



Robert **Bird** Group

Structural and Civil Design Statement

**Blacktown Mount Druitt Hospital
Stage 2 Redevelopment**

SSD for Bulk Excavation
(Early Works Package)

Issue: C

Prepared For: Health Infrastructure NSW

Project No.: 10684X

28th September 2015

Document No.: RPT-S-150928



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Appendix C – Sediment and Erosion Control Plan

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1.0 Introduction

Robert Bird Group (RBG) has been engaged by Health Infrastructure (HI) NSW to provide structural and civil engineering advice on the building works for Stage 2 of the Blacktown Mount Druitt Hospital Redevelopment (BMDH-2).

This report is in relation to the scope of works named “Early Works Package – Bulk Excavation”, in particular the structural and civil design associated with the bulk excavation, shoring and retention systems to be adopted in the new Clinical Services Building.

The structural design for the main building will be developed and included in the future SSD application for the detailed design of the Clinical Services Building

2.0 Key Issues

Preliminary studies have identified the following items to be key issues in the structural design of the retention system of the Clinical Services Building.

2.1 General Basement Shoring

- There are two levels of sub-ground floors (L1 and L2) requiring excavation to different levels across the site.
- Due to the varying depth to competent rock across the site, and the depth of the proposed excavation, the proposed retention system around the footprint of the building will consist of a combination of contiguous piles, soldier piles with shotcrete infill panels, and temporary earth batters.
- Temporary anchors will be adopted as required to provide horizontal restraint to the piled walls prior to construction of the building’s permanent slabs

2.2 Services Tunnels

- The services tunnels connect L1 and L2 of the new Clinical Services Buildings to existing hospital buildings. Appendix A contains sketches indicating the extent of the proposed services tunnels on the site and a conceptual construction methodology
- The construction of the services tunnels that extend from the new clinical services building to the existing facility will require :
 - Contiguous piled walls in the area outside the footprint of the existing buildings.
 - Excavation and construction below the existing L2 and L3 slabs and around existing foundations. A shotcrete wall system is proposed for the services tunnels below the existing slabs. Excavation and installation of the shotcrete will be carried out in stages.
- The ground level below the existing slab varies, in some areas the existing slab has been poured directly on ground, in other areas a void space exists under the slab.

Structural drawings showing the retention systems and a conceptual construction methodology for the tunnels are contained in Appendix A.

3.0 Design Parameters – Structural

The structural design will be based on the following loadings :

3.1 Vertical Loads

The vertical loads to be considered are separated into dead loads (permanent actions) and live loads (imposed actions). The dead load to be resisted by each structural element will be taken as the sum of the self-weight of the structure to be supported and a nominated superimposed dead load (SDL) to allow for additional permanent loads from partitions, toppings, ceilings and services where applicable. The live loads (LL) are determined from AS1170.1 according to the intended floor usage.

3.2 Horizontal Loads

The design of the shoring and retention systems will incorporate the advice and soil design parameters nominated by the J&K Geotechnical report.

3.3 Design Standards

Structural design will be conducted in accordance with the current revision of all relevant Australian Standards. These standards will include, but are not limited to:

Standard	Title	Edition
AS/NZS 1170.0	Structural Design Actions Part 0: General Principles	2002
AS/NZS 1170.1	Structural Design Actions Part 1: Permanent, Imposed and Other Actions	2002
AS/NZS 1170.2	Structural Design Actions Part 2: Wind Actions	2002
AS1170.4	Structural Design Actions Part 3: Earthquake Loads	2007
AS 2159	Piling – Design and Installation	2009
AS 2670.1	Evaluation of human body exposure to whole-body vibration	2001
AS 3600	Concrete Structures	2009
AS 3700	Masonry Structures	2001
AS 4100	Steel Structures	1998

4.0 Design Parameters – Civil

The civil design will be based on the following :

4.1 Design Standards / References

- Managing Urban Stormwater – Soils and Construction Volume 1 (4th Edition, March 2004) – NSW Department of Housing
- Blacktown City Council Development Control Plan 2015 Part J Water Sensitive Urban Design and Integrated Water Cycle Management
- Blacktown City Council Works Specification Civil - 2005
- AS 3798 Guidelines on Earthworks for Commercial and Residential Developments

4.2 Erosion and Sediment Control

To maintain the quality of stormwater discharge from the site during the construction stage, erosion and sediment control measures will be installed. Soil management measures are to be in compliance with the Landcom guidelines – Managing Urban Stormwater Runoff: Soils and Construction (“Blue Book”) and Blacktown City Council’s Development Control Plan (DCP). The sediment and erosion control plan is included in the Appendix C.

Potential erosion and sediment control measures for the development may include, but not be limited to, the following:

- Settling tanks/basins;
- Surface water collection systems i.e. drains to collect construction site runoff and convey flows to control and treatment systems;
- Shaker grid and wash down areas at vehicle entry points; and,

- Sediment protection devices on existing and proposed inlet pits.
- Vehicular access shall be provided to all sediment basins to enable regular maintenance and sediment removal.

Vehicular access shall be provided to all sediment basins to enable regular maintenance and sediment removal.

4.3 Bulk Earthworks

For the bulk earthworks it is estimated that that a total volume of cut material of 33,800m³ is to be removed from site. There is no fill requirement. The above volume does not include temporary batter, slopes and does not allow for bulking of material during excavation.

As described by the geotechnical report, exported materials will consist of fill, clay and shale layers.

The bulk excavation drawings are contained in Appendix D.

4.4 Site Water Management

The existing stormwater system will be diverted around the western side of the proposed building in advance of the bulk excavation works. Refer to the Integrated Water Management Plan Report for further details

5.0 Reference Documents

5.1 Geotechnical report

The geotechnical report prepared by J&K Geotechnics – *“Report to Health Infrastructure on geotechnical Investigation for Stage 2 of Blacktown Hospital Redevelopment at Blacktown Road, Blacktown NSW, 24th July 2014, Ref : 24416SB1rpt”* – for the site has been used in the design of the shoring and retention system :

Generally, the geotechnical conditions at the site consist of fill to varying depths, overlying silty clay that grades into weathered bedrock.

In accordance with the recommendations in the geotechnical report :

- Contiguous piled walls have adopted on the northern and southern walls in locations sensitive to movement, ie adjacent to roads or adjoining structures.
- Soldier Pile walls have been adopted for the eastern and western walls in less sensitive areas.
- Piles are typically socketed 3m into rock
- Batters have been adopted in locations to address changes in levels

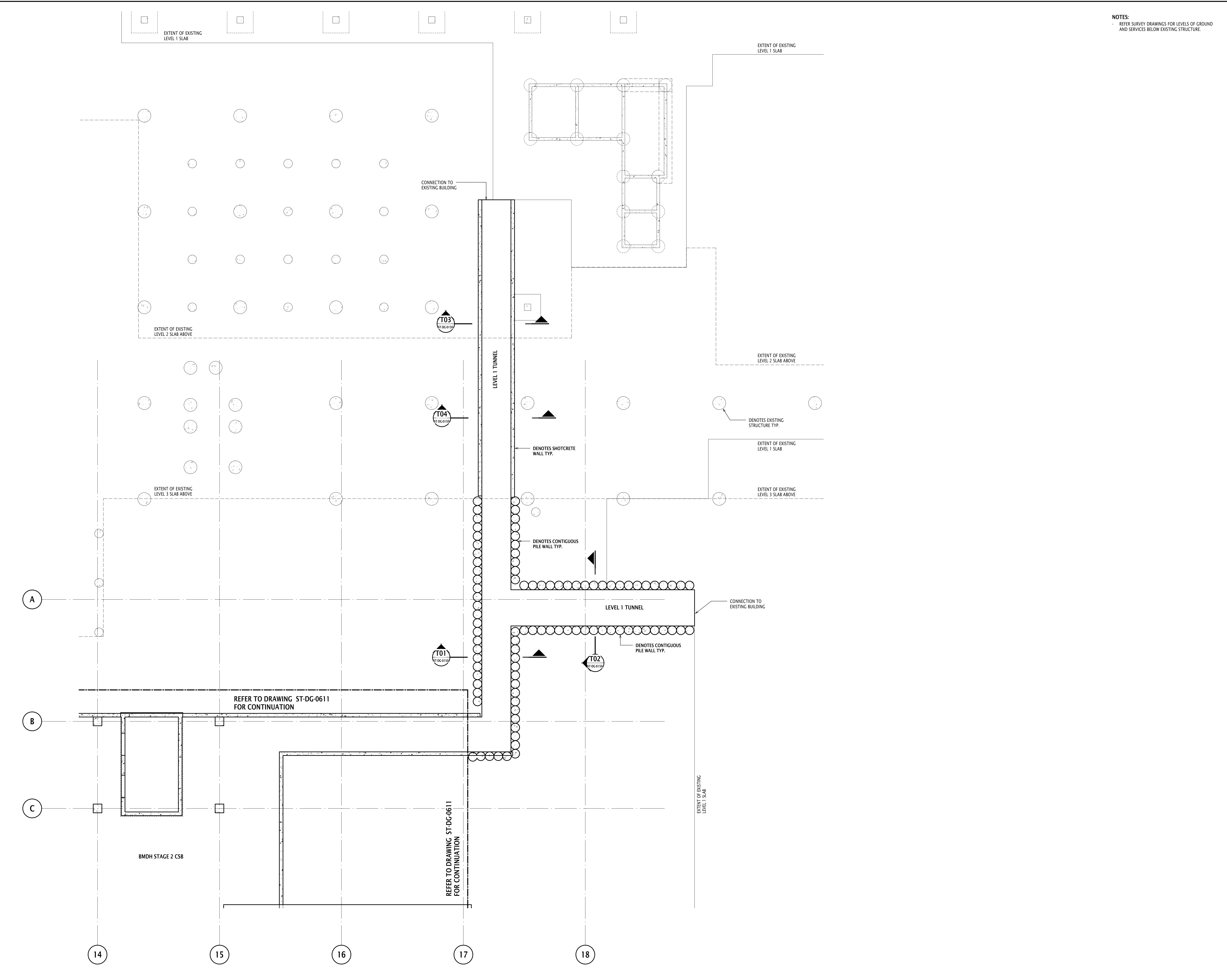
5.2 Structural drawings of existing hospital building

Structural drawings prepared by Woolacotts have been used to provide information in relation to the as-built structure - refer Appendix B for drawing listing.

