

NSW Site Auditor Scheme SITE AUDIT STATEMENT



A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the Contaminated Land Management Act 1997 on 26 March 2009. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. **149B**

This site audit is a ~~statutory audit~~/non-statutory audit* within the meaning of the Contaminated Land Management Act 1997.

Site auditor details (as accredited under the Contaminated Land Management Act 1997)

Name **Dr Ian C Swane** Company **Sinclair Knight Merz**

Address **100 Christie Street, St Leonards NSW**

..... Postcode **2065**

Phone **02 9928 2126** Fax **02 9928 2224**

Site details

Address **Fort Wallace, Fullerton Street, Stockton, NSW**

..... Postcode **2295**

Property description (attach a list if several properties are included in the site audit)

Lot 1 DP 547183 at Stockton, Newcastle (Certificate of Title attached – Figure 1)

Local Government Area **Newcastle City Council**

Area of site (e.g. hectares) **31.78 ha**

Current zoning **Zone 5(a) Special Uses (Defence)**

To the best of my knowledge, the site ~~is~~**is not*** the subject of a declaration, order, agreement, proposal or notice under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.

~~Declaration/Order/Agreement/Proposal/Notice* no(s)~~

A handwritten signature in blue ink that reads "Ian C Swane".

Site audit commissioned by

Name **Ms Vicki Pearce** Company **Australian Government,
Department of Defence**

Address **Property Disposal Unit, BP3-2-A024, Brindabella Park, Canberra ACT**
..... Postcode **1225**

Phone **(02) 6266 8024** Fax **(02) 6266 8276**

Name and phone number of contact person (if different from above)

Purpose of site audit

- ☒ A. To determine land use suitability (*please specify intended use[s]*)

For the purpose of this audit, Defence has divided the Site into two types of areas referred to as “unrestricted landuse” and “non-development landuse”¹. The “unrestricted landuse” category refers to those areas where the most sensitive landuse would be “standard” residential (HIL A). The “non-development landuse” includes heritage or ecologically constrained areas where the most sensitive landuse would be open space/parkland (HIL E). A plan showing the location of these two area types across the site is provided in Figure 2 (attached).

~~OR~~

- ~~☐ B(i) To determine the nature and extent of contamination, and/or~~
~~☐ B(ii) To determine the appropriateness of an investigation/remedial action/management plan*, and/or~~
~~☐ B(iii) To determine if the land can be made suitable for a particular use or uses by implementation of a specified remedial action plan/management plan* (*please specify intended use[s]*)~~

Information sources for site audit

Consultancy(ies) which conducted the site investigation(s) and/or remediation

GHD, SMEC, WSP, GETEX, Alpha Geoscience & Gibson Nominees

¹ SMEC email 22 July 2008

Title(s) of report(s) reviewed

1. GHD. July 2004. *"Preliminary Contamination Assessment, Fort Wallace Disposal Study"*. Prepared for CSIG – Canberra
2. SMEC. March 2008. *"Fort Wallace Contamination Assessment Final"*. Prepared for the Department of Defence (2 volumes)
3. SMEC. March 2008. *"Fort Wallace Remedial Action Plan, Final"*. Prepared for the Department of Defence
4. SMEC. 8 September 2008. *"Fort Wallace Delineation Sampling, June 2008"*, 8 pages plus attachments. Prepared for the Department of Defence
5. SMEC. 6 November 2008. *"Remediation Specification Fort Wallace"*, 32 pages. Prepared for the Department of Defence
6. SMEC. June 2009. *"Fort Wallace – Validation Sampling Analysis and Quality Plan"*, Version 3. Prepared for the Department of Defence
7. SMEC. 22 September 2009. *"Fort Wallace Validation Report"*. Prepared for the Department of Defence
8. SMEC. 22 December 2009. *"Final Fort Wallace Site Environmental Management Plan"*. Prepared for the Department of Defence. 36 pages

Other information reviewed (including previous site audit reports and statements relating to the site)

9. Newcastle City Council. October 2005. *"Development Control Plan 2005"*
10. Department of Defence. 14 March 2007. *"Fort Wallace Property Report"*. 8 pages
11. GHD. June 2004. *"Building Condition Assessment, Former Fort Wallace, Stockton"*. Preliminary Draft. Prepared for Corporate Services & Infrastructure
12. Gibson Nominees. December 2006. *"Review of Ordnance-Related Contamination Issues Relating to the Former Stockton Rifle Range and Fort Wallace, New South Wales"*. Prepared for the Department of Defence
13. Alpha Geoscience. August 2007. *"Geophysical Survey EM-61, Stockton Rifle Range and Fort Wallace, Stockton"*. Prepared for WSP Environmental and the Department of Defence. 17 pages
14. SKM (17 September 2008) *"Site Audit Report on a Remedial Action Plan for Fort Wallace, Fullerton Street, Stockton, NSW"*. Prepared for the Department of Defence
15. SKM (17 September 2008) Site Audit Statement 149 for Fort Wallace, Fullerton Street, Stockton, NSW. Prepared for the Department of Defence. 9 pages
16. SMEC (6 October 2009) Letter *"3001625.001 Fort Wallace Validation Report Addendum 1 Letter Report"*. Prepared for the Department of Defence. 8 pages
17. SMEC (26 November 2009) Letter *"Site Auditor Review Comments on Final Fort Wallace Validation Report"*. Prepared for the Department of Defence. 21 pages plus attachments
18. Gibson Nominees (3 December 2009) Letter *"Fort Wallace Land Use Options: Ordnance-Related Contamination Issues"*. 5 pages
19. SMEC (9 December 2009) *"Fort Wallace Pavement Investigation Report"*. Prepared for the Department of Defence. 8 pages

Site audit report

Title **Site Audit Report for the Remediation of Fort Wallace, Fullerton Street, Stockton, NSW, Site Audit 149B by Dr Ian Swane**

Report no. **149B** Date **23 December 2009**



PART II: Auditor's findings

Please complete either Section A or Section B, **not** both. (*Strike out the irrelevant section.*)

Use Section A where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s).

Use Section B where the audit is to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specified land use or uses subject to the successful implementation of a remedial action or management plan.

Section A

- ☒ I certify that, in my opinion, the **“unrestricted landuse”** portion of the site (refer Figure 2) is **SUITABLE** for the following use(s) (*tick all appropriate uses and strike out those not applicable*):

- ☐ ~~Residential, including substantial vegetable garden and poultry~~
- ☐ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ☒ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☒ Day care centre, preschool, primary school
- ☒ Residential with minimal opportunity for soil access, including units
- ☒ Secondary school
- ☒ Park, recreational open space, playing field
- ☒ Commercial/industrial
- ☒ Other (*please specify*) **Defence uses**

AND

- ☒ I certify that, in my opinion, the **“non-development landuse”** portion of the site (refer Figure 2) is **SUITABLE** for the following use(s) (*tick all appropriate uses and strike out those not applicable*):

- ☐ ~~Residential, including substantial vegetable garden and poultry~~
- ☐ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ☐ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ☐ ~~Day care centre, preschool, primary school~~
- ☒ Residential with minimal opportunity for soil access, including units
- ☒ Secondary school
- ☒ Park, recreational open space, playing field
- ☒ Commercial/industrial
- ☒ Other (*please specify*) **Defence uses**



**subject to compliance with the following environmental management plans
(insert title, date and author of plan) in light of contamination remaining on the
site:**

- SMEC (22 December 2009) *"Final Fort Wallace Site Environmental Management Plan"*
- SMEC (9 December 2009) *"Fort Wallace Pavement Inspection Report"*

OR

~~**I certify that, in my opinion, the site is NOT SUITABLE for any use due to the
risk of harm from contamination.**~~

Overall comments

1. This site audit statement should be read in conjunction with the site audit report.
2. This site audit statement applies to the condition of the site at the time the last assessment was undertaken by SMEC in December 2009. The property owner is responsible for ensuring the site remains in a suitable condition. ..
3. All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a low risk. Visible and identified ACM fragments, Defence waste and all known UXO waste have been removed from the Site.
4. Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.
5. A pavement investigation report prepared by SMEC (Ref [19]) assessed the bitumen pavements to have a short to medium life of 2 to 5 years, and provided recommendations on maintenance actions for the pavement.
6. The purpose of the EMP is to manage contamination risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services.
7. Groundwater should not be extracted from the Fort Wallace site if groundwater at the Hunter Water Sewerage Treatment Plant located to the south of the site is contaminated at unacceptable levels and if there is a risk that such extraction could cause contaminated groundwater to migrate onto the site.
8. One approach to notify future owners of the need to comply with the SEMP and the requirements of the site audit statement would be to place a positive covenant on the land title. A registered survey plan prepared by a licensed surveyor could also be obtained to accurately define the two types of areas referred to as *"unrestricted landuse"* and *"non-development landuse"*.

Section B

~~Purpose of the plan² which is the subject of the audit:~~

~~I certify that, in my opinion:~~

~~☐ the nature and extent of the contamination HAS/HAS NOT* been appropriately determined~~

~~AND/OR~~

~~☐ the investigation/remedial action plan/management plan* IS/IS NOT* appropriate for the purpose stated above~~

~~AND/OR~~

~~☐ the site CAN BE MADE SUITABLE for the following uses (tick all appropriate uses and strike out those not applicable):~~

~~☐ Residential, including substantial vegetable garden and poultry~~

~~☐ Residential, including substantial vegetable garden, excluding poultry~~

~~☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~

~~☐ Day care centre, preschool, primary school~~

~~☐ Residential with minimal opportunity for soil access, including units~~

~~☐ Secondary school~~

~~☐ Park, recreational open space, playing field~~

~~☐ Commercial/industrial~~

~~☐ Other (please specify)~~

~~if the site is remediated/managed* in accordance with the following remedial action plan/management plan* (insert title, date and author of plan)~~

~~.....~~

~~subject to compliance with the following condition(s):~~

~~Overall comments~~

² For simplicity, this statement uses the term 'plan' to refer to both plans and reports.



PART III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority under the *Contaminated Land Management Act 1997* (Accreditation No. 9821).

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997*, and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.



Signed

Date **23 December 2009**



PART IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remedial action or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use(s) of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A or Section B of Part II, **not** both.

In **Section A** the auditor may conclude that the land is *suitable* for a specified use(s) OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further remediation or investigation of the site was needed to render the site fit for the specified use(s). Any **condition** imposed should be limited to implementation of an environmental management plan to help ensure the site remains safe for the specified use(s). The plan should be legally enforceable: for example a requirement of a notice under the *Contaminated Land Management Act 1997* (CLM Act) or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of the *Environmental Planning and Assessment Act 1979*.

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

In **Section B** the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or whether land can be made suitable for a particular land use or uses upon implementation of a remedial action or management plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

In **Part III** the auditor certifies his/her standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to:

Department of Environment and Climate Change (NSW)

Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
Fax: (02) 9995 5930

AND

the **local council** for the land which is the subject of the audit.



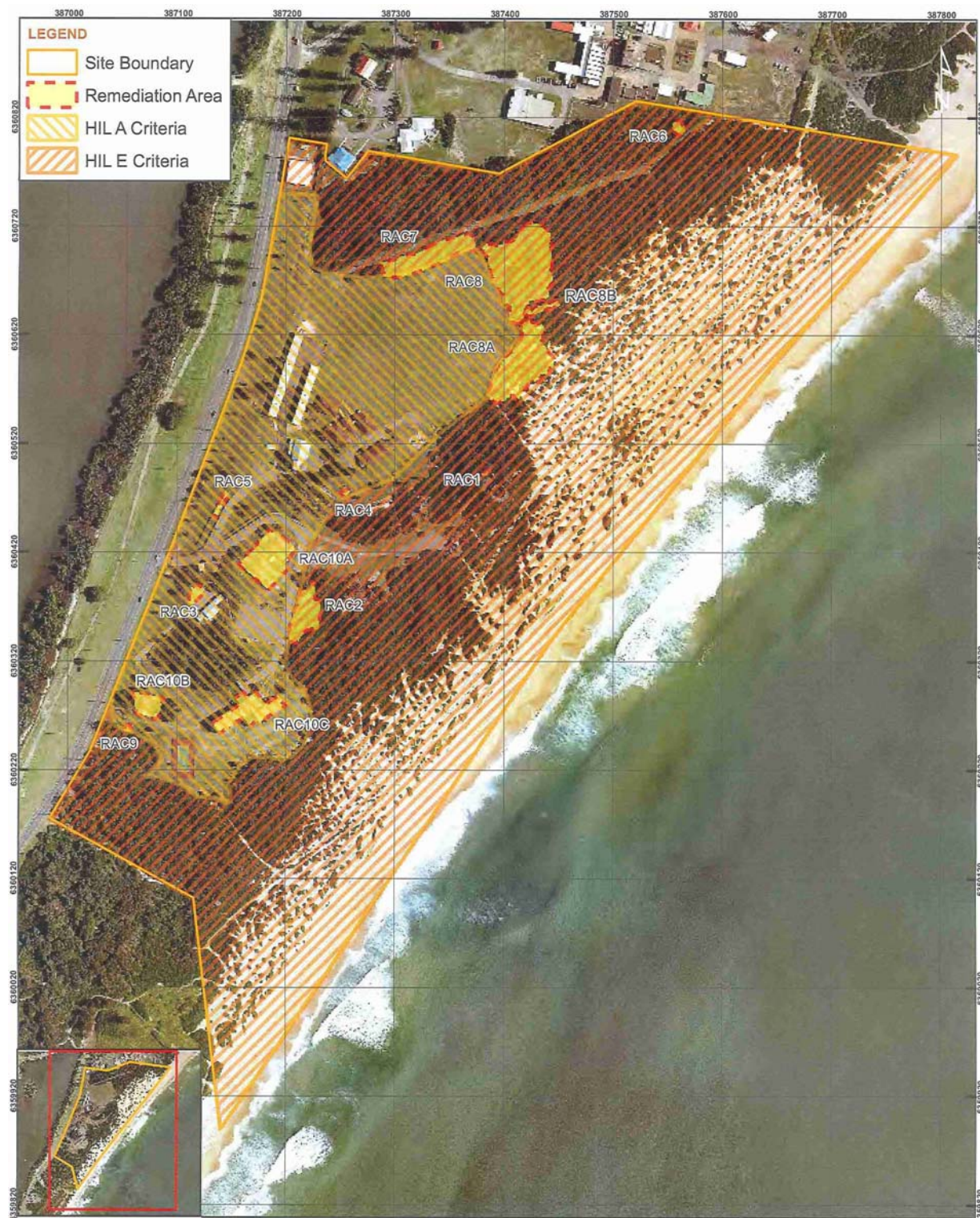
Diagram

CONVERSION TABLE ADDED IN
REGISTRAR GENERAL'S DEPARTMENT

FEET	INCHES	METRES
1	0.083	0.305
2	0.167	0.610
3	0.250	0.914
4	0.333	1.219
5	0.417	1.524
6	0.500	1.829
7	0.583	2.134
8	0.667	2.438
9	0.750	2.743
10	0.833	3.048
11	0.917	3.353
12	1.000	3.658
13	1.083	3.963
14	1.167	4.268
15	1.250	4.573
16	1.333	4.878
17	1.417	5.183
18	1.500	5.488
19	1.583	5.793
20	1.667	6.098
21	1.750	6.403
22	1.833	6.708
23	1.917	7.013
24	2.000	7.318
25	2.083	7.623
26	2.167	7.928
27	2.250	8.233
28	2.333	8.538
29	2.417	8.843
30	2.500	9.148
31	2.583	9.453
32	2.667	9.758
33	2.750	10.063
34	2.833	10.368
35	2.917	10.673
36	3.000	10.978
37	3.083	11.283
38	3.167	11.588
39	3.250	11.893
40	3.333	12.198
41	3.417	12.503
42	3.500	12.808
43	3.583	13.113
44	3.667	13.418
45	3.750	13.723
46	3.833	14.028
47	3.917	14.333
48	4.000	14.638
49	4.083	14.943
50	4.167	15.248
51	4.250	15.553
52	4.333	15.858
53	4.417	16.163
54	4.500	16.468
55	4.583	16.773
56	4.667	17.078
57	4.750	17.383
58	4.833	17.688
59	4.917	17.993
60	5.000	18.298
61	5.083	18.603
62	5.167	18.908
63	5.250	19.213
64	5.333	19.518
65	5.417	19.823
66	5.500	20.128
67	5.583	20.433
68	5.667	20.738
69	5.750	21.043
70	5.833	21.348
71	5.917	21.653
72	6.000	21.958
73	6.083	22.263
74	6.167	22.568
75	6.250	22.873
76	6.333	23.178
77	6.417	23.483
78	6.500	23.788
79	6.583	24.093
80	6.667	24.398
81	6.750	24.703
82	6.833	25.008
83	6.917	25.313
84	7.000	25.618
85	7.083	25.923
86	7.167	26.228
87	7.250	26.533
88	7.333	26.838
89	7.417	27.143
90	7.500	27.448
91	7.583	27.753
92	7.667	28.058
93	7.750	28.363
94	7.833	28.668
95	7.917	28.973
96	8.000	29.278
97	8.083	29.583
98	8.167	29.888
99	8.250	30.193
100	8.333	30.498

(See Diagram)

Figure 2 Location of Proposed Landuse Areas



Ian C Swane

Site Audit Report for the Remediation of Fort Wallace, Fullerton Street, Stockton, NSW



SITE AUDIT 149B BY DR IAN SWANE

- Final
- 23 December 2009



Site Audit Report for the Remediation of Fort Wallace, Fullerton Street, Stockton, NSW

SITE AUDIT 149B BY DR IAN SWANE

- Final
- 23 December 2009

Sinclair Knight Merz
ABN 37 001 024 095
100 Christie Street
PO Box 164
St Leonards NSW
Australia 1590
Tel: +61 2 9928 2100
Fax: +61 2 9928 2500
Web: www.skmconsulting.com

COPYRIGHT: The concepts and information contained in this document are the property of Sinclair Knight Merz Pty Ltd. Use or copying of this document in whole or in part without the written permission of Sinclair Knight Merz constitutes an infringement of copyright.



Contents

1.	Introduction	1
1.1	Purpose	1
1.2	Scope	5
1.3	Standards and Audit Methodology	6
1.3.1	NSW DECCW Approved Guidelines	6
1.3.2	Newcastle City Council Requirements	8
1.3.3	Decision Process for Sensitive Residential Sites	9
1.3.4	Hypothesis Testing	11
1.4	Outcome of Previous Audit	12
1.4.1	Stage 2 Investigation	12
1.4.2	Remediation Strategy	14
1.4.3	Management of the Site Post-Remediation	15
1.5	Information Reviewed	16
1.6	Chronology of Site Audit Program	17
1.7	Abbreviations	20
2.	Conclusions & Recommendations	23
2.1	Background	23
2.2	Remediation Work	23
2.3	Validation	31
2.4	Suitability of Site for Future Uses	33
2.5	Future Management of the Site	35
3.	Review of Remedial Works	37
3.1	Overview of Remediation Strategy	37
3.2	Compliance with Regulatory Requirements	41
3.2.1	General	41
3.2.2	Compliance with RAP & Earlier Site Audit Statement	43
3.2.3	Compliance with NCC Requirements	45
3.3	Project Supervision & Progress Reporting	46
3.3.1	Supervision and Management of the Remediation Work	46
3.3.2	Record Keeping and Reporting During Remediation	49
3.4	Environmental Protection	50
3.4.1	General	50
3.4.2	Design and Operation of Contaminated Soil Stockpile Area	53
3.5	Environmental Monitoring	55
3.6	Community Consultation	56
3.7	OH&S	57
3.8	Excavation, Classification and Material Disposal	58



3.8.1	Earthwork Procedures	58
3.8.2	Completion of Waste Classification Assessments	60
3.8.3	Adequacy of Waste Classification Assessments	62
3.8.4	Cradle-to-Grave Tracking of Wastes	62
3.8.5	Disposal of Wastes to Suitably Licensed Landfills	71
3.8.6	Assessment of Risk	73
3.8.7	Comparison of Actual and Predicted Quantities	75
3.9	Backfilling & Reinstatement	76
3.9.1	Importation of VENM	76
3.9.2	Reinstatement of Excavations and Stockpile Area	77
3.10	ACM Clearance	79
3.10.1	Methodology	79
3.10.2	Asbestos Clearance Work	80
3.10.3	Assessment of Risk	85
3.11	Defence Waste & UXO Clearance	87
3.11.1	Assessment by Defence-Accredited UXO Specialist	87
3.11.2	Findings Made by Remediation Work	91
3.12	Hazardous Building Materials	93
4.	Review of Validation Program	96
4.1	DQOs for Validation Program	96
4.2	Validation Criteria	98
4.3	Sampling Program & QA/QC	99
4.3.1	Documentation Completeness	99
4.3.2	Data Completeness and Representativeness	102
4.3.3	Data Comparability	104
4.3.4	Precision & Accuracy for Sampling & Analysis	106
4.4	Validation of Remediation Areas	107
4.4.1	RAC 1 – Northern Gun Emplacement	107
4.4.2	RAC 2 – Waste Material Southern Gun Emplacement	108
4.4.3	RAC 3 – Administration Building	109
4.4.4	RAC 4 – Pump House	110
4.4.5	RAC 5 – Western Terrace	111
4.4.6	RAC 6 – Sand Dunes	112
4.4.7	RAC 7 – Waste Disposal Area	113
4.4.8	RAC 8 – Waste Disposal Area	114
4.4.9	RAC 8a – Waste Disposal Former Training Area	116
4.4.10	RAC 8b – Surface Waste Disposal	117
4.4.11	RAC 9 – Septic Tank	118
4.4.12	RAC 10a – Demolished Buildings 1, 2 and 21	119
4.4.13	RAC 10b – Demolished Building 3	121
4.4.14	RAC 10c – Demolished Building 31	122



4.4.15 Bitumen Pavements	123
4.4.16 Stockpile Area	125
4.4.17 Remainder of Site	126
4.4.18 Imported Backfill	128
4.5 Review of SEMP	129
5. Other Relevant Information	134
Appendix A Figures & Tables from Delineation Sampling Report	136
Appendix B Figures & Tables from Validation Report	137
Appendix C Site Auditor Photographs	138
Appendix D Audit Correspondence	139
Appendix E Site Audit Statement and SEMP	140



Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
Draft	30.10.09	Gonzalo Parra		30.10.09	Draft - Electronic
Final	23.12.09	Ian Swane	Ian Swane	23.12.09	Final

Distribution of copies

Revision	Copy no	Quantity	Issued to
Final	1 & 2	2	Department of Defence – Hard copy & electronic
	3	1	The City of Newcastle – Hard copy
	4	1	SKM Project file – Hard copy & electronic
	5	1	SKM Site Auditor – Hard copy & electronic
	6	1	URS Project Manager - Electronic

Printed:	23 December 2009
Last saved:	23 December 2009
File name:	I:\ENVR\Projects\EN02226\Deliverables\Site Audits\Fort Wallace\Validation\SAR 149B Validation.docx
Author:	Dr Ian Swane
Project manager:	Dr Ian Swane
Name of organisation:	Department of Defence
Name of project:	Site Audit Report for Fort Wallace, Fullerton Street, Stockton, NSW
Name of document:	Site Audit 149B by Dr Ian Swane
Document version:	Final
Project number:	EN02226

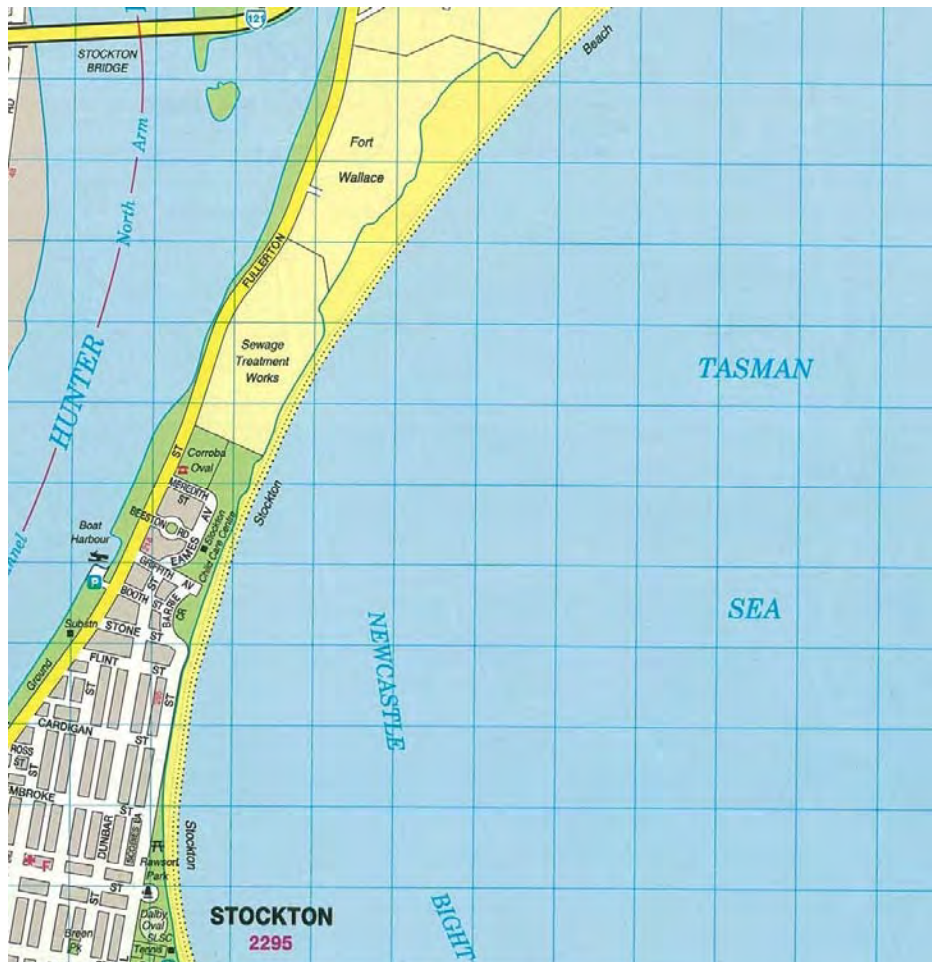


1. Introduction

1.1 Purpose

This Site Audit Report contains the results of a Non-Statutory Site Audit for a remediation and validation report prepared for the cleanup of Fort Wallace (hereafter referred to as the 'Site'), which is located along Fullerton Street on the Stockton Peninsula approximately 5km north of Newcastle in NSW as shown in **Figure 1**. The Department of Defence ('Defence') currently owns the Site, which occupies an area of 31.78 ha. The Site is legally described as Lot 1 DP 547183 in the Local Government Area of Newcastle. A layout plan of the site is shown in **Figure 2**.

■ Figure 1 Site Location



Source: GHD (July 2004) "Preliminary Contamination Assessment, Fort Wallace Disposal Study"



■ Figure 2 Site Layout



Source: Figure 2, Ref [7]



The Fort Wallace Site has been used by Defence for over 70 years. A fort offering naval defences was first constructed in 1912-13 as part of the defence of Newcastle and the coal supply industry. The gun emplacements were upgraded during World War 2, but defence operations were scaled back thereafter. The Site was subsequently used for training purposes until 1967, at which time Army's 130 Signal Squadron was established at the Site. Additional barracks were constructed in 1972-1974.

The Site is now surplus to the needs of Defence, who proposes to rehabilitate the Site to a condition suitable for potential future uses that may include no change, re-establish Defence activities or low density residential dwellings. The purpose of the remedial work is to make the site suitable for the most sensitive land uses of the range of possible options, which comprise residential and open space parkland. Such a high standard of rehabilitation would also not preclude the site from being used for other less sensitive land uses.

For the purpose of the remedial works, Defence has divided the Site into two types of areas referred to as "*unrestricted landuse*" and "*non-development landuse*"¹. The "*unrestricted landuse*" category refers to those areas where the most sensitive landuse would be "*standard*" residential (NEHF A). The "*non-development landuse*" includes heritage or ecologically constrained areas where the most sensitive landuse would be open space/parkland (NEHF E). A plan showing the location of these two area types across the Site is provided in **Figure 3**.

The audit has been undertaken by Dr Ian Swane, a NSW Department of Environment, Climate Change and Water (DECCW) accredited Site Auditor (Accreditation No. 9821) in accordance with the NSW Contaminated Lands Management (CLM) Act 1997 and the Environment Protection and Biodiversity Conservation (EPBC) Act 1999. For annual return purposes to the NSW DECC, the audit is number 149B in the records of the Site Auditor. The site audit was commissioned by Defence on 12 December 2006.

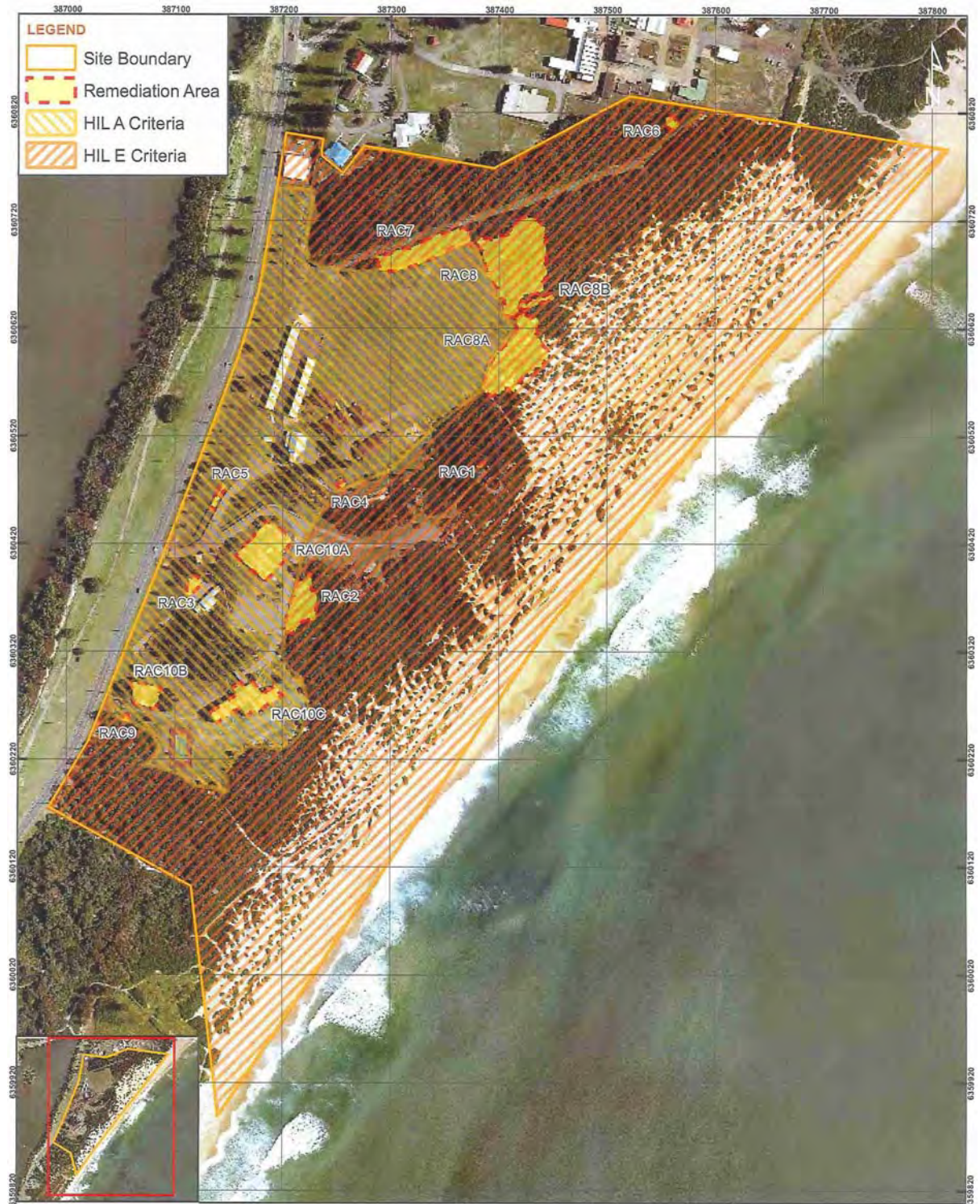
The primary purpose of this report is to confirm in writing that Fort Wallace has been remediated to standards appropriate for its proposed future land uses. The remediation work at the Site was conducted between 3 March 2009 and 6 October 2009.

This report follows an earlier site audit report that reviewed documentation on past investigations and a Remediation Action Plan (RAP) prepared by SMEC. The earlier report was titled "*Site Audit Report on a Remedial Action Plan for Fort Wallace, Fullerton Street, Stockton, NSW*" and was dated 17 September 2008. The previous report was numbered site audit 149.

¹ SMEC email 22 July 2008



■ Figure 3 Location of Proposed Landuse Areas



Source: Figure 9, Ref [7]



1.2 Scope

The scope of work undertaken for the audit of the remediation and validation of Fort Wallace has comprised the following tasks:

- Review step-out investigation reports prepared by SMEC following the audit of the RAP
- Review a Sampling, Analysis and Quality Plan (SAQP) prepared by SMEC for the validation of Site. Provide review comments and approve a final SAQP
- Conduct independent site inspections and monitor site work throughout the period of the remedial works
- Attend project review meetings on a regular basis
- Liaise with and provide feedback to SMEC who supervised the remedial works and validated the Site
- Review a draft validation report prepared by SMEC for the remediated Site. Provide comments on the draft and obtain additional information from the environmental consultants as required
- Review additional information provided by environmental consultants that sought to address issues raised by the Site Auditor
- Review a draft site environmental management plan (SEMP) for the future management of the Site and provide comments
- Issue a draft site audit statement (SAS) and draft SEMP to the City of Newcastle for their review and comment
- Prepare a final site audit report (SAR) and statement and then issue to the Department of Defence and The City of Newcastle.

The conclusions reached by the Site Auditor on the suitability of Fort Wallace are presented in **Section 2**. The results of the Site Auditor's review of the remediation work is then presented in **Section 3** followed by a review of the validation program for the Site in **Section 4**. The Site Auditor's assessment of a draft SEMP prepared by SMEC is presented in **Section 4.5**. Other relevant information concerning the SAR is provided in **Section 5**.

Copies of significant figures and tables given in the available documentation are provided at the end of this report in **Appendix A** for the June 2008 delineation sampling report (Ref [4]) and **Appendix B** for the September 2009 remediation and validation report (Ref [7]). Copies of photographs taken by the Site Auditor during the audit period are provided in **Appendix C**, while **Appendix D** provides a copy of correspondence issued and received by the Site Auditor during the course of the audit. **Appendix E** provides a copy of the site audit statement and SEMP.



1.3 Standards and Audit Methodology

1.3.1 NSW DECCW Approved Guidelines

The Site Audit was undertaken in accordance with the provisions of the CLM Act and the requirements of the NSW DECCW as specified in the DECCW-endorsed documents listed on the NSW DECCW website at www.epa.nsw.gov.au/clm/guidelines.htm. These documents, as at December 2009, comprised:

NSW DECCW Documents

- Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (NSW DECC, June 2009)
- Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC, March 2007)
- Guidelines for the NSW Site Auditor Scheme, 2nd edition (NSW DEC, April 2006)
- Guidelines for Assessing Former Orchards and Market Gardens (NSW EPA, June 2005)
- Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report (NSW EPA, April 1999)
- Guidelines for the NSW Site Auditor Scheme (NSW EPA, June 1998)
- Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA, September 2000)
- Guidelines for Assessing Banana Plantation Sites (NSW EPA, October 1997)
- Sampling Design Guidelines (NSW EPA, September 1995)
- Guidelines for the Vertical Mixing of Soil on Former Broad-Acre Agricultural Land (NSW EPA, January 1995)
- Guidelines for Assessing Service Station Sites (NSW EPA, December 1994)
- Written advice provided by the NSW DECCW to Site Auditors

Other NSW DECCW-Endorsed Publications

- Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards (Department of Health and Ageing and EnHealth Council, Commonwealth of Australia, June 2002)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000)
- National Environment Protection (Assessment of Site Contamination) Measures (NEPMs) 1999, Schedules B(1) to B(10)
- Australian Drinking Water Guidelines (NHMRC & ARMCANZ, 2004)
- Composite Sampling, by Lock WH (National Environmental Health Forum Monographs, Soil Series No. 3, 1996, SA Health Commission, Adelaide)



- Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes (NSW Agriculture and CMPS&F Environmental, February 1996)
- Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC, 1992)

The NSW DECCW-endorsed guidelines do not address all issues of concern at this site. The other issues include:

- The management of asbestos containing materials
- The delineation of buried wastes using geophysical methods
- The risks posed by petroleum hydrocarbons in groundwater
- The conduct of site-specific risk assessments

For these issues, the Site Auditor has used information provided in the technical literature from reputable sources. The documents include:

- Dutch 2000 Guidelines (Ministry of Housing, Spatial Planning and Environment, February 2000)
- enHealth (2001) *"Health-based Soil Investigation Levels"*
- enHealth (June 2002) *"Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards"*. Commonwealth of Australia
- enHealth (2005) *"Management of Asbestos in the Non-Occupational Environment"*. Department of Health and Ageing, Commonwealth of Australia
- Delaney AJ, Strasser JC, Lawson DE, Arcone SA & Evenson EB. September 1997. *"Geophysical Investigations at a Buried Disposal Site on Fort Richardson, Alaska"*. USACE Cold Regions Research and Engineering Laboratory, Report CRREL Report 97-4
- Merrington G. Fishwick S & Brooke D. 2006. *"The Derivation and Use of Soil Screening values for metals for the ecological Risk Assessment of Contaminated Land: A Regulatory Perspective"*. Land Contamination & Reclamation, 14(3).
- NOHSC (April 2005) *"Code of Practice for the Management and Control of Asbestos in the Workplaces"* [NOHSC:2018 (2005)]
- SA Health Commission & enHealth (1991-2002) Proceedings of National Workshops on the Health Risk Assessment and Management of Contaminated Sites
- SA Health Commission (1996) National Environmental Health Forum Monographs
- Standards Australia (1995) *"AS 4361.1 – Guide to lead paint management, Part 1: Industrial applications"*
- Standards Australia (1998a) *"AS 4361.2 – Guide to lead paint management, Part 2: Residential and commercial buildings"*



- Standards Australia (1998b) *“AS5667.1 Water quality – Sampling: Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples”*
- Standards Australia (1998c) *“AS5667.11 Water quality – Sampling: Part 11: Guidance on sampling of groundwaters”*
- Standards Australia (1999) *“AS4482.2-1999 Guide to the Sampling and Investigation of Potentially Contaminated Soil, Part 2: Volatile Substances”*
- Standards Australia (2005) *“AS4482.1-2005 Guide to the Sampling and Investigation of Sites with Potentially Contaminated Soil, Part 1: Non-volatile and Semi-volatile Compounds”*
- USEPA (August 2000) *“Guidance for the Data Quality Objective Process”*
- WA Department of Health (May 2009a) *“Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia”*
- WA Department of Health (May 2009b) *“Management of Small-Scale Low-Risk Soil Asbestos Contamination”*

1.3.2 Newcastle City Council Requirements

Fort Wallace is located on Commonwealth land within the local government area of Newcastle City Council (NCC). The NCC requirements for the management of contaminated land are described in Section 4.2 of a Development Control Plan (DCP) dated October 2005 (NCC, October 2005). The DCP, among other things, outlines requirements relating to the use and/or development of land that is or may be contaminated and represents Council’s policy adopted in accordance with the Contaminated Land Planning Guidelines notified under section 145C of the Environmental Planning and Assessment Act 1979.

Matters in the DCP considered to be relevant to the Fort Wallace land include:

- Council may require a site audit statement to be prepared to verify that the information provided by a proponent adheres to appropriate standards, procedures and guidelines [Section 4.2.2(h)].
- Remediation of land to be subdivided or developed should be completed consistent with the proposed or current zoning and land use, so that it does not place any future land owner or occupier in a position where further remediation of contaminants is required [Section 4.2.3(a)i].
- Remediation of land to be subdivided or developed should not place a public agency in a position where it may have to become involved in any future management or monitoring of contaminated land [Section 4.2.3(a)ii].
- Remediation of land in general should:



- Be carried out in accordance with the DCP [Section 4.2.3(a)iii]
- Aim to remediate land to the highest land use possible under current or proposed zoning without the need for site specific on-going management controls such as capping [Section 4.2.3(a)iv]
- Be carried out and completed in a manner which will not result in an unacceptable level of risk to human health or the environment [Section 4.2.3(a)v]
- Aim to remediate groundwater to a level that allows the maximum reuse of the resource into the future [Section 4.2.3(a)vi]
- Information relating to land contamination should be managed in a manner that provides a basis for informed planning decisions, facilitate community consultation, minimise risk to human health and the environment, avoids unnecessary restrictions on development, enables Council to exercise its duties and acknowledges any limitations on information [Section 4.2.4(a)].

The Site Auditor considers that these NCC requirements are relevant to this audit since Defence has a policy of working with State and local government authorities.

1.3.3 Decision Process for Sensitive Residential Sites

The Site Auditor has assessed the risks posed by ground contamination at the Site by following the *'Decision Process for Assessing Urban Redevelopment Sites'* as given by the NSW DEC (2006) *'Guidelines for the NSW Site Auditor Scheme (2nd edition)'* (refer pages 50-51). As mentioned in **Section 1.1**, the Fort Wallace site is surplus to the needs of Defence who proposes to rehabilitate the land to a condition suitable for potential future uses that may include no change, re-establish Defence activities or low density residential dwellings. The purpose of the remedial work is to make the site suitable for the most sensitive land uses of the range of possible options, which comprise residential and open space parkland. Such a high standard of rehabilitation would also not preclude the site from being used for other less sensitive land uses.

For the purposes of this site audit, the assessment has used the DECC's decision process for the most sensitive land use, this being NEHF A ('standard' residential), for land located in the *"unrestricted landuse"* category, as shown in **Figure 3**. This land use is described as being for residential with gardens and accessible soil (home produce contributing less than 10% fruit and vegetable intake; no poultry), including children's day-care centres, preschools or primary schools, town houses and villas. For land located in the *"non-development landuse"* category, the audit has used the DECC's decision process for open space/parkland land use, this being NEHF E. The decision process for both these land uses involves 7 issues.

The first issue in the DECCW decision process for 'standard' residential or open space land use is that:

SINCLAIR KNIGHT MERZ



'all site assessment, remediation and validation reports follow the 1997 EPA publication Guidelines for Consultants Reporting on Contaminated Sites'.

The Data Quality Objectives (DQO's) and assessment criteria that the Site Auditor set for the environmental assessments conducted at the site are summarised in **Table 1-1**.

■ **Table 1-1 Data Quality Objectives and Evaluation Criteria**

DQO	Evaluation Criteria
Documentation completeness	<ul style="list-style-type: none"> • DQO process properly described • Site properly identified • Site history adequately known • The conceptual site contamination model for the site is known to a high level of confidence • The site conditions adequately known • Completion of field calibration records, borehole logs, chain of custody documentation, laboratory test certificates from NATA-registered laboratories
Data completeness	<ul style="list-style-type: none"> • Sampling density comparison meets NSW DECCW recommended minimum sampling densities for all potential contaminants of concern at all areas of environmental concern or as otherwise justified by the environmental consultant
Data comparability	<ul style="list-style-type: none"> • Use of appropriate techniques for the sampling, storage and transportation of samples • Use of NATA certified laboratory using NEPM procedures
Data representativeness	<ul style="list-style-type: none"> • Good sampling coverage of all areas of environmental concern at the site and selection of representative samples
Precision and accuracy for sampling and analysis	<ul style="list-style-type: none"> • Use properly trained and qualified field personnel • Blind field duplicates to be collected at minimum rate of 1 in 10 • RPD's to be less than 30% for inorganic and 50% for organic analyses • Acceptable levels for equipment rinsate blanks • Achieve laboratory QC criteria

These DQO's and criteria were set by the Site Auditor in order to assess the reliability and adequacy of the data provided by environmental consultants. The DQO's were used by the Site Auditor to identify any areas in the documentation where the level of non-compliance was considered to be significant.

The second check in the DECCW decision process for 'Standard' residential or open space land use is that:

'aesthetic issues have been addressed'.

The third check in the DECCW decision process for 'Standard' residential or open space land use is that:



‘soils have been assessed against the lower of the appropriate health-based investigation levels and provisional phytotoxicity-based investigation levels (see columns 1, 3 and 5 in Appendix II)’.

The fourth check in the DECCW decision process for ‘Standard’ residential or open space land use is that:

‘any issues relating to local area background soil concentrations that exceed appropriate site soil criteria have been adequately addressed in the site assessment report(s)’

The fifth check in the DECCW decision process for ‘Standard’ residential or open space land use is that:

‘all impacts of chemical mixtures have been assessed’.

The sixth check in the DECCW decision process for ‘Standard’ residential or open space land use is that:

‘the site management strategy is appropriate’.

The seventh check in the DECCW decision process for ‘Standard’ residential or open space land use is that:

‘any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed and reported to the site owner or occupier.’

The Site Auditor has applied this 7-step decision process to the review of the remediation and validation report that has been prepared for the Fort Wallace site.

1.3.4 Hypothesis Testing

The NSW DECCW advises² that the possibility of a Site Auditor making a decision error, although small, is undesirable because of the adverse consequences arising from that incorrect decision. Such a possibility can be controlled through the use of hypothesis testing. This test can be used to show either that the baseline condition is false (and therefore the alternative condition is true) or that there is insufficient evidence to indicate that the baseline condition is false (and therefore the Site Auditor decides by default that the baseline condition is true). The burden of proof is placed on rejecting the baseline condition, because the test hypothesis structure maintains the baseline condition as being true until overwhelming evidence is presented to indicate that the baseline condition is not true.

² Page 65 of the NSW DEC (April 2006) “Guidelines for the NSW Site Auditor Scheme (2nd edition)”



The baseline condition that has been adopted in this site audit is that all parts of the site are contaminated and need to be remediated or managed in order to make the site suitable for the proposed land use standards as previously described in **Section 1.3.3**. It is the job of the environmental consultant engaged by Defence to collect sufficient evidence to indicate that this baseline condition is false following the completion of the investigation and possibly remedial works.

1.4 Outcome of Previous Audit

1.4.1 Stage 2 Investigation

The previous site audit report considered the available data supported the conclusion that the soils at the Fort Wallace site had been significantly impacted by past Defence activities. Some areas of buried household and general waste were found in the northern part of the Site. A few sampling locations were found to have levels of PAHs and/or metals exceeding the Soil Investigation Levels (SILs) for sensitive land uses, which were considered to be possible hot-spots.

The Stage 2 investigation report concluded that no widespread groundwater contamination was present at the Site. A groundwater plume containing elevated dissolved zinc levels was found in the buried waste area at the northern end of the Site, which is considered to be the source of the impacts. The plume was found to be largely confined to the northern area of the Site and no evidence was found for any significant off-site migration. The Site Auditor considers the available information supported these conclusions.

The Stage 2 investigation report recommended that:

- The identified contamination hot-spots, exceedance areas, buried waste and potentially asbestos containing material be managed through remediation
- A RAP be developed for the Site prior to conducting remedial activities
- It was anticipated that remediation of the hot-spots, exceedance areas and buried waste areas would be through excavation and validation
- It was anticipated that asbestos containing material (ACM) be manually removed
- Future development involving soil disturbance would require further assessments of site conditions in areas where the risk of contamination was considered low.

The Site Auditor considered the available information supported these conclusions. The Site Auditor also considered that additional delineation sampling and testing needed to be undertaken at the four hot-spots and two “*exceedance*” areas identified by the Stage 2 investigation in order that the extent of contamination and the associated risks could be better defined. It was also recommended that delineation testing be conducted at three other suspect areas identified, these being:



- The heavily vegetated area at FWD2
- At locations where septic tanks were located or remain at the Site. Alternatively, the remediation program should be expanded to include the removal of these tanks and any associated contamination
- Asphalt pavement samples should also be tested to check whether parts of old pavement at the Site are contaminated by PAHs and heavy metals. If old pavement was found to be contaminated, then the Site Auditor considered that the environmental consultant would need to undertake a site-specific risk assessment to check whether the risks posed by the presence of this material could be adequately managed.

The site audit report recommended that remedial works at these areas should not be undertaken until the delineation testing had been completed and reviewed by the Site Auditor. The existing 9 functioning groundwater monitoring wells should also be registered with the Department of Planning.

The Site Auditor also considers that a revised validation plan needed to be prepared, which covered those areas of the Site to be remediated as well as areas where no remediation work was considered necessary but where additional sampling may be required, particularly where sensitive land uses were being proposed (eg. residential with accessible soil). This is because the sampling strategy used in the Stage 2 investigation used a judgemental approach that did not meet NSW DECC minimum sampling requirements. It was further recommended that the validation plan should also:

- Include the results of additional delineation sampling undertaken by the environmental consultant
- Assess the validation requirements in accordance with DECC and NEPM guidelines
- Address limitations identified in the site audit report³
- Include a draft EMP for the future use of the Fort Wallace site. The EMP should include, among other things, an “*Unexpected Findings Protocol*” to manage among other things UXO, asbestos containing material and Defence-related waste.

The validation plan should be prepared by the environmental consultant in accordance with DECCW and NEPM guidelines and be approved by the Site Auditor prior to the commencement of the remediation works.

³ As specified in Section 4.8, SKM (17 September 2008)



1.4.2 Remediation Strategy

The previous site audit report advised that the RAP prepared by SMEC proposed for the Fort Wallace site to be remediated at the following areas:

- Buried waste at waste disposal areas RAC7 and RAC8
- Four hot-spots identified as RAC1 (sample location FWGE3A in the Inner Fort/Gun Emplacement area), RAC2 (sample location FWGEWP4 in the Inner Fort/Gun Emplacement area), RAC4 (sample location FWPH1B in the Outer Fort/Pump House area), and RAC6 (sample location FW37B in the Sand Dunes area)
- Two “*exceedance areas*” identified as RAC3 (sample location FWAB3 in the Administration Block area) and RAC5 (sample location FWTA2 in the Outer Fort/Western Terraced area)
- ACM fragments scattered across the Site.

The Site Auditor considered the available information supported the conclusion that a program of remedial work needed to be undertaken at the Fort Wallace site involving the removal of buried waste, ACM and contaminated material from the above areas. The Site Auditor also considered that additional delineation sampling and testing needed to be undertaken, as described in the previous section.

The preferred remediation strategy proposed by the RAP for the buried waste was excavation and off-site disposal at a licensed landfill. The Site Auditor considered the available data supported this preferred remedial option. However, the Site Auditor considered that uncertainty remained with respect to the extent and volume of waste needing to be removed from these two areas. The Site Auditor considered this uncertainty could be addressed by, among other things:

- Using the volumes given in the Stage 2 report/RAP as lower bound estimates
- Including a reasonable contingency allowance in the project budget
- Ensuring all excavation works were supervised by a suitably experienced environmental engineer/scientist on a full-time basis.

The Site Auditor also noted that the RAP did not include a third burial area that was identified by SMEC in the Stage 2 investigation report. This third area was a suspect burial area in a gully behind Southern Gun Emplacement. The Site Auditor considered that in the absence of any additional information, the remediation strategy for the Site should include conducting an additional delineation testing in this area, and if need be, additional remedial work.

The preferred remediation strategy proposed by the RAP for managing ACM fragments remaining in soils at the Site was manual removal followed by soil validation samples at areas where a large number of fragments were found. The Site Auditor considered the available data supported this



preferred option. SMEC advised that asbestos removal work had already been undertaken at some areas of the Site, such as near damaged buildings and the Oval, and that no further work needed to be undertaken in such areas. However, SMEC provided no asbestos clearance documentation for these areas. The Site Auditor considered that asbestos clearance documentation meeting regulatory requirements needed to be provided for all parts of the Site in order to support the preparation of a site audit statement that minimises future constraints on the management of the Site.

The Site Auditor considered that all waste material and abandoned infrastructure (both above and below ground) containing hazardous building materials should be removed from areas of the Site to be used for “*unrestricted landuse*”. This is because of the risks such materials would pose to the future amenity and safety of these sensitive areas. It was important for the validation plan to demonstrate all such materials had been removed from these “*unrestricted landuse*” areas.

The previous site audit report emphasised the importance of the environmental consultant ensuring all waste materials generated by the remedial work was tracked from cradle-to-grave and appropriate documentation prepared that would allow all material movements to be independently audited. It was recommended that a Standard Operating Procedure (SOP) for waste tracking should be provided to and approved by the Site Auditor prior to the commencement of site works.

1.4.3 Management of the Site Post-Remediation

The previous site audit report advised that following the completion of the remedial works, an SEMP would need to be prepared that should assist future users of the Site in managing the following matters:

- A restriction on the extraction of large quantities of groundwater from the southern portion of the Site due to the risk of contaminated groundwater migrating onto the Site from the adjacent sewage treatment plant operated by the Hunter Water Corporation. The Site Auditor considered that this risk should be addressed by recommending that groundwater should not be extracted from the Fort Wallace site if groundwater at the Hunter Water Sewerage Treatment Plant located to the south of the site is contaminated at unacceptable levels and if there was a risk that such extraction could cause contaminated groundwater to migrate onto the Site
- Including an “*Unexpected Findings Protocol*” in order to manage the small risk of finding presently unknown UXOs, ACM or small pockets of waste material
- Ongoing management of waste and/or infrastructure (both above and below ground) containing hazardous building materials in “*non-development landuse*” areas of the Site.

The Site Auditor also noted that the 2006 UXO study by Gibson Nominees (Ref [12]) recommended that Defence should also offer to sponsor a UXO-specific advice and public



education program prior to the commencement of any new development works at the Fort Wallace property.

1.5 Information Reviewed

The environmental reports that were reviewed as part of the Site Auditor's assessment of the SMEC RAP comprised:

1. GHD. July 2004. *"Preliminary Contamination Assessment, Fort Wallace Disposal Study"*. Prepared for CSIG – Canberra
2. SMEC. March 2008. *"Fort Wallace Contamination Assessment Final"*. Prepared for the Department of Defence (2 volumes)
3. SMEC. March 2008. *"Fort Wallace Remedial Action Plan, Final"*. Prepared for the Department of Defence

The environmental reports that have been reviewed as part of the Site Auditor's assessment of the remediation and validation program for the Site comprise:

4. SMEC. 8 September 2008. *"Fort Wallace Delineation Sampling, June 2008"*, 8 pages plus attachments. Prepared for the Department of Defence
5. SMEC. 6 November 2008. *"Remediation Specification Fort Wallace"*, 32 pages. Prepared for the Department of Defence
6. SMEC. June 2009. *"Fort Wallace – Validation Sampling Analysis and Quality Plan"*, Version 3. Prepared for the Department of Defence
7. SMEC. 22 September 2009. *"Fort Wallace Validation Report"*. Prepared for the Department of Defence
8. SMEC. 22 December 2009. *"Final Fort Wallace Site Environmental Management Plan"*. Prepared for the Department of Defence. 36 pages

Other information reviewed for this site audit includes:

9. Newcastle City Council. October 2005. *"Development Control Plan 2005"*
10. Department of Defence. 14 March 2007. *"Fort Wallace Property Report"*. 8 pages
11. GHD. June 2004. *"Building Condition Assessment, Former Fort Wallace, Stockton"*. Preliminary Draft. Prepared for Corporate Services & Infrastructure
12. Gibson Nominees. December 2006. *"Review of Ordnance-Related Contamination Issues Relating to the Former Stockton Rifle Range and Fort Wallace, New South Wales"*. Prepared for the Department of Defence
13. Alpha Geoscience. August 2007. *"Geophysical Survey EM-61, Stockton Rifle Range and Fort Wallace, Stockton"*. Prepared for WSP Environmental and the Department of Defence. 17 pages



14. SKM (17 September 2008) "*Site Audit Report on a Remedial Action Plan for Fort Wallace, Fullerton Street, Stockton, NSW*". Prepared for the Department of Defence
15. SKM (17 September 2008) Site Audit Statement 149 for Fort Wallace, Fullerton Street, Stockton, NSW. Prepared for the Department of Defence. 9 pages
16. SMEC (6 October 2009) Letter "*3001625.001 Fort Wallace Validation Report Addendum 1 Letter Report*". Prepared for the Department of Defence. 8 pages
17. SMEC (26 November 2009) Letter "*Site Auditor Review Comments on Final Fort Wallace Validation Report*". Prepared for the Department of Defence. 21 pages plus attachments
18. Gibson Nominees (3 December 2009) Letter "*Fort Wallace Land Use Options: Ordnance-Related Contamination Issues*". 5 pages
19. SMEC (9 December 2009) "*Fort Wallace Pavement Investigation Report*". Prepared for the Department of Defence. 8 pages

The Site Auditor is unaware of the existence of any other relevant documents that provide information on site conditions or the remediation and validation work. Additional information was obtained by the Site Auditor when site inspections were conducted during the remediation work period on 16/03/09, 16/04/09, 21/05/09, 11/06/09, 30/07/09, 24/09/09 and 30/09/09.

1.6 Chronology of Site Audit Program

Following the issuing of the Site Auditor's review of the RAP, the main events that have occurred during the remediation phase of the project, which are relevant to this audit, are:

- 21 July 2008 – A project review meeting was held for the planning of the remediation work
- 7 August 2008 – A project review meeting was held for the planning of the remediation work
- 26 August 2008 – A project kickoff meeting for the plan of the remediation work was held
- 8 September 2008 – A delineation sampling letter report was prepared by SMEC (Ref [4])
- 22 September 2008 – A project review meeting was held for the planning of the remediation work
- 20 October 2008 – The Site Auditor provided recommendations concerning documentation that should be reviewed prior to the commencement of remediation works at Fort Wallace (**Appendix D**)
- 22 October 2008 – A project review meeting was held to review the remediation work
- 6 November 2008 – The Defence-accredited UXO consultant prepared a letter concerning the ongoing UXO risks at Fort Wallace (**Appendix D**). A copy of this letter was eventually provided to the Site Auditor over 12 months later on 26 November 2009.
- 27 November 2008 – A project review meeting was held to review the remediation work



- 5 December 2008 – A draft version of the SAQP for the validation program was prepared by SMEC
- 27 January 2009 – A project review meeting was held to review the remediation work
- 6 February 2009 – A Remediation Specification prepared by SMEC for the Site (Ref [5]) was released by the URS Project Manager
- 17 February 2009 – The Site Auditor provided review comments on the Remediation Specification (**Appendix D**)
- 16 March 2009 – The Site Auditor attended a project review meeting and inspected the Site
- 16 April 2009 – The Site Auditor attended a project review meeting and inspected the Site
- 21 May 2009 – The Site Auditor attended a project review meeting and inspected the Site
- 25 May 2009 – The Site Auditor provided feedback on the site inspection conducted at Fort Wallace (**Appendix D**)
- 2 June 2009 – The Site Auditor provided review comments on the draft SAQP (**Appendix D**)
- 11 June 2009 – The Site Auditor attended a project review meeting and inspected the Site
- 19 June 2009 - A final version of the SAQP for the validation program was issued by SMEC (Ref [6])
- 30 July 2009 – The Site Auditor attended a project review meeting and inspected the Site
- 4 August 2009: First draft version of the SEMP was prepared by SMEC
- 9 September 2009: A copy of the first draft of the SEMP was provided to the Site Auditor
- 9 September 2009: The Site Auditor provided detailed review comments in the form of a revised draft of the SEMP (**Appendix D**)
- 10 September 2009: The Site Auditor issued a draft site audit statement (SAS) and draft SEMP to NCC (Daniel O'Brien) and Defence for their review and comment (**Appendix D**)
- 22 September 2009 – Review comments on the draft SEMP were provided by the Defence-appointed project manager (**Appendix D**)
- 23 September 2009 – The Site Auditor received a copy of the final remediation and validation report from SMEC (Ref [7])
- 24 September 2009 - The Site Auditor attended a project review meeting and inspected the Site
- 24 September 2009: Review comments were provided by NCC (Daniel O'Brien) (**Appendix D**)
- 25 September 2009 – The Site Auditor provided feedback on remediation work that still needed to be completed at the Site following observations of ACM contamination made during the previous day's site inspection (**Appendix D**)



- 30 September 2009 – The Site Auditor re-inspected the areas of the Site where additional remediation work had been undertaken
- 6 October 2009 – An addendum letter report (Ref [16]) was issued by SMEC describing the additional remediation work that was undertaken to address ACM contamination previously observed by the Site Auditor at the 25/09/09 site inspection (**Appendix D**)
- 28 October 2009 – The Site Auditor provided additional feedback on the remediation and validation report (**Appendix D**)
- 29 October 2009 – The Site Auditor provided additional feedback on the remediation and validation report (**Appendix D**)
- 2 November 2009 – The Site Auditor provided additional feedback on the remediation and validation report (**Appendix D**)
- 13 November 2009 – Additional information was provided by SMEC (superseded by 26 November 2009 report)
- 18 November 2009 – A project review meeting was held to review the remediation and validation work
- 26 November 2009 – Additional information was provided by SMEC (Ref [17]) that sought to address the Site Auditor's review comments made between 28/10/09 and 2/11/09 (**Appendix D**)
- 26 November 2009 – The Defence appointed PM provided the Site Auditor with a letter prepared by the Defence-accredited UXO consultant concerning UXO-risks at Fort Wallace. The letter was dated 6 November 2008
- 27 November 2009 – The Site Auditor provided feedback on the 26/11/08 letter from the Defence-accredited UXO consultant concerning UXO-risks at Fort Wallace (**Appendix D**)
- 3 December 2009 - A further letter was prepared by the Defence accredited UXO-specialist concerning ongoing UXO risks at the Site (**Appendix D**)
- 3 December 2009 – A draft site audit report (SAR) was issued by the Site Auditor to Defence for their review and comment
- 3 December 2009 – A project review meeting was held to review the remediation and validation work
- 4 December 2009 - Information on the discovery of a gas mask at the Site was provided by the Defence-appointed PM (**Appendix D**)
- 4 December 2009 – The Site Auditor requested that the Defence-accredited UXO consultant examine all available information concerning the gas mask and to provide advice (**Appendix D**)
- 7 December 2009 – Feedback on the gas mask discovery was provided by the Defence-accredited UXO consultant (**Appendix D**)



- 9 December 2009 - A pavement inspection report was issued by SMEC (**Appendix E**)
- 9 December 2009 - A revised version of the SEMP was prepared by SMEC
- 21 December 2009 - Additional review comments were provided by the SKM Site Auditor on the SEMP (**Appendix D**)
- 22 December 2009 - A final version of the SEMP was provided by SMEC (Ref [8]) and attached to the SAS (**Appendix E**)
- 23 December 2009 – A final SAS, SEMP and SAR were completed and issued by the Site Auditor.

1.7 Abbreviations

ACM	Asbestos containing material
AEC	Area of Environmental Concern
AHD	Australian Height Datum
ANZECC	Australia and New Zealand Environment and Conservation Council
ASS	Acid sulphate soil
B&D waste	Building and demolition waste
Bgl	Below ground level
BTEX	Benzene, toluene, ethyl benzene, xylenes
CEMP	Construction Environmental Management Plan
COV	Coefficient of variation
DCP	Development Control Plan
DEC	Department of Environment and Conservation, NSW
DECC	Department of Environment and Climate Change, NSW
DECCW	Department of Environment, Climate Change and Water, NSW
DEWHA	Department of the Environment, Water, Heritage and the Arts
DHC	Department of Housing and Construction
DIPNR	Department of Infrastructure, Planning & Natural Resources (renamed Department of Planning)
DQI	Data quality indicators
DQO	Data quality objectives
EA	Environment Australia
EIL	Ecological investigation level
EMP	Environmental Management Plan
EPA	Environment Protection Authority
EPBC Act	Environmental Protection & Biodiversity Conservation Act 1999
GPS	Global positioning system
HAA	Heavy anti-aircraft (guns)
HDPE	High density polyethylene
HIL	Health investigation level
HMAS	Her/His Majesty's Australian Ship



HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra
INCHEM	International Programme on Chemical Safety, World Health Organisation
IER	Initial environmental review
kg	Kilograms
L	Litres
LAA	Light anti-aircraft (guns)
LGA	Local Government Area
m	Metres
mg	Milligrams
MHWM	Mean High Water Mark
MOU	Memorandum of understanding
MPN	Most probable number
NABSW	National Advisory Body on Scheduled Wastes
NCC	Newcastle City Council
NEHF	National Environment Health Forum
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NIOSH	National Institute for Occupational Safety and Health (USA)
NMOC	Non-methane organic compounds
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
OCP	Organochlorine pesticides
OH&S	Occupational health and safety
PAH	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PETN	Pentaerythritol tetranitrate or Penthrate
PID	Photoionisation detector
PM	Project Manager
POL	Petrol, oils, lubricants
Ppm	parts per million
PRG	Preliminary Remediation Goal (US EPA)
RAP	Remediation Action Plan
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RL	Reduced level
SAA	Small arms ammunition
SAC	Soil acceptance criteria
SKM	Sinclair Knight Merz
SMEC	Snowy Mountains Engineering Corporation
SMP	Site Management Plan
STP	Sewage treatment plant
SVOCs	Semi volatile organic compounds

SINCLAIR KNIGHT MERZ



TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total petroleum hydrocarbons
TRH	Total Recoverable hydrocarbons
TSG	Transport and Service Group, Department of Administrative Services
USA	United States of America
US EPA	United States Environmental Protection Agency
VHCs	Volatile halogenated compounds
VENM	Virgin Excavated Natural Material
VSAQP	Validation sampling, analysis and quality plan
WHO	World Health Organisation
µg	Micrograms



2. Conclusions & Recommendations

2.1 Background

This Site Audit Report contains the results of a Non-Statutory Site Audit for a remediation and validation report prepared for the cleanup of Fort Wallace, which occupies a 31.78ha area and is located along Fullerton Street on the Stockton Peninsula. The Site is legally described as Lot 1 DP 547183 in the Local Government Area of Newcastle.

The Site is surplus to the needs of Defence, who proposes to rehabilitate the Site to a condition suitable for potential future uses that may include no change, re-establish Defence activities or low density residential dwellings. The purpose of the remedial work is to make the site suitable for the most sensitive land uses of the range of possible options, which comprise residential and open space parkland. Such a high standard of rehabilitation would also not preclude the site from being used for other less sensitive land uses.

For the purpose of the remedial works, Defence have divided the Site into two types of areas referred to as “*unrestricted landuse*” and “*non-development landuse*”⁴. The “*unrestricted landuse*” category refers to those areas where the most sensitive landuse would be “*standard*” residential (NEHF A). The “*non-development landuse*” includes heritage or ecologically constrained areas where the most sensitive landuse would be open space/parkland (NEHF E). A plan showing the location of these two area types across the Site is provided in **Figure 3**.

2.2 Remediation Work

Compliance with Regulatory Requirements

The Site Auditor considers the available information indicates that the remediation work conducted at the Fort Wallace site generally complied with regulatory requirements, including NCC requirements as described in their DCP. However, not all the work followed the procedures specified in the RAP or the additional requirements specified in the earlier site audit documents.

The main areas of non compliance were:

- The environmental consultant did not provide full-time supervision of the remediation work (RAP requirement)
- Not all contaminated soil and waste generated by the building rehabilitation program was tracked from cradle-to-grave and appropriate documentation prepared that would allow all material movements to be independently audited (SAS Condition 7)

⁴ Refer to SMEC email 22 July 2008



Project Supervision and Project Reporting

The approach taken during the remediation project was for the work undertaken by the remediation contractor to be subject to part-time supervision by the Defence-appointed PM and inspections conducted by the environmental consultant. The remediation contractor was primarily responsible for the supervision and management of the remediation work conducted at the Site and that SMEC's role was limited to a part time role. The Site Auditor considers there is a low risk that the deficiencies in the supervision and management of the remediation work significantly affected the final condition of the Site to an extent that warrant changes to the site audit statement.

The Site Auditor considers the extent of records provided for review was appropriate to audit the remediation work undertaken at the Fort Wallace site and to support the conclusion that the contaminated materials encountered during the remediation work were removed from the Site and clean soils were imported to the Site to backfill the excavations. However, insufficient documentation was provided on the tracking of excavated soils and B&D waste from cradle-to-grave. This is because of discrepancies in the waste tracking data.

Environmental Protection and Monitoring

The Site Auditor considers that for the Fort Wallace site, a high level of environmental protection and monitoring should have been achieved. However, data gaps were present in the available documentation. Furthermore, some environmental control measures specified in the RAP were not implemented. However, the Site Auditor considers the deficiencies in the documentation and work practices undertaken for the remediation of the Site have been mitigated. The Site Auditor considers there is a low risk that possible deficiencies in the environmental protection standards achieved by the remediation work significantly affected the final condition of the Site to an extent that warrant changes to the site audit statement and SEMP.

Community Consultation & OH&S

The Site Auditor considers the available information supports the conclusion that an appropriate community consultation program was implemented during the project. No information on OH&S outcomes for the remediation contractor was provided. However, this deficiency in the available information is not considered a significant matter for the purpose of this site audit.

Excavation, Classification & Material Disposal

The Site Auditor considers the available information support the conclusion that appropriate earthwork procedures were generally used by the remediation contractor to remediate the Fort Wallace site and that these procedures generally complied with the RAP. The one omission was that the backfill material was not verified as being compacted to achieve a 98% level of standard compaction. The Site Auditor does not consider this deficiency to be a significant matter for the



purposes of this audit since the compaction standard achieved by the backfill does not affect the assessment of contamination risks remaining at the Site. However, future developers/builders should recognise that there is a risk that the sandy soils used to backfill areas of the Site may be in a loose condition and affect the performance of structures that may be built in the area.

The Site Auditor considers the available information support the conclusion that appropriate waste classification assessments were generally provided for the waste materials removed from the Fort Wallace site that met NSW DECCW guidelines. The one exception identified was for a small stockpile of demolition waste (KANE Demo 2 Stockpile). The Site Auditor considers this material was a mixed waste, which should have been disposed at a landfill licensed to accept both '*Special Waste – Asbestos Waste*' and '*Restricted Solid Waste*'. However, this deficiency is not considered to be a significant matter since the stockpile was relatively small (35m³) and represented less than 1% of the total volume of waste disposed to landfill. Furthermore, the disposal requirements for '*Special Waste – Asbestos Waste*' are more stringent than '*General Solid Waste*'.

The Site Auditor considers that deficiencies existed in the waste tracking documentation, which means that a significant portion of the excavated soils and waste generated at the Fort Wallace site was not tracked from cradle-to-grave as required by the DECCW and the RAP. The main deficiencies were:

- The validation report stated that approximately 9,300 tonnes of General Solid Waste were removed the Fort Wallace site and disposed at the SITA Raymond Terrace landfill. However, this quantity far exceeded the total stockpiled amount of 6604 tonnes measured by the licensed surveyor. The 9,300 tonnes given in the validation report is some 2,697 tonnes, or 41% greater than the amount measured by the licensed surveyor
- The validation report stated that approximately 215 tonnes of Restricted Solid Waste were removed from the Fort Wallace site and disposed at the SITA Kemps Creek landfill. However, this quantity far exceeded the stockpiled amount of 92.4 tonnes measured by the licensed surveyor and the 92.5 tonnes of Restricted Solid Waste given on the tip dockets as having been disposed at the SITA Kemps Creek landfill
- The plans prepared by the licensed surveyor show that some 936.6 tonnes (669m³) of "*Special Waste – Asbestos*" was stockpiled at the site for removal and disposal at a suitably licensed landfill. Trucking records and landfill tip dockets provided by SMEC show this material was labelled "*contaminated soil*" rather than "*Special Waste – Asbestos*"
- The validation report and supplementary information advised that some 1573 tonnes of General Solid Waste were disposed to the SITA Raymond Terrace landfill between 1/06/09 and 4/06/09. However, the trucking records indicated that some 2,604 tonnes of General Solid Waste were disposed at the landfill during the period. The Site Auditor considers the most plausible explanation for this discrepancy is that contaminated soil from



the nearby Stockton Rifle Range site was being included in the materials tracking data for the Fort Wallace remediation project

- The two B&D waste stockpiles (KANE Demo 1 & KANE Demo 2) contained ACM contamination. The stockpiles were screened by the remediation contractor to generate two types of material – B&D waste containing ACM and sandy soil. The remediation contractor then removed the B&D waste off-site as asbestos waste, while the sandy soil was returned back to the demolition areas. No information was provided on what measures were taken to guarantee no asbestos was present in the material that remained on-site. The only validation information provided was that SMEC conducted a walkover inspection of the backfilled areas.
- The location of the 40m³ stockpile of ACM contaminated soil excavated from around the searchlight bunker was not shown in any of the plans provided in the validation report. No further information was provided by SMEC to address this issue
- 184.94 tonnes of material was removed from the Site and disposed at an unspecified location between 20/05/09(?) and 26/05/09 and a further 53.25 tonnes of material was removed and disposed from the Site at an unspecified location between 14/05/09 and 15/05/09

The Site Auditor considers that some of the deficiencies in the waste tracking documentation do not affect the assessment of contamination risks at the Fort Wallace site since they are associated with the off-site disposal of the contaminated soil and waste removed from the Fort Wallace site. The main effect of these set of deficiencies is to increase the risk that the following problems may have occurred:

- Waste materials removed from the Stockton Rifle Range site may have been incorrectly allocated to the Fort Wallace remediation project
- Some of the asbestos impacted soil may not have been disposed in accordance with the Waste Regulations in the POEO Act and DECCW requirements, since the requirements for disposing asbestos waste are much more stringent than “*General Solid Waste*”
- There is a risk that Defence may have incurred unnecessarily high project costs since the amount of contaminated soil and waste that was measured as having been generated at the Fort Wallace site is significantly less than the amount claimed by SMEC and the remediation contractor
- Some of the waste removed from the Fort Wallace site may have not been taken to a suitably licensed landfill as required by the RAP and regulatory requirements but reused at any site/s

The Site Auditor considers these risks can be addressed by Defence arranging for a more detailed review of the remediation work that involves:

SINCLAIR KNIGHT MERZ



- Obtaining copies of all landfill tip disposal records and cross-checking all loads of materials removed from the Site with the trucking records
- Obtaining copies of the remediation contractor's daily site records and cross-checking the chronology of the waste disposal work
- The Site Auditor preparing a follow-up report on the waste disposal data

Backfilling & Reinstatement

The Site Auditor considers the available data support the conclusions that clean VENM soil was imported to the Fort Wallace site from the Boral Cox lane sand quarry to backfill excavated areas. Furthermore, the contaminated soil and B&D waste had been removed from the unsealed stockpile area and disposed off-site prior to the validation of the area.

However, the Site Auditor considers that there were some deficiencies in available data on the reinstatement of the following excavated areas:

- The placement of screened soil removed from the two B&D waste stockpiles (KANE Demo 1 & KANE Demo 2) that contained ACM contamination. No information was provided describing the measures that were taken to guarantee no asbestos was present in the material that remained on-site. The only validation information was that SMEC conducted a walkover inspection of the backfilled areas
- No data were provided on how ACM contaminated soil was removed from the searchlight area in June 2009 and the area reinstated

These deficiencies are associated with an increased risk that ACM contamination may remain in shallow soils at some areas of the Site (eg. demolition areas). The Site Auditor has assessed the significance of these risks in a review of the ACM clearance work conducted at the Site.

ACM Clearance

The Site Auditor considers the scope of the ACM clearance work covered most of the main areas of concern at the Site. However, a number of deficiencies were identified that increased the risk that presently unknown ACM fragments remain buried in parts of the Site proposed to be developed for 'standard' residential land use. These deficiencies comprised:

- The remediation contractor limited the removal of ACM fragments to fragments found at the ground surface using hand picking methods. No raking of the soils or excavation of deeper soils was undertaken
- The standard of ACM clearance work may not have met the recommendations given in the WA Department of Health (May 2009) guidelines
- The remediation contractor and environmental consultant did not advise the Site Auditor that ACM contamination was found in the search light area in June 2009 until the Site



Auditor found a reference to it in a back appendix of the validation report. This lack of reporting raises the uncertainty of other significant findings having gone unreported

- The Getek asbestos clearance certificates provided by the remediation contractor were limited to a clearance of visible ACM fragments that were found at the ground surface and did not assess the risks posed by ACM fragments that may have not been found at the ground surface or by deeper materials. The certificates also provided no assessment of the risks posed by ACM fragments remaining in the cleared areas
- The Site Auditor found a large amount of ACM fragments to have remained in a previously remediated area of the Site
- No asbestos clearance has been provided for the Stage 3 area. Consequently, the Site Auditor is unable to check the final condition of the area
- There is a risk that ACM remains in the searchlight area. This is because the additional remediation work conducted on 29/09/09 only involved raking the ground surface and did not involve an assessment of deeper soils. Furthermore, the asbestos clearance certificate provided by the occupation hygienist excluded all material below the immediate ground surface. The Site Auditor considers this limitation means that there is a risk that ACM remains below the ground surface, which could be exposed when the sand moves due to wind and water erosion
- There is a risk that the screened sand removed from the B&D waste may have contained ACM fragments and that the demolition areas were re-contaminated when this material was used to backfill these areas
- The validation report shows areas where building and demolition waste remain, with 3 of these areas being located in proposed residential areas
- The SMEC addendum report (Ref [16]) advised that the oval area contains occasional cobble and brick rubble

The Site Auditor considers that the deficiencies in the ACM clearance work conducted at the Site should not pose an unacceptable risk to future users of the Site because:

- SMEC made regular inspections of the Site and the work undertaken by the remediation contractor
- The Site Auditor monitored the remediation work by inspecting the Site on 7 occasions between 16/03/2009 and 30/09/2009, which included a final inspection
- All known areas of ACM contaminated soil have been remediated. All known visible and identified ACM fragments have been removed from the Site
- Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment



- The ACM is in a compressed form that would be readily identifiable, allowing any such material to be easily removed from the Site
- The amount of remediation work required to provide a guarantee of no ACM fragments remaining at the Site is not feasible. Furthermore, such a large amount of additional work would be environmentally detrimental due to the large amount of resources that would need to be expended for no measurable gain in risk mitigation
- The risks posed by unknown contamination remaining at the Site are to be managed by an SEMP, which is attached to the site audit statement
- The SEMP provides management controls that should address any increase in contamination risks caused by deficiencies in the level of ACM clearance work conducted during the period of the remediation work.

Defence Waste & UXO Clearance

An assessment of ordnance-related contamination issues for the Fort Wallace site was undertaken by Gibson Nominees in December 2006 (Ref [12]). The report concluded there was a low potential for UXO being present at the Fort Wallace site. In the previous site audit report (Ref [14]), the Site Auditor considered the conclusions and recommendations made by the UXO consultant were appropriate and met DECCW requirements. However, the Site Auditor included a condition on the site audit statement (Ref [15]) that *“The validation program should include formal certification from a Defence-approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil”*. This was done because the proposed land use for the Site included ‘standard’ residential, which may not have been a land use considered by the 2006 UXO report.

A small number of spent projectiles and casings were subsequently discovered by the remediation contractor during the project. These were primarily encountered during the heritage stabilisation works within the heritage precinct. One of these items was believed to have been a hand grenade that was found within the heritage listed gun emplacement area. A small conical object resembling an empty head of a mortar shell was also encountered during test pitting in the western terrace. A more recent report issued by the Defence-accredited UXO specialist (Ref [18]) further advised that the items found at the Site during the remedial works comprised small arms projectiles, empty fired cartridge cases and a drill/practice hand grenade. A gas mask of WWII vintage was also reported to have been found by the remediation contractor during bitou bush spraying works just south of the Southern 9in Gun Emplacement (URS email 9/12/09).

These findings were reviewed by the Defence-accredited UXO specialist from Gibson Nominees and a formal certification was provided in a letter dated 3 December 2009 (Ref [18]). The certification concluded that:

SINCLAIR KNIGHT MERZ



We are satisfied that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil.”

The validation report concluded that the risk of unknown UXO or Defence related waste remaining at the Fort Wallace site was low, but recommended that an unexpected findings protocol be included in an SEMP as a contingency measure. The Site Auditor considers the available information supports the conclusion and recommendation made by the validation report.

Hazardous Building Materials

Hazardous building materials include, but are not limited to, ACM (in the form of fibro, old linoleum and electrical boards), lead-based paint, and PCBs in some old lights. Breakage, weathering or burial of these materials pose a contamination risk to soils at a site. The Site Auditor considers that hazardous building materials pose a risk to the future amenity and safety of sensitive land use areas (such as ‘standard’ residential), if these materials are not properly managed and adequate protection measures not taken. Consequently, the previous site audit statement (Ref [15]) that reviewed the RAP included a condition that *“All waste material and abandoned infrastructure (both above and below ground) containing hazardous building materials should be removed from areas of the Site to be used for ‘unrestricted landuse’”*.

However, the only information provided by the validation program was a copy of an asbestos register dated 14/08/2008. No information was provided on:

- Whether a detailed assessment of buildings had been undertaken prior to the commencement of demolition/building work to determine the presence and location of hazardous building materials
- Whether a plan of management had been prepared prior to the commencement of the demolition/building work
- Whether the demolition/building work was undertaken in accordance with the plan
- Whether all areas where demolition/building work occurred were cleared of asbestos and other types of contaminants and waste
- The presence and location of hazardous building materials remaining at the Site.

The Site Auditor considers that deficiencies in the documentation of hazardous building materials remaining at the Fort Wallace site should not pose an unacceptable soil contamination risk to future users of the Site because:

- The soils at the Site were subject to a program of remediation and validation work
- The Site Auditor monitored the remediation work by inspecting the Site on 7 occasions between 16/03/2009 and 30/09/2009, which included a final inspection



- All known areas of ACM contaminated soil have been remediated. All known visible and identified ACM fragments have been removed from the Site
- Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment
- The ACM is in a compressed form that would be readily identifiable, allowing any such material to be easily removed from the Site
- The risks posed by unknown contamination remaining at the Site are to be managed by an SEMP, which is attached to the site audit statement
- The SEMP provides management controls that should address any increase in contamination risks caused by deficiencies in the level of documentation on hazardous building materials remaining at the Site.

2.3 Validation

Remediated & Stockpile Areas

SMEC validated the soils remaining in the remediated areas by the collection of shallow soil samples from the excavation faces and testing them for the contaminants of concern. SMEC also collected validation samples from the part of the oval used for stockpiling excavated soil and waste prior to its removal to off-site landfills. SMEC concluded that the validation data collected from the remediated and former stockpile areas showed that they met NSW DECCW requirements for the proposed land uses, these being “*standard*” residential (NEHF A) in the “*unrestricted landuse*” area and open space/parkland (NEHF E) in the “*non-development landuse*” area.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectible
- The validation samples met or was close to meeting the data completeness DQO for each remediation area
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A criteria in all validation samples and the EIL criteria in practically all validation samples
- The few samples where metal concentrations in individual samples exceeded the EIL criteria had concentrations less than 2.5 times the EIL and 95% UCL average concentrations less than the EIL



- Most of the remediation areas and the Site was cleared of ACM fragments by an occupational hygienist from Getex
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area
- Soils used to backfill excavations consisted either of locally won sand from the nearby area or clean imported VENM sourced from the Boral Cox Lane sand quarry
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

Bitumen Pavements

SMEC considered the risk posed to future users of the Site from the old bitumen to be low since the PAHs appeared to be primarily bound in the asphalt matrix therefore restricting potential exposure pathways. SMEC recommended that the asphalt material be managed using procedures and controls specified in a SEMP.

The Site Auditor considers the available information support the conclusion that the PAH contamination associated with the old bitumen pavement can be managed by means of an SEMP because:

- The elevated PAHs in the old bitumen pavement appear not to have migrated into surrounding areas and is restricted to the old bitumen and the soil near the bitumen contact surface
- The existing bitumen pavement appears to be providing an adequate cap that has an expected life of 2-5 years
- An SEMP has been prepared by SMEC for managing the bitumen pavement
- The existing bitumen pavements are providing a useful function in terms of facilitating site access and the use of an SEMP avoids the need for the bitumen to be removed in the short to medium term
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report
- The Site Auditor has placed the following comments on the site audit statement:

“All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a



low risk. Visible and identified ACM fragments, Defence waste and all known UXO waste have been removed from the Site.”

“A pavement investigation report prepared by SMEC (Ref [19]) assessed the bitumen pavements to have a short to medium life of 2 to 5 years, and provided recommendations on maintenance actions for the pavement.”

“The purpose of the EMP is to manage contamination risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services.”

Remainder of Site

In the previous site audit report on the RAP, the Site Auditor recommended that the validation plan needed to consider those areas of the Fort Wallace site where no remediation work was proposed, particularly in the proposed “*unrestricted landuse*” area where the most sensitive land use would be “standard” residential. This is because the sampling strategy used in the Stage 2 investigation used a judgemental approach that did not meet NSW DECC minimum sampling requirements.

The validation report program undertaken by SMEC sought to address this requirement by undertaking a metal detector survey across those parts of the “*unrestricted landuse*” area where remediation work was not performed. The survey found no evidence of any significant areas of buried waste remaining in this area. SMEC concluded that the remainder of the site was suitable for the proposed land uses. The Site Auditor considers the available data support the SMEC conclusion.

2.4 Suitability of Site for Future Uses

The Site Auditor considers available information supports the conclusion that the “*unrestricted landuse*” area, as shown in **Figure 3**, meets NSW DECCW requirements and is suitable for the following NEPM land use categories provided the Site is managed in accordance with the SEMP:

- Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- Day care centre, preschool, primary school
- Residential with minimal opportunity for soil access, including units
- Secondary school
- Park, recreational open space, playing field
- Commercial/industrial
- Defence uses



The Site Auditor considers available information supports the conclusion that the “*non-development landuse*” area, as shown in **Figure 3**, meets NSW DECCW requirements and is suitable for the following NEPM land use categories provided the Site is managed in accordance with the SEMP:

- Residential with minimal opportunity for soil access, including units
- Secondary school
- Park, recreational open space, playing field
- Commercial/industrial
- Defence uses

The Fort Wallace site needs to be managed in accordance with SEMP in light of contamination remaining on the site. The SEMP comprise:

- SMEC (22 December 2009) “*Final Fort Wallace Site Environmental Management Plan*”
- SMEC (9 December 2009) “*Fort Wallace Pavement Inspection Report*”

The Site Auditor has also placed 8 comments on the site audit statement. These comments record key observations in light of the audit, which are not directly related to the suitability of the Site for the approved land uses. Some of these observations cover aspects relating to the broader environmental context to aid in decision-making in relation to the site. These comments are:

1. This site audit statement should be read in conjunction with the site audit report.
2. This site audit statement applies to the condition of the site at the time the last assessment was undertaken by SMEC in December 2009. The property owner is responsible for ensuring the site remains in a suitable condition.
3. All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a low risk. Visible and identified ACM fragments, Defence waste and all known UXO waste have been removed from the Site.
4. Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.
5. A pavement investigation report prepared by SMEC (Ref [19]) assessed the bitumen pavements to have a short to medium life of 2 to 5 years, and provided recommendations on maintenance actions for the pavement.
6. The purpose of the EMP is to manage contamination risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services.



7. Groundwater should not be extracted from the Fort Wallace site if groundwater at the Hunter Water Sewerage Treatment Plant located to the south of the site is contaminated at unacceptable levels and if there is a risk that such extraction could cause contaminated groundwater to migrate onto the site.
8. One approach to notify future owners of the need to comply with the SEMP and the requirements of the site audit statement would be to place a positive covenant on the land title. A registered survey plan prepared by a licensed surveyor could also be obtained to accurately define the two types of areas referred to as “*unrestricted landuse*” and “*non-development landuse*”.

2.5 Future Management of the Site

In the validation report, SMEC recommended that a SEMP be prepared to provide ongoing management controls for:

- Known contamination remaining in PAHs in the bitumen road pavement
- Fill material
- Hazardous building materials that remain in structures, some of which are heritage protected
- Unknown contamination that requires an ‘*unexpected findings protocol*’ to be followed
- Buried services some of which are constructed from ACM

The Site Auditor considers that an SEMP was an appropriate means of managing these issues because:

- DECCW guidelines consider that an environmental management plan can be an effective means of ensuring the environment is protected, users of the site are not exposed to contamination remaining on-site and the site remains suitable for the specified use when complete clean-up of contamination affecting an area is not practicable
- SMEC concluded that the elevated PAHs in the bitumen road pavement posed a low risk to future users of the Site while the road pavement remained intact. An SEMP was required to identify the presence of the elevated PAHs, provide ongoing management controls so that the integrity of the bitumen pavement could be maintained, and allow future disturbance of the pavement to be managed
- A road pavement assessment issued by SMEC concluded that the bitumen road pavement was presently in a reasonable condition. Furthermore, the road pavement was providing a useful means of site access and the removal of the bitumen pavement would be an unnecessary expense to Defence
- The Site is reasonably large (31.78ha) and has a long history of use by Defence. This means that it is not reasonable to assume that no unknown contamination or waste material



remains at the Site. The Site Auditor considers that sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment

- Hazardous building materials that remain in structures at the Site do not pose a soil contamination risk while the materials remain intact and contained in the structure. An SEMP is an appropriate means to identify the presence of these materials in structures at the Site, provide ongoing management controls so that the integrity of these materials could be maintained, and allow future disturbance of the pavement to be managed
- Removal of all hazardous building materials that remain in structures at the Site was not possible since some of the structures were heritage listed, some of the structures may be used in the future, and the removal at these structures would be an unnecessary expense to Defence
- An SEMP is an appropriate way for notifying future owners of the possible presence of unknown contamination and/or waste materials remaining at the Site and provides a mechanism for managing these risks by means of an *'unexpected findings protocol'*
- Buried services constructed from ACM that remain at the Site do not pose a soil contamination risk while the services remain buried and undisturbed. An SEMP is an appropriate means to identify the presence of these materials in structures at the Site, provide ongoing management controls so that the integrity of these materials could be maintained, and allow future disturbance of these services to be managed
- Deficiencies in the remediation and validation work can be addressed by means of the information and controls provided by the SEMP.

The SEMP was prepared by SMEC and subject to review by the Site Auditor and key stakeholders such as the Department of Defence and Newcastle City Council (NCC). The Site Auditor considers the SEMP attached to the SAS has been reviewed by the Site Auditor and stakeholders consistent with the recommendations provided by the DECCW. The Site Auditor considers the SEMP provides a suitable basis for managing known and unknown contamination risks at the Fort Wallace site.

The Site Auditor also considers it is important that future owners of the Site manage the old bitumen pavements containing elevated PAHs in accordance with recommendations provided in the SMEC (9 December 2009) *"Fort Wallace Pavement Inspection Report"*.



3. Review of Remedial Works

This section of the site audit report provides a review of the available data that documents the remediation work conducted at the Fort Wallace site. The review has been divided into the following sections:

- *Section 3.1 – Overview of remediation strategy*
- *Section 3.2 - Compliance with regulatory requirements*
- *Section 3.3 – Project supervision and progress reporting*
- *Section 3.4 – Environmental monitoring*
- *Section 3.5 – Environmental protection*
- *Section 3.6 – Community consultation*
- *Section 3.7 – Occupational health and safety & emergency response*
- *Section 3.8 – Excavation, classification and material disposal*
- *Section 3.9 – Backfilling and reinstatement*
- *Section 3.10 – ACM clearance*
- *Section 3.11 - Defence waste and UXO clearance*
- *Section 3.12 – Hazardous building materials*

*A review of the validation program that was conducted as part of the remediation project is presented in **Section 4**.*

3.1 Overview of Remediation Strategy

The objectives of the remediation work were specified by SMEC⁵ to be:

- Meet NSW DECCW and Defence requirements
- Minimise risk to surrounding residents/properties, future site occupiers and the environment to acceptable levels
- Render the site suitable for potential future uses, noting that the future land uses have not been documented

This remediation strategy is consistent with the RAP⁶.

