

Portsmouth Water Limited

Solent Road

Solent Road, Havant

Flood Alleviation Completion Report

**REPORT REF.
191922-01**

June 2021

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Document Control Sheet

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	For Information	LB	CC 	BC 	07.06.2021

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1. Introduction

- 1.1. The Solent Road Flood Alleviation Scheme was proposed to reduce the risk of flooding from the Lavant Stream to the site through removal of a 600mm diameter culvert and by providing mitigative compensation areas to facilitate development on the adjacent land. It was proposed to construct a new bund to attenuate exceedance flows.
- 1.2. The Flood Alleviation Scheme comprised of lowering the southern bank to levels ranging from 5.05mAOD to 5.4mAOD and a localised lowering of areas along the northern bank to levels ranging between 5.2mAOD and 5.4mAOD. A bund was proposed to be constructed to the south of the watercourse with a crest width of 0.5m set at levels ranging from 5.8mAOD to 6.05mAOD with side slopes of 1 in 2. The designed scheme is shown in **Appendix A** whilst the As-Built drawings are provided in **Appendix B**, for reference.
- 1.3. This note sets out the review undertaken by Ardent Consulting Engineers (hereafter referred to as 'Ardent') of the As-Built survey of the constructed flood alleviation scheme focussing on the following key elements:
 - Construction of the Flood Defence Bund.
 - Construction of the Compensation Areas to the North of the Lavant Stream.
 - Construction of the Retaining Wall at the location of the Existing Headwall.
- 1.4. This report should be read in conjunction with the relevant drawings and the specifications including the CDM and Health & Safety Files produced by Woodmace Limited (the contractor).

2. Site Visit

- 2.1. Ardent undertook a site investigation on Friday 30th April 2021 between 1pm and 2pm to carry out a visual inspection of the works. The construction at the time of the visit was nearing completion and the purpose of the visit was to ensure that the construction following the proposed design drawings (Ref. *191921-001, 191921-002, 191921-003, 191921-004*).
- 2.2. The visual inspection of the bund and compensation areas noted little discrepancy between the design and construction although it was noted, anecdotally, that levels of the compensation areas had been amended slightly due to the on-site levels found during the construction process. It is believed that water levels were higher at the time of the initial topographical survey and, as such, some discrepancy was recorded with level heights. This is discussed further in the following section.
- 2.3. At the time of visit the bund was being completed with all elements visually appearing in place save for the Flood Defence Marking on the edging, which was in the process of being installed, and the retaining wall which had already been built over with the bund. The Enkamat geotextile was also not installed but was noted as being present on site.
- 2.4. It has since been confirmed that all of the above items were constructed appropriately. Please refer to the Photographic Log produced by Ardent (Ref. *191922-02*).

3. Construction Works – As-Built Survey Levels Review

Flood Defence Bund

- 3.1. The As-built survey was overlaid upon the design drawings to assess the alignment and relative levels of the bund crest. A review of this noted that the alignment was essentially the same with an allowance for an appropriate tolerance to allow for the on-site levels.
- 3.2. Furthermore, along the crest of the bund the levels are within $\pm 10\text{mm}$ with the main body of the bund slightly higher than the design. This construction is therefore considered appropriate.
- 3.3. Confirmation of the appropriateness of the geotechnical properties of the completed bund is provided in the Ridge and Partners Geotechnical Completion Report (Ref. 5013348-RDG-XX-ST-DOC-C-06-SVR-300421).

Northern Compensation Areas - Levels

- 3.4. In order to compensate for the lost floodplain in the development site to the south of the Lavant Stream it was necessary to provide 107m^3 of compensation on the northern bank with these areas designed at levels between 5.2mAOD and 5.4mAOD.
- 3.5. However, once on-site works commenced it became apparent that the tree survey works were not fully representative of the site layout. As such, the design was amended to utilise as much of the area as possible for compensation resulting in a compensatory volume of 118m^3 being provided.
- 3.6. As introduced earlier, site levels noted during the construction deemed that these levels would not be appropriate and, as such, two of the compensation areas are located $\pm 150 - 200\text{mm}$ above the proposed design.
- 3.7. A hand calculation of these two areas was undertaken with a conservative estimate of the entire base areas being 200mm higher. This leads to an estimated loss of volume of 17m^3 . This results in a compensation volume of 111m^3 provided on site.
- 3.8. Considering this volume against the initial volume required (107m^3), the compensation volume that has been constructed is still larger than that required and therefore the construction is considered appropriate.

Northern Compensation Areas – Unknown Services

- 3.9. It was noted during the construction phase that a previously unknown service, in the form of an overflow pipe from north of the site, was encountered. The pipe is understood to act as an overflow from the ponds to the north of the development area.
- 3.10. The pipework alignment runs through one of the proposed compensation areas creating an obstruction. However, given the size of the pipework it not considered a significant constraint and should not act as an impediment to the compensation area function. Please refer to **Figure 1** below for an image of the pipe.



