# PROPOSED WINNEY BAY CLIFFTOP WALK, 5 LANDS COASTAL WALKWAY - STAGE 5, CAPTAIN COOK LOOKOUT - WINNEY BAY

AT

## COPACABANA, NSW

FOR

## GOSFORD CITY COUNCIL

## A3 SERIES - PAVEMENT PLANS, SECTIONS AND DETAILS

LOCALITY PLAN


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CONCEPT PLANS
NOT FOR CONSTRUCTION

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.

A1

| REVISION | DESCRIPTION | DATE | REVISION | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| A | PRELIMINARY ISSUE TO QUANTITY SURVEYOR | 05.06.15 | | | |
| B | RE-ISSUE TO QUANTITY SURVEYOR | 24.06.15 | | | |
| C | 90% ISSUE | 29.06.15 | | | |
| D | COUNCIL APPROVAL | 19.08.15 | | | |

RGH CONSULTING GROUP Multi-discipline Engineering

FOR GOSFORD CITY COUNCIL CENTRAL COAST

5 LANDS WALK CENTRAL COAST · NEW SOUTH WALES

ADDRESS: WINNEY BAY RESERVE COPACABANA N.S.W.

PROJECT: 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY

DRAWING TITLE: COVER SHEET

ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830

| | |
|---|---|
| SCALE | 1:100 @ A1 |
| DRAWN | JOON |
| DESIGNED | CF |
| CHECKED | AJG |
| DATE | JANUARY 2015 |
| JOB NUMBER | 20140492 |

SHEET A3.01

REV D

## CONCRETE (C)

C01. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600, AS 1379 & AS 3610 CURRENT EDITIONS WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

C02 ALL CEMENT TO BE TYPE SL, SHRINKAGE LIMITED CEMENT IN ACCORDANCE WITH AS3972, EXCEPT THAT THE MAXIMUM SHRINKAGE OF THE CEMENT IN THE MORTAR TEST SAMPLE IN ACCORDANCE WITH AS3600 SHALL BE LESS THAN 600 MICROSTRAIN.

| ELEMENT | STRENGTH GRADE (MPa) | SLUMP (mm) | MAXIMUM AGGREG. SIZE (mm) | MINIMUM CEMENT CONTENT (kg/cu.m) |
|---|---|---|---|---|
| SLABS | M40 | 80 | 20 | 350 |
| FOOTINGS | M40 | 80 | 20 | 350 |

PROJECT ASSESSMENT SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379 CLAUSE 97.

C03.
a. ALL CONCRETE IN SLABS AND BEAMS TO BE PROPORTIONED TO LIMIT DRYING SHRINKAGE TO 650 MICROSTRAIN AT 56 DAYS.
b. DETAILS OF THE PROPOSED MIX TO BE SUBMITTED & APPROVAL OBTAINED PRIOR TO POURING ANY CONCRETE.
c. SHRINKAGE TESTS SHALL BE CARRIED OUT BY AN APPROVED NATA REGISTERED LABORATORY IN ACCORDANCE WITH AS 1012 PART 13. TESTS SHALL BE CONDUCTED ON THE FIRST BATCH OF CONCRETE USED IN SUSPENDED SLABS AND SUBSEQUENTLY AT THE RATE OF ONE TEST EVERY ADDITIONAL 100m³ OF CONCRETE SUPPLIED. THREE SPECIMENS SHALL BE TAKEN FOR EACH TEST AND THE SHRINKAGE SHALL BE THE AVERAGE OF THE THREE RESULTS.
THE COST OF TESTING SHALL BE BORNE BY THE CONTRACTOR AS SHALL ANY ADDITIONAL TESTS REQUIRED IF THE CONCRETE FAILS TO MEET THE SPECIFIED SHRINKAGE LIMITS.

C04. NO ADMIXTURES OTHER THAN LOW RANGE WRA SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING.

C05. CLEAR CONCRETE COVER TO ALL REINFORCEMENT SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE. COVER MAY NEED TO BE INCREASED FOR FIRE RATING.

| EXPOSURE CLASS TO AS 3600 | MINIMUM CONCRETE GRADE | CAST AGAINST GROUND | CAST IN FORMS & EXPOSED | CAST IN FORMS & NOT EXPOSED |
|---|---|---|---|---|
| A1 (INTERNAL) | 32 | 40mm | - | 25mm |
| A2 (EXTERNAL) | 32 | 40mm | 30mm | - |
| B1 (EXTERNAL) | 32 | 50mm | 40mm | - |
| B2 (EXTERNAL) | 40 | 65mm | 45mm | - |
| C2 | 50 | 65mm | - | - |

NOTE: WHERE CONCRETE IS POURED ON A VAPOURPROOF MEMBRANE 0.2mm MINIMUM THICKNESS, THE COVER TO CONCRETE CAST AGAINST GROUND MAY BE REDUCED BY 10mm.

C06. CONCRETE SIZES SHOWN DO NOT INCLUDE THICKNESSES OF APPLIED FINISHES. NO FINISH WHICH DECREASES COVER IS ALLOWED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

C07. DEPTHS OF BEAMS ARE GIVEN FIRST AND INCLUDE SLAB THICKNESS.

C08. FOR CHAMFERS, DRIP GROOVES, REGLETS, ETC. REFER TO ARCHITECTS DETAILS, MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS.

C09. NO HOLES, CHASES, BLOCKOUTS, DUCTS OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

C10. CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO THE APPROVAL OF THE ENGINEER.

C11. ALL CONCRETE COLUMNS GREATER THAN 1.2 METRES IN HEIGHT SHALL BE POURED A MINIMUM OF 4 HOURS PRIOR TO SLAB OR BEAM OVER.

C12. THE FINISHED CONCRETE SHALL BE MECHANICALLY VIBRATED TO ACHIEVE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.

C13. CURING OF ALL CONCRETE IS TO BE ACHIEVED BY KEEPING SURFACES CONTINUOUSLY WET FOR A PERIOD OF THREE DAYS, AND THE PREVENTION OF LOSS OF MOISTURE FOR A TOTAL OF 7 DAYS FOLLOWED BY A GRADUAL DRYING OUT. APPROVED SPRAYED ON CURING COMPOUNDS THAT COMPLY WITH AS 3799 MAY BE USED WHERE FLOOR FINISHES WILL NOT BE AFFECTED (REFER MANUFACTURERS SPECIFICATION). POLYTHENE SHEETING OR WET HESSIAN MAY BE USED IF PROTECTED FROM WIND AND TRAFFIC.

C14. CONSTRUCTION SUPPORT PROPPING IS TO BE LEFT IN PLACE WHERE NEEDED TO AVOID OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING. NO BRICKWORK OR PARTITION WALLS ARE TO BE CONSTRUCTED ON SUSPENDED LEVELS UNTIL SEVEN DAYS AFTER PROPPING HAS BEEN REMOVED AND THE SLAB PRE-LOADED WITH THE BRICKS OR UNITS TO BE USED IN THE WALL.

C15. REPAIRS TO CONCRETE SHALL NOT BE ATTEMPTED WITHOUT THE PERMISSION OF THE ENGINEER.

C16. CAST-IN FIXINGS, BOLTS ETC. SHALL NOT BE ALTERED WITHOUT THE PERMISSION OF THE ENGINEER.

C17. CONDUITS, PIPES ETC. SHALL ONLY BE LOCATED IN THE MIDDLE THIRD OF THE SLAB DEPTH AND SPACED AT NOT LESS THAN 3 DIAMETERS. CONDUITS AND PIPES SHALL NOT BE PLACED WITHIN THE COVER TO REINFORCEMENT.

C18. SLABS AND BEAMS SHALL BE CONSTRUCTED TO BEAR ONLY ON THE BEAMS, WALLS, COLUMNS ETC. SHOWN ON THE DRAWINGS. ALL OTHER BUILDING ELEMENTS SHALL BE KEPT 12mm CLEAR OF SOFFITS OF STRUCTURE.

C19. PLASTIC FORMWORK SPACERS AND BAR CHAIRS TO BE USED IN ALL EXPOSED CONCRETE WORK.

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.

## REINFORCEMENT (R)

R01. REINFORCEMENT SYMBOLS:

N DENOTES GRADE 500 N BARS TO AS 4671
R DENOTES GRADE 250 R HOT ROLLED PLAIN BARS TO AS 4671
L DENOTES GRADE 500 L HARD-DRAWN WIRE REINFORCING FABRIC TO AS 4671
W DENOTES GRADE 450 W HARD-DRAWN PLAIN WIRE TO AS 4671
TM DENOTES GRADE 500 TRENCH MESH TO AS 4671

NUMBER OF BARS IN GROUP
17N20-250
BAR GRADE AND TYPE
SPACING IN mm
NOMINAL BAR SIZE IN mm

THE FIGURES FOLLOWING THE FABRIC SYMBOLS RL, SL, L .. TM IS THE REFERENCE NUMBER TO AS 4671.

R02. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.

R03. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR OTHERWISE APPROVED IN WRITING BY THE ENGINEER. LAPS SHALL BE IN ACCORDANCE WITH AS 3600 AND NOT LESS THAN THE DEVELOPMENT LENGTH FOR EACH BAR, AS PER THE TABLE BELOW:

| BAR SIZE | SPLICE LENGTHS (mm) LESS THAN 300 CONCRETE BELOW BAR OR VERTICAL BAR 25MPa | ≥32MPa |
|---|---|---|
| N12 | 300 | 300 |
| N16 | 550 | 500 |
| N20 | 750 | 650 |
| N24 | 1000 | 900 |
| N28 | 1350 | 1200 |
| N32 | 1650 | 1450 |
| N36 | 2000 | 1750 |
| | MORE THAN 300 CONCRETE BELOW BAR 25MPa | ≥32MPa |
| N12 | 400 | 400 |
| N16 | 650 | 600 |
| N20 | 950 | 850 |
| N24 | 1300 | 1150 |
| N28 | 1850 | 1500 |
| N32 | 2050 | 1850 |
| N36 | 2500 | 2200 |

BOTTOM BAR LAPPED @ SUPPORTS AND TOP BAR LAPPED AT MID SPAN.

R04. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.

R05. FABRIC SHALL BE LAPPED 2 TRANSVERSE WIRES PLUS 25mm. BUNDLED BARS SHALL BE TIED TOGETHER AT 30 BAR DIAMETER CENTRES WITH 3 WRAPS OF THE WIRE.

R06. WHERE TRANSVERSE TIE BARS ARE NOT SHOWN PROVIDE N12-400 SPLICED WHERE NECESSARY AND LAP WITH MAIN BARS 400mm UNLESS NOTED.

R07. JOGGLES TO BARS SHALL COMPRISE A LENGTH OF 12 BAR DIAMETERS BETWEEN BEGINNING AND END OF AN OFFSET OF 1 BAR DIAMETER.

R08. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1 METRE CENTRES BOTH WAYS, AND 800 EACH WAY FOR FABRIC. WHERE POURED ON GROUND AS FORMWORK PROVIDE PLATES UNDER ALL BAR CHAIRS. PLASTIC TIPPED STEEL CHAIRS SHALL NOT BE USED ON EXPOSED FACES IN EXPOSURE CLASSIFICATION B1, B2 AND C ONLY PLASTIC OR PLASTIC OR CONCRETE CHAIRS.

R09. AT A SIMPLE OR END SUPPORT OF A SLAB ON A MASONRY WALL, ALL BOTTOM SLAB REINFORCEMENT SHALL EXTEND OVER THE MASONRY WALL BY A LENGTH 75mm FOR N12 BARS & 96mm FOR N16 BARS. IF THIS CANNOT BE ACHIEVED DUE TO COVER REQUIREMENTS THEN THE BARS SHALL BE CRANKED. FOR FABRIC THE LAST WELDED CROSS ROD SHALL BE LOCATED OVER THE WALL AND 50mm MINIMUM BEYOND THE FACE OF THE WALL.

R10. SITE BENDING OF REINFORCEMENT SHALL BE AVOIDED IF POSSIBLE. WHERE SITE BENDING IS UNAVOIDABLE IT SHALL BE CARRIED OUT COLD, WITHOUT THE APPLICATION OF HEAT, AND IN ACCORDANCE WITH THE PRACTICE NOTE RPN1 OF THE STEEL REINFORCEMENT INSTITUTE OF AUSTRALIA.

R11. THE STRUCTURAL ENGINEER SHALL BE GIVEN 24 HOURS NOTICE FOR REINFORCEMENT INSPECTION AND CONCRETE SHALL NOT BE DELIVERED UNTIL FINAL APPROVAL HAS BEEN OBTAINED FROM THE STRUCTURAL ENGINEER.

## STRUCTURAL STEEL (SS)

SS1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 4100 AND AS 1554 EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

SS2. UNLESS NOTED OTHERWISE ALL MATERIAL SHALL BE:
- GRADE 250 HOT-ROLLED PLATES COMPLYING WITH AS 3678;
- GRADE 250 HOT-ROLLED FLATS,
- GRADE 300PLUS UB, UC, PFC, ANGLES, AND TFB,
- GRADE 300 WB, WC COMPLYING WITH AS 3679.2;
- GRADE C350 RHS, CHS COMPLYING WITH AS 1163;

SS3. THREE(3) COPIES OF WORKSHOP FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AT LEAST 7 DAYS PRIOR TO COMMENCEMENT OF FABRICATION AND PERMISSION TO USE OBTAINED PRIOR TO FABRICATION. PERMISSION TO USE DOES NOT RELIEVE THE BUILDER OF THE FULL RESPONSIBILITY FOR DIMENSIONS, FIT AND COMPLIANCE WITH ARCHITECTURAL AND ENGINEERING DRAWINGS.

SS4. BOLTS:-
- 4.8/S - COMMERCIAL BOLTS OF GRADE 4.8 TO AS 1111, SNUG TIGHTENED.
- 8.8/S - HIGH STRENGTH STRUCTURAL BOLTS OF GRADE 8.8 TO AS 1252, SNUG TIGHTENED.
- 8.8/TB - HIGH STRENGTH STRUCTURAL BOLTS OF GRADE 8.8 TO AS 1252 FULLY TENSIONED TO AS 4100 AS BEARING JOINT.
- 8.8/TF - HIGH STRENGTH STRUCTURAL BOLTS OF GRADE 8.8 TO AS 1252 FULLY TENSIONED TO AS 4100 AS A FRICTION JOINT WITH FACING SURFACES LEFT UNCOATED.

ALL BOLTS SHALL BE M20 GRADE 8.8/S UNLESS NOTED. NO CONNECTION SHALL HAVE LESS THAN 2 BOLTS. ALL BOLTS, NUTS & WASHERS TO BE GALVANISED. TB AND TF BOLTS TO BE INSTALLED USING APPROVED LOAD INDICATING WASHERS, OR BY TURN OF NUT CONTROL OF TENSIONING.

SS6. WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1554.1. WELDING SS CONSUMABLES SHALL BE E480X OR W50X U.N.O. ALL WELD SHALL BE 6 MM CFW SP CATEGORY U.N.O. CPBW SHALL BE SP CATEGORY U.N.O. INSPECTION SHALL BE CARRIED OUT TO AS 1554.1. ALL GP/SP WELDS SHALL BE 100% VISUALLY SCANNED.
BUTT WELDS SHALL BE COMPLETE PENETRATION WELDS TO AS 1554.

SS6. ALL DETAILS, GAUGE LINES ETC. WHERE NOT SPECIFICALLY SHOWN ARE TO BE IN ACCORDANCE WITH AISC DESIGN CAPACITY TABLES FOR STRUCTURAL STEEL AND AISC STANDARDIZED STRUCTURAL CONNECTIONS. PLATES TO BE 10mm THICK, EX-STANDARD SQUARE EDGE FLATS U.N.O.

SS7. STEELWORK TO BE CONCRETE ENCASED SHALL BE WRAPPED WITH F41 STEELWIRE FABRIC AND SHALL HAVE 50mm MINIMUM CONCRETE COVER TO THE STRUCTURAL STEEL.

SS8. PROVIDE SEAL PLATES TO ALL HOLLOW SECTIONS. PROVIDE VENT HOLES TO HOLLOW MEMBERS & DRAIN HOLES TO ALL MEMBERS TO BE HOT DIP GALVANISED.

SS9. IT IS THE BUILDER'S RESPONSIBILITY TO ENSURE THAT STEELWORK IS SECURELY TEMPORARILY BRACED AS NECESSARY TO STABILISE THE STRUCTURE DURING ERECTION.

SS10. STRUCTURAL STEELWORK SHALL HAVE THE FOLLOWING SURFACE TREATMENT IN ACCORDANCE WITH THE SPECIFICATION.

| ELEMENT | SURFACE CLEANING | PROTECTIVE COATING |
|---|---|---|
| • EXTERNAL | MECHANICAL | HOT DIPPED GALV. + 2 COAT EPOXY |

SS11. THE BUILDER SHALL PROVIDE ALL CLEATS AND DRILL ALL HOLES NECESSARY FOR FIXING STEEL TO STEEL AND TIMBER TO STEEL WHETHER OR NOT DETAILED ON THE DRAWINGS.

SS12. THE FABRICATION AND ERECTION OF THE STRUCTURAL STEELWORK SHALL BE UNDERTAKEN BY A QUALIFIED PERSON EXPERIENCED IN SUCH SUPERVISION, IN ORDER TO ENSURE THAT ALL REQUIREMENTS OF THE DESIGN ARE MET. ALL BEAMS AND RAFTERS SHALL BE FABRICATED AND ERECTED WITH NATURAL CAMBER UP.

SS13. REFERENCE SHOULD BE MADE TO AS 2312 FOR APPROPRIATE COATING SYSTEMS FOR ALL EXTERNAL APPLICATIONS. COATING OF EXTERNAL LINTELS SHALL BE IN ACCORDANCE WITH B.C.A AND AS 3700.

## FOOTPATH NOTES:

- ALLOW ADDITIONAL CONCRETE THICKNESS WHERE 'SANDBLASTED' CONCRETE FINISH IS SPECIFIED TO MAINTAIN 45mm MIN. COVER
- ALL SETOUT DIMENSION AND PATH WIDTHS BY OTHERS.
- ALL FALLS AND GRADES ON PATHS BY OTHERS. PATHS TO HAVE SUFFICIENT GRADE & CROSSFALL SO AS TO NOT POND SURFACE WATER

## JOINT SPACING SCHEDULE

| PATH WIDTH | TJ SPACING | EJ SPACING |
|---|---|---|
| 1.2m | 1.2m | 3.6m |
| 2.4m | 2.4m | 7.2m |
| 6.0m | 6.0m | 18.0m |

## STRUCTURAL STAINLESS STEEL (SSS)

SS1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 4100 AND AS 1554 EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

SS2. UNLESS NOTED OTHERWISE ALL STAINLESS STEEL SHALL BE COMPLYING WITH AS/NZS 4673. OF A GRADE SUITABLE FOR USE IN MARINE SPLASH ZONE CONDITIONS.

SS3. THREE(3) COPIES OF WORKSHOP FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AT LEAST 7 DAYS PRIOR TO COMMENCEMENT OF FABRICATION AND PERMISSION TO USE OBTAINED PRIOR TO FABRICATION. PERMISSION TO USE DOES NOT RELIEVE THE BUILDER OF THE FULL RESPONSIBILITY FOR DIMENSIONS, FIT AND COMPLIANCE WITH ARCHITECTURAL AND ENGINEERING DRAWINGS.

SS4. BOLTS:-
ALL BOLTS SHALL BE M16 GRADE 304/8 UNLESS NOTED OTHERWISE. ALL BOLTS, NUTS & WASHERS TO BE STAINLESS STEEL. (GRADE 304) TO ISO 3506, SNUG TIGHTENED WITH NYLON LOCK NUTS. STAINLESS STEEL TO BE SEPARATED FROM OTHER METALS WITH NEOPRENE WASHERS.

SS5. WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1554.1. AND AS 1554.6 WELDING CONSUMABLES SHALL BE SUITABLE FOR STAINLESS STEEL OR ALLUMINIUM U.N.O. ALL WELDS SHALL BE 3mm C.F.W. SP CATEGORY U.N.O. CPBW SHALL BE SP CATEGORY U.N.O. INSPECTION SHALL BE CARRIED OUT TO AS 1554.1. AND AS 1554.6 ALL GP/SP WELDS SHALL BE 100% VISUALLY SCANNED.
BUTT WELDS SHALL BE COMPLETE PENETRATION WELDS TO AS 1554.

SS6. ALL DETAILS, GAUGE LINES ETC. WHERE NOT SPECIFICALLY SHOWN ARE TO BE IN ACCORDANCE WITH AISC DESIGN CAPACITY TABLES FOR STRUCTURAL STEEL AND AISC STANDARDIZED STRUCTURAL CONNECTIONS. PLATES TO BE 6mm THICK, EX-STANDARD SQUARE EDGE FLATS U.N.O.

SS7. PROVIDE SEAL PLATES TO ALL HOLLOW SECTIONS.

SS8. IT IS THE BUILDERS RESPONSIBILITY TO ENSURE THAT STEELWORK IS SECURELY TEMPORARILY BRACED AS NECESSARY TO STABILISE THE STRUCTURE DURING ERECTION.

SS9. THE BUILDER SHALL PROVIDE ALL CLEATS AND DRILL ALL HOLES NECESSARY FOR FIXING STEEL TO STEEL AND TIMBER TO STEEL WHETHER OR NOT DETAILED ON THE DRAWINGS.

SS10. THE FABRICATION AND ERECTION OF THE STRUCTURAL STEELWORK SHALL BE UNDERTAKEN BY A QUALIFIED PERSON EXPERIENCED IN SUCH SUPERVISION, IN ORDER TO ENSURE THAT ALL REQUIREMENTS OF THE DESIGN ARE MET. ALL BEAMS AND RAFTERS SHALL BE FABRICATED AND ERECTED WITH NATURAL CAMBER UP.

## FORMWORK (FW)

FW1. THE DESIGN, CONSTRUCTION AND PERFORMANCE OF THE FORMWORK AND FALSEWORK IS THE RESPONSIBILITY OF THE BUILDER.

FW2. DESIGN AND CONSTRUCTION AND STRIPPING TIMES SHALL COMPLY WITH AS 3610 AND AS 3600 UNLESS OTHERWISE APPROVED BY THE ENGINEER.

FW3. DURING CONSTRUCTION, SUPPORT PROPPING SHALL BE PROVIDED WHERE LOADS FROM STACKED MATERIALS, FORMWORK AND OTHER SUPPORTED SLABS INDUCE LOADS IN A SLAB OR BEAM WHICH EXCEED THE DESIGN LOAD FOR STRENGTH OR SERVICEABILITY AT THAT AGE ONCE THE NOMINATED 28 DAY STRENGTH HAS BEEN ATTAINED, THESE LOADS SHALL NOT EXCEED THE DESIGN SUPERIMPOSED LOADS SET OUT IN THE GENERAL NOTES.

FW4. IN MULTI-STOREY CONSTRUCTION PROPPING SHALL BE PROVIDED AT LEAST 3 LEVELS BELOW THE FLOOR BEING CAST. PROP REMOVAL IS TO BE PROGRAMMED TO AVOID DISTRESS TO PREVIOUSLY CAST FLOORS. RE-SHORING OR BACK-PROPPING IS SUBJECT TO THE APPROVAL OF THE PROJECT DESIGN ENGINEER.

FW5. THE FORMWORK SHALL BE DESIGNED TO RELY ON NO RESTRAINT OR SUPPORT FROM THE PERMANENT STRUCTURE WITHOUT PRIOR APPROVAL FROM THE PROJECT DESIGN ENGINEER.

FW5. FORMWORK SHALL BE DESIGNED TO ACCOMMODATE MOVEMENTS AND LOAD RE DISTRIBUTION DUE TO POST-TENSIONING.

FW6. WHERE NECESSARY SPECIAL REQUIREMENTS FOR SEQUENCE OF CONCRETE PLACEMENT AND STRIPPING ARE SET OUT ON DRAWINGS.

FW7. DESIGN INFORMATION CONCERNING THE FOUNDATION FORMWORK SHALL BE DETERMINED FROM THE CONDITIONS EXISTING ON SITE AT THE TIME OF CONSTRUCTION. REFER ALSO TO THE GEOTECHNICAL REPORT WHERE AVAILABLE.

FW8. UNLESS NOTED OTHERWISE PROVIDE UPWARD CAMBER TO FORMWORK OF CANTILEVERS OF L/120, WHERE L IS THE SHORTEST PROJECTION BEYOND COLUMN OR WALL FACE, AND TO FORMWORK OF SLABS WHERE NOTED ON PLAN. MAINTAIN THE SLAB AND BEAM DEPTHS SHOWN.

## CHEMICALLY ANCHORED REINFORCEMENT

CAR1. WHERE SHOWN ON THE DRAWINGS REINFORCMENT BARS SHALL BE CHEMICALLY ANCHORED INTO EXISTING CONCRETE AS DESCRIBED BELOW.

CAR2. PERCUSSION DRILL (CORING NOT PERMITTED) A HOLE TO THE CORRECT DIAMETER AND DEPTH FOR THE PARTICULAR SIZE REINFORCING BARS AS TABULATED BELOW, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

| BAR SIZE (Y OR N) | HOLE DIA (mm) | HOLE DEPTH (mm) |
|---|---|---|
| 12 | 16 | 120 |
| 16 | 22 | 150 |
| 20 | 28 | 250 |
| 24 | 32 | 280 |

CAR3. THOROUGHLY CLEAN THE HOLE USING A ROUND WIRE BRUSH AND BLOWOUT ALL DUST.

CAR4. ENSURE HOLE IS CLEAN AND DRY AND INSERT SUFFICIENT HILTI HY 150 RESIN INTO THE BASE OF THE HOLE TO ENSURE THAT WHEN THE BAR IS INSTALLED RESIN APPEARS AT THE FACE OF THE HOLE.

CAR5. IMMEDIATELY INSERT THE REINFORCING BAR INTO THE HOLE BY ROTATING SLOWLY TO FULLY COAT THE BAR WITH RESIN, AND PUSH FULLY INTO THE HOLE.

CAR6. ENSURE BAR IS NOT DISTURBED WHILST RESIN IS CURING. (APPROX. 2 HOURS).

CAR7. DRILLING CONTRACTOR IS TO OBTAIN WRITTEN AUTHORISATION FROM ADJOINING PROPERTY OWNERS BEFORE CARRYING OUT PLACEMENT OF PILING ANCHORS.

## DESIGN SPECIFICATION:

REINFORCEMENT:
BAR - N500 GRADE
STIRRUP - R250 GRADE
MESH - SL500 GRADE - LOW DUCTILITY3

"BS" COVER:
TOP - 45mm
SIDE - 45mm
BTM - 65mm

"C" COVER:
TOP - 65mm
SIDE - 65mm
BTM - 65mm

DAMP PROOF MEMBRANE:
0.2mm POLYETHYLENE FILM CONTINUOUSLY BRANDED "AS2870 CONCRETE UNDERLAY, 0.2mm - HIGH IMPACT RESISTANCE"

SITE CLASSIFICATION: AS 3600
"S" - ADD SULPHATE / DCIA IN FRONT
REFER GEOTECHNICAL REPORT
BY DOUGLAS PARTNERS REF: 84701.00 DATED APRIL 2015

EXPOSURE CLASSIFICATION: AS 3600
B2 - COASTAL F'c = 40MPa (B2) PATHWAYS
C - TIDAL/SPLASH ZONE F'c = 50MPa (C2)

LOADING: AS 1170.1
SHARED PATHWAYS / STAIRS: 3kPa
TRAFFICABLE PATHWAY: 5kPa

## DESIGN REFERENCE STANDARDS:

AS 3600 - CONCRETE STRUCTURES
AS 4100 - STEEL STRUCTURES
AS1170 - STRUCTURAL DESIGN ACTIONS
AS 1012 - CONCRETE TESTING
AS 1289 - SOIL TESTING
AS 1379 - CONCRETE MANUFACTURE
AS 1478 - CONCRETE ADMIXTURES
AS/NZS 4671 - STEEL REINFORCING MATERIALS
AS/NZS 4680 - HOT DIP GALVANIZING (ZINC) COATINGS
AS 1554 - STRUCTURAL STEEL WELDING
AS4673 - STAINLESS STEEL STRUCTURES
AS2312 - GUIDE TO THE PROTECTION OF IRON & STEEL AGAINST EXTERIOR ATMOSPHERIC CORROSION
AS3610 - FORMWORK FOR CONCRETE
AS2156 - WALKING TRACKS
AS1428 - DESIGN FOR ACCESS AND MOBILITY
AS2890 - OFF STREET CAR PARKING

CONCEPT PLANS
NOT FOR CONSTRUCTION

A1

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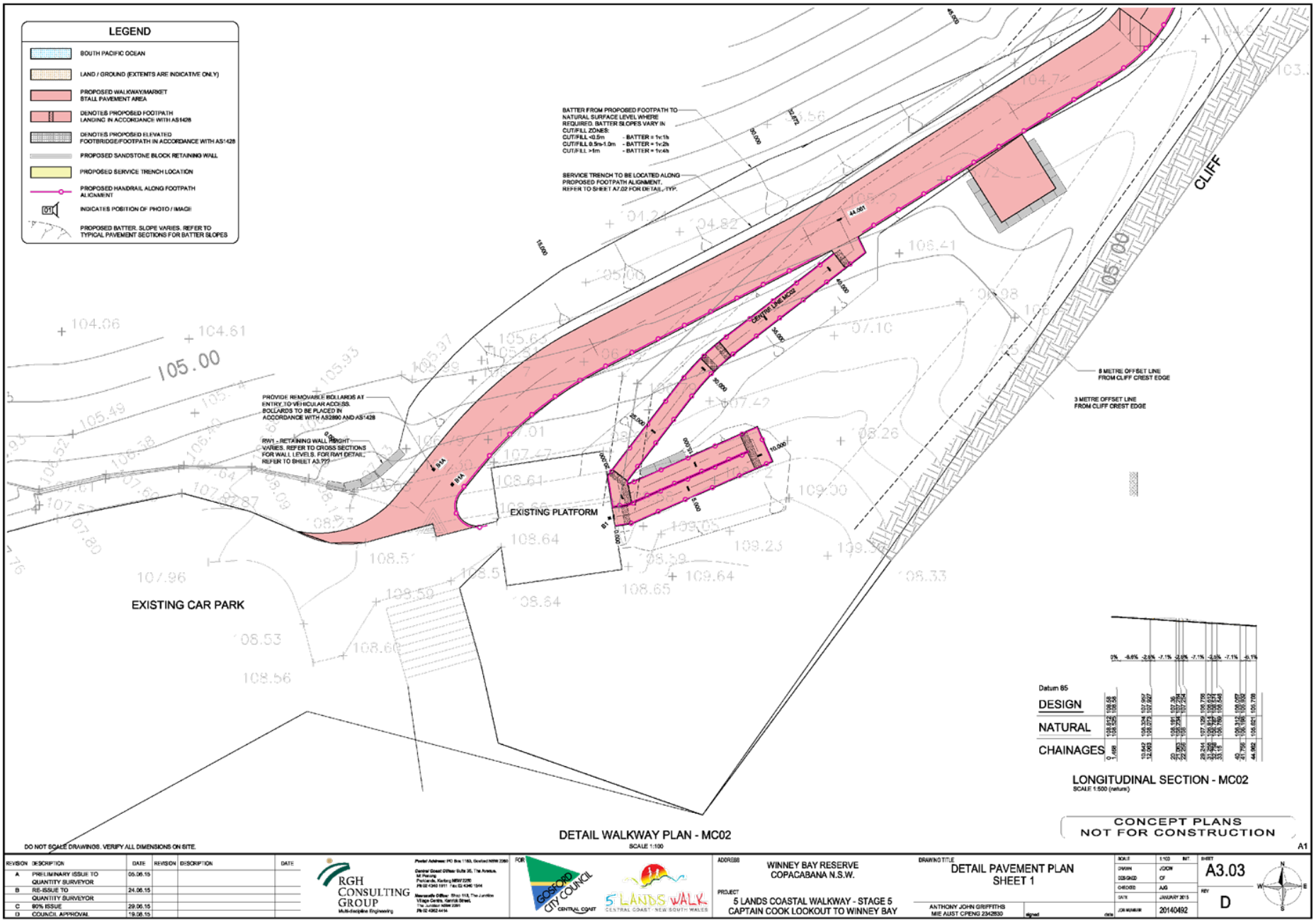
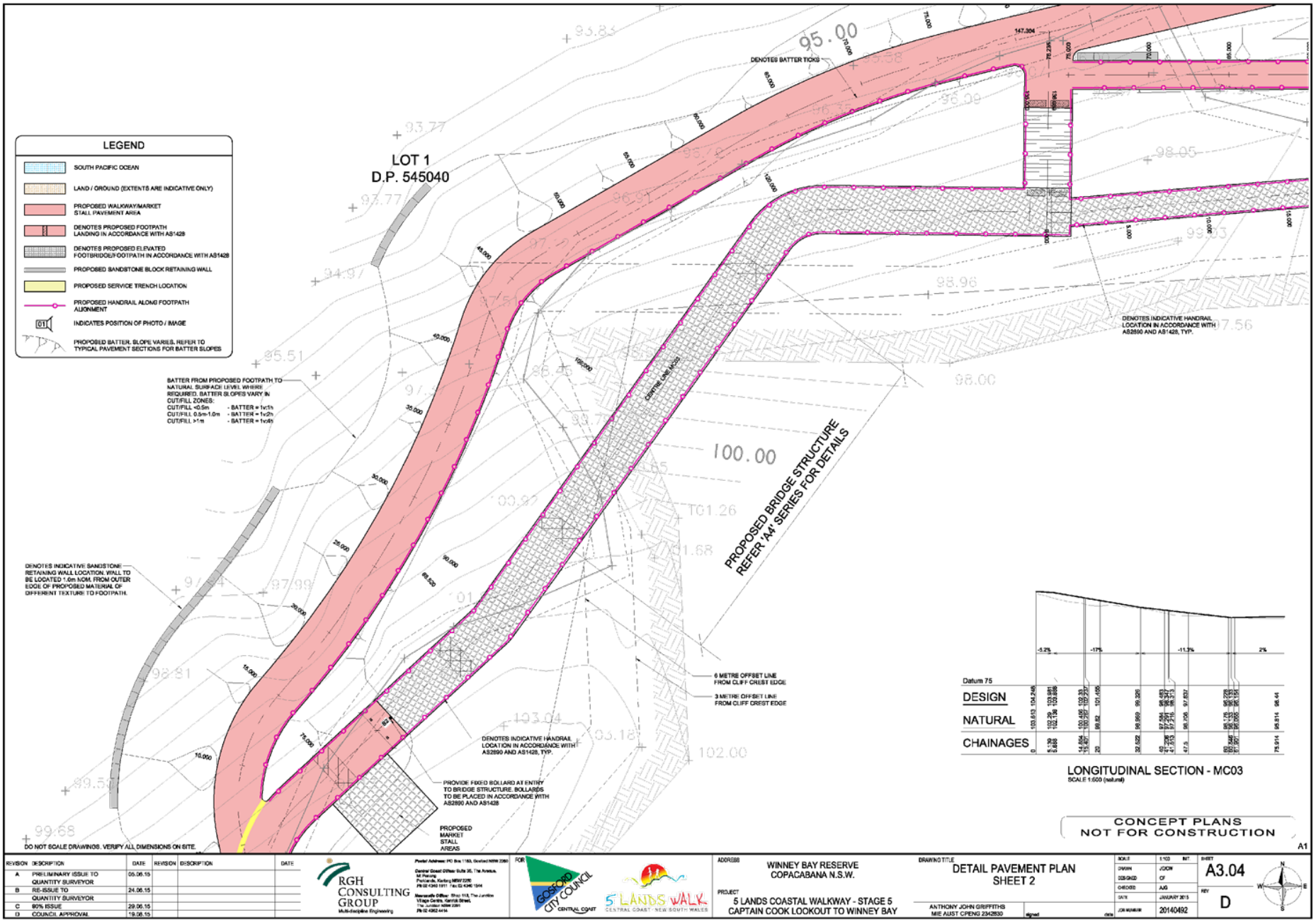
| SHEET | A3.02 |
| REV | D |


