





STRUCTURAL STEELWORK

- ALL MATERIALS AND WORKMANSHIP MUST BE IN ACCORDANCE WITH AS 4100. & ASCE STRUCTURAL STEEL FABRICATION AND ERECTION SPECIFICATION UNO
- ALL SHOP DRAWINGS ARE TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL 7 DAYS BEFORE FABRICATION COMMENCES. FABRICATION MUST NOT COMMENCE WITHOUT ENGINEERS APPROVAL OF WORKSHOP DRAWINGS.
- STEEL GRADE 350 U.N.O
- ALL STEEL MUST BE IN ACCORDANCE WITH AS 3678 GRADE 250, AS 3679 GRADE 300 FOR T OR I SECTIONS, AS 1163 GRADE 350 HOLLOW SECTIONS.
- ALL STEEL TO BE GALVANISED TO 600 G/M2 TO AS1650 UNLESS OTHERWISE PROTECTED BY PAINT COATING OR HDPE SLEEVE FULLY SEALED TO OXYGEN.
- MINIMUM STEEL PLATE THICKNESS SHALL BE 8MM UNO.
- ALL GUSSET PLATES SHALL BE 8MM UNO
- FABRICATION MUST COMPLY TO AS 4100 SECTION 14.
- ERECTION MUST COMPLY TO AS 4100 SECTION 15.
- THE FABRICATION AND ERECTION OF THE STEELWORK MUST BE SUPERVISED BY A QUALIFIED ENGINEER.
- CONTRACTOR TO PROVIDE ALL MATERIALS, CLEATS AND TO DRILL ALL HOLES NECESSARY FOR FIXING THE STEEL IN PLACE WHETHER OR NOT SHOWN IN DRAWINGS
- ALL DIMENSIONS AND SETOUTS TO BE OBTAINED FROM ARCHITECTURAL DRAWINGS WHERE NOT INDICATED ON STRUCTURAL DRAWINGS.
- PROVIDE SEAL PLATES TO ALL HOLLOW SECTIONS, WITH BREATHER HOLES WHERE MEMBER IS TO BE GALVANIZED
- FREE ALL MEMBERS FROM TWISTS AND DISTORTIONS BEFORE AND AFTER WELDING.
- WHERE THE FABRICATOR PROVIDES A SPLICE FOR AN APPROVED REGION (EG. TRANSPORTATION) THE SPLICE SHALL BE COMPLETE PENETRATION BUTT WELDED (CATEGORY BOLDING

- ALL BOLTING TO AS 4100
- ALL BOLTS SHALL BE MINIMUM ØM20 GRADE 8.8/S UNO
- ALL BOLTS, NUTS WASHER TO BE HOT DIPPED GALVANIZED UNO
- NO CONNECTION SHALL HAVE LESS THAN 2 BOLTS UNO
- BOLT DESIGNATION
- 4.6/S - COMMERCIAL BOLTS TO AS 1111 SNUG TIGHT TO AS 4100
- 8.8/S - HIGH STRENGTH STRUCTURAL BOLTS TO AS 1252 SNUG TIGHT
- 8.8/TB - HIGH STRENGTH STRUCTURAL BOLTS FULLY TENSIONED TO AS 4100 AS A BEARING JOINT
- 8.8/TF - HIGH STRENGTH STRUCTURAL BOLTS FULLY TENSIONED TO AS 4100 AS A FRICTION JOINT WITH FACING SURFACES UNCOATED
- /TB AND /TF BOLTS TO BE INSTALLED IN ACCORDANCE WITH AS 4100 SECTION 15. USING APPROPRIATE LOAD INDICATING WASHERS USING EITHER THE PART TURN METHOD OR DIRECT TENSION INDICATOR METHOD.

- WELDING**
- ALL WELDING TO BE CARRIED OUT IN ACCORDANCE WITH AS1554 BY SKILLED TRADESMEN.
  - BUTT WELDS MUST BE FULL PENETRATION BUTT WELDS UNO AND DEVELOP THE ULTIMATE TENSILE STRENGTH OF THE MEMBER.
  - FILLET WELDS SHALL BE CONTINUOUS WELDS 6 MM TYPE SP USING E48XX ELECTRODES.
  - SURFACES TO BE WELDED MUST BE SMOOTH, FREE OF ALL SCALE, RUST, GREASE, PAINT, SALT OR ANY OTHER FOREIGN MATERIAL. CONTACT BEARING SURFACES MUST BE FLUSH WITH NO VOIDS UNDER.
  - WELDING IS TO BE EXAMINED BY AN INDEPENDENT NATA TESTING AUTHORITY TO AS2207 AS FOLLOWS.

FILLET SP	VISUAL	100% OF LENGTH
BUTT WELD SHOP	VISUAL	100% OF LENGTH
BUTT WELD SHOP	NDT/ULTRASONIC	10% LENGTH
BUTT WELD SITE	VISUAL	100% OF LENGTH
BUTT WELD SITE	NDT/ULTRASONIC	20% LENGTH
  - WELD TEST RECORDS ARE TO BE MAINTAINED AND SUBMITTED TO THE SUPERINTENDENT.
  - THE SUPERINTENDENT MAY AT HIS DISCRETION MAY REQUIRE THAT THE CONTRACTOR CARRY OUT TESTING OF WELDS BY RADIOGRAPHIC TESTING TO AS 2177.1 OR ADDITIONAL ULTRASONIC TESTING OR OTHER MEANS.
  - ANY FURTHER TESTING REQUIRED AS A RESULT OF THE DISCOVERY OF A DEFECTIVE WELD SHALL BE CARRIED OUT AT THE CONTRACTOR'S EXPENSE. ANY WAITING TIME DUE TO CARRYING OUT THE ABOVE TESTS SHALL BE AT THE CONTRACTOR'S EXPENSE.
  - DEFECTIVE PORTIONS OF WELDS SHALL BE REMOVED, RE-WELDED AND RE-INSPECTED. FULL RECORDS SHALL BE KEPT OF ALL REPAIRS.
  - THE CONTRACTOR SHALL PROVIDE ACCESS AT ALL REASONABLE TIMES AND ALL FACILITIES NECESSARY FOR INSPECTION DURING MANUFACTURE AND ON COMPLETION. THE CONTRACTOR SHALL SUPPLY TEST CERTIFICATES AND EVIDENCE THAT ALL MATERIALS OR PARTS CONFORM WITH THE TESTS REQUIRED.

STAINLESS STEEL

- ALL MATERIALS SHALL BE SUPPLIED, MANUFACTURED & INSTALLED IN ACCORDANCE WITH AS1418, AS 4100; AS 1554;
- SUPPLY IN ACCORDANCE WITH ASTM A240 / 480 AND ASTM A276
- CONFORM TO AUSTRALIAN STAINLESS REFERENCE MANUAL ISSUED BY THE AUSTRALIAN STAINLESS STEEL DEVELOPMENT ASSOCIATION ASSDA
- ALL STAINLESS STEEL SHALL BE 316 S MARINE GRADE
- WITH A PRE > 23.5 (PITTING RESISTANCE EQUIVALENT)
- ALL WELDED STAINLESS STEEL SHALL BE GRADE 316 L
- FY = 205 MPa TO ASTM A955M
- WHERE STAINLESS STEEL IS TO BE SUBMERGED IN SALT WATER A MORE CORROSION RESISTANT GRADE SUPER DUPLEX 2205 (UNS 31803) SHALL BE USED
- PROTECT S.S DURING FABRICATION TO PREVENT DISCOLORATION BY IRON PARTICLES AND THE LIKE.
- PICKLE & PASSIVATE ALL S.S PLATES & SECTIONS.
- REMOVE ANY SHARP EDGES TO CUT SS
- STORE S.S CLEAR OF THE GROUND AND AWAY FROM CONTACT WITH CARBON STEEL
- ALL SURFACES TO BE FINISHED TO A SURFACE ROUGHNESS RA < 0.5 WITH ONLY SILICON CARBIDE ABRASIVE GRIT OF 320 GRADE TO BE USED
- THE SUPERINTENDENT MAY INSPECT ALL MATERIALS ARRIVING ON SITE WITH A ROUGHNESS METER TO ENSURE COMPLIANCE WITH THE Ra VALUES SPECIFIED. ANY REJECTED MATERIAL SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

- BOLDING**
- ALL S.S WELDING SHALL BE 6MM TYPE SP USING AN 'OVER ALLOYED ELECTRODE COMPATIBLE WITH THE STRENGTH GRADE OF THE SECTION AT THE WELD.
  - ALL SS FASTENERS SHALL BE MINIMUM CLASS 80
  - NO JOINT SHALL HAVE LESS THAN 2 FASTENERS
  - S.S BOLTS TO BE GRADE 316 A4-80
  - MINIMUM M16 Ø U.N.O
  - PROVIDE MINIMUM 5 THREADS PAST NUT
  - WASHERS SHALL BE MINIMUM 50 x 5 MM PL S.S 316
  - EITHER USE NYLOK NUTS OR TACK WELD OR OTHERWISE APPROPRIATELY SEIZE ALL STAINLESS STEEL NUTS TO THE BOLT TO PREVENT NUT COMING UNDONE OVER TIME
  - TO PREVENT "GAULING OR PICKUP", ALL STAINLESS STEEL FASTENERS AND ARE TO BE TREATED WITH "DURALAC" OR EQUIVALENT NICKEL ANTI-SEIZING COMPOUND TO THE BOLT THREAD, PRIOR TO FASTENING.
  - APPLY A LIGHT OIL TO PINS & BEARING SURFACES PRIOR TO INSTALLATION.