Figure 1: Existing Overflow Pipe in Compensation Area (Ref. *Photograph 3 in Report Ref. 191922-02*)

Retaining Wall Structure and Enkamat Covering

- 3.11. During the site visit undertaken by Ardent, the retaining wall structure was not evident on site as the topsoil associated with the bund had been placed over the top. However, photographic evidence of the construction of the retaining wall and Enkamat placement have been provided by Woodmace and illustrated in **Figure 2** below.



Figure 2: Retaining Wall and Enkamat Construction Process

3.12. The levels of the bund and markers are within $\pm 5\text{mm}$ of the longsection design with the alignment appropriate with the design works. As such, the construction is considered appropriate.

Flood Defence Marker

3.13. Evidence of the Flood Defence Marker on the edging to the bund has been provided by Woodmace and is shown to be appropriate in **Figure 3** below.



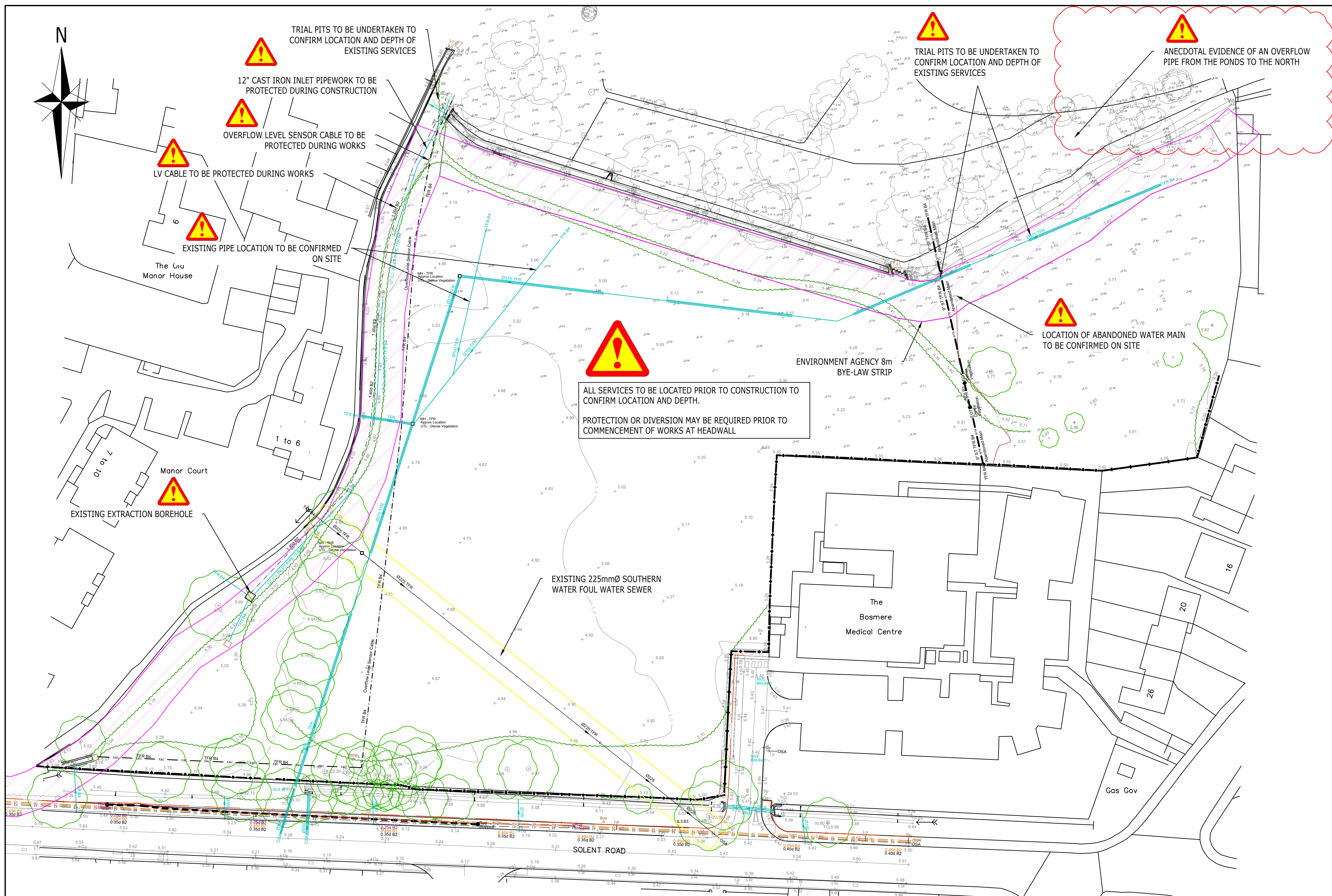
Figure 3: Evidence of Flood Defence Marker on Bund Edging

4. Conclusion

- 4.1. Following on from the review of the available information (Ref. *As-Built Survey, Woodmace*) the flood alleviation scheme has been concluded to have been constructed in accordance with the Ardent design (line and level).
- 4.2. Confirmation of the appropriateness of the geotechnical properties of the completes bund is provided in the Ridge and Partners Geotechnical Completion Report (Ref. *5013348-RDG-XX-ST-DOC-C-06-SVR-300421*).
- 4.3. The construction of the flood defence bund and compensations areas, in terms of line and level, is therefore deemed appropriate and acceptable.