LEGEND
SOUTH PACIFIC OCEAN
LAND / GROUND (EXTENTS ARE INDICATIVE ONLY)
PROPOSED WALKWAY/MARKET STALL PAVEMENT AREA
DENOTES PROPOSED FOOTPATH LANDING IN ACCORDANCE WITH AS1428
DENOTES PROPOSED ELEVATED FOOTBRIDGE/FOOTPATH IN ACCORDANCE WITH AS1428
PROPOSED SANDSTONE BLOCK RETAINING WALL
PROPOSED SERVICE TRENCH LOCATION
PROPOSED HANDRAIL ALONG FOOTPATH ALIGNMENT
INDICATES POSITION OF PHOTO / IMAGE
PROPOSED BATTER. SLOPE VARIES. REFER TO TYPICAL PAVEMENT SECTIONS FOR BATTER SLOPES
BATTER FROM PROPOSED FOOTPATH TO NATURAL SURFACE LEVEL WHERE REQUIRED. BATTER SLOPES VARY IN CUT/FILL ZONES:
CUT/FILL <0.5m - BATTER = 1v:1h
CUT/FILL 0.5m-1.0m - BATTER = 1v:2h
CUT/FILL >1m - BATTER = 1v:4h
SERVICE TRENCH TO BE LOCATED ALONG PROPOSED FOOTPATH ALIGNMENT. REFER TO SHEET A7.02 FOR DETAIL, TYP.
PROVIDE REMOVABLE BOLLARDS AT ENTRY TO VEHICULAR ACCESS. BOLLARDS TO BE PLACED IN ACCORDANCE WITH AS2890 AND AS1428
RW1 - RETAINING WALL HEIGHT VARIES. REFER TO CROSS SECTIONS FOR WALL LEVELS. FOR RW1 DETAIL REFER TO SHEET A3.??
EXISTING PLATFORM
EXISTING CAR PARK
CLIFF
8 METRE OFFSET LINE FROM CLIFF CREST EDGE
3 METRE OFFSET LINE FROM CLIFF CREST EDGE
Centre Line MC02
DETAIL WALKWAY PLAN - MC02
SCALE 1:100
Datum 85
DESIGN
NATURAL
CHAINAGES
LONGITUDINAL SECTION - MC02
SCALE 1:500 (return)
CONCEPT PLANS NOT FOR CONSTRUCTION
DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.
A1
REVISION DESCRIPTION DATE
A PRELIMINARY ISSUE TO QUANTITY SURVEYOR 05.06.15
B RE-ISSUE TO QUANTITY SURVEYOR 24.06.15
C 80% ISSUE 29.06.15
D COUNCIL APPROVAL 19.08.15
RGH CONSULTING GROUP
Multi-discipline Engineering
FOR GOSFORD CITY COUNCIL CENTRAL COAST
5 LANDS WALK CENTRAL COAST · NEW SOUTH WALES
ADDRESS WINNEY BAY RESERVE COPACABANA N.S.W.
PROJECT 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY
DRAWING TITLE DETAIL PAVEMENT PLAN SHEET 1
ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830
SCALE 1:100 (A1)
DRAWN JOON
DESIGNED CF
CHECKED AJG
DATE JANUARY 2015
JOB NUMBER 20140492
SHEET A3.03
REV D


LEGEND
SOUTH PACIFIC OCEAN
LAND / GROUND (EXTENTS ARE INDICATIVE ONLY)
PROPOSED WALKWAY/MARKET STALL PAVEMENT AREA
DENOTES PROPOSED FOOTPATH LANDING IN ACCORDANCE WITH AS1428
DENOTES PROPOSED ELEVATED FOOTBRIDGE/FOOTPATH IN ACCORDANCE WITH AS1428
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PROPOSED SERVICE TRENCH LOCATION
PROPOSED HANDRAIL ALONG FOOTPATH ALIGNMENT
INDICATES POSITION OF PHOTO / IMAGE
PROPOSED BATTER. SLOPE VARIES, REFER TO TYPICAL PAVEMENT SECTIONS FOR BATTER SLOPES
LOT 1
D.P. 545040
DENOTES BATTER TICKS
DENOTES INDICATIVE HANDRAIL LOCATION IN ACCORDANCE WITH AS2890 AND AS1428, TYP.
BATTER FROM PROPOSED FOOTPATH TO NATURAL SURFACE LEVEL WHERE REQUIRED, BATTER SLOPES VARY IN CUT/FILL ZONES:
CUT/FILL <0.5m - BATTER = 1v1h
CUT/FILL 0.5m-1.0m - BATTER = 1v2h
CUT/FILL >1m - BATTER = 1v4h
PROPOSED BRIDGE STRUCTURE REFER 'A4' SERIES FOR DETAILS
DENOTES INDICATIVE SANDSTONE RETAINING WALL LOCATION. WALL TO BE LOCATED 1.0m NOM. FROM OUTER EDGE OF PROPOSED MATERIAL OF DIFFERENT TEXTURE TO FOOTPATH.
6 METRE OFFSET LINE FROM CLIFF CREST EDGE
3 METRE OFFSET LINE FROM CLIFF CREST EDGE
PROVIDE FIXED BOLLARD AT ENTRY TO BRIDGE STRUCTURE. BOLLARDS TO BE PLACED IN ACCORDANCE WITH AS2890 AND AS1428
PROPOSED MARKET STALL AREAS
Datum 75
DESIGN
NATURAL
CHAINAGES
LONGITUDINAL SECTION - MC03
SCALE 1:500 (natural)
CONCEPT PLANS NOT FOR CONSTRUCTION
DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.
A1
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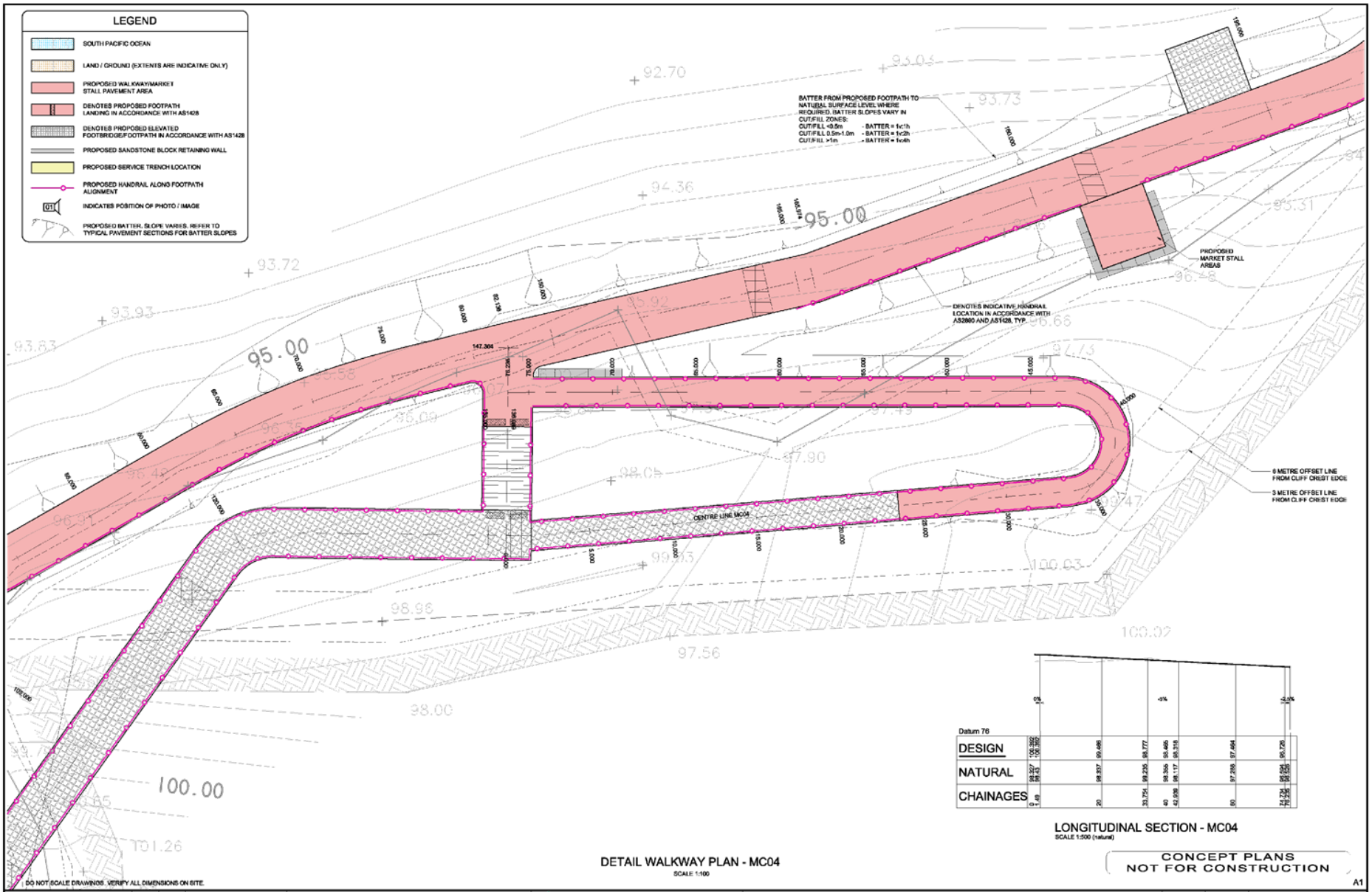
Multi-discipline Engineering
GOSFORD CITY COUNCIL
CENTRAL COAST
5 LANDS WALK
CENTRAL COAST · NEW SOUTH WALES
ADDRESS
WINNEY BAY RESERVE
COPACABANA N.S.W.
PROJECT
5 LANDS COASTAL WALKWAY - STAGE 5
CAPTAIN COOK LOOKOUT TO WINNEY BAY
DRAWING TITLE
DETAIL PAVEMENT PLAN
SHEET 2
ANTHONY JOHN GRIFFITHS
MIE AUST CPENG 2342830
SCALE 1:100
DRAWN JOON
DESIGNED CF
CHECKED AJG
DATE JANUARY 2015
JOB NUMBER 20140492
SHEET A3.04
REV D


LEGEND
SOUTH PACIFIC OCEAN
LAND / GROUND (EXTENTS ARE INDICATIVE ONLY)
PROPOSED WALKWAY/MARKET STALL PAVEMENT AREA
DENOTES PROPOSED FOOTPATH LANDING IN ACCORDANCE WITH AS1428
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PROPOSED SANDSTONE BLOCK RETAINING WALL
PROPOSED SERVICE TRENCH LOCATION
PROPOSED HANDRAIL ALONG FOOTPATH ALIGNMENT
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CUT/FILL >1m - BATTER = 1v:4h
PROPOSED MARKET STALL AREAS
DENOTES INDICATIVE HANDRAIL LOCATION IN ACCORDANCE WITH AS2890 AND AS1428, TYP.
CENTRE LINE MC04
0 METRE OFFSET LINE FROM CLIFF CREST EDGE
3 METRE OFFSET LINE FROM CLIFF CREST EDGE
95.00
100.00
Datum 76
DESIGN
NATURAL
CHAINAGES
LONGITUDINAL SECTION - MC04
SCALE 1:500 (natural)
DETAIL WALKWAY PLAN - MC04
SCALE 1:100
CONCEPT PLANS NOT FOR CONSTRUCTION
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CENTRAL COAST · NEW SOUTH WALES
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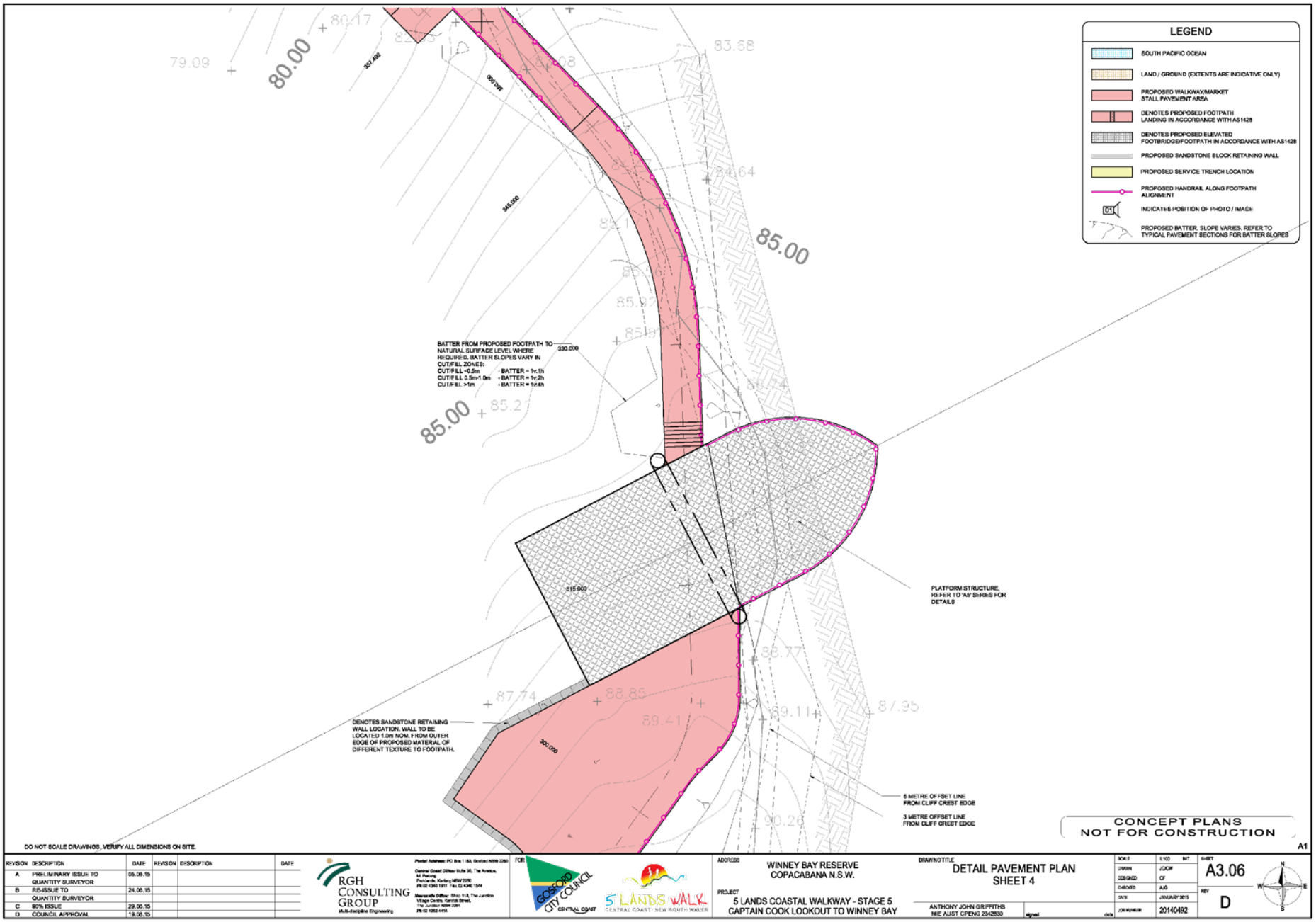
COPACABANA N.S.W.
PROJECT
5 LANDS COASTAL WALKWAY - STAGE 5
CAPTAIN COOK LOOKOUT TO WINNEY BAY
DRAWING TITLE
DETAIL PAVEMENT PLAN
SHEET 3
ANTHONY JOHN GRIFFITHS
MIE AUST CPENG 2342830
SCALE 1:100
DRAWN JOON
DESIGNED CF
CHECKED AJG
DATE JANUARY 2015
JOB NUMBER 20140492
SHEET A3.05
REV D


LEGEND
SOUTH PACIFIC OCEAN
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6 METRE OFFSET LINE FROM CLIFF CREST EDGE
3 METRE OFFSET LINE FROM CLIFF CREST EDGE
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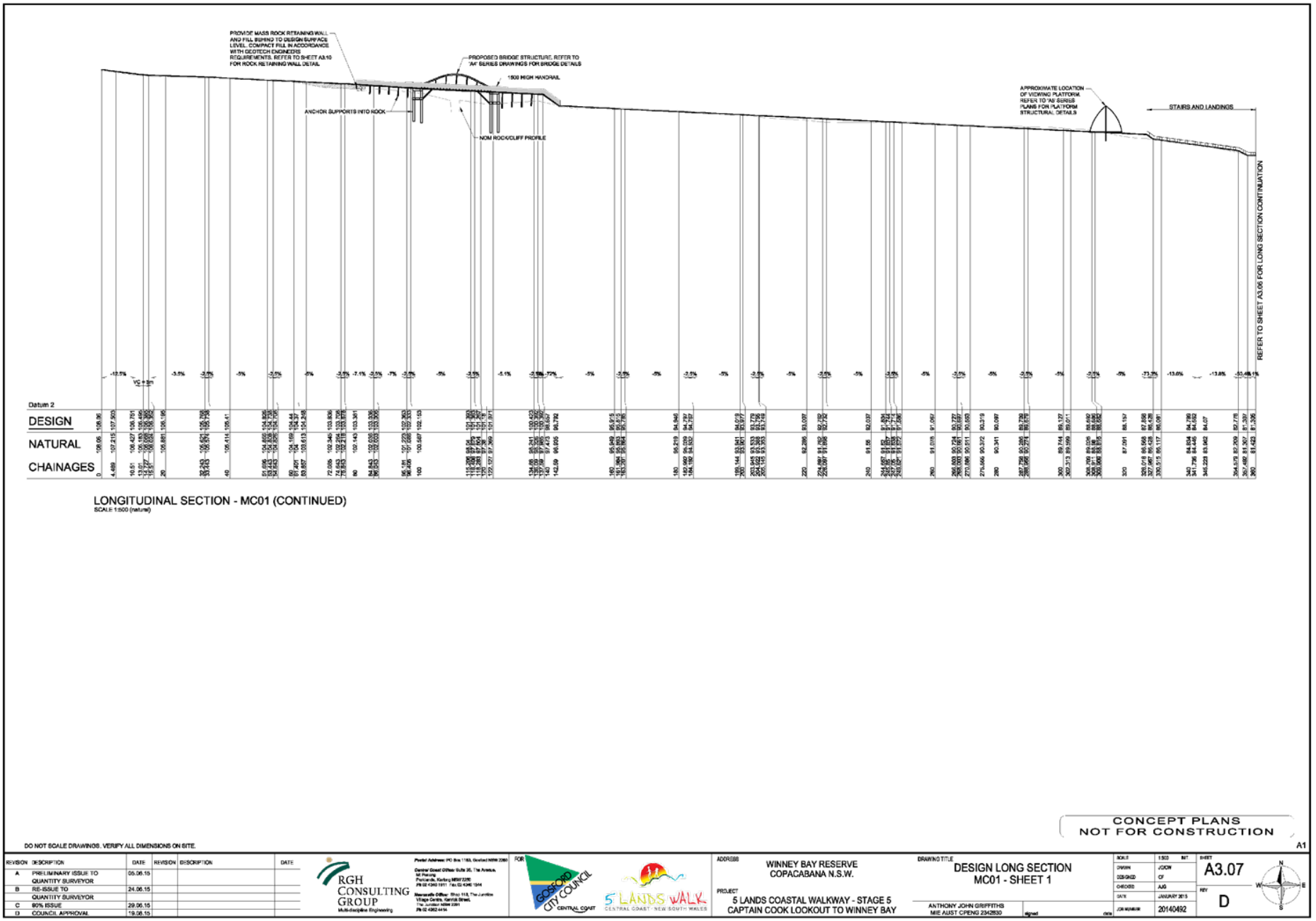
PROJECT
5 LANDS COASTAL WALKWAY - STAGE 5
CAPTAIN COOK LOOKOUT TO WINNEY BAY
DRAWING TITLE
DETAIL PAVEMENT PLAN
SHEET 4
ANTHONY JOHN GRIFFITHS
MIE AUST CPENG 2342830
SCALE 1:100 @A1
DRAWN JOON
DESIGNED CF
CHECKED AJG
DATE JANUARY 2015
JOB NUMBER 20140492
SHEET A3.06
REV D




LONGITUDINAL SECTION - MC01 (CONTINUED)
SCALE: 1:500 (natural)

CONCEPT PLANS
NOT FOR CONSTRUCTION

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A1

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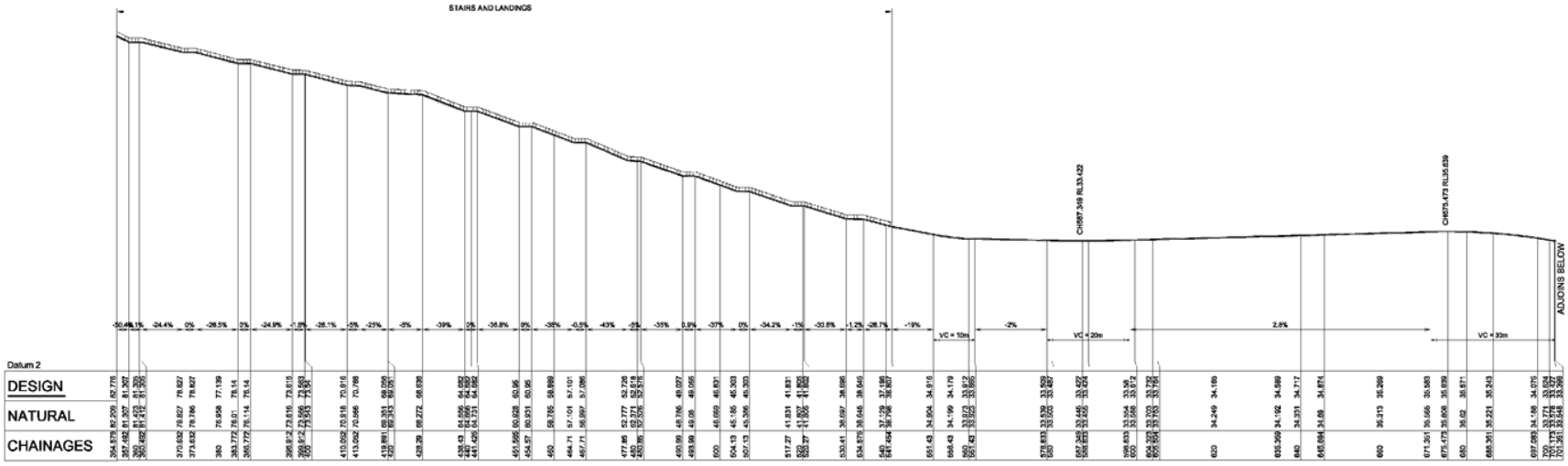
Multi-discipline Engineering

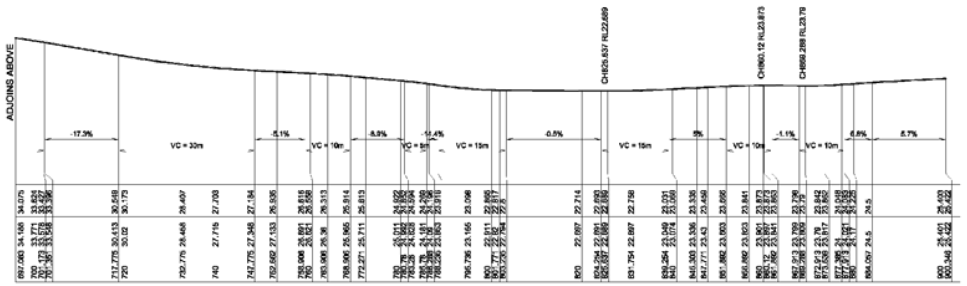
FOR GOSFORD CITY COUNCIL CENTRAL COAST
5 LANDS WALK CENTRAL COAST · NEW SOUTH WALES

ADDRESS: WINNEY BAY RESERVE COPACABANA N.S.W.
PROJECT: 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY
DRAWING TITLE: DESIGN LONG SECTION MC01 - SHEET 1
ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830

| | |
|---|---|
| SCALE | 1:500 |
| DRAWN | JOON |
| DESIGNED | CF |
| CHECKED | AJG |
| DATE | JANUARY 2015 |
| JOB NUMBER | 20140492 |
| SHEET | A3.07 |
| REV | D |




LONGITUDINAL SECTION - MC01 (CONTINUED)
SCALE 1:500 (natural)




CONCEPT PLANS
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Multi-discipline Engineering

FOR GOSFORD CITY COUNCIL CENTRAL COAST
5 LANDS WALK CENTRAL COAST · NEW SOUTH WALES

ADDRESS: WINNEY BAY RESERVE COPACABANA N.S.W.

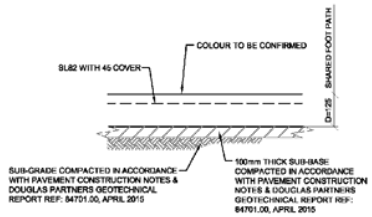
PROJECT: 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY

DRAWING TITLE: DESIGN LONG SECTION MC01 - SHEET 2

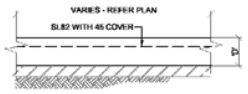
ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830

| | |
|---|---|
| SCALE | 1:500 INT |
| DRAWN | JOON |
| DESIGNED | CF |
| CHECKED | AJG |
| DATE | JANUARY 2015 |
| JOB NUMBER | 20140492 |

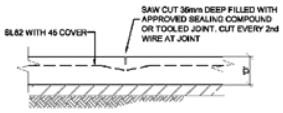
SHEET A3.08
REV D



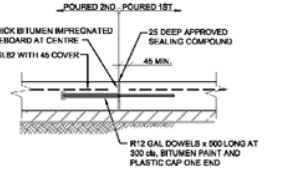

SHARED / FOOTPATH SLAB
SCALE 1:20



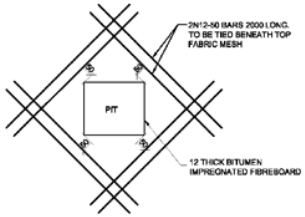

SHARED / FOOTPATH DETAIL
SCALE 1:20



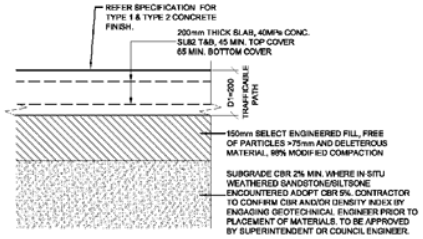

SHARED / FOOTPATH TOOL JOINT (TJ)
SCALE 1:20



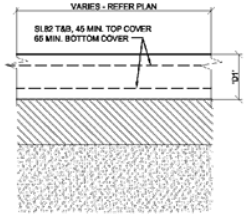

SHARED / FOOTPATH EXPANSION JOINT (EJ)
SCALE 1:20



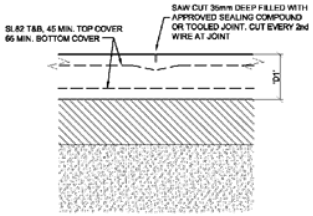

TYPICAL STORMWATER PIT (TRIMMER BARS) DETAIL
N.T.S.



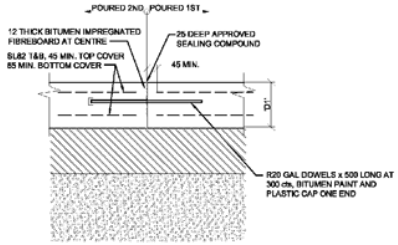

TRAFFICABLE PATH SLAB
SCALE 1:20




TRAFFICABLE PATH DETAIL
SCALE 1:20

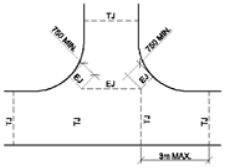



TRAFFICABLE PATH TOOL JOINT (TJ)
SCALE 1:20

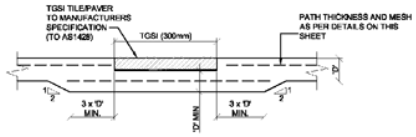



TRAFFICABLE PATH EXPANSION JOINT (EJ)
SCALE 1:20

CONCRETE PAVEMENT TYPES 1 & 2
(REFER SPECIFICATION FOR FINISH TYPES)




TYPICAL PATH JOINTING DETAIL AT INTERSECTIONS
N.T.S.




TACTILE GROUND SURFACE INDICATOR (TGSI) PATH INSERT
SCALE 1:20

PROVIDE AT ALL RAMP AND STAIR LANDINGS IN ACCORDANCE WITH TYPICAL STAIR SECTION ON SHEET A3.12 AND RAMP SECTION ON SHEET A3.11


TYPICALSHARED PATH JOINTING DETAIL
N.T.S.

CONCEPT PLANS
NOT FOR CONSTRUCTION

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A1

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Multi-discipline Engineering

FOR GOSFORD CITY COUNCIL CENTRAL COAST
5 LANDS WALK CENTRAL COAST · NEW SOUTH WALES

ADDRESS: WINNEY BAY RESERVE COPACABANA N.S.W.

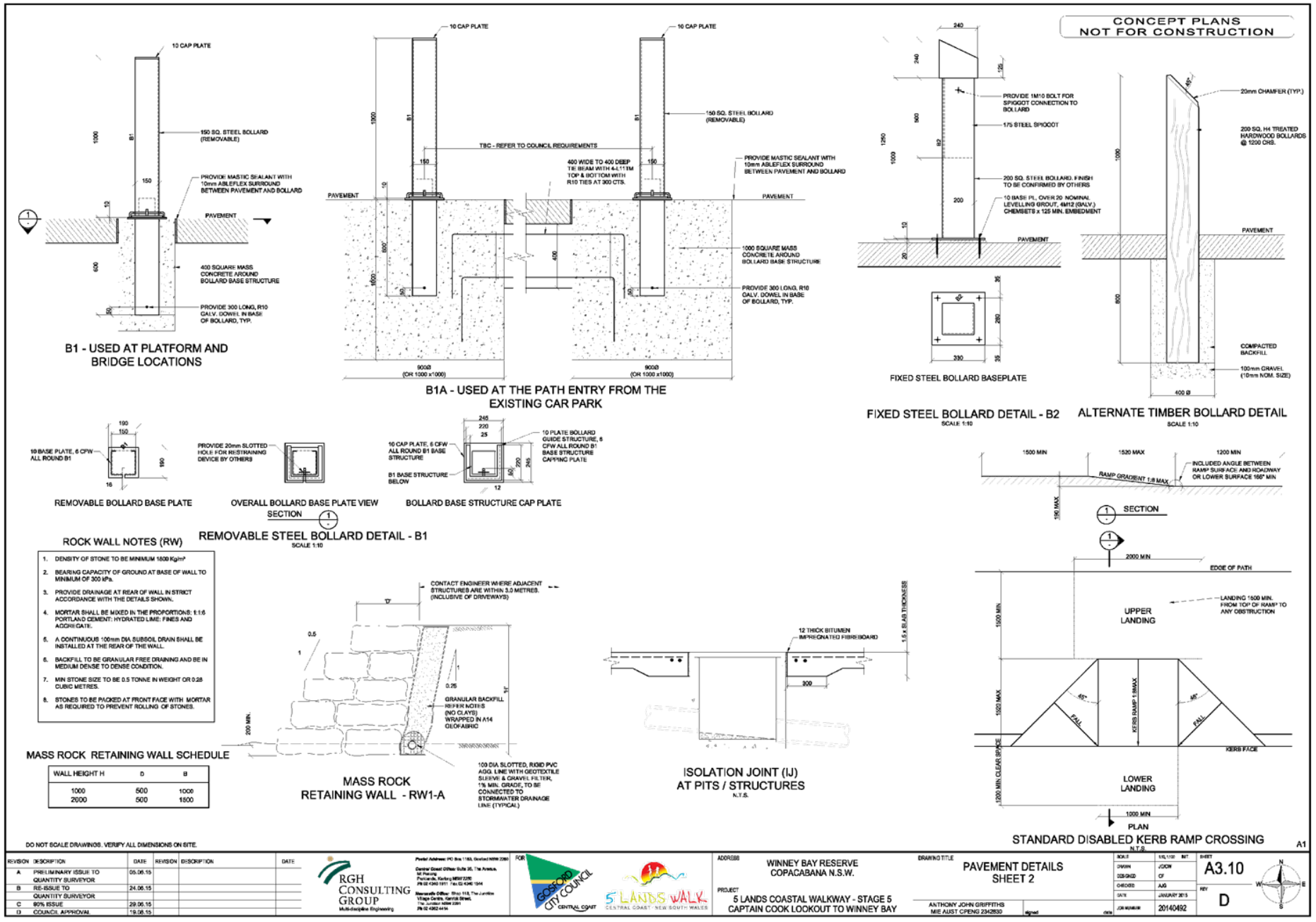
PROJECT: 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY

DRAWING TITLE: PAVEMENT DETAILS SHEET 1

ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830

| | |
|---|---|
| SCALE | 1:10 @ A1 |
| DRAWN | JOON |
| DESIGNED | CF |
| CHECKED | AJG |
| DATE | JANUARY 2015 |
| JOB NUMBER | 20140492 |

SHEET A3.09
REV D


CONCEPT PLANS
NOT FOR CONSTRUCTION
B1 - USED AT PLATFORM AND BRIDGE LOCATIONS
B1A - USED AT THE PATH ENTRY FROM THE EXISTING CAR PARK
FIXED STEEL BOLLARD BASEPLATE
FIXED STEEL BOLLARD DETAIL - B2
SCALE 1:10
ALTERNATE TIMBER BOLLARD DETAIL
SCALE 1:10
REMOVABLE BOLLARD BASE PLATE
OVERALL BOLLARD BASE PLATE VIEW
BOLLARD BASE STRUCTURE CAP PLATE
SECTION
REMOVABLE STEEL BOLLARD DETAIL - B1
SCALE 1:10
ROCK WALL NOTES (RW)
1. DENSITY OF STONE TO BE MINIMUM 1800 Kg/m³
2. BEARING CAPACITY OF GROUND AT BASE OF WALL TO MINIMUM OF 300 kPa.
3. PROVIDE DRAINAGE AT REAR OF WALL IN STRICT ACCORDANCE WITH THE DETAILS SHOWN.
4. MORTAR SHALL BE MIXED IN THE PROPORTIONS: 1:1:6 PORTLAND CEMENT: HYDRATED LIME: FINES AND AGGREGATE.
5. A CONTINUOUS 100mm DIA SUBSOIL DRAIN SHALL BE INSTALLED AT THE REAR OF THE WALL.
6. BACKFILL TO BE GRANULAR FREE DRAINING AND BE IN MEDIUM DENSE TO DENSE CONDITION.
7. MIN STONE SIZE TO BE 0.5 TONNE IN WEIGHT OR 0.28 CUBIC METRES.
8. STONES TO BE PACKED AT FRONT FACE WITH MORTAR AS REQUIRED TO PREVENT ROLLING OF STONES.
MASS ROCK RETAINING WALL SCHEDULE
WALL HEIGHT H | D | B
1000 | 500 | 1000
2000 | 500 | 1500
MASS ROCK RETAINING WALL - RW1-A
ISOLATION JOINT (IJ) AT PITS / STRUCTURES
N.T.S.
STANDARD DISABLED KERB RAMP CROSSING
N.T.S.
SECTION
PLAN
UPPER LANDING
LOWER LANDING
EDGE OF PATH
KERB FACE
DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.
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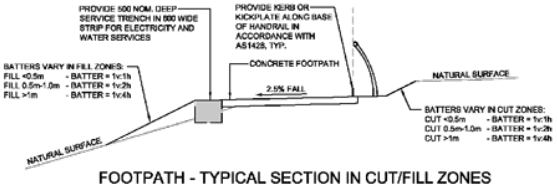
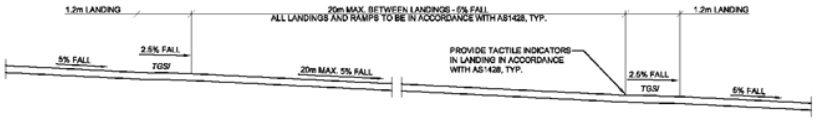
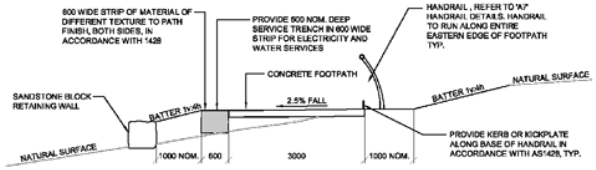
DRAWING TITLE PAVEMENT DETAILS SHEET 2
ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830
SCALE
DRAWN JOON
DESIGNED CF
CHECKED AJG
DATE JANUARY 2015
JOB NUMBER 20140492
SHEET A3.10
REV D
A1



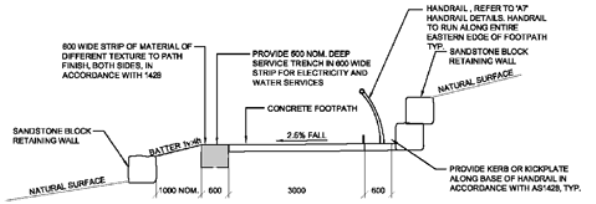

FOOTPATH - TYPICAL SECTION IN CUT/FILL ZONES
SCALE 1:100



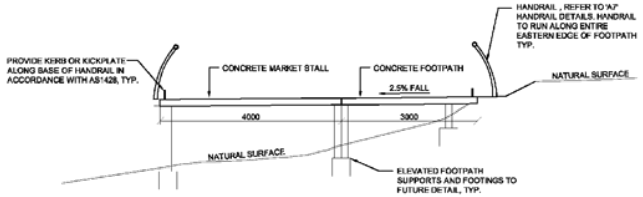

TYPICAL LANDING DETAILS
SCALE 1:100



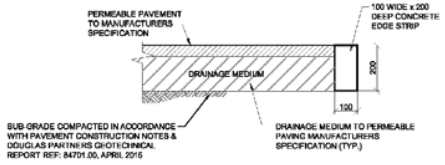

FOOTPATH - TYPICAL SECTION WHERE RETAINING (LOW SIDE)
SCALE 1:100



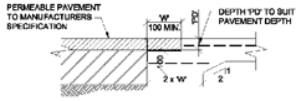

FOOTPATH - TYPICAL SECTION WHERE RETAINING (HIGH SIDE)
SCALE 1:100



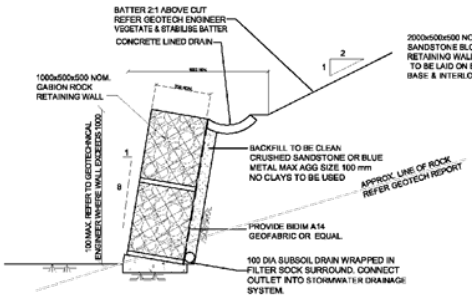

TYPICAL SECTION WHERE FOOTPATH/MARKET STALL SUSPENDED
SCALE 1:100



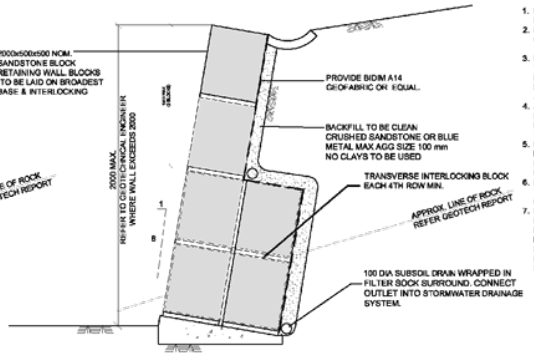

PERMEABLE PAVEMENT EDGE DETAIL (OPTIONAL)
SCALE 1:20




ISOLATION JOINT (IJ) AT PAVING INTERFACE
SCALE 1:20




RETAINING WALL (RW2) GABION ROCK OPTION
SCALE 1:20




RETAINING WALL MASS BLOCK OPTION
SCALE 1:20

ROCK WALL NOTES
NOTE:

1. DENSITY OF STONE TO BE MINIMUM 1800 kg/m³
2. BEARING CAPACITY OF GROUND AT BASE OF WALL TO BE A MINIMUM OF 600 kPa.
3. MORTAR SHALL BE MIXED IN THE PROPORTIONS: 1:1:6 PORTLAND CEMENT: HYDRATED LIME: FINES AND AGGREGATE.
4. A CONTINUOUS 100mm DIA SUBSOIL DRAIN SHALL BE INSTALLED AT THE REAR OF THE WALL.
5. BACKFILL TO BE GRANULAR FREE DRAINING AND BE IN MEDIUM DENSE TO DENSE CONDITION.
6. MIN STONE SIZE TO BE 0.9 TONNE IN WEIGHT OR 0.5 CUBIC METRES.
7. STONES TO BE LAID ON BROADEST BASE INTERLOCKING AT FRONT FACE TO BE PACKED WITH MORTAR AS REQUIRED TO PREVENT ROLLING OF STONES.