Appendix A

Structural SSD Drawings

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KEY PLAN

CONSULTANT

 18 Chiswick Street
 St Leonards, NSW 1585
 AUSTRALIA
 Tel: +61 2 9852 2100
 Fax: +61 2 9852 2100
 Web: www.jacobs.com

CLIENT

 NSW GOVERNMENT Health Infrastructure

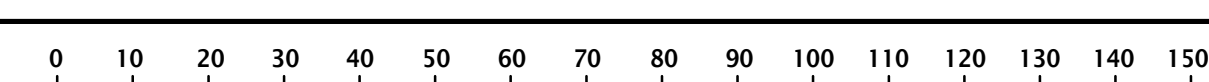
Structural, Civil & Construction Engineering Consultant
Robert Bird Group
 BRISBANE OFFICE:
 Robert Bird Group Pty Ltd
 PO Box 433,
 Fortitude Valley QLD 4006
 Level 1, 480 St Pauls Terrace
 Fortitude Valley QLD 4006
 Ph: (07) 5319 2777
 ACN 910 580 248
 Web Site: www.robertbird.com

PROJECT
BLACKTOWN HOSPITAL STAGE 2 SCHEMATIC DESIGN OLNLY
BLACKTOWN ROAD
BLACKTOWN NSW 2148

TITLE
LEVEL 1 GENERAL ARRANGEMENT SHEET 4 (TUNNEL)

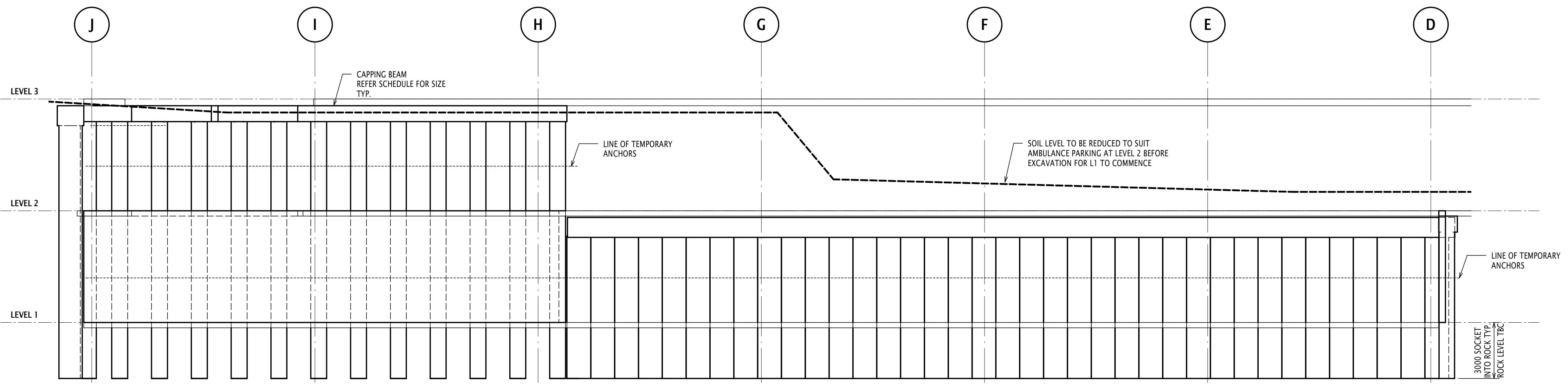
PRELIMINARY - NOT FOR CONSTRUCTION

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DESIGNER S.MORLEY	DESIGN REVIEW S.MORLEY
PRINCIPAL/PROJECT LEADER S.MORLEY	DATE 03 09 2015
Scale at B1 1 : 100	Drawing No. 10684X
Drawing No. BS2-ST-DG-0613	REV 01



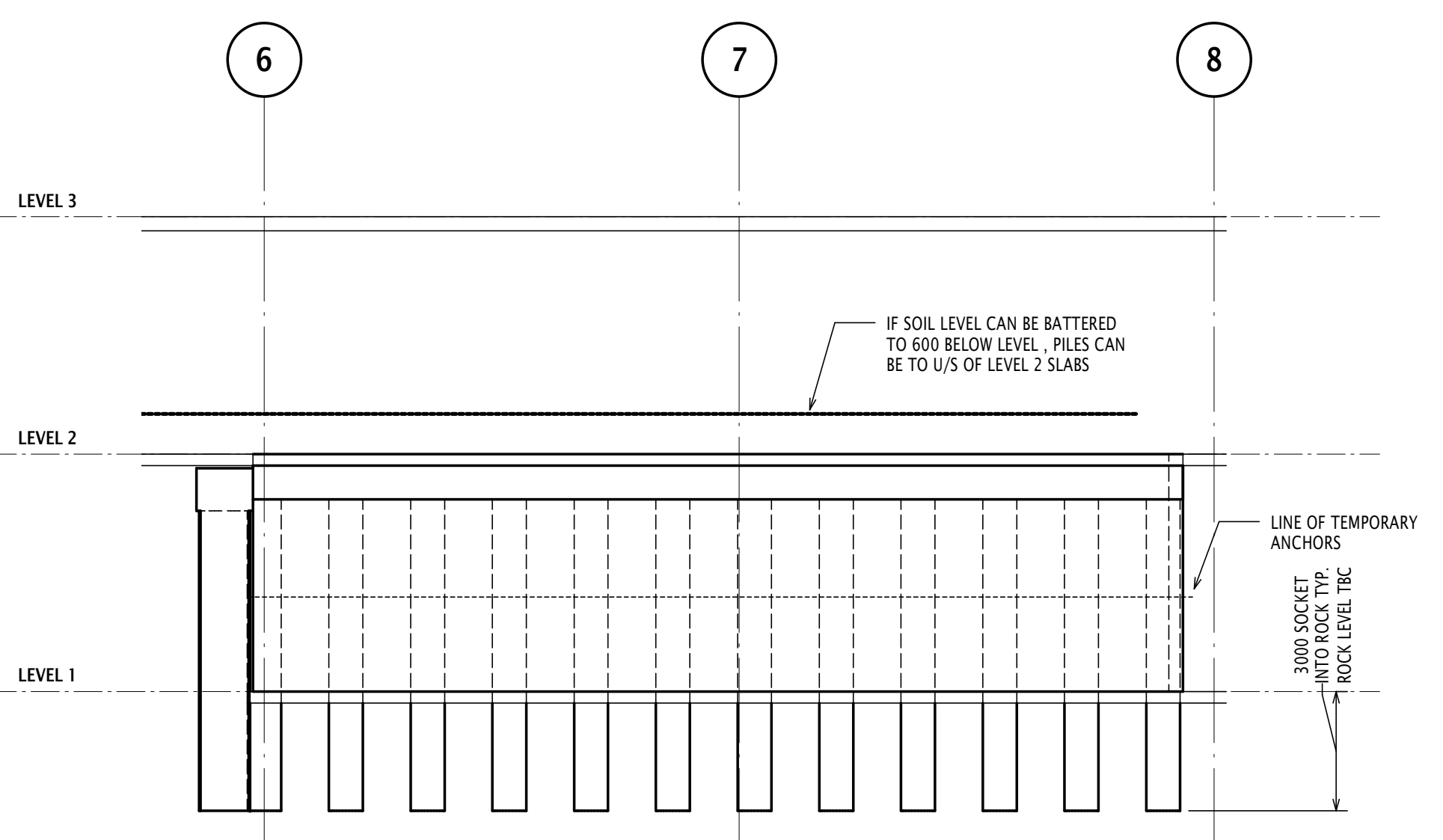
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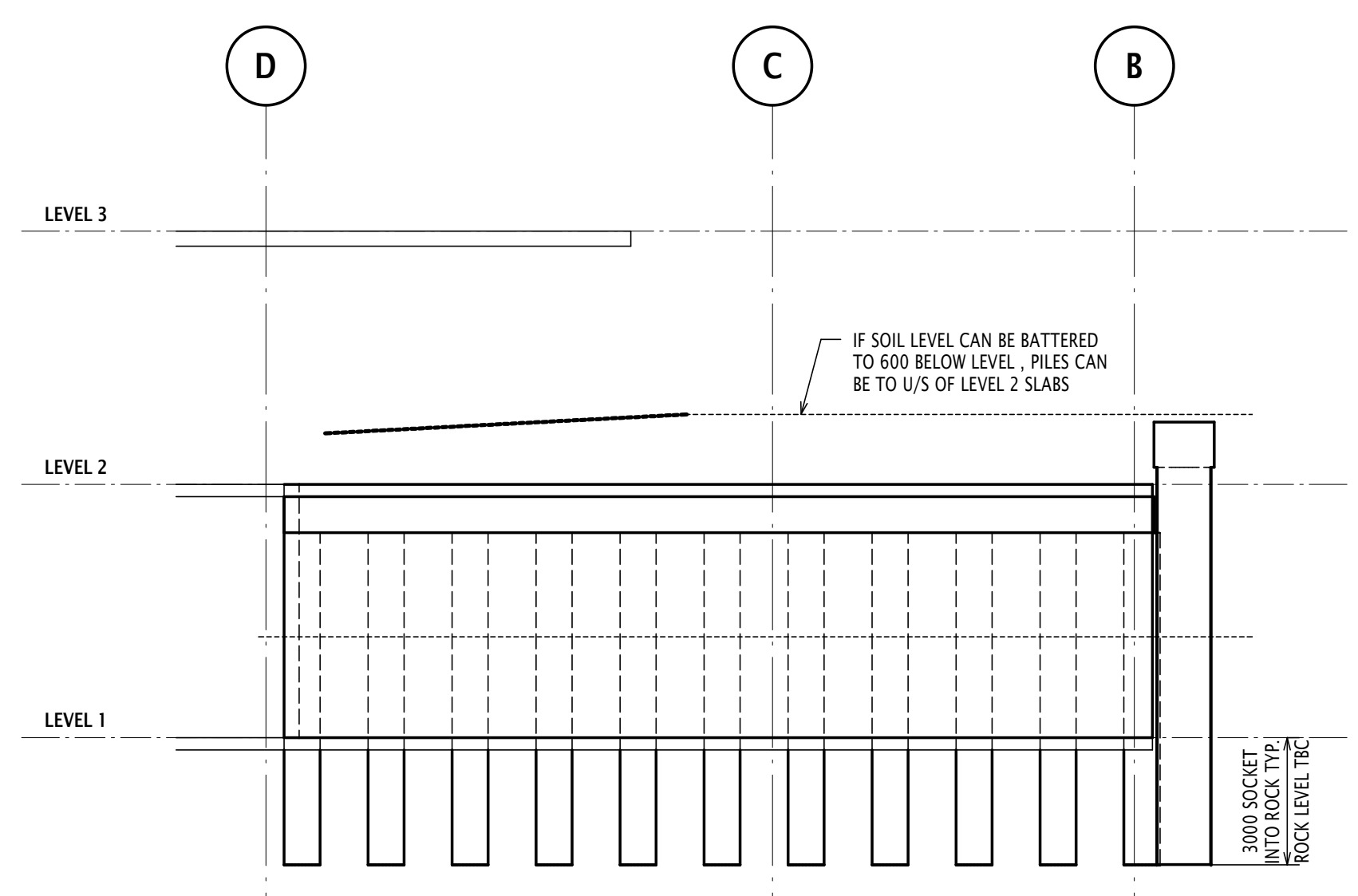


CAPPING BEAM SCHEDULE				
PILE DIA	A (mm)	B (mm)	CONC STRENGTH (MPa)	COVER (mm)
600	700	600	40	40
900	1000	750	40	40
1200	1300	800	40	40

