

# JEMENA SITE WORKS

## CLYDE STREET, HAMILTON NORTH, N.S.W. 2292

### - CC DOCUMENTATION -



Planning & Environment

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No. SSO 7676

granted on the 18 July 2019

Signed [Signature]

Sheet No. 1 of 17



#### DRAWING SCHEDULE

| DRG No. | DRAWING TITLE                                   |
|---------|---|
| C00.CC  | COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN |
| C01.CC  | CIVIL SPECIFICATIONS                            |
| C10.CC  | EROSION AND SEDIMENT CONTROL PLAN               |
| C11.CC  | EROSION AND SEDIMENT CONTROL DETAILS            |
| C20.CC  | BULK EARTHWORKS PLAN                            |
| C21.CC  | CUT FILL PLAN                                   |
| C30.CC  | STORMWATER MANAGEMENT SITE PLAN                 |
| C31.CC  | STORMWATER MANAGEMENT INSET PLAN 'A'            |
| C35.CC  | CAPPING LAYER EXTENT PLAN                       |
| C40.CC  | SITE SECTIONS - SHEET 1                         |
| C41.CC  | SITE SECTIONS - SHEET 2                         |
| C42.CC  | SITE SECTIONS - SHEET 3                         |
| C50.CC  | LOW PERMEABILITY WALL SETOUT PLAN               |
| C51.CC  | LOW PERMEABILITY WALL SECTIONS - SHEET 1        |
| C52.CC  | LOW PERMEABILITY WALL SECTIONS - SHEET 2        |
| C53.CC  | LOW PERMEABILITY WALL LONG SECTION - SHEET 1    |
| C54.CC  | LOW PERMEABILITY WALL LONG SECTION - SHEET 2    |

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THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNTIL ALL AUTHORITY APPROVALS HAVE BEEN GRANTED.

**FOR CONSTRUCTION**

| REVISION       | DESCRIPTION             | ISSUED | VER'D | APP'D | DATE     | CLIENT  | ARCHITECT   | PROJECT   | DRAWING TITLE  | JOB NUMBER   |  |                |          |               |          |
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| A              | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 | <small>DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED</small> | <small>THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD</small> | <small>ALL SETOUT TO ARCHITECT'S DRAWINGS, DIMENSIONS TO BE VERIFIED WITH THE ARCHITECT AND ON SITE BEFORE MAKING SHOP DRAWINGS OR COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.</small> |  | <small>Suite 4, 215 Pacific Hwy, Charlestown NSW 2290<br/>P.O. Box 180, Charlestown NSW 2290<br/>Ph (02) 4943 1777 Fax (02) 4943 1577<br/>Email newcastle@northrop.com.au AIN 81 094 433 100</small> | <table border="1"> <tr> <td>DRAWING NUMBER</td> <td>REVISION</td> </tr> <tr> <td><b>C00.CC</b></td> <td><b>A</b></td> </tr> </table> | DRAWING NUMBER | REVISION | <b>C00.CC</b> | <b>A</b> |
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DRAWING SHEET SIZE = A1

**ACCESS AND SAFETY**

1. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AND INDUSTRIAL REQUIREMENTS FOR PROVISION OF A SAFE WORKING ENVIRONMENT INCLUDING (BUT NOT LIMITED TO) TRAFFIC CONTROL.
2. THE CONTRACTOR SHALL PROVIDE TRAFFIC MANAGEMENT PLANS FOR THE PROPOSED WORKS COMPLETED BY A SUITABLY QUALIFIED PERSON AND APPROVED BY COUNCIL / REGULATORY AUTHORITY. WORKS ARE NOT TO COMMENCE ON SITE PRIOR TO THE APPROVAL OF TRAFFIC MANAGEMENT SCHEMES.
3. THE CONTRACTOR SHALL ENSURE SAFE ACCESS TO ALL ADJACENT AND NEIGHBORING BUSINESSES AND RESIDENCES AT ALL TIMES DURING AND AFTER WORK ACTIVITIES.
4. THE CONTRACTOR SHALL ENSURE PUBLIC ACCESS EXTERNAL TO THE SITE IS IN ACCORDANCE WITH COUNCILS REQUIREMENTS AT ALL TIMES.

**EXISTING SERVICES**

1. ALL UTILITY SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, AND THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS.
2. THE CONTRACTOR IS TO PROTECT AND MAINTAIN ALL EXISTING SERVICES THAT ARE TO BE RETAINED IN THE VICINITY OF WORKS. ANY AND ALL DAMAGES TO EXISTING SERVICES AS A RESULT OF PROPOSED WORKS (INCLUDING ANY ECONOMIC LOSS SUFFERED AS A RESULT OF DAMAGES) SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUPERINTENDENT TO RECTIFY AND MADE GOOD AT NO COST TO THE PRINCIPAL OR NORTHROP CONSULTING ENGINEERS.
3. CARE TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES, NO MECHANICAL EXCAVATIONS AREA TO BE UNDERTAKEN OVER COMMUNICATION, GAS OR ELECTRICAL SERVICES. HAND EXCAVATION ONLY IN THESE AREAS.
4. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE ADJUSTMENT OF EXISTING SERVICE AND INFRASTRUCTURE AS REQUIRED TO FACILITATE PROPOSED WORKS AND CONSTRUCTION REQUIREMENTS.
5. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS UNLESS DIRECTED OTHERWISE ON THE DRAWINGS OR BY THE SUPERINTENDENT.
6. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES, SERVICES TO ALL ADJACENT BUILDINGS NOT AFFECTED BY THE WORKS ARE PROTECTED AND NOT DISRUPTED.
7. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL FOR THE RELOCATION AND/OR CONSTRUCTION OF TEMPORARY SERVICES AND FOR ANY ASSOCIATED INTERRUPTION OF SUPPLY FROM THE APPROPRIATE SERVICE AUTHORITY.
8. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.

**PAVEMENTS**

1. FINAL PAVEMENT LAYER SHALL COMPLY WITH CURRENT RMS AND/OR COUNCIL SPECIFICATIONS. PROVIDE CERTIFICATES VERIFYING THE QUALITY AND SPECIFICATION COMPLIANCE OF ALL IMPORTED MATERIAL. CERTIFICATES ARE TO BE VERIFIED AGAINST STOCKPILED MATERIAL AND NOT BE MORE THAN 1 MONTH OLD.
  2. ALL PAVEMENTS HAVE BEEN DESIGNED FOR A SUBGRADE (CBR AS NOMINATED ON THE PAVEMENT DETAILS)
- COMPACTION STANDARDS**
- BASE 98% MODIFIED MAXIMUM DRY DENSITY (MMD)
  - SUBGRADE 98% STANDARD MAXIMUM DRY DENSITY (SMDD)
3. THE CONTRACTOR SHALL CONFIRM THE DESIGN CBR IN ACCORDANCE WITH THE TTP FOR CONSTRUCTION.
  4. ALLOW FOR AT LEAST TWO SUCCESSFUL COMPACTION TESTS IN EACH LAYER. ALLOW FOR ONE (1) ADDITIONAL TEST PER 200sqm OF PAVEMENT, OR AS OTHERWISE SPECIFIED IN THE INSPECTION AND TESTING PLAN FOR CONSTRUCTION (DP REPORT 91196.02.R007). ALL COMPACTION TESTING TO BE BY A N.A.T.A. REGISTERED LABORATORY IN ACCORDANCE WITH THE LATEST VERSION OF AS3798 FOR PAVEMENTS (MINIMUM 2 TESTS PER LAYER).
  5. MATCH NEW PAVEMENTS NEATLY AND FLUSH WITH EXISTING
  6. COMPACTION TESTING AND FREQUENCY IN ACCORDANCE WITH THE INSPECTION TEST PLAN FOR CONSTRUCTION (DP REPORT 91196.02.R007).
  7. **PAVEMENT HOLD POINTS**
    - 7.1. SUB-GRADE PROOF ROLL PRIOR TO SET-UP AND FORM FOR CONCRETE POUR/PAVEMENT CONSTRUCTION.
    - 7.2. INSPECTION OF FORMWORK / STEEL PRIOR TO CONCRETE POUR.
    - 7.3. SUBMISSION OF SUB-GRADE AND BASE DENSITY TESTS.
    - 7.4. FOR ADDITIONAL REQUIREMENTS REFER TO DOUGLAS PARTNERS REPORT REF 9116.02.R007.

**GENERAL**

1. ALL WORKS TO BE IN ACCORDANCE WITH PROJECT SPECIFICATION, RELEVANT LOCAL COUNCIL SPECIFICATIONS, REGULATORY AUTHORITIES SPECIFICATIONS, ENGINEERING DRAWINGS AND NOTES, AUSTRALIAN STANDARDS, LANDCOM AND EPA SPECIFICATIONS AND THE LATEST VERSION OF NATSPEC SPECIFICATIONS. CONFLICTS BETWEEN THE ABOVE DOCUMENT SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION.
2. ALL CIVIL ENGINEERING DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATION DOCUMENTATION, NAMELY ARCHITECTURAL, STRUCTURAL, HYDRAULIC AND LANDSCAPE.
3. THE CONTRACTOR IS TO DESIGN, OBTAIN APPROVALS AND CARRY OUT REQUIRED TEMPORARY TRAFFIC CONTROL PROCEDURES BEFORE AND DURING CONSTRUCTION IN ACCORDANCE WITH ALL REGULATORY AUTHORITIES, INCLUSIVE OF LOCAL COUNCILS AND STATE AUTHORITIES AS REQUIRED.
4. THE CONTRACTOR IS TO OBTAIN ALL AUTHORITY APPROVALS AS REQUIRED PRIOR TO COMMENCEMENT OF WORKS.
5. RESTORE ALL PAVED, COVERED, GRASSED AND LANDSCAPED AREAS TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT ON COMPLETION OF ALL AND ANY WORKS, WHERE PLANTING OF NEW GRASS IS NECESSARY REFER TO DOCUMENTATION FOR PROJECT SPECIFIC GUIDANCE.
6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF WORKS.
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO LODGMENT OF TENDER AND ON SITE WORKS. THE PRICE AS TENDERED SHALL BE INCLUSIVE OF ALL WORKS SHOWN ON THE TENDER PROJECT DRAWINGS. ADDITIONAL PAYMENTS FOR WORKS SHOWN ON THE TENDER PROJECT DRAWINGS WILL NOT BE APPROVED.
8. DO NOT OBTAIN DIMENSIONS BY SCALING DRAWINGS.
9. IN CASE OF DOUBT OR DISCREPANCY REFER TO SUPERINTENDENT FOR CLARIFICATION OR CONFIRMATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
10. WHERE NEW WORKS ADJUT EXISTING SURFACES AND INFRASTRUCTURE, THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED. MAKE SMOOTH TRANSITION TO EXISTING FEATURES AND MAKE GOOD WHERE JOINED.
11. ORIGIN OF LEVELS SHOWN ON THE FOLLOWING DRAWINGS ARE ASSUMED TO BE TO AUSTRALIAN HEIGHT DATUM (AHD) AS PROVIDED BY SURVEY DATA. THE CONTRACTOR IS TO CONFIRM ALL LEVELS AND HEIGHT DATA PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
12. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS AND THE DIRECTIONS OF THE SUPERINTENDENT.
13. THE CONTRACTOR IS TO PROVIDE TEMPORARY DIVERSION DRAINS AND MOUNDS AS REQUIRED TO ENSURE THAT AT ALL TIMES EXPOSED SURFACES ARE FREE DRAINING AND WHERE NECESSARY EXCAVATE SUMPS AND PROVIDE PUMPING EQUIPMENT TO DRAIN EXPOSED AREAS.
14. ANY AND ALL DAMAGE TO EXISTING INFRASTRUCTURE AND/OR PAVEMENTS SHALL BE REPORTED TO THE SUPERINTENDENT AND SHALL BE REPAIRED AND MADE GOOD BY THE CONTRACTOR TO MATCH NEATLY AND FLUSH TO EXISTING AT NO EXTRA COST TO THE PRINCIPAL OR NORTHROP CONSULTING ENGINEERS.
15. THE CONTRACTOR IS TO REFER TO HYDRAULIC ENGINEERS DRAWINGS FOR STORMWATER DRAINAGE DETAILS IN ADDITION TO THOSE SHOWN ON THE CIVIL ENGINEERING DRAWINGS. ANY CONFLICTS IDENTIFIED ARE TO BE REFERRED TO THE SITE FORMAN OR SUPERINTENDENT PRIOR TO PROCEEDING WITH WORKS.
16. THE CONTRACTOR SHALL ENSURE COUNCIL ASSETS AND UTILITIES ARE PROTECTED AT ALL TIMES. ANY AND ALL DAMAGE TO COUNCIL ASSETS AND/OR UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF COUNCIL AND THE UTILITIES AUTHORITY AND AT NO COST TO THE PRINCIPAL OR NORTHROP CONSULTING ENGINEERS.

**EARTHWORKS**

- PRIOR TO THE COMMENCEMENT OF EARTHWORKS THE CONTRACTOR IS TO REVIEW THE HAZARDOUS MATERIALS ASSESSMENT/ENVIRONMENTAL REPORT. ALL SURPLUS EXCAVATED MATERIAL SHALL BE MANAGED IN ACCORDANCE WITH THE PROJECT EIS.
1. THE CONTRACTOR SHALL REVIEW THE SITE SPECIFIC GEOTECHNICAL REPORT PREPARED BY DOUGLAS PARTNERS (REF No. 91196.02.R007). REMOVE ALL TOPSOIL, ORGANIC MATTER, RUBBLE, UNCONTROLLED FILL, UNSUITABLE MATERIAL AND THE LIKE AND UNDERTAKE ALL REQUIRED SUBGRADE/BASE LAYER TESTING (PROOF ROLLING ETC) UNDER THE GUIDANCE OF A SUITABLE QUALIFIED GEOTECHNICAL ENGINEER PRIOR TO BACK FILLING WITH CONTROLLED SPECIFIED MATERIAL.
  2. THE CONTRACTOR SHALL ALLOW TO EXCAVATE IN ALL MATERIALS UNLESS NOTED OTHERWISE.
  3. THE CONTRACTOR IS TO ALLOW FOR A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO PROVIDE ADVICE AND CERTIFICATION OF ANY WORKS ASSOCIATED WITH TREATING OR MANAGING UNSUITABLE GROUND CONDITIONS THROUGHOUT THE CONTRACT (E.G. STABILITY OF EXCAVATIONS, POOR SUBGRADE, ETC).
  4. THE CONTRACTOR SHALL PROOF ROLL ALL EXPOSED NATURAL SUBGRADE FOR BUILDING PLATFORMS, PAVED AREAS, AREAS TO BE FILLED, OR CUT BATTERS IN THE PRESENCE OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER WHO WILL CERTIFY THE WORKS AND CONFIRM FILLING METHODOLOGY. ALL SOFT, WET OR UNSUITABLE MATERIAL ENCOUNTERED SHALL BE ADVISED TO THE PRINCIPAL'S AGENT FOR INSTRUCTION REMOVE & REPLACE OR REMEDIATE ALL AREAS AS DIRECTED BY THE PRINCIPAL'S AGENT.
  5. THE CONTRACTOR AND GEOTECHNICAL ENGINEER ARE TO ENSURE CONTINUITY IN COMPACTION BETWEEN CUT/FILL AREAS LOCATED IN BUILDING PLATFORMS AND ROAD SUBGRADES
  6. THE CONTRACTOR IS TO OBTAIN AND PROVIDE CERTIFICATES VERIFYING THE QUALITY OF IMPORTED MATERIAL FOR THE SUPERINTENDENTS APPROVAL.
  7. TESTING OF SITE MATERIAL, SUBGRADES AND PAVEMENT LAYERS SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY AND IN ACCORDANCE WITH THE LATEST VERSION OF AS3798. WHERE THE FILL IS TO PROVIDE SUPPORT TO BUILDING FLOOR SLAB, LEVEL 1 TESTING PROCEDURES (IN ACCORDANCE WITH AS3798) SHALL BE FOLLOWED, OTHERWISE LEVEL 2 TESTING SHALL BE UNDERTAKEN. THE TESTING AUTHORITY SHALL BE ENGAGED BY THE CONTRACTOR.
  8. ALL FILL MATERIAL SHALL BE PLACED IN MAXIMUM 200mm THICK LAYERS (LOOSE) AND COMPACTED AT OPTIMUM MOISTURE CONTENT (i.e. DR - 2%) USING SUITABLE COMPACTION EQUIPMENT TO ACHIEVE A DRY DENSITY DETERMINED IN ACCORDANCE WITH AS1289 2.1.1, AS1289 5.7.1 AND AS1289 5.8.8 OF NOT LESS THAN THE FOLLOWING STANDARD MINIMUM DRY DENSITY.
- COMPACTION REQUIREMENT**
- GENERAL AREAS 100% SMDD
  - PAVEMENT SUB-GRADE 98% SMDD (U.N.O.)
  - PAVEMENT BASE LAYERS 98% MMDD (U.N.O.)
  - CLAY CAP 100% SMDD
9. FREQUENCY OF TESTING SHALL BE IN ACCORDANCE WITH TABLE 8.1 OF AS3798 FOR TYPE 1 EARTHWORKS.
  10. DENSITY TESTING SHALL BE UNDERTAKEN WITHIN TRENCHES AT A RATE OF ONE (1) TEST PER TWO (2) LAYERS PER FORTY (40) LINEAL METRES OF TRENCH.
  11. WHERE TEST RESULTS ARE BELOW THE SPECIFIED COMPACTION, RE-COMPACT AND RETEST UNTIL SPECIFIED COMPACTION STANDARDS ARE ACHIEVED, OTHERWISE SUBGRADE REPLACEMENT IS REQUIRED IF COMPACTION STANDARDS ARE NOT ACHIEVED.
  12. IF SUBGRADE OR FILL IS TOO WET TO ACHIEVE COMPACTION, UNDERTAKE ONE OR MORE OF THE FOLLOWING:
    - 12.1. SCARIFY AND WORK TO ACCELERATE DRYING.
    - 12.2. REPLACE WITH SUITABLE MATERIAL. RE-COMPACT WHEN MOISTURE CONTENT APPROACHES OPTIMUM.
  13. THE CONTRACTOR CAN REUSE CUT MATERIAL AS DIRECTED BY THE SITE SPECIFIC GEOTECHNICAL AUTHORITY OR PRINCIPALS AGENT. WHERE THERE IS INSUFFICIENT CUT MATERIAL SUITABLE FOR FILLING OR SUBGRADE REPLACEMENT, THE CONTRACTOR IS TO ALLOW TO IMPORT FILL. IMPORTED FILL SHALL COMPLY WITH THE FOLLOWING:
    - 16.1. APPROVED AND CERTIFIED BY THE SITE GEOTECHNICAL ENGINEER.
    - 16.2. MINIMUM CBR VALUE OF 8%
  14. THE CONTRACTOR IS TO ALLOW FOR THE REPLACEMENT OF UNSUITABLE AND/OR SENSITIVE GROUND (I.E. SILTS, ORGANIC MATTER ETC) WITH SELECTED MATERIAL FROM EXCAVATIONS IF AVAILABLE OR SELECT IMPORTED FILL.