The method used to remediate the Site was a dig-and-dump approach involving the excavation of contaminated soils and waste material at 14 designated areas of the Site. These areas are shown in **Figure 4**.

⁵ Refer Section 1.2, Ref [7]

⁶ Refer Sections 1.2 & 5.1, Ref [3]



■ Figure 4 Location of Remediation Areas



Source: Figure 3, Ref [7]

SINCLAIR KNIGHT MERZ



The excavation depth was defined by the depth required to ensure all waste material had been removed and the remaining soils had contaminant levels less than the soil acceptance criteria (SAC).

The excavated materials were to be stockpiled, sampled, classified and then removed from the Site and disposed at a suitably licensed landfill. For the deeper excavations, the remediated areas were then to be backfilled with clean soil imported to the Site.

The 14 designated areas comprised all those identified in the RAP together with additional areas recommended in the previous site audit report (dated 17 September 2008) and a few areas identified during the course of the remedial work. The 8 areas identified in the RAP comprised:

- RAC 1 – Northern Gun Emplacement
- RAC 2 – Waste material Southern Gun Emplacement
- RAC 3 – Administration Building
- RAC 4 – Pump House
- RAC 5 – Western Terrace
- RAC 6 – Sand dunes
- RAC 7 – Waste disposal area
- RAC 8 – Waste disposal area

The additional area recommended in the previous site audit report was:

- RAC 9 – Septic tank

The 5 additional areas identified during the course of the remedial work were:

- RAC 8a – Waste disposal area
- RAC 8b – Surface waste disposal
- RAC 10a – Demolished Buildings 1, 2 and 21
- RAC 10b – Demolished Building 3
- RAC 10c – Demolished Building 31

The remediation work also involved the manual removal of ACM fragments that had been scattered across the Site and the provision of Asbestos Clearance Certificates. This work was specified in the SMEC (March 2008) RAP⁷. Finally, the remediation work also involved the disposal of demolition rubble that had been generated by the building rehabilitation work undertaken in parallel with the remediation program.

⁷ Refer Section 6.2.5, Ref [3]



The Site Auditor considers the scope of the remediation work addressed all tasks identified in the RAP, additional areas recommended in the previous site audit report (as discussed in **Section 1.4**), and additional areas identified during the course of the remedial work. The Site Auditor considers the scope of the remediation work undertaken at the Fort Wallace site was capable of remediating the Site to a standard appropriate for the intended land uses.

The remediation work conducted at the Fort Wallace site was undertaken in parallel with a program of building demolition and stabilisation work, with much of this other work undertaken by a building contractor. SMEC advised⁸ that this work involved the demolition of several buildings, 'weather proofing' of some buildings, the stabilisation of some heritage-listed structures, repair of drainage, constructing steel-mesh fences around some areas and painting. SMEC also advised that the building demolition and stabilisation work was unlikely to have significantly impacted the contamination status of the Site because of its nature and extent, except for the demolition of structures containing ACM. SMEC advised that this risk was addressed by having each cleared area checked for ACM fragments and an Asbestos Clearance Certificate produced.

The Site Auditor considers the available information generally supported these conclusions made by SMEC concerning the building demolition and stabilisation work. This is because:

- Much of this work was located at heritage-protected buildings in the area of the Site to be used for open space/parkland
- The work involved conventional maintenance work to buildings such as concreting, metal and timber work, and to a lesser extent painting
- The building contractor was required to prepare a Construction Environmental Management Plan (CEMP) for their work
- Inspections of the work areas showed they were being kept in a reasonably clean condition

However, the Site Auditor's opinion was qualified on the following conditions being met:

- Asbestos Clearance Certificates were provided in the validation report for each area where a building was demolished containing ACM
- Information was provided that shows all waste generated by the building demolition and stabilisation work were removed from the Site and disposed at a suitably licensed landfill
- The Site Auditor inspected the Site and found no evidence of ACM fragments or other types of waste material remaining in the cleared areas

These issues are examined in **Sections 3.8** and **3.10** of this report.

⁸ Section 4.1, Ref [7]



3.2 Compliance with Regulatory Requirements

3.2.1 General

The previous site audit report⁹ advised that all relevant regulatory approvals for the remedial works program should be obtained prior to the commencement of site works. Although not a legal requirement but because of Defence policy, the report recommended that Newcastle City Council be notified of the intended commencement of the remediation works. The report also advised that all remedial work and validation testing should be undertaken in accordance with regulatory requirements and to standards acceptable to the NSW DECCW and Newcastle City Council.

In the validation report, SMEC advised that:

- SMEC prepared an Environmental Management Plan (EMP), Occupational Health & Safety (OH&S) Plan, Validation Sampling Analysis and Quality Plan (VSAQP) and assisted in the preparation of Environmental Clearance Certificate for the remediation of the Site¹⁰
- The remediation contractor prepared an OH&S Plan and a Construction Environmental Management Plan (CEMP)¹¹
- SMEC monitored the remediation contractor's compliance with their CEMP¹²
- An environmental monitoring program was implemented during the period of the remediation works, which involved the measurement of dust and asbestos fibres¹³
- The remediation and validation works were undertaken in general accordance with regulatory requirements and the RAP¹⁴
- ACM was removed and managed by a suitably licensed AS1 subcontractor (Empire Contracting Pty Ltd)¹⁵
- Wastes removed from the Site to landfills in NSW were classified in accordance with NSW DECCW waste guidelines¹⁶
- Wastes were tracked from cradle-to-grave¹⁷
- The risk of unknown UXO remaining at the Site was assessed by a Defence-accredited UXO specialist to be low¹⁸

⁹ Section 4.1.1, Ref [14]

¹⁰ Sections 1.3, 4.1.1 & 4.3.7, Ref [11]

¹¹ Sections 4.1.1 & 4.3.4, Ref [7]

¹² Sections 4.3.4 & 4.3.6, Ref [7]

¹³ Section 4.3.6, Ref [7]

¹⁴ Sections 4.3.7 & 10.1, Ref [7]

¹⁵ Section 4.1.2, Ref [7]

¹⁶ Sections 4.3.2 & 10.1, Ref [7]

¹⁷ Section 4.3.2, Ref [7]



- An occupational hygienist provided asbestos clearance certificates for areas of the Site where ACM fragments had been found¹⁹
- Stockpiles and excavations were surveyed by a licensed surveyor²⁰
- The validation report was prepared in general accordance with the requirements of the Validation SAQP and the NSW DECCW²¹

The Site Auditor checked compliance of the remediation works with regulatory requirements by:

- Monitoring the remediation work by inspecting the Site on 7 occasions between 16/03/09 and 30/09/09
- Requiring additional remediation work to be undertaken following the completion of remediation work by the contractor. The need for additional work arose out of observations made by the Site Auditor at a site inspection conducted on 24/09/09, which was documented in a report issued by the Site Auditor on 25/09/09 (**Appendix D**). SMEC subsequently provided a letter report (Ref [16]) documenting the additional remediation work on 6/10/09 (**Appendix D**). The Site Auditor also re-inspected the Areas of Concern (AEC) on 30/09/09, with the final condition of the searchlight area shown in Photo 15 (**Appendix C**).
- Regularly attending project review meetings and the minutes produced by these meetings. These data indicated that no complaints had been received from any regulatory authority or local community during the remediation work period and that conduct of the work meet the requirements of the Defence and URS Project Managers
- The Site Auditor did not receive any negative feedback from regulatory authorities or from the media concerning the remediation works
- Reviewing the dust monitoring data provided in the validation report²²
- Reviewing the asbestos fibre monitoring laboratory test data provided in Appendix H of the validation report
- Reviewing the asbestos clearance certificates provided in Appendix H of the validation report, which indicate the asbestos removal work was undertaken by the AS1-licensed asbestos removal company Empire Contracting Pty Ltd and supervised by occupational hygienists from GETEX Pty Limited

¹⁸ Section 9.19, Ref [7]

¹⁹ Sections 4.1.2 & 4.3.3, Ref [7]

²⁰ Section 4.3.1, Ref [7]

²¹ Sections 1.5 & 10.1, Ref [7]

²² Section 4.3.6, Appendices A, H & J, Ref [7]



- Reviewing a report prepared by a Defence-accredited UXO consultant on the ongoing UXO risks at the Fort Wallace (Ref [18]). The report was prepared following the completion of the remediation and validation work and was dated 3/12/09
- Reviewing the survey drawings provided in Appendix D of the validation report, which indicate that the excavations and stockpiles were surveyed by Proust & Gardner Consulting Pty Limited
- Reviewing the waste classification and materials tracking data provided in Appendices B, C and K of the validation report
- Inspecting the site at the end of the remediation works to confirm that its physical appearance supported the information provided in the validation report

The Site Auditor considers the available information indicates that the remediation work conducted at the Fort Wallace site generally complied with regulatory requirements.

3.2.2 Compliance with RAP & Earlier Site Audit Statement

Many of the regulatory requirements that needed to be followed by the remediation program were documented in a Remedial Action Plan (RAP) prepared by SMEC and dated March 2008 (Ref [3]). The RAP was reviewed by the Site Auditor and additional requirements were specified in a site audit report and statement issued on 17 September 2008 (Refs [14] & [15]). The earlier site audit statement concluded that the site could be made suitable for the proposed land uses if the site was remediated in accordance with the RAP. A copy of the site audit statement was also provided to the DECCW and NCC.

However, not all the work followed the procedures specified in the RAP or the additional requirements specified in the earlier site audit documents. The available documentation indicates that the main reasons the remediation work did not follow all procedures specified in the RAP was a reduction in the scope of work that SMEC were able to undertake and some elements of the methodology used by the remediation contractor. The Site Auditor has identified and assessed the significance of these variations in the following sections of this report.

The earlier site audit statement also included 12 conditions that the remediation and validation program needed to meet. The Site Auditor considers that sufficient information has been provided to indicate that these conditions were generally met. A summary of these conditions and the section of this report that examines compliance are provided in **Table 3-1**.



■ **Table 3-1 Conditions on Site Audit Statement Prepared for RAP**

Condition	Description	Section where Compliance is Reviewed
1	The remediation of the Fort Wallace site should be subject to a site audit undertaken by an accredited NSW DECC Site Auditor as defined by the Contaminated Land Management Act 1997.	This report and associated site audit statement
2	The remediation works should be designed to include a sufficient contingency allowance to cover the risk of needing to remove a greater volume of buried waste than provided for in the RAP.	Section 3.8
3	A validation plan should be prepared by the environmental consultant and approved by the Site Auditor prior to the commencement of the remediation works. The validation plan should cover areas of the site to be remediated as well as areas where no remediation work is considered necessary but where additional sampling may be required, particularly where sensitive land uses are proposed (eg. residential with accessible soil). The sampling densities should be designed to meet the recommendations given in DECC and NEPM guidelines.	Section 4
4	A community consultation program should be implemented in accordance with NEPM Schedule B(8) <i>"Guideline on Community Consultation and Risk Communication"</i> .	Section 3.6
5	All relevant regulatory approvals for the remedial works program should be obtained prior to the commencement of site works.	Section 3.2
6	Newcastle City Council should be notified of the intended commencement of the remediation works not less than 30 days prior to the commencement of the work.	Section 3.2.3
7	All waste materials should be tracked from cradle-to-grave and appropriate documentation prepared that will allow all material movements to be independently audited. A Standard Operating Procedure (SOP) for waste tracking should be provided to and approved by the site auditor prior to the commencement of site works.	Sections 3.8 & 3.9
8	All waste material and abandoned infrastructure (both above and below ground) containing hazardous building materials should be removed from areas of the Site to be used for "unrestricted landuse".	Section 3.12
9	All remedial work and validation testing should be undertaken in accordance with regulatory requirements and to standards acceptable to the NSW DECCW and Newcastle City Council.	Sections 3 & 4
10	The validation program should include formal certification from a Defence-approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil.	Section 3.11
11	The validation program should include the preparation of an Environmental Management Plan (EMP) for the future use of the Fort Wallace site. The EMP should include an	Section 4.5



Condition	Description	Section where Compliance is Reviewed
	"Unexpected Findings Protocol" to manage among other things UXO, asbestos containing material and Defence-related waste.	
12	Groundwater should not be extracted from the Fort Wallace site if groundwater at the Hunter Water Sewerage Treatment Plant located to the south of the site is contaminated at unacceptable levels and if there is a risk that such extraction could cause contaminated groundwater to migrate onto the site.	Section 4.5

3.2.3 Compliance with NCC Requirements

As previously mentioned in **Section 1.3.2**, NCC requirements for the management of contaminated land are described in Section 4.2 of their October 2005 DCP (Ref [9]).

The Site Auditor considers the available information indicates the Fort Wallace site has been remediated in accordance with NCC requirements. This is because:

- The investigation, remediation planning, remediation and validation phases of the project have been the subject of review by a NSW DECCW-accredited Site Auditor
- Remediation of land has been completed consistent with the proposed or current zoning and land use, so that it does not place any future land owner or occupier in a position where further remediation of contaminants is required
- NCC has been involved in the review of the draft Site Environmental Management Plan (SEMP), with review comments provided on 24/09/09 (**Appendix D**)
- Remediation of land was in general carried out in accordance with the DCP
- The Site was remediated to the highest land use possible consistent with current and likely zoning without the need for site specific on-going management controls such as capping
- The remediation work was carried out and completed in a manner which should not result in an unacceptable level of risk to human health or the environment
- Information relating to land contamination has been managed in a manner that should provide a basis for informed planning decisions, facilitates community consultation, minimise risk to human health and the environment, avoids unnecessary restrictions on development, enables Council to exercise its duties and acknowledges any limitations on information.



3.3 Project Supervision & Progress Reporting

3.3.1 Supervision and Management of the Remediation Work

The main organisations who were involved in the remediation and validation of the Fort Wallace site were:

- SMEC: The environmental consultant who supervised the remediation work and validated the remediated Site under an engagement from Defence
- URS: The Defence-appointed project manager
- Synergy Resource Management (Synergy): The remediation contractor engaged by Defence
- Kane Constructions: Demolition and building stabilisation contractor engaged by Defence
- Empire Contracting Pty Ltd: Asbestos removal subcontractor engaged by Synergy
- GETEX: The occupational hygienist consultant engaged by Synergy who undertook the asbestos clearance and certification work together with the asbestos fibre air monitoring
- Proust & Gardner: The licensed surveyor engaged by Synergy who surveyed the excavations made at the remediation areas and calculated earthwork volumes

The Site Auditor considers that most of these organisations are known in the industry as being suitably experienced for the types of work they performed on this project. The following additional information was obtained from internet searches on 28/10/09:

- Empire Contracting: their website advised that the company is a specialist asbestos and hazardous material removal contractor and holds a license issued by the NSW WorkCover Authority as an AS1 'Friable Asbestos' removal contractor (Licence No. 204967 AS1)
- Getex: their website advised that the company is a specialist consulting and testing company in Occupational Health & Safety, is NATA accredited and complies with ISO/IEC 17025
- Proust & Gardner: A member of the Consulting Surveyors Association of New South Wales

The RAP²³ specified four duties that the SMEC environmental scientist had concerning the environmental management of remediation work at the Site. These duties were:

- Implementation and documentation of the EMP during field activities on a daily basis and the keeping of a daily remediation diary
- Ensuring that all infrastructure to eliminate / control environmental emissions from the site was correctly installed and operated throughout the works

²³ Section 8.15.2 & 8.16, Ref [3]



- Ensuring that all Subcontractors and Field Personnel assigned to the works performed their work in accordance with the EMP
- Reporting all environmental incidents to the Project Manager, on the appropriate form and assisting investigations as required.

The Site Auditor agreed with the inclusion of these duties in the RAP since they would provide a rigorous, independent check on the standard of work achieved by the remediation contractor. Furthermore, the proposed high level of independent supervision would provide the Site Auditor with a high level of confidence that all contaminated areas were properly remediated and all waste materials had been removed from the site. The Site Auditor considers that for the Fort Wallace site, a high level of independent supervision needed to be provided by the environmental consultant for the period of the remediation work because:

- The Site was large and has a long history of Defence use
- The high value of the project
- There was a high level of uncertainty posed by uncontrolled dumping of materials over the period of Defence use
- The potential for UXO, Defence-related waste, asbestos and other types of contaminated materials to be present
- The proposed future use of the Site includes sensitive land uses such as 'standard' residential

However, the project supervision and management duties specified in the RAP were not listed in the validation report as work undertaken by SMEC and it is assumed that these duties were not included in SMEC's scope of work for the remediation program.

It appears that the approach taken during the remediation project was for the work undertaken by the remediation contractor to be subject to part-time supervision by the Defence-appointed PM and inspections conducted by the environmental consultant. The validation report²⁴ advised that the remediation contractor was primarily responsible for the supervision and management of the remediation work conducted at the Site and that SMEC's role was limited to:

- Guiding the extent of remediation work
- Alerting the remediation contractor if ACM fragments were observed
- Minimising the possibility of the contractor disturbing native flora and fauna including the transport of weeds into, out of and within the site
- Taking a photographic record of the remediation work

²⁴ Section 4.1, Ref [7]



- Documenting the works undertaken

The validation report²⁵ advised that SMEC supervised the majority of excavation work conducted at 11 of the 14 designated remediation areas. However, they did not supervise all excavation work conducted at these 11 areas and did not supervise any of the work conducted at 3 areas (RAC10a – RAC10c) where buildings were demolished. SMEC also advised that they were not retained to audit the implementation of the contractor's EMP²⁶.

The Site Auditor considers there is a low risk that the deficiencies in the supervision and management of the remediation work significantly affected the final condition of the Site to an extent that warrant changes to the site audit statement. This is because:

- SMEC advised 26/11/09²⁷ that environmental protection measures and excavation works were undertaken in general accordance with the CEMP and DECCW requirements
- SMEC was not made aware of and did not observe any reportable environmental incidents during SMEC/WSP's period of on-site supervision²⁸
- The remediation contractor was well regarded in the industry and has successfully completed a number of remediation projects
- SMEC made regular inspections of the Site and the work undertaken by the remediation contractor, as previously discussed
- The final condition of the Site was subject to a validation program that generally met NSW DECCW requirements (**Section 4**)
- The Site Auditor monitored the remediation work by inspecting the Site on 7 occasions between 16/03/2009 and 30/09/2009, which included a final inspection. Photographs taken during these inspections are provided in **Appendix C**
- The Site Auditor regularly attended project review meetings and did not receive any negative feedback from regulatory authorities concerning the remediation works
- The risks posed by unknown contamination remaining at the Site are to be managed by an SEMP, which is attached to the site audit statement (**Appendix E**)
- The SEMP provides management controls that should address any increase in contamination risks caused by deficiencies in the level of independent supervision that occurred during the period of the remediation work.

²⁵ Sections 4.1 & 4.2, Ref [7]

²⁶ Section 4.3.6, Ref [7]

²⁷ Item 4, Ref [17]

²⁸ Section 4.3.4, Ref [7]



3.3.2 Record Keeping and Reporting During Remediation

The record keeping and reporting information provided by SMEC during the period of the remediation work and which was provided in the validation report comprised:

- Survey plans of excavations (Appendix D, Ref [7])
- An excavation and stockpile register (Appendix C, Ref [7])
- Site photographs (Appendix E, Ref [7])
- Waste classification reports (Appendix B, Ref [7])
- A summary of off-site disposal quantities (Section 4.3.2, Ref [7]) and examples of landfill tip records (Appendix K, Ref [7] and Ref [17])
- A register of truck movements (Appendix K, Ref [7])
- An example of an imported VENM trucking record (Ref [17])
- Observations of the exposed soils remaining in the remediated areas (Section 9, Ref [7])
- Calibration documentation (Appendix F, Ref [7])
- Asbestos clearance certificates (Appendix H, Ref [7])
- Laboratory test certificates (Appendix J, Ref [7])
- Liquid waste disposal records for surface water that had percolated into the septic tank^{29, 30}
- Minutes of project review meetings.

The Site Auditor considers the extent of records provided for review was appropriate to audit the remediation work undertaken at the Fort Wallace site and to support the conclusion that the contaminated materials encountered during the remediation work were removed from the Site and clean soils were imported to the Site to backfill the excavations.

However, insufficient documentation was provided on the tracking of excavated soils and B&D waste from cradle-to-grave. This is because of discrepancies in the data, which are described in **Section 3.8**. The significance of these discrepancies has been assessed by the Site Auditor in **Section 3.8.6**.

²⁹ Section 4.3.2, Ref [7]

³⁰ Comment 18 & Annex B, Ref [17]



3.4 Environmental Protection

3.4.1 General

The RAP³¹ provided an outline of an EMP for the remediation works. The matters described included:

Objectives/updating; interim controls; indigenous heritage; stockpiling of excavated material; dust; noise; surface and stormwater management / erosion and sediment control; discharge of pumped water from works; traffic movements and management; underground services; working and operational hours; restricted and operational hours; restricted access and site security; emergency contact numbers; responsibility of key personnel; remediation diary; waste management.

The RAP advised that a final version of the EMP should be prepared by the remediation contractor. In the previous site audit report³², the Site Auditor recommended that the final EMP should also include protocols for managing:

- A detailed material tracking procedure to ensure materials are tracked from cradle-to-grave and which would be documented in a manner that would allow the Site Auditor to check compliance
- UXO and other forms of unexpected findings
- Acid sulphate soils
- Equipment decontamination
- Weed control
- The requirement for full-time supervision of excavation works by the environmental consultant.

The Site Auditor also recommended that the final EMP be reviewed and approved by the Site Auditor prior to the commencement of site works.

The validation report³³ advised that the EMP for the remediation work was prepared by the remediation contractor and that the following controls were observed by SMEC to have been implemented during the work program:

- Excavated materials were placed in discrete stockpiles and excavator maintenance was undertaken in a designated maintenance area to reduce the potential for cross contamination
- Vehicle movements were restricted to marked access tracks and roads to control dust

³¹ Section 8, Ref [7]

³² Section 4.6, Ref [14]

³³ Sections 4.1 & 4.3.4, Ref [7]



- Trucks transporting soils off-site covered their loads
- A water cart was used to wet stockpiles and excavations involving ACM
- No stockpile exceeded 4m in height and the majority of stockpiles were covered with a geofabric liner to minimise material migration due to wind and rainfall³⁴
- Filter socks were placed around surface drains in the vicinity of the works zone
- Concrete slabs and large metal pieces were separated from the excavated material, where possible, for recycling³⁵
- Spray grass was used post-remediation to bind the backfilled soils
- Temporary fencing was placed around excavations with hidden drops (only)
- Working hours for on-site excavation work were 7:00am to 6:00pm Mondays to Fridays³⁶
- SMEC was not made aware of and did not observe any reportable environmental incidents during SMEC's period of on-site supervision

The Site Auditor considers there were data gaps in the information provided on the environmental control measures implemented during the remediation work period. The gaps included, but may not be limited to:

- The Site Auditor was not provided with a copy of the EMP used by the remediation contractor for work at the Fort Wallace site. The Site Auditor is therefore unable to check whether the remediation contractor's EMP was consistent with the one given in the RAP
- No documentation from the remediation contractor was provided on possible findings of UXO, other forms of Defence-related waste or unexpected discoveries during site work
- No information was provided on whether any acid sulphate soil were encountered during site work and whether any mitigation procedures were implemented
- No information was provided on how equipment was decontaminated and where this occurred
- The location of the designated excavator maintenance area³⁷ was not specified and no information was provided on whether any validation samples were collected following the completion of remediation work
- Information on weed control procedures implemented during the work

³⁴ Section 4.3.1, Ref [7]

³⁵ Section 4.3.1, Ref [7]

³⁶ Section 4.3.1, Ref [7]

³⁷ Section 4.3.4, Ref [7]



The Site Auditor sought to address these concerns by requesting additional information be provided³⁸. The additional information subsequently provided by SMEC on 26/11/09 (Ref [17]) comprised:

- A small number of spent projectiles and casings were collected by the remediation contractor during the project. These were primarily encountered during the heritage stabilisation works within the heritage precinct. One of these items was believed to have been a hand grenade that was found within the heritage listed gun emplacement area. A small conical object resembling an empty head of a mortar shell was also encountered during test pitting in the western terrace. A more recent report issued by the Defence-accredited UXO specialist (Ref [18]) further advised that the items found at the Site during the remedial works comprised small arms projectiles, empty fired cartridge cases and a drill/practice hand grenade
- Olfactory indicators of potential or actual acid sulphate soils were not encountered during the excavation works, which supported the findings of the earlier SMEC investigation report
- No dedicated vehicle decontamination facility was setup by the remediation contractor at the Fort Wallace site
- No dedicated excavator maintenance area was setup by the remediation contractor at the Fort Wallace site
- No incident reports were available from the remediation contractor
- A designated weed spraying program using glyphosphate was undertaken in the sand dunes. The remediation contractor also undertook some weed control in accordance with the CEMP

The Site Auditor considers that for the Fort Wallace site, a high level of environmental protection should have been achieved for the reasons given in **Section 3.3.1**. However, data gaps were present in the available documentation. Furthermore, some environmental control measures specified in the RAP were not implemented.

The Site Auditor considers the deficiencies in the documentation and work practices undertaken for the remediation of the Site have been mitigated by the following means:

- The reasons given in **Section 3.3.1**.
- A Defence-accredited UXO specialist concluded that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil

³⁸ Email 29/10/09 (Appendix D)



- No reports were made during the project of any fuel spills or other pollution incidents occurring at the Site
- No gross contamination is known to have been encountered at the Site, which suggest there was a low risk of equipment being significantly contaminated

The Site Auditor considers there is a low risk that possible deficiencies in the environmental protection standards achieved by the remediation work significantly affected the final condition of the Site to an extent that warrant changes to the site audit statement and SEMP.

3.4.2 Design and Operation of Contaminated Soil Stockpile Area

The March 2008 RAP³⁹ advised that all excavated material was to be stockpiled on HDPE sheeting to prevent potential contamination of the ground beneath the stockpile during remedial works. Stockpiles were also to be appropriately bunded and/or silt-fenced to prevent migration of sediment laden stormwater.

The November 2008 Remediation Specification⁴⁰ that formed part of the remediation contract provided similar requirements, these being:

- Excavated materials were to be stockpiled in '*contaminated areas*' of the site where possible, or on impermeable material (ie. HDPE) in order to minimise the potential for cross-contamination
- Environmental controls were to be established on/around stockpiles in accordance with the CEMP including but not limited to bunding and HDPE liners covering the stockpiles
- The Contractor's lump sum fees for environmental controls were to include stockpile management, including the supply, maintenance and disposal of controls.

The validation report⁴¹ advised that the contaminated soil that was excavated across the Fort Wallace site was stockpiled in one area located at the southern end of the oval, which was not a designated '*contaminated area*'. Furthermore, the stockpile area was not lined with an impermeable material such as HDPE. A photograph in the report⁴² shows some straw bales and a geofabric cover over one stockpile nearest the access road, but the report does not indicate bunding or silt fencing was constructed around the whole area. The SMEC validation report⁴³ justified this approach on the basis that the surface soils that remained across the former stockpile area were validated as meeting the soil criteria for 'standard' residential land use.

³⁹ Sections 6.4.4 & 8.5, Ref [3]

⁴⁰ Section 7.4, Ref [5]

⁴¹ Section 4.3.4, Ref [7]

⁴² Plate 28 in Appendix E, Ref [7]

⁴³ Section 4.3.4, Ref [7]



The Site Auditor considers the stockpiling of the contaminated soils without a base liner posed a risk of cross-contamination to both soils and groundwater underlying the stockpile area. The main laydown mechanism to the underlying soils would be physical disturbance and mixing with some of the stockpiled contaminated soil. For the case of groundwater, the main laydown mechanism would be from contaminants that dissolved into rainfall and seeped through the contaminated soil stockpiles and into the unconfined groundwater system.

The Site Auditor sought to address these concerns by requesting additional information be provided⁴⁴. SMEC subsequently advised⁴⁵ that the potential impacts to groundwater quality were low because:

- The low levels of groundwater contamination found by the earlier investigations indicated the contaminated soils had a low leachate generation potential
- The contaminated soil had generally low levels of contamination
- The contaminated soil was relatively dry and contained no free draining liquid
- The contaminated soil was only stockpiled in the oval area for a relatively short time (3 months)
- The presence of fine grained soils in the area that would inhibit the migration of metal contaminants through the soil
- The SEMP includes a restriction on the reuse of groundwater at the Site.

The Site Auditor considers that the reasons provided by SMEC are valid. Additional reasons supporting SMEC's assessment included:

- The stockpiled contaminated soil was subject to minimal screening and other forms of movement
- The stockpiled contaminated soil was not subject to other forms of treatment or mixing with additives
- Contamination was in the form of heavy metals, PAHs and ACM which had low leachate generation potential
- The oval area was not pristine but had been filled and levelled in the past and contained some B&D rubble mixed in with the sandy soils
- The site audit statement includes the comment that *“Groundwater should not be extracted from the Fort Wallace site if groundwater at the Hunter Water Sewerage Treatment Plant located to the south of the site is contaminated at unacceptable levels and if there is a risk that such extraction could cause contaminated groundwater to migrate onto the site”*.

⁴⁴ Email 29/10/09 (Appendix D)

⁴⁵ Comment 6, Ref [17]



On account of these reasons, the Site Auditor considers there is no need for additional groundwater monitoring to undertaken in the area.

3.5 Environmental Monitoring

The environmental monitoring requirements specified in the RAP (Ref [3]) and the Remediation Specification (Ref [5]) prepared by SMEC were:

- All intrusive works extending below 200mm were to be supervised by an appropriate indigenous monitor (RAP Section 8.4)
- Visual inspection of dust levels so that no wind-borne dust leaves the confines of the site (RAP Sections 8.1 & 8.6)
- Daily inspections by the site supervisor and excavation contractors for potential surface water runoff or movement of sediment from stockpiles, so that no water containing any suspended matter or contaminants leaves the site in a manner that could pollute any nearby waterway (RAP Sections 8.1 & 8.8)
- Collection and testing of water samples prior to pumping and removal by a licensed liquid waste removal contractor (RAP Section 8.9)
- Daily inspection of roads used by trucks removing materials from the Site (RAP Section 8.10.2)
- Monitoring was to be performed for noise, dust and odours (as a minimum) and was to consider potential impacts throughout the worksite, at worksite boundaries, and at the locations of sensitive receptors (Specification Section 9.1)

The validation report advised that the environmental monitoring program involved:

- The use of indigenous monitors to observe excavations and manage any indigenous artefacts unearthed (Section 8.4, Ref [7])
- Limited dust monitoring at the Site conducted by SMEC, which involved two passive dust gauges that collected samples generally over a 2-week period between April and June 2009 (4 samples per location). The validation report provided copies of laboratory reports, a summary table of the monitoring data and an assessment of the results.
- Periodic inspections of the remediation work
- Asbestos air monitoring conducted by GETEX during asbestos clearance work. The validation report provided copies of laboratory reports and an assessment of the results for each asbestos clearance certificate

The available data indicate that average dust levels over the sampling period were consistent with NSW DECCW baseline concentrations and no free asbestos fibres were detected by the asbestos air monitoring program.



Data gaps in the information provided included:

- Daily field inspection records produced by the remediation contractor, which would have demonstrated whether inspections of the works were being undertaken on a daily basis and whether any environmental incidents occurred
- The use of dust measuring techniques that meet NSW DECCW requirements and Australian Standards
- Noise and odour monitoring data
- Test data on samples of liquid waste that was removed from a septic tank and disposed by a liquid waste contractor⁴⁶

The Site Auditor considers these deficiencies in the environmental monitoring program are not significant matters for the purpose of this site audit for the reasons given in **Section 3.3.1**. The Site Auditor considers there is a low risk that the possible deficiencies in the environmental monitoring program significantly affected the final condition of the Site to an extent that warrant changes to the site audit statement and SEMP.

3.6 Community Consultation

The RAP⁴⁷ advised that the remediation contractor should discuss the level of community involvement with Defence before commencing a communication program. In the previous site audit report⁴⁸, the Site Auditor recommended that a community consultation program should be developed and implemented that meets NEPM (1999) guidelines and the Newcastle Council DCP (Ref [9]). Defence should also offer to sponsor a UXO-specific advice and public education program prior to the commencement of any new development works at the Fort Wallace property, as recommended by the Gibson Nominees (December 2006) report (Ref [12]).

From discussions at project review meetings, the Site Auditor was aware that Defence had regular discussions with NCC concerning the project. A draft SAS and SEMP were also sent to NCC by the Site Auditor on 10 September 2009, with review comments provided by NCC on 24 September 2009.

The validation report advised that the following community consultation activities were undertaken by Defence during the remediation of the Fort Wallace site:

- A website was established, which included “*Frequently Asked Questions*”, a summary of site works and relevant contact details

⁴⁶ Section 4.3.2, Ref [7]

⁴⁷ Section 10, Ref [3]

⁴⁸ Section 4.10, Ref [14]



- Two community information sessions were held
- A billboard was placed at the Site entrance
- All site workers carried a project business card, which was handed to community members in the event of an unsolicited enquiry

SMEC also advised that they were not aware of any significant community complaints related to the remediation work at the Site.

The Site Auditor considers the available information supports the conclusion that an appropriate community consultation program was implemented during the project because:

- Of the initiatives and outcomes recorded in the validation report
- A double-sided A4 size brochure was issued by Defence to the local community on July 2009, which provided an update on the remediation work
- Project minutes dated 30/07/09 indicate that a community meeting was to be held on 5/08/09, with the meeting to be advertised in the local newspapers
- Information provided at the project review meetings indicated that no major complaints had been received from any regulatory authority or community during the remediation work period and that conduct of the work meet Defence requirements
- The Site Auditor did not receive any negative feedback from regulatory authorities or from the media concerning the remediation works
- The outcome of the community consultation program does not affect the assessment of the suitability of the remediated site for future land uses.

3.7 OH&S

The RAP⁴⁹ provided an outline of the requirements for an OH&S Plan for the remedial work. It was understood that an OH&S Plan was to be prepared by the appointed remediation contractor and was to include any access limitations required by Defence.

The validation report⁵⁰ advised that OH&S Plans were prepared by SMEC and the remediation contractor for their own work. The report advised that SMEC personnel followed their plan and no injuries or lost time occurred. No information on OH&S outcomes for the remediation contractor was provided. However, this deficiency in the report is not considered a significant matter for the purpose of this site audit because:

- The Site Auditor is aware that OH&S procedures were being implemented by the remediation contractor during the project, since the Site Auditor participated in a site

⁴⁹ Section 9, Ref [3]

⁵⁰ Section 4.1, Ref [7]



induction process at the time of his first site inspection. Furthermore, the Site Auditor observed OH&S procedures being implemented when site inspections were conducted on 7 occasions between 16/03/2009 and 30/09/2009

- Information provided at the project review meetings indicated that no significant OH&S incidents or issues occurred during the project and that conduct of the work meet the requirements of the Defence and URS Project Managers
- The Site Auditor did not receive any negative feedback from regulatory authorities or from the media concerning the remediation works
- The outcome of the OH&S program does not affect the assessment of the suitability of the remediated site for future land uses

3.8 Excavation, Classification and Material Disposal

As previously described in **Section 3.1**, the remediation work involved the excavation of contaminated and/or waste materials from the 14 designated remediation areas of concern. The excavated materials were stockpiled, sampled, classified and then removed from the Site and disposed at a suitably licensed landfill. The remediation work also involved the manual removal of ACM fragments that had been scattered across the Site, and the disposal of demolition rubble that had been generated by the building rehabilitation work.

The issues concerning the excavation, classification and material disposal that have been reviewed by the Site Auditor in this report are:

- Were appropriate earthwork procedures used that complied with the RAP?
- Were waste classification assessments undertaken for all materials removed from the site?
- Were appropriate waste classification assessments undertaken that met NSW DECCW requirements?
- Were all excavated materials and waste generated by the building rehabilitation program tracked from cradle-to-grave?
- Were all contaminated soil and waste disposed at suitably licensed landfills?

3.8.1 Earthwork Procedures

The validation report⁵¹ advised that the following earthwork procedures were used by the remediation program:

- The location of remediation areas using a handheld GPS and previously prepared site plans and coordinates
- The pegging of each remediation area

⁵¹ Section 4.3.1, Ref [7]



- Clearing of vegetation
- Excavation of impacted material as directed by the SMEC environmental scientist/engineer, placement of the material in trucks, and transportation to the stockpile area located at the southern end of the oval
- Placement of excavated material from each RAC into a discrete stockpile, which was pegged and named according to its origin
- Collection of samples from the stockpiles and waste classification
- Loading of classified stockpiles into trucks for transportation to a suitably licensed landfill
- The surveying of excavations, stockpiles and backfilled areas by a licensed surveyor for volume calculations
- The validation of remediated areas by SMEC
- The backfilling of remediated areas with imported clean VENM soil and compaction using an excavator and bulldozer
- In most cases the surface levels of the backfilled areas were worked to replicate pre-remediation conditions, with the ground surface spray grassed to provide interim erosion protection.

The Site Auditor considers the available data indicate these work procedures were generally followed, as indicated by:

- The data provided in the validation report
- The excavation and stockpile register prepared by the remediation contractor and provided in Appendix C of the validation report
- The part-time supervision of the work by SMEC and the photo log that was provided in Appendix E of the validation report
- The licensed surveyor plans of final excavated surfaces, stockpiles and backfilled areas provided in Appendix D of the validation report
- Copies of landfill tip dockets provided in Appendix K of the validation report
- The Site Auditor monitored the remediation work by inspecting the Site on 7 occasions between 16/03/2009 and 30/09/2009, which included a final inspection. Photographs taken during these inspections are provided in **Appendix C**
- The excavation areas appeared to have been correctly located in the areas of concern, as specified by drawings and survey data given in the RAP
- The earthwork procedures described in the validation report complied with good practice
- Many of the final excavation surfaces were inspected by the Site Auditor prior to backfilling



- The Site Auditor regularly attended project review meetings and did not receive any negative feedback from regulatory authorities concerning the remediation works

The Site Auditor considers these procedures were appropriate and generally followed those described in the RAP (Ref [3]) and the Remediation Specification (Ref [5]) that had been reviewed by the Site Auditor. One omission was that the RAP⁵² required backfill to be placed in 500mm thick lifts and then compacted to achieve a 98% level of standard compaction, which was to be verified by undertaking compaction testing by a certified geotechnical laboratory. However, the validation report advised that the backfill was worked across the excavation using an excavator and bulldozer⁵³.

The Site Auditor does not consider this deficiency to be a significant matter for the purposes of this audit since the compaction standard achieved by the backfill does not affect the assessment of contamination risks remaining at the Site. However, future developers/builders should recognise that there is a risk that the sandy soils used to backfill areas of the Site may be in a loose condition and affect the performance of structures that may be built in the area.

3.8.2 Completion of Waste Classification Assessments

Waste classification assessments of the stockpiled materials were prepared by SMEC. A total of 18 waste classification assessments were provided in 15 reports that were included in the validation report⁵⁴. Each report provided information on:

- Background information, project objective, scope of work and site details
- Stockpile sample register that for each sample provided data on the stockpile number, sample ID, sampling data, description of the material sample and approximate stockpile volume
- Sampling procedures, substances analysed and laboratory testing at a NATA accredited chemical laboratory
- Summary of laboratory results
- Chain-of-custody form
- Laboratory test certificates

A summary of the waste classification data given in the SMEC report is provided in **Table 3-2**. The reports appear to cover all contaminated soil and waste materials removed from the Fort Wallace site.

⁵² Sections 6.2.2.7, 6.2.3.8 & 6.2.4.5, Ref [3]

⁵³ Section 4.3.1, Ref [7]

⁵⁴ Appendix B, Ref [7]



■ **Table 3-2 Summary of Solid Waste Classification Data**

Report Date	Excavation Location	Stockpile	Approx. In situ Volume (m ³)	Date Sampled	Sample IDs	No. Samples	Sampling Frequency (m ³ /sample)	Waste Classification
22/05/2009	RAC1	RAC1	10	20/04/2009	SP1-SP3	3	3.3	General Solid Waste (non-putrescible)
28/05/2009	RAC2	RAC2	430	12/05/2009	SP8-SP14	7	61.4	General Solid Waste (non-putrescible)
28/05/2009	RAC2	RAC2 - Asbestos	140	12/05/2009	SP1-SP7	7	20.0	Special Waste - Asbestos waste
22/05/2009	RAC3	RAC3	60	23/04/2009	SP1-SP3	3	20.0	Restricted Solid Waste
22/05/2009	RAC4	RAC4	10	20/04/2009	RAC4 SP1 - RAC4 SP3	3	3.3	General Solid Waste (non-putrescible)
22/05/2009	RAC5	RAC5	35	23/04/2009	RAC5 SP1 - RAC5 SP3	3	11.7	General Solid Waste (non-putrescible)
11/05/2009	RAC6	RAC6 - Asbestos	50	20/04/2009	RAC6 SP1 - RAC6 SP3	3	16.7	Special Waste - Asbestos waste
11/05/2009	RAC7	RAC7 - Asbestos	160	21/04/2009	RAC7 SP1 - RAC7 SP4	4	40.0	Special Waste - Asbestos waste
		RAC7	380	21/04/2009	RAC7 SP5 - RAC7 SP9	5	76.0	General Solid Waste (non-putrescible)
15/05/2009	RAC8	RAC8 - Asbestos	160	23/04/2009	RAC8 SP1 - RAC8 SP5	5	32.0	Special Waste - Asbestos waste
		RAC8	1450	23/04/2009	RAC8 SP6 - RAC8 SP14	9	161.1	General Solid Waste (non-putrescible)
15/05/2009	RAC8a	RAC8a - Asbestos	90	21/04/2009	RAC8a SP1 - RAC8a SP3	3	30.0	Special Waste - Asbestos waste
		RAC8a	1600	21/04/2009	RAC8a SP4 - RAC8a SP12	9	177.8	General Solid Waste (non-putrescible)
17/06/2009	RAC8b	RAC8b	70	18/05/2009	8b/1 - 8b/4	4	17.5	General Solid Waste (non-putrescible)
29/05/2009	RAC9	RAC9	25	11/05/2009	RAC9 SP1 - RAC9 SP3	3	8.3	General Solid Waste (non-putrescible)
17/06/2009	Search light bunker	FWSEARCH	40	11/06/2009	FWSEARCH1 - FWSEARCH3	3	13.3	Special Waste - Asbestos waste
1/06/2009	Two demolished residential buildings	Kane Demo 1	60	12/05/2009	KANE1 BSP1 - KANE1 BSP3	3	20.0	Special Waste - Asbestos waste
1/06/2009	Two demolished residential buildings	Kane Demo 2	35	12/05/2009	KANE1 CSP1 - KANE1 CSP3	3	11.7	Special Waste - Asbestos waste
Totals			4805			80	60.1	

The available information indicates that the waste classification assessments were based on the collection of grab samples from the stockpiled material. The laboratory data showed that:

- Most samples had low total and leachable metal concentrations
- Practically all samples had low (< HIL A) to non-detectible middle to heavy-end TPH (C₁₀-C₃₆) concentrations
- All samples had non-detectible light-end TPH (C₆-C₉), BTEX and VOC concentrations
- Most samples had low (< HIL A) to non-detectible PAH concentrations, but a few had high concentrations that resulted in a Restricted Solid Waste classification (stockpile RAC 3)
- All samples had non-detectible to very low (<1mg/kg) OCP concentrations
- All soil samples had non-detectible asbestos fibre concentrations. However, fragments of compressed sheeting generally contained asbestos fibres



The Site Auditor considers the laboratory results indicate that the excavated material generally contained relatively low contaminant levels. The main contaminants were asbestos fibres in ACM fragments and some PAHs probably from tars used in the construction of old road pavement.

3.8.3 Adequacy of Waste Classification Assessments

The information provided in the validation report indicates that most of the waste classification assessments were appropriate and met NSW DECCW requirements. An exception identified by the Site Auditor was the KANE Demo 2 Stockpile waste classification report⁵⁵, which classified the material as '*Special Waste – Asbestos Waste*' due to the presence of ACM fragments.

However, the laboratory test results show that 3 samples were tested for a range of analytes, with one sample measuring a lead concentration of 4450mg/kg (Sample 1d KANE 1CSP3). A TCLP test conducted on this sample measured a TCLP lead concentration of 1.53mg/L, which is less than the 5mg/L TCLP1 criteria for General Solid Waste⁵⁶. However, the total lead concentration of 4450mg/kg still exceeded the 1500mg/kg SCC1 criteria for '*General Solid Waste*' but was less than the 6000mg/kg SCC2 '*Restricted Solid Waste*' criteria.

The Site Auditor considers this material was a mixed waste, which should have been disposed at a landfill licensed to accept both '*Special Waste – Asbestos Waste*' and '*Restricted Solid Waste*'. However, this deficiency in the waste classification assessment is not considered to be a significant matter since the stockpile was relatively small (35m³) and represented less than 1% of the total volume of waste disposed to landfill. Furthermore, the disposal requirements for '*Special Waste – Asbestos Waste*' are more stringent than '*General Solid Waste*'.

3.8.4 Cradle-to-Grave Tracking of Wastes

In order to check whether all excavated materials and waste generated by the building rehabilitation program had been tracked from cradle-to-grave, the Site Auditor examined the following information provided in the validation report:

- Survey plans of the excavated areas and in-situ volumes calculated by the licensed surveyor⁵⁷
- A diagram prepared by the remediation contractor showing stockpile locations and estimates of in-situ volumes⁵⁸

⁵⁵ SMEC (1 June 2009) "*Fort Wallace – KANE Demo 2 Stockpile - Waste Classification*" included in Appendix B, Ref [7]

⁵⁶ DECC (July 2009) "*Waste Classification Guidelines*"

⁵⁷ Appendix D, Ref [7]

⁵⁸ Appendix B, Ref [7]



- A survey diagram of the stockpile area prepared by the licensed surveyor, showing stockpile locations and ex-situ (bulked) volumes⁵⁹
- Earthwork quantities given in the main text of the validation report⁶⁰

A comparison of the volumes reported by these various sources is provided in **Table 3-3**. Copies of the diagrams are provided in **Appendix B**, with extracts of the stockpile diagrams provided in **Figures 5** and **6**.

■ **Table 3-3 Summary of Volume Data Provided in the Validation Report**

	Licensed Surveyor	Remediation Contractor's Estimate of In-situ Volumes		Licensed Surveyor	
Excavation Location	Surveyed Excavation Volume - insitu (m ³)	Stockpile	Approx. Insitu Volume (m ³)	Surveyed Bulk Volume (m ³)	Surveyed Volumes Converted to Insitu Volumes (m ³)
RAC1	8	RAC1	10	7	5.6
RAC2	746	RAC2	430	574	459.2
RAC2		RAC2 - Asbestos	140	203	162.4
RAC3	60	RAC3	60	66	52.8
RAC4	7	RAC4	10	5	4
RAC5	34	RAC5	35	36	28.8
RAC6	27	RAC6 - Asbestos	50	35	28
RAC7	656	RAC7 - Asbestos	160	185	148
		RAC7	380	397	317.6
RAC8	2141	RAC8 - Asbestos	160	158	126.4
		RAC8	1450	1832	1465.6
RAC8a	1896	RAC8a - Asbestos	90	88	70.4
		RAC8a	1600	1844	1475.2
RAC8b	not provided	RAC8b	70	not provided	not provided
RAC9	not provided	RAC9	25	22	17.6
Search light bunker	not provided	FWSEARCH	40	not provided	not provided
Two demolished residential buildings		Kane Demo 1	60	not provided	not provided
Two demolished residential buildings		Kane Demo 2	35	not provided	not provided
Totals	5575		4805	5452	4361.6

⁵⁹ Appendix D, Ref [7]

⁶⁰ Section 4.3.2, Ref [7]

Legend

- Clean Stockpiles -
- Asbestos Stockpiles -
- Kane Demo Sites Stockpiles -
- Vegetation & other Stockpiles -

This Aerial photograph has been geo-referenced from Google Earth and is indicative of on-ground locations only.

This map is indicative only and not to scale. All excavation and stockpile locations should be verified on site.

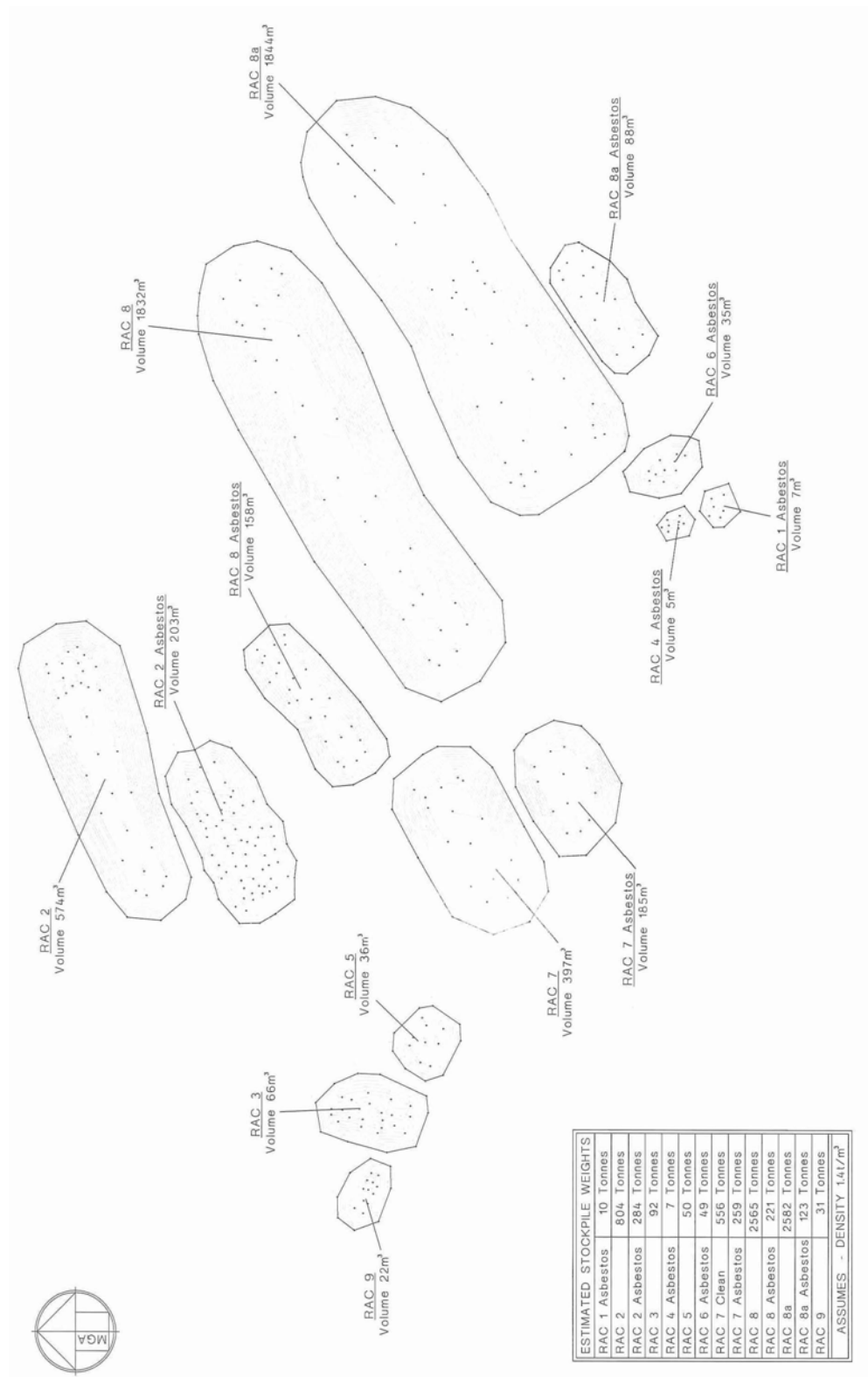
Stockpile Data:

Stockpile ID	Volume	Category
RAC8a	90m ³	Clean Stockpile
RAC6	50m ³	Clean Stockpile
RAC1	10m ³	Clean Stockpile
RAC8b	1600m ³	Clean Stockpile
RAC8	162m ³	Clean Stockpile
RAC2	430m ³	Clean Stockpile
RAC2	240m ³	Clean Stockpile
RAC8a	1653m ³	Clean Stockpile
RAC4	10m ³	Clean Stockpile
RAC7	160m ³	Clean Stockpile
RAC7	380m ³	Clean Stockpile
RAC5	25m ³	Clean Stockpile
RAC3	600m ³	Clean Stockpile
RAC9	75m ³	Clean Stockpile
Kane Demo (1) rubble/soil (screening refuse)	-	Kane Demo Site
Kane Demo (1) bricks 75m ³	75m ³	Kane Demo Site
Kane Demo (1) soil/rubble (To be flip screened and moved)	-	Kane Demo Site
Fence, Veg & Concrete	-	Vegetation & other Stockpile
RAC9 Concrete from Septic	-	Vegetation & other Stockpile
Kane Demo (2) soil/rubble	-	Kane Demo Site
Vegetation	-	Vegetation & other Stockpile

PAGE 64



■ Figure 6 Survey Plan and Quantities Provided by Licensed Surveyor





The various amounts of waste stated in the validation report as having been received by landfills from the Fort Wallace site were:

- General Solid Waste = 9,300 tonnes (received at the SITA Raymond Terrace landfill)
- Restricted Solid Waste = 215 tonnes (received by the SITA Kemps Creek landfill)
- Asbestos Cement Waste = 1.12 tonnes (off-site disposal location not specified)
- Inert Mixed Demo Waste = 125.69 tonnes (off-site disposal location not specified)
- Inert Concrete Waste = 27.90 tonnes (off-site disposal location not specified)
- Green Waste = 14.38 tonnes (off-site disposal location not specified)

The quantity of stockpiled materials that required landfill disposal and were measured by the licensed surveyor are summarised in **Table 3-4**.

■ **Table 3-4 Surveyed Quantities Requiring Landfill Disposal (tonnes)**

Excavation Location	Licensed Surveyor Stockpile Data ⁽¹⁾		
	General Solid Waste	Restricted Solid Waste	Special Waste - Asbestos
RAC1	9.8		
RAC2	803.6		
RAC2			284.2
RAC3		92.4	
RAC4	7		
RAC5	50.4		
RAC6			49
RAC7			259
	555.8		
RAC8			221.2
	2564.8		
RAC8a			123.2
	2581.6		
RAC8b	??		
RAC9	30.8		
Search light bunker		??	
Two demolished residential buildings		??	
Two demolished residential buildings		??	
Totals	6603.8	92.4	936.6

Note:

(1) Assumed density of stockpiled material was 1.4t/m³, the same density as used by the licensed surveyor



The Site Auditor identified a number of data gaps or inconsistencies in the materials tracking information provided in the validation report. The Site Auditor sought to address these concerns by requesting additional information from the environmental consultant⁶¹. SMEC subsequently provided additional information in a letter report dated 26/11/09 (Ref [17]), with a copy provided in **Appendix D**. A description of the data deficiencies and an assessment of the additional data follows:

- 1) **Discrepancy in Total Volume of Contaminated Soil Disposed to Landfill**: Section 4.3.2 of the validation report stated that approximately 9,300 tonnes of General Solid Waste were removed from the Fort Wallace site and disposed at the SITA Raymond Terrace landfill. However, this quantity far exceeded the stockpiled volumes measured by the licensed surveyor, as summarised in **Table 3-4**. The surveyor's data show that only 4717m³ of General Solid Waste, equivalent to 6603.8 tonnes, needed to be disposed at this landfill. The 9,300 tonnes given in the validation report is some 2696.5 tonnes, or 41% greater. In their follow-up assessment, SMEC considered that the surveyed volumes of stockpiled soil provided by the licensed surveyor were actually weights in tonnes rather than volumes in cubic metres. The Site Auditor considers the available information do not support SMEC's explanation because:
 - No factual data were provided by SMEC to support their opinion
 - A licensed surveyor was used to measure the quantities who should know the difference between m³ and tonnes
 - The survey plans provided by the licensed surveyor clearly show quantities as both m³ and tonnes
 - The total stockpile soil volume measured by the licensed surveyor (6815m³ in-situ) is in reasonable agreement with the total excavation volume measured by the licensed surveyor (5575m³), as shown in **Table 3-3**
 - The explanation provided by SMEC was mere conjecture and the alleged error was not confirmed by the licensed surveyor
- 2) **Discrepancy in Amount of Restricted Solid Waste Disposed to Landfill**: Section 4.3.2 of the validation report stated that approximately 215 tonnes of Restricted Solid Waste were removed from the Fort Wallace site and disposed at the SITA Kemps Creek landfill. It appears this volume was based on a trucking record provided in Appendix K of the validation report. However, this quantity far exceeded the stockpiled volume of 66m³ of Restricted Solid Waste, equivalent to 92.4 tonnes, which needed to be disposed at this landfill. This volume was measured by the licensed surveyor and summarised in **Table 3-4**. The 215 tonnes given in the validation report is some 122.6 tonnes, or 133% greater. In their follow-up assessment, SMEC advised that the material did contain some rubble that would increase the overall density of the

⁶¹ Email 29/10/09 (Appendix D)



material. The Site Auditor considers the available information do not support SMEC's explanation because:

- The 3 sets of truck disposal and tip dockets provided by SMEC indicate that a total of 92.5 tonnes of Restricted Solid Waste was disposed to the SITA Kemps Creek landfill, which agrees with the surveyor's data
- No factual data were provided by SMEC to support their opinion
- A licensed surveyor was used to measure the quantities who should know the difference between cubic metres and tonnes
- The RAC3 stockpile volume measured by the licensed surveyor (52.8m^3 in-situ) is in reasonable agreement with the excavation volume measured by the licensed surveyor (60m^3), as shown in **Table 3-3**

- 3) **Disposal of Asbestos Waste to Landfill:** The plans prepared by the licensed surveyor show that some 936.6 tonnes (669m^3) of "*Special Waste – Asbestos*" was stockpiled at the site for removal and disposal at a suitably licensed landfill. However, this waste was not mentioned in the materials tracking section of the validation report (Section 4.3.2) and no landfill tip dockets were provided in Appendix K. In their follow-up assessment, SMEC advised that this material was classified as "*Special Waste – Asbestos*" and a total of 1350 tonnes of this material was disposed between 25/05/09 and 26/05/09, as shown by the trucking records and example tip records in Appendix K of the validation report. The Site Auditor considers the available information indicates that 1350 tonnes of material were disposed to the Raymond Terrace landfill between 25/05/09 and 26/05/09 but was considered by the trucking company and the landfill as being "*contaminated soil*" rather than "*Special Waste – Asbestos*". This is shown by the two example landfill tip dockets and the trucking record summary provided in the validation report referring to the material as "*contaminated soil*".
- 4) **Disposal of 1573 tonnes of General Solid Waste:** Section 4.3.2 of the validation report advised that some 1573 tonnes of General Solid Waste were disposed to the SITA Raymond Terrance landfill on 1/06/09. However, no landfill tip dockets for this material were provided in Appendix K. In their follow-up assessment, SMEC advised that this batch of material was disposed between 1/06/09 and 4/06/09. However, the Site Auditor observed that the only trucking record provided for this period gave a total net weight of 2,604.26 tonnes, which far exceeds the quantity of 1573 tonnes stated in the validation report. The Site Auditor considers the available information indicates that the 1573 tonnes of General Waste from the Fort Wallace site was probably removed at that time, but that other material from another site was included in the trucking record. The most plausible explanation would be that contaminated soil from the nearby Stockton Rifle Range site was being included in the materials tracking data for the Fort Wallace remediation project.



- 5) **Disposal of Other Solid Wastes:** Section 4.3.2 of the validation report described four other solid wastes that were disposed off-site, each category having a volume of between 1.12 tonnes and 125.69 tonnes. No information was provided on where these materials were disposed and no landfill tip dockets or other types of documentation were provided. In their follow-up assessment, SMEC advised that these materials comprised:
- Asbestos cement waste – 1.12 tonnes
 - Inert mixed demolition waste – 125.69 tonnes
 - Inert concrete waste – 27.90 tonnes
 - Green waste – 14.38 tonnes
- 6) **KANE Demo 1 Stockpile:** The SMEC waste classification report dated 1 June 2009 for the KANE Demo 1 Stockpile stated that only a portion of the demolition waste was stockpiled for off-site disposal. No information was provided on what happened to the rest of the demolition waste, what type of material was it, why was it separated from the material disposed off-site, how much demolition waste remained on-site and where was it placed. The material disposed off-site is reported to have contained asbestos. No information was provided on what measures were taken to guarantee no asbestos was present in the material that remained on-site. In their follow-up assessment, SMEC advised that two stockpiles of building and demolition waste containing ACM contamination were generated by the building rehabilitation work conducted by Kane Constructions. These stockpiles were screened by the remediation contractor to generate two types of material – B&D waste containing ACM and sandy soil. The remediation contractor then removed the B&D waste off-site as asbestos waste, while the sandy soil was returned back to the demolition areas RAC10A and RAC10B. SMEC further advised that during the course of the validation program, SMEC conducted a walkover of the backfilled areas and considered that minimal building and demolition waste was visible at these locations and the risk of ACM being placed back in these locations was low. The Site Auditor has reviewed the adequacy of the validation work conducted in these two areas in **Sections 4.4.12 and 4.4.13**, respectively.
- 7) **KANE Demo 2 Stockpile:** The same issues as described above but for the KANE Demo 2 Stockpile waste classification report dated 1 June 2009
- 8) **Unclassified Stockpiles:** The stockpile location plan provided in Appendix B of the validation report showed three stockpiles for which no waste classification reports were provided. These stockpiles were labelled “*Fence, Veg & Concrete*”, “*Kane Demo (1) soil/rubble (to be flip screened and moved)*”, and “*Kane Dem (1) rubble/soil (screening refuse)*”. The validation report provided no further information on these materials, how they were managed, where they were finally placed and what measures were taken to ensure they were not contaminated. In their follow-up assessment, SMEC advised that the vegetation and concrete stockpiles were



pre-classified as “General Solid Waste” in accordance with DECCW guidelines. Information on the KANE stockpiles was provided in feedback provided for previous comments.

- 9) **Stockpile RAC8b:** No information was provided on the location of stockpile RAC8b that was reported to contain 70m³ of contaminated soil. The stockpile location plan provided in Appendix B of the validation report did not show its location. In their follow-up assessment, SMEC advised the material that formed stockpile RAC8b was excavated from an area between RAC8 and RAC8b. Samples FW8bv1 and FW8bv2 were collected to validate the surface soils remaining in the area. The excavated material was placed on hardstand within the stockpile area before off-site disposal in accordance with the waste classification report for Fort Wallace 8b Stockpile.
- 10) **ACM Contamination around Searchlight Bunker:** The location of the 40m³ stockpile of ACM contaminated soil excavated from around the searchlight bunker was not shown in any of the plans provided in the validation report. No further information was provided by SMEC to address this issue.
- 11) **Landfill Dockets:** No information was provided in the landfill summary data provided in Section 4.3.2 of the validation report for a number of the landfill dockets provided in Appendix K of the validation report. The dockets of concern and additional feedback provided by SMEC are as follows:
 - 32.84 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 25/05/09. SMEC considers this material is from RAC8a and was classified as asbestos waste
 - 12.44 tonnes of material disposed at the Raymond Terrace landfill on 3/6/09. SMEC considers this material to be the green waste disposed offsite
 - 2,640.26 tonnes of material disposed at the Raymond Terrace landfill between 1/06/09 and 4/06/09. SMEC considers this to be asbestos waste removed from the site
 - 184.94 tonnes of material disposed at an unspecified location between 20/05/09(?) and 26/05/09. No information was provided to explain why each load received was referred to as a “quarry docket”. Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as “*charged weight*” rather than “*net weight*” as given in the other landfill tip dockets. SMEC subsequently advised that this material was waste disposed offsite from the excavation work but no further information on its final destination was provided
 - 53.25 tonnes of material disposed at an unspecified location between 14/05/09 and 15/05/09. No information was provided to explain why each load received was referred to as a “quarry docket”. Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as “*charged weight*” rather than “*net weight*” as given in the other landfill tip dockets.



SMEC subsequently advised that this material was waste disposed offsite from the excavation work but no further information on its final destination was provided

- 6269.59 tonnes of material disposed at an unspecified location between 9/06/09 and 16/06/09. No information was provided to explain why each load received was referred to as a “quarry docket”. Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as “*charged weight*” rather than “*net weight*” as given in the other landfill tip dockets. SMEC subsequently advised that this material was the VENM imported from the Boral quarry
- 12.36 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09. SMEC considered this material to be the FW RAC1 stockpile
- 19.18 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09. SMEC considered this material to be the FW RAC4 stockpile
- 31.92 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09. SMEC considered this material to be the FW RAC5 stockpile
- 32.2 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 25/05/09. SMEC considered this material to be the FW RAC7 stockpile

12) **Liquid Waste Disposal Dockets:** No copies were provided of the liquid waste disposal dockets for the effluent that was reported to have been pumped out of the septic tank excavation. SMEC subsequently provided a Transpacific invoice detailing the work that was undertaken.

The Site Auditor has assessed the significance of the deficiencies in the cradle-to-grave tracking of materials at the Fort Wallace site in **Section 3.8.6**.

3.8.5 Disposal of Wastes to Suitably Licensed Landfills

The validation report⁶² advised that most of the excavated and demolition waste removed from the Site was disposed at two NSW landfills. These were:

- SITA Raymond Terrace Landfill – 9300 tonnes of General Solid Waste
- SITA Elizabeth Drive Landfill – 215 tonnes of Restricted Solid Waste

The Site Auditor checked the appropriateness of these landfills by reviewing the POEO license data kept on the NSW DECCW website on 2/11/2009. A summary of the license data is provided in **Table 3-5**.

⁶² Section 4.3.2, Ref [7]



■ **Table 3-5 Summary of POEO Licence Data for Landfills Used by Fort Wallace Project**

Landfill Facility	Waste Disposed	POEO Licence No.	Permitted Fee-Based Activity
SITA (Port Stephens) Raymond Terrace Landfill	General Solid Waste	7628	Non-thermal treatment of general waste
SITA Kemps Creek Elizabeth Drive Landfill	Restricted Solid Waste	4548	Waste storage - Hazardous, restricted solid, liquid, clinical & related waste & asbestos waste

The information available from the DECCW indicates that the landfills used by the remediation contractor were appropriate for the types of excavated and demolition waste materials removed from the Fort Wallace site.

However, the validation report did not advise where other waste materials generated by the remediation and demolition works were disposed. These materials comprised:

- Special Waste – Asbestos = 936.6 tonnes (as measured by the licensed surveyor)
- Asbestos Cement Waste = 1.12 tonnes (as stated in Section 4.3.2, Ref [7])
- Inert Mixed Demo Waste = 125.69 tonnes (as stated in Section 4.3.2, Ref [7])
- Inert Concrete Waste = 27.90 tonnes (as stated in Section 4.3.2, Ref [7])
- Green Waste = 14.38 tonnes (as stated in Section 4.3.2, Ref [7])
- Liquid waste removed from the septic tank (as stated in Section 4.3.2, Ref [7])

The Site Auditor sought to address these concerns by requesting additional information be provided⁶³. Additional information was subsequently provided by SMEC on 26/11/2009 (Ref [17]), which addressed most of these issues. However, the additional information did not address the following wastes:

- 184.94 tonnes of material disposed at an unspecified location between 20/05/09(?) and 26/05/09
- 53.25 tonnes of material disposed at an unspecified location between 14/05/09 and 15/05/09

⁶³ Email 29/10/09 (Appendix D)



3.8.6 Assessment of Risk

The Site Auditor considers the available information support the conclusion that appropriate earthwork procedures were generally used by the remediation contractor to remediate the Fort Wallace site and that these procedures generally complied with the RAP. The one omission was that the backfill material was not verified as being compacted to achieve a 98% level of standard compaction. The Site Auditor does not consider this deficiency to be a significant matter for the purposes of this audit since the compaction standard achieved by the backfill does not affect the assessment of contamination risks remaining at the Site. However, future developers/builders should recognise that there is a risk that the sandy soils used to backfill areas of the Site may be in a loose condition and affect the performance of structures that may be built in the area.

The Site Auditor considers the available information support the conclusion that appropriate waste classification assessments were generally provided for the waste materials removed from the Fort Wallace site that met NSW DECCW guidelines. The one exception identified was for a small stockpile of demolition waste (KANE Demo 2 Stockpile). The Site Auditor considers this material was a mixed waste, which should have been disposed at a landfill licensed to accept both '*Special Waste – Asbestos Waste*' and '*Restricted Solid Waste*'. However, this deficiency is not considered to be a significant matter since the stockpile was relatively small (35m³) and represented less than 1% of the total volume of waste disposed to landfill. Furthermore, the disposal requirements for '*Special Waste – Asbestos Waste*' are more stringent than '*General Solid Waste*'.

The Site Auditor considers that deficiencies existed in the waste tracking documentation, which mean that a significant portion of the excavated soils and waste generated at the Fort Wallace site was not tracked from cradle-to-grave as required by the DECCW and the RAP. The main deficiencies were:

- The validation report stated that approximately 9,300 tonnes of General Solid Waste were removed the Fort Wallace site and disposed at the SITA Raymond Terrace landfill. However, this quantity far exceeded the total stockpiled amount of 6604 tonnes measured by the licensed surveyor. The 9,300 tonnes given in the validation report is some 2,697 tonnes, or 41% greater than the amount measured by the licensed surveyor
- The validation report stated that approximately 215 tonnes of Restricted Solid Waste were removed from the Fort Wallace site and disposed at the SITA Kemps Creek landfill. However, this quantity far exceeded the stockpiled amount of 92.4 tonnes measured by the licensed surveyor and the 92.5 tonnes of Restricted Solid Waste given on the tip dockets as having been disposed at the SITA Kemps Creek landfill
- The plans prepared by the licensed surveyor show that some 936.6 tonnes (669m³) of "*Special Waste – Asbestos*" was stockpiled at the site for removal and disposal at a suitably



licensed landfill. Trucking records and landfill tip dockets provided by SMEC show this material was labelled “*contaminated soil*” rather than “*Special Waste – Asbestos*”

- The validation report and supplementary information advised that some 1573 tonnes of General Solid Waste were disposed to the SITA Raymond Terrance landfill between 1/06/09 and 4/06/09. However, the trucking records indicated that some 2,604 tonnes of General Solid Waste were disposed at the landfill during the period. The Site Auditor considers the most plausible explanation for this discrepancy is that contaminated soil from the nearby Stockton Rifle Range site was being included in the materials tracking data for the Fort Wallace remediation project
- The two B&D waste stockpiles (KANE Demo 1 & KANE Demo 2) contained ACM contamination. The stockpiles were screened by the remediation contractor to generate two types of material – B&D waste containing ACM and sandy soil. The remediation contractor then removed the B&D waste off-site as asbestos waste, while the sandy soil was returned back to the demolition areas. No information was provided on what measures were taken to guarantee no asbestos was present in the material that remained on-site. The only validation information provided was that SMEC conducted a walkover inspection of the backfilled areas.
- The location of the 40m³ stockpile of ACM contaminated soil excavated from around the searchlight bunker was not shown in any of the plans provided in the validation report. No further information was provided by SMEC to address this issue
- 184.94 tonnes of material was removed from the Site and disposed at an unspecified location between 20/05/09(?) and 26/05/09 and a further 53.25 tonnes of material was removed and disposed from the Site at an unspecified location between 14/05/09 and 15/05/09

The Site Auditor considers that some of the deficiencies in the waste tracking documentation do not affect the assessment of contamination risks at the Fort Wallace site since they are associated with the off-site disposal of the contaminated soil and waste removed from the Fort Wallace site. The main effect of these set of deficiencies is to increase the risk that the following problems may have occurred:

- Waste materials removed from the Stockton Rifle Range site may have been incorrectly allocated to the Fort Wallace remediation project
- Some of the asbestos impacted soil may not have been disposed in accordance with the Waste Regulations in the POEO Act and DECCW requirements, since the requirements for disposing asbestos waste are much more stringent than “*General Solid Waste*”
- There is a risk that Defence may have incurred unnecessarily high project costs since the amount of contaminated soil and waste that was measured as having been generated at the



Fort Wallace site is significantly less than the amount claimed by SMEC and the remediation contractor

- Some of the waste removed from the Fort Wallace site may have not been taken to a suitably licensed landfill as required by the RAP and regulatory requirements but reused at any site/s

The Site Auditor considers these risks can be addressed by Defence arranging for a more detailed review of the remediation work that involves:

- Obtaining copies of all landfill tip disposal records and cross-checking all loads of materials removed from the Site with the trucking records
- Obtaining copies of the remediation contractor's daily site records and cross-checking the chronology of the waste disposal work
- The Site Auditor preparing a follow-up report on the waste disposal data

The Site Auditor also considers that some of the deficiencies in the waste tracking documentation do affect the assessment of contamination risks at the Fort Wallace site. These deficiencies are associated with an increased risk that ACM contamination may remain in shallow soils at some areas of the Site (eg. demolition areas). This is because:

- Un-validated screened waste was backfilled in these areas
- No data were provided on how ACM contaminated soil was removed from the searchlight area in June 2009 and stockpiled prior to disposal

The Site Auditor has assessed the significance of these risks in a review of the ACM clearance work conducted at the Site, which is reported in **Section 3.10**.

3.8.7 Comparison of Actual and Predicted Quantities

The RAP (Ref [3]) estimated the volumes of contaminated soil and waste that would need to be remediated at the Fort Wallace site. The total volume was estimated to be 3,497m³, with the breakdown being:

- RAC 1: 1m³
- RAC 2: 3m³
- RAC 3: 2m³
- RAC 4: 2.5m³
- RAC 5: 16m³
- RAC 6: 2.5m³
- RAC 7: 170m³
- RAC 8: 3,300m³



In the previous site audit of the RAP completed in September 2008, the Site Auditor considered there was a high risk that a greater volume of contaminated soil and waste than provided for in the RAP may need to be excavated and remediated. This conclusion was made because of deficiencies in the soil contamination assessments provided in the investigation reports and the RAP. The Site Auditor addressed this concern by including Condition 2 in Site Audit Statement 149, which stated:

“The remediation works should be designed to include a sufficient contingency allowance to cover the risk of needing to remove a greater volume of buried waste than provided for in the RAP.”

The actual total volume of contaminated soil and waste that was excavated and disposed off-site was measured by a licensed surveyor at 5,452m³, with a breakdown of the actual volumes summarised in **Table 3-3**. The actual excavated volume is 56% greater than the volume allowed for in the RAP. The Site Auditor notes that Condition 2 of Site Audit Statement 149 was satisfied, since the scope of the remediation work was expanded to include the increased volumes predicted by the Site Auditor.

3.9 Backfilling & Reinstatement

3.9.1 Importation of VENM

The RAP⁶⁴ advised that excavated areas would be backfilled with certified Virgin Excavated Natural Material (VENM), which was either won on-site or imported to the Site. Any imported materials used to backfill excavations would have an appropriate report validating the material prior to its importation.

The validation report⁶⁵ advised that backfill material consisted of 6,300 tonnes of yellow, fine-grained sand that was imported to the Site from the Boral Stockton Quarry at Cox Lane, Fern Bay between 10 and 15 June 2009. The Site Auditor considers this quarry was a suitable of VENM for backfilling the remediated areas because:

- The sand was consistent with the on-site soils
- The material came from a VENM quarry source
- Validation samples collected and tested by SMEC verified the sand was clean VENM, with these data reviewed in **Section 4.4.18**)

No truck or quarry records were provided in the validation report to demonstrate that all materials imported to the Site and used to backfill the excavations was VENM from Boral's sand quarry. The Site Auditor sought to address these concerns by requesting additional information be provided⁶⁶. The additional information⁶⁷ that was subsequently provided comprised:

⁶⁴ Sections 6.2.2.7, 6.2.3.7, 6.2.4.5, 6.4.7 & 6.6, Ref [3]

⁶⁵ Sections 4.3.2 & 6.1.5, Ref [7]

⁶⁶ Email 29/10/09 (Appendix D)



- An explanation that the trucking records⁶⁸ for 6269.59 tonnes of material moved between 9/06/09 and 16/06/09 was the sand VENM imported from the Boral Cox Lane sand quarry
- An example of a Boral Quarry docket was provided

The Site Auditor considers the additional information addressed the documentation deficiency in the validation report.

3.9.2 Reinstatement of Excavations and Stockpile Area

The RAP⁶⁹ required backfill to be placed in 500mm thick lifts and then compacted to achieve a 98% level of standard compaction, which was to be verified by undertaking compaction testing by a certified geotechnical laboratory. However, the validation report advised that the backfill was worked across the excavation using an excavator and bulldozer⁷⁰.

The Site Auditor does not consider this deficiency to be a significant matter for the purposes of this audit since the compaction standard achieved by the backfill does not affect the assessment of contamination risks remaining at the Site. However, future developers/builders should recognise that there is a risk that the sandy soils used to backfill areas of the Site may be in a loose condition and affect the performance of structures that may be built in the area.

The validation report⁷¹ also advised that when all the stockpiled waste had been removed, the remaining surface soils were validated and re-worked to level the disturbed ground surface. The Site Auditor checked this sequence of events by comparing the sampling date recorded on the chain-of-custody forms⁷² with the landfill disposal records⁷³ given in the validation report. The data show that the validation samples (FWSA1-FWSA12) were collected on 11/06/09. However, the landfill tip dockets show that a large amount of contaminated soil/waste material was still being removed from the stockpile area on that day and subsequent days. The relevant tip records show:

- 11/06/09: Approximately 2046 tonnes of General Solid Waste taken to the Raymond Terrace landfill⁷⁴ (based on a count of 66 truck loads at an average load of 31 tonnes)
- 12/06/09: Approximately 837 tonnes of General Solid Waste taken to the Raymond Terrace landfill⁷⁵

⁶⁷ Comments 17 & 24, Ref [17]

⁶⁸ Appendix K, Ref [7]

⁶⁹ Sections 6.2.2.7, 6.2.3.8 & 6.2.4.5, Ref [3]

⁷⁰ Section 4.3.1, Ref [7]

⁷¹ Sections 4.3.1 & 9.18, Ref [7]

⁷² Appendix J, Ref [7]

⁷³ Appendix K, Ref [7]

⁷⁴ Based on 66 truck loads at an average truck load of 31 tonnes



- 16/06/09: Approximately 186 tonnes of General Solid Waste taken to the Raymond Terrace landfill⁷⁶
- 29/06/09: 296 tonnes of General Solid Waste taken to the Raymond Terrace landfill (9 loads)

The Site Auditor sought to address these concerns by requesting additional information be provided⁷⁷. The additional information that was subsequently provided⁷⁸ advised that these materials were in fact VENM that was imported to the Site from Boral's Box Lane sand quarry. The only contaminated soil that was removed from the Site after this time was some 296 tonnes of material from RAC 8B and the searchlight area. SMEC advised that this material was stockpiled on hardstand prior to disposal. The Site Auditor considers the additional information addressed the documentation deficiency in the validation report.

The remaining deficiencies in data on the reinstatement of excavated areas were:

- The placement of screened soil removed from the two B&D waste stockpiles (KANE Demo 1 & KANE Demo 2) that contained ACM contamination. As previously advised in **Section 3.8.4**, no information was provided describing the measures that were taken to guarantee no asbestos was present in the material that remained on-site. The only validation information provided was that SMEC conducted a walkover inspection of the backfilled areas
- No data were provided on how ACM contaminated soil was removed from the searchlight area in June 2009 and the area reinstated

These deficiencies are associated with an increased risk that ACM contamination may remain in shallow soils at some areas of the Site (eg. demolition areas). The Site Auditor has assessed the significance of these risks in a review of the ACM clearance work conducted at the Site, which is reported in **Section 3.10**.

⁷⁵ Based on 27 truck loads at an average truck load of 31 tonnes

⁷⁶ Based on 6 truck loads at an average truck load of 31 tonnes

⁷⁷ Review 2/11/09 (Appendix D)

⁷⁸ Comment 30, Ref [17]



3.10 ACM Clearance

3.10.1 Methodology

The RAP⁷⁹ and Remediation Specification⁸⁰ required ACM fragments to be removed from the Fort Wallace site by using two approaches:

- Tilling the upper 200mm of the soil and manual “*emu parade*” collection in areas of the site where high frequencies of ACM fragments are found, such as the grounds surrounding the barracks
- Manual “*emu parade*” collection in areas of the site where ACM fragments are scattered, such as the sand dune and scrub areas

The ACM removal work was to be undertaken by an AS1 asbestos removal contractor licensed with WorkCover to remove friable asbestos materials. Both approaches would require the production of an asbestos clearance certificate by a suitably qualified occupational hygienist.

The validation report⁸¹ advised that ACM fragments visible on the ground surface were manually collected and removed from the Fort Wallace site. This work was done by Empire Contracting, who is described in the validation report⁸² as a suitably licensed (AS1) asbestos contractor. The occupational hygienist was Getek. The Site Auditor checked the qualifications of both organisations based on information provided on their websites and consider they met the requirements for undertaking work at the Site (refer **Section 3.3.1** for further information).

Copies of asbestos clearance certificates were provided in Appendix H of the SMEC validation report. Each certificate provided information on:

- The location of the area cleared and inspected
- The time of work and the name of the inspector
- The scope of work undertaken
- Limitations of the work
- Results and conclusions

The validation report⁸³ advised that the ACM clearance work used a hand picking (emu bob) approach and that the work was not undertaken in strict accordance with the WA Department of Health (May 2009) asbestos guidelines. No further information was provided by the validation report and no information was provided by the Getek asbestos clearance certificates on the methods

⁷⁹ Section 6.2.5, Ref [3]

⁸⁰ Section 7.1, Ref [5]

⁸¹ Section 9.16, Ref [7]

⁸² Section 4.1.2, Ref [7]

⁸³ Section 4.3.3, Ref [7]



used. The Site Auditor is therefore unable to check whether the ACM clearance work meets WA Department of Health or NSW DECCW requirements.

The Site Auditor sought to address this deficiency by undertaking an inspection of the Fort Wallace site on 24/09/09. The inspection found a large amount of ACM fragments remaining in the searchlight area, which had previously been remediated in June 2009 according to the validation report. During the inspection, the Site Auditor was also advised that ACM fragments had been found during vegetation clearance work at the Plot Room area. These findings were described by the Site Auditor in a memo dated 25/09/09 (**Appendix D**).

The Site Auditor considers these findings indicate that presently unknown ACM fragments are likely to remain at the Site, particularly in disturbed/fill soils below the ground surface. The significance of this risk is assessed by the Site Auditor in **Section 3.10.3**.

3.10.2 Asbestos Clearance Work

The ACM clearance program divided the Site up into a number of stages, which are shown in **Figures 5** and **6**, with a summary of the certification provided in **Table 3-6**. **Figure 6** also shows the locations where the occupational hygienist undertook emu-picking across the Fort Wallace site.



■ **Table 3-6 Summary of ACM Certification**

Stage Area	Getex Report	Date of Inspection	Clearance Given
1	3908.01.ASCC	10 March 2009	No visible ACM remaining
2	3908.01.ASCC	10 March 2009	No visible ACM remaining
3	3908.01.ASCC	10 March 2009	Buried ACM remaining
4	3908.05.ASCC	19 March 2009	No visible ACM remaining
5	3908.05.ASCC	19 March 2009	No visible ACM remaining
6	3908.01.ASCC 3908.09A.ASCC	10 March 2009 & 18 September 2009	No visible ACM remaining No visible ACM remaining
7	3908.02.ASCC	11 March 2009	No visible ACM remaining
8	3908.01.ASCC	10 March 2009	No visible ACM remaining
9	3908.02.ASCC	11 March 2009	No visible ACM remaining
10	3908.02.ASCC	11 March 2009	No visible ACM remaining
11	3908.02.ASCC	11 March 2009	No visible ACM remaining
12	3908.03.ASCC	12 March 2009	No visible ACM remaining
13	3908.02.ASCC	11 March 2009	No visible ACM remaining
14	3908.03.ASCC 3908.06.ASCC	12 March 2009 1 April 2009	No visible ACM remaining No visible ACM remaining
15	3908.03.ASCC	12 March 2009	No visible ACM remaining
16	3908.03.ASCC	12 March 2009	No visible ACM remaining
17	3908.03.ASCC	12 March 2009	No visible ACM remaining
18	3908.03.ASCC	12 March 2009	No visible ACM remaining
19	3908.04.ASCC	13 March 2009	No visible ACM remaining
20	3908.04.ASCC	13 March 2009	No visible ACM remaining
21	3908.04.ASCC	13 March 2009	No visible ACM remaining
22	3908.05.ASCC	19 March 2009	No visible ACM remaining
Follow-up clearances (1)	3908.09A.ASCC	18 September 2009	No visible ACM remaining
Searchlight Area	Not provided		
Building Demolition Areas ⁸⁴	RAC10A = Stage 14, RAC10B = Stage 12 & RAC10C = Stage 12		
Remaining Demolition Fill (SMEC Figure 25) ⁸⁵	Refer Stages 12 & 14		

■ Documentation deficiency

Note

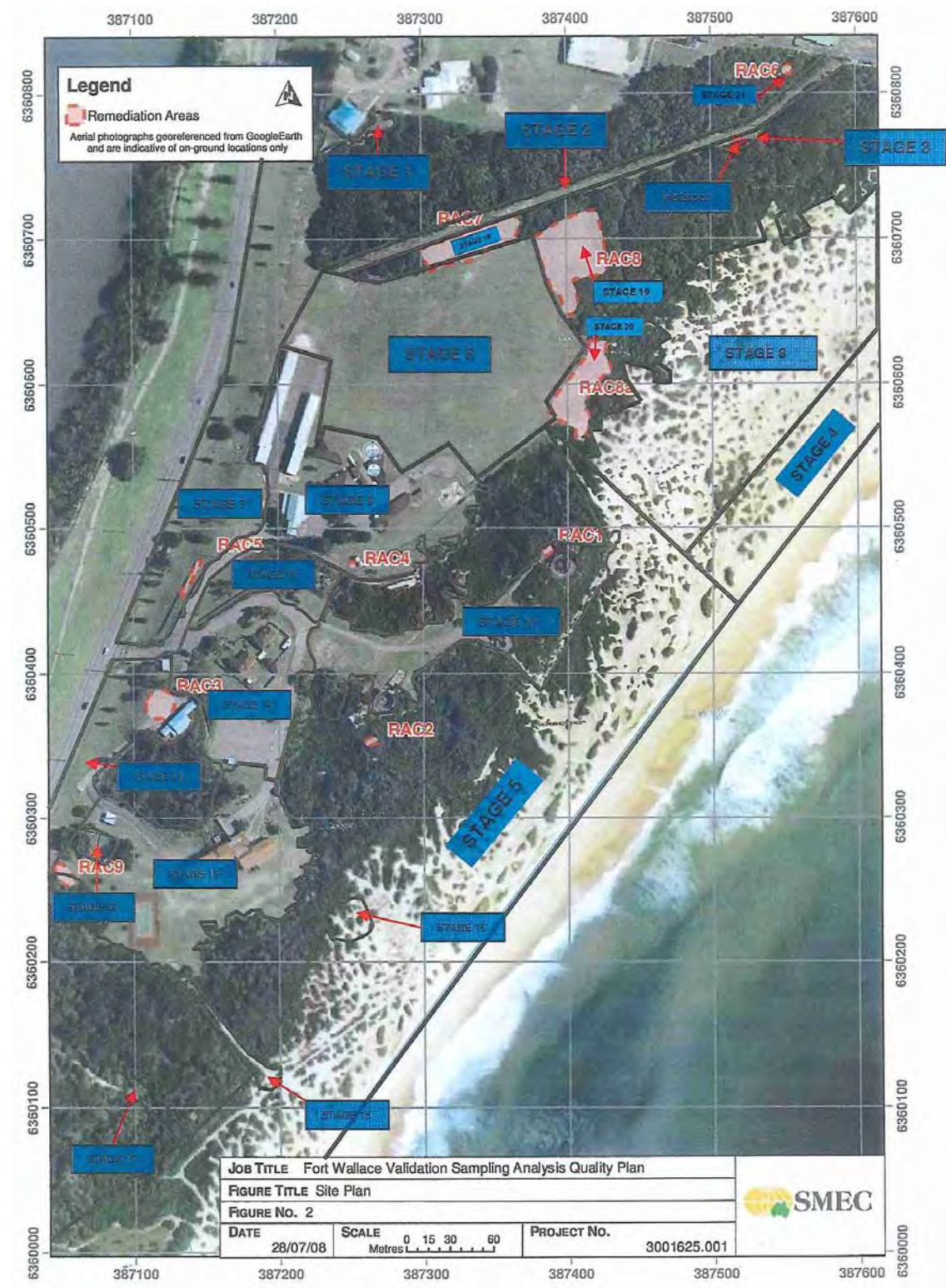
- (1) The areas comprised a 3m wide corridor along the security fencing erected in various places at the eastern end of the site, the area near the gymnasium building, the former stockpile area (Stage 6), RAC7, RAC8, RAC8a and RAC9 (includes plotting room area)

⁸⁴ Refer Comment 4, Ref [17]

⁸⁵ Refer Comment 8, Ref [17]



■ **Figure 5 Location of Asbestos Clearance Areas**



Source: SMEC (September 2008) Figure 2 in Appendix H

SINCLAIR KNIGHT MERZ



■ Figure 6 Location of Asbestos Clearance Areas



Source: SMEC (September 2008) Figure 3 in Appendix H



The Site Auditor considers the scope of the ACM clearance work, as described in the validation report, covered most of the main areas of concern at the Site. However, the following deficiencies were identified:

- Stage 3 – The Getex asbestos clearance certificate found that buried ACM remained in this area and recommended its removal. The validation report⁸⁶ advised that further remediation work was done in this area but that no follow-up asbestos clearance certificate was provided
- Searchlight area - No data were provided on how ACM contaminated soil was removed from the searchlight area in June 2009, how the area reinstated and whether any ACM clearance work was performed by the occupational hygienist from Getex⁸⁷. Furthermore, the Site Auditor found a large amount of ACM when the area was inspected on 24/09/09
- Backfilled Demolition Areas - The two B&D waste stockpiles (KANE Demo 1 & KANE Demo 2) contained ACM contamination and were screened, with the sandy soil used to backfill the demolition areas. However, no information was provided describing the measures that were taken to guarantee no asbestos was present in the screened B&D waste
- Standard of ACM clearance work – The ACM clearance work undertaken at the Site may not have met the recommendations given in the WA Department of Health (May 2009) guidelines. Documentation deficiencies include, but may not be limited to:
 - The depth of clearance achieved by the raking work (WA guidelines recommend a minimum of 10cm)
 - An assessment of the likelihood of deeper ACM contamination being present, which is particularly relevant in a dunal environment
 - Data on the weight, frequency and location of ACM collected
 - The number of passes performed for remediation purposes (Section 5.2.2 of the WA guidelines recommend a minimum of 3 passes of picking made with a 90° direction change between each and using a grid pattern)
 - Calculation of the percent contamination
 - Whether the final inspection conducted by SMEC did not detect surface ACM

The Site Auditor sought to address these concerns by requesting additional information be provided⁸⁸. The additional information that was subsequently provided comprised:

⁸⁶ Section 4.3.3, Ref [7]

⁸⁷ These works are reported to have involved the removal of 40m³ of ACM contaminated soil. This information was provided in a waste classification report dated 17 June 2009 in Appendix C, Ref [7]

⁸⁸ Reviews 28/10/09 & 2/11/09 (Appendix D)



- Searchlight Area - An addendum letter report dated 6/10/09 was provided by SMEC (Ref [16]). The report advised that further remediation work was undertaken in the area on 29/09/09, which involved the raking of surface soils and ACM removal by Empire Contracting under the supervision of an occupational hygienist from Getex. SMEC also advised that they were present during this work. An asbestos clearance certificate was provided by Getex, which advised that “no visually identifiable asbestos containing materials were identified at the time”. SMEC also advised that ACM was not visible in the area at the completion of the work.
- Backfilled Demolition Areas - SMEC advised⁸⁹ that they conducted a walkover inspection of the backfilled areas

3.10.3 Assessment of Risk

The Site Auditor considers there is a risk that presently unknown ACM fragments remain buried in parts of the Site proposed to be developed for ‘standard’ residential land use. This is because:

- The remediation contractor limited the removal of ACM fragments to fragments found at the ground surface using hand picking methods. No raking of the soils or excavation of deeper soils was undertaken
- The standard of ACM clearance work may not have met the recommendations given in the WA Department of Health (May 2009) guidelines
- The remediation contractor and environmental consultant did not advise the Site Auditor that ACM contamination was found in the search light area in June 2009 until the Site Auditor found a reference to it in a back appendix of the validation report. This lack of reporting raises the uncertainty of other significant findings having gone unreported
- The Getek asbestos clearance certificates provided by the remediation contractor were limited to a clearance of visible ACM fragments that were found at the ground surface and did not assess the risks posed by ACM fragments that may have not been found at the ground surface or by deeper materials. The certificates also provided no assessment of the risks posed by ACM fragments remaining in the cleared areas
- The Site Auditor found a large amount of ACM fragments to have remained in a previously remediated area of the Site
- No asbestos clearance has been provided for the Stage 3 area. Consequently, the Site Auditor is unable to check the final condition of the area
- There is a risk that ACM remains in the searchlight area. This is because the additional remediation work conducted on 29/09/09 only involved raking the ground surface and did not involve an assessment of deeper soils. Furthermore, the asbestos clearance certificate

⁸⁹ Comment 12, Ref [17]



provided by the occupation hygienist excluded all material below the immediate ground surface. The Site Auditor considers this limitation means that there is a risk that ACM remains below the ground surface, which could be exposed when the sand moves due to wind and water erosion

- There is a risk that the screened sand removed from the B&D waste may have contained ACM fragments and that the demolition areas were re-contaminated when this material was used to backfill these areas
- The validation report⁹⁰ shows areas where building and demolition waste remain, with 3 of these areas being located in proposed residential areas
- The SMEC (6 October 2009) addendum report (Ref [16]) advised that the oval area contains occasional cobble and brick rubble

The Site Auditor considers that the deficiencies in the ACM clearance work conducted at the Site should not pose an unacceptable risk to future users of the Site because:

- SMEC made regular inspections of the Site and the work undertaken by the remediation contractor, as previously discussed
- The Site Auditor monitored the remediation work by inspecting the Site on 7 occasions between 16/03/2009 and 30/09/2009, which included a final inspection. Photographs taken during these inspections are provided in **Appendix C**
- All known areas of ACM contaminated soil have been remediated. All known visible and identified ACM fragments have been removed from the Site
- Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment
- The ACM is in a compressed form that would be readily identifiable, allowing any such material to be easily removed from the Site
- The amount of remediation work required to provide a guarantee of no ACM fragments remaining at the Site is not feasible. Furthermore, such a large amount of additional work would be environmentally detrimental due to the large amount of resources that would need to be expended for no measurable gain in risk mitigation
- The risks posed by unknown contamination remaining at the Site are to be managed by an SEMP, which is attached to the site audit statement (**Appendix E**)

⁹⁰ Figure 25, Ref [7]



- The SEMP provides management controls that should address any increase in contamination risks caused by deficiencies in the level of ACM clearance conducted at the Site during the period of the remediation work.