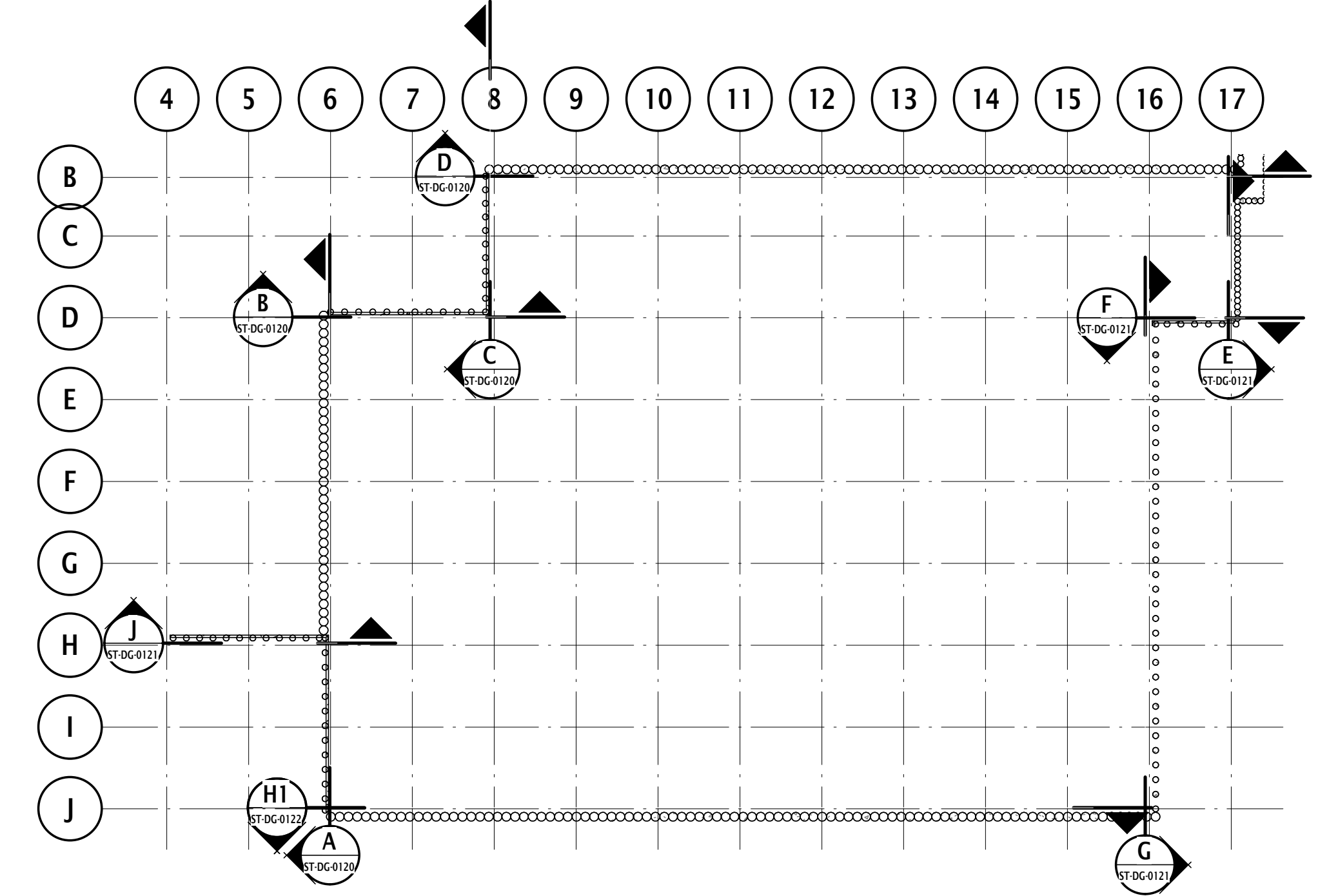
SHORING ELEVATION A
SCALE 1 : 100



SHORING ELEVATION B
SCALE 1 : 100

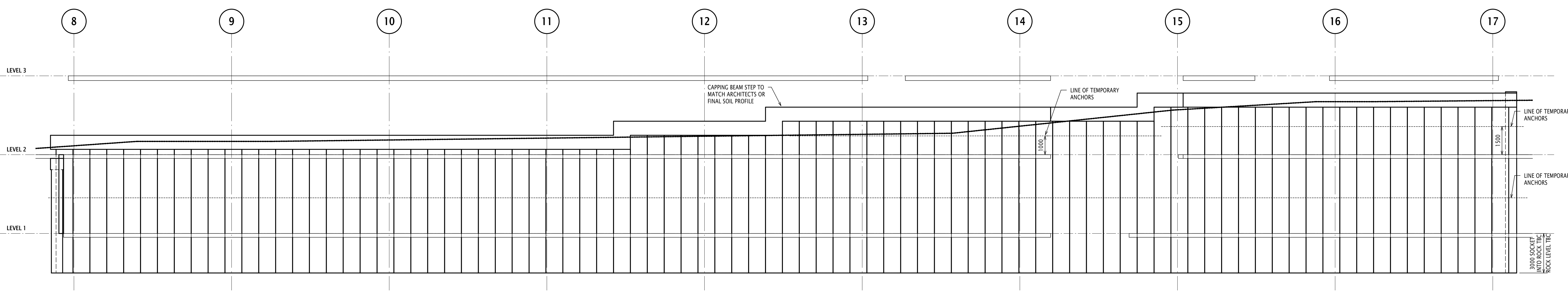


SHORING ELEVATION C
SCALE 1 : 100



SHORING ELEVATION KEY PLAN

NOTE:
CO-ORDINATION REQUIRED TO DETERMINE FINAL SOIL RETENTION LEVELS IN SOME INSTANCES PILES MAY NEED TO BE CUT DOWN TO SUIT FINISHED SURFACE LEVELS.



SHORING ELEVATION D
SCALE 1 : 100

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02	02.10.15	AL	SM	ISSUED FOR SSD
01	25.09.15	AL	SM	ISSUED FOR SSD

CONSULTANT

18 Chiswick Street
Sydney, NSW 2008
AUSTRALIA

Tel: +61 2 952 2200
Fax: +61 2 952 2200
Web: www.jacobs.com

CLIENT

NSW GOVERNMENT Health Infrastructure

Structural, Civil & Construction Engineering Consultant

Robert Bird Group

SYDNEY OFFICE:
Robert Bird Group Pty Ltd
PO Box A2309
Sydney South, NSW 1235
Level 11
151 Castlereagh St
Sydney NSW 2000

Ph: (02) 8246 3200
ACN 010 580 248

Web Site: www.robertbird.com

PROJECT

**BLACKTOWN HOSPITAL
STAGE 2
SCHEMATIC DESIGN ONLY**

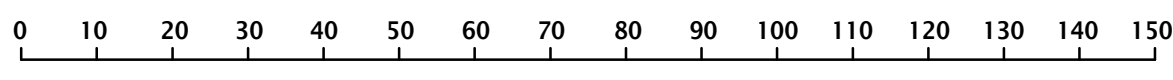
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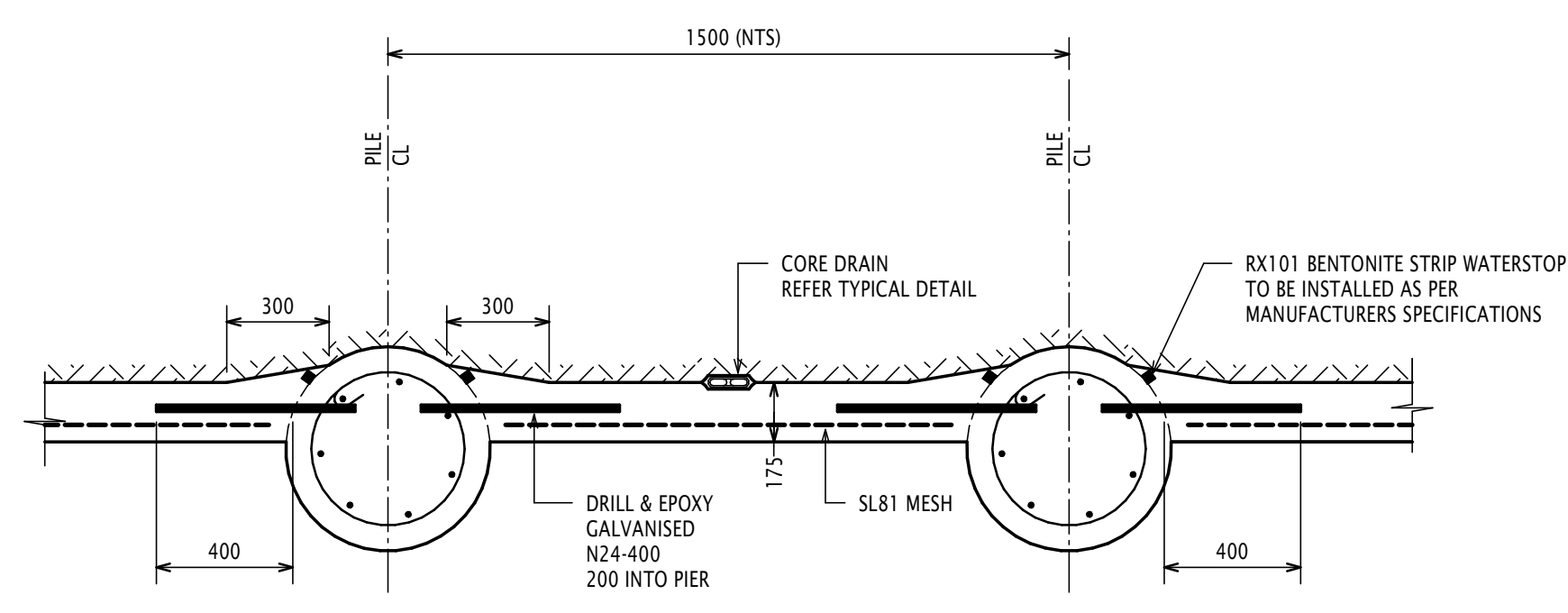
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SHORING ELEVATIONS
SHEET 1

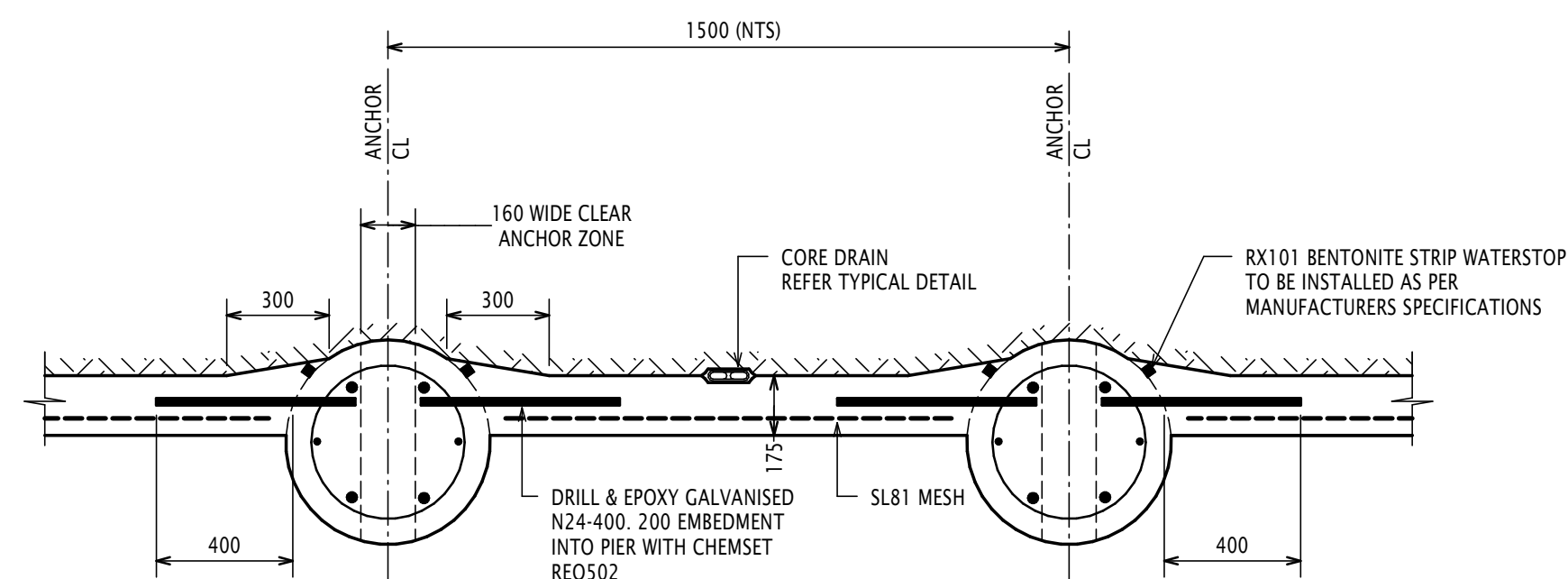
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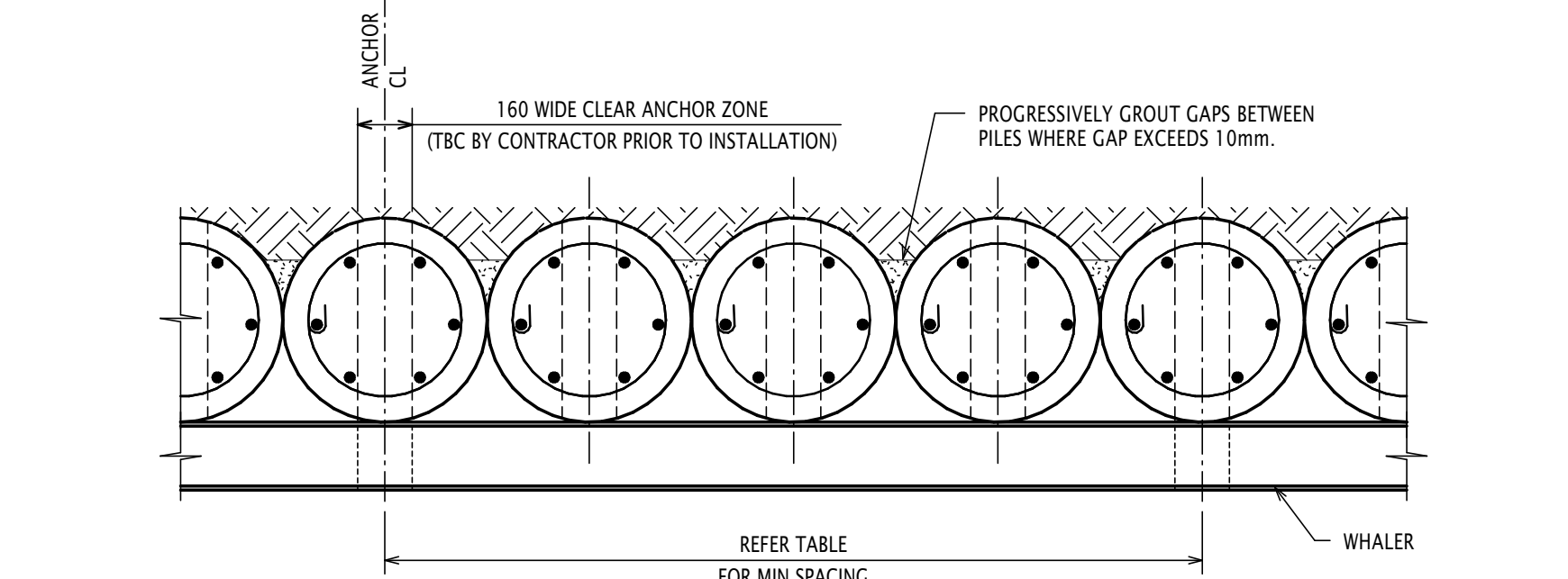