**EARTHWORKS (cont)**

18. THE CONTRACTOR IS TO PROGRAM EXCAVATIONS TO ENSURE THAT BULK EARTHWORKS AND EXPOSED SURFACES ARE ADEQUATELY DRAINED DURING CONSTRUCTION. ALL EXPOSED SURFACES SHALL BE GRADED AND SEALED OFF TO REMOVE DEPRESSIONS, ROLLERS MARKS AND SIMILAR WHICH WOULD ALLOW WATER TO POND AND PENETRATE THE UNDERLYING MATERIAL. ANY DAMAGE RESULTING FROM THE CONTRACTOR NOT OBSERVING THESE REQUIREMENTS SHALL BE RECTIFIED AT NO COST TO THE PRINCIPAL OR NORTHROP CONSULTING ENGINEERS.
19. THE CONTRACTOR IS TO PROVIDE AND INSTALL TEMPORARY DRAINAGE OR SUMP PUMPING AS REQUIRED UNTIL SUFFICIENT SITE STORMWATER DRAINAGE HAS BEEN INSTALLED. ENSURE THAT ALL SEDIMENT AND EROSION CONTROL PROVISIONS ARE ADHERED TO FOR TEMPORARY DRAINAGE MEASURES (REFER TO THE ENGINEERING SEDIMENT AND EROSION CONTROL DRAWINGS).
20. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE AND MAINTAIN THE INTEGRITY OF ALL SERVICES, CONDUITS AND PIPES DURING CONSTRUCTION, SPECIFICALLY DURING THE BACKFILLING AND COMPACTION PROCEDURE. ANY AND ALL DAMAGE TO NEW OR EXISTING SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST.
21. ALLOWABLE EXCAVATION TOLERANCE IS -0 MM (BELOW DOCUMENTED LEVELS) AND +50MM (ABOVE DOCUMENTED LEVELS). REFER TO LATEST VERSION OF JEMENA GAS NETWORKS (NSW) LTD PROJECT REQUIREMENTS.
22. THE CONTRACTOR IS TO INSTALL CUT-OFF DRAINAGE SWALES (AT MIN 1% LONGITUDINAL GRADE AND MIN 500MM WIDE) TO THE HIGH SIDE OF ALL BUILDING PLATFORMS TO PROTECT THE PLATFORMS DURING CONSTRUCTION. ALL TEMPORARY DRAINAGE SWALES ARE TO BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF "THE BLUE BOOK"
23. ALL EARTH BATTERS SHALL BE CUT/FILLED TO A MAXIMUM 1 (VERTICAL) IN 4 (HORIZONTAL) SLOPE UNLESS NOTED OTHERWISE ON THE DRAWINGS.
24. ANY CONTAMINATED MATERIAL FOUND ON SITE DURING CONSTRUCTION AND EARTHWORKS ACTIVITIES SHALL BE ADVISED TO THE PRINCIPAL'S AGENT FOR DIRECTION.
25. PRIOR TO THE COMMENCEMENT OF EXCAVATION WORKS GREATER THAN 1.5M IN DEPTH, THE CONTRACTOR SHALL OBTAIN THE SERVICES OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO DETERMINE THE STABILITY OF A NATURAL MATERIAL AND BENCHING REQUIREMENTS.
26. THE CONTRACTOR MUST PROVIDE THE SUPERINTENDENT AND OR THE DESIGN ENGINEER WITH A COPY OF THE GEOTECHNICAL ENGINEERS REPORT.
27. THE CONTRACTOR IS TO PROVIDE SAFETY BARRIERS / FENCING IN ACCORDANCE WITH OH&S AND REGULATORY AUTHORITY REQUIREMENTS.

**STORMWATER DRAINAGE (cont)**

5. ALL PIPE BENDS, JUNCTIONS, ETC ARE TO BE PROVIDED USING PURPOSE MADE FITTINGS OR STORMWATER PITS.
6. ALL CONNECTIONS TO EXISTING DRAINAGE STRUCTURES SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND CEMENT RENDERED TO ENSURE A SMOOTH, WATER TIGHT FINISH.
7. STORMWATER PIPEWORK TO FINISH FLUSH WITH INTERNAL PIT WALLS AND MUST NOT PROTRUDE. CONNECTION TO BE NEATLY RENDERED AND MADE NEAT.
8. U.N.O. MATERIAL USED FOR BEDDING OF PIPES SHALL BE APPROVED NON-COHESIVE GRANULAR MATERIAL HAVING HIGH PERMEABILITY AND HIGH STABILITY WHEN SATURATED AND FREE OF ORGANIC AND CLAY MATERIAL.
9. MATERIAL USED FOR ALL PIPE BEDDING AND BACK FILL SHALL BE APPROVED NON-COHESIVE GRANULAR MATERIAL HAVING A HIGH PERMEABILITY AND HIGH STABILITY WHEN SATURATED, BE FREE FROM ORGANIC AND CLAY MATERIAL AND COMPLY WITH THE CURRENT VERSION OF AS3725. PIPE BEDDING SHALL BE TYPE H52 U.N.O. UNDER ROADS AND H2 UNDER GENERAL AREAS U.N.O. AND BE IN ACCORDANCE WITH THE CURRENT VERSION OF AS3725.
10. THE CONTRACTOR SHALL ENSURE AND PROTECT THE INTEGRITY OF ALL STORMWATER PIPES DURING CONSTRUCTION. ANY AND ALL DAMAGE TO THESE PIPES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AND AT NO EXTRA COST.
11. NOTE THAT THE PIT COVER LEVEL NOMINATED IN GUTTERS ARE TO THE INVERT OF THE GUTTER WHICH ARE 40mm LOWER THAN THE PAVEMENT LEVEL AT LIP OF GUTTER. REFER KERB DETAILS FOR CONFIRMATION.

**HOLD POINTS**

1. THE CONTRACTOR SHALL PROVIDE MINIMUM 72 HOURS NOTICE TO CERTIFYING AUTHORITY FOR ALL CIVIL ENGINEERING INSPECTIONS AT ALL HOLD POINTS. THE STAGES FOR HOLD POINTS ARE:
  11. PRIOR TO BACK FILLING STORMWATER PIPES/TRENCHES.
  12. AT FINISHED SUBGRADE UNDER PAVEMENTS.
  13. PRIOR TO EXTERNAL CONCRETE POUR INCLUDING STORMWATER PITS WHERE CAST INSITU
  14. FINAL INSPECTION PRIOR TO PRACTICAL COMPLETION.
2. CONSTRUCTION SHALL NOT PROCEED UNTIL APPROVAL IS GIVEN BY CERTIFYING AUTHORITY FOR EACH HOLD POINT.

**STORMWATER DRAINAGE**

1. ALL CONCRETE PIPES SHALL BE CLASS 2 RUBBER-RING JOINTED RCP U.N.O.
2. ALL PIPE ARE TO BE LAID AT 1.0% MIN GRADE U.N.O.
3. ALL STORMWATER INLET PITS SHOWN ON THE CIVIL ENGINEERING DRAWINGS SHALL BE CAST IN-SITU REINFORCED CONCRETE PITS (U.N.O.). THE USE OF PRE-CAST CONCRETE STORMWATER DRAINAGE PITS ARE TO BE CONFIRMED AND APPROVED BY THE SUPERINTENDENT AND NORTHROP CONSULTING ENGINEERS PRIOR TO THEIR PURCHASE AND INSTALLMENT ON SITE (U.N.O.)
4. **PIT COVERS**
  - 4.1. USE HOT DIPPED GALVANISED COVERS AND GRATES COMPLYING WITH RELEVANT COUNCIL AND AUSTRALIAN STANDARDS U.N.O.
  - 4.2. ALL COVERS AND GRATES TO BE POSITION IN A FRAME AND MANUFACTURED AS A UNIT TO THE MINIMUM LOAD CLASS SPECIFIED.
  - 4.3. ALL COVERS AND GRATES TO BE FITTING WITH POSITIVE COVER LIFTING KEYS.
  - 4.4. OBTAIN SUPERINTENDENTS APPROVAL FOR THE USE OF CAST IRON SOLID COVERS AND GRATES (U.N.O.). CAST IRON SOLID COVERS (IF APPROVED) TO CONSIST OF CROSS-WEBBED, CELLULAR CONSTRUCTION WITH THE RIBS UPPERMOST TO ALLOW INFILLING WITH CONCRETE. INSTALL POSITIVE COVER LIFTING KEYS AND PLASTIC PLUGS.
  - 4.5. UNLESS DETAILED OR SPECIFIED OTHERWISE, COVERS AND GRATES TO BE CLASS 'D' IN VEHICULAR PAVEMENTS AND CLASS 'B' ELSEWHERE.



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Signed JH

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| 3   | ISSUED FOR APPROVAL     | JL     | CS    | AK    | 03.10.18 | DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED |           | <p>Newcastle<br/>Suite 4, 215 Pacific Hwy, Charlestown NSW 2290<br/>P.O. Box 180 Charlestown NSW 2290<br/>Ph (02) 4943 1777 Fax (02) 4943 1577<br/>Email newcastle@northrop.com.au ADR 61 094 433 100</p> | <b>JEMENA SITE WORKS,<br/>CLYDE STREET,<br/>HAMILTON NORTH, N.S.W. 2292</b> | <b>CIVIL SPECIFICATIONS</b> | <b>NL172903</b> |
| 4   | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |  |           |   |   |                             |                 |
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| 6   | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |  |           |   |   |                             |                 |
| 7   | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 19.03.19 |  |           |   |   |                             |                 |
| A   | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |  |           |   |   |                             |                 |
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Approved Application No. SSD 7676

granted on the 18 July 2019

Signed H

Sheet No. 3 of 17

**LEGEND**

- BOUNDARY LINE
- EXISTING EASEMENT LINE
- SEDIMENT FENCE REFER TO DRAWING C11.CC
- CUT-OFF SWALE
- STABILISED SITE ACCESS. REFER TO DRAWING C10A OR SD6-14 OF THE "BLUE BOOK"
- STOCKPILE
- PROPOSED MAIN ACCESS HAULAGE ROAD
- DENOTES EARTH BUND FINISHED AT RL 6.5 AHD.
- PROPOSED CONTOURS

**EROSION AND SEDIMENTATION CONTROL NOTES**

- ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE APPROPRIATE FOR THE SOIL TYPE(S) ON-SITE, IN ACCORDANCE WITH THE "BLUE BOOK" (MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION LANDCOM, 2004), OR OTHER CURRENT RECOGNISED INDUSTRY STANDARDS FOR EROSION AND SEDIMENT CONTROL FOR AUSTRALIAN CONDITIONS. THIS INCLUDES SEDIMENT TRAPS AND LINING OF CHANNELS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION AND SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS AND SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ALL MAINTENANCE, CLEANING AND BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.
- INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE "BLUE BOOK".
- ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE "BLUE BOOK".
- INSTALL SEDIMENT FENCING, OR OTHER SEDIMENT CONTROL DEVICES, AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT OR APPROPRIATE COUNCIL OFFICER.
- ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAY'S WORK.
- ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ON-SITE AND DISPOSED OFF SITE. STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE SPREAD ON-SITE AS DIRECTED BY THE SUPERINTENDENT OR REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES AND RE.
- CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE "BLUE BOOK" (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).
- ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE "BLUE BOOK".
- PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
- SHADE CLOTH TO BE PROVIDED TO ALL PERIMETER FENCING TO REDUCE WIND BLOWN DUST MIGRATION.
- THE EROSION AND SEDIMENT CONTROL MEASURES SHOWN ON THIS PLAN ARE GENERAL SITE MEASURES. ADDITIONAL MEASURES MAY BE REQUIRED AROUND INDIVIDUAL BUILDING ZONES DEPENDENT ON THE SEQUENCE OF CONSTRUCTION.
- THE CONTRACTOR IS TO LIMIT SITE EROSION VIA IMPLEMENTING THE FOLLOWING PRINCIPLES:
  - DELINEATE "NO GO" AREAS THROUGHOUT THE SITE TO MINIMISE DISTURBANCE AREAS TO ONLY THOSE REQUIRED TO COMPLETE THE CURRENT WORKS.
  - INSTALL BUNDS/CUT OFF DRAINS TO BREAK THE FLOW LENGTH UP IN AREAS WHERE EROSION IS OBSERVED TO BE OCCURRING.
  - PROGRESSIVELY REHABILITATE DISTURBANCE AREAS. CONSIDER THE USE OF SOIL BINDERS TO MINIMISE EROSION SHOULD DISTURBANCE AREAS BE UNABLE TO BE REHABILITATED.
- SEDIMENT CONTROL DEVICES, OTHER THAN SEDIMENT BASINS, SHALL BE DE-SILTED AND MADE FULLY OPERATIONAL AS SOON AS REASONABLE AND PRACTICABLE AFTER A SEDIMENT-PRODUCING EVENT, WHETHER NATURAL OR ARTIFICIAL. IF THE DEVICE'S SEDIMENT RETENTION CAPACITY FALLS BELOW 75% OF ITS DESIGN RETENTION CAPACITY, SEDIMENT REMOVED FROM ON-SITE DEVICES SHALL BE DISPOSED OF ON-SITE IN ACCORDANCE WITH THE REMEDIAL ACTION REPORT.
- THE CONTRACTOR SHALL ENSURE THAT APPROPRIATE PROCEDURES AND SUITABLY QUALIFIED PERSONNEL ARE ENGAGED TO PLAN AND CONDUCT SITE INSPECTIONS AND WATER QUALITY MONITORING THROUGHOUT THE CONSTRUCTION AND MAINTENANCE PHASE.
- ALL ESC MEASURES SHALL BE INSPECTED AND ANY MAINTENANCE UNDERTAKEN IMMEDIATELY.
  - AT LEAST DAILY (WHEN WORK IS OCCURRING ON-SITE); AND
  - AT LEAST WEEKLY (WHEN WORK IS NOT OCCURRING ON-SITE); AND
  - WITHIN 24HRS OF EXPECTED RAINFALL; AND
  - WITHIN 18HRS OF A RAINFALL EVENT THAT CAUSES RUNOFF ON THE SITE.
- PERIODIC TURBIDITY MONITORING OF DOWNSCREEN WATERWAYS SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE "TIME-FRAMES" LISTED IN NOTE 17.
- WRITTEN RECORDS SHALL BE KEPT ON-SITE OF ESC MONITORING AND MAINTENANCE ACTIVITIES CONDUCTED DURING THE CONSTRUCTION AND MAINTENANCE PERIODS, AND BE AVAILABLE TO COUNCIL OFFICERS ON REQUEST.
- ALL ENVIRONMENTALLY RELEVANT INCIDENTS SHALL BE RECORDED IN A FIELD LOG THAT SHALL REMAIN ACCESSIBLE TO ALL RELEVANT REGULATORY AUTHORITIES.
- ALL WATER QUALITY DATA, INCLUDING DATES OF RAINFALL, DATES OF TESTING, TESTING RESULTS AND DATES OF WATER RELEASE, SHALL BE KEPT IN AN ON-SITE REGISTER. THE REGISTER IS TO BE MAINTAINED UP TO DATE FOR THE DURATION OF THE APPROVED WORKS AND BE AVAILABLE ON-SITE FOR INSPECTION BY (INSERT NAME OF REGULATORY AUTHORITY) ON REQUEST.