3.11 Defence Waste & UXO Clearance

3.11.1 Assessment by Defence-Accredited UXO Specialist

An assessment of ordnance-related contamination issues for the Fort Wallace site was undertaken by Gibson Nominees in December 2006 (Ref [12])⁹¹. The matters considered by the assessment were:

- Site conditions and military history
- Principal uses
- UXO potential
- Waste disposal by burial
- National UXO database information
- Regulatory issues
- Risk assessment
- Remediation costs
- Conclusions and recommendations

The data provided by the assessment were reviewed in the previous site audit report⁹².

The Gibson Nominee report considered there was a low potential for UXO being present at the Fort Wallace site because:

- No record of any incidental recoveries of explosive ordnance-related material has been found
- The property was never subject to impact from any material that would give rise for potential UXO incidence
- In respect to the operation of the coastal artillery weapons, illicit disposal of complete ammunition items or major components (ie. projectiles or filled cartridge cases) is improbable
- There is some slight potential for propellant to have been buried, but that practice would have been most unusual. These could have included primers (the device used to initiate the burning of the propellant) and complete fuses or parts thereof. Normally these components

⁹¹ Reference to a Milsearch (2002) report in Section 9.19 of the validation report is an error and the correct reference should be the Gibson Nominees (2006) report, as indicated in Comment 33 of Ref [17]

⁹² Section 3.3, Ref [14]



would have been returned to the ammunition depot, but they too, could potentially have been burned and the arisings (remnants) subsequently buried. However, such practices were at variance with the procedures of the day and are considered improbable.

- Ammunition for both the 3.7-in HAA and the 40mm LAA guns were ‘fixed’ (ie. was employed as a complete unit as supplied to the gunline). The illicit disposal of such items by discarding or burial was also considered improbable.
- Scattered items of produce, principally cartridge cases and possibly individual complete cartridges may be remnant near the firing point of the 25yd small arms range (the location of which has yet to be confirmed). Due to its comparatively lower level of use, contamination at the firing point from heavy metals (eg. mercury, antimony) was expected to be insignificant. There was some potential for contamination (eg. copper and lead) to exist from projectiles in and beyond the stop-butts.

A risk assessment was provided in the Gibson Nominee report, which used a UXO-specific rapid screening risk assessment protocol developed by Thomas and Edwards (2005)⁹³. The parameters used in the risk assessment were based on an assessment of historical information on weapons usage at the Site and the experience of the UXO consultant.

The UXO risk assessment rated the Site as ‘*low priority*’ with ‘*slight*’ risk of incidence. Gibson Nominees advised that the land use advice for this risk rating is “*All land usage and development, within these areas, should continue without further UXO investigation or remediation.*” Gibson Nominees also advised that it was not possible for any remediation operation to guarantee the detection and removal of all UXO from affected land and so a zero risk option is not possible. Even a survey using 100% search coverage could not guarantee that no UXO item remained at the Site. While such a level of survey would reduce risks to the lowest level possible, the cost of such work was estimated to be between \$263,200 and \$338,400 at 2006 prices.

In the previous site audit report, the Site Auditor considered the methodology used to assess UXO risks at the Site met DECCW requirements because:

- The risk assessment was undertaken by Gibson Nominees, which is a specialist company in the field of UXO risk assessment
- The work was undertaken for the Department of Defence, who are the most experienced government agency in Australia to manage UXO risks
- The risk assessment methodology is known by the Site Auditor to have been used at many other Defence sites around Australia.

⁹³ Thomas DG & Edwards LD (2005) “*A Qualitative Screening Risk Assessment of Unexploded Ordnance-Affected Sites in Australia*” (included in Appendix 5 of Ref [12])



The conclusions made by the UXO risk assessment were:

- *“no evidence of impact by HE-filled projectiles has been recorded or identified;*
- *the matter of contamination originating from small arms ammunition and produce should be included in the wider contamination issues for Fort Wallace;*
- *there is no evidence of UXO contamination at Fort Wallace, however, the possibility of explosive ordnance components having been buried with other refuse cannot be positively discounted;*
- *the issues of potential burials of non-ordnance refuse poses a greater issue than does UXO and should be addressed as part of contamination studies.”*

The recommendations made by the risk assessment with respect to the Fort Wallace site were:

- *“That unless and until additional evidence or indicators emerge of UXO contamination, no further specialist field studies be undertaken.*
- *Defence offers to sponsor a UXO-specific advice and public education program following the disposal of both properties (SRR and Fort Wallace) and during any development of new works.*
- *That contamination from small arms ammunition be included in the wider contamination assessment and, where found to be necessary, the remediation plan for either or both sites.*
- *That during the assessment and, where found to be necessary, remediation or burial pits, the possibility that ordnance-related material may be present be appreciated and appropriately managed.”*

In the previous site audit report, the Site Auditor considered the conclusions and recommendations made by the UXO consultant were appropriate and met DECCW requirements because:

- They were supported by the UXO risk assessment undertaken by Gibson Nominees
- They were made by organisations appointed by the Department of Defence who are qualified to manage UXO safely
- The Site Auditor will include seeking the concurrence of the Defence National UXO Office on this conclusion as a condition on the site audit statement
- No evidence of live bullets or other types of UXO was found during the Stage 2 investigation
- The Stage 2 investigations conducted by SMEC sought to address the contamination issues poses by small arms ammunition and waste burial
- The remediation works that were proposed to be undertaken at the Site would further reduce the risk of unknown UXO remaining at the Site



- The low risks posed by unknown UXO, if any, remaining at the Site could be managed by including an “*Unexpected Findings*” protocol in an Environmental Management Plan (EMP) that can be prepared by an environmental consultant and reviewed to in a future site audit statement prepared following the successful remediation of the Site.

The Site Auditor also included a condition on the site audit statement (Ref [15]) that “*The validation program should include formal certification from a Defence-approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil*”.

Such a formal certification was provided in a letter prepared by the UXO-specialist Dave Thomas from Gibson Nominees dated 3 December 2009 (Ref [18]). A copy of the letter is provided in **Appendix D**. The letter concluded:

“Given that the Fort Wallace Site has been or is to be remediated in accordance with the March 2008 Fort Wallace Remedial Action Plan Final and that, beyond the recovery of a number of small arms projectiles, empty fired cartridge cases and a drill/practice hand grenade, ordnance-related contamination is not an issue.

However, no assessment or remediation measures can provide a 100% guarantee that no hazardous item or items remain. On that basis, we recommend that the following advice be provided on divestment: ‘The potential for explosive ordnance to be remnant on the site is very low. However in the event that an item suspected to be ordnance-related is found, it should not be touched, tampered with or disturbed in any way. Its general appearance should be carefully noted along with the best route to the item. Its location should be marked and people kept away. The police should be advised and will attend. The police may arrange for specialist Defence personnel to attend who will either remove the item or render it safe. There is no charge for this service.’

We are satisfied that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil.”

The Site Auditor considers that the recommendation for particular advice to be provided on divestment has been fulfilled by Section 4.4 of the SEMP attached to the site audit statement (**Appendix E**).



3.11.2 Findings Made by Remediation Work

The validation report⁹⁴ advised that “UXO or significant quantities of Defence related waste such as spent bullets, were not encountered during the remediation and validation works”. This observation is understood to apply to:

- All remediation areas where excavation work was undertaken
- All areas of the Site where site inspections and clearances were undertaken
- Areas of the Site where metal detector surveys were undertaken by SMEC, which are shown in **Figure 7**.

■ Figure 7 Extent of Metal Detector Surveys during Remediation & Validation Work



⁹⁴ Section 4.3.1, Ref [7]



The validation report⁹⁵ concluded that the risk of unknown UXO or Defence related waste remaining at the Fort Wallace site was low. However, the report recommended that an unexpected findings protocol be included in an SEMP as a contingency measure.

The Site Auditor checked these findings by:

- Reviewing the available data provided by the validation report
- Monitoring the remediation work by inspecting the Site on 7 occasions between 16/03/09 and 30/09/09
- Regularly attending project review meetings and the minutes produced by these meetings
- Requesting additional information be provided⁹⁶.

The additional information subsequently provided comprised:

- SMEC follow-up report dated 26/11/09 (Ref [17]): SMEC advised that a small number of spent projectiles and casings were collected by the remediation contractor during the project. These were primarily encountered during the heritage stabilisation works within the heritage precinct. One of these items was believed to have been a hand grenade that was found within the heritage listed gun emplacement area. A small conical object resembling an empty head of a mortar shell was also encountered during test pitting in the western terrace. A more recent report issued by the Defence-accredited UXO specialist (Ref [18]) further advised that the items found at the Site during the remedial works comprised small arms projectiles, empty fired cartridge cases and a drill/practice hand grenade
- Gibson Nominees email dated 7/12/09: A gas mask of WWII vintage was reported to have been found by the remediation contractor during bitou bush spraying works just south of the Southern 9in Gun Emplacement (URS email 9/12/09). The Site Auditor subsequently requested that the Defence-accredited UXO specialist review and assess this new finding. In a Gibson Nominee email dated 7/12/09 (**Appendix D**), Dave Thomas advised that the finding in no way changed his UXO assessment provided on 3/12/09.

The Site Auditor considers the available information supports the conclusion and recommendation made by the validation report because:

- Of the findings made in the previous site audit
- The findings made by the remediation contractor and environmental consultant during the remediation and validation of the Site

⁹⁵ Section 9.19, Ref [7]

⁹⁶ Emails 29/10/09 & 4/12/09 (Appendix D)



- The provision of a formal certification by a Defence-approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil (Ref [18])
- An SEMP has been prepared that provides an unexpected findings protocol for UXO, which is reviewed in **Section 4.5**
- The Site Auditor has placed the following comments on the site audit statement:
 - *“All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a low risk. Visible and identified ACM fragments, Defence waste and all known UXO waste have been removed from the Site.”*
 - *“Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.”*

3.12 Hazardous Building Materials

Hazardous building materials include, but are not limited to, ACM (in the form of fibro, old linoleum and electrical boards), lead-based paint, and PCBs in some old lights. Breakage, weathering or burial of these materials pose a contamination risk to soils at a site. The Site Auditor considers that hazardous building materials pose a risk to the future amenity and safety of sensitive land use areas (such as ‘standard’ residential), if these materials are not properly managed and adequate protection measures not taken. Consequently, the previous site audit statement (Ref [15]) that reviewed the RAP included a condition that *“All waste material and abandoned infrastructure (both above and below ground) containing hazardous building materials should be removed from areas of the Site to be used for ‘unrestricted landuse’”*.

A building condition assessment report was prepared by GHD in June 2004 (Ref [11]). The report documented the results of an asbestos audit, which involved the inspection of accessible areas of buildings and the production of an asbestos register. The report⁹⁷ also advised that other hazardous building materials that could be present on-site included Synthetic mineral fibre (SMF), lead-based paint used on older buildings and PCBs associated with old lightings.

Some of the recommendations made by the report were that, prior to the demolition of buildings:

- An asbestos survey needed to be conducted
- A detailed assessment of buildings be undertaken to determine the presence and location of hazardous building materials

⁹⁷ Section 4.2, Ref [11]



- A plan of management be prepared to ensure that appropriate procedures were implemented by the demolition work and the disposal of waste materials.

The validation report⁹⁸ advised that a program of building demolition and rehabilitation work was undertaken at the Fort Wallace site in parallel with the remediation work. Some demolition waste was also placed in the stockpile area and removed from the Site⁹⁹. However, no information was provided on:

- Whether an asbestos survey of the buildings had been conducted prior to the commencement of demolition/building work
- Whether a detailed assessment of buildings had been undertaken prior to the commencement of demolition/building work to determine the presence and location of hazardous building materials
- Whether a plan of management had been prepared prior to the commencement of the demolition/building work
- Whether the demolition/building work was undertaken in accordance with the plan
- Whether all areas where demolition/building work occurred were cleared of asbestos and other types of contaminants and waste
- The presence and location of hazardous building materials remaining at the Site.

The Site Auditor sought to address these concerns by requesting additional information be provided¹⁰⁰. The additional information¹⁰¹ that was subsequently provided comprised a copy of an Asbestos Register for the Site dated 14/08/09.

The Site Auditor considers that deficiencies in the documentation of hazardous building materials remaining at the Fort Wallace site should not pose an unacceptable soil contamination risk to future users of the Site because:

- The soils at the Site were subject to a program of remediation and validation work
- The Site Auditor monitored the remediation work by inspecting the Site on 7 occasions between 16/03/2009 and 30/09/2009, which included a final inspection. Photographs taken during these inspections are provided in **Appendix C**
- All known areas of ACM contaminated soil have been remediated. All known visible and identified ACM fragments have been removed from the Site

⁹⁸ Section 4.1, Ref [7]

⁹⁹ Section 4.3.2, Ref [7]

¹⁰⁰ Reviews 28/10/09 and 2/11/09 (Appendix D)

¹⁰¹ Comment 40, Ref [17]



- Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment
- The ACM is in a compressed form that would be readily identifiable, allowing any such material to be easily removed from the Site
- The risks posed by unknown contamination remaining at the Site are to be managed by an SEMP, which is attached to the site audit statement (**Appendix E**)
- The SEMP provides management controls that should address any increase in contamination risks caused by deficiencies in the level of documentation on hazardous building materials remaining at the Site.



4. Review of Validation Program

This section of the site audit report provides a summary of the Site Auditor's review of the validation program conducted at the Fort Wallace site during and following the completion of the remediation work. The review has applied a DQO process to each of the Remediation Areas of the Site. Section 4.5 provides the Site Auditor's review of the SEMP prepared by SMEC.

4.1 DQOs for Validation Program

The validation report prepared by SMEC described the Data Quality Objectives (DQOs) used for the validation program conducted at the Site¹⁰², which can be summarised as:

- **Step 1 – State the Problem:** In its pre-remediated state, contamination at the site posed a risk to human health and the environment. As such remediation was required to reduce the risk posed by the contamination to an acceptable level
- **Step 2 – Identify the decision:** The principal study question was “*Has the remediation of the contamination reduced the risk to human health and the environment to an acceptable level?*” Other questions that arise included:
 - Had the lateral and vertical extent of contamination been adequately delineated, removed and validated?
 - Had the appropriate contaminants of concern been identified for validation sampling?
 - Did the validation program adequately assess the risks of unknown contamination being present at the site?
 - Determine whether the concentrations of contaminants at the site post remediation were significantly above background levels
 - Determine whether the concentrations of contaminants exceeded the adopted (and DECC endorsed) site assessment criteria
 - Confirm the pathways of exposure to humans, the environment and Defence operations to the contamination
 - Determine whether contaminants post remediation pose a human health or ecological risk to the receptors of concern
 - Determine whether contamination post remediation will affect potential future land uses at the sites
 - Determine the requirements for ongoing environmental management post remediation (if any)
- **Step 3 - Identify inputs into the decision:** The primary inputs required to be measured by the validation program were:

¹⁰² Refer Section 5 in Ref [7]



- Assess in greater detail areas of environmental concern
 - Assess site conditions (i.e. topography, hydrogeology) post remediation and their potential to influence the migration of contamination
 - Aesthetic impacts in residual surface and deeper soils caused by contamination including staining, odours and visible asbestos
 - Compare data on contaminant concentrations post remediation to the background quality of soils and groundwater at the site
 - Compare contaminant concentrations post remediation to adopted site assessment criteria
 - Rate of groundwater flow from the site and the location of potential receptors
 - The migration potential of contamination (if any) at the site
 - The toxicity of the contaminants and their persistence
 - NSW DECCW and NEPM endorsed adopted site assessment criteria
 - Assess the results of previous investigations, the observations made during the remediation works and historical data
 - NSW DECCW endorsed site investigation and environmental guidelines
- Step 4 – Study boundaries: The study boundaries were defined in terms of geographic boundaries, environmental media of concern and temporal boundaries. The geographic boundaries were defined by the survey boundaries of the Site. The environmental media of concern were defined to be soils. Temporal boundaries were defined as the persistence of potential contaminants of concern in the environment post remediation.
 - Step 5 – Develop a decision rule: The decision rules adopted were:
 - Decide if sufficient validation sampling has been conducted to show that the remediated site is validated to be suitable for potential changes in the future land use
 - Decide if the safety of current and future users may be impacted; and
 - Decide if contamination at the Site may impact the Hunter River.
 - Step 6 – Specify limits on decision errors: The Data Quality Indicators (DQIs) were as summarised in **Table 1-1**.
 - Step 7 – Optimise the design for obtaining data: Use a dynamic validation work plan that allows flexibility based on field observations made by a SMEC representative, target sampling at the most significant areas of environmental concern at the Site, use field screening techniques (eg. PID), and use NSW DECCW and NEPM sampling design guidelines.



The Site Auditor considers the DQO process used by SMEC generally followed DECCW and NEPM guidelines and was consistent with the validation sampling, quality and analysis plan (VSAP) that was previously prepared by SMEC and reviewed by the Site Auditor.

4.2 Validation Criteria

The previous site audit report¹⁰³ considered that three types of remediation criteria needed to be specified for the Site, these being:

- Soils remaining on-site
- Disposal criteria for soil
- Imported fill criteria

The validation report¹⁰⁴ provided criteria for these materials. The Site Auditor considers the remediation criteria provided in the validation report generally meet NSW DECCW requirements because:

- The criteria for soils remaining on-site in the “*unrestricted landuse*” area consisted of the HIL A and EIL criteria given in the NSW DECCW-endorsed guidelines
- The criteria for soils remaining on-site in the “*non-development landuse*” area consisted of the HIL E and EIL criteria given in the NSW DECCW-endorsed guidelines
- The statistical criteria to be used for the validation of the soils complied with NSW DECCW-endorsed guidelines
- The aesthetic criteria to be used for the validation of the soils complied with NSW DECCW-endorsed guidelines (soils should not be discoloured or affected by odours to an extent that would be considered a hazard or nuisance)
- The asbestos criteria to be used for the validation of the soils was no surface or known/suspected subsurface ACM to remain onsite and no free fibres in surface soils, which is more conservative criteria recommended by the WA Department of Health (2009) guidelines and comply with NSW DECCW-endorsed guidelines
- The criteria for classifying waste materials removed from the Site consisted of the NSW DECC (2008) waste classification guidelines
- The criteria for soils imported to the Site consisted of the HIL A and EIL criteria, NEPM (1999) background ranges for metals, and the NSW DECC (2008) waste classification guidelines

¹⁰³ Section 4.5, Ref [14]

¹⁰⁴ Section 6, Ref [7]



- A site-specific spent bullet criteria of not more than 6 lead bullets per square metre, which is based on the conservative assumption that the lead could disintegrate over this area and no cause concentrations in the shallow soils to exceed the HIL A criterion

However, the validation report provided no criteria for faecal coliforms, which is a contaminant of concern at the septic tank area (RAC 9). The Site Auditor addressed this deficiency by adopting the Grade A biosolid product criteria given in the NSW EPA (October 1997) “*Environmental Guidelines, Use and Disposal of Biosolid Products*”. Grade A material is considered by the NSW DECCW as suitable for unrestricted use. The criteria for faecal coliforms is <1,000 MPN per gram (dry weight).

4.3 Sampling Program & QA/QC

This section of the audit report reviews the general adequacy of the sampling and laboratory test work and its compliance with the DQO’s listed in **Section 4.1**, which concern documentation completeness, data completeness and representativeness, data comparability, precision and accuracy. More detailed assessment of the data completeness achieved at each of the remediation areas of concern (RACs) is provided in **Section 4.4**.

4.3.1 Documentation Completeness

Fieldwork Documentation

The main tasks that were documented as having been undertaken by SMEC as part of the validation program conducted at the BNTS site were:

- A delineation sampling program conducted in June 2008 prior to the commencement of remediation work
- An inspection of the excavation work and an examination of the final excavation surfaces to check for any physical evidence of soil contamination or waste material and field screening using a photo-ionisation detector (PID)
- A metal detection survey conducted across the proposed residential area of the Site
- Collection of surface soil samples from the exposed final excavation surfaces, recording the sample locations using a GPS, logging each sample and preparing a photographic log
- A pavement condition assessment

A summary of the fieldwork documentation provided by SMEC for the validation program is presented in **Table 4-2**.



■ **Table 4-2 Summary of Fieldwork Documentation**

Fieldwork Documentation	References
Delineation sampling program (June 2008)	Ref [4]
Sampling location plans	Figs 9–24 in Appn A, Ref [7]
Soil sample collection techniques	Section 7.1.2, Ref [7]
Description of field screening protocols	Sections 7.1.2, Ref [7]
Decontamination procedures	Sectns 7.1.2 & 8.1.4, Ref [7]
Soil sample descriptions and photo log	Sectn 9 & Appn E, Ref [7]
Field screening equipment calibration records	Appendix F, Ref [7]
Headspace volatile gas measurements using a PID	Tables 15 – 27, Ref [7]
Sample preservation methods	Sectns 7.1.2 & 8.1.6, Ref [7]
Use of a NATA-registered chemical laboratory/ies	Section 8.2, Ref [7]
Pavement condition assessment	Ref [19]

Legend:

 Inadequate information provided in validation report

The Site Auditor considers the fieldwork documentation provided by the validation report generally met the documentation completeness DQO.


Laboratory Documentation

A summary of the laboratory documentation provided by SMEC for the validation program is presented in **Table 4-3**.

■ **Table 4-3 Summary of Laboratory Documentation**

Laboratory Documentation	References
Delineation sampling program (June 2008)	Ref [4]
A copy of the chain-of-custody forms acknowledging receipt of date and time, and identity of samples included in shipments	Appendix J, Ref [7]; Ref [17]
Laboratory test certificates	Appendix J, Ref [7]; Ref [17]
Description of the surrogates and spikes used	Appendix J, Ref [7]
Record of holding times and a comparison with method specifications	Section 8.2.3 & Appendix J, Ref [7]
Analytical test methods used by the NATA-registered laboratory	Section 8.2.2 & Appendix J, Ref [7]
Laboratory accreditation for analytical methods used	Section 8.2.1 & Appendix J, Ref [7]

Legend:

 Inadequate information provided in validation report



The Site Auditor considers the laboratory documentation provided by the validation report generally meets NSW DECCW guidelines and the documentation completeness DQO. The Site Auditor found that laboratory test certificates and chain-of-custody forms were missing from the validation report for samples FW8b-V1 and FW8b-V2. Copies of this documentation was subsequently provided by SMEC in a follow-up report dated 26/11/09 (Ref [17]).

Contamination Assessment Documentation

A summary of the documentation provided on contamination assessments in the validation report and additional information is provided in **Table 4-4**.

■ **Table 4-4 Summary of Contamination Assessment Documentation**

Assessment Documentation	References
Delineation Sampling Assessment	
Delineation sampling assessment	Ref [4]
ACM & UXO Clearances	
ACM clearance/risk assessment	Sectns 4.1.2, 4.3.3 & Appn H, Ref [7]; Ref [16]; Ref [17]
UXO clearance/risk assessment	Section 9.19, Ref [7]; Ref [17], Ref [18]
Soil Contamination Assessment	
Summary of all results in tables that: <ul style="list-style-type: none"> show all essential details such as sample numbers and sample depth show assessment criteria highlights all results exceeding the assessment criteria 	Tables in Appendix G, Ref [7]
Site plans showing all sample locations, sample identification numbers and sampling depths	Figs 9–24 in Appn A, Ref [7]
Site plans showing the extent of residual soil contamination exceeding selected assessment criteria for each sample depth	Not required
Site plans showing the extent of residual aesthetically impacted material	Figure 25 in Appendix A, Ref [7]
Plan showing the location of buried services that may be constructed from ACM	Not provided
Pavement Condition	
Pavement condition assessment & risk posed by underlying contamination	Ref [19]

Legend:

Inadequate information provided in validation report



Copies of these figures and summary tables from the delineation sampling report and the validation report are provided in **Appendices A** and **B**, respectively. The Site Auditor performed a check-print on the laboratory summary tables and considers they provide an accurate summary of practically all results. The exceptions are:

- The faecal coliform data obtained for the 6 validation samples from the septic tank RAC9 area were not included in the summary tables. The results show that faecal coliform concentrations ranged between <0.2 and 13 MPN/g
- Sample RAC10CDUP1 was tested for asbestos fibres and measured a non-detectable concentration
- Samples FWD2/1 to FWD2/3 were tested for asbestos fibres and measured non-detectable concentrations

The Site Auditor considers the contamination assessment documentation provided by the validation report generally met the documentation completeness DQO. The main deficiency was that no plan was provided showing the location of buried services that may be constructed from ACM and which remain at the Fort Wallace site.

The Site Auditor considers this deficiency was addressed by the SEMP prepared by SMEC, because it includes procedures and controls for the ongoing management of buried services some of which are constructed from ACM. A review of the SEMP is provided in **Section 4.5**.

4.3.2 Data Completeness and Representativeness

The minimum sampling requirements recommended by the NSW DECCW for characterising contamination in soils at a site are provided in various guidelines that have been issued or endorsed by the regulatory authorities. For some cases, the Site Auditor has interpreted the available guidelines to derive appropriate default sampling requirements for cases not covered by the guidelines.

The main types of area that the Site Auditor considers are present at the Fort Wallace site that needed to be investigated and/or validated are:

- Near-surface soils (0-0.5m)
- Natural soils underlying fill/disturbed soils
- Small excavations (<500m²)
- Large size excavations (>500m²)
- Underground tanks
- Pits
- Shallow soils around old buildings
- Small amounts of imported fill



- Large amounts of imported fill

These minimum sampling requirements for the various types of areas are considered to be:

- Near-surface soils (0-0.5m): The NSW EPA (1995) '*Contaminated Sites Sampling Guidelines*' provides recommended minimum sampling frequencies that vary according to the area being investigated.
- Natural soils underlying fill/disturbed soils: The natural soils that underlie a fill/disturbed soil layer could be investigated at a lower frequency than that given by the NSW EPA (1995) '*Contaminated Sites Sampling Guidelines*' provided there is a low risk of contamination and/or migration of contamination from the overlying fill/disturbed soil layer.
- Small excavations (<500m²): The NSW EPA (1994) '*Guidelines for Assessing Service Station Sites*' recommend that small excavations should be validated on a regular 8.5m grid or any demonstrably similar sampling pattern. This usually means that samples from the floor of an excavation should be validated at a frequency of one sample per 8.5 x 8.5m grid (ie. 72m²) and wall samples at a frequency of one sample per 8.5 linear metre. The number of wall samples to be collected at a given location may depend on the types of materials remaining in the excavation face and whether more than one laydown mechanism exists. For example, for a given location one wall sample may need to be collected from a near-surface fill layer and another near the base of the excavation if there was a risk of contaminated fluids migrating into deeper soils. The Site Auditor considers this sampling strategy would be appropriate for validating UST tanks and other small excavations.
- Larger size excavations (>500m²): The NSW EPA (1995) '*Contaminated Sites Sampling Guidelines*' recommend that the sampling frequency for validating larger excavations may be decreased (ie. larger sampling) depending on the excavation size. The size of the regular grid sampling for given areas are summarised in the following table.

Area (m ²)	Floor Grid Spacing (m)	Wall Spacing (m)
>500 – 1500	10	10
>1500 – 5000	15	15
>5000	20	20

- Underground tanks: The NSW EPA (1994) '*Guidelines for Assessing Service Station Sites*' recommend that for a single tank pit excavation, one sample should be collected from the floor and one from each wall of the pit. To validate a multiple tank pit excavation, the number of samples should be proportionally increased. Additional samples should be collected along pipelines and at bowser locations at a regular 8.5m grid or any demonstrably similar sampling pattern.



- Pits: The NSW EPA (1994) '*Guidelines for Assessing Service Station Sites*' recommend 2 soil samples be taken near a below-ground waste oil tank.
- Shallow soils around old buildings: These soils have the potential to be impacted by flaking lead-based paint and the spraying of pesticides/herbicides. The NSW EPA (1995) '*Contaminated Sites Sampling Guidelines*' recommend a minimum sampling density of 1 per 100m² for small areas (500m²), which corresponds to a spacing of 1 per 10m. For larger building areas (2000m²), the spacing would increase to 1 per 20m.
- Small amounts of imported fill: The NSW EPA (1994) '*Guidelines for Assessing Service Station Sites*' recommend that imported fill be tested at a minimum frequency of one per 100m³. This rate of testing is comparable to the rate recommended by the WA DEC¹⁰⁵ for quantities of waste material between 500 and 2,000m³.
- Large amounts of imported fill: The NSW EPA (1994) '*Guidelines for Assessing Service Station Sites*' recommend that imported fill be tested at a minimum frequency of one per 100m³. However, the NSW DECCW provides no recommendations for large volumes of imported fill. The SMEC validation report¹⁰⁶ estimates that 6300 tonnes of sandy VENM were imported to the Site, which is considered to be equivalent to 4,200m³ (unit weight 1.5t/m³). Guidelines from the WA DEC¹⁰⁷ recommend that a minimum sampling frequency of 20 samples be tested for quantities of waste material between 4,000 and 5,000m³.

The Site Auditor has used these minimum sampling requirements to assess the data completeness of the SMEC validation data, with the results of this review provided on an area-by-area basis in **Section 4.4**.

4.3.3 Data Comparability

A summary of the data comparability documentation provided in the validation report is provided in **Table 4-6**.

¹⁰⁵ Refer pages 18-19 in WA DEC (2005) "*Landfill Waste Classification and Waste Definitions 1996 (As amended)*"

¹⁰⁶ Section 12.2, Ref [8]

¹⁰⁷ Refer pages 18-19 in WA DEC (2005) "*Landfill Waste Classification and Waste Definitions 1996 (As amended)*"



■ **Table 4-6 Summary of Data Comparability**

Data Comparability	References
Appropriate field screening techniques	Sections 7.1.2, Ref [7]
Appropriate calibration of field equipment (PID)	Appendix F, Ref [7]
Appropriate soil sampling techniques	Section 7.1.2, Ref [7]
Appropriate sample splitting techniques	Section 7.1.2, Ref [7]
Appropriate decontamination procedures	Sectns 7.1.2 & 8.1.4, Ref [7]
Appropriate containers (including preservation) used for soil samples	Sectns 7.1.2 & 8.1.6, Ref [7]
Appropriate sample storage and transportation	Sectns 7.1.2 & 8.1.6, Ref [7]
Appropriate management of chain of custody forms	Appendix J, Ref [7]
Samples tested within recommended holding times	Sectn 8.2.3 & Appn J, Ref [7]
The laboratory test methods complied with the 1999 NEPM <i>“Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils”</i>	Section 8.2.2 & Appendix J, Ref [7]
Appropriate performance of laboratory in inter-laboratory trials for the analytical methods used where available	Not available
Appropriate PQL's for the analytes tested	Sectn 8.2.3 & Appn J, Ref [7]

Legend:

Inadequate information provided in validation report

The Site Auditor considers the documentation provided by the validation report generally meets NSW DECCW guidelines for the data comparability DQO. The Site Auditor considers the absence of documentation on the performance of the laboratories in inter-laboratory trials is not significant, since there are no NSW government controlled and/or managed inter-laboratory trial for chemical laboratories.

One deficiency identified was that the recommended holding time for soil samples tested for faecal coliforms was exceeded. The holding time for testing faecal coliforms is 24 hours. The available data provided in the validation report indicate that the validation samples taken in the septic tank excavation area were collected on 28/04/09 and tested on 11/05/09, nearly 2 weeks later. The laboratory tests measured faecal coliforms up to 13 MPN/g. The significance of this deficiency is assessed in **Section 4.4.11**.



4.3.4 Precision & Accuracy for Sampling & Analysis

A summary of the available information relevant to an assessment of the precision and accuracy of the validation data is provided in **Table 4-7**.

■ **Table 4-7 Summary of Precision & Accuracy Compliance**

Precision & Accuracy	References
Use of properly trained and qualified field personnel	Section 8.1.1, Ref [7]
Blind field duplicates collected at a minimum rate of 1 in 10 (soils)	Section 8.3, Ref [7]
RPD's less than 30% for inorganic and 50% for organic analyses (soils)	Section 8.3, Ref [7]
Acceptable levels for equipment rinsate blanks	Not required for dedicated sampling equipment (Section 7.1.2, Ref [7])
Acceptable levels for field blanks	Not required – low risk of volatile contamination (Section 7.1.2, Ref [7])
Acceptable levels for laboratory-prepared trip spike results for volatile analytes	Not required – low risk of volatile contamination (Section 7.1.2, Ref [7])
Acceptable levels for trip blank results	Not required – low risk of volatile contamination (Section 7.1.2, Ref [7])
Laboratory QC criteria achieved	Sections 7.1.2, 8.2 & Appendix J, Ref [71]

Note:

The NSW DECCW acceptance criteria for method blanks and spike recovery results are specified in Section 4.10 of Schedule B(2) in the NEPM (1999) 'Guideline on Data Collection, Sample Design and Reporting' and Section 8 of AS4482.1-1997.

Legend:

Inadequate information provided in validation report

The documentation indicates that the validation report generally satisfied the data precision and accuracy DQO's.



4.4 Validation of Remediation Areas

4.4.1 RAC 1 – Northern Gun Emplacement

The Northern Gun Emplacement is located within the Inner Fort, which is part of the Fort Wallace site that has an open-space “*non-development landuse*” due to its heritage significance. The 2008 contamination investigation (Ref [2]) and subsequent delineation testing (Ref [4]) found surface soils having elevated PAH concentrations.

The remediation work involved the scraping of 8m³ of soil from a 33m² area to a depth of 0.2 – 0.4m, with 3 validation samples collected and tested for PAHs and metals. No backfill was placed in the area due to the shallow excavation depth. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all final samples measured PAH and metal concentrations less than the HIL A and EIL criteria.

SMEC concluded that the Northern Gun Emplacement Area (RAC 1) had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed open space land use. SMEC also considered that ACM in the soils posed a low risk since this area was cleared by an occupational hygienist, as previously discussed in **Section 3.10**.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectable
- The 3 final validation samples meet the data completeness DQO for a 33m² area, since for small excavations a minimum sampling frequency of 1 per 72m² was sufficient
- The laboratory data measured concentrations for the contaminants of concern less than the HIL E and EIL criteria in all validation samples
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 11), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report



4.4.2 RAC 2 – Waste Material Southern Gun Emplacement

The Southern Gun Emplacement is located within the Inner Fort, which is part of the Fort Wallace site that has an open-space “*non-development landuse*” due to its heritage significance. The 2008 contamination investigation (Ref [2]) found surface soils having elevated lead concentrations. The Site Auditor also concluded in the previous site audit report (Ref [14]) the potential for waste materials to have been buried/dumped in the area.

The remediation work found B&D waste containing sand, bricks, concrete, plaster, plastic, ACM fragments and vegetation waste to extend to a depth of 3m bgl. SMEC reported that all this material was removed. The remediation work involved the excavation of 748m³ of soil from a 260m² area to a depth of up to 3m, with a final set of 20 validation samples being collected and tested for metals and asbestos fibres. SMEC advised that the area was then reworked and a swale drain created for surface water flows from a pipe leading from a car park to the west of the area. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all final samples measured metal concentrations less than the HIL A and EIL criteria and non-detectible asbestos fibres.

SMEC concluded that the Southern Gun Emplacement Area (RAC 2) had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed open space land use. SMEC also considered that there is potential for unknown fill material to be present in the area due to its long history as a Defence fortification and its location in a dunal environment.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectible
- The 12 final floor validation samples meet the data completeness DQO for a 260m² area, since for small excavations a minimum sampling frequency of 1 per 72m² was sufficient. The 8 wall validation samples meet the data completeness DQO for a 260m² area
- The laboratory data measured concentrations for the contaminants of concern less than the HIL E and EIL criteria in all validation samples
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 16), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**



- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.3 RAC 3 – Administration Building

The Administration Building is located within the Outer Fort, which is part of the Fort Wallace site that has a proposed “*unrestricted landuse*” where the most sensitive land use would be “standard” residential. The 2008 contamination investigation (Ref [2]) and subsequent delineation testing (Ref [4]) found surface soils having elevated PAH and lead concentrations in the near-surface soils.

The remediation work involved the scraping of 60m³ of material from a 134m² area to a depth greater than 0.2m, with 3 final validation samples collected and tested for PAHs and metals. The excavated material consisted of sand, bricks, sandstone, bitumen and fill material. The excavation was reported to have been backfilled with imported VENM. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all final samples measured PAH and metal concentrations less than the HIL A and EIL criteria.

SMEC concluded that the RAC3 Administration Building area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed ‘standard’ residential land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectable
- The 3 final validation samples meet the data completeness DQO for a 134m² area, since for small excavations a minimum sampling frequency of 1 per 72m² was sufficient
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 13), as discussed in **Section 3.10**



- The excavation pits were backfilled with clean imported VENM, as discussed in **Section 4.4.18**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.4 RAC 4 – Pump House

The Pump House is located within the Outer Fort, which is part of the Fort Wallace site that has a proposed “*unrestricted landuse*” where the most sensitive land use would be “standard” residential. The 2008 contamination investigation (Ref [2]) and subsequent delineation testing (Ref [4]) found surface soils having elevated PAH concentrations in the near-surface soils.

The remediation work involved the scraping of 7m³ of material from a 22m² area to a depth of 0.15m bgl, with 2 validation samples collected and tested for PAHs, TPH and metals. The excavated material consisted of sand, bricks and gravel. The excavation was reported to have been backfilled with imported VENM. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all final samples measured PAH, TPH and metal concentrations less than the HIL A and EIL criteria.

SMEC concluded that the RAC4 Pump House area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed ‘standard’ residential land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectible
- The 2 validation samples meet the data completeness DQO for a 22m² area, since for small excavations a minimum sampling frequency of 1 per 72m² was sufficient
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**



- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 9), as discussed in **Section 3.10**
- The excavation pits were backfilled with clean imported VENM, as discussed in **Section 4.4.18**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.5 RAC 5 – Western Terrace

The Western Terrace is located within the Outer Fort, which is part of the Fort Wallace site that has a proposed “*unrestricted landuse*” where the most sensitive land use would be “standard” residential. The 2008 contamination investigation (Ref [2]) and subsequent delineation testing (Ref [4]) found surface soils having elevated PAH concentrations in the near-surface soils.

The remediation work involved the scraping of 34m³ of material from a 59m² area to a depth greater than 0.2m, with 2 final validation samples collected and tested for PAHs and metals. The excavated material consisted of sand and bricks. The excavation was reported to have been backfilled with imported VENM. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all final samples measured PAH and metal concentrations less than the HIL A and EIL criteria.

SMEC concluded that the RAC5 Western Terrace area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed ‘standard’ residential land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectable
- The 2 final validation samples meet the data completeness DQO for a 59m² area, since for small excavations a minimum sampling frequency of 1 per 72m² was sufficient
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples



- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 9), as discussed in **Section 3.10**
- The excavation pits were backfilled with clean imported VENM, as discussed in **Section 4.4.18**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.6 RAC 6 – Sand Dunes

The RAC6 Sand Dune area is located within the part of the Fort Wallace site that is to have an open-space “*non-development landuse*” due to its environmental significance. The 2008 contamination investigation (Ref [2]) and subsequent delineation testing (Ref [4]) found surface soils having elevated PAH, lead and zinc concentrations in the near-surface soils.

The remediation work involved the scraping of 27m³ of material from a 121m² area to a depth of 0.1m bgl, with 6 final validation samples collected and tested for PAHs and metals. The excavated material consisted of sand. Some ACM fragments were also found in the area during the ACM clearance performed by the occupational hygienist from Getek. A further 8m³ of soil was reported to have been removed. The excavation was reported to have been backfilled with imported VENM. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all final samples measured PAH and metal concentrations less than the HIL A and EIL criteria. Four of the samples from the ACM impacted area were also tested for asbestos fibres and measured non-detectable concentrations.

SMEC concluded that the Sand Dune area (RAC 6) had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed open space land use. SMEC also considered that there is potential for unknown fill material to be present in the area due to its long history as a Defence fortification and its location in a dunal environment.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature



- PID concentrations were non-detectable
- The 6 validation samples meet the data completeness DQO for a 121m² area, since for small excavations a minimum sampling frequency of 1 per 72m² was sufficient
- The laboratory data measured concentrations for the contaminants of concern less than the HIL E and EIL criteria in all validation samples
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 21), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- The excavation pits were backfilled with clean imported VENM, as discussed in **Section 4.4.18**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.7 RAC 7 – Waste Disposal Area

The RAC7 Waste Disposal area is located within the part of the Fort Wallace site that is to have an open-space “*non-development landuse*” due to its environmental significance¹⁰⁸. The 2008 contamination investigation (Ref [2]) found buried waste and fill material in the area.

The remediation work involved the excavation of 656m³ of material from a 1,448m² area to a maximum depth of 1.0m bgl, with 28 validation samples collected and tested for metals, PAHs, TPH, OCPs, VOCs and asbestos fibres. The excavated material consisted of sand, bricks, concrete, plastic, metal, tyres, ACM fragments and vegetative matter. The excavation was reported to have been backfilled with imported VENM. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria.

SMEC concluded that the Waste Disposal area (RAC 7) had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed open space land use.

The Site Auditor considers the available data support the SMEC conclusion because:

¹⁰⁸ The proposed landuse is shown by SMEC Figure 2 (Ref [7]).



- The remediation and validation data generally meet the DQO's for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectable
- The 22 floor validation samples was close to meeting the data completeness DQO for a 1,448m² area, since for large excavations the NSW EPA (1995) guidelines recommend a minimum sampling frequency of 7 samples. The 6 wall validation samples were also close to meeting the data completeness DQO for a 1,448m² area
- The laboratory data measured concentrations for the contaminants of concern less than the HIL E and EIL criteria in all validation samples
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 18), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- The excavation pits were backfilled with clean imported VENM, as discussed in **Section 4.4.18**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.8 RAC 8 – Waste Disposal Area

The RAC8 Waste Disposal area is located within the part of the Fort Wallace site that is to have an open-space “*non-development landuse*” due to its environmental significance¹⁰⁹. The 2008 contamination investigation (Ref [2]) found buried waste and fill material in the area.

The remediation work involved the excavation of 2,141m³ of material from a 3,899m² area to a maximum depth of 3.2m bgl, with 60 validation samples collected and tested for metals, PAHs, TPH, OCPs, VOCs and asbestos fibres. The excavated material consisted of sand, bricks, concrete, plastic, metal, ACM fragments, horse bones and vegetative matter. The excavation was reported to have been backfilled with imported VENM. The laboratory results were summarised in SMEC

¹⁰⁹ The proposed landuse is shown by SMEC Figure 2 (Ref [7]).



Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria.

SMEC concluded that the Waste Disposal area (RAC 8) had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed open space land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO's for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectible
- The 45 floor validation samples meet the data completeness DQO for a 2,141m² area, since for large excavations the NSW EPA (1995) guidelines recommend a minimum sampling frequency of 8 samples. The 15 wall validation samples were also close to meeting the data completeness DQO for a 2,141m² area
- The laboratory data measured concentrations for the contaminants of concern less than the HIL E and EIL criteria in all validation samples
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 19), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- The excavation pits were backfilled with clean imported VENM, as discussed in **Section 4.4.18**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report



4.4.9 RAC 8a – Waste Disposal Former Training Area

The RAC8a Waste Disposal Former Training area is located within the part of the Fort Wallace site that is to have an open-space “*non-development landuse*” due to its environmental significance¹¹⁰. The 2008 contamination investigation (Ref [2]) found buried waste and fill material in the area.

The remediation work involved the excavation of 1,896m³ of material from a 2,067m² area to a maximum depth of 2.5m bgl, with 32 validation samples collected and tested for metals, PAHs, TPH, OCPs, VOCs and asbestos fibres. The excavated material consisted of sand, bricks, concrete, plastic, metal, ACM fragments and vegetative matter. The excavation was reported to have been backfilled with imported VENM. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria.

SMEC concluded that the Waste Disposal Former Training area (RAC 8a) had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed open space land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectible
- The 32 floor validation samples meet the data completeness DQO for a 1,896m² area, since for large excavations the NSW EPA (1995) guidelines recommend a minimum sampling frequency of 7 samples. The absence of any wall validation samples is not considered to be significant given the results of the floor samples and the fact that the remediation work removed all the buried waste from the area
- The laboratory data measured concentrations for the contaminants of concern less than the HIL E and EIL criteria in all validation samples
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 20), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**

¹¹⁰ The proposed landuse is shown by SMEC Figure 2 (Ref [7]).



- The excavation pits were backfilled with clean imported VENM, as discussed in **Section 4.4.18**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.10 RAC 8b – Surface Waste Disposal

The RAC8b Surface Waste Disposal area is located within the part of the Fort Wallace site that is to have an open-space “*non-development landuse*” due to its environmental significance¹¹¹. The presence of buried waste in the area was identified when remediation works were being conducted at nearby areas RAC 8 and RAC 8a.

The remediation work involved the scraping of 30m³ of material from a 145m² area to a depth of 0.1m bgl, with 2 validation samples collected and tested for metals, PAHs and TPH. The excavated material consisted of sand, bricks and concrete. No backfill was placed in the excavated area due to the shallow depth of the excavation. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria.

SMEC concluded that the Surface Waste Disposal area (RAC 8b) had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed open space land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectable
- The 2 validation samples meet the data completeness DQO for a 145m² area, since for small excavations a minimum sampling frequency of 1 per 72m² was sufficient
- The laboratory data measured concentrations for the contaminants of concern less than the HIL E and EIL criteria in all validation samples

¹¹¹ The proposed landuse is shown by SMEC Figure 2 (Ref [7]).



- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stages 19 & 20), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.11 RAC 9 – Septic Tank

The Septic Tank is located within the Outer Fort, which is part of the Fort Wallace site that has a proposed “*unrestricted landuse*” where the most sensitive land use would be “standard” residential. The Site Auditor recommended the tank be removed and the remaining soils validated in the previous site audit report (Ref [14]) that reviewed the RAP.

The remediation work involved the pumping out of liquids from the tank and their off-site disposal, removal of the tank, breaking up the concrete tank and disposal off-site, excavation and disposal of surrounding sand. SMEC advised that the area affected by these remedial works was approximately 5m² and the volume of soil excavated and disposed was 22m³. The excavated material consisted of sand and concrete. One floor and 4 wall validation samples were collected and tested for metals, PAHs, TPH, OCP and faecal coliforms. Some ACM fragments were also found in the area during the ACM clearance performed by the occupational hygienist from Getek. The excavation was reported to have been backfilled with reworked soil from the area. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria.

SMEC concluded that the RAC9 Septic Tank area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed ‘standard’ residential land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- The samples tested for faecal coliforms were tested nearly 2 weeks after sampling, which exceeded the recommended holding time of 1 day, as previously discussed in **Section 4.3.3**. The Site Auditor considers this deficiency is not a significant matter for the purposes of this



audit since the maximum concentration measured was 13 MPN/g, which is well below the remediation criteria of 1,000MPN/g. Furthermore, these low concentrations are consistent with the septic tank not having been used for many years, during which time organic matter and pathogens would have biodegraded to a large extent

- PID concentrations were non-detectible
- The 1 floor and 4 wall validation samples meet the data completeness DQO for an underground tank
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 22), as discussed in **Section 3.10**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.12 RAC 10a – Demolished Buildings 1, 2 and 21

Buildings 1, 2 and 21 were located within the Outer Fort, which is part of the Fort Wallace site that has a proposed “*unrestricted landuse*” where the most sensitive land use would be “standard” residential. These buildings were demolished by Kane Constructions as part of the building rehabilitation work. The remediation contractor was then engaged to remove the foundations and surface soils impacted by D&B waste, which included ACM fragments.

SMEC advised that the area affected by these remedial works was approximately 1,600m². As previously mentioned in **Section 3.8.2**, the excavated material from the demolished building areas was placed in two stockpiles labelled Kane Demo 1 and 2, which had volumes of 60m³ and 35m³, respectively. The remaining surface soils were then validated by SMEC through the collection of 7 surface samples, which were tested for metals, OCPs and asbestos fibres. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria.



In the validation report¹¹², SMEC advised that the two stockpiles labelled Kane Demo 1 and 2 were screened using an excavator screen tumbler, with the fine sandy fraction placed in one stockpile while the oversize material was placed in another. In a supplementary report¹¹³, SMEC advised that the stockpile containing the oversized fraction was classified as '*Special Waste – Asbestos Waste*' and disposed at an off-site landfill, while the fine sandy fraction was backfilled in the building demolition area. No validation samples were collected of the screened sandy soil but SMEC advised that they inspected the backfilled area and found no evidence of ACM fragments.

SMEC concluded that the RAC10a Demolished Building area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed 'standard' residential land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO's for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectible
- The 7 validation samples meet the data completeness DQO for a 1,600m² area, since for large excavations the NSW EPA (1995) guidelines recommend a minimum sampling frequency of 7 samples.
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples
- SMEC inspected the area and advised that minimal B&D waste was visible in the area and that the risk of ACM being placed back in the area was low
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

¹¹² Section 9.12.2, Ref [7]

¹¹³ Comment 12, Ref [17] (Appendix D)



4.4.13 RAC 10b – Demolished Building 3

Building 3 was located within the Outer Fort, which is part of the Fort Wallace site that has a proposed “*unrestricted landuse*” where the most sensitive land use would be “standard” residential. The building was demolished by Kane Constructions as part of the building rehabilitation work. The remediation contractor was then engaged to remove the foundations and surface soils impacted by D&B waste, which included ACM fragments.

SMEC advised that the area affected by these remedial works was approximately 560m². As previously mentioned in **Section 3.8.2**, the excavated material from the demolished building areas was placed in two stockpiles labelled Kane Demo 1 and 2, which had volumes of 60m³ and 35m³, respectively. The remaining surface soils were then validated by SMEC through the collection of 6 surface samples, which were tested for metals, OCPs and asbestos fibres. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and practically all samples measured concentrations less than the EIL criteria. The exception was sample RAC10BVF1, which measured mercury at 1.46mg/kg (EIL = 1mg/kg).

In the validation report¹¹⁴, SMEC advised that the two stockpiles labelled Kane Demo 1 and 2 were screened using an excavator screen tumbler, with the fine sandy fraction placed in one stockpile while the oversize material was placed in another. In a supplementary report¹¹⁵, SMEC advised that the stockpile containing the oversized fraction was classified as ‘*Special Waste – Asbestos Waste*’ and disposed at an off-site landfill, while the fine sandy fraction was backfilled in the building demolition area. No validation samples were collected of the screened sandy soil but SMEC advised that they inspected the backfilled area and found no evidence of ACM fragments.

SMEC concluded that the RAC10b Demolished Building area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed ‘standard’ residential land use.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectible

¹¹⁴ Section 9.12.2, Ref [7]

¹¹⁵ Comment 12, Ref [17] (Appendix D)



- The 6 validation samples meet the data completeness DQO for a 560m² area, since for large excavations the NSW EPA (1995) guidelines recommend a minimum sampling frequency of 6 samples.
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A in all validation samples and less than the EIL criteria in practically all samples
- The average mercury concentration had a 95% upper confidence limit (UCL) less than the EIL, with the one exceedance having a concentration less than 2.5 times the EILs
- SMEC inspected the area and advised that minimal B&D waste was visible in the area and that the risk of ACM being placed back in the area was low
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.14 RAC 10c – Demolished Building 31

Building 31 was located within the Outer Fort, which is part of the Fort Wallace site that has a proposed “*unrestricted landuse*” where the most sensitive land use would be “standard” residential. The building was demolished by Kane Constructions as part of the building rehabilitation work. The remediation contractor was then engaged to remove the foundations and surface soils impacted by D&B waste, which included ACM fragments.

SMEC advised that the area affected by these remedial works was approximately 1,200m². In the validation report¹¹⁶, SMEC advised that the material had been removed by Kane Constructions prior to SMEC commencing their work at the Site. The remaining surface soils were subsequently validated by SMEC through the collection of 7 surface samples, which were tested for metals, OCPs and asbestos fibres. The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria.

SMEC concluded that the RAC10b Demolished Building area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed ‘standard’ residential land use.

¹¹⁶ Section 9.14.1, Ref [7]



The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO's for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- PID concentrations were non-detectable
- The 7 validation samples meet the data completeness DQO for a 1,200m² area, since for large excavations the NSW EPA (1995) guidelines recommend a minimum sampling frequency of 7 samples.
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples
- SMEC inspected the area and advised that minimal B&D waste was visible in the area and that the risk of ACM being placed back in the area was low
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.15 Bitumen Pavements

The contamination investigation (Ref [2]) and the subsequent delineation sampling (Ref [4]) identified that the deeper older layers of bitumen and underlying soils near the bitumen contact surface sometimes had elevated PAH concentrations. Two additional samples of the older bitumen near the vehicle maintenance area were tested as part of the validation program¹¹⁷. One of these samples measured very high PAH concentrations of 559mg/kg benzo(a)pyrene and 8420mg/kg total PAHs.

SMEC considered¹¹⁸ the risk posed to future users of the Site from the old bitumen to be low since the PAHs appeared to be primarily bound in the asphalt matrix therefore restricting potential exposure pathways. SMEC recommended that the asphalt material be managed using procedures

¹¹⁷ Samples FWVMP1 and FWABP1

¹¹⁸ Section 9.16.1, Ref [7]



and controls specified in a SEMP, which was subsequently prepared by SMEC and which is reviewed in **Section 4.5**.

The Site Auditor considered that the assessment of health risks posed by PAHs in the old bitumen pavement did not meet NSW DECCW requirements and requested¹¹⁹ SMEC address the following issues:

- Does SMEC/WSP consider your risk assessment to meet NSW DECCW requirements, such as those specified in the NSW DEC (2006) site auditor guidelines (Section 4.2.2 & Appendix VII)? If not, does SMEC/WSP propose to provide the Site Auditor with a human health risk assessment that meets NSW DECCW requirements?
- How does SMEC/WSP propose to prevent human contact with the very high PAH levels present in some parts of the asphalt pavement?
- How does SMEC/WSP propose to stop the asphalt pavement from wearing/weathering and releasing asphalt fragments containing high PAH concentrations, which may wash from the area and migrate to down-gradient areas of the site and be available to children?
- If the asphalt pavement is to remain at the site, does SMEC/WSP consider that a security fence needs to be constructed around the asphalt paved areas?

SMEC addressed these concerns by providing the Site Auditor with a pavement condition assessment report dated 9 December 2009 (Ref [19]). The report summarised the results of an investigation into the present condition of the bitumen road pavement at the Fort Wallace site. The scope of work involved:

- A site walkover of existing roads at Fort Wallace
- Photographing roads onsite
- Correlation of observed pavement condition with relevant reference pavements
- Preliminary interpretation of pavement condition

The report concluded that:

- There was a low risk of pavement failure
- The estimated remaining life of the pavements ranged from 2 to 5 years
- Recommended remedial actions included sealing cracks, gaps and potholes.

The Site Auditor considers the available information support the conclusion that the PAH contamination associated with the old bitumen pavement can be managed by means of an SEMP because:

¹¹⁹ Site auditor review dated 2/11/09 (Appendix D)



- The elevated PAHs in the old bitumen pavement appear not to have migrated into surrounding areas and is restricted to the old bitumen and the soil near the bitumen contact surface
- The existing bitumen pavement appears to be providing an adequate cap that has an expected life of 2-5 years
- An SEMP has been prepared by SMEC for managing the bitumen pavement
- The existing bitumen pavements are providing a useful function in terms of facilitating site access and the use of an SEMP avoids the need for the bitumen to be removed in the short to medium term
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report
- The Site Auditor has placed the following comments on the site audit statement:
 - “All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a low risk. Visible and identified ACM fragments, Defence waste and all known UXO waste have been removed from the Site.”*
 - “A pavement investigation report prepared by SMEC (Ref [19]) assessed the bitumen pavements to have a short to medium life of 2 to 5 years, and provided recommendations on maintenance actions for the pavement.”*
 - “The purpose of the EMP is to manage contamination risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services.”*

4.4.16 Stockpile Area

The validation report and supplementary information¹²⁰ documents the remediation and validation work that was undertaken at the main stockpile area that was located at the southern end of the main oval and covered an area of 4,500m². Once the stockpiled waste was removed, SMEC advise that 12 validation samples (FWSA1 – FWSA12) were collected and tested for metals, TPH, PAHs, VOCs and asbestos. The samples were collected on a grid pattern. The area was then graded and regrassed.

The laboratory results were summarised in SMEC Table G (**Appendix B**) and show that all samples measured concentrations less than the HIL A and EIL criteria. SMEC concluded that the

¹²⁰ Section 9.18, Ref [7]; Comment 7, Ref [17]



stockpile area had been remediated and validated to a condition that meets NSW DECCW requirements for the proposed 'standard' residential land use with accessible soils.

The Site Auditor considers the available data support the SMEC conclusion because:

- The remediation and validation data generally meet the DQO's for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- The 12 validation samples meet the data completeness DQO for a 4,500m² area, since for large excavations the NSW EPA (1995) guidelines recommend a minimum sampling frequency of 12 samples
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples
- The area was cleared of ACM fragments by an occupational hygienist from Getex (Stage 6), as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report

4.4.17 Remainder of Site

In the previous site audit report on the RAP (Ref [14]), the Site Auditor recommended that the validation plan needed to consider those areas of the Fort Wallace site where no remediation work was proposed, particularly in the proposed "*unrestricted landuse*" area where the most sensitive land use would be "standard" residential. This is because the sampling strategy used in the Stage 2 investigation used a judgemental approach that did not meet NSW DECC minimum sampling requirements.

The validation report program undertaken by SMEC sought to address this requirement by undertaking a metal detector survey across those parts of the "*unrestricted landuse*" area where remediation work was not performed. The purpose of the survey was to identify buried metal objects in these areas to provide an indication of possible buried waste. The survey involved 1m wide lanes at 10m intervals across these areas, with the locations of the lanes shown in SMEC Figure 9 (**Appendix B**). Information on the survey was provided in **Section 9.15.1** of the



validation report. The survey registered 7 detections, of which 3 were considered to be buried pipes. The other 4 were considered to cover only small areas less than 1m². SMEC concluded that the metal detector survey indicated there was a low risk of significant volumes of buried metallic waste remaining within 0.5m bgl of the “*unrestricted landuse*” area.

SMEC concluded that the remainder of the site was suitable for the proposed land uses. The Site Auditor considers the available data support the SMEC conclusion because:

- The results of the metal detector survey indicated there was a low risk of significant quantities of buried waste remaining in the proposed “*unrestricted landuse*” area
- The remediation and validation data generally meet the DQO’s for documentation completeness, data completeness, data representativeness, data comparability, and data precision/accuracy. Deficiencies identified by the Site Auditor are considered to be of a minor nature
- The validation samples data showed all sample locations (other than the old bitumen) met the HIL A criteria and that practically all samples met the EIL criteria
- The investigation and validation programs indicated that the main cause of contamination at the Fort Wallace site was the burial of waste and the scattering of ACM fragments
- The investigation and validation programs found no evidence of significant contamination caused by the spraying of OCPs, spillage of petroleum hydrocarbons or solvents or other liquid chemicals, leaching of contaminants into the undisturbed natural soils
- An extensive ACM clearance program was undertaken at the Site, as discussed in **Section 3.10**
- The Site Auditor inspected the Site and found no evidence of waste or any physical sign of contamination remaining in the area. Photographs showing the final condition of remediated areas are provided in **Appendix C**
- An SEMP has been prepared by SMEC to provide ongoing management of unknown waste materials remaining at the Site. A review of the SEMP is provided in **Section 4.5**
- The Site Auditor has made the suitability of the Site for its intended uses conditional on future owners following the SEMP and recommendations made in the pavement condition report



4.4.18 Imported Backfill

The validation report¹²¹ provides information on the VENM fill material that the remediation contractor imported to the Fort Wallace site for backfilling excavations. Details on the imported material have previously been reviewed in **Section 3.9.1**. This section reviews the results of laboratory tests taken on samples of the imported fill.

The validation report advises that one source of imported fill was used, this being the Boral Sand Quarry at Stockton. From this location some 6,300 tonnes were sourced. A total of 15 samples were taken to validate the imported soil (STVENM1 – STVENM15), with a summary of the laboratory data provided in Appendix G of the validation report (**Appendix B**). All samples were tested for metals, TPH, BTEX, OCPs, PCBs and asbestos fibres.

All soil samples measured concentrations less than the HIL A and EIL criteria with non-detectible concentrations recorded for practically all analytes, the only exception being arsenic that was measured at concentrations of between 2 and 3mg/kg. Metal concentrations were also low and consistent with typical background concentrations given in the NEPM (1999) guidelines.

SMEC concluded that the imported fill material meets NSW DECCW requirements for imported fill material and for use at the Fort Wallace site where the most sensitive land use is ‘standard’ residential (NEPM A).

The Site Auditor considers the available data support this conclusion because:

- The imported soils came from a sand quarry that had no history of contaminating activities and where VENM materials were being excavated and which had a low risk of contaminated
- The 15 validation samples was close to meeting the data completeness DQO for a 6,300 tonnes of VENM
- The laboratory data measured concentrations for the contaminants of concern less than the HIL A and EIL criteria in all validation samples
- Validation samples collected and tested by SMEC verified the imported soils were clean VENM
- The Site Auditor inspected the fill material on several occasions during the remediation works and confirms that the imported material was consistent with the material description given in the validation report and no physical evidence of soil contamination was observed, as shown by photographs in **Appendix C**.

¹²¹ Section 9.17, Ref [7]



4.5 Review of SEMP

In the validation report¹²², SMEC recommended that a Site Environmental Management Plan (SEMP) be prepared to provide ongoing management controls for:

- Known contamination remaining in PAHs in the bitumen road pavement
- Fill material
- Hazardous building materials that remain in structures, some of which are heritage protected
- Unknown contamination that requires an '*unexpected findings protocol*' to be followed
- Buried services some of which are constructed from ACM

The Site Auditor considers that an SEMP was an appropriate means of managing these issues because:

- DECCW guidelines¹²³ consider that an environmental management plan can be an effective means of ensuring the environment is protected, users of the site are not exposed to contamination remaining on-site and the site remains suitable for the specified use when complete clean-up of contamination affecting an area is not practicable
- SMEC concluded (Refs [7] & [17]) that the elevated PAHs in the bitumen road pavement posed a low risk to future users of the Site while the road pavement remained intact. An SEMP was required to identify the presence of the elevated PAHs, provide ongoing management controls so that the integrity of the bitumen pavement could be maintained, and allow future disturbance of the pavement to be managed
- A road pavement assessment issued by SMEC on 9 December 2009 (Ref [19]) concluded that the bitumen road pavement was presently in a reasonable condition. Furthermore, the road pavement was providing a useful means of site access and the removal of the bitumen pavement would be an unnecessary expense to Defence
- The Site is reasonably large (31.78ha) and has a long history of use by Defence. This means that it is not reasonable to assume that no unknown contamination or waste material remains at the Site. The Site Auditor considers that sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment
- Hazardous building materials that remain in structures at the Site do not pose a soil contamination risk while the materials remain intact and contained in the structure. An

¹²² Section 10.2, Ref [7]

¹²³ Section 3.4.6, DECC (April 2006)



SEMP is an appropriate means to identify the presence of these materials in structures at the Site, provide ongoing management controls so that the integrity of these materials could be maintained, and allow future disturbance of the pavement to be managed

- Removal of all hazardous building materials that remain in structures at the Site was not possible since some of the structures were heritage listed, some of the structures may be used in the future, and the removal at these structures would be an unnecessary expense to Defence
- An SEMP is an appropriate way for notifying future owners of the possible presence of unknown contamination and/or waste materials remaining at the Site and provides a mechanism for managing these risks by means of an '*unexpected findings protocol*'
- Buried services constructed from ACM that remain at the Site do not pose a soil contamination risk while the services remain buried and undisturbed. An SEMP is an appropriate means to identify the presence of these materials in structures at the Site, provide ongoing management controls so that the integrity of these materials could be maintained, and allow future disturbance of these services to be managed
- Deficiencies in the remediation and validation work identified in **Sections 3 and 4** can be addressed by means of the information and controls provided by the SEMP.

The SEMP was prepared by SMEC and subject to review by the Site Auditor and key stakeholders such as the Department of Defence and Newcastle City Council (NCC). The chronology of the review process was:

- 4 August 2009: First draft version of the SEMP was prepared by SMEC
- 9 September 2009: A copy of the first draft of the SEMP was provided to the Site Auditor
- 9 September 2009: The Site Auditor provided detailed review comments in the form of a revised draft of the SEMP (**Appendix D**)
- 10 September 2009: The Site Auditor issued a draft site audit statement (SAS) and draft SEMP to NCC (Daniel O'Brien) and Defence for their review and comment (**Appendix D**)
- 22 September 2009: Review comments were provided by the Defence appointed PM (**Appendix D**)
- 24 September 2009: Review comments were provided by NCC (Daniel O'Brien) (**Appendix D**)
- 28 October 2009: The Site Auditor provided additional review comments to SMEC on the SEMP (Comments 9 & 10), which addressed earlier comments received from NCC (**Appendix D**)
- 3 December 2009: Recommendations for a UXO "*unexpected findings protocol*" were provided in a letter from Gibson Nominees (Ref [18]) who were the Department of Defence accredited UXO-specialist for the project (**Appendix D**)



- 9 December 2009: A pavement inspection report was issued by SMEC (**Appendix E**)
- 9 December 2009: A revised version of the SEMP was prepared by SMEC and provided by the Defence-appointed PM
- 21 December 2009: Additional review comments were provided by the SKM Site Auditor on the SEMP (**Appendix D**)
- 22 December 2009: A final version of the SEMP was provided by SMEC (Ref [8]) and attached to the SAS (**Appendix E**)

The Site Auditor considers the SEMP attached to the SAS has been reviewed by the Site Auditor and stakeholders consistent with the recommendations provided by the DECCW in their April 2006 *“Guidelines for the NSW Site Auditor Scheme”*¹²⁴.

The SEMP provided by SMEC stated¹²⁵ that its objective was to provide a process for safely managing:

- Materials known to be affected by low levels of residual contaminants in shallow soils, deeper soils and groundwater at the site;
- Potential hazardous building materials associated with heritage buildings and structures;
- Potential ACM in above ground and below ground services remaining on site;
- Beneficial re-use of groundwater from the site; and
- Unexpected, potentially harmful materials encountered in the future.

The SEMP provided information on:

- Purpose
- Background information
- SEMP objective
- Limitations
- Roles and responsibilities for site management staff, contractors, subcontractors and occupants
- Site conditions and information on materials to be managed
- Management procedures and control measures
- A figure that clearly shows each of the land uses stated in Section A of the SAS
- A figure that shows site management areas¹²⁶

¹²⁴ Sections 3.4.5 & 3.4.6, DEC (April 2006)

¹²⁵ Section 1.3, Ref [8]



- An asbestos register

Management procedures and controls were provided¹²⁷ for the following known materials/areas:

- Road asphalt (containing elevated PAHs)
- Underground services constructed of ACM
- Above ground structures containing hazardous building materials (eg. lead paint and ACM)
- Groundwater
- A small incinerator that may contain asbestos

Management procedures and controls were provided¹²⁸ for the following areas containing fill and/or B&D waste:

- Terraced area fill
- Oval fill
- Heritage area and B&D waste
- B&D waste (general)

Management procedures and controls were provided¹²⁹ for the following unknown materials that may be unexpectedly found at the Site:

- ACM fragments
- Defence-related waste
- UXO

The SEMP also advised that:

- It did not provide detailed Safe Work Method Statements (SWMS), Occupational Health and Safety (OH&S) Plans or Construction Work Method Statements
- It was limited to known contamination management issues and did not cover any other general environmental management requirement that may apply to the Site
- It must be referenced when a change in landuse is proposed and when planning or conducting activities at the site that may disturb the existing ground surface and/or buildings and structures.

¹²⁶ These areas comprise building and demolition waste, gravel road, heritage area buildings and demolition waste, oval fill, asphalt roads and terrace area fill

¹²⁷ Table 3, Ref [8]

¹²⁸ Table 4, Ref [8]

¹²⁹ Table 5, Ref [8]



The Site Auditor considers these objectives and the plan meet the requirements of the DECCW as specified in their April 2006 “*Guidelines for the NSW Site Auditor Scheme*”¹³⁰.

The Site Auditor considers the SEMP addresses the recommendations made in the earlier site audit report dated 17 September 2008 (Ref [14]), as previously discussed in **Section 1.4.3**. The SEMP:

- Places a restriction on the extraction of large quantities of groundwater from the southern end of the Site that lies adjacent to a sewage treatment plant operated by the Hunter Water Corporation
- Includes an “*Unexpected Findings Protocol*” in order to manage the small risk of finding presently unknown UXOs, ACM or small pockets of waste material
- Provides procedures and controls for the ongoing management of waste and/or infrastructure (both above and below ground) containing hazardous building materials in “*non-development landuse*” areas of the Site.

The SEMP does not include a requirement for Defence to sponsor a UXO-specific advice and public education program prior to the commencement of any new development works at the Fort Wallace property, as recommended in the 2006 UXO study by Gibson Nominees (Ref [12]). The Site Auditor considers this omission is appropriate given that a recent UXO assessment provided by Gibson Nominees on 3 December 2009 (Ref [18]) recommended that this requirement be dropped given that remediation works have been completed at the Site and an SEMP has been prepared for the ongoing management of the Site.

The Site Auditor considers the SEMP provides a suitable basis for managing known and unknown contamination risks at the Fort Wallace site.

¹³⁰ Section 3.4.6, DEC (April 2006)



5. Other Relevant Information

This Site Audit Report and the accompanying Site Audit Statement relates to the Fort Wallace site at Lot 1 DP 547183, Fullerton Street, Stockton and has been prepared in accordance with the Contaminated Land Management Act 1997. Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

The audit report and statement have been prepared for the Department of Defence for the purposes nominated in the audit report. It is acknowledged that the audit report and statement may be used by Newcastle City Council and the NSW DECCW in reaching their conclusions about the Site. The scope of work performed in connection with the audit review may not be appropriate to satisfy the needs of any other person. Any other person's use of, or reliance on, the audit report and statement, or the findings, conclusions, recommendations or any other material presented in them, is at that person's sole risk.

The audit was, and this report is, limited by and relies on the scope of work undertaken for this audit, the information made available to the Site Auditor by the Department of Defence and their consultants SMEC through the documents provided to us, and also on our observations of the Site made during the audit period. The Site Auditor has taken this information to represent a fair and reasonable characterisation of the status of the land. Whilst all reasonable care has been taken, to the extent practical under normal auditing procedures, to assure adequacy of the information, the Site Auditor and SKM cannot warrant that this is the case. If the information is subsequently determined to be false, inaccurate or incomplete, it is possible that the Site Auditor's conclusions, as expressed in the audit report and statement may change.

This Site Audit applies to the condition of the Site at the time the last assessment was undertaken by SMEC in December 2009. The Site Auditor and SKM cannot be responsible for future activities that may result in changes to the site conditions. In the event that site conditions have since changed or are likely to change in the future, the Site Auditor recommends that the property owner engage an environmental consultant to confirm that the Site is being properly maintained for its proposed land use/s.

It must also be recognised that sub-surface conditions, including groundwater levels and contaminant concentrations, can change in a limited time. This should be borne in mind if the audit report and statement is used after a protracted delay.

There are always some variations in sub-surface conditions across a site that cannot be fully defined by investigation. No investigation, in practice, can be thorough enough to preclude the presence of materials on the subject property that presently, or in the future, may be considered



hazardous. Hence it is possible that the measurements and values obtained from the sampling and testing presented do not represent the extremes of conditions which exist within the site.

Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable at the time of this audit report and statement, may in the future become subject to different regulatory standards and require reassessment.

It is not possible in a Site Audit Report to present all data that could be of interest to all readers of this report. Readers are therefore referred to the referenced documentation for further data.

Yours faithfully

A handwritten signature in blue ink, reading 'Ian C Swane', is shown. The signature is fluid and cursive, with a horizontal line drawn underneath the name.

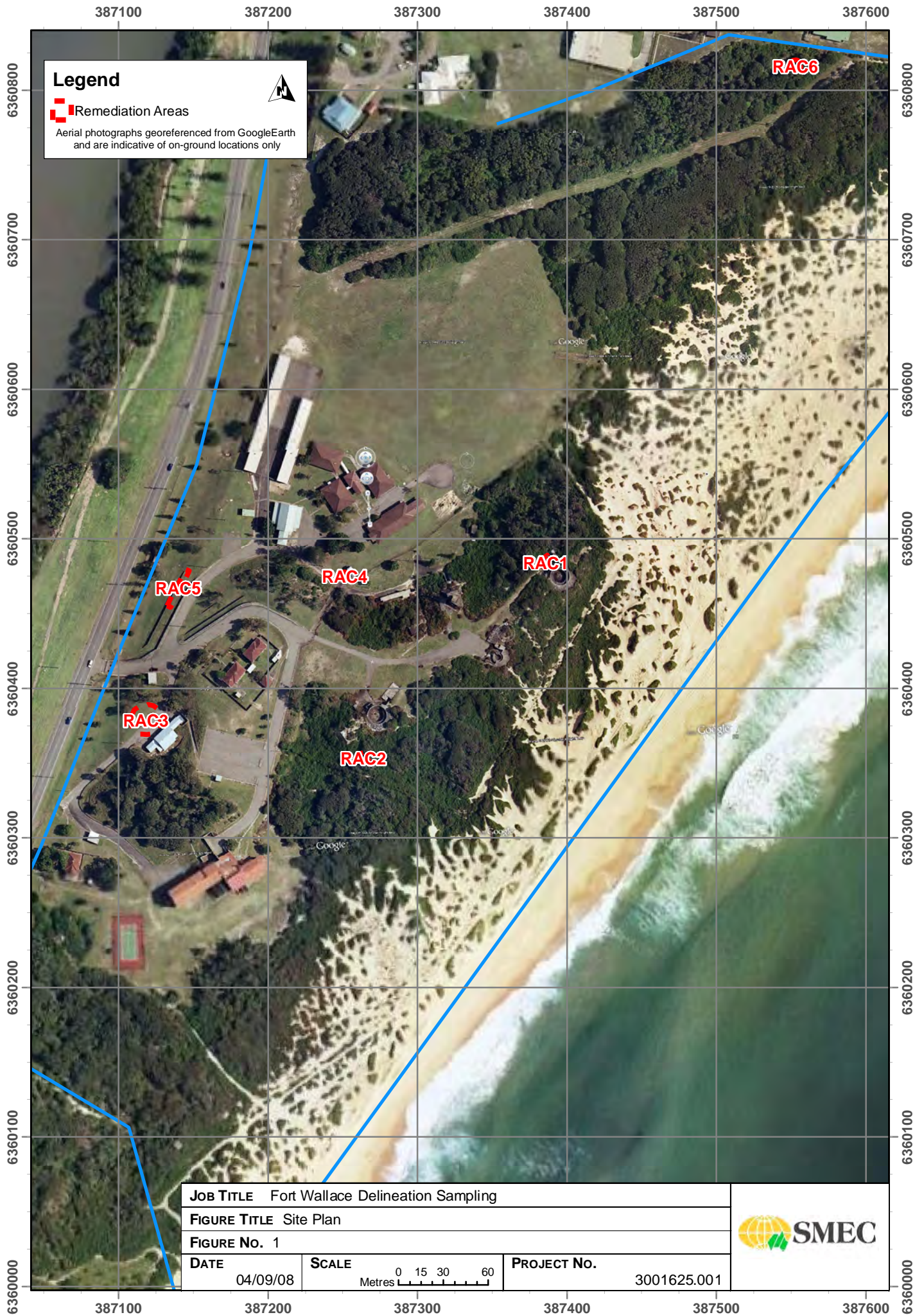
Dr Ian C Swane (CPEng)

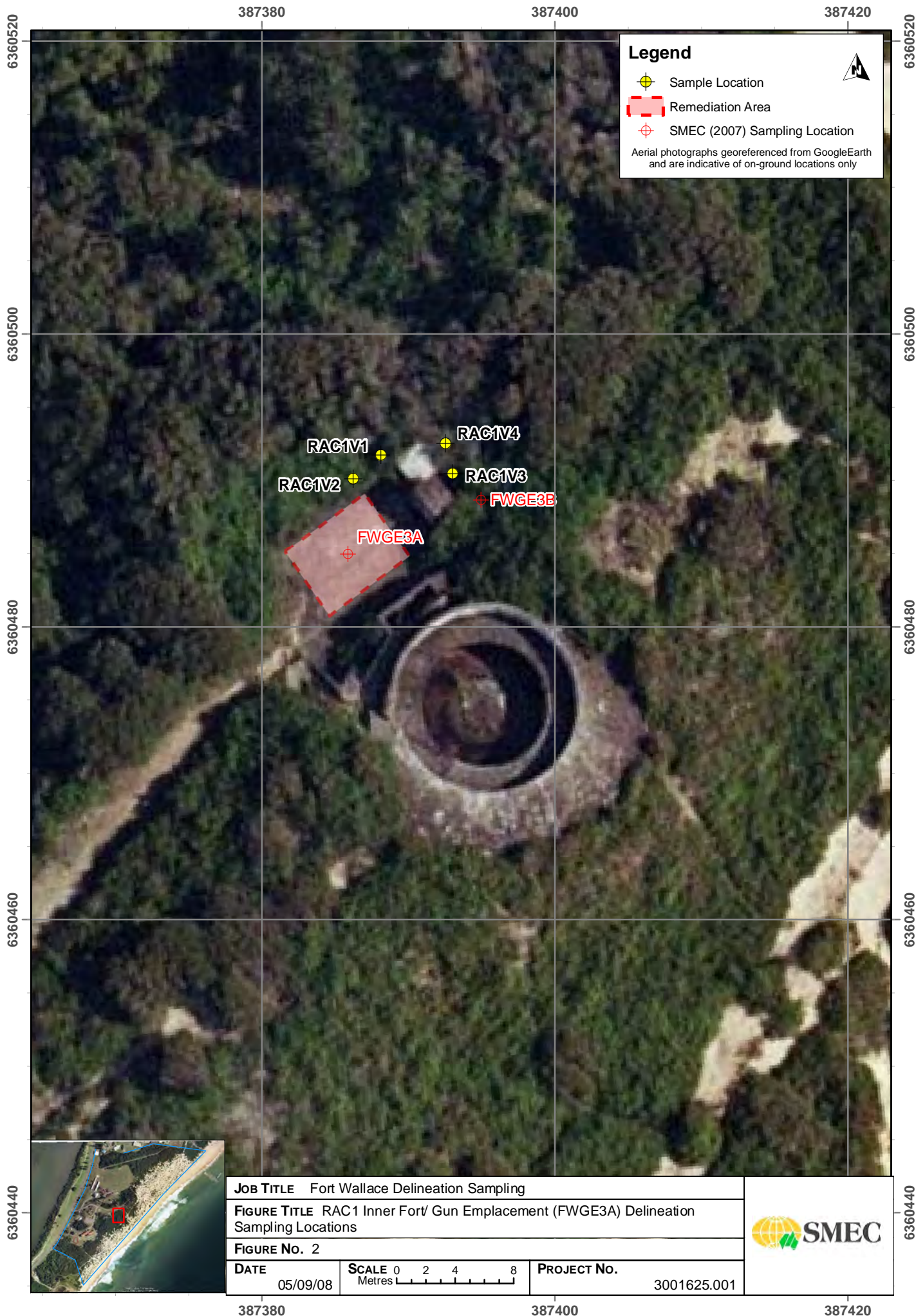
NSW DECCW & WA DEC Site Auditor

QLD DERM Third Party Reviewer



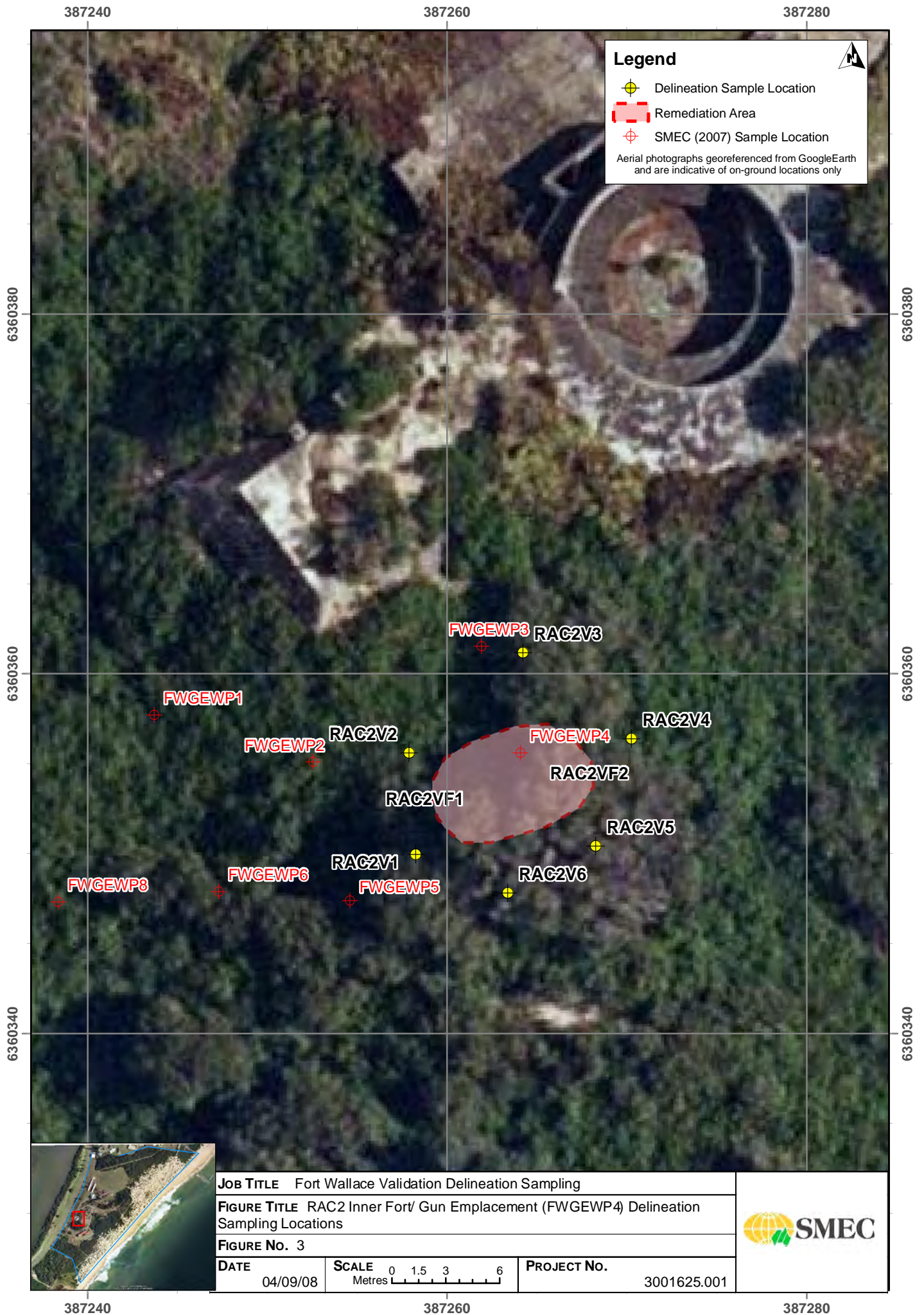
Appendix A Figures & Tables from Delineation Sampling Report



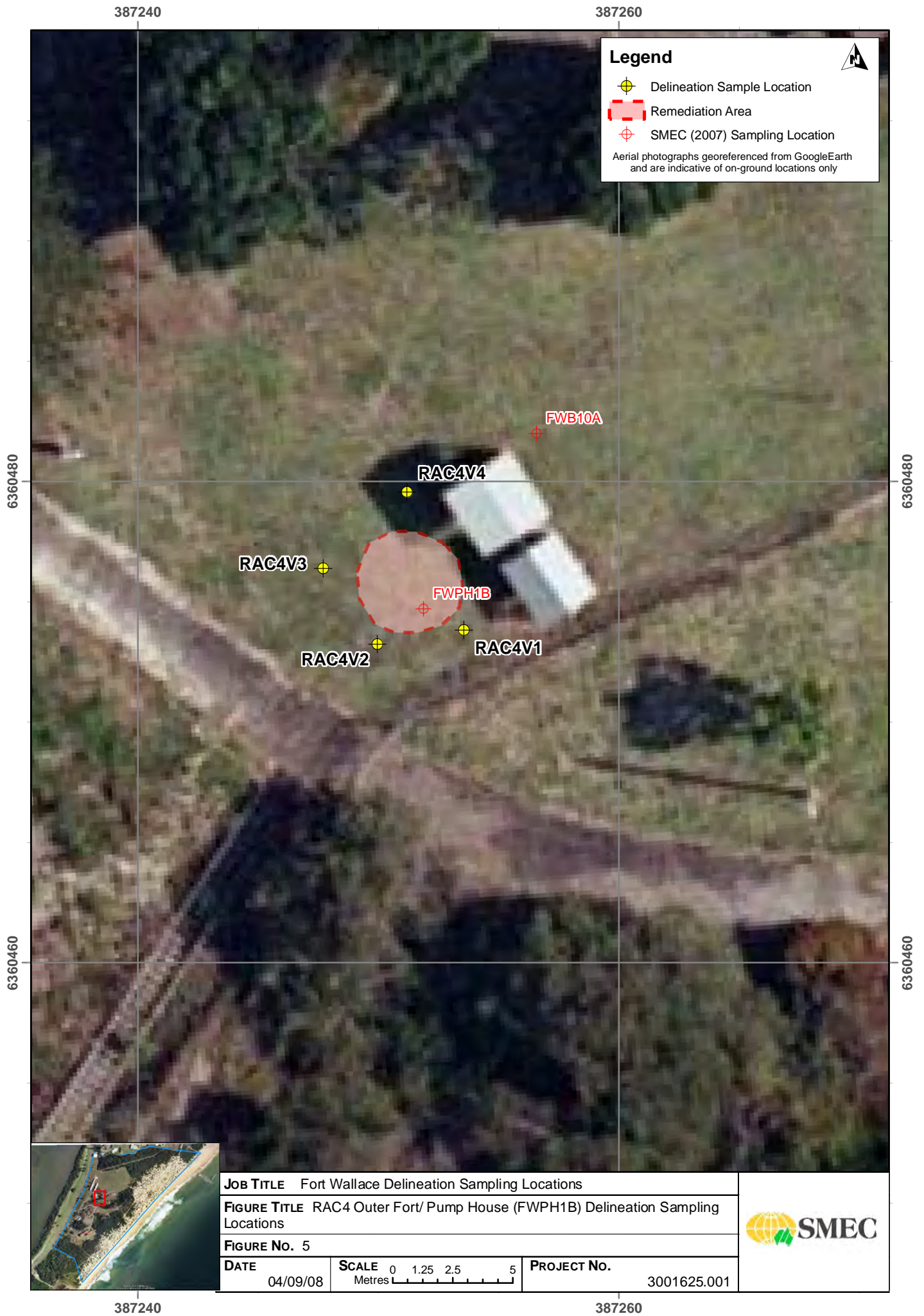


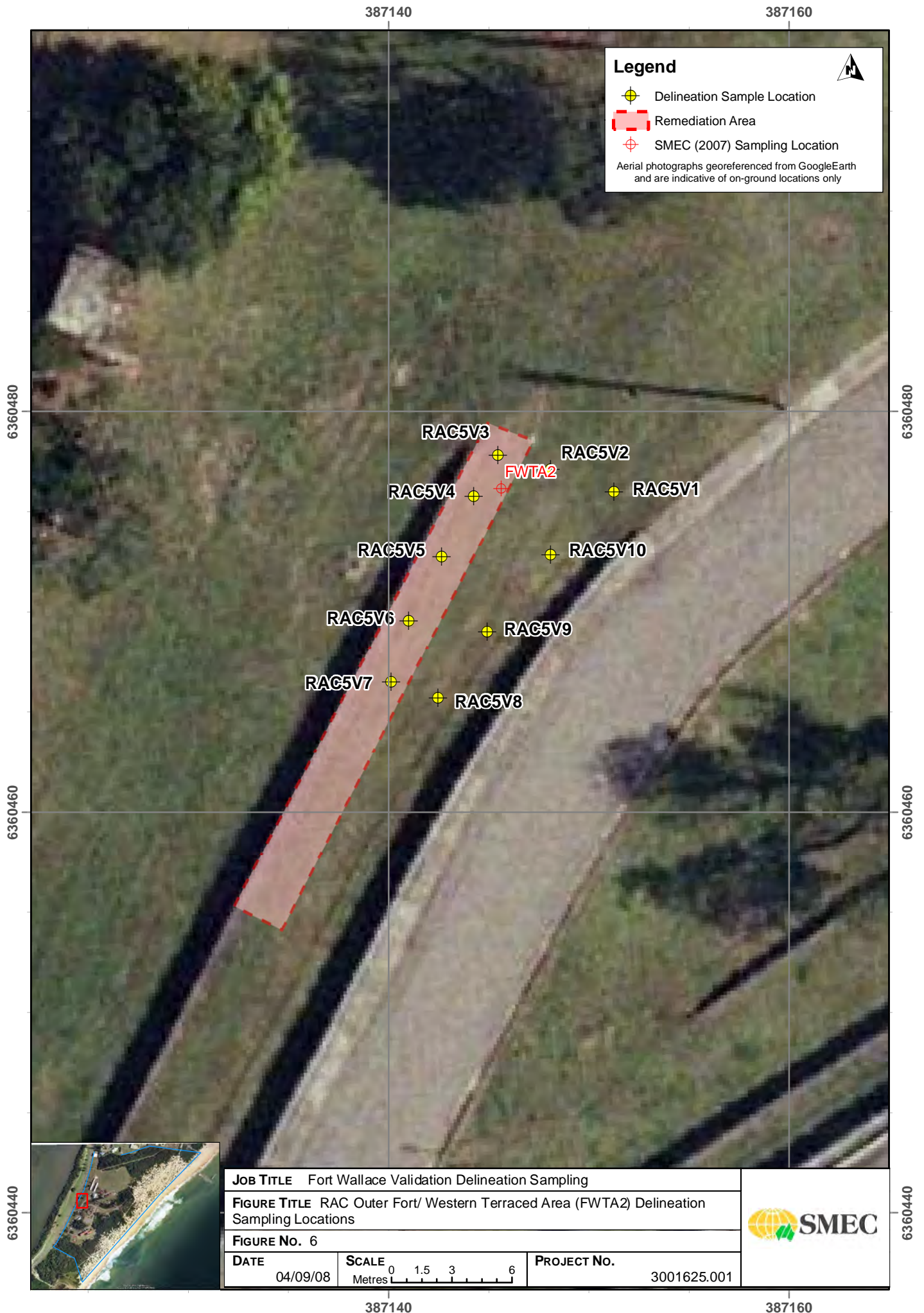
Job Title Fort Wallace Delineation Sampling		
Figure Title RAC1 Inner Fort/ Gun Emplacement (FWGE3A) Delineation Sampling Locations		
Figure No. 2		
Date05/09/08	Scale0 2 4 8Metres	Project No.3001625.001













FORT WALLACE DELINEATION - SUMMARY RESULT TABLE

SAMPLE DEPTH		Metals										PAH/Phenols														
		Arsenic	Cadmium	Chromium (total)	Copper	Lead	Mercury	Nickel	Zinc	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(b)&(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Pyrene		
EQOL		1	0.1	1	2	2	0.05	1	5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
NEPM 1999 HIL A		100	20	100	1000	300	15	600	7000					1								20				
NEPM 1999 HIL E		200	40	200	2000	600	30	600	14000					2								40				
Full data set for relevant RACs, depths (ie. 0 - 0.2m) and contaminants of concern																										
RAC1		5	0.1	3	8	129	<0.05	2	145	<0.5	<0.5	0.83	4.6	17	4.2	3.6	1	10.5	<0.5	3.5	<0.5	53.4	4.9	10.3		
0.1		FWGE3A	12	0.2	2	7	95	0.59	2	71	<0.5	<0.5	<0.5	0.8	1	2	0.7	0.8	<0.5	2.3	<0.5	11.4	1.2	2		
0.1		RAC1v.1-0.1	6	1.4	25	91	809	0.28	10	3870	<0.5	<0.5	0.5	1.7	2.9	5	1.9	2	<0.5	5.2	<0.5	1.8	<0.5	2.5	4.8	
0.1		RAC1v.2-0.1	5	0.3	7	15	155	0.35	4	259	<0.5	<0.5	<0.5	<0.5	0.6	1	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	4.7	0.5	1	
0.1		RAC1v.3-0.1	2	0.1	4	15	85	0.09	1	153	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	0.7	<0.5	<0.5	1.3	<0.5	0.6		
0.1		RAC1v.4-0.1	2	0.5	21	24	229	0.43	4	1530	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	0.9	<0.5	<0.5	1.7	<0.5	0.8		
RAC2		1	0.1	2	5	16	<0.05	1	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.2		FWGEWP1	2	0.3	6	13	78	0.89	1	283	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	10	<0.5	<0.5		
0.2		FWGEWP2	<1	<0.1	<1	2	<2	<0.05	<1	7	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	10	<0.5	<0.5		
0.2		FWGEWP3	2	0.3	7	10	2760	0.36	1	187	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	10	<0.5	<0.5		
0.1		FWGEWP4	2	<0.1	1	<2	2	<0.05	<1	6	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
0.1		FWGEWP5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.2		FWGEWP6	2	0.2	7	12	60	0.11	2	162	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
RAC3		16	0.3	8	35	562	<0.05	4	380	0.6	2.4	3.6	14.8	19.9	32	20.3	15.2	4.8	44.7	1	16.6	<0.5	236.1	17.2	43	
0.1		RAC3v.1-0.1	3	<0.1	8	10	14	<0.05	7	36	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	1.2	<0.5	0.6	
0.1		RAC3v.2-0.1	2	0.2	5	15	46	0.08	4	80	<5	<5	<5	10.3	21.1	29	16.3	15.3	<5	42.2	<5	12.4	<5	207.9	19.4	41.9
0.1		RAC3v.3-0.1	3	0.3	14	19	44	0.12	14	88	<0.5	0.7	1.6	6.1	8.3	12	5.3	6.7	1	24.6	0.5	4.8	<0.5	105	11.6	21.8
0.1		RAC3v.4-0.1	5	0.9	16	166	225	0.18	13	240	<0.5	1.2	1.9	7.5	10.2	18	6.9	8.9	1.4	23.9	<0.5	6.6	0.5	117.7	8.9	21.8
0.1		RAC3v.5-0.1	4	0.1	7	13	17	0.1	3	48	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	
RAC4		1	0.2	4	14	78	<0.05	<0.1	143	<0.5	<0.5	1.3	3.6	4.3	7	3.7	3.4	0.9	13.8	0.6	2.9	<0.5	63.9	9.9	12.5	
0.1		FWPH1B	2	0.2	8	12	153	<0.05	1	188	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.2		FW810A	1	0.2	2	7	22	0.07	1	61	<0.5	<0.5	<0.5	0.7	1	2	0.5	1	<0.5	<0.5	<0.5	<0.5	11.5	1	2.3	
0.1		RAC4v.1-0.1	1	0.1	2	6	12	0.07	1	49	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	1.7	<0.5	0.8	
0.1		RAC4v.2-0.1	2	0.5	7	20	47	0.08	7	163	<0.5	<0.5	<0.5	0.7	1.1	2	0.6	0.9	<0.5	2.4	<0.5	0.6	<0.5	11.9	1.2	2.4
0.1		RAC4v.3-0.1	1	0.3	5	18	43	0.08	4	112	<0.5	<0.5	<0.5	1.1	1.6	3	0.9	1.3	<0.5	4	<0.5	0.8	<0.5	18.8	2.4	3.7
RAC5		2	<0.1	4	4	5.5	<0.05	3.5	17.5	<0.5	<0.5	0.5	1.15	1.35	2	1	1.25	<5	3.4	<0.5	0.9	<0.5	15.7	1.35	3.1	
0.2		FWTA2	2	<0.1	8	9	16	0.07	8	31	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	
0.1		RAC5v.1-0.1	2	<0.1	9	8	8	0.07	9	27	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	
0.1		RAC5v.2-0.1	2	<0.1	6	8	16	0.05	5	23	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	
0.1		RAC5v.3-0.1	2	0.1	5	6	6	0.05	4	18	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	0.6	
0.1		RAC5v.4-0.1	2	<0.1	5	6	6	0.07	4	25	0.6	<0.5	1	1.5	2.1	3	1.1	1.8	<0.5	5.1	<0.5	1	<0.5	25.1	3.5	4.4
0.1		RAC5v.5-0.1	2	<0.1	7	6	6	0.05	5	24	<0.5	<0.5	<0.5	<0.5	<0.5	2	1	1.3	<0.5	3.3	<0.5	0.9	<0.5	15.1	1.3	2.8
0.1		RAC5v.6-0.1	2	<0.1	5	7	6	0.08	5	22	1.6	<0.5	2.5	4.2	5.3	8	2.8	5.1	0.7	15.7	0.7	2.6	<0.5	70.1	9	11.9
0.1		RAC5v.7-0.1	2	<0.1	4	8	5	0.07	4	21	<0.5	<0.5	<0.5	<0.5	0.9	1.2	0.9	1.1	<0.5	2.7	<0.5	0.7	<0.5	13.2	1.3	2.4
0.1		RAC5v.8-0.1	2	<0.1	3	9	4	0.05	2	18	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	
0.1		RAC5v.9-0.1	2	<0.1	4	10	5	0.07	5	28	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	
0.1		RAC5v.10-0.1	4	<0.1	8	10	5	0.07	5	28	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	

		Metals										PAH/Phenols														
SAMPLE DEPTH	SAMPLE ID	Arsenic	Cadmium	Chromium (total)	Copper	Lead	Mercury	Nickel	Zinc	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)&(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Pyrene	
EQI		1	0.1	1	2	2	0.05	1	5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
NEPM 1999 HIL A		100	20	100	1000	300	15	600	7000					1										20		
NEPM 1999 HIL E		200	40	200	2000	600	30	600	14000					2										40		
Full data set for relevant RACs, depths (ie. 0 - 0.2m) and contaminants of concern																										
RAC6	0.1	FW37A	1	0.2	3	11	98	<0.05	1	87	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	1.9	0.5	0.6
	0.1	FW37B	7	0.3	5	17	548	0.07	3	223	<0.5	<0.5	0.6	2.4	3.2	2.7	2.4	0.5	6.6	<0.5	<0.5	2.2	<0.5	34.6	2.4	6.6
	0.1	RAC6v.1-0.1	<1	<0.1	<1	11	<2	<0.05	<1	<5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	
	0.1	RAC6v.2-0.1	<1	0.1	<1	12	41	0.07	<1	58	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	
	0.1	RAC6v.3-0.1	<1	0.2	2	13	75	0.08	1	119	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	1.2	<0.5	0.6	
	0.1	RAC6v.4-0.1	1	0.4	6	14	173	0.15	4	237	<0.5	<0.5	<0.5	1.3	2.3	3	1.6	1.7	<0.5	4.6	<0.5	1.3	<0.5	22	2.1	4.1
	0.1	RAC6v.5-0.1	<1	0.2	2	15	41	0.18	2	101	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	
	0.1	RAC6v.6-0.1	<1	0.3	2	16	22	0.13	1	68	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	

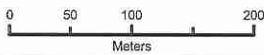


Appendix B Figures & Tables from Validation Report



DATE 21/09/2009

SCALE 1:8,500



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 1

FIGURE TITLE Site Location Plan

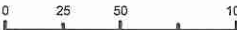
CREATED BY B. Stewart


LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.