CONCEPT PLANS
NOT FOR CONSTRUCTION

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.

A1

| REVISION | DESCRIPTION | DATE | REVISION | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| A | PRELIMINARY ISSUE TO QUANTITY SURVEYOR | 05.06.15 | | | |
| B | RE-ISSUE TO QUANTITY SURVEYOR | 24.06.15 | | | |
| C | 90% ISSUE | 29.06.15 | | | |
| D | COUNCIL APPROVAL | 19.06.15 | | | |

RGH CONSULTING GROUP
Multidiscipline Engineering

Postal Address: PO Box 1180, Gosford NSW 2250
Central Coast Office: Suite 35, The Avenue, Mt Penang, Parklands, Kariong NSW 2250
Ph 02 4340 7015 Fax 02 4340 1044
Newcastle Office: Shop 115, The Junction Village Centre, Kenrick Street, The Junction NSW 2291
Ph 02 4062 8414

FOR GOSFORD CITY COUNCIL CENTRAL COAST
5 LANDS WALK CENTRAL COAST · NEW SOUTH WALES

ADDRESS: WINNEY BAY RESERVE COPACABANA N.S.W.

PROJECT: 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY

DRAWING TITLE: PAVEMENT DETAILS SHEET 3

ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830

| | |
|---|---|
| SCALE | 1:10 / N/T |
| DRAWN | JG/CW |
| DESIGNED | CF |
| CHECKED | AJG |
| DATE | JANUARY 2015 |
| JOB NUMBER | 20140492 |

SHEET: A3.11
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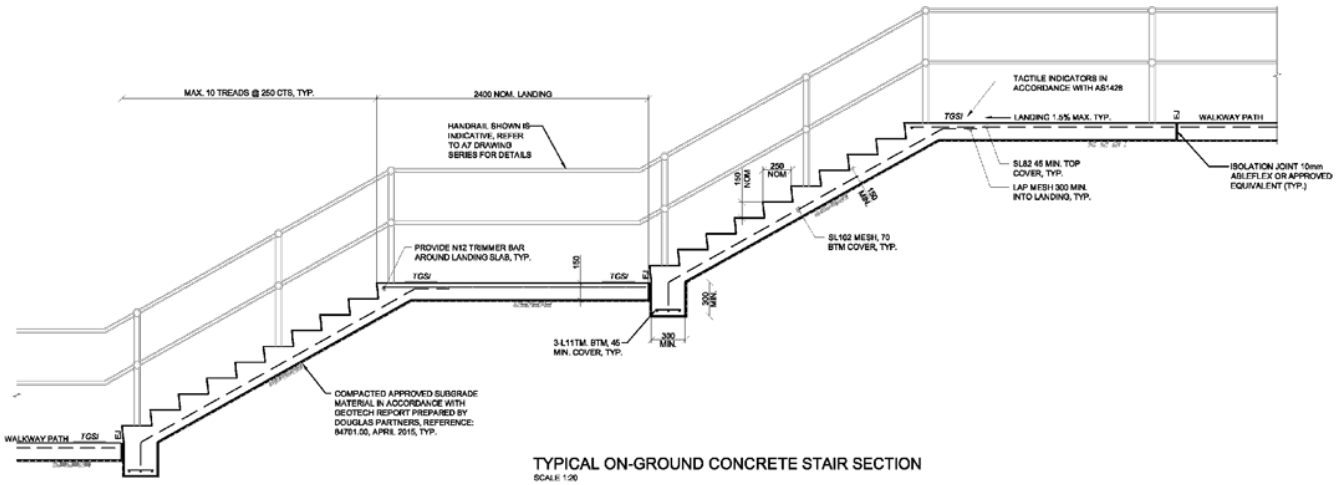



## TYPICAL ON-GROUND CONCRETE STAIR SECTION

SCALE 1:20

NOTES:
1. MAXIMUM NUMBER OF STEPS PER FLIGHT = 10 STEPS.
2. MINIMUM NUMBER OF STEPS PER FLIGHT - 2 STEPS.
3. HAND RAILING SHALL BE PROVIDED WHERE THERE ARE MORE THAN 4 RISERS IN ON FLIGHT. PROVIDE ON ONE SIDE ONLY.
4. HANDRAILING TO BE HOT DIPPED GALVANISED.

CONCEPT PLANS
NOT FOR CONSTRUCTION

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.

A1

| REVISION | DESCRIPTION | DATE | REVISION | DESCRIPTION | DATE |
|---|---|---|---|---|---|
| A | RE-ISSUE TO QUANTITY SURVEYOR | 24.06.15 | | | |
| B | 90% ISSUE | 29.06.15 | | | |
| C | COUNCIL APPROVAL | 19.08.15 | | | |

RGH CONSULTING GROUP
Multi-discipline Engineering

FOR GOSFORD CITY COUNCIL CENTRAL COAST
5 LANDS WALK CENTRAL COAST · NEW SOUTH WALES

ADDRESS: WINNEY BAY RESERVE COPACABANA N.S.W.

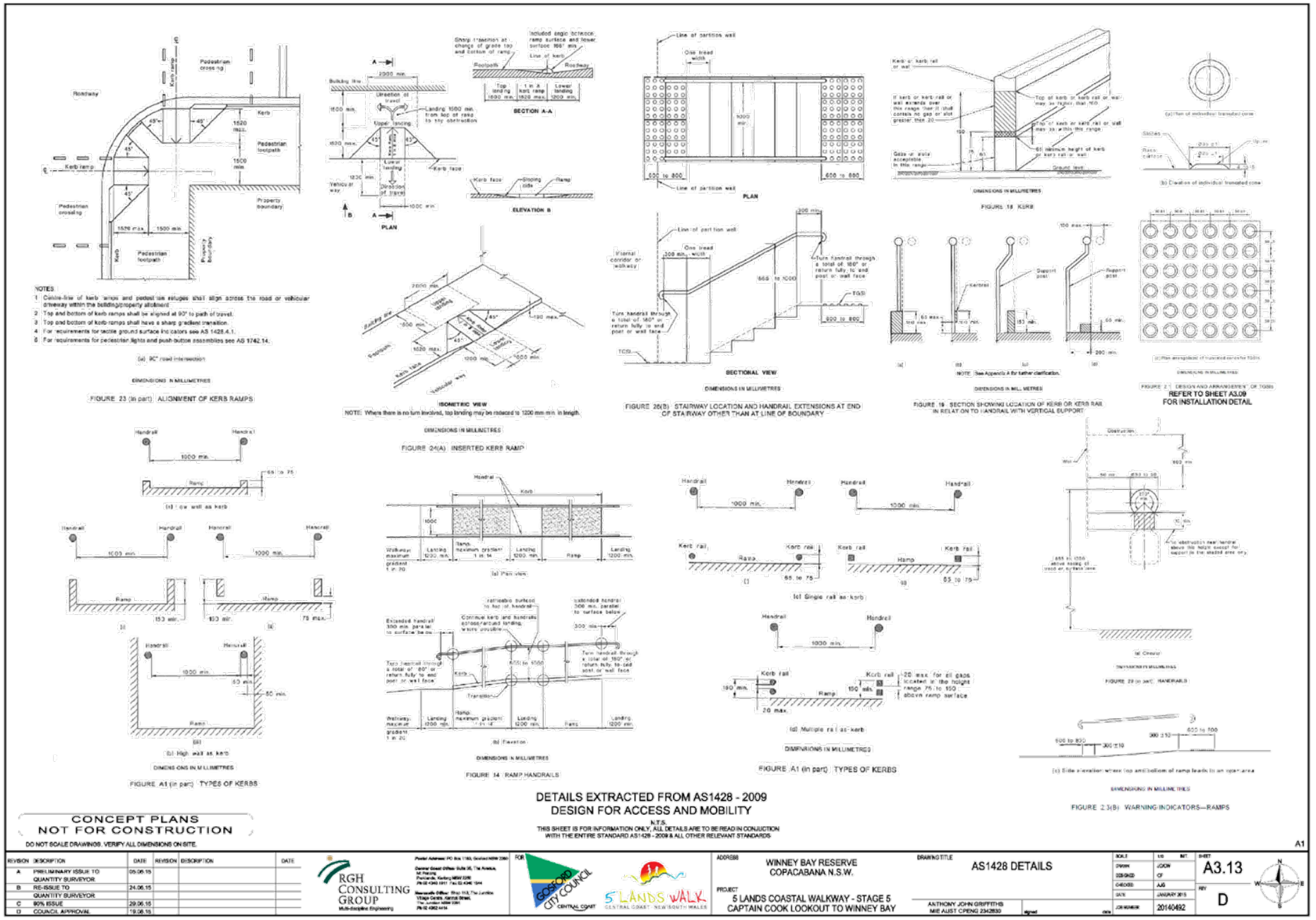
PROJECT: 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY

DRAWING TITLE: PAVEMENT DETAILS SHEET 4

ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830 signed date

| | |
|---|---|
| SCALE | 1:10 @ A1 |
| DRAWN | JOON |
| DESIGNED | CF |
| CHECKED | AJG |
| DATE | JANUARY 2015 |
| JOB NUMBER | 20140492 |

SHEET A3.12
REV C


NOTES
1 Centre-line of kerb ramps and pedestrian refuges shall align across the road or vehicular driveway within the building/property allotment.
2 Top and bottom of kerb ramps shall be aligned at 90° to path of travel.
3 Top and bottom of kerb ramps shall have a sharp gradient transition.
4 For requirements for tactile ground surface indicators see AS 1428.4.1.
5 For requirements for pedestrian lights and push-button assemblies see AS 1742.14.
(a) 90° road intersection
DIMENSIONS IN MILLIMETRES
FIGURE 23 (in part) ALIGNMENT OF KERB RAMPS
SECTION A-A
ELEVATION B
PLAN
ISOMETRIC VIEW
NOTE: Where there is no turn involved, top landing may be reduced to 1200 mm min in length.
DIMENSIONS IN MILLIMETRES
FIGURE 24(A) INSERTED KERB RAMP
PLAN
SECTIONAL VIEW
DIMENSIONS IN MILLIMETRES
FIGURE 26(B) STAIRWAY LOCATION AND HANDRAIL EXTENSIONS AT END OF STAIRWAY OTHER THAN AT LINE OF BOUNDARY
DIMENSIONS IN MILLIMETRES
FIGURE 18 KERB
NOTE: See Appendix A for further clarification.
DIMENSIONS IN MILLIMETRES
FIGURE 19 SECTION SHOWING LOCATION OF KERB OR KERB RAIL IN RELATION TO HANDRAIL WITH VERTICAL SUPPORT
REFER TO SHEET A3.09
FOR INSTALLATION DETAIL
(a) Low wall as kerb
(b) High wall as kerb
DIMENSIONS IN MILLIMETRES
FIGURE A1 (in part) TYPES OF KERBS
(a) Plan view
(b) Elevation
DIMENSIONS IN MILLIMETRES
FIGURE 14 RAMP HANDRAILS
(a) Single rail as kerb
(b) Multiple rail as kerb
DIMENSIONS IN MILLIMETRES
FIGURE A1 (in part) TYPES OF KERBS
(a) Clevis
DIMENSIONS IN MILLIMETRES
FIGURE 2.3(B) WARNING INDICATORS—RAMPS
(c) Side elevation where top and bottom of ramp leads to an open area
DIMENSIONS IN MILLIMETRES
CONCEPT PLANS
NOT FOR CONSTRUCTION
DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE.
DETAILS EXTRACTED FROM AS1428 - 2009
DESIGN FOR ACCESS AND MOBILITY
N.T.S.
THIS SHEET IS FOR INFORMATION ONLY. ALL DETAILS ARE TO BE READ IN CONJUCTION WITH THE ENTIRE STANDARD AS1428 - 2009 & ALL OTHER RELEVANT STANDARDS
A1
REVISION DESCRIPTION DATE
A PRELIMINARY ISSUE TO QUANTITY SURVEYOR 05.06.15
B RE-ISSUE TO QUANTITY SURVEYOR 24.06.15
C 90% ISSUE 29.06.15
D COUNCIL APPROVAL 19.08.15
RGH CONSULTING GROUP
Multi-discipline Engineering
GOSFORD CITY COUNCIL
5 LANDS WALK
CENTRAL COAST NEW SOUTH WALES
ADDRESS WINNEY BAY RESERVE COPACABANA N.S.W.
PROJECT 5 LANDS COASTAL WALKWAY - STAGE 5 CAPTAIN COOK LOOKOUT TO WINNEY BAY
DRAWING TITLE AS1428 DETAILS
ANTHONY JOHN GRIFFITHS MIE AUST CPENG 2342830
SCALE
DRWN JGON
DES/CHKD CF
CHECKED AJG
DATE JANUARY 2015
JOB NUMBER 20140492
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# Appendix B

Media release

28 September 2018

**Re-exhibition of clifftop pathway plans at Winney Bay**

Central Coast Council is inviting the community to provide feedback on the design of the Winney Bay Clifftop Walk that will lead from Captain Cook Lookout to Winney Bay Reserve.

The draft concept plans for the $4.6million state government funded project were originally publicly exhibited by the former Gosford City Council in 2011, and incorporate a 3 metre-wide clifftop pathway, bridge and lookout.

Mayor Jane Smith said that Council have listened to concerns and agreed to re-exhibit the plans to ensure the community could have a say in the final design of the iconic walkway.

"In April, I attended a public meeting at Copacabana to discuss current and future plans for the walkway and it was clear that the community wanted more of a say with regards to this project," Mayor Smith said.

"The community wants to see these plans and have a say in the design and we will give them this opportunity.

"Protecting and enhancing our natural environment is a key priority for Council as well as creating recreational and tourism opportunities.

"I can assure residents that Council is already acting on these priorities, including commencing an environmental assessment for the project and developing a weed management and bush regeneration plan for the whole of the Winney Bay Reserve.

"We also want to ensure that the project acknowledges the original inhabitants of the land in an appropriate manner by considering elements such as interpretive signage and the use of culturally significant endemic species."

Council will also be hosting a drop-in information session at Copacabana SLSC on Thursday 4 October from 3.30pm until 7.30pm.

On 23 June 2018, the NSW government announced a $4.6 million grant to construct the part of the Winney Bay Cliff Top Walk between Captain Cook Lookout and the stairway. The draft concept plans for stage two include:

- a bridge across the coastal ravine that references the annual whale migration
- a lookout that faces the rising sun on the first day after the Winter Solstice
- multi-use spaces along the Cliff Top Walk that provides for uses such as local events, exhibitions and weddings.

In August 2018, Council completed the first stage of the upgrade, which included a 510 metre set of stairs and pathway linking with the existing fire trail at the north western end of the reserve. The

project was enabled with the help of an $875,000 grant contribution through the Federal Government Improving Your Local Parks and Environment Program.

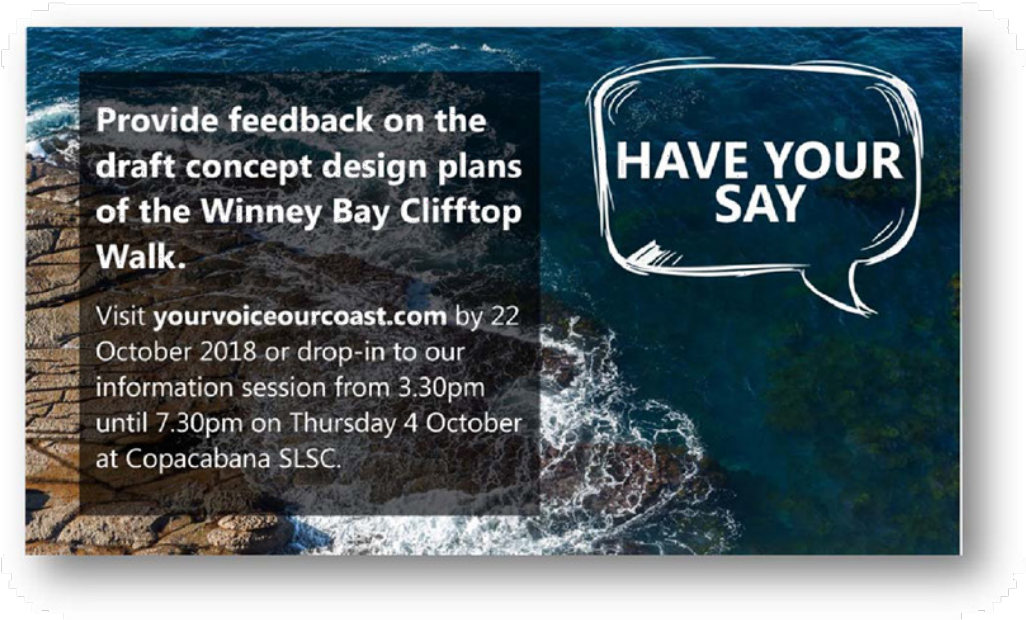
To view the plans and make a submission, go to yourvoiceourcoast.com before 22 October 2018. Consideration of all community feedback will be given in finalising the plans prior to commencement of construction.

# Appendix C

Advertising and publications

Central Coast Express Advocate – 27 September 2018

Customer Service Slide

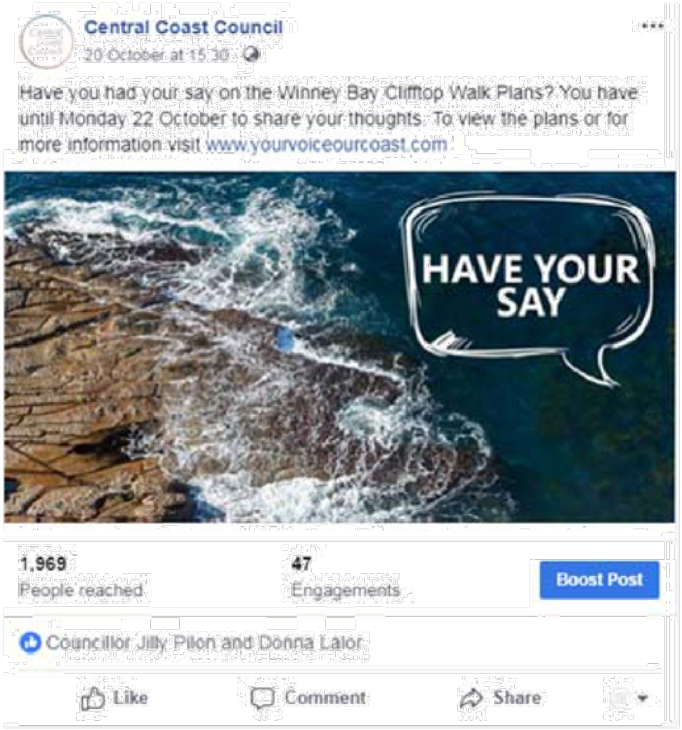


# Appendix D

Tweets (various dates)



Facebook posts (various dates)



Central Coast Council
20 October at 15:30
Have you had your say on the Winney Bay Clifftop Walk Plans? You have until Monday 22 October to share your thoughts. To view the plans or for more information visit www.yourvoiceourcoast.com
HAVE YOUR SAY
1,969
People reached
47
Engagements
Boost Post
Councillor Jilly Pilon and Donna Lalor
Like
Comment
Share

PROGRESSIVE RISK MANAGEMENT



**Risk Management Plan**

Terrigal and Wamberal Beach

Central Coast Council

P033823.002

July 2018

PROGRESSIVE RISK MANAGEMENT

## Document Control

| Project Details: | |
|---|---|
| Project Name: | Risk Management Plan |
| Site Address: | Terrigal and Wamberal Beach |
| Client Name: | Central Coast Council |
| Project Reference: | P033823.002 |



| Report Review | | | | | |
|---|---|---|---|---|---|
| Report Version / Revision: | Rev0_Draft | | | | |
| Prepared by: | | Technical Review by: | | Authorised for Issue by: | |
| Name: | Jonathan Coffey | Name: | Nick Passlow | Name: | Nick Passlow |
| Position: | Principal Consultant | Position: | Director | Position: | Director |
| Date: | 15/06/2018 | Date: | 15/06/2018 | Date: | 15/06/2018 |

| Report Review | | | | | |
|---|---|---|---|---|---|
| Report Version / Revision: | Rev0_Final | | | | |
| Prepared by: | | Technical Review by: | | Authorised for Issue by: | |
| Name: | Jonathan Coffey | Name: | Nick Passlow | Name: | Nick Passlow |
| Position: | Principal Consultant | Position: | Director | Position: | Director |
| Date: | 24/07/2018 | Date: | 24/07/2018 | Date: | 24/07/2018 |

PROGRESSIVE RISK MANAGEMENT

## Table of Contents

# 1. Introduction

Progressive Risk Management Pty Ltd (PRM) were engaged by Central Coast Council (Council) to prepare a Risk Management Plan (RMP) for the management of asbestos contamination identified at various locations at Terrigal and Wamberal Beaches, located in the Central Coast Council local government area in NSW (referred to as 'the site').

This RMP has been developed by PRM in consultation with Council representatives to provide a documented approach for the active management of potential risk presented by the identified asbestos contamination.

## 1.1. Background

Suspected asbestos containing materials (ACM) in the form of bonded fibre-cement fragments have been identified by Council staff and members of the public at various locations across the site. The source of the suspected ACM is currently unclear and requires additional investigation.

## 1.2. Objectives

The primary objective of this RMP is to provide strategies to suitably and actively manage the identified contamination in order to:

- Assess and better understand both the source/s and the extent of the asbestos contamination.
- Protect human health.
- Prevent ongoing contamination to the extent practicable.
- Minimise costs and liability to Council associated with the identified contamination.
- Prioritise management requirements to allow Council to systematically implement recommended management strategies to reduce the potential risks of the identified contamination to the extent practicable.

# 2. Summary of Existing Information

## 2.1. PRM Site Inspection

PRM completed a detailed inspection and associated reporting in May 2018. The detailed site inspection report, including summary of the suspected ACM contamination and potential sources is included in **Appendix A**.

The site inspection included a visual inspection of the foreshore between Wamberal Surf Club and Terrigal Rock Pool, and a detailed inspection of the Wamberal foredune including collection of suspected ACM fragments from Council owned land.

Recommendations provided in the PRM (2018) Site Inspection Report included:

1. Fencing of those properties where suspected ACM was observed by PRM that did not have fencing in place at the time of the inspection.
2. Collection and analysis of various types of suspected ACM present at the site to confirm the type and potential friability of the various types of ACM present. It is noted that the majority of visually observed suspected ACM was not sampled, as these were located on private property and not able to be accessed.
3. Due diligence asbestos air monitoring (AAM) to assess air quality at the site.
4. Provision of a dedicated phone number for members of the public to report suspected ACM finds.

The PRM Site Inspection Report is included at **Appendix A**.

## 2.2. Mitigation measures implemented to date

Council have employed a series of temporary mitigation measure at the site including daily site inspections across Terrigal and Wamberal Beaches to identify and remove suspected ACM. In addition, the erection of temporary fencing at those sections of Wamberal foredune visually suspected to contain ACM.

Council have implemented an online data capture program to log the identification of suspected ACM at the site. A review of the data collected by Council between April and June 2018 indicates the frequency of ACM identified at the site has reduced, particularly at Wamberal Beach where no ACM has been identified by Council during daily site inspections since 23 May 2018. A summary of the data capture is presented in **Figure 1**.

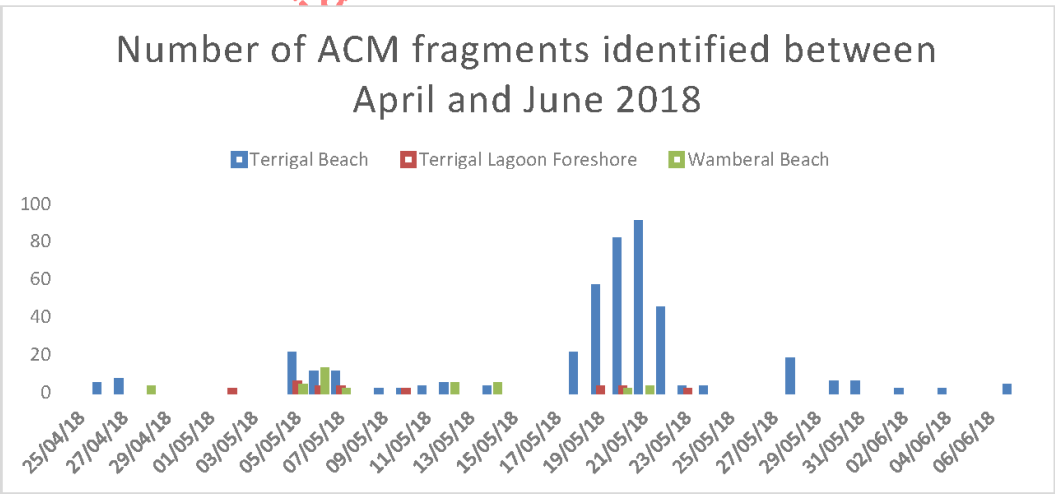



**Figure 1: Number of ACM fragments identified during Council site inspections between April and June 2018.**

## 2.3. Data gaps:

Following a review of the existing information, the following data gaps have been identified as requiring additional consideration and assessment:

1. The type and condition of ACM identified at the site to date has been highly variable. Although the ACM fragments identified to date have been reported as non-friable, it is not clear how and by whom this assessment has been made, and the friability of the contamination should be assessed.
2. The potential ACM sources have not been appropriately assessed and delineated through intrusive works.
3. The potential for airborne asbestos fibres to be present at the site has not been assessed. Although the likelihood of fibres being present at the site is considered to be low, the collection of background air monitoring data is considered to be a proactive data collection exercise in the instance that Council are approach by residents/members of the pubic regarding potential exposure scenarios.

## 3. Risk Management Strategy

### 3.1. Risk Assessment

The key risk, potential impacts, likelihood of occurrence and management approach are described in **Table 1**.

**Table 1: Risk Assessment**

| Risk | Impact to council | Likelihood | Management Approach |
|---|---|---|---|
| Impacts to human health from the identified ACM contamination. | • Financial: Litigation from private and government entities. | **Low:** In consideration of the non-friable nature[1] of the ACM identified to date, the risk of potential exposure under normal conditions is considered to be negligible. | Undertake appropriate assessment of representative ACM fragments found at the site to correctly determine and document potential friability.<br>Complete due-diligence AAM to provide Council with adequate data to address potential enquiries with regard to potential exposure scenarios. |
| Ongoing or increase in the presence of ACM contamination at the site. | • Financial: Ongoing management and remedial costs. | **Medium:** The source of the ACM contamination has not been confirmed or delineated. | Detailed investigation of suspected ACM sources to determine the presence and extent of ACM to inform ongoing management and/or remediation requirements. |
| Further erosion of Wamberal foredune resulting in the disturbance of additional ACM from the improvised shore protection structures and potential health and safety risks due to collapse of structures and buildings. | • Financial: Ongoing management/ remedial costs/ litigation from private and government entities. | **High:** The likelihood of a major storm event occurring in which the Wamberal foredune is impacted is unknown, however the potential for additional erosion and partial or complete collapse of parts of the foredune are considered high if such an event occurred. | Council consider taking enforcement action against private property owners where ACM has been identified on their property; and/or<br>Undertaking appropriate remedial works to repair the foredune with appropriately designed long-term erosion protection measures which also remove the potential risk of exposure to the identified ACM contamination. |

[1] Friability of the ACM is yet to be confirmed through inspection, sampling and analysis.





### 3.2. Management Approach

The following recommendations have been designed to address the key risk and current data gaps identified as part of the RMP development.

**Table 2: Proposed Management Approach**

| Item | Recommended Action | Comment |
|---|---|---|
| **Immediate Management Recommendations (on or before 30 July 2018)** | | |
| 1 | Continue the daily site inspections. Based on a review of the online smartsheet data, the site inspections are recommended to be continued at Terrigal Beach on a daily basis, with a reduce frequency to weekly (or following any extreme weather event) inspections at Wamberal Beach. | Commenced June 2018 |
| 2 | Collection of representative ACM fragments as well as "grab samples" of soil material for assessment of friability. | |
| 3 | Fencing at Wamberal Beach dune to be extended to include all properties to address both ACM risk and general safety risk from potential collapse onto Beach. Council to consider implications of fencing residents access stairs. Council to seek relevant advice from an appropriately qualified engineer (i.e. coastal engineer) on suitable fencing options. | |
| 4 | Council to create a dedicated phone number of public reports of any suspected ACM identified at the Beach. | |
| 5 | Complete an initial 5-day Asbestos Air Monitoring (AAM) event at Wamberal Beach to identify the presence (or absence) of airborne asbestos fibres. This AAM should be done under different wind conditions for a cross-section of data. Pending the results, the data can either be made publicly available on the Council website or retained by Council in the instance that enquiries to potential exposure are made by residents or Beach users | |
| 6 | Underwater survey of Terrigal swim zone to identify presence/absence of suspected ACM fragments in that area. | Completed June 2018 |
| 7 | Prepare a Community Fact Sheet detailing the potential risks posed by the identified ACM contamination and how best to manage the identified risk | Completed June 2018 |
| **Short Term Management Recommendations (i.e. within 3 months)** | | |
| 1 | Undertake intrusive investigation works at Terrigal Beach to assess the suspected fill material behind the original timber sea wall. The sea wall fill is considered to be a potential source of the ACM appearing at Terrigal. Should ACM be identified, remedial measures will be required to either remove and/or encapsulate the fill. | |
| 2 | Undertake intrusive investigation works on Wamberal Beach between the foreshore and foredune to assess the presence (or absence) of ACM within the Beach strata. Where identified, the ACM should be remediated/removed. This is designed to allow CCC to provide data as to the presence/absence of ACM on the public opens space land. Potential limitations may be associated with the portion of Beach owned by the Browns. | |

| Table 2: Proposed Management Approach | | |
|---|---|---|
| **Item** | **Recommended Action** | **Comment** |
| **Long-Term Management Recommendations (i.e. within 6 months)** | | |
| 1 | Council to consider long-term solutions, including whether to:<br>• Undertake enforcement action against private property owners where ACM has been identified on their property, such as clean-up notices or other statutory notices;<br>• Consider placing a notation on Section 10.7 Planning Certificate to identify ACM contamination on the property.<br>• Develop solutions to address/remediate the identified contamination in addition to the above-mentioned options. | |

# 4. Limitations

This report is confidential and has been prepared by Progressive Risk Management Pty Ltd (PRM) for Central Coast Council (the client). This report may only be used and relied upon by the client and must not be copied to, used by or relied upon by any person other than the client.

All results, conclusions and recommendations presented should be reviewed by a competent person before being used for any other purpose. PRM accepts no liability for use of, interpretation of or reliance upon this report by any person or body other than the client. Third parties must make their own independent inquiries.

This report should not be altered amended or abbreviated, issued in part or issued incomplete without prior checking and approval by PRM. PRM accepts no liability that may arise from the alteration, amendment, abbreviation or part-issue or incomplete issue of this report. To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and this report are expressly excluded (save as agreed otherwise with the client).

PRM shall bear no liability in relation to any change to site conditions after the date of this report. This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope and limitations defined herein (*Scope of Works*). Should information become available regarding conditions at the site including previously unknown sources of contamination, PRM reserves the right to review the report in the context of the additional information.

## Appendix A: PRM 2018 Sit Inspection Report

PROGRESSIVE RISK MANAGEMENT



**Site Inspection Report**

Terrigal and Wamberal Beach

Central Coast Council

P033823 July 2018

PROGRESSIVE RISK MANAGEMENT

## Document Control

| Project Details: | |
|---|---|
| Project Name: | Site Inspection Report |
| Site Address: | Terrigal and Wamberal Beach |
| Client Name: | Central Coast Council |
| Project Reference: | P033823.001 |



| Report Review | | | | | |
|---|---|---|---|---|---|
| Report Version / Revision: | Draft V0 | | | | |
| Prepared by: | | Technical Review by: | | Authorised for Issue by: | |
| Name: | Jonathan Coffey | Name: | Nick Passlow | Name: | Nick Passlow |
| Position: | Principal Consultant | Position: | Director | Position: | Director |
| Date: | 11/05/2018 | Date: | 11/05/2018 | Date: | 11/05/2018 |

| Report Review | | | | | |
|---|---|---|---|---|---|
| Report Version / Revision: | Final V0 | | | | |
| Prepared by: | | Technical Review by: | | Authorised for Issue by: | |
| Name: | Jonathan Coffey | Name: | Nick Passlow | Name: | Nick Passlow |
| Position: | Principal Consultant | Position: | Director | Position: | Director |
| Date: | 24/07/2018 | Date: | 24/07/2018 | Date: | 24/07/2018 |

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## Attachments and Appendices

# 1. Introduction

Progressive Risk Management Pty Ltd (PRM) were engaged by Central Coast Council (Council) to provide professional advice regarding the management of suspected asbestos containing materials (ACM) identified at various locations at Terrigal and Wamberal Beaches, located on the Central Coast, NSW (referred to as 'the site').

The site inspection report has been prepared to provide a summary of the historical site setting as well as the current site conditions (with regards to suspected ACM contamination) to assist Council to determine appropriate mitigation actions for any issues raised.

The regional site location is provided in **Figure 1**.

## 1.1. Background

Suspected ACM in the form of non-friable cement fragments has been identified by members of the public at various locations across the site. The source of the suspected ACM is currently unclear.

In light of recent media reports regarding the identification of suspected ACM by members of the public, Council have employed a series of temporary mitigation measure at the site including daily site inspections to identify and remove suspected ACM, and the erection of temporary fencing at sections of Wamberal foredune visually suspected to contain ACM.

## 1.2. Objectives

The objectives of the historical information review and site inspection are to:

- Identify potential historical sources of suspected ACM contamination at the site.
- Document the current site condition (with respect to suspected ACM contamination).
- Evaluate the current mitigation measures implemented by council at the site.
- Provide recommendations of additional mitigations measure (where required).
- Inform the preparation of a Risk Management Plan for the site.

## 1.3. Scope of Works

The following scope of works was completed by PRM:

- A summary of historical information for the site as made available by Council.
- Site inspection and photographic log of suspected ACM related contamination.
- Collection of representative ACM fragments for laboratory analysis.
- Review of current mitigation measures implemented by Council at the site.
- Preparation of a brief report detailing the results of the site inspection.

# 2. Site Description and History

## 2.1. Site Description

The following site description was sourced from WorleyParsons report: *Open Coast and Broken Bay Beaches Coastal Processes and Hazard Definition Study* (February, 2014).