**SOIL LOSS CALCULATION**

THE SITE IS LOCATED WITHIN THE HAMILTON SOIL LANDSCAPE AND PRIMARILY CONSISTS OF MODERATE TO HIGH PERMEABILITY SOILS COMPRISING OF SILTY SAND, SAND FINE TO MEDIUM GRAINED AND FILL COMPRISING OF A MIXTURE OF GRASS/TOPSOIL (CLEAN SAND AND BUILDING RUBBLE, WHICH HAVE THE FOLLOWING PROPERTIES IN ACCORDANCE WITH TABLE C13 OF THE "BLUE BOOK"):

| CONSTRAINT                                       | VALUE                          |
|--|--------------------------------|
| SITE DISTURBANCE AREA                            | 7.4ha                          |
| SEDIMENT TYPE                                    | F                              |
| SOIL HYDROLOGY GROUP                             | A                              |
| K = SOIL ERODIBILITY (K-FACTOR)                  | 0.016                          |
| R = RAINFALL EROSIVITY (R-FACTOR)                | 2582                           |
| S = 2 YEAR, 6 HOUR STORM INTENSITY               | 10.9 mm/hr                     |
| LS = SLOPE LENGTH/GRADIENT                       | 0.26 (250m SLOPE @ 1% GRADE)   |
| P = EROSION CONTROL PRACTICE (P-FACTOR)          | 1.3 (TYPICAL)                  |
| C = GROUND COVER (C-FACTOR)                      | 10 (TYPICAL FOR STRIPPED SITE) |
| SOIL LOSS (RUSLE METHOD) (m <sup>3</sup> /ha/yr) | 14                             |
| TOTAL SOIL LOSS (m <sup>3</sup> /year) #         | 79                             |
| EROSION HAZARD (TABLE 4.2 BLUE BOOK)             | VERY LOW                       |

**STORAGE REQUIREMENTS**

AS SOIL LOSS <math>= 150m^3/yr</math> UNDER THE PROVISION OF THE "BLUE BOOK", THE REQUIREMENT FOR A SEDIMENT BASIN IS CONSIDERED UNNECESSARY. NOT WITHSTANDING THIS, 15,000L OF STORMWATER STORAGE SHALL BE PROVIDED TO SATISFY THE 'NO DISCHARGE' REQUIREMENTS OF THE EIS, EQUAL TO THE RUNOFF FROM THE 100-YEAR ARI 72 HOUR STORM EVENT.

STORED VOLUME SHALL BE DISCHARGED TO SEWER UNDER THE TRADE WASTE AGREEMENT FOR THE SITE. MAXIMUM DISCHARGE RATE 10 L/s OR 864 KL/DAY. SUITABILITY OF STORED WATER FOR DISCHARGE UNDER TRADE WASTE LICENCE TO BE ASSESSED PRIOR TO DISCHARGE AND IN CONSULTATION WITH HUNTER WATER.

THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNTIL ALL AUTHORITY APPROVALS HAVE BEEN GRANTED.

**FOR CONSTRUCTION**

DRAWN: J. PARKINSON  
DESIGNED: A. KILLEN  
JOB MANAGER: C. SMITH  
VERIFIER: C. SMITH

| REVISION | DESCRIPTION             | ISSUED | VER'D | APP'D | DATE     | CLIENT   |
|----------|-------------------------|--------|-------|-------|----------|--|
| 4        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 | <br>DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED. |
| 5        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |  |
| 6        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 24.01.19 |  |
| 7        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |  |
| 8        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 19.03.19 |  |
| A        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 | THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD.  |

ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VERIFIED WITH THE ARCHITECT AND ON SITE BEFORE MAKING SHOP DRAWINGS OR COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.

SCALE 1:1000 @ A1



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 Email newcastle@northrop.com.au AIN 01 004 433 100

PROJECT

**JEMENA SITE WORKS,**  
CLYDE STREET,  
HAMILTON NORTH, N.S.W. 2292

DRAWING TITLE

**EROSION AND SEDIMENT CONTROL PLAN**

JOB NUMBER

**NL172903**

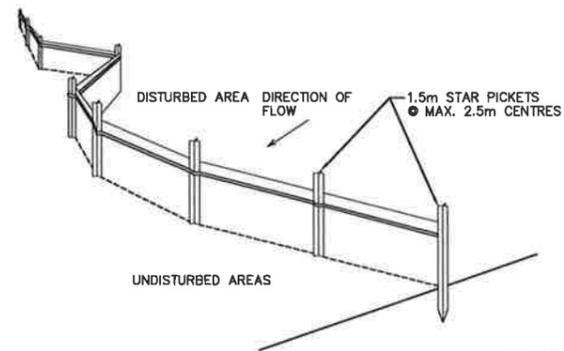
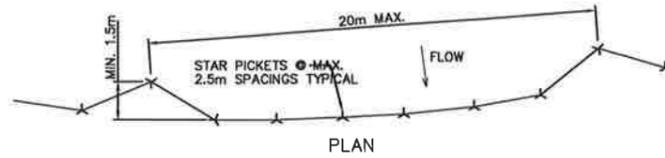
DRAWING NUMBER

**C10.CC**

REVISION

**A**

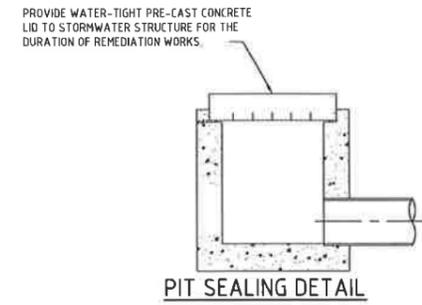
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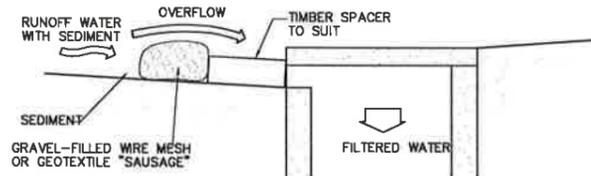
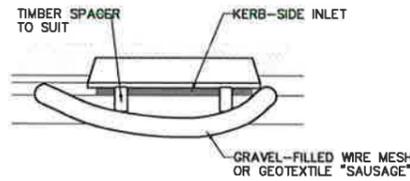
**SEDIMENT FENCE**  
SCALE N.T.S.

**SEDIMENT FENCE CONSTRUCTION NOTES:**

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 15m LONG STAR PICKETS INTO GROUND @ 2.5m INTERVALS (MAX.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



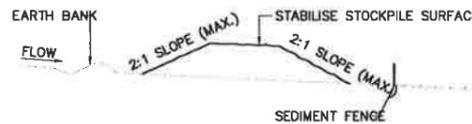
**PIT SEALING DETAIL**  
INSTALL PIT PROTECTION TO ALL NEW & EXISTING STORMWATER PITS.



**MESH AND GRAVEL INLET FILTER CONSTRUCTION NOTES:**

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
3. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
4. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
5. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY CAN FIRMLY ABUT EACH OTHER AND SEDIMENT / LADEN WATERS CANNOT PASS BETWEEN.

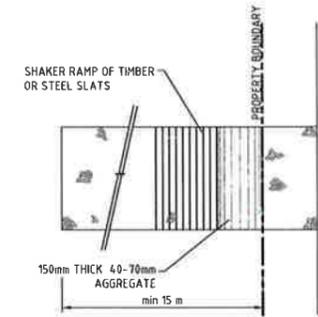
**MESH AND GRAVEL INLET FILTER**  
SCALE N.T.S.



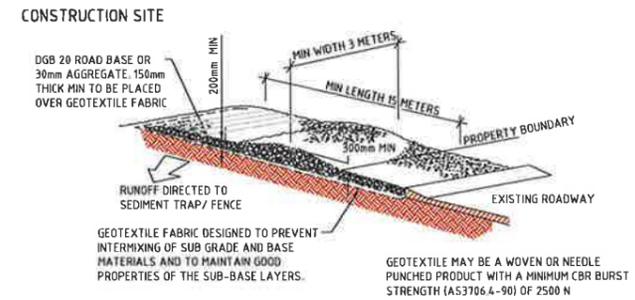
**STOCKPILE CONSTRUCTION NOTES:**

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT, WHERE THEY ARE TO BE PLACED FOR MORE THAN 10 DAYS. STABILISE FOLLOWING THE APPROVED E.S.C.P. OR S.W.H.P. TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
4. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

**STOCKPILES**  
SCALE N.T.S.



**STABILISED SITE ACCESS WITH SHAKER RAMP**  
N.T.S.



**STABILISED SITE ACCESS WITH SHAKER RAMP**  
N.T.S.

**STABILISED SITE ACCESS WITH SHAKER RAMP CONSTRUCTION NOTES:**

1. THIS DEVICE IS TO BE LOCATED AT ALL EXITS FROM CONSTRUCTION SITE.
2. THIS DEVICE IS TO BE REGULARLY CLEANED OF DEPOSITED MATERIAL SO AS TO MAINTAIN A 50mm DEEP SPACE BETWEEN PLANKS.
3. ANY UNSEALED ROAD BETWEEN THIS DEVICE AND NEAREST ROADWAY IS TO BE TOPPED WITH 100mm THICK 40-70mm SIZE AGGREGATE.
4. ALTERNATIVELY, PRECAST CONCRETE CATTLE GRIDS MAY BE USED. 1, 2 & 3 ABOVE ALSO APPLY.

THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNTIL ALL AUTHORITY APPROVALS HAVE BEEN GRANTED.

**FOR CONSTRUCTION**

| REVISION | DESCRIPTION             | ISSUED | VER'D | APP'D | DATE     | CLIENT | ARCHITECT | ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VERIFIED WITH THE ARCHITECT AND ON SITE BEFORE MAKING SHOP DRAWINGS OR COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. | PROJECT   | DRAWING TITLE                                   | JOB NUMBER      |
|----------|-------------------------|--------|-------|-------|----------|--------|-----------|--|---|---|-----------------|
| 2        | ISSUED FOR APPROVAL     | JP     | CS    | AK    | 19.09.18 |        |           | <p>Newcastle<br/>Suite 4, 215 Pacific Hwy, Charlesstown NSW 2290<br/>P.O. Box 160, Charlestown NSW 2290<br/>Ph (02) 4943 1777 Fax (02) 4943 1577<br/>Email newcastle@northrop.com.au AHN 81 094 433 100</p>  | <b>JEMENA SITE WORKS,<br/>CLYDE STREET,<br/>HAMILTON NORTH, N.S.W. 2292</b> | <b>EROSION AND SEDIMENT<br/>CONTROL DETAILS</b> | <b>NL172903</b> |
| 3        | ISSUED FOR APPROVAL     | AK     | CS    | AK    | 03.10.18 |        |           |  |   |   |                 |
| 4        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |        |           |  |   |   |                 |
| 5        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |        |           |  |   |   |                 |
| 6        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |        |           |  |   |   |                 |
| A        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |        |           |  |   |   |                 |

DESIGNED: A.KILLEN  
DRAWN: J.PARKINSON  
JOB MANAGER: C.SMITH  
VERIFIER: C.SMITH

| LEGEND |                        |
|--------|------------------------|
|        | BOUNDARY LINE          |
|        | EXISTING EASEMENT LINE |
|        | EXTENT OF ASBESTOS PIT |
|        | PROPOSED CONTOURS      |

### BULK EARTHWORKS NOTES

1. BULK EARTHWORKS LEVELS SHOWN ARE BASED ON THE FOLLOWING FLOOR ALLOWANCES:

- CAPPING LAYER: 525mm  
COMPRISING OF:  
- 350mm IMPORTED CLAY  
- 175mm IMPORTED RECYCLED 20mm ROAD BASE.
- EXCAVATED MATERIAL FROM ASBESTOS DISPOSAL PIT TO BE RESPREAD BENEATH CAPPING LAYER: 2150m<sup>3</sup>
- EXCAVATED MATERIAL FROM BARRIER WALL TO BE RESPREAD BENEATH CAPPING LAYER: 2600m<sup>3</sup>
- DEMOLITION WASTE: 4000m<sup>3</sup>

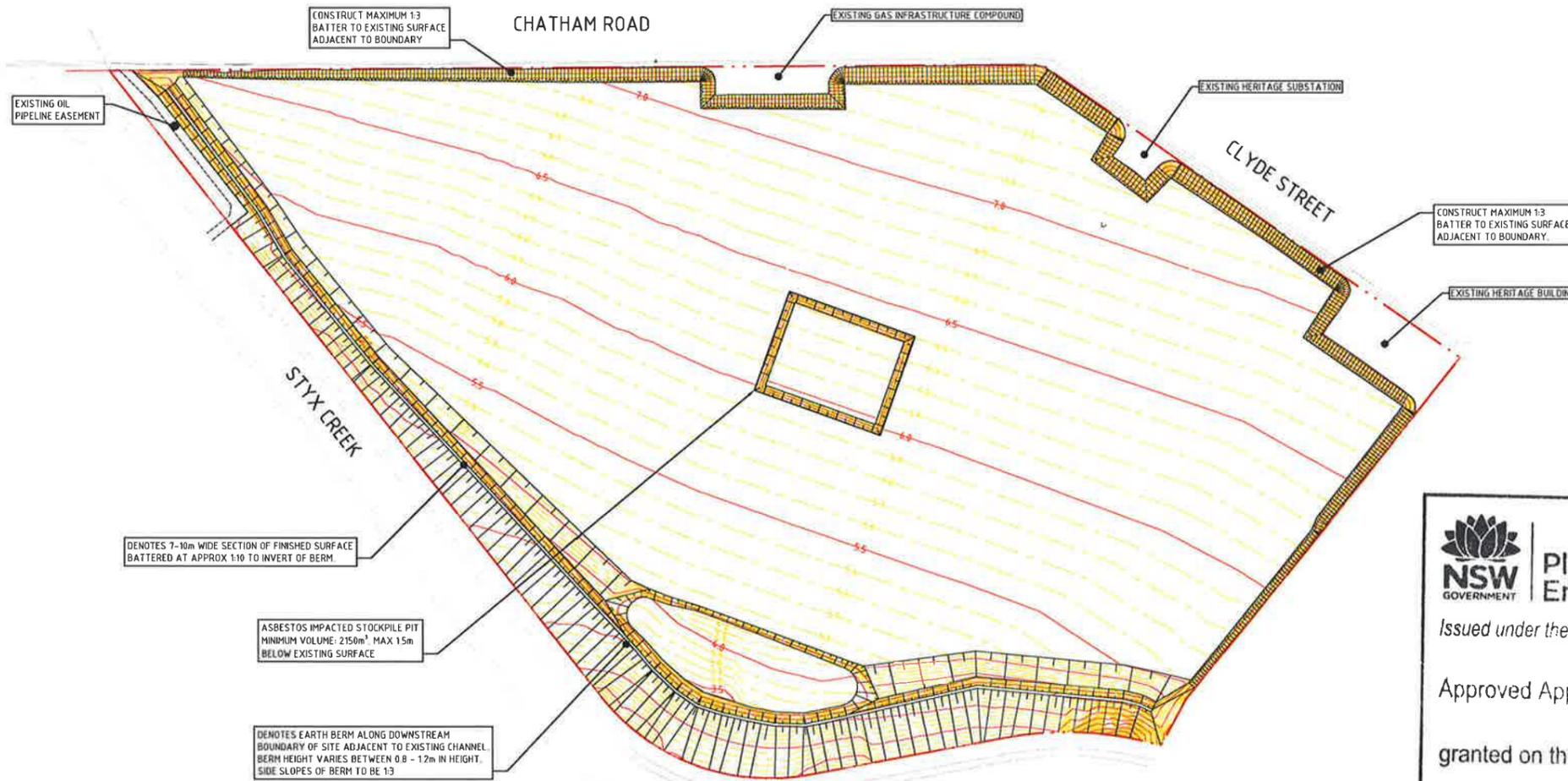
2. THE APPROXIMATE SITE EARTHWORKS VOLUMES BASED ON THE NOTED PAVEMENT THICKNESSES ARE OUTLINED BELOW:

- CUT: 20,586m<sup>3</sup>
- FILL: 23,716m<sup>3</sup>
- NET: 3,130m<sup>3</sup> (FILL) - FILL COMPRISING SITE WON MATERIAL

NOTE:  
THE ABOVE VOLUMES ARE BASED ON SUPPLIED SURVEY DATA AND AS SUCH ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL SATISFY THEMSELVES AS TO THEIR ACCURACY.

THE ABOVE VOLUMES DO NOT INCLUDE A STRIPPING ALLOWANCE.

NOTE: NOMINATED MATERIAL TO BE APPROVED BY VALIDATION CONSULTANT PRIOR TO IMPORTATION



**Planning & Environment**

*Issued under the Environmental Planning and Assessment Act 1979*

Approved Application No. SSD 7676

granted on the 18 July 2019

Signed [Signature]

Sheet No. 5 of 17

THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNTIL ALL AUTHORITIES' APPROVALS HAVE BEEN GRANTED.