DATE 21/09/2009		SCALE 1:4,500				COORDINATE SYSTEM MGA 94 Zone 56	
PROJECT NO. 3001625.001		PROJECT TITLE Fort Wallace Remediation Validation					
FIG NO. 2		FIGURE TITLE Site Plan					
CREATED BY B. Stewart		LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09					

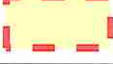
**SMEC**

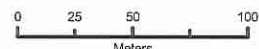
Copyright - City2See.com
Aerial Photography Licensed by Sindair Knight Merz Pty Ltd.



LEGEND

 Site Boundary

 Remediation Area

DATE 21/09/2009	SCALE 1:4,500		COORDINATE SYSTEM MGA 94 Zone 56
PROJECT NO. 3001625.001	PROJECT TITLE Fort Wallace Remediation Validation		
FIG NO. 3	FIGURE TITLE Remediation Areas		
CREATED BY B. Stewart	LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09		



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



LEGEND

Fort Wallace Site

Stockton Beach

Hawks Nest

Boyces Track

Landscape: Beaches and unstable dunes of Quaternary Holocene sand on Tomago Coastal Plain.

Soils: Deep (>200cm) well to poorly drained Solonchaks/Calcareous Sands (Uc1.1) on beaches, with deep (>200cm) very well-drained Calcareous Sands (Uc1.21) on dunes.

Landscape: Low Holocene sand sheets and low transgressive dunes on the Tomago Coastal Plain. Local relief <3m, slope gradients <10%, elevation 3 -12m. Dry scrubland, woodland and tall open forest.

Soils: Deep (>300cm) well drained Podzols (Uc2.3) and Siliceous Sands/Podzols (Uc2.21) on dunes, deep (>200cm), poorly drained Humus Podzols (Uc5.1) on sand sheets.

Landscape: Steep Quaternary Holocene sand dunes on the Tomago Coastal Plain. Local relief 10-30m, slopes <25%, elevation 10 -40m. Uncleared tall open-forest.

Soils: Deep (>300cm) well-drained weakly developed Podzols (Uc2.2).

DATE 21/09/2009

SCALE Not to Scale

PROJECT NO. 3001625.001

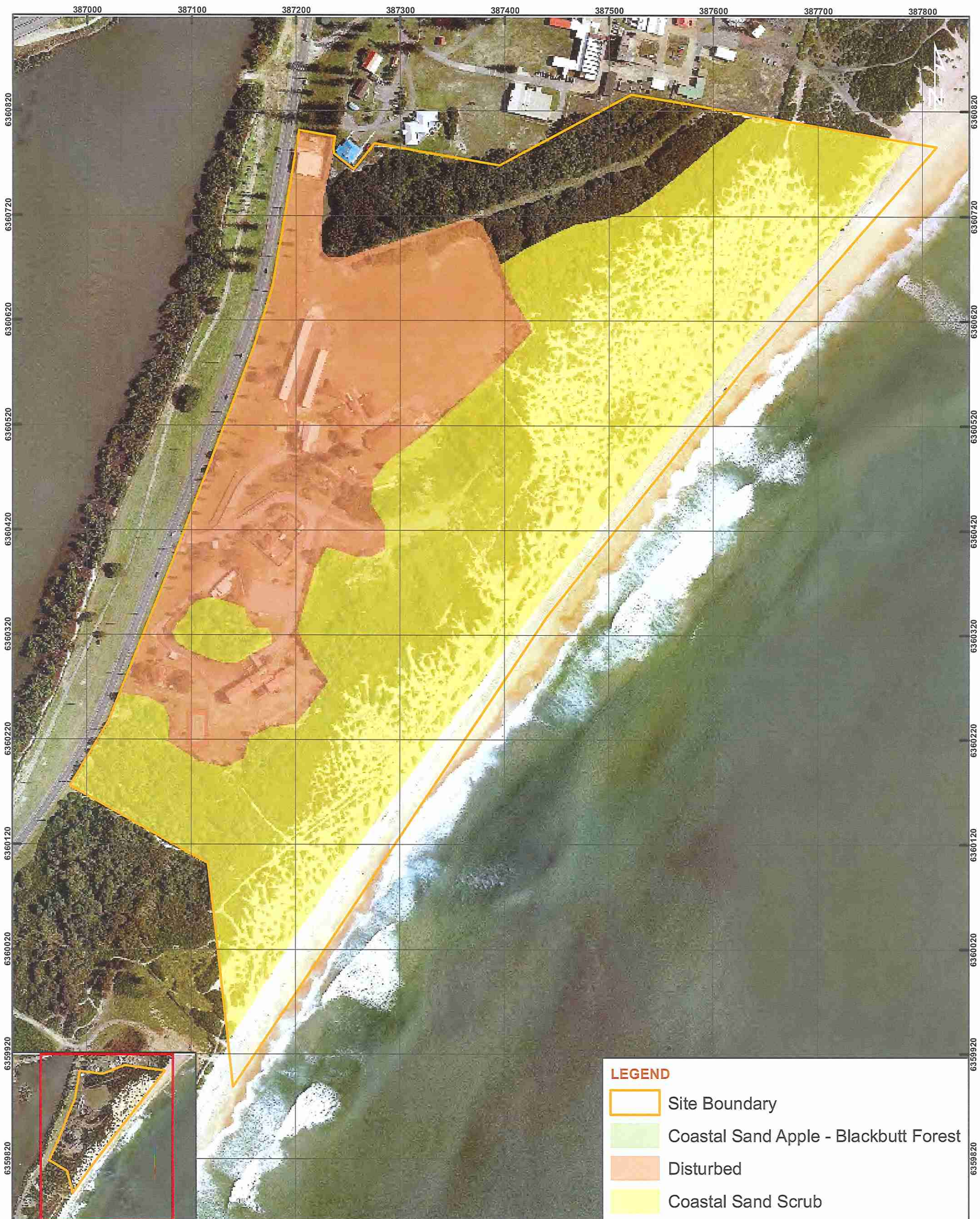
PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 4

FIGURE TITLE: Geological Overview

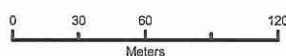
CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\ EandP\Cassie\Projects\Stockton\Remediation Validation May 09



DATE 21/09/2009

SCALE 1:4,700



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 5a

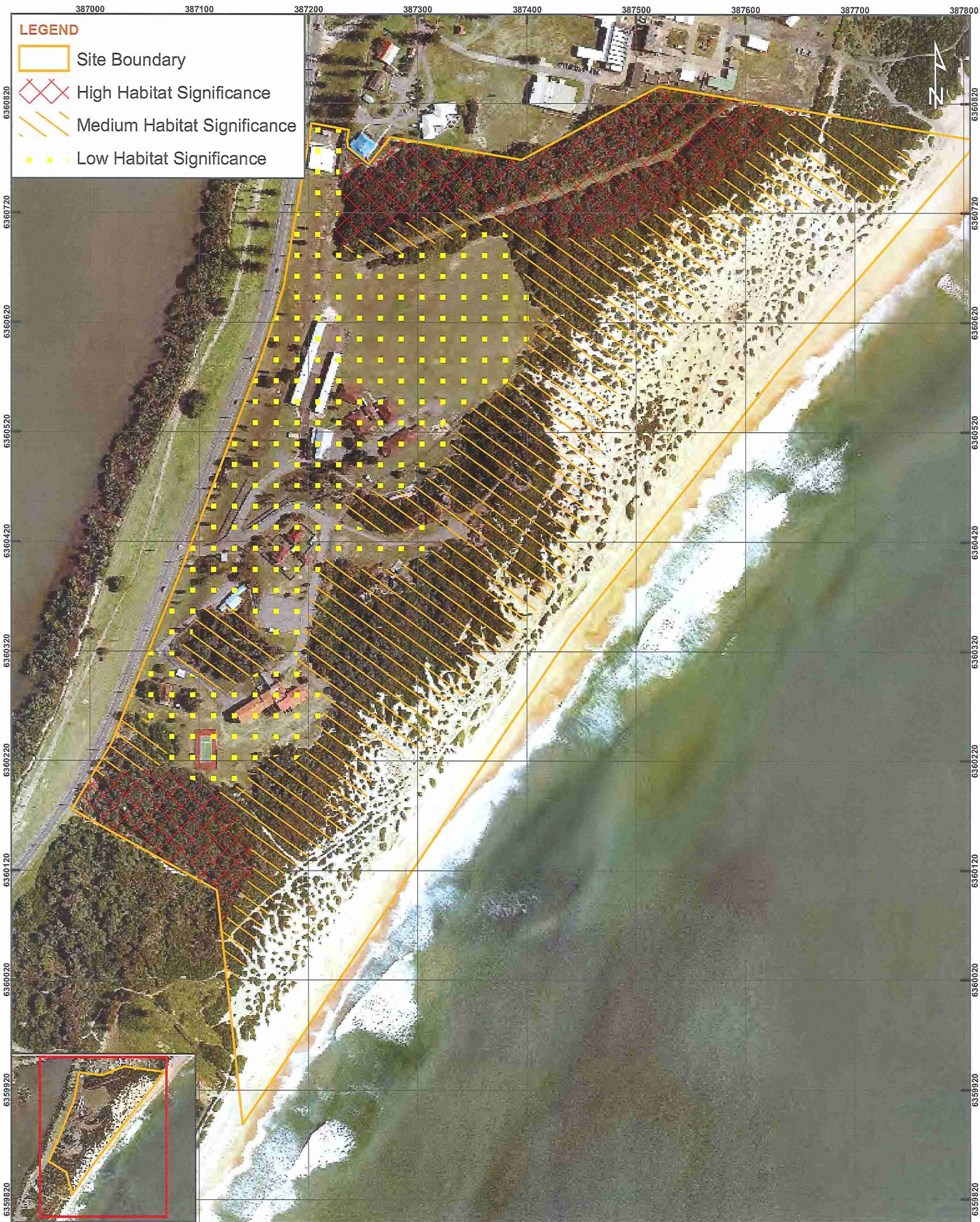
FIGURE TITLE Vegetation Communities

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09

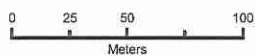


Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:4,500



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 5b

FIGURE TITLE Habitat Significance

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09



Copyright - City2See.com
Aerial Photography Licensed by Sindair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE Not to Scale

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 6a

FIGURE TITLE The Fern Bay Complex of Archeological and Cultural/Historical Sites
Source: (GML 2007)

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09





DATE 21/09/2009

SCALE Not to Scale

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 6b

FIGURE TITLE Archeological Sensitivity Plan for Fort Wallace
 Source: (GML 2007)

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May09





DATE 21/09/2009

SCALE Not to Scale

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 6c


FIGURE TITLE Levels of Historic Significance
Source: (GML 2007)


CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09







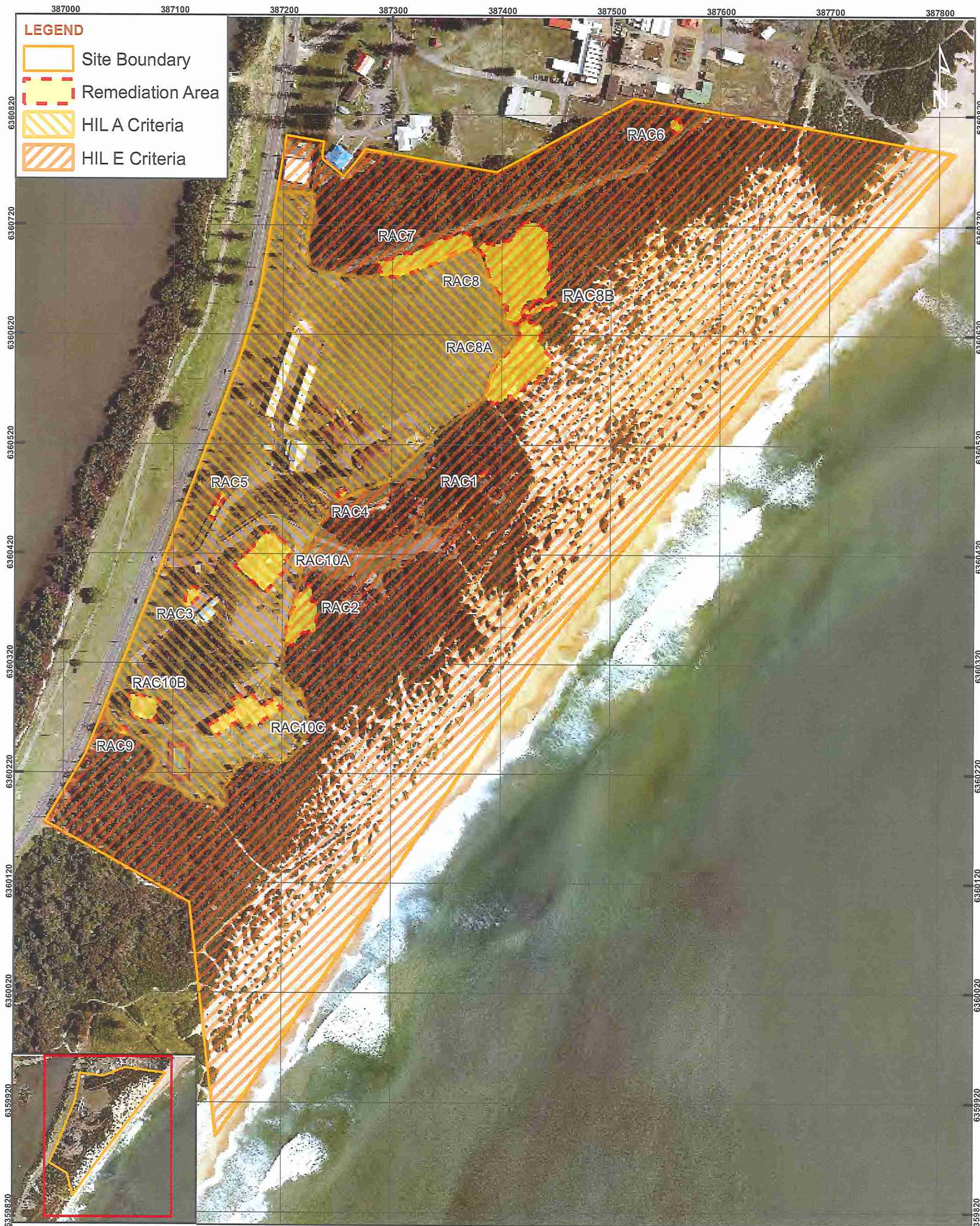
DATE 21/09/2009		SCALE 1:3,500				COORDINATE SYSTEM MGA 94 Zone 56	
PROJECT NO. 3001625.001		PROJECT TITLE Fort Wallace Remediation Validation					
FIG NO. 7		FIGURE TITLE Inferred Surface Water Flows					
CREATED BY B. Stewart		LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09					

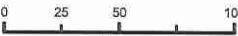



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009	SCALE 1:3,500		COORDINATE SYSTEM MGA 94 Zone 56	 Copyright - City2See.com Aerial Photography Licensed by Sindair Knight Merz Pty Ltd.
PROJECT NO. 3001625.001	PROJECT TITLE Fort Wallace Remediation Validation			
FIG NO. 8	FIGURE TITLE Inferred Groundwater Contours			
CREATED BY B. Stewart	LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09			



DATE 21/09/2009		SCALE 1:4,500				COORDINATE SYSTEM MGA 94 Zone 56	
PROJECT NO. 3001625.001		PROJECT TITLE Fort Wallace Remediation Validation					
FIG NO. 9		FIGURE TITLE Validation Criteria Zones					
CREATED BY B. Stewart		LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09					

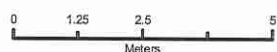
**SMEC**

Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:200



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 10

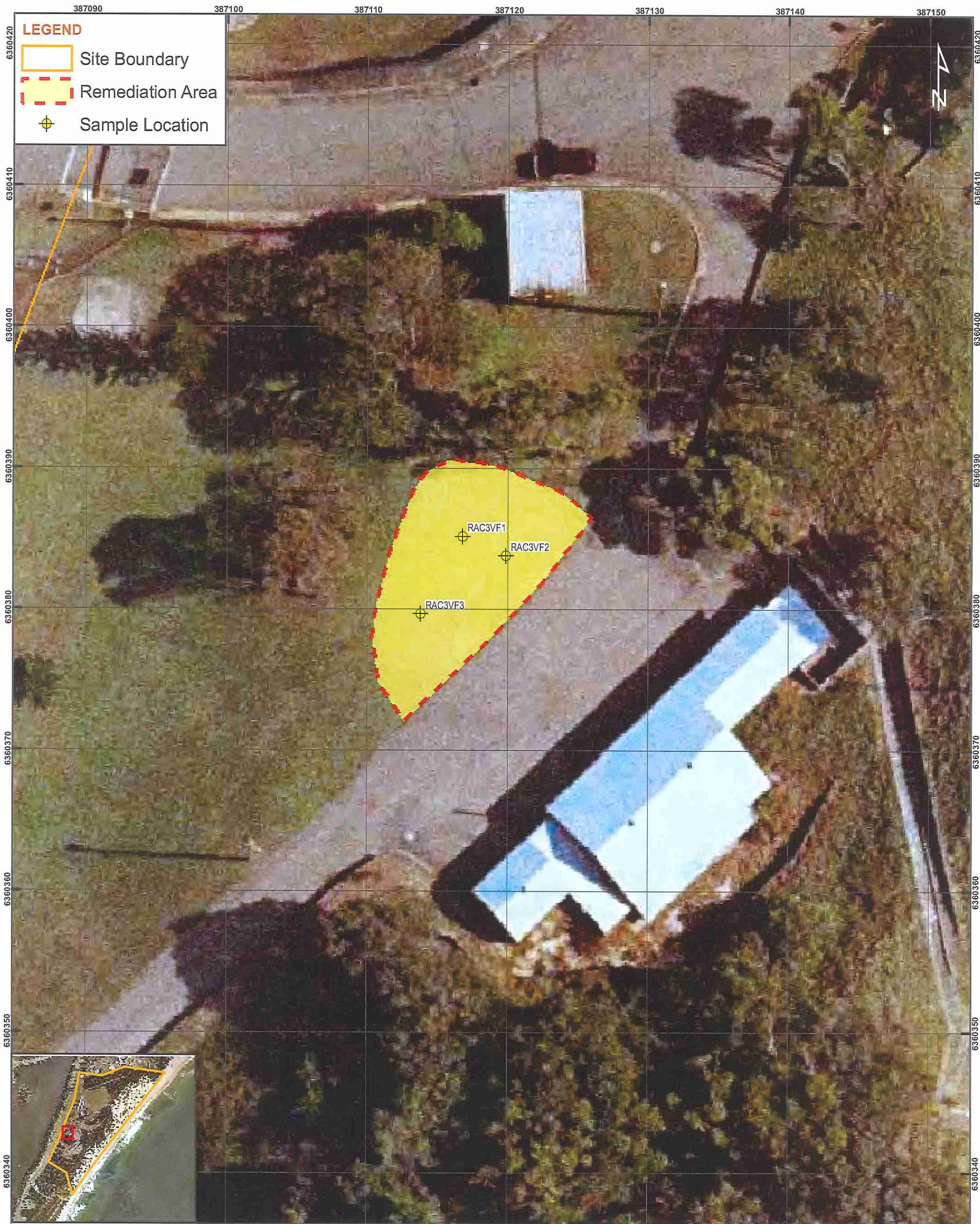
FIGURE TITLE Validation Sample Locations: RAC 1

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09

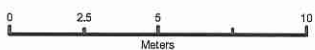


Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:350



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 12

FIGURE TITLE Validation Sample Locations: RAC 3



CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009		SCALE 1:250		COORDINATE SYSTEM MGA 94 Zone 56	
PROJECT NO. 3001625.001		PROJECT TITLE Fort Wallace Remediation Validation			
FIG NO. 13		FIGURE TITLE Validation Sample Locations: RAC 4			
CREATED BY B. Stewart		LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09			

Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.

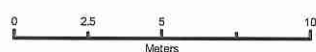


Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:350



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 14

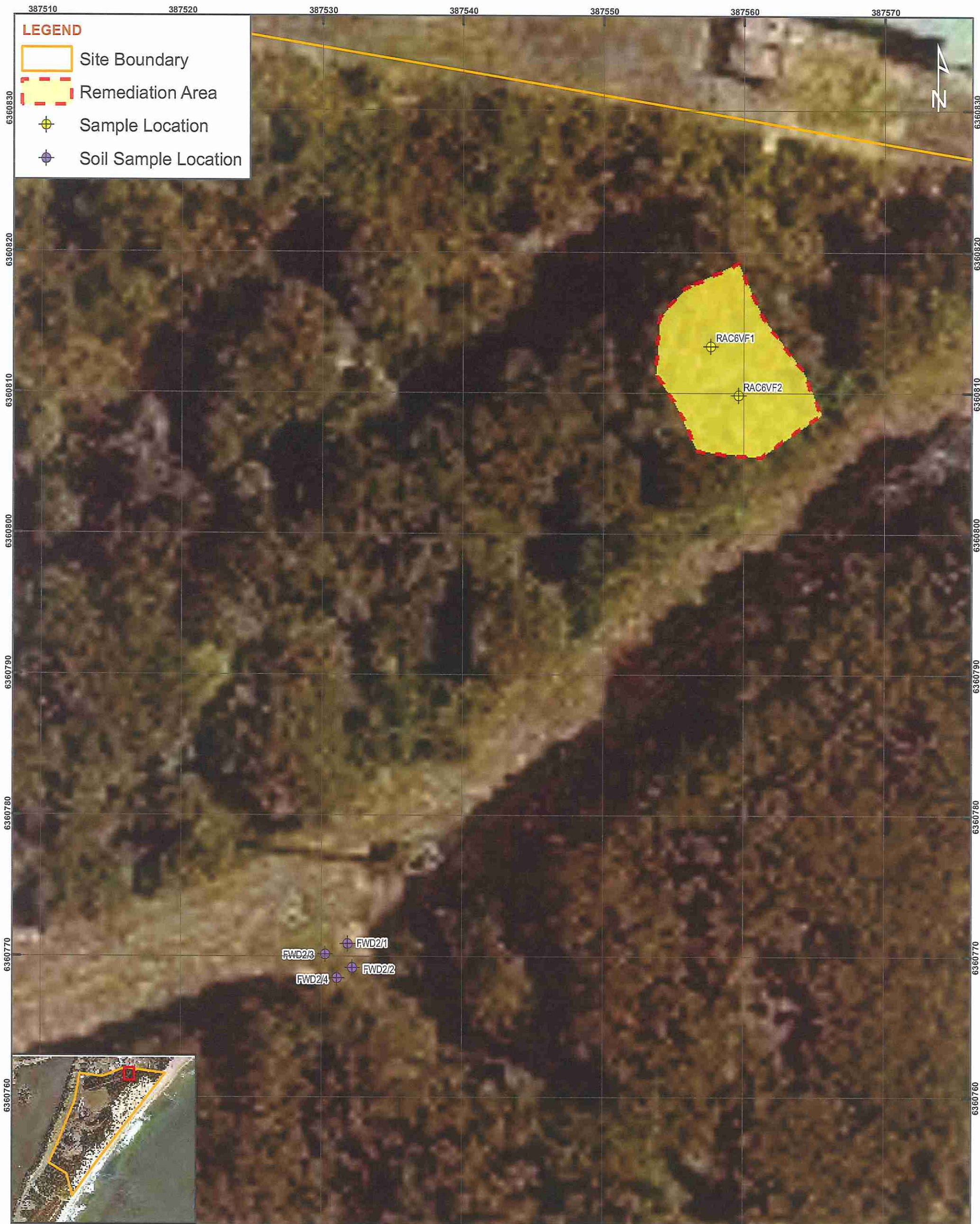
FIGURE TITLE Validation Sample Locations: RAC 5

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09

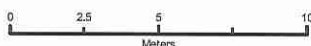


Copyright - City2See.com
Aerial Photography Licensed by Sindair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:350



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 15

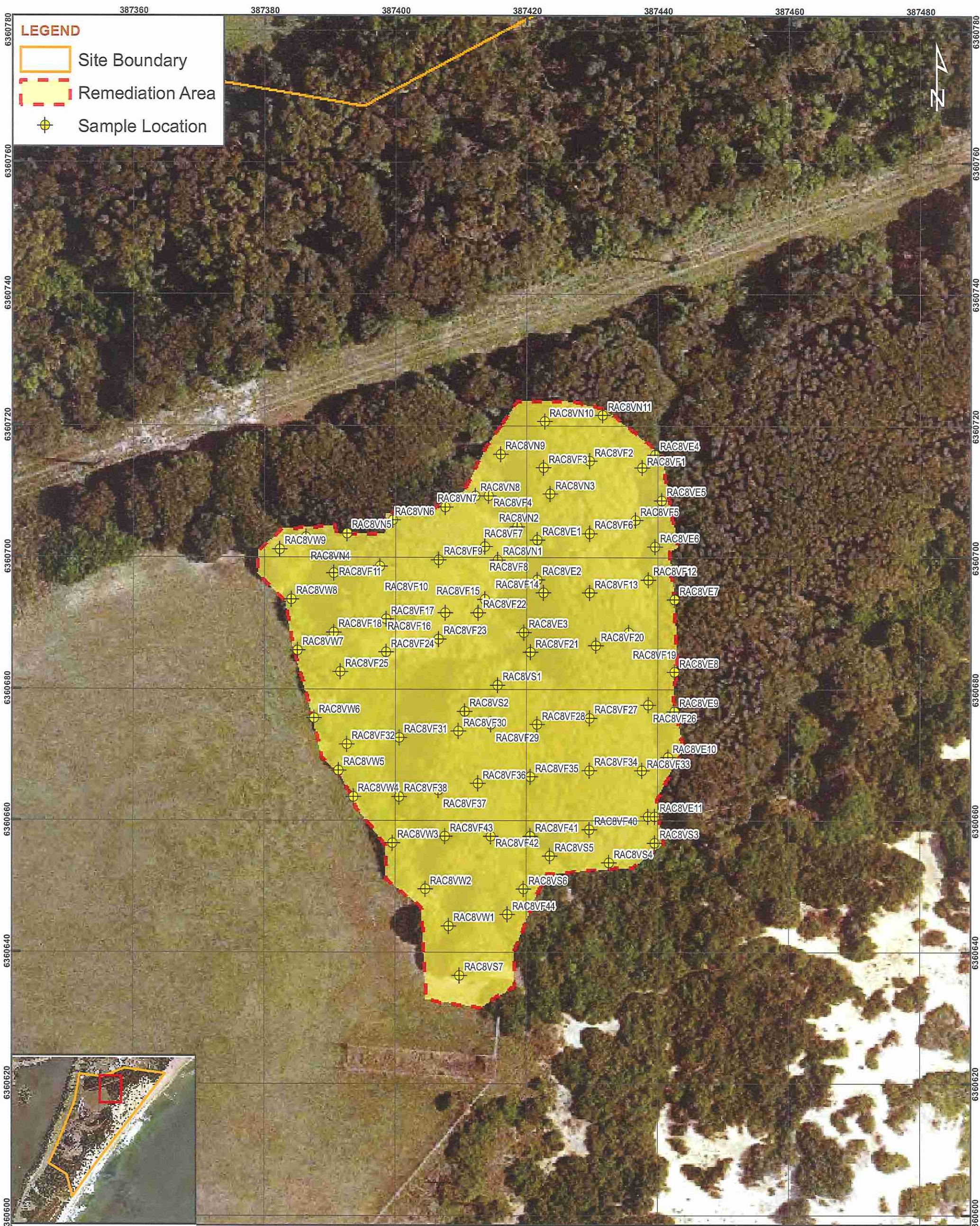
FIGURE TITLE Validation Sample Locations: RAC 6

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09

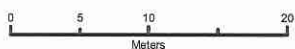


Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:750



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 17

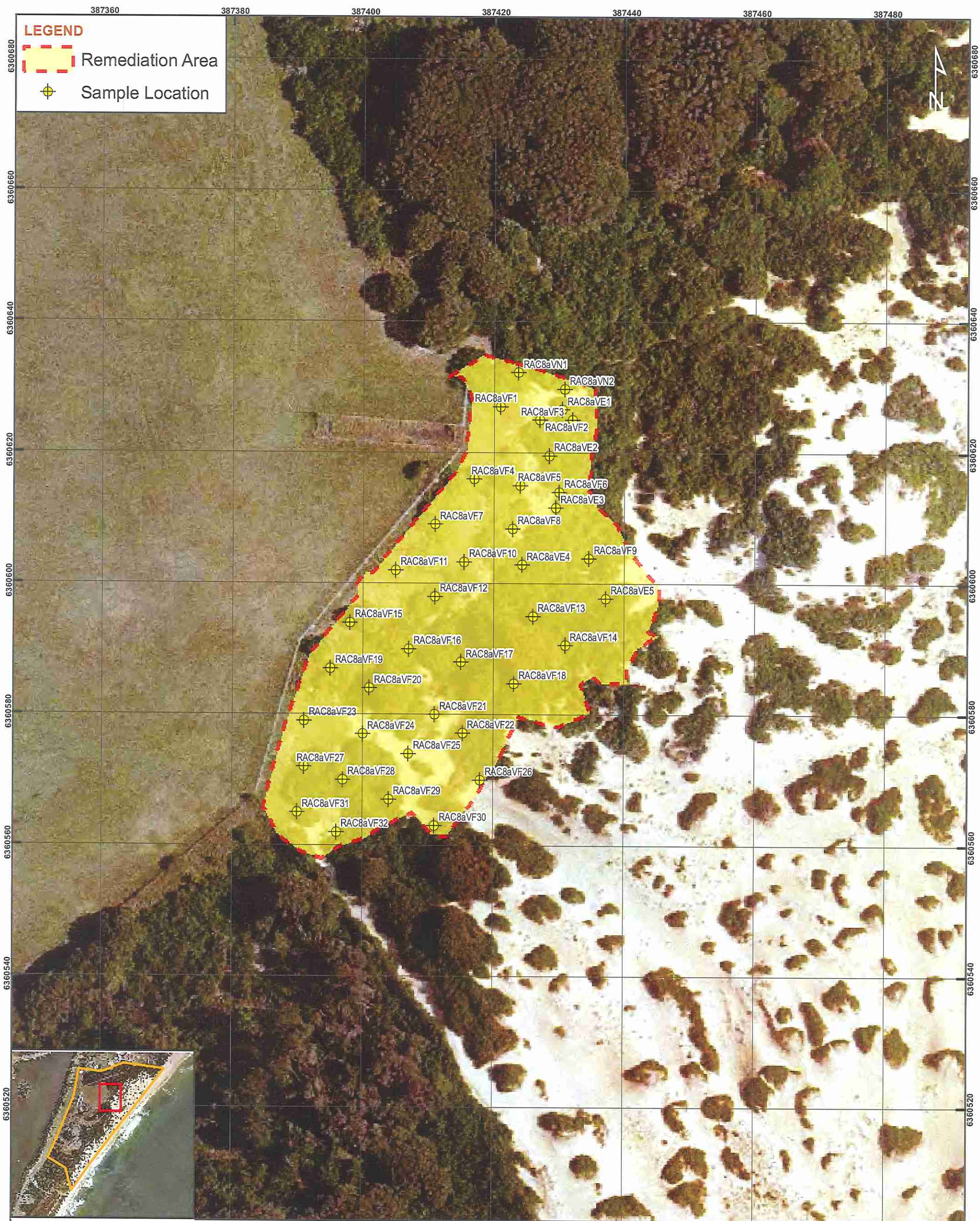
FIGURE TITLE Validation Sample Locations: RAC 8

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:750



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 18

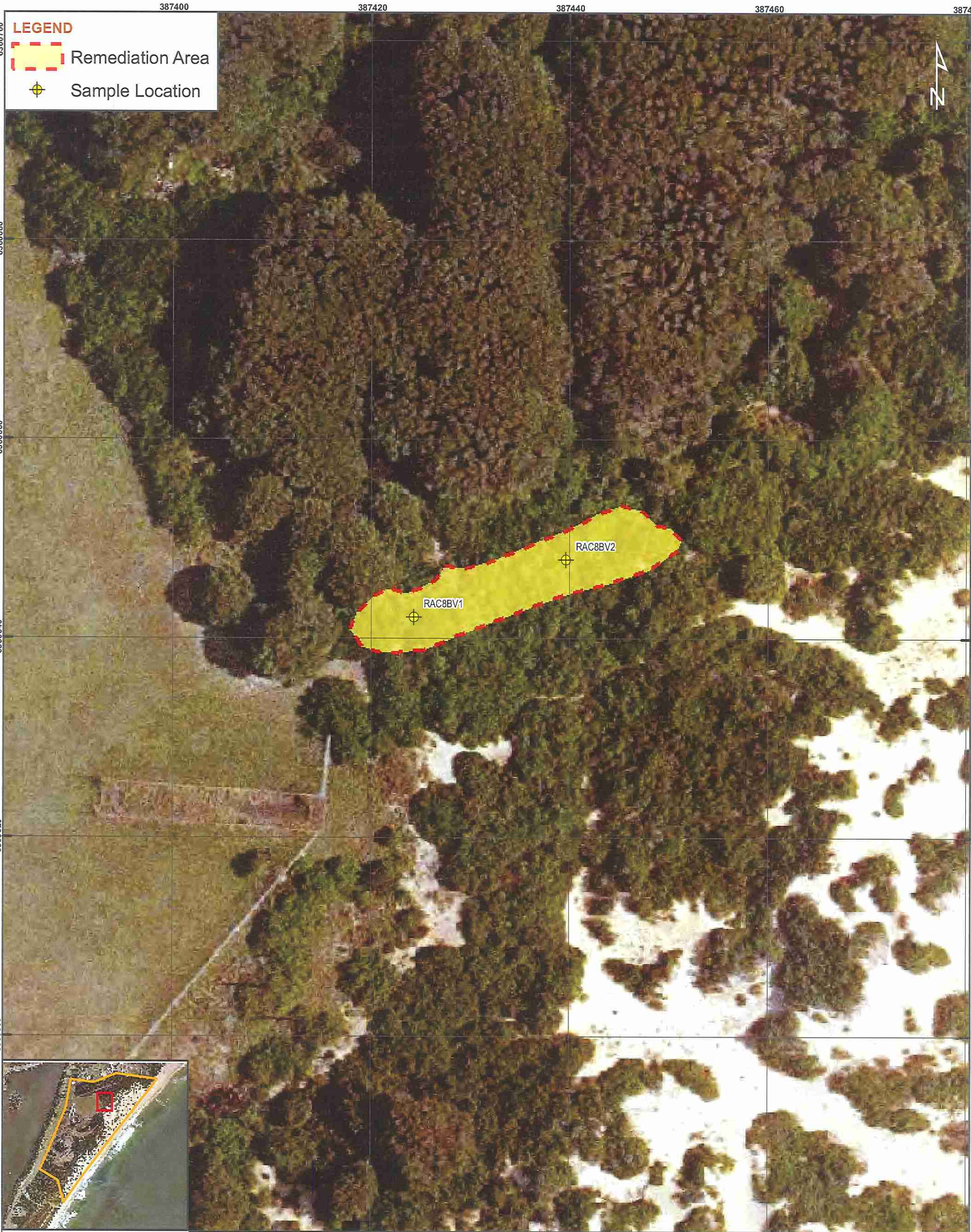
FIGURE TITLE Validation Sample Locations: RAC 8a



CREATED BY B. Stewart

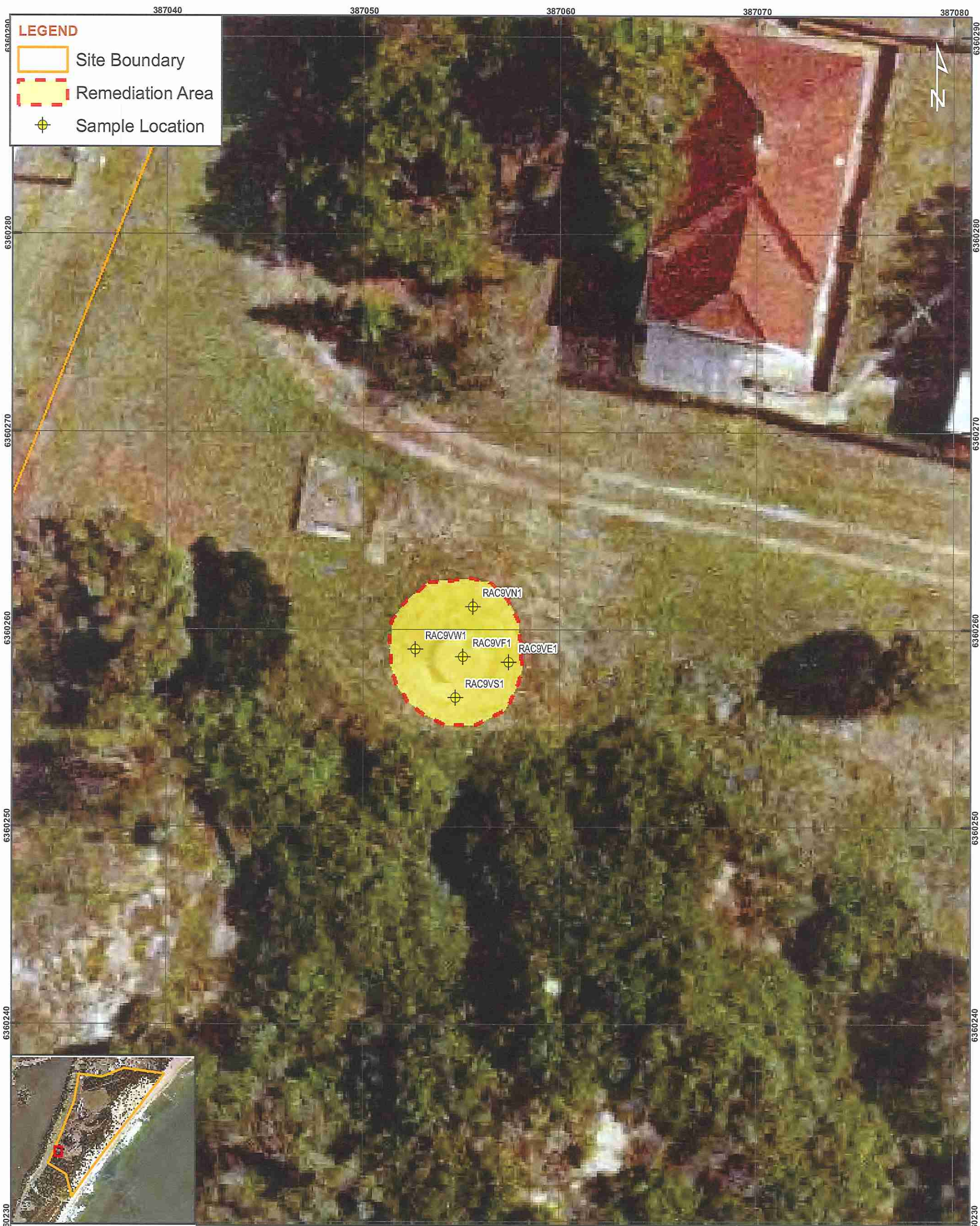
LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09




Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.




DATE 21/09/2009		SCALE 1:500				COORDINATE SYSTEM MGA 94 Zone 56	
PROJECT NO. 3001625.001		PROJECT TITLE Fort Wallace Remediation Validation					
FIG NO. 19		FIGURE TITLE Validation Sample Locations: RAC 8b					
CREATED BY B. Stewart		LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09				 Copyright - City2See.com Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.	



63

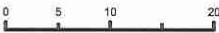
DATE 21/09/2009	SCALE 1:250		COORDINATE SYSTEM MGA 94 Zone 56
PROJECT NO. 3001625.001	PROJECT TITLE Fort Wallace Remediation Validation		
FIG NO. 20	FIGURE TITLE Validation Sample Locations: RAC 9		
CREATED BY B. Stewart	LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09		


63



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009		SCALE 1:1,000				COORDINATE SYSTEM MGA 94 Zone 56	
PROJECT NO. 3001625.001		PROJECT TITLE Fort Wallace Remediation Validation					
FIG NO. 21		FIGURE TITLE Validation Sample Locations: RAC 10a, RAC 10b and RAC 10c					
CREATED BY B. Stewart		LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09					



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



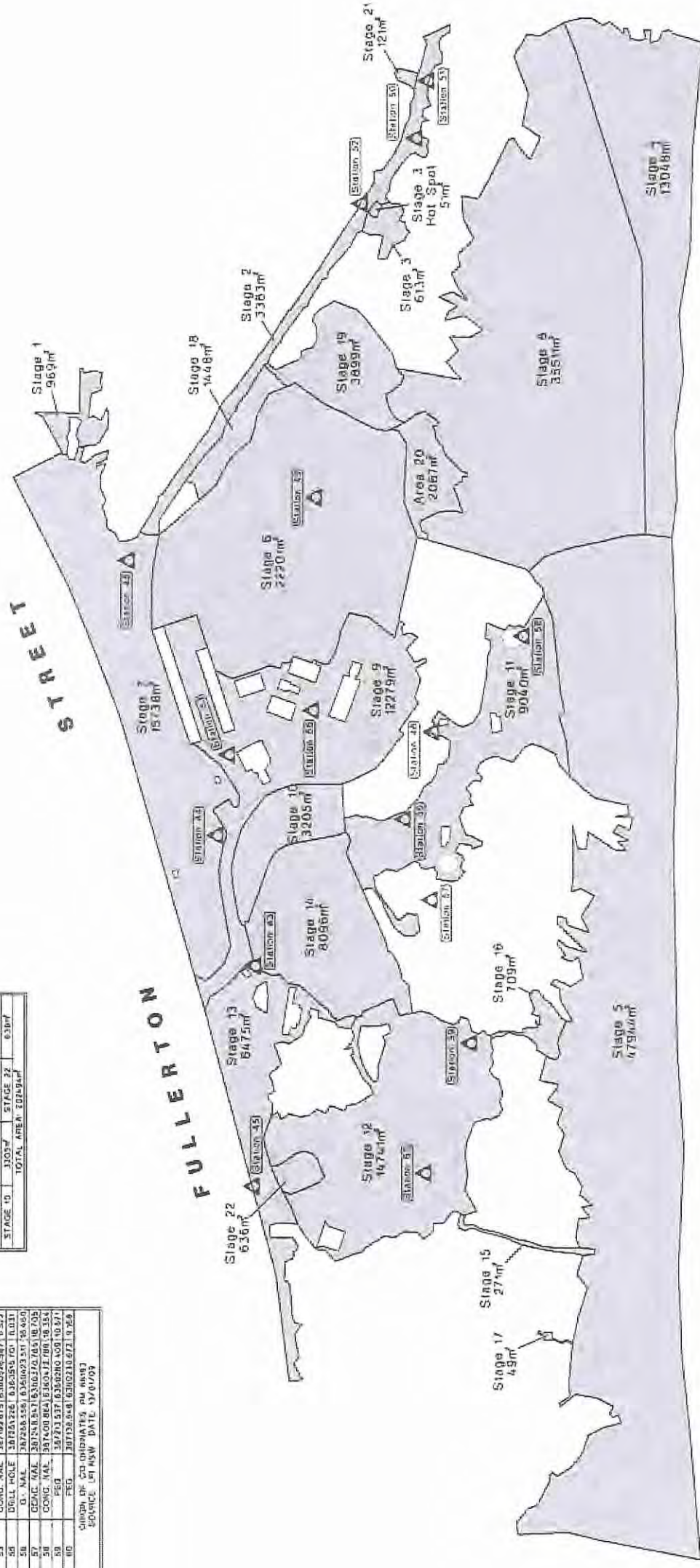
DATE 21/09/2009	SCALE 1:2,000	0 12.5 25 50 Meters	COORDINATE SYSTEM MGA 94 Zone 56
PROJECT NO. 3001625.001	PROJECT TITLE Fort Wallace Remediation Validation		
FIG NO. 22	FIGURE TITLE Additional Sampling Locations - Western Terrace, Pavement and Stockpile Area		
CREATED BY B. Stewart	LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09		



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.

SURVEY STATION DETAILS									
STATION NO	DESCRIPTION	DATE	TIME	WIND	WAVE	SEA	SWELL	MOON	GLASS
43	DRILL HOLE	13/04/03	13:45	0403	800	7.33			
44	FEW	13/04/03	13:45	0403	800	7.33			
45	FEW	13/04/03	13:45	0403	800	7.33			
46	FEW	13/04/03	13:45	0403	800	7.33			
47	FEW	13/04/03	13:45	0403	800	7.33			
48	FEW	13/04/03	13:45	0403	800	7.33			
49	FEW	13/04/03	13:45	0403	800	7.33			
50	FEW	13/04/03	13:45	0403	800	7.33			
51	FEW	13/04/03	13:45	0403	800	7.33			
52	FEW	13/04/03	13:45	0403	800	7.33			
53	FEW	13/04/03	13:45	0403	800	7.33			
54	FEW	13/04/03	13:45	0403	800	7.33			
55	FEW	13/04/03	13:45	0403	800	7.33			
56	FEW	13/04/03	13:45	0403	800	7.33			
57	FEW	13/04/03	13:45	0403	800	7.33			
58	FEW	13/04/03	13:45	0403	800	7.33			
59	FEW	13/04/03	13:45	0403	800	7.33			
60	FEW	13/04/03	13:45	0403	800	7.33			

FURNACE AREAS			
STAGE 1	565.9 ^a	STAGE 11	900.1 ^a
STAGE 2	118.3 ^b	STAGE 12	913.1 ^a
STAGE 3	61.0 ^b	STAGE 13	843.2 ^a
STAGE 4	1.5 ^d	STAGE 14	809.0 ^a
POST CROCI	330.4 ^b	STAGE 15	717.0 ^a
STAGE 5	471.1 ^b	STAGE 16	1.0 ^d
STAGE 6	223.0 ^b	STAGE 17	1.0 ^d
STAGE 7	913.30 ^a	STAGE 18	1.0 ^d
STAGE 8	365.1 ^b	STAGE 19	238.0 ^a
STAGE 9	1.0 ^d	STAGE 20	200.7 ^a
STAGE 10	310.5 ^a	STAGE 21	1.0 ^d
TOTAL AREA		STAGE 22	630.1 ^a
		STAGE 23	630.1 ^a





DATE 21/09/2009	SCALE 1:4,500	0 25 50 100 Meters	COORDINATE SYSTEM MGA 94 Zone 56
PROJECT NO. 3001625.001	PROJECT TITLE Fort Wallace Remediation Validation		
FIG NO. 24	FIGURE TITLE Metal Detector Lines		
CREATED BY B. Stewart	LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09		

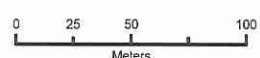
**SMEC**

Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009

SCALE 1:4,500



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Remediation Validation

FIG NO. 25

FIGURE TITLE Residual Material



CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\
Stockton\Remediation Validation May 09

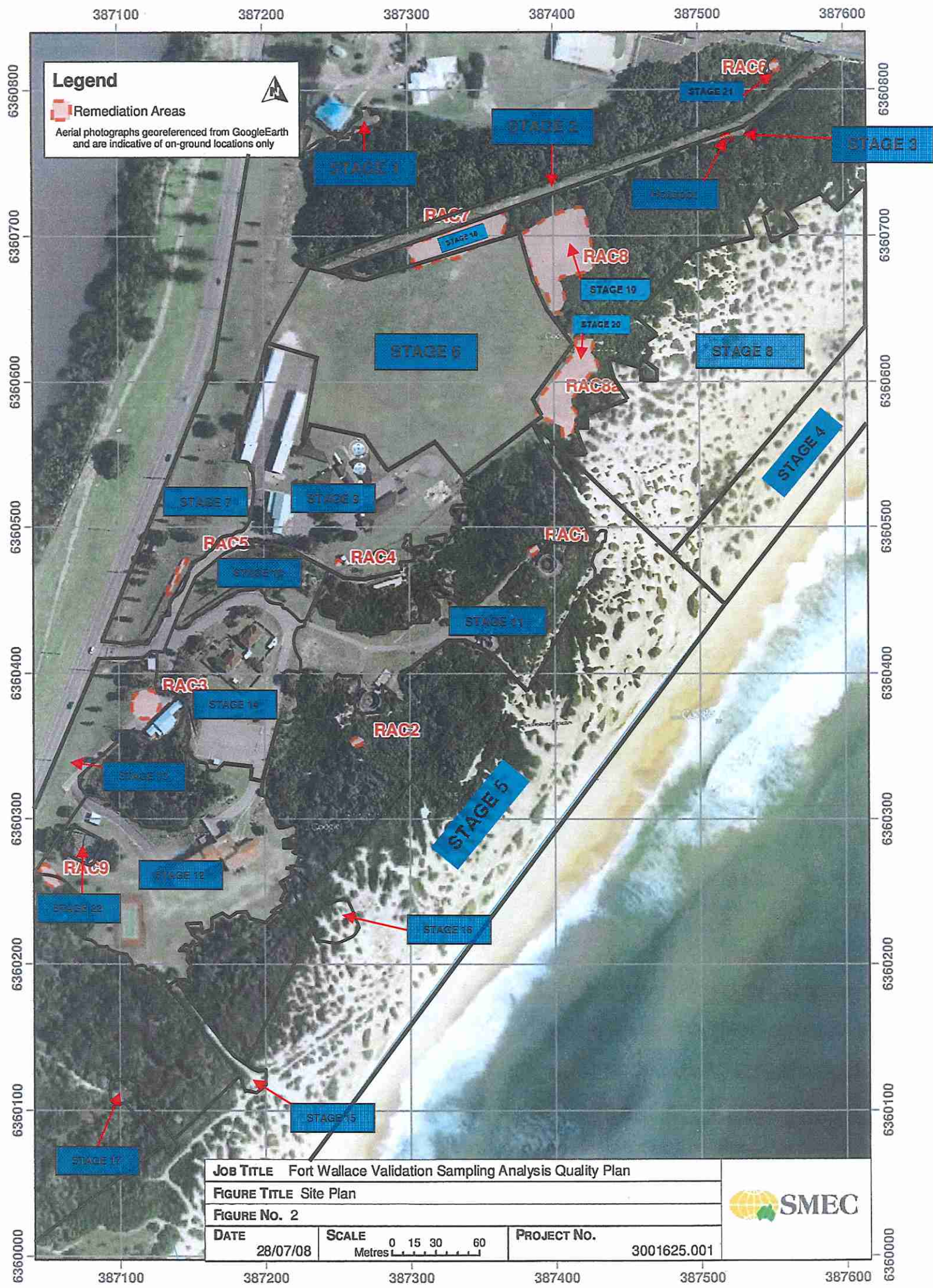


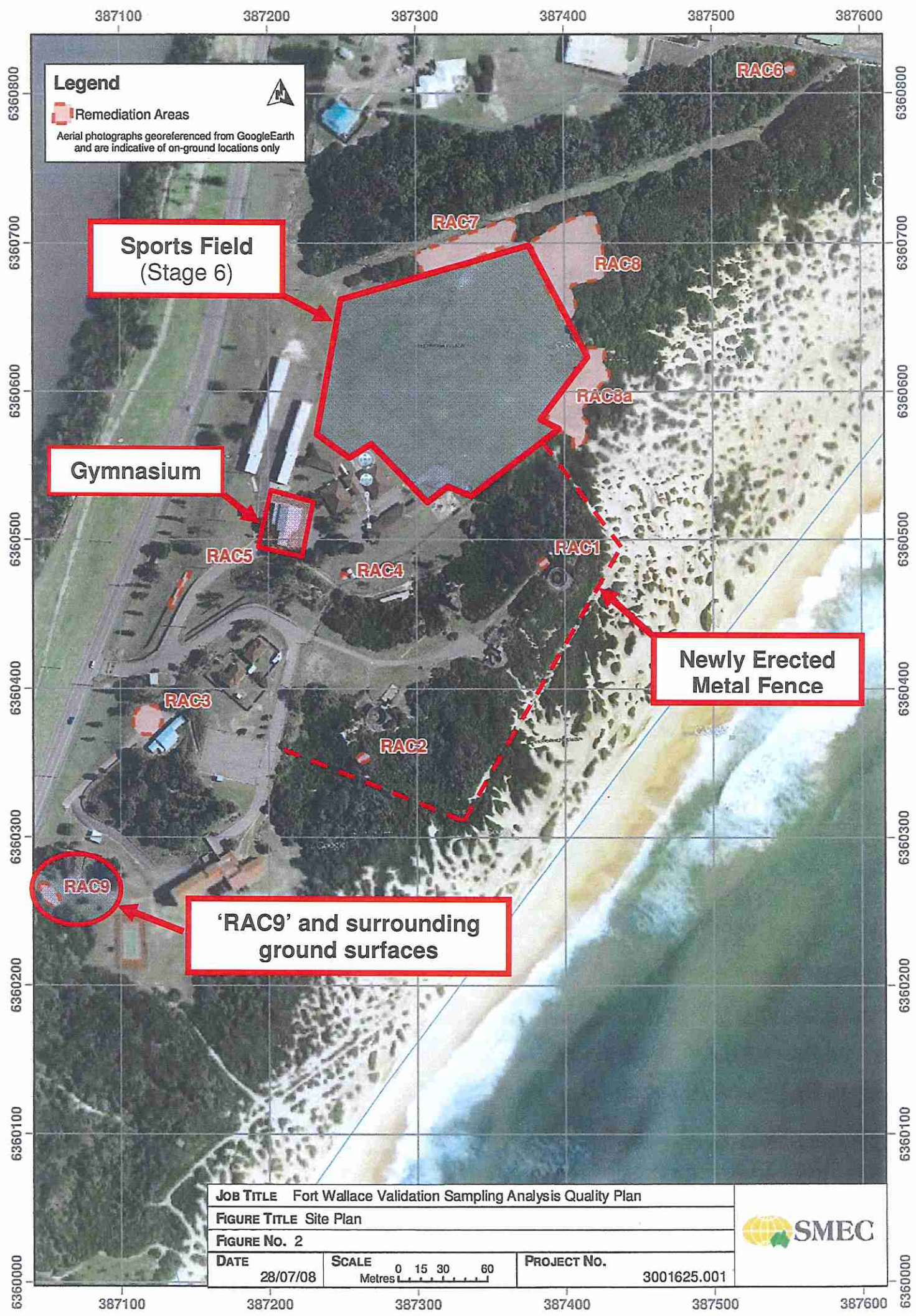
Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.



DATE 21/09/2009	SCALE 1:1,000		COORDINATE SYSTEM MGA 94 Zone 56	
PROJECT NO. 3001625.001	PROJECT TITLE Fort Wallace Remediation Validation			
FIG NO. 26	FIGURE TITLE Dust Monitoring Locations			
CREATED BY B. Stewart	LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Remediation Validation May 09			

Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.





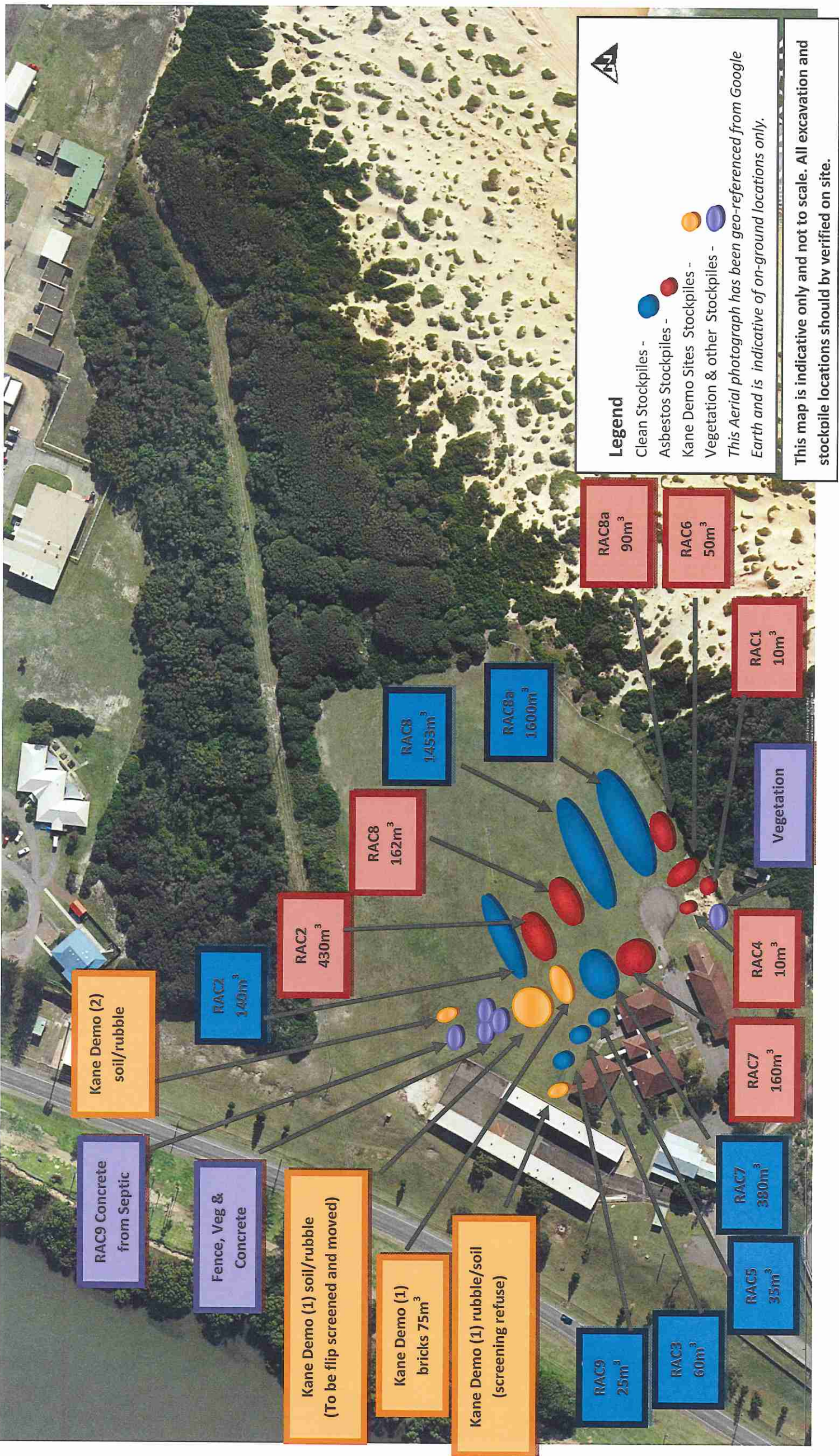

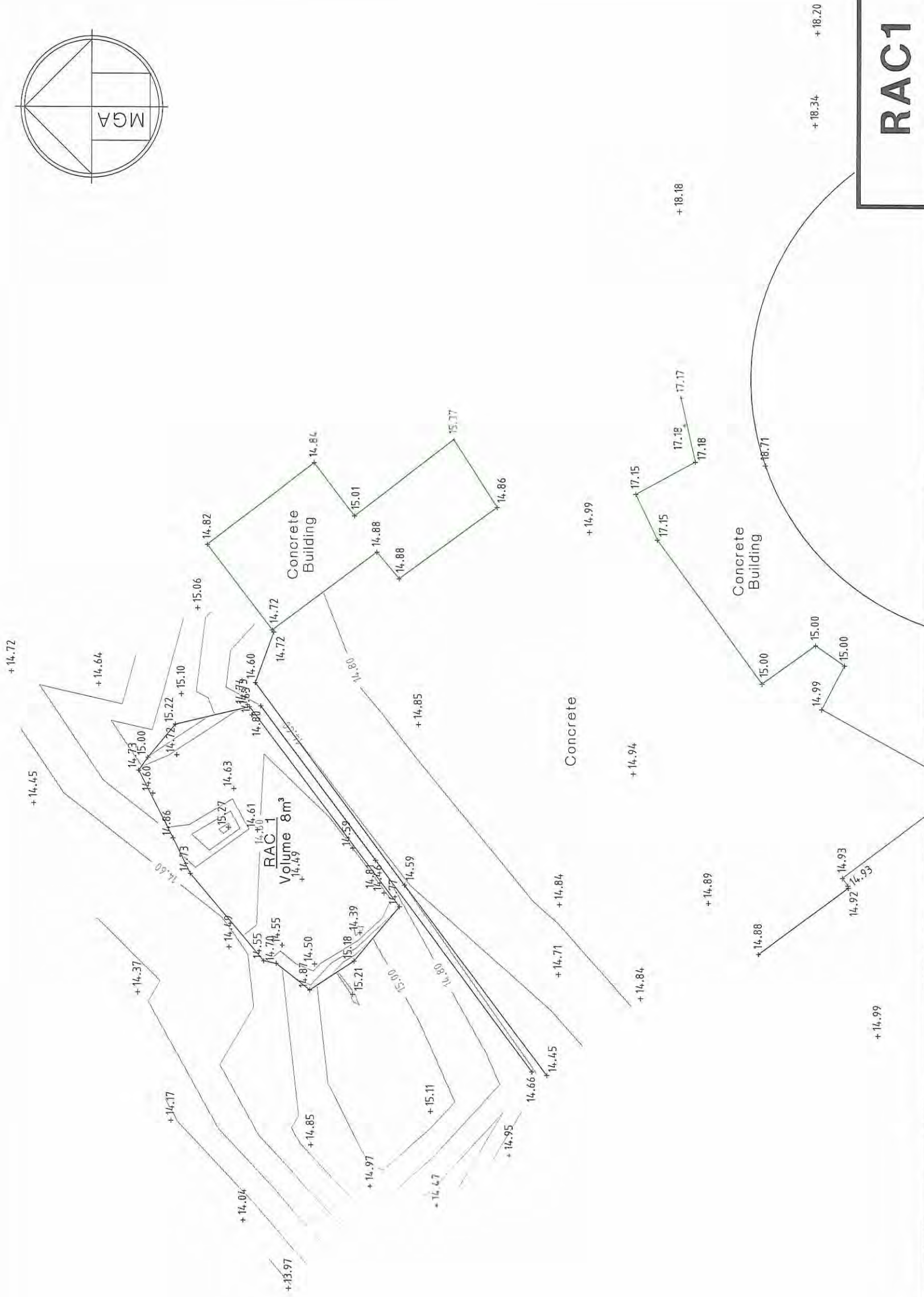
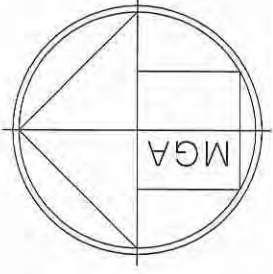


Figure courtesy of Synergy Resource Management

JOB TITLE Fort Wallace Sampling Analysis			
FIGURE TITLE Stockpile Locations			
FIGURE NO. 3			
DATE	SCALE	PROJECT NO.	
8/05/09	Not to Scale	3001625.001	



PREPARED BY:
PROUST & GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS
406 Pacific Highway
PO Box 132
DY 23410
Lindfield NSW 2070
ACT 093 046 407
Tel: 9416 1335
Fax: 9416 3845
Email: png@png.com.au
ABN 74 093 046 407

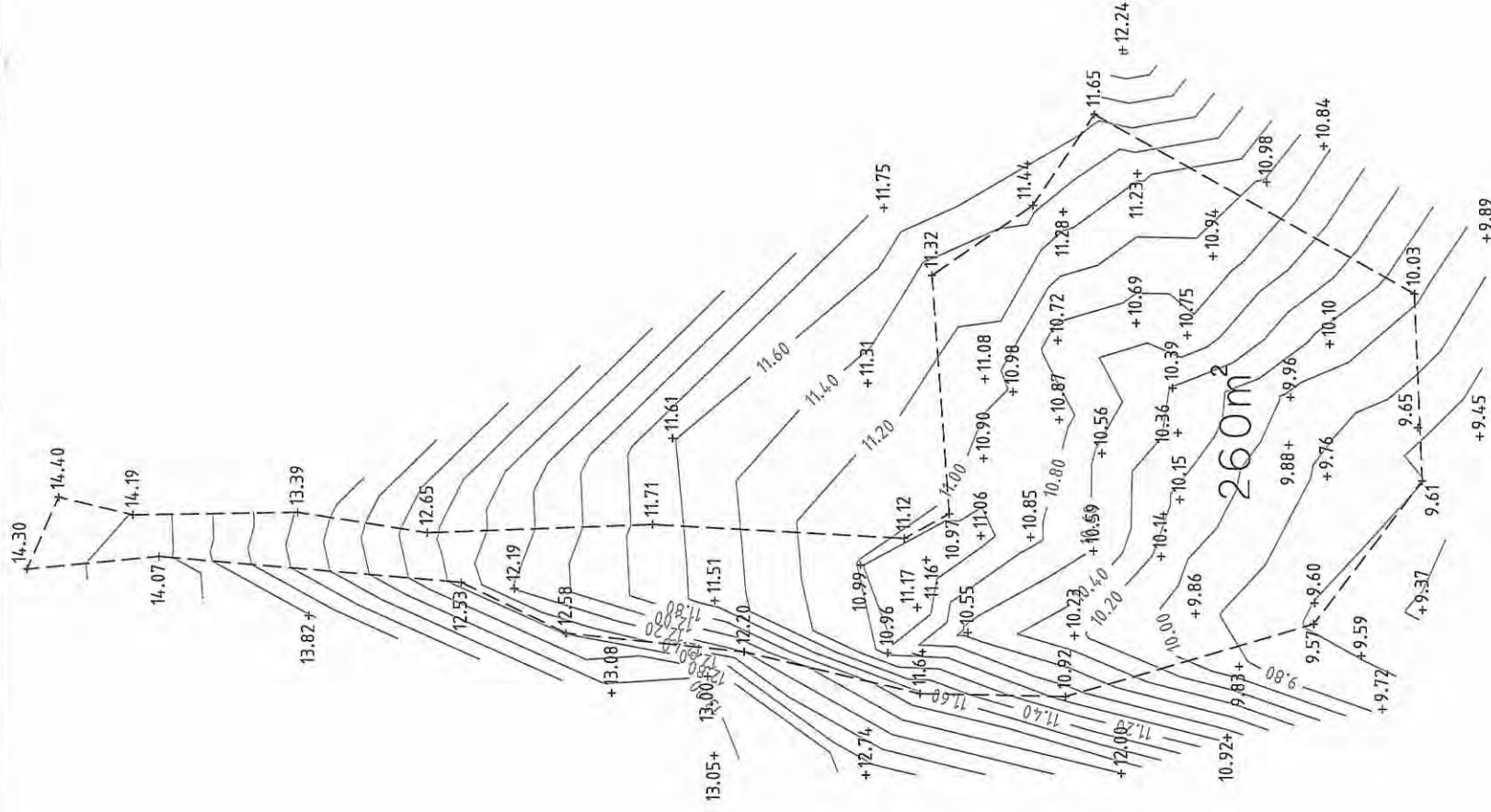
SURVEYED R.P.
DRAWN R.P.
APPROVED R.C.

SCALE 1:100
DATUM A.H.D.
ORIGIN PM 66183
R.L. 1.782

JOB No. 22606
DATE 06/05/2009
DWG. No. RAC1 EXCAVATED
SHEET 1 OF 1 SHEETS

CLIENT
SYNERGY RESOURCE
MANAGEMENT PTY LTD

INSITU VOLUME PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON



18.70

NATURAL SURFACE AREA PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

JOB No. 22606	A
DATE 18/03/2009	
DWG. No. 22606-FORT RAC2	
SHEET 1 OF 1 SHEETS	

PREPARED BY:

PROUST & GARDNER
CONSULTING PTY LIMITED

SURVEYORS & PLANNERS

406 Pacific Highway
PO Box 132
DX 234110
Lundfield NSW 2070
ACN 093 046 407

Tel: 9416 1335
Fax: 9416 3845

Email: info@pogg.com.au
ABN 74 093 046 407



INSITU VOLUME PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

CLIENT
SYNERGY
RESOURCE MANAGEMENT

JOB No. 22606	A
---------------	---

DATE 06/05/2009

DWG. No. RAC2 Excavated

SHEET 1 OF 1 SHEETS

PREPARED BY:
PROUST & GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS

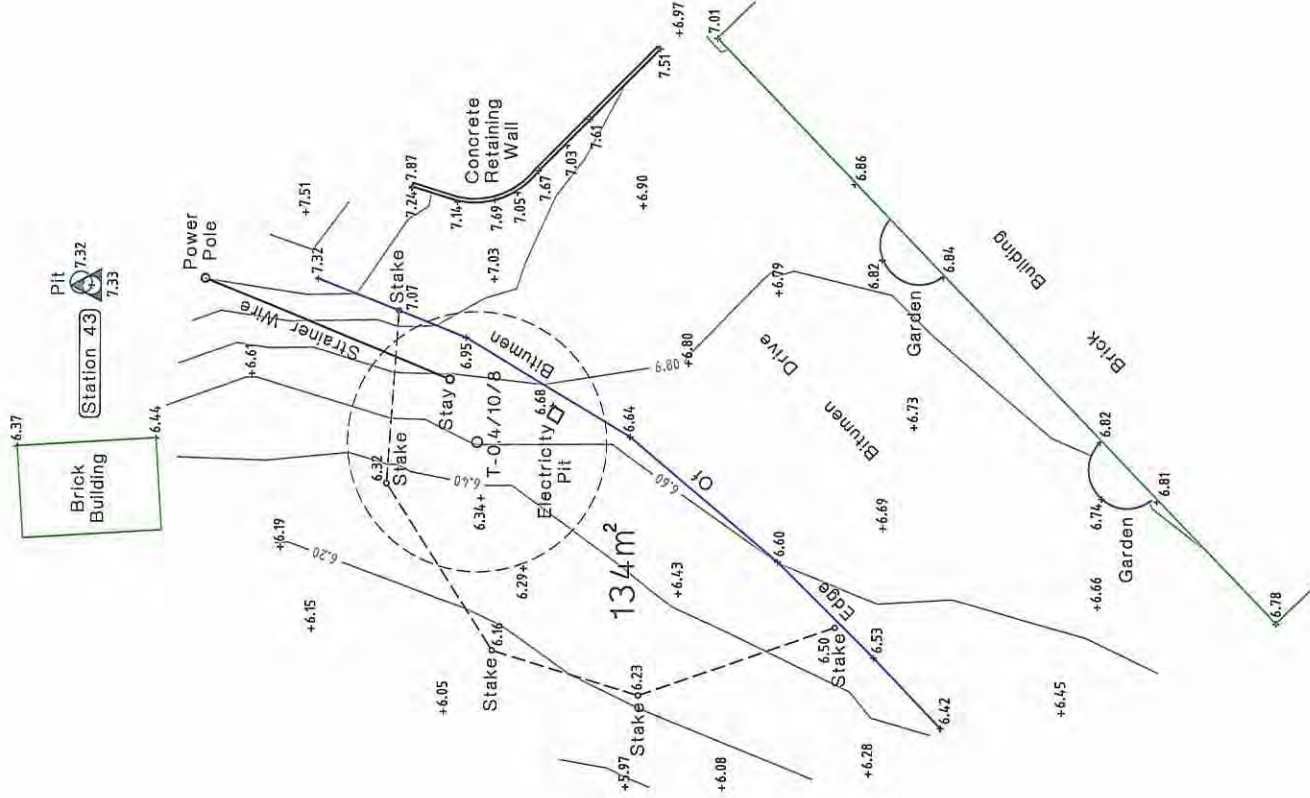
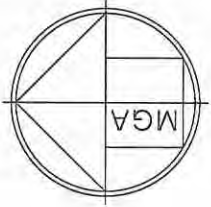
406 Pacific Highway
PO Box 132
DX 23410
Lindfield NSW 2070
ACN 093 046 407

SCALE 1:200
DATUM A.H.D.
ORIGIN PM 66183
R.L. 1.782

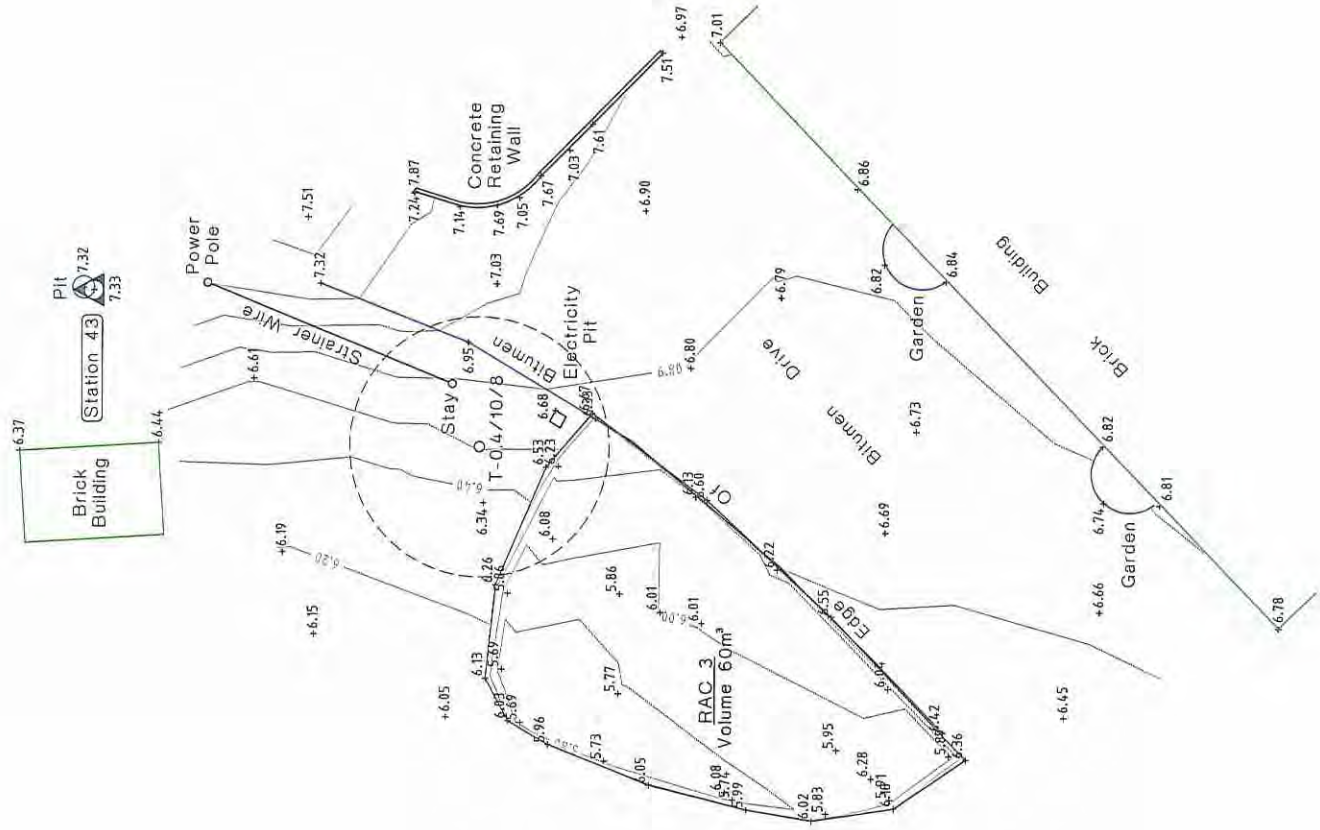
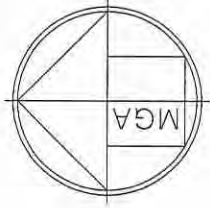
SURVEYED	R.P.
DRAWN	R.P.
APPROVED	R.C.

DATE MAY 09

AMENDMENT



RAC3		NATURAL SURFACE AREA PLAN FORT WALLACE FULLERTON STREET STOCKTON		CLIENT SYNERGY RESOURCE MANAGEMENT PTY LTD		JOB No. 22606		A	
						DATE 13/03/2009			
						DWG. No. 22606-FORT 03			
						SHEET 3 OF 5 SHEETS			
PREPARED BY: PROUST & GARDNER CONSULTING PTY LIMITED SURVEYORS & PLANNERS 405 Pacific Highway PO Box 152 Lindfield NSW 2070 Tel: 9414 1395 Fax: 9416 3845 Email: info@proustg.com.au ABN 74 072 544 497		SCALE 1:200 DATUM A.H.D. ORIGIN PM 66183 R.L. 1.782		SURVEYED R.P. DRAWN G.L.S. APPROVED R.C.		XXXX		DATE	
F									
E									
D									
C									
B									
A		ORIGINAL ISSUE							
No.		AMENDMENT							



RAC3

INSITU VOLUME PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

CLIENT
SYNERGY RESOURCE
MANAGEMENT PTY LTD

JOB No. 22606
DATE 06/05/2009
DWG. No. RAC3 EXCAVATED
SHEET 1 OF 1 SHEETS

PREPARED BY:
PROUST&GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS
408 Pacific Highway
PO Box 132
Dunedin 9010
Tel: 9416 1335
Fax: 9416 3845
Email: info@proustg.com.au
PRT 14792 (Rev 001)

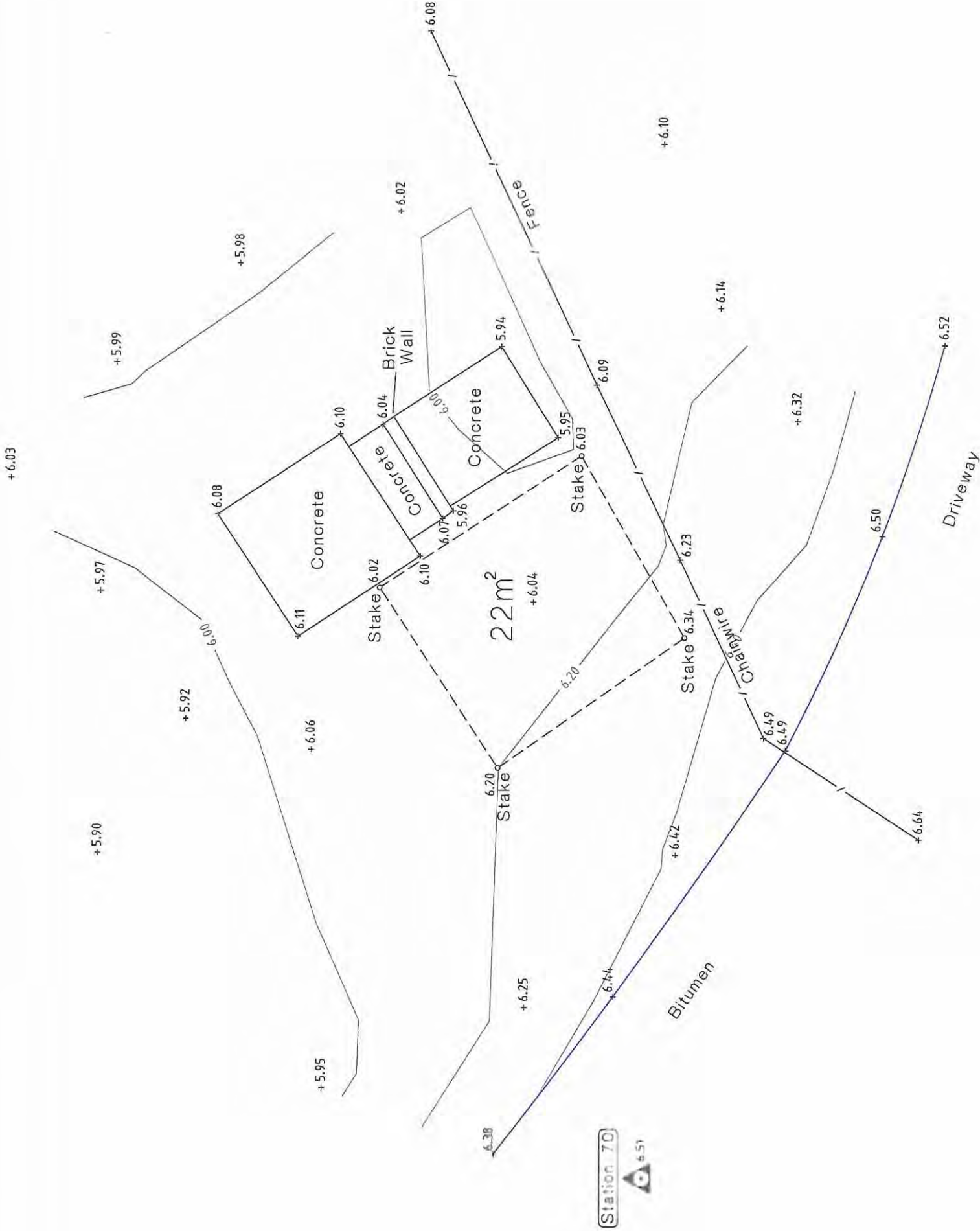
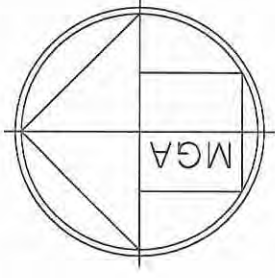
SCALE 1:200
DATUM A.H.D.
ORIGIN PM 66183
R.L. 1.782

SURVEYED R.P.
DRAWN R.P.
APPROVED R.C.