Appendix A

Ardent Consulting Engineers Design Layouts



UTILITIES / CONSTRAINTS KEY:

- LV — EXISTING LV ELECTRICITY CABLE (UG)
- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PUBLIC (SOUTHERN WATER) FOUL WATER SEWER
- SOUTHERN WATER 6m EASEMENT
- EXISTING 12" CAST IRON INLET PIPE
- EXISTING FIBRE OPTIC CABLE (UG)
- EXISTING BT TELECOM (UG)
- EXISTING WATERCOURSE
- ABANDONED POTABLE WATER MAIN
- ELECTRIC COMMUNICATIONS (UG)
- 8m ENVIRONMENT AGENCY BYE-LAW STRIP
- EXISTING CULVERT & HEADWALLS TO BE REMOVED
- FENCE LINE

! WARNING

THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES WITHIN THE VICINITY OF THE WORKS (HAND DUG OR OTHER METHOD) 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.

ONLY DRAINAGE PICKED UP FROM GPR SURVEY INCLUDED WITHIN THE CONSTRAINTS PLAN. ALL PRIVATELY OWNED PORTSMOUTH WATER UTILITIES AND ASSETS MAY NOT BE SHOWN ON THE PLAN AND THEREFORE THE CONTRACTOR SHOULD TAKE CARE WHEN EXCAVATING AND WORKING IN ALL AREAS ACROSS THE SITE.

PROPOSED WORKS ARE LOCATION WITHIN THE VERY NORTHERN REGION OF ZONE C AND POSES A LOW RISK TO SPRINGS.

CONTRACTOR TO BE MINDFUL OF ANY WORKS AND OR ACCESS REQUIRED WITHIN ADJACENT, HIGHER RISK ZONES WITH CARE TAKEN TO ENSURE NO CONTAMINATION OF THE SPRINGS OCCURS.