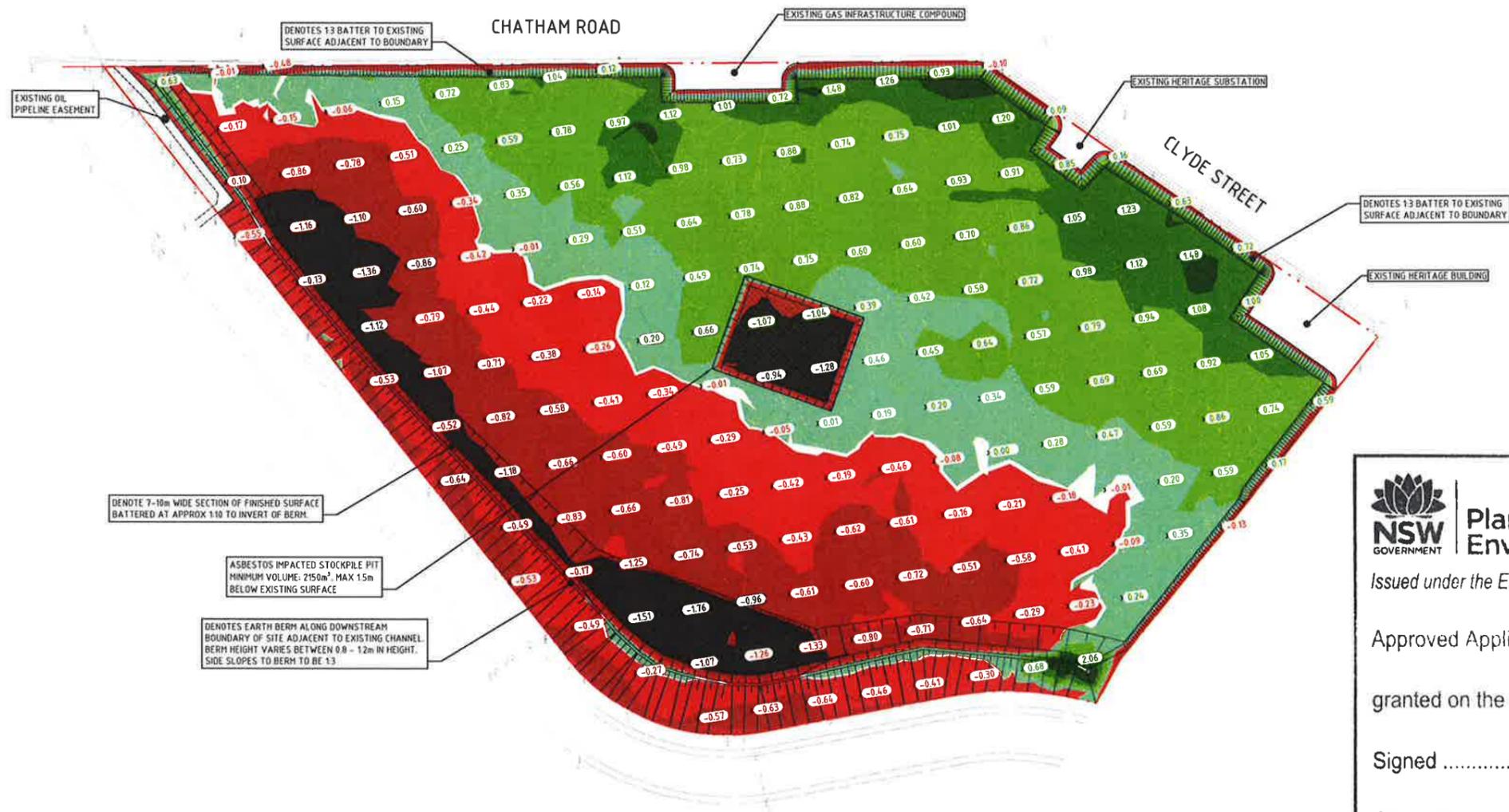
**FOR CONSTRUCTION**

| REVISION   | DESCRIPTION             | ISSUED | VER'D | APP'D | DATE     | CLIENT   | ARCHITECT  | SCALE                    | PROJECT  | DRAWING TITLE                      | JOB NUMBER             |
|--|-------------------------|--------|-------|-------|----------|--|--|--------------------------|--|------------------------------------|------------------------|
| 3  | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 18.10.18 | <p><b>FORD CIVIL</b><br/>CONSTRUCTION<br/>INFRASTRUCTURE<br/>DESIGNERS<br/>&amp; ENGINEERS<br/>CONSULTANTS</p> | <p><b>NORTHROP</b><br/>Newcastle<br/>Suite 4, 215 Pacific Hwy, Charlestown NSW 2290<br/>P.O. Box 180, Charlestown NSW 2290<br/>Ph (02) 4943 1777 Fax (02) 4943 1577<br/>Email newcastle@northrop.com.au ABN 81 094 433 100</p> | <p>SCALE 1:1000 @ A1</p> | <p><b>JEMENA SITE WORKS,<br/>CLYDE STREET,<br/>HAMILTON NORTH, N.S.W. 2292</b></p> | <p><b>BULK EARTHWORKS PLAN</b></p> | <p><b>NL172903</b></p> |
| 4  | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |  |  |                          |  |                                    |                        |
| 5  | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 24.01.19 |  |  |                          |  |                                    |                        |
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| A  | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |  |  |                          |  |                                    |                        |
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DRAWN: J. PARKINSON  
DESIGNED: A. KILLEN  
JOB MANAGER: C. SMITH  
VERIFIER: C. SMITH

| LEGEND |                        |  |
|--------|------------------------|--|
|        | BOUNDARY LINE          |  |
|        | EXISTING EASEMENT LINE |  |
|        | EXTENT OF ASBESTOS PIT |  |

| Surface Analysis: Elevation Ranges |                 |                       |                       |
|------------------------------------|-----------------|-----------------------|-----------------------|
| Number                             | Color           | Minimum Elevation (m) | Maximum Elevation (m) |
| 1                                  | Black           | -3.070                | -1.000                |
| 2                                  | Dark Red        | -1.000                | -0.500                |
| 3                                  | Red             | -0.500                | -0.050                |
| 4                                  | Light Red       | -0.050                | 0.000                 |
| 5                                  | Light Green     | 0.000                 | 0.500                 |
| 6                                  | Green           | 0.500                 | 1.000                 |
| 7                                  | Dark Green      | 1.000                 | 1.500                 |
| 8                                  | Very Dark Green | 1.500                 | 2.500                 |



DENOTES 1:3 BATTER TO EXISTING SURFACE ADJACENT TO BOUNDARY

EXISTING GAS INFRASTRUCTURE COMPOUND

EXISTING HERITAGE SUBSTATION

DENOTES 1:3 BATTER TO EXISTING SURFACE ADJACENT TO BOUNDARY

EXISTING HERITAGE BUILDING

DENOTE 7-10m WIDE SECTION OF FINISHED SURFACE BATTERED AT APPROX 1:10 TO INVERT OF BERM

ASBESTOS IMPACTED STOCKPILE PIT  
MINIMUM VOLUME: 2150m<sup>3</sup>, MAX 1.5m BELOW EXISTING SURFACE

DENOTES EARTH BERM ALONG DOWNSTREAM BOUNDARY OF SITE ADJACENT TO EXISTING CHANNEL. BERM HEIGHT VARIES BETWEEN 0.8 - 1.2m IN HEIGHT. SIDE SLOPES TO BERM TO BE 1:3

**NSW GOVERNMENT** | **Planning & Environment**  
 Issued under the Environmental Planning and Assessment Act 1979  
 Approved Application No. SSD 7676  
 granted on the 18 July 2019  
 Signed [Signature]  
 Sheet No. 6 of 17

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| 3        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 | <br>DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED |
| 4        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |  |
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| 7        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 19.03.19 |  |
| A        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |  |

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 Email: newcastle@northrop.com.au ASB 61 094 433 100

**NORTHROP**  
 PROJECT  
**JEMENA SITE WORKS,  
 CLYDE STREET,  
 HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE  
**CUT FILL PLAN**

JOB NUMBER  
**NL172903**

DRAWING NUMBER  
**C21.CC**

REVISION  
**A**

DRAWING SHEET SIZE: A1

DRAWN: J. PARKINSON, DESIGNED: A. KILLEN, JOB MANAGER: C. SMITH, VERIFIER: C. SMITH

| LEGEND |  |
|--------|--|
|        | BOUNDARY LINE  |
|        | EXISTING EASEMENT LINE                                 |
|        | STORMWATER PIPE  |
|        | SEDIMENT FENCE   |
|        | GRATED INLET PIT. REFER TO DRAWING C31.CC FOR DETAILS. |
|        | EXTENT OF ASBESTOS PIT                                 |
|        | EXTENT OF 1% AEP                                       |
|        | PROPOSED CONTOURS                                      |
|        | PROPOSED DIRECTION OF FALL IN FINISHED SURFACE         |

### STORMWATER MANAGEMENT SUMMARY

LGA: NEWCASTLE CITY COUNCIL (NCC)

THIS STORMWATER MANAGEMENT PLAN HAS BEEN DEVELOPED IN ACCORDANCE WITH NCC'S 2012 DCP AND 2015 STORMWATER TECHNICAL MANUAL.

THE DEVELOPMENT SITE HAS TOTAL AREA OF 7.02 HECTARES. THE EXISTING SITE IS GENERALLY FLAT, FALLING TOWARDS CLYDE STREET TO THE WEST AND AN EXISTING CONCRETE-LINED STORMWATER CHANNEL TO THE WEST. AS PART OF REMEDIATION WORKS, IT IS PROPOSED TO REGRADE SITE LEVELS SUCH THAT THE MAJORITY OF THE SITE FALLS TOWARDS THE STORMWATER CHANNEL AT AN AVERAGE GRADE OF 1.0%. FOLLOWING COMPLETION OF SITE REGRADING THE SITE WILL BE SEALED WITH A 500mm THICK CAPPING LAYER OF SPRAY SEAL.

#### 1. DETENTION

IN ACCORDANCE WITH NCC'S 2012 DCP SECTION 7.06 STORMWATER, ONSITE DETENTION HAS BEEN PROVIDED FOR THE SITE.

OVERLAND FLOW FROM THE SITE WILL BE COLLECTED IN A SINGLE DETENTION BASIN AT THE EASTERN BOUNDARY OF THE SITE WHICH WILL DISCHARGE INTO THE EXISTING CONCRETE-LINED CHANNEL. THE TOTAL DETENTION VOLUME PROVIDED BY THE BASIN IS 2500 KL.

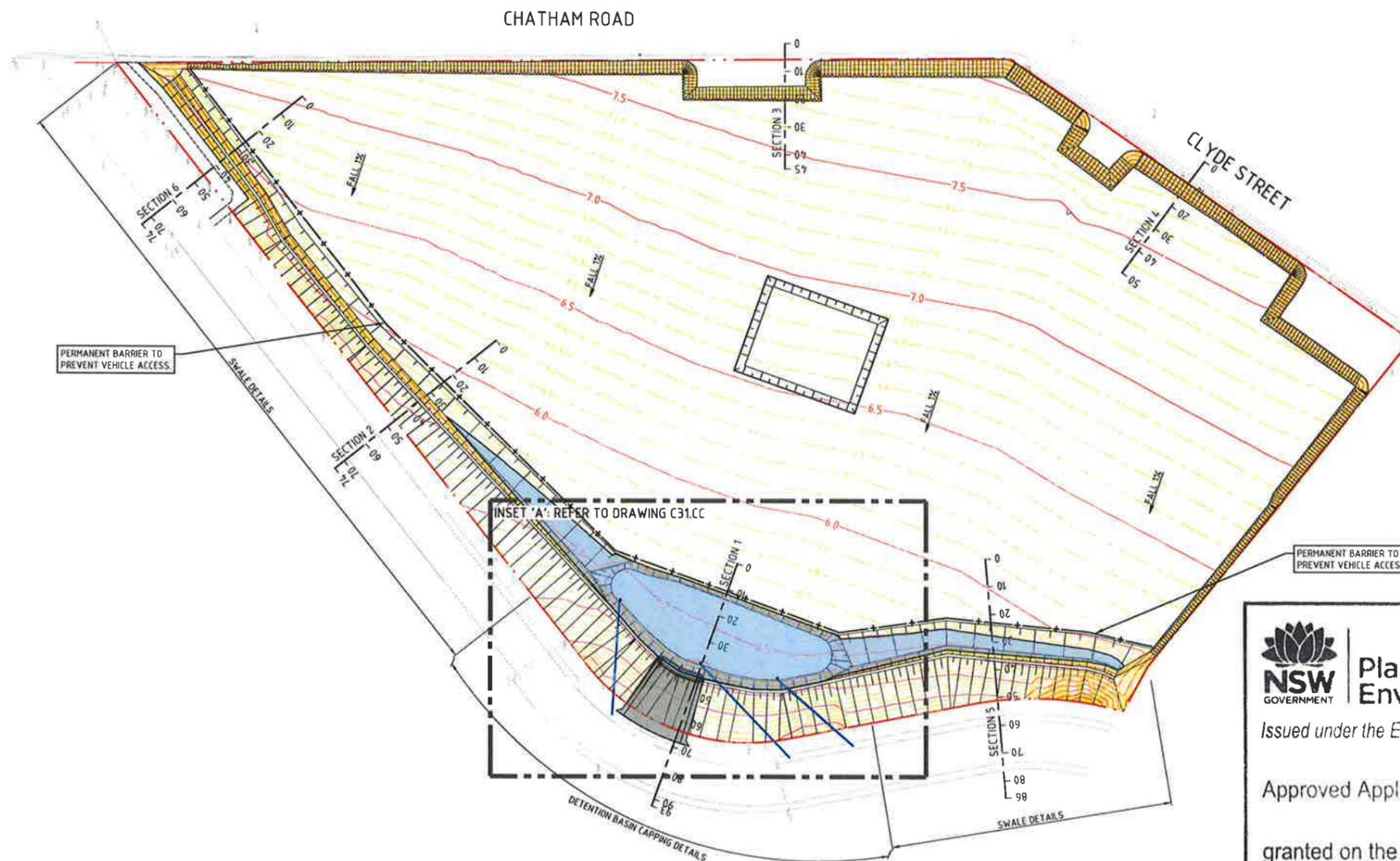
THE STORMWATER DETENTION BASINS AND OUTLETS HAVE BEEN SIZED USING ARR2016 METHODS IMPLEMENTED IN THE DRAINS SOFTWARE PACKAGE. THE RESULTS OF THE DRAINS MODEL HAVE BEEN PROVIDED IN THE TABLE BELOW. THE PRE-DEVELOPED SCENARIO ASSUMED THE SITE WAS 100% PERVIOUS.

|                       | 20% AEP | 10% AEP | 5% AEP | 2% AEP | 1% AEP |
|-----------------------|---------|---------|--------|--------|--------|
| PRE-DEVELOPED (m³/s)  | 0.89    | 1.30    | 1.78   | 2.50   | 2.92   |
| POST-DEVELOPED (m³/s) | 0.80    | 1.10    | 1.68   | 2.11   | 2.78   |

NOTE: DRAINS MODEL IS AVAILABLE ON REQUEST.

#### 2. WATER QUALITY

WATER QUALITY TREATMENT MEASURES HAVE NOT BEEN PROVIDED FOR THE PROPOSED REMEDIATION WORKS AS THE SITE CURRENTLY HAS NO PROPOSED END USE AND THERE WILL GENERALLY BE LOW POLLUTANT RUNOFF POTENTIAL. IT IS CONSIDERED THAT ONCE THE SITE IS RE-DEVELOPED, WATER QUALITY MEASURES CONSISTENT WITH THE PROPOSED END-USE WILL BE PROVIDED TO MITIGATE POLLUTANT GENERATION.