MAY 09
DATE

AMENDMENT

No.



RAC4

NATURAL SURFACE AREA PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

CLIENT
SYNERGY RESOURCE
MANAGEMENT PTY LTD

JOB No. 22606	A
DATE 19/03/2009	
DWG. No. 22606-FORT RAC4	
SHEET 1 OF 1 SHEETS	

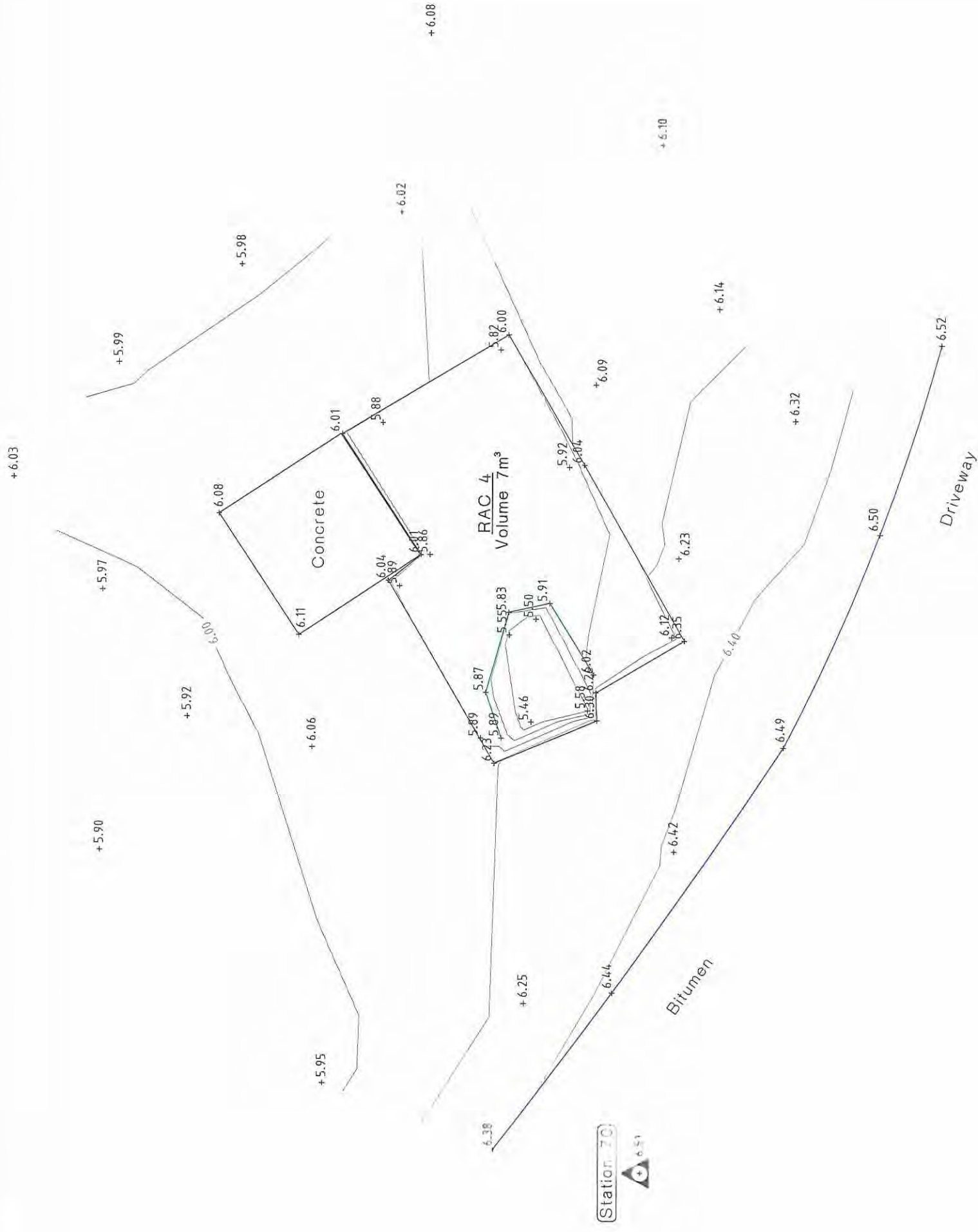
SCALE 1:100	
DATUM A.H.D.	
ORIGIN PM 66183	
R.L. 1.782	

SURVEYED R.P.	
DRAWN G.L.S.	
APPROVED R.C.	

PREPARED BY:
PROUST & GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS

406 Pacific Highway
PO Box 132
DX 23410
Lindfield NSW 2070
ACT 093 046 407

Tel: 9416 1335
Fax: 9416 3845
Email: png@png.com.au
ABN 74 093 046 407



INSITU VOLUME PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

CLIENT

SHEET 1 OF 1 SHEETS

R.L. 1.782

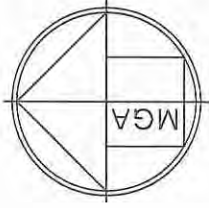
APPROVED R.C.

406 Pacific Highway
PO Box 132
DX 23410
Lindfield NSW 2070
ACN 093 046 407

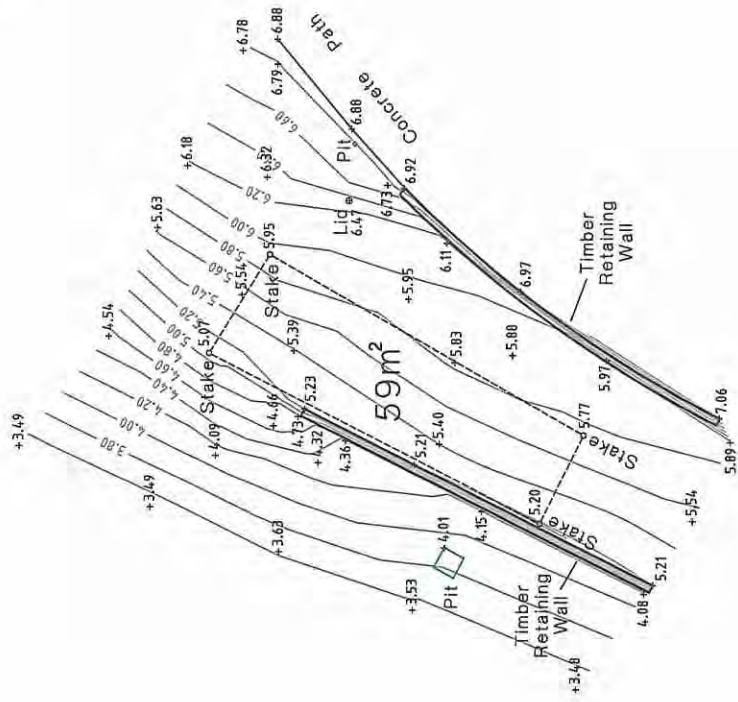
406 Pacific Highway
PO Box 132
DX 23410
Lindfield NSW 2070
ACN 093 046 407

Tel: 9416 1335
Fax: 9416 3845

Email: enrig@ping.com.au
ABN 74 093 046 407



Station 44
6.69



RAC5

NATURAL SURFACE AREA PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

CLIENT
SYNERGY RESOURCE
MANAGEMENT PTY LTD

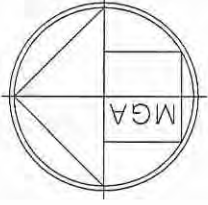
JOB No. 22606
DATE 13/03/2009
DWG. No. 22606-FORT 04
SHEET 4 OF 5 SHEETS

PREPARED BY:
PROUST & GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS
406 Pacific Highway
STOCKTON
NSW 2310
Tel: 0412 1335
Fax: 0416 3815
Email: eng@pna.com.au
A91 74 093 546 407

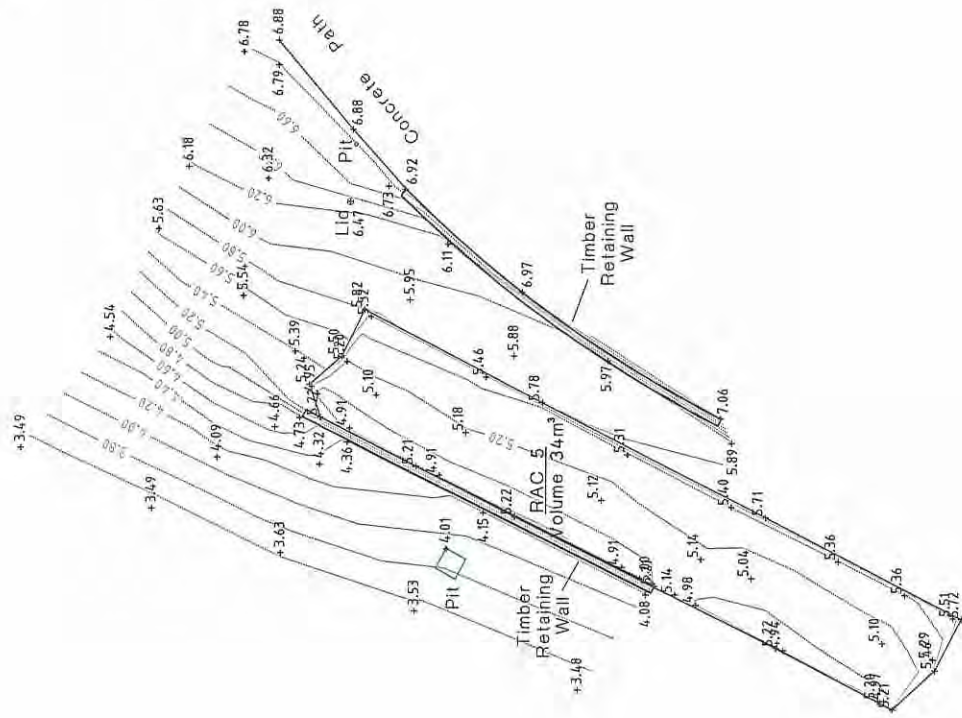
SCALE 1:200
DATUM A.H.D.
ORIGIN PM 56183
R.L. 1.782

SURVEYED R.P.
DRAWN G.L.S.
APPROVED R.C.

No.	AMENDMENT	DATE
F		
E		
D		
C		
B		
A	ORIGINAL ISSUE	XXXX



(Station 44)
+6.69



RAC5

INSITU VOLUME PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

CLIENT
SYNERGY RESOURCE
MANAGEMENT PTY LTD

JOB No. 22606
DATE 06/05/2009
DWG. No. RAC5 EXCAVATED
SHEET 1 OF 1 SHEETS

PREPARED BY:
PROUST & GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS
405 Pacific Highway
PO Box 132
DUNEDIN 9010
Tel: 9414 1335
Fax: 9414 3855
Email: info@proustgandner.com.au
ABN 98 989 896 407

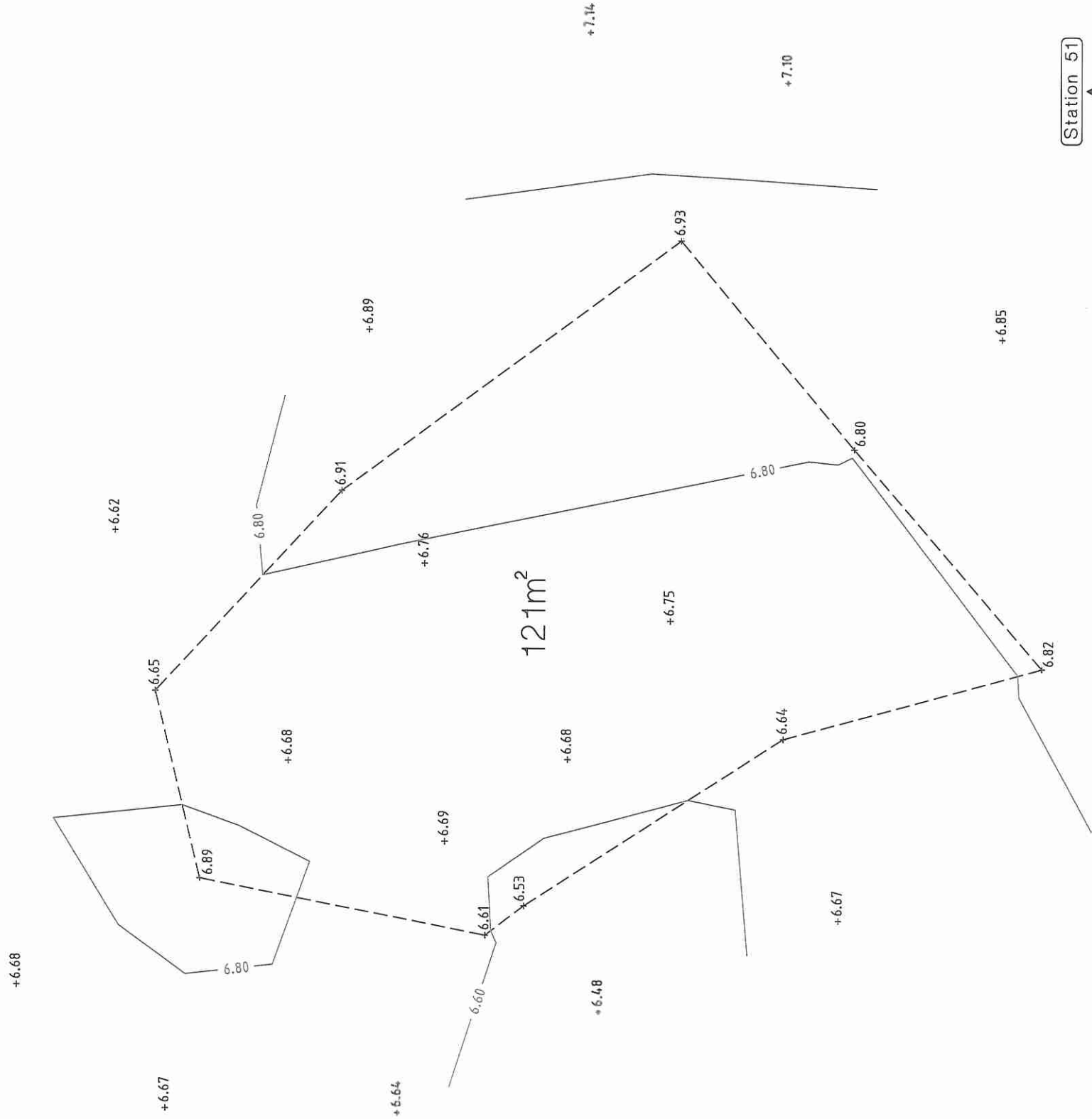
SCALE 1:200
DATUM A.H.D.
ORIGIN PM 66183
R.L. 1.782

SURVEYED R.P.
DRAWN R.P.
APPROVED R.C.

MAY 09
DATE

AMENDMENT

No.



RAC6

Station 51
+7.03

PREPARED BY:
PROUST&GARDNER
CONSULTING PTY LIMITED

SURVEYORS & PLANNERS

406 Pacific Highway
PO Box 132
DX 23410
Undfield NSW 2070
Tel: 9416 1335
Fax: 9416 3845
Email: png@png.com.au
ABN 74 093 046 407

SURVEYED R.P.
DRAWN G.L.S.
APPROVED R.C.

SCALE 1:100
DATUM A.H.D.
ORIGIN PM 66183
R.L. 1.782

JOB No. 22606

A

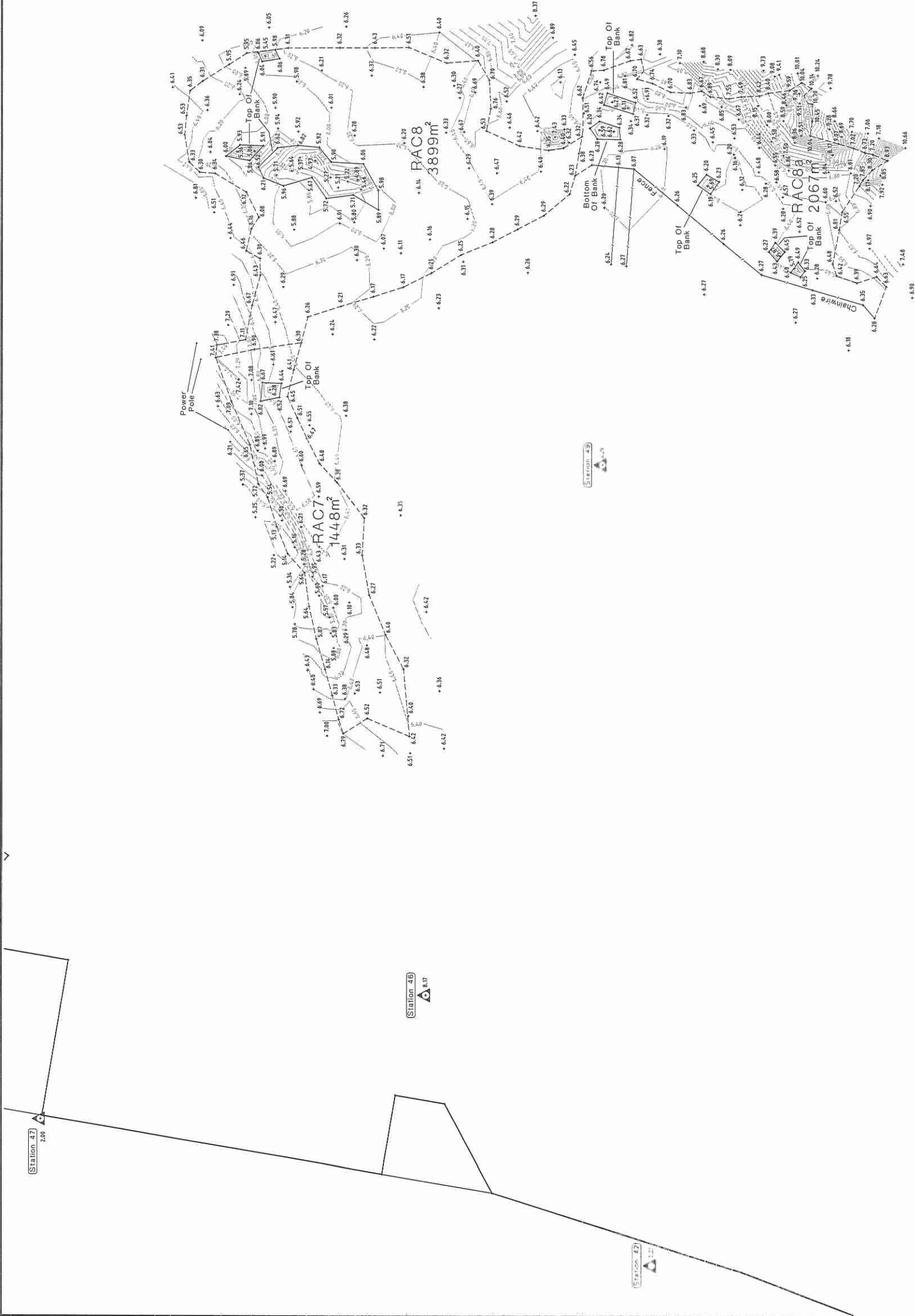
DATE 13/03/2009

DWG. No. 22606-FORT 05

SHEET 5 OF 5 **SHEETS**

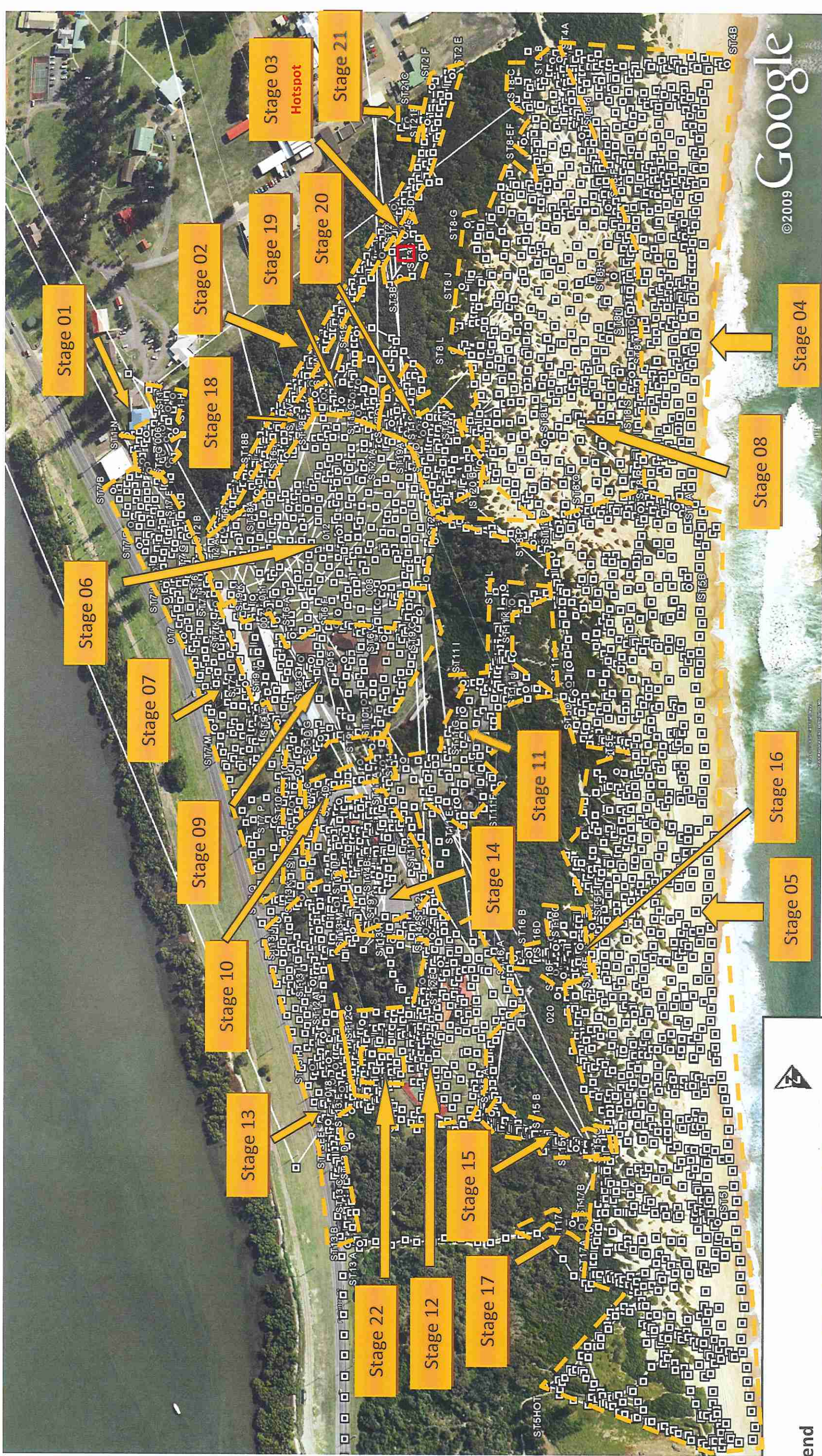
CLIENT
SYNERGY RESOURCE
MANAGEMENT PTY LTD

**CLEARING & GRUBBING
FORT WALLACE
FULLERTON STREET
STOCKTON**



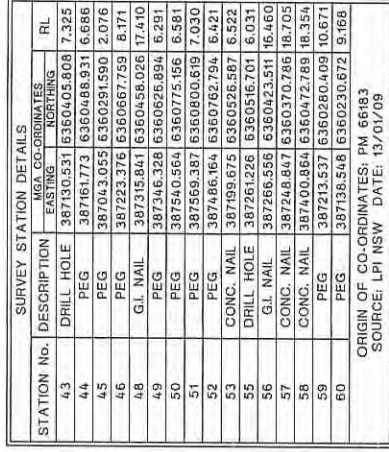
RAC7				RAC8				RAC8a				CLEARING & GRUBBING FORT WALLACE FULLERTON STREET STOCKTON			
												CLIENT SYNERGY RESOURCE MANAGEMENT PTY LTD			
												JOB No. 22606			
												DATE 13/03/2009			
												DWG. No. 22606-FORT 06			
												SHEET 6 OF 6 SHEETS			
												Tel. 9414 1395 Fax. 9414 9845 Email: png@png.com.au ABN 74 093 046 407			
												PROUST&GARDNER CONSULTING PTY LIMITED SURVEYORS & PLANNERS			
												400 Pacific Highway PO Box 132 DX 23410 Unfield NSW 2070 ACN 093 046 407			
												SCALES A1 - 1:500 A3 - 1:1000			
												DATUM A.H.D. ORIGIN PM 66183 R.L. 1782			
												SURVEYED R.P. DRAWN G.L.S. APPROVED R.C.			
												20/3/09			
												DATE			
												AMENDMENT			
												No.			

Figure 3 Fort Wallace - GPS Survey tracking of the Occupational Hygienist clearance for the ACM surface pick

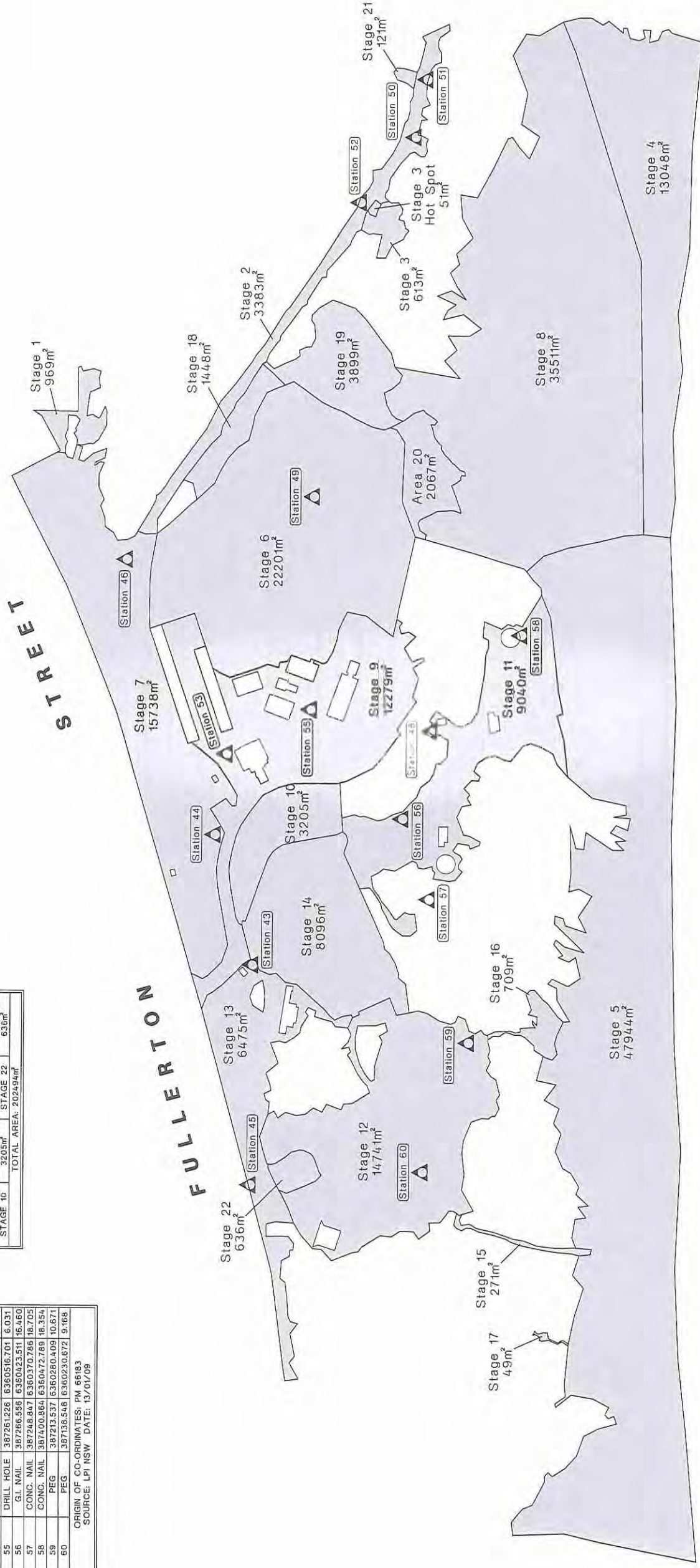


Legend

- Survey perimeter - ---
 - Hotspot perimeter - ---
 - Tracking markers -
(Recorded on a GPS with an approximate 10m interval between markers)
- This Aerial photograph has been geo-referenced from Google Earth and is indicative of on-ground locations only.*



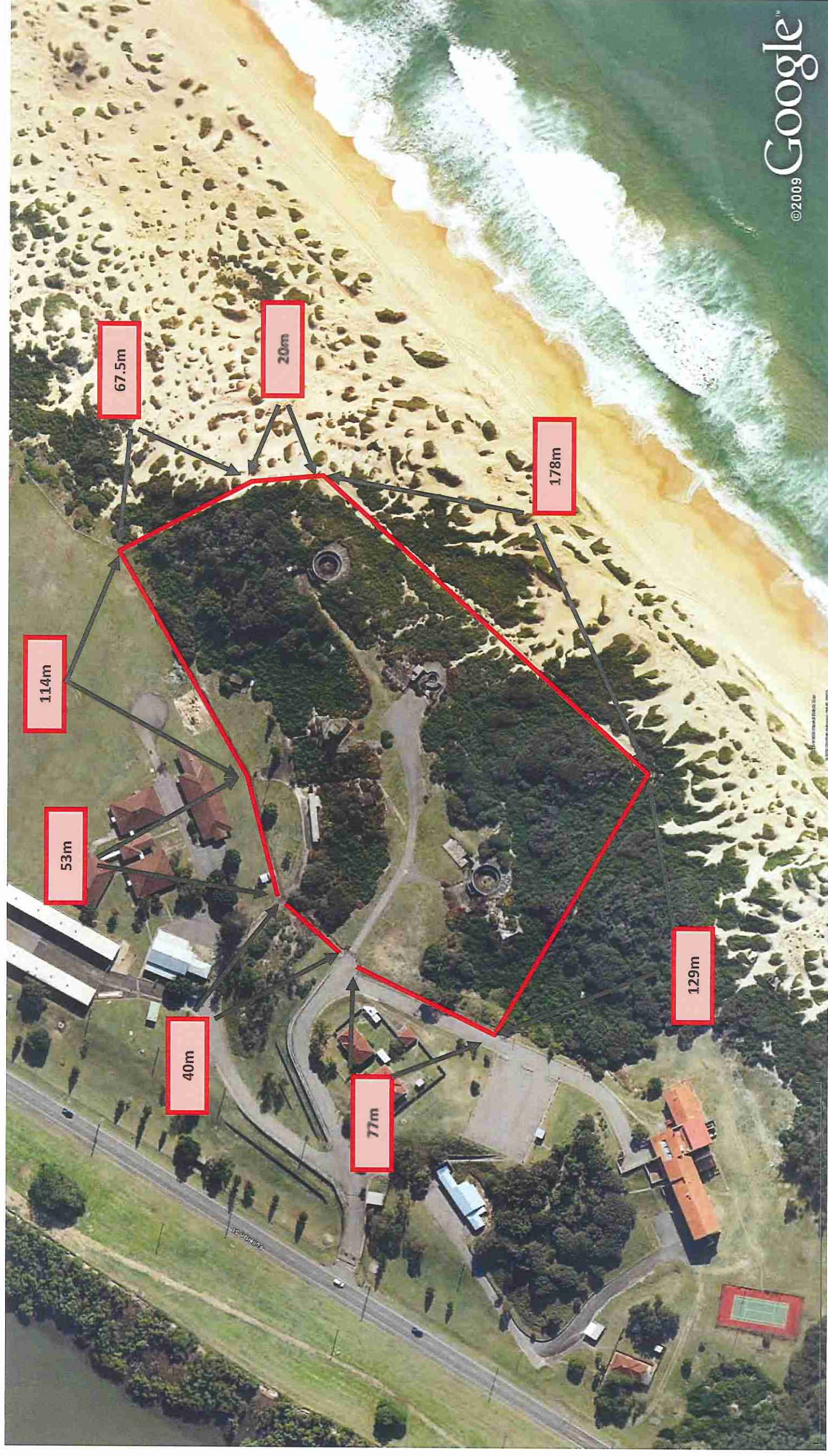
PICKING AREAS			
STAGE 1	969m ²	STAGE 11	9040m ²
STAGE 2	3383m ²	STAGE 12	14741m ²
STAGE 3	613m ²	STAGE 13	6475m ²
STAGE 3		STAGE 14	8095m ²
HOT SPOT	51m ²	STAGE 15	271m ²
STAGE 4	13046m ²	STAGE 16	709m ²
STAGE 5	4794m ²	STAGE 17	49m ²
STAGE 6	22201m ²	STAGE 18	14485m ²
STAGE 7	15736m ²	STAGE 19	34999m ²
STAGE 8	35511m ²	STAGE 20	20677m ²
STAGE 9	12279m ²	STAGE 21	121m ²
STAGE 10	32050m ²	STAGE 22	636m ²
		TOTAL AREA: 202498m ²	

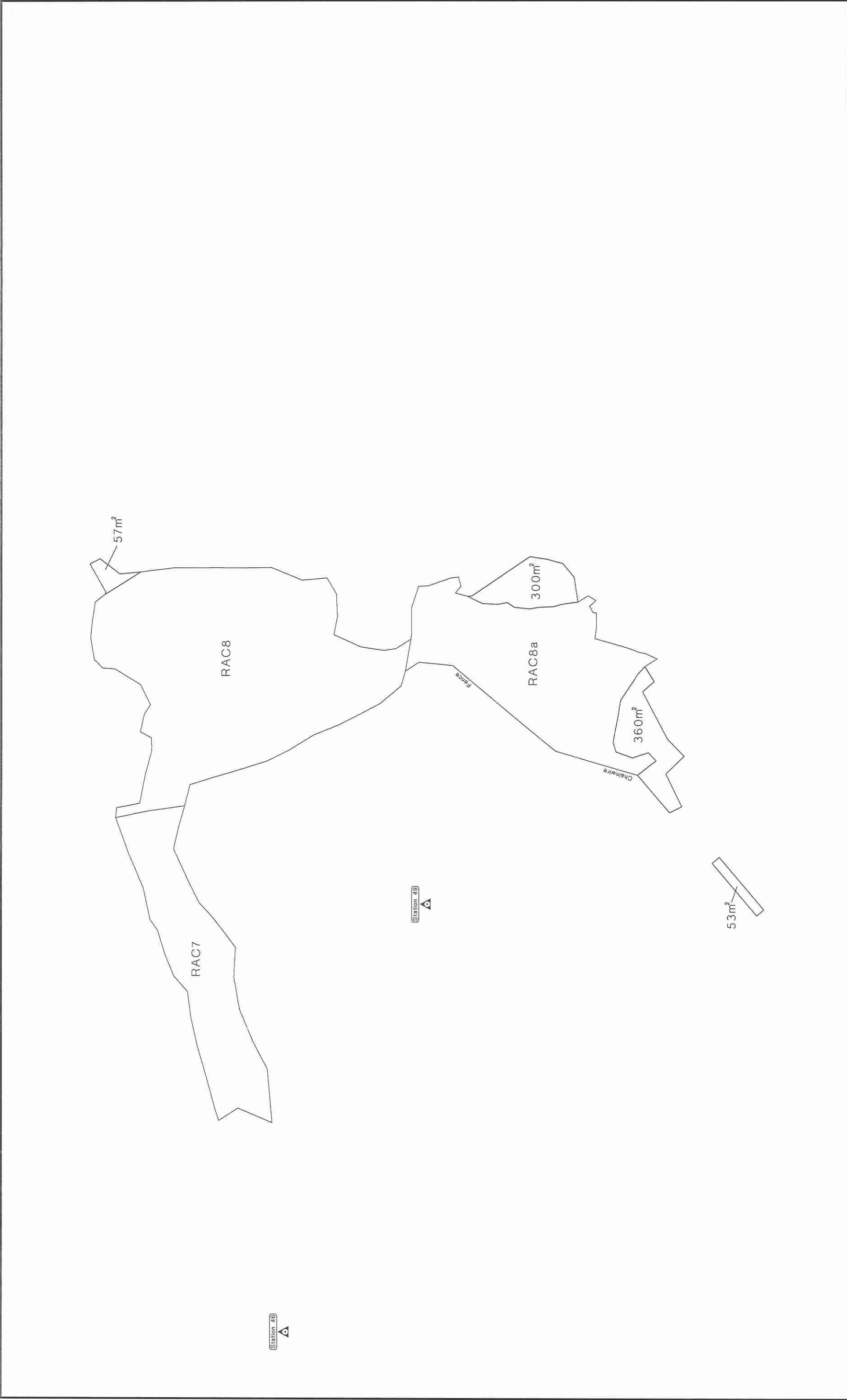


PACIFIC OCEAN

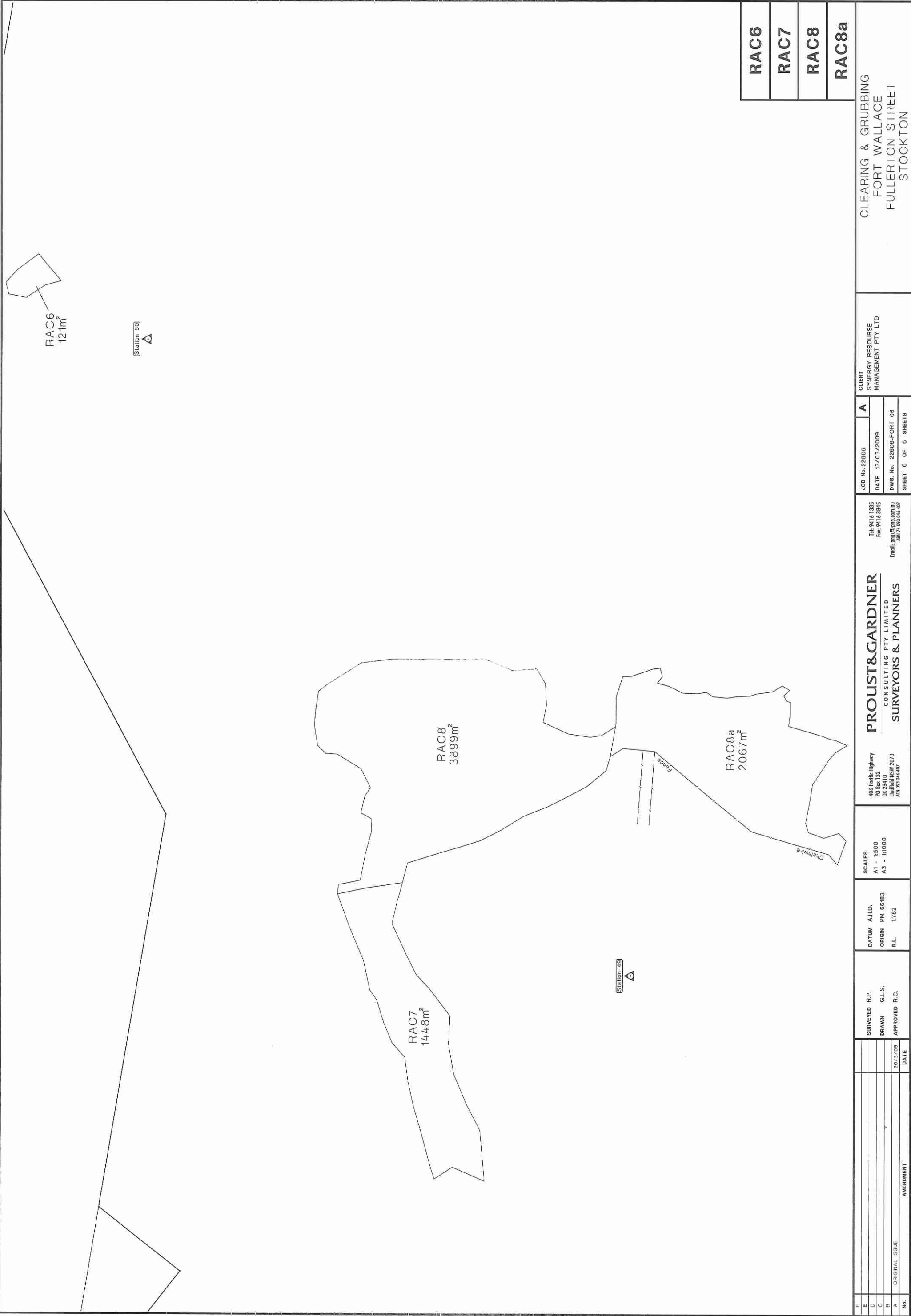
[illegible]

Fort Wallace Fence Line – Total Perimeter = 708.5m



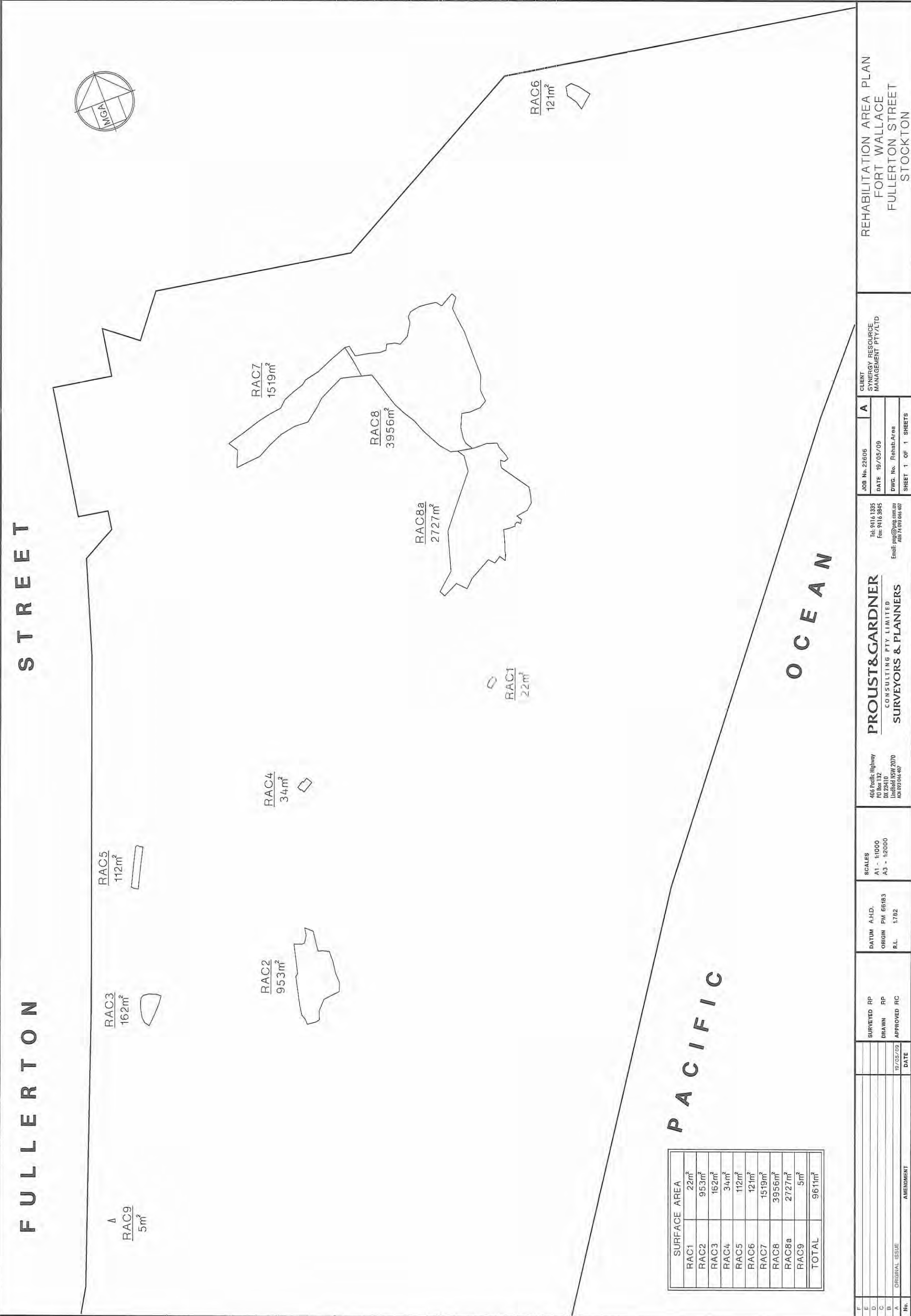


RAC8		RAC8a		EXTRA CLEARING & GRUBBING FORT WALLACE FULLERTON STREET STOCKTON		CLIENT SYNERGY RESOURCE MANAGEMENT PTY LTD									
No.	AMENDMENT	ORIGINAL ISSUE	DATE	JOB No. 22606		A									
				DATE 14/05/2009											
				DWG. No. Clear&Grub Extra											
				SHEET 1 OF 1 SHEETS											
				406 Pacific Highway PO Box 132 DX 23410 Lindfield NSW 2070 ACT 072 044 407				PROUST&GARDNER CONSULTING PTY LIMITED SURVEYORS & PLANNERS				Tel: 9416 1335 Fax: 9416 3865 Email: pmg@pmg.com.au A/N 74 093 044 407			
				SCALES A1 - 1:500 A3 - 1:1000				DATUM A.H.D. ORIGIN PM 6693 R.L. 1782				SURVEYED R.P. DRAWN R.P. APPROVED R.C.			



RAC6
RAC7
RAC8
RAC8a

F				SURVEYED R.P.	DATUM A.H.D.	SCALES	406 Pacific Highway PO Box 132 DX 23410 Lindfield NSW 2070 ACN 093 046 407	PROUST&GARDNER CONSULTING PTY LIMITED SURVEYORS & PLANNERS	Tel: 9416 1335 Fax: 9416 3845 Email: prog@png.com.au AS/NZS 74 093 046 407	CLIENT SYNERGY RESOURCE MANAGEMENT PTY LTD	CLEARING & GRUBBING FORT WALLACE FULLERTON STREET STOCKTON
E											
D											
C											
B											
A				DRAWN G.L.S.	ORIGIN PM 66183	A3 - 1:1000			JOB No. 22606	A	
ORIGINAL ISSUE											
20/3/09											
DATE				APPROVED R.C.	R.L. 1782				DATE 13/03/2009		
AMENDMENT									DWG. No. 22606-FORT 06		



REHABILITATION AREA PLAN
FORT WALLACE
FULLERTON STREET
STOCKTON

CLIENT
SYNERGY RESOURCE
MANAGEMENT PTY/LTD

JOB No. 22606
DATE 19/05/09
DWG. No. Rehab Area
SHEET 1 OF 1 SHEETS

Tel: 9416 1335
Fax: 9416 3845
Email: pgs@pgs.com.au
Addr: 74 073 046 487

PROUST & GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS

406 Pacific Highway
PO Box 132
DX 23410
Lindfield NSW 2070
A/CN 093 046 487

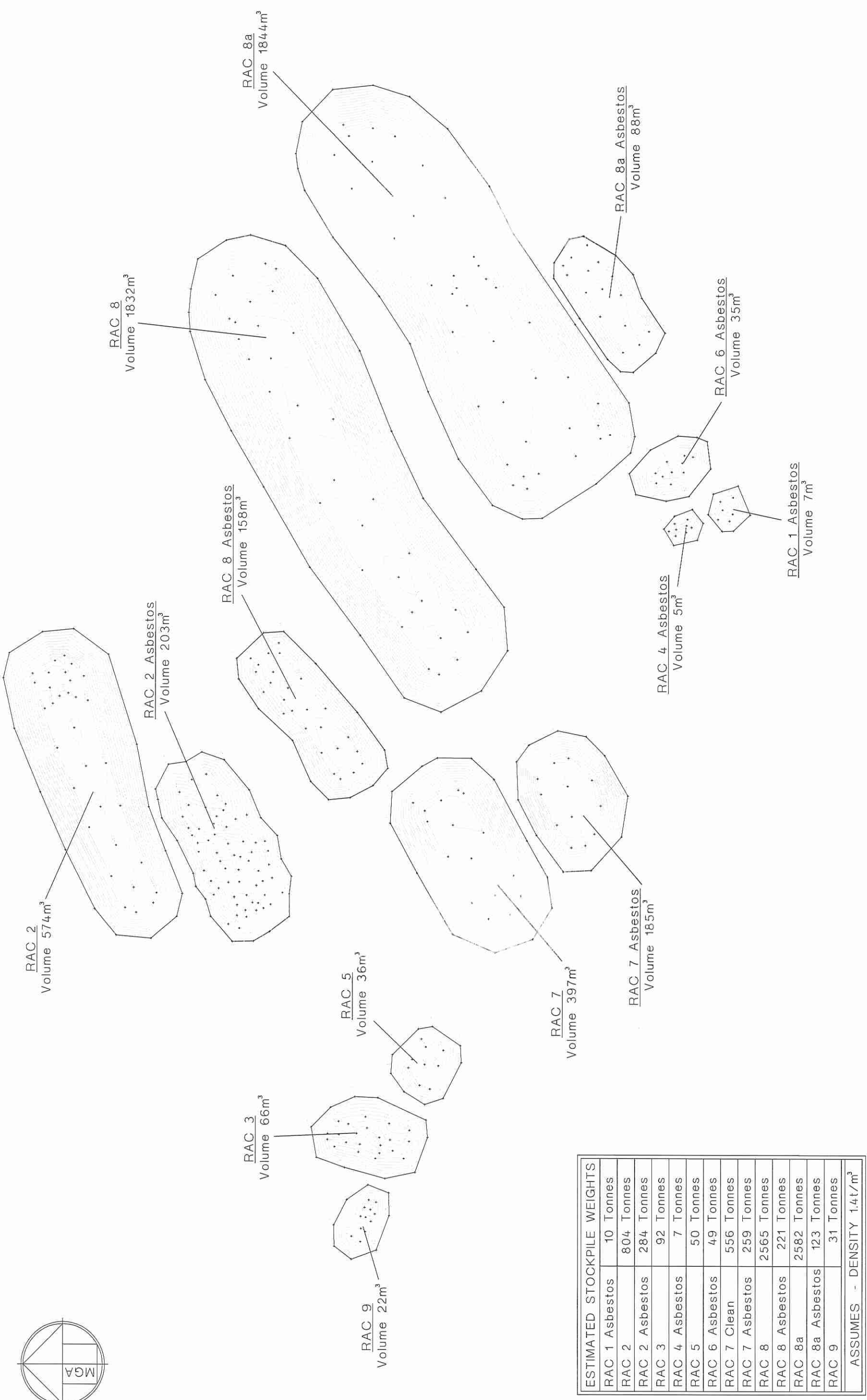
SCALES
A1 - 1:1000
A3 - 1:2000

DATUM A.H.D.
ORIGIN PM 66/83
R.L. 1.782

SURVEYED RP
DRAWN RP
APPROVED RP

19/05/09
DATE

No.	AMENDMENT
F	
E	
D	
C	
B	
A	ORIGINAL ISSUE

[illegible]

SMEC/WSP undertook validation sampling during the course of the remediation works.

Section 8.15.2 of the SMEC/WSP (2008) *Fort Wallace Remedial Action Plan* listed that the Site Environmental Scientist should also perform the following tasks:

- Implementation and documentation of the CEMP during field activities on a daily basis;
- Ensuring that all infrastructure to eliminate / control environmental emissions from the site is correctly installed and operated throughout the works;
- Ensuring that all Subcontractors and Field Personnel assigned to the works perform their work in accordance with the CEMP; and
- Reporting all environmental incidents to the Project Manager, on the appropriate form, and assisting investigations as required.

SMEC/WSP were not commissioned to undertake these activities and accordingly, these responsibilities were assigned to *Synergy*. As part of good field practice for environmental works, SMEC/WSP field staff maintained site notes which described the remediation activities.

4.1.3 Stage 3 – Validation Reporting

This report has been prepared to assess whether the site has been remediated in accordance with remediation planning documents and to the determined land use criteria. The report includes the results of environmental sampling undertaken during remedial works and potential ongoing management requirements.

SMEC/WSP note that on the basis of this validation report, the NSW DECCW Accredited Site Auditor (Dr Ian Swane) will prepare a Site Audit Report (SAR) and Site Audit Statement (SAS) regarding landuse suitability of the site.

4.2 Schedule of Remediation Works

The site remediation works for Fort Wallace were carried out between 3 March 2009 and 23 July 2009.

Civil earthworks were carried out by *Synergy Resource Management*. Supervision of the civil earthworks and sampling activities were completed by SMEC/WSP.

Table 6 below provides a summary of the remediation works that were completed in each remediation area of concern (RAC), including the period over which the works were undertaken.

Table 6 – Summary of Remediation Schedule

RAC	Remediation Activities	Period	Level of Supervision
RAC1	Inner Fort Gun Emplacement - Concentrations of B(a)P and lead in surface soils (<0.1m) exceeding the adopted assessment criteria. The area remediated was approximately 33m ² and on average 0.2m deep.	Excavation/Validation – 17 April 2009 Stockpile Sampled - 20 April 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC2	Inner Fort Gun Emplacement - Concentrations of lead in surface soils (<0.1m) exceeding the adopted assessment criteria. The area	Excavation/Validation – 24 to 28 April 2009	SMEC/WSP supervised the majority of the

RAC	Remediation Activities	Period	Level of Supervision
	remediated was approximately 260m ² and on average 0.8m deep.	Stockpile Sampled - 11 April 2009 Stockpile Disposal – May 2009	excavation
RAC3	Administration Block - Concentrations of lead in surface soil (<0.1m) exceeding the adopted assessment criteria. The area remediated was approximately 134m ² and on average 0.4m deep.	Excavation – 23 April 2009 Stockpile Sampled - 23 April 2009 Stockpile Disposal – June 2009	SMEC/WSP supervised the majority of the excavation
RAC4	Outer Fort/Pump House - Concentrations of PAH and B(a)P in surface soils (<0.1m), exceeding the adopted assessment criteria. The area remediated was approximately 22m ² and on average 0.15m deep.	Excavation – 17 April 2009 Stockpile Sampled - 20 April 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC5	Outer Fort/Western Terraced Area - During the investigations fill was encountered in test pits. Concentrations of B(a)P in surface soils (<0.2m) marginally exceed the adopted assessment criteria. The area remediated was approximately 59m ² and on average 0.2m deep.	Excavation – 23 April 2009 Stockpile Sampled - 23 April 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC6	Sand Dunes - Concentrations of lead, PAHs and B(a)P in surface soils (<0.1m) marginally exceed the adopted assessment criteria. The area remediated was approximately 121m ² and on average 0.2m deep. Surface ACM was also excavated from a nearby area which was added to the same stockpile.	Excavation – 16 April 2009 Stockpile Sampled - 20 April 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC7	Waste Disposal Area - Test pits in this area encountered partially buried waste primarily of domestic origin (including tyres, bricks and scrap metal), to approximately 0.5m below ground level (bgl). The area remediated was approximately 1,448m ² and on average 0.3m deep.	Excavation – 16 to 17 April 2009 Stockpile Sampled - 21 April 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC8	Waste Disposal Area - Test pits in this area encountered partially buried waste primarily of domestic origin (including tyres, bricks and roller doors), to approximately 3m bgl. The area remediated was approximately 3,899m ² and on average 0.5m deep.	Excavation – 17 to 22 April 2009 Stockpile Sampled - 23 April 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC8a	Waste Disposal Area - Test pits in this area encountered partially buried waste primarily of domestic origin (including concrete and tyres), to approximately 0.3m bgl. The area remediated was approximately 2,067m ² and on average 0.5m deep.	Excavation – 16 to 20 April 2009 Stockpile Sampled - 21 April 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation

RAC	Remediation Activities	Period	Level of Supervision
RAC8b	Waste Disposal Area - The area remediated was approximately 145m ² , with an average stockpile height of 1m.	Excavation – 18 May 2009 Stockpile Sampled – 18 May 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC9	Septic Tank - One septic tank required excavation and disposal offsite. The tank was pumped out and removed. Surrounding soils were also excavated. The excavation area was 5m ² .	Excavation – 23 to 28 April 2009 Stockpile Sampled - 12 May 2009 Stockpile Disposal – May 2009	SMEC/WSP supervised the majority of the excavation
RAC10a	Demolished former residential building. Partially removed demolition waste, leveled ground surface and imported sand to cover the ground surface. The area demolished was approximately 35m ² .	Excavation – unknown (before SMEC/WSP) Stockpile Sampled - 23 April 2009 Stockpile Disposal – May 2009	No Environmental Consultant supervision of the building demolition - only sampling of residual surface soils
RAC10b	Demolished former residential building. Partially removed demolition waste, leveled ground surface and imported sand to cover the ground surface. The area demolished was approximately 35m ² .	Excavation – unknown (before SMEC/WSP)	No Environmental Consultant supervision of the building demolition - only sampling of residual surface soils
RAC10c	Demolished former residential building. Partially removed demolition waste, leveled ground surface and imported sand to cover the ground surface. The area demolished was approximately 35m ² .	Excavation – unknown (before SMEC/WSP)	No Environmental Consultant supervision of the building demolition - only sampling of residual surface soils

Figure 3 in Appendix A shows the Remediation Areas.

All material excavated as part of the remediation program was stockpiled in the designated area located on the southern end of the oval. All stockpiles were properly marked and sampled for Waste Classification purposes, prior to disposal at an authorised landfill facility. See **Appendix B** for waste classification reports.

4.3 Description of Remediation Works

4.3.1 Earthwork Procedures

Remediation areas were initially located using a handheld GPS and previously prepared site plans and coordinates. The extent of each remediation area was pegged. Vegetation disrupting access to the remediation area was cleared, to allow the excavation limits to be defined during the excavation process, as guided by the onsite Environmental Scientist/Engineer.

Once the excavation limit had been determined and exposed, the impacted material was excavated and placed on articulated trucks, which then transported the impacted material

During SMEC/WSP's onsite supervision, SMEC/WSP observed the Remediation Contractor tool box meetings and undertook periodic inspections of the work site.

During the periodic inspections and onsite supervision works, SMEC/WSP observed:

- Environmental controls being implemented by the Remediation Contractor, including the placement of filter socks around surface water drains in the work zones;
- The use of Indigenous monitors to observe excavations and manage any Indigenous artefacts unearthed. Where bones were identified in RAC 8, works were ceased until the nature of the (horse) bones were confirmed by the appropriate authorities including the Indigenous monitors;
- Dust generation was controlled by the periodic use of a water cart and the covering of loads moving offsite; and
- Sandy soils appeared to allow the percolation of rainfall within each RAC, without lateral migration of surface waters as sheet flow.

Two passive dust gauges (FWD1 and FWD2) were installed in locations shown on **Figure 26** in **Appendix A**. One dust gauge was installed adjacent to what was considered to be the most sensitive receptor surrounding the site and one gauge was installed within the proximity of the primary bulk earthwork areas.

Dust samples were collected through gauges which were comprised of a steel pole (approx. 2m in height), with a plastic cylinder attached, in which the sample container and funnel fits. The sample containers were 4.5L brown glass cylinders containing 7.6ml of copper sulphate to counter any algal growth in the containers (which has the potential to compromise field results). Dust was collected in a passive manner, as the dust settled on the funnel of the glass gauge. The dust gauge sample containers were replaced on a two week period (approximately), subject to SMEC/WSP personnel being onsite.

SMEC/WSP also note that during the ACM removal works *Getex* undertook asbestos air monitoring, with the laboratory reports provided in **Appendix H**.

Baseline data was not collected as the dust sampling program was commissioned after commencement of the remediation works. Comparative analysis for the results during the remediation program is presented in **Table 7** below. Laboratory reports are presented in **Appendix J**.

Table 7 – Summary of Dust Monitoring Results

Sample ID	Sample Collection Date	Time Exposure Days	Funnel Diameter (mm)	Ash Content	Combustible Matter	Total Insoluble Matter	Particulate Matter	Soluble Solids	Total Solids
				g/(m ² mth)	g/(m ² mth)	g/(m ² mth)	-	g/(m ² mth)	g/(m ² mth)
FW D1/1	20/04/09	14	150	0.3	0.1	0.4	<0.1	0.2	0.6
FW D1/2	16/04/09	26	150	1.8	0.2	2	<0.1	0.4	2.4
FW D1/3	12/05/09	14	150	0.8	0.2	1	<0.1	0.1	1.1
FW D1/4	11/06/09	16	150	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Sample ID	Sample Collection Date	Time Exposure Days	Funnel Diameter (mm)	Ash Content	Combustible Matter	Total Insoluble Matter	Particulate Matter	Soluble Solids	Total Solids
FW D2/1	02/04/09	14	150	0.4	0.2	0.6	<0.1	0.1	0.7
FW D2/2	16/04/09	26	150	0.3	0.2	0.5	<0.1	0.3	0.8
FW D2/3	12/05/09	14	150	1.1	0.2	1.3	<0.1	0.3	1.6
FW D2/4	11/06/09	16	150	0.2	0.1	0.3	<0.1	0.2	0.5

NSW DECCW provide a baseline of 4g/m²month, with Table 7 showing that the results for the dust monitoring during the remedial works were less than this value.

4.3.7 Regulatory Approvals and Requirements

The remediation and validation works were undertaken in general accordance with the following regulatory requirements:

- Project specific Department of Defence Environmental Clearance Certificate, endorsed by the Defence Regional Environmental Officer;
- *Protection of the Environment Operations Act 1997*;
- WorkCover and enHealth general requirements (ACM removal);
- NSW DECCW (2009) *Waste Classification Guidelines* including disposal at a licensed landfill facility; and
- Other NSW OH&S and environmental legislation, including the *Newcastle City Council Development Control Plan*.

4.3.8 Community Consultation

SMEC/WSP did not undertake a Community Consultation program as part of the environmental consulting works. SMEC understands however, that the following activities were undertaken by the Department of Defence:

- A website was established, which included Frequently Asked Questions, a summary of site works and relevant contact details;
- Two community information sessions were held - one meeting before the works commenced and one during the works program;
- A billboard was placed at the entrance to the site, which included a site plan noting the general remediation activities and the relevant contact details; and
- All site workers carried a project business card, which was to be handed to community members in the event of an unsolicited enquiry in order to direct them to the appropriate project contact.

SMEC/WSP was not made aware of any significant community complaints related to the remediation works but understand that there was some community interest in the heritage works.

Table 8 – Adopted Soil Validation Criteria (mg/kg)

Contaminant	NEPM (1999) HIL A	NEPM (1999) HIL E	NEPM (1999) Phytotoxicity	NSW EPA (1994)	Dutch (2000)	US EPA Region IX
Metals						
Arsenic	100	200	20			
Cadmium	20	40	3			
Chromium (III)	12%	24%	400			
Chromium (VI)	100	200	1			
Copper	1000	2000	100			
Lead	300	600	600			
Mercury	15	30	1			
Nickel	600	600	60			
Zinc	7000	14000	200			
PCB						
Total PCB	10	20				
Petroleum Hydrocarbons						
TPH C ₆ -C ₉				65		
TPH C ₁₀ -C ₃₆				1000		
Benzene				1/1*		
Ethylbenzene				50/3.1		
Toluene				130/1.4		
Xylenes (total)				25/14		
PAH						
Total PAH	20	40		20		
Benzo(a)pyrene	1	2				
Acenaphthene						3700
Anthracene						22000
Benz(a)anthracene						0.62
Chrysene						62
Fluoranthene						2300
Fluorene						2700
Indeno(1,2,3-c,d)pyrene						0.62
Naphthalene						56

Contaminant	NEPM (1999) HIL A	NEPM (1999) HIL E	NEPM (1999) Phytotoxicity	NSW EPA (1994)	Dutch (2000)	US EPA Region IX
Pyrene						2300
OCP's						
Aldrin + Dieldrin	10	20				
Chlordane	50	100				
DDT+DDD+DDE	200	400				
Heptachlor	10	20				
VOC (excluding BTEX)						
dichlorodifluoromethane						94
ethyl acetate					75	19000
hexachlorobutadiene						6.2
isopropylbenzene						570
methyl tributyl ether					100	32
n-butylbenzene						240
n-propylbenzene						240
sec-butylbenzene						220
Styrene					100	1700
trichloroethene (tce)					60	0.053
tert-butylbenzene						390
tetrachloroethene (pce)					4	0.48
trichlorofluoromethane						390
vinyl acetate						430
vinyl chloride					0.1	
1,1,1,2-tetrachloroethane						3.2
1,1,1-trichloroethane					15	1200
1,1,2,2-tetrachloroethane						0.41
1,1,2-trichloroethane					10	0.73
1,1-dichloroethane					15	510
1,1-dichloroethene					0.3	
1,2,3-trichloropropane						0.034
1,2,4-trichlorobenzene						62
1,2,4-trimethylbenzene						51

Contaminant	NEPM (1999) HIL A	NEPM (1999) HIL E	NEPM (1999) Phytotoxicity	NSW EPA (1994)	Dutch (2000)	US EPA Region IX
1,2-dibromoethane						0.032
1,2-dichlorobenzene						600
1,2-dichloroethane					4	
1,2-dichloropropane						0.34
1,3,5-trimethylbenzene						21
1,3-dichlorobenzene						530
1,3-dichloropropane						100
1,4-dichlorobenzene						3.4
bromobenzene						28
bromodichloromethane						0.82
carbon disulfide						360
carbon tetrachloride						0.25
chlorobenzene					30	150
chlorodibromomethane						1.1
chloroethane						3
Chloroform					10	0.22
chloromethane						47

Note - *refers to NSW EPA (1994) Guidelines for Assessing Service Station Sites lower BTEX criteria, as they are applicable for use as Ecological Investigation Levels (EILs).

6.1.2 Statistical Criteria

According to the NSW EPA (1997) *Contaminated Sites: Sampling Design Guidelines*, individual sample values exceeding health based criteria are considered to be acceptable to remain on site if the following conditions are met:

- the 95% UCL value is less than the criteria,
- the standard deviation does not exceed 50% of the adopted assessment criteria value;
- A normal probability distribution should only be used for data sets where the COV is not greater than 1.2; and
- the value is less than 250% of the criteria.

Individual values exceeding 250% of the criteria are considered to be “hotspots” and need to be remediated. Areas where the criteria are exceeded but are below the hotspot criteria, and where UCL values cannot be calculated, are considered to be “exceedance areas”. Areas where the UCL exceeds the criteria are considered to be “contaminated areas”. Hotspots and contaminated areas require remediation to render the area suitable.

Rinsate Samples

Rinsate blanks consist of pre-preserved bottles filled with laboratory prepared water that has been passed over decontaminated field equipment. Rinsate blanks are prepared on site, labelled with a unique sample ID and transported to the primary laboratory for analysis as environmental samples. The purpose of the rinsate blank is to determine the effectiveness of decontamination procedures.

Rinsate samples are not required if dedicated and/or disposable sampling equipment is used at sampling locations.

Laboratory Quality Control

Samples were submitted to NATA accredited laboratories LabMark (primary) and ALS (secondary). Analytical methods complied with NEPM and NSW DECCW requirements, with laboratory detection limits used in the laboratory tests less than the adopted site assessment criteria.

Field Data Sheets

While on site, the SMEC/WSP representative filled out the following forms:

1. Daily Record Sheet – this details the date, site conditions and the works undertaken;
2. Field Screening Form – outlining the sample ID, sample type, depth and PID reading; and
3. Chain of Custody Documentation (CoC) for all samples to be transported to a laboratory. The CoC will detail the following information:
 - a) Site identification;
 - b) The sampler;
 - c) Nature of the sample – soil or water;
 - d) Collection time and date;
 - e) Analyses to be performed; and
 - f) Sample preservation method.

7.2 Validation Sampling

Based on the SMEC (2008) VSAQP, **Table 9** outlines the validation sampling conducted post remediation.

Table 9 – Proposed Validation Sampling Program - SAQP

RAC	Analytical Suite	Depth of Excavation (m)	Sampling Rationale	Number Samples	Sample Identification	Figure
RAC 1 – Northern Gun Emplacement	Metals 8 (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg) and PAHs	0.2	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	2 + 1	RAC1vF1 and RAC1vF2 Re-sampled ID RAC1vF1/2	10
RAC 2 – Waste Material below Southern Gun Emplacement	Metals 8 (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	0.1 to 1.5	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	20	RAC2vF1to RAC2vF20	11

RAC	Analytical Suite	Depth of Excavation (m)	Sampling Rationale	Number Samples	Sample Identification	Figure
RAC 3 – Administration Block	Metals 8 (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg) and PAHs	0.4	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	3 + 1	RAC3vF1 to RAC3vF3 Re-sampled ID RAC3F2/2	12
RAC 4 – Pump House	Metals 8 (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg), TPH and PAHs	0.15	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	2	RAC4vF1 and RAC4vF2	13
RAC 5 – Western Terraced Area	Metals 8 (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg) and PAHs	0.2	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	2 + 1	RAC5vF1 and RAC5vF2 Re-sampled ID RAC5vF1/2	14
RAC 6 – Sand Dunes	Metals 8 (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg) and PAHs	0.2	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	2	RAC6vF1 and RAC6vF2	15
RAC 7 – Waste Disposal Area	TPH, PAHs, OCPs, VOCs, asbestos fibres and Metals (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	0.1 to 1.0	Walls – Minimum of one validation sample per wall, at a rate of one sample per 8 linear metres. Floor – Minimum of one sample at a rate of one sample per 8.5m*8.5m grid or 72m ²	44	RAC7vN1 RAC7vS1 RAC7vE1 to RAC7vE10 RAC7vW1 to RAC7vW10 RAC7vF1 to RAC7vF22	16
RAC 8 – Waste Disposal Area	TPH, PAHs, OCPs, VOCs, asbestos fibres and Metals (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	0.1 to 3.2	Walls – Minimum of one validation sample per wall, at a rate of one sample per 8 linear metres. Floor – Minimum of one sample at a rate of one sample per 8.5m*8.5m grid or 72m ²	82	RAC8vN1 to RAC8vN11 RAC8vS1 to RAC8vS7 RAC8vE1 to RAC8vE10 RAC8vW1 to RAC8vW9 RAC8vF1 to RAC8vF45	17
RAC 8a – Waste Disposal Former Training Area	TPH, PAHs, OCPs, VOCs, asbestos fibres and Metals (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	0.3 to 2.5	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	39	RAC8vN1 to RAC8vN2 RAC8vE1 to RAC8vE5 RAC8vF1 to RAC8vF32	18
RAC 8b – Waste Disposal Area	TPH, PAHs and Metals (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	0.1	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	8	8b/5 to 8b/10 FW8b-V1 FW8b-V2	19
RAC 9 – Septic Tanks	Metals 8, TPH, PAHs, OCPs and Faecal Coliforms	2.0	Walls – Minimum of one validation sample per wall, at a rate of one sample per 8 linear metres. Floor – Minimum of one sample at a rate of one sample per 8.5m*8.5m grid or 72m ²	5	RAC9vN1 RAC9vS1 RAC9vE1 RAC9vW1 RAC9vF1	20
RAC 10a – Demolished Buildings 1,2 & 21	OCPs, asbestos fibres and Metals (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	0.1	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	7	RAC10avF1 to RAC10avF7	21
RAC 10b – Demolished Building 3	OCPs, asbestos fibres and Metals (As, Cd, Cu,	0.1	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ²	6	RAC10bvF1 to RAC10bvF6	21

RAC	Analytical Suite	Depth of Excavation (m)	Sampling Rationale	Number Samples	Sample Identification	Figure
	Total Cr, Ni, Pb, Zn, Hg)		grid).			
RAC 10c – Demolished Building 31	OCPs, asbestos fibres and Metals (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	0.1	Surface validation samples at a rate of one sample per 8.5m by 8.5m grid (or 1 sample per 72m ² grid).	7	RAC10cvF1 to RAC10cvF7	21

7.2.1 Additional Validation / Delineation Sampling – Site Auditor Request

Additional validation sampling was carried out based on the information provided by the Site Auditor in the “Site Audit Report on the Remedial Action Plan for Fort Wallace, Fullerton Street, Stockton, NSW” (17.09.08) and “Site Auditor Review Comments on Draft Validation SAQP for Fort Wallace, Newcastle” (02.06.09).

The Auditor recommended additional soil sampling to complement SMEC’s sampling regime and to delineate / validate the potential extent of contamination with the RACs as summarised below and in **Table 10**:

- Asphalt/bitumen from sealed roadways at the site be tested for total PAHs and lead as well as Toxicity Characteristic Leaching Procedure (TCLP);
- Fill material behind the retaining wall above the terraces;
- In areas which have not been investigated and where unrestricted land use is possible, metal detectors be used to search for metal objects as an indication of significant volumes of buried waste;
- Asbestos Containing Material (ACM) present at the ground surface be removed;
- Heavily vegetated area - FWD2; and
- Disused septic tanks are removed from the site.

Table 10 – Proposed Validation Sampling Program – Auditor Requirements

Area	Sampling Rationale	Depth of Excavation (m)	Analytical Suite	Number Samples	Sample Identification	Figure
Asphalt Roads	To assess the potential leachability of PAHs in pavements onsite. 1 bitumen sample from the admin block and 1 from the vehicle maintenance area.	Layers of asphalt	PAHs + Lead, TCLP PAHs/lead and Neutral Leach PAHs/lead	2 samples	FWVMP1 and FWABP1	22
Fill material behind retaining wall	To assess the nature of possible fill material	0.5	TPH, PAHs, OCPs, VOCs, asbestos fibres and Metals (As, Cd, Cu, Total Cr, Ni, Pb, Zn, Hg)	2 boreholes = 1 surface (0.1m) and 1 deeper (0.5m)	FWCT1, FWCT2, FWCT3 and FWCT4	22

Area	Sampling Rationale	Depth of Excavation (m)	Analytical Suite	Number Samples	Sample Identification	Figure
				sample per borehole.		
Fill material between RAC8 and RAC8a	To assess the nature of possible fill material	1.0 (if required)	TPH, PAHs, Metals and Asbestos	2	8bv1 and 8bv2	19
FWD2	Elevated lead and zinc in surface soils identified during the SMEC/WSP (2008) <i>Contamination Assessment</i>	0.1	Metals and Asbestos	4	FWD2/1 FWD2/2 FWD2/3 FWD2/4	15
Metal Detectors	To validate that additional significant waste pits are unlikely to exist	-	-	Metal detector Lines at 10m intervals	MD	25
ACM across site	Unconstrained area	-	Occupational Hygienist Asbestos Clearance Certificate	-	-	23

Sensitivity

The method detection limit is a measure of how sensitively the analytical technique/instrument quantifies the concentration of the compound present. The detection limits achieved by the laboratories should be within the criteria for each compound analysed. Therefore sufficient confidence can be placed in the results obtained. The sensitivity is described as the EQL, which is typically between 2 and 5 times the method detection limit.

The table below compares Soil EQLs against adopted investigation levels.

Table 12 – Summary of Soil EQLs compared against investigation levels

Contaminant	EQL (mg/kg)	NEPM (1999) HIL A (mg/kg)	NEPM (1999) HIL E (mg/kg)	NEPM (1999) Provisional phytotoxicity based investigation level (mg/kg)	NSW EPA (1994) (mg/kg)	Dutch Intervention Values (2000) (mg/kg)	EQL below at least one listed investigation level?
Metals							
Arsenic	1	100	200	20			✓
Cadmium	0.1	20	40	3			✓
Chromium (III)	1	12%	24%	400		380	✓
Chromium (VI)		100	200	1			
Copper	2	1000	2000	100			✓
Lead	2	300	600	600	300		✓
Mercury (inorganic)	0.05	15	30	1			✓
Nickel	1	600	600	60			✓
Zinc	5	7000	14000	200			✓
PCBs							
Total PCB	0.5	10	20				✓
Petroleum Hydrocarbons							
TPH C ₆ -C ₉	10				65		✓
TPH C ₁₀ -C ₃₆	100				1000		✓
Benzene	0.5				1		✓
Ethylbenzene	0.5				3.1/50		✓
Toluene	0.5				1.4/130		✓
Xylenes (total)	1				14/25		✓

Contaminant	EQL (mg/kg)	NEPM (1999) HIL A (mg/kg)	NEPM (1999) HIL E (mg/kg)	NEPM (1999) Provisional phytotoxicity based investigation level (mg/kg)	NSW EPA (1994) (mg/kg)	Dutch Intervention Values (2000) (mg/kg)	EQL below at least one listed investigation level?
PAHs							
Total PAH		20	40				
Benzo(a)pyrene	0.5	1	2				✓
Acenaphthene	0.5						✓
Anthracene	0.5						✓
Benz(a)anthracene	0.5						✓
Chrysene	0.5						✓
Fluoranthene	0.5						✓
Fluorene	0.5						✓
Indeno(1,2,3-c,d)pyrene	0.5						✓
Naphthalene	0.5						✓
Pyrene	0.5						✓
VOC (excluding BTEX)							
dichlorodifluoromethane	5						✓
ethyl acetate	0.5					75	✓
hexachlorobutadiene	0.5						✓
isopropylbenzene	0.5						✓
methyl tributyl ether	0.5					100	✓
n-butylbenzene	0.5						✓
n-propylbenzene	0.5						✓
sec-butylbenzene	0.5						✓
Styrene	0.5					100	✓
trichloroethene (tce)	0.5					60	✓
tert-butylbenzene	0.5						✓
tetrachloroethene (pce)	0.5					4	✓

Contaminant	EQL (mg/kg)	NEPM (1999) HIL A (mg/kg)	NEPM (1999) HIL E (mg/kg)	NEPM (1999) Provisional phytotoxicity based investigation level (mg/kg)	NSW EPA (1994) (mg/kg)	Dutch Intervention Values (2000) (mg/kg)	EQL below at least one listed investigation level?
trichlorofluoromethane	5						✓
vinyl acetate	5						✓
vinyl chloride	5					0.1	marginally above Dutch Intervention
1,1,1,2-tetrachloroethane	0.5						✓
1,1,1-trichloroethane	0.5					15	✓
1,1,2,2-tetrachloroethane	0.5						✓
1,1,2-trichloroethane	0.5					10	✓
1,1-dichloroethane	0.5					15	✓
1,1-dichloroethene	0.5					0.3	marginally above Dutch Intervention
1,2,3-trichloropropane	0.5						✓
1,2,4-trichlorobenzene	0.5						✓
1,2,4-trimethylbenzene	0.5						✓
1,2-dibromoethane	0.5						✗
1,2-dichlorobenzene	0.5						✓
1,2-dichloroethane	0.5					4	✓
1,2-dichloropropane	0.5						✓
1,3,5-trimethylbenzene	0.5						✓
1,3-dichlorobenzene	0.5						✓
1,3-dichloropropane	0.5						✓
1,4-dichlorobenzene	0.5						✓
bromobenzene	5						✓
bromodichloromethane	0.5						✓
carbon disulfide	0.5						✓
carbon tetrachloride	0.5						✓

Contaminant	EQL (mg/kg)	NEPM (1999) HIL A (mg/kg)	NEPM (1999) HIL E (mg/kg)	NEPM (1999) Provisional phytotoxicity based investigation level (mg/kg)	NSW EPA (1994) (mg/kg)	Dutch Intervention Values (2000) (mg/kg)	EQL below at least one listed investigation level?
chlorobenzene	0.5					30	✓
chlorodibromomethane	0.5						✓
chloroethane	5						✓
Chloroform	0.5					10	✓
chloromethane	5						✓
OCPs							
Heptachlor epoxide	0.05					4	✓
Endosulfan sulphate	0.05						✓
Hexachlorobenzene	0.05						✓
Aldrin	0.05						✓
Aldrin + Dieldrin	0.05	10	20				✓
a-BHC	0.05						✓
b-BHC	0.05						✓
d-BHC	0.05						✓
Endosulfan II	0.05						✓
DDT	0.05						✓
cis-Chlordane	0.05						✓
trans-chlordane	0.05						✓
g-BHC (Lindane)	0.05						✓
Dieldrin	0.05						✓
Endrin	0.05						✓
Methoxychlor	0.2						✓
DDD	0.05						✓
4,4-DDE	0.2						✓
Endrin aldehyde	0.05						✓

Contaminant	EQL (mg/kg)	NEPM (1999) HIL A (mg/kg)	NEPM (1999) HIL E (mg/kg)	NEPM (1999) Provisional phytotoxicity based investigation level (mg/kg)	NSW EPA (1994) (mg/kg)	Dutch Intervention Values (2000) (mg/kg)	EQL below at least one listed investigation level?
Heptachlor	0.05	10	20				✓
Endosulfan I	0.05						✓
DDT+DDE+DDD	0.05	200	400			4	✓
Asbestos	0.5	No free fibres detected					✓

In summary, and as shown in **Table 12** above, the EQLs for soils met the DQO for being between 2 and 5 times less than the investigation levels, with the exception of Vinyl chloride and 1,1 dichloroethene. SMEC/WSP do not consider this result significant for the following reasons:

- It is unlikely that the use of chlorinated solvents at the site is widespread, based on sampling and analysis results from the Contamination Assessment (SMEC, 2008); and
- EQLs for other chlorinated solvents likely to be present when vinyl chloride or 1,1 dichloroethene are present were 2-5 times less than the investigation levels.

Laboratory Blanks

Laboratory blanks are used to monitor unintentionally introduced contaminants to the sample in the laboratory, for example organic or inorganic residues contained on glassware or cleaning reagents. Laboratory method blanks are used as part of the precision process. The acceptance criteria of the method blank is not detected >95% of the reported EQL. Laboratory blanks throughout the validation program were reported within the acceptance criteria.

Field Rinsate Samples

Rinsate blanks consisted of pre-preserved bottles filled with laboratory prepared water that has been passed over decontaminated field equipment. Rinsate blanks were prepared on site, labelled with a unique sample ID and transported to the primary laboratory for analysis as environmental samples. The purpose of the rinsate blank is to determine the effectiveness of decontamination procedures.

The rinsate blanks collected throughout the project are summarised in **Table 13**.

Table 13 – Summary of rinsate samples

Rinsate Sample	Date	Equipment	Detects
RINSATE	17/4/09	Trowel	None
RINSATE	21/4/09	Trowel	None
RINSATE	23/4/09	Trowel	None

Rinsate Sample	Date	Equipment	Detects
RINSATE	12/5/09	Trowel	None

Holding Times

The time between the field sampling and analyte result was as short as possible in order to prevent any biological, chemical or physical alteration of the analyte. All samples were analysed within the prescribed holding time for each analyte (refer to **Appendix J – Laboratory Reports**) with the exception of moisture and pH in some samples.

Representativeness

Representativeness indicates how accurately and precisely the collected data represent the characteristics of a population, parameter variations at a sampling point, or an environmental condition. SMEC/WSP consider that the samples collected were representative of the environmental media targeted during sampling.

8.3 Intra-laboratory and Inter-laboratory Duplicates

Intra-laboratory (blind duplicate) samples are provided by the collection of two environmental samples from the same location. These samples are preserved, stored, transported, prepared and analysed in an identical manner. As a minimum, the results of the analyses on the blind duplicate sample pair are assessed by calculating the Relative Percent Differences (RPDs) between the results. The RPD is calculated as the difference between the results divided by their mean value and expressed as a percentage. If the RPD exceeds the value adopted for any analytes, additional investigation will be required, or justification provided for not conducting additional investigation.

A target ratio of one blind duplicate for every ten environmental samples was used.

To check the accuracy of the laboratory results, a subset of samples (inter-laboratory samples) split from the parent samples, were sent for laboratory analysis at a secondary laboratory.

During the validation stage of this project, 25 duplicate soil samples and 14 triplicate samples were analysed.

The intra-laboratory and inter-laboratory duplicate samples analysed, with the respective primary sample, are summarised in **Table 14**. Refer to **Appendix I** for RPD calculations.

Samples that exceed the RPD criteria are attributable to inherent variability of the sample material and the low concentrations of the compounds relative to the laboratory limits of reporting.

Table 14 – Summary of Soil intra-lab duplicates

Parent Sample	Date	Intra-lab Duplicate	Inter-lab Duplicate
RAC2VF11	28/4/09	RAC2 DUP1	
RAC2VW3	28/4/09	RAC2 DUP2	RAC2 TRIP1
RAC7VE7	17/4/09	RAC7 DUP1	RAC7 TRIP1
RAC7VF14	17/4/09	RAC7 DUP2	

Parent Sample	Date	Intra-lab Duplicate	Inter-lab Duplicate
RAC7VF10	17/4/09	RAC7 DUP3	
RAC7VF6	17/4/09	RAC7 DUP4	RAC7 TRIP2
RAC8VF17	23/4/09	RAC8 DUP1	
RAC8VF13	23/4/09	RAC8 DUP2	RAC8 TRIP1
RAC8VF22	23/4/09	RAC8 DUP3	RAC8 TRIP2
RAC8VF30	23/4/09	RAC8 DUP4	
RAC8VF35	23/4/09	RAC8 DUP5	RAC8 TRIP3
RAC8VW7	23/4/09	RAC8 DUP6	
RAC8aVF1	20/4/09	RAC8a DUP1	
RAC8aVF6	20/4/09	RAC8a DUP3	RAC8a TRIP1
RAC8aVF8	20/4/09	RAC8a DUP4	RAC8a TRIP2
RAC9VF1	28/4/09	RAC9 DUP	RAC9 TRIP1
RAC10aVF1	12/5/09	RAC10a DUP1	
RAC10cVF1	12/5/09	RAC10c DUP1	RAC10c TRIP1
RAC2SP1	12/5/09	RAC2SP DUP1	RAC2SP TRIP1
RAC7SP9	21/4/09	RAC7SP DUP1	
RAC8SP2	23/4/09	RAC8SP DUP1	RAC8SP TRIP1
RAC8SP9	23/4/09	RAC8SP DUP2	
RAC8aSP11	20/4/09	RAC8aSP DUP1	RAC8aSP TRIP1
FWSA12	11/6/09	FWSA DUP1	FWSA TRIP1
STVENM8	26/5/09	STVENM DUP1	

8.3.1 QA/QC Decision Error Limits

For the purposes of this investigation, an overall error limit of 95% (i.e. 5% outside acceptable limits) was adopted in line with industry standards.

8.4 Summary of QA/QC Assessment

Where elevated RPDs were identified in soils, samples were collected from heterogeneous surface material and/or concentrations were close to the detection limits.