Terrigal and Wamberal Beach are a 2.8km long stretch of sand that trends southwest from Wamberal Point on the north side of Wamberal Lagoon entrance south to Terrigal Lagoon entrance where the Beach begins to curve around to the southeast to terminate at the rocks on the southern end of Terrigal Beach, in lee of Broken Head.

A 1km long 20m high foredune, between Wamberal and Terrigal lagoons, has been developed for Beachfront housing. South of the lagoon mouth, rocky bluffs then a low dune back the 700m long Terrigal Beach. The northern portion of Wamberal Beach is well exposed with waves averaging 1.5m and up to 15 rips dominating the surf zone.

**Figure 2** provides the site layout.

## 2.2. Zoning and Surrounding Land Use

The Council LEP online interactive zoning map indicates the site is zoned as *RE1 Public Open Space*. Terrigal Beach is bordered by Terrigal Drive/Prominade, high density residential and commercial properties. The central and southern section of Wamberal Beach is bound by residential properties which have been built on the foredune. It is understood that a small number of these properties have encroached onto Council land, zoned as RE1 Public Open Space.

## 2.3. Site History

### 2.3.1. Review of available information

A series of historical images for Terrigal Beach were reviewed by PRM as part of the site history review. The images were accessed online[1] by PRM on 3 July 2018 and included various imagery of Terrigal Beach and surrounds between 1907 and 1958. The images generally show Terrigal Beach to be low density residential and agricultural grazing land. In addition, a 1930's image of Terrigal Beach provided by Council is included in **Plate 1**. The image shows a former timber sea wall on the Beach front.

**Plate 1** – 1930 historical image of Terrigal Beach

[1] http://www.historicphotographs.com.au

## 2.3.2. Review of Historical Aerial Photographs

Historical aerial photographs from 1954, 1964, 1977, 1986, 1991, 1995, 1999, 2005, 2007, 2010, 2012 and 2014 were obtained from Council for review (noting 1943 was not available). The aerial photograph review was conducted to ascertain a general history of the site and surrounding area. This review is summarised in **Table 1.**

**Table 1: Historical Aerial Photograph Review**

| Year | Observations |
|---|---|
| **1954** | **Terrigal:** The Terrigal township consists primarily of low density residential properties. The location and layout of roads appears similar to present day. A portion of grassed land is located between the sand and what is now known as Terrigal Drive/Prominade. A number of small structures (assumed to be the Terrigal Surf club and Beach shacks) are located on the grassed area. The Norfolk pines in the southern end of Terrigal Beach are present. The Terrigal Lagoon appears similar to present day.<br>**Wamberal:** The foredune area includes a number of lots consisting of small buildings and structures (assumed to be Beach shacks) and a number of lots with dense vegetation. The location and layout of roads appears similar to present day. |
| **1964** | **Terrigal:** Significant develop of the Terrigal township has occurred. A number of low density residential properties have been developed into much larger buildings. The smaller buildings (assumed to be Beach shacks) have been removed from the grassed area, and the area appears to be utilised as a car park. The rockpool at the southern end of the Beach appears to have been constructed. The Terrigal Lagoon appears similar to present day.<br>**Wamberal:** The density of houses on the foredune has increased significantly. A number of smaller shacks have been removed and replaced with larger buildings. Only a minor amount of vegetation remains on the foredune. |
| **1977** | **Terrigal:** Additional high-density development of the Terrigal township has occurred. The Beachfront carpark has been asphalted. The remainder of the Beach appears similar to the 1964 imagery.<br>**Wamberal:** A number of smaller shacks have again been removed and replaced with larger buildings. Only a minor amount of vegetation remains on the foredune. The carpark at the Wamberal surf club has been built. The remainder of the Beach appears similar to the 1964 imagery. |
| **1986** | **Terrigal:** The site appears similar to the 1977 imagery.<br>**Wamberal:** More development of Beachfront properties has occurred. The site appears similar to the 1977 imagery. |
| **1991** | **Terrigal:** The site appears similar to the 1986 imagery. A sea wall is present (assumed to be the timber sea wall built in 1988).<br>**Wamberal:** The site appears similar to the 1986 imagery. |
| **1995** | **Terrigal:** The site appears similar to the 1986 imagery. A sea wall is present (assumed to be the timber sea wall built in 1988).<br>**Wamberal:** The site appears similar to the 1986 imagery. |
| **1999** | **Terrigal:** The site appears similar to the 1995 imagery.<br>**Wamberal:** The site appears similar to the 1995 imagery. |
| **2005** | **Terrigal:** The site appears similar to the 1999 imagery. The current sea wall and walkway is present.<br>**Wamberal:** The site appears similar to the 1999 imagery. |

| Table 1: Historical Aerial Photograph Review | |
|---|---|
| **Year** | **Observations** |
| **2007** | **Terrigal:** The site appears similar to the 2005 imagery.<br>**Wamberal:** The site appears similar to the 2005 imagery. |
| **2010** | **Terrigal:** The site appears similar to the 2007 imagery.<br>**Wamberal:** The site appears similar to the 2007 imagery. |
| **2012** | **Terrigal:** The site appears similar to the 2010 imagery.<br>**Wamberal:** The site appears similar to the 2010 imagery. |
| **2014** | **Terrigal:** The site appears similar to the 2012 imagery.<br>**Wamberal:** The site appears similar to the 2012 imagery. |

### 2.3.3. Significant Storm Events

A number of significant storm events have been recorded at the site since the 1970s. Generally speaking, the storms resulted in significant impacts (erosion) to the foredune and in some cases damage and destruction of property and houses.

A summary of relevant storm information sourced from WorleyParsons (2014) is provided in **Table 2**.

| Table 2: Summary of historical storm events | |
|---|---|
| **Year** | **Details** |
| **1974** | The major storms of May-June 1974 are the most significant coastal storms that have been recorded to have impacted on the Central Coast of NSW (WorleyParsons, 2014). The severe erosion threatened virtually all Beachfront developments at Terrigal-Wamberal. Significant damage to the foredune at Wamberal was recorded, including damage to retaining structures and properties. The State Emergency Services and Australian Army were called in to place rocks, sand bags and other materials in front of the eroding dune face in an effort to halt further shoreline recession. Septic tanks were placed in front of the home units at Pacific Street (Wamberal) by private contractors. |
| **1978** | The major storms of June 1978 also produced significant erosion at Terrigal-Wamberal. Following the severe effects of the 1974 storms, many Beachfront owners constructed a variety of shore protection structures comprising rock rubble, corrugated iron, rubber tyres, besser blocks and concrete walls, while some sprayed the dune face with gunite and others attempted to mitigate erosion by planting vegetation. These ad hoc shore protection measures did not appear to be designed or constructed on sound coastal engineering principles, which was demonstrated during the severe storms of June 1978 when two houses collapsed into the ocean at Wamberal Beach. Anecdotal evidence suggest that much of the associated debris was buried insitu at the Beach. |
| **1986** | The August 1986 storms also resulted in major erosion at Terrigal-Wamberal Beaches. Exposed rock and fill material were reported on the foredune at Wamberal Beach. |
| **1995** | The 1995 storm event resulted in complete erosion of the Terrigal Beach face up to the old timber seawall, as well as minor overtopping of the wall. In addition, the complete erosion of the Wamberal foredune area was reported with wave runup occurring all the way to the primary dune area. |

| Table 2: Summary of historical storm events | |
|---|---|
| **Year** | **Details** |
| **2016** | The June 2016 storms also resulted in major erosion at Terrigal-Wamberal Beaches. The complete erosion of the Wamberal foredune between Terrigal Lagoon and Wamberal Surf Club was reported, with wave runup occurring all the way to the primary dune area and onto private property. Significant undercutting of landscaped areas, access stairs and retaining structures was observed, with many areas still in a state of disrepair at the time of writing this report.<br>Suspected ACM has been observed in the foredune of at a number of properties along the Wamberal portion of the site. The ACM appears to consist primarily of bonded cement sheeting of various size and condition. |

# 3. Summary of Contamination

To date, fragments of suspected non-friable ACM are continually being identified at various locations across the site. The vast majority of ACM has been identified in two key areas:

1. In the wash zone and foreshore area of Terrigal Beach (generally at the low-tide mark).
2. Within improvised shore protection structures at Wamberal Beach foredune.

## 3.1. Sources of Contamination

Based on a review of available information the asbestos identified at Terrigal and Wamberal Beaches are likely to be from two separate sources, as described below.

### 3.1.1. Terrigal Beach

The exact source/s of the suspected ACM contamination identified at Terrigal Beach is unclear, however, anecdotal evidence suggests it may be associated with the historical construction and backfilling of a former timber sea wall at Terrigal Beach. It is understood that the former sea wall is located beneath the sand at the southern end of Terrigal Beach, between the rockpool and the surf life saving club. Images of the former timber seawall and exposed filling were provided to PRM by Council on 8 May 2018. **Plate 2** shows the exposed sea wall and fill material exposed during the 2016 storm event. Additional imagery of the exposed former seawall at Terrigal were source online[2] by PRM and are provided in **Plate 3** and **Plate 4**. It is suspected that fragments of ACM are being exposed by tidal erosion and natural Beach processes and are being transported within the wash-zone and deposited at random locations at Terrigal Beach. It is important to note that this has not been investigated or confirmed and is currently based on anecdotal evidence only.



**Plate 2** – 2016 Storm event at Terrigal Beach showing exposed timber sea wall and associated fill material.

[2] Sourced at www.centralcoastdrones.com.au

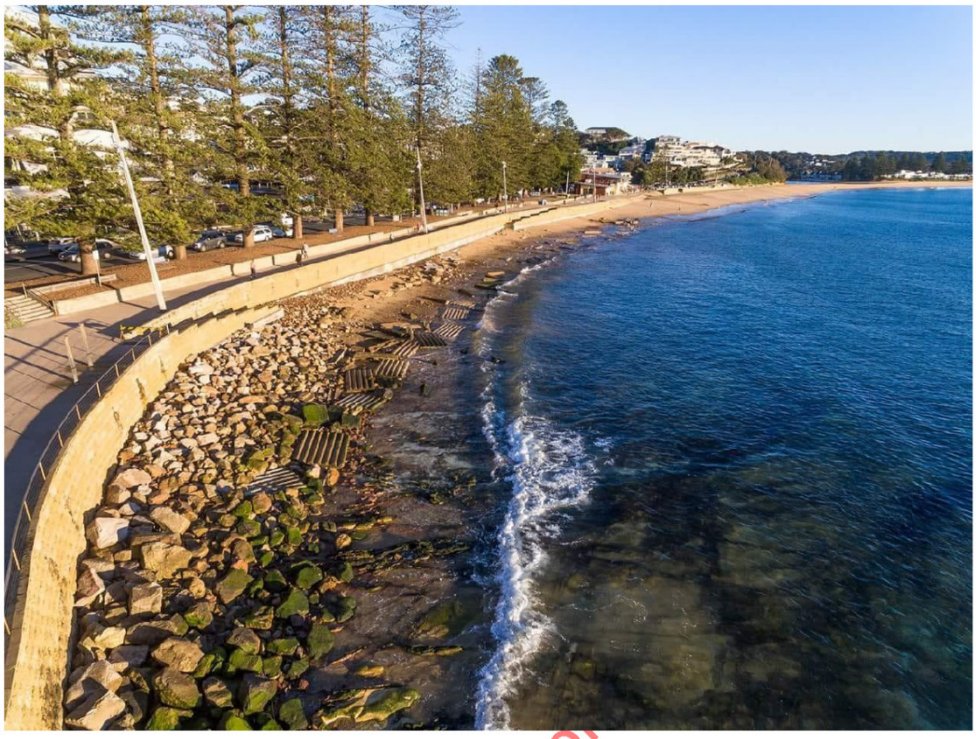


**Plate 3** – Terrigal beach erosion and exposed former sea wall

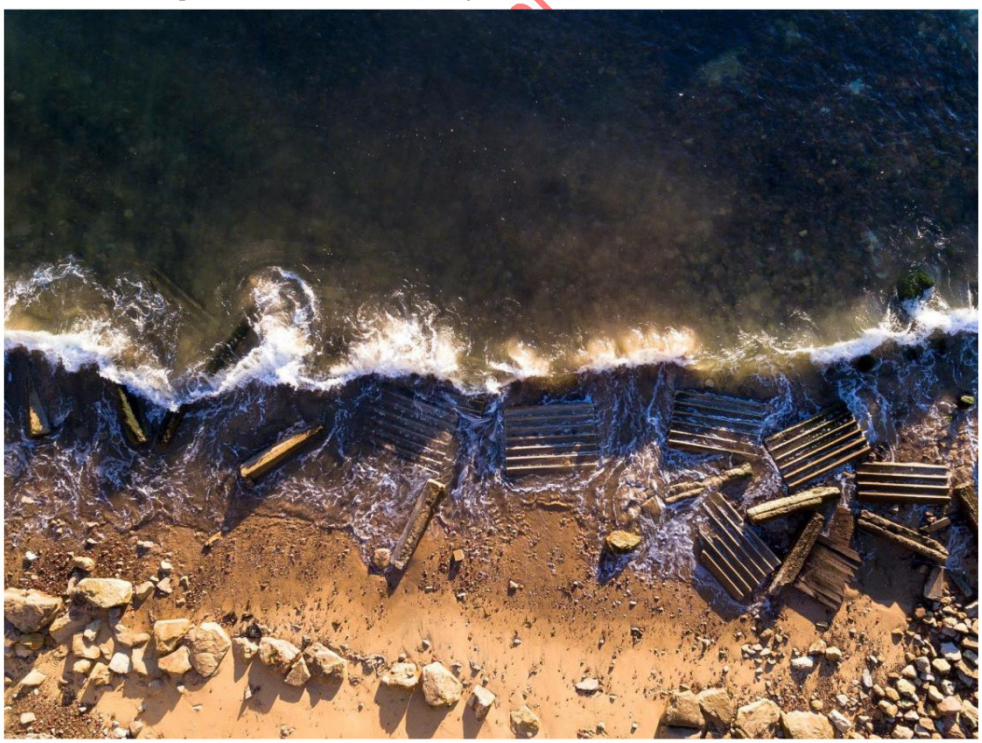


**Plate 4** – Terrigal beach erosion and exposed former sea wall (aerial view).
Source: www.centralcoastdrones.com.au

### 3.1.2. Wamberal Beach

The ACM identified at Wamberal is likely primarily associated with the historical insitu demolition of former Beach shacks containing various forms of ACM (sheeting, cladding, roofing, water pipes and guttering), and the construction of improvised shore protection structures using various types of fill material including ACM.

In addition, a number of significant storm events over the last 50 years are known to have disturbed the improvised shore protection structures and the foredune of Wamberal Beach, causing historical fill material to be exposed, and in some instances fill material and entire houses to be washed into the ocean.

**Plate 5** displays the typical condition of the eroded foredune and associated filling at Wamberal beach.

**Plate 5** - Foredune erosion and typical filling at Wamberal Beach.

## 3.2. Transport Mechanisms

The primary transport mechanism for the suspected ACM are likely to be related to the disturbance of the fill materials during major storm events. It is considered likely that ACM disturbed during the major storm events has been buried within Wamberal and Terrigal Beaches and is exposed randomly during natural tidal events and wind erosion of the Beach.

# 4. Site Inspection

## 4.1. General

PRM completed a detailed site inspection on 4 May 2018, between 8:30am and 3:00pm. The inspection was performed by experienced Environmental Scientists from PRMs Environmental Risk Team. Council representative Brett Whyte accompanied PRM during part of the site inspection and provided detailed background of the site and the issues relating to the ongoing identification of suspected ACM.

The site inspection included a visual inspection of the foreshore between Wamberal Surf Club and Terrigal Rock Pool, and a detailed inspection of the Wamberal foredune including collection of suspected ACM fragments from Council owned land.

The inspection is summarised in the following sections and a photographic photo log is provided in **Appendix A**.

## 4.2. Observations

**Foreshore:**

The visual inspection of the foreshore between Wamberal Surf Club and Terrigal Rock Pool did not identify any suspected ACM.

**Foredune (Wamberal):**

The primary area of concern at the site is the Wamberal Beach foredune. The majority of the foredune has been impacted by tidal erosion and significant damage to the improvised shore protection structures. Significant fill material, including suspected ACM, was observed at a number of locations along the Wamberal foredune.

However, it is noted that the volume suspected ACM observed by PRM during the site inspection was minimal and was limited to the Wamberal foredune or the sand immediately below the foredune.

The majority of locations where suspected ACM was observed had been fenced by Council. However, several properties where suspected ACM was observed were not fenced at the time of the inspection. **Table 3** and **Figure 3** provide a summary of the ACM observations at the Wamberal foredune.

**Table 3: Properties observed with suspected ACM**

| Property ID | Fenced (Y/N) | Comments |
|---|---|---|
| **15** | Y | |
| **17** | Y | |
| **19** | Y | |
| **25** | N | |
| **29** | Y | Sample Collected (SF01) |
| **31** | Y | |
| **33** | Y | |
| **49** | N | |
| **55** | N | Sample Collected (SF03) |

| Table 3: Properties observed with suspected ACM | | |
|---|---|---|
| **Property ID** | **Fenced (Y/N)** | **Comments** |
| **65** | Y | |
| **69** | N | |
| **75** | N | Sample Collected (SF02) |
| **79** | Y | |
| **83** | Y | |
| **89** | N | |
| **91** | N | |
| **93** | N | |
| **95** | Y | |
| **101** | Y | |
| **105** | N | |

A photolog of the above listed properties is included in **Appendix B**.

## 4.3. Sample Collection

A total of three suspected ACM fragments were collected from Council owned land immediately below the Wamberal Beach foredune. The fragments were photographed, the location recorded using hand held GPS (accurate to +/- 1m) and the fragments collected in a plastic zip lock bag and transported to NATA Accredited laboratory, Envirolab Services, for analysis.

A summary of the sample collection for the three samples is included in **Appendix B**.

## 4.4. Analytical Results

Analytical results for the three suspected ACM fragments collected during the site inspection are summarised in **Table 4**.

| Table 4: Analytical Results | | |
|---|---|---|
| **Sample ID** | **Description** | **Analytical Result** |
| **SF01** | Non-friable fragment: Weathered but not easily crushed/ pulverised by hand. | Chrysotile asbestos detected |
| **SF02** | Non-friable fragment: Weathered but not easily crushed/ pulverised by hand. | Chrysotile asbestos detected |
| **SF03** | Non-friable fragment: Weathered but not easily crushed/ pulverised by hand. | Chrysotile asbestos detected |

Sample locations are provided on **Figure 2** and laboratory analytical reports are included in **Appendix C**.

# 5. Review of CCC Mitigation Measures

Council have employed a series of temporary mitigation measure at the site, including daily site inspections to identify and remove suspected ACM, and the erection of temporary fencing at those sections of Wamberal foredune visually suspected to contain ACM.

In consideration of the type of ACM identified at the site to date (non-friable) and the minimal volume and limited extent of suspected ACM observed at publicly accessible portions of the site by PRM during the site inspection, the current mitigation measures are considered appropriate to address the immediate risk of the ACM to site users in the short term, until more permanent rectification works are implemented.

However, consideration should be given to the following additional mitigation measures:

1. Fencing of those properties where suspected ACM was observed by PRM that did not have fencing in place at the time of the inspection (see Table 3).
2. Collection and analysis of various types of suspected ACM present at the site to confirm the type and potential friability of the various types of ACM present. It is noted that the majority of samples would need to be collected from private property.
3. Due diligence asbestos air monitoring (AAM) to provide council with a record of AAM which may be used in the preparation of a Risk Management Plan.
4. Provision of a dedicated phone number for members of the public to report suspected ACM finds.

# 6. Limitations

This report is confidential and has been prepared by Progressive Risk Management Pty Ltd (PRM) for Central Coast Council (the client). This report may only be used and relied upon by the client and must not be copied to, used by or relied upon by any person other than the client.

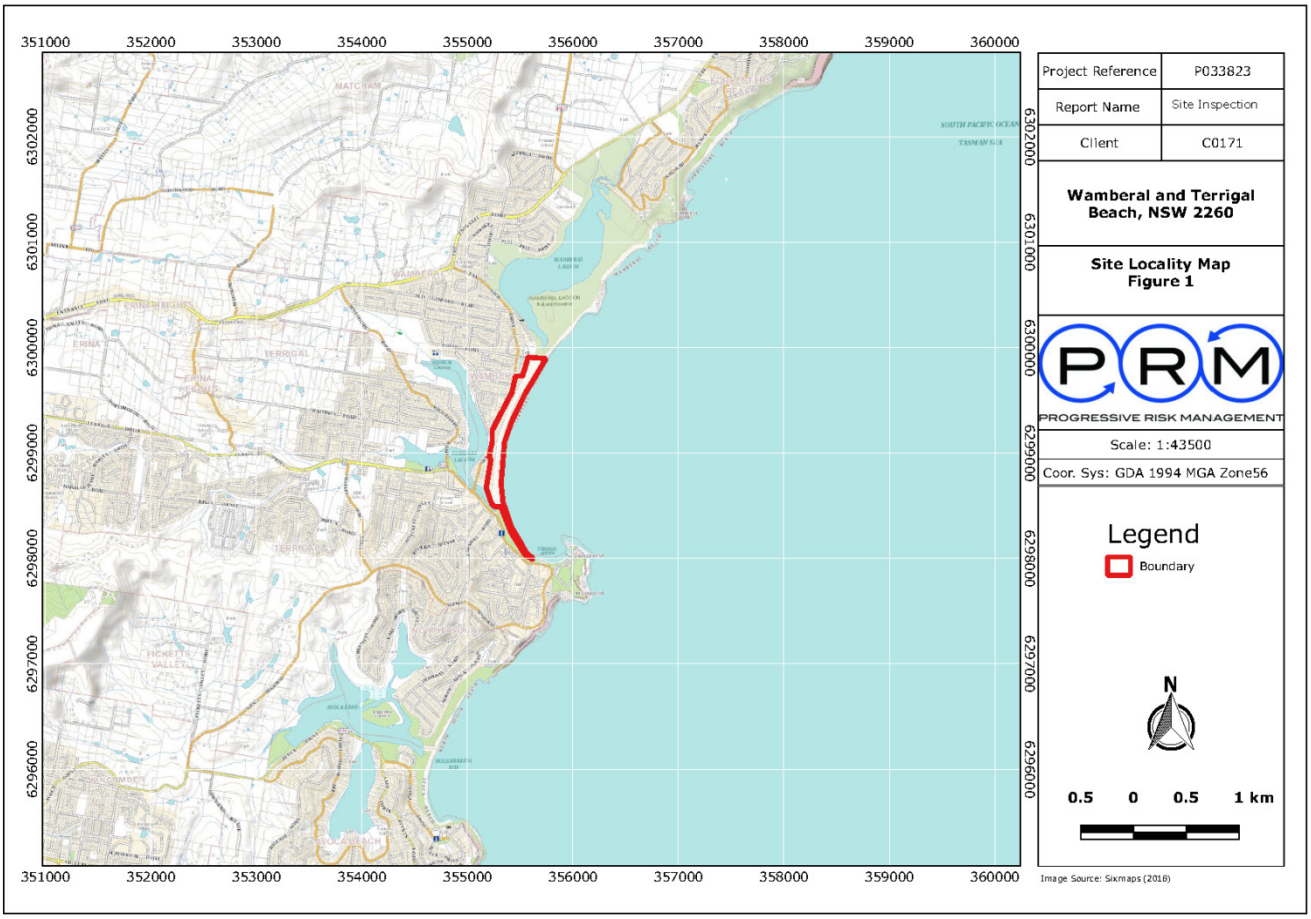
This report is limited to the observations made by PRM during the Site Inspection detailed above and was limited to the assessment of suspected ACM only, as detailed in the *Scope of Works.*

All results, conclusions and recommendations presented should be reviewed by a competent person before being used for any other purpose. PRM accepts no liability for use of, interpretation of or reliance upon this report by any person or body other than the client. Third parties must make their own independent inquiries.

This report should not be altered amended or abbreviated, issued in part or issued incomplete without prior checking and approval by PRM. PRM accepts no liability that may arise from the alteration, amendment, abbreviation or part-issue or incomplete issue of this report. To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and this report are expressly excluded (save as agreed otherwise with the client).

PRM shall bear no liability in relation to any change to site conditions after the date of this report. This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope and limitations defined herein (*Scope of Works*). Should information become available regarding conditions at the site including previously unknown sources of contamination, PRM reserves the right to review the report in the context of the additional information.

## Figures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6302000 6301000 6300000 6299000 6298000 6297000 6296000
Project Reference P033823
Report Name Site Inspection
Client C0171
Wamberal and Terrigal Beach, NSW 2260
Site Locality Map Figure 1
PRM PROGRESSIVE RISK MANAGEMENT
Scale: 1:43500
Coor. Sys: GDA 1994 MGA Zone56
Legend
Boundary
N
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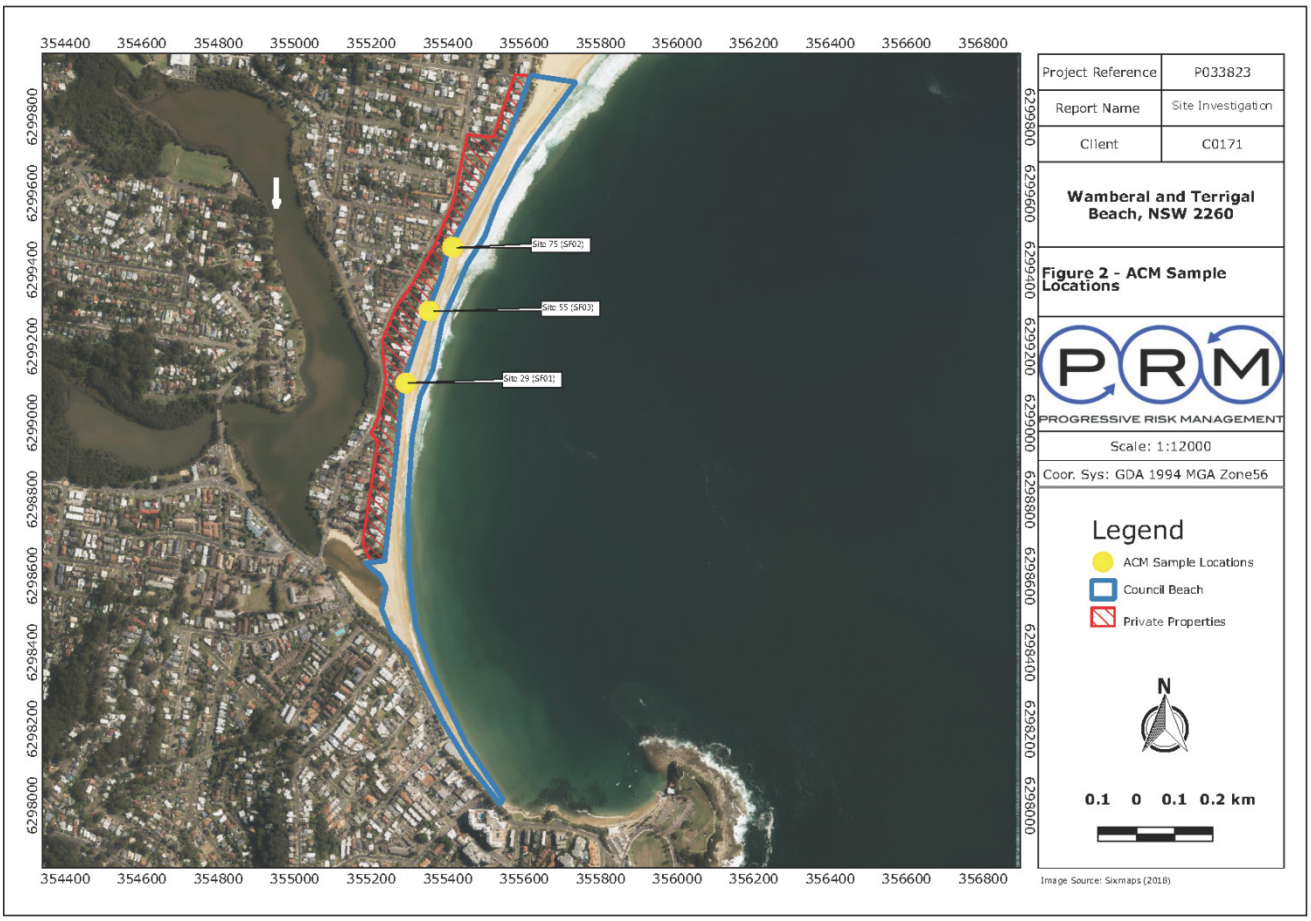
Image Source: Sixmaps (2018)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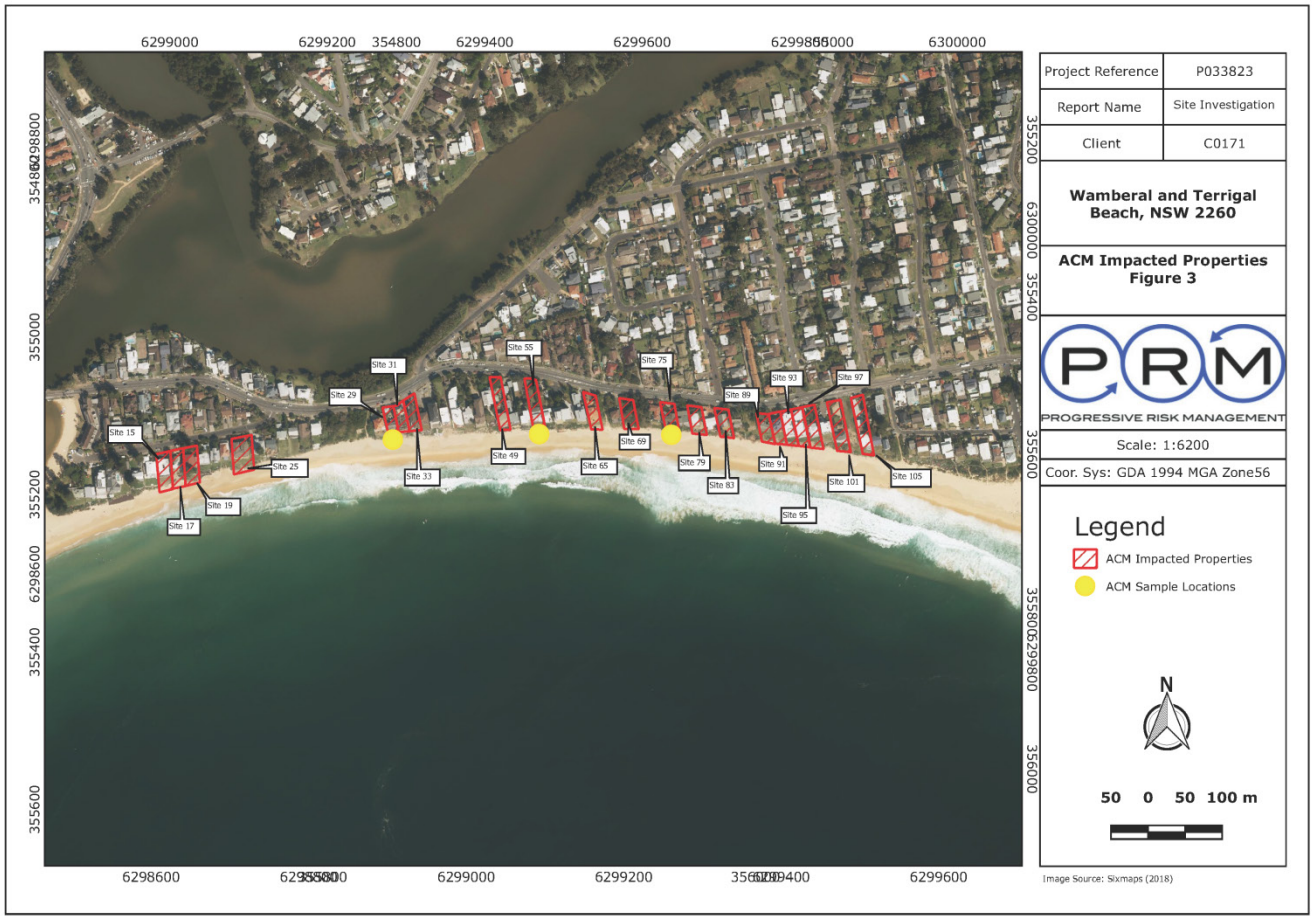
6299800 6299600 6299400 6299200 6299000 6298800 6298600 6298400 6298200 6298000
Site 75 (SF02)
Site 55 (SF03)
Site 29 (SF01)
Project Reference P033823
Report Name Site Investigation
Client C0171
Wamberal and Terrigal Beach, NSW 2260
Figure 2 - ACM Sample Locations
PRM PROGRESSIVE RISK MANAGEMENT
Scale: 1:12000
Coor. Sys: GDA 1994 MGA Zone56
Legend
ACM Sample Locations
Council Beach
Private Properties
N
0.1 0 0.1 0.2 km
Image Source: Sixmaps (2018)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Site 15
Site 17
Site 19
Site 25
Site 29
Site 31
Site 33
Site 49
Site 55
Site 65
Site 69
Site 75
Site 79
Site 87
Site 89
Site 91
Site 93
Site 95
Site 97
Site 101
Site 105
Project Reference
P033823
Report Name
Site Investigation
Client
C0171
Wamberal and Terrigal Beach, NSW 2260
ACM Impacted Properties Figure 3
PROGRESSIVE RISK MANAGEMENT
Scale: 1:6200
Coor. Sys: GDA 1994 MGA Zone56
Legend
ACM Impacted Properties
ACM Sample Locations
N
50 0 50 100 m
Image Source: Sixmaps (2018)

## Appendix A: Photographic Log

PROGRESSIVE RISK MANAGEMENT

**Photolog**

**Properties observed with suspected ACM: Refer to Table 1 for details.**

**Photo 1:** Site: 15

**Photo 2:** Site: 17

**Photo 3:** Site: 19

**Photo 4:** Site: 25

**Photo 5:** Site: 29

**Photo 6:** Site: 31

PROGRESSIVE RISK MANAGEMENT

**Photolog**

**Properties observed with suspected ACM: Refer to Table 1 for details.**

**Photo 7:** Site: 33

**Photo 8:** Site: 49

**Photo 9:** Site: 55

**Photo 10:** Site: 65

**Photo 11:** Site: 69

**Photo 12:** Site: 75

PROGRESSIVE RISK MANAGEMENT

**Photolog**

**Properties observed with suspected ACM: Refer to Table 1 for details.**

**Photo 13:** Site: 79

**Photo 14:** Site: 83

**Photo 15:** Site: 89

**Photo 16:** Site: 91

**Photo 17:** Site: 93

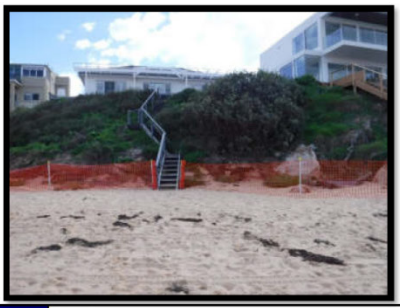
**Photo 18:** Site: 95



**Photo 19:** Site: 97



**Photo 20:** Site: 101



**Photolog**

**Properties observed with suspected ACM: Refer to Table 1 for details.**

**Photo 21:** Site: 105

**End of Photolog**

# Appendix B: Summary of ACM Sample Collection

## Sample Collection Record - SF02

| Inspection Particulars: | |
|---|---|
| **Site Personnel:** | Geoff Fletcher, Sarah Dale |
| **Date:** | 4th May 2018 |
| **Time:** | 8:30am |
| **Weather:** | Clear skies |
| **Wind:** | No wind |
| **Public Enquiry:** | No |
| **Google Maps Site ID:** | 75 Ocean View Drive, Wamberal NSW 2260 |

| Inspection Results: | |
|---|---|
| **General Comments:** | |
| **Embankment Decription:** | Good vegetation coverage, timber retaining wall on property, no temporary fence on public beach. |
| **Embankment materials:** | Sandstone at base, building rubble, minor exposed fill |

| Suspected Asbestos Containing Material Observed? | | |
|---|---|---|
| **Private Property** | Yes | Bonded fragments, weathered |
| **Council Beach** | Yes | Bonded fragments, weathered |

**Areas of Note:**



| Note Number: | Comment/Description: |
|---|---|
| **Note 1:** | Suspected Asbestos Fragment |
| **Note 2:** | Suspected Asbestos Fragment SF02 |
| **Note 3:** | |

## Sample Collection Record - SF03

| Inspection Particulars: | |
|---|---|
| **Site Personnel:** | Geoff Fletcher, Sarah Dale |
| **Date:** | 4th May 2018 |
| **Time:** | 8:30am |
| **Weather:** | Clear skies |
| **Wind:** | No wind |
| **Public Enquiry:** | No |
| **Google Maps Site ID:** | 55 Ocean View Drive, Wamberal NSW 2260 |

**Inspection Results:**

| General Comments: | |
|---|---|
| **Embankment Decription:** | Good vegetation coverage at top of embankment, fill exposed at the base, no temporary fence on public beach. |
| **Embankment materials:** | Concrete, brick and sandstone in exposed fill |

| Suspected Asbestos Containing Material Observed? | | |
|---|---|---|
| **Private Property** | Yes | Bonded fragments, weathered |
| **Council Beach** | Yes | Bonded fragments, weathered |

**Areas of Note:**



| Note Number: | Comment/Description: |
|---|---|
| **Note 1:** | Suspected Asbestos Fragment |
| **Note 2:** | Suspected Asbestos Fragment |
| **Note 3:** | |

## Sample Collection Record - SF01

| Inspection Particulars: | |
|---|---|
| **Site Personnel:** | Geoff Fletcher, Sarah Dale |
| **Date:** | 4th May 2018 |
| **Time:** | 8:30am |
| **Weather:** | Clear skies |
| **Wind:** | No wind |
| **Public Enquiry:** | No |
| **Google Maps Site ID:** | 29 Ocean View Drive, Wamberal NSW 2260 |

| Inspection Results: | |
|---|---|
| **General Comments:** | |
| **Embankment Decription:** | Good vegetation coverage at top of embankment, major erosion at the bottom, construction site on property, temporary fence on public beach. |
| **Embankment materials:** | Building rubble; concrete, brick, igneous and sandstone blocks throughout in exposed fill. |

| Suspected Asbestos Containing Material Observed? | | |
|---|---|---|
| **Private Property** | Yes | Bonded fragments, weathered |
| **Council Beach** | Yes | Bonded fragments, weathered |

**Areas of Note:**




| Note Number: | Comment/Description: |
|---|---|
| **Note 1:** | Suspected Asbestos Fragment |
| **Note 2:** | Building rubble |
| **Note 3:** | |

# Appendix C: Laboratory Analytical Results

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 191023

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey, Geoff Fletcher |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823, Wamberal & Terrigal** |
| **Number of Samples** | 3 Material |
| **Date samples received** | 07/05/2018 |
| **Date completed instructions received** | 07/05/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

## Report Details

| | |
|---|---|
| **Date results requested by** | 08/05/2018 |
| **Date of Issue** | 08/05/2018 |

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with** *

**Asbestos Approved By**
Analysed by Asbestos Approved Identifier: Matt Tang
Authorised by Asbestos Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823, Wamberal & Terrigal**

| Asbestos ID - materials | | | | |
|---|---|---|---|---|
| Our Reference | | 191023-1 | 191023-2 | 191023-3 |
| Your Reference | UNITS | SF01 | SF02 | SF03 |
| Date Sampled | | 04/05/2018 | 04/05/2018 | 04/05/2018 |
| Type of sample | | Material | Material | Material |
| Date analysed | - | 08/05/2018 | 08/05/2018 | 08/05/2018 |
| Mass / Dimension of Sample | - | 79x40x5mm | 54x51x5mm | 42x27x5mm |
| Sample Description | - | Grey compressed fibre cement material | Grey compressed fibre cement material | Grey compressed fibre cement material |
| Asbestos ID in materials | - | Chrysotile asbestos detected<br><br>Amosite asbestos detected<br><br>Crocidolite asbestos detected | Chrysotile asbestos detected | Chrysotile asbestos detected |

**Client Reference: P033823, Wamberal & Terrigal**

| Method ID | Methodology Summary |
|---|---|
| **ASB-001** | Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004. |

**Client Reference: P033823, Wamberal & Terrigal**

| Result Definitions | |
|---|---|
| NT | Not tested |
| NA | Test not required |
| INS | Insufficient sample for this test |
| PQL | Practical Quantitation Limit |
| < | Less than |
| > | Greater than |
| RPD | Relative Percent Difference |
| LCS | Laboratory Control Sample |
| NS | Not specified |
| NEPM | National Environmental Protection Measure |
| NR | Not Reported |

22 October 2018

**Central Coast Council**
P.O Box 20
Wyong, NSW 2259

Attention: Martin Ball

# Preliminary Asbestos Assessment – Terrigal and Wamberal Beach

## 1. Introduction

Progressive Risk Management (PRM) was engaged by Central Coast Council (Council) to undertake a preliminary asbestos assessment at Terrigal and Wamberal Beaches, located on the NSW Central Coast (referred to as 'the site').