REFER TO B.A. HYDRO SOLUTIONS REPORT DATED NOVEMBER 2014

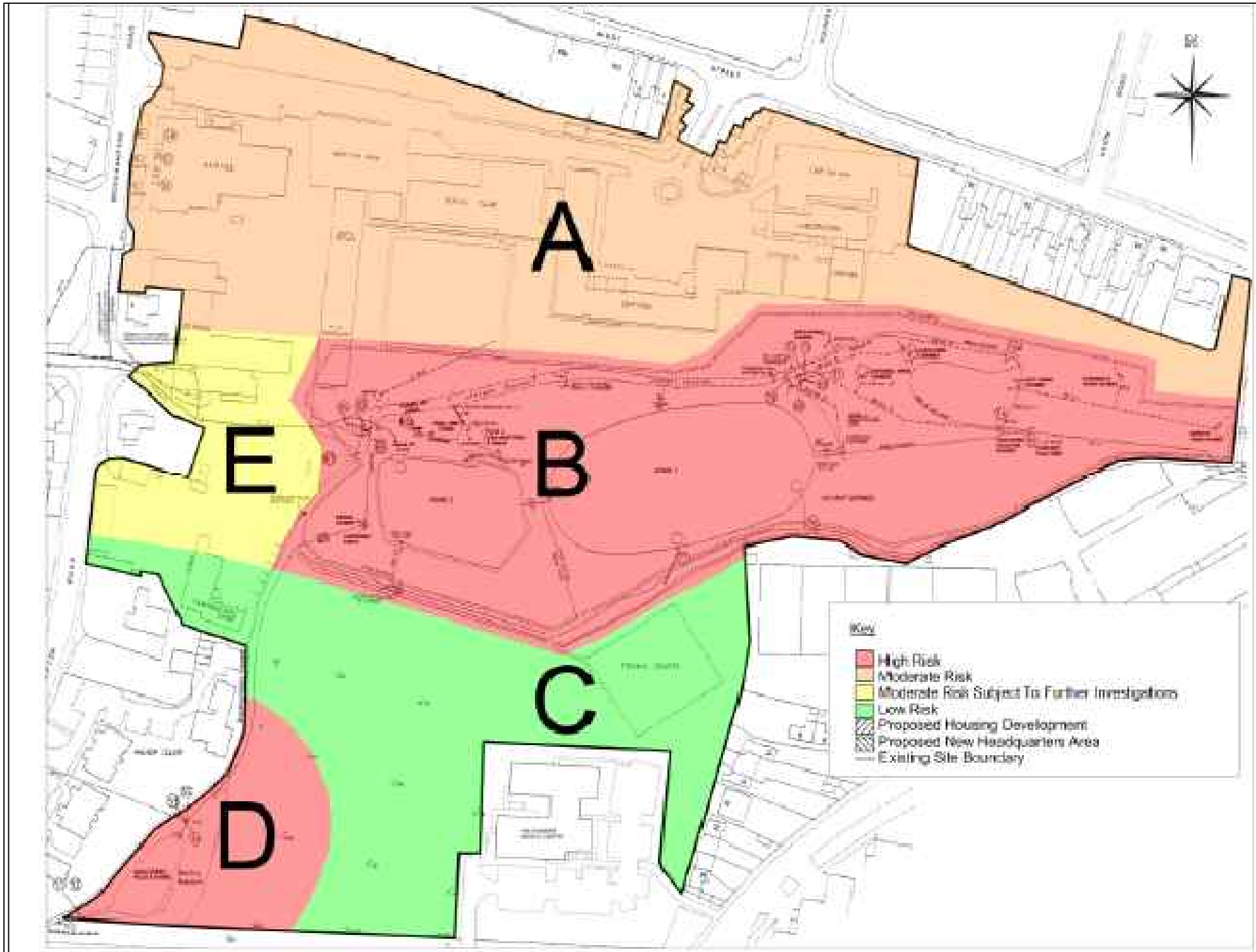


FIGURE 1: RISK ZONES TO SPRINGS ASSOCIATED WITH THE PORTSMOUTH WATER SITE. EXTRACTED FRIM B.A. HYDRO SOLUTIONS REPORT

- NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
 - ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES UNLESS OTHERWISE STATED.
 - DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
 - 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 MATERIALS AND WORKMANSHIP SHALL COMPLY FULLY WITH THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOLUME ONE, SPECIFICATION FOR HIGHWAY WORKS AND THE LOCAL AUTHORITY SPECIFICATION FOR ROAD CONSTRUCTION AND STANDARD DETAILS.
 - ALL CLAY AND CONCRETE PIPEWORK TO BE IN ACCORDANCE WITH BS EN 295-1/ BS 65 AND BS EN 1916/ BS 5911-1 RESPECTIVELY, ALL LAND DRAINS TO BE IN ACCORDANCE WITH TABLE 5/1 OF MCDHW.
 - EXISTING TOPSOIL TO BE RETAINED ON SITE IN ACCORDANCE WITH BS 3882-07.
 - ALL BUND SLOPES TO BE TOPSOILED PRIOR TO SEEDING TO A MINIMUM DEPTH OF 100mm FOR LANDSCAPE PROPOSALS.
 - THE CONTRACTOR IS TO SATISFY HIMSELF THAT THE POSITION OF ALL UTILITIES IS CORRECT.
 - REFER TO THE LATEST GEOTECHNICAL SPECIFICATION FOR MATERIAL DETAILS. REPORT REFERENCE 5013348 PRODUCED BY RIDGE AND PARTNERS LLP, OCTOBER 2020
 - UNLESS STATED OTHERWISE, ALL EXCAVATED MATERIAL SHALL BE DISPOSED OF AT AN APPROVED TIP OFF-SITE.
 - THE PUBLIC HIGHWAY AND WORKS WILL BE KEPT CLEAN AND FREE OF DEBRIS BY USE OF WHEEL WASHING FACILITIES AND ROAD SWEEPERS TO THE COUNCIL'S SATISFACTION.
 - ALL SETTING OUT SHALL BE AGREED ON-SITE WITH THE ENGINEER, PRIOR TO THE COMMENCEMENT OF THE WORKS.

- CDM NOTES:**
- THE ATTENTION OF THE CLIENT, PRINCIPAL DESIGNER, PRINCIPAL CONTRACTOR, DESIGNERS AND CONTRACTORS IS DRAWN TO THE FOLLOWING POTENTIAL RISKS IN CONJUNCTION WITH THE PROPOSED ON-SITE AND OFF-SITE WORKS AS DESIGNED FOR THIS PROJECT:
- WORKS IN THE VICINITY OF LIVE SERVICES INCLUDING GAS, ELECTRICITY, BT AND TELECOMS WILL BE NECESSARY AND THE ADVICE OF ALL STATUTORY SERVICE COMPANIES MUST BE SOUGHT BEFORE ANY WORKS COMMENCE. PRIVATE SERVICES MAY BE PRESENT WITHIN THE LIMIT OF WORKS AND CARE SHOULD BE TAKEN TO LOCATE AND AVOID THESE DURING CONSTRUCTION.
 - WORKS WITHIN AND ABUTTING THE EXISTING HIGHWAY WILL ENTAIL TRAFFIC HAZARDS AND ALL APPROPRIATE SAFETY MEASURES INCLUDING BARRIERS, SIGNS AND LIGHTING MUST BE UNDERTAKEN TO THE APPROVAL OF THE LOCAL AUTHORITY, THE HIGHWAY AUTHORITY AND THE POLICE DEPARTMENT.
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- CONSTRUCTION CONSTRAINTS**
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 - CONSIDERATION TO BE GIVEN FOR DRYING OF WON MATERIAL.#
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 - PHASING OF WORKS.
 - WORKS OVER AND ADJACENT TO LIVE UTILITIES.
 - INCLEMENT WEATHER DELAYING THE EARTHWORKS WORKS PROGRAMME