CHEMSET BOLTS

- ALL CHEMSET BOLTS TO BE A4-80 GRADE
- MINIMUM M 24Ø S.S ALL THREAD
- IN ROCK CHEMSET MIN 500mm
- CHEMSET SHALL BE HILTI HIT 500
- ENGINEER TO INSPECT EMBEDMENT PRIOR TO GROUTING

STRUCTURAL TIMBER - WHARF

- ALL TIMBER CONSTRUCTION TO RELEVANT CURRENT AUSTRALIAN STANDARDS - AS1720 TIMBER CODE; AS 2082 - GRADING OF TIMBER; AS 3660 PROTECTION OF BUILDINGS FROM SUBTERRANIAN TERMITES.
- AS 1684 IS RELEVANT TO DOMESTIC CONSTRUCTION IN SHELTERED LOCATIONS.
- TIMBERWORK TO BE SUPPLIED, INSTALLED AND FINISHED TO S. BEST PRACTICE FOR WHARF & BRIDGE CARPENTRY USING SKILLED TRADESMEN
- PROVIDE INDEPENDENT QUALIFIED GRADING CERTIFICATE TO ALL TIMBER.
- SHOULD ANY OF THE DELIVERED TIMBER BE FOUND NOT ADEQUATE BY THE ENGINEER, IT WILL BE REJECTED AND THE CONTRACTOR SHALL REPLACE THE TIMBER AT THRIER OWN EXPENSE.
- ALL TIMBER TO BE JOINT GROUP J2 OR BETTER.
- ALL TIMBER BELOW THE TIDE ZONE DURABILITY CLASS 1
- ALL TIMBER BEAMS SHALL BE STAMPED SHOWING GRADE AND TIMBER SPECIES
- PILES - F22 HW TURPENTINE UNSEASONED
- GAL RING TO HEAD AND FIBERGLASS CAPPED
- KOPPERS PILES - F27 DOUBLE TREATED ONLY IF SPECIFIED
- BEAMS - F17 TURPENTINE UNSEASONED HARDWOOD
- QUALIFIED WHARF CARPENTER SHALL SELECT BEAMS TO BE REASONABLY FREE OF HORIZONTAL SHRINKAGE CRACKING AND KNOT HOLES. KNOT HOLES GREATER THAN 30MM ARE NOT ACCEPTABLE. LARGE SHRINKAGE CRACKS / HEARTCHECKS > 500MM OR 5MM WIDE ARE NOT ACCEPTABLE
- PAINT ALL TIMBER BEAMS IN THE TIDAL ZONE WITH 1 COAT OF CCN OIL AND 1 COAT OF BLACKJACK TO ALL SIDES AND ENDS AND DRILLED HOLES
- OREGON TO BE GRADE F7 WHERE SPECIFIED ONLY
- WHERE SPECIFIED EXPOSED SOFTWOOD TIMBER TO BE CCA TREATED RADIATA PINE (TO AS1604) REDRIED AFTER FULL IMPREGNATION
- HARDWOOD TO BE NON-ASH TYPE EUCALYPT FROM NSW OR QLD.
- ALL TIMBER TO BE STRAIGHT & FAIR & TRUE WITH NO DEFECTS THAT MAY AFFECT THE STRENGTH & SERVICABILITY OF THE MEMBER.
- CONTRACTOR TO PROVIDE ALL TIMBERS AND DETERMINE CORRECT LENGTHS.
- FULL LENGTHS OF TIMBER SHALL BE USED. SPLICES SHALL ONLY BE MADE WHERE ALLOWED BY ENGINEER
- JOINTS TO BE WELL FITTING AND SNUG FIT WITHOUT WEDGING OR PACKING
- FAYING SURFACES TO BE STRAIGHT & PARALLEL.
- JOINTS ABOVE THE TIDAL ZONE SHALL BE NOTCHED 50MM TO PILE & 25MM TO BEAM
- JOINTS BELOW THE TZ TO BE NOTCHED 25MM ONLY
- STORE ALL TIMBER OFF GROUND TO AVOID DAMAGE
- PROVIDE STAINLESS STEEL NAILING PLATES TO ENDS OF ALL BEAMS BY PRYDA KNUCKLE NAILPLATES COVERING THE WHOLE SECTION OF THE MEMBER LESS 25MM EACH SIDE

- TIMBER DECKING**
- DECKING ABOVE THE TIDAL ZONE 140 \* 40mm KILN DRIED F27 IRONBARK DRESSED ALL ROUND AND ARRISSED
  - ALL DECKING IN TIDAL ZONE SHALL BE TURPENTINE F22 HARDWOOD 150 \* 50 MM
  - NOTWITHSTANDING THE STRUCTURAL DECKING GRADE THE DECKING SHALL BE OF UNIFORM APPEARANCE OVER THE WHOLE OF THE DECKING AREA
  - PLANKS SHALL BE FREE OF KNOTS AND WANES > 10 MM Ø
  - SELECT GRADED DISCARD ANY PLANKS WITH KNOTS WANES OR GUM POCKETS THAT MAY CAUSE TRIP HAZARDS OR CAUSE ROTTING OF THE PLANK
  - 5MM GAP BETWEEN SEASONED PLANKS
  - 2MM GAP BETWEEN UNSEASONED PLANKS
  - TIMBER DECKING TO BE FIXED TO TIMBER BEAMS USING 2 OFF 5MM Ø STAINLESS STEEL 316 BUGLE HEADED SCREWS WITH COUNTERSUNK HEADS @ 125 MM LONG.
  - PRE-DRILL HOLE 1MM Ø LESS THAN SCREW
  - INSERT COPPER NAPHTHENATE (CN) EMULSION INTO EACH HOLE PRIOR TO INSERTING SCREW.
  - PROVIDE 1 LAYER OF CTS BITUMINOUS MALTHOID TO BE INSTALLED TOP OF EACH TIMBER BEAM & BENEATH DECKING
  - LAY PLANK WITH HEARTWOOD FACE DOWN TO PREVENT ROT
  - DECKING SHALL BE EVEN & THE TOP CORNERS OF PLANKS SHALL BE LIGHTLY CHAMPHERED. MAXIMUM LEVEL DIFFERENCE BETWEEN ADJACENT PLANKS 2.0 MM
  - AT CLIENTS INSTRUCTION WHERE DECK IS TO BE OILED PROVIDE 2 COATS INTERGRAIN TIMBER OIL NATURAL ANTISKID FOR WET TRAFFICABLE AREAS TO ALL SURFACES OF PLANKS & HOLES
  - IN TIDAL ZONE WHERE TIMBER DECKING IS USED APPLY EPIREZ NON-SLIP WITH QUARTZ GRIP PER MANUFACTURERS SPECIFICATION

- BOLDING TIMBER**
- ALL BOLTING IN ACCORDANCE WITH AS 1684 AND AS1720
  - ALL BOLTS TO BE GALVANIZED Ø M24 - 8.8 / S UNO
  - NO CONNECTION SHALL HAVE LESS THAN 2 BOLTS UNO
  - INSTALL BOLTS IN PRE-DRILLED HOLES 2MM Ø GREATER THAN THE BOLT DIAMETER.
  - PROVIDE 50 \* 5 PL GAL WASHERS
  - PROVIDE BOLTS OF ADEQUATE LENGTH TO LEAVE AT LEAST 5 THREADS PAST NUT
  - BOLTS SHALL BE GIVEN MIN CLEARANCE OF 8 BOLT Ø TO END OF TIMBERS AND 4 Ø TO EDGES OF TIMBER.
  - DO NOT USE ANY TIMBER WITH LOOSE KNOTS, SLOPING GRAIN OR OTHER DEFECTS WITHIN 100MM OF A CONNECTION
  - THREAD ON BOLT SHALL NOT EXTEND >75MM INTO TIMBER & SHALL NOT PROTRUDE >2 BOLT Ø PAST NUT AND WASHER
  - ALL BOLTS TO BE RECESSED INTO MEMBERS.
  - ALL RECESSED BOLT HOLES IN TIMBER TO BE FILLED WITH EPOXY MIXED WITH BULKER TALC WITH A DOMED SURFACE.
  - COACHBOLTS INSTALLED IN PRE-DRILLED HOLES 80% Ø BOLT
  - ALL BOLTED CONNECTIONS TO BE INSPECTED AND RE-TIGHTENED BY CONTRACTOR AFTER 6 MONTHS

TIMBER PAINT

- ALL TIMBER SHALL BE PAINTED WITH A REPUTABLE EXTERIOR WEATHERPROOF PAINT 2 COATS
- PREPARE TIMBER BY
- ENSURE ALL HEARTWOOD LAYED FACE DOWN
- DO NOT PRESENT ANY BEAMS WITH MAJOR KNOTS - US SELECTED TIMBER BEAMS
- FILL ALL MINOR SWALES WITH BLACKJACK
- FILL ANY GAPS AND PAINT ALL ENDS

EPIREZ NON SLIP SURFACING

- ALL NON SLIP AREAS TO BE INSTALLED PER MANUFACTURERS SPECIFICATION
- PREPARE SURFACE BY WATER BLAST CLEAN
- APPLY COATINGS IN THE DRY NOT IN THE WET. THIS MAY REQUIRE COATING APPLICATION PRIOR TO INSTALLATION OF THE DECKING
- APPLY PRIMER COAT - EPIREZ 123 EPOXY SEALER / PRIMER
- APPLY FIRST COAT: EPIREZ SUPATUFF EPOXY H.D
- APPLY EPIREZ SIL - CARB AGGREGATE 1.0MM Ø
- APPLY SECOND COAT: EPIREZ SUPATUFF EPOXY H.D
- COLOUR OF NON SLIP SURFACING IS TO BE ADVISED.

RECYCLED PLASTIC BEAMS

- THE PLASTIC BEAMS SHALL BE BY APR COMPOSITES OR EQUIVALENT
- THE BULK DENSITY = 1 T /M3
- THE DESIGN MATERIAL PROPERTIES SHALL BE MINIMUM E(SERVICEABILITY) = 3150 MPa
- CREEP FACTOR FOR LONG TERM DEFLECTION \* 2.5
- E(ULTIMATE) = 1500 MPa - NOT LINEAR
- TENSILE STRESS ALLOWABLE = 11.5 MPa
- BENDING STRESS ALLOWABLE FB(ULS) = 21 MPa
- SHEAR STRESS ALLOWABLE FS(uls) = 7 MPa
- TEAR OUT OF AN M12 COACHBOLT = 19.9 KN

HDPE BLOCKS

- HDPE SHALL BE TAKEN TO MEAN HIGH DENSITY POLYETHYLENE
- USE WEAREX OR SOLIDUR FOR HDPE APPLICATIONS
- USE POLYSTONE 7000 SR WHERE SHOWN FOR UHDPPE APPLICATIONS

SIGNAGE

- FABRICATE 2 OFF PLASTIC SIGNS ENGRAVED WITH WORDS PER NBC REQUIREMENTS TO EFFECTIVELY DETER PEOPLE FROM CLIMBING ON STRUCTURE BEAMS
- INFORM OF RISK TO LIFE AND INJURY
- INSTALL BOTH SIGNS TO BEAM ENDS USING S.S 316 FIXINGS