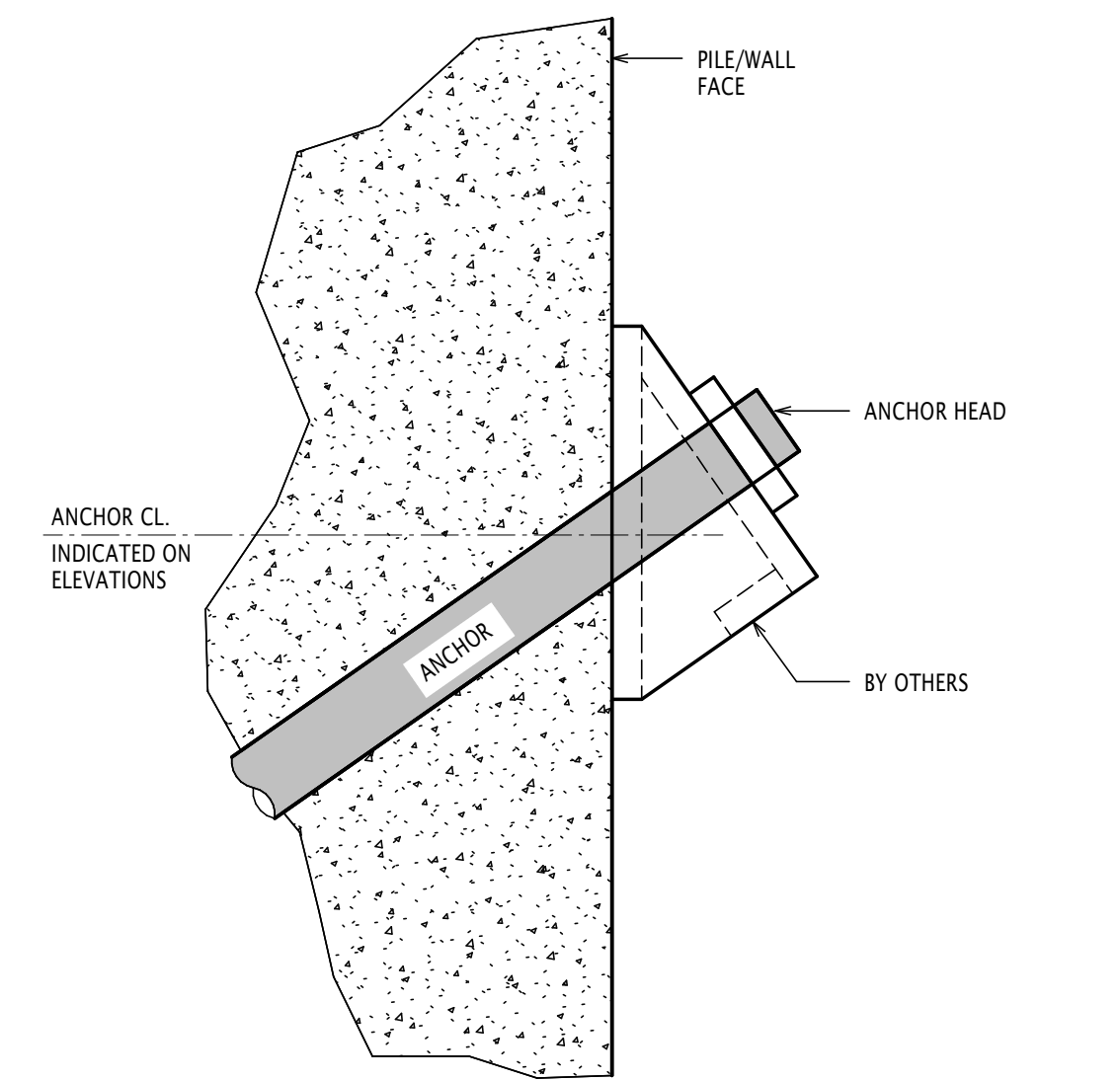
TYPICAL CANTILEVERED SOLDIER PILE WALL DETAIL
SCALE 1:20



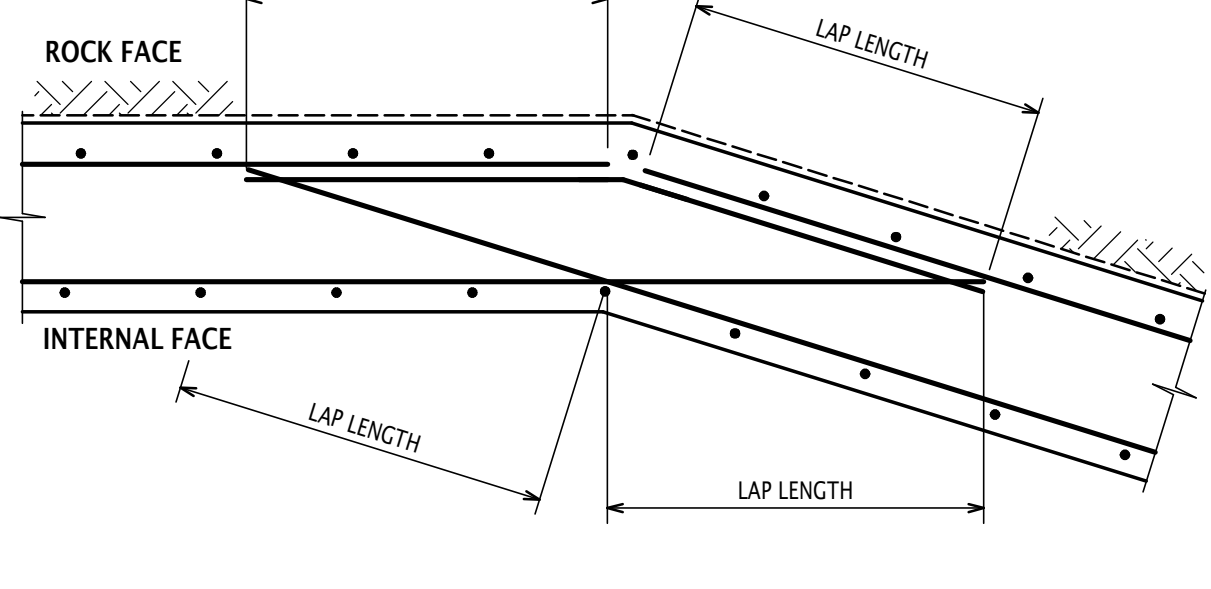
TYPICAL ANCHORED SOLDIER PILE WALL DETAIL
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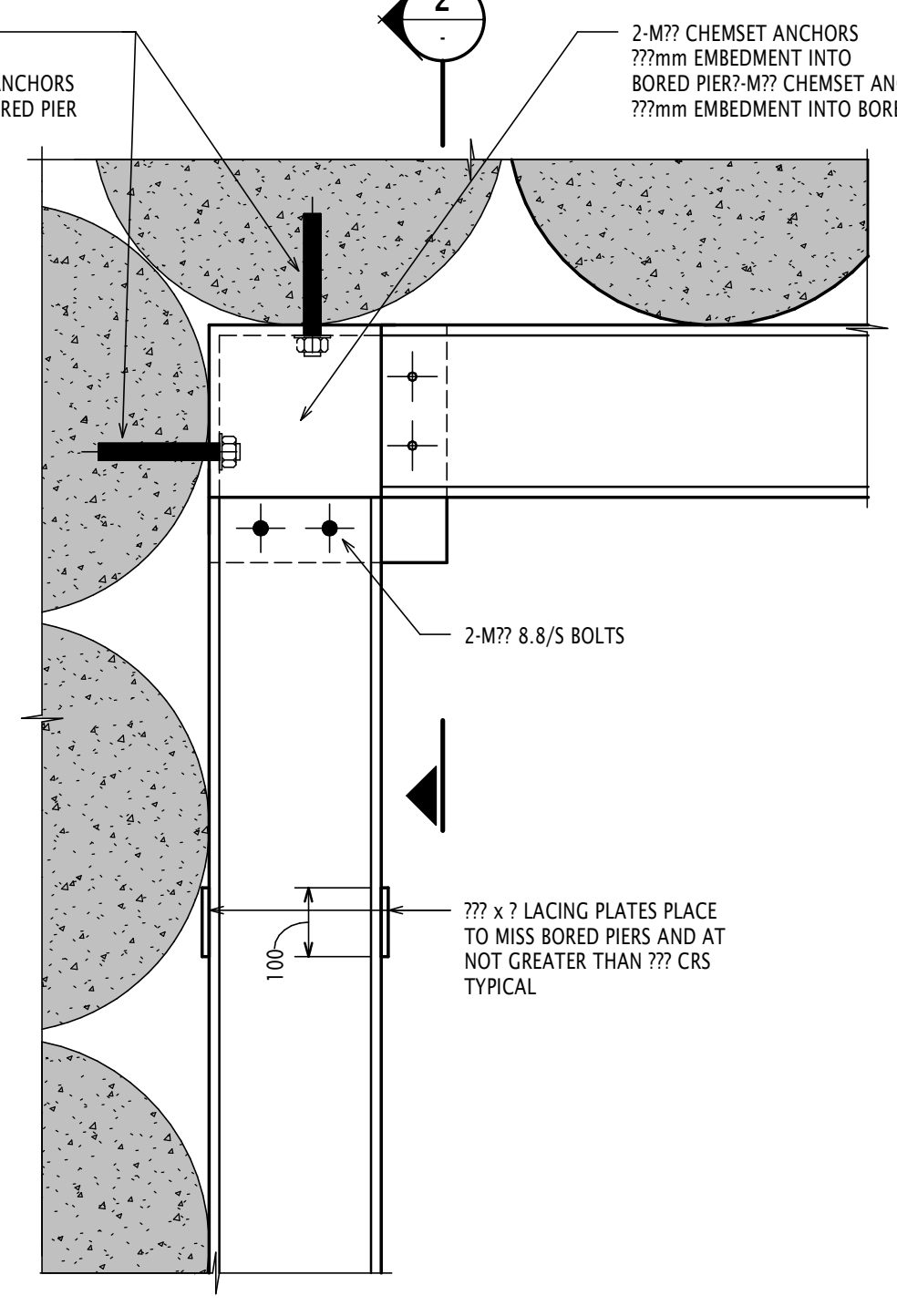
TYPICAL ANCHORED CONTIGUOUS PILE WALL DETAIL
SCALE 1:20



