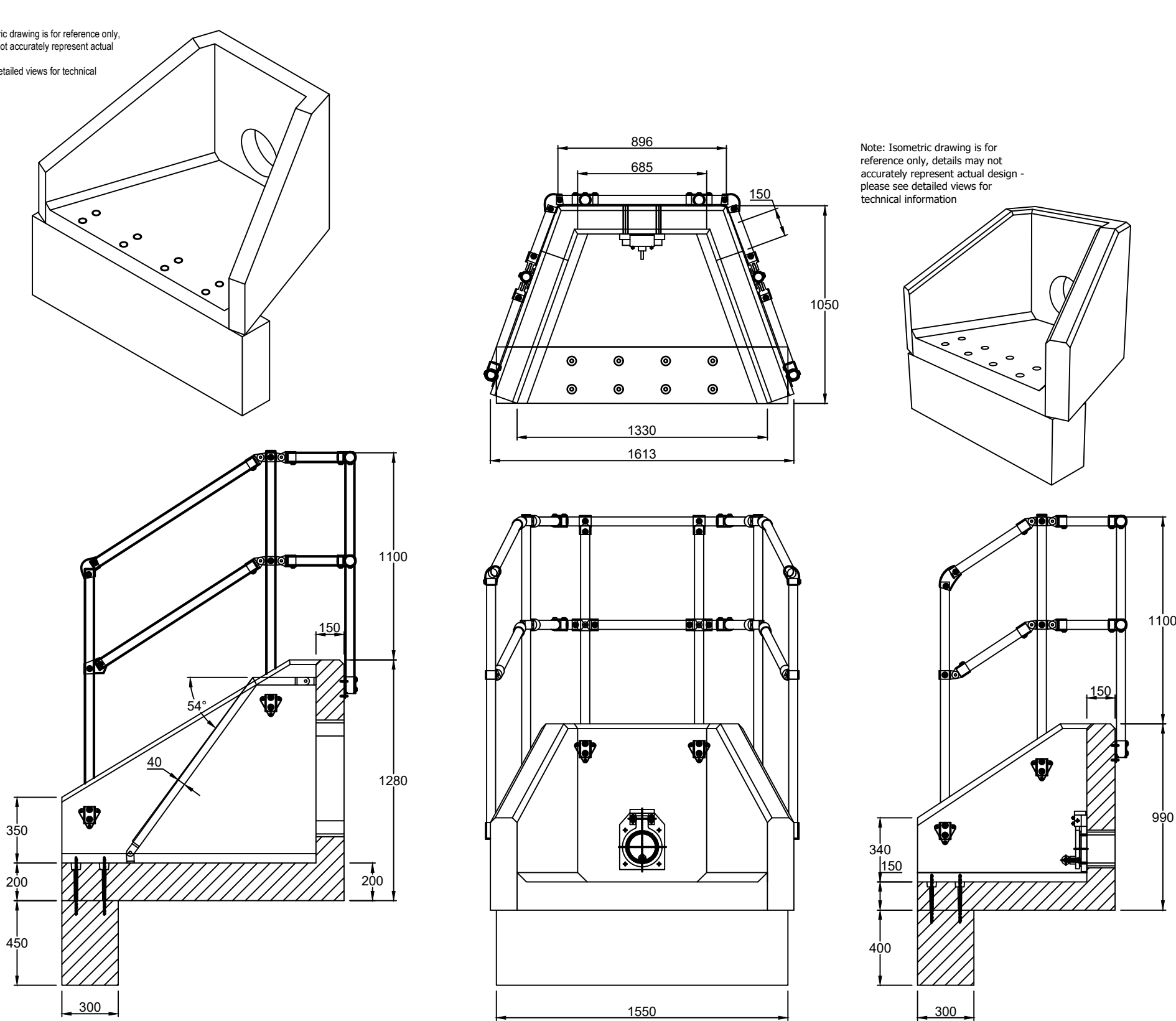
1:20



ATHLON SFA10 Y HEADWALL - OUTFALL SAFETY GRILLE
(Max Pipe Dia 600mm)
1:25



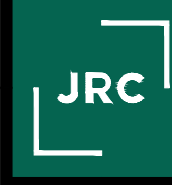
ATHLON SFA11 C HEADWALL - CRANKED GRATING
(Max Pipe Dia 450mm)
1:25