CONCRETE

- ALL MATERIALS & WORKMANSHIP SHALL BE IN ACCORDANCE WITH AS3600 AND AS3610 CURRENT EDITION WITH AMENDMENTS. EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS
- PREMIXED OR READYMIX CONCRETE SUPPLY SHALL BE IN ACCORDANCE WITH AS1379.
- PORTLAND CEMENT SHALL BE TYPE SL AND SHALL BE OBTAINED FROM AN APPROVED SOURCE.
- ALL THE REQUIREMENTS OF THE ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO FORMWORK, REINFORCEMENT AND CONCRETE.
- PROJECT CONTROL TESTING SHALL BE CARRIED OUT TO AS3600 AND AS1379, CLAUSE B7.
- CONCRETE MIX DESIGNS TO BE SUBMITTED FOR REVIEW PRIOR TO USE.
- MAX AGG SIZE = 20 MM
- CEMENT TYPE = MARINE
- MAX WATER : CEMENT RATIO = 0.4
- MAX SHRINKAGE STRAIN AT 56 DAYS 600E-6 UM TO AS1012.13
- CURING = 7 DAYS WET CURE
- EXPOSURE CLASSIFICATION = C
- FC = 50 MPa
- COVER = 70 MM
- SLUMP = 80 MM
- CEMENT CONTENT = 470 KG/M3
- DURABILITY AT 28 DAYS = 1000 COLOMBS
- NO ADMIXTURES OR ASH CONTENT SHALL BE USED UNLESS APPROVED BY ENGINEER IN WRITING.
- FOR THESE CONCRETE MIXES THE REQUIREMENTS SPECIFIED FOR STRENGTH AND SHRINKAGE ARE MANDATORY, OTHER PARAMETERS FOR THESE MIXES HAVE BEEN SUGGESTED BUT MAY BE VARIED.
- WHERE POSSIBLE ALL CONCRETE IS TO BE PLACED IN THE DRY.
- CONCRETE PLACED UNDER WATER TO BE POURED USING A TREMMIE.
- ALL CONCRETE SHALL BE COMPACTED USING MECHANICAL VIBRATORS.
- FINISHED CONCRETE SHALL BE A DENSE HOMOGENOUS MASS, COMPLETELY FILLING THE FORMWORK & THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS
- CONSTRUCTION SUPPORT PROPPING IS TO BE LEFT IN PLACE WHERE NEEDED TO AVOID OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING.
- CONCRETE FORMED SURFACES TO HAVE CLASS 2 FINISH TO AS3610 UNLESS ARCHITECTS SPECIFY OTHER
- CONCRETE SIZES SHOWN DO NOT INCLUDE THICKNESS OF APPLIED FINISHES
- O HOLES CHASES OR EMBEDMENTS OF PIPES OTHER THAN THAT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE WITHOUT THE PRIOR WRITTEN ENGINEERS APPROVAL.
- CONSTRUCTION JOINTS WHERE NOT SHOWN TO BE LOCATED TO APPROVAL OF ENGINEER
- THE ENGINEER SHALL BE GIVEN 24 HOURS NOTICE FOR REINFORCEMENT INSPECTION AND CONCRETE SHALL NOT BE DELIVERED UNTIL FINAL APPROVAL OBTAINED.

GROUT

- ALL GROUT SHALL BE COMBEXTRA UW
- OR SIKa GROUT UW
- OR DENSO UW
- MINIMUM 50 MPa
- APPLY IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION

STEEL REINFORCEMENT

- ALL REINFORCEMENT SHALL BE TO AS4671 - 2001
- ALL REINFORCEMENT SHALL BE STRENGTH GRADE 500N UNO
- ALL REINFORCEMENT SHALL BE GALVANISED TO 600 G/M2 TO AS4680.
- THE GALVANISING OF REINFORCING SHALL BE UNDERTAKEN AFTER ALL CUTTING, BENDING AND WELDING OF CAGES IS COMPLETE.
- REPAIR ANY DAMAGE TO GALVANISING OR CUTS FOLLOWING THE PROCEEDURES IN AS4680.
- DO NOT ACTIVATE ADJACENT STEELWORK BY CONTACT WITH THE GALVANISED REINFORCEMENT.
- ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED AT 800MM CRS ON PLASTIC CHAIRS
- LAPS AND SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR OTHERWISE APPROVED IN WRITING BY THE ENGINEER.
- TENSION LAP LENGTHS (MM) SHALL BE:

N12	N16	N20	N24	N28	N32	N36
500	750	1000	1200	1450	1800	2150
- FABRIC LAP SHALL BE SUCH THAT THE TWO OUTERMOST WIRES OF ONE SHEET OVERLAP THE TWO OUTERMOST WIRES OF THE OTHER SHEET BY 25MM MINIMUM.
- ENGINEER SHALL BE GIVEN 24 HOURS NOTICE FOR REINFORCEMENT INSPECTION
- CONCRETE SHALL NOT BE POURED UNTIL FINAL APPROVAL IS OBTAINED.

ANCHORS

- 100 KG GAL DANFORTH ANCHORS TO BE USED
  - PER NSW FORE AND AFT MOORING STUDY 1987 CL 3.1.2; ADMIRALTY OFFICE (1959) COMPARITIVE TESTS BY THE BRITISH SERVICE MINISTRIES; AND VOL III OF THE MANUAL OF SEAMANSHIP
- | TYPE                | HORIZONTAL | HOLDING PULL |
|---------------------|------------|--------------|
|                     | SAND       | DEEP MUD     |
| CONCRETE BLOCK      | 0.6X       | 0.9X         |
| DANFORTH            | 15X        | -            |
| SINGLE PICK MOORING | 4.5X       | 5.5X         |
| STOCKLESS           | 2.5X       | 3.5X         |
| CQR / PLOUGH        | 6.5X       | -            |
| IMPROVED ADMIRALTY  | 3.5X       | -            |
| CHAIN < 2" Ø        | 1X         | -            |
| CHAIN > 2"Ø         | 0.6X       | -            |
- NOTE: ALL FACTORS ABOVE ARE MULTIPLIED BY THE WEIGHT IN AIR

ROPES AND CORDAGE

- ROPE MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH AS 4142 - FIBER ROPES
- MOORING PILE ROPE SHALL BE KINNERS THREE STRAND HAWSER LAID POLYETHYLENE SILVER ROPE 24Ø MINIMUM BREAKING FORCE 51.7 KN
- MOORING BLOCK / ANCHOR RODE ROPE SHALL BE TYPE GREEN 28MM Ø \* 3 STRAND SHIPS MOORING LINE MINIMUM BREAKING LOAD OF 94.6 KN
- RODE LENGTH SHALL COMPLY TO CL 3.1.5 MSB FORE AND AFT MOORING STUDY 1987 - THE MINIMUM RODE LENGTH SHALL BE HALF THE LOW TIDE WATER DEPTH.
- SPLICING OF SYNTHETIC FIBRE ROPES SHALL BE TO BEST INDUSTRY PRACTICE FOR RIGGING AND LIFTING, AND TO THE ADMIRALTY SEAMANSHIP MANUAL.
- SPLICING SHALL BE OVER A MINIMUM OF 5 TUCKS
- MOORING RODE SHALL HAVE A GALVANISED HARD-EYE/ THIMBLE SPLICED AT EITHER END IN ACCORDANCE WITH AS 1138.
- USE ONLY GALVANIZED HEAVY DUTY GRADE THIMBLES SUITABLE FOR RIGGING AND LIFTING (NOT LIGHT GRADE COMMERCIAL).

ANCHOR CHAIN

- MOORING GROUND CHAIN SHALL BE STUDLINK CHAIN BALDT GRADE 1 CHAIN @ 1/2" Ø PROOF TEST 24 T / BREAK LOAD 34T WEIGHT PER 15 FATHOM SHOT (27.4M) = 491 KG WEIGHT / M LENGTH = 18 KG / M 8 LINKS PER LM APPROX
- GALVANISED
- MINIMUM 5M GROUND CHAIN EACH MOORING LINE UNLESS NOMINATED OTHERWISE
- OTHER CHAINS MAY BE SUBMITTED TO ENGINEER FOR REVIEW.
- ANCHOR CHAINS MUST BE WELL BALANCED TO TAKE UP EVENLY
- MOORING LINE LENGTH INCLUDING RODE MUST BE 3 TIMES THE HIGH TIDE WATER DEPTH MINIMUM OR 15 M WHICHEVER GREATER
- ALL SHACKLES AND FIXTURES AND FITTINGS SHALL BE RATED AS FOR THE ATTACHING CHAIN MINIMUM
- ALL PINS TO SHACKLES ETC SHALL BE SEIZED SO THEY CANNOT WORK LOOSE
- ALL CHAINS, RODES AND FIXING MUST BE INSPECTED ANNUALLY FOR WEAR

SHACKLES

- ALL SHACKLES TO BE RATED MINIMUM 4.7T. SWL
- ALL CONNECTIONS TO BE SECURED BY SHACKLES.
- LARGED-SHACKLE GALVANISED STEEL TO AS B278
- SEIZE PINS SUCH THAT THEY CANNOT WORK LOOSE OVER TIME.

MOORING BALANCING

- MOOR EVENLY AND BALANCED ON CHAINS TO TAKE UP EVENLY
- CONTRACTOR TO RETURN TO SITE AS REQUIRED AND ADJUST PONTOON CHAINS AS REQUIRED TO ENSURE LOADS ARE BALANCED.
- CONTRACTOR TO RETURN TO SITE AFTER 3 MONTHS AND ADJUST CHAINS AS REQUIRED.

SEA NET

- THE SEA NET SHALL BE DESIGNED, SUPPLIED AND INSTALLED AND CERTIFIED BY SEADRAGON PTY LTD TO THE MINIMUM PERFORMANCE SPECIFICATION OF THESE DRAWINGS AND SPECIFICATION.
- PREDATOR PRO
- 150 MM WEAVE (10") BLUE / BLACK COLOUR
- ØØ S.S WIRES WOVEN THROUGH THREAD
- HEAVY DUTY THREAD CUT RESISTANT
- CONTRACTOR SHALL HAVE AT LEAST 10 YEARS EXPERIENCE INSTALLING AND MAINTAINING SEAPOL NETS
- HANG NET WITH WEAVE AT 45° TO ALLOW FOR EXPANSION
- SEANET MUST EFFECTIVELY PREVENT SHARKS FROM ENTERING THE ENCLOSURE
- SEADRAGON TO PROVIDE ALL S.S 316 EYEBOLTS AND INSTALL
- PROVIDE ALL ROPES AND CORDAGE AND CHAINS AND SHACKLES AND ANCHORS
- BALANCE NET AND CHAINS AND ANCHORS EVENLY AND ENSURE NET WORKS AT ALL TIDES
- ADJUST SEANET AFTER 1 MONTH
- ADJUST SEANET AFTER 6 MONTHS

MAINTENANCE - CONTRACTOR

- THE CONTRACTOR SHALL RETURN AS PART OF THESE WORKS AFTER 6 MONTHS AND TIGHTEN ALL BOLTS TO TIMBER WORK TO ENSURE THE JOINT IS TIGHT AFTER SHRINKAGE.