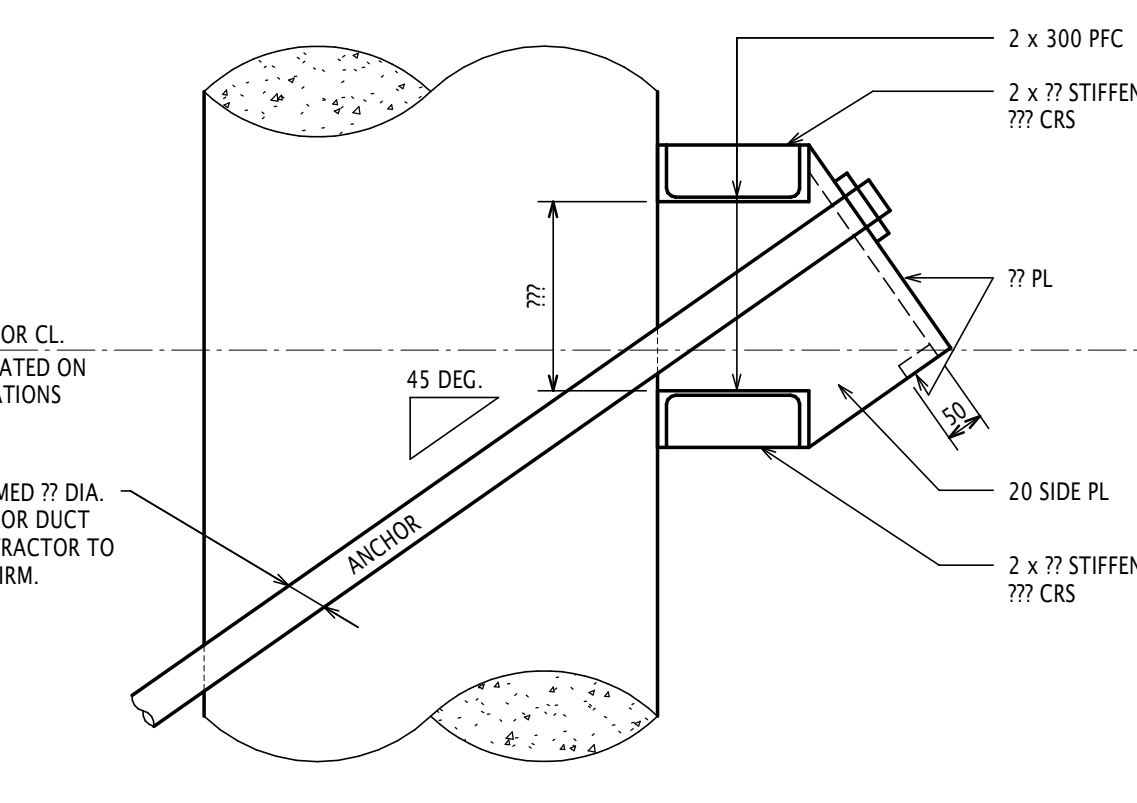
TYPICAL ANCHOR HEAD DETAIL
SCALE 1:10



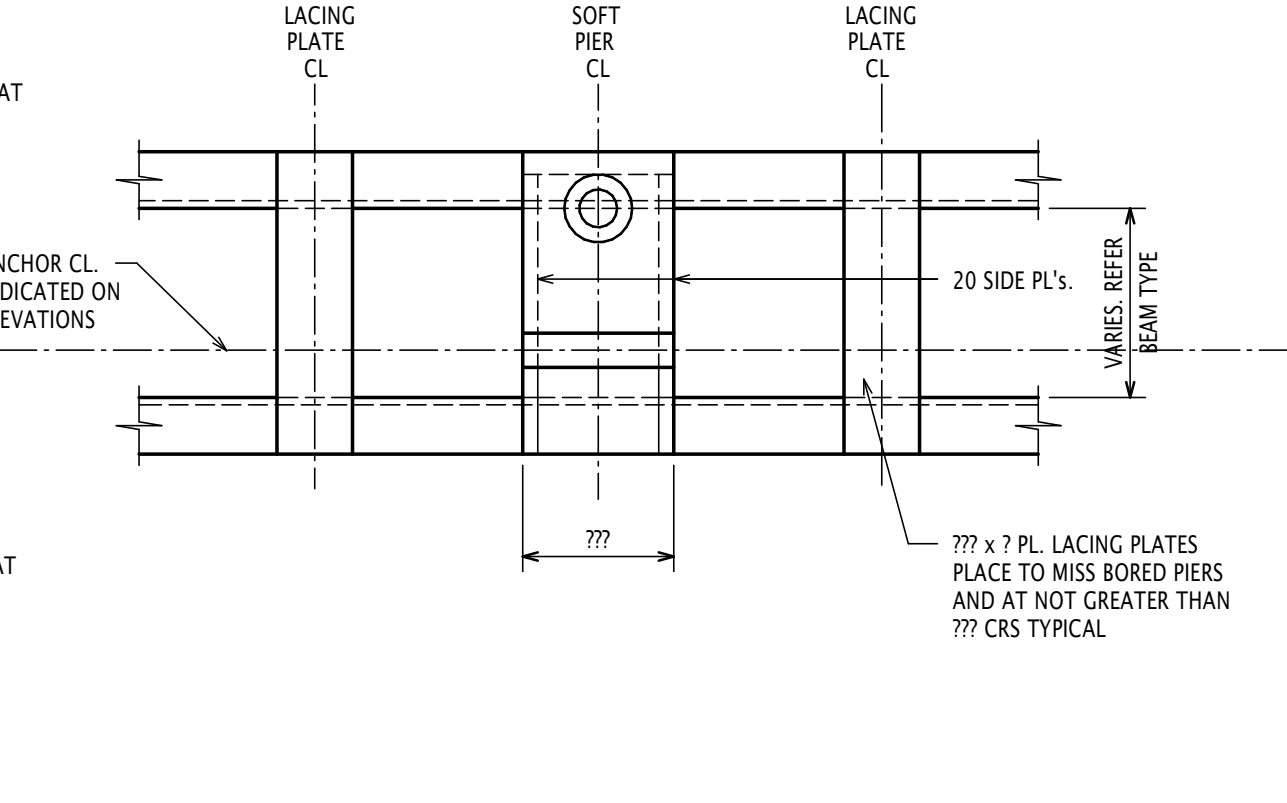
TYPICAL SHORING WALL CRANK DETAIL - REINFORCING BARS
SCALE 1:10



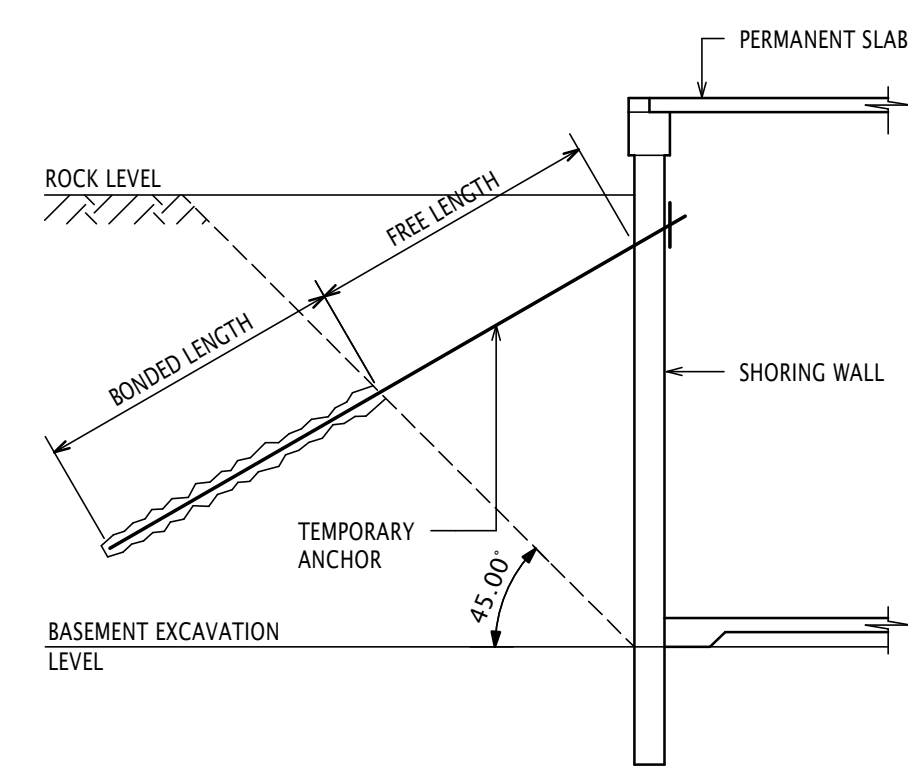
WHALER BEAM CORNER FIXING
SCALE 1:10



WHALER BEAM
SCALE 1:10

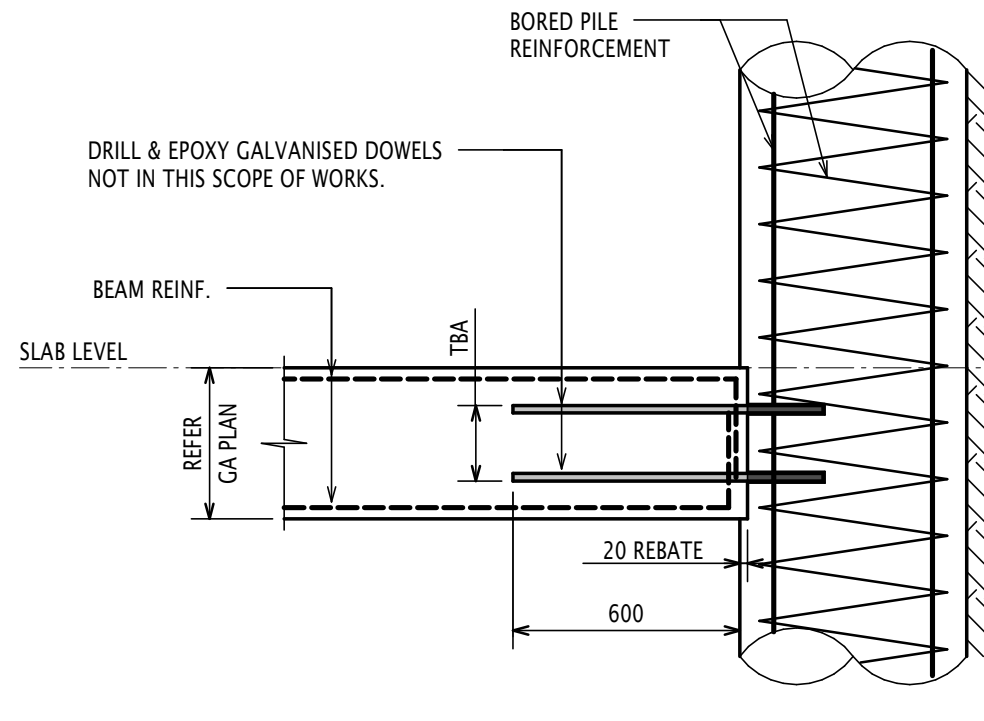


TYPICAL ANCHOR & WHALER BEAM ELEVATION
SCALE 1:10

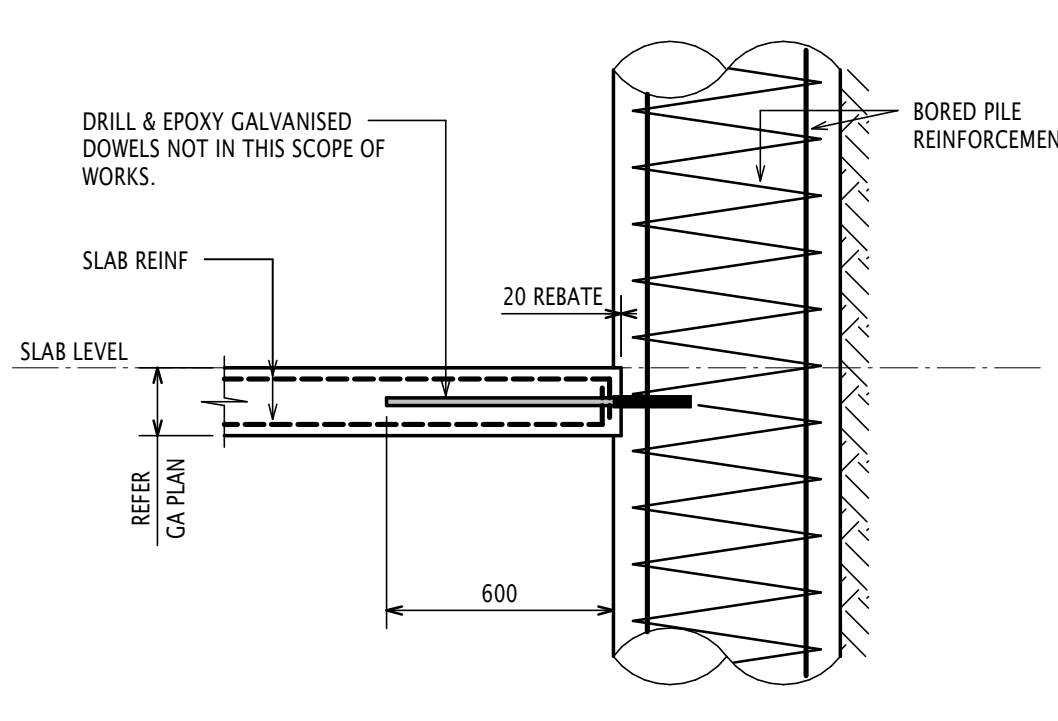


1. FREE LENGTH IS TO BE GROUTED AFTER ANCHOR IS STRESSED
2. REFER GEOTECHNICAL REPORT AND ADVICE FOR CALCULATION OF THE REQUIRED BONDED LENGTH
3. ALL BASEMENT ANCHORS TO BE DESTRESSED AFTER COMPLETION OF ALL THE CONNECTING SLAB LEVELS.

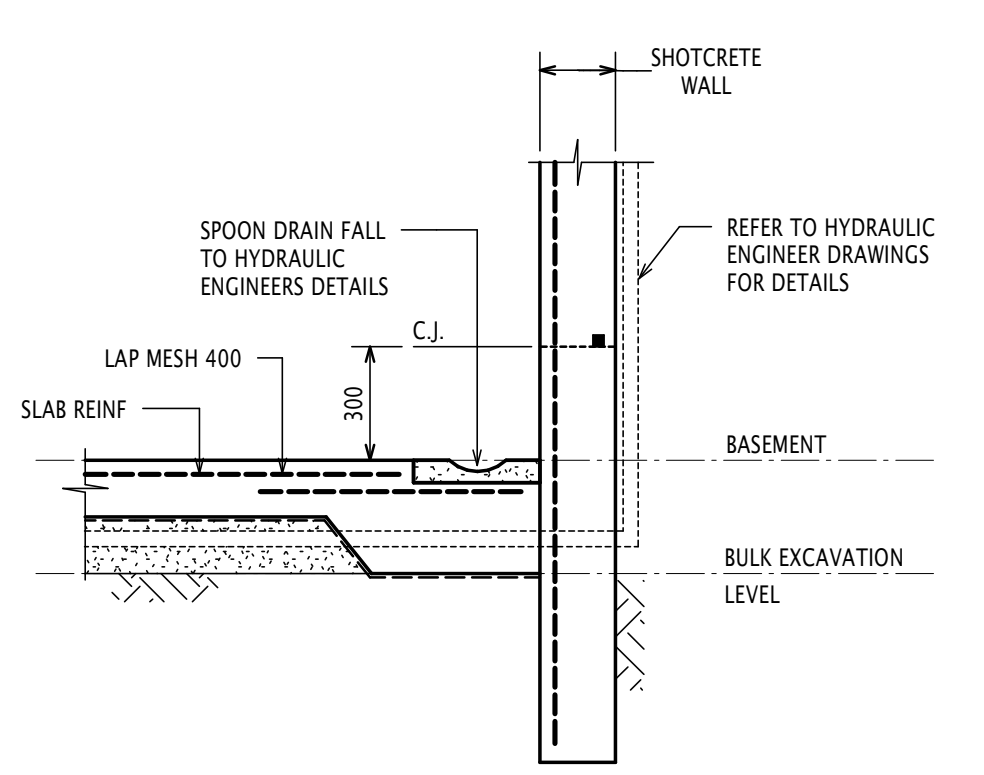
TYPICAL ANCHOR NOTES



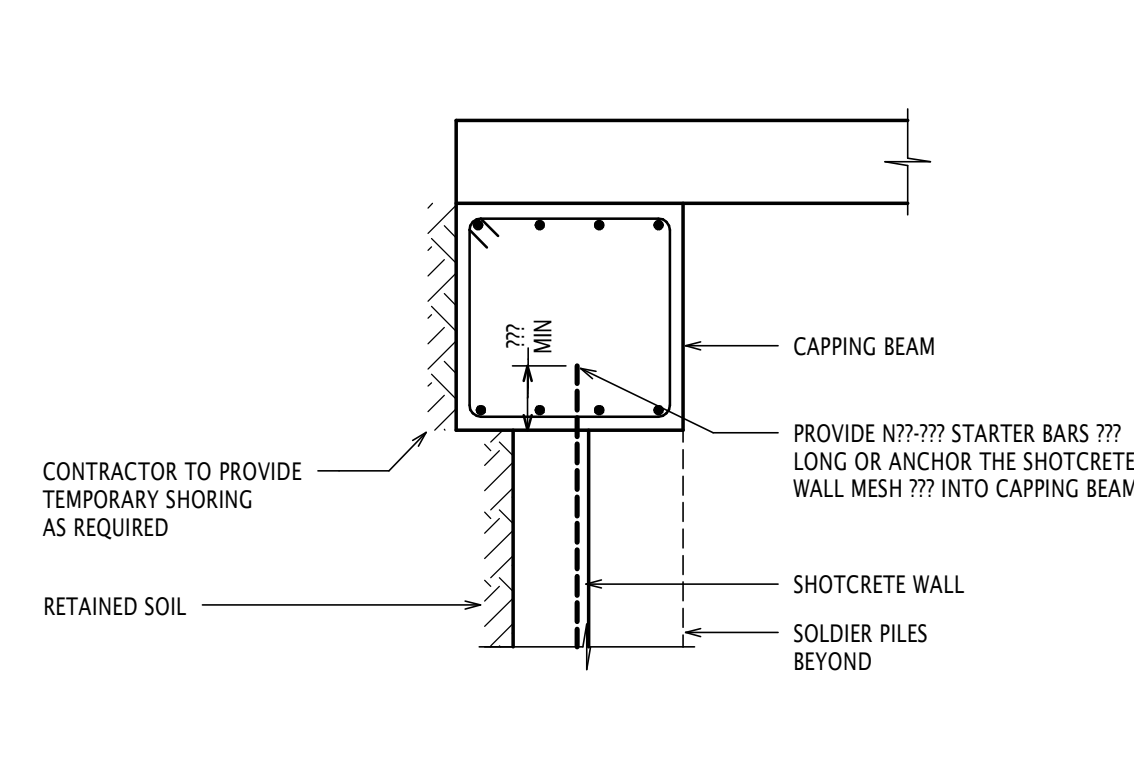