The areas assessed include:

- Wamberal beach: between the Wamberal Surf Life Saving Club (SLSC) in the north, and Terrigal Lagoon in the south.
- Terrigal beach: between the Terrigal SLSC in the north, and the rock pool in the south (adjacent Ash Street).

**Figure 1** provides the regional site location and **Figure 2** provides the assessment areas.

## 2. Background

Suspected asbestos containing material (ACM), generally in the form of bonded cement fragments has been identified by staff members of Council and the general public at various locations across the site. The suspected ACM has been generally identified deposited at the high-tide mark at the site.

The source/s of the suspected ACM contamination identified at Wamberal beach is unclear. However, suspected ACM identified at Wamberal Beach is thought to be associated with a number of significant storm events over the last 50 years which have disturbed improvised shore protection structures (containing waste/fill including ACM), and in some instances, entire houses (suspected to contain ACM) which have been washed into the ocean.

The source/s of the suspected ACM contamination identified at Terrigal Beach is also unclear. However, anecdotal evidence suggests it may be associated with the historical construction and backfilling of a former timber sea wall at Terrigal Beach. It is understood that the former sea wall is located beneath the sand at the southern end of Terrigal Beach, in the area assessed.

## 3. Objective

The objective of the preliminary assessment was to investigate the upper 1.0 m of beach strata for the presence of significant anthropogenic material, including ACM, which may be contributing to suspected ACM fragments regularly identified at the high tide mark at various locations across the site.

## 4. Scope of Works

The scope of works of the preliminary assessment included:

- Preparation of all relevant safety documentation for the works including Safe Work Method Statement (SWMS).
- A site walkover/visual observation of the site to identify indicators of potential contamination, such as suspected ACM.
- Excavation of 75 test pits inclusive of; a visual assessment, logging and sample collection (where deemed necessary).
- Background asbestos air monitoring (AAM) at the site inclusive of NATA-accredited laboratory analysis of the air monitoring samples.
- NATA-accredited laboratory analysis of selected beach sand samples for asbestos.
- Preparation of a letter report inclusive of photographic log.

## 5. Methodology

**Test pitting:**

A herringbone investigation pattern with approximately 40 metre spacing was adopted for the test pit locations. A total of 75 observational test pits were excavated to a target depth of approximately 1 m across the site. A total of 67 test pits were excavated at Wamberal beach and 8 at Terrigal Beach.

Test pits were excavated using a 5-tonne excavator to the target depth. At each test pit location, the beach surface was inspected for any anthropological inclusions, including suspected ACM. As the test pits were excavated, each bucket of sand was dispersed evenly along the ground in chronological order to be inspected for the presence of ACM fragments.

All locations were surveyed using a Trimble – R1 Handheld GNSS Receiver and latitudes and longitudes were recorded (WGS84).

All investigation locations are shown in **Figures 2, 3 and 4 (Areas 1-7).**

**Soil Sample Collection and Laboratory Analysis:**

At selected test pit locations, a 500ml sample of beach sand was collected for laboratory analysis for asbestos. Samples were collected via hand using fresh nitrile gloves and placed directly into zip-lock bags labelled with a unique sample ID. All samples were transported to a NATA-accredited analytical laboratory (Envirolab Services Pty Ltd) under chain of custody (COC) conditions for analysis.

A total of 29 soil samples were analysed for asbestos. Standard sampling procedures for contaminated site investigations were adhered to at all times.

**Background Asbestos Air Monitoring (AAM):**

Air monitors were placed at various locations around the site to measure the background concentrations for potential asbestos fibres in ambient air. Background AAM was conducted in accordance with the NOHSC:3003(2005) with samples then analysed by an external NATA-accredited laboratory, Envirolab Services Pty Ltd.

A total of five AAM events were undertaken at Wamberal Beach between 27 August and 26 September 2018. The AAM at Wamberal Beach consisted of 6 air monitors placed on the beach front and along public access pathways.

A total of five AAM events were undertaken at Terrigal Beach between 27 August and 4 October 2018. The AAM at Wamberal Beach consisted of 4 air monitors placed along public walkways and on Terrigal Beach.

Additional AAM was completed during the intrusive excavation works on Wamberal and Terrigal Beach, with an air monitor placed on the western side of the fenced off work zone.

## 6. Assessment Criteria

**Asbestos in soils:**

National Environment Protection Council (1999, Revised 2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 – *Schedule B1 Guideline on Investigation levels for Soil and Groundwater* (NEPC, 2013) provides health-based screening levels for different forms of asbestos contamination in soil.

To apply these screening levels, significant investigations, excavation and sample volumes are required to assess the volume of asbestos relative to soil. In consideration of the scope and objectives of the investigation, PRM adopted a high level criterion to assess the presence / absence of asbestos in soil samples and whether additional investigations are required to assess the risk to site users.

The high level criteria adopted by PRM was *'no asbestos in any form observed on the site surface at test pit locations or present in analytical results'.*

**Air monitoring criteria:**

WA Department of Health (DOH) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (May 2009) recommend an exposure trigger level of 0.01 fibres per millilitre (f/ml) asbestos air quality limit to protect the public, which is the limit of detection using the membrane filter method.

PRM adopted this criterion in relation to measuring the background levels for potential asbestos fibres in ambient air.

## 7. Results

The following sections summarise the results of the preliminary assessment. The photographic log presented in **Appendix A** documents key stages of the test pitting works.

Laboratory analytical results are summarised in **Table 1** and provided in laboratory reports in **Appendix B**.

**Visual Inspection:**

The results of the visual assessment found that the subsurface conditions within the observational test pits consisted of beige beach sand. Suspected ACM was not observed at the ground surface of the test pit locations or during the excavation to the target depth.

Anthropogenic inclusions were observed at the following locations:

- TP49: concrete fragments were observed at 1.0 mbgl.
- TP55: concrete and rock boulders were observed at 1.0 mbgl.
- TP69: the staircase extending from Terrigal Boulevard was reached at 1.0 mbgl.

**Soil Laboratory Results**

Asbestos was not detected at the laboratory reporting limit in the soil samples analysed. All NATA accredited analysis certificates are attached in **Appendix B.**

**Table 1: Summary of analytical results**

| Test pit ID | Depth (mbgl): | Location: | Sample Description: | Analytical Results: |
|---|---|---|---|---|
| **OP06** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP09** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP12** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP16** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP20** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP23** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |

| Table 1: Summary of analytical results | | | | |
|---|---|---|---|---|
| **Test pit ID** | **Depth (mbgl):** | **Location:** | **Sample Description:** | **Analytical Results:** |
| **OP27** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP29** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP31** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP34** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP37** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP40** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP42** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP44** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP47** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP49** | 0.1-0.2 | Wamberal Beach | Beige sand, concrete slab at 1.0 mbgl | No asbestos detected |
| **OP52** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP55** | 0.1-0.2 | Wamberal Beach | Beige sand, rock / concrete at 1.0 mbgl | No asbestos detected |
| **OP57** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP62** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP65** | 0.1-0.2 | Wamberal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP69** | 0.1-0.2 | Terrigal Beach | Beige sand, concrete stairs at 1.0 mbgl | No asbestos detected |
| **OP70** | 0.1-0.2 | Terrigal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP71** | 0.1-0.2 | Terrigal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP72** | 0.1-0.2 | Terrigal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP73** | 0.1-0.2 | Terrigal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP74** | 0.1-0.2 | Terrigal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP75** | 0.1-0.2 | Terrigal Beach | Beige sand, no inclusions | No asbestos detected |
| **OP76** | 0.1-0.2 | Terrigal Beach | Beige sand, no inclusions | No asbestos detected |



## Air monitoring Results:

All results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.

Air monitoring reports included in **Appendix C.**

## 8. Conclusions

Field observations and the data collected during the preliminary investigation supports the following conclusions:

- Suspected ACM was not visually observed on the surface in the vicinity of any of the test pits excavated as part of the investigation.
- Suspected ACM was not visually observed within the upper 1.0m of beach strata in any of the test pits excavated as part of the investigation.
- Laboratory analytical results indicate asbestos was not detected at the laboratory limit of reporting.
- Background AAM results were below the detection limit of 0.01 fibre/ml.

The results of the preliminary investigation indicate that the source of suspected ACM identified at the site is unlikely to be associated with gross ACM contamination being present within the beach strata of Terrigal and Wamberal beaches.

## Limitations

This report is confidential and has been prepared by Progressive Risk Management Pty Ltd (PRM) for Central Coast Council (the client). This report may only be used and relied upon by the client and must not be copied to, used by or relied upon by any person other than the client. This report is limited to the observations made by PRM during the Contamination Assessment, and was limited to the assessment of contamination in soils only, as detailed in the *Scope of Works and Methodology*.

All results, conclusions and recommendations presented should be reviewed by a competent person before being used for any other purpose. PRM accepts no liability for use of, interpretation of or reliance upon this report by any person or body other than the client. Third parties must make their own independent inquiries.

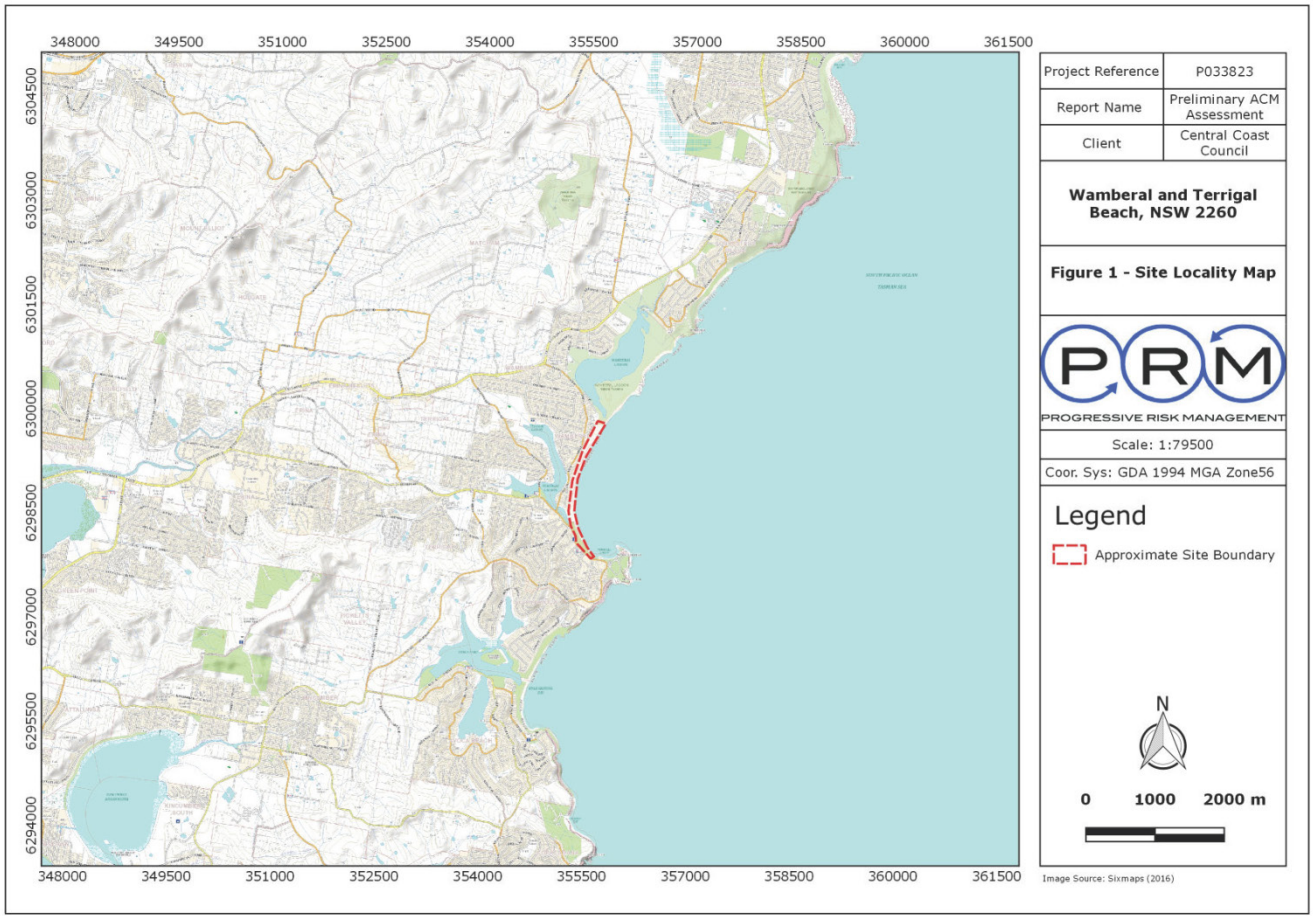
This report should not be altered amended or abbreviated, issued in part or issued incomplete without prior checking and approval by PRM. PRM accepts no liability that may arise from the alteration, amendment, abbreviation or part-issue or incomplete issue of this report. To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and this report are expressly excluded (save as agreed otherwise with the client).

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope and limitations defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, PRM reserves the right to review the report in the context of the additional information.

## Document Control

| **Project Details and Report Review:** | | | | | |
|---|---|---|---|---|---|
| **Project Details** | | | | | |
| Project Name: | Preliminary Asbestos Assessment | | | | |
| Site Address: | Terrigal / Wamberal Beach, NSW 2260 | | | | |
| Client Name: | Central Coast Council | | | | |
| Project Reference: | P033823.015 | | | | |
| **Report Version** | | | | | |
| Report Version: | Rev0: Draft | | | | |
| **Current Version Review** | | | | | |
| Prepared by: | | Technical Review by: | | Authorised for Issue by: | |
|  | |  | |  | |
| Name: | Sarah Dale | Name: | Jonathan Coffey | Name: | Nick Passlow |
| Position: | Consultant | Position: | Principal Consultant | Position: | Director |
| Date: | 12/10/2018 | Date: | 17/10/2018 | Date: | 18/10/2018 |

# Figures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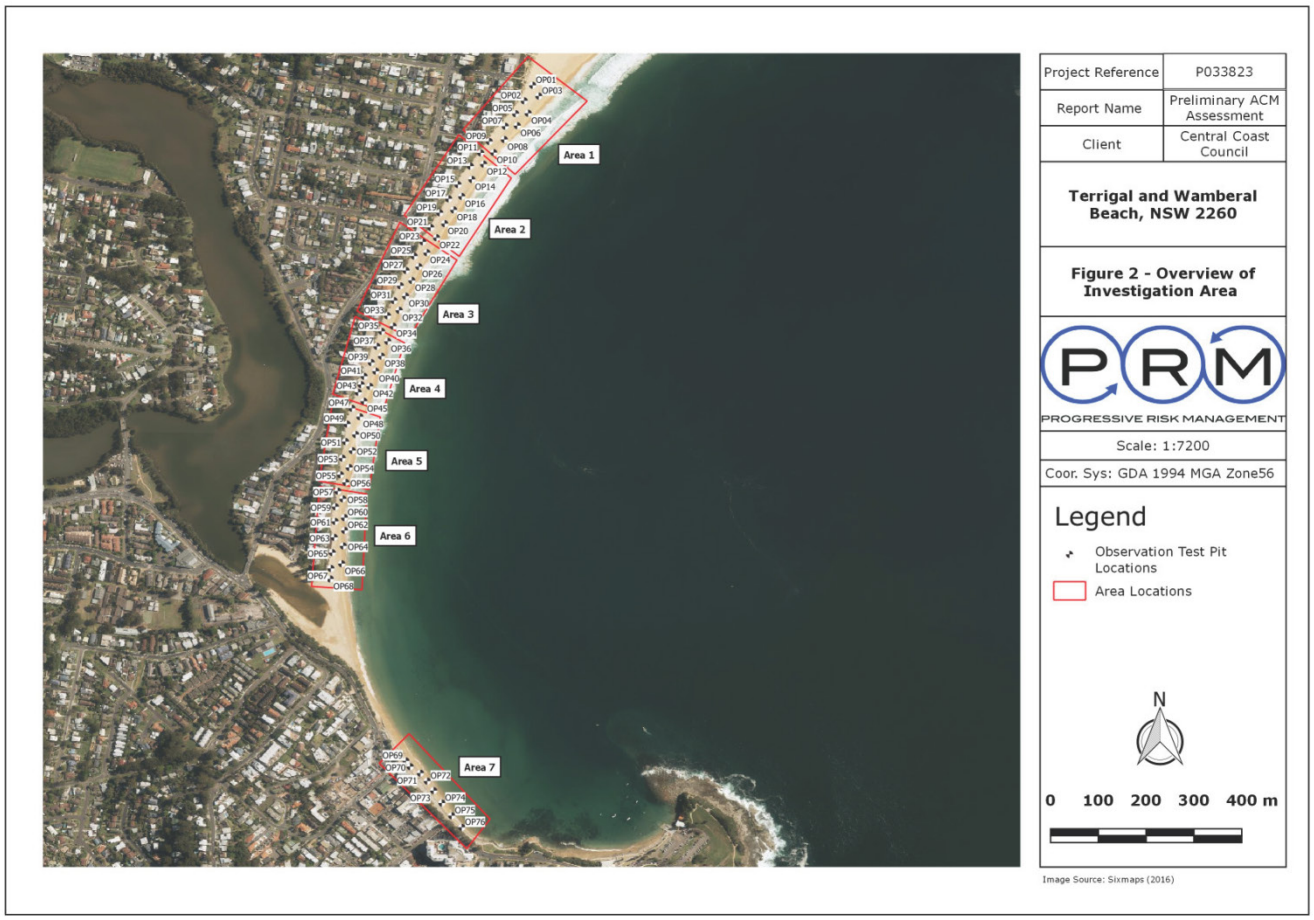
357000
358500
360000
361500
6304500
6303000
6301500
6300000
6298500
6297000
6295500
6294000
Project Reference
P033823
Report Name
Preliminary ACM Assessment
Client
Central Coast Council
Wamberal and Terrigal Beach, NSW 2260
Figure 1 - Site Locality Map
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:79500
Coor. Sys: GDA 1994 MGA Zone56
Legend
Approximate Site Boundary
N
0
1000
2000 m
Image Source: Sixmaps (2016)


Area 1
Area 2
Area 3
Area 4
Area 5
Area 6
Area 7
Project Reference
P033823
Report Name
Preliminary ACM Assessment
Client
Central Coast Council
Terrigal and Wamberal Beach, NSW 2260
Figure 2 - Overview of Investigation Area
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:7200
Coor. Sys: GDA 1994 MGA Zone56
Legend
Observation Test Pit Locations
Area Locations
N
0
100
200
300
400 m
Image Source: Sixmaps (2016)


| | |
|---|---|
| Project Reference | P033823 |
| Report Name | Preliminary ACM Assessment |
| Client | Central Coast Council |

**Wamberal Beach, NSW 2260**

**Figure 3 - Area 1 Test Pit Locations**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:800

Coor. Sys: WGS 84 EPSG:4326

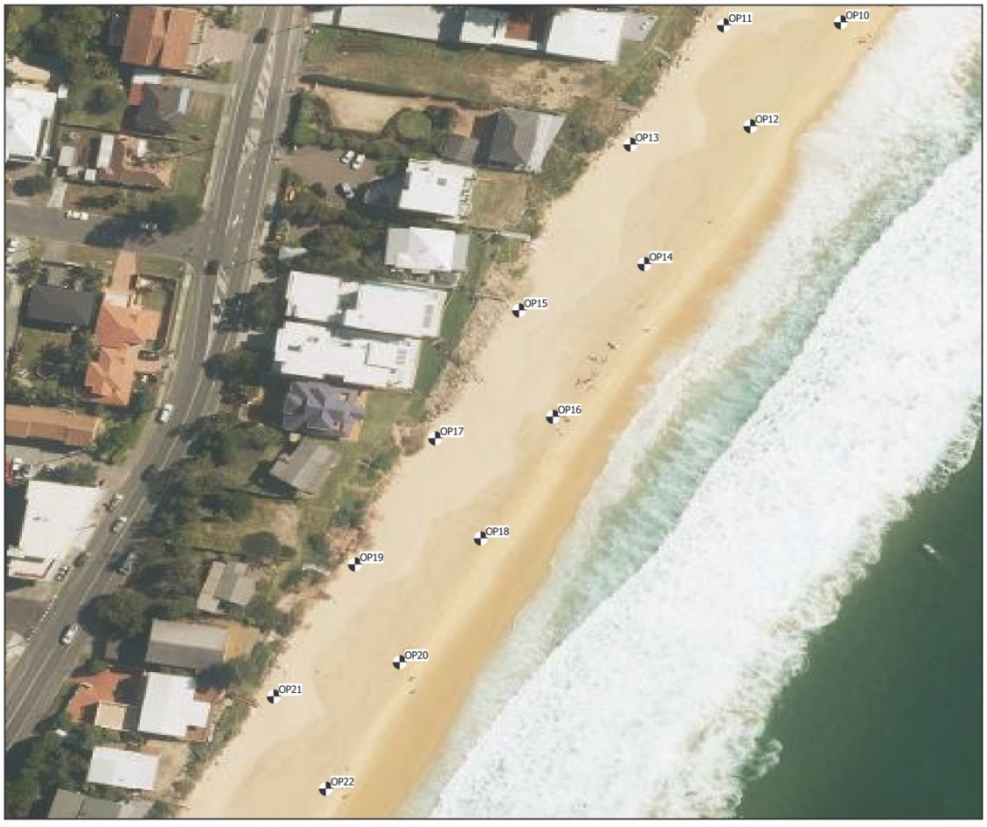
Legend

Observation Test Pit Locations

N

0 10 20 30 40 m

Image Source: Sixmaps (2016)




| | |
|---|---|
| Project Reference | P033823 |
| Report Name | Preliminary ACM Assessment |
| Client | Central Coast Council |

**Wamberal Beach, NSW 2260**

**Figure 3 - Area 2 Test Pit Locations**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:800

Coor. Sys: WGS 84 EPSG:4326

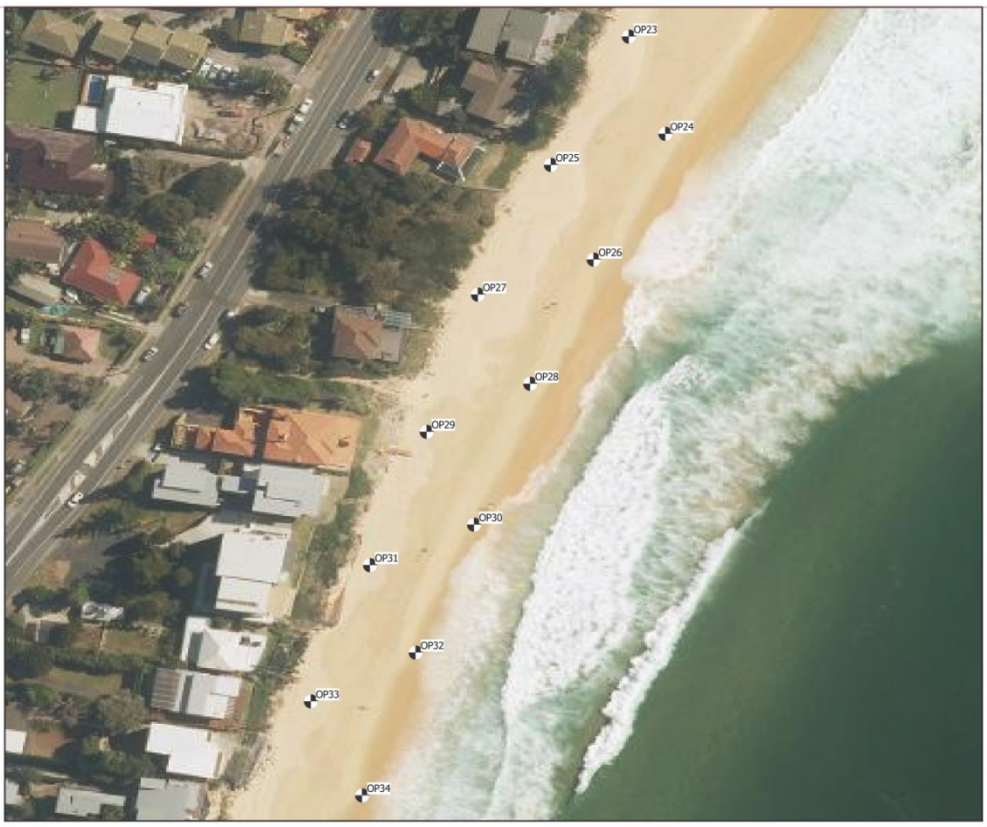
Legend

Observation Test Pit Locations

N

0 10 20 30 40 m

Image Source: Sixmaps (2016)




| | |
|---|---|
| Project Reference | P033823 |
| Report Name | Preliminary ACM Assessment |
| Client | Central Coast Council |

**Wamberal Beach, NSW 2260**

**Figure 3 - Area 3 Test Pit Locations**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:800

Coor. Sys: WGS 84 EPSG:4326

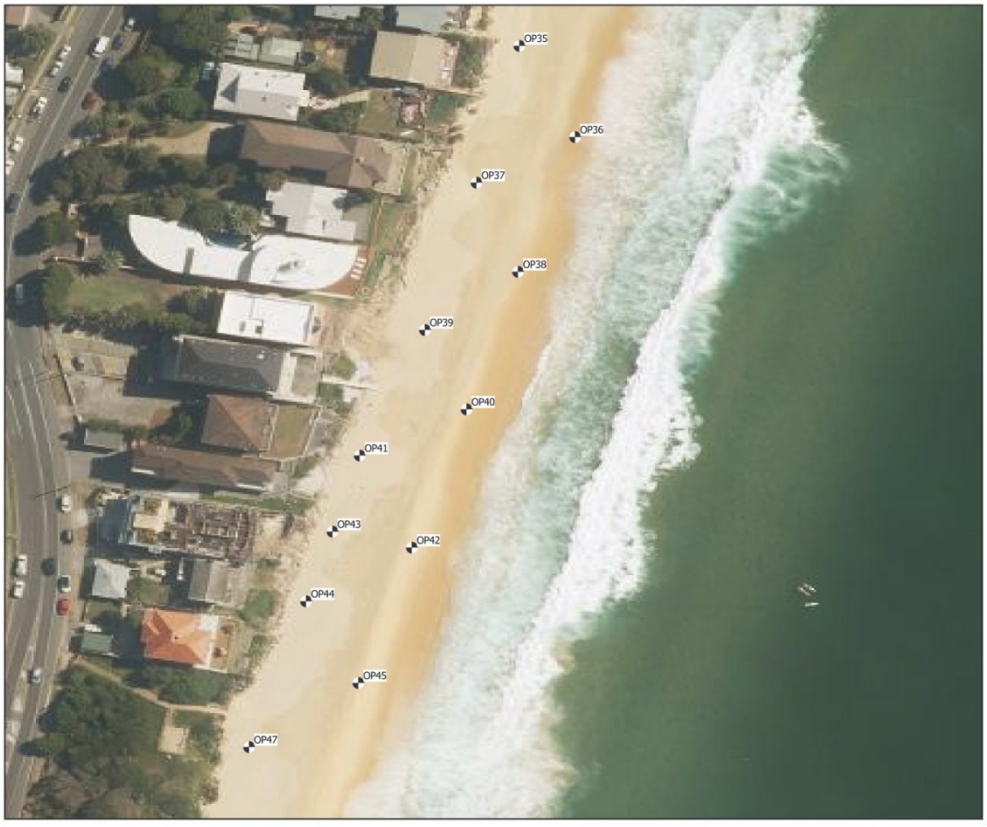
Legend

Observation Test Pit Locations

N

0 10 20 30 40 m

Image Source: Sixmaps (2016)




| | |
|---|---|
| Project Reference | P033823 |
| Report Name | Preliminary ACM Assessment |
| Client | Central Coast Council |

**Wamberal Beach, NSW 2260**

**Figure 3 - Area 4 Test Pit Locations**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:800

Coor. Sys: WGS 84 EPSG:4326

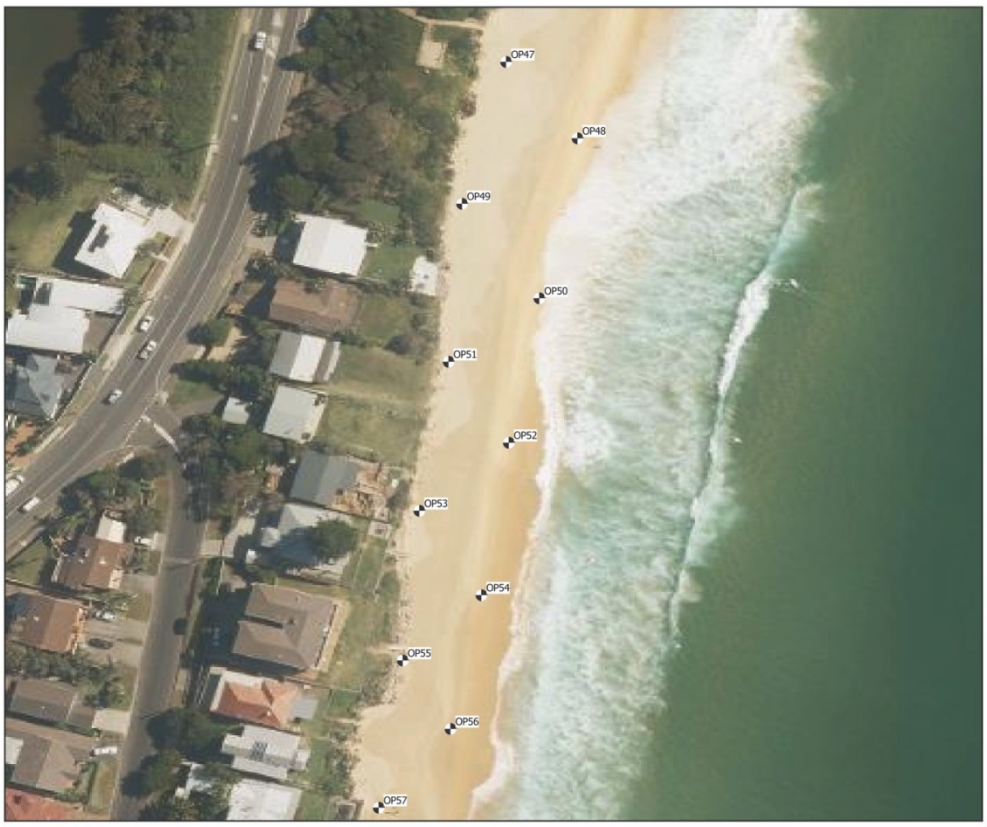
Legend

Observation Test Pit Locations

N

0 10 20 30 40 m

Image Source: Sixmaps (2016)




| | |
|---|---|
| Project Reference | P033823 |
| Report Name | Preliminary ACM Assessment |
| Client | Central Coast Council |

**Wamberal Beach, NSW 2260**

**Figure 3 - Area 5 Test Pit Locations**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:800

Coor. Sys: WGS 84 EPSG:4326

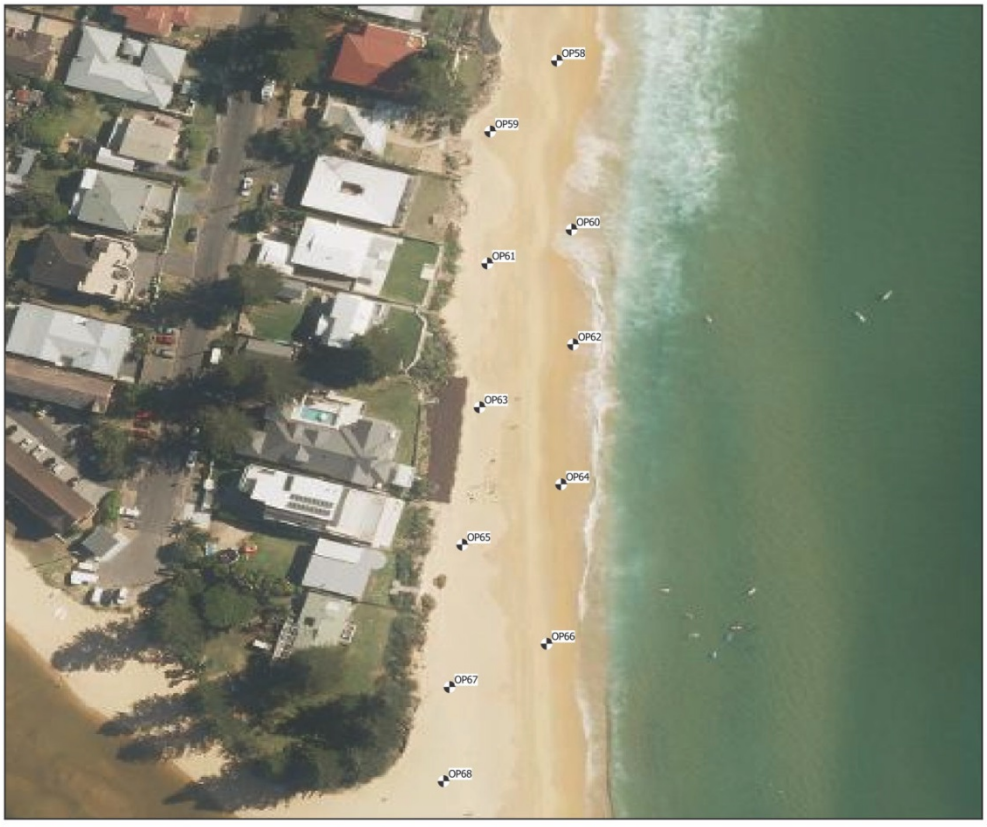
Legend

Observation Test Pit Locations

N

0 10 20 30 40 m

Image Source: Sixmaps (2016)




| | |
|---|---|
| Project Reference | P033823 |
| Report Name | Preliminary ACM Assessment |
| Client | Central Coast Council |