8/4/2009

Metals (MB)										OCP										Petroleum Hydrocarbons (TPH)										Polycyclic Aromatic H												
Field ID	LocCode	Sample Depth	Sampled Date	Lab No.	Area	Purpose	Asenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	a-BHC	Aldrin + Dieldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDT+DDE+DDD	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	TPH C 6 - C 9 Fraction	TPH C 10 - C 14 Fraction	TPH C 15 - C 28 Fraction	TPH C 29-C 36 Fraction	TPH+C 10 - C 36 (Sum of total)	Acenaphthylene	Anthracene	Benzo(a) pyrene	Benzo(b,k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	
EQL							1	0.1	1	2	2	0.05	1	5	0.05		0.05	0.05	0.05	0.05	0.05	4	0.05	0.05			0.05	0.05	0.05	0.05	0.2	10	50	100	100	0.5	0.5	0.5	0.5	1	0.5	0.5
Dutch Intervention																						4																				
EPA 1984 Service Station																																										
NEPM 1989 EL							3	1	100	600	200											4																				
NEPM 1989 HL A							20	100	1000	300	15	600	7000									200																				
NEPM 1989 HL E							200	40	200	2000	600	30	600	14000								400																				
USEPA PRG Res Soil															0.09		0.32																									
Field ID	LocCode	Sample Depth	Sampled Date	Lab No.	Area	Purpose	<1	<0.1	<1	2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC7VF20	RAC7VF20	41/7/2009	41/7/2009	42664	RAC7	Validation	<1	<0.1	2	2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC7VF21	RAC7VF21	41/7/2009	41/7/2009	42664	RAC7	Validation	<1	<0.1	5	5	<2	<0.05	<1	55	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC7VF22	RAC7VF22	41/7/2009	41/7/2009	42664	RAC7	Validation	<1	<0.1	2	6	14	<0.05	1	26	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP1	RAC8BDUP1	4/23/2009	4/23/2009	42650	RAC8	Validation	1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP2	RAC8BDUP2	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP3	RAC8BDUP3	4/23/2009	4/23/2009	42650	RAC8	Validation	2	<0.1	1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP4	RAC8BDUP4	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP5	RAC8BDUP5	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP6	RAC8BDUP6	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP7	RAC8BDUP7	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP8	RAC8BDUP8	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP9	RAC8BDUP9	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP10	RAC8BDUP10	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP11	RAC8BDUP11	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP12	RAC8BDUP12	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP13	RAC8BDUP13	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP14	RAC8BDUP14	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP15	RAC8BDUP15	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP16	RAC8BDUP16	4/23/2009	4/23/2009	42650	RAC8	Validation	2	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP17	RAC8BDUP17	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP18	RAC8BDUP18	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP19	RAC8BDUP19	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP20	RAC8BDUP20	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
RAC8BDUP21	RAC8BDUP21	4/23/2009	4/23/2009	42650	RAC8	Validation	<1	<0.1	<1	<2	<2	<0.05	<1	<5	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<10	<50	<100	<100	0	<0.5	<0.5	<0.5				

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Arocarbons (PAH)										Polychlorinated Biphenyls (PCB)										BTEX by P&T														
Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	Aroclor 1016	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	PCBs (Sum of total)	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1,2-trichlorobenzene	1,2,3-trichloropropane	1,2,4-trichlorobenzene	1,2,4-trimethylbenzene	1,2-dibromo-3-chloropropane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
EQUL															1	50	130		25		15		10									4		
Dutch Intervention																																		
EPA 1994 Service Station																																		
NEPM 1999 EIL																																		
NEPM 1999 HIL A							20							10																				
NEPM 1999 HIL E							40							20																				
USEPA PRG Res Soil								3.9							0.64	400	520			270	3.2	1200		0.73	510	120		62	52		600			

Volatile Organic Compounds (VOC)																																							
	1,3,5-trimethylbenzene	1,3-dichlorobenzene	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chlorotoluene	4-chlorotoluene	Benzene	Bromobenzene	Bromodichloromethane	Bromoform	Bromomethane	Chloroethane	Carbon disulfide	Carbon tetrachloride	Chlorobromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Dichlorodifluoromethane	Ethyl acetate	Ethylbenzene	Hexachlorobutadiene	Isopropylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	TCE	tert-butylbenzene	Tetra						
mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	0.5	0.5	0.5	0.5	5	10	5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5					
EQCL								1	75																														
Dutch Intervention																																							
EPA 1994 Service Station																																							
NEPM 1999 EIL																																							
NEPM 1999 HIL A																																							
NEPM 1999 HIL E																																							
USEPA PRG Res Soil																																							
21	530	100	3.4			160	0.64	28	0.82	62		150	1.1	47	43	67	94	19000	400	6.2	570	32	56	240	240	1700	390												
Field ID	LocCode	Sample Depth	Sampled Date	Lab No.	Area	Purpose	1,3,5-trimethylbenzene	1,3-dichlorobenzene	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chlorotoluene	4-chlorotoluene	Benzene	Bromobenzene	Bromodichloromethane	Bromoform	Bromomethane	Chloroethane	Carbon tetrachloride	Chlorobenzene	Chlorobromomethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Dichlorodifluoromethane	Ethyl acetate	Ethylbenzene	Hexachlorobutadiene	Isopropylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	TCE	tert-butylbenzene	Tetra	
RAC1VF1	RAC1VF1		4/17/2009	42464	RAC1	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RAC1VF1/2	RAC1VF1/2		5/16/2009	42826	RAC1	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC1VF2	RAC1VF2		4/17/2009	42464	RAC1	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2DUP1	RAC2DUP1		4/26/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2DUP2	RAC2DUP2		4/26/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF1	RAC2VF1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF10	RAC2VF10		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF11	RAC2VF11		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF12	RAC2VF12		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF2	RAC2VF2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF3	RAC2VF3		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF3/2	RAC2VF3/2		5/18/2009	42826	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF4	RAC2VF4		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF5	RAC2VF5		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF6	RAC2VF6		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF7	RAC2VF7		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF8	RAC2VF8		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF9	RAC2VF9		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN3	RAC2VN3		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN2	RAC2VN2		4/28/2009	42588	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VN1	RAC2VN1		4/28/2009	42588	RAC2	Validation	-	-	-	-																													

[illegible]

[illegible]

										Toluene		trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichlorofluoromethane	Vinyl acetate	Vinyl chloride	Xylene (m & p)	Xylene (o)	Asbestos
										mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
										0.5	0.5	0.5	0.5	5	5	5	1	0.5	
EQL																0.1			
Dutch Intervention										130									
EPA 1994 Service Station																			
NEPM 1999 EIL																			
NEPM 1998 HIL A																			
NEPM 1998 HIL E																			
USEPA PRG Res Soil										520	69			390	430				
Field ID	LocCode	Sample Depth	Sampled Date	Lab No.	Area	Purpose													
RAC1VF1	RAC1VF1		4/17/2009	42464	RAC1	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC1VF1/2	RAC1VF1/2		5/18/2009	42826	RAC1	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC1VF2	RAC1VF2		4/17/2009	42464	RAC1	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2DUP1	RAC2VF11		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2DUP2	RAC2VM3		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF1	RAC2VF1		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF10	RAC2VF10		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF11	RAC2VF11		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF12	RAC2VF12		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF2	RAC2VF2		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF3	RAC2VF3		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF3/2	RAC2VF3/2		5/18/2009	42826	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC2VF4	RAC2VF4		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF5	RAC2VF5		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF6	RAC2VF6		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF7	RAC2VF7		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF8	RAC2VF8		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VF9	RAC2VF9		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VN1	RAC2VN1		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VN2	RAC2VN2		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VN3	RAC2VN3		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VN1	RAC2VN1		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VM2	RAC2VM2		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VM3	RAC2VM3		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VM4	RAC2VM4		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC2VM5	RAC2VM5		4/28/2009	42568	RAC2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC3VF1	RAC3VF1		4/23/2009	42550	RAC3	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC3VF2	RAC3VF2		4/23/2009	42550	RAC3	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC3VF2/2	RAC3VF2/2		5/18/2009	42826	RAC3	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC3VF3	RAC3VF3		4/23/2009	42550	RAC3	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC4VF1	RAC4VF1		4/17/2009	42464	RAC4	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC4VF2	RAC4VF2		4/17/2009	42464	RAC4	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC5VF1	RAC5VF1		4/23/2009	42550	RAC5	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC5VF1/2	RAC5VF1/2		5/18/2009	42826	RAC5	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC5VF2	RAC5VF2		4/23/2009	42550	RAC5	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC6VF1	RAC6VF1		4/16/2009	42500	RAC6	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC6VF2	RAC6VF2		4/16/2009	42500	RAC6	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
FWD2/1	FWD2/1		6/11/2009	43195	FWD2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
FWD2/2	FWD2/2		6/11/2009	43195	FWD2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
FWD2/3	FWD2/3		6/11/2009	43195	FWD2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
FWD2/4	FWD2/4		6/11/2009	43195	FWD2	Validation	-	-	-	-	-	-	-	-	-	-	-	-	-
RAC7DUP1	RAC7VE7		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7DUP2	RAC7VF14		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7DUP3	RAC7VF10		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7DUP4	RAC7VF6		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VE3	RAC7VE3		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VE4	RAC7VE4		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VE5	RAC7VE5		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VE6	RAC7VE6		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VE7	RAC7VE7		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VE8	RAC7VE8		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF1	RAC7VF1		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF2	RAC7VF2		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF3	RAC7VF3		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF4	RAC7VF4		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF5	RAC7VF5		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF6	RAC7VF6		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF7	RAC7VF7		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF8	RAC7VF8		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF9	RAC7VF9		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF10	RAC7VF10		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF11	RAC7VF11		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF12	RAC7VF12		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF13	RAC7VF13		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF14	RAC7VF14		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF15	RAC7VF15		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF16	RAC7VF16		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF17	RAC7VF17		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF18	RAC7VF18		4/16/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND
RAC7VF19	RAC7VF19		4/17/2009	42464	RAC7	Validation	-	-	-	-	-	-	-	-	-	-	-	-	ND

8/4/2009

8/4/2009

8/4/2009

	#2500	#2600	#2700	#2800	#2900	#3000	#3100	#3200	#3300	#3400	#3500	#3600	#3700	#3800	#3900	#4000	#4100	#4200	#4300	#4400	#4500	#4600	#4700	#4800	#4900	#5000	#5100	#5200	#5300	#5400	#5500	#5600	#5700	#5800	#5900	#6000	#6100	#6200	#6300	#6400	#6500	#6600	#6700	#6800	#6900	#7000	#7100	#7200	#7300	#7400	#7500	#7600	#7700	#7800	#7900	#8000	#8100	#8200	#8300	#8400	#8500	#8600	#8700	#8800	#8900	#9000	#9100	#9200	#9300	#9400	#9500	#9600	#9700	#9800	#9900	#10000	#10100	#10200	#10300	#10400	#10500	#10600	#10700	#10800	#10900	#11000	#11100	#11200	#11300	#11400	#11500	#11600	#11700	#11800	#11900	#12000	#12100	#12200	#12300	#12400	#12500	#12600	#12700	#12800	#12900	#13000	#13100	#13200	#13300	#13400	#13500	#13600	#13700	#13800	#13900	#14000	#14100	#14200	#14300	#14400	#14500	#14600	#14700	#14800	#14900	#15000	#15100	#15200	#15300	#15400	#15500	#15600	#15700	#15800	#15900	#16000	#16100	#16200	#16300	#16400	#16500	#16600	#16700	#16800	#16900	#17000	#17100	#17200	#17300	#17400	#17500	#17600	#17700	#17800	#17900	#18000	#18100	#18200	#18300	#18400	#18500	#18600	#18700	#18800	#18900	#19000	#19100	#19200	#19300	#19400	#19500	#19600	#19700	#19800	#19900	#20000	#20100	#20200	#20300	#20400	#20500	#20600	#20700	#20800	#20900	#21000	#21100	#21200	#21300	#21400	#21500	#21600	#21700	#21800	#21900	#22000	#22100	#22200	#22300	#22400	#22500	#22600	#22700	#22800	#22900	#23000	#23100	#23200	#23300	#23400	#23500	#23600	#23700	#23800	#23900	#24000	#24100	#24200	#24300	#24400	#24500	#24600	#24700	#24800	#24900	#25000	#25100	#25200	#25300	#25400	#25500	#25600	#25700	#25800	#25900	#26000	#26100	#26200	#26300	#26400	#26500	#26600	#26700	#26800	#26900	#27000	#27100	#27200	#27300	#27400	#27500	#27600	#27700	#27800	#27900	#28000	#28100	#28200	#28300	#28400	#28500	#28600	#28700	#28800	#28900	#29000	#29100	#29200	#29300	#29400	#29500	#29600	#29700	#29800	#29900	#30000	#30100	#30200	#30300	#30400	#30500	#30600	#30700	#30800	#30900	#31000	#31100	#31200	#31300	#31400	#31500	#31600	#31700	#31800	#31900	#32000	#32100	#32200	#32300	#32400	#32500	#32600	#32700	#32800	#32900	#33000	#33100	#33200	#33300	#33400	#33500	#33600	#33700	#33800	#33900	#34000	#34100	#34200	#34300	#34400	#34500	#34600	#34700	#34800	#34900	#35000	#35100	#35200	#35300	#35400	#35500	#35600	#35700	#35800	#35900	#36000	#36100	#36200	#36300	#36400	#36500	#36600	#36700	#36800	#36900	#37000	#37100	#37200	#37300	#37400	#37500	#37600	#37700	#37800	#37900	#38000	#38100	#38200	#38300	#38400	#38500	#38600	#38700	#38800	#38900	#39000	#39100	#39200	#39300	#39400	#39500	#39600	#39700	#39800	#39900	#40000	#40100	#40200	#40300	#40400	#40500	#40600	#40700	#40800	#40900	#41000	#41100	#41200	#41300	#41400	#41500	#41600	#41700	#41800	#41900	#42000	#42100	#42200	#42300	#42400	#42500	#42600	#42700	#42800	#42900	#43000	#43100	#43200	#43300	#43400	#43500	#43600	#43700	#43800	#43900	#440
--	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	------

[illegible]

*RPDs have only been considered where a concentration is greater than 0 times the EQL.



Appendix C Site Auditor Photographs



Photo 1 Excavated surfaces around plotting room (21/05/09)



Photo 2 Excavated surface in front of Administration Building RAC3 (21/05/09)

SINCLAIR KNIGHT MERZ



Photo 3 Excavated surface between retaining walls RAC5 (21/05/09)



Photo 4 Contaminated soil stockpile area (21/05/09)

SINCLAIR KNIGHT MERZ



Photo 5 Excavated surfaces at waste disposal areas RAC7, RAC8 & RAC8A (21/05/09)



Photo 6 Excavations at RAC8A showing existing subsoil drainage system (21/05/09)



Photo 7 Excavated surfaces near pump house RAC4 (21/05/09)



Photo 8 Backfilled remediated area at RAC 6 (24/09/09)

SINCLAIR KNIGHT MERZ



Photo 9 Cleared and re-grassed contaminated soil stockpile area (24/09/09)



Photo 10 Scraped soils near plotting room (24/09/09)



Photo 11 Stockpiled waste material near plotting room (24/09/09)



Photo 12 General view of searchlight area (24/09/09)

SINCLAIR KNIGHT MERZ



Photo 13 ACM fragments found at searchlight area (24/09/09)



Photo 14 Wild flowers growing in sand dunes near searchlight building (24/09/09)

SINCLAIR KNIGHT MERZ



Photo 15 Searchlight area after ACM fragments removed (30/09/09)



Appendix D Audit Correspondence



Ms Vicki Pearce
Department of Defence – Property Disposal Unit
BP3-2-A024, Brindabella Park
CANBERRA ACT 1225

20 October 2008

Let SKM FortW201008.doc
EN02226

Dear Ms Pearce

Remediation of Contamination at Fort Wallace, Fullerton Street, Stockton, NSW

I refer to an approval provided by URS on behalf of the Department of Defence dated 3 October 2008. The approval was for the DECC-accredited Site Auditor, Dr Ian Swane, to assess whether any further investigation work needs to be undertaken at the Fort Wallace site (the Site) prior to the appointment of a remediation contractor. This letter provides the results of the review.

The site audit statement (SAS) issued on 17 September 2008 concluded that the nature and extent of the contamination had been appropriately determined and the remedial action plan (RAP)¹ was appropriate for the stated purpose. The SAS also concluded that different parts of the Site can be made suitable for a wide range of uses provided it was remediated in accordance with the RAP subject to compliance with 12 conditions. In my opinion, no further investigation work needs to be undertaken at the Site prior to the appointment of a remediation contractor.

The scope of remediation work is usually subject to variations that arise during the course of the work due to the nature of the work and the difficulties in accurately quantifying the work scope based on investigation data. The Site Auditor considers that sufficient information has been obtained by past investigations to allow the commencement of the remedial works and its revision as the project proceeds, provided regular communications are maintained with the Site Auditor throughout all stages of the work.

Prior to the commencement of remedial works at the Site, the Site Auditor recommends that the following tasks be undertaken in order to facilitate the completion of the remediation works and the validation program to DECC standards:

¹ SMEC (March 2008) *“Fort Wallace Remedial Action Plan, Final”*



- a) A copy of the tender documentation for the remediation contract and the tender submission prepared by the appointed remediation contractor is provided to the Site Auditor for review.
- b) A delineation sampling report and a draft Sampling, Analysis and Quality Plan for the validation program (SAQP) prepared by SMEC have been reviewed and approved by the Site Auditor².
- c) A detailed schedule for the remediation works and validation program is provided to the Site Auditor.

Please don't hesitate to contact the undersigned should any further assistance be required at this time.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', is written over a light blue rectangular background. The signature is fluid and cursive, with a horizontal line drawn underneath the name.

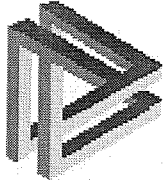
Dr Ian C Swane (CPEng)

NSW DECC & WA DEC Site Auditor, QLD EPA TPR

Phone: (02) 9928 2126; Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au

² Copies of the tender documentation and tender submission prepared by the appointed remediation contractor will need to be provided to allow the Site Auditor to complete Task (b).



Gibson Nominees Pty. Ltd.

One-stop Seamless Strategic Support

A.C.N. 008 434 222

Miss V. Pearce
Project Officer
Property Disposals
Department of Defence
Brindabella Park Offices
CANBERRA ACT 2600

Dear Miss Pearce

**POTENTIAL FOR REMNANT HAZARDOUS ORDNANCE-RELATED
MATERIEL AT FORT WALLACE**

I refer to your request today to provide an opinion on the potential for hazardous ordnance-related material (including unexploded ordnance) to be remnant at the Fort Wallace site.

A detailed Stage 1 assessment has found no evidence to suggest that the presence of such material exists at this site. Please note, however, that, as indicated in our earlier review, this opinion is conditional upon no such material having been discarded in the identified waste dumps at Fort Wallace.

On that basis, it is our opinion that, on the balance of probabilities, the potential for ordnance-related material that poses an explosive or pyrotechnic hazard to be remnant at the Fort Wallace site is low.

Please contact us again if we can assist further in this matter.

Yours sincerely

David Thomas
CEO

6 November 2008

Memo



To	Lachlan Wood & Seth Molinari (URS)	Date	17 February 2009
From	Dr Ian Swane	Project No	EN02226
Copy	Daniel Cramer and Hugh Selby (SMEC), Vicki Pearce (Defence)		
Subject	Site Auditor Review of Remediation Specification for Fort Wallace (4 pages)		

Lachlan / Seth

This memo provides my Site Auditor review comments on the main text of the Remediation Specification for Fort Wallace ("Specification") version 05 dated 6 November 2008. The document was prepared by SMEC and defines the remediation work to be undertaken by the contractor Synergy. The document and the request to review it were provided to the Site Auditor in an email from URS dated 6 February 2009.

The purpose of my review, as I understand it, is to advise whether the scope of work described in the main text of the Specification is consistent with the scope of work described in the RAP and additional work recommended in my site audit report (SAR). The Site Auditor has also assessed issues that may impact the contamination land audit of the work and the form of the final site audit statement. The methodology adopted by the Site Auditor has been to review the Specification with reference to my site audit report dated 17 September 2008 together with the investigation reports and RAP that were the subject of the audit report¹.

Note that the review does not include a review of the figures and the version of the RAP that were included in Appendices A and B of the Specification, since this information was not supplied by URS. The review also does not identify typographical errors and minor matters that are unlikely to have a significant impact on the scope of remedial work to be undertaken by the contractor.

My review comments on the proposed scope of works are as follows.

1. The Specification has included the remediation areas that were specified in the RAP and practically all the additional areas recommended in the SAR. In some cases the volumes differed from those previously described in the SMEC (March 2008) contamination assessment and RAP. The Site Auditor assumes that the changes in

¹ SMEC (March 2008) "*Fort Wallace Contamination Assessment*" and SMEC (March 2008) "*Fort Wallace Remedial Action Plan*"



volume estimates have come about because SMEC has reassessed the available data. No calculations supporting these new volume estimates have been provided to the Site Auditor, so an opinion on the accuracy of these estimates cannot be provided. It is recommended that the URS Contract Administrator ensure that a sufficient contingency allowance has been allowed in the remediation budget to ensure all necessary works are undertaken by the contractor under this contract.

2. The Specification has included the removal of two septic tanks (RAC 9), as recommended in the SAR². It is recommended that a plan showing the location of these and any other septic tanks be included in the Specification if not done already and a copy provided to the Site Auditor for review.
3. The Specification has included the removal of asbestos containing material (ACM) from the Site. Section 7.1 advises that ACM is to be removed from the entire Site of 32 ha, while Section 5.1 advises that accessible site areas are estimated to be approximately 20 ha. A later part of Section 7.1 then advises that ACM removal shall only occur in certain accessible areas as defined by the Specification³. In my opinion, there appears to be some confusion as to the actual size and location of the areas needing to be remediated from ACM. Furthermore, the Specification has not defined the term “accessible areas”. In my opinion, ACM needs to be removed from the entire Site that is to be remediated for “unrestricted land use (includes residential), while ACM needs to be removed from all areas that are located in future non-residential areas that are likely to be accessed by the general public in the future. It is recommended that a plan showing the location of the proposed ACM remediation areas be provided to the Site Auditor for review as soon as possible. It is also recommended that the URS Contract Administrator clarifies the extent of the ACM remediation work to be undertaken by the contractor and the definition of “accessible areas”. What happens if a bushfire goes through the area in the next few weeks?
4. The Specification has included an additional area not previously documented, this being RAC 8a “Waste Disposal Former Training Area”. No plan showing the extent of this area has been provided. The Site Auditor assumes that the remedial works proposed for this new area is a response to recommendations given in the SAR⁴ regarding the potential need for additional remedial work in the RAC 8 area. It is

² Refer Section 4.4.1 in the SAR

³ Section 7.1 in the Specification states that “ACM removal shall occur in all accessible areas, including: In and within 5m of the outside edge of access tracks; and in and within 5m of the outside edge of clearings”

⁴ Refer Section 4.4.4 in the SAR



recommended that a plan defining the extent of the RAC 8a area be included in the Specification if not done already and a copy provided to the Site Auditor for review.

5. The Specification has not included an allowance for remedial work in a suspect burial area in a gully behind the Southern Gun Emplacement (locations FW13-FW17)⁵. SMEC had earlier estimated the amount of waste in this area to be 125m³. If no remedial work is to be undertaken in this area, then SMEC will need to justify this decision in their validation report by undertaking additional reconnaissance work, soil testing and assessment work for the area.
6. The Specification has not included an allowance for remedial work in the heavily vegetated area at FWD2 and asphalt pavement. The SAR recommended that additional delineation testing be undertaken by SMEC in these areas. The need for any additional work in these areas will need to be determined by SMEC once this delineation testing has been completed.
7. The Specification has not included the removal of all waste material and abandoned infrastructure (both above and below ground) containing hazardous building materials from those areas of the site to be used for “unrestricted landuse”, which includes residential⁶. It is recommended that this work be either included in the scope of the remedial work or addressed by means of a Site Management Plan (SMP) that would be referred to in the final site audit statement.

Other matters that have been identified in the Site Auditor review that should also be addressed by the URS Contract Administrator are:

8. It is recommended that the ACM removal and clearance methodology and cleanup criteria⁷ proposed by the remediation contractor and their occupational hygienist meets the requirements of the NSW DECC and NSW Department of Health. It is suggested that the Site Auditor be requested to review the methodology prior to the work being commenced
9. It is recommended that the ACM Management Plan⁸ prepared by the remediation contractor and their occupational hygienist meets the requirements of the NSW DECC and NSW Department of Health. The plan should include correspondence from the Department of Health and/or NSW DECC approving the adopted cleanup criteria, as recommended in the NSW DEC (2006) site auditor guidelines. It is suggested that the

⁵ Refer Section 4.4.4 in the SAR

⁶ Refer Section 4.4.6 in the SAR

⁷ Refer Section 5.4 of the Specification

⁸ Refer Section 7.1 of the Specification



Site Auditor be requested to review the methodology prior to the work being commenced

10. It is recommended that remediation areas be extended to limits approved by the environmental consultant from SMEC/WSP. It is recommended that an additional hold point reflecting this requirement be included in Section 5.4 of the Specification
11. It is recommended that no excavations are backfilled unless they have been inspected, surveyed, documented, validated and approved by SMEC/WSP. It is recommended that an additional hold point reflecting this requirement be included in Section 5.4 of the Specification
12. Section 7.1 of the Specification states that *"The Contractor is required to peg and survey the proposed ACM removal areas, prior to ACM removal occurring. No ACM removal can occur, without prior visual inspection and approval of the pegged areas by the Environmental Consultant"*. It is recommended that SMEC/WSP also be allowed to make their own inspections and provide advice to the URS Contract Administrator on other areas where ACM removal should occur. In such a situation, URS should instruct the contractor to undertake this additional work.
13. Section 7.1 of the Specification requires the contractor to undertake additional removal works to the satisfaction of the Occupational Hygienist if the Occupational Hygienist considers that sufficient ACM removal has not been undertaken. It is recommended that SMEC/WSP also be allowed to make their own inspections and provide advice to the URS Contract Administrator on areas where additional ACM remediation work is required. In such a situation, URS should instruct the contractor to undertake this additional work.
14. It is recommended that the remediation contractor should only engage an occupation hygienist who will produce written certification of the site that can be relied upon by Defence and the Site Auditor.
15. A copy of the Construction Program should be provided to the Site Auditor so site inspections can be planned.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', with a horizontal line underneath.

Dr Ian C Swane (CPEng)

NSW DECC & WA DEC Site Auditor; QLD EPA TPR

Phone: (02) 9928 2126; Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au

SINCLAIR KNIGHT MERZ

The SKM logo trade mark is a registered trade mark of Sinclair Knight Merz Pty Ltd.

Memo



To	Daniel Cramer / Hugh Selby (SMEC)	Date	25 May 2009
From	Dr Ian Swane	Project No	EN02226
Copy	Lachlan Wood (URS), Vicki Pearce (Defence)		
Subject	Site Auditor Inspection of Stockton Rifle Range and Fort Wallace Sites, Stockton (2 pages)		

Daniel / Hugh

This memo provides a summary of findings the Site Auditor made as a result of an inspection I conducted at the Stockton Rifle Range and Fort Wallace sites on 21 May 2009 and a project meeting I attended on the same day.

Stockton Rifle Range

1. I inspected the stockpile sieving operation being undertaken by Synergy. I advised at the project meeting that Synergy needed to ensure that all excavated materials were being tracked from cradle-to-grave and the process was being well documented. SMEC should periodically review this documentation and ensure that these requirements are being met and that any deficiencies are addressed.
2. Synergy need to ensure the stockpiled material is well managed and stockpiles are properly maintained, well defined and adequately separated from each other. Synergy need to ensure that no cross-contamination occurs between clean/validated materials and the different categories of contaminated/waste material. SMEC should periodically review this work and ensure any deficiencies are addressed. SMEC needs to also ensure the ground surface remaining in stockpile areas are validated after the areas are no longer used.
3. A lot of bullets have been exposed along the access road at the northern end of the stop butt, indicating that this area needs further remedial work. I suggest that bullets and other waste materials along the stop bullet be progressively removed by emu picking as they become exposed and identified, particularly after windy/rainy periods. It is no point in SMEC validating the area until these bullets and Defence related waste have been removed. The northern part of the stop butt may need to be re-scraped.
4. Synergy/SMEC need to continue to remove any ACM fragments and waste as they are identified during subsequent walkover inspections. The locations from which the materials are removed should be recorded by GPS and documented in the SMEC validation report.

SINCLAIR KNIGHT MERZ

The SKM logo trade mark is a registered trade mark of Sinclair Knight Merz Pty Ltd.



5. I inspected the septic tank excavation at the western end of the site. It looked good and can be backfilled after SMEC has confirmed the validation tests meet the remediation criteria and all remediation/validation work in the area has been properly documented.
6. I identified a suspect area where I suggest further assessment needs to be undertaken by SMEC. The area is located at the western end of the site on the northern side of the access road where some lantana is growing around a large tree. The presence of the lantana and the rough appearance of the ground suggest there is a risk of waste material being dumped there. I suggest SMEC gets a couple of test pits placed in the area.
7. I also remind SMEC and URS of the need to ensure all previous issues I have raised in earlier site inspection have been properly addressed. These matters were described in my 17/03/2009 email and 20/04/2009 memo.

Fort Wallace

8. I inspected the various excavations that were present on the day. They looked good and can be backfilled after SMEC has confirmed the validation tests meet the remediation criteria and all remediation/validation work in the areas has been properly documented.
9. I identified a suspect area where I suggest further assessment needs to be undertaken by SMEC. The area is located at an uncleared corner on the eastern side of the main cleared area to the east of the playing field. The presence of the weeds and the rough appearance of the ground suggest there is a risk of waste material being dumped there. I suggest SMEC gets a couple of test pits placed in the area.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', is written over a light blue rectangular background. The signature is fluid and cursive, with a horizontal line drawn underneath the name.

Dr Ian C Swane (CPEng)

NSW DECC & WA DEC Site Auditor; QLD EPA TPR

Phone: (02) 9928 2126

Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au

Memo



To	Daniel Cramer & Hugh Selby (SMEC)	Date	2 June 2009
From	Dr Ian Swane	Project No	EN02226
Copy	Lachlan Woods (URS) & Vicki Pearce (Defence)		
Subject	Site Auditor Review Comments on Draft Validation SAQP for Fort Wallace, Newcastle (2 pages)		

Daniel / Hugh

I have reviewed the SMEC draft document titled "*Fort Wallace - Draft Validation Sampling Analysis and Quality Plan*" dated 5/12/2008. My comments are largely editing changes that update the document in light of advice provided over the past four months. My comments are:

1 Introduction

1. Section 1.1: The objective of the validation sampling program should also be to demonstrate that the remediated site meets DECC requirements for the proposed land use, as suggested in Section 2.2.1.
2. Section 1.4: Change the reference to the SAR from "draft" to "final" and change the date to 17/09/2008.
3. Section 1.4: Other areas of the site where the SAR (Sections 2.2, 3.12 & 4.4.1) recommended further assessment and/or remediation were:
 - The heavily vegetated area at FWD2 (located at northern end of sand dunes, as shown in SMEC Figure 14 from the ESA report)

3 Sampling Methodology

4. Table 2, RAC 6 – Sand Dunes (FW37B): The area to be validated should be extended to include the exceedance measured at sampling location FWD2.
5. A new sub-section needs to be included that describes the protocols and procedures to be used for the identification, removal and validation of ACM contamination from the Site. An explanation also needs to be given as to why asbestos certification is only proposed for that part of the Site shown in SMEC Figure 13 and not the whole Site, as recommended by the Site Auditor¹.
6. Groundwater monitoring wells remaining at the site should be registered with the Department of Planning, as previously recommended by the Site Auditor².

4 Assessment Criteria

7. Section 4.1.3: Additional statistical criteria should be included that were recommended in Section 3.9.1 of the SAR. These are:

¹ Refer Sections 2.3 & 4.4.5 in the SAR

² Refer Sections 2.2, 3.12 in SAR



- The standard deviation does not exceed 50% of the SAC
 - A normal probability distribution should only be used for data sets where the COV is not greater than 1.2
8. Section 4.1.5 can refer to the WA Department of Health (May 2009) "*Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in WA*". The Site Auditor will accept the ACM soil acceptance criteria recommended in these guidelines.

Please provide me with a final complete version of the SAQP.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', is written over a light blue horizontal line.

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR

Phone: (02) 9928 2126

Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au

Memo



To	Daniel Cramer & Hugh Selby (SMEC)	Date	9 September 2009
From	Dr Ian Swane	Project No	EN02226
Copy	Lachlan Woods (URS) & Vicki Pearce (Defence)		
Subject	Site Auditor Review Comments on Draft Fort Wallace Validation Report (8 pages)		

Daniel / Hugh

I have reviewed the SMEC draft document titled “*Fort Wallace Validation Report*” dated 4/08/2009. My comments are largely editing changes and are as follows:

Table of Contents

1. Remove the draft stamp
2. Remove typographical errors from the report
3. The table of contents need to have a few section headings edited (Sections 8, 9.3, 9.10.

Executive Summary

4. SMEC should also advise on page vi that the following additional remediation work was also undertaken:
 - The manual removal of ACM fragments that were scattered across the site and the provision of Asbestos Clearance Certificates
5. SMEC should include the following conclusions on page vii or otherwise explain why these conclusions can’t be made:
 - All known areas of contaminated soil have been remediated and contaminant levels remaining in bitumen pavements have been characterised and assessed as posing a low risk
 - All visible and identified ACM fragments have been removed from the Site.
 - All known UXO and Defence-related waste have been removed from the Site.
 - Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.
 - SMEC should itemise those locations on the site where known contamination remain. SMEC should then explain why this material poses a low risk to future site users and the environment and can remain on-site and managed by an SEMP.
 - SMEC should describe the hazardous building materials remaining at the site and explain why these materials can remain on-site and pose a low risk to future users
6. Concerning the recommendations, I would recommend the second bullet point be changed to read: “*If the site is to be used for more sensitive land uses than assessed in this report, it is recommended that a suitably experienced environmental practitioner be consulted to determine if any additional investigations need to be undertaken.*”

SINCLAIR KNIGHT MERZ

The SKM logo is a trade mark of Sinclair Knight Merz Pty Ltd. © Sinclair Knight Merz Pty Ltd, 2006



7. Concerning the recommendations, please explain the rationale behind the recommendation given in dot point 3. Does this mean that a plumber repairing a leaking pipe needs to consult an environmental consultant prior to undertaking the work? I would suggest removing this recommendation unless there is a valid reason for its retention.

Section 1 Introduction

8. Section 1.5: Remove the second reference to NSW Department of Climate Change (2008) Waste Classification Guidelines
9. Section 1.5: Update US EPA (April 2009) PRGs rather than the 2004 reference

Section 2 Site Description

10. Section 2.3.2: Remove paragraph indent

Section 3 Site History

11. Section 3.1: Include the references in Section 11
12. Section 3.2.3: Include a reference to this report in Section 11
13. Section 3.2.4: Include a reference to this report in Section 11
14. Section 3.2.4: On page 15, change the reference from Figure 6 to Figures 6a – 6c

Section 4 Remediation Methodology

15. Section 4.1: Explain that the rehabilitation works conducted at the Fort Wallace site involved a program of site remediation and a separate program of demolition and structural rehabilitation work. Explain that the demolition and structural rehabilitation work was undertaken by the building contractor Kane. Explain how the demolition and structural rehabilitation work did not affect the conduct or outcome of the remediation work.
16. Section 4.1: Section 8.15.2 of the RAP specified four duties that the SMEC environmental scientist had concerning the environmental management of remediation work at the site. Advise whether these tasks were also undertaken by SMEC, or if not, if another organisation was responsible for this work.
17. Section 4.1: Describe the record keeping and reporting that SMEC conducted during the period of the remediation work. Section 8.16 of the RAP advised that the SMEC environmental scientist would keep a diary of the remediation works. Advise whether this task was undertaken.
18. Section 4.1: Describe who was responsible for the manual removal of ACM fragments and make reference to the additional information provided in Section 9.16
19. Section 4.1.1: Advise whether an OH&S Plan was prepared by the remediation contractor prior to the commencement of work.
20. Section 4.3.1: Describe:
 - How remediation areas were located and how the excavation limits were defined
 - Whether materials were excavated and directly loaded into trucks and then transported to the Stockpile Area
 - The location and design of the Stockpile Area and operations that occurred at the Stockpile Area



- When validation samples were collected and when excavations were backfilled
 - How excavations were backfilled
 - How remediated areas were landscaped and any erosion protective measures
 - Describe how the stockpile area was reinstated
21. Section 4.3.1: The report should confirm whether any UXO or Defence-waste (eg. spent bullets) were uncovered by the remedial work or validation program. Provide details of any such material that was encountered and its significance.
 22. Section 4.3.2: Provide information on the materials handling and stockpiling strategy used by the remediation contractor. How many stockpiles were used? How were different materials allocated to stockpiles? Explain the stockpile register provided in Appendix C.
 23. Section 4.3.2: Provide a summary of the waste classification reports that were prepared and included in Appendix B. Explain the basis for the waste classifications provided in Appendix B.
 24. Section 4.3.2: Provide details of the landfill/s where materials removed from the site were disposed.
 25. Section 4.3.2: Provide summary details of the information provided on the tip dockets such as landfill, date, number of loads received on that day, tonnage received on that day. Also provide a copy of a few landfill tip dockets as an example. This data should be included in Appendix C.
 26. Section 4.3.2: Provide summary details of the volumes of different waste material that were disposed off-site to landfill/s. Compare these volumes against the survey volumes provided in Appendix D and assess whether the quantities are in agreement or explain the reason for any significant discrepancies.
 27. New section – ACM Clearance: Describe the ACM clearance procedures used and how ACM materials were removed and disposed. Was the material placed on the large material stockpiles that were subsequently disposed to landfill? Make reference to the Asbestos Clearance Certificates given in Appendix H.
 28. New section – ACM Clearance: Explain why the Stage 14 area was cleared on two occasions (refer Getex Reports 3908.03.ASCC and 3908.06.ASCC dated 12/03/09 and 1/04/09)
 29. New section – ACM Clearance: The GETEX Asbestos Clearance Certificate Report Number 3908.01.ASCC advises that large amounts of ACM remained below the ground surface at a hot-spot in the Stage 3 area located in the north-eastern corner of the site. The report recommended that the ACM impacted soil be removed from this area. However, the validation report does not indicate whether this work was done. The remediation areas shown in SMEC Figure 3 do not include this hot-spot as a remediation area. SMEC needs to either justify why this work was not done or arrange for the work to be done and documented in the final validation report ASAP.
 30. New section – Environmental Management: Advise whether the EMPs prepared by SMEC and the remediation contractor complied with the protocols given in Section 8 of the SMEC (March 2008) RAP. Advise whether the work was undertaken in compliance with these protocols. Describe those features of the work that used other protocols and



- justify their use (eg. Section 8.5 of the RAP specified that excavated material would be stockpiled on HDPE sheeting. This did not occur and explain the reasons for that).
31. New section – Environmental Management: The RAP gave several options for controlling dust and surface water. Describe what measures were used. Describe how cross-contamination was prevented and/or addressed.
 32. New section – Environmental Management: Describe any environmental incidents that occurred during the work and how these were addressed.
 33. Section 4.3.4: Advise whether the environmental monitoring program also included the following tasks:
 - Daily inspection of the works by the site manager/foreman from the remediation contractor and the maintenance of a site diary
 - Regular inspections of the work by SMEC and the recording of the information in field records
 34. Section 4.3.4: Confirm whether during the period of the remediation work that:
 - All interim environmental controls were installed
 - No evidence of indigenous heritage was uncovered
 - Dust generation was controlled
 - No stormwater from impacted areas migrated from these areas but naturally dissipated due to the permeable nature of the soils
 35. Section 4.3.4: Explain the basis for selecting the two dust monitoring locations shown on Figure 26.
 36. Section 4.3.4: Include copies of laboratory test certificates for the air monitoring program in Appendix J and make reference to these certificates in this section of the report.
 37. Section 4.3.4: Because no baseline data were collected, reference should be made to the air monitoring data that is being collected in the Newcastle area by the NSW DECCW and which is available on their website.
 38. Section 4.3.4: Reference should also be made to the asbestos air monitoring that was undertaken by GETEX during asbestos clearance operations and included in Appendix H.
 39. Section 4.3.4: Compare the air monitoring data against air quality criteria endorsed by the NSW DECCW and advise whether the air quality measured during the program of remedial work complied with these criteria.
 40. New section – Regulatory approval & requirements: Advise whether the remediation and validation work complied with all regulatory requirements, which include:
 - The endorsement of the Environmental Clearance Certificate for the remediation work by the Department of Defence
 - POEO Act requirements
 - ACM managed in accordance with WorkCover and enHealth requirements
 - Wastes classified in accordance with NSW DECCW requirements
 - All waste materials removed from the site were disposed at suitably licensed landfills
 - All remedial works complied with the requirements of NSW OH&S and environmental legislation

SINCLAIR KNIGHT MERZ

The SKM logo is a trade mark of Sinclair Knight Merz Pty Ltd. © Sinclair Knight Merz Pty Ltd, 2006



- All remedial works complied with the Newcastle Council DCP
- 41. New section – Community Consultation: Provide summary details on the community consultation program that was undertaken during the remediation of the site and advise whether it met recommendations given in the NEPM (1999) guidelines and the Newcastle Council DCP.
- 42. New section – Community Consultation: Provide a summary of any community complaints that were received concerning the remediation work
- 43. New section – OH&S: Provide summary information on the OH&S measures used during the project and whether any significant incidents or lost time injuries occurred.

Section 6 Validation Criteria

- 44. Section 6.1.1: The lower BTEX criteria given in the NSW EPA (1994) guidelines should also be included, since they are applicable as EILs (the higher criteria included in Table 8 are appropriate as HILs). These lower criteria should be ethylbenzene 3.1mg/kg, toluene 1.4mg/kg and xylenes 14mg/kg. These criteria should be added to Table 8 in the validation report.
- 45. Section 6.1.1: The remediation criteria specified for UXO and Spent bullets should be included (refer Section 4.1.6 and Table 3, VSAQP)
- 46. Section 6.1.5: The imported clean fill criteria should also meet the EILs given in the NSW DECC (2006) site auditor guidelines
- 47. Section 6.1.5: Explain why the sampling frequency for imported soil was stated in the validation report as a minimum of 1 sample per 1000m³, whereas Section 7.1.1 of the validation report and the VSAQP (Section 3.2.1) specified a minimum of 1 sample per 100m³. Is this a typographical error?

Section 7 Sampling Program

- 48. Section 7.1.1: Include the requirement given in Section 3.2.1 of the VSAQP for the footprints of stockpile areas to be validated at a rate of 1 sample per 100m². If this requirement was subsequently relaxed by SMEC during the validation program, justify the frequency that was ultimately achieved.
- 49. Section 7.1.1: Explain why the sampling frequency specified for stockpile sampling (ie. waste classification) is significantly different from the one given in Section 3.2.1 of the VSAQP. If the sampling frequency given in the VSAQP was relaxed by SMEC during the validation program, justify the frequency that was ultimately achieved.
- 50. Section 7.2 Table 9: Correct the sample identification numbers for RAC2 (20 samples collected)
- 51. Section 7.2.1 Table 10: The “Fill material between RAC8 and RAC8a” row refers to Figure 19. Show the locations of samples 8bv1 and 8bv2 on this figure.
- 52. Section 7.2.1 Table 10: For the “Metal Detector” row, change Figure 26 to Figure 25.
- 53. Section 7.2.1 Table 10: The ACM Area refers to Figure 23. This figure is very different from the one attached to the Asbestos Clearance Certificates provided in Appendix H. Explain this difference or remove Figure 23 and insert the figure used in the Asbestos Clearance Certificates.

Section 8 QA/QC

- 54. Include Section numbers.

SINCLAIR KNIGHT MERZ

The SKM logo is a trade mark of Sinclair Knight Merz Pty Ltd. © Sinclair Knight Merz Pty Ltd, 2006



- 55. The start date in this section is given as 4 March but in Section 4.2 as 3 March. Please correct.
- 56. Field Rinsate Sample: In the last sentence on page 49, change the reference from “intra-laboratory duplicates” to “rinsates”.

Section 9 Results

- 57. Section 9.15.1: This section should advise that no spent bullets or other types of metallic Defence-waste were found by the metal detector survey.
- 58. Section 9.15.2: This section should advise whether or not the results of the non-intrusive site screening supported a conclusion that there was a low risk of any significant quantity of buried metallic waste being present in the screened area.
- 59. Section 9.16: Explain why elevated PAH levels in the bitumen pavement represent only a low risk to future users of the site and that there is no need to remove the pavements for this reason. Explain what measures should be taken if maintenance work or pavement demolition work was to occur in the future. Reference should be made to the need for an SEMP.
- 60. Section 9.16.1: Where in Figures 22 or 25 does it show where asphalt material remains onsite? Needs clarification.
- 61. Section 9.16.1: Figure 25 shows areas where building and demolition waste remain. Provide detailed information on these areas, the waste materials that remain, why the material remains and was not removed. The figure shows two of these areas are located in the part of the site that is to be assessed as suitable for residential land use. Why is this?
- 62. Section 9.16.1: Describe the oval fill.
- 63. Section 9.16.1: Describe the design and location of the asphalt roads.
- 64. Section 9.16.1: Describe the terrace fill. Where is it located on Figure 25? If it is not readily identifiable on the figure, use some additional labelling.
- 65. New section: Assess the risk posed by any unknown UXO or Defence-related waste remaining at the site. Bring together the information provided by the Gibson Nominees (2006) report, the SMEC Stage 2 investigation, the findings made during the remediation work, the findings made by the metallic detector survey and the findings made by the validation program. Advise whether all the additional data confirms the previous recommendation made in the Gibson report that there is a low risk. However, also provide advice on how this low risk and an unexpected finding should be managed in the future.
- 66. Section 9.17: Document how much clean VENM from the Boral Quarry was imported to the site based on copies of supply dockets provided by the remediation contractor. Compare this volume with the volume of waste disposed to landfill and the quantity estimates provided by the surveyors. Do these quantities agree? If not, explain the reason for any discrepancies.
- 67. Section 9.17: Describe how validation samples from the clean VENM were selected and the basis for the analytes used for testing program.
- 68. New section – Hazardous Building Materials: SMEC should itemise and show on a plan the locations where hazardous building materials remain at the site. Buried services that use ACM conduits should also be shown on the plan. Reference should be made to the

SINCLAIR KNIGHT MERZ

The SKM logo is a trade mark of Sinclair Knight Merz Pty Ltd. © Sinclair Knight Merz Pty Ltd, 2006



site's asbestos register and any other registers of hazardous building materials that may exist for the site. SMEC should explain why these materials can remain on-site and pose a low risk to future users.

Section 10 Conclusions and Recommendations

69. Section 10.1: Check the commence date of the remediation work used in other sections of the report
70. Section 10.1: SMEC should also advise that the following additional remediation work was also undertaken:
 - The manual removal of ACM fragments that were scattered across the site and the provision of Asbestos Clearance Certificates
71. Section 10.1: SMEC should include the following conclusions or otherwise explain why these conclusions can't be made:
 - All known areas of contaminated soil have been remediated and contaminant levels remaining in bitumen pavements have been characterised and assessed as posing a low risk
 - All visible and identified ACM fragments have been removed from the Site.
 - All known UXO and Defence-related waste have been removed from the Site.
 - Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.
 - SMEC should itemise those locations on the site where known contamination remain. SMEC should then explain why this material poses a low risk to future site users and the environment and can remain on-site and managed by an SEMP.
 - SMEC should describe the hazardous building materials remaining at the site and explain why these materials can remain on-site and pose a low risk to future users
72. Section 10.2: I would recommend the second bullet point be changed to read: *"If the site is to be used for more sensitive land uses than assessed in this report, it is recommended that a suitably experienced environmental practitioner be consulted to determine if any additional investigations need to be undertaken."*
73. Section 10.2: Please explain the rationale behind the recommendation given in dot point 3. Does this mean that a plumber repairing a leaking pipe needs to consult an environmental consultant prior to undertaking the work? I would suggest removing this recommendation unless there is a valid reason for its retention.

Figures

74. Figure 19: Show the locations of samples 8bv1 and 8bv2 on this figure.
75. Figure 23: Should this figure be replaced with the figure attached to the Asbestos Clearance certificates in Appendix H?
76. Figures 22 or 25: Where do these figures show where asphalt material remains onsite? Needs clarification.
77. Figure 25: Where is the terrace fill located on Figure 25? If it is not readily identifiable on the figure, use some additional labelling.



Appendices

78. Appendix C: Provide summary details of the information provided on the tip dockets such as landfill, date, number of loads received on that day, tonnage received on that day. Also provide a copy of a few landfill tip dockets as an example

I request that SMEC revised the validation report to address the above comments plus any review comments provided by the URS Project Manager and Defence. Please provide me with a final complete version of the validation report as soon as possible but no later than 18 September 2009.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', is shown. The signature is fluid and cursive, with a horizontal line drawn underneath the name.

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR

Phone: (02) 9928 2126

Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au

Swane, Ian C (SKM)

From: Swane, Ian C (SKM)
Sent: Thursday, 10 September 2009 5:22 PM
To: 'mail@ncc.nsw.gov.au'
Cc: Cramer, Daniel; Hugh.Selby@smec.com.au; Vicki.Pearce1@defence.gov.au; 'French, David MR 1'; 'Lachlan_Wood@URSCorp.com'
Subject: Draft Site Audit Statement and Site Environmental Management Plan - Fort Wallace, Stockton
Attachments: SAS 149B Validation draft.pdf; Revised Draft SEMP Fort Wallace 100909.pdf

Attention: Daniel O'Brien, Jo White (Newcastle City Council)

Daniel / Jo

I have been the NSW DECCW-accredited Site Auditor for the Fort Wallace site since December 2006, which covers the period when the detailed investigations and remediation work were conducted. The remediation work was completed in July 2009 and I have since reviewed a draft validation report prepared by the environmental consultant SMEC. The available data indicate that:

- All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a low risk. All visible and identified ACM fragments have been removed from the Site. All known UXO and Defence-related waste have been removed from the Site.
- Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.

Please find attached a draft site audit statement (SAS) for the site, which advises that the site is suitable for the intended land uses. Also attached is a draft Site Environmental Management Plan (SEMP) prepared by SMEC which I have reviewed and had revised. The purpose of the SEMP is to manage risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services.

I am intending to finalise and issue the signed site audit statement and report by the end of this month. Before that time, I would be interested in receiving any comments/feedback from Council on the form and contents of the draft SAS and SEMP. I trust the attached documents meet with your requirements. Please don't hesitate to contact me should Council require any further information on the attached documents or feedback on the site audit work I have undertaken at the site.

Regards
Ian

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR
SKM Practice Leader Contaminated Land Management
Tel: +61 2 9928 2126 Fax: +61 2 9928 2224
Mobile: 0418 867 112 Email: ISwane@skm.com.au

Swane, Ian C (SKM)

From: Lachlan_Wood@URSCorp.com
Sent: Tuesday, 22 September 2009 8:55 AM
To: Swane, Ian C (SKM)
Cc: Vicki.Pearce1@defence.gov.au; Hugh.Selby@smec.com.au
Subject: RE: Draft Site Audit Statement and Site Environmental Management Plan - Fort Wallace, Stockton
Attachments: pic24370.gif

Ian,

I have a couple of comments on the draft SEMP for your consideration:

- Section 1.2, final sentence of first paragraph. Would it be possible to have the sentence read: "*At the date of the SEMP the site is owned by the Department of Defence*"
- Section 4.4, final sentence of page 12. Would it be possible to have the sentence read: "*In the case of UXO, cease all work and clear the work area. Do not touch the item and report the find immediately to the Department of Defence and allow them to assess the item.*"

I don't have any comments on the SAS.

If you would like to discuss the requested changes please feel free to give me a call.

Cheers,

Lachlan

=====
Lachlan Wood
Associate Environmental Engineer

URS Australia Pty Ltd
Level 3, 116 Miller Street, North Sydney NSW 2060
Tel: +61-2-8925 5703 Mobile: 0402 031 916
Fax: +61-2-8925 5555
Email: lachlan_wood@urscorp.com

---> Please consider our environment and think before you print - thank you <---

This e-mail and any attachments contain URS Corporation confidential information that may be proprietary or privileged. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.

▼ "Swane, Ian C (SKM)" <ISwane@skm.com.au>

"Swane, Ian C (SKM)"
<ISwane@skm.com.au>

10/09/2009 05:29 PM

To<Lachlan_Wood@URSCorp.com>,
<Vicki.Pearce1@defence.gov.au>

cc"Cramer, Daniel" <Daniel.Cramer@smec.com>,
<Hugh.Selby@smec.com.au>

SubjectRE: Draft Site Audit Statement and Site Environmental

Lachlan / Vicki

Please advise if you have any comments that require changes to the draft documents for Fort Wallace that were attached to the email I sent to Newcastle City Council.

Regards

Ian

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR

SKM Practice Leader Contaminated Land Management

Tel: +61 2 9928 2126 Fax: +61 2 9928 2224

Mobile: 0418 867 112 Email: ISwane@skm.com.au

From: Swane, Ian C (SKM)

Sent: Thursday, 10 September 2009 5:22 PM

To: 'mail@ncc.nsw.gov.au'

Cc: Cramer, Daniel; Hugh.Selby@smec.com.au; Vicki.Pearce1@defence.gov.au; 'French, David MR 1';

'Lachlan_Wood@URSCorp.com'

Subject: Draft Site Audit Statement and Site Environmental Management Plan - Fort Wallace, Stockton

Attention: Daniel O'Brien, Jo White (Newcastle City Council)

Daniel / Jo

I have been the NSW DECCW-accredited Site Auditor for the Fort Wallace site since December 2006, which covers the period when the detailed investigations and remediation work were conducted. The remediation work was completed in July 2009 and I have since reviewed a draft validation report prepared by the environmental consultant SMEC. The available data indicate that:

- All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a low risk. All visible and identified ACM fragments have been removed from the Site. All known UXO and Defence-related waste have been removed from the Site.
- Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.

Please find attached a draft site audit statement (SAS) for the site, which advises that the site is suitable for the intended land uses. Also attached is a draft Site Environmental Management Plan (SEMP) prepared by SMEC which I have reviewed and had revised. The purpose of the SEMP is to manage risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services.

I am intending to finalise and issue the signed site audit statement and report by the end of this month. Before that time, I would be interested in receiving any comments/feedback from Council on the form and contents of the draft SAS and SEMP. I trust the attached documents meet with your requirements. Please don't hesitate to contact me should Council require any further information on the attached documents or feedback on the site audit work I have undertaken at the site.

Regards

Ian

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR
SKM Practice Leader Contaminated Land Management
Tel: +61 2 9928 2126 Fax: +61 2 9928 2224
Mobile: 0418 867 112 Email: ISwane@skm.com.au

SKM is committed to working with its clients to deliver a sustainable future for all. Please consider the environment before printing this e-mail.

Notice - This message contains confidential information intended only for the exclusive use of the addressee named above. No confidentiality is waived or lost by any mistaken transmission to you. If you have received this message in error please delete the document and notify us immediately.

Any opinion, text, documentation or attachment received is valid as at the date of issue only. The recipient is responsible for reviewing the status of the transferred information and should advise us immediately upon receipt of any discrepancy.

All email sent to SKM will be intercepted, screened and filtered by SKM or its approved Service Providers.

Swane, Ian C (SKM)

From: Daniel O'Brien [DOBRIEN@ncc.nsw.gov.au]
Sent: Thursday, 24 September 2009 11:22 AM
To: Swane, Ian C (SKM)
Subject: Fort Wallace - Draft SAS and SEMP

Hi Ian

I have had a brief look at the above documents you emailed to Council.

I raise the following matters for consideration regarding the SEMP and SAS:

1. Are the HIL A and HIL E areas clearly enough defined on the ground particularly when considering potential future planning or landuse changes? Often marker mesh/geo-fabric is used to designate such areas post remediation however the SEMP does not refer to there being any marker layers.
2. Section 4.6 *Land Use Changes* is valid as there is a high possibility of further investigations being required should a specific landuse change be proposed at the site especially if it is more sensitive. I am a little concerned however that a developer could argue no need for any further investigations for say a proposed residential development with accessible soil in "unrestricted landuses" areas as the site audit statement says it has already been adequately sampled to conclude it is suitable for this use. Is there thus some conflict between the SAS and the SEMP?
3. A positive covenant on the land in relation to the need to comply with the final SEMP and groundwater usage constraints would perhaps be a good idea to ensure all future owners are made aware of these matters.

Regards

Daniel O'Brien

Environment Protection Officer

Ph: (02) 497 42 534 Fax: (02) 49742501

e-mail: dobrien@ncc.nsw.gov.au

***** Confidentiality and Disclaimer Statement *****

The information in this e-mail and any attachments are confidential and may be subject to legal professional privilege. It is intended solely for the attention and use of the named addressee(s). If you are not the intended recipient, or person responsible for delivering this information to the intended recipient, please notify the sender immediately. Unless you are the intended recipient or his/her representative you are not authorised to, and must not read, copy, distribute, use or retain this message or any part of it.

Opinions, conclusions and other information expressed in this message are not given or endorsed by NCC unless otherwise indicated by an authorised officer independent of this message.

NCC has implemented anti-virus software, and whilst all care is taken, it is the recipient's responsibility to ensure that the message and any attachments are scanned for viruses prior to use.

This footnote also confirms this e-mail message has been read electronically by an e-mail content breakdown system.

Newcastle City Council

Web: <http://www.newcastle.nsw.gov.au>

E-mail: mail@ncc.nsw.gov.au

Swane, Ian C (SKM)

From: Swane, Ian C (SKM)
Sent: Friday, 25 September 2009 10:36 PM
To: 'Selby, Hugh'; Cramer, Daniel
Cc: 'Lachlan_Wood@URSCorp.com'; Vicki.Pearce1@defence.gov.au; French, David MR 1
Subject: Site Auditor Feedback from Site Inspections at Fort Wallace and Stockton Rifle Range

Hugh / Daniel

I provide the following feedback on the inspections I did at Fort Wallace and Stockton Rifle Range yesterday.

Fort Wallace

1. The remediation contractor has not completed their work as large and numerous pieces of asbestos sheeting remain in the area of the two search lights located at the south-eastern corner of the site. The remediation contractor needs to bring back their occupational hygienist to remove all ACM material from the area and provide a certification. SMEC needs to inspect this work and verify that the work is properly undertaken, that the ACM has been properly disposed and the area meets the cleanup criteria. Once this is done, SMEC will need to provide me with an addendum letter report.
2. Given this significant find and the strong winds that have occurred in the area over the past week, SMEC needs to also undertake a check over the site and verify there are no other suspect areas where ACM or other types of buried waste may remain now be visible and exposed.
3. There also remains some stockpiled waste around the entrance to the plotting room that needs to be removed and the ground surface cleaned up since there is a lot of scattered rubbish remaining exposed over this area. I understand that some ACM was also uncovered in the area. SMEC needs to ensure that the final condition of this area is acceptable and provide an addendum letter report verifying this fact.

Stockton Rifle Range

4. The stockpile and treatment area has had a lot of activity over the past 6 months and it is likely that the top 0.10-0.15m of soil has been impacted by lead contaminated soil and spent bullets. This is because the area was not sealed, as had been recommended in the RAP. I also found numerous spent bullets scattered over the area and a few outside the stockpile area. There is also a risk that the area of lead impacted soil may extend outside the boundaries of the area given the large amount of activity and the amount of dust that would have been generated over the past 6 months.
5. SMEC needs to provide me with a plan for the decommissioning, remediation and validation of the stockpile and treatment area. It will be critical that SMEC undertake close supervision of this operation and is able to track all materials from cradle to grave.
6. I also found a significant number of spent cartridge cases and bullets along the firing mound located about 100m from the old stop but where there is an old gravel/bitumen access road. SMEC should carefully check this area and remove as much of this material as possible.
7. SMEC needs to provide me with a timeline for the completion of all remaining work needing to be done at the Stockton Rifle Range site. This timeline should include a minimum allowance of 2 weeks for my review of a complete draft site audit report plus at least another 2 weeks for me to complete my site audit report after I have received the final validation report from SMEC.

Regards
Ian

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR
SKM Practice Leader Contaminated Land Management
Tel: +61 2 9928 2126 Fax: +61 2 9928 2224
Mobile: 0418 867 112 Email: ISwane@skm.com.au



Level 6 76 Berry Street
North Sydney NSW 2060 Australia
(PO Box 1052 North Sydney 2059)
Telephone: +61 2 9925 5555
Facsimile: +61 2 9925 5566
www.smec.com

06 October 2009

Ian Swane
NSW DECCW Site Auditor
SKM
100 Christie Street
St.Leonards
NSW 2065

Dear Ian

Re: 3001625.001 Fort Wallace Validation Report Addendum 1 Letter Report

This letter forms an addendum to the SMEC (2009) *Fort Wallace Validation Report*, with reference to your email dated 25.09.09 "Site Auditor Feedback from Site Inspections at Fort Wallace and Stockton Rifle Range"

1. *Issue: The remediation contractor has not completed their work as large and numerous pieces of asbestos sheeting remain in the area of the two search lights located at the south-eastern corner of the site. The remediation contractor needs to bring back their occupational hygienist to remove all ACM material from the area and provide a certification. SMEC needs to inspect this work and verify that the work is properly undertaken, that the ACM has been properly disposed and the area meets the cleanup criteria. Once this is done, SMEC will need to provide me with an addendum letter report.*

Response: As commissioned by Synergy Resource Management, raking of surface soils and ACM removal was undertaken by Empire Contracting Pty Ltd under the supervision of an Occupational Hygienist from GETEX, at the location of the search lights on 29.09.09. SMEC were present during the asbestos removal works and the Asbestos Clearance Certificate provided by GETEX (reference 3908.10ASCC) is included in Annex A. At the time of completion of the works, ACM was not visible at the inspected location.

2. *Issue: Given this significant find and the strong winds that have occurred in the area over the past week, SMEC needs to also undertake a check over the site and verify there are no other suspect areas where ACM or other types of buried waste may remain now be visible and exposed.*

Response: SMEC undertook a walkover at the searchlight and in the vicinity of the septic tank, which is adjacent to the heritage stabilisation works being undertaken at the Plotting Room. ACM was not observed in these areas at the time of the walkover.

3. *Issue: There also remains some stockpiled waste around the entrance to the plotting room that needs to be removed and the ground surface cleaned up since there is a lot of scattered rubbish remaining exposed over this area. I understand that some ACM was also uncovered in*



SIVEC Holdings Ltd ABN 84 057 274 049 SIVEC Operations Pty Ltd ABN 66 065 474 428 SIVEC Developments Pty Ltd ABN 67 061 044 423
SIVEC International Pty Ltd ABN 32 055 440 619 SIVEC Australia Pty Ltd ABN 47 065 475 149 SIVEC Services Pty Ltd ABN 79 066 504 792





the area. SMEC needs to ensure that the final condition of this area is acceptable and provide an addendum letter report verifying this fact.

Response: The stockpiled material (generally comprised of timber logs and grasses) has been removed and placed on the hardstand carpark area (at the Synergy site sheds). The surface area has been levelled with the occasional cobble and brick visible. In addition to the previously provided Asbestos Clearance Certificate (3908.09A.ASCC, dated 18.09.09), a brief walkover was undertaken by SMEC on 29.09.09. The potential for building and demolition waste to remain in this area is noted on Figure 25 in the SMEC (2009) *Fort Wallace Validation Report* and Figure 3 in the SMEC (2009) *Site Environmental Management Plan*.

Yours sincerely

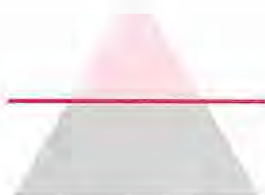
Daniel Cramer
Australian Technical Principal Contamination and Waste
SMEC Australia Pty Ltd

References –

SMEC (2009) *Fort Wallace Validation Report*.

SMEC (2009) *Site Environmental Management Plan*.

Annex A – Additional GETEX Asbestos Clearance Certificate



GETEX

ASBESTOS CLEARANCE CERTIFICATE

Report Number:

3908.10.ASCC

Report Date:

30 September 2009

1. CLIENT DETAILS

Client Company:

Synergy Resource Management Pty Ltd

Client Contact:

Andrew Reardon

Client Address:

PO Box 693

NORTH SYDNEY NSW 2059

2. SITE DETAILS

Inspection Site:

Synergy Resource Management Site

Fort Wallace

Fullerton Road

STOCKTON NSW 2295

**Removal/Treatment
Contractor:**

Empire Contracting Pty Ltd

3. INSPECTION DETAILS

Area Inspected:

All easily accessible excavated ground surfaces surrounding the two (2) observation/searchlight shelters surrounded by a newly erected metal fence located on the central eastern section of the above mentioned Inspection Site.

Refer to Appendix I for Site Map.

(Stage Locations are approximate only).

Refer to Appendix II for Site Photographs.



GETEX PTY LIMITED

ABN 59 116 287 471

Suite 2.02, Building 2, Waterloo Business Park

35 Waterloo Road North Ryde NSW 2113

Phone: (02) 9889 2488 Fax: (02) 9889 2499

Email: help@getex.com.au Web: www.getex.com.au



Exclusions: All material below the immediate ground surface.
Any potentially asbestos containing material exposed at a time later than the Time of Inspection due to the actions of wind, rain, physical or mechanical disturbance.

Date of Inspection: 29 September 2009
Time of Inspection: 10:30hrs
Inspected By: Kris Narayan BAppSc(EMT) of GETEX

4. SCOPE

GETEX PTY LIMITED was requested by Andrew Reardon of Synergy Resource Management Pty Ltd to attend the above mentioned site to conduct a limited visual walk over inspection of the Area Inspected for the possible occurrence of visually identifiable asbestos containing materials.

5. RESULTS

No visually identifiable asbestos containing materials were identified at the Time of Inspection in the Area Inspected.

Based on the results of the inspection it is considered that the Area Inspected is safe for normal activities to proceed with respect to visually identifiable asbestos containing materials.

6. LIMITATIONS

GETEX PTY LTD and its staff members are professionally qualified and trained to achieve a suitable level of competency for the tasks undertaken.

Although all work is performed to a professional and diligent standard, the potential variance between the practical limitations of the scope of work undertaken, the cost of our services, all possible issues of concern, and any loss or damages which may be associated with our work are such that we cannot warrant that all issues of concern or all asbestos containing materials have been identified. We therefore limit any potential liability associated with our work to the cost of our services.

The inspection was limited to the Area Inspected at the Time of Inspection and subject to the Exclusions noted.

Best Regards,



Kris Narayan BAppSc(EMT)
Consultant

APPENDIX I

Site Map



APPENDIX II

Site Photographs



Photograph 1
The two observation shelters as viewed
from the north.



Photograph 4
Ground surfaces adjacent east of the fence-
line surrounding the two observation shelters.



Photograph 2
The ground surfaces adjacent west of the two
observation shelters.



Photograph 5
Ground surfaces adjacent west of the fence-
line surrounding the two observation shelters.



Photograph 3
Ground surfaces between the two observation
shelters.

Memo



To	Daniel Cramer & Hugh Selby	Date	28 October 2009
From	Dr Ian C Swane	Project No	EN02226
Copy	Lachlan Woods (URS) & Vicki Pearce (Defence)		
Subject	Site Auditor Review Comments on Final Fort Wallace Validation Report (3 pages)		

Daniel / Hugh

During the preparation of my site audit report, I have identified some matters that I have previously raised in past reviews that have not been addressed in the final version of the SMEC Fort Wallace Validation Report dated 22/09/09. I have also identified some new comments that SMEC included in the report that raise new issues. Newcastle City Council (NCC) also provided some feedback on the remediation and validation work undertaken at the Fort Wallace site in their email dated 24/09/09.

Please provide feedback in a separate stand-alone letter that addresses the following matters:

1. In the Executive Summary (page vii) and in the Conclusions section (page 89), the report includes the following new conclusion: *"The current oval area contains fill which might include materials such as construction and demolition debris and ACM"*. Later in these sections, SMEC has included the following new recommendation: *"If the oval area is developed, it is recommended that a suitably experienced environmental practitioner be consulted to determine what, if any, additional management of the disturbed materials is required in accordance with the SEMP."*

Given this new conclusion and recommendation, does SMEC consider this area in its present condition to be suitable for 'standard' residential land use? If so, provide detailed information showing how the area meets NSW DECCW guidelines for this land use. If not, would the area in its present condition be suitable for a less sensitive land use, such as open space/parkland?

2. In past reviews I have requested SMEC to *"describe the hazardous building materials remaining at the site and to explain why these materials can remain on-site and pose a low risk to future users"*. In my opinion, it is important that this information is provided to the Site Auditor so that the potential for recontamination of the site from demolition works can be assessed and so a check can be made that the SEMP includes adequate measures to control these risks. It is requested that SMEC provide all available information on hazardous building materials that remain at the site and a copy of the current asbestos register for the site.
3. In past reviews I have noted that Section 8.15.2 of the RAP specified four duties that the SMEC environmental scientist had concerning the environmental management of remediation work at the site. These duties were:



- Implementation and documentation of the EMP during field activities on a daily basis
- Ensuring that all infrastructure to eliminate / control environmental emissions from the site is correctly installed and operated throughout the works
- Ensuring that all Subcontractors and Field Personnel assigned to the works perform their work in accordance with the EMP; and
- Reporting all environmental incidents to the Project Manager, on the appropriate form and assisting investigations as required.

The Site Auditor agreed with the inclusion of these duties in the RAP since they would provide a rigorous check on the standard of work achieved by the remediation contractor and provide the Site Auditor with a high level of confidence that all contaminated areas were properly remediated and all waste materials were removed from the site. These duties were not listed in the validation report as work undertaken by SMEC and it is assumed that these duties were not included in SMEC's scope of work for the remediation program.

To address this deficiency in the level of independent supervision of the remediation work, it is requested that SMEC provide an assessment of the standard of work achieved by the remediation contractor and the level of confidence that the work was undertaken in accordance with NSW DECCW requirements.

4. Section 4.1 (page 19) advises that an Asbestos Clearance Certificate was provided for areas where demolition work had occurred. Provide a table that summarises each location where demolition work occurred at the site and a reference to the Asbestos Clearance Certificate that was provided for that area. If an area does not have an Asbestos Clearance Certificate, assess the significance of this lack of validation data and whether such work needs to be undertaken to confirm the area is suitable for the proposed land use/s.
5. Section 4.3.3 (page 25) advises that the ACM clearance work was undertaken with reference to the WA Department of Health Guidelines. What does this statement mean? Furthermore, no opinion on the adequacy and sufficiency of the ACM clearance and validation work was provided in Section 9.16.1 (page 86). SMEC needs to clearly state whether the ACM clearance work conducted at the Fort Wallace site meets NSW DECCW and Department of Health requirements for the proposed land uses, and if so, why. If not, SMEC needs to advise what additional work needs to be undertaken to meet these requirements.
6. The RAP specified that the stockpile area would be lined with HDPE to minimise the potential for soils and groundwater in the area to be contaminated by the contaminated soils that were stockpiled in the area. The validation report advised that this did not occur, but that validation samples were collected across the cleared area that showed the remaining soils had not been impacted. SMEC needs to provide an assessment on the potential impacts to groundwater quality caused by the stockpiling operation and the risks to groundwater receptors.



7. Section 9.18 of the validation report advised that 12 validation soil samples were collected from cleared stockpile. Additional information that needs to be provided includes:
 - How were sample locations selected? Were samples collected from areas that had the highest contamination risks
 - Did the sampling frequency meet the 1 per 100m² frequency specified in Section 7.1.1. If not, assess the significance of any change
 - Confirm whether the area validated covers the entire stockpile area
8. Figure 25 shows areas where building and demolition waste remain, with 3 of these areas being located in proposed residential areas. Were these areas cleared of ACM and an Asbestos Clearance Certificate provided for each area? If an area does not have an Asbestos Clearance Certificate, assess the significance of this lack of validation data and whether such work needs to be undertaken to confirm the area is suitable for the proposed land use/s.
9. In their 24/09/09 email, the NCC queried whether the HIL A and HIL E areas clearly enough defined on the ground, particularly when considering potential future planning or land use changes. The NCC further advised that often marker mesh/geo-fabric is used to designate such areas post remediation, however the SEMP does not refer to there being any marker layers. SMEC needs to address this issue.
10. In their 24/09/09 email, the NCC queried the need for further investigations at the site in areas considered by SMEC to already be suitable for 'standard' residential land use. Wouldn't the need for further investigation make the area unsuitable for the proposed land use? SMEC needs to address this issue.

I will be able to complete my site audit report upon receipt of your additional information. In the interim, please don't hesitate to contact me should you require any further clarification of the issues raised.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', is shown. The signature is fluid and cursive, with a horizontal line drawn underneath the name.

Dr Ian C Swane (CPEng)

NSW DECCW & WA DEC Site Auditor & QLD DERM TPR

Phone: (02) 9928 2126

Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au

Memo



To	Daniel Cramer & Hugh Selby	Date	29 October 2009
From	Dr Ian C Swane	Project No	EN02226
Copy	Lachlan Woods (URS) & Vicki Pearce (Defence)		
Subject	Additional Site Auditor Review Comments on Final Fort Wallace Validation Report (5 pages)		

Daniel / Hugh

In addition to the review comments sent to you yesterday, I have identified some further matters in the final validation report for which additional information needs to be provided. Please provide this feedback in a separate stand-alone letter that addresses the following matters (the numbering continues on from yesterday's memo):

11. Nowhere in the main text of the validation report is any mention made of the fact that ACM fragments were found at the search light area by the remediation contractor in June 2009 when installing some fencing. I can't recall any mention of this being made when I inspected the site and attended project meetings on 11 June or 30 July. The only mention of it appears in a waste classification report dated 17 June 2009 that was placed at the back of Appendix C in the 2602 page report. This report states that some 40m³ of ACM contaminated material was excavated from the area. Please provide:
 - a) An explanation as why this significant finding was not drawn to the attention of the Site Auditor at the time during the project
 - b) Was an asbestos clearance of this area undertaken by the remediation contractor's occupational hygienist (Getex) and was an asbestos clearance report prepared? If not, why not?
 - c) Where was the 40m³ of asbestos contaminated soil stockpiled? Its location is not shown in the stockpile location plan provided in the validation report.
 - d) Why was a significant amount of ACM fragments found by the Site Auditor in this same area when an inspection was undertaken on 24/09/09?
 - e) Has contaminated and/or waste material been found at any other area of the Fort Wallace site and not reported to the Site Auditor and/or documented in the validation report?
12. The SMEC waste classification report dated 1 June 2009 for the KANE Demo 1 Stockpile states that only a portion of the demolition waste was stockpiled for off-site disposal. What happened to the rest of the demolition waste? What type of material was it and why was it separated from the material disposed off-site? How much of the demolition waste remained on-site and where was it placed? The material disposed off-site is reported to have contained asbestos. What measures were taken to guarantee no asbestos was present in the material that remained on-site?



13. Same questions as above for the KANE Demo 2 Stockpile waste classification report dated 1 June 2009.
14. The laboratory test results for the KANE Demo 2 Stockpile waste classification report shows that 3 samples were tested and one had a lead concentration of 4450mg/kg. Why was the stockpiled waste not classified as 'Hazardous Waste'? Why was a TCLP test not conducted on these samples and possibly classified as 'Restricted Solid' waste?
15. The stockpile location plan provided in Appendix B of the validation report shows three stockpiles for which no waste classification reports were provided. These stockpiles are labelled "*Fence, Veg & Concrete*", "*Kane Demo (1) soil/rubble (to be flip screened and moved)*", and "*Kane Dem (1) rubble/soil (screening refuse)*". The validation report provides no further information on these materials. Please provide detailed information on these material, how they were managed and where they were finally placed. What measures were taken to ensure they were not contaminated?
11. Provide information on the location of stockpile RAC8b that was reported to contain 70m³ of contaminated soil. The stockpile location plan provided in Appendix B of the validation report does not show its location.
12. Provide information on the following materials for which landfill dockets are provided in Appendix K but no information was provided in the landfill summary data provided in Section 4.3.2 of the validation report
 - a) 32.84 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 25/05/09
 - b) 12.44 tonnes of material disposed at the Raymond Terrace landfill on 3/6/09
 - c) 2,640.26 tonnes of material disposed at the Raymond Terrace landfill between 1/06/09 and 4/06/09
 - d) 184.94 tonnes of material disposed at an unspecified location between 20/05/09(?) and 26/05/09. Explain why each load received is referred to as a "quarry docket"? Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as "*charged weight*" rather than "*net weight*" as given in the other landfill tip dockets.
 - e) 53.25 tonnes of material disposed at an unspecified location between 14/05/09 and 15/05/09. Explain why each load received is referred to as a "quarry docket"? Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as "*charged weight*" rather than "*net weight*" as given in the other landfill tip dockets.
 - f) 6269.59 tonnes of material disposed at an unspecified location between 9/06/09 and 16/06/09. Explain why each load received is referred to as a "quarry docket"? Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight



- disposed as “*charged weight*” rather than “*net weight*” as given in the other landfill tip dockets.
- g) 12.36 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09
 - h) 19.18 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09
 - i) 31.92 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09
 - j) 32.2 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 25/05/09
- 13 Provide copies of the liquid waste disposal dockets for the effluent that was reported to have been pumped out of the septic tank excavation
- 14 The plans prepared by the licensed surveyor show that some 936.6 tonnes (669m³) of “*Special Waste – Asbestos*” was stockpiled at the site for removal and disposal at a suitably licensed landfill. However, this waste is not mentioned in the materials Tracking section of the validation report (Section 4.3.2) and no landfill tip dockets for this material were provided in Appendix K. Please explain.
- 15 Section 4.3.2 of the validation report advises that some 1573 tonnes of General Solid Waste were disposed to the SITA Raymond Terrace landfill on 1/06/09. However, no landfill tip dockets for this material were provided in Appendix K. Please explain.
- 16 Section 4.3.2 of the validation report describes four other solid wastes that were disposed off-site, each category having a volume of between 1.12 tonnes and 125.69 tonnes. Explain where these material were disposed and provide landfill tip dockets or other types of documentation that support the tracking of this material.
- 17 Section 4.3.2 of the validation report states that approximately 9,300 tonnes of General Solid Waste were removed from the Fort Wallace site and disposed at the SITA Raymond Terrace landfill. Please explain where this quantity comes from, since it does not agree with the stockpiled volumes measured by the licensed survey and shown in a plan provided in Appendix D. This plan shows that 6603.8 tonnes of General Solid Waste needed to be disposed. The 9,300 tonnes given in the validation report is some 2696.5 tonnes, or 41% greater. A breakdown of the quantities measured by the licensed surveyor is provided in **Table 1** on the following page.
- 18 Section 4.3.2 of the validation report states that approximately 215 tonnes of Restricted Solid Waste were removed from the Fort Wallace site and disposed at the SITA Kemps Creek landfill. Please explain where this quantity comes from, since it does not agree with the stockpiled volumes measured by the licensed survey and shown in a plan provided in Appendix D. This plan shows that 92.4 tonnes of Restricted Solid Waste needed to be disposed. The 215 tonnes given in the validation report is some 122.6 tonnes, or 133% greater. A breakdown of the quantities measured by the licensed surveyor is provided in **Table 1** on the following page.



■ **Table 1 Surveyed Quantities Requiring Landfill Disposal (tonnes)**

Excavation Location	Licensed Surveyor Stockpile Data ⁽¹⁾		
	General Solid Waste	Restricted Solid Waste	Special Waste - Asbestos
RAC1	9.8		
RAC2	803.6		
RAC2			284.2
RAC3		92.4	
RAC4	7		
RAC5	50.4		
RAC6			49
RAC7			259
	555.8		
RAC8			221.2
	2564.8		
RAC8a			123.2
	2581.6		
RAC8b	??		
RAC9	30.8		
Search light bunker		??	
Two demolished residential buildings		??	
Two demolished residential buildings		??	
Totals	6603.8	92.4	936.6

Note:

(1) Assumed density of stockpiled material was 1.4t/m³, the same density as used by the licensed surveyor

19. Section 4.3.2 of the validation report advises that approximately 6300 tonnes of VENM were imported to the site from Boral's Cox Lane sand quarry. Provide truck records and/or sand quarry records to support this volume. SMEC also needs to provide data that demonstrates that all materials imported to the site and used to backfill the excavations was VENM from Boral's Cox Lane sand quarry. If this is



not possible, assess the significance of this lack of data on SMEC's assessment of the suitability of the remediated site for its proposed land uses

20. Advise whether the remediation contractor encountered any UXO, other forms of Defence-related waste or unexpected discoveries during site work
21. Advise whether any acid sulphate soils were encountered during site work and, if so, whether any mitigation procedures were implemented
22. Describe how the remediation contractor's equipment was decontaminated and where this occurred. Did SMEC take any validation samples to confirm the area had not been contaminated?
23. Provide information on the location of the designated excavator maintenance area referred to in Section 4.3.4 of the validation report. Did SMEC take any validation samples to confirm the area had not been contaminated?
24. Describe the weed control measures implemented during the remediation work

I will be able to complete my site audit report upon receipt of your additional information. In the interim, please don't hesitate to contact me should you require any further clarification of the issues raised.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', is positioned above a horizontal blue line.

Dr Ian C Swane (CPEng)

NSW DECCW & WA DEC Site Auditor & QLD DERM TPR

Phone: (02) 9928 2126

Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au

Memo



To	Daniel Cramer & Hugh Selby	Date	2 November 2009
From	Dr Ian C Swane	Project No	EN02226
Copy	Lachlan Woods (URS) & Vicki Pearce (Defence)		
Subject	Additional Site Auditor Review Comments on Final Fort Wallace Validation Report (3 pages)		

Daniel / Hugh

In addition to the review comments sent to you last week, I have identified some further matters in the final validation report for which additional information needs to be provided. Please provide this feedback in a separate stand-alone letter that addresses the following matters (the numbering continues on from the previous memo):

25. The validation report¹ advised that when all the stockpiled waste had been removed, the remaining surface soils were validated and re-worked to level the disturbed ground surface. The Site Auditor checked this sequence of events by comparing the sampling date recorded on the chain-of-custody forms² with the landfill disposal records³ given in the validation report. The data show that the validation samples (FWSA1-FWSA12) were collected on 11/06/09. However, the landfill tip dockets show that a large amount of contaminated soil/waste material was still being removed from the stockpile area on that day and subsequent days. The relevant tip records show:
- 11/06/09: Approximately 2046 tonnes of General Solid Waste taken to the Raymond Terrace landfill⁴ (based on a count of 66 truck loads at an average load of 31 tonnes)
 - 12/06/09: Approximately 837 tonnes of General Solid Waste taken to the Raymond Terrace landfill⁵
 - 16/06/09: Approximately 186 tonnes of General Solid Waste taken to the Raymond Terrace landfill⁶
 - 29/06/09: 296 tonnes of General Solid Waste taken to the Raymond Terrace landfill (9 loads)
- Please explain this apparent discrepancy in the data.
26. When were the near-surface soils across the former stockpile area reworked by the remediation contractor? Presumably only occurred after all the stockpiled material had been removed.

¹ Sections 4.3.1 & 9.18, Ref [7]

² Appendix J, Ref [7]

³ Appendix K, Ref [7]

⁴ Based on 66 truck loads at an average truck load of 31 tonnes

⁵ Based on 27 truck loads at an average truck load of 31 tonnes

⁶ Based on 6 truck loads at an average truck load of 31 tonnes



27. Provide a data quality assessment as to whether the validation samples taken from the stockpile area on 11/06/09 provide representative data on the condition of the final soils that remain on the surface of the oval.
28. Section 9.19 of the validation report refers to a UXO report by Milsearch (2002). The only UXO report I am aware of for the Fort Wallace site was the one prepared by Gibson Nominees (December 2006). Please clarify which UXO report SMEC is referring to for the Fort Wallace site.
29. Condition 10 in the previous site audit statement, stated that *“The validation program should include formal certification from a Defence-approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil”*. Please obtain and provide this certification, since it was not included in the final validation report.
30. Laboratory test certificates and chain-of-custody forms are missing for validation samples FW8b-V1, FW8b-V2, FWABP1 and FWVMP1. Please provide copies of these documents.
31. Laboratory sample FWVMP1 from the asphalt pavement measured a benzo(a)pyrene concentration of 559mg/kg and a total PAH concentration of 8,420mg/kg. These concentrations exceed the HIL A criteria by 421-559 times. The validation report considers the bitumen can remain in the areas of the site where the future land use is to be ‘standard’ residential. The validation report (Section 9.16.1) states *“The risk posed to future users of the site by the elevated PAH concentrations in the asphalt is considered to be low, as the PAHs appear to be primarily bound in the asphalt mix, therefore restricting potential exposure pathways. At this stage, removal of the asphalt roads is considered unnecessary and SMEC/WSP recommend the management of the PAH exceedances in the asphalt material rather than removal and remediation”*. Further assessment is required to address the following issues:
 - Does SMEC/WSP consider your risk assessment to meet NSW DECCW requirements, such as those specified in the NSW DEC (2006) site auditor guidelines (Section 4.2.2 & Appendix VII)? If not, does SMEC/WSP propose to provide the Site Auditor with a human health risk assessment that meets NSW DECCW requirements?
 - How does SMEC/WSP propose to prevent human contact with the very high PAH levels present in some parts of the asphalt pavement?
 - How does SMEC/WSP propose to stop the asphalt pavement from wearing/weathering and releasing asphalt fragments containing high PAH concentrations, which may wash from the area and migrate to down-gradient areas of the site and be available to children?
 - If the asphalt pavement is to remain at the site, does SMEC/WSP consider that a security fence needs to be constructed around the asphalt paved areas?
32. Explain why no ACM clearance appears to have been performed by Getex at the searchlight area when remedial works were undertaken in area in June 2009



33. An ACM clearance report was issued for the oval area (Stage 6) on 10/03/09. However, the southern end of this area was subsequently used to stockpile contaminated soil and demolition rubble that contained ACM, with the last of the stockpiled material being removed some 3 months later in June 2009. Explain why no follow-up ACM clearance appears to have been undertaken for the stockpile area. Does SMEC/WSP consider that a follow-up ACM clearance survey needs to be undertaken in this area.
34. The holding time for testing faecal coliforms is 24 hours. The available data provided in the validation report indicate that the validation samples taken in the septic tank excavation area were collected on 28/04/09 and tested on 11/05/09, nearly 2 weeks later. The laboratory tests measured faecal coliforms up to 13 MPN/g. The late testing of these samples would tend to under-estimate the true faecal coliform concentration in the field. Assess the significance of the holding time exceedance on the faecal coliform contamination around the former septic tank area.
25. A building condition assessment report was prepared by GHD in June. Some of the recommendations made by the report were that, prior to the demolition of buildings:
- An asbestos survey needed to be conducted
 - A detailed assessment of buildings be undertaken to determine the presence and location of hazardous building materials
 - A plan of management be prepared to ensure that appropriate procedures were implemented by the demolition work and the disposal of waste materials.
- Please advise whether this work was undertaken and provide copies of the documentation produced.

I will be able to complete my site audit report upon receipt of your additional information. In the interim, please don't hesitate to contact me should you require any further clarification of the issues raised.

Yours sincerely

A handwritten signature in blue ink, reading 'Ian C Swane', is written over a horizontal blue line.

Dr Ian C Swane (CPEng)

NSW DECCW & WA DEC Site Auditor & QLD DERM TPR

Phone: (02) 9928 2126

Fax: (02) 9928 2224

E-mail: ISwane@skm.com.au



Level 6 76 Berry Street
North Sydney NSW 2060 Australia
(PO Box 1052 North Sydney 2059)
Telephone: +61 2 9925 5555
Facsimile: +61 2 9925 5566
www.smec.com

26 November 2009

Ian Swane
NSW DECCW Site Auditor
SKM
100 Christie Street
St.Leonards
NSW 2065

Dear Ian

Re: site Auditor Review Comments on Final Fort Wallace Validation Report

This letter forms the response to the following three sets of comments provided by the Site Auditor in relation to the Final Fort Wallace Validation Report:

1. Memo ics 28.10.09 "Site Auditor Review comments on Final Fort Wallace Validation Report"
2. Memo M15ics 29.10.09 "Additional Site Auditor Review Comments on Final Fort Wallace Validation Report"
3. Memo M15ics 29.10.09 "Additional Site Auditor Review Comments on Final Fort Wallace Validation Report"

Itemised responses to these comments are provided in Table 1 below.