ATHLON SFA6 B HEADWALL - FLAP VALVE
(Max Pipe Dia 600mm)
1:25

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ALTHON HEADWALL NOTES

- All dimensions in mm
- All measurements ± 1 mm

Specification Information

- Opening in back wall cast to suit outside diameter of the pipework
- Invert level of pipe can be set to your specification

Headwall Installation

Units should be bedded on minimum 200mm thick well compacted Class 6A* selected well graded granular material.
*Manual of contract documents for Highway Works: Volume (MCHW1) specification for Highway Works, Series 600 (Nov.09).
Sit the headwall level or with a slight fall 1:50 from pipe to spill mouth.

Handling

- Weight of concrete is based on 2.4 tonne/m³+5% is recommended for sizing lifting equipment.
- All lifting points shall be used as specified below
- Unit to be lifted as per lifting diagram

Concrete

- Mix ref: Self-compacting DC4/DS4 Mix
- Lifting strength based on 2 cubes = 20N/mm²
- Characteristic 28 day cube strength = 50N/mm²
- Concrete provides Design Chemical Class 4 (DC4) to special Digest 1, Table F2.

Reinforcement

- Reinforcement to BS EN 13369
- Scheduling, dimensioning, bending & cutting to BS8666
- Cage to be machine tied with steel wire

Manufacture

- Manufacture to BS EN 15258:2008 precast concrete products - Retaining wall elements, Factory Production Control certificate number: 0086-CPR-650448 & BS EN 13369
- Tolerances to BS EN 13369 clause 4.3.1.1
- Finishing:

- Marking: Units shall be indelibly marked to show:
 - Mould reference code
 - De-mould date
 - Job reference number & unique product number
 - Unit weight (kg)

Design

- Concrete design to EC2
- Althon have designed the concrete units only, the site conditions should be assessed for suitability by the scheme designer
- Units are designed to withstand a vertical live load surcharge of 10kN/m²
- Weight of soil = 18kN/m³
- Angle of internal friction = 30 Deg
- Design Life: >100 years

Fabrication Specification

- Manufacture IAW EN 1090-2 EXC CLASS 1
- Material grade is to be: BS EN 10025 S275
- Welding carried out IAW EN 1090-2 PARA 7.5.4 - 7.5.18
- All fillet and butt welds to have a minimum throat thickness of 6mm & joints to be fully welded where possible.
- Ensure vertical flats are fully welded both sides where possible.
- All sharp edges and burrs are to be removed.
- Remove all weld spatter.
- Holes by punching are permitted with reaming.
- Galvanising is carried out after fabrication to BS EN ISO 1461

Handrail Specification

- Kee Klamp® Galvanised Size 8 Fittings
- Size 8 48.3mm OD 3.2mm Wall Thickness Galvanised Medium Duty Tube to BS EN 10255
- 360Nm Design Load at stated in BS 8118, BS 6180, BS 6399 & BS 7818, Civil Engineering Specification for the Water Industry (CESWI) 7th Edition Clause 2.60 Handrails & Balusters & The Engineering Equipment and Materials Users' Association (EEMUA) Publication 105 7th Edition Factory Stairways, Ladders and Handrails
- Other design loads available on request
- GRP/FRP Handrails also available

TA1	31.03.26	First Issue	JDC	DWJP
REV.	DATE	DETAILS	BY	CHK.



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DRAWING STATUS FOR TECHNICAL APPROVAL

PROJECT
ELM GROVE
TROWBRIDGE

CLIENT
REDROW

DRAWING TITLE
S104 DRAINAGE CONSTRUCTION DETAILS
SHEET 2

SCALE @ A1 AS SHOWN	SIZE A1	DATE MAR 26
PROJECT NUMBER 1960	DRAWING NUMBER 3582	REVISION TA1