TYPICAL BEAM TO CONTIGUOUS BORED PILE DETAIL
SCALE 1:20



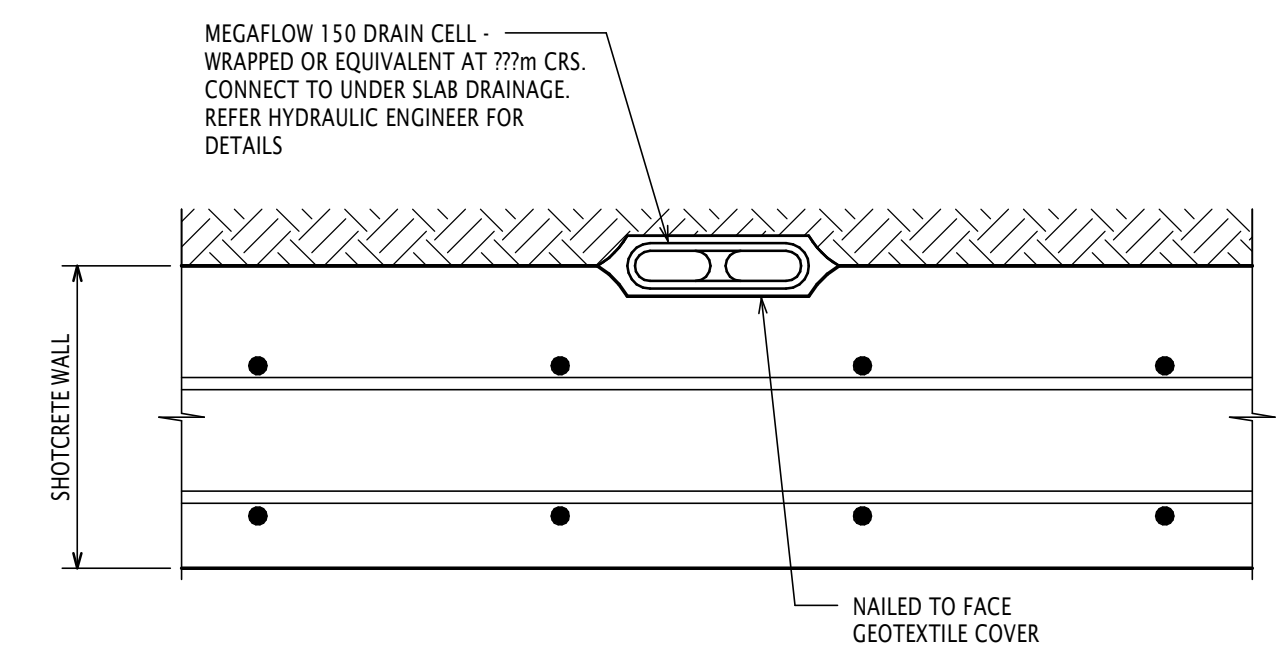
TYPICAL SLAB TO CONTIGUOUS BORED PILE DETAIL
SCALE 1:20



TYPICAL SLAB TO SHOTCRETE WALL DRAINAGE DETAIL AT BASE
SCALE 1:20



TYPICAL CAPPING BEAM TO SHOTCRETE WALL DETAIL
SCALE 1:20



TYPICAL WALL DRAINAGE DETAIL
SCALE 1:5

CONCRETE NOTES:
-REFER NOTES ON COVER SHEET.
-CONCRETE COVER

LOCATION	COVER
PILES	50mm
SHOTCRETE	30mm
CAPPING BEAM	40mm

CONCRETE NOTES:
-REFER NOTES ON COVER SHEET
-MIN CONC. STRENGTH AT 28 DAYS

LOCATION	Fc (MPa)
PILE CAPS	N40
CEP LID	N50
EGRESS TUNNEL LID	N50

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CONSULTANT
JACOBS
18 Chiswick Street
Sydney NSW 2008
AUSTRALIA
Tel: +61 2 952 2200
Fax: +61 2 952 2200
Web: www.jacobs.com