SMEC Holdings Ltd ABN 64 057 274 049 SMEC Operations Pty Ltd ABN 66 065 474 425 SMEC Developments Pty Ltd ABN 67 051 044 423
SMEC International Pty Ltd ABN 32 035 440 519 SMEC Australia Pty Ltd ABN 47 065 475 149 SMEC Services Pty Ltd ABN 79 066 504 792





Level 6 76 Berry Street,
North Sydney NSW 2060 Australia
(PO Box 1052 North Sydney 2059)
Telephone: +61 2 9925 5555
Facsimile: +61 2 9925 5566
www.smecc.com

TABLE 1 – Site Auditor Comments

Item	Auditor Id	Auditor Comment	SMEC Response
1	1 (Memo lcs 281009)	In the Executive Summary (page vii) and in the Conclusions section (page 89), the report includes the following new conclusion: "The current oval area contains fill which might include materials such as construction and demolition debris and ACM". Later in these sections, SMEC has included the following new recommendation: "If the oval area is developed, it is recommended that a suitably experienced environmental practitioner be consulted to determine what, if any, additional management of the disturbed materials is required in accordance with the SEMP." Given this new conclusion and recommendation, does SMEC consider this area in its present condition to be suitable for 'standard' residential land use? If so, provide detailed information showing how the area meets NSW DECCW guidelines for this land use. If not, would the area in its present condition be suitable for a less sensitive land use, such as open space/parkland?	<p>Based on the work carried out, the area is considered suitable for residential development; subject to the implementation of the SEMP.</p> <p>SMEC consider the conclusion to be a revision of the original conclusion, based on comments on the draft validation report. SMEC also note that this comment is a continuation of the recommendation from the Contamination Assessment "Future development involving soil disturbance should include further assessments of site conditions in areas where the risk of contamination was considered low".</p> <p>To support the assessment</p> <p>a) Excavations and testing along three of the edges of the oval indicated the presence of</p>



SMEC Holdings Ltd ABN 64 057 274 049 SMEC Operations Pty Ltd ABN 65 065 474 426 SMEC Development Pty Ltd ABN 67 061 044 423
SMEC International Pty Ltd ABN 32 055 440 513 SMEC Australia Pty Ltd ABN 47 055 475 149 SMEC Services Pty Ltd ABN 79 066 304 752



Item	Auditor Id	Auditor Comment	SMEC Response
			<p>inert fill including sand, and some building rubble with contaminant concentrations below the residential criteria. ACM was not observed in the residual material along the northern, eastern and western exposed edges.</p> <p>b) A metal detector search did not indicate the presence of significant volumes of buried metallic waste [which would normally be associated with demolition debris] within the oval</p>
2	2 (Memo lcs 281009)	<p>In past reviews I have requested SMEC to "describe the hazardous building materials remaining at the site and to explain why these materials can remain onsite and pose a low risk to future users". In my opinion, it is important that this information is provided to the Site Auditor so that the potential for recontamination of the site from demolition works can be assessed and so a check can be made that the SEMP includes adequate measures to control these risks. It is requested that SMEC provide all available information on hazardous building materials that remain at the site and a copy of the current asbestos register for the site.</p>	<p>Please refer to Annex A - Fort Wallace Asbestos Register (as at 14 August 2008) recently provided by URS. SMEC note that some of the buildings, primarily referenced on the first page of the document have been demolished.</p> <p>Table 3 in the SMEC (2009) SEMP references the site structures both above and underground and associated management actions. The Asbestos Register will now be included as an Appendix C in the Site Environmental Management Plan (SEMP).</p>
3		<p>In past reviews I have noted that Section 8.15.2 of the RAP specified four duties that the SMEC environmental scientist had concerning the environmental management of remediation work at the site. These duties were:</p> <ol style="list-style-type: none"> 1. Implementation and documentation of the EMP during field 	<p>SMEC's engagement did not include the listed duties. However, as per the Auditor's previous set of comments, SMEC included a new Section (4.3.4) Environmental Management and revised the Environmental Monitoring Section (4.3.6), to address this issue.</p>



Item	Auditor Id	Auditor Comment	SMEC Response
		<p>activities on a daily basis;</p> <ol style="list-style-type: none"> Ensuring that all infrastructure to eliminate / control environmental emissions from the site is correctly installed and operated throughout the works; Ensuring that all Subcontractors and Field Personnel assigned to the works perform their work in accordance with the EMP; and Reporting all environmental incidents to the Project Manager, on the appropriate form and assisting investigations as required. <p>The Site Auditor agreed with the inclusion of these duties in the RAP since they would provide a rigorous check on the standard of work achieved by the remediation contractor and provide the Site Auditor with a high level of confidence that all contaminated areas were properly remediated and all waste materials were removed from the site. These duties were not listed in the validation report as work undertaken by SMEC and it is assumed that these duties were not included in SMEC's scope of work for the remediation program. To address this deficiency in the level of independent supervision of the remediation work, it is requested that SMEC provide an assessment of the standard of work achieved by the remediation contractor and the level of confidence that the work was undertaken in accordance with NSW DECCW requirements.</p>	<p>Whilst SMEC was onsite during the excavation of Remediation Areas of Concern (RACs) and collection of validation sampling, excavation works were undertaken in general accordance with the Contractor's Construction Environmental Management Plan and DECCW requirements.</p>
4	4 (Memo lcs 281009)	<p>Section 4.1 (page 19) advises that an Asbestos Clearance Certificate was provided for areas where demolition work had occurred. Provide a table that summarises each location where demolition work occurred at the site and a reference to the Asbestos Clearance Certificate that was provided for that area. If an area does not have an Asbestos Clearance Certificate, assess the significance of this lack of validation</p>	<p>Asbestos clearance certificates (including a plan showing the location of the clearances) for the demolition areas are provided in Appendix H of the validation report. A summary of the relevant stages of asbestos clearance compared to the demolition work is as follows:</p>



Item	Auditor Id	Auditor Comment	SMEC Response
		data and whether such work needs to be undertaken to confirm the area is suitable for the proposed land use/s.	<ul style="list-style-type: none"> • RAC10A = Stage 14 • RAC10B = Stage 12 • RAC10C = Stage 12
5	5 (Memo ICS 281009)	Section 4.3.3 (page 25) advises that the ACM clearance work was undertaken with reference to the WA Department of Health Guidelines. What does this statement mean? Furthermore, no opinion on the adequacy and sufficiency of the ACM clearance and validation work was provided in Section 9.16.1 (page 86). SMEC needs to clearly state whether the ACM clearance work conducted at the Fort Wallace site meets NSW DECCW and Department of Health requirements for the proposed land uses, and if so, why. If not, SMEC needs to advise what additional work needs to be undertaken to meet these requirements.	<p>SMEC consider that at the time of the assessment and remediation works, NSW DECCW (as described in Section 4.3.9 of the Guidelines for the NSW Site Auditor Scheme [2nd edition]) did not have an endorsed framework for managing the nature and type of ACM encountered at Fort Wallace. The draft WA (Feb, 2008) <i>Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia</i> (now published May 2009) Section 4.1.1 Hand Picking, provided an approach for removing ACM of the nature expected to be encountered onsite.</p> <p>The endorsed SAQP provided a methodology for ACM removal including the validation of areas through the use of an Occupational Hygienist (working in accordance with NSW WorkCover requirements). In addition to the validation of ACM fragment removal, residual soils in RACs where asbestos was a potential contaminant of concern were analysed (using polarised light microscopy) to detect asbestos fibres, so that comparison could be made to NSW Department of Health reference of no free fibres at ground surface.</p> <p>As documented in the laboratory reports (Appendix J) and Asbestos Clearance Certificates (Appendix</p>



Item	Auditor Id	Auditor Comment	SMEC Response
			H), SMEC consider the validation of asbestos to meet the adopted assessment criteria.
6	6 (Memo ics 281009)	The RAP specified that the stockpile area would be lined with HDPE to minimise the potential for soils and groundwater in the area to be contaminated by the contaminated soils that were stockpiled in the area. The validation report advised that this did not occur, but that validation samples were collected across the cleared area that showed the remaining soils had not been impacted. SMEC needs to provide an assessment on the potential impacts to groundwater quality caused by the stockpiling operation and the risks to groundwater receptors.	<p>SMEC consider that based on the investigations undertaken during the SMEC (2008) Contamination Assessment leachability of contaminants encountered onsite is low, as supported by the negligible impacts to groundwater identified during the groundwater monitoring.</p> <p>SMEC also note that during the Contamination Assessment (2008), groundwater was encountered at 5.5mbgl in monitoring well FWGW03 (which is located approximately 30m to the South-East of the Stockpile Area).</p> <p>In summary, materials stockpiled in the area can be characterised as follows:</p> <ul style="list-style-type: none"> • low contaminant levels; • Low leachability levels; and • Dry, no free draining liquid. <p>The materials were stockpiled for a relatively short period of time (approximately 3 months). Within which the average rainfall over the stockpiling period was 3.7mm/day with a maximum of</p>



Item	Auditor Id	Auditor Comment	SMEC Response
			<p>57mm/day in early April.</p> <p>The base of the stockpile area, is not purely comprised of sand, as there is a detectable portion of finer particles, which may assist in inhibiting the migration of metal contaminants through the soil profile, via adsorption.</p> <p>Drawing on the above, SMEC consider that there is a very low risk that the stockpile area activities have had a significant impact on groundwater quality in a highly disturbed ecosystem. Refer to Figure 18 in Appendix A of the Contamination Assessment for the inferred groundwater flow direction. SMEC note that Table 3 in SEMP identifies the management requirements for groundwater, including an exclusion on the extraction of groundwater subject to testing.</p>
7	7 (Memo Ics 281008)	<p>Section 9.18 of the validation report advised that 12 validation soil samples were collected from cleared stockpile. Additional information that needs to be provided includes:</p> <ol style="list-style-type: none"> 1. How were sample locations selected? 2. Were samples collected from areas that had the highest contamination risks 3. Did the sampling frequency meet the 1 per 100m² frequency specified in Section 7.1.1. 	<p>SMEC consider that stockpiles in the Stockpile Area occupied an area of 1,200m². However the total Stockpile Area shown on Figure 22 is approximately 4,500m², as this area incorporates the various activities associated with stockpiling including the hardstand road.</p> <p>Due to the size of the Stockpile Area (4,500m²) and the nature of contamination stockpiled in this area, SMEC adopted a grid based sampling pattern in accordance with the minimum sampling frequency</p>

Item	Auditor Id	Auditor Comment	SMEC Response
		<p>4. If not, assess the significance of any change –</p> <p>Confirm whether the area validated covers the entire stockpile area</p>	<p>stated in the NSW EPA Sampling Design Guidelines. SMEC consider that a sampling frequency of 1:100m² is not designed for validating large areas, such as the Stockpile Area. SMEC collected 12 samples in this area, which meets the NSW EPA minimum sampling density for an area between 4,000-5000m². SMEC consider that due to the nature of the contaminants of concern and the extent of the Stockpile Area, the validation approach implemented has validated the stockpile area.</p>
8	8 (Memo lcs 281009)	<p>Figure 25 shows areas where building and demolition waste remain, with 3 of these areas being located in proposed residential areas. Were these areas cleared of ACM and an Asbestos Clearance Certificate provided for each area? If an area does not have an Asbestos Clearance Certificate, assess the significance of this lack of validation data and whether such work needs to be undertaken to confirm the area is suitable for the proposed land use/s.</p>	<p>As shown in Appendix H, asbestos clearance certificates (Stages 12 and 14) were provided for these areas.</p> <p>The demolition works were outside the scope of the Remediation Works package. Due to the nature of these works, SMEC observed some traces of building and demolition waste in these areas. SMEC also collected validation samples (results shown in Appendix G - RAC10a to RAC10c). Based on the sampling results, sampling density and asbestos clearance certificates, SMEC consider the area to be suitable for residential development, however any residual building and demolition should be managed via the SEMP.</p>
9	9 (Memo lcs 281009)	<p>In their 24/09/09 email, the NCC queried whether the HIL A and HIL E areas clearly enough defined on the ground, particularly when considering potential future planning or land use changes. The NCC further advised that often marker mesh/geo-fabric is used to designate such areas post remediation, however the SEMP does not refer to there being any marker layers. SMEC needs to address this issue.</p>	<p>SMEC consider the placement of marker mesh along certain land use boundaries not to be necessary, as these boundaries would be indicated by boundary surveys prior to any construction occurring.</p>



Item	Auditor Id	Auditor Comment	SMEC Response
			<p>SMEC understand that the survey, delineating the 'heritage curtilage' has been undertaken and that this reflects the adopted assessment criteria zones as shown on Figure 9 in Appendix A.</p> <p>SMEC consider that this comment relates to Section 4.6 in the SEMP and changing open space to a more sensitive landuse.</p>
10	10 (Memo ics 281009)	In their 24/09/09 email, the NCC queried the need for further investigations at the site in areas considered by SMEC to already be suitable for 'standard' residential land use. Wouldn't the need for further investigation make the area unsuitable for the proposed land use? SMEC needs to address this issue.	<p>An expected findings protocol has been included in the SEMP to address unexpected findings of ACM at the site. .</p> <p>An asbestos clearance certificate was prepared for this 'stage' which has subsequently been revised based on the additional works. The excavated material was stockpiled in Stockpile Area on the asphalt hardstand for offsite disposal.</p> <p>Due to the extent of the site in a sandy environment, the potential for unexpected finds of ACM onsite have been addressed in the SEMP.</p> <p>SMEC consider that contamination and waste identified during the remediation works has been documented in the validation report. This includes the removal of the stockpiled demolition waste referred to as '8b', which is located between RAC's 8 and 8a.</p>
11	11 (Memo 15 Ics 281009)	<p>Nowhere in the main text of the validation report is any mention made of the fact that ACM fragments were found at the search light area by the remediation contractor in June 2009 when installing some fencing. I can't recall any mention of this being made when I inspected the site and attended project meetings on 11 June or 30 July. The only mention of it appears in a waste classification report dated 17 June 2009 that was placed at the back of Appendix C in the 2602 page report. This report states that some 40m3 of ACM contaminated material was excavated from the area. Please provide:</p> <p>a) An explanation as why this significant finding was not drawn to the attention of the Site Auditor at the time during the project</p> <p>b) Was an asbestos clearance of this area undertaken by the remediation contractor's occupational hygienist (Getex) and was an asbestos clearance report prepared? If not, why not?</p> <p>c) Where was the 40m3 of asbestos contaminated soil stockpiled? Its location is not shown in the stockpile location plan provided in the validation report.</p> <p>d) Why was a significant amount of ACM fragments found by the</p>	<p>An expected findings protocol has been included in the SEMP to address unexpected findings of ACM at the site. .</p> <p>An asbestos clearance certificate was prepared for this 'stage' which has subsequently been revised based on the additional works. The excavated material was stockpiled in Stockpile Area on the asphalt hardstand for offsite disposal.</p> <p>Due to the extent of the site in a sandy environment, the potential for unexpected finds of ACM onsite have been addressed in the SEMP.</p> <p>SMEC consider that contamination and waste identified during the remediation works has been documented in the validation report. This includes the removal of the stockpiled demolition waste referred to as '8b', which is located between RAC's 8 and 8a.</p>



Item	Auditor Id	Auditor Comment	SMEC Response
		<p>Site Auditor in this same area when an inspection was undertaken on 24/09/09?</p> <p>e) Has contaminated and/or waste material been found at any other area of the Fort Wallace site and not reported to the Site Auditor and/or documented in the validation report?</p>	
12	12 (Memo 15 ICS 29/10/09)	<p>The SMEC waste classification report dated 1 June 2009 for the KANE Demo 1 Stockpile states that only a portion of the demolition waste was stockpiled for off site disposal. What happened to the rest of the demolition waste? What type of material was it and why was it separated from the material disposed off-site? How much of the demolition waste remained on-site and where was it placed? The material disposed off-site is reported to have contained asbestos. What measures were taken to guarantee no asbestos was present in the material that remained onsite?</p>	<p>The demolition of onsite structures was outside the scope of the Remediation works, however a significant amount of building and demolition waste was encountered on the surface in some of these area. The Remediation contractor removed this material and passed it through a flip screen, to separate building material from the soils.</p> <p>There were originally two stockpiles brought down from the two Kane demolition sites. These two stockpiles were flipped screened, which created 4 stockpiles. The due to the size of the aperture of the flip screens, each original stockpile was split into building and demolition waste with traces of soil. The building and demolition waste piles contained asbestos and were subsequently disposed of offsite as asbestos waste (refer to Appendix B Waste Classifications). The Remediation Contractor placed the screened sandy soil material back in the demolition areas (RAC 10A and RAC10B).</p> <p>During the course of the validation program, SMEC conducted a walkover of the area where the screened material was placed back where the material originated onsite. SMEC consider that minimal building and demolition waste was visible</p>



Item	Auditor Id	Auditor Comment	SMEC Response
			at these locations and that the risk of ACM being placed back in these locations is low.
13	13 (Memo 15 ICS 291009)	Same questions as above for the KANE Demo 2 Stockpile waste classification report dated 1 June 2009.	As above.
14	14 (Memo 15 ICS 291009)	The laboratory test results for the KANE Demo 2 Stockpile waste classification report shows that 3 samples were tested and one had a lead concentration of 4450mg/kg. Why was the stockpiled waste not classified as 'Hazardous Waste'? Why was a TCLP test not conducted on these samples and possibly classified as 'Restricted Solid' waste?	Sample Id KANE 1CSP3 had a total lead concentration of 4450mg/kg, accordingly TCLP analysis for lead was requested with the results reported in Lab report E042890. The lead TCLP result for KANE1CSP3 was 1.53mg/L (as documented in the waste classification letter "KANE Demo 2"). This laboratory report is attached to the waste classification (which is provided in Appendix B).
15	15 (Memo 15 ICS 291009)	The stockpile location plan provided in Appendix B of the validation report shows three stockpiles for which no waste classification reports were provided. These stockpiles are labelled "Fence, Veg & Concrete", "Kane Demo (1) soil/rubble (to be flip screened and moved)", and "Kane Dem (1) rubble/soil (screening refuse)". The validation report provides no further information on these materials. Please provide detailed information on these material, how they were managed and where they were finally placed. What measures were taken to ensure they were not contaminated?	In relation to the KANE stockpiles please refer to the above. In accordance with the NSW DECCW Waste classification guidelines, vegetation and concrete are pre-classified as General Solid Waste.
16	11 (Memo 15 ICS 291009)	Provide information on the location of stockpile RAC8b that was reported to contain 70m ³ of contaminated soil. The stockpile location plan provided in Appendix B of the validation report does not show its location	Stockpile (RAC) 8b was excavated from the area between RAC8 and RAC8b. Validation samples FW8bv1 and FW8b v2, were collected to validate the residual surface in this area. The excavated material was placed on the hardstand within the stockpile area before offsite disposal, in accordance with the Waste Classification for "Fort



Item	Auditor Id	Auditor Comment	SMEC Response
17	12 (Memo 15 Ics 291009)	<p>Provide information on the following materials for which landfill docket is provided in Appendix K but no information was provided in the landfill summary data provided in Section 4.3.2 of the validation report</p> <ul style="list-style-type: none"> a) 32.84 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 25/05/09 b) 12.44 tonnes of material disposed at the Raymond Terrace landfill on 3/6/09 c) 2,640.26 tonnes of material disposed at the Raymond Terrace landfill between 1/06/09 and 4/06/09 d) 184.94 tonnes of material disposed at an unspecified location between 20/05/09(?) and 26/05/09. Explain why each load received is referred to as a "quarry docket"? Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as "charged weight" rather than "net weight" as given in the other landfill tip dockets. e) 53.25 tonnes of material disposed at an unspecified location between 14/05/09 and 15/05/09. Explain why each load received is referred to as a "quarry docket"? Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as "charged weight" rather than "net weight" as given in the other landfill tip dockets. f) 6269.59 tonnes of material disposed at an unspecified location between 9/06/09 and 16/06/09. Explain why each load 	<p>Wallace 8b Stockpile".</p> <p>SMEC consider that the truck dockets in Appendix K, provide the detailed breakdown of the material disposed offsite. The following is a summary</p> <ul style="list-style-type: none"> a) This is material from RAC8a, which is classified as asbestos waste. Please find in ANNEX B the truck docket and landfill receipt. b) SMEC consider this to be the green waste disposed of offsite, with landfill receipts 70024385 and 70024383 as included in Annex B. c) SMEC consider this to be the asbestos waste removed from the site. An example truck docket corresponding to landfill receipt 70024097 is included in ANNEX B. d) SMEC consider this material to be the remainder of bulk stockpile material disposed offsite from the excavation works. e) SMEC consider these to be bricks and concrete separated during the excavation works and sent for recycling offsite. f) SMEC consider this to be the imported VENM from Boral used to backfill excavations. An example Boral docket with Remediation Contractor truck docket is provided in ANNEX B.



Item	Auditor Id	Auditor Comment	SMEC Response
		<p>received is referred to as a "quarry docket"? Was this material disposed at a suitably licensed landfill or some other location? Also explain why this set of tip dockets refers to the weight disposed as "charged weight" rather than "net weight" as given in the other landfill tip dockets.</p> <p>g) 12.36 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09</p> <p>h) 19.18 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09</p> <p>i) 31.92 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 26/05/09</p> <p>j) 32.2 tonnes of contaminated soil disposed at the Raymond Terrace landfill on 25/05/09</p>	<p>g) SMEC consider this material to be FW RAC1 stockpile, as shown on the truck docket and landfill receipt in ANNEX B.</p> <p>h) SMEC consider this material to be the FW RAC4 stockpile, as shown on the truck docket and landfill receipt in ANNEX B.</p> <p>i) SMEC consider this material to be the material from FW RAC5, as shown on the truck docket and landfill receipt in ANNEX B.</p> <p>j) SMEC consider this material to be a portion of the material from FW RAC7, as shown on the truck docket and landfill receipt in ANNEX B.</p>
18	13 (Memo 15 ics 291009)	Provide copies of the liquid waste disposal dockets for the effluent that was reported to have been pumped out of the septic tank excavation	Liquid waste encountered was primarily surface water that that entered the tank. Although requested disposal dockets could not be provided by the Remediation Contractor, a Transpacific Tax Invoice however was provided (and included in Annex B).
19	14 (Memo 15 ics 291009)	The plans prepared by the licensed surveyor show that some 936.6 tonnes (669m ³) of "Special Waste – Asbestos" was stockpiled at the site for removal and disposal at a suitably licensed landfill. However, this waste is not mentioned in the materials Tracking section of the validation report (Section 4.3.2) and no landfill tip dockets for this material were provided in Appendix K. Please explain	As provided in Appendix B this material was classified as Special Waste Asbestos Waste. Example Truck Dockets 762039 and 762040 describe the material (A-soil), with the corresponding landfill receipts (70023661-PS and 70023660-PS), for the sequence of 1350.42 tonnes



Item	Auditor Id	Auditor Comment	SMEC Response
			of asbestos waste disposed of between 25/5/09 and 29/5/09. This equates to a density of 2.01, which is greater than the estimate of the surveyor.
20	15 (Memo 15 ICS 291009)	Section 4.3.2 of the validation report advises that some 1573 tonnes of General Solid Waste were disposed to the SITA Raymond Terrace landfill on 1/06/09. However, no landfill tip dockets for this material were provided in Appendix K. Please explain.	As shown in Appendix K, this batch of material was disposed of between 1/6/09 and 4/6/09, where as the validation report only references 1/6/09.
21	16 (Memo 15 ICS 291009)	Section 4.3.2 of the validation report describes four other solid wastes that were disposed off-site, each category having a volume of between 1.12 tonnes and 125.69 tonnes. Explain where these material were disposed and provide landfill tip dockets or other types of documentation that support the tracking of this material.	<p>SMEC consider that this information has been provided in Appendix K from the Contractor, with example dockets provided in ANNEX B and a summary as follows:</p> <ul style="list-style-type: none"> • Asbestos Cement Waste – 1.12 tonnes; • Inert Mixed Demo Waste – 125.69 tonnes (Boral Recycling Receipt numbers – 713898, 713904, 713901, 713897 and 713902); • Inert Concrete Waste – 27.90 tonnes (Boral Receipt 713902 – 26/05/09 and Synergy Truck Docket 762038); • Green Waste – 14.38 tonnes (Synergy Truck Dockets 744806+ 761439)
22	17 (Memo 15 ICS 291009)	Section 4.3.2 of the validation report states that approximately 9,300 tonnes of General Solid Waste were removed from the Fort Wallace site and disposed at the SITA Raymond Terrace landfill. Please	SMEC consider that the surveyed volume (5,452m ³) relates to the tonnage, resulting in an approximate Bulk Density of 1.7. The elevated bulk



Item	Auditor Id	Auditor Comment	SMEC Response
		explain where this quantity comes from, since it does not agree with the stockpiled volumes measured by the licensed survey and shown in a plan provided in Appendix D. This plan shows that 6603.8 tonnes of General Solid Waste needed to be disposed. The 9,300 tonnes given in the validation report is some 2696.5 tonnes, or 41% greater. A breakdown of the quantities measured by the licensed surveyor is provided in Table 1 on the following page.	density reflects the nature of the material, which included a mixture of wastes including sand as well as the building and demolition waste. The tonnage estimate by the surveyor was not based on a known bulk density of the material excavated and therefore the volume in m ³ is a more accurate representation to be compared against actual landfill receipts.
23	18 (Memo 15 lcs 291009)	Section 4.3.2 of the validation report states that approximately 215 tonnes of Restricted Solid Waste were removed from the Fort Wallace site and disposed at the SITA Kemps Creek landfill. Please explain where this quantity comes from, since it does not agree with the stockpiled volumes measured by the licensed survey and shown in a plan provided in Appendix D. This plan shows that 92.4 tonnes of Restricted Solid Waste needed to be disposed. The 215 tonnes given in the validation report is some 122.6 tonnes, or 133% greater. A breakdown of the quantities measured by the licensed surveyor is provided in Table 1 on the following page. Table 1 Surveyed Quantities Requiring Landfill Disposal (tonnes)	The Restricted Solid Waste comes from the RAC3 stockpile and associated PAH TCLP results. The material contained within the stockpile did contain some rubble, which would increase the density of the material. Also refer to the above in relation to survey volume versus tonnage. Please find attached in Annex B additional truck docket/landfill receipts for the restricted solid waste.
24	19 (Memo 15 lcs 291009)	Section 4.3.2 of the validation report advises that approximately 6300 tonnes of VENM were imported to the site from Boral's Cox Lane sand quarry. Provide truck records and/or sand quarry records to support this volume. SMEC also needs to provide data that demonstrates that all materials imported to the site and used to backfill the excavations was VENM from Boral's Cox Lane sand quarry. If this is not possible, assess the significance of this lack of data on SMEC's assessment of the suitability of the remediated site for its proposed land uses	Chemical analysis results are presented in Appendix G for the imported VENM (Sample IDs STVENM1-15). As noted in Sections 4.3.2, 6.1.5 and 9.17 of the validation report, the VENM is sand material imported from Boral. As noted in Section 9.17 a SMEC representative inspected the source site. An example of the Boral Quarry docket is provided in ANNEX B.



Item	Auditor Id	Auditor Comment	SMEC Response
			During the course of the validation program SMEC observed the VENM being imported to the site. At the completion of the backfilling works SMEC undertook a site walkover and observed the backfill material to be consistent with the material sourced from the Boral site.
25	20 (Memo 15 ICS 291009)	Advise whether the remediation contractor encountered any UXO, other forms of Defence-related waste or unexpected discoveries during site work	<p>SMEC understand that a small number of spent projectiles and casings were collected by the Remediation Contractor during the course of the remediation works. These were primarily encountered during the heritage stabilisation works within the heritage precinct. SMEC understand that the Rehabilitation Contractor encountered what is believed to be a hand grenade within the heritage listed gun emplacement.</p> <p>SMEC note that as documented in the Contamination Assessment, a small conical object resembling an empty head of a mortar shell was encountered during test pitting in the western terrace.</p>
26	21 (Memo 15 ICS 291009)	Advise whether any acid sulphate soils were encountered during site work and, if so, whether any mitigation procedures were implemented	Olfactory indicators of potential or actual acid sulphate soils were not encountered during the excavation works, which supports the findings of the Contamination Assessment
27	22 (Memo 15 ICS 291009)	Describe how the remediation contractor's equipment was decontaminated and where this occurred. Did SMEC take any validation samples to confirm the area had not been contaminated?	There appeared to be no specific vehicle decontamination point at Fort Wallace. Accordingly no samples were collected from this area.



Item	Auditor Id	Auditor Comment	SMEC Response
28	23 (Memo 15 Ics 291009)	Provide information on the location of the designated excavator maintenance area referred to in Section 4.3.4 of the validation report. Did SMEC take any validation samples to confirm the area had not been contaminated?	There appeared to be no specific vehicle maintenance area at Fort Wallace. Accordingly no samples were collected. The Remediation Contractor has indicated that incident reports were not available.
29	24 (Memo 15 Ics 291009)	Describe the weed control measures implemented during the remediation work	Aside from the designated weed spraying using glyphosate in the sand dunes onsite, weed control was undertaken by the Remediation Contractor in accordance with the Construction Environmental Management Plan.
30	25 (Memo 16 Ics 021109)	<p>The validation report advised that when all the stockpiled waste had been removed, the remaining surface soils were validated and re-worked to level the disturbed ground surface. The Site Auditor checked this sequence of events by comparing the sampling date recorded on the chain-of-custody forms with the landfill disposal records given in the validation report. The data show that the validation samples (FWSA 1-FWSA12) were collected on 11/06/09. However, the landfill tip docket shows that a large amount of contaminated soil/waste material was still being removed from the stockpile area on that day and subsequent days. The relevant tip records show: „</p> <ul style="list-style-type: none"> • 11/06/09: Approximately 2046 tonnes of General Solid Waste taken to the Raymond Terrace landfill4 (based on a count of 66 truck loads at an average load of 31 tonnes) „ • 12/06/09: Approximately 837 tonnes of General Solid Waste taken to the Raymond Terrace landfill5 „ • 16/06/09: Approximately 186 tonnes of General Solid Waste 	<p>The scanned version of the truck docket summary was replaced by the original for legibility. Hence, the Synergy annotation was removed, with the volumes queried (quarry) dockets relating to imported material. So only a small amount of material was disposed of after 10.6.09, which was stockpiled on the hardstand. In summary:</p> <ul style="list-style-type: none"> • 11/06/09 – 16/06/09 is imported backfill sands with an example truck docket (773879) included in Annex B. • 29/06/09 – 296 tonnes is the material for waste classification 8b and FWSearch



Item	Auditor Id	Auditor Comment	SMEC Response
		taken to the Raymond Terrace landfill ¹⁶ "	
		<ul style="list-style-type: none"> 29/06/09: 296 tonnes of General Solid Waste taken to the Raymond Terrace landfill (9 loads) Please explain this apparent discrepancy in the data. 	
31	26 (Memo 16 lcs 021109)	When were the near-surface soils across the former stockpile area reworked reby the remediation contractor? Presumably only occurred after all the stockpiled material had been removed of the oval.	SMEC consider the oval was regraded. The surface soils have been periodically re-graded due to the weather and other contractors driving across the area. The grading works were completed after the stockpiles were removed. Hence, SMEC consider that the oval was not cut and filled. SMEC consider that the final inspection (GETEX report 3908.09 dated 18 September 2009) undertaken by the Occupational Hygienist of the oval was representative of the oval surface conditions at the completion of the remediation program.
32	27 (Memo 16 lcs 021109)	Provide a data quality assessment as to whether the validation samples taken from the stockpile area on 1/06/09 provide representative data on the condition of the final soils that remain on the surface	SMEC consider that as the area was graded, not excavated or filled, the Validation Samples collected are representative of the residual soils
33	28 (Memo 16 lcs 021109)	Section 9.19 of the validation report refers to a UXO report by Milsearch (2002). The only UXO report I am aware of for the Fort Wallace site was the one prepared by Gibson Nominees (December 2006). Please clarify which UXO report SMEC is referring to for the Fort Wallace site.	Agreed, the correct reference is Gibson Nominees (2006) <i>Review of Ordnance-related Contamination Issues Relating to the Fort Stockton Rifle Range and Fort Wallace, New South Wales</i> "
34	29 (Memo 16 lcs 021109)	Condition 10 in the previous site audit statement, stated that "The validation program should include formal certification from a Defence-approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace	Further clarification on documentation being sort and to be provided in a separate document by URS.



Item	Auditor Id	Auditor Comment	SMEC Response
		site being used for sensitive land uses that include residential with accessible soil". Please obtain and provide this certification, since it was not included in the final validation report.	
35	30 (Memo 16 lcs 021109)	Laboratory test certificates and chain-of-custody forms are missing for validation samples FW8b-V1, FW8b-V2, FWABP1 and FWVMP1. Please provide copies of these documents.	FW8b summary results provided in Appendix G, including reference to laboratory report 43250 (attached in ANNEX C). FWABP1 and FWVMP1 results provided in E041999 in Appendix K.
36	31 (Memo 16 lcs 021109)	Laboratory sample FWVMP1 from the asphalt pavement measured a benzo(a)pyrene concentration of 559mg/kg and a total PAH concentration of 8,420mg/kg. These concentrations exceed the HIL A criteria by 421-559 times. The validation report considers the bitumen can remain in the areas of the site where the future land use is to be 'standard' residential. The validation report (Section 9.16.1) states "The risk posed to future users of the site by the elevated PAH concentrations in the asphalt is considered to be low, as the PAHs appear to be primarily bound in the asphalt mix, therefore restricting potential exposure pathways. At this stage, removal of the asphalt roads is considered unnecessary and SMEC/WSP recommend the management of the PAH exceedances in the asphalt material rather than removal and remediation". Further assessment is required to address the following issues: " Does SMEC/WSP consider your risk assessment to meet NSW DECCW requirements, such as those specified in the NSW DEC (2006) site auditor guidelines (Section 4.2.2 & Appendix VII)? If not, does <ul style="list-style-type: none"> • SMEC/WSP propose to provide the Site Auditor with a human health risk assessment that meets NSW DECCW requirements? " • How does SMEC/WSP propose to prevent human contact with 	SMEC consider that the risk posed by the PAHs be managed through the procedures documented in the SEMP. SMEC consider that as the PAHs are found within the road, if the good condition of the road is maintained, then potential migration of the PAHs is restricted. A separate preliminary pavement assessment letter will be provided by a SMEC Pavement Engineer.



Item	Auditor Id	Auditor Comment	SMEC Response
		<p>the very high PAH levels present in some parts of the asphalt pavement? „</p> <ul style="list-style-type: none"> • How does SMEC/WSP propose to stop the asphalt pavement from wearing/weathering and releasing asphalt fragments containing high PAH concentrations, which may wash from the area and migrate to down-gradient areas of the site and be available to children? „ • If the asphalt pavement is to remain at the site, does SMEC/WSP consider that a security fence needs to be constructed around the asphalt paved areas? 	
37	32 (Memo 16 ICS 021109)	Explain why no ACM clearance appears to have been performed by Getex at the searchlight area when remedial works were undertaken in area in June.	GETEX Asbestos Clearance Certificate 3908.10 (dated 30.09.09) for the searchlight area described was included in the SMEC Fort Wallace Validation Report Addendum 1 Letter Report dated 06 October 2009
38	33 (Memo 16 ICS 021109)	An ACM clearance report was issued for the oval area (Stage 6) on 10/03/09. However, the southern end of this area was subsequently used to stockpile contaminated soil and demolition rubble that contained ACM, with the last of the stockpiled material being removed some 3 months later in June 2009. Explain why no follow-up ACM clearance appears to have been undertaken for the stockpile area. Does SMEC/WSP consider that a follow-up ACM clearance survey needs to be undertaken in this area.	SMEC considers that the GETEX Asbestos Clearance certificate 3908.09 dated 18.09.09 included in Appendix H of the Validation Report, is an asbestos clearance of the oval after the re-grading and stockpile removal works were complete.
39	34 (Memo 16 ICS 021109)	The holding time for testing faecal coliforms is 24 hours. The available data provided in the validation report indicate that the validation samples taken in the septic tank excavation area were collected on 28/04/09 and tested on 11/05/09, nearly 2 weeks later. The laboratory tests measured faecal coliforms up to 13 MPN/g. The late testing of these samples would tend to under-estimate the true faecal coliform	SMEC agree the holding time for faecal Coliforms in soils is 24hrs and this was exceeded. As the adopted assessment criteria for faecal Coliforms in soil is 1,000MPN/g, the sources (both the septic tank and building) have been removed and the excavation backfilled, SMEC consider the risk



Item	Auditor Id	Auditor Comment	SMEC Response
40	25 (Memo 16 lcs 021109)	<p>concentration in the field. Assess the significance of the holding time exceedance on the faecal coliform contamination around the former septic tank area.</p> <p>A building condition assessment report was prepared by GHD in June. Some of the recommendations made by the report were that, prior to the demolition of buildings:</p> <p>An asbestos survey needed to be conducted „</p> <p>A detailed assessment of buildings be undertaken to determine the presence and location of hazardous building materials „</p> <p>A plan of management be prepared to ensure that appropriate procedures were implemented by the demolition work and the disposal of waste materials.</p> <p>Please advise whether this work was undertaken and provide copies of the documentation produced.</p>	<p>posed by faecal Coliforms to be low.</p> <p>Please refer to Annex A, where an Asbestos Register prepared for the site dated 14 August 2008 is included.</p>



Level 6 76 Berry Street
North Sydney NSW 2060 Australia
(PO Box 1052 North Sydney 2059)
Telephone: +61 2 9925 5555
Facsimile: +61 2 9925 5566
www.smec.com

Yours sincerely

Daniel Cramer
Australian Technical Principal Contamination and Waste
SMEC Australia Pty Ltd

References –

SMEC (2009) *Fort Wallace Validation Report*.

SMEC (2009) *Site Environmental Management Plan*.

ANNEX A – Fort Wallace Asbestos Register as at 14 August 2008

ANNEX B – Example Truck Dockets

ANNEX C – Laboratory Report



SMEC Holdings Ltd ABN 84 057 274 049 SMEC Operations Pty Ltd ABN 66 065 474 428 SMEC Developments Pty Ltd ABN 67 061 044 423
SMEC International Pty Ltd ABN 32 055 440 519 SMEC Australia Pty Ltd ABN 47 065 475 149 SMEC Services Pty Ltd ABN 79 066 504 792



FORT WALLACE- ASBESTOS REGISTER- AS AT 14 AUG 08

Asset Number	Inspect Date	Asbestos	Inspect	Primary Location	Secondary Location	Sample Description	Condition	Control	Priority
1337/A0001	14-Mar-06	Yes	01-Mar-11	Building 1	Eaves and ceiling above west entry	1337/1/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	14-Mar-06	Yes	01-Mar-11	Building 1, bathroom	ceiling lining	1337/1/03	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	14-Mar-06	Yes	01-Mar-11	Building 1, laundry and north entry	ceiling lining	1337/1/04	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	14-Mar-06	Yes	01-Mar-11	building 1, sunroom adjacent to dining room	ceiling lining	1337/1/05	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	Bathroom	Ceiling	1337/A001/ES886	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	Internal: north west room	Ceiling	1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	Laundry & foyer, north elevation	Ceiling	Refer to 1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	External: west elevation at entrance to building	Veranda ceiling	1337/A001/ES881	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	External	Electrical backing board	not sampled due to electrical hazard	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	Building 2	Eaves and ceiling above west entry	ref 1337/1/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	Building 2, bathroom	ceiling lining	ref 1337/1/03	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	Sunroom adjacent to dining room	ceiling lining	ref 1337/1/05	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	building 2, laundry and north entry	ceiling lining	ref 1337/1/04	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	05-Apr-07	Yes	05-Apr-10	Bathroom	Ceiling	Refer to 1337/A001/ES886	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	05-Apr-07	Yes	05-Apr-10	Internal: south west room	Ceiling	Refer to 1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0003	14-Mar-06	Yes	01-Mar-11	Southwest sunroom	Ceiling lining	1337/3/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months

Asset Number	inspect date	asbestos	inspect	Primary Location	Secondary Location	Sample Description	condition	control	priority
1337/A0003	14-Mar-06	Yes	01-Mar-11	Eaves, south and west entry	lining	1337/3/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0003	05-Apr-07	Yes	05-Apr-10	Internal: laundry & foyer at south east corner	Ceiling	Refer to 1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	14-Mar-06	Yes	01-Mar-11	Main door	Possible asbestos infill	not sampled due to no access	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	14-Mar-06	Yes	01-Mar-11	Roof Cover	Electrical room	1337/7/04	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	14-Mar-06	Yes	01-Mar-11	Main Switchboard	backing board	1337/7/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-10	Internal throughout	Ceiling	1337/A007/ES897	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-08	Main external door: west elevation	Fire door	1337/A007/ES889	Frable (Deteriorated/Damaged/Unsatisfactory)	Removal	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-10	Internal south wall adjacent kitchenette	Electrical mounting board	Refer to 1337/A007/ES895	Unfrable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-10	External north annexed substation and south annex	Roof membrane	1337/A007/ES891	Unfrable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	external	Eaves	not sampled due to height restriction	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	external	vent louvers	not sampled due to height restriction	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	Gable end	Cladding	not sampled due to height restriction	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	Main hall	Electrical board	1337/8/03	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	South central room	ceiling lining	1337/8/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	Rooms adjacent to main hall	Floor covering	1337/8/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	External roof ends	Gable	1337/A008/ES943	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months

Asset Number	Inspect date	Asbestos	Reinspect	Primary Location	Secondary Location	Sample Description	Condition	Control	Priority
1337/A0008	05-Apr-07	Yes	05-Apr-10	South store room behind counter	Ceiling	1337/A008/ES850	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	External south west veranda above door	Wall infill panel	1337/A008/ES872	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	Above wall cavity to old chimney lining	Infill soffit panel	1337/A008/ES851	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	Internal south wall of basketball court	Electrical mounting board	1337/A008/ES848	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	12-36 Months
1337/A0021	05-Apr-07	Yes	05-Apr-10	External window frames	Windows	1337/A021/ES878	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0024	14-Mar-06	Yes	01-Mar-11	Heritage building 24	Electrical pits casting adjacent to heritage buildings	1337/24/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0030	05-Apr-07	Yes	05-Apr-10	External walls east side	Vertical movement joints	Refer to 1337/A030/ES832	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0030	05-Apr-07	Yes	05-Apr-10	External walls west side	Vertical movement joints	1337/A030/ES832	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0032	14-Mar-06	Yes	01-Mar-11	External	Canopy	1337/32/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0032	14-Mar-06	Yes	01-Mar-11	Front door	possible asbestos core	not sampled due to destructive nature of sampling	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0032	05-Apr-07	Yes	05-Apr-10	Door	Firedoor	1337/A032/ES840	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0033	14-Mar-06	Yes	01-Mar-11	Roof cover	Bituminous lining	1337/33/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0033	05-Apr-07	Yes	05-Apr-10	External roof top	Roof membrane	1337/A033/ES877	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/AZ001	05-Apr-07	Yes	05-Apr-08	West of building 008	In ground services pit	1337/A008/ES871	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/AZ001	05-Apr-07	Yes	05-Apr-10	External: North of building	In ground services pit	1337/A024/ES859	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/AZ001	05-Apr-07	Yes	05-Apr-10	External: North of building	In ground services pit	1337/A024/ES860	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/AZ001	05-Apr-07	Yes	05-Apr-08	South west corner of building 008	In ground services pit	1337/A008/ES869	Unfriable (Stable/Satisfactory)	Removal	12-36 Months

Asset Number	Inspect Date	Asbestos	Reinspect	Primary Location	Secondary Location	Sample Description	Condition	Action	Priority
1337/AZ001	05-Apr-07	Yes	05-Apr-08	South west corner of building 008.	In ground services pit	1337/A008/ ES870	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/AZ001	05-Apr-07	Yes	05-Apr-10	External west side of building 007 substation	In ground services pit	1337/A007/ ES892	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/AZ040	05-Apr-07	Yes	05-Apr-10	1337/A013 Internal west wall adjacent entry	Electrical mounting board	1337/A013/ ES857	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/AZ040	05-Apr-07	Yes	05-Apr-10	1337/A025 protruding from ext walls of building	Ventilation pipe work	1337/A025/ ES862	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months

Delivery Docket

Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 70023543-PS
Voucher No:

Time In: 25/05/2009 2:20:50 PM
Time Out: 25/05/2009 2:20:50 PM

Vehicle Rego: CAM937

Client: camsons (landfill)
Order Number: ps37
Contract: ps37
EPA Permit No:

Weighed Waste Price
contaminated soil
Storage Location: Landfill In

Each Items Qty Price

GROSS Weight: 50.52t
TARE Weight: 16.08t
NET Weight: 34.44t

Chargeable Weight: 34.44t
Each Item Weight: 0.00t
Unit Cost:

Council Fee:
Each Items:
EPA Levy:
Cartage :
GST :
Temporary Acc:

Total Price:

Total Amount Tendered:
Change Given:

Driver: Dave
Operator: kevin



Delivering reliable service in quarry products and bulk transport...

104080

762088

• Sands • Soil • Roadbase • Landscape Materials
• Recycled Products • Decorative Gravels • Bulk Transport
• EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

Date 25-5-09	Camsons Fleet No. 937	Order No. FWR AC8 A
CUSTOMER'S SIGNATURE X		I.D./Rego D.LIND
CUSTOMER'S SIGNATURE X		Job No. 8
From STOCKTON		
Customer SYNERGY		
Delivered to on Site SITA		
Delivery Address RAYMOND TERRACE		
Material ART: CONT / SOIL	Quarry Docket No. 70023543	
Start	Gross	50:52
Finish	Tare	16:08
Travel	Net	34:44

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 826 824 886

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666
DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
SF6306.05 REFER TO CAMSONS TRADING TERMS & CONDITIONS



providing reliable service in quarry products and bulk transport...

- Sands • Soil • Roadbase • Landscape Materials
- Recycled Products • Decorative Gravels • Bulk Transport
- EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

10 AC 80

774806

MRB 940 774806

Delivery Docket

Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 70024385-PS

Voucher No:

Time In: 3/06/2009 6:44:46 AM

Time Out: 3/06/2009 6:44:46 AM

Vehicle Rego: P23555

Client: Camsons (processable)

Order Number:

Contract:

EPA Permit No:

Weighed Waste green waste Price

Storage Location: green waste

Each Items Qty Price

GROSS Weight: 12.50t

TARE Weight: 5.50t

NET Weight: 7.00t

Change to Weight: 7.00t

Weight: 0.00t

Council Fee:

Each Items:

EPA Levy:

Cartage:

GST:

Temporary Acc:

Total Price:

Total Amount Tendered:

Change Given:

Driver:

Operator: kevin

Date 3.6.09	Camsons Fleet No. 940	Order No.
CUSTOMER'S SIGNATURE X <i>[Signature]</i>		I.D./Rego MRB
CUSTOMER'S SIGNATURE X Peter Brown		Job No. 8
From Stockton (Fort Wallace)		
Customer Synergy		
Delivered to on Site Site		
Delivery Address Raymond Terrace		
Material Green Waste		Quarry Docket No. 70024384-PS
Start	Gross	12.04 12.50
Finish	Tare	10.16 5.50
Travel	Net	1.94 7.00
		8.94

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 886

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666

DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY

SF2008.05

REFER TO CAMSONS TRADING TERMS & CONDITIONS

CAMSONS

Delivering reliable service in quarry products and bulk transport...

• Sands • Soil • Roadbase • Landscape Materials
 • Recycled Products • Decorative Gravels • Bulk Transport
 • EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

761439

Date 02-06-09 937 Camsons Fleet No. Order No.

CUSTOMER'S SIGNATURE

X *[Signature]*

I.D./Rego

DT

CUSTOMER'S SIGNATURE

X Peter Brown

Job No.

8

From STOCKTON FERN BAY FORT WALLACE

Customer SYNERGY

Delivered to on Site SITA

Delivery Address RAYMOND TERRACE

Material Clean waste

Quarry Docket No.

70024383-PS

Start Gross 21.52

Tare 16.08

Net 5.44

MSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 886

Box 430 St Marys NSW 1790

PHONE (02) 9675 6444 FAX (02) 9675 3666

ELECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
 REFER TO CAMSONS TRADING TERMS & CONDITIONS

Delivery Docket

761439
DT937Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 70024383-PS

Voucher No:

Time In: 3/06/2009 6:37:19 AM
Time Out: 3/06/2009 6:37:19 AM

Vehicle Rego: CAM937

Client: Camsons (processable)
Order Number:
Contract:
LPA Permit No:

Weighed Waste	Price
green waste	
Storage Location: green waste stock	
Each Items	Qty Price

GROSS Weight:	21.52t
TARE Weight:	16.08t
NET Weight:	5.44t

Chargeable Weight:	5.44t
Each Item Weight:	0.00t
Unit Cost:	

Council Fee:	
Each Items:	
EPA Levy:	
Cartage :	
GST :	
Temporary Acc:	

Total Price:

Total Amount Tendered:
Change Given:Driver: Doug
Operator: Kevin

Boral
Quarries



BORAL RESOURCES (NSW) PTY LTD
ACN 000 756 507 ABN 51 000 756 507
PO Office Box 42
Wentworthville NSW 2145
Sales Orders 1300 723 999
Facsimile (02) 9033 6150

STOCKTON 773879
Phone No: 0249201406

CUSTOMER - CAMSONS PTY LIMITED T/AS CAMSO PO BOX 130 ST MARYS NSW 2760				PLANT No. 13	
DELIVER TO FORT WALLACE STOCKTON JOB X BIN				DATE 09:58 12/05/09	
PRODUCT DESCRIPTION FILL SAND S/D				DOCKET No. 623764	
CARTER CAMSONS TRANSPORT				ORDER No. FORT WALLACE	
REG. No. CAM940				QUOTE No. 025610	
EX-BIN				CUSTOMER No. 30221	
EX-STOCK				ZONE	
DESPATCHER				PRODUCT 137540	
ADDITIONAL CHARGES				UNIT PRICE	
NO				CARTER'S No. CAM940	
PAY CARTER				CARTAGE RATE	
RATE				DISTANCE	
VALUE				GROSS TONNES 45.90	
CHARGE CUSTOMER				TARE TONNES 15.70	
RATE				NETT TONNES 31.20	
VALUE				TOTAL ADD-ONS	
HOURLY HIRE				CHECK SUM	
DIVERSION				CASH SALE EXCL. GST	
MINIMUM LOAD				GST PAYABLE	
OTHER				TOTAL INCL. GST	
TOTAL ADD-ONS				CASH RECEIPT	
RECEIVED THE SUM OF \$				CASH	
SIGNATURE				CREDIT CARD	
				CHEQUE	
<p>The handling, storage and placement of quarry products can generate dust that may contain crystalline silica, which can cause breathing difficulties or lung disease through prolonged exposure. Prolonged exposure to dust from quarry products should be avoided. Use adequate dust prevention or control methods. Wear suitable protective clothing, safety goggles and dust masks that conform to Australian standards (AS/NZS 1715 or 1718). If dust gets into eyes, rinse with water continuously for 10 minutes. If dust is inhaled, move immediately to fresh air and if adverse symptoms persist, seek prompt medical advice. Contact Boral for more information, including Material Safety Data Sheet (MSDS).</p>					
Goods received and description above checked:				DELIVERED QUANTITY: 2684.051	
NAME <i>W. Hall</i>				SIGNATURE	

WHITE - SIGNATURE GREEN - CARTER PINK - CUSTOMER



Delivering reliable service in quarry products and bulk transport ...

104080

773879

• Sands • Soil • Roadbase • Landscape Materials
• Recycled Products • Decorative Gravels • Bulk Transport
• EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

Date 12.6.09	Camsons Fleet No. 9140	Order No.
CUSTOMER'S SIGNATURE X		I.D./Rego DC
CUSTOMER'S SIGNATURE X C. Pringle		Job No. 77
From		
Customer Synergy		
Delivered to on Site Port Wallis		
Delivery Address Stockton		
Material Fill Sand	Quarry Docket No. 6237614	
Start	Gross	46.90
Finish	Tare	15.70
Travel	Net	31.20

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 856

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666

DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY

SF/306.05

REFER TO CAMSONS TRADING TERMS & CONDITIONS

Delivery Docket

Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 762039 70023661-PS
Voucher No:

Time In: 26/05/2009 1:36:38 PM
Time Out: 26/05/2009 1:53:29 PM

Vehicle Rego: CAM933

Client: camsons (landfill)
Order Number: ps39
Contract: ps39
EPA Permit No:

Weighed Waste Price
contaminated soil
Storage Location: Landfill In

Each Items Qty Price

GROSS Weight: 22.90t
TARE Weight: 10.54t
NET Weight: 12.36t

Chargeable Weight: 12.36t
Each Item Weight: 0.00t
Unit Cost:

Council Fee:
Each Items:
EPA Levy:
Cartage :
GST ;
Temporary Acc:

Total Price:

Total Amount Tendered:
Change Given:

Driver: Bill
Operator: kevin



Delivering reliable service in quarry products and bulk transport...

• Sands • Soil • Roadbase • Landscape Materials
• Recycled Products • Decorative Gravels • Bulk Transport
• EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

Date	26.5.09	Camsons Fleet No.	933	Order No.	FWRAC-1
CUSTOMER'S SIGNATURE				I.D./ Rego	
X				Bill	
CUSTOMER'S SIGNATURE				Job No.	
X				8	
From					
Stuckton.					
Customer					
Synergy					
Delivered to on Site					
Delivery Address					
Raymond Terrace.					
Material				Quarry Docket No.	
H:10 Soil				70023661-PS	
Start		Gross	22.90		
Finish		Tare	10.54		
Travel		Net	12.36		

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 886

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666

DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
7306.05 REFER TO CAMSONS TRADING TERMS & CONDITIONS

Delivery Docket

Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 762040 70023660-PS
Voucher No:

Time In: 26/05/2009 1:33:59 PM
Time Out: 26/05/2009 1:54:10 PM

Vehicle Rego: N47269

Client: camsons (landfill)
Order Number: ps40
Contract: ps40
EPA Permit No:

Weighted Waste	Price
contaminated soil	Landfill In
Storage Location:	
Each Items	Qty Price

GROSS Weight:	24.78t
TARE Weight:	5.60t
NET Weight:	19.18t
Chargeable Weight:	19.18t
Each Item Weight:	0.00t
Unit Cost:	

Council Fee:
Each Items:
EPA Levy:
Cartage :
GST :
Temporary Acc:

Total Price:

Total Amount Tendered:
Change Given:

Driver: Bill
Operator: kevin

CAMSONS

Delivering reliable service in quarry products and bulk transport ...

• Sands • Soil • Roadbase • Landscape Materials
• Recycled Products • Decorative Gravels • Bulk Transport
• EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

Date 26-5-09	Camsons Fleet No. 933	Order No. EURAC - 4
CUSTOMER'S SIGNATURE X		I.D./Rego Bill
CUSTOMER'S SIGNATURE X		Job No. 8
From Stockton		
Customer Synergy		
Delivered to on Site		
Delivery Address Raymond Terrace		
Material A. Soil	Quarry Docket No. 70023660-PS	
Start	Gross	24.78
Finish	Tare	5.60
Travel	Net	19.18

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 624 686

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666
DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
SF/030.05 REFER TO CAMSONS TRADING TERMS & CONDITIONS

Delivery Docket

Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 70023662-PS
Voucher No:

Time In: 26/05/2009 1:40:57 PM
Time Out: 26/05/2009 1:40:57 PM

Vehicle Rego: CAM937

Client: camsons (landfill)
Order Number: ps41
Contract: ps41
EPA Permit No:

Weighted Waste contaminated soil Storage Location:	Price Landfill In
Each Items	Qty Price

GROSS Weight:	48.00t
TARE Weight:	16.08t
NET Weight:	31.92t

Chargeable Weight:	31.92t
Each Item Weight:	0.00t
Unit Cost:	

Council Fee:
Each Items:
EPA Levy:
Cartage :
GST :
Temporary Acc:

Total Price:

Total Amount Tendered:
Change Given:

Driver: Dave
Operator: kevin

CAMSONS

Delivering reliable service in quarry
products and bulk transport...

• Sands • Soil • Roadbase • Landscape Materials
• Recycled Products • Decorative Gravels • Bulk Transport
• EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

Date 26-5-09	Camsons Fleet No. 937	Order No. FWR ACS
CUSTOMER'S SIGNATURE X		I.D./Rego D.LIND
CUSTOMER'S SIGNATURE X		Job No. 8
From STOCKTON		
Customer SYNERGY		
Delivered to on Site SITA		
Delivery Address RAYMOND TERRACE		
Material CART: CONT/SOIL	Quarry Docket No. 70023662	
Start	Gross	48:00
Finish	Tare	16:08
Travel	Net	31:92

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 886

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666
DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
REFER TO CAMSONS TRADING TERMS & CONDITIONS

MRB 923 761928

Delivery Docket

Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 70023572-PS
Voucher No:

Time In: 25/05/2009 4:08:41 PM
Time Out: 25/05/2009 4:08:41 PM

Vehicle Rego: CAM923

Client: camsons (landfill)
Order Number: ps37
Contract: ps37
EPA Permit No:

Weighed Waste Price
contaminated soil
Storage Location: Landfill In
Each Items Qty Price

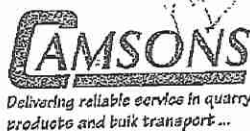
GROSS Weight: 48.02t
TARE Weight: 15.82t
NET Weight: 32.20t
Chargeable Weight: 32.20t
Each Item Weight: 0.00t
Unit Cost:

Council Fee:
Each Items:
EPA Levy:
Cartage :
GST :
Temporary Acc:

Total Price:

Total Amount Tendered:
Change Given:

Driver: marty
Operator: kevin



120080

761928

• Sands • Soil • Roadbase • Landscape Materials
• Recycled Products • Decorative Gravels • Bulk Transport
• EPA Licensed • EnviroAgg • Bottom Ash • Aggregates

Date 25.5.09	Camsons Fleet No. 923	Order No. RWRACT
CUSTOMER'S SIGNATURE X		I.D./Rego MRB
CUSTOMER'S SIGNATURE X		Job No. 8
From Stockton		
Customer Synergy		
Delivered to on Site Site		
Delivery Address Raymond Terrace		
Material Contaminated Soil	Quarry Docket No. 70023572-PS	
Start	Gross	48.02
Finish	Tare	15.82
Travel	Net	32.20

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 886

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666

DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
SF305.05 REFER TO CAMSONS TRADING TERMS & CONDITIONS

761426
DT 937

Delivery Docket

Newline Rd Resource Recovery Facility
330 Newline Road
Raymond Terrace 2324

Phone: 02.4987.4524

ABN: 34071096421

Ticket No: 70024097-PS
voucher No:

Time In: 1/06/2009 8:18:17 AM
Time Out: 1/06/2009 8:18:17 AM

Vehicle Rego: CAM937

Client: camsons (landfill)
Order Number: ps48
Contract: ps48
EPA Permit No:

Weighed Waste	Price
contaminated soil	
Storage Location:	Landfill In
Each Items	Qty Price

GROSS Weight:	47.20t
TARE Weight:	16.08t
NET Weight:	31.12t

Chargeable Weight:	31.12t
Each Item Weight:	0.00t
Unit Cost:	

Council Fee:
Each Items:
EPA Levy:
Cartage :
GST :
Temporary Acc:

Total Price:

Total Amount Tendered:
Change Given:

Driver: Doug

Operator: kevin

CAMSONS

Delivering reliable service in quarry
products and bulk transport ...

• Sands • Soil • Roadbase • Landscape Materials
• Recycled Products • Decorative Gravels • Bulk Transport
• EPA Licenced • EnviroAgg • Bottom Ash • Aggregates

Date 01.06.09	Camsons Fleet No. 937	Order No. HWRAC 2
CUSTOMER'S SIGNATURE X		I.D./Rego DT
CUSTOMER'S SIGNATURE X		Job No. 8
From FERNBAY FORT wallare -		
Customer SYNGRAY		
Delivered to on Site SITA		
Delivery Address RAYMOND TERRACE		
Material COAT - SOIL	Quarry Docket No. 70024097-PS	
Start	Gross	47.20
Finish	Tare	16.08
Travel	Net	31.12

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 886

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666
DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
SP/306.05 REFER TO CAMSONS TRADING TERMS & CONDITIONS



Delivering reliable service in quarry products and bulk transport.

104080

774816

- Sands • Soil • Roadbase • Landscape Materials
- Recycled Products • Decorative Gravels • Bulk Transport
- EPA Licensed • EnviroAgg • Bottom Ash • Aggregates

Date: 01.6.09 Camsons Fleet No. 0120 Order No. FW/R463

CUSTOMER'S SIGNATURE X I.D. Rego MRB

CUSTOMER'S SIGNATURE X Job No. 10

From: Stockton

Customer: Synergy

Delivered on Site: Site

Delivery Address: Kemps Creek

Material: R SW/C-SOIL Quarry Docket No. 30070074-ED

Start	Gross	46.90
Finish	Tare	15.48
Travel	Net	31.42

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.N. 27 828 824 406
PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666
DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
REFER TO CAMSONS TRADING TERMS & CONDITIONS

MRB 0120 774816

Delivery Docket

SITA Australia Pty Ltd
Elizabeth Drive Landfill
172 Elizabeth Drive
Kemps Creek NSW 1778
Phone: 02 4774 8865

ABN: 70 002 902 650

Ticket No: 30070074-ED

Time In: 9/06/2009 3:20:51 PM
Time Out: 9/06/2009 3:39:46 PM

Vehicle: 00 CAMS-0
Client: MS-5
Order Number: Stockton

Contract: 28635

Weighted Waste
INDUST CATEG
Unit Cost: \$
Storage Location: ND A4/L6 E6

Each Item	Qty	Price
GROSS Weight:		46.90
TARE Weight:		15.48
NET Weight:		1.42
Chargeable Weight:		1.42
Each Item Weight:		0.00

Fee: \$
Each Item: \$
EPA Levy: \$
GST: \$
Temporary Acc: \$
Total Price: \$
Amount Tendered: \$

Change Given:

Operator: Jerry



Delivering reliable services in quarry products and bulk transport.

- Sands • Soil • Roadbase • Landscape Materials
- Recycled Products • Decorative Gravels • Bulk Transport
- EPA Licensed • EnviroAgg • Bottom Ash • Aggregates

1104080

768432

Date	09.06.09	Camsons Fleet No.	947	Order No.	FWR443
CUSTOMER'S SIGNATURE	X	ID / Rego	AH		
CUSTOMER'S SIGNATURE	X	Job No.	10		
From	STOCKTON				
Customer	SYNERGY				
Delivered to on Site	SITA				
Delivery Address	KEMPS CREEK				
Material	REGISTERED SOLID WASTE				
Start	Gross	47-14			
Finish	Tare	16-74			
Travel	Net	30-40			
Quarry Docket No.	30070109-ED				

CAMSONS PTY LTD A.C.N. 002 113 279 A.B.H. 27 528 824 896

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3665

DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY

REUSE FOR ALTERNATE TABLES & CONDITIONS

768432

Delivery Docket 947

SITA Australia Pty Ltd
Elizabeth Drive Landfill
1725 Elizabeth Drive
KEMPS CREEK NSW 2178
Phone: 02 4774 8866

ABN: 70 002 902 650

Ticket No: 30070109-ED

Time In: 10/06/2009 7:39:04 AM
Time Out: 10/06/2009 8:17:51 AM

Vehicle Rego: CAM947
Client: CAMSONS
Order Number: Stockton

Contract: 28635

Weighted waste:
INDUST CATEG
Unit Cost: \$
Storage Location: IND A4/L6/E6

Each Items	Qty	Price
GROSS Weight:	47.14t	
TARE Weight:	16.74t	
NET Weight:	30.40t	
Chargeable weight:	30.40t	
Each Item weight:	0.00t	

Fee:	\$
Each Items:	\$
EPA Levy:	\$
GST:	\$
Temporary Acc:	\$
Total Price:	\$
Amount Tendered:	\$

Change Given:

Operator: Milton

.....



Delivering reliable service in quarry products and bulk transport

104080

768476

- Sands • Soil • Roadbase • Landscape Materials
- Recycled Products • Decorative Gravels • Bulk Transport
- EPA Licensed • EnviroAgg • Bottom Ash • Aggregates

Date	09-06-09	Camsons Fleet No.	Q32	Order No.	FW Rac3
CUSTOMER'S SIGNATURE		I.D./Flag			
X		P5			
CUSTOMER'S SIGNATURE		Job No			
X		10			
From	STOCKTON				
Customer	SINERG +				
Delivered to on Site	SITA				
Delivery Address	KEMPS CK				
Material	solid waste				
Start	Gross	Quarry Docket No.			
Finish	Tare	30070104			
Travel	Net				

CAMSONS PTY LTD A.C.N. 002 113 270 A.B.N. 27 828 824 806

PO Box 430 St Marys NSW 1790

SALES: PHONE (02) 9675 6444 FAX (02) 9675 3666
DIRECT ORDERS: PHONE (02) 9675 6222 FAX (02) 9677 2587

YELLOW - OFFICE COPY BLUE - CUSTOMER'S COPY PINK - SPARE COPY WHITE - BOOK COPY
REFER TO CAMSONS TRADING TERMS & CONDITIONS

Delivery Docket

SITA Australia Pty Ltd
Elizabeth Drive Landfill
1725 Elizabeth Drive
KEMPS CREEK NSW 2178
Phone: 02 4774 8866

ABN: 70 002 902 650

Ticket No: 30070104-ED

Time In: 10/06/2009 7:29:50 AM
Time Out: 10/06/2009 8:02:45 AM

Vehicle Rego: CAM932
Client: CAMSONS
Order Number: stockton

Contract: 28635

Weighted waste:
INDUST CATEG
Unit Cost: \$
Storage Location: IND A4/L6/E6

Each Items	Qty	Price
GROSS weight:	47.04t	
TARE weight:	16.34t	
NET weight:	30.70t	
Chargeable weight:	30.70t	
Each Item weight:	0.00t	

Fee:	\$
Each Items:	\$
EPA Levy:	\$
GST:	\$
Temporary Acc:	\$
Total Price:	\$
Amount Tendered:	\$

Change Given:

operator: milton

.....

768476

CAM932
P5

Boral Recycling



BORAL RECYCLING PTY LTD
ACN 000 061 843 ABN 42-000 061 943
PO Office: Brite NSW 2145
Recivals orders 1300 853 999
Fax (02) 9604 8585

CUSTOMER CAMSONS PTY LIMITED T/AS CAMSO PO BOX 430 ST. MARYS NSW 2760				PLANT No: 23			
RECEIVED FROM				DATE 10:58 26/05/09			
PRODUCT DESCRIPTION RECEIVAL BRICK MIX S/P				DOCKET No: 13898 SYNERGY			
CARTER CAMSONS TRANSPORT				ORDER No: NEWCASTLE			
REG. No: CAM937				QUOTE No: 300189			
EX-BIN				EX-STOCK			
DESPATCHER				DISTANCE			
ADDITIONAL CHARGES		NO	PAY CARTER		CHARGE CUSTOMER		GROSS TONNES
			RATE	VALUE	RATE	VALUE	48.60
HOURLY HIRE							TARE TONNES
							16.00
DIVERSION							NETT TONNES
							32.60
MINIMUM LOAD							TOTAL ADD-ONS
							CHECK SUM
OTHER							CASH SALE EXCL. GST
TOTAL ADD-ONS							GST PAYABLE
CASH RECEIPT						CASH	TOTAL INCL. GST
RECEIVED THE SUM OF \$						CREDIT CARD	
SIGNATURE						CHEQUE	
Construction / Demolition Material for Disposal							
Delivered By:			Inspected By			Inspected At	
			Receivals Officer:			Unloading:	
Signed			Signed			Signed	

WHITE - SIGNATURE GREEN - CARTER PINK - CUSTOMER WHITE - OFFICE

Boral
Recycling



BORAL RECYCLING PTY LTD
ACN 000 061 843 ABN 42 000 061 843
PO Office Box 42
Wentworthville NSW 2145
Receivals orders 1300 853 999
Fax (02) 9604 8585

CUSTOMER CAMSONS PTY LIMITED T/AS CAMSO PO BOX 430 ST MARYS NSW 2760				PLANT No. 23	
RECEIVED FROM				DATE 12:15 26/05/09	
PRODUCT DESCRIPTION RECEIVAL BRICK MIX S/P				DOCKET No. 713904 SYNERGY	
CARTER CAMSONS TRANSPORT				ORDER No. NEWCASTLE	
REG. No. CAM937				QUOTE No. 300189	
EX-BIN				CUSTOMER No. 16221	
EX-STOCK				ZONE	
DESPATCHER				PRODUCT	
ADDITIONAL CHARGES				UNIT PRICE	
NO				CARTER'S No. CAM937	
PAY CARTER				CARTAGE RATE	
RATE				DISTANCE	
VALUE				GROSS TONNES	
CHARGE CUSTOMER				TARE TONNES	
RATE				NET TONNES	
VALUE				TOTAL ADD-ONS	
HOURLY HIRE				CHECK SUM	
DIVERSION				CASH SALE EXCL. GST	
MINIMUM LOAD				GST PAYABLE	
OTHER				TOTAL INCL. GST	
TOTAL ADD-ONS				CASH RECEIPT	
CASH RECEIPT				CASH	
RECEIVED THE SUM OF \$				CREDIT CARD	
SIGNATURE				CHEQUE	
Construction / Demolition Material for Disposal					
Delivered By:		Inspected By		Inspected At	
D. LIND		Receivals Officer:		Unloading:	
Signed		Signed		Signed	

WHITE - SIGNATURE GREEN - CARTER PINK - CUSTOMER WHITE - OFFICE

Boral Recycling



BORAL RECYCLING PTY LTD
ACN 000 061 843 ABN 42 000 061 843
PO Office Box 42
Wentworthville NSW 2145
Receivals orders 1300 853 999
Fax (02) 9604 8585

MRO 923
761933

CUSTOMER CAMSONS PTY LIMITED T/AS CAMSO PO BOX 430 ST. MARYS NSW 2760						PLANT No. 23	
RECEIVED FROM						DATE 11:21 28/05/09	
PRODUCT DESCRIPTION RECEIVAL BRICK MIX S7P						DOCKET No. 713901 SYNERGY	
CARTER CAMSONS TRANSPORT						ORDER No. SYNERGY	
REG. No. CAM923						QUOTE No. 300189	
EX-BIN						CUSTOMER No. 36221	
EX-STOCK						ZONE	
DESPATCHER						PRODUCT 159510	
ADDITIONAL CHARGES						UNIT PRICE	
NO						CARTER'S No. CAM923	
PAY CARTER						CARTAGE RATE	
RATE						DISTANCE	
VALUE						GROSS TONNES 47.50	
CHARGE CUSTOMER						TARE TONNES 15.58	
RATE						NET TONNES 31.92	
VALUE						TOTAL ADD-ONS	
HOURLY HIRE						CHECK SUM	
DIVERSION						CASH SALE EXCL. GST	
MINIMUM LOAD						GST-PAYABLE	
OTHER						TOTAL INCL. GST	
TOTAL ADD-ONS						CASH RECEIPT	
RECEIVED THE SUM OF \$						CASH	
SIGNATURE						CREDIT CARD	
Construction / Demolition Material for Disposal						CHEQUE	
Delivered By:				Inspected By		Inspected At	
Receivals Officer:				Unloading:			
Signed				Signed		Signed	

WHITE - SIGNATURE GREEN - CARTER PINK - CUSTOMER WHITE - OFFICE

Boral Recycling



BORAL RECYCLING PTY LTD.
ACN 000 061 843 ABN 42 000 061 843
PO Office Box 42
Wentworthville NSW 2145
Receivals orders 1300 853 999
Fax (02) 9604 8585

MRB 9123
761932

CUSTOMER				PLANT No. 23	
CAMSONS PTY LIMITED T/AS CAMSO PO BOX 430				DATE 10:30 26/05/09	
ST MARYS				DOCKET No. 713897	
RECEIVED FROM				ORDER No. NERGY	
PRODUCT DESCRIPTION				QUOTE NERGY	
RECEIVAL BRICK MIX				CUSTOMER No. 300189	
CARTER				ZONE 26221	
CAMSONS TRANSPORT				PRODUCT	
REG. No.				UNIT PRICE 159510	
EX-BIN CAM923		EX-STOCK		CARTER'S No.	
				CARTAGE RATE CAM923	
DESPATCHER		DISTANCE			
ADDITIONAL CHARGES	NO	PAY CARTER		CHARGE CUSTOMER	
		RATE	VALUE	RATE	VALUE
HOURLY HIRE					
DIVERSION					
MINIMUM LOAD					
OTHER					
TOTAL ADD-ONS					
CASH RECEIPT				GROSS TONNES	
RECEIVED THE SUM OF \$				TARE TONNES 46.80	
SIGNATURE				NETT TONNES 13.98	
Construction / Demolition Material for Disposal				TOTAL ADD-ONS 1.02	
Delivered By:				CHECK SUM	
Inspected By Receivals Officer:				CASH	
Inspected At Unloading:				GST PAYABLE	
Signed				CREDIT CARD	
Signed				TOTAL INCL. GST	
Signed					

WHITE - SIGNATURE GREEN - CARTER PINK - CUSTOMER WHITE - OFFICE

Boral
Recycling



BORAL RECYCLING PTY LTD
ACN 000 061 843 ABN 42 000 061 843
PO Office Box 42
Wentworthville NSW 2145
Receivals orders 1300 853 999
Fax (02) 9604 8585

CUSTOMER CAMSONS PTY LIMITED T/AS CAMSO PO BOX 430 ST MARYS NSW 2760						PLANT No. 23	
RECEIVED FROM						DATE 11:39 26/05/09	
						DOCKET No. 713902 SYNERGY 762038 ORDER No. SYNERGY	
PRODUCT DESCRIPTION RECEIVAL CONC TYPE B S/P						QUOTE No. 200189	
CARTER CAMSON TRANSPORT						CUSTOMER No. 36221	
						ZONE	
REG. No. CAM933						PRODUCT 142426	
						UNIT PRICE	
EX-BIN EX-STOCK DESPATCHER						CARTER'S No. CAM933	
						CARTAGE RATE	
DISTANCE						GROSS TONNES 43.90	
ADDITIONAL CHARGES		NO	PAY CARTER RATE VALUE		CHARGE CUSTOMER RATE VALUE		TARE TONNES 16.00
HOURLY HIRE							NET TONNES 27.90
DIVERSION							TOTAL ADD-ONS
MINIMUM LOAD							CHECK SUM
OTHER							CASH SALE EXCL. GST
TOTAL ADD-ONS							GST PAYABLE
CASH RECEIPT						CASH	
RECEIVED THE SUM OF \$						CREDIT CARD	
						CHEQUE	
SIGNATURE						TOTAL INCL. GST	
Construction / Demolition Material for Disposal							
Delivered By:				Inspected By Receivals Officer:		Inspected At Unloading:	
Signed				Signed		Signed	

WHITE - SIGNATURE GREEN - CARTER PINK - CUSTOMER WHITE - OFFICE



Liquid and Hazardous Waste Division

Transpacific Technical Services - Northern NSW

a Division of Transpacific Industries Pty Ltd

ABN: 40 010 745 383

PO Box 246 RUTHERFORD NSW 2320

Ph: (02) 4939 1111 / 1800 003 283 Fax: (02) 4939 1113

TAX INVOICE

Synergy Resource Management
P O Box 693
NORTH SYDNEY NSW 2059

Customer Number	Invoice Number	Invoice Date	Due Date	Page
161SYN001	46STI0000027699	29/04/2009	COD	1 / 1

Description	Qty	Unit Price	Subtotal (Excl GST)
Job Details: J708857 27/04/09 Customer Ref: 05147	Notes: EFTPOS after Invoicing		
Generator: Fort Wallace Defence Site, Stockton - Synergy Resource Management Fullerton Road STOCKTON NSW 2295			
1618106 - One Tank Envirocycle > 5000 Ltr (l)	7,000.00		
1616000 - Environmental Management Fee (ea)	1.00		

* Indicates taxable supply

TOTAL (Excl GST)

GST

TOTAL (if paid by due date)

A late payment fee of \$22.00 (GST Inclusive) will be
applicable if payment is not received by the due date

TOTAL (if paid after due date)

Account/Service Enquiries:

PO Box 246

RUTHERFORD NSW 2320

Ph: (02) 4939 1111 / 1800 003 283

Fax: (02) 4939 1113

Email: linda.humphrys@transpac.com.au

Payment Enquiries:

PO Box 1824

MILTON QLD 4064

Ph: (07) 3100 8433

Fax: (07) 3376 2751

Email:

accountsreceivable@transpac.com.au

Payment Options:

Cheque

Please mail cheque to payment enquiries address

Make cheque payable to Transpacific Industries Pty Ltd

Credit Card

Please call Linda Humphrys on (02) 4939 1112

Direct Deposit - Commonwealth Bank

Account Name: Transpacific Industries Pty Ltd

BSB: 064-000 Account No: 1146 6124

-Please use 161SYN001 as payment reference.

-Please email or fax a remittance to Payment Enquiries

Local Branch:

Newcastle: Raven Street KOORAGANG ISLAND NSW 2304 PH: (02) 4939 1111 Tamworth: 31-33 Gunnedah Rd TAMWORTH NSW 2340 PH: (02) 6762 2692

Transpacific Industries Group Ltd | Level 1 159 Coronation Drive Milton QLD 4064 Australia

PO Box 1824 Milton BC QLD 4064 Australia

Telephone +61 7 3367 7800 | Facsimile: +61 7 3367 7899 | www.transpacific.com.au

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS

FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION

Laboratory Report No: E043250
Client Name: SMEC Australia Pty Ltd
Client Reference: 3001625.001
Contact Name: Hugh Selby
Chain of Custody No: na
Sample Matrix: SOIL

Cover Page 1 of 3
plus Sample Results

Date Received: 16/06/2009
Date Reported: 22/06/2009

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occurred within the agreed settlement period.

QUALITY ASSURANCE CRITERIA

Accuracy: matrix spike: 1 in first 5-20, then 1 every 20 samples
lcs, crm, method: 1 per analytical batch
surrogate spike: addition per target organic method

Precision: laboratory duplicate: 1 in first 5-10, then 1 every 10 samples
laboratory triplicate: re-extracted & reported when duplicate RPD values exceed acceptance criteria

Holding Times: soils, waters: Refer to LabMark Preservation & THT table
VOC's 14 days water / soil
VAC's 7 days water or 14 days acidified
VAC's 14 days soil
SVOC's 7 days water, 14 days soil
Pesticides 7 days water, 14 days soil
Metals 6 months general elements
Mercury 28 days

Confirmation: target organic analysis: GC/MS, or confirmatory column

Sensitivity: EQL: Typically 2-5 x Method Detection Limit (MDL)

**QUALITY CONTROL
GLOBAL ACCEPTANCE CRITERIA (GAC)**

Accuracy: spike, lcs, crm general analytes 70% - 130% recovery
surrogate: phenol analytes 50% - 130% recovery
organophosphorous pesticide analytes 60% - 130% recovery
phenoxo acid herbicides, organotin 50% - 130% recovery

Precision: anion/cation bal: +/- 10% (0-3 meq/l),
+/- 5% (>3 meq/l)
method blank: not detected >95% of the reported EQL
duplicate lab 0-30% (>10xEQL), 0-75% (5-10xEQL)
RPD (metals): 0-100% (<5xEQL)
duplicate lab 0-50% (>10xEQL), 0-75% (5-10xEQL)
RPD: 0-100% (<5xEQL)

**QUALITY CONTROL
ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)**

Accuracy: spike, lcs, crm analyte specific recovery data
surrogate: <3xstd of historical mean

Uncertainty: spike, lcs: measurement calculated from historical analyte specific control charts

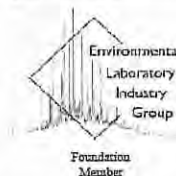
RESULT ANNOTATION

Data Quality Objective s: matrix spike recovery p: pending bcs: batch specific lcs
Data Quality Indicator d: laboratory duplicate lcs: laboratory control sample bmb: batch specific mb
Estimated Quantitation Limit t: laboratory triplicate crm: certified reference material
not applicable r: RPD relative % difference mb: method blank

David Burns
Quality Control (Report signatory)
david.burns@labmark.com.au

Geoff Weir
Authorising Chemist (NATA signatory)
geoff.weir@labmark.com.au

Jeremy Truong
Authorising Chemist (NATA signatory)
jeremy.truong@labmark.com.au



Laboratory Report: E043250

Cover Page 2 of 3

NEPC GUIDELINE COMPLIANCE - DQO

1. GENERAL

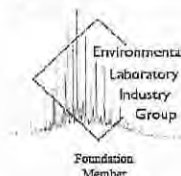
- A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.
- B. EQL's are matrix dependant and may be increased due to sample dilution or matrix interference.
- C. Laboratory QA/QC samples are specific to this project.
- D. Inter-laboratory proficiency results are available upon request. NATA accreditation details available at www.nata.asn.au.
- E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.
- F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If recovery data <20%, then the relevant results for that compound are considered not reliable.
- G. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action. Anomolous QC data is examined in conjunction with other QC samples and a final decision whether to accept or reject results is provided by the professional judgement of the senior analyst. The USEPA-CLP National Functional Guidelines are referred to for specific recommendations.
- H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.
- I. LabMark shall maintain an official copy of this Certificate of Analysis for all traceable reference purposes.

2. CHAIN OF CUSTODY (COC) & SAMPLE RECEIPT NOTICE (SRN) REQUIREMENTS

- A. SRN issued to client upon sample receipt & login verification.
- B. Preservation & sampling date details specified on COC and SRN, unless noted.
- C. Sample Integrity & Validated Time of Sample Receipt (VTSR) Holding Times verified (preservation may extend holding time, refer to preservation chart).

3. NATA ACCREDITED METHODS

- A. NATA accreditation held for each in-house method and sample matrix type reported, unless noted below (Refer to subcontracted test reports for NATA accreditation status).
- B. NATA accredited in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA / APHA documents. Corporate Accreditation No. 13542.
- C. Subcontracted analyses: Refer to Sample Receipt Notice and additional DQO comments.
Reported by Amdel Limited, NATA accreditation No.1526.



Laboratory Report: E043250

Cover Page 3 of 3

4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: SOIL

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
1	Petroleum Hydrocarbons (TPH)	2	0	0%	0	0	0%
2	Polyaromatic Hydrocarbons (PAH)	2	0	0%	0	0	0%
3	Acid extractable metals (M7)	2	0	0%	0	0	0%
4	Acid extractable metals - mercury	2	0	0%	0	0	0%
5	Moisture	2	--	--	--	--	--

GLOSSARY:

#d	number of discrete duplicate extractions/analyses performed.
%d-ratio	NEPC guideline for laboratory duplicates is 1 in 10 samples (min 10%).
#t	number of triplicate extractions/analyses performed.
#s	number of spiked samples analysed.
%s-ratio	USEPA guideline for laboratory matrix spikes is 1 in 20 samples (min 5%).

5. ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

- A. All tests were conducted by LabMark Environmental Sydney, NATA accreditation No. 13542, unless indicated below.
- B. The following test was conducted by Amdel Limited, NATA accreditation No.1526. :- ASBESTOS

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC data. Acceptance of this self assessment certificate does not preclude any requirement for a QA/QC review by a accredited contaminated site EPA auditor, when and wherever necessary. Laboratory QA/QC self assessment references available upon request.

Laboratory Identification		213007	213008	ics	mb				
Sample Identification		FW8b-V1	FW8b-V2	QC	QC				
Depth (m)		--	--	--	--				
Sampling Date recorded on COC		15/6/09	15/6/09	--	--				
Laboratory Extraction (Preparation) Date		18/6/09	18/6/09	18/6/09	18/6/09				
Laboratory Analysis Date		20/6/09	20/6/09	19/6/09	19/6/09				
Method : E006.2									
Petroleum Hydrocarbons (TPH)									
C10 - C14 Fraction	EQL	<50	<50	--	<50				
C15 - C28 Fraction	50	<100	<100	84%	<100				
C29 - C36 Fraction	100	<100	<100	--	<100				
Sum of TPH C10 - C36	100	--	--	--	--				

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E006.2: 8-10g soil extracted with 20ml DCM/Acetone/Hexane (10:45:45). Analysis by GC/FID.

This report supercedes reports issued on: N/A

Laboratory Identification		213007	213008	ics	mb				
Sample Identification		FW8b-V1	FW8b-V2	QC	QC				
Depth (m)		--	--	--	--				
Sampling Date recorded on COC		15/6/09	15/6/09						
Laboratory Extraction (Preparation) Date		18/6/09	18/6/09	18/6/09	18/6/09				
Laboratory Analysis Date		19/6/09	19/6/09	19/6/09	19/6/09				
Method : E007.2									
Polyaromatic Hydrocarbons (PAH)		EQL							
Naphthalene	0.5	<0.5	<0.5	86%	<0.5				
Acenaphthylene	0.5	<0.5	<0.5	83%	<0.5				
Acenaphthene	0.5	<0.5	<0.5	85%	<0.5				
Fluorene	0.5	<0.5	<0.5	85%	<0.5				
Phenanthrene	0.5	<0.5	<0.5	83%	<0.5				
Anthracene	0.5	<0.5	<0.5	83%	<0.5				
Fluoranthene	0.5	0.7	<0.5	84%	<0.5				
Pyrene	0.5	0.7	<0.5	86%	<0.5				
Benz(a)anthracene	0.5	<0.5	<0.5	82%	<0.5				
Chrysene	0.5	<0.5	<0.5	88%	<0.5				
Benzo(b)&(k)fluoranthene	1	<1	<1	86%	<1				
Benzo(a) pyrene	0.5	<0.5	<0.5	85%	<0.5				
Indeno(1,2,3-c,d)pyrene	0.5	<0.5	<0.5	81%	<0.5				
Dibenz(a,h)anthracene	0.5	<0.5	<0.5	80%	<0.5				
Benzo(g,h,i)perylene	0.5	<0.5	<0.5	83%	<0.5				
Sum of reported PAHs	--	1.4	--	--	--				
2-FBP (Surr @ 5mg/kg)	--	95%	94%	95%	94%				
TP-dl14 (Surr @ 5mg/kg)	--	95%	98%	101%	99%				

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E007.2: 8-10g soil extracted with 20ml DCM/Acetone/Hexane (10:45:45). Analysis by GC/MS.



ENVIRONMENTAL LABORATORIES

Laboratory Report No: E043250

Client Name: SMEC Australia Pty Ltd

Contact Name: Hugh Selby

Client Reference: 3001625.001

Page: 3 of 5

plus cover page

Date: 22/06/09

This report supersedes reports issued on: N/A

Final

Certificate
of Analysis

Laboratory Identification		213007	213008	crm	ics	mb			
Sample Identification		FW8b-V1	FW8b-V2	QC	QC	QC			
Depth (m)		--	--	--	--	--			
Sampling Date recorded on COC		15/6/09	15/6/09						
Laboratory Extraction (Preparation) Date		18/6/09	18/6/09	18/6/09	18/6/09	18/6/09			
Laboratory Analysis Date		19/6/09	19/6/09	19/6/09	19/6/09	19/6/09			
Method : E022.2									
Acid extractable metals (M7)									
EQL	Arsenic	1	1	101%	102%	<1			
	Cadmium	0.1	<0.1	95%	96%	<0.1			
	Chromium	1	1	99%	93%	<1			
	Copper	2	2	99%	97%	<2			
	Nickel	1	<1	97%	94%	<1			
	Lead	2	15	99%	95%	<2			
	Zinc	5	23	97%	100%	<5			

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

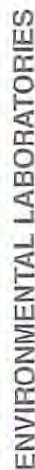
E022.2: 0.5g digested in nitric/hydrochloric acid. Analysis by ICP-MS.

Laboratory Identification		213007	213008	crm	ics	mb			
Sample Identification		FW8b-V1	FW8b-V2	QC	QC	QC			
Depth (m)		--	--	--	--	--			
Sampling Date recorded on COC		15/6/09	15/6/09	--	--	--			
Laboratory Extraction (Preparation) Date		18/6/09	18/6/09	18/6/09	18/6/09	18/6/09			
Laboratory Analysis Date		19/6/09	19/6/09	19/6/09	19/6/09	19/6/09			
Method : E026.2 Acid extractable metals - mercury									
Mercury		<0.05	<0.05	97%	92%	<0.05			
EQL 0.05									

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E026.2: 0.5g digested with nitric/hydrochloric acid. Analysis by CV-ICP-MS or FIMS.



Client Reference:

3001625.001

Date: 22/06/09

This report supercedes reports issued on: N/A

Certificate of Analysis

Laboratory Identification		213007	213008							
Sample Identification		FW8b-V1	FW8b-V2							
Depth (m)		--	--							
Sampling Date recorded on COC		15/6/09	15/6/09							
Laboratory Extraction (Preparation) Date		18/6/09	18/6/09							
Laboratory Analysis Date		19/6/09	19/6/09							
Method : E005.2										
Moisture										
Moisture										
EQL										
--		2	1							

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Amdel Ltd
ABN 30 008 127 802

Unit 2, 35 Cormack Road, Wingfield SA, 5013
PO Box 552, Port Adelaide BC, SA 5015
Phone: (08) 8440 7145 Facsimile: (08) 8440 7197

ASBESTOS IDENTIFICATION REPORT

CLIENT: LabMark

DATE: 19 June 2009

ADDRESS: 8 Leighton Place, Asquith NSW 2077

REPORT NO: 9AA0570AD

PROJECT NO: E043250

PAGE NO: 1 of 1

RESULTS:

LabMark ID	Sample	Sample Depth	Sample size (g)	Description	Asbestos detected*
213007	FW8b-V1		45	White and grey sand- sized particles	No
213008	FW8b-V2		37	Off-white sand- sized particles	No

APPROVED IDENTIFIER: Michael Till

APPROVED SIGNATORY:
Michael Till



The size stated above refers to the as-received weight in grams of unconsolidated particles

* Detected by polarized light microscopy

Note: Chrysotile is a fibrous silicate mineral commonly known as white asbestos, amosite is a fibrous silicate commonly known as brown or grey asbestos and crocidolite is a fibrous silicate commonly known as blue asbestos.

The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

SCOPE OF ACCREDITATION: Class 7.82.31: Qualitative identification of asbestos types in bulk samples by polarized light microscopy, including dispersion staining.



This document is issued in accordance with NATA's accreditation requirements
Accredited for compliance with ISO/IEC 17025.
NATA accreditation number: 1526
This document may not be reproduced except in full.

Sample Receipt Notice (SRN) for E043250



Quality, Service, Support

Client Details		Laboratory Reference Information	
Client Name: SMEC Australia Pty Ltd Client Phone: 02 9925 5555 Client Fax: 02 9925 5566 Contact Name: Hugh Selby Contact Email: hugh.selby@smec.com Client Address: PO Box 1052 North Sydney NSW 2060 Project Name: 3001625.001 Project Number: - Not provided - CoC Serial Number: - Not provided - Purchase Order: - Not provided - Surcharge: No surcharge applied (results by 6:30pm on due date) Sample Matrix: SOIL		<div>Please have this information ready when contacting Labmark.</div> Laboratory Report: E043250 Quotation Number: - Not provided, standard prices apply Laboratory Address: Unit 1, 8 Leighton Pl. Asquith NSW 2077 Phone: 61 2 9476 6533 Fax: 61 2 9476 8219 Sample Receipt Contact: Ros Schacht Email: Ros.Schacht@labmark.com.au Reporting Contact: Leanne Boag Email: leanne.boag@labmark.com.au	
Date Sampled (earliest date): 15/06/2009 Date Samples Received: 16/06/2009 Date Sample Receipt Notice issued: 16/06/2009 Date Preliminary Report Due: 23/06/2009 Client TAT Request Date: 23/06/2009		NATA Accreditation: 13542 TGA GMP License: 185-336 (Sydney) APVMA License: 6105 (Sydney) AQIS Approval: NO356 (Sydney) AQIS Entry Permit: 200521534 (Sydney)	
Reporting Requirements: Electronic Data Download required: Yes		Invoice Number: 09EA4472	

Sample Condition: COC received with samples. Report number and lab ID's defined on COC.
Samples received in good order .
Samples received with cooling media: Crushed ice .
Samples received chilled.
Security seals not used .
Sample container & chemical preservation suitable .

Comments: Asbestos subcontracted to Labmark SA.

Holding Times: Date received allows for sufficient time to meet Technical Holding Times.

Preservation: Chemical preservation of samples satisfactory for requested analytes.

Important Notes:

LabMark shall responsibly dispose of spent customer soil and water samples which includes the disintegration of the sample label. A sample disposal fee of \$1.00 is applicable on all samples received by the laboratory regardless of whether they have undergone analytical testing. Sample disposal of environmental samples shall be 31 days (water) and 3 months (soil, HN03 preserved samples) after laboratory receipt, unless otherwise requested in writing by the client. Samples requested to be held in non-refrigerated storage shall incur \$5.00/ sample/ 3 months. Additional refrigerated storage shall incur \$30/ sample/ 3 months. Combination prices apply only if requested. Transfer of report ownership from LabMark to the client shall occur once full and final payment has been settled and verified. All report copies may be retracted where full payment does not occur within the agreed settlement period.

Analysis comments:

Subcontracted Analyses:

Reported by Amdel Limited, NATA accreditation No.1526.

Thank you for choosing Labmark to analyse your project samples.
Additional information on www.labmark.com.au

Sample Receipt Notice (SRN) for E043250



Quality, Service, Support

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

GRID REVIEW TABLE				Requested Analysis															
No.	Date	Depth	Client Sample ID	Acid extractable metals - mercury	Acid extractable metals (M7)	Moisture	Polyaromatic Hydrocarbons (PAH)	PREP Not Reported	Petroleum Hydrocarbons (TPH)	External Asbestos									
213007	15/06		FW8b-V1	●	●	●	●	●	●	●									
213008	15/06		FW8b-V2	●	●	●	●	●	●	●									
Totals:				2	2	2	2	2	2	2									

'PREP Not Reported' refers to an internal laboratory instruction - client confirmation of this parameter is not required.

Thank you for choosing Labmark to analyse your project samples.
Additional information on www.labmark.com.au

Sample
Receipt
Notice (SRN) for **E043250**



Quality, Service, Support

				Requested Analysis															
No.	Date	Depth	Client Sample ID	M8 - M7-T_S															
213007	15/06		FW8b-V1	●															
213008	15/06		FW8b-V2	●															
Totals:				2															

Thank you for choosing Labmark to analyse your project samples.
Additional information on www.labmark.com.au

SYDNEY

☐ **BRISBANE**☐ MELBOURNE

Ph: (02) 9476 6533 Fax: (02) 9476 8219
Unit 1/8 Leighton Place Asquith NSW 2077
E: enviro.sydney@labmark.com.au

Ph: (07) 3902 4600 Fax: (07) 3902 4646
1/21 Smallwood Place Murarie QLD 4172
E: enviro_brisbane@labmark.com.au

Ph: (03) 9538 2277 Fax: (03) 9538 2278
1868 Dandenong Road Clayton VIC 3168
E: enviro.melbourne@labmark.com.au

Environmental Analysis Request – Chain Of Custody (COC)

Company: SMEC
Address: 6676 BERRY ST NW, SUITE 111
Contact: HEIDI SELBY
Telephone: 99255855 Fax:
Project Name: 300105, 001
Project Number: 9
Quote Reference: Structure
Send Results to: Wichita - 501 N Y to Space - 001001 (email)
Results Required by: 24 hrs ☐ 48 hrs ☐ 5 Day ☒ Other ☐
COC Number*:
#The COC number will act as a purchase order number if not supplied
Purchase Order No:
* Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply

Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply.

[illegible]

#	Please Provide Field PID Readings where possible	Totals:
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
91		
92		
93		
94		
95		
96		
97		
98		
99		
100		

***** METALS (Please circle)**

Chain of Custody

Relinquished by: <u> </u>	Date/Time: <u>10-6-09</u>	<input type="checkbox"/> All Samples Received in Good Condition <input type="checkbox"/> All Documentation in Proper Order <input type="checkbox"/> Samples Received with an Attempt to Chill <input type="checkbox"/> Samples Received Within Holding Times Average sample temp on receipt: (°C) <u>70</u> For enquires please quote Ref. No. <u>6063250</u>
Received by: <u> </u>	Date/Time: <u>10/6/09 1415</u>	
Relinquished by: <u> </u>	Date/Time: <u> </u>	
Received by: <u> </u>	Date/Time: <u> </u>	
Relinquished by: <u> </u>	Date/Time: <u> </u>	
Received by: <u> </u>	Date/Time: <u> </u>	

Swane, Ian C (SKM)

From: Swane, Ian C (SKM)
Sent: Friday, 27 November 2009 9:04 AM
To: 'Lachlan_Wood@URSCorp.com'
Cc: Vicki.Pearce1@defence.gov.au; Hugh.Selby@smec.com.au;
Seth_Molinari@URSCorp.com; French, David MR 1
Subject: RE: Fort Wallace Validation Letter Response

Lachlan

I refer to the letter from Gibson Nominees dated 6 November 2008 regarding the potential UXO risk at the site that was attached to your email from last night. This is the first time I have been provided with this letter. I have reviewed the letter and this email provides you with my feedback.

In my opinion, the letter does not meet NSW DECCW requirements since:

- It does not conclude that the site is suitable, from a UXO risk perspective, for sensitive land uses that include residential with accessible soil
- It is highly qualified and therefore does not represent a formal certification
- It suggests that there is an unknown risk of hazardous ordnance-related material (including unexploded ordnance) having been discarded in identified waste dumps at Fort Wallace
- It does not make reference to the EMP prepared by SMEC that is meant to manage unknown future UXO risks at the site.

The need for such a certification was reinforced by Condition 10 in my site audit statement 149 that was issued following my review of the proposed remediation strategy some 14 months ago on 17 September 2008. Condition 10 stated that: *"The validation program should include formal certification from a Defence-approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil"*. This condition was placed on this earlier site audit statement because the site has a long history of ordnance storage and use, which is a very different situation compared to the Belconnen Naval Transmitting Station.

This letter from Gibson Nominees will not allow me to conclude that the site is suitable for the proposed land uses and to issue a Section A site audit statement to that effect. If you need a second opinion on this matter, I would be ready to contact the Contaminated Sites Section at the DECCW to discuss.

In order for this matter to be addressed without delay, I would recommend that you have David Thomas attend the next project meeting that is to be held at the URS Sydney office on December 3 where the matter can be discussed and David can advise the meeting what other UXO clearance and/or assessment work needs to be done in order that he can issue the required certification. I am particularly interested in better understanding the location of the identified waste dumps at Fort Wallace that was mentioned in David's letter and the unknown risk of hazardous ordnance-related material (including unexploded ordnance) that remains at the site.

I am concerned that I was only given the opportunity to review this letter and provide you with my feedback more than 12 months after the letter was prepared. This issue could have been addressed at any time since then. Nevertheless, I am ready as always to assist the Department of Defence in conducting my audit work as efficiently and expeditiously as possible and will be available to discuss the matter with you at your earliest convenience.

Regards

Ian

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR

SKM Practice Leader Contaminated Land Management

Tel: +61 2 9928 2126 Fax: +61 2 9928 2224

Mobile: 0418 867 112 Email: ISwane@skm.com.au

From: Lachlan_Wood@URSCorp.com [mailto:Lachlan_Wood@URSCorp.com]
Sent: Thursday, 26 November 2009 5:19 PM
To: Swane, Ian C (SKM)
Cc: Vicki.Pearce1@defence.gov.au; Hugh.Selby@smec.com.au; Seth_Molinari@URSCorp.com
Subject: Fw: Fort Wallace Validation Letter Response

Ian,

Further to our meeting last week, please find attached the final letter response from SMEC to the queries you have raised in relation to the final Fort Wallace Validation Report.