**Planning & Environment**

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No. SSD 7676

granted on the 18 July 2019

Signed JH

Sheet No. 7 of 17

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PROJECT

**JEMENA SITE WORKS,  
CLYDE STREET,  
HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE

**STORMWATER MANAGEMENT  
SITE PLAN**

|                        |          |                 |
|------------------------|----------|-----------------|
| JOB NUMBER             |          | <b>NL172903</b> |
| DRAWING NUMBER         | REVISION |                 |
| <b>C30.CC</b>          | <b>A</b> |                 |
| DRAWING SHEET SIZE: A1 |          |                 |

DRAWN: J.PARKINSON DESIGNED: A.KILLEN JOB MANAGER: C.SMITH VERIFIER: C.SMITH



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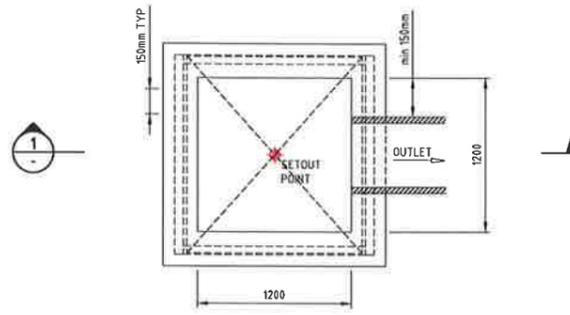
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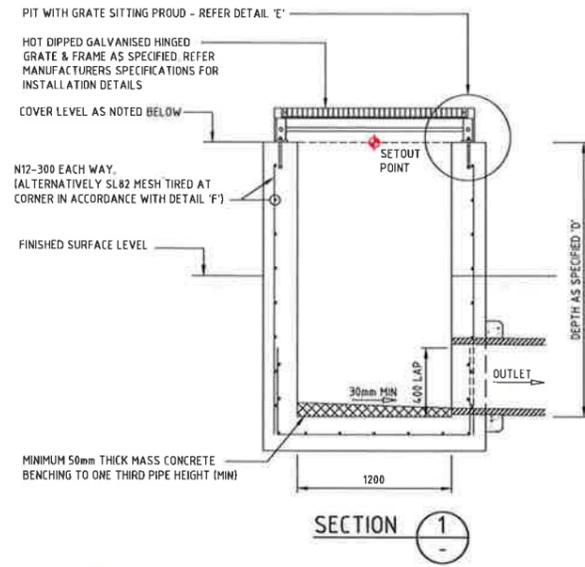
Signed H

Sheet No. 8 of 17



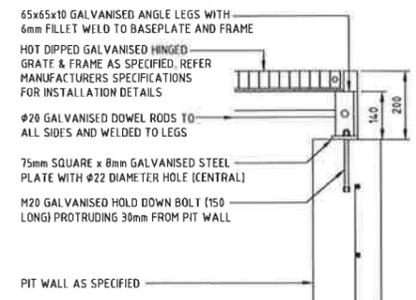
PLAN DISCHARGE PIT - TYPICAL

- PIT STRUCTURE TO BE 150mm THICK MINIMUM (UNLESS SHOWN OTHERWISE)
- REFER TO PIT INTERFACE DETAIL 'F' FOR CORNER REINFORCEMENT IF MESH IS USED IN LIEU OF N12-300 EACH WAY
- PROVIDE STEP IRONS IN ACCORDANCE WITH AS1657 WHEN PIT DEPTHS ARE GREATER THEN 1200mm
- SPARGE INTERNAL PIT FACE AT ALL PIPE CONNECTIONS AND PENETRATIONS
- SHAPE BASE OF PIT TO DIRECT FLOWS TOWARDS OUTLET. PROVIDE A MINIMUM 30mm SMOOTH DROP FROM INLET TO OUTLET
- PROVIDE ADEQUATE LEVEL OF COMPACTION AROUND PIT. REFER TO SPECIFICATION FOR REQUIREMENTS.
- THE USE OF EQUIVALENT PRE-CAST STORMWATER PITS IS SUBJECT TO APPROVAL FROM THE PRINCIPAL.

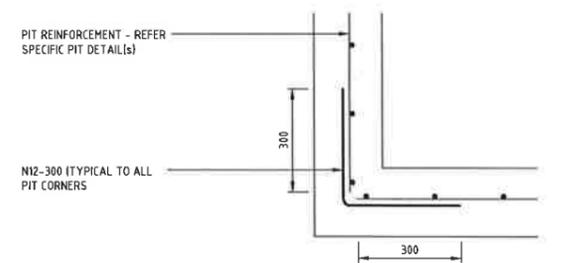


SECTION 1

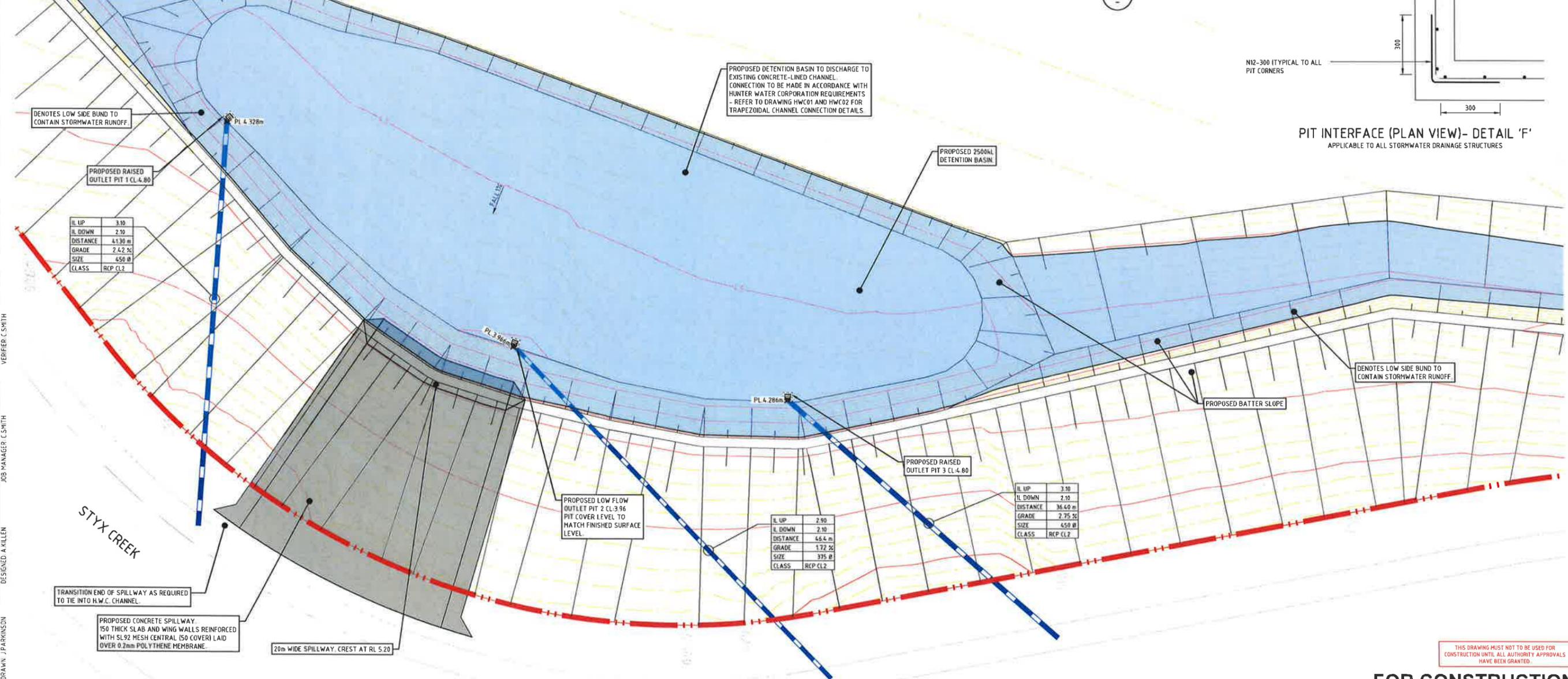
REFER TO DRAWING C30.CC FOR LEGEND



PIT INTERFACE - DETAIL 'E'



PIT INTERFACE (PLAN VIEW) - DETAIL 'F'  
APPLICABLE TO ALL STORMWATER DRAINAGE STRUCTURES



|          |         |
|----------|---------|
| IL UP    | 3.10    |
| IL DOWN  | 2.10    |
| DISTANCE | 4.130 m |
| GRADE    | 2.42 %  |
| SIZE     | 450 Ø   |
| CLASS    | RCP CL2 |

|          |         |
|----------|---------|
| IL UP    | 2.90    |
| IL DOWN  | 2.10    |
| DISTANCE | 66.4 m  |
| GRADE    | 1.72 %  |
| SIZE     | 375 Ø   |
| CLASS    | RCP CL2 |

|          |         |
|----------|---------|
| IL UP    | 3.10    |
| IL DOWN  | 2.10    |
| DISTANCE | 36.60 m |
| GRADE    | 2.75 %  |
| SIZE     | 450 Ø   |
| CLASS    | RCP CL2 |

VERIFIER C SMITH  
JOB MANAGER C SMITH  
DESIGNED A KILLEN  
DRAWN J PARKINSON

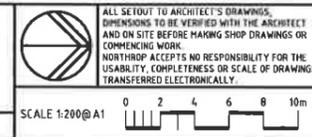
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PROJECT  
**JEMENA SITE WORKS,  
CLYDE STREET,  
HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE  
**STORMWATER MANAGEMENT  
INSET PLAN 'A'**

|                    |                 |
|--------------------|-----------------|
| JOB NUMBER         | <b>NL172903</b> |
| DRAWING NUMBER     | <b>C31.CC</b>   |
| REVISION           | <b>A</b>        |
| DRAWING SHEET SIZE | A1              |

| LEGEND |  |
|--------|--|
|        | BOUNDARY LINE  |
|        | EXISTING EASEMENT LINE   |
|        | EXTENT OF GENERAL AREA CAPPING LAYER. REFER TO DRAWING C42.CC FOR DETAIL.      |
|        | EXTENT OF SWALE CAPPING LAYER. REFER TO DRAWING C42.CC FOR DETAIL.             |
|        | EXTENT OF DETENTION BASIN CAPPING LAYER. REFER TO DRAWING C42.CC FOR DETAIL.   |
|        | EXTENT OF SOIL BENTONITE WALL CAPPING BEAM REFER TO DRAWING C42.CC FOR DETAIL. |
|        | PROPOSED CONTOURS  |

**BARRIER WALL CONCRETE CROSSING.**  
 (6m WIDE x 3m LONG). 200 THICK WITH 2 LAYERS OF SL92 MESH TOP AND BOTTOM (50 COVER). LAID OVER 0.2mm POLYTHENE MEMBRANE. PROVIDE PROPRIETARY BOLT DOWN BOLLARDS INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS, PLACEMENT AND QUANTITY OF BOLLARDS TO BE DETERMINED BY SITE SUPERINTENDENT.

EXISTING OIL PIPELINE EASEMENT

PERMANENT BARRIER TO PREVENT VEHICLE ACCESS.

CHATHAM ROAD

EXISTING GAS INFRASTRUCTURE COMPOUND

EXISTING HERITAGE SUBSTATION

CLYDE STREET

EXISTING HERITAGE BUILDING

STYX CREEK

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Approved Application No. SSD 7676

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Sheet No. 9 of 17

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0 10 20 30 40 50m

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PROJECT

**JEMENA SITE WORKS,  
 CLYDE STREET,  
 HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE

**CAPPING LAYER EXTENT PLAN**

JOB NUMBER

**NL172903**

DRAWING NUMBER

**C35.CC**

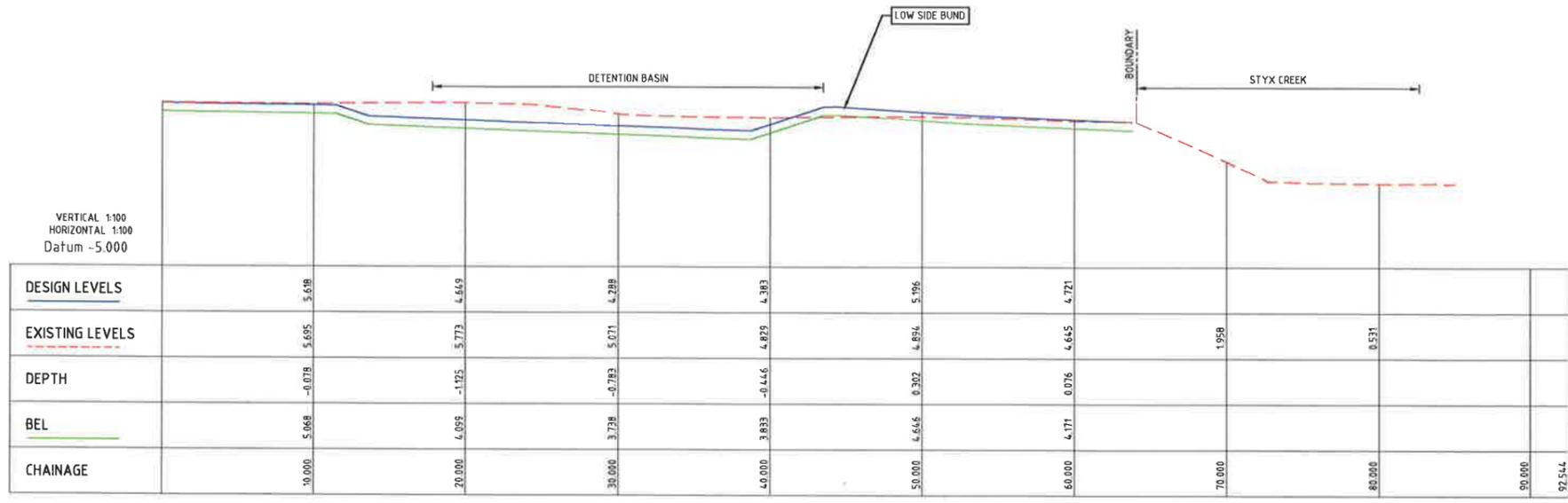
REVISION

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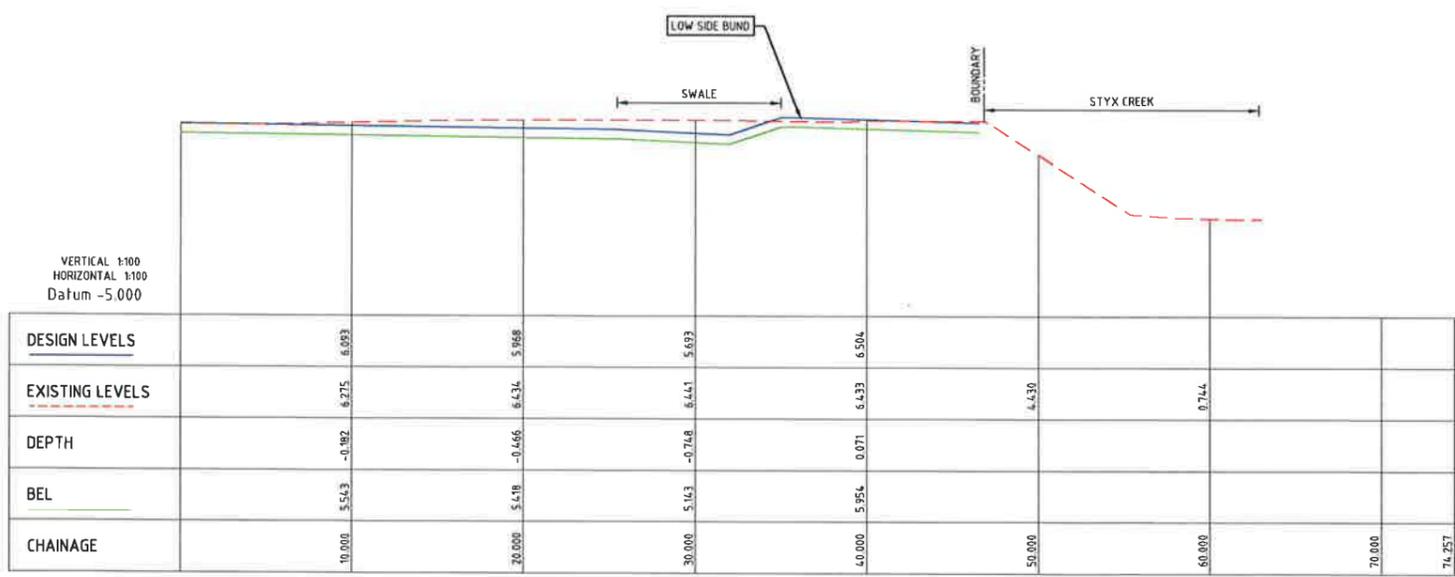
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 DESIGNED: A KILLEN  
 JOB MANAGER: C SMITH  
 VERIFIER: C SMITH