MAINTENANCE - OWNER

- THE OWNER SHALL RECOGNISE THAT ALL MARINE STRUCTURES ARE ACTIVE AND IN CONSTANT MOTION. BOATS AND FLOATING VESSELS MOVE IN THE WATER COLUMN AND WAVES AND CYCLIC LOADS IMPACT STRUCTURES.
- THE AS DRAWN STRUCTURES REQUIRE ACTIVE AND ENGAGED MANAGEMENT AND MAINTENACE. THEY ARE NOT SET AND FORGET STRUCTURES
- AN EXPERIENCED MANAGER TO BE RESPONSIBLE FOR ONGOING MONITOR BY REGULAR VISUAL INSPECTION
- KEEP ADEQUATE WRITTEN RECORDS OF INSPECTIONS
- CONDUCT THOROUGH VISUAL CHECK AFTER STORM EVENT FOR ANY DAMAGE AND REPORT TO ENGINEER FOR ASSESSMENT

Drawing Status

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION

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H

TENDER

191019

REVISION

COMMENTS

DATE

CLIENT

NORTHERN BEACHES COUNCIL

C/O MRS. TINE BIRKEMOSE

PROJECT

PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL

DRAWING TITLE

SPECIFICATION (CONT)

DRAWN

DESIGNED

REVIEWED

APPROVED

STEVE FITZHENRY B.E

PROJECT NO

PAPER SIZE

SHEET NO

ISSUE

18.09072

A3

S01

H

Land & Marine

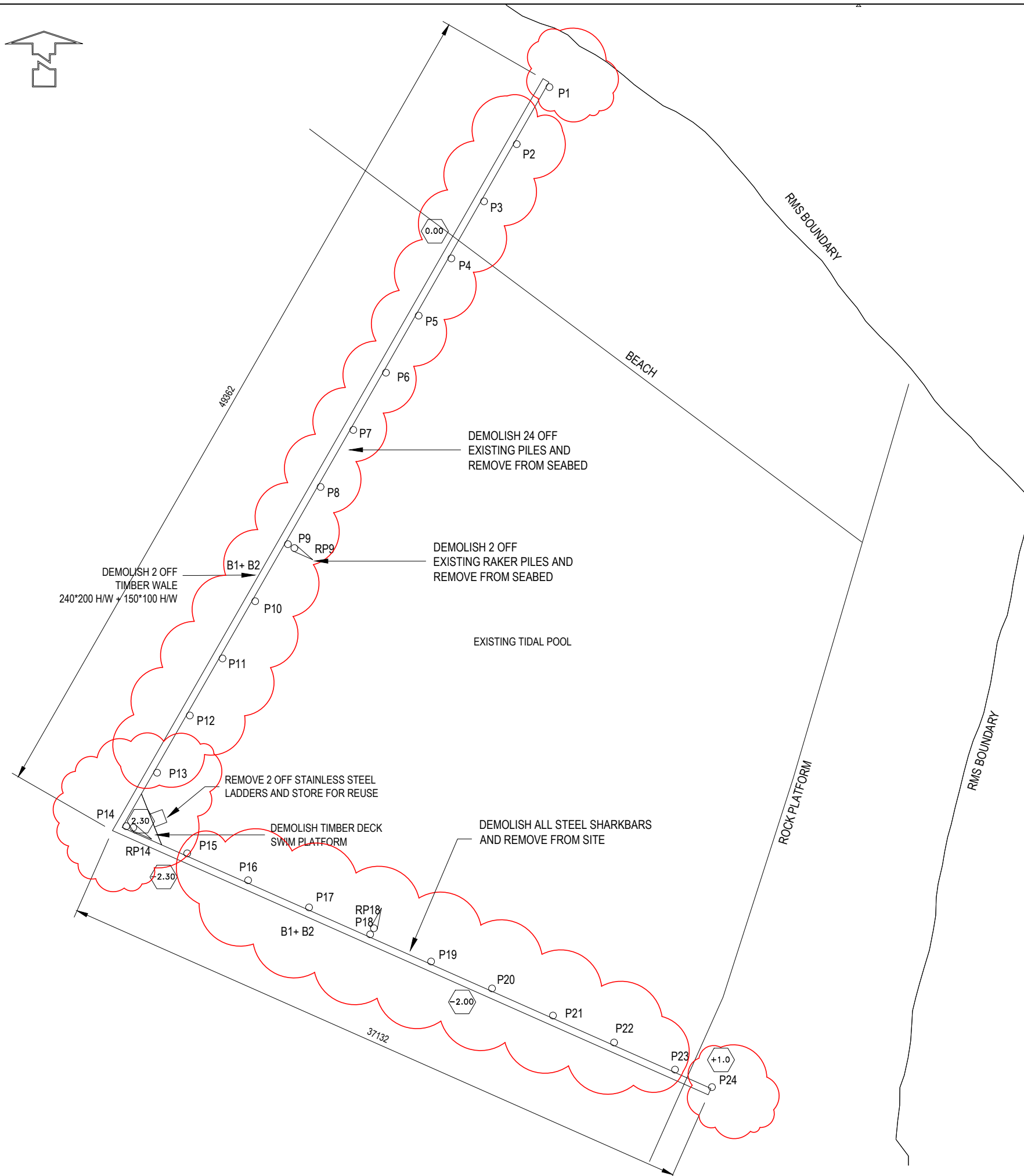
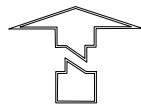
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## NOTES:

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## LEGEND



CLOUDED AREAS TO BE DEMOLISHED

PLAN IS BASED ON RMS DIGITAL DATA  
PILES AND WATERFRONT FACILITIES  
TO ADJACENT PROPERTIES  
ARE SHOWN FOR REFERENCE ONLY

ANY DISTURBANCE OR DAMAGE TO THE EXISTING  
STRUCTURES OR GROUNDS SHALL BE  
REINSTATED TO ORIGINAL CONDITION PRIOR TO  
DISESTABLISHMENT FROM SITE

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H TENDER

191019

REVISION COMMENTS DATE

CLIENT

**NORTHERN BEACHES COUNCIL**  
C/O MRS. TINE BIRKEMOSE

PROJECT  
**PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL**

DRAWING TITLE  
**EXISTING SITE PLAN & DEMOLITION PLAN**

DRAWN DESIGNED REVIEWED APPROVED  
**STEVE FITZHENRY B.E.**

PROJECT NO. PAPER SIZE SHEET NO. ISSUE  
**18.09072 A3 S02 H**

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## EXISTING SITE PLAN & DEMOLITION PLAN

SCALE 1:250





A  
S11

#### BERTHING & MOORING NOTE

- VESSELS ARE NOT TO BERTH THE TIDAL POOL STRUCTURE AT ANY TIME
- DO NOT MOOR TO THE SEAPool AT ANY TIME

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#### LEGEND

RED LINES - PROPOSED WORKS

LEGEND  
CLOUDED WORKS BY OTHERS  
SEADRAGON

### MEMBER SCHEDULE

D1	140W * 40 H/W F22 DECKING KILN DRIED D.A.R
B1	300 H * 350 W F22 H/W TIMBER BEAM
B2	200 * 100 F22 H/W TIMBER BEAM
B3	150 x 150 F22 H/W BEAM
B4	100 x 100 F22 H/W BEAM
B5	300x125 F22 H/W BEAM
TR1	75Wx65 H/W F17 TOERAIL

ALL TIMBER SHALL BE TURPENTINE IN TIDAL ZONE  
2 COATS OF CCN OIL TO ALL FACES AND ENDS  
LIBERALLY COAT ALL BEAM ENDS CUTS OR  
CHECKS AND BOLT HOLES WITH BLACKJACK

### PILE SCHEDULE

P1 - P9  
NEW PILES 323Ø \* 12.7 STEEL CHS GRADE 350 MPa  
MINIMUM 2.0M INTO ROCK  
OR 6.0M INTO DENSE SAND  
355 Ø HDPE SLEEVE OVER  
50 MPA CONCRETE FILLED  
SET 2.0 M INTO SEABED  
OR 500MM INTO GROUTED OVER AUGERED HOLE IN ROCK  
P10 - P12  
NEW PILES 508Ø \* 12.7 STEEL CHS GRADE 350 MPa  
MINIMUM 2.4M INTO ROCK  
OR 7.0M INTO DENSE SAND  
630 Ø HDPE SLEEVE OVER  
50 MPA CONCRETE FILLED  
SET 2.0 M INTO SEABED  
OR 500MM INTO GROUTED OVER AUGERED HOLE IN ROCK  
P13 - P18  
NEW PILES 323Ø \* 12.7 STEEL CHS GRADE 350 MPa  
MINIMUM 2.0M INTO ROCK OR 6.0M INTO DENSE SAND  
IGNORE TOP 1M FOR SILT  
355 Ø HDPE SLEEVE OVER  
50 MPA CONCRETE FILLED  
SET 2.0 M INTO SEABED  
OR 500MM INTO GROUTED OVER AUGERED HOLE IN ROCK  
P19  
NEW 500Ø HDPE SLEEVE  
50 MPA CONCRETE FILLED  
SET 200MM INTO SOUND ROCK  
4 - 20Ø S.S A4 - 80 ALL THREAD  
CHEMSET 600 TO ROCK  
IN DRILLED 20 Ø HOLES  
INSERT HILTI- HIT 500 EPOXY INTO HOLE  
HARD DRIVE BARS TO BASE OF HOLE

### NET SCHEDULE

SSC1	½ INCH STAINLESS STEEL CHAIN
GC1	½ INCH GALVANISED STEEL CHAIN
GC2	1 INCH GAL STEEL CHAIN

NOTE  
ALL STEEL PILES SHALL BE ALLOWED EITHER TO HAVE TEETH  
PRE-INSTALLED TO BASE OR CONTRACTOR SHALL ALLOW  
TO AUGER INTO ROCK IF REQUIRED