**Wamberal Beach, NSW 2260**

**Figure 3 - Area 6 Test Pit Locations**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:800

Coor. Sys: WGS 84 EPSG:4326

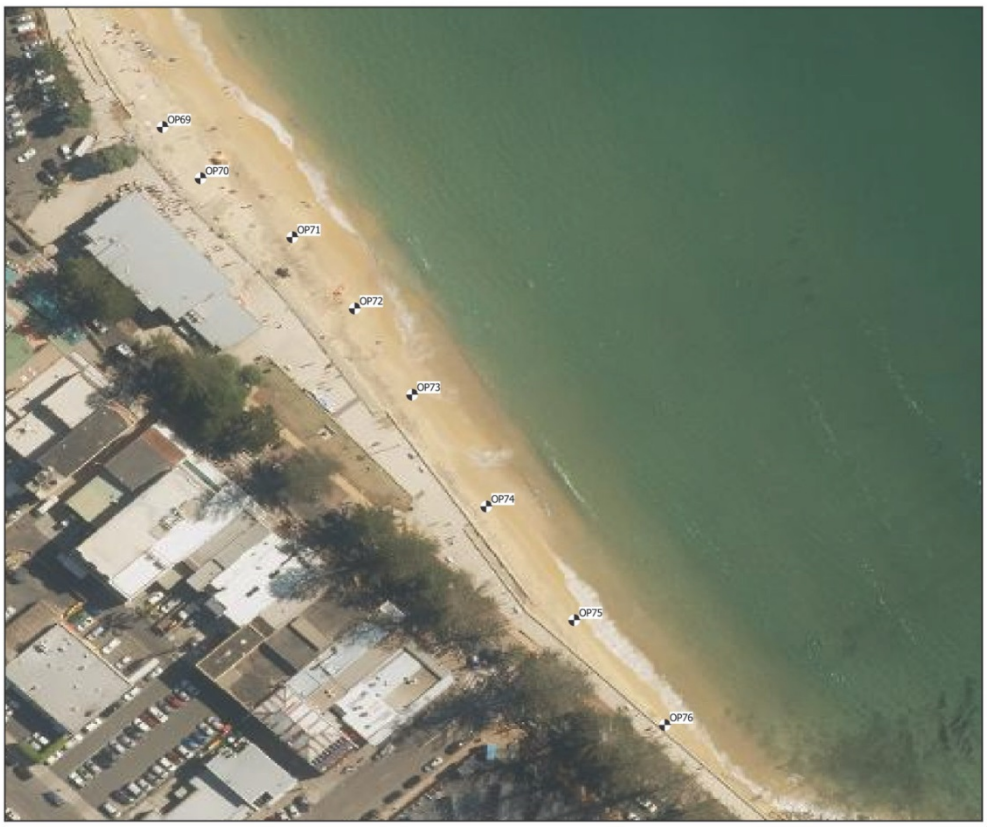
Legend

Observation Test Pit Locations

N

0 10 20 30 40 m

Image Source: Sixmaps (2016)




| | |
|---|---|
| Project Reference | P033823 |
| Report Name | Preliminary ACM Assessment |
| Client | Central Coast Council |

**Terrigal Beach, NSW 2260**

**Figure 4 - Area 7 Test Pit Locations**

PROGRESSIVE RISK MANAGEMENT

Scale: 1:800

Coor. Sys: WGS 84 EPSG:4326

Legend

Observation Test Pit Locations

N

0 10 20 30 40 m

Image Source: Sixmaps (2016)

# Appendix A

Photolog

| Photolog - Wamber Beach 28/08/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Wamberal Beach - Wamberal Beach, Wamberal NSW 2260 |

**Photo 1:** Image of OP01

**Photo 2:** Image of OP03

**Photo 3:** Image of OP04

**Photo 4:** Image of OP06

**Photo 5:** Image of OP12 reinstated observation pit.

**Photo 6:** Image of OP13

| Photolog - Wamber Beach 28/08/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Wamberal Beach - Wamberal Beach, Wamberal NSW 2260 |

**Photo 7:** Image of OP28

**Photo 8:** Image of OP20

**Photo 9:** Image of OP25

**Photo 10:** Image of OP27

PROGRESSIVE RISK MANAGEMENT

| Photolog - Wamber Beach 29/08/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Wamberal Beach - Wamberal Beach, Wamberal NSW 2260 |

**Photo 1:** Image of OP30

**Photo 2:** Image of OP30

**Photo 3:** Image of OP30

**Photo 4:** Image of OP32

**Photo 5:** Image of OP33

**Photo 6:** Image of OP40

| Photolog - Wamber Beach 29/08/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Wamberal Beach - Wamberal Beach, Wamberal NSW 2260 |

**Photo 7:** Image of OP43

**Photo 8:** Image of OP44

**Photo 9:** Image of OP45

**Photo 10:** Image of OP45

| Photolog - Wamber Beach 25/09/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Wamberal Beach - Wamberal Beach, Wamberal NSW 2260 |

**Photo 1:** Image of OP47

**Photo 2:** Image of OP49

**Photo 3:** Image of OP49

**Photo 4:** Image of OP50

**Photo 5:** Image of OP51

**Photo 6:** Image of OP53

| Photolog - Wamber Beach 25/09/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Wamberal Beach - Wamberal Beach, Wamberal NSW 2260 |

**Photo 7:** Image of OP55

**Photo 8:** Image of OP56

**Photo 9:** Image of OP58

**Photo 10:** Image of OP62

**Photo 11:** Image of OP62

**Photo 12:** Image of OP63

| Photolog - Wamber Beach 25/09/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Wamberal Beach - Wamberal Beach, Wamberal NSW 2260 |

**Photo 13:** Image of OP65

**Photo 14:** Image of OP66

| Photolog - Terrigal Beach 26/09/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Terrigal Beach - Terrigal Beach, Terrigal NSW 2260 |

**Photo 1:** Image of OP69

**Photo 2:** Image of OP70

**Photo 3:** Image of OP70

**Photo 4:** Image of OP71

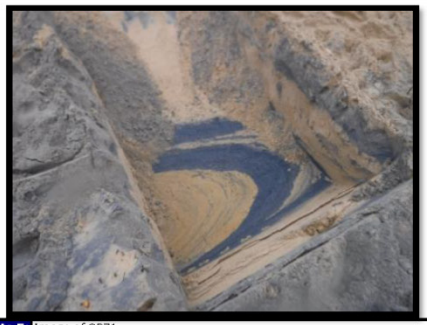


**Photo 5:** Image of OP71

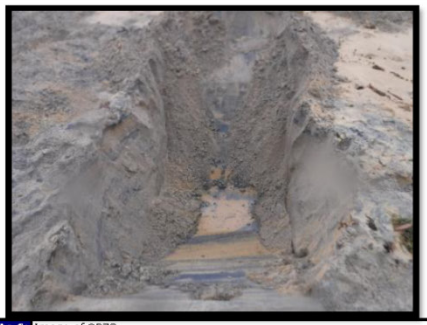


**Photo 6:** Image of OP72

| Photolog - Terrigal Beach 26/09/2018 | |
|---|---|
| **Report Name:** | Preliminary ACM Assessment |
| **Project Ref:** | P033823.015 / C0171 |
| **Site Details:** | Terrigal Beach - Terrigal Beach, Terrigal NSW 2260 |

**Photo 7:** Image of OP73

**Photo 8:** Image of OP74

**Photo 9:** Image of OP75

**Photo 10:** Image of OP76

**End of Photolog**

# Appendix B

NATA Accredited Laboratory Results

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
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# CERTIFICATE OF ANALYSIS 199892

| Client Details | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

| Sample Details | |
|---|---|
| **Your Reference** | **PO33823 CCC Wamberal** |
| **Number of Samples** | 14 soil |
| **Date samples received** | 04/09/2018 |
| **Date completed instructions received** | 04/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

| Report Details | |
|---|---|
| **Date results requested by** | 10/09/2018 |
| **Date of Issue** | 10/09/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Asbestos Approved Identifier: Matt Tang
Authorised by Asbestos Approved Signatory: Matt Tang

**Results Approved By**
Matthew Tang, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: PO33823 CCC Wamberal**

| Asbestos ID - soils NEPM - ASB-001 | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199892-1 | 199892-2 | 199892-3 | 199892-4 | 199892-5 |
| Your Reference | UNITS | OP06 | OP09 | OP12 | OP16 | OP20 |
| Depth | | 0.3-0.4 | 0.3-0.4 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 |
| Type of sample | | soil | soil | soil | soil | soil |
| Date analysed | - | 06/09/2018 | 06/09/2018 | 06/09/2018 | 06/09/2018 | 06/09/2018 |
| Sample mass tested | g | 1,211.18 | 1,019.45 | 1,174.32 | 1,166.62 | 1,202.24 |
| Sample Description | - | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil |
| Asbestos ID in soil (AS4964) >0.1g/kg | - | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected |
| Trace Analysis | - | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected |
| Total Asbestos[#1] | g/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Asbestos ID in soil <0.1g/kg* | - | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected |
| ACM >7mm Estimation* | g | – | – | – | – | – |
| FA and AF Estimation* | g | – | – | – | – | – |
| ACM >7mm Estimation* | %(w/w) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| FA and AF Estimation*#2 | %(w/w) | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |

**Client Reference: PO33823 CCC Wamberal**

| Asbestos ID - soils NEPM - ASB-001 | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199892-6 | 199892-7 | 199892-8 | 199892-9 | 199892-10 |
| Your Reference | UNITS | OP23 | OP27 | OP29 | OP31 | OP34 |
| Depth | | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 |
| Type of sample | | soil | soil | soil | soil | soil |
| Date analysed | - | 06/09/2018 | 06/09/2018 | 06/09/2018 | 06/09/2018 | 06/09/2018 |
| Sample mass tested | g | 1,185.91 | 1,102.38 | 943.23 | 1,206.74 | 1,079.06 |
| Sample Description | - | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil |
| Asbestos ID in soil (AS4964) >0.1g/kg | - | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected |
| Trace Analysis | - | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected |
| Total Asbestos[#1] | g/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Asbestos ID in soil <0.1g/kg* | - | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected |
| ACM >7mm Estimation* | g | – | – | – | – | – |
| FA and AF Estimation* | g | – | – | – | – | – |
| ACM >7mm Estimation* | %(w/w) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| FA and AF Estimation*#2 | %(w/w) | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |

**Client Reference: PO33823 CCC Wamberal**

| Asbestos ID - soils NEPM - ASB-001 | | | | | |
|---|---|---|---|---|---|
| Our Reference | | 199892-11 | 199892-12 | 199892-13 | 199892-14 |
| Your Reference | UNITS | OP37 | OP40 | OP42 | OP44 |
| Depth | | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 |
| Type of sample | | soil | soil | soil | soil |
| Date analysed | - | 06/09/2018 | 06/09/2018 | 06/09/2018 | 06/09/2018 |
| Sample mass tested | g | 1,073.15 | 1,096.73 | 948.9 | 1,089.9 |
| Sample Description | - | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil |
| Asbestos ID in soil (AS4964) >0.1g/kg | - | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected |
| Trace Analysis | - | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected |
| Total Asbestos[#1] | g/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| Asbestos ID in soil <0.1g/kg* | - | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected |
| ACM >7mm Estimation* | g | – | – | – | – |
| FA and AF Estimation* | g | – | – | – | – |
| ACM >7mm Estimation* | %(w/w) | <0.01 | <0.01 | <0.01 | <0.01 |
| FA and AF Estimation*#2 | %(w/w) | <0.001 | <0.001 | <0.001 | <0.001 |

**Client Reference: PO33823 CCC Wamberal**

| Method ID | Methodology Summary |
|---|---|
| **ASB-001** | Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004. |
| **ASB-001** | Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004.<br>Results reported denoted with * are outside our scope of NATA accreditation.<br><br>**NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)<br><br>**NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.<br><br>Estimation = Estimated asbestos weight<br><br>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques. |

**Client Reference: PO33823 CCC Wamberal**

| Result Definitions | |
|---|---|
| NT | Not tested |
| NA | Test not required |
| INS | Insufficient sample for this test |
| PQL | Practical Quantitation Limit |
| < | Less than |
| > | Greater than |
| RPD | Relative Percent Difference |
| LCS | Laboratory Control Sample |
| NS | Not specified |
| NEPM | National Environmental Protection Measure |
| NR | Not Reported |

**Client Reference: PO33823 CCC Wamberal**

## Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
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# CERTIFICATE OF ANALYSIS 201859

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey, Sarah Dale, Geoff Fletcher |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823 CCC Wamberal Beach** |
| **Number of Samples** | 7 Soil |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 08/10/2018 |
| **Date of Issue** | 08/10/2018 |

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**Asbestos Approved By**
Analysed by Asbestos Approved Identifier: Aida Marner
Authorised by Asbestos Approved Signatory: Lucy Zhu

**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823 CCC Wamberal Beach**

| Asbestos ID - soils NEPM - ASB-001 | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 201859-1 | 201859-2 | 201859-3 | 201859-4 | 201859-5 |
| Your Reference | UNITS | OP47 | OP49 | OP52 | OP55 | OP57 |
| Depth | | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 |
| Date Sampled | | 25/09/2018 | 25/09/2018 | 25/09/2018 | 25/09/2018 | 25/09/2018 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date analysed | - | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 |
| Sample mass tested | g | 1,230.73 | 908.95 | 1,157.97 | 1,100.76 | 1,139.65 |
| Sample Description | - | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil |
| Asbestos ID in soil (AS4964) >0.1g/kg | - | No asbestos detected at reporting limit of 0.1g/kg<br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br>Organic fibres detected |
| Trace Analysis | - | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected |
| Total Asbestos#1 | g/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Asbestos ID in soil <0.1g/kg* | - | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected |
| ACM >7mm Estimation* | g | – | – | – | – | – |
| FA and AF Estimation* | g | – | – | – | – | – |
| ACM >7mm Estimation* | %(w/w) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| FA and AF Estimation*#2 | %(w/w) | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |

**Client Reference: P033823 CCC Wamberal Beach**

| Asbestos ID - soils NEPM - ASB-001 | | | |
|---|---|---|---|
| Our Reference | | 201859-6 | 201859-7 |
| Your Reference | UNITS | OP62 | OP65 |
| Depth | | 0.1-0.2 | 0.1-0.2 |
| Date Sampled | | 25/09/2018 | 25/09/2018 |
| Type of sample | | Soil | Soil |
| Date analysed | - | 08/10/2018 | 08/10/2018 |
| Sample mass tested | g | 1,258.61 | 1,375.07 |
| Sample Description | - | Beige sandy soil | Beige sandy soil |
| Asbestos ID in soil (AS4964) >0.1g/kg | - | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected |
| Trace Analysis | - | No asbestos detected | No asbestos detected |
| Total Asbestos#1 | g/kg | <0.1 | <0.1 |
| Asbestos ID in soil <0.1g/kg* | - | No visible asbestos detected | No visible asbestos detected |
| ACM >7mm Estimation* | g | – | – |
| FA and AF Estimation* | g | – | – |
| ACM >7mm Estimation* | %(w/w) | <0.01 | <0.01 |
| FA and AF Estimation*#2 | %(w/w) | <0.001 | <0.001 |

**Client Reference: P033823 CCC Wamberal Beach**

| Method ID | Methodology Summary |
|---|---|
| **ASB-001** | Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004. |
| **ASB-001** | Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004.<br>Results reported denoted with * are outside our scope of NATA accreditation.<br><br>**NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)<br><br>**NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.<br><br>Estimation = Estimated asbestos weight<br><br>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques. |

**Client Reference: P033823 CCC Wamberal Beach**

| Result Definitions | |
|---|---|
| NT | Not tested |
| NA | Test not required |
| INS | Insufficient sample for this test |
| PQL | Practical Quantitation Limit |
| < | Less than |
| > | Greater than |
| RPD | Relative Percent Difference |
| LCS | Laboratory Control Sample |
| NS | Not specified |
| NEPM | National Environmental Protection Measure |
| NR | Not Reported |

**Client Reference: P033823 CCC Wamberal Beach**

## Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

**Envirolab Services Pty Ltd**
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www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 201860

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey, Sarah Dale, Geoff Fletcher |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823 CCC Terrigal Beach** |
| **Number of Samples** | 8 Soil |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 08/10/2018 |
| **Date of Issue** | 08/10/2018 |

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**Asbestos Approved By**
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823 CCC Terrigal Beach**

| Asbestos ID - soils NEPM - ASB-001 | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 201860-1 | 201860-2 | 201860-3 | 201860-4 | 201860-5 |
| Your Reference | UNITS | OP69 | OP70 | OP71 | OP72 | OP73 |
| Depth | | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 |
| Date Sampled | | 26/09/2018 | 26/09/2018 | 26/09/2018 | 26/09/2018 | 26/09/2018 |
| Type of sample | | Soil | Soil | Soil | Soil | Soil |
| Date analysed | - | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 |
| Sample mass tested | g | 1,156.32 | 1,045.82 | 1,276 | 1,330.99 | 1,034.99 |
| Sample Description | - | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil | Beige sandy soil |
| Asbestos ID in soil (AS4964) >0.1g/kg | - | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected |
| Trace Analysis | - | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected | No asbestos detected |
| Total Asbestos[#1] | g/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Asbestos ID in soil <0.1g/kg* | - | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected |
| ACM >7mm Estimation* | g | – | – | – | – | – |
| FA and AF Estimation* | g | – | – | – | – | – |
| ACM >7mm Estimation* | %(w/w) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| FA and AF Estimation*#2 | %(w/w) | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |

**Client Reference: P033823 CCC Terrigal Beach**

| Asbestos ID - soils NEPM - ASB-001 | | | | |
|---|---|---|---|---|
| Our Reference | | 201860-6 | 201860-7 | 201860-8 |
| Your Reference | UNITS | OP74 | OP75 | OP76 |
| Depth | | 0.1-0.2 | 0.1-0.2 | 0.1-0.2 |
| Date Sampled | | 26/09/2018 | 26/09/2018 | 26/09/2018 |
| Type of sample | | Soil | Soil | Soil |
| Date analysed | - | 08/10/2018 | 08/10/2018 | 08/10/2018 |
| Sample mass tested | g | 1,105.4 | 1,185.54 | 1,224.81 |
| Sample Description | - | Beige sandy soil | Beige sandy soil | Beige sandy soil |
| Asbestos ID in soil (AS4964) >0.1g/kg | - | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected | No asbestos detected at reporting limit of 0.1g/kg<br><br>Organic fibres detected |
| Trace Analysis | - | No asbestos detected | No asbestos detected | No asbestos detected |
| Total Asbestos#1 | g/kg | <0.1 | <0.1 | <0.1 |
| Asbestos ID in soil <0.1g/kg* | - | No visible asbestos detected | No visible asbestos detected | No visible asbestos detected |
| ACM >7mm Estimation* | g | – | – | – |
| FA and AF Estimation* | g | – | – | – |
| ACM >7mm Estimation* | %(w/w) | <0.01 | <0.01 | <0.01 |
| FA and AF Estimation*#2 | %(w/w) | <0.001 | <0.001 | <0.001 |

**Client Reference: P033823 CCC Terrigal Beach**

| Method ID | Methodology Summary |
|---|---|
| **ASB-001** | Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004. |
| **ASB-001** | Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004.<br>Results reported denoted with * are outside our scope of NATA accreditation.<br><br>**NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)<br><br>**NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.<br><br>Estimation = Estimated asbestos weight<br><br>Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques. |

**Client Reference: P033823 CCC Terrigal Beach**

| Result Definitions | |
|---|---|
| NT | Not tested |
| NA | Test not required |
| INS | Insufficient sample for this test |
| PQL | Practical Quantitation Limit |
| < | Less than |
| > | Greater than |
| RPD | Relative Percent Difference |
| LCS | Laboratory Control Sample |
| NS | Not specified |
| NEPM | National Environmental Protection Measure |
| NR | Not Reported |

**Client Reference: P033823 CCC Terrigal Beach**

## Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

# Appendix C

Background Air Monitoring Reports

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Monday, 3 September 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.004 | **Client Code:** | C0171 |

| **Introduction:** | |
|---|---|
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Site Details:** | |
|---|---|
| **Site Name:** | Wamberal Beach |
| **Site Address:** | Ocean View Drive, Wamberal Beach NSW 2260 |
| **Date of Monitoring:** | 27-29 August 2018 |
| **Purpose of Monitoring:** | Background Asbestos fibre Air Monitoring |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure:** | Refer to **Figure 1** appended to this report, for sampling locations. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br><br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results.<br>Filter ID DE300575 void due to pump battery fault/failure. Filter ID DG096273 void due to pump fallen onto ground. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.004 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Beach front of Wamberal Beach SLSC | 27/08/18 | PRM54 | DE300607 | 07:24 | 13:40 | 376 | 489 | 0.0 | <0.01 |
| Public access pathway off Surfers Road | 27/08/18 | PRM73 | DE300592 | 07:34 | 13:44 | 370 | 481 | 0.0 | <0.01 |
| Beach front of property 95 | 27/08/18 | PRM74 | DE300578 | 07:41 | 13:46 | 365 | 475 | 0.0 | <0.01 |
| Public access pathway adjacent property 67 | 27/08/18 | PRM52 | DE300593 | 07:51 | 13:52 | 361 | 469 | 0.0 | <0.01 |
| Public access pathway adjacent property 27 | 27/08/18 | PRM40 | DE300575 | 07:59 | 13:58 | 359 | 467 | **VOID** | **VOID** |
| Beach front of property 1 | 27/08/18 | PRM62 | DE300568 | 08:06 | 14:02 | 356 | 463 | 0.0 | <0.01 |
| Blank | 27/08/18 | - | DE300595 | - | - | - | - | 0.0 | - |
| Beach front of Wamberal Beach SLSC | 28/08/18 | PRM48 | DG096267 | 08:25 | 15:08 | 403 | 524 | 0.0 | <0.01 |
| Public access pathway off Surfers Road | 28/08/18 | PRM64 | DG096263 | 08:31 | 15:05 | 394 | 512 | 0.0 | <0.01 |
| Beach front of property 95 | 28/08/18 | PRM74 | DG096276 | 08:37 | 15:02 | 385 | 501 | 0.0 | <0.01 |
| Public access pathway adjacent property 67 | 28/08/18 | PRM73 | DG096275 | 08:43 | 14:58 | 375 | 488 | 0.0 | <0.01 |
| Public access pathway adjacent property 27 | 28/08/18 | PRM62 | DG096273 | 08:46 | 15:20 | 394 | 512 | **VOID** | **VOID** |
| Beach front of property 1 | 28/08/18 | PRM32 | DG096260 | 08:51 | 15:24 | 393 | 511 | 0.0 | <0.01 |
| Blank | 28/08/18 | - | DG096277 | - | - | - | - | 0.0 | - |
| Beach front of Wamberal Beach SLSC | 29/08/18 | PRM63 | DG096287 | 07:08 | 13:18 | 370 | 481 | 0.0 | <0.01 |
| Public access pathway off Surfers Road | 29/08/18 | PRM73 | DG096259 | 07:12 | 13:22 | 370 | 481 | 0.0 | <0.01 |
| Beach front of property 95 | 29/08/18 | PRM62 | DG096286 | 07:14 | 13:24 | 370 | 481 | 0.0 | <0.01 |
| Public access pathway adjacent property 67 | 29/08/18 | PRM59 | DG096274 | 07:22 | 13:28 | 366 | 476 | 0.0 | <0.01 |
| Public access pathway adjacent property 27 | 29/08/18 | PRM56 | DE300586 | 07:25 | 13:32 | 367 | 477 | 0.0 | <0.01 |
| Beach front of property 1 | 29/08/18 | PRM52 | DG096269 | 07:29 | 13:36 | 367 | 477 | 0.0 | <0.01 |
| Blank | 29/08/18 | - | DG096264 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

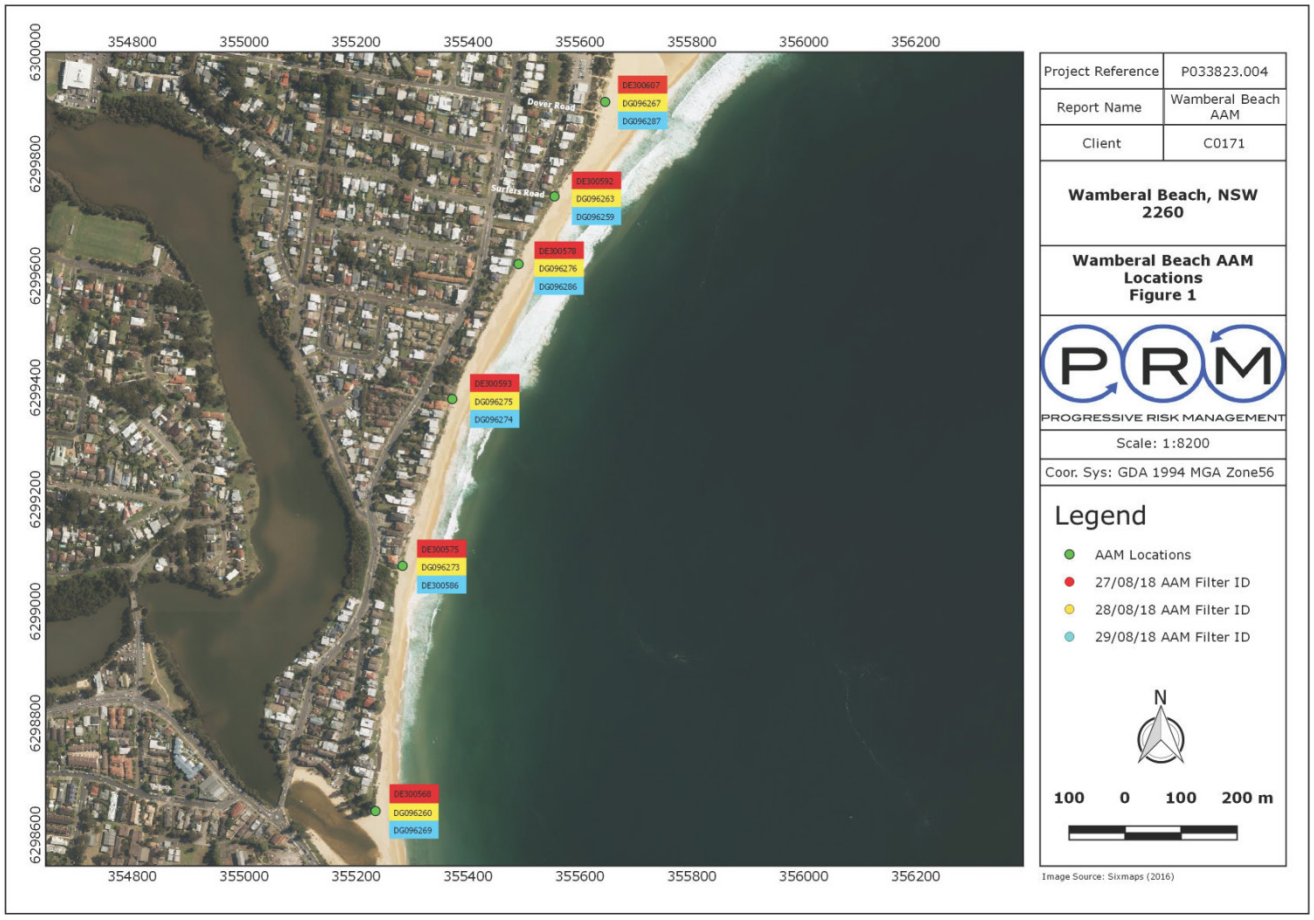
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

If you have further questions please do not hesitate to contact the undersigned.

| **Report Review:** | | |
|---|---|---|
| | **Report Prepared by:** | **Report Reviewed by:** |
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Managing Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-68 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |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DE300575
DG096273
DE300586
DE300568
DG096260
DG096269
Project Reference
P033823.004
Report Name
Wamberal Beach AAM
Client
C0171
Wamberal Beach, NSW 2260
Wamberal Beach AAM Locations Figure 1
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:8200
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
27/08/18 AAM Filter ID
28/08/18 AAM Filter ID
29/08/18 AAM Filter ID
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Image Source: Sixmaps (2016)

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report 27/08/2018 |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.004 |

**Photo 1:** Image of PRM54 Beach front of Wamberal Beach SLSC

**Photo 2:** Image of PRM73 Public access pathway off Surfers Road

**Photo 3:** Image of PRM74, Beach front of property 95

**Photo 4:** Image of PRM52, Public access pathway adjacent property 67

**Photo 5:** Image of PRM40, Public access pathway adjacent property 27

**Photo 6:** Image of PRM62, Beach front of property 1

**End of Photolog**

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report 28/08/2018 |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.004 |

**Photo 1:** Image of PRM48 Beach front of Wamberal Beach SLSC

**Photo 2:** Image of PRM64 Public access pathway off Surfers Road

**Photo 3:** Image of PRM74, Beach front of property 95

**Photo 4:** Image of PRM73, Public access pathway adjacent property 67

**Photo 5:** Image of PRM62, Public access pathway adjacent property 27

**Photo 6:** Image of PRM32, Beach front of property 1

**End of Photolog**

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report 29/08/2018 |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.004 |

**Photo 1:** Image of PRM63, Beach front of Wamberal Beach SLSC

**Photo 2:** Image of PRM73, Public access pathway off Surfers Road

**Photo 3:** Image of PRM62, Beach front of property 95

**Photo 4:** Image of PRM59, Public access pathway adjacent property 67

**Photo 5:** Image of PRM56, Public access pathway adjacent property 27

**Photo 6:** Image of PRM52, Beach front of property 1

**End of Photolog**

**Envirolab Services Pty Ltd**
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customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 199624

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Sarah Dale |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.004, Wamberal Beach AAM** |
| **Number of Samples** | 6 Filter |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 27/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 30/08/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Lucy Zhu
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.004, Wamberal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199624-1 | 199624-2 | 199624-3 | 199624-4 | 199624-5 |
| Your Reference | UNITS | Beach front of Wamberal Beach SLSC | Public access pathway off Surfers Rd | Beachfront of property 95 | Public access pathway adj property 67 | Beachfront of property 1 |
| Cassette No. | | DE300607 | DE300592 | DE300578 | DE300593 | DE300568 |
| Pump ID | | PRM54 | PRM73 | PRM74 | PRM52 | PRM62 |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 30/08/2018 | 30/08/2018 | 30/08/2018 | 30/08/2018 | 30/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | 100 |
| Volume Sampled | Litres | 489 | 481 | 474 | 469 | 463 |
| Total Sample Time | Min | 376 | 370 | 365 | 361 | 356 |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |

| Fibre Counting + Concentration | | |
|---|---|---|
| Our Reference | | 199624-6 |
| Your Reference | UNITS | Blank |
| Cassette No. | | DE300595 |
| Pump ID | | - |
| Type of sample | | Filter |
| Date analysed | - | 30/08/2018 |
| Fibres | - | 0.0 |
| Fields | - | 100 |
| Effective Filter Area | $mm^2$ | 381.65 |
| Graticule Diameter | µm | 100 |
| Volume Sampled | Litres | - |
| Total Sample Time | Min | 0 |
| Fibre Concentration | Fibres/mL | - |

**Client Reference: P033823.004, Wamberal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.004, Wamberal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
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customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 199627

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Sarah Dale |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.004, Wamberal Beach AAM** |
| **Number of Samples** | 6 Filters |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 28/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 04/09/2018 |
| **Reissue Details** | This report replaces R02 created on 04/09/2018 due to: Registration amended (client request) |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Lucy Zhu
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.004, Wamberal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199627-1 | 199627-2 | 199627-3 | 199627-4 | 199627-6 |
| Your Reference | UNITS | Beach front of Wamberal Beach SLSC | Public access pathway off Surfers Rd | Beachfront of property 95 | Public access pathway adj property 67 | Beachfront of property 1 |
| Cassette No. | | DG096267 | DG096263 | DG096276 | DG096275 | DG096260 |
| Pump ID | | PRM48 | PRM64 | PRM74 | PRM73 | PRM32 |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 30/08/2018 | 30/08/2018 | 30/08/2018 | 30/08/2018 | 30/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | 100 |
| Volume Sampled | Litres | 524 | 512 | 500 | 488 | 511 |
| Total Sample Time | Min | 403 | 394 | 385 | 375 | 393 |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |

| Fibre Counting + Concentration | | |
|---|---|---|
| Our Reference | | 199627-7 |
| Your Reference | UNITS | Blank |
| Cassette No. | | DG096277 |
| Pump ID | | - |
| Type of sample | | Filter |
| Date analysed | - | 30/08/2018 |
| Fibres | - | 0.0 |
| Fields | - | 100 |
| Effective Filter Area | $mm^2$ | 381.65 |
| Graticule Diameter | µm | 100 |
| Volume Sampled | Litres | - |
| Total Sample Time | Min | 0 |
| Fibre Concentration | Fibres/mL | - |

**Client Reference: P033823.004, Wamberal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.004, Wamberal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

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# CERTIFICATE OF ANALYSIS 199621

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Sarah Dale |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.004, Wamberal Beach AAM** |
| **Number of Samples** | 7 Filter |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 29/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 31/08/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Matt Tang
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.004, Wamberal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199621-1 | 199621-2 | 199621-3 | 199621-4 | 199621-5 |
| Your Reference | UNITS | Beach front of Wamberal Beach SLSC | Public access pathway off Surfers Rd | Beachfront of property 95 | Public access pathway adj property 67 | Public access pathway adj property 27 |
| Cassette No. | | DG096287 | DG096259 | DG096286 | DG096274 | DE300586 |
| Pump ID | | PRM63 | PRM73 | PRM62 | PRM59 | PRM56 |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | 100 |
| Volume Sampled | Litres | 481 | 481 | 481 | 476 | 477 |
| Total Sample Time | Min | 370 | 370 | 370 | 366 | 367 |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |

| Fibre Counting + Concentration | | | |
|---|---|---|---|
| Our Reference | | 199621-6 | 199621-7 |
| Your Reference | UNITS | Beachfront of property 1 | Blank |
| Cassette No. | | DG096269 | DG096264 |
| Pump ID | | PRM52 | - |
| Type of sample | | Filter | Filter |
| Date analysed | - | 31/08/2018 | 31/08/2018 |
| Fibres | - | 0.0 | 0.0 |
| Fields | - | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 |
| Volume Sampled | Litres | 477 | - |
| Total Sample Time | Min | 367 | 0 |
| Fibre Concentration | Fibres/mL | <0.01 | - |

**Client Reference: P033823.004, Wamberal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.004, Wamberal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Tuesday, 4 September 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.005 | **Client Code:** | C0171 |

| **Introduction:** | |
|---|---|
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Site Details:** | |
|---|---|
| **Site Name:** | Terrigal Beach |
| **Site Address:** | Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Date of Monitoring:** | 27-29 August 2018 |
| **Site Description:** | Terrigal Beach SLSC carpark to the rockpool on the eastern end of the esplanade. |
| **Purpose of Monitoring:** | To determine the extent of airborne asbestos contamination, if present. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for sampling locations. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

**Project Ref:** P033823.005 **Client Reference:** C0171

| Location | Date | Pump ID | Filter ID | Start Time | Finish Time | Sample Time (min) | Volume Sampled | Fibres / 100 Fields | Results (fibres/mL) |
|---|---|---|---|---|---|---|---|---|---|
| Terrigal Beach carpark on signage post | 27/08/18 | PRM63 | DE300590 | 08:20 | 14:12 | 352 | 458 | 0.0 | <0.01 |
| SE of Terrigal SLSC on the esplanade walkway on signage post | 27/08/18 | PRM32 | DE300550 | 08:24 | 14:14 | 350 | 455 | 0.0 | <0.01 |
| Opposite Kurrawyba Aveune on the esplanade walkway on signage post | 27/08/18 | PRM59 | DE300591 | 08:29 | 14:16 | 347 | 451 | 0.0 | <0.01 |
| Opposite Ash Street on the esplanade walkway on fence | 27/08/18 | PRM56 | DE300582 | 08:32 | 14:18 | 346 | 450 | 0.0 | <0.01 |
| Blank | 27/08/18 | - | DE300583 | - | - | - | - | 0.0 | - |
| Terrigal Beach carpark on signage post | 28/08/18 | PRM63 | DG096262 | 08:50 | 15:32 | 402 | 523 | 0.0 | <0.01 |
| Beach front of the Terrigal SLSC on signage post | 28/08/18 | PRM56 | DG096271 | 08:45 | 15:34 | 409 | 532 | 0.0 | <0.01 |
| Opposite Kurrawyba Aveune on the esplanade walkway on signage post | 28/08/18 | PRM59 | DG096265 | 08:40 | 15:36 | 416 | 541 | 0.0 | <0.01 |
| Opposite Ash Street on the esplanade walkway on fence | 28/08/18 | PRM52 | DG096261 | 08:35 | 15:38 | 423 | 550 | 0.0 | <0.01 |
| Blank | 28/08/18 | - | DG096266 | - | - | - | - | 0.0 | - |
| Terrigal Beach carpark on signage post | 29/08/18 | PRM48 | DG096280 | 07:18 | 13:45 | 387 | 503 | 0.0 | <0.01 |
| Beach front of the Terrigal SLSC on signage post | 29/08/18 | PRM74 | DG096284 | 07:22 | 13:48 | 386 | 502 | 0.0 | <0.01 |
| Opposite Kurrawyba Aveune on the esplanade walkway on signage post | 29/08/18 | PRM32 | DG096281 | 07:28 | 13:51 | 383 | 498 | 0.0 | <0.01 |
| Opposite Ash Street on the esplanade walkway on fence | 29/08/18 | PRM71 | DG096278 | 07:32 | 13:54 | 382 | 497 | 0.0 | <0.01 |
| Blank | 29/08/18 | - | DE300596 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