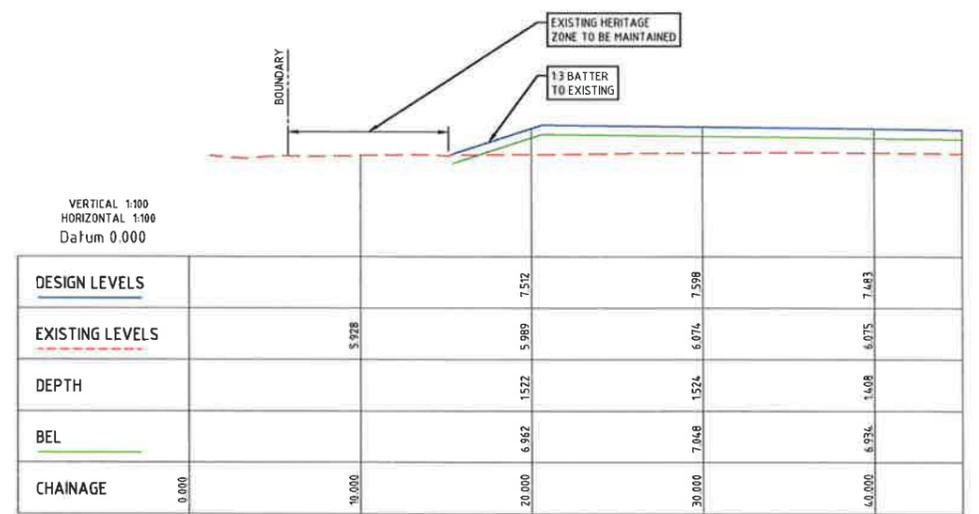

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SECTION 1 LONG SECTION



SECTION 2 LONG SECTION



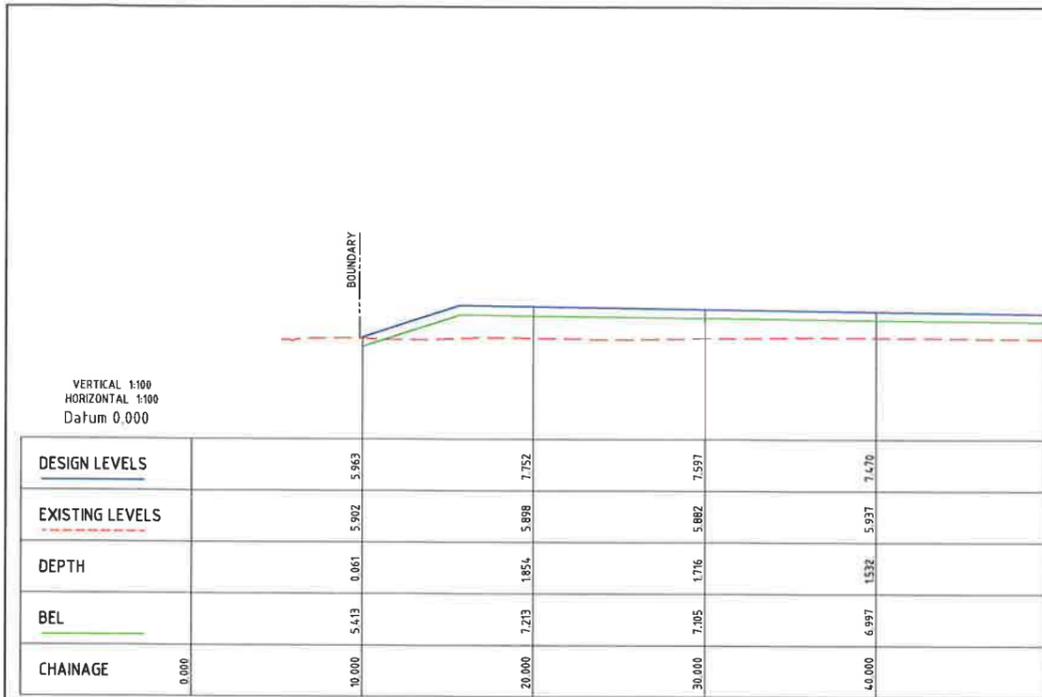
SECTION 3 LONG SECTION

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 DESIGNED: A.WILLEN  
 JOB MANAGER: C.SMITH  
 VERIFIER: C.SMITH

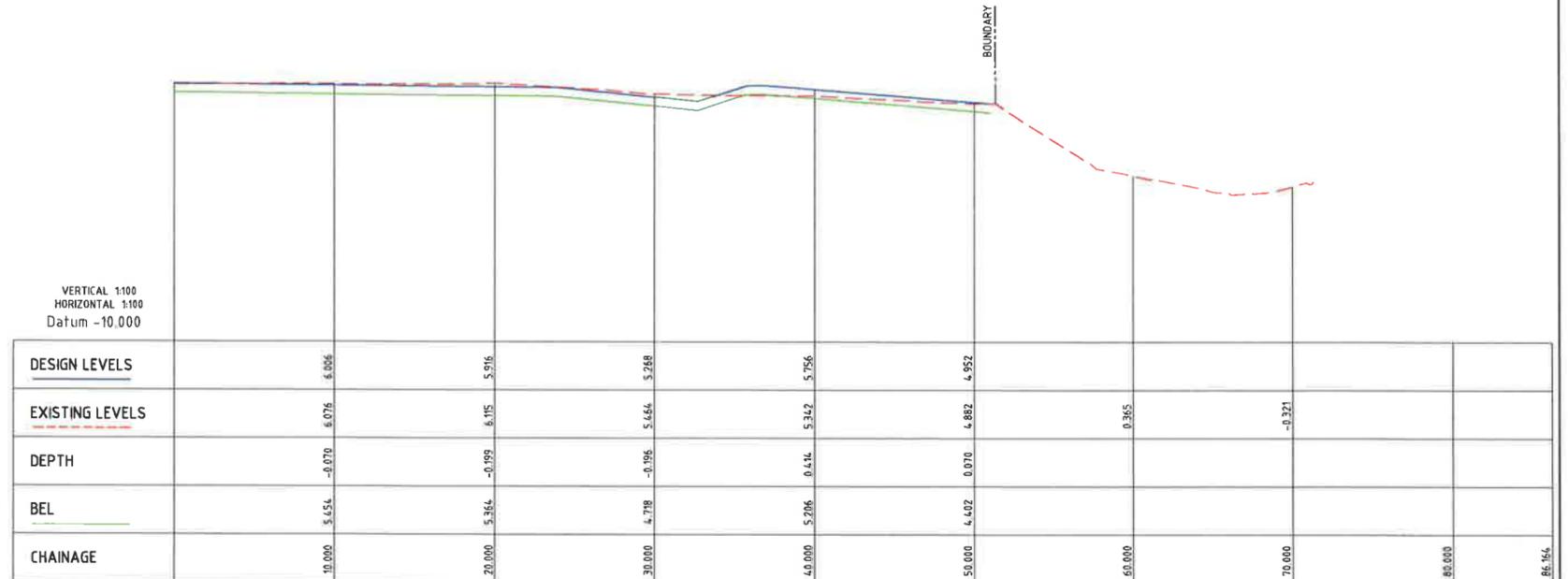
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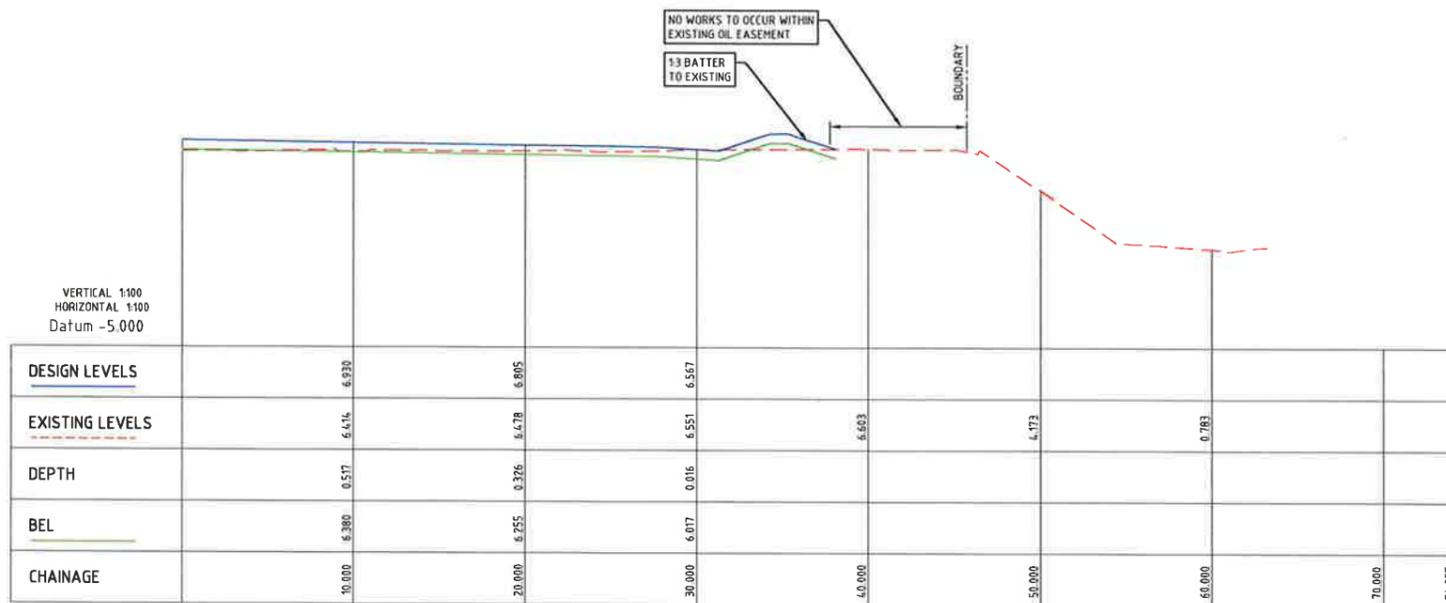
| <table border="1"> <thead> <tr> <th>REVISION</th> <th>DESCRIPTION</th> <th>ISSUED</th> <th>VER'D</th> <th>APP'D</th> <th>DATE</th> <th>CLIENT</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>ISSUED FOR APPROVAL</td> <td>JP</td> <td>CS</td> <td>AK</td> <td>19.09.18</td> <td rowspan="6"> <br/>           FORD CIVIL<br/>           ENGINEERING<br/>           SURVEYING<br/>           BUILDING<br/>           CONSULTANTS<br/>           (NSW) PTY LTD         </td> </tr> <tr> <td>3</td> <td>ISSUED FOR APPROVAL</td> <td>SF</td> <td>CS</td> <td>AK</td> <td>18.10.18</td> </tr> <tr> <td>4</td> <td>RE-ISSUED FOR APPROVAL</td> <td>JP</td> <td>CS</td> <td>AK</td> <td>07.11.18</td> </tr> <tr> <td>5</td> <td>RE-ISSUED FOR APPROVAL</td> <td>SF</td> <td>CS</td> <td>AK</td> <td>24.01.19</td> </tr> <tr> <td>6</td> <td>RE-ISSUED FOR APPROVAL</td> <td>SF</td> <td>CS</td> <td>AK</td> <td>12.03.19</td> </tr> <tr> <td>A</td> <td>ISSUED FOR CONSTRUCTION</td> <td>SF</td> <td>CS</td> <td>AK</td> <td>26.03.19</td> </tr> </tbody> </table> | REVISION                | DESCRIPTION | ISSUED | VER'D | APP'D    | DATE  | CLIENT | 2 | ISSUED FOR APPROVAL | JP | CS | AK | 19.09.18 | <br>FORD CIVIL<br>ENGINEERING<br>SURVEYING<br>BUILDING<br>CONSULTANTS<br>(NSW) PTY LTD | 3 | ISSUED FOR APPROVAL | SF | CS | AK | 18.10.18 | 4 | RE-ISSUED FOR APPROVAL | JP | CS | AK | 07.11.18 | 5 | RE-ISSUED FOR APPROVAL | SF | CS | AK | 24.01.19 | 6 | RE-ISSUED FOR APPROVAL | SF | CS | AK | 12.03.19 | A | ISSUED FOR CONSTRUCTION | SF | CS | AK | 26.03.19 | ARCHITECT<br><br>CLIENT<br><br>ARCHITECT<br><br>CLIENT | ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VERIFIED WITH THE ARCHITECT AND ON SITE BEFORE MAKING SHOP DRAWINGS OR COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.<br><br><br><b>NORTHROP</b><br>Newcastle<br>Suite 4, 215 Pacific Hwy, Charlestown NSW 2290<br>P.O. Box 180, Charlestown NSW 2290<br>Ph (02) 4943 1777 Fax (02) 4943 1577<br>Email newcastle@northrop.com.au ABN 81 094 433 100 | PROJECT<br><b>JEMENA SITE WORKS,<br/>           CLYDE STREET,<br/>           HAMILTON NORTH, N.S.W. 2292</b> | DRAWING TITLE<br><b>SITE SECTIONS<br/>           SHEET 1</b> | JOB NUMBER<br><b>NL172903</b><br>DRAWING NUMBER<br><b>C40.CC</b><br>REVISION<br><b>A</b><br>DRAWING SHEET SIZE: A1 |
|---|-------------------------|-------------|--------|-------|----------|---|--------|---|---------------------|----|----|----|----------|---|---|---------------------|----|----|----|----------|---|------------------------|----|----|----|----------|---|------------------------|----|----|----|----------|---|------------------------|----|----|----|----------|---|-------------------------|----|----|----|----------|--|---|--|--|--|
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| 4   | RE-ISSUED FOR APPROVAL  | JP          | CS     | AK    | 07.11.18 |   |        |   |                     |    |    |    |          |   |   |                     |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                         |    |    |    |          |  |   |  |  |  |
| 5   | RE-ISSUED FOR APPROVAL  | SF          | CS     | AK    | 24.01.19 |   |        |   |                     |    |    |    |          |   |   |                     |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                         |    |    |    |          |  |   |  |  |  |
| 6   | RE-ISSUED FOR APPROVAL  | SF          | CS     | AK    | 12.03.19 |   |        |   |                     |    |    |    |          |   |   |                     |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                         |    |    |    |          |  |   |  |  |  |
| A   | ISSUED FOR CONSTRUCTION | SF          | CS     | AK    | 26.03.19 |   |        |   |                     |    |    |    |          |   |   |                     |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                        |    |    |    |          |   |                         |    |    |    |          |  |   |  |  |  |



SECTION 4 LONG SECTION



SECTION 5 LONG SECTION



SECTION 6 LONG SECTION

**NSW GOVERNMENT** Planning & Environment  
 Issued under the Environmental Planning and Assessment Act 1979

Approved Application No. SSO 7676

granted on the 18 July 2019

Signed [Signature]

Sheet No. 11 of 17

DRAWN: J.PARKINSON, DESIGNED: A.KILLEN, JOB MANAGER: C.SMITH, VERIFIER: C.SMITH

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| REVISION | DESCRIPTION             | ISSUED | VER'D | APP'D | DATE     | CLIENT |
|----------|-------------------------|--------|-------|-------|----------|--------|
| 2        | ISSUED FOR APPROVAL     | JP     | CS    | AK    | 19.09.18 |        |
| 3        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |        |
| 4        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |        |
| 5        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 24.01.19 |        |
| 6        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |        |
| A        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |        |

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PROJECT

**JEMENA SITE WORKS, CLYDE STREET, HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE

**SITE SECTIONS SHEET 2**

JOB NUMBER

**NL172903**

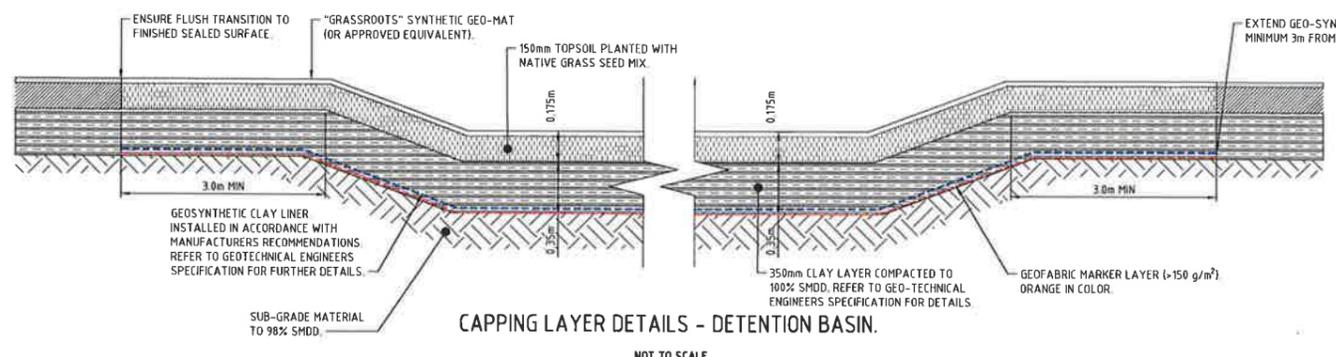
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**C41.CC**

REVISION

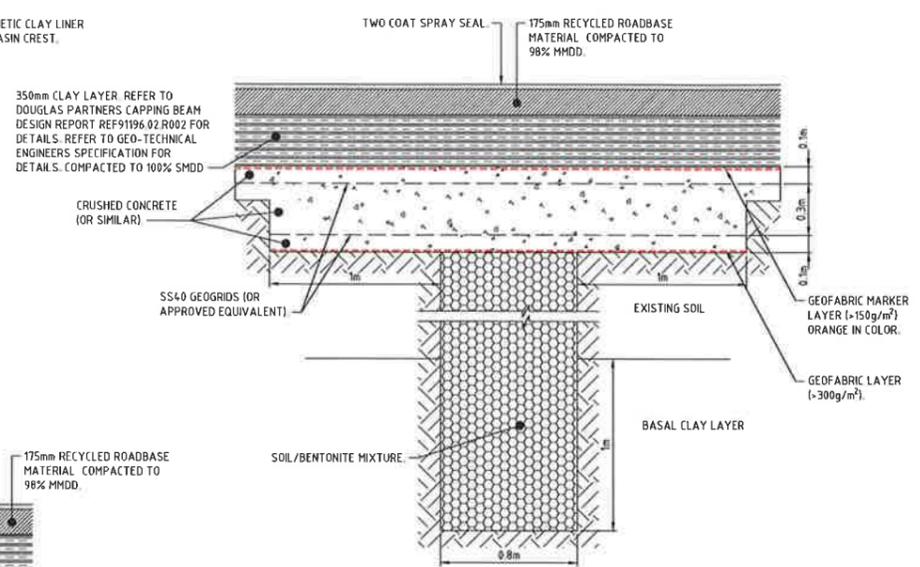
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DRAWING SHEET SIZE = A1