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PROJECT

**PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL**

DRAWING TITLE

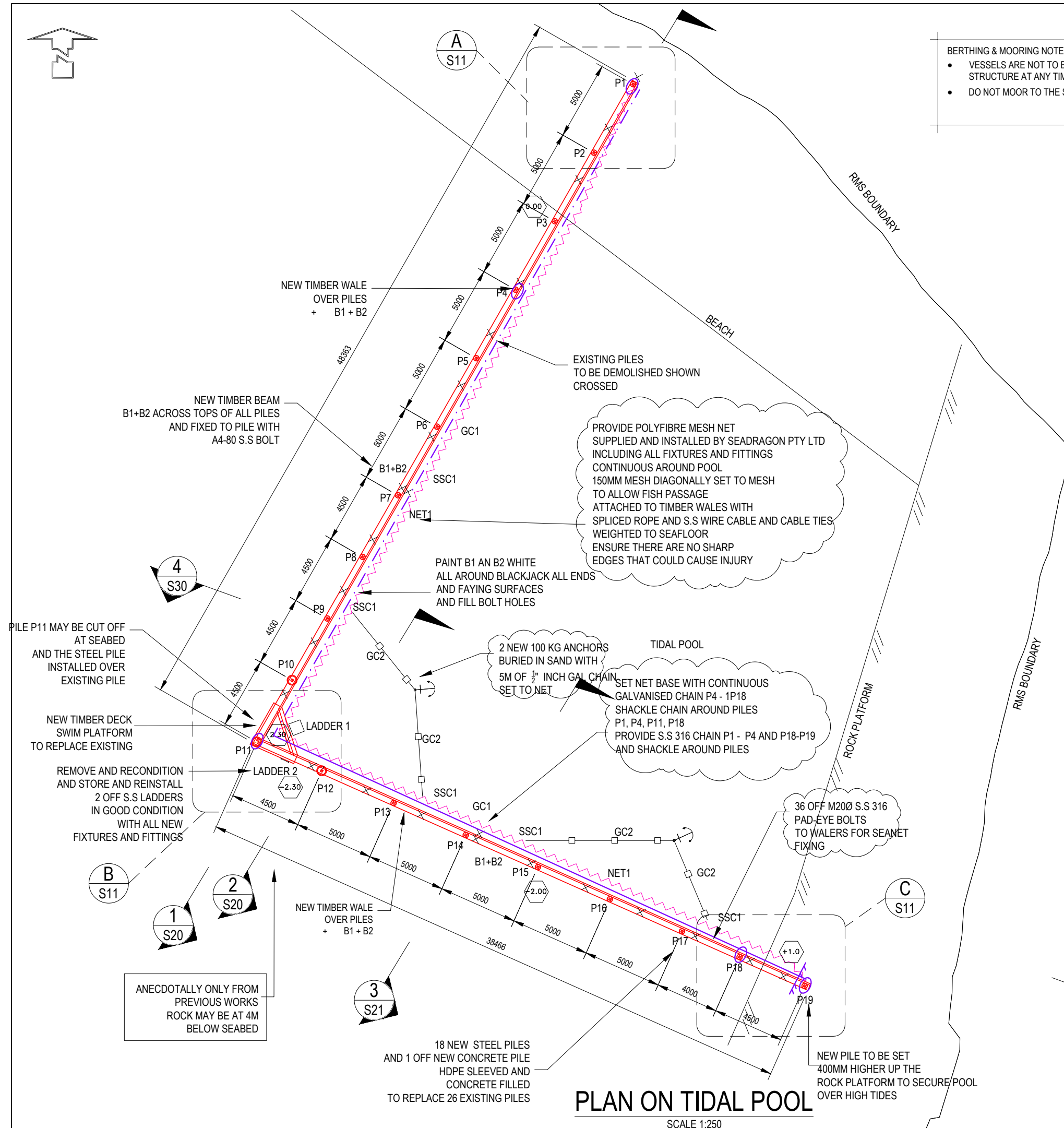
**GENERAL ARRANGEMENT**

DRAWN DESIGNED REVIEWED APPROVED

STEVE FITZHENRY B.E

PROJECT NO. PAPER SIZE SHEET NO. ISSUE  
18.09072 A3 **S10** H

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## PLAN ON TIDAL POOL

SCALE 1:250

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LEGEND

RED LINES - PROPOSED WORKS

LEGEND

CLOUDED WORKS BY OTHERS  
SEADRAGON

LEGEND

CLOUDED WORKS BY OTHERS  
SEADRAGON

NEW PILE TO BE SET  
400MM HIGHER UP THE  
ROCK PLATFORM TO SECURE POOL  
OVER HIGH TIDES

PROVIDE S.S 316 CHAIN P1 9  
AND SHACKLE AROUND PILES  
SPLICE ROPE AROUND PILE AND  
PROVIDE HDPE SHEATH  
TURNBUCKLE TO S.S TOP TENSION WIRE

DETAIL C

SCALE 1:50

S10

DETAIL A

SCALE 1:50

S20

DETAIL B

SCALE 1:50

S10

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PROJECT  
PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL

DRAWING TITLE  
PLAN DETAILS

DRAWN DESIGNED REVIEWED APPROVED  
STEVE FITZHENRY B.E.

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NEW TIMBER BEAM  
B1+B2 ACROSS TOPS OF ALL PILES  
BOLT LAMINATED 200 S.S WITH NYLOCK NUTS  
STAGGER SPLICES  
AND FIXED TO PILE WITH  
A4-80 S.S BOLT

PROVIDE S.S 316 CHAIN P1  
AND SHACKLE AROUND PILES  
SPLICE ROPE AROUND PILE AND PROVIDE HDPE SHEATH  
TURNBUCKLE TO S.S TOP TENSION WIRE

SHACKLE GAL CHAIN GC1  
AROUND PILE AND SHACKLE  
SSC1 TO GC1

NEW TIMBER WALE  
OVER PILES  
+ B1 + B2

OLD PILE TO BE  
REMOVED SHOWN CROSSED

18 NEW STEEL PILES  
AND 1 OFF NEW CONCRETE PILE  
HDPE SLEEVED AND  
CONCRETE FILLED  
TO REPLACE 26 EXISTING PILES

NEW TR1  
TOERAIL  
TO 2 SIDES OF PLATFORM

NEW D1 140W \* 40 DECKING  
TO SWIM PLATFORM  
NO KNOTS OR WANES OR ROUGH  
TIMBER

REMOVE AND CLEAN AND  
REPLACE EXISTING STAINLESS STEEL  
LADDER NO.1  
WITH NEW S.S FIXTURES AND FITTINGS

B2 TIMBER GIRDERS  
AT 600 CRS SEAT ON B4

B5+B4 HEADSTOCK  
SEAT ON B2 LAMINATED BEAM

SHACKLE GAL CHAIN GC1  
AROUND PILE AND SHACKLE  
SSC1 TO GC1

NEW TIMBER DECK  
SWIM PLATFORM  
TO REPLACE EXISTING

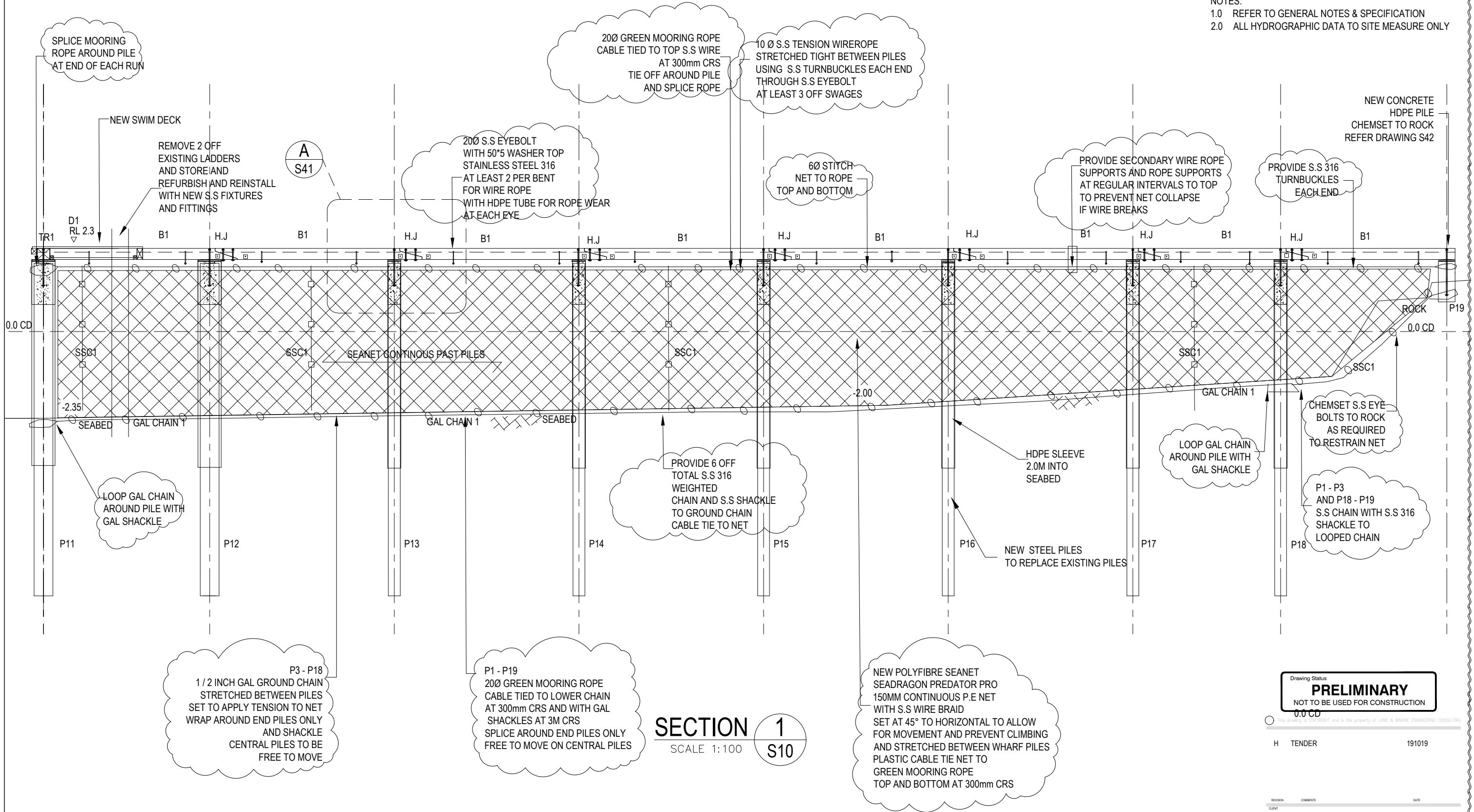
REMOVE AND CLEAN AND  
REPLACE EXISTING  
STAINLESS STEEL  
LADDER NO.2  
WITH NEW S.S FIXTURES AND FITTINGS

NEW TIMBER WALE  
OVER PILES  
+ B1 + B2





NOTES:  
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SECTION 1  
SCALE 1:100  
S10

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PROJECT  
PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL

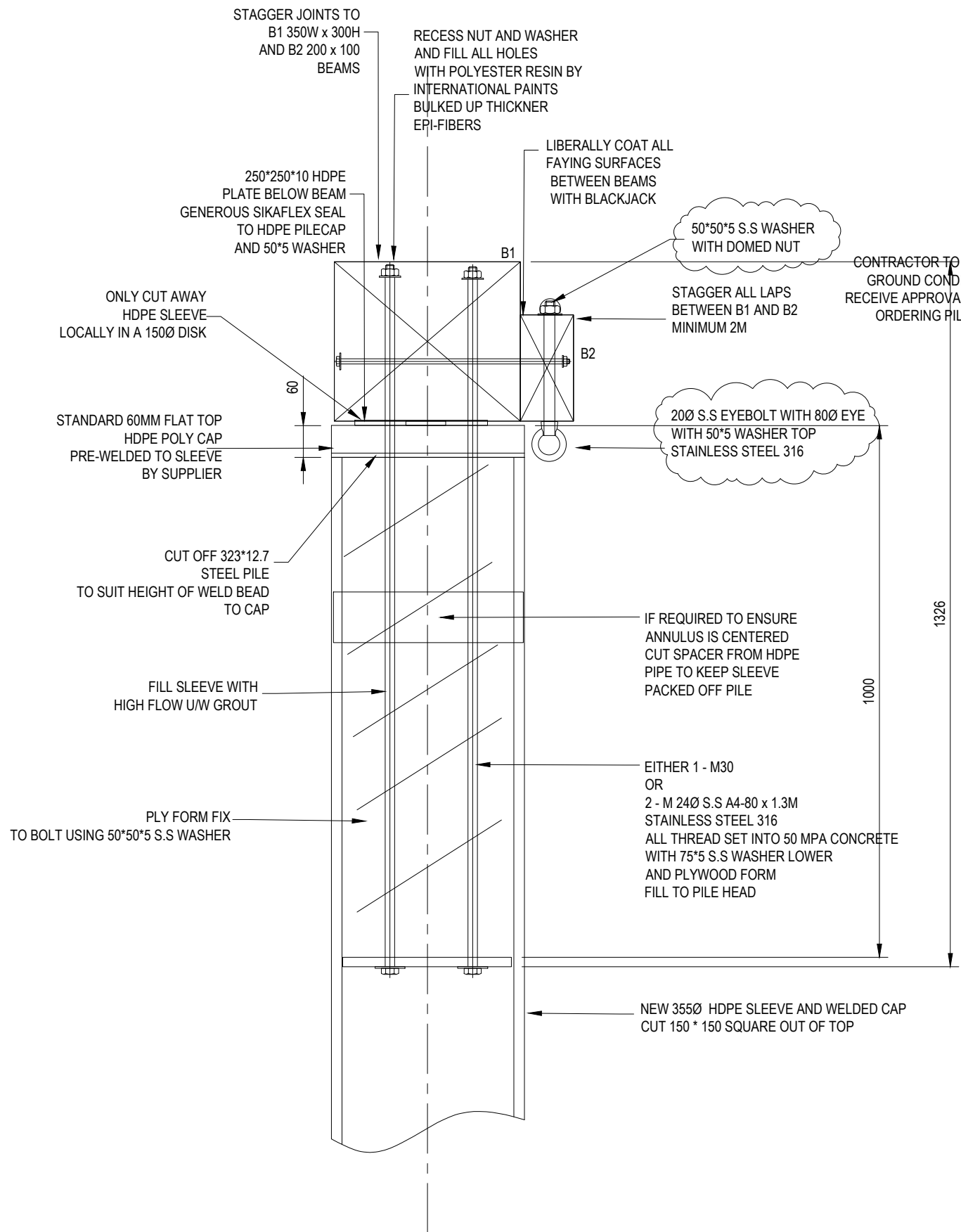
DRAWING TITLE  
SECTIONS

DESIGNED BY  
STEVE FITZHENRY B.E.

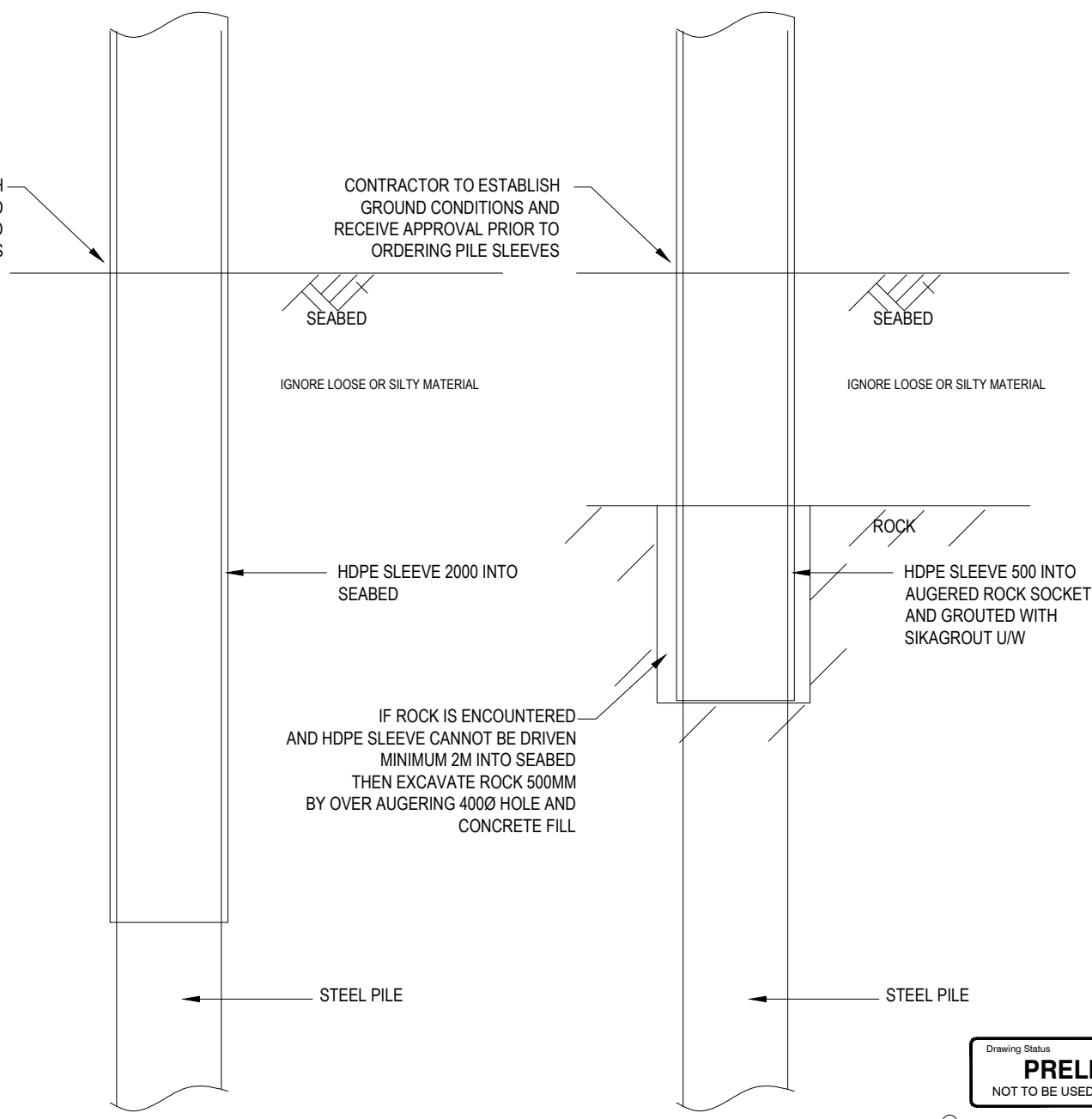
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TYPICAL DETAIL ON HDPE / STEEL PILE  
SCALE 1:10