TENDER ISSUE **FOR INFORMATION ONLY**

B	TPO REMOVED AND OVERFLOW PIPE NOTED	LB	CC	BC	31.03.2021
A	ROOT PROTECTION AREAS AMENDED	LB	CC	BC	17.11.2020
Rev	Description	Drn	Chk	App	Date

ARDENT CONSULTING ENGINEERS

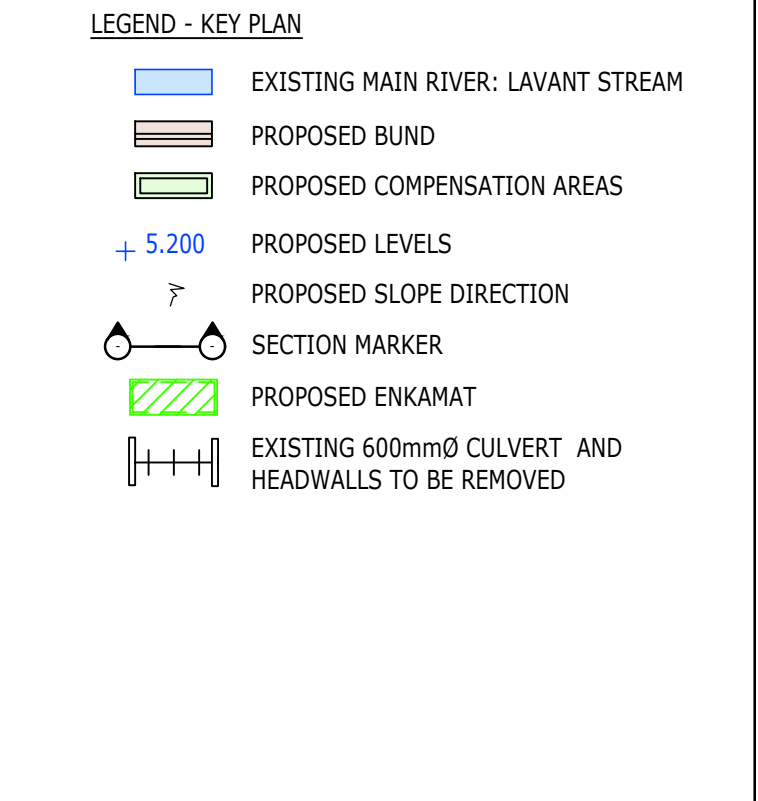
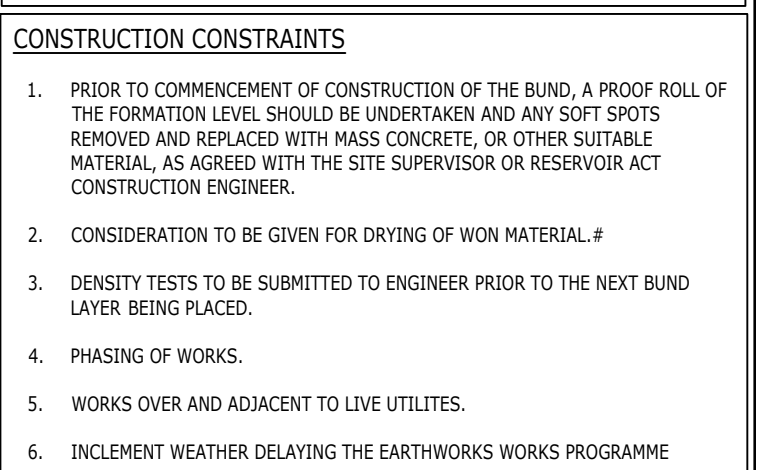
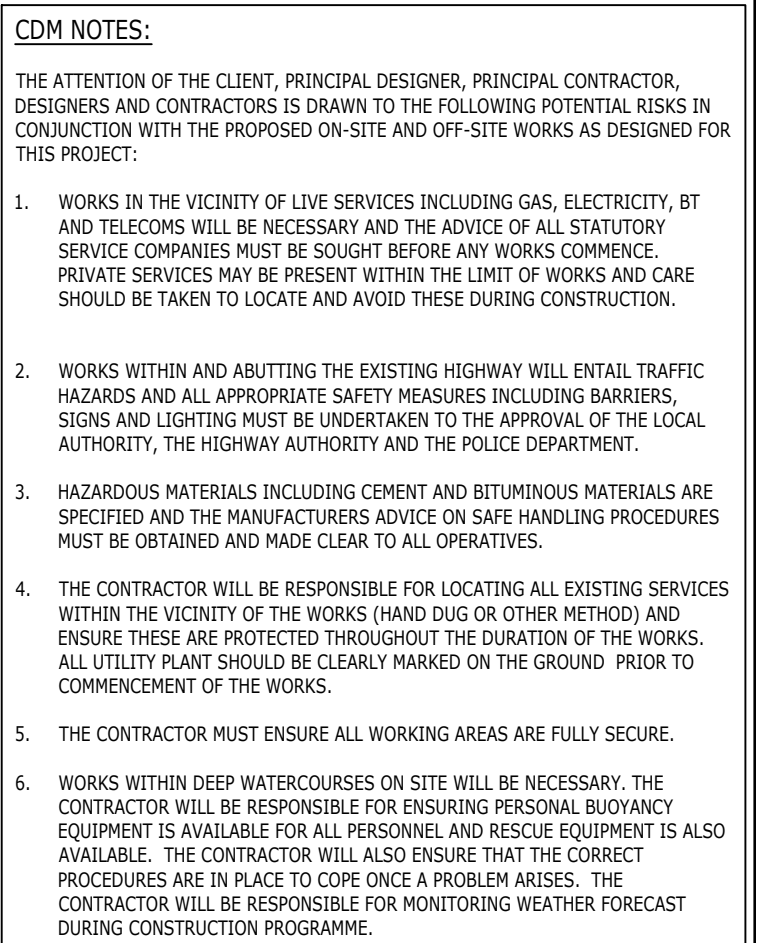
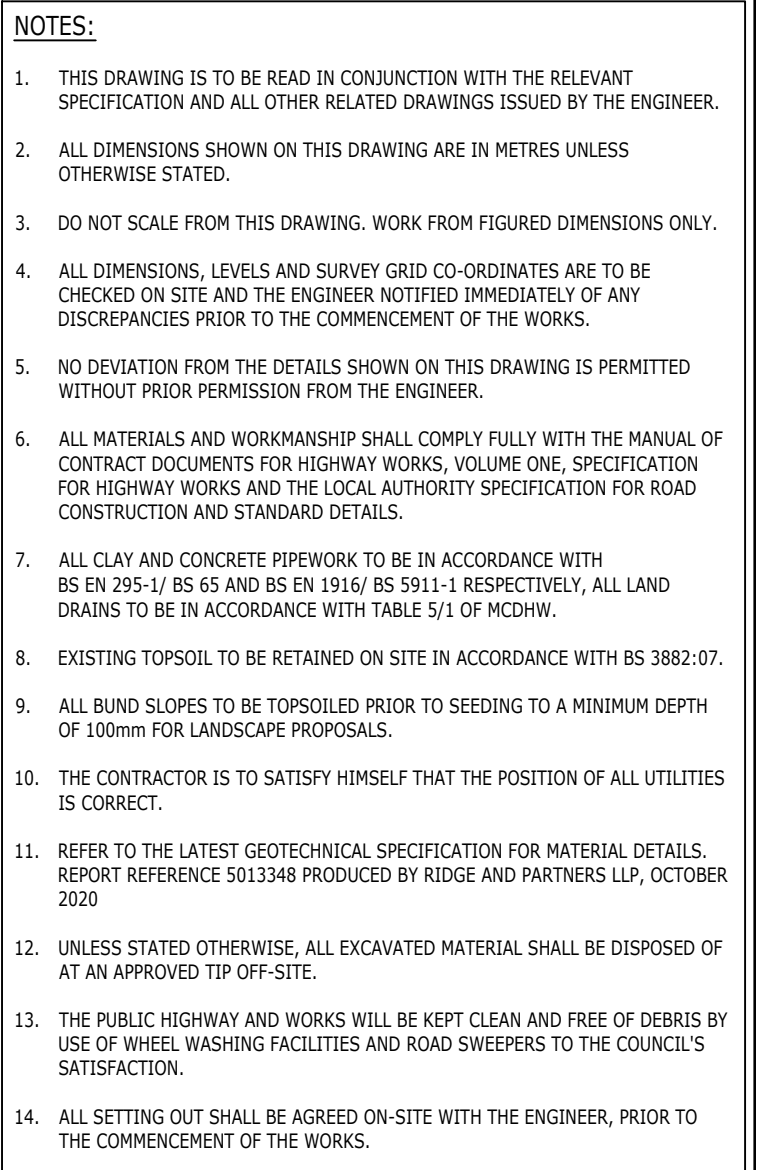
Third Floor
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London
EC3M 5JE

