GEOTECHNICAL STANDARD DRAWINGS
TYPICAL SLOPE STABILISATION WORKS WITH SOIL NAILS

SCHEDULE OF DRAWINGS

01 COVER SHEET
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03 NOTES
04 GENERAL ARRANGEMENT
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06 SOIL NAIL DETAILS
<table>
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<tr>
<th>ISSUE</th>
<th>SHEET</th>
<th>ISSUE DETAIL</th>
<th>AUTHORISED</th>
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<tbody>
<tr>
<td>A</td>
<td>ALL</td>
<td>INITIAL SETUP</td>
<td>SGE *</td>
<td>17/10/2012</td>
</tr>
<tr>
<td>B</td>
<td>ALL</td>
<td>COMPLETE REVISION</td>
<td>B.XIAO</td>
<td>21/03/2014</td>
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* SENIOR GEOTECHNICAL ENGINEER
GENERAL NOTE
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. REDUCED LEVELS ARE RELATED TO AUSTRALIAN HEIGHT DATUM.
3. ARCHITECTURAL FINISH OF THE EXPOSED FACING PANEL WALL MUST BE TO URBAN DESIGNER REQUIREMENTS.
4. REFER TO URBAN DESIGNER REQUIREMENT FOR DETAILS OF PANEL DIMENSIONS, CORNERS AND TERMINATIONS, BOUNDARIES, ARCHITECTURAL DETAILS AND MATERIALS TO BE PROVIDED.
5. WHERE REINFORCEMENT IS REQUIRED BY URBAN DESIGN SPECIFICATION, MINIMUM COVER TO REINFORCEMENT MUST BE MAINTAINED.

SHOCTCRETE
6. SHOCTCRETE WALL EXPOSURE CLASSIFICATION B1 IN ACCORDANCE WITH AS4671.
7. SHOCTCRETE MIX DESIGN MUST BE EXPOSURE CLASSIFICATION B2 IN ACCORDANCE WITH R63 CLAUSE 2.3.3.
8. MINIMUM 28 DAY COMPREHENSIVE STRENGTH OF SHOCTCRETE AND SOIL NAIL CEMENT GROUT MUST BE 40MPa.
9. SOIL NAILS, GROUT AND SHOCTCRETE MUST BE IN ACCORDANCE WITH SPECIFICATION R64 AND R63.

SOIL NAILS, BEARING PLATES, WASHERS AND STEEL MESH MUST BE HOT DIP GALVANISED IN ACCORDANCE WITH LAPS ARE NOT ALLOWED OVER STRIP DRAINS.

REINFORCEMENT
10. STEEL MESH MUST BE GRADE D500N IN ACCORDANCE WITH AS4671.
11. BEARING PLATE MUST BE GRADE 250 IN ACCORDANCE WITH AS3678.
12. NOMINAL COVER TO SOIL NAIL HEAD AND BEARINGS MUST BE NOT LESS THAN 10mm.
13. NOMINAL COVER TO STEEL MESH MUST BE NOT LESS THAN 7mm TO SURFACE AND ROCK.
14. 40mm COVER IS ACCEPTABLE TO STRIP DRAIN. CONSTRUCTION METHODOLOGY TO ENSURE COVER TO STRIP DRAIN IS ACHIEVED. LOCAL ADDITIONAL EXCAVATION MAY BE REQUIRED.
15. STEEL MESH MUST BE LAPPED BY 3 Wires.
16. STEEL MESH LAPS MUST BE STAGGERED AND CUT SUCH THAT ONLY TWO SHEETS ARE LAPPED AT ONE LOCATION.
17. SOIL NAILS, BEARING PLATES, WASHERS AND STEEL MESH MUST BE HOT DIP GALVANISED IN ACCORDANCE WITH AS4671 WITH A COATING WEIGHT OF 600g/m².
18. SOIL NAIL NUTS MUST BE GRADE C COMPLYING WITH AS1112.3 AND PROPERTY CLASS 5 COMPLYING WITH AS4291.2.
19. SOIL NAILS, BEARING PLATES, WASHERS AND STEEL MESH MUST BE GRADE D500N IN ACCORDANCE WITH AS4671.
20. REINFORCEMENT LAPS ARE NOT ALLOWED OVER STRIP DRAINS.
21. STEEL MESH LAPS MUST BE STAGGERED AND CUT SUCH THAT ONLY TWO SHEETS ARE LAPPED AT ONE LOCATION.
22. STEEL MESH MUST BE GRATED ACCORDING TO AS1170.4.

EXCAVATION
37. EXCAVATION STAGE MUST NOT EXCEED 2m DEPTH PRIOR TO INSPECTION BY THE PRINCIPAL'S SUITABLY QUALIFIED GEOTECHNICAL ENGINEER AND INSTALLATION OF SOIL NAIL WALL.
38. THE PRINCIPAL'S SUITABLY QUALIFIED GEOTECHNICAL ENGINEER WILL INSPECT THE ROOF FACE FOR THE DEPTH OF WEATHERINGS, LAYERS OF ROCK AND UNFAVOURABLE JOINTING AND BEDDING PLANES.
39. WHERE THERE ARE UNFAVOURABLE OSMOTIC JOINTS, ADDITIONAL SOIL NAILS MAY BE REQUIRED TO STABILISE THE ROOF FACE AS DIRECTED BY THE PRINCIPAL'S SUITABLY QUALIFIED GEOTECHNICAL ENGINEER.