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LITTLE MANLY TIDAL POOL

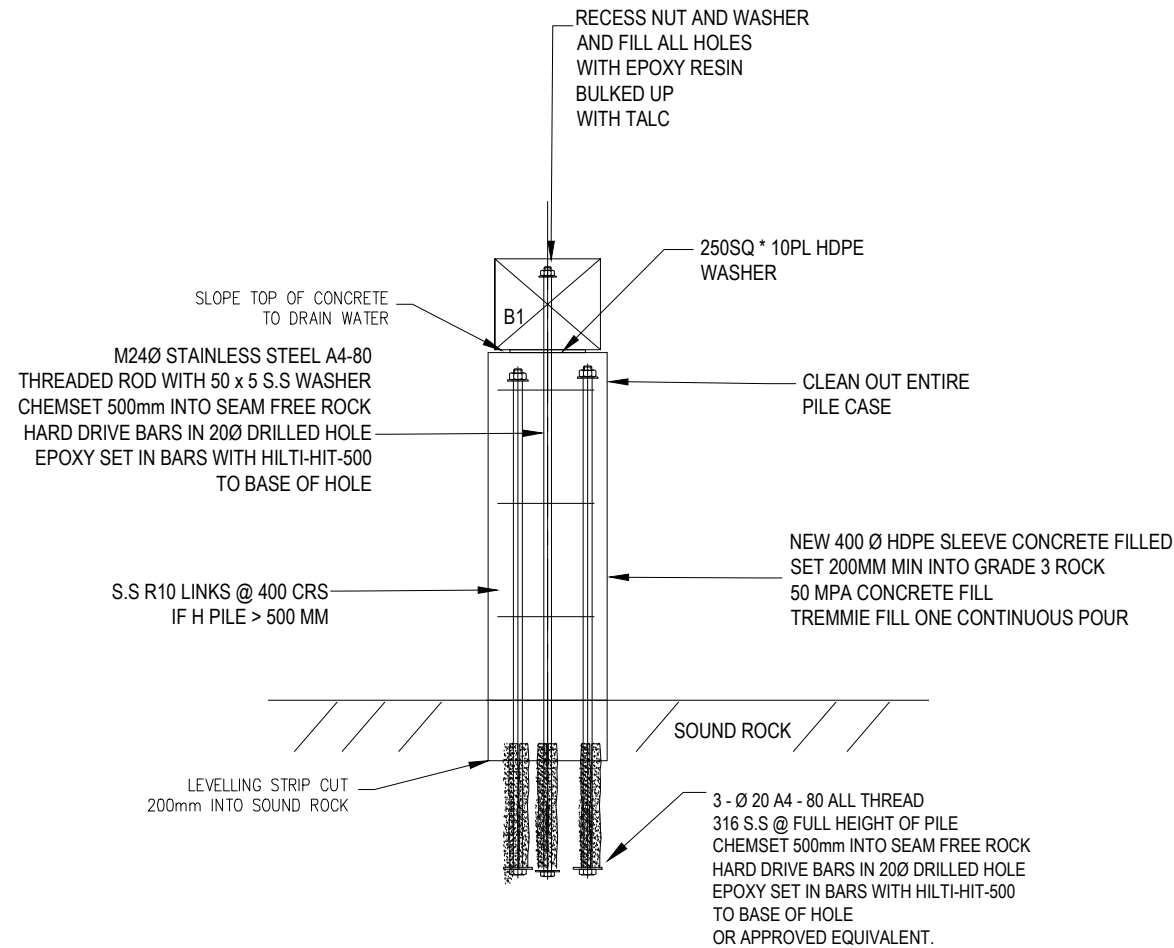
DRAWING TITLE  
PILE DETAILS

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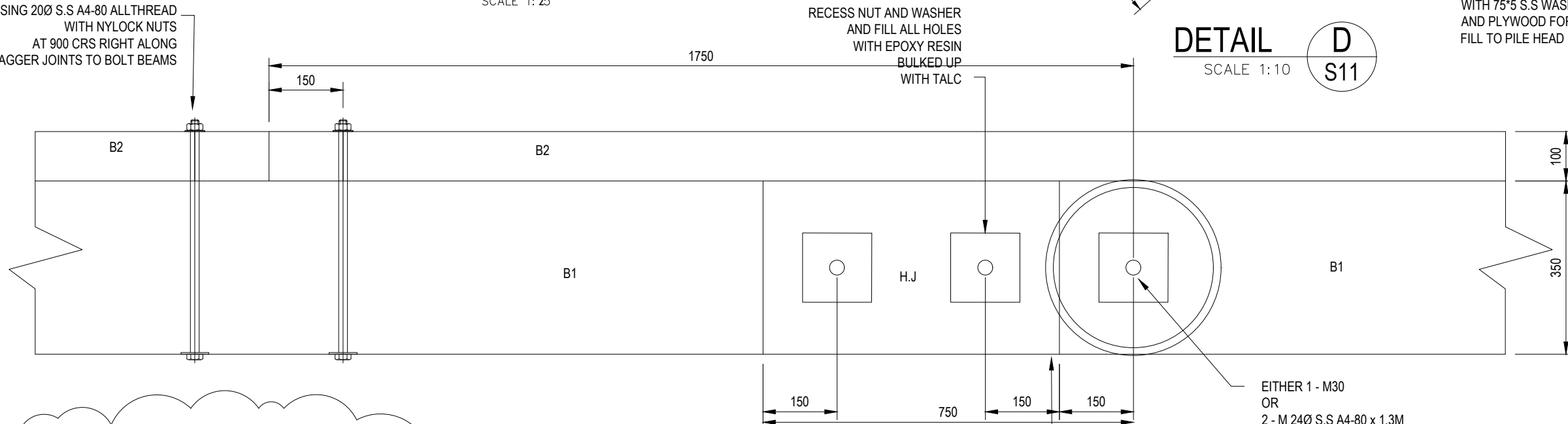




**TYPICAL DETAIL ON HDPE PILE TYPE 1**

SCALE 1: 25

300Hx350W H/W BEAM WITH 200x100 BEAM BOLT LAMINATED USING 20Ø S.S A4-80 ALLTHREAD WITH NYLOCK NUTS AT 900 CRS RIGHT ALONG STAGGER JOINTS TO BOLT BEAMS



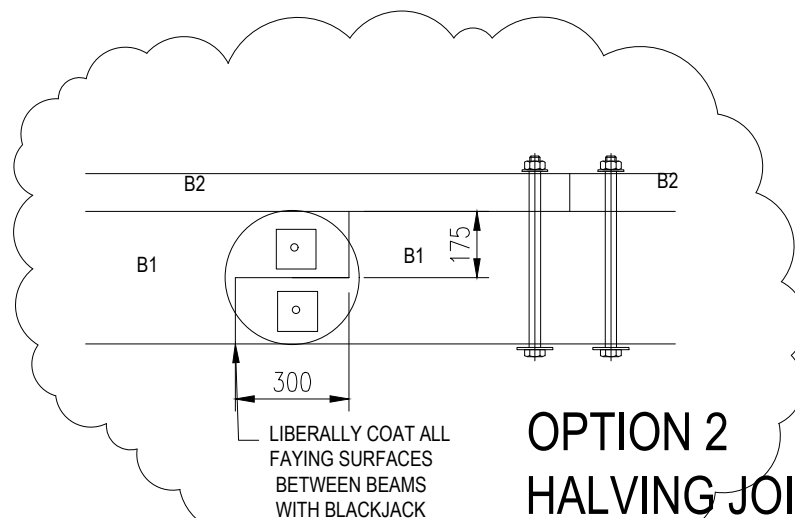
CORNER PILE  
2 - M30Ø S.S A4-80 x 1.3M  
STAINLESS STEEL 316  
ALL THREAD SET INTO 50 MPA CONCRETE  
WITH 75\*5 S.S WASHER LOWER  
AND PLYWOOD FORM  
FILL TO PILE HEAD

**DETAIL E S11**

**OPTION 1  
HALVING JOINT**

LIBERALLY COAT ALL FAYING SURFACES BETWEEN BEAMS WITH BLACKJACK

EITHER 1 - M30  
OR  
2 - M 24Ø S.S A4-80 x 1.3M  
STAINLESS STEEL 316  
ALL THREAD SET INTO 50 MPA CONCRETE  
WITH 75\*5 S.S WASHER LOWER  
AND PLYWOOD FORM  
FILL TO PILE HEAD



- NOTES:
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PROJECT  
**PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL**

DRAWING TITLE  
**DETAILS**

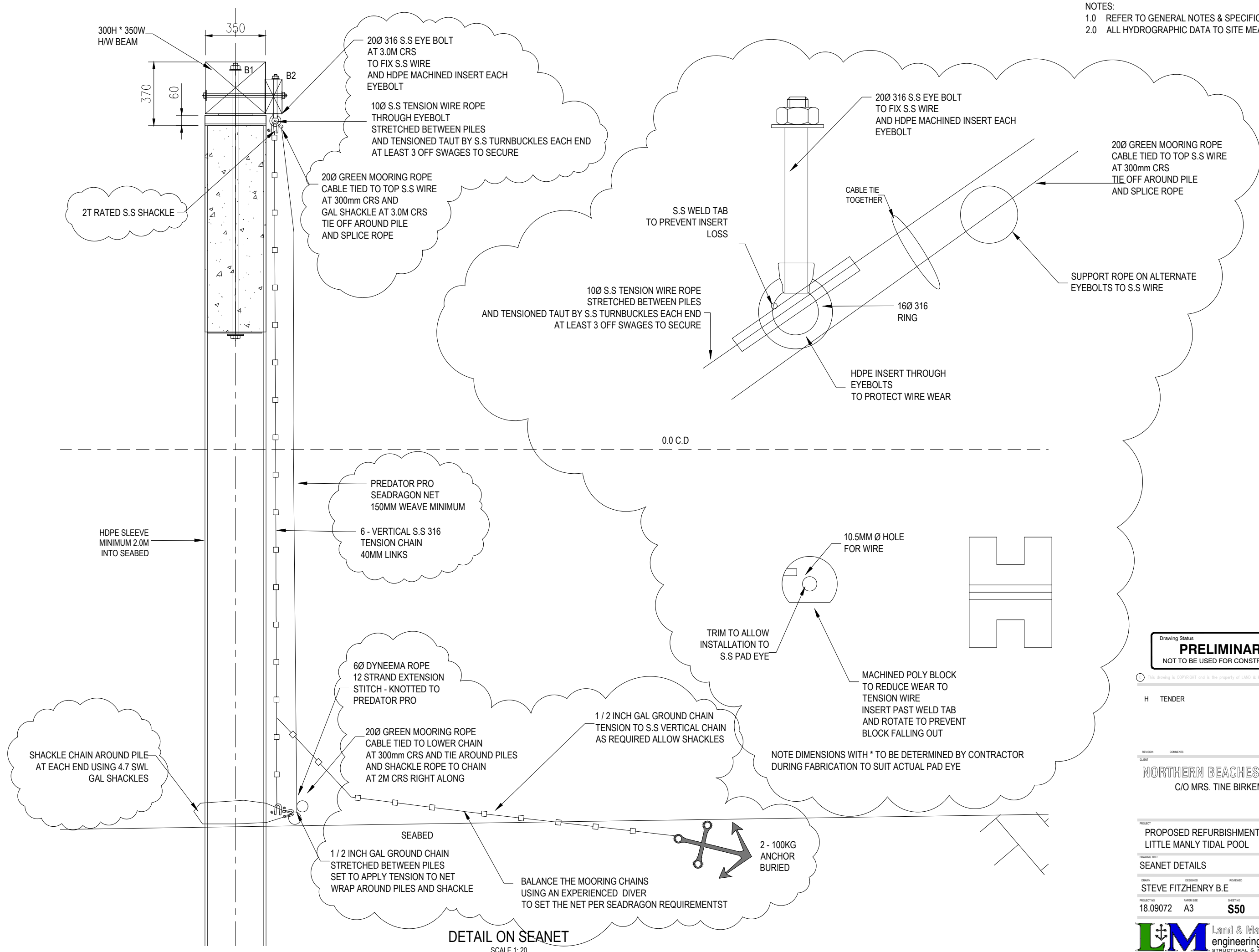
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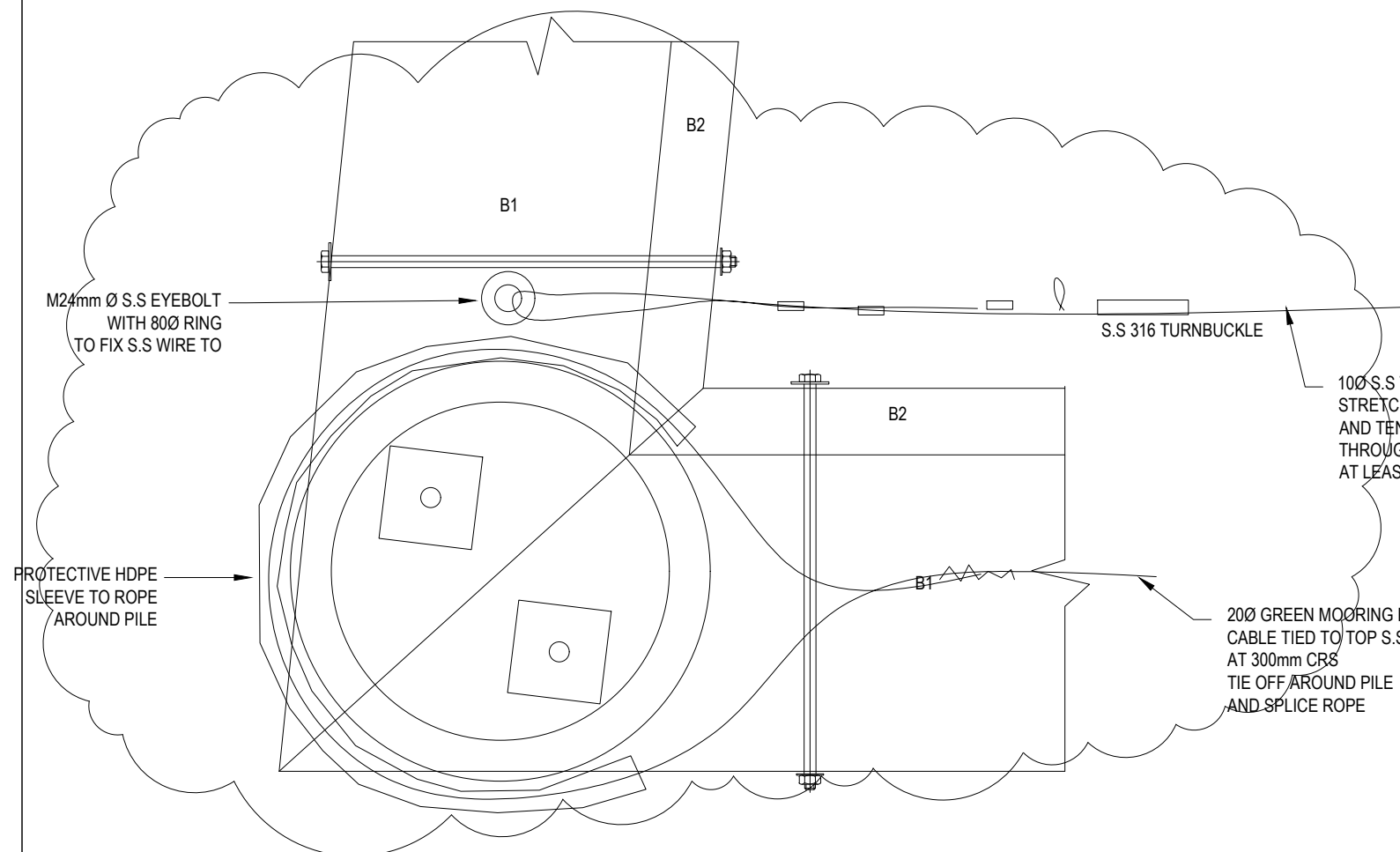
PROJECT  
**PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL**