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

Client: **PORTSMOUTH WATER**

Project Title: **SOLENT ROAD, HAVANT**

Drawing Title: CONSTRAINTS PLAN			
A1 Scale	Date	Designed by	LB
1:500 @ A1	16.10.2020	Checked by	CC
Drawn by	LB	Approved by	BC
Drawing Number	191921-001		Rev B



NOTE:
IN ACCORD WITH DMRB PART 5 HD 39/16, THE SURFACE LEVEL OF KERBS AND EDGING STRIPS SHALL BE WITHIN $\pm 6\text{mm}$ OF THE DESIGN LEVEL

TENDER ISSUE
FOR INFORMATION
ONLY

C	COMPENSATION AREAS AMENDED AND TFO REMOVED	LB	CC	BC	31.03.2021
B	COMPENSATION AREAS AMENDED FOR PW OBSERVATIONS	LB	CC	BC	10.03.2021
A	RPZ AND COMPENSATION AREAS AMENDED	LB	CC	BC	17.11.2020
Rev	Description	Drn	Chk	App	Date

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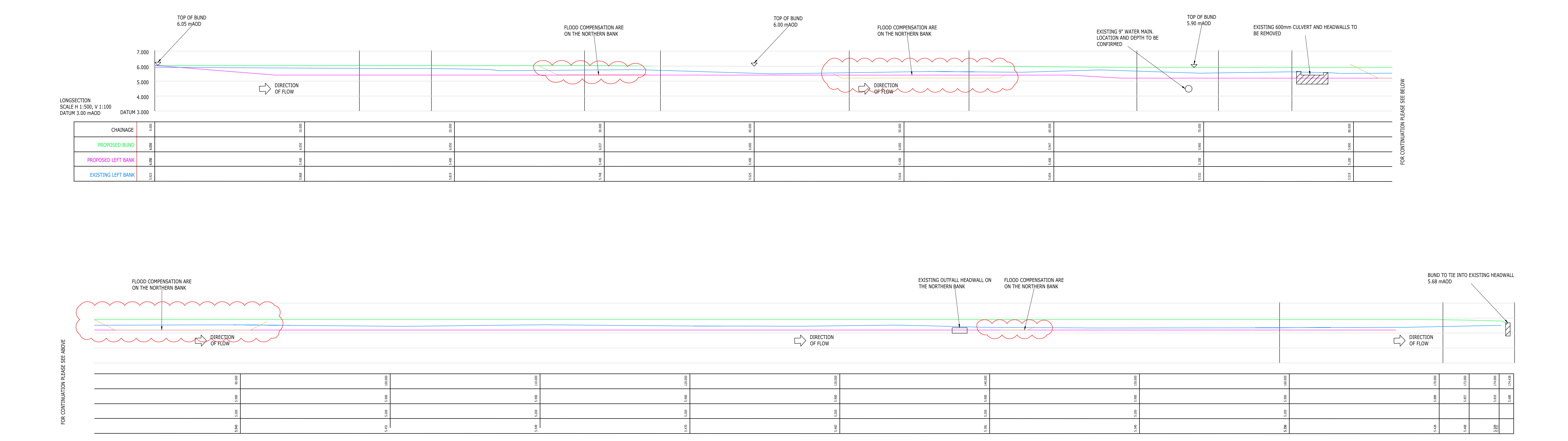
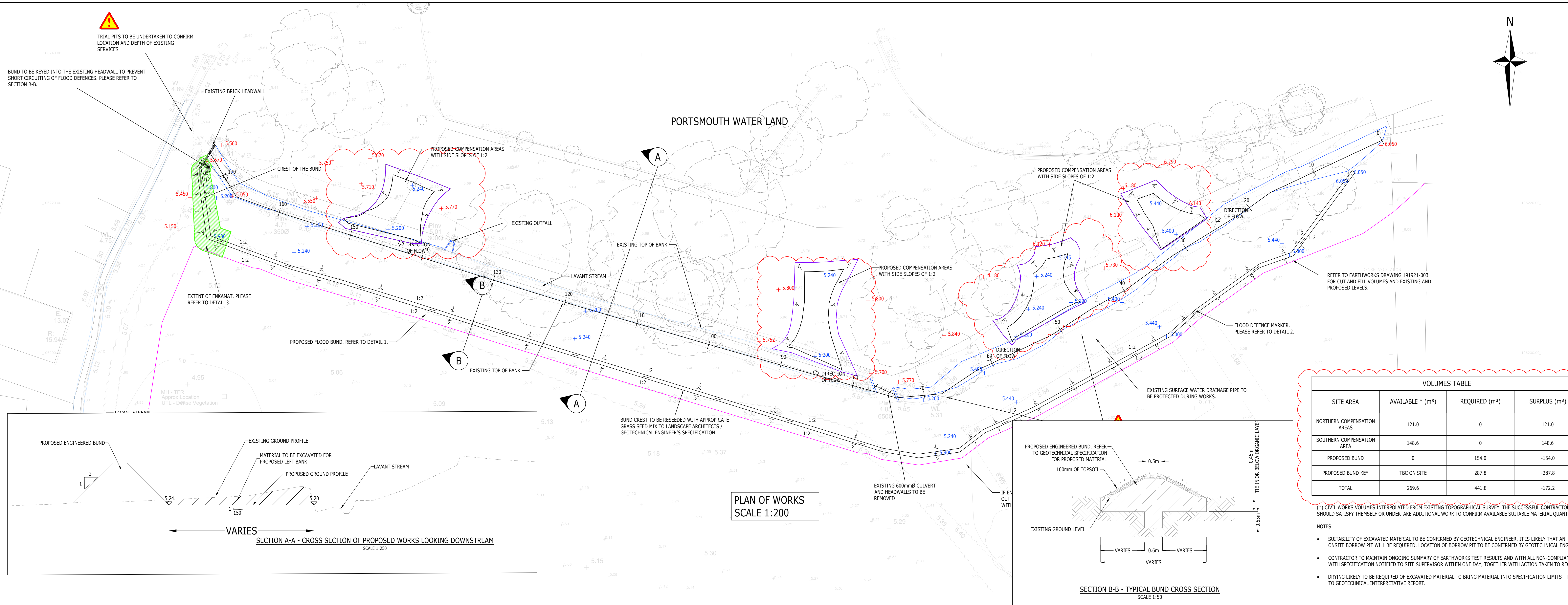
PORTSMOUTH WATER