CLIENT
NSW Health Infrastructure
Structural, Civil & Construction Engineering Consultant

Robert Bird Group
SYDNEY OFFICE:
Robert Bird Group Pty Ltd
PO Box A2309
Sydney South, NSW 1235
Level 11
151 Cantonment St
Sydney NSW 2000
Ph: (02) 8246 3200
ACN 010 580 248
Web Site: www.robertbird.com

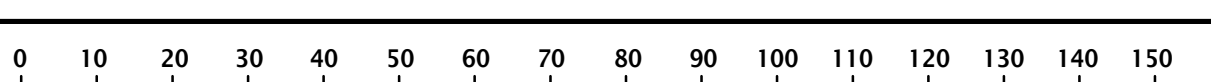
PROJECT
BLACKTOWN HOSPITAL STAGE 2 SCHEMATIC DESIGN ONLY
BLACKTOWN ROAD
BLACKTOWN NSW 2148

TITLE
SHORING DETAILS SHEET 1

PRELIMINARY - NOT FOR CONSTRUCTION

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DESIGNER CEP LID	DESIGN REVIEW
PRINCIPAL/PROJECT LEADER	DATE 03 09 2015
Scale at B1 As indicated	
Drawing No. 10684X	REV BS2-ST-DG-0130

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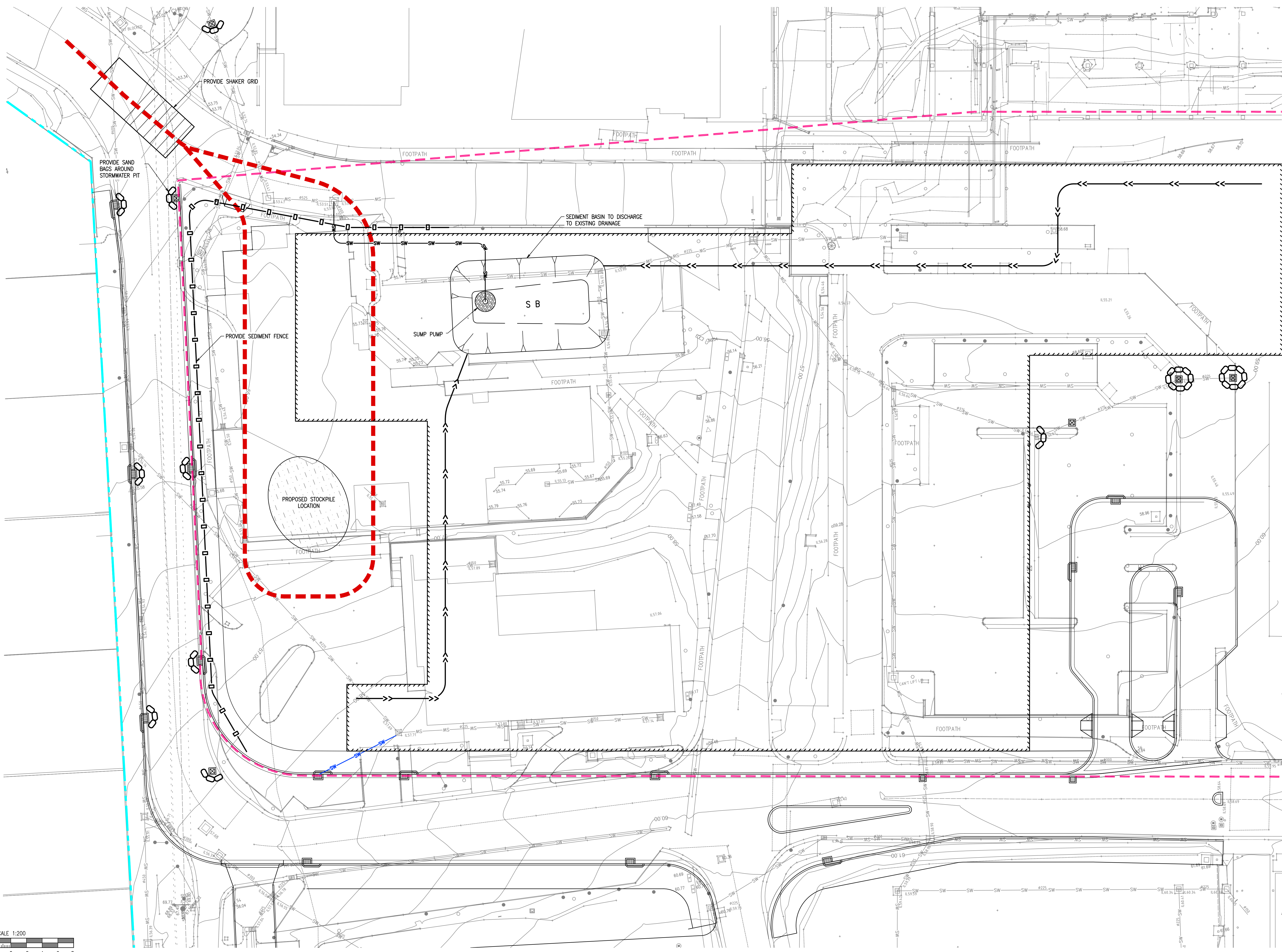
Appendix B

Wollacotts drawing transmittal existing hospital

Drawing Number	Job Name
S1.01	North - Footing Plan
S1.02	South East - Footing Plan
S1.03	South Centre
S1.04	South East Footing Plan
S1.05	Footings Details
S1.07	Column Details
S1.08	Maintenance Compound Sub - Station And Fuel Store
S1.09	North - Level 1 Sizes
S1.10	South West - Level 1 Sizes
S1.11	South Centre - Level 1 Sizes
S1.12	North - Level 2 Sizes
S1.13	South West - Level 2 Sizes
S1.14	South Centre
S1.15	South East -Level 2 Sizes
S1.16	North - Level 2 Reinforcement
S1.17	South East - Level 2 Reinforcement
S1.18	South Centre - Level 2 Reinforcement
S1.19	South East - Level 2 Reinforcement
S1.20	Level 2 Beams - Sheet 1
S1.22	North - Level 3 Sizes
S1.23	South West - Level 3 Sizes
S1.24	South Centre - Level 3 Sizes
S1.25	South East - Level 3 Sizes
S1.26	North - Level 3 Reinforcement
S1.27	South West - Level 3 Reinforcement
S1.28	South Centre - Level 3 Reinforcement
S1.29	South East - Level 3 – Reinforcement
S1.30	Level 3 Beams - Sheet 1
S1.31	Level 3 Beams - Sheet 2
S1.32	North - Level 4 Sizes
S1.33	South West - Level 4 Sizes
S1.34	South Centre - Level 4 Sizes
S1.35	South East –Level 4 Sizes
S1.36	North - Level 4 Reinforcement
S1.37	South West - Level 4 Reinforcement
S1.38	South Centre - Level 4 Reinforcement
S1.39	South East – Level 4 Reinforcement
S1.40	Level 4 Beams – Sheet 1
S1.41	Level 4 Beams – Sheet 2
S1.42	North & South East – Level 5 Sizes
S1.43	South Centre – Level 5 Sizes
S1.44	North & South East – Level 5 Reinforcement
S1.45	South Centre - Level 5 Reinforcement
S1.46	Level 5 – Beams And Sections
S1.47	Levels 2 – 5 Concrete Details Sheet 1
S1.48	Levels 2 – 5 Concrete Details Sheet 2
S1.49	Levels 2 – 4 – Typical Reinforcement Details. Sheet 1
S1.50	Levels 2 - 4 - Typical Reinforcement Details Sheet 2
S1.51	Levels 2 To 4 –Typical Beams
S1.52	Wall Details
S1.53	Stair Details

S1.55	North - Structural Steel Plan
S1.56	South West - Structural Steel Plan
S1.57	South Centre – Structural Steel Plan
S1.58	South East – Structural Steel Plan
S1.59	Structural Steel Sections
S1-60	Structural Steel Details – Sheet 1
S1.61	Structural Steel Details – Sheet 2
S1.62	Miscellaneous Steelwork Details – Sheet 1
S1.63	Miscellaneous Steelwork Details – Sheet 2
S1.64	Glazed Canopy
S1.65	Ambulance Bay Canopy
S1.66	Main Entry Ramp – Footing And Sizes Plans
S1.67	Main Entry Ramp – Reinforcement And Details
S2	Structural, Civil And Hydraulic Standards Notes
S3.01	Detail Unit – Floor Plan And Details
S3.02	Detail Unit- Roof Plan And Details
S13.01	Community Health – Structural Floor Plan And Details
S13.02	Community Health – Structural Roof Plan And Details
S18.01	Palliative Care – Structural Plan And Sections
H18.02	Palliative Care – Hydraulic Services Floor Plan
S18.03	Palliative Care – Structural Roof Details
S1.57	South Centre – Structural Steel Plan
S2.01	Oncology Unit – Structural Floor Plan And Details
S2.02	Oncology Unit – Structural Roof Plan And Details

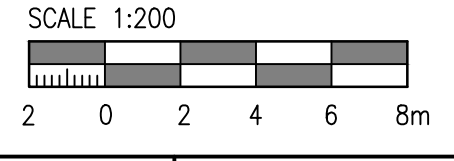
Appendix C Sediment and Erosion Control Plan



- LEGEND**
- EXISTING SITE BOUNDARY
 - EARLY WORKS EXTENTS
 - PROPOSED BUILDING EXTENTS
 - PROPOSED CONSTRUCTION ACCESS VEHICLE PATH
 - PROPOSED SEDIMENT FENCE
 - PROPOSED EARTH DIVERSION BANK WITH CATCH DRAIN
 - SW PROPOSED TEMPORARY STORMWATER LINE
 - PROVIDE TEMPORARY SANDBAGS AROUND PITS TO EXISTING GRATED PITS DOWNSTREAM OF CONSTRUCTION WORKS.
 - PROPOSED SUMP PUMP
 - S B SETTLING/SEDIMENTATION BASIN (LANDCOM DETAIL SD6-4)
 - ||||| SHAKER GRID AND WASH DOWN FACILITY
 - PROPOSED STOCKPILE

NOTES

REFER BIN2-CV-DG-1110 FOR EROSION & SEDIMENT CONTROL NOTES & DETAILS.