DRAWING TITLE  
**SEANET DETAILS**

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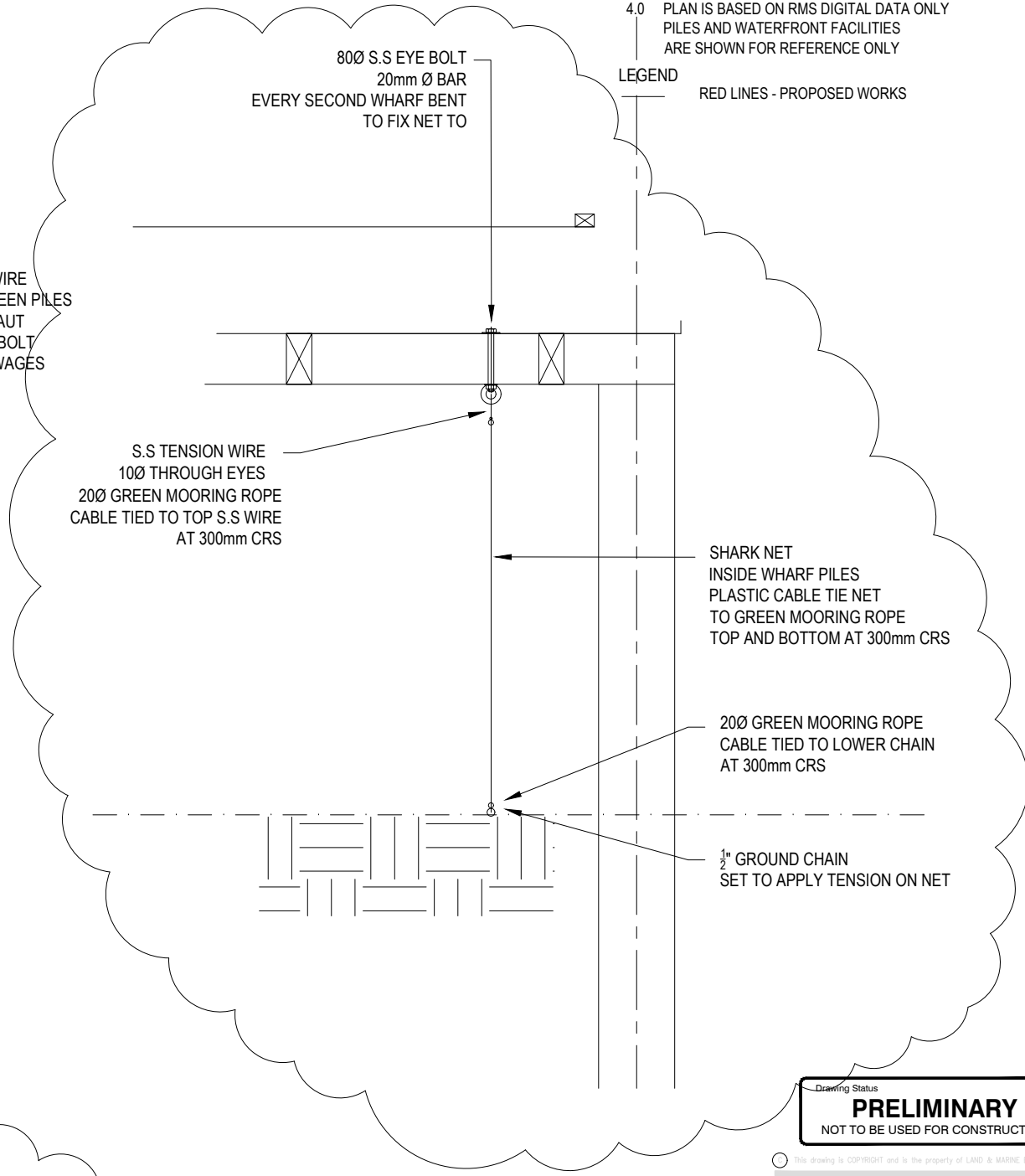
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DETAIL ON PILE CONNECTION

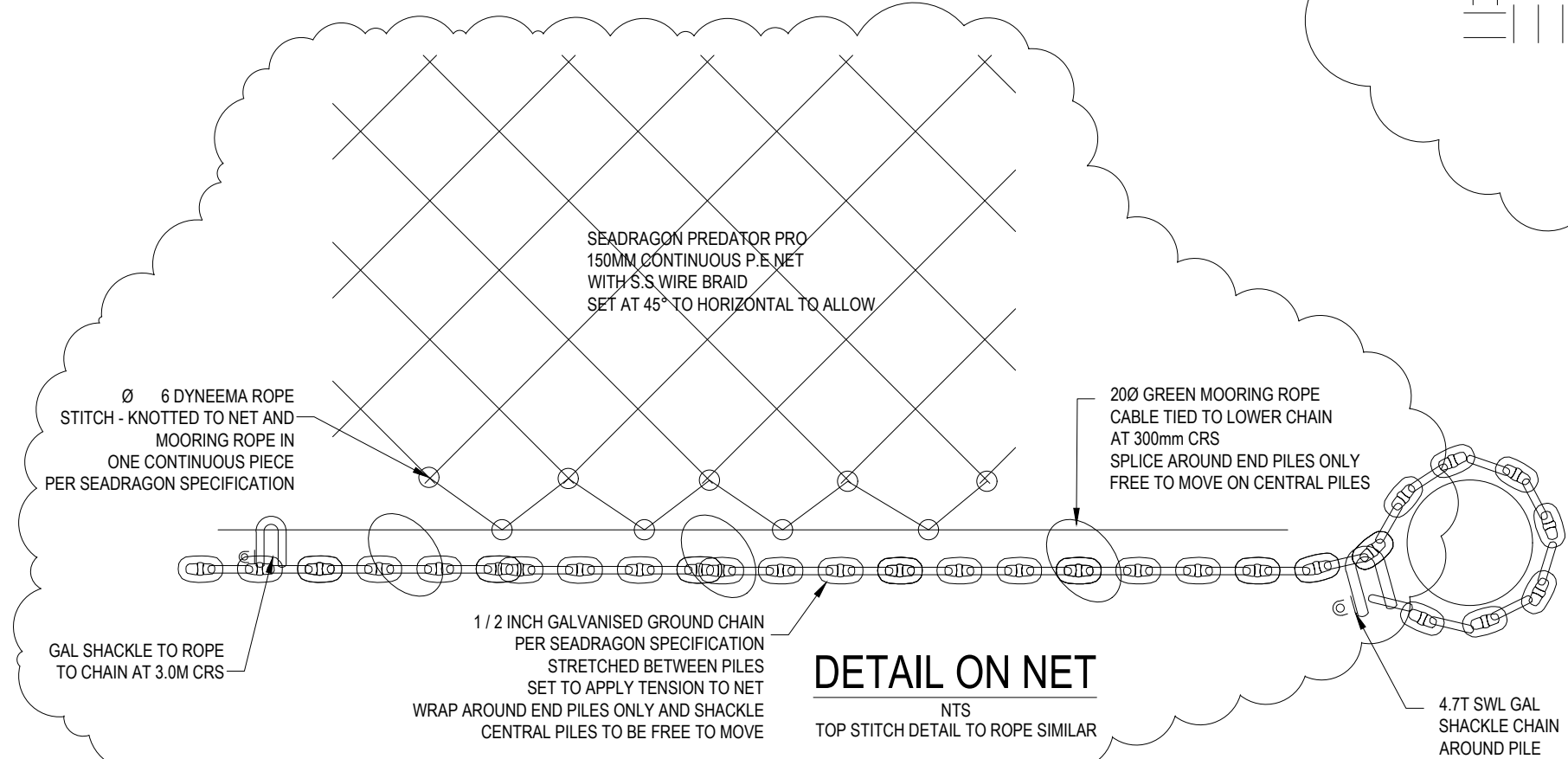
SCALE 1:100



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**LEGEND**

RED LINES - PROPOSED WORKS



DETAIL ON NET

NTS  
TOP STITCH DETAIL TO ROPE SIMILAR

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PROJECT

**PROPOSED REFURBISHMENT  
LITTLE MANLY TIDAL POOL**

DRAWING TITLE

**SEA NET DETAILS**

DRAWN DESIGNED REVIEWED APPROVED

**STEVE FITZHENRY B.E.**

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