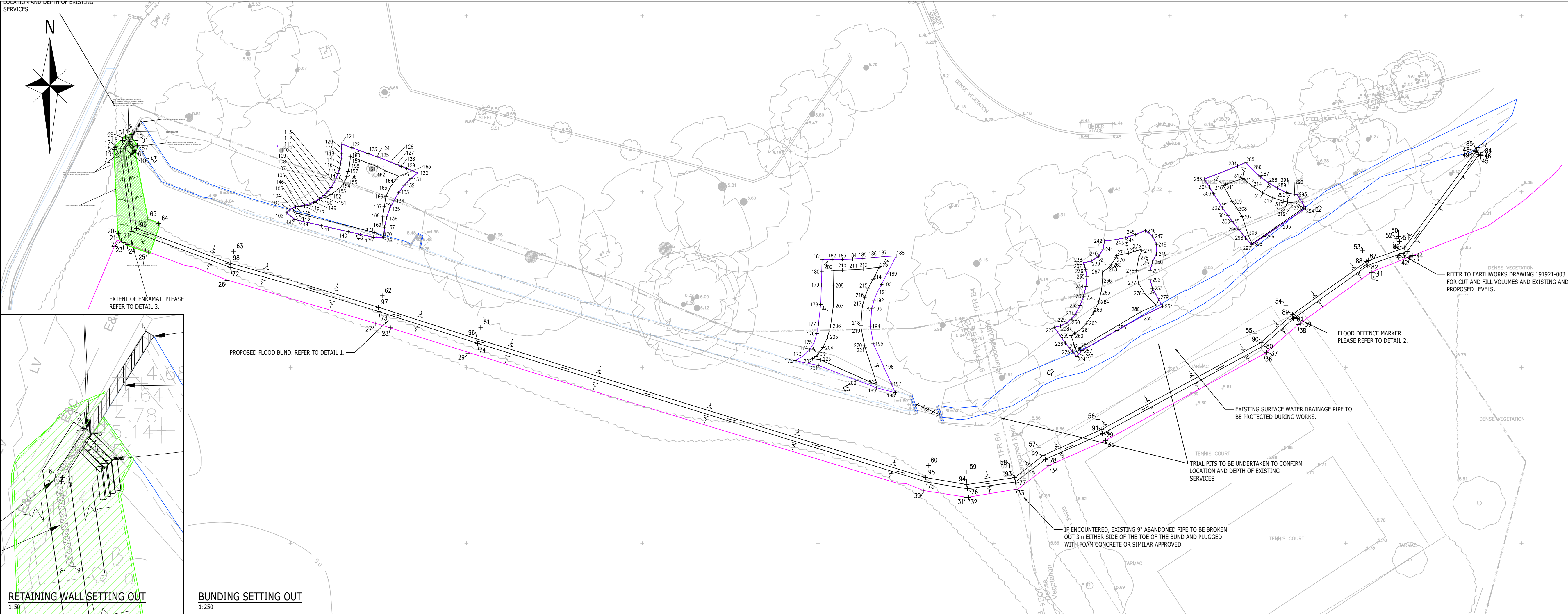
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SOLENT ROAD, HAVANT

Drawing Title:

**PROPOSED FLOOD ALLEVIATION
WORKS PLAN AND DETAILS**

A0 Scale AS SHOWN	Date October 2020	Designed by LB
Drawn by LB	Checked by JE	Approved by BC
Drawing Number 191921-002		Rev C





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TENDER ISSUE **FOR INFORMATION ONLY**

B	COMPENSATION AREAS AMENDED AND TPO REMOVED	DR	LB	BC	31.03.2021
A	COMPENSATION AREAS AMENDED FOR PW OBSERVATIONS	LB	CC	BC	11.03.2021

Rev	Description	Dwn	Chk	App	Date
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Web: www.ardent-ce.co.uk
E-mail: enquiries@ardent-ce.co.uk

worksafe consultant
www.smasit.co.uk

SSIP SAFETY SCHEDULED IN PREPAREDNESS

Client

PORSTMOUTH WATER

Project Title:

SOLENT ROAD, HAVANT

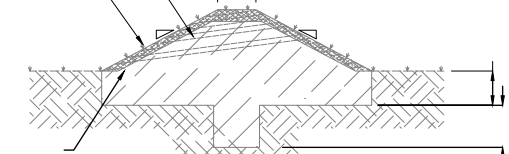
Drawing Title:

SETTING OUT PLAN

A1 Scale	Date	Designed by	LB
1:250 @ A1	17.11.2020		
Drawn by	Checked by	Approved by	BC
AMG	CC		
Drawing Number	191921-004		Rev B

Appendix B

Woodmace Limited As-Built Survey



WOODMACE

PROJECT

PORTSMOUTH WATER CO

AS-BUILT SURVEY

FLOOD ALLEVIATION BUND