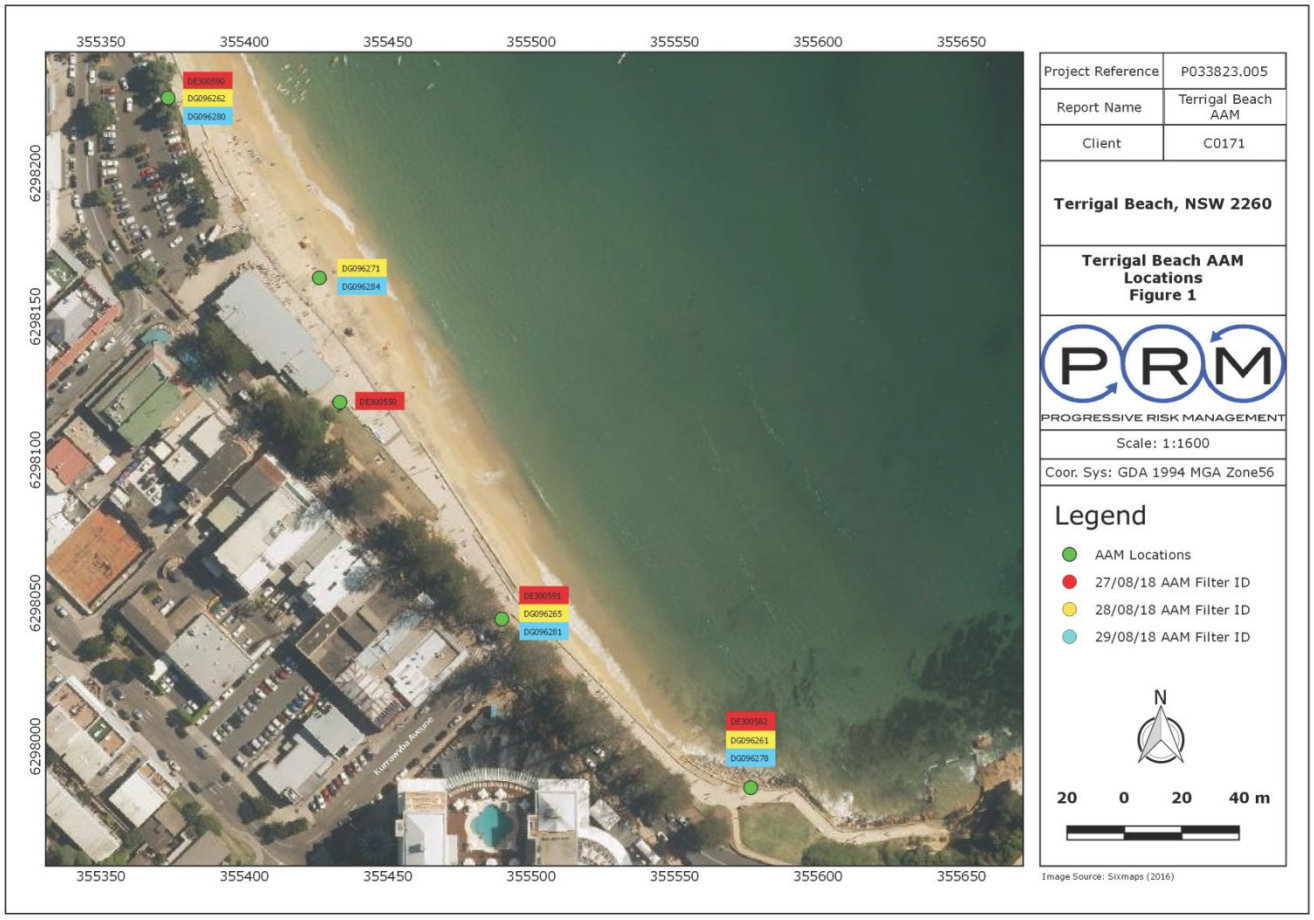
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

If you have further questions please do not hesitate to contact the undersigned.

| **Report Review:** | | |
|---|---|---|
| | **Report Prepared by:** | **Report Reviewed by:** |
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Managing Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-68 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |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DG096271
DG096284
DE300593
DE300591
DG096265
DG096281
DE300592
DG096261
DG096278
Kurrawa Avenue
Project Reference
P033823.005
Report Name
Terrigal Beach AAM
Client
C0171
Terrigal Beach, NSW 2260
Terrigal Beach AAM Locations Figure 1
PROGRESSIVE RISK MANAGEMENT
Scale: 1:1600
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
27/08/18 AAM Filter ID
28/08/18 AAM Filter ID
29/08/18 AAM Filter ID
N
20 0 20 40 m
Image Source: Sixmaps (2016)

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report 27/08/2018 |
| **Site:** | Terrigal Beach - Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Reference:** | P033823.005 |

**Photo 1:** Image of PRM63, Terrigal Beach carpark on signage post

**Photo 2:** Image of PRM32, SE of Terrigal SLSC on the esplanade walkway on signage post

**Photo 3:** Image of PRM59, Opposite Kurrawyba Aveune on the esplanade walkway on signage post

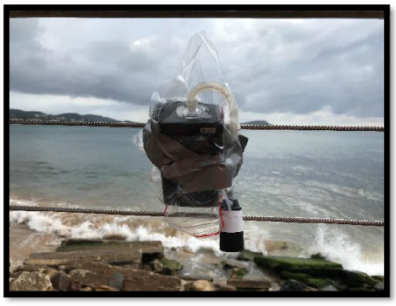

**Photo 4:** Iamge of PRM56, Opposite Ash Street on the esplanade walkway on fence

**End of Photolog**

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report 28/08/2018 |
| **Site:** | Terrigal Beach - Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Reference:** | P033823.005 |

**Photo 1:** Image of PRM63, Terrigal Beach carpark on signage post

**Photo 2:** Image of PRM56, Beach front of the Terrigal SLSC on signage post

**Photo 3:** Image of PRM59, Opposite Kurrawyba Aveune on the esplanade walkway on signage post

**Photo 4:** Image of PRM52, Opposite Ash Street on the esplanade walkway on fence

**End of Photolog**

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report 29/08/2018 |
| **Site:** | Terrigal Beach - Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Reference:** | P033823.005 |

**Photo 1:** Terrigal Beach carpark on signage post

**Photo 2:** Beach front of the Terrigal SLSC on signage post

**Photo 3:** Opposite Kurrawyba Aveune on the esplanade walkway on signage post

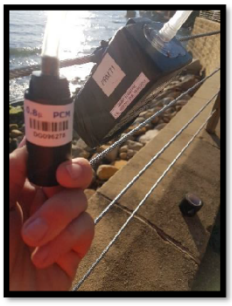

**Photo 4:** Opposite Ash Street on the esplanade walkway on fence

**End of Photolog**

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 199616

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Sarah Dale |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.005, Terrigal Beach AAM** |
| **Number of Samples** | 5 Filter |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 27/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 31/08/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Matt Tang
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.005, Terrigal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199616-1 | 199616-2 | 199616-3 | 199616-4 | 199616-5 |
| Your Reference | UNITS | Terriga Beach car park | SE of Terrigal SLSC on the esplanade walkway | Opp. Kurrawyba Ave on the esplanade walkway | Opp. Ash St on the esplanade walkway on fence | Blank |
| Cassette No. | | DE300590 | DE300550 | DE300591 | DE300582 | DE300583 |
| Pump ID | | PRM63 | PRM32 | PRM59 | PRM56 | - |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | [NA] |
| Volume Sampled | Litres | 458 | 455 | 451 | 450 | [NA] |
| Total Sample Time | Min | 352 | 350 | 347 | 346 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | [NA] |

**Client Reference: P033823.005, Terrigal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.005, Terrigal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 199620

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Sarah Dale |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.005, Terrigal Beach AAM** |
| **Number of Samples** | 5 Filter |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 28/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 31/08/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Matt Tang
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.005, Terrigal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199620-1 | 199620-2 | 199620-3 | 199620-4 | 199620-5 |
| Your Reference | UNITS | Terriga Beach car park on signage post | Beachfront of the Terrigal SLSC on signage post | Opp. Kurrawyba Ave on the esplanade | Opp. Ash St on the esplanade walkway on | Blank |
| Cassette No. | | DG096262 | DG096271 | DG096265 | DG096261 | DG096266 |
| Pump ID | | PRM63 | PRM56 | PRM59 | PRM52 | - |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | [NA] |
| Volume Sampled | Litres | 523 | 532 | 541 | 550 | [NA] |
| Total Sample Time | Min | 402 | 409 | 416 | 423 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | [NA] |

**Client Reference: P033823.005, Terrigal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.005, Terrigal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
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customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 199623

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Sarah Dale |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.005, Terrigal Beach AAM** |
| **Number of Samples** | 5 Filter |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 29/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 31/08/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Matt Tang
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.005, Terrigal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 199623-1 | 199623-2 | 199623-3 | 199623-4 | 199623-5 |
| Your Reference | UNITS | Terriga Beach car park on signage post | Beachfront of the Terrigal SLSC on signage post | Opp. Kurrawyba Ave on the esplanade | Opp. Ash St on the esplanade walkway on | Blank |
| Cassette No. | | DG096280 | DG096284 | DG096281 | DG096278 | DE300597 |
| Pump ID | | PRM48 | PRM74 | PRM32 | PRM71 | - |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 | 31/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | 100 |
| Volume Sampled | Litres | 503 | 502 | 498 | 497 | - |
| Total Sample Time | Min | 387 | 386 | 383 | 382 | 0 |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | - |

**Client Reference: P033823.005, Terrigal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.005, Terrigal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Control Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Tuesday, 4 September 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.006 | **Client Code:** | C0171 |

| **Introduction:** | |
|---|---|
| **Introduction:** | Progressive Risk Management (PRM) conducted asbestos fibre air monitoring during the assessment of asbestos containing materials (ACM) at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct asbestos fibre air monitoring during the ACM assessment works.<br>• NATA-accredited laboratory analysis of the air monitoring samples. |

| **Site Details:** | |
|---|---|
| **Site Name:** | Wamberal Beach |
| **Site Address:** | Ocean View Drive, Wamberal Beach NSW 2260 |
| **Date of Monitoring:** | Tuesday, 28 August 2018 |
| **Site Description:** | Wamberal Beach from the SLSC to the lagoon. |
| **Removal works:** | Insitu test pitting. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for sampling locations. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Asbestos fibre air monitoring:*** Monitors are placed at various locations around the asbestos assessment area during works. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination during the asbestos assessment works.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.006 | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Exclusion zone fence | 28/08/18 | PRM71 | DG096270 | 10:00 | 14:56 | 296 | 385 | 0.0 | <0.01 |
| Inside excavator near door | 28/08/18 | PRM06 | DG096282 | 10:05 | 14:55 | 290 | 377 | 0.0 | <0.01 |
| Blank | 28/08/18 | - | DG096279 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

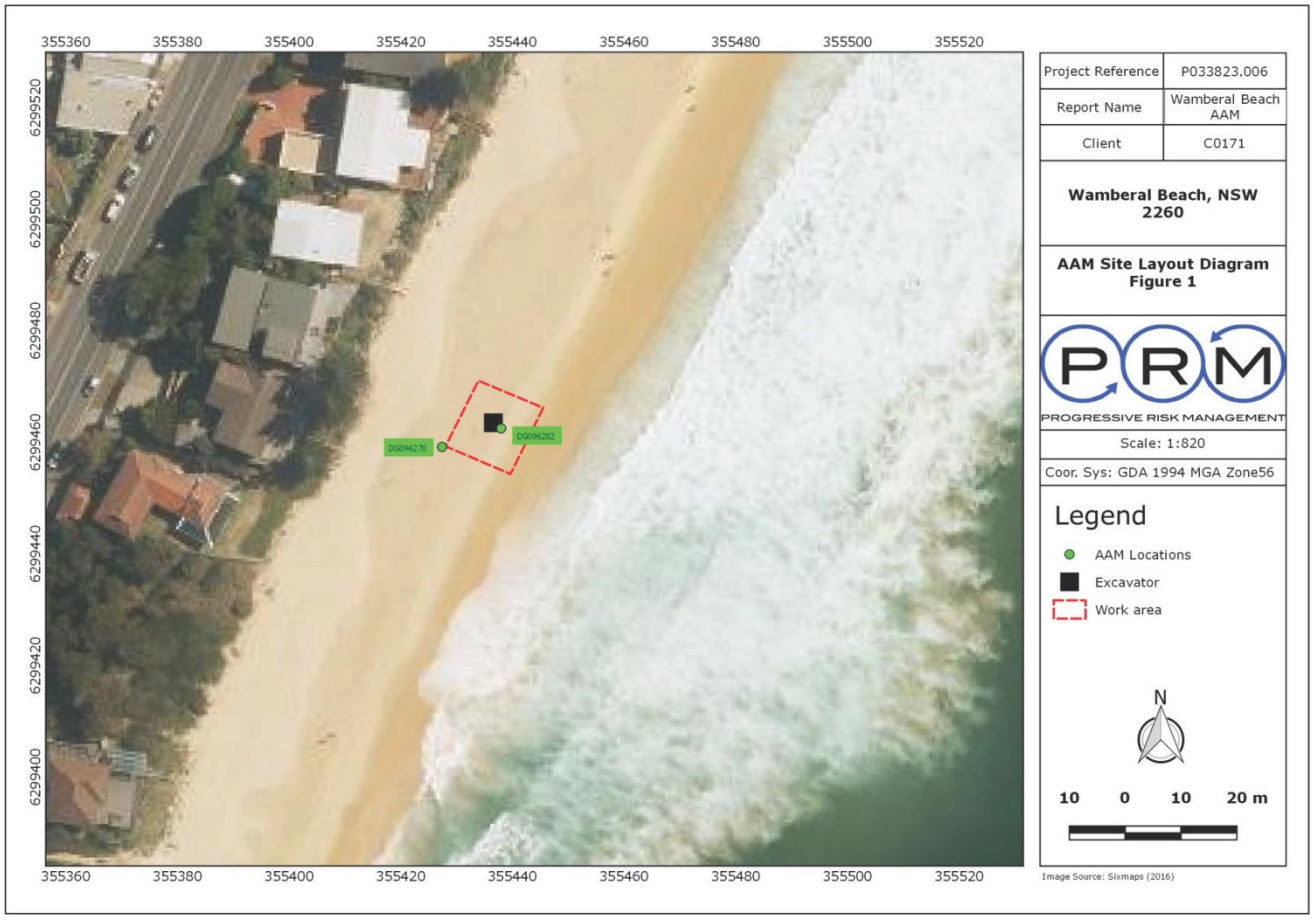
This Air Monitoring Report has been prepared by PRM for the client listed above, based upon a specific request made by the client for air monitoring to be undertaken during asbestos assessment works. This Air Monitoring Report:

- May only be used for the purpose of the asbestos assessment works performed on the specified date and in the specific areas outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any clearance, decontamination or encapsulation following the asbestos removal works and in no way certifies the removal works area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Managing Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management Pty Ltd** | | |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DG096270
DG096282
Project Reference
P033823.006
Report Name
Wamberal Beach AAM
Client
C0171
Wamberal Beach, NSW 2260
AAM Site Layout Diagram Figure 1
PROGRESSIVE RISK MANAGEMENT
Scale: 1:820
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
Excavator
Work area
N
10 0 10 20 m
Image Source: Sixmaps (2016)

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.006 |

**Photo 1:** Image of PRM71 on exclusion zone fence

**Photo 2:** Image of work area and PRM71 location

**Photo 3:** Image of PRM06 inside excavator


**Photo 4:** Image of PRM06 inside excavator

**End of Photolog**

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
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# CERTIFICATE OF ANALYSIS 199615

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.006, Terrigal/ Wamberal Beach Control AAM** |
| **Number of Samples** | 3 Filter |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 28/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 31/08/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Matt Tang
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.006, Terrigal/ Wamberal Beach Control AAM**

| Fibre Counting + Concentration | | | | |
|---|---|---|---|---|
| Our Reference | | 199615-1 | 199615-2 | 199615-3 |
| Your Reference | UNITS | Exclusion zone fence | Inside excavator near door | Blank |
| Cassette No. | | DG096270 | DG096282 | DG096279 |
| Pump ID | | PRM71 | PRM06 | - |
| Type of sample | | Filter | Filter | Filter |
| Date analysed | - | 31/08/2018 | 31/08/2018 | 31/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | 100 | [NA] |
| Volume Sampled | Litres | 385 | 377 | [NA] |
| Total Sample Time | Min | 296 | 290 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | [NA] |

**Client Reference: P033823.006, Terrigal/ Wamberal Beach Control AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.006, Terrigal/ Wamberal Beach Control AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Control Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Wednesday, 5 September 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.007 | **Client Code:** | C0171 |

| **Introduction:** | |
|---|---|
| **Introduction:** | Progressive Risk Management (PRM) conducted control asbestos fibre air monitoring during the assessment of asbestos containing materials (ACM) at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct control asbestos fibre air monitoring during the ACM assessment works.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate, and in no way states that the asbestos removal area is suitable for reoccupation. |

| **Site Details:** | |
|---|---|
| **Site Name:** | Wamberal Beach |
| **Site Address:** | Ocean View Drive, Wamberal Beach NSW 2260 |
| **Date of Monitoring:** | Wednesday, 29 August 2018 |
| **Site Description:** | Wamberal Beach. SLSC to the lagoon. |
| **Assessment works:** | Insitu test pitting. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for sampling locations. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• Monitors are placed at various locations around the asbestos assessment work area during works. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination during the asbestos assessment works to confirm the control measures implemented were satisfactory.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

Project Reference: P033823.007 Client Reference: C0171

| Location | Date | Pump ID | Filter ID | Start Time | Finish Time | Sample Time (min) | Volume Sampled | Fibres / 100 Fields | Results (fibres/mL) |
|---|---|---|---|---|---|---|---|---|---|
| Exclusion zone fence | 29/08/18 | PRM64 | DE300596 | 08:40 | 12:10 | 210 | 273 | 0.0 | <0.01 |
| Inside excavator near seat | 29/08/18 | PRM06 | DG096283 | 08:38 | 11:45 | 187 | 243 | 0.0 | <0.01 |
| Blank | 29/08/18 | - | DG096285 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

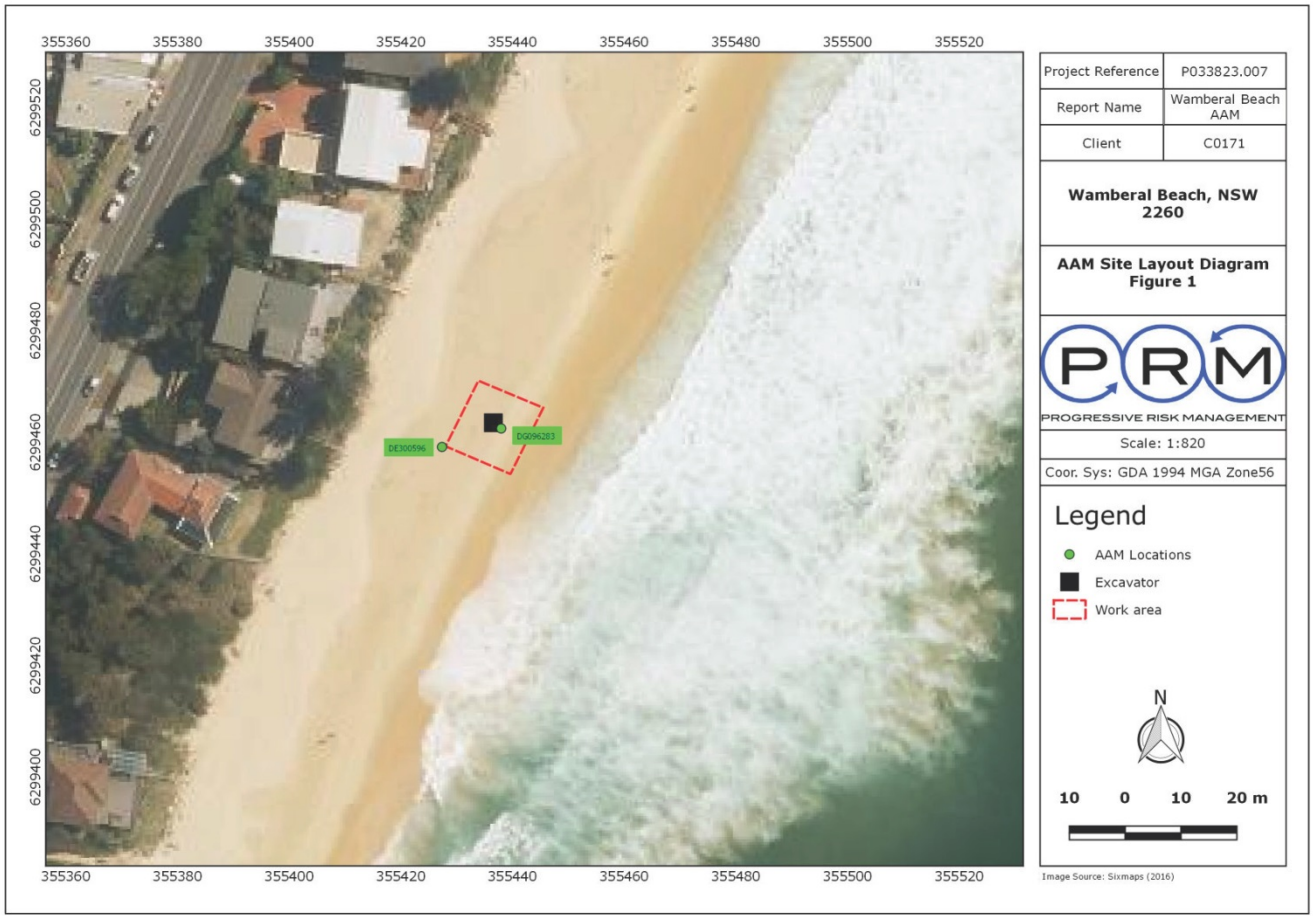
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for air monitoring to be undertaken during asbestos assessment works. This Air Monitoring Report:

- May only be used for the purpose of the asbestos assessment works performed on the specified date and in the specific areas outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Does not relate to remaining ACMs not associated to the removal works (to which this air monitoring letter applies), which may be present within the site.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any clearance, decontamination or encapsulation following the asbestos removal works and in no way certifies the removal works area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | Report Prepared by: | Report Reviewed by: |
|---|---|---|
| Signature: |  |  |
| Name: | Sarah Dale | Nick Passlow |
| Position: | Consultant | Managing Director |
| NSW SafeWork LAA Number: | - | - |
| Phone: | 0420-692-608 | 0404-485-980 |
| Email: | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| Progressive Risk Management Pty Ltd | | |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6299500
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6299460
6299440
6299420
6299400
DE300596
DG096283
Project Reference
P033823.007
Report Name
Wamberal Beach AAM
Client
C0171
Wamberal Beach, NSW 2260
AAM Site Layout Diagram Figure 1
PROGRESSIVE RISK MANAGEMENT
Scale: 1:820
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
Excavator
Work area
N
10 0 10 20 m
Image Source: Sixmaps (2016)

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.007 |

**Photo 1:** Image of PRM64 on exclusion zone fence

**Photo 2:** Image of work area and PRM64 location

**Photo 3:** Image of PRM06 inside excavator

**Photo 4:** Image of PRM06 location

**End of Photolog**

**Envirolab Services Pty Ltd**
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www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 199618

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Sarah Dale |
| **Address** | 79 Darley Rd, Manly, NSW, 2095 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.007, Terrigal/ Wamberal Beach Control AAM** |
| **Number of Samples** | 3 Filter |
| **Date samples received** | 30/08/2018 |
| **Date completed instructions received** | 30/08/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 29/08/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 31/08/2018 |
| **Date of Issue** | 31/08/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Matt Tang
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.007, Terrigal/ Wamberal Beach Control AAM**

| Fibre Counting + Concentration | | | | |
|---|---|---|---|---|
| Our Reference | | 199618-1 | 199618-2 | 199618-3 |
| Your Reference | UNITS | Exclusion zone fence | Inside excavator near seat | Blank |
| Cassette No. | | DE300596 | DE096283 | DG096285 |
| Pump ID | | PRM64 | PRM06 | - |
| Type of sample | | Filter | Filter | Filter |
| Date analysed | - | 31/08/2018 | 31/08/2018 | 31/08/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | 100 | [NA] |
| Volume Sampled | Litres | 273 | 243 | [NA] |
| Total Sample Time | Min | 210 | 187 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | [NA] |

**Client Reference: P033823.007, Terrigal/ Wamberal Beach Control AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.007, Terrigal/ Wamberal Beach Control AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Thursday, 4 October 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.008 | **Client Code:** | C0171 |

| **Site Details:** | |
|---|---|
| **Site Name:** | Wamberal Beach |
| **Site Address:** | Ocean View Drive, Wamberal Beach NSW 2260 |
| **Date of Monitoring:** | Tuesday, 25 September 2018 |
| **Purpose of Monitoring:** | To determine the extent of background airborne asbestos contamination, if present. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for site location and sampling locations. |
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.008 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Beach front of Wamberal Beach SLSC | 25/09/18 | PRM37 | DG096294 | 08:36 | 13:56 | 320 | 448 | 0.0 | <0.01 |
| Public access pathway off Surfers Road | 25/09/18 | PRM73 | DG096301 | 08:40 | 13:54 | 314 | 440 | 0.0 | <0.01 |
| Beach front of property 95 | 25/09/18 | PRM48 | DG096288 | 08:44 | 13:51 | 307 | 430 | 0.0 | <0.01 |
| Public access pathway adjacent property 67 | 25/09/18 | PRM33 | DG096289 | 08:29 | 13:50 | 321 | 449 | 0.0 | <0.01 |
| Public access pathway adjacent property 27 | 25/09/18 | PRM71 | DG096300 | 08:22 | 13:48 | 326 | 456 | 0.0 | <0.01 |
| Beach front of property 1 | 25/09/18 | PRM63 | DG096296 | 08:12 | 13:44 | 332 | 465 | 0.0 | <0.01 |
| Blank | 25/09/18 | - | DG096292 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

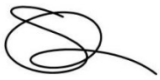
**Limitations:**

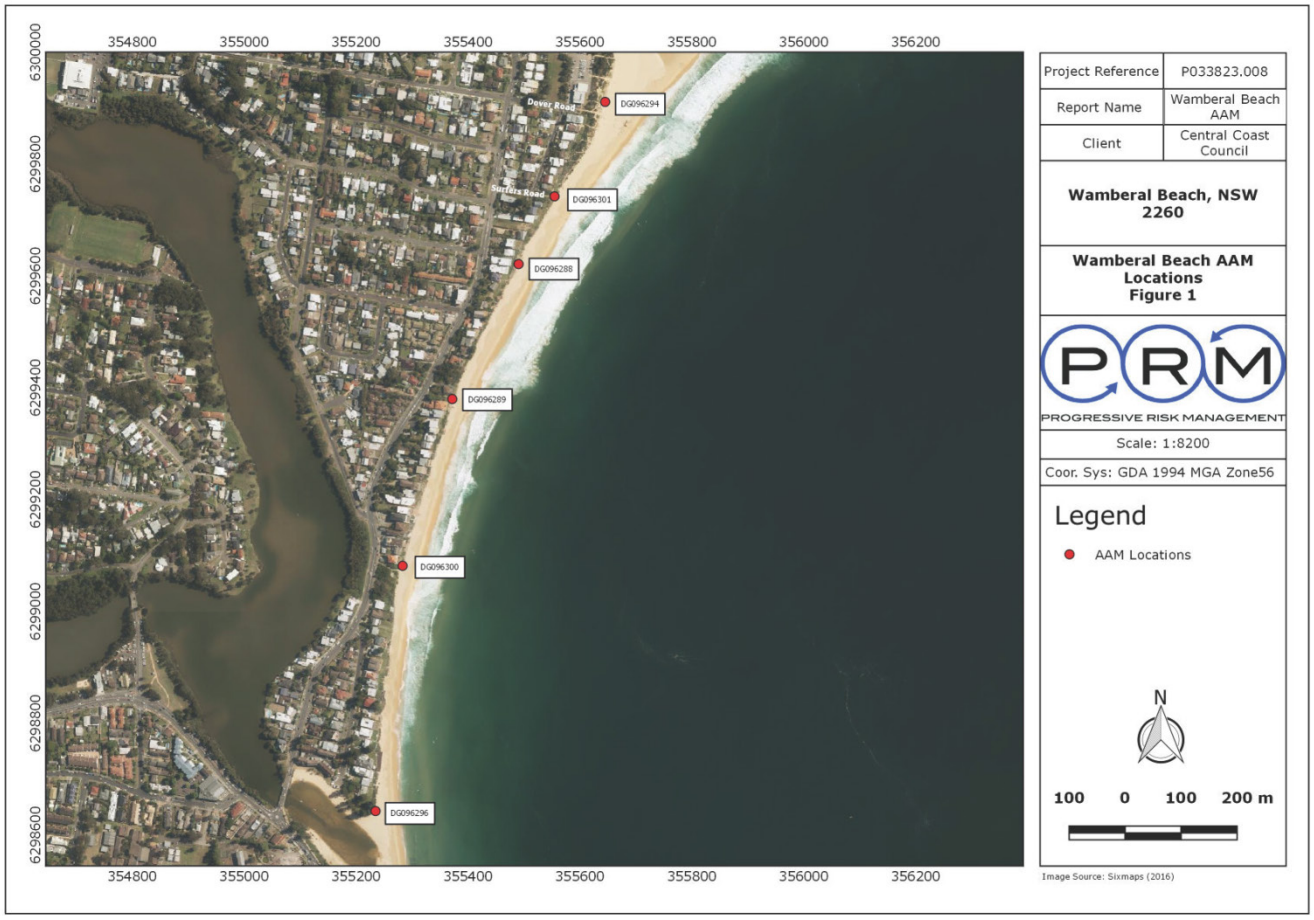
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |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6298800
6298600
Dover Road
Surfairs Road
DG096294
DG096301
DG096288
DG096289
DG096300
DG096296
Project Reference
P033823.008
Report Name
Wamberal Beach AAM
Client
Central Coast Council
Wamberal Beach, NSW 2260
Wamberal Beach AAM Locations
Figure 1
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:8200
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
N
100 0 100 200 m
Image Source: Sixmaps (2016)

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.008 |

**Photo 1:** Image of PRM37

**Photo 2:** Image of PRM73

**Photo 3:** Image of PRM48

**Photo 4:** Image of PRM33

**Photo 5:** Image of PRM71

**Photo 6:** Image of PRM63

**End of Photolog**

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 201855

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.008, Wamberal Beach AAM** |
| **Number of Samples** | 6 Filters |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 25/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 02/10/2018 |
| **Date of Issue** | 02/10/2018 |

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**Asbestos Approved By**
Analysed by Approved Counter: Aida Marner
Analysed by Asbestos Count Approved Signatory: Matt Tang
**Results Approved By**
Matthew Tang, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.008, Wamberal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 201855-1 | 201855-2 | 201855-3 | 201855-4 | 201855-5 |
| Your Reference | UNITS | Beach front of Wamberal Beach SLSC | Public access pathway off Surfers Rd | Beachfront of property 95 | Public access pathway adj property 67 | Public access pathway adj property 27 |
| Cassette No. | | DG096294 | DG096301 | DG096288 | DG096289 | DG096300 |
| Pump ID | | PRM37 | PRM73 | PRM48 | PRM33 | PRM71 |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | 100 |
| Volume Sampled | Litres | 448 | 440 | 430 | 449 | 456 |
| Total Sample Time | Min | 320 | 314 | 307 | 321 | 326 |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |

| Fibre Counting + Concentration | | | |
|---|---|---|---|
| Our Reference | | 201855-6 | 201855-7 |
| Your Reference | UNITS | Beachfront of property 1 | Blank |
| Cassette No. | | DG096296 | DG096292 |
| Pump ID | | PRM63 | - |
| Type of sample | | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 |
| Fields | - | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | [NA] |
| Volume Sampled | Litres | 465 | [NA] |
| Total Sample Time | Min | 332 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | [NA] |

**Client Reference: P033823.008, Wamberal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.008, Wamberal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Thursday, 4 October 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.009 | **Client Code:** | C0171 |

| **Site Details:** | |
|---|---|
| **Site Name:** | Terrigal Beach |
| **Site Address:** | Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Date of Monitoring:** | Tuesday, 25 September 2018 |
| **Purpose of Monitoring:** | To determine the extent of background airborne asbestos contamination, if present. |
| **Inspector:** | Geoff Fletcher: Senior Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for site location and sampling locations. |
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.009 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Terrigal Beach carpark on signage post | 25/09/18 | PRM25 | DG096290 | 08:48 | 14:15 | 327 | 458 | 0.0 | <0.01 |
| SE of Terrigal SLSC on the esplanade walkway on signage post | 25/09/18 | PRM10 | DG096291 | 10:33 | 14:17 | 224 | 314 | 0.0 | <0.01 |
| Opposite Kurrawyba Aveune on the esplanade walkway on signage post | 25/09/18 | PRM04 | DG096293 | 08:33 | 14:20 | 347 | 486 | 0.0 | <0.01 |
| Opposite Ash Street on the esplanade walkway on signage post | 25/09/18 | PRM68 | DG096302 | 08:28 | 14:22 | 354 | 496 | 0.0 | <0.01 |
| Blank | 25/09/18 | - | DG096303 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

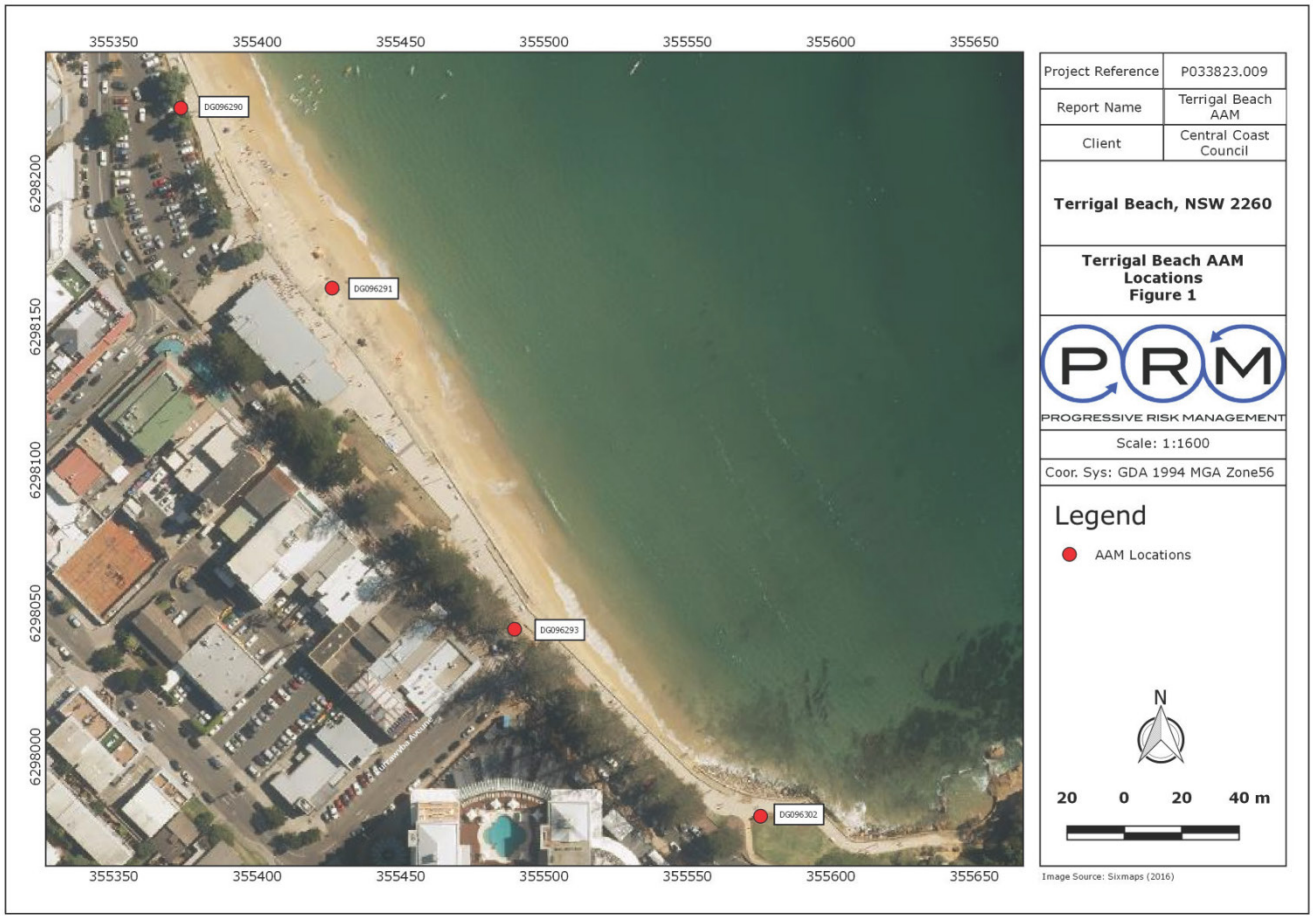
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |


355350
355400
355450
355500
355550
355600
355650
6298200
6298150
6298100
6298050
6298000
DG096290
DG096291
DG096293
DG096302
Project Reference
P033823.009
Report Name
Terrigal Beach AAM
Client
Central Coast Council
Terrigal Beach, NSW 2260
Terrigal Beach AAM Locations Figure 1
PROGRESSIVE RISK MANAGEMENT
Scale: 1:1600
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
N
20 0 20 40 m
Image Source: Sixmaps (2016)

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Terrigal Beach - Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Reference:** | P033823.009 |

**Photo 1:** Image of PRM25

**Photo 2:** Image of PRM10

**Photo 3:** Image of PRM04

**Photo 4:** Image of PRM68

**End of Photolog**

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 201858

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.009, Terrigal Beach AAM** |
| **Number of Samples** | 5 Filter |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |
| **Sampler Name** | S Dale, G Fletcher |
| **Date Sampled** | 25/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 02/10/2018 |
| **Date of Issue** | 02/10/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Panika Wongchanda
Analysed by Asbestos Count Approved Signatory: Matt Tang
**Results Approved By**
Matthew Tang, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.009, Terrigal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 201858-1 | 201858-2 | 201858-3 | 201858-4 | 201858-5 |
| Your Reference | UNITS | Terrigal Beach Carpark | SE of Terrigal SLSC on the esplanade walkway | Opp. Kurrawyba Ave on the esplanade walkway | Opp. Ash St on the esplanade walkway | Blank |
| Cassette No. | | DG096290 | DG096291 | DG096293 | DG096302 | DG096303 |
| Pump ID | | PRM25 | PRM10 | PRM04 | PRM68 | - |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | [NA] |
| Volume Sampled | Litres | 458 | 314 | 486 | 496 | [NA] |
| Total Sample Time | Min | 327 | 224 | 347 | 354 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | [NA] |

**Client Reference: P033823.009, Terrigal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.009, Terrigal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Thursday, 4 October 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.010 | **Client Code:** | C0171 |

| **Site Details:** | |
|---|---|
| **Site Name:** | Wamberal Beach |
| **Site Address:** | Ocean View Drive, Wamberal Beach NSW 2260 |
| **Date of Monitoring:** | Tuesday, 25 September 2018 |
| **Purpose of Monitoring:** | To determine the extent of background airborne asbestos contamination, if present. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for site location and sampling locations. |
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.010 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Exclusion Zone Fence | 25/09/18 | PRM06 | DG096298 | 10:30 | 13:55 | 205 | 410 | 0.0 | <0.01 |
| Blank | 25/09/18 | - | DG096297 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |


355380
355400
355420
355440
355460
6299500
6299480
6299460
6299440
DG096298
Project Reference
P033823.010
Report Name
Wamberal Beach AAM
Client
Central Coast Council
Wamberal Beach, NSW 2260
AAM Site Layout Diagram
Figure 1
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:500
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
Excavator
Work area
N
5 0 5 10 15 m
Image Source: Sixmaps (2016)

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.010 |

**Photo 1:** Photo of PRM06

**Photo 2:** Photo showing works area

**End of Photolog**

**Envirolab Services Pty Ltd**
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ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 201852

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.010 - Wamberal Beach Work Zone AAM** |
| **Number of Samples** | 2 Filter |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |
| **Sampler Name** | S Dale, G Fletcher |
| **Date Sampled** | 25/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 02/10/2018 |
| **Date of Issue** | 02/10/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Panika Wongchanda
Analysed by Asbestos Count Approved Signatory: Matt Tang
**Results Approved By**
Matthew Tang, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.010 - Wamberal Beach Work Zone AAM**

| Fibre Counting + Concentration | | | |
|---|---|---|---|
| Our Reference | | 201852-1 | 201852-2 |
| Your Reference | UNITS | Exclusion Zone Fence | Blank |
| Cassette No. | | DG096298 | DG096297 |
| Pump ID | | PRM06 | - |
| Type of sample | | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 |
| Fields | - | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 |
| Volume Sampled | Litres | 410 | - |
| Total Sample Time | Min | 205 | 0 |
| Fibre Concentration | Fibres/mL | <0.01 | - |

**Client Reference: P033823.010 - Wamberal Beach Work Zone AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.010 - Wamberal Beach Work Zone AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Thursday, 4 October 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.011 | **Client Code:** | C0171 |

| **Site Details:** | |
|---|---|
| **Site Name:** | Wamberal Beach |
| **Site Address:** | Ocean View Drive, Wamberal Beach NSW 2260 |
| **Date of Monitoring:** | Wednesday, 26 September 2018 |
| **Purpose of Monitoring:** | To determine the extent of background airborne asbestos contamination, if present. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for site location and sampling locations. |
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.011 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Beach front of Wamberal Beach SLSC | 26/09/18 | PRM48 | DG096308 | 07:19 | 12:15 | 296 | 414 | 0.0 | <0.01 |
| Public access pathway off Surfers Road | 26/09/18 | PRM33 | DG096299 | 07:30 | 12:08 | 278 | 389 | 0.0 | <0.01 |
| Beach front of property 95 | 26/09/18 | PRM71 | DG096305 | 07:32 | 12:06 | 274 | 384 | 0.0 | <0.01 |
| Public access pathway adjacent property 67 | 26/09/18 | PRM68 | DG096307 | 07:42 | 12:02 | 260 | 364 | 0.0 | <0.01 |
| Public access pathway adjacent property 27 | 26/09/18 | PRM63 | DG096304 | 07:47 | 11:58 | 251 | 351 | 0.0 | <0.01 |
| Beach front of property 1 | 26/09/18 | PRM73 | DG096526 | 07:52 | 11:50 | 238 | 333 | 0.0 | <0.01 |
| Blank | 26/09/18 | - | DG096306 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

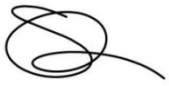
**Limitations:**

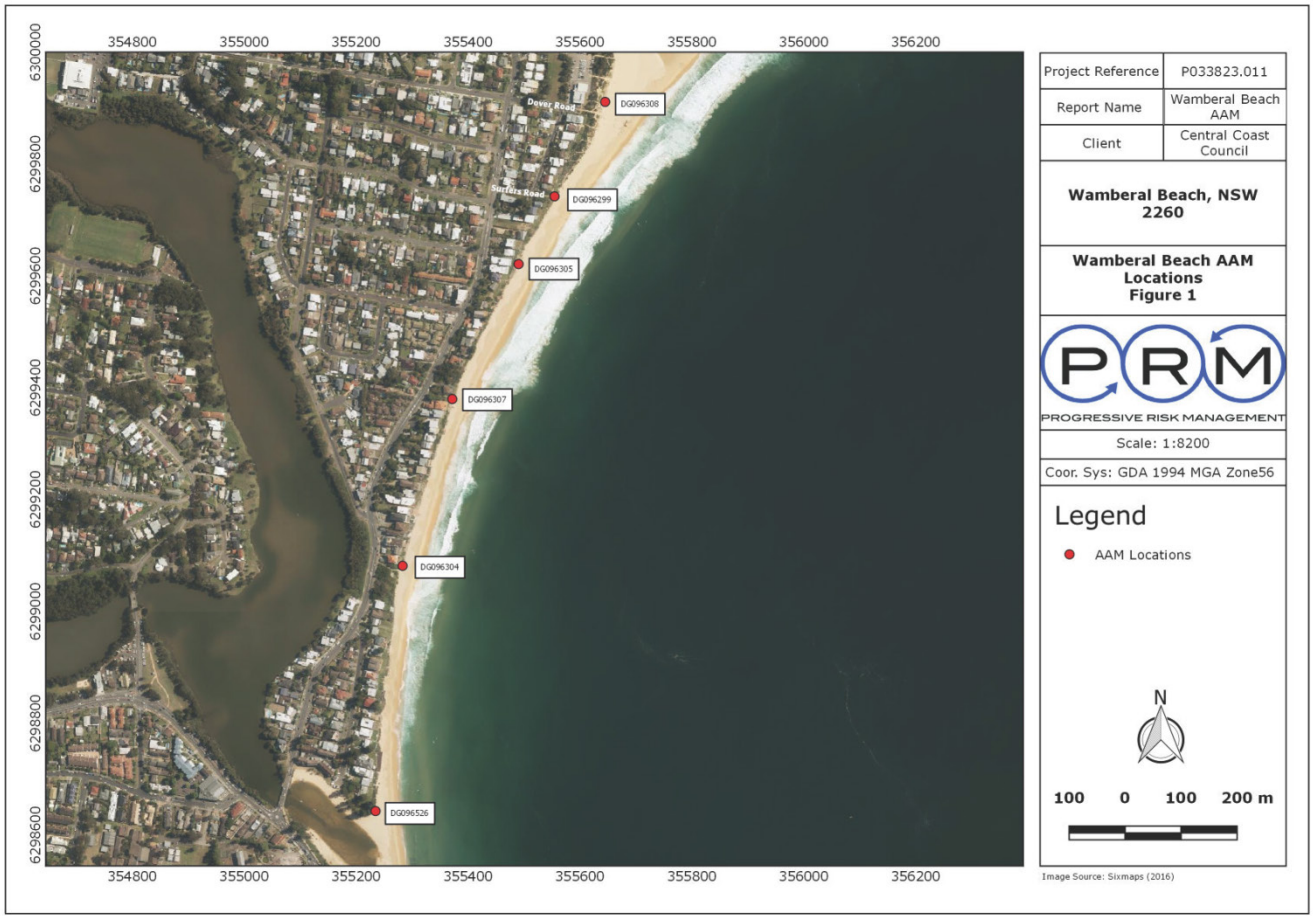
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |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6299800
6299600
6299400
6299200
6299000
6298800
6298600
Dover Road
Surfers Road
DG096308
DG096299
DG096305
DG096307
DG096304
DG096526
Project Reference
P033823.011
Report Name
Wamberal Beach AAM
Client
Central Coast Council
Wamberal Beach, NSW 2260
Wamberal Beach AAM Locations Figure 1
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:8200
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
N
100 0 100 200 m
Image Source: Sixmaps (2016)

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Wamberal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.011 |

**Photo 1:** Image of PRM48

**Photo 2:** Image of PRM33

**Photo 3:** Image of PRM71

**Photo 4:** Image of PRM68

**Photo 5:** Image of PRM63

**Photo 6:** Image of PRM73

**End of Photolog**

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 201854

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.011, Wamberal Beach AAM** |
| **Number of Samples** | 6 Filters |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |
| **Sampler Name** | S Dale |
| **Date Sampled** | 26/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 02/10/2018 |
| **Date of Issue** | 02/10/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Panika Wongchanda
Analysed by Asbestos Count Approved Signatory: Matt Tang
**Results Approved By**
Matthew Tang, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.011, Wamberal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 201854-1 | 201854-2 | 201854-3 | 201854-4 | 201854-5 |
| Your Reference | UNITS | Beach front of Wamberal Beach SLSC | Public access pathway off Surfers Rd | Beachfront of property 95 | Public access pathway adj property 67 | Public access pathway adj property 27 |
| Cassette No. | | DG096308 | DG096299 | DG096305 | DG096307 | DG096304 |
| Pump ID | | PRM48 | PRM33 | PRM71 | PRM68 | PRM63 |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | 100 |
| Volume Sampled | Litres | 414 | 389 | 384 | 364 | 351 |
| Total Sample Time | Min | 296 | 278 | 274 | 260 | 251 |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |

| Fibre Counting + Concentration | | | |
|---|---|---|---|
| Our Reference | | 201854-6 | 201854-7 |
| Your Reference | UNITS | Beachfront of property 1 | Blank |
| Cassette No. | | DG096526 | DG096306 |
| Pump ID | | PRM73 | - |
| Type of sample | | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 |
| Fields | - | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 |
| Graticule Diameter | µm | 100 | 100 |
| Volume Sampled | Litres | 291 | - |
| Total Sample Time | Min | 208 | 0 |
| Fibre Concentration | Fibres/mL | <0.01 | - |

**Client Reference: P033823.011, Wamberal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.011, Wamberal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Thursday, 4 October 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.012 | **Client Code:** | C0171 |

| **Site Details:** | |
|---|---|
| **Site Name:** | Terrigal Beach |
| **Site Address:** | Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Date of Monitoring:** | Wednesday, 26 September 2018 |
| **Purpose of Monitoring:** | To determine the extent of background airborne asbestos contamination, if present. |
| **Inspector:** | Geoff Fletcher: Senior Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for site location and sampling locations. |
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.012 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Terrigal Beach carpark on signage post | 26/09/18 | PRM04 | DG096528 | 08:12 | 11:30 | 198 | 396 | 0.0 | <0.01 |
| SE of Terrigal SLSC on the esplanade walkway on signage post | 26/09/18 | PRM06 | DG096524 | 08:05 | 11:33 | 208 | 416 | 0.0 | <0.01 |
| Opposite Kurrawyba Aveune on the esplanade walkway on signage post | 26/09/18 | PRM25 | DG096523 | 07:58 | 11:35 | 217 | 434 | 0.0 | <0.01 |
| Opposite Ash Street on the esplanade walkway on signage post | 26/09/18 | PRM10 | DG096525 | 07:53 | 11:38 | 225 | 450 | 0.0 | <0.01 |
| Blank | 26/09/18 | - | DG096522 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

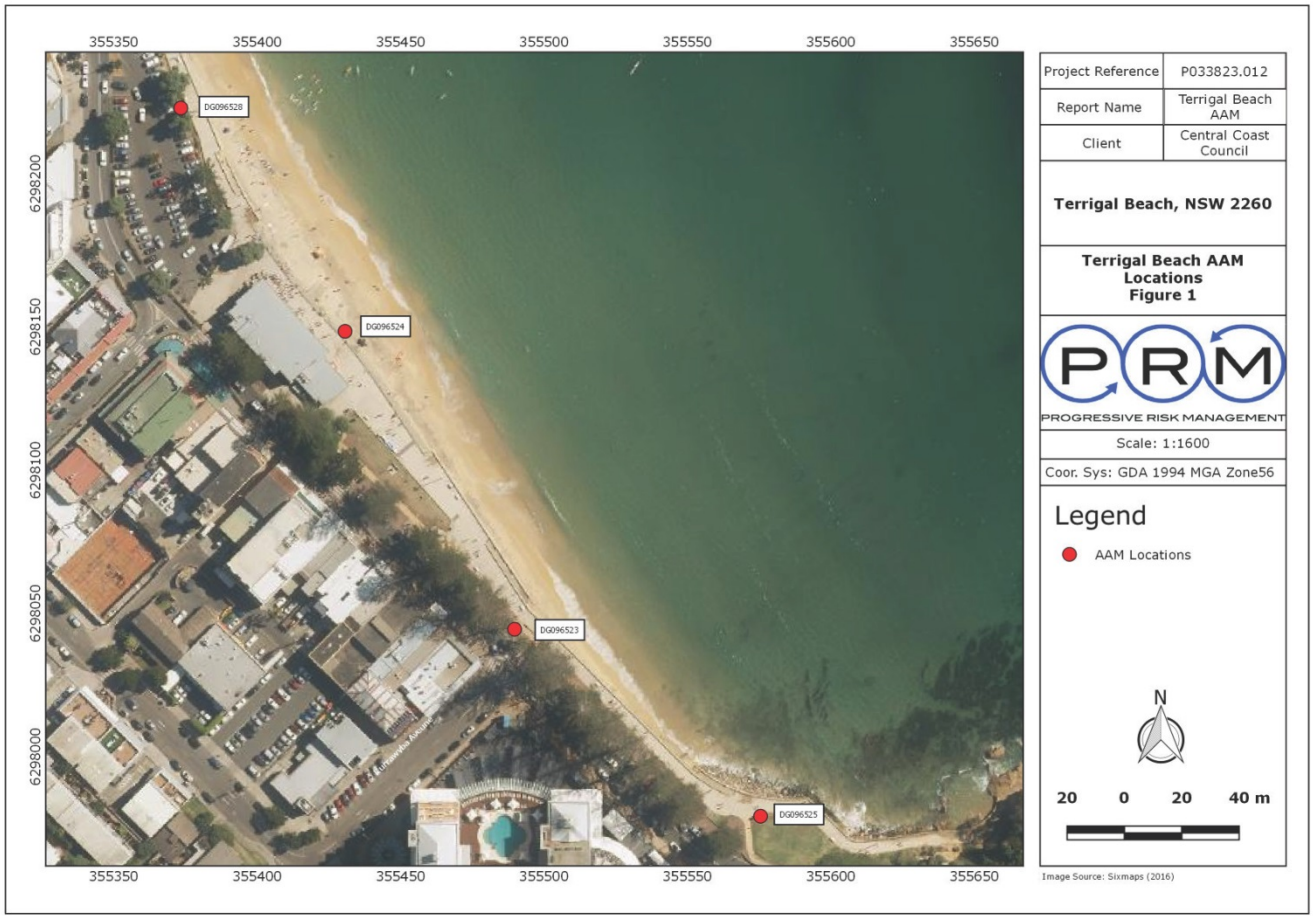
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |


355350
355400
355450
355500
355550
355600
355650
6298200
6298150
6298100
6298050
6298000
DG096528
DG096524
DG096523
DG096525
Project Reference
P033823.012
Report Name
Terrigal Beach AAM
Client
Central Coast Council
Terrigal Beach, NSW 2260
Terrigal Beach AAM Locations Figure 1
PROGRESSIVE RISK MANAGEMENT
Scale: 1:1600
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
N
20 0 20 40 m
Image Source: Sixmaps (2016)

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Terrigal Beach - Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Reference:** | P033823.012 |

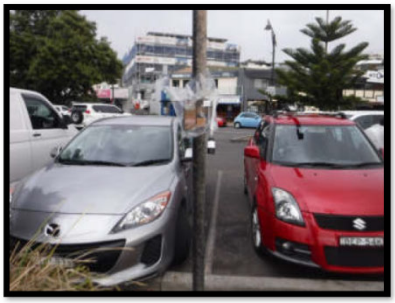


**Photo 1:** Image of PRM04

**Photo 2:** Image of PRM06

**Photo 3:** Image of PRM25

**Photo 4:** Image of PRM10

**End of Photolog**

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
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customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 201857

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.012, Terrigal Beach AAM** |
| **Number of Samples** | 5 Filter |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |
| **Sampler Name** | S Dale, G Fletcher |
| **Date Sampled** | 26/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 02/10/2018 |
| **Date of Issue** | 02/10/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Panika Wongchanda
Analysed by Asbestos Count Approved Signatory: Matt Tang
**Results Approved By**
Matthew Tang, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.012, Terrigal Beach AAM**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 201857-1 | 201857-2 | 201857-3 | 201857-4 | 201857-5 |
| Your Reference | UNITS | Terrigal Beach Carpark | SE of Terrigal SLSC on the esplanade walkway | Opp. Kurrawyba Ave on the esplanade walkway | Opp. Ash St on the esplanade walkway | Blank |
| Cassette No. | | DG096528 | DG096524 | DG096523 | DG096525 | DG096522 |
| Pump ID | | PRM04 | PRM06 | PRM25 | PRM10 | - |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | [NA] |
| Volume Sampled | Litres | 396 | 416 | 434 | 450 | [NA] |
| Total Sample Time | Min | 198 | 208 | 217 | 225 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | [NA] |

**Client Reference: P033823.012, Terrigal Beach AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.012, Terrigal Beach AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Thursday, 4 October 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.013 | **Client Code:** | C0171 |

| **Site Details:** | |
|---|---|
| **Site Name:** | Terrigal Beach |
| **Site Address:** | Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Date of Monitoring:** | Wednesday, 26 September 2018 |
| **Purpose of Monitoring:** | To determine the extent of background airborne asbestos contamination, if present. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for site location and sampling locations. |
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.013 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Exclusion Zone Fence | 26/09/18 | PRM37 | DG096517 | 08:45 | 10:38 | 113 | 226 | 0.0 | <0.01 |
| Blank | 26/09/18 | - | DG096515 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |


355380
355400
355420
355440
355460
355480
355500
6298200
6298180
6298160
6298140
6298120
DG096517
Project Reference
P033823.013
Report Name
Terrigal Beach AAM
Client
Central Coast Council
Terrigal Beach, NSW 2260
AAM Site Layout Diagram
Figure 1
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:600
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
Excavator
Work Area
N
5 0 5 10 15 20 m
Image Source: Sixmaps (2016)

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Terrigal Beach - Ocean View Drive, Wamberal Beach NSW 2260 |
| **Reference:** | P033823.013 |

**Photo 1:** Image of PRM37

**Photo 2:** Image of work zone

**End of Photolog**

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customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 201853

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.013 - Terrigal Beach Work Zone AAM** |
| **Number of Samples** | 2 Filter |
| **Date samples received** | 28/09/2018 |
| **Date completed instructions received** | 28/09/2018 |
| **Sampler Name** | S Dale, G Fletcher |
| **Date Sampled** | 26/09/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 02/10/2018 |
| **Date of Issue** | 02/10/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Aida Marner
Analysed by Asbestos Count Approved Signatory: Matt Tang
**Results Approved By**
Matthew Tang, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.013 - Terrigal Beach Work Zone AAM**

| Fibre Counting + Concentration | | | |
|---|---|---|---|
| Our Reference | | 201853-1 | 201853-2 |
| Your Reference | UNITS | Exclusion Zone Fence | Blank |
| Cassette No. | | DG096517 | DG096515 |
| Pump ID | | PRM37 | - |
| Type of sample | | Filter | Filter |
| Date analysed | - | 02/10/2018 | 02/10/2018 |
| Fibres | - | 0.0 | 0.0 |
| Fields | - | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | [NA] |
| Volume Sampled | Litres | 226 | [NA] |
| Total Sample Time | Min | 113 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | [NA] |

**Client Reference: P033823.013 - Terrigal Beach Work Zone AAM**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
| **Disclaimer** | Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation. |

**Client Reference: P033823.013 - Terrigal Beach Work Zone AAM**

## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

| Background Asbestos Air Monitoring | | | |
|---|---|---|---|
| **Date:** | Tuesday, 9 October 2018 | | |
| **Client Name:** | Central Coast Council | | |
| **Client Address:** | P.O. Box 21, Gosford NSW 2250 | | |
| **Project Reference:** | P033823.014 | **Client Code:** | C0171 |

| **Site Details:** | |
|---|---|
| **Site Name:** | Terrigal Beach |
| **Site Address:** | Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Date of Monitoring:** | Thursday, 4 October 2018 |
| **Purpose of Monitoring:** | To determine the extent of background airborne asbestos contamination, if present. |
| **Inspector:** | Sarah Dale: Consultant |
| **Figure(s):** | Refer to **Figure 1** appended to this report, for site location and sampling locations. |
| **Introduction:** | Progressive Risk Management (PRM) was engaged to conduct background asbestos fibre air monitoring at the site. This report provides details of the air monitoring conducted as well as the laboratory analysis results. |
| **Scope of Works:** | The following scope of works was undertaken:<br>• Conduct background asbestos fibre air monitoring at the site.<br>• NATA-accredited laboratory analysis of the air monitoring samples.<br>It should be noted that this Air Monitoring Report is not a clearance certificate and in no way states that an area is suitable for reoccupation. |

| **Legislation and Methodology:** | |
|---|---|
| **Legislation:** | This air monitoring was undertaken in general accordance with the following:<br>• Safe Work Australia *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]. |
| **Methodology:** | **Asbestos fibre air monitoring:**<br>Field-based, analytical and reporting elements of this asbestos fibre air monitoring was conducted in general accordance with NOHSC:3003(2005) as follows:<br>• ***Background asbestos fibre air monitoring:*** Monitors are placed at various locations around the assessment area. Air monitoring is conducted to measure the background concentrations for potential asbestos contamination in ambient air.<br>• ***Analysis:*** The air monitoring samples were then analysed by an external NATA accredited laboratory, Envirolab Services Pty Ltd. |

| **Summary of Results:** |
|---|
| Based upon the results of this asbestos fibre air monitoring detailed within this report, all results were below the detection limit of 0.01 fibre/mL of air, the lowest detectable limit for the method used.<br>Refer to the following page for Detailed Results information and the appended NATA-accredited analysis results. |

***Progressive Risk Management***
***Unit 14, 76 Reserve Road***
***Artarmon NSW 2064***

PROGRESSIVE RISK MANAGEMENT

**Detailed Results:**

| **Project Ref:** | P033823.014 | | | | **Client Reference:** | C0171 | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Date** | **Pump ID** | **Filter ID** | **Start Time** | **Finish Time** | **Sample Time (min)** | **Volume Sampled** | **Fibres / 100 Fields** | **Results (fibres/mL)** |
| Terrigal Beach carpark on signage post | 4/10/18 | PRM48 | DG096518 | 04:08 | 06:00 | 112 | 392 | 0.0 | <0.01 |
| SE of Terrigal SLSC on the esplanade walkway on signage post | 4/10/18 | PRM71 | DG096516 | 04:12 | 06:02 | 110 | 385 | 0.0 | <0.01 |
| Opposite Kurrawyba Aveune on the esplanade walkway on signage post | 4/10/18 | PRM68 | DG096512 | 04:14 | 06:04 | 110 | 385 | 0.0 | <0.01 |
| Opposite Ash Street on the esplanade walkway on fence | 4/10/18 | PRM73 | DG096513 | 04:16 | 06:06 | 110 | 385 | 0.0 | <0.01 |
| Blank | 4/10/18 | - | DG096519 | - | - | - | - | 0.0 | - |

NATA accredited laboratory analysis report is attached to the rear of this report.

**Limitations:**

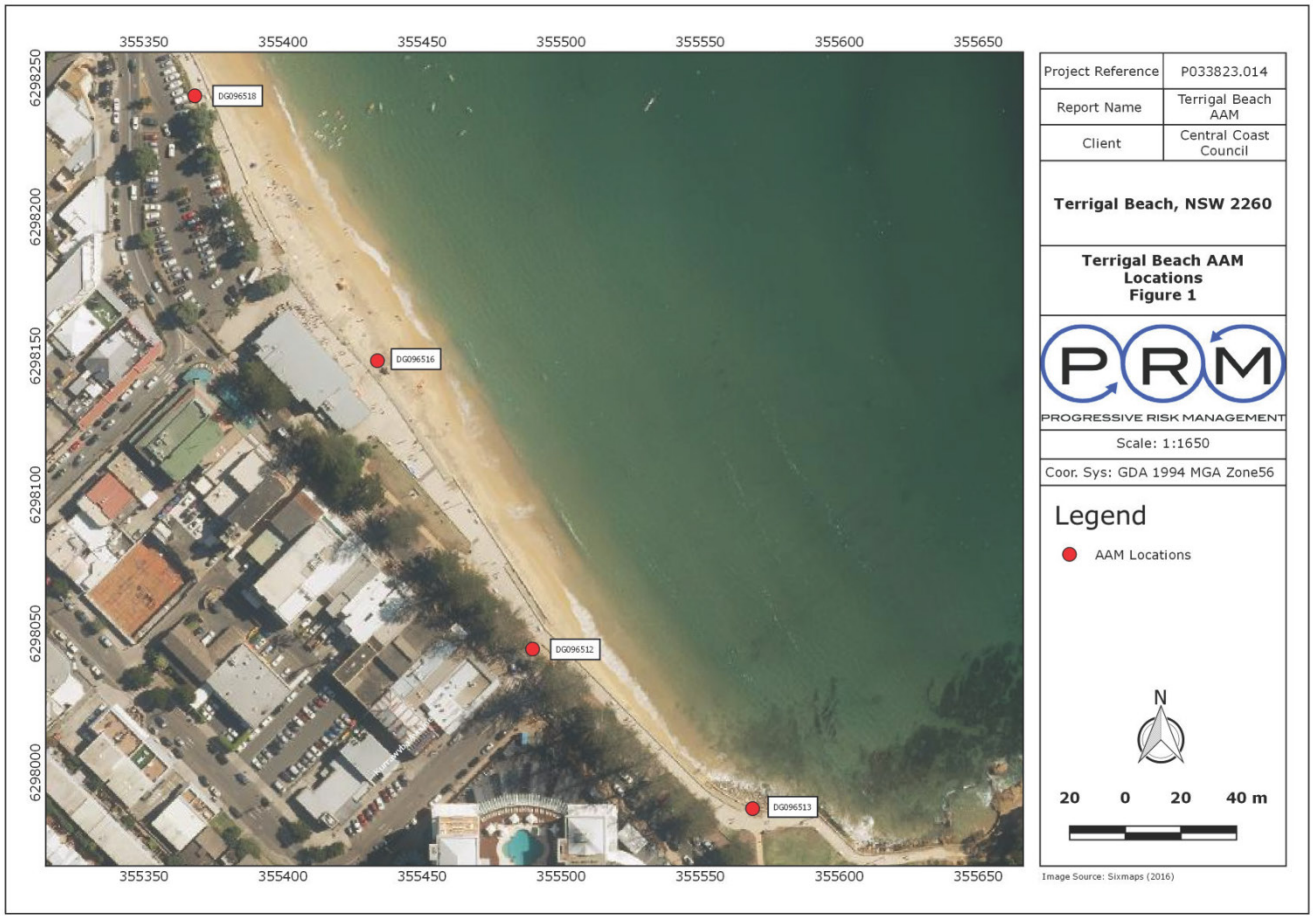
This Air Monitoring Report has been prepared by Progressive Risk Management Pty Ltd (PRM) for the client listed above, based upon a specific request made by the client for background asbestos fibre air monitoring to be undertaken at the site. This Air Monitoring Report:

- May only be used for the purpose of the background asbestos fibre air monitoring performed on the specified date on the specific site outlined in the Site Details section. Dates or areas not listed are not applicable to this Air Monitoring Report.
- Must not be copied to, used by, altered, amended or abbreviated, issued in part or issued incomplete without the prior written consent of PRM.
- In no way comments on any asbestos removal works and in no way certifies an area suitable for reoccupation.
- To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and the air monitoring letter are excluded unless they are expressly stated to apply in this letter.
- The data and advice provided herein relates only to the project and structures described in the Air Monitoring Report and must be reviewed by a competent professional before being used for any other purpose. PRM accepts no responsibility for other use of the data.

If you have further questions please do not hesitate to contact the undersigned.

**Report Review:**

| | **Report Prepared by:** | **Report Reviewed by:** |
|---|---|---|
| **Signature:** |  |  |
| **Name:** | Sarah Dale | Nick Passlow |
| **Position:** | Consultant | Director |
| **NSW SafeWork LAA Number:** | - | - |
| **Phone:** | 0420-692-608 | 0404-485-980 |
| **Email:** | sarah.dale@progressiverm.com.au | nick.passlow@progressiverm.com.au |
| **Progressive Risk Management** | | |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DG096518
DG096516
DG096512
DG096513
Project Reference
P033823.014
Report Name
Terrigal Beach AAM
Client
Central Coast Council
Terrigal Beach, NSW 2260
Terrigal Beach AAM Locations Figure 1
PRM
PROGRESSIVE RISK MANAGEMENT
Scale: 1:1650
Coor. Sys: GDA 1994 MGA Zone56
Legend
AAM Locations
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20 0 20 40 m
Image Source: Sixmaps (2016)

PROGRESSIVE RISK MANAGEMENT

| Photolog | |
|---|---|
| **Report:** | Asbestos Fibre Air Monitoring Report |
| **Site:** | Terrigal Beach - Terrigal Esplanade, Terrigal Beach NSW 2260 |
| **Reference:** | P033823.014 |

**Photo 1:** Image of PRM48

**Photo 2:** Image of PRM71

**Photo 3:** Image of PRM68

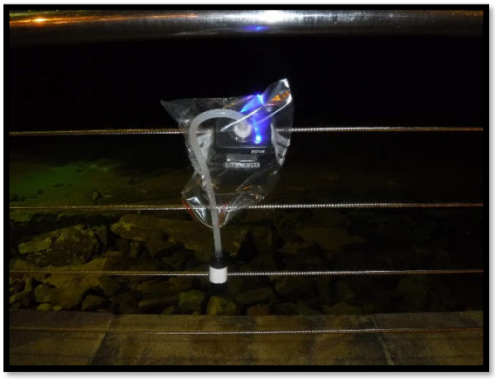

**Photo 4:** Image of PRM73

**Photo 5:** Image of beach raking works

**Photo 6:** Image of beach raking works

**End of Photolog**

**Envirolab Services Pty Ltd**
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

# CERTIFICATE OF ANALYSIS 202414

## Client Details

| | |
|---|---|
| **Client** | Progressive Risk Management Pty Ltd |
| **Attention** | Jonathan Coffey, Sarah Dale |
| **Address** | 14/76 Reserve Road, ARTARMON, NSW, 2064 |

## Sample Details

| | |
|---|---|
| **Your Reference** | **P033823.014, Terrigal Beach AAM CCC** |
| **Number of Samples** | 5 Filter |
| **Date samples received** | 05/10/2018 |
| **Date completed instructions received** | 05/10/2018 |
| **Sampler Name** | Jonathan Coffey |
| **Date Sampled** | 04/10/2018 |

## Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

## Report Details

| | |
|---|---|
| **Date results requested by** | 08/10/2018 |
| **Date of Issue** | 08/10/2018 |

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

**Asbestos Approved By**
Analysed by Approved Counter: Aida Marner
Analysed by Asbestos Count Approved Signatory: Lucy Zhu
**Results Approved By**
Lucy Zhu, Asbsestos Analyst

**Authorised By**

Jacinta Hurst, Laboratory Manager

**Client Reference: P033823.014, Terrigal Beach AAM CCC**

| Fibre Counting + Concentration | | | | | | |
|---|---|---|---|---|---|---|
| Our Reference | | 202414-1 | 202414-2 | 202414-3 | 202414-4 | 202414-5 |
| Your Reference | UNITS | Terrigal Beach Carpark on signage post | SE of Terrigal SLSC on the esplanade walkway | Opp. Kurrawyba Ave on the esplanade walkway | Opp. Ash St on the esplanade walkway | Blank |
| Cassette No. | | DG096518 | DG096516 | DG096512 | DG096513 | DG096519 |
| Pump ID | | PRM48 | PRM71 | PRM68 | PRM73 | - |
| Type of sample | | Filter | Filter | Filter | Filter | Filter |
| Date analysed | - | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 | 08/10/2018 |
| Fibres | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fields | - | 100 | 100 | 100 | 100 | 100 |
| Effective Filter Area | $mm^2$ | 381.65 | 381.65 | 381.65 | 381.65 | [NA] |
| Graticule Diameter | µm | 100 | 100 | 100 | 100 | [NA] |
| Volume Sampled | Litres | 392 | 385 | 385 | 385 | [NA] |
| Total Sample Time | Min | 112 | 110 | 110 | 110 | [NA] |
| Fibre Concentration | Fibres/mL | <0.01 | <0.01 | <0.01 | <0.01 | [NA] |

**Client Reference: P033823.014, Terrigal Beach AAM CCC**

| Method ID | Methodology Summary |
|---|---|
| **ASB-002** | Estimation of Airborne Asbestos Fibres by the Membrane Filter Method. Filters examined in accordance with NOHSC:3003 (April 2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres and Envirolab in-house method ASB-002.<br><br>The microscope constant for Carl Zeiss Axio Lab.A1 (Sydney Laboratory) calculated using 25mm filter is 48593.<br><br>The microscope constant for Olympus BX41 (Perth Laboratory) calculated using 25mm filter is 46981.<br><br>These constants are to be used to calculate fibres/mL concentration for asbestos fibre air monitoring filters.<br><br>If less than 10 fibres/100 graticule areas is observed, the figure of 10 fibres/100 graticule areas is the minimum that can be used to calculate airborne fibre concentration as per NOHSC: 3003(April 2005) |
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## Report Comments

Volume Measurement data for fibre samples was supplied by "client", the "client" has been trained by the Envirolab Group and hence the concentration data is covered by the Envirolab Group's NATA Accreditation. Therefore the facility is responsible for the data reported.