CONSTRUCTION SEQUENCE
40. ANY UTILITIES WITHIN THE VICINITY MAY BE RELOCATED/REMOVED PRIOR TO THE EXCAVATION COMMENCE.
41. COMMENCE EXCAVATION TO THE FACE OF CUT. THE EXCAVATION OF INDIVIDUAL "LIFTS" MUST NOT EXCEED A DEPTH OF 0.5M BELOW THE ROCK SOIL NAILS TO BE INSTALLED. EXCAVATION FACE TO BE INSPECTED BY PRINCIPAL'S SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO VERIFY AND CONFIRM THE DESIGN ASSUMPTION.
42. COMMENCE INSTALLATION OF THE SUITABILITY TEST SOIL NAILS AND CONDUCT SUITABILITY TEST AS REQUIRED.
43. COMMENCE INSTALLATION OF THE PERMANENT SOIL NAILS AND CONDUCT ACCEPTANCE TEST AS REQUIRED.
44. FIX STRIP DRAINS TO THE FACE OF THE EXCAVATION.
45. COMMENCE INSTALLATION OF THE SUITABILITY TEST SOIL NAILS AND CONDUCT SUITABILITY TEST AS REQUIRED.
46. COMMENCE CONSTRUCTION OF THE DRAIN AND CAPPING BEAM (IF REQUIRED).
47. COMMENCE CONCRETE FOOTING CONSTRUCTION OF THE FACING WALL (IF REQUIRED).
48. INSTALL FACING WALLS (IF REQUIRED).

SOIL NAILING
49. REFER RMS SPECIFICATION R64 FOR CONSTRUCTION STAGING AND SPECIFICATION REQUIREMENTS.
50. SHOCTCRETE MUST BE GRADE D500N IN ACCORDANCE WITH AS4671.
51. SHOCTCRETE WALL EXPOSURE CLASSIFICATION B1 IN ACCORDANCE WITH AS4671.
52. SOIL NAILS, BEARING PLATES, WASHERS AND STEEL MESH MUST BE HOT DIP GALVANISED IN ACCORDANCE WITH LAPS ARE NOT ALLOWED OVER STRIP DRAINS.
53. STEEL MESH LAPS MUST BE STAGGERED AND CUT SUCH THAT ONLY TWO SHEETS ARE LAPPED AT ONE LOCATION.
54. STEEL MESH MUST BE GRADE D500N IN ACCORDANCE WITH SOIL NAILS, BEARING PLATES, WASHERS AND STEEL MESH MUST BE GRADE D500N IN ACCORDANCE WITH SOIL NAILS, BEARING PLATES, WASHERS AND STEEL MESH MUST BE GRADE D500N IN ACCORDANCE WITH AS4671.
55. SOIL NAILS, BEARING PLATES, WASHERS AND STEEL MESH MUST BE GRADE D500N IN ACCORDANCE WITH AS4671.
56. SOIL NAILS, GROUT AND SHOCTCRETE MUST BE IN ACCORDANCE WITH SPECIFICATION R64 AND R63.

REFERENCES
RMS R64: GEOTEXTILES (SEPARATION AND FILTRATION)
RMS R63: SOIL NAILING
RMS R61: SHOCTCRETE WORK WITHOUT STEEL FIBRES
RMS 3211: CEMENTS, BINDERS AND FILLERS
RMS 3557: FLEXIBLE STRIP FILTER DRAINS

NOTES
30. EXCAVATION COMMENCE.
31. COMMENCE INSTALLATION OF THE SUITABILITY TEST SOIL NAILS AND CONDUCT SUITABILITY TEST AS REQUIRED.
32. COMMENCE INSTALLATION OF THE PERMANENT SOIL NAILS AND CONDUCT AcceptANCE TEST AS REQUIRED.
33. FIX STRIP DRAINS TO THE FACE OF THE EXCAVATION.
34. INSTALL FACING WALLS (IF REQUIRED).
35. COMMENCE CONCRETE FOOTING CONSTRUCTION OF THE FACING WALL (IF REQUIRED).
36. COMMENCE CONSTRUCTION OF THE DRAIN AND CAPPING BEAM (IF REQUIRED).
37. EXCAVATION STAGE MUST NOT EXCEED 2m DEPTH PRIOR TO INSPECTION BY THE PRINCIPAL'S SUITABLY QUALIFIED GEOTECHNICAL ENGINEER AND INSTALLATION OF SOIL NAIL WALL.
38. THE PRINCIPAL'S SUITABLY QUALIFIED GEOTECHNICAL ENGINEER WILL INSPECT THE ROOF FACE FOR THE DEPTH OF WEATHERINGS, LAYERS OF ROCK AND UNFAVOURABLE JOINTING AND BEDDING PLANES.
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UTILITY INFORMATION SHOWN ON THE PLANS DOES NOTCKET ANY PRINTED MATERIAL INVOLVED IN THE PROJECT. THE PRESENCE OF A UTILITY SERVICE, ITS SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION, PRIOR TO THE COMMENCEMENT OF ROADWORKS AND THE PRESENTATION OF THE PLANS. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.
TABLE 1: SOIL NAIL DETAILS

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<tr>
<th>ROW No</th>
<th>LENGTH (m)</th>
<th>BAR TYPE</th>
<th>DRILLED HOLE DIAMETER (mm)</th>
<th>INCLINATION TO HORIZONTAL</th>
<th>INCLINATION TO VERTICAL</th>
<th>SPACING (m)</th>
<th>SHOTCRETE THICKNESS (mm)</th>
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TYPICAL CROSS SECTION AND CONCRETE FACING

TYPICAL CROSS SECTION WITHOUT CONCRETE FACING