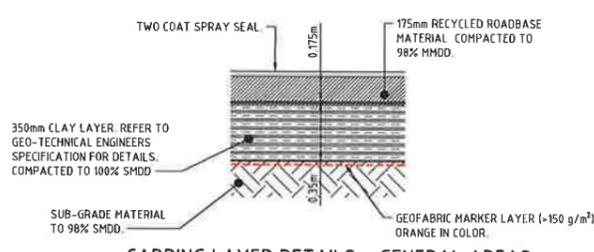
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NOT TO SCALE



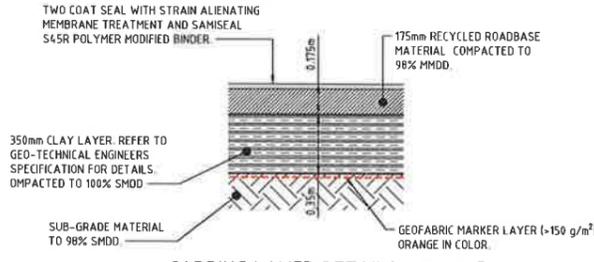
CAPPING BEAM DETAIL - SOIL BENTONITE WALL

NOT TO SCALE



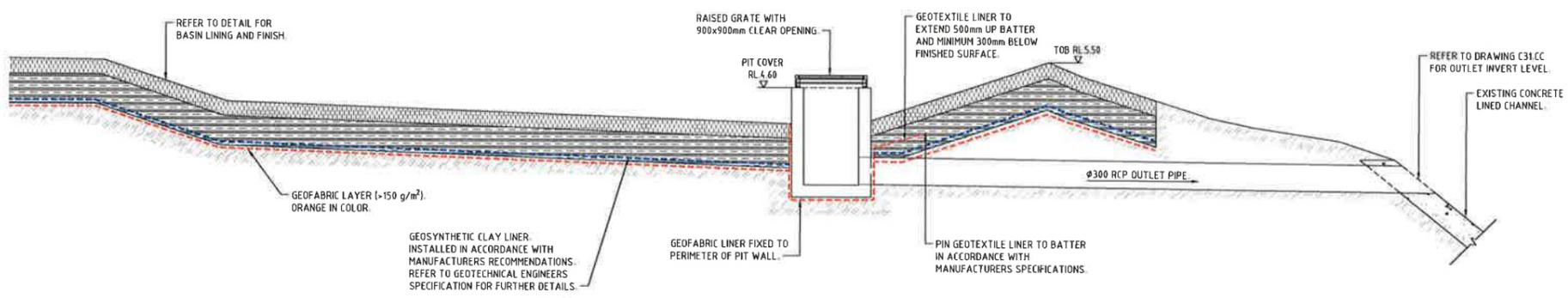
CAPPING LAYER DETAILS - GENERAL AREAS

NOT TO SCALE



CAPPING LAYER DETAILS - SWALE

NOT TO SCALE



STORMWATER DETENTION BASIN OVERFLOW PIT TYPICAL SECTION

NOT TO SCALE

- NOTES: THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE LATEST REVISION OF DOUGLAS PARTNERS GEOTECHNICAL ENGINEERS DESIGN REPORTS.
1. CAPPING SYSTEM DESIGN REPORT - REF: 91196.02.R.003
  2. CAPPING BEAM DESIGN REPORT - REF: 91196.02.R.002
  3. BARRIER WALL DESIGN REPORT - REF: 91196.02.R.004
  4. INSPECTION AND TEST PLAN FOR VALIDATION - REF: 91196.02.R.007

**NSW GOVERNMENT** Planning & Environment

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No. SSD 7676

granted on the 18 July 2019

Signed [Signature]

Sheet No. 12 of 17

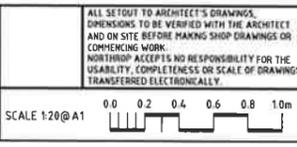
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|----------|-------------------------|--------|-------|-------|----------|--------|
| 4        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |        |
| 5        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |        |
| 6        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 24.01.19 |        |
| 7        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |        |
| 8        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 21.03.19 |        |
| A        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |        |

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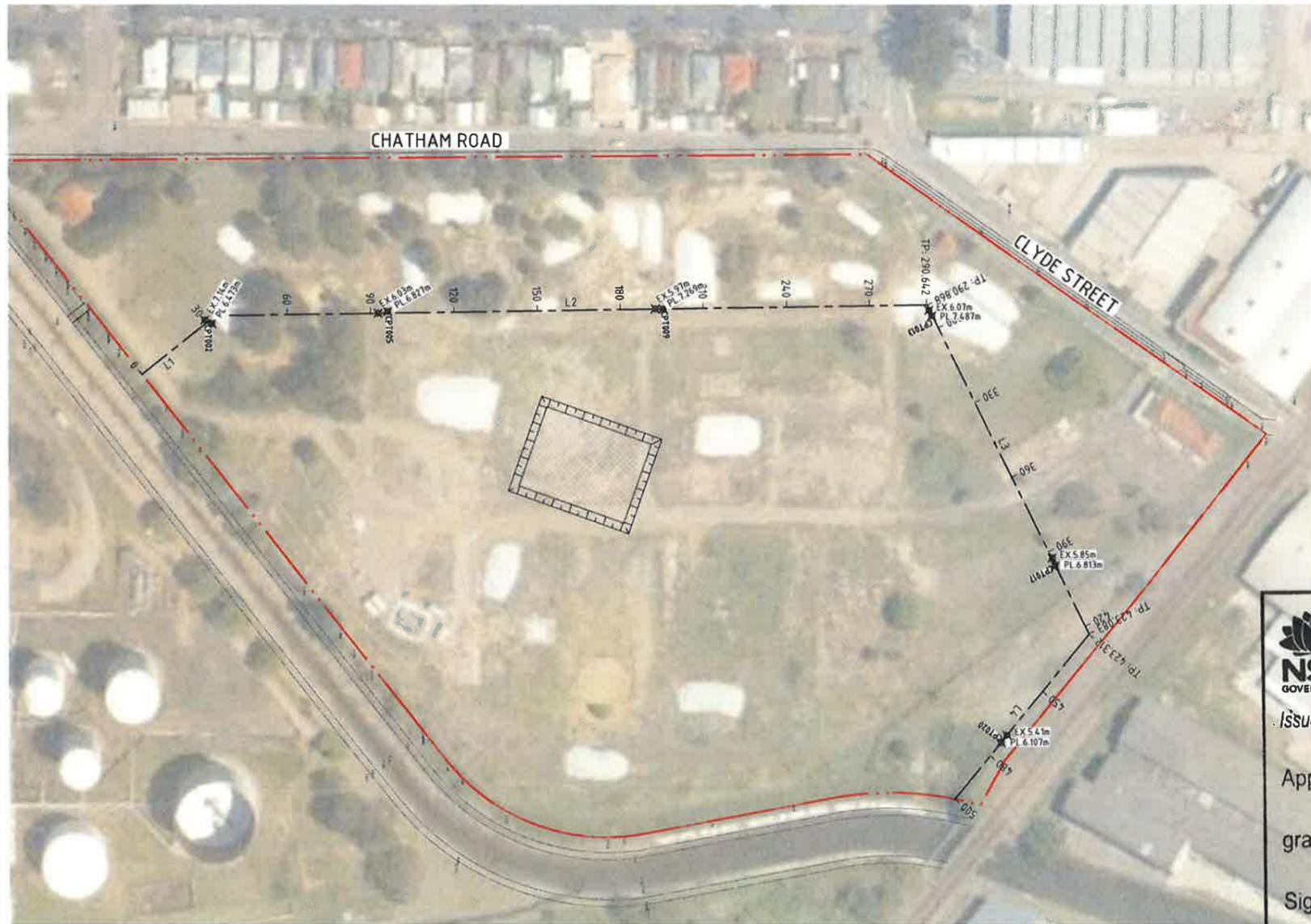
Suite 4, 215 Pacific Hwy, Charlesstown NSW 2280  
 P.O. Box 160, Charlestown NSW 2290  
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 Email newcastle@northrop.com.au ARV 81 054 433 100

PROJECT  
**JEMENA SITE WORKS,  
 CLYDE STREET,  
 HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE  
**SITE SECTIONS  
 SHEET 3**

|                                 |                      |
|---------------------------------|----------------------|
| JOB NUMBER<br><b>NL172903</b>   |                      |
| DRAWING NUMBER<br><b>C42.CC</b> | REVISION<br><b>A</b> |
| DRAWING SHEET SIZE = A1         |                      |

| Set Out Table for Low Permeability Wall |          |                    |                          |                              |         |              |
|---|----------|--------------------|--------------------------|------------------------------|---------|--------------|
| TAG                                     |          | CHAINAGE           | EASTING                  | NORTHING                     | LENGTH  | BEARING      |
| L1                                      | BP<br>EP | 0.000<br>34.081    | 382178.124<br>382161.287 | 63574.06.738<br>63574.36.370 | 34.081  | 150° 23' 43" |
| L2                                      | BP<br>EP | 34.081<br>290.642  | 382161.287<br>382196.522 | 63574.36.370<br>6357690.500  | 256.560 | 007° 53' 38" |
| L3                                      | BP<br>EP | 290.868<br>423.083 | 382196.661<br>382322.856 | 6357690.663<br>6357730.105   | 132.216 | 072° 38' 36" |
| L4                                      | BP<br>EP | 423.312<br>500.226 | 382323.065<br>382374.433 | 6357730.048<br>6357672.801   | 76.915  | 138° 05' 52" |




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 granted on the 18 June 2019  
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 Sheet No. 13 of 17

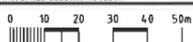
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| REVISION | DESCRIPTION             | ISSUED | VER'D | APP'D | DATE     |
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| 3        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |
| 4        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |
| 5        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 24.01.19 |
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| 7        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 19.03.19 |
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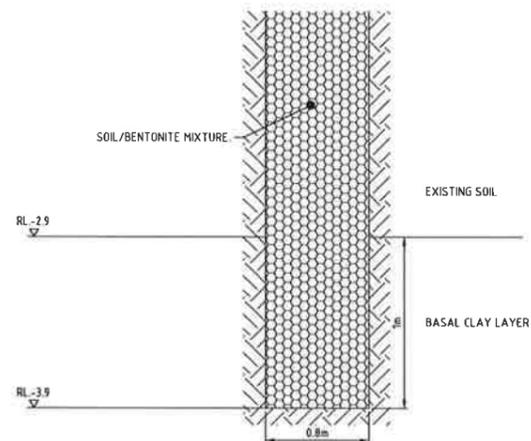
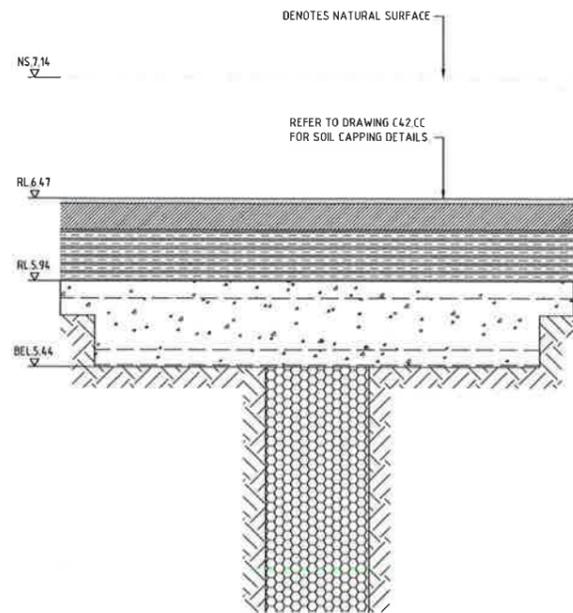
  
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 Email newcastle@northrop.com.au ABL# 81 094 433 100

PROJECT  
**JEMENA SITE WORKS,  
 CLYDE STREET,  
 HAMILTON NORTH, N.S.W. 2292**

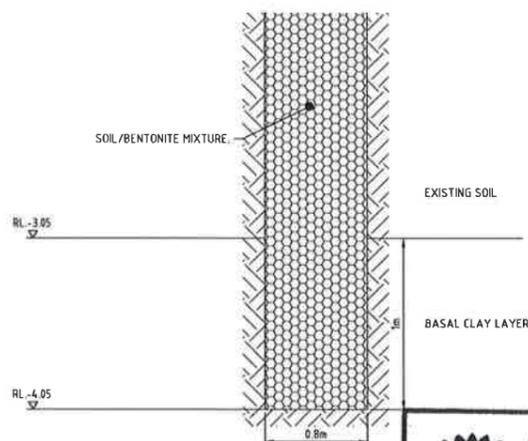
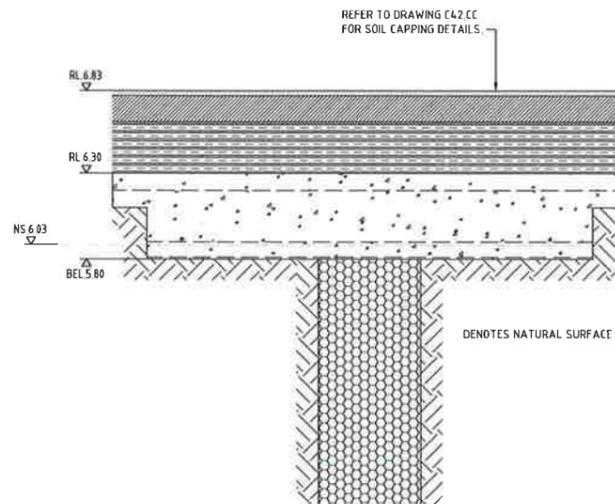
DRAWING TITLE  
**LOW PERMEABILITY  
 WALL SETOUT PLAN**

JOB NUMBER  
**NL172903**  
 DRAWING NUMBER  
**C50.CC**  
 REVISION  
**A**  
 DRAWING SHEET SIZE = A1

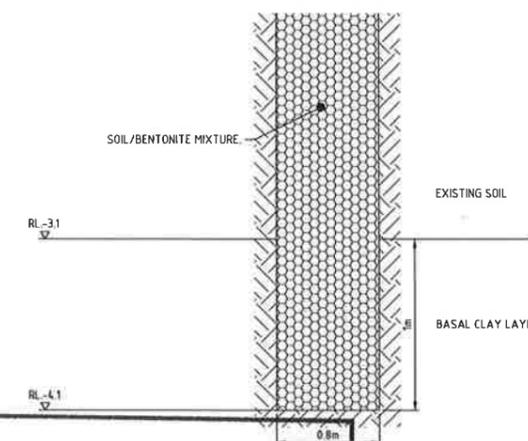
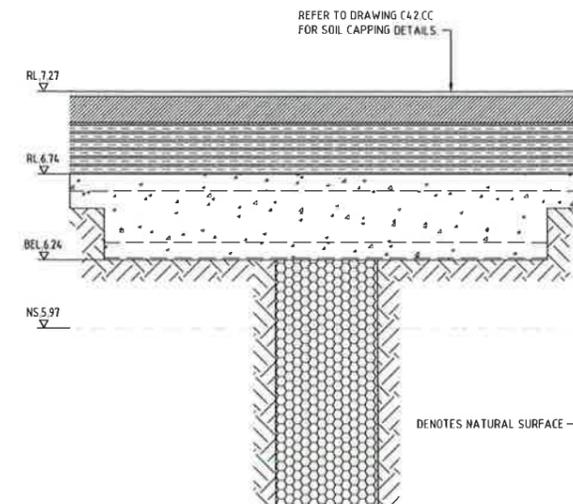
DRAWN: J. PARKINSON  
 DESIGNED: A. KILLEN  
 JOB MANAGER: C. SMITH  
 VERIFIER: C. SMITH



CPT002  
NOT TO SCALE



CPT005  
NOT TO SCALE



CPT009  
NOT TO SCALE

**NSW GOVERNMENT** | **Planning & Environment**  
 Issued under the Environmental Planning and Assessment Act 1979  
 Approved Application No. SSD 7676  
 granted on the 18 July 2019  
 Signed [Signature]  
 Sheet No. 14 of 17

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|----------|-------------------------|--------|-------|-------|----------|--------|
| 3        | ISSUED FOR APPROVAL     | SF     | CS    | AK    | 28.09.18 |        |
| 4        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |        |
| 5        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |        |
| 6        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 24.01.19 |        |
| 7        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |        |
| A        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |        |