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1	29.09.15	JAR	CR	ISSUED FOR SSD

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1	29.09.15	JAR	CR	ISSUED FOR SSD

CONSULTANT
 Structural, Civil & Construction Engineering Consultant
Robert Bird Group
 SYDNEY OFFICE
 Robert Bird Group Pty Ltd
 70 Macquarie Street
 Sydney South, NSW 2000
 Level 11
 155 Cantonment St
 Sydney NSW 2000
 Ph. (02) 8246 3200

PROJECT MANAGER
 M. GUNDEL
 Checked
 C. WATKINS

MAIN CONTRACTOR

PRINCIPAL

PROJECT
BLACKTOWN MT DRUITT HOSPITAL STAGE 2
 BLACKTOWN CAMPUS: BLACKTOWN ROAD, NSW 2148

CIVIL
 DRAWING TITLE
EROSION & SEDIMENT CONTROL PLAN
 SCALE (B1) AS NOTED
 PROJECT NO: 10684Y
 DRAWING NO: BIN2-CV-DG-1101
 REVISION: 1

FOR INFORMATION

Appendix D

Bulk Excavation Drawings

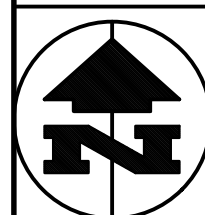
BLACKTOWN MT DRUITT HOSPITAL STAGE 2 (BIN2) CIVIL INFRASTRUCTURE EARLY WORKS PACKAGE 2 - CSB BULK EARTHWORKS -



LOCATION PLAN
SCALE: NTS

EARLY WORKS PACKAGE 2 DRAWING TABLE	
DRAWING NUMBER	DRAWING TITLE
BIN2-CV-DG-1000	COVER SHEET
BIN2-CV-DG-1101	EROSION & SEDIMENT CONTROL PLAN
BIN2-CV-DG-1110	EROSION & SEDIMENT CONTROL NOTES & DETAILS
BIN2-CV-DG-1201	BULK EARTHWORKS PLAN
BIN2-CV-DG-1210	BULK EARTHWORKS SECTIONS
BIN2-CV-DG-1301	GENERAL ARRANGEMENT PLAN

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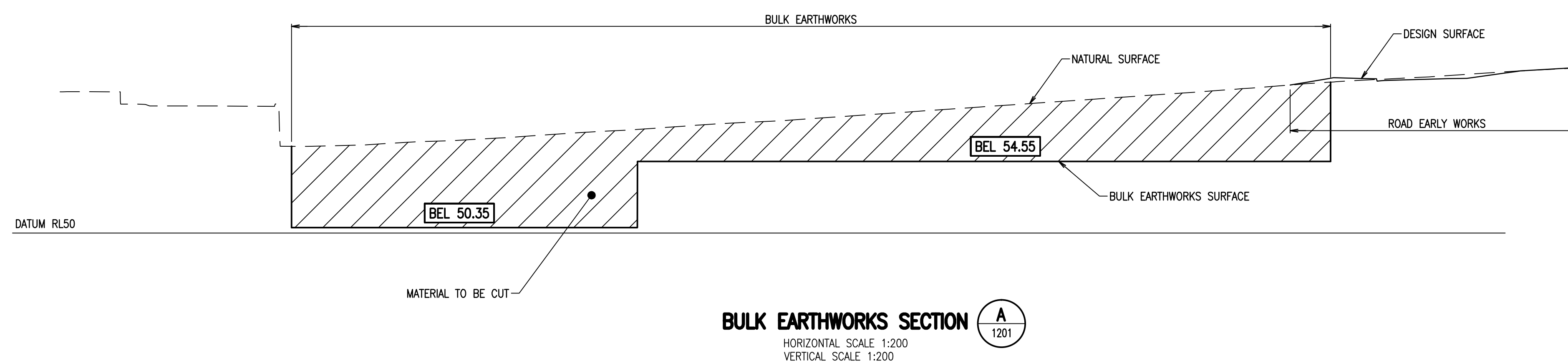
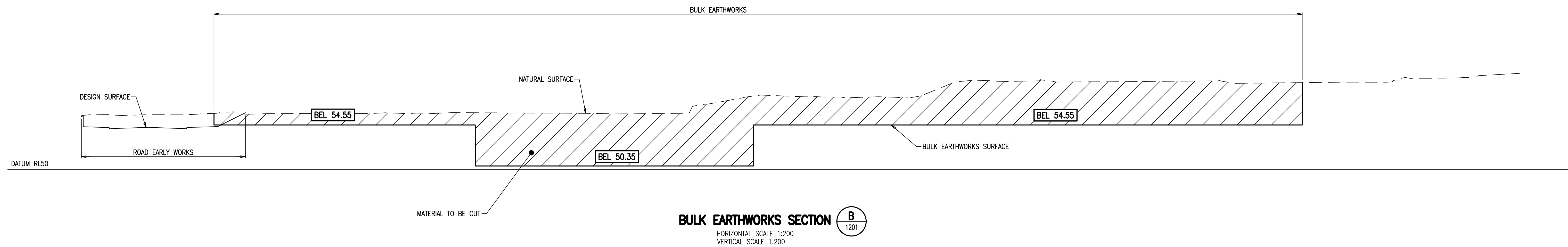
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CONSULTANT		PROJECT MANAGER		MAIN CONTRACTOR		PRINCIPAL		
Date generated 29.09.15	Drawn M. GUNDEL Checked C. WHITE	Design L. RUSSELL Approved C. ROPE						

PROJECT	
BLACKTOWN MT DRUITT HOSPITAL STAGE 2 BLACKTOWN CAMPUS: BLACKTOWN ROAD, NSW 2148	

CIVIL	
DRAWING TITLE BIN2 - EARLY WORKS PACKAGE 2 - CSB BULK EARTHWORKS	
COVER SHEET	
SCALE (B1): AS NOTED	DRAWING No: BIN2-CV-DG-1000
PROJECT No: 10684Y	REVISION: 1

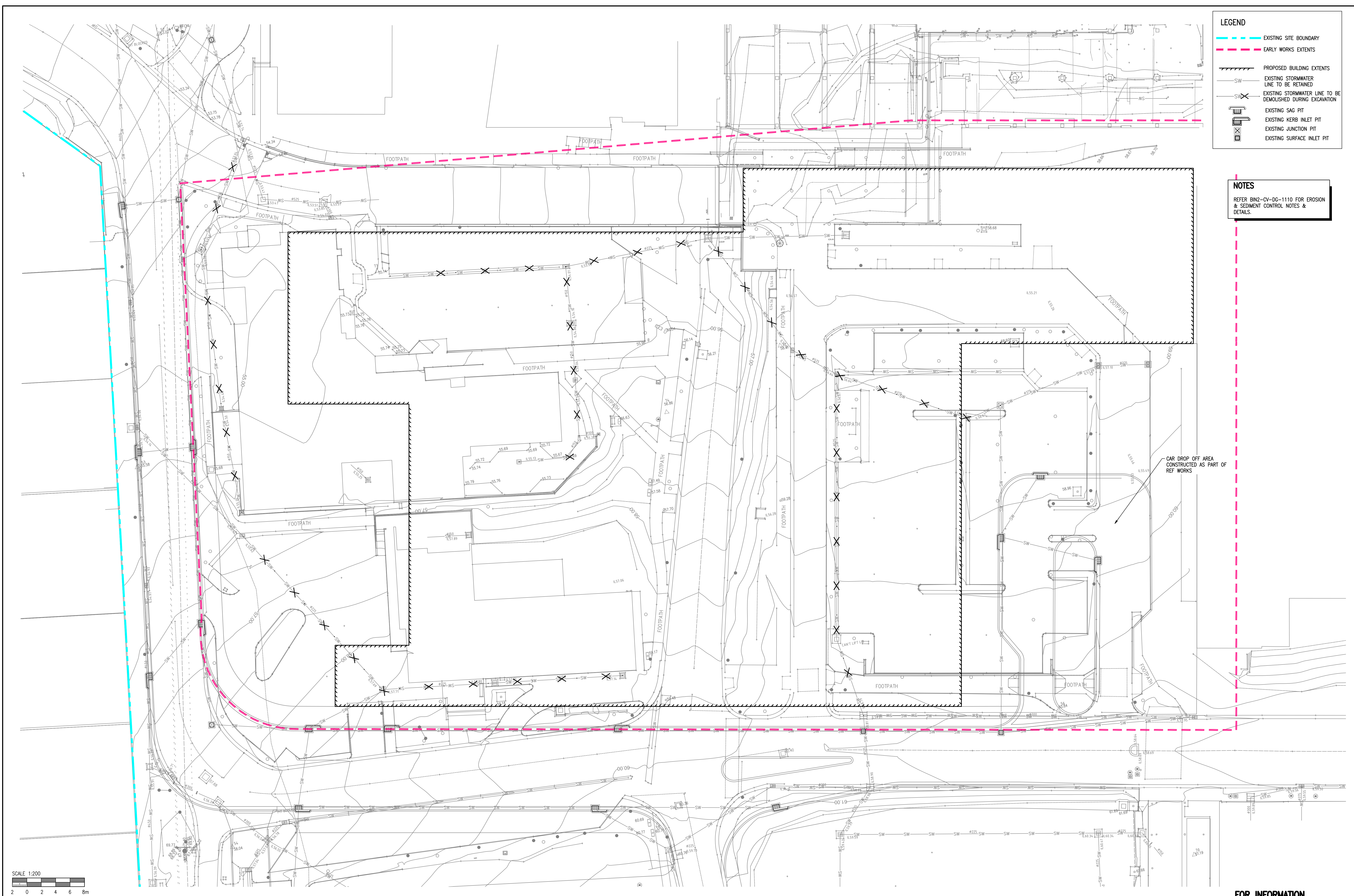
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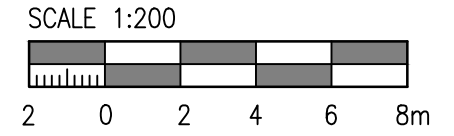
LEGEND

- EXISTING SITE BOUNDARY
- EARLY WORKS EXTENTS
- PROPOSED BUILDING EXTENTS
- EXISTING STORMWATER LINE TO BE RETAINED
- EXISTING STORMWATER LINE TO BE DEMOLISHED DURING EXCAVATION
- EXISTING SAG PIT
- EXISTING KERB INLET PIT
- EXISTING JUNCTION PIT
- EXISTING SURFACE INLET PIT

NOTES

REFER BIN2-CV-DG-1110 FOR EROSION & SEDIMENT CONTROL NOTES & DETAILS.

CAR DROP OFF AREA
CONSTRUCTED AS PART OF
REF WORKS



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I, the undersigned, being a duly qualified and licensed Professional Engineer, do hereby certify that the above is a true and correct copy of the original drawings as submitted to me for certification, and that I am not aware of any falsification of the same.

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CONSULTANT
 Structural, Civil & Construction
 Engineering Consultant
Robert Bird Group
 SYDNEY OFFICE
 Robert Bird Group Pty Ltd
 70 Macquarie Street
 Sydney, NSW 2000
 Ph: (02) 8246 3200
 Website: www.robertbird.com

PROJECT MANAGER
 Date generated: 29.09.15
 Drawn: M. GUNDEL
 Checked: C. WHITE

MAIN CONTRACTOR
 Design: L. RUSSELL
 Approved: C. ROPE

PRINCIPAL
 Scale: AS SHOWN

PROJECT
BLACKTOWN MT DRUITT HOSPITAL STAGE 2
 BLACKTOWN CAMPUS: BLACKTOWN ROAD, NSW 2148

CIVIL
 DRAWING TITLE: BIN2 - EARLY WORKS PACKAGE 2 - GSB BULK EARTHWORKS
GENERAL ARRANGEMENT PLAN
 SCALE: (AS NOTED) DRAWING NO: BIN2-CV-DG-1301
 PROJECT NO: 10684Y

FOR INFORMATION

Health Infrastructure
 Western Sydney Local Health District

REVISION: 1



Robert**Bird**Group

Sydney Office

Robert Bird Group Pty Ltd
ABN 67 010 580 248 ACN 010 580 248

Level 11
151 Castlereagh Street
Sydney NSW 2000
PO Box A2309
Sydney South Post Shop NSW 1235
Australia

P: +61 (0) 2 8246 3200
F: +61 (0) 2 8246 3201

www.robertbird.com