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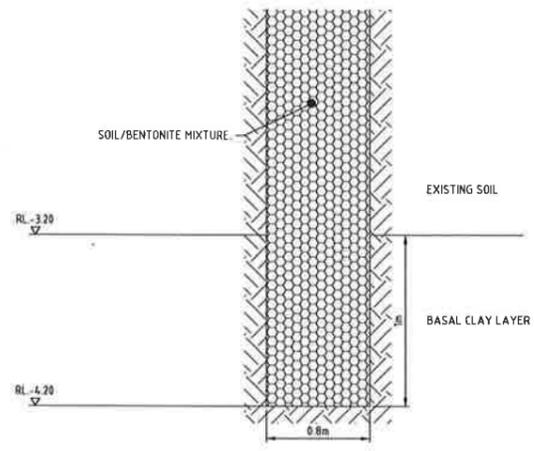
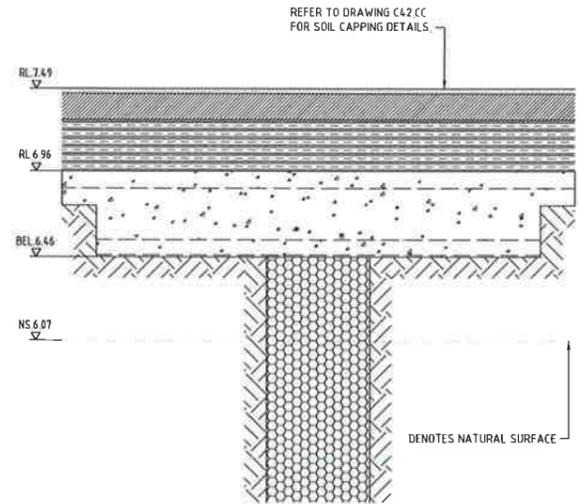
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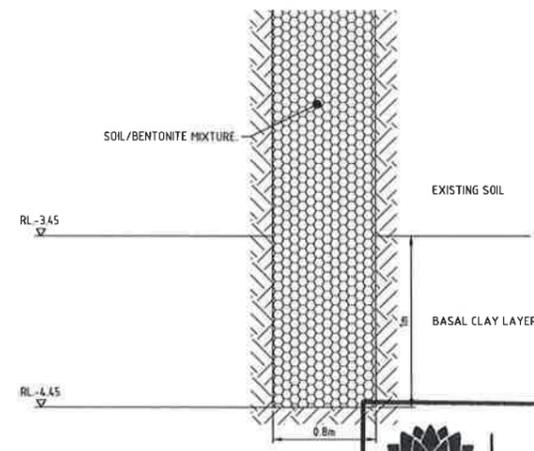
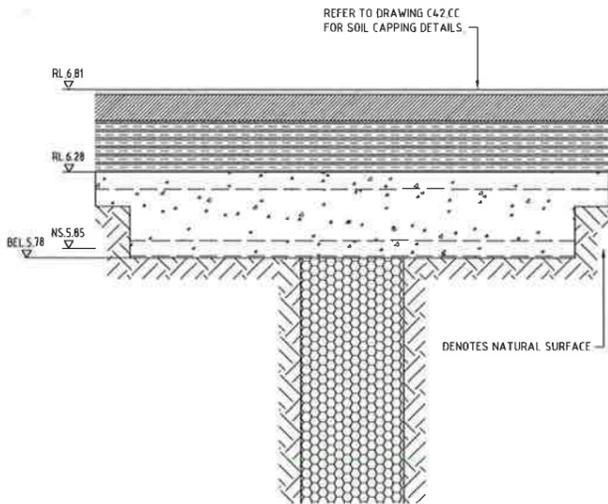
PROJECT  
**JEMENA SITE WORKS,  
 CLYDE STREET,  
 HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE  
**LOW PERMEABILITY  
 WALL SECTIONS  
 SHEET 1**

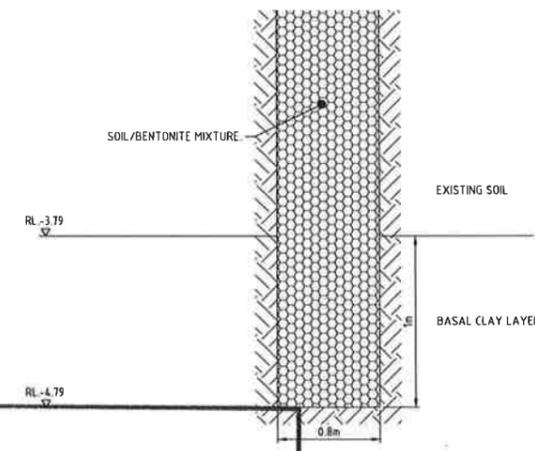
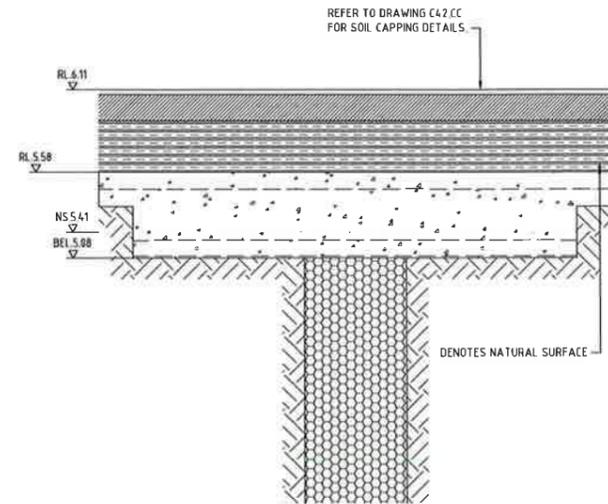
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| DRAWING NUMBER<br><b>C51.CC</b> | REVISION<br><b>A</b> |
| DRAWING SHEET SIZE = A1         |                      |



CPT013  
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CPT020  
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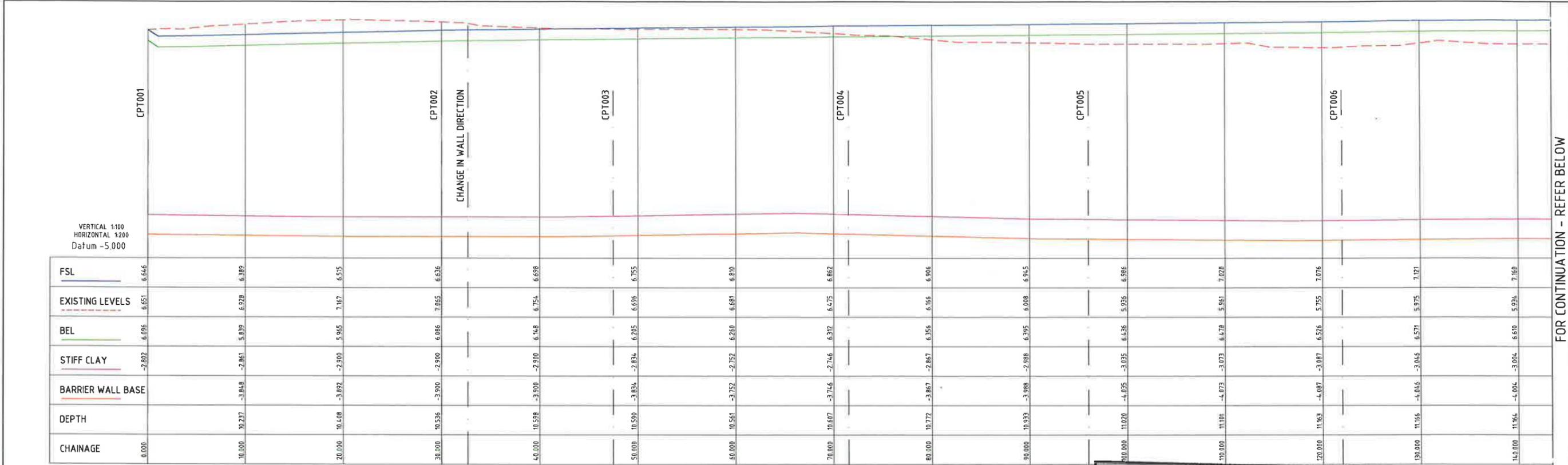
PROJECT

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CLYDE STREET,  
HAMILTON NORTH, N.S.W. 2292**

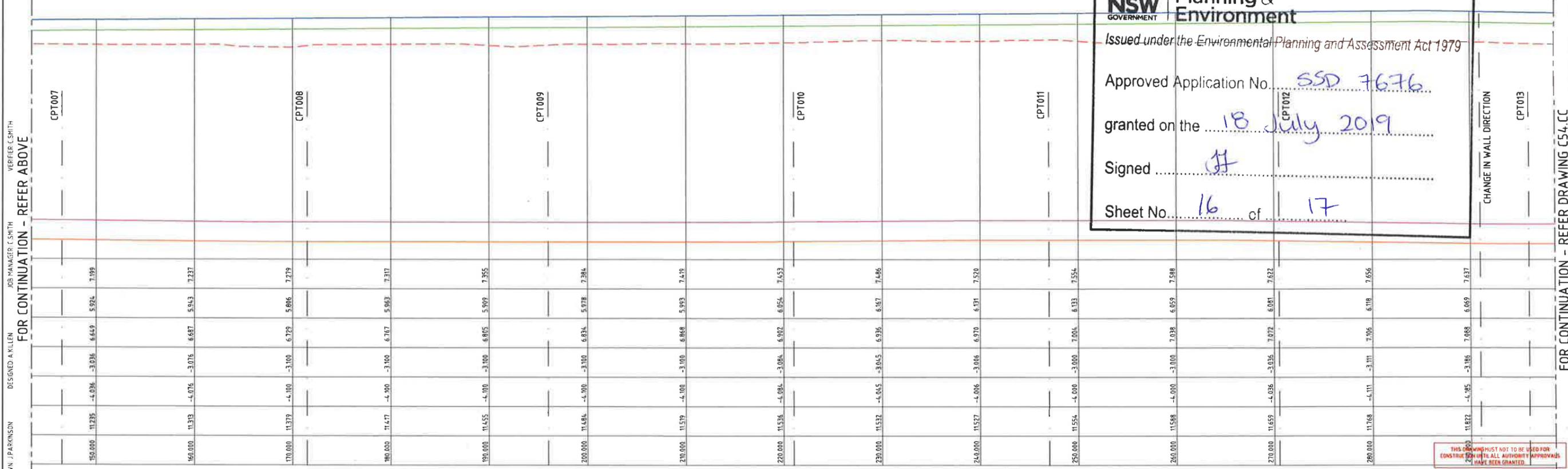
DRAWING TITLE

**LOW PERMEABILITY  
WALL SECTIONS  
SHEET 2**

|                         |          |                 |  |
|-------------------------|----------|-----------------|--|
| JOB NUMBER              |          | <b>NL172903</b> |  |
| DRAWING NUMBER          | REVISION |                 |  |
| <b>C52.CC</b>           | <b>A</b> |                 |  |
| DRAWING SHEET SIZE = A1 |          |                 |  |



LOW PERMEABILITY WALL LONG SECTION



LOW PERMEABILITY WALL LONG SECTION - CONTINUED

**NSW GOVERNMENT** Planning & Environment

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Approved Application No. SSD 7676

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Sheet No. 16 of 17

| REVISION | DESCRIPTION             | ISSUED | VER'D | APP'D | DATE     |
|----------|-------------------------|--------|-------|-------|----------|
| 1        | ISSUED FOR APPROVAL     | SF     | CS    | AK    | 28.09.18 |
| 2        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |
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| 5        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |
| 6        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |

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CLIENT: JEMENA SITE WORKS, CLYDE STREET, HAMILTON NORTH, N.S.W. 2292

ARCHITECT: NORTHROP CONSULTING ENGINEERS PTY LTD.

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PROJECT: JEMENA SITE WORKS, CLYDE STREET, HAMILTON NORTH, N.S.W. 2292

DRAWING TITLE: LOW PERMEABILITY WALL LONG SECTION SHEET 1

JOB NUMBER: NL172903

DRAWING NUMBER: C53.CC

REVISION: A

DRAWING SHEET SIZE: A1

DRAWN: J. PARKINSON DESIGNED: A. KILLEN JOB MANAGER: C. SMITH VERIFIER: C. SMITH

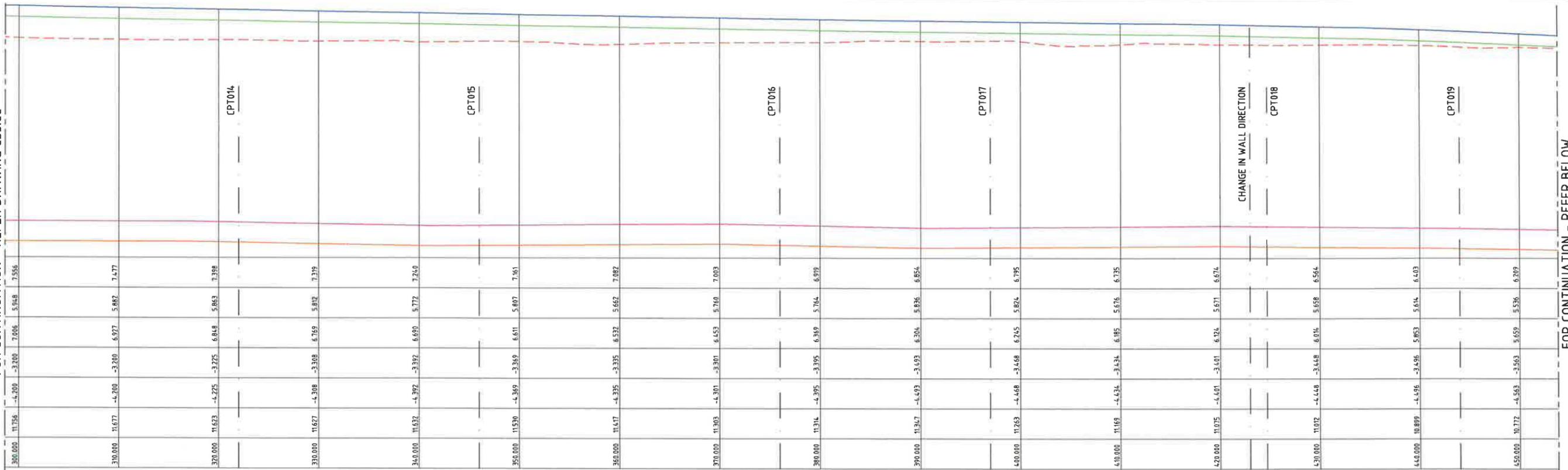
FOR CONTINUATION - REFER ABOVE

FOR CONTINUATION - REFER DRAWING C54.CC

FOR CONTINUATION - REFER BELOW

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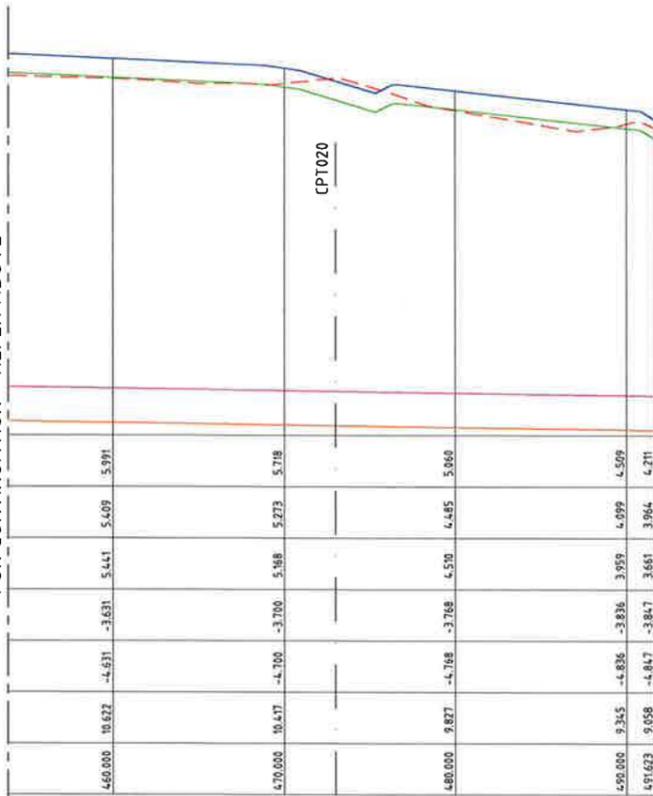
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LOW PERMEABILITY WALL LONG SECTION - CONTINUED

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LOW PERMEABILITY WALL LONG SECTION - CONTINUED

**NSW GOVERNMENT** | **Planning & Environment**  
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 Sheet No. 17 of 17

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|----------|-------------------------|--------|-------|-------|----------|--------|
| 1        | ISSUED FOR APPROVAL     | SF     | CS    | AK    | 28.09.18 |        |
| 2        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 18.10.18 |        |
| 3        | RE-ISSUED FOR APPROVAL  | JP     | CS    | AK    | 07.11.18 |        |
| 4        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 24.01.19 |        |
| 5        | RE-ISSUED FOR APPROVAL  | SF     | CS    | AK    | 12.03.19 |        |
| A        | ISSUED FOR CONSTRUCTION | SF     | CS    | AK    | 26.03.19 |        |

**FORD CIVIL**  
 CIVIL ENGINEERING  
 SURVEYING  
 LANDSCAPE ARCHITECTURE

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PROJECT  
**JEMENA SITE WORKS,  
 CLYDE STREET,  
 HAMILTON NORTH, N.S.W. 2292**

DRAWING TITLE  
**LOW PERMEABILITY WALL  
 LONG SECTION  
 SHEET 2**

|                                 |                                 |
|---------------------------------|---------------------------------|
| JOB NUMBER<br><b>NL172903</b>   | REVISION<br><b>A</b>            |
| DRAWING NUMBER<br><b>C54.CC</b> | DRAWING SHEET SIZE<br><b>A1</b> |