In addition, please find attached a letter from Gibson Nominees regarding the potential UXO on the site. I am informed by Vicki that this is consistent with the letter provided for the BNTS project.

With regards to the pavement at Fort Wallace, SMEC have arranged for a pavement engineer to attend the site next week to confirm the condition of the road surface. A separate letter will be provided by the end of next week to close out this issue.

At the meeting last week, you indicated that you would be able to provide a complete draft SAR by the end of next week (4 Dec 09). I acknowledge that the pavement issue will not be closed out until next week, however, this is only an isolated issue so I anticipate that it will not cause undue delays in issuing your SAR.

Can you please confirm when you will be able to issue your draft SAR, such that planning activities in relation to the site can be progressed. As you are aware, the site is intended to go to market by the end of January and it is imperative that we have all the documentation finalised before this date, your ongoing assistance in achieving this outcome is appreciated.

Regards,

Lachlan

(See attached file: 3001625 001 Additional Fort Wallace Auditor Comments Response 26 11 09.pdf)(See attached file: FW UXO Letter.pdf)

=====
Lachlan Wood
Associate Environmental Engineer

URS Australia Pty Ltd
Level 3, 116 Miller Street, North Sydney NSW 2060
Tel: +61-2-8925 5703 Mobile: 0402 031 916
Fax: +61-2-8925 5555
Email: lachlan_wood@urscorp.com

---> Please consider our environment and think before you print - thank you <---

This e-mail and any attachments contain URS Corporation confidential information that may be proprietary or privileged. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.



A.C.N. 008 434 222

Gibson Nominees Pty. Ltd.

One-stop Seamless Strategic Support

Our reference: 25/09

Ms. V. Pearce
Property Disposal Task Force
Defence Support Group
BP3-2-A024
CANBERRA AIRPORT ACT 2600

Dear Ms Pearce,

**FORT WALLACE LAND USE OPTIONS: ORDNANCE-RELATED
CONTAMINATION ISSUES**

We refer to your recent request for an opinion on appropriate land use at Fort Wallace at Fern Bay, NSW. We also refer to our initial review of ordnance-related contamination issues relating to the former Stockton Rifle Range and Fort Wallace, New South Wales provided in December 2006.

We would stress that the opinions herein relate only to the effect that any ordnance-related contamination issues may have on the suitability of the site for various uses; in preparing it we have not considered the effects of any other potential or actual contaminants.

In our 2006 review, we took the view that:

- the matter of contamination originating from small arms ammunition and produce should be included in the wider contamination issues for Fort Wallace; and,
- there is no evidence of UXO contamination at Fort Wallace, however, the possibility of explosive ordnance components having been buried with other refuse cannot be positively discounted.

The review made the following recommendations:

- That unless and until additional evidence or indicators emerge of UXO contamination, no further specialist field studies be undertaken.

- As a condition of any Contract for Sale, that Defence require the purchaser to execute a UXO-specific advice and public education program following acquisition and on completion of any development.
- That contamination from small arms ammunition be included in the wider contamination assessment and, where found to be necessary, the remediation plan.
- That during the assessment and, where found to be necessary, remediation of burial pits, the possibility that ordnance-related material may be present be appreciated and appropriately managed.

Since the completion of that review, we have considered the following additional documents:

- SMEC (March 2008): Fort Wallace Contamination Assessment *Final*
- SMEC (December 2008): Fort Wallace Remedial Action Plan
- Swane, I.C. (September 2008): Site Audit Report on a Remedial Action Plan for Fort Wallace, Fullerton Street, Stockton, NSW, Site Audit 149
- SMEC (September 2009): Final Fort Wallace Site Environmental Management Plan

We have also perused Godden Mackay Logan (May 2008): Fort Wallace Heritage Management Strategy.

Few of the above later documents make little more than passing reference to ordnance-related contamination issues. Advice provided to us is that no UXO¹ has been found on the site and that the only ordnance-related items recovered have been small arms cartridge cases and projectiles and an inert (ie. free from explosive) drill/practice hand grenade. The recovery of these items is consistent with the past military use and history of the site.

We have not been provided with a copy of the Milsearch (2002) report 'Unexploded Ordnance (UXO) Assessment' but have noted various references to and information extracted from it.

We make the following comments and observations, however:

In respect to the March 2008 Final Contamination Assessment:

- The Milsearch report (above) is cited as advising that the "risk of encountering UXO at the site was very low". We concur with this advice.

¹ Ie., items of ammunition that failed to function as designed when they were fired, projected, launched or placed (short definition). This definition excludes the drill/practice hand grenade reportedly recovered.

- Although UXO was listed amongst the ‘Potential Contaminants of Concern’, no ‘Recommended Investigations’ targeted at UXO were listed. However, paragraph 7.5 states that ‘No live ammunition or other types of UXO were found during the investigation.’
- In the ‘Summary of Detailed Site Inspection’ the discovery of ‘bullets and cartridges’ is cited and reference made to further information at Figure 6, Appendix A, where no such further detail on such items is provided. The location of a ‘possible miniature range stop butt’ is, however, shown. Our advice is that the items found were, in fact, small arms projectiles and empty fired cartridge cases. These items are free from explosive and are not, in any case, classified as UXO by definition.
- The conclusions and recommendations in this report made no reference to ordnance-related contamination incidence.

In respect to the 2008 Remedial Action Plan, ordnance was not cited as a potential contaminant of concern and it notes our earlier advice that ‘the risk of encountering UXO at the site was very low’. The plan consequently did not call up a UXO specialist to monitor excavation works. The plan also noted that ‘None of the investigation works have detected any UXO on site and there is a low risk of UXO occurrence and subsequently remediation of UXO is not required’. However, a precautionary course of action was detailed (at paragraph 4.4.3) in the event that ordnance related material was to be found. There is no evidence that any such material was subsequently discovered.

The September 2008 Site Audit Statement, ‘Site Audit Report on a Remedial Action Plan for Fort Wallace, Fullerton Street, Stockton, NSW, Site Audit 149 provided Dr Ian Swane’s certification that:

- the nature and extent of the contamination has been appropriately determined and that the remedial action plan is appropriate for the purpose stated above²; and
- that the site could be made suitable for wide range of uses, including residential, day care centre, pre-school and primary school.

The report also required that:

- The validation program should include formal certification from a Defence approved UXO consultant that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil, and,
- The validation program should include the preparation of an Environmental Management Plan (EMP) for the future use of the Fort Wallace site. The EMP

² I.e., ‘To remediate the Fort Wallace site so it can be reused for a variety of uses that are still to be determined.’

should include an “Unexpected Findings Protocol” to manage among other things UXO, asbestos containing material and Defence-related waste.

We concur with Dr Swane’s certification and requirements and the 2009 Final Fort Wallace Site Environmental Management Plan (SEMP) does, in fact, include the ‘Unexpected Findings Protocol’ required by Dr Swane.

The SEMP does note, however, in paragraph 1.2 that ‘All known Un-Exploded (*sic*) Ordnance (UXO) have been removed from site.’ We have established that this advice is not accurate, but only as a result of error in expression. In fact, it appears that no item of explosive ordnance has been discovered on the site throughout.

Conclusion

Conditional upon the completion of the preferred works options detailed in the Remedial Action Plan and the implementation of the SEMP it appears that earlier predictive advice of low potential for explosive ordnance and hazardous ordnance-related components (including UXO) to be remnant at Fort Wallace is valid.

On that basis, we believe that a UXO-specific advice and public education program is no longer required and that there is no evidence of burial of complete ordnance items or components.

Given that the Fort Wallace Site has been or is to be remediated in accordance with the March 2008 Fort Wallace Remedial Action Plan *Final* and that, beyond the recovery of a number of small arms projectiles, empty fired cartridge cases and a drill/practice hand grenade, ordnance-related contamination is not an issue.

However, no assessment or remediation measures can provide a 100% guarantee that no hazardous item or items remain. On that basis, we recommend that the following advice be provided on divestment: ‘The potential for explosive ordnance to be remnant on the site is very low. However in the event that an item suspected to be ordnance-related is found, it should not be touched, tampered with or disturbed in any way. Its general appearance should be carefully noted along with the best route to the item. Its location should be marked and people kept away. The police should be advised and will attend. The police may arrange for specialist Defence personnel to attend who will either remove the item or render it safe. There is no charge for this service.’

We are satisfied that the risk of UXO being present at the Fort Wallace site is very low and does not prevent the Fort Wallace site being used for sensitive land uses that include residential with accessible soil.

We trust that this advice is of assistance. Please contact us again if we can help further.

Yours sincerely,

A handwritten signature in black ink, reading "D. G. Thomas." The signature is written in a cursive style with a large, stylized initial "D" and a small "G" between the first and last names.

David Thomas
CEO

3 December 2009

Swane, Ian C (SKM)

From: Lachlan_Wood@URSCorp.com
Sent: Friday, 4 December 2009 10:05 AM
To: SusanD@gml.com.au; Swane, Ian C (SKM)
Cc: Vicki.Pearce1@defence.gov.au
Subject: Fw: Fort Wallace Gas Mask
Attachments: pic13735.gif; image001.png; DSC05731.JPG

Susan / Ian,

Please find below the requested information from the contractor regarding the gas mask found at Fort Wallace.

Cheers,

Lachlan

=====
Lachlan Wood
Associate Environmental Engineer

URS Australia Pty Ltd
Level 3, 116 Miller Street, North Sydney NSW 2060
Tel: +61-2-8925 5703 Mobile: 0402 031 916
Fax: +61-2-8925 5555
Email: lachlan_wood@urscorp.com

---> Please consider our environment and think before you print - thank you <---

This e-mail and any attachments contain URS Corporation confidential information that may be proprietary or privileged. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.

----- Forwarded by Lachlan Wood/Sydney/URSCorp on 04/12/2009 10:02 AM -----

"James Taylor"

<james.taylor@srmcorp.com.au>

To:<Lachlan_Wood@URSCorp.com>

04/12/2009 09:48 AM

cc

SubjectFort Wallace Gas Mask

Lachlan,

The aforementioned mask was discovered during bitou bush spraying works undertaken by Synergy. The mask was found by the employee who was undertaking the spraying after a path was cut through the bitou bush just south of the Southern 9'Gun Emplacement, refer attached photo. The path ran from RAC2 through to the south eastern corner of the gun emplacement bunker. The mask was found just off the cut path approximately in the centre of the photo.

Regards,

James Taylor BSc.

Environmental Project Manager



Mobile: 0432 044 542

Fax: +61 2 9417 5136

PO Box 693

North Sydney, NSW 2059

Email: james.taylor@srmcorp.com.au

Caution - This message may contain privileged and/or confidential information intended only for the use of the recipient. If you are not the intended recipient of this message you are hereby notified that any use, dissemination, distribution or reproduction of this message is prohibited. If you have received this message in error please notify Synergy Resource Management Pty Ltd immediately and delete this message from your computer. Any views expressed in this message are those of the individual sender and do not necessarily reflect the views of Synergy Resource Management Pty Ltd. Synergy Resource Management Pty Ltd disclaims all liability for any direct or indirect loss in connection with this e-mail and/or any attachment

(See attached file: image001.png)(See attached file: DSC05731.JPG)



Swane, Ian C (SKM)

From: Swane, Ian C (SKM)
Sent: Friday, 4 December 2009 7:15 PM
To: 'Lachlan_Wood@URSCorp.com'
Cc: Vicki.Pearce1@defence.gov.au; Moss, Jo J (SKM)
Subject: RE: Fort Wallace Gas Mask

Lachlan

Thanks for the information provided earlier today. I also understand that the gas mask was of WWII vintage.

Could you please request Defence's UXO-expert Dave Thomas to examine all available information pertaining to the gas mask and get him to advise me in writing on the following matters:

- What is the most likely reason for the gas mask to have been at the Fort Wallace site?
- Is there a risk that other gas masks may be present at the site?
- Is there a risk that chemical weapons were stored at the site during or after WWII?
- Does the finding of the gas mask change his assessment dated 3/12/09?

Regards

Ian

Dr Ian C Swane (CPEng)

NSW & WA DEC Site Auditor & QLD EPA TPR
SKM Practice Leader Contaminated Land Management
Tel: +61 2 9928 2126 Fax: +61 2 9928 2224
Mobile: 0418 867 112 Email: ISwane@skm.com.au

From: Lachlan_Wood@URSCorp.com [mailto:Lachlan_Wood@URSCorp.com]
Sent: Friday, 4 December 2009 10:05 AM
To: SusanD@gml.com.au; Swane, Ian C (SKM)
Cc: Vicki.Pearce1@defence.gov.au
Subject: Fw: Fort Wallace Gas Mask

Susan / Ian,

Please find below the requested information from the contractor regarding the gas mask found at Fort Wallace.

Cheers,

Lachlan

=====
Lachlan Wood
Associate Environmental Engineer

URS Australia Pty Ltd
Level 3, 116 Miller Street, North Sydney NSW 2060
Tel: +61-2-8925 5703 Mobile: 0402 031 916
Fax: +61-2-8925 5555
Email: lachlan_wood@urscorp.com

---> Please consider our environment and think before you print - thank you <---

This e-mail and any attachments contain URS Corporation confidential information that may be proprietary or privileged. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.

Swane, Ian C (SKM)

From: Lachlan_Wood@URSCorp.com
Sent: Monday, 7 December 2009 12:19 PM
To: Swane, Ian C (SKM)
Cc: Vicki.Pearce1@defence.gov.au; Hugh.Selby@smec.com.au
Subject: Fw: FIND AT FORT WALLACE
Attachments: pic07441.gif

Ian,

Your queries regarding the gas mask were forwarded to Dave Thomas, who has provided the response below.

Please advise if you have any further queries.

Regards,

Lachlan

=====
Lachlan Wood
Associate Environmental Engineer

URS Australia Pty Ltd
Level 3, 116 Miller Street, North Sydney NSW 2060
Tel: +61-2-8925 5703 Mobile: 0402 031 916
Fax: +61-2-8925 5555
Email: lachlan_wood@urscorp.com

---> Please consider our environment and think before you print - thank you <---

This e-mail and any attachments contain URS Corporation confidential information that may be proprietary or privileged. If you receive this message in error or are not the intended recipient, you should not retain, distribute, disclose or use any of this information and you should destroy the e-mail and any attachments or copies.

----- Forwarded by Lachlan Wood/Sydney/URSCorp on 07/12/2009 12:17 PM -----

"David Thomas"
<dthomas@wix.com.au>

07/12/2009 11:46 AM

Please respond to "David Thomas" <dthomas@wix.com.au>

To "Pearce, Vicki MISS 1"
<Vicki.Pearce1@defence.gov.au>

cc "Lachlan Wood" <lachlan_wood@urscorp.com>

Subject FIND AT FORT WALLACE

Vicki,

The item appears to be of WWII or 1950's vintage and is certainly of no later than 1960's manufacture. Its presence may be due to a number of causes, none of which relate to the use of chemical warfare agents (CWA) or its storage.

What is the most likely reason for the gas mask to have been at the Fort Wallace site?

I recall that as late as 1965 (at which time I was Chief Clerk at HQ Northern NSW Area [HQNNSWA] at Adamstown and Fort Wallace was under command), ground maintenance at Fort Wallace was periodically undertaken by HQNNSWA workers. Part of this program was weed control (and bitou amongst other weeds has always been a problem at Fort Wallace). I have no direct recollection as to whether this program involved spraying, but I suspect that it did. Given the toxicity of some of the herbicides used up to that time, protective dress and perhaps the wearing of masks would appear to have been a reasonable precaution. The availability of military-issue masks would make their use a reasonable course of action. This item may have been displaced during such an activity.

Gas warfare training was also a common occurrence during and after WWII at many military establishments. Typically training gases were used in a 'gas chamber' - usually a tent. The most common training agents used were airborne lachrymatory (tear inducing) chemicals of which tear gas (*chloroacetophenone*) and, in later years, CS (*orthochlorobenzalmalononitrile*) were common. A few occasions are recorded where DM or adamsite (*diphenylaminechloroarsine*) a vomit-inducing agent may have been used. These chemicals are not toxic and are non-persistent in air.

The mask could well have been misplaced during any of these activities.

Is there a risk that other gas masks may be present at the site?

There is a possibility that other such items may have been misplaced. However, given the innocuous nature of the item, I would not term that a risk as such. Noting, though that gas masks were (and remain) an accountable item (ie, the person using them had to provide a signature for them and stood the risk of having to pay for them if the correct number were not returned at the conclusion of the activity) it is unlikely that additional such items lie, apparently at random, across the site. I consider that it would have been more likely that a number of such items were included in one or more of the burials on the site, having been worn out by fair wear and tear and disposed of by a Board of Survey sentencing them to burning/burial.

Is there a risk that chemical weapons were stored at the site during or after WWII?

There is no evidence in the historical records held in the National UXO Office or in the literature (most noticeably Plunkett, G. (2008): Chemical warfare in Australia. AWM Canberra) that CW or CWA (other than possibly training chemicals) have ever been stored or used at the site.

Does the finding of the gas mask change his assessment dated 3/12/09?

The finding of a gas mask in no way changes my assessment.

I trust that this is of assistance.

Regards

David Thomas

Gibson Nominees Pty Ltd
2930 Nelson Bay Road
SALT ASH NSW 2318
Telephone: +61 2 4982 6205
Mobile: 0427 680 685
E-Mail: dthomas@wix.com.au

Swane, Ian C (SKM)

From: Swane, Ian C (SKM)
Sent: Monday, 21 December 2009 6:21 PM
To: Hugh.Selby@smec.com.au; Cramer, Daniel; 'Lachlan_Wood@URSCorp.com'; Seth_Molinari@URSCorp.com
Cc: Vicki.Pearce1@defence.gov.au; Moss, Jo J (SKM)
Subject: Suggested Revisions to SMEC SEMP & SAS
Attachments: SAS 149B Revised draft.pdf

Hugh / Daniel / Lachlan / Seth

I have completed my review of the SMEC SEMP dated 9 December 2009. It would be good if the document could include the following changes that pick up new information provided by consultants in the past few weeks:

1. Section 1.2 on page 1: Add the following sentence at the end of the 4th dot point to be consistent with the recommendation provided by the UXO-consultant Dave Thomas in his letter dated 3/12/09 (page 4). The additional sentence should read:
"In fact, no item of explosive ordnance has been discovered on the site throughout the investigative and remediation work".
2. Section 3.2 on page 6: At the end of the 1st dot point add the following sentence:
"Recommendations for maintaining the road pavements are given in SMEC (9 December 2009) "Fort Wallace Pavement Investigation Report".
3. Table 4 Oval Fill Area on page 11: I would suggest the phrase *"and potentially ACM"* be rephrased to read *"for ACM fragments refer Table 5"*. This is because the risk posed by ACM fragments is not an aesthetic one (as suggested by Table 4) but a health one (as addressed in Table 5).
4. Section 4.4 on page 13: Change the last paragraph to be consistent with the recommendation provided by the UXO-consultant Dave Thomas in his letter dated 3/12/09 (page 4). I suggest the paragraph read:
"The potential for explosive ordnance to be remnant on the site is very low. However in the event than an item suspected to be ordnance-related is found, it should not be touched, tampered with or disturbed in any way. Its general appearance should be carefully noted along with the best route to the item. Its location should be marked and people kept away. The police should be advised and will attend. The police may arrange for specialist Defence personnel to attend who will either remove the item or render it safe. There is no charge for this service".
5. Section 4.6 on page 17: At the beginning of the section, include the new sentence and revise the beginning of the existing sentence, which will address review comment 2 from Newcastle City Council (email 24/09/2009):
"This SEMP has been prepared for the intended land uses specified in Section 1.2. In the event that a subsequent change"

I will be completing and issuing my site audit by cob on 23 December 2009. If SMEC is unable to make these revisions before say midday on the 23rd, I will address these issues by placing a few extra comments on the site audit statement.

I also attach a revised draft of the SAS that includes a few extra comments that addresses road pavement maintenance made by SMEC in their 9/12/09 report and suggestions made by NCC in their 24/09/09 review comments. Please advise me prior to midday on 23rd if there are any issues with these new comments.

Regards
Ian



Appendix E Site Audit Statement and SEMP

NSW Site Auditor Scheme

SITE AUDIT STATEMENT



A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the Contaminated Land Management Act 1997 on 26 March 2009. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. **149B**

This site audit is a ~~statutory audit~~/non-statutory audit* within the meaning of the Contaminated Land Management Act 1997.

Site auditor details (as accredited under the Contaminated Land Management Act 1997)

Name **Dr Ian C Swane** Company **Sinclair Knight Merz**

Address **100 Christie Street, St Leonards NSW**

..... Postcode **2065**

Phone **02 9928 2126** Fax **02 9928 2224**

Site details

Address **Fort Wallace, Fullerton Street, Stockton, NSW**

..... Postcode **2295**

Property description (attach a list if several properties are included in the site audit)

Lot 1 DP 547183 at Stockton, Newcastle (Certificate of Title attached – Figure 1)

Local Government Area **Newcastle City Council**

Area of site (e.g. hectares) **31.78 ha**

Current zoning **Zone 5(a) Special Uses (Defence)**

To the best of my knowledge, the site ~~is~~/is not* the subject of a declaration, order, agreement, proposal or notice under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.

~~Declaration/Order/Agreement/Proposal/Notice* no(s)~~

A handwritten signature in blue ink that reads 'Ian C Swane'.

Site audit commissioned by

Name **Ms Vicki Pearce** Company **Australian Government,
Department of Defence**

Address **Property Disposal Unit, BP3-2-A024, Brindabella Park, Canberra ACT**
..... Postcode **1225**

Phone **(02) 6266 8024** Fax **(02) 6266 8276**

Name and phone number of contact person (if different from above)

Purpose of site audit

- ☒ A. To determine land use suitability (*please specify intended use[s]*)

For the purpose of this audit, Defence has divided the Site into two types of areas referred to as “unrestricted landuse” and “non-development landuse”¹. The “unrestricted landuse” category refers to those areas where the most sensitive landuse would be “standard” residential (HIL A). The “non-development landuse” includes heritage or ecologically constrained areas where the most sensitive landuse would be open space/parkland (HIL E). A plan showing the location of these two area types across the site is provided in Figure 2 (attached).

~~OR~~

- ~~☐ B(i) To determine the nature and extent of contamination, and/or~~
~~☐ B(ii) To determine the appropriateness of an investigation/remedial action/management plan*, and/or~~
~~☐ B(iii) To determine if the land can be made suitable for a particular use or uses by implementation of a specified remedial action plan/management plan* (*please specify intended use[s]*)~~

Information sources for site audit

Consultancy(ies) which conducted the site investigation(s) and/or remediation

GHD, SMEC, WSP, GETEX, Alpha Geoscience & Gibson Nominees

¹ SMEC email 22 July 2008

Title(s) of report(s) reviewed

1. GHD. July 2004. *"Preliminary Contamination Assessment, Fort Wallace Disposal Study"*. Prepared for CSIG – Canberra
2. SMEC. March 2008. *"Fort Wallace Contamination Assessment Final"*. Prepared for the Department of Defence (2 volumes)
3. SMEC. March 2008. *"Fort Wallace Remedial Action Plan, Final"*. Prepared for the Department of Defence
4. SMEC. 8 September 2008. *"Fort Wallace Delineation Sampling, June 2008"*, 8 pages plus attachments. Prepared for the Department of Defence
5. SMEC. 6 November 2008. *"Remediation Specification Fort Wallace"*, 32 pages. Prepared for the Department of Defence
6. SMEC. June 2009. *"Fort Wallace – Validation Sampling Analysis and Quality Plan"*, Version 3. Prepared for the Department of Defence
7. SMEC. 22 September 2009. *"Fort Wallace Validation Report"*. Prepared for the Department of Defence
8. SMEC. 22 December 2009. *"Final Fort Wallace Site Environmental Management Plan"*. Prepared for the Department of Defence. 36 pages

Other information reviewed (including previous site audit reports and statements relating to the site)

9. Newcastle City Council. October 2005. *"Development Control Plan 2005"*
10. Department of Defence. 14 March 2007. *"Fort Wallace Property Report"*. 8 pages
11. GHD. June 2004. *"Building Condition Assessment, Former Fort Wallace, Stockton"*. Preliminary Draft. Prepared for Corporate Services & Infrastructure
12. Gibson Nominees. December 2006. *"Review of Ordnance-Related Contamination Issues Relating to the Former Stockton Rifle Range and Fort Wallace, New South Wales"*. Prepared for the Department of Defence
13. Alpha Geoscience. August 2007. *"Geophysical Survey EM-61, Stockton Rifle Range and Fort Wallace, Stockton"*. Prepared for WSP Environmental and the Department of Defence. 17 pages
14. SKM (17 September 2008) *"Site Audit Report on a Remedial Action Plan for Fort Wallace, Fullerton Street, Stockton, NSW"*. Prepared for the Department of Defence
15. SKM (17 September 2008) Site Audit Statement 149 for Fort Wallace, Fullerton Street, Stockton, NSW. Prepared for the Department of Defence. 9 pages
16. SMEC (6 October 2009) Letter *"3001625.001 Fort Wallace Validation Report Addendum 1 Letter Report"*. Prepared for the Department of Defence. 8 pages
17. SMEC (26 November 2009) Letter *"Site Auditor Review Comments on Final Fort Wallace Validation Report"*. Prepared for the Department of Defence. 21 pages plus attachments
18. Gibson Nominees (3 December 2009) Letter *"Fort Wallace Land Use Options: Ordnance-Related Contamination Issues"*. 5 pages
19. SMEC (9 December 2009) *"Fort Wallace Pavement Investigation Report"*. Prepared for the Department of Defence. 8 pages

Site audit report

Title **Site Audit Report for the Remediation of Fort Wallace, Fullerton Street, Stockton, NSW, Site Audit 149B by Dr Ian Swane**

Report no. **149B** Date **23 December 2009**



PART II: Auditor's findings

Please complete either Section A or Section B, **not** both. (*Strike out the irrelevant section.*)

Use Section A where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s).

Use Section B where the audit is to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specified land use or uses subject to the successful implementation of a remedial action or management plan.

Section A

- ☒ I certify that, in my opinion, the **“unrestricted landuse”** portion of the site (refer Figure 2) is **SUITABLE** for the following use(s) (*tick all appropriate uses and strike out those not applicable*):

- ☐ ~~Residential, including substantial vegetable garden and poultry~~
- ☐ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ☒ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☒ Day care centre, preschool, primary school
- ☒ Residential with minimal opportunity for soil access, including units
- ☒ Secondary school
- ☒ Park, recreational open space, playing field
- ☒ Commercial/industrial
- ☒ Other (*please specify*) **Defence uses**

AND

- ☒ I certify that, in my opinion, the **“non-development landuse”** portion of the site (refer Figure 2) is **SUITABLE** for the following use(s) (*tick all appropriate uses and strike out those not applicable*):

- ☐ ~~Residential, including substantial vegetable garden and poultry~~
- ☐ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ☐ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ☐ ~~Day care centre, preschool, primary school~~
- ☒ Residential with minimal opportunity for soil access, including units
- ☒ Secondary school
- ☒ Park, recreational open space, playing field
- ☒ Commercial/industrial
- ☒ Other (*please specify*) **Defence uses**



**subject to compliance with the following environmental management plans
(insert title, date and author of plan) in light of contamination remaining on the
site:**

- SMEC (22 December 2009) *"Final Fort Wallace Site Environmental Management Plan"*
- SMEC (9 December 2009) *"Fort Wallace Pavement Inspection Report"*

OR

~~**I certify that, in my opinion, the site is NOT SUITABLE for any use due to the
risk of harm from contamination.**~~

Overall comments

1. This site audit statement should be read in conjunction with the site audit report.
2. This site audit statement applies to the condition of the site at the time the last assessment was undertaken by SMEC in December 2009. The property owner is responsible for ensuring the site remains in a suitable condition. ..
3. All known areas of contaminated soil have been remediated and contaminant levels remaining in old bitumen pavements have been characterised and assessed as posing a low risk. Visible and identified ACM fragments, Defence waste and all known UXO waste have been removed from the Site.
4. Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.
5. A pavement investigation report prepared by SMEC (Ref [19]) assessed the bitumen pavements to have a short to medium life of 2 to 5 years, and provided recommendations on maintenance actions for the pavement.
6. The purpose of the EMP is to manage contamination risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services.
7. Groundwater should not be extracted from the Fort Wallace site if groundwater at the Hunter Water Sewerage Treatment Plant located to the south of the site is contaminated at unacceptable levels and if there is a risk that such extraction could cause contaminated groundwater to migrate onto the site.
8. One approach to notify future owners of the need to comply with the SEMP and the requirements of the site audit statement would be to place a positive covenant on the land title. A registered survey plan prepared by a licensed surveyor could also be obtained to accurately define the two types of areas referred to as *"unrestricted landuse"* and *"non-development landuse"*.

Section B

~~Purpose of the plan² which is the subject of the audit:~~

~~I certify that, in my opinion:~~

~~☐ the nature and extent of the contamination HAS/HAS NOT* been appropriately determined~~

~~AND/OR~~

~~☐ the investigation/remedial action plan/management plan* IS/IS NOT* appropriate for the purpose stated above~~

~~AND/OR~~

~~☐ the site CAN BE MADE SUITABLE for the following uses (tick all appropriate uses and strike out those not applicable):~~

~~☐ Residential, including substantial vegetable garden and poultry~~

~~☐ Residential, including substantial vegetable garden, excluding poultry~~

~~☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~

~~☐ Day care centre, preschool, primary school~~

~~☐ Residential with minimal opportunity for soil access, including units~~

~~☐ Secondary school~~

~~☐ Park, recreational open space, playing field~~

~~☐ Commercial/industrial~~

~~☐ Other (please specify)~~

~~if the site is remediated/managed* in accordance with the following remedial action plan/management plan* (insert title, date and author of plan)~~

~~.....~~

~~subject to compliance with the following condition(s):~~

~~Overall comments~~

² For simplicity, this statement uses the term 'plan' to refer to both plans and reports.



PART III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority under the *Contaminated Land Management Act 1997* (Accreditation No. 9821).

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997*, and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.



Signed

Date **23 December 2009**



PART IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remedial action or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use(s) of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A or Section B of Part II, **not** both.

In **Section A** the auditor may conclude that the land is *suitable* for a specified use(s) OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further remediation or investigation of the site was needed to render the site fit for the specified use(s). Any **condition** imposed should be limited to implementation of an environmental management plan to help ensure the site remains safe for the specified use(s). The plan should be legally enforceable: for example a requirement of a notice under the *Contaminated Land Management Act 1997* (CLM Act) or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of the *Environmental Planning and Assessment Act 1979*.

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

In **Section B** the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or whether land can be made suitable for a particular land use or uses upon implementation of a remedial action or management plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

In **Part III** the auditor certifies his/her standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to:

Department of Environment and Climate Change (NSW)

Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
Fax: (02) 9995 5930

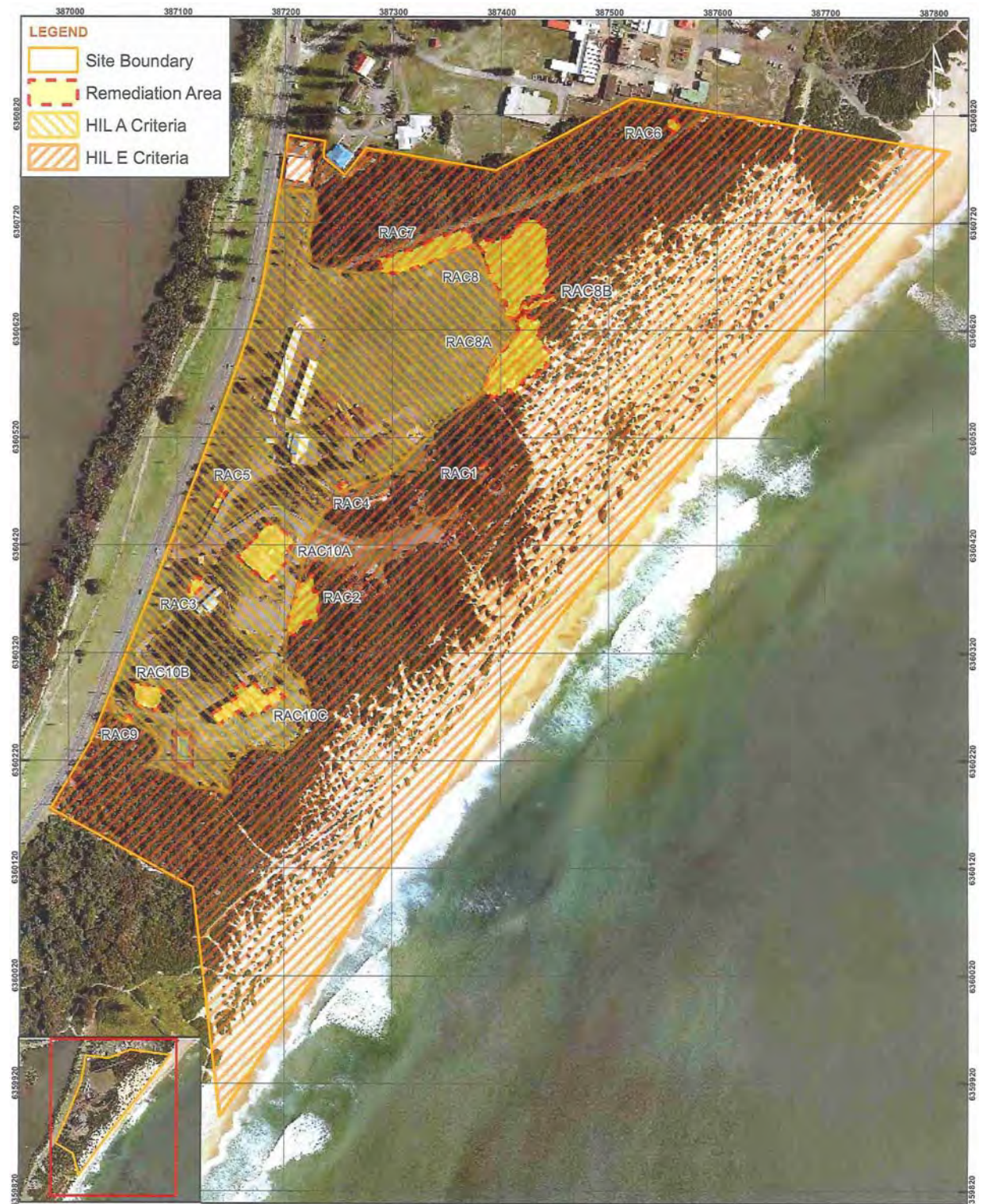
AND

the **local council** for the land which is the subject of the audit.



[illegible]

Figure 2 Location of Proposed Landuse Areas



Ian C Swane



Final Fort Wallace Site Environmental Management Plan

For: Department of Defence
DECEMBER 22, 2009

Project Name:	Fort Wallace Site Environmental Management Plan
Project Number:	3001625.004
Report for:	Department of Defence

PREPARATION, REVIEW AND AUTHORISATION

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
00	04/08/09	Hugh Selby	Stephen Barnett	Daniel Cramer
	10/09/09		Dr Ian Swane (SKM)	
01	22/09/09	Hugh Selby	Stephen Barnett	Daniel Cramer
02	27/11/09	Hugh Selby	Daniel Cramer	Daniel Cramer
03	09/12/09	Hugh Selby	Daniel Cramer	Daniel Cramer
04	22/12/09	Hugh Selby	Daniel Cramer	Daniel Cramer

ISSUE REGISTER

Distribution List	Date Issued	Number of Copies
Department of Defence: Property Disposals	22/12/09	1 electronic
Contract Administrator : Lachlan Wood (URS)	22/12/09	1 electronic
Site Auditor: Dr Ian Swane (SKM)	22/12/09	1 electronic
North Sydney Office Library (SMEC office location):	22/12/09	1 electronic
SMEC Project File:	22/12/09	1 electronic

SMEC COMPANY DETAILS

SMEC Australia Pty Ltd
PO BOX 1052, North Sydney, NSW 2059

Tel: 02 9925 5555

Fax: 02 9925 5566

Email: daniel.cramer@smec.com

www.smec.com

The information within this document is and shall remain the property of **SMEC Australia Pty Ltd**

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Purpose	1
1.2	Background	1
1.3	SEMP Objective	2
1.4	Limitations	2
2	ROLES AND RESPONSIBILITIES	4
3	SITE CONDITION	5
3.1	Overview	5
3.2	Materials to be Managed	6
4	MANAGEMENT PROCEDURES & CONTROL MEASURES	8
4.1	Principles	8
4.2	Procedures and Controls	8
4.3	Earthworks Protocol – Activities, Hazards, Pathways and Controls	13
4.4	Unexpected Findings Protocol	13
4.5	Documentation and Reporting	18
4.6	Land Use Changes	18
5	REFERENCES	19
TABLE 1 - SEMP RESPONSIBILITIES		4
TABLE 2 - SUMMARY OF SITE INFRASTRUCTURE.....		6
TABLE 3 - MANAGEMENT PROCEDURES AND CONTROLS FOR KNOWN MATERIALS/AREAS		10
TABLE 4 - MANAGEMENT PROCEDURES AND CONTROLS FOR FILL AND DEMOLITION/BUILDING WASTE		11
TABLE 5 - MANAGEMENT PROCEDURES AND CONTROLS FOR UNKNOWN MATERIALS THAT MAY BE UNEXPECTED FOUND AT THE SITE		12
TABLE 6 - SUMMARY OF POTENTIAL LOW DENSITY RESIDENTIAL POTENTIAL EXPOSURE PATHWAYS AND CONTROL MEASURES		15
APPENDIX A – FIGURES		
APPENDIX B – PHOTOGRAPHS		
APPENDIX C – ASBESTOS REGISTER		

Abbreviations

ACM	Asbestos Containing Material
ANZECC	Australian and New Zealand Environment Conservation Council
DA	Development Application
DECCW	Department of Environment, Climate Change and Water
EMP	Environmental Management Plan
EPA	Environment Protection Authority
HDPE	High- Density Polyethylene
HIL	Health based Investigation Level
LEP	Local Environment Plan
NEPM	National Environment Protection Measure
NSW	New South Wales
OHSP	Occupational Health and Safety Plan
PAH	Polycyclic Aromatic Hydrocarbon
RAC	Remediation Area of Concern
RAP	Remedial Action Plan
SMEC	Snowy Mountains Engineering Corporation
SEMP	Site Environmental Management Plan
SWMS	Safe Work Method Statement
TCLP	Toxicity Characteristics Leaching Procedure
UXO	Un-Exploded Ordnance
VENM	Virgin Excavated Natural Material
WSP	WSP Environmental Pty Ltd

1 INTRODUCTION

1.1 Purpose

This document is a Site Environmental Management Plan (SEMP) for the Fort Wallace site. It provides procedures and controls for managing contamination risks posed by unexpected findings, old bitumen pavements and hazardous building materials remaining in structures and buried services at the site.

Future users of the site need to implement the procedures and controls specified in this SEMP in order to comply with the requirements specified in a non-statutory site audit statement 149B prepared for the site by Dr Ian Swane, a NSW DECCW accredited site auditor.

The SEMP does not provide detailed background information on site history, site conditions, previous investigations and the outcome of remediation work. Readers requiring information on these matters should refer to the reports listed in **Section 4**.

1.2 Background

Fort Wallace is located along Fullerton Street on the Stockton Peninsula, approximately 5km north of Newcastle, NSW (**Figure 1 in Appendix A**). The site occupies 31.78ha and is legally described as Lot 1 DP547183 in the Local Government Area of Newcastle. At the date of this SEMP, the site is owned by the Department of Defence ('Defence').

Environmental investigations at the site identified the need for a program of remediation work to remove some areas of buried waste and some localised areas impacted by metals, PAHs¹ and ACM² fragments. The waste and contamination was likely to have been associated with historical land uses at the site.

A program of remediation work was subsequently undertaken to address these areas of environmental concern as part of a due diligence process for the sale of the site. The work was undertaken between March and July 2009 and a validation report (SMEC/WSP, 2009) was prepared.

The validation report concluded that:

- All known areas of contaminated soil had been remediated.
- Contaminant levels remaining in old bitumen pavements had been characterised and assessed as posing a low risk.
- Visible and identified asbestos containing material (ACM) fragments had been removed from the site.
- All known Un-Exploded Ordnance (UXO) have been removed from the site. During the course of the investigative and remediation work, items of explosive ordnance were not discovered.

¹ PAHs = Polycyclic Aromatic Hydrocarbons (main source was likely to be old bitumen/tar)

² ACM = Asbestos containing material (mainly fibro)

- Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment.
- The site was suitable for the proposed land uses, subject to the implementation of a SEMP.

For the purpose of the remediation and validation work, the site was divided into two types of areas referred to as “*unrestricted landuse*” and “*non-development landuse*”. The “*unrestricted landuse*” category refers to those areas where the most sensitive landuse would be “*standard*” residential (HIL A). The “*non-development landuse*” includes heritage or ecologically constrained areas where the most sensitive landuse would be open space/parkland (HIL E). A plan showing the location of these two area types across the site is provided in **Figure 2 in Appendix A**.

1.3 SEMP Objective

The objective of the SEMP is to provide a process for safely managing:

- Materials known to be affected by low levels of residual contaminants in shallow soils, deeper soils and groundwater at the site;
- Potential hazardous building materials associated with heritage buildings and structures;
- Potential ACM in above ground and below ground services remaining on site;
- Beneficial re-use of groundwater from the site; and
- Unexpected, potentially harmful materials encountered in the future.

The SEMP must be referenced when a change in landuse is proposed and when planning or conducting activities at the site that may disturb the existing ground surface and/or buildings and structures.

1.4 Limitations

The information within this Plan is based on the data collected during the stated remediation and validation period. SMEC/WSP performed the fieldwork in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession.

SMEC/WSP's validation report and subsequent SEMP is strictly limited to the assessment of known contaminants of concern within the nominated remediation areas. The absence of any identified hazardous or toxic materials on the subject property should not be interpreted that such materials do not exist on the subject property.

This Plan relates only to the objectives stated and does not relate to any other work undertaken for the Client.

This SEMP has been prepared on the basis of the contaminant concentrations observed in the soil and groundwater at the time of the validation assessment. These conditions may change with time and space.

Conclusions and recommendations regarding the property are the professional opinions of SMEC/WSP personnel. Whilst normal Quality Assurance assessments of data reliability have been made, SMEC/WSP assumes no responsibility or liability for errors in any data obtained from regulatory agencies, sources outside of SMEC/WSP, or developments resulting from situations outside the scope of this project.

This SEMP does not provide detailed Safe Work Method Statements (SWMS), Occupational Health and Safety Plans (OHSPs) or Construction Work Method Statements.

This SEMP is limited to those management aspects arising from existing reported contamination conditions and does not cover any other general environmental management requirements that may apply to the site irrespective of such conditions.

2 ROLES AND RESPONSIBILITIES

The implementation of this SEMP is the responsibility of the owner of the site or it's Nominated Representative. This SEMP has been prepared for all site users, including those involved in designing, developing, constructing, ongoing operations, maintenance, administration and occupation on the site. This includes:

- Site Management Staff;
- Contractors;
- Subcontractors; and
- Occupants.

Planning decisions and intrusive works on the site should only be conducted by contractors/individuals who have read and acknowledged understanding of this SEMP.

Table 1 below outlines the responsibilities for the implementation of this SEMP. These responsibilities do not replace any other regulatory responsibilities of the parties in relation to a change in landuse or development work at the site.

Table 1 - SEMP Responsibilities

Organisation	Responsibilities
Site Owner	<ul style="list-style-type: none">▪ Provide this SEMP to any new site owner, any occupant and any contractor.▪ Ensure all parties clearly understand this SEMP and what is required to comply with the SEMP requirements.▪ Update this SEMP if site conditions change and inform other parties of the changes.▪ Ensure information relating to site conditions such as potential contaminants in soils, groundwater or building materials is readily available.▪ Ensure any tender documentation, scope of works, design briefs, contract documents, and other relevant documents developed in relation to works at the site include SEMP specific requirements.
Planning Authorities	<ul style="list-style-type: none">▪ Maintain information regarding this SEMP on planning instruments.▪ Ensure the DA process considers the soil contamination, groundwater and hazardous materials.
Occupant	<ul style="list-style-type: none">▪ Provide this SEMP to contractors (engaged by the Occupant).▪ Comply with this SEMP during the occupation of the site.
Contractors	<ul style="list-style-type: none">▪ Comply with this SEMP for all site works, as well as relevant legislation and guidance.▪ Inform the owner/occupier if conditions change from those documented in this SEMP.▪ Ensure designs and work methods reflect the requirements of this SEMP.

It is the responsibility of all site users to be informed and conduct site planning and site works in accordance with this SEMP.

3 SITE CONDITION

3.1 Overview

The site is currently non-operational and is maintained by caretakers appointed by the Commonwealth. The site generally comprises:

- Open space, including an oval, grassed areas and sand dunes (primarily vegetated by bitou bush);
- Heritage infrastructure, including three Gun Emplacements which are associated with historical Defence activities;
- Buildings, used for mess, administration and vehicle maintenance activities during the period in which Defence were active onsite; and
- A road network, for vehicular access to key site infrastructure.

A mesh wire fence bounds the site to the west, with damaged wire fencing existing around the remainder of the site. Entrance to the site is via a gated access road leading from Fullerton Street on the western side of the site. The land uses surrounding the site are as follows:

- North – The Stockton Centre for Developmentally Disabled;
- South – Remnants of Hunter Water Sewerage Treatment Plant;
- East – Pacific Ocean; and
- West – Fullerton Street, then the Hunter River.

The eastern portion of the site is dominated by the coastal dune system forming part of Stockton Beach. Three Observation Posts are located in the dunes, which in patches have been heavily overgrown by bitou bush. Rusted fence posts can also be observed in the dune area. Immediately to the west of the dunes are the Gun Emplacements and associated infrastructure. The northern portion of the site is dominated by an oval and powerline easement, while a significant portion of the western section has been terraced for the construction of the site infrastructure.

Figure 2 in Appendix A documents the current site features.

Table 2 provides a summary of infrastructure remaining at the site. Buried services for water supply, sewage, stormwater, electricity and telecommunications also remain at the site. Refer to **Appendix C** for an Asbestos Register.

A groundwater divide appears to exist on-site due to the site being located on a narrow peninsular bounded on the west by the Hunter River and the east by the Pacific Ocean. Rain falling on the site is a source of fresh water recharge that flows on the eastern side of the site to the Pacific Ocean and on the western side of the site to the Hunter River.

Table 2 - Summary of Site Infrastructure

Main Entrance	Barracks	Plotting Room	Inner Fort	Outer Fort	Other
Guard house	Barracks (a central, isolated building)	Plotting Room (self contained unit)	Brick retaining wall	Drill hall	Four searchlight positions
WWI Engine Room	Tennis court	Miniature range (Demolished)	Barbed wire fence	Mess hall site (Demolished)	Septic Tank (removed)
Married Quarters – Cottages	Car park	AWAS Quarters (Demolished)	Two 6" gun emplacements	Transport Compound (Vehicle maintenance pit and Garage)	Fuel Filling Shed (removed)
Garages		Degassing Plan Chamber	Two 9.2" gun emplacements.	Latrine Site (Demolished)	Fire Fighting Equipment Store
Entrance road			Magazine Rooms	Storage Compound	Timber Security Fences
			Pump Rooms (Water Pump Shed)	Administration buildings	Tunnel air vents
			Power House		Roads and car parks
			Search lights		Quarter Master Store
			Tunnels - underground connection between the Power House and the 9.2" gun Magazines and Pump Rooms		Flammable goods store (removed)
			Observation tower		Electrical Transformer
			Support buildings (wireless room and casualty rooms)		Explosive Store
					Incinerators
					Oval
					Water, Sewage, Electricity and Telecommunications

3.2 Materials to be Managed

While all known areas of contaminated soil have been remediated, some materials remain at the site that will need to be managed. Furthermore, there is a risk that some other potentially contaminated materials may be found.

The materials that are known to remain at the site and that need to be managed comprise:

- Road pavements, constructed of old asphalt that consists of dark grey/black aggregate and gravel. The asphalt material is on average 100mm thick and contains elevated PAHs (up to 8,420mg/kg) and lead. These pavements pose a low risk when left undisturbed but need to be managed if disturbed, such as during demolition or pavement resealing works. Recommendations for maintaining the road pavements are given in SMEC (9 December 2009) "Fort Wallace Pavement Investigation Report;

- Buried services, including boxes and associated piping, which may contain asbestos;
- Building materials, that may contain asbestos and lead-based paint; and
- An old incinerator, that consists of a rusted brown box with a protruding pipe. The box has an ACM lining.

Because of the long history of the site as a Defence facility, there is also a risk that some materials that were removed from the site by the remediation work may remain in small quantities at presently unknown locations. These materials primarily comprise ACM fragments, Defence-related waste and UXO. Sufficient investigations, remediation work and validation testing have been undertaken to conclude that any unknown contamination or waste material that may remain at the site poses a low risk to future users and the environment. Procedures and controls need to be provided however, to manage “unexpected findings”.

There are also some areas of the site where fill material (containing small quantities of building and demolition rubble) remain. These areas comprise:

- The oval: The oval appears to be constructed of fill material comprised of sand, some brown silty clay, the occasional brick and piece of concrete (and potentially ACM). Due to historical water infrastructure cutting through the oval, this material has an organic odour when wet. The average thickness of this material was approximately 500mm from the existing oval surface;
- Terraced areas: The central and western portions of the site contain a series of terraces, which appear to have been constructed of fill material. The stepped areas are marked by lateral beams of timber forming retaining walls. The material within the terraces is generally comprised of grey/brown sands and includes the occasional brick and boulder. The thickness of fill material within the terraces varies, however generally extends 1.5m from the terrace surface. During previous investigations in these areas, concentrations of contaminants of concern were generally less than the adopted assessment criteria;
- Gun Emplacement heritage area: Building and demolition waste is present around the heritage listed gun emplacement structures;
- Heritage Area Building and Demolition Waste: Sandy material with brick, concrete and scrap metal pieces is located in this area. This material is generally located at the ground surface and down to approximately 500mm depth; and
- Rusted star pickets: These form the remnants of security fences located throughout the sand dune area. A rusting steel pipe was observed to enter the dunes from the oval.

The locations of these materials that remain at the site are shown on **Figure 3** in **Appendix A**. Photographs of some of these materials are provided in **Appendix B**.

Environmental investigations have also identified that groundwater at the site has elevated zinc concentrations. Furthermore, the Hunter Water Sewerage Treatment Plant is located to the south of the site and may be a source of dissolved metals and ammonia contamination.

4 MANAGEMENT PROCEDURES & CONTROL MEASURES

4.1 Principles

The principal environmental site management approach is to manage contamination risks in a safe manner, so that the site remains suitable for its intended uses, as described in Section 1.2.

The contamination risks are currently low, due to either or a combination of low levels of contaminants, limited exposure risks, materials being inert and/or inaccessible. As such, no specific management controls are required for passive activities at the site such as general maintenance, walking or driving.

Key activities requiring the actioning of this SEMP include, but are not necessarily limited to:

- Excavation;
- Removal/repair of existing structures;
- Removal/repair of old asphalt pavements;
- Removal/repair of existing underground services; and
- Landscaping.

All such works should be managed and supervised by suitably qualified and experienced personnel. No such work should be commenced at the site until relevant personnel have received a copy and read this SEMP. Persons responsible for the implementation of this SEMP are specified in Section 2.

Soils, wastes and hazardous building materials at the site must be managed in accordance with regulatory requirements. These include, but may not be limited to:

- *Protection of the Environment Operations Act 1997*;
- Department of Environment, Climate Change and Water (DECCW) waste management guidelines and requirements;
- *Occupational Health and Safety Act 2000* and WorkCover requirements; and
- Newcastle Council Development Control Plan (DCP).

Changes to this SEMP should only occur with the approval of the Site Owner or Newcastle City Council. Alternative management approaches will have to provide detailed explanations and justification on how the alternative approach will manage the risks to human health at safe levels that meet the requirements of the site owner and consent authorities.

4.2 Procedures and Controls

Table 3 summarises the potential risks and general management requirements for materials that are known to remain at the site and that need to be managed. Table 4 summarises the potential risks and general management requirements for fill and demolition/building waste materials that are known to remain at the site and that need to be managed. Table 5 summarises the potential risks and general

management requirements for unknown materials that may be unexpectedly found at the site.

Table 3 - Management Procedures and Controls for Known Materials/Areas

Area	Hazard	Risk	Management for Low Density Residential Land Use Setting	Management for Open Space Land Use Setting	Responsibility
Road Asphalt	Elevated concentrations of PAHs	Ingestion and dermal contact	Maintain current road condition, or implement job-specific EMP for works that will disturb pavement	Maintain current road condition, or implement job-specific EMP for works that will disturb pavement	Site Owner, Occupants & Contractors
Underground services constructed of ACM	Asbestos in underground services	Inhalation of asbestos fibres. Dispersion of asbestos fibres and ACM.	Do not disturb, or implement job-specific EMP for works that will disturb buried services	Do not disturb, or implement job-specific EMP for works that will disturb buried services	Site Owner, Occupants & Contractors
Above ground structures containing hazardous building materials (lead paint and ACM)	Potential flaking/corroding lead paint. ACM.	Inhalation or ingestion of lead paint dust. Inhalation of asbestos fibres.	Retain structure, comply with Asbestos and Hazardous building Material Management Plans. Ongoing maintenance of structures using non hazardous materials. Implement job-specific EMP for works that will disturb structures.	Retain structure, comply with Asbestos and Hazardous building Material Management Plans. Ongoing maintenance of structures using non hazardous materials. Implement job-specific EMP for works that will disturb structures.	Site Owner, Occupants & Contractors
Groundwater	Elevated zinc and potential impacts from sewage treatment plant	Ingestion – not suitable for drinking	No groundwater extraction unless studies confirm suitability for proposed use	No groundwater extraction unless studies confirm suitability for proposed use	Site Owner & Occupant
Incinerator	Incinerator potentially containing asbestos	Inhalation of asbestos fibres. Dispersion of asbestos fibres and ACM via wind (if uncovered/disturbed)	Dispose of incinerator offsite in accordance with NSW DECC requirements.	Maintain in good condition. Comply with Asbestos Management Plan. Review if more sensitive landuse proposed.	Site Owner & Occupant

Table 4 - Management Procedures and Controls for Fill and Demolition/Building Waste

Area	Hazard	Risk	Management for Low Density Residential Land Use Setting	Management for Open Space Land Use Setting	Responsibility
Terraced Area Fill	Building and demolition waste comprised of bricks, concrete and scrap metal	Aesthetic impacts for residential land use	Acknowledge presence of these materials in small quantities. Maintain adequate vegetative cover to prevent erosion. Remove during construction if practicable.	Not applicable	Site Owner & Occupant
Oval Fill	Building and demolition waste comprised of bricks, concrete, scrap metal (for ACM fragments refer to Table 5)	Aesthetic impacts for residential land use	Acknowledge presence of these materials in small quantities. Maintain adequate vegetative cover to prevent erosion. Remove during construction if practicable.	Maintain adequate vegetative cover to prevent erosion. Review if more sensitive landuse is proposed.	Site Owner & Occupant
Heritage Area Building and Demolition Waste	Building and demolition waste comprised of bricks, concrete and scrap metal	Aesthetically unacceptable and trip hazards	Not applicable	Maintain adequate vegetative cover to prevent erosion. Review if more sensitive land use is proposed.	Site Owner & Occupant
Building and Demolition waste (General)	Building and demolition waste comprised of bricks, concrete and scrap metal	Aesthetically unacceptable and trip hazards	Acknowledge presence of these materials in small quantities. Maintain adequate vegetative cover to prevent erosion. Remove during construction if practicable.	Maintain adequate vegetative cover to prevent erosion. Review if more sensitive land use is proposed.	Site Owner & Occupant

Table 5 - Management Procedures and Controls for Unknown Materials that may be Unexpected Found at the Site

Material	Hazard	Risk	Management for Low Density Residential Land Use Setting	Management for Open Space Land Use Setting	Responsibility
ACM fragments (either on ground surface or buried)	Asbestos	Inhalation of asbestos fibres. Dispersion of asbestos fibres and ACM if uncovered and disturbed.	Remove and dispose off-site in accordance with regulatory requirements. Manage with Unexpected Findings Protocol (Section 4.4).	Remove and dispose off-site in accordance with regulatory requirements. Manage with Unexpected Findings Protocol (Section 4.4).	Site Owner, Occupant & Contractors
Defence-related waste	Defence-related waste (e.g. Spent bullets, cartridges, packing)	Aesthetic impacts	Remove and dispose off-site in accordance with regulatory requirements. Manage with Unexpected Findings Protocol (Section 4.4).	Remove and dispose off-site in accordance with regulatory requirements. Manage with Unexpected Findings Protocol (Section 4.4).	Site Owner, Occupant & Contractors
UXO	Small arms ammunition and other types of Defence ordnance	Explosion Chemical risks. Aesthetic impacts.	Do not touch and report immediately to Defence. Manage with Unexpected Findings Protocol (Section 4.4).	Do not touch and report immediately to Defence. Manage with Unexpected Findings Protocol (Section 4.4).	Site Owner, Occupant & Contractors

4.3 Earthworks Protocol – Activities, Hazards, Pathways and Controls

Table 6 provides a summary of the potential hazards and exposure pathways associated with each earthworks type activity and the related precautionary control measures. The list of activities is not intended to be exhaustive and relates to the 'developable' portion of the site only (i.e. the portion assessed against low density residential criteria) and the management areas as shown on Figure 3 in Appendix A.

If site activities are undertaken within a management area, then the following documentation should be maintained:

- Activity diary;
- Additional testing reports;
- Daily photographs of site conditions;
- Non conformance register and remedial action statement; and
- Surface/groundwater testing reports.

4.4 Unexpected Findings Protocol

In the event that any material suspected of containing potentially hazardous substances is found, the following procedure should be implemented:

1. Stop/prevent any activity in the area and surround and secure the area. Do not touch or disturb the item/material.
2. Report the Unexpected Finding to the Owner or Nominated Representative.
3. Record location, visual appearance, odour, depth, surrounding material and mode of discovering the material to the Owner or Nominated Representative.
4. Obtain assistance from a suitably qualified practitioner in identifying the potential hazard to human health or the environment in accordance with NSW regulatory requirements. This may include sampling and laboratory analysis, but could be limited to inspections.
5. Establish management actions in compliance with NSW regulatory requirements.
6. Obtain the Owner or Nominated Representative's and regulator's approvals for the proposed management actions.
7. Do not recommence work until the appropriate approvals have been received.
8. Implement the approved management action plan and seek on-going advice as necessary.
9. Document the findings and compliance with the approved action plan and provide documentation to the Owner or Nominated Representative.
10. Update SEMP hazards and controls as required.

The potential for explosive ordnance to be remnant on the site is very low. However in the event that an item suspected to be ordnance-related is found, it should not be touched, tampered with or disturbed in any way. Its general appearance should be carefully noted along with the best route to the item. Its location should be marked and people kept away.

The police should be advised and will attend. The police may arrange for specialist Defence personnel to attend who will either remove the item or render it safe. There is no charge for this service.

Table 6 - Summary of Potential Low Density Residential Potential Exposure Pathways and Control Measures

Activity	Hazard	Exposure Pathway	Precautionary Control Measure
Landscaping <ul style="list-style-type: none"> - Grass cutting - Tree lopping - Stump grinding - Planting trees 	<ul style="list-style-type: none"> Contaminated soil ACM fragments and services Building and Demolition Waste Lead paint flakes 	<ul style="list-style-type: none"> Dermal contact with soil Inhalation and ingestion of soil dust 	<ul style="list-style-type: none"> Review project documentation to identify whether and what materials can be expected to be encountered by the works. Inspect the work areas and conduct an Activity Risk Assessment. Conduct additional investigations if required. Establish appropriate safe work procedures. Familiarise staff with potential issues [toolbox briefing]. Identify, report, and safely manage any suspect material. Wear long-sleeved shirts, long-pants and gloves. Avoid creating dust (e.g. avoid working on hot wind days). Wash hands and face immediately after works. Remove (and collect) loose soil off equipment. Wash soiled clothes separately. Do not eat, drink or smoke during works.
Construction <ul style="list-style-type: none"> - Disturbance of surface cover - Excavation - Stockpiling material - Offsite disposal of material - Work documentation 	<ul style="list-style-type: none"> Contaminated soil ACM Building and Demolition Waste Lead paint flakes 	<ul style="list-style-type: none"> Dermal contact with soil Inhalation and ingestion of soil dust 	<ul style="list-style-type: none"> Develop and implement Safe Work Methods Statement including: <ul style="list-style-type: none"> Contact Details Legislation WorkCover requirements Proposed Works Summary of expected contamination Unexpected findings protocols. Guidance by an appropriately qualified environmental practitioner. Dust Control <ul style="list-style-type: none"> Minimise drop height from excavator bucket to repository Stop work in high wind conditions Wear long trousers, and long sleeved shirts. Work upwind from the soil exposure area. Wash hands, arms and face prior to consuming food, drinks, or smoking. Change work clothing prior to leaving the site.

Activity	Hazard	Exposure Pathway	Precautionary Control Measure
			<ul style="list-style-type: none"> ▪ Launder work wear separate from other clothing. ▪ Offsite disposal in accordance with NSW guidelines. ▪ Effective truck wheel washing procedures to minimise the export of contamination from the site. ▪ Machinery to remain on hard surfaces where possible. ▪ Periodic cleaning of work corridors to avoid spreading of contamination. ▪ Surfacewater discharge controls, following chemical analysis of excavation/stockpile run-off prior to discharge. ▪ If groundwater is to be intercepted and pumped, a groundwater disposal plan, following chemical analysis of groundwater prior to discharge. ▪ Stockpiling within bunds/containers. ▪ Placing stockpiled material on impermeable barrier [e.g. HDPE]. ▪ Covering of stockpiles with HDPE to prevent migration through dust and stormwater. ▪ Minimum of 0.5m overlap of stockpile cover and base. ▪ Effective and documented tracking of stockpiles, noting their origin, stockpiled location and end location. ▪ Activity diary. ▪ Additional testing reports of material for reuse or offsite disposal. ▪ Daily photographs of site conditions. ▪ Non conformance register and remedial action statement. ▪ Surface/groundwater testing reports.
Disturbance/ Removal or maintenance of services - Work Documentation	<ul style="list-style-type: none"> ▪ Contaminated soil ▪ ACM ▪ Building and Demolition Waste ▪ Lead paint flakes 	<ul style="list-style-type: none"> ▪ Dermal contact with soil ▪ Inhalation and ingestion of soil dust 	<ul style="list-style-type: none"> ▪ If ACM is suspected, works to be undertaken by an AS1 licensed contractor. ▪ Wear long-sleeved shirts, long-pants and gloves. ▪ Avoid creating dust (e.g. avoid working on hot wind days). ▪ Wash hands and face immediately after works. ▪ Remove (and collect) loose soil off equipment. ▪ Wash soiled clothes separately. ▪ Do not eat, drink or smoke during works.

Activity	Hazard	Exposure Pathway	Precautionary Control Measure
			<ul style="list-style-type: none"> ▪ Activity diary. ▪ Additional testing reports. ▪ Daily photographs of site conditions. ▪ Non conformance register and remedial action statement. ▪ Surface/groundwater testing reports.



4.5 Documentation and Reporting

Site activities that involve the disturbance of known impacted and/or waste materials (Table 3) are to be managed in accordance with a job-specific EMP. The EMP is to be prepared by a suitably qualified and experienced person and a copy retained by the Site Owner.

For all materials and areas listed in Tables 3 - 5, a report documenting the completed activities should be prepared by the Contractor and provided to and retained by the Site Owner.

The Site Owner should keep a record of any incidents associated with work involving materials listed in Table 3 - 5.

Any changes made to this SEMP, or the use of alternate management approaches should be recorded by the Site Owner.

4.6 Land Use Changes



This SEMP has been prepared for the intended land uses specified in Section 1.2. In the event that a subsequent change is proposed, then a review of current land use restrictions and possibly additional detailed contamination investigations at the subject area should be undertaken so as to confirm the suitability of the area for the change in land use. The investigation must be performed by an appropriately qualified and experienced environmental practitioner.

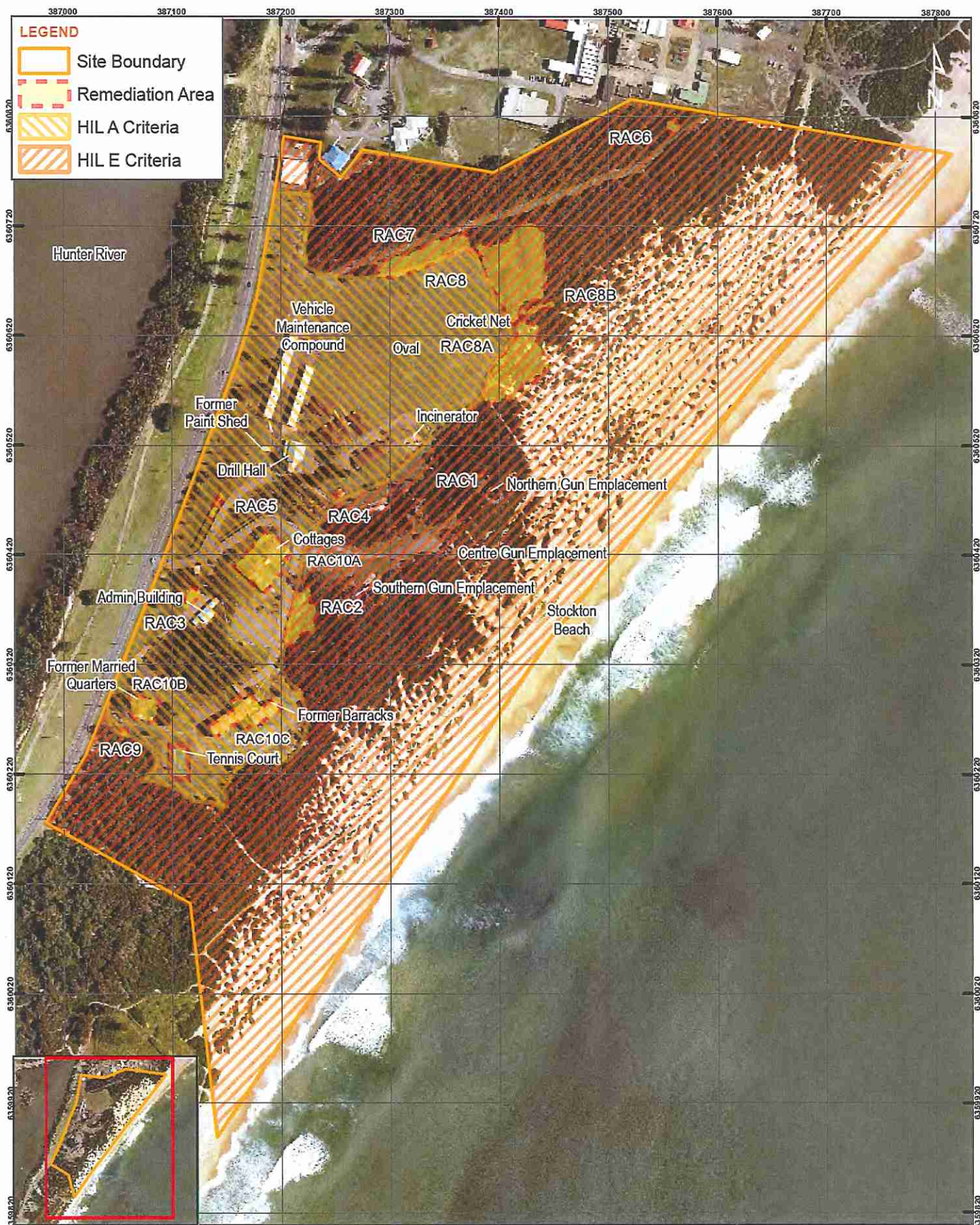
5 REFERENCES

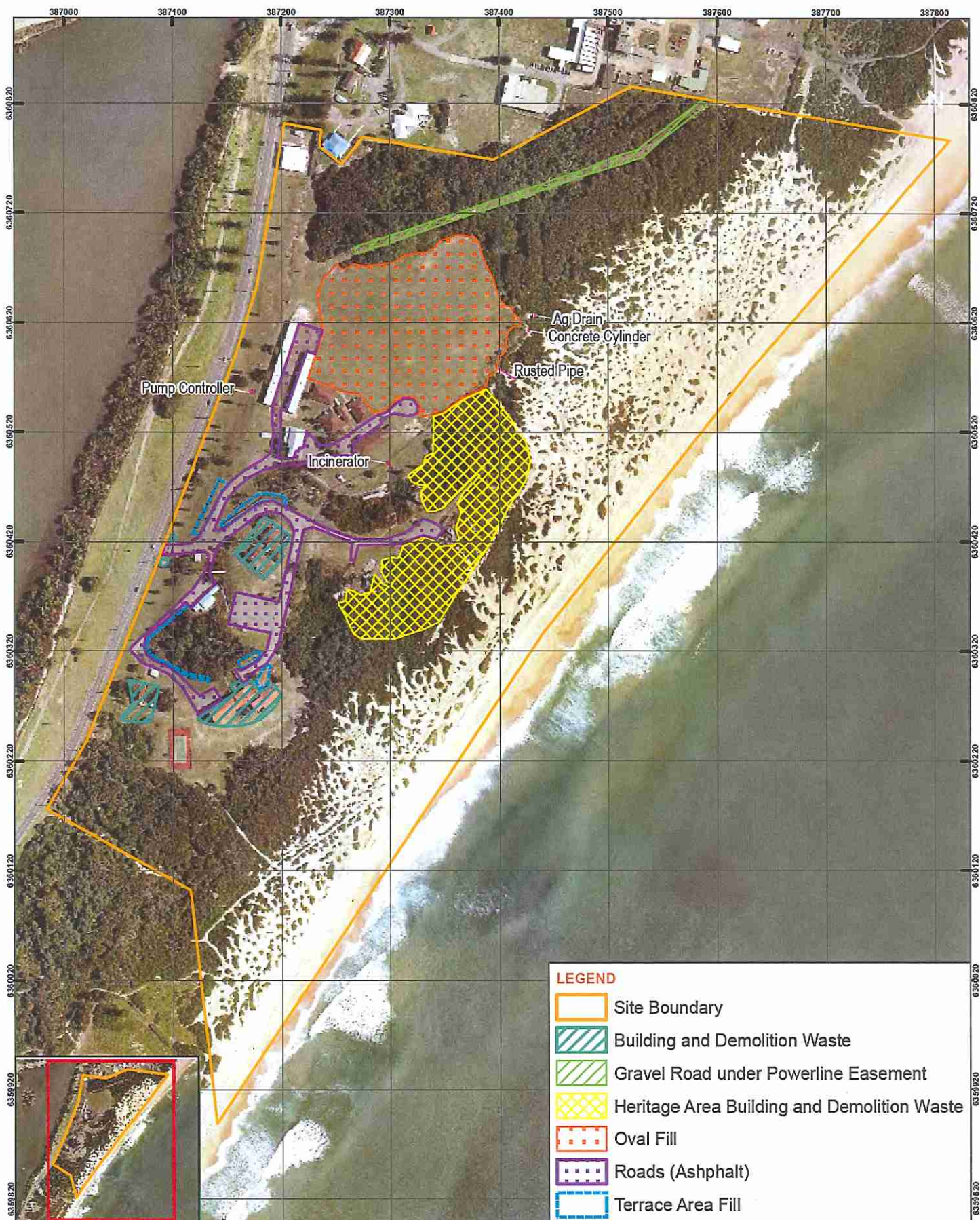
- National Environment Protection Council (1999) *National Environment Protection Measure, Guideline on the Investigation Levels for Soil and Groundwater*.
- National Environment Protection Council (1999) *National Environmental Protection Measure, Assessment of Site Contamination - Schedule B series*.
- Newcastle City Council (2005) *Local Environment Plan*.
- NSW DEC (2006) *Guidelines for the NSW Site Auditor Scheme*.
- NSW Environment Protection Authority (1997) *Guidelines for Consultants Reporting on Contaminated Sites*.
- SMEC (2009) *Fort Wallace Pavement Investigation*
- SMEC/WSP (2008) *Fort Wallace Environmental Assessment*.
- SMEC/WSP (2008) *Remedial Action Plan*.
- SMEC/WSP (2008) *Fort Wallace Delineation Sampling June 2008*
- SMEC/WSP (2008) *Remediation Specification Fort Wallace*.
- SMEC/WSP (2009) *Validation Sampling Analysis and Quality Plan*.
- SMEC/WSP (2009) *Fort Wallace Validation Sampling Report*.

APPENDIX A – FIGURES



DATE 21/09/2009	SCALE 1:8,500		COORDINATE SYSTEM MGA 94 Zone 56	 Copyright - City2See.com Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.
PROJECT NO. 3001625.001	PROJECT TITLE Fort Wallace Site Environmental Management Plan			
FIG NO. 1	FIGURE TITLE Site Location Plan			
CREATED BY B. Stewart	LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Site Environmental Management Plans			



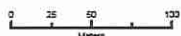


LEGEND

- Site Boundary
- Building and Demolition Waste
- Gravel Road under Powerline Easement
- Heritage Area Building and Demolition Waste
- Oval Fill
- Roads (Ashphalt)
- Terrace Area Fill

DATE 21/09/2009

SCALE 1:4,500



COORDINATE SYSTEM
MGA 94 Zone 56

PROJECT NO. 3001625.001

PROJECT TITLE Fort Wallace Site Environmental Management Plan

FIG NO. 3

FIGURE TITLE Site Management Areas

CREATED BY B. Stewart

LOCATION R:\group information\Environment and Planning\EandP\Cassie\Projects\Stockton\Site Environmental Management Plans



Copyright - City2See.com
Aerial Photography Licensed by Sinclair Knight Merz Pty Ltd.

APPENDIX B – PHOTOGRAPHS

1 APPENDIX B PHOTO LOG



Figure 1 Example of Asbestos Containing Material (ACM)

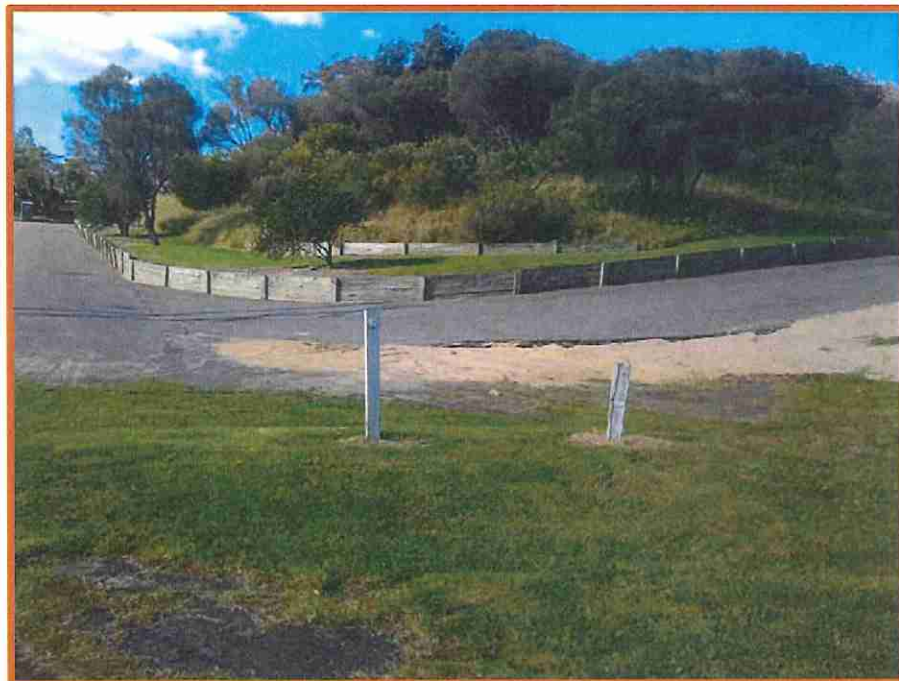


Figure 2 Example of Asphalt Roads with Terraced Area in the background



Figure 3 Potential Fill In Oval



Figure 4 Example of partially buried Building and Demolition Waste



Figure 5 Western Terraced area

APPENDIX C – ASBESTOS REGISTER

FORT WALLACE- ASBESTOS REGISTER- AS AT 14 AUG 08

Asset Number	inspect date	Asbestos	inspect	Primary Location	Secondary Location	Sample Description	condition	control	priority
1337/A0001	14-Mar-06	Yes	01-Mar-11	Building 1	Eaves and ceiling above west entry	1337/1/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	14-Mar-06	Yes	01-Mar-11	Building 1, bathroom	ceiling lining	1337/1/03	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	14-Mar-06	Yes	01-Mar-11	Building 1, north entry	ceiling lining	1337/1/04	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	14-Mar-06	Yes	01-Mar-11	building 1, sunroom adjacent to dining room	ceiling lining	1337/1/05	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	Bathroom	Ceiling	1337/A001/ES886	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	Internal: north west room	Ceiling	1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	Laundry & foyer, north elevation	Ceiling	Refer to 1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0001	05-Apr-07	Yes	05-Apr-10	External: west elevation at entrance to building	Veranda ceiling	1337/A001/ES881	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	External	Electrical backing board	not sampled due to electrical hazard	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	Building 2	Eaves and ceiling above west entry	ref 1337/1/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	Building 2, bathroom	ceiling lining	ref 1337/1/03	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	Sunroom adjacent to dining room	ceiling lining	ref 1337/1/05	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	14-Mar-06	Yes	01-Mar-11	building 2, laundry and north entry	ceiling lining	ref 1337/1/04	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	05-Apr-07	Yes	05-Apr-10	Bathroom	Ceiling	Refer to 1337/A001/ES886	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0002	05-Apr-07	Yes	05-Apr-10	Internal: south west room	Ceiling	Refer to 1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0003	14-Mar-06	Yes	01-Mar-11	Southwest sunroom	Ceiling lining	1337/3/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months

Asset Number	Inspection Date	Asbestos	Reinspect	Primary Location	Secondary Location	Sample Description	Condition	Control	Priority
1337/A0003	14-Mar-06	Yes	01-Mar-11	Eaves, south and west entry	Lining	1337/3/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0003	05-Apr-07	Yes	05-Apr-10	Internal laundry & foyer at south east corner	Ceiling	Refer to 1337/A001/ES882	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	14-Mar-06	Yes	01-Mar-11	Main door	Possible asbestos infill	not sampled due to no access	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	14-Mar-06	Yes	01-Mar-11	Roof Cover	Electrical room	1337/7/04	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	14-Mar-06	Yes	01-Mar-11	Main Switchboard	backing board	1337/7/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-10	Internal throughout	Ceiling	1337/A007/ES897	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-08	Main external door: west elevation	Fire door	1337/A007/ES889	Frable (Deteriorated/Damaged/Unsatisfactory)	Removal	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-10	Internal south wall adjacent kitchenette	Electrical mounting board	Refer to 1337/A007/ES895	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0007	05-Apr-07	Yes	05-Apr-10	External north annexed substation and south annex	Roof membrane	1337/A007/ES891	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	external	Eaves	not sampled due to height restriction	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	external	vent louvers	not sampled due to height restriction	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	Gable end	Cladding	not sampled due to height restriction	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	Main hall	Electrical board	1337/8/03	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	South central room	ceiling lining	1337/8/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	14-Mar-06	Yes	01-Mar-11	Rooms adjacent to main hall	Floor covering	1337/8/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	External roof ends	Cable	1337/A008/ES843	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months

Asset Number	Inspect date	Asbestos	Reinspect	Primary Location	Secondary Location	Sample Description	Condition	Control	Priority
1337/A0008	05-Apr-07	Yes	05-Apr-10	South store room behind counter	Ceiling	1337/A008/ES850	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	External south west veranda above door	Wall infill panel	1337/A008/ES872	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	Above wall cavity to old chimney lining	Infill soffit panel	1337/A008/ES851	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0008	05-Apr-07	Yes	05-Apr-10	Internal south wall of basketball court	Electrical mounting board	1337/A008/ES848	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	12-36 Months
1337/A0021	05-Apr-07	Yes	05-Apr-10	External window frames	Windows	1337/A021/ES878	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0024	14-Mar-06	Yes	01-Mar-11	Heritage building 24	Electrical pits casting adjacent to heritage buildings	1337/24/02	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0030	05-Apr-07	Yes	05-Apr-10	External walls east side	Vertical movement joints	Refer to 1337/A030/ES832	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0030	05-Apr-07	Yes	05-Apr-10	External walls west side	Vertical movement joints	1337/A030/ES832	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0032	14-Mar-06	Yes	01-Mar-11	External	Canopy	1337/32/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0032	14-Mar-06	Yes	01-Mar-11	Front door	possible asbestos core	not sampled due to destructive nature of sampling	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0032	05-Apr-07	Yes	05-Apr-10	Door	Firedoor	1337/A032/ES840	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0033	14-Mar-06	Yes	01-Mar-11	Roof cover	Bituminous lining	1337/33/01	Sealed (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A0033	05-Apr-07	Yes	05-Apr-10	External roof top	Roof membrane	1337/A033/ES877	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/A2001	05-Apr-07	Yes	05-Apr-08	West of building 008	In ground services pit	1337/A008/ES871	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/A2001	05-Apr-07	Yes	05-Apr-10	External: North of building 024	In ground services pit	1337/A024/ES859	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/A2001	05-Apr-07	Yes	05-Apr-10	External: North of building 024	In ground services pit	1337/A024/ES860	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/A2001	05-Apr-07	Yes	05-Apr-08	South west corner of building 008	In ground services pit	1337/A008/ES869	Unfriable (Stable/Satisfactory)	Removal	12-36 Months

Asset Number	inspect date	asbestos	reinspect	Primary Location	Secondary Location	Sample Description	condition	control	priority
1337/AZ001	05-Apr-07	Yes	05-Apr-10	South west corner of building 008.	In ground services pit	1337/A008/ ES870	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/AZ001	05-Apr-07	Yes	05-Apr-10	External west side of building 007 substation	In ground services pit	1337/A007/ ES892	Unfriable (Stable/Satisfactory)	Removal	12-36 Months
1337/AZ040	05-Apr-07	Yes	05-Apr-10	1337/A013 Internal west wall adjacent entry	Electrical mounting board	1337/A013/ ES857	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months
1337/AZ040	05-Apr-07	Yes	05-Apr-10	1337/A025 protruding from ext walls of building	Ventilation pipe work	1337/A025/ ES862	Unfriable (Stable/Satisfactory)	Defer Action (Leave, Label and Maintain)	Greater Than 36 Months



Fort Wallace Pavement Investigation Report

For: Department of Defence
DECEMBER 09, 2009

Project Name:	Fort Wallace Pavement Investigation
Project Number:	3001625.001
Report for:	Department of Defence

PREPARATION, REVIEW AND AUTHORISATION

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
00	08/12/09	RMK	HS	DC
Final	09/12/09	RMK	HS	DC

ISSUE REGISTER

Distribution List	Date Issued	Number of Copies
Department of Defence: Property Disposals	09/12/09	1 electronic
Contract Administrator : Lachlan Wood (URS)	09/12/09	1 electronic
Site Auditor: Dr Ian Swane (SKM)		
North Sydney Office Library (SMEC office location):	09/12/09	1 electronic
SMEC Project File:	09/12/09	1 electronic

SMEC COMPANY DETAILS

SMEC Australia Pty Ltd
PO BOX 1052, North Sydney, NSW 2059

Tel: 02 9925 5555

Fax: 02 9925 5566

Email: daniel.cramer@smec.com

www.smec.com

The information within this document is and shall remain the property of SMEC Australia Pty Ltd

TABLE OF CONTENTS

1	INTRODUCTION.....	1
2	SCOPE OF WORKS.....	1
3	PAVEMENT INVESTIGATION RESULTS.....	1
4	PAVEMENT INVESTIGATION PHOTOGRAPHS	3

1 INTRODUCTION

SMEC has been undertaking a Contamination Investigation/Remediation/Validation project at the Department of Defence site "Fort Wallace", located at Stockton just north of Newcastle. As part of these works, elevated concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) were detected in the roads onsite. SMEC assessed the risks posed to both the environment and human health, by the PAHs in the roads, to be low. In order to provide some interpretation of the condition of the roads, SMEC undertook an investigation of the pavements at Fort Wallace on 2 December 2009. This report summarises the findings of the investigation in relation to the following:

- the current condition of the pavement;
- the likelihood of failure; and
- an estimate of pavement life.

2 SCOPE OF WORKS

The scope of the works involved the following:

- A site walkover of existing roads at Fort Wallace;
- photographing roads onsite;
- correlation of observed pavement condition with relevant reference pavements; and
- Preliminary interpretation of pavement condition.

It is noted that SMEC did not undertake any testing of the pavement. SMEC is also not aware of any available pavement test results.

The site is currently non-operational hence traffic is light and generally involves infrequent vehicle movement of maintenance workers. Anecdotal advice from site personnel is that the pavements have been trafficked by heavy construction vehicles as part of the remediation works.

On the day of the visit, the weather on site was sunny and windy, and there were very minor signs of recent rain events manifested as small areas with pooled water.

3 PAVEMENT INVESTIGATION RESULTS

The findings of the pavement investigation are summarised in the table below.

Location	Photo Ref	Observed Distress	Possible Cause	Likelihood of Failure	Estimated Remaining life	Remedial Action/Treatment
Entrance Road to Admin Building Road from Former Married Quarters to Admin Building	1 (typical)	Longitudinal crack.	Embankment movement due to loss of support on the lower side over time leading to crack in the wearing surface.	Low risk if cracks are sealed else ingress of water into the embankment will lead to deterioration of embankment and pavement materials.	Short to medium term.	Seal the cracks.
Road to Drill Hall	2	Opening/gap between foot path and kerb.	Embankment movement due to loss of support on the lower side over time leading to crack in the wearing surface.	Low risk if gaps are sealed. Otherwise ingress of water into the embankment will lead to deterioration of embankment and pavement materials.	Short to medium term.	Seal the gaps between the footpath and kerb.
Outside Drill Hall	3	Pooling of water in surface.	Heavy loading in the past resulting in depression of the surface and underlying pavement material.	Low risk. Possible pothole enlargement if untreated due to deterioration of wearing surface and underlying pavement material.	Medium term.	Leave as is and monitor following use by heavy vehicles.
Outside Drill Hall	4	Cracking of wearing surface.	Tree roots.	Low risk. Further cracking of pavement wearing surface if untreated.	Medium term.	No significant risk to operations, leave as is.
Road to around Incinerator	5	Pothole.	Flat area with poor drainage, heavy vehicle loading (Caterpillar Grader parked in the vicinity of observed distress).	Low risk. Further failure possible if left untreated due to ingress of water into the pavement with loss of strength of pavement underlying materials.	Short to medium term.	Repair pothole.
Parking at Vehicle Maintenance Compound	6	Crack in concrete slab.	Corner cracking propagating from corner of drainage pit.	Low risk, however ingress of water into pavement layers will lead to a deterioration of supporting pavement layers.	Short term.	Repair crack, possible asphalt overlay to allow drainage of surface water.

Notes:

1. Estimate of the remaining life is based on visual assessment assuming no vehicle loading on pavements. No pavement testing or loading data is available. Based on this, it is assumed that short term is approximately 2 years and medium term 5 years.

4 PAVEMENT INVESTIGATION PHOTOGRAPHS



Photo 1 - Longitudinal crack around drainage inlet pit

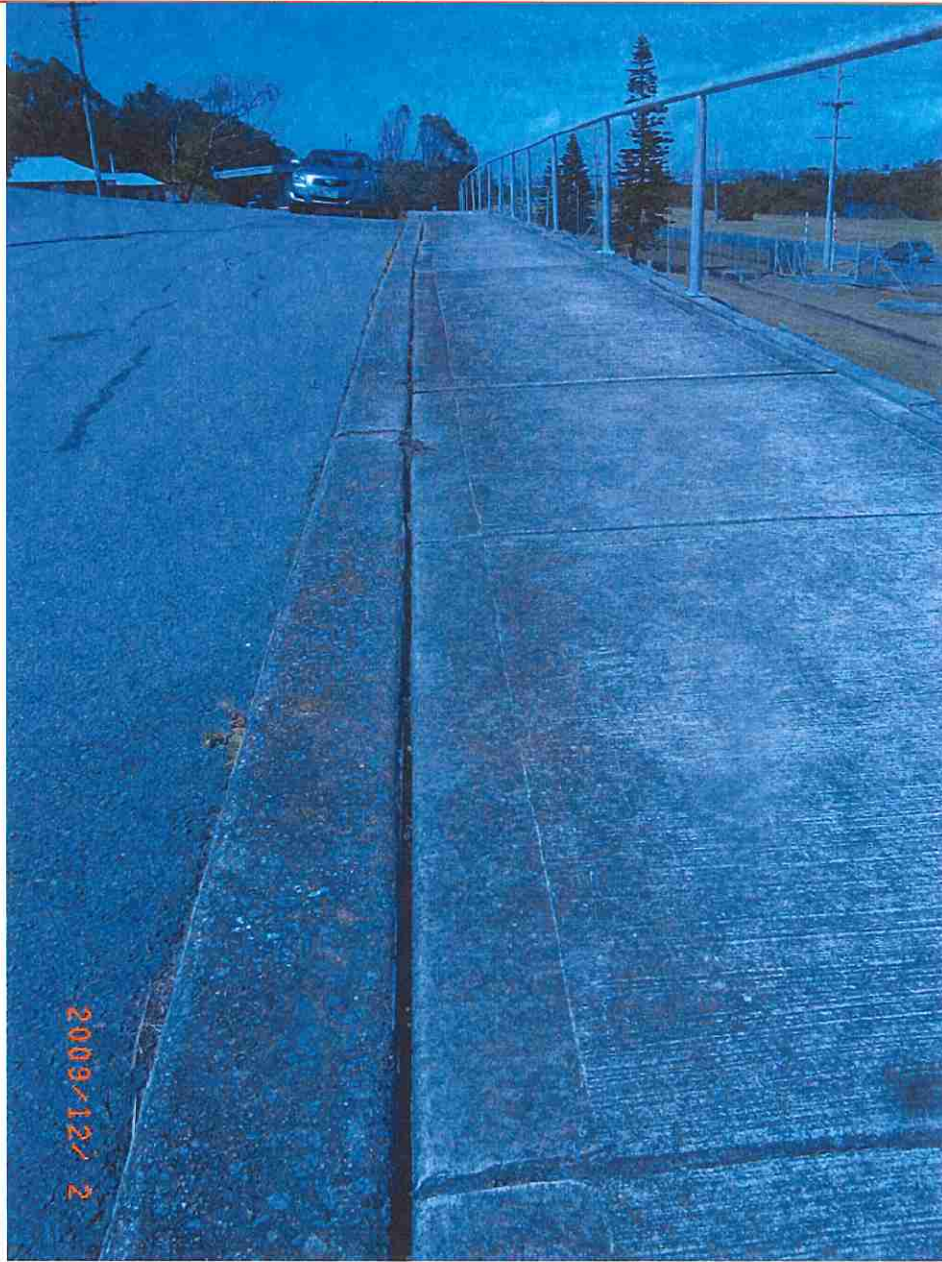


Photo 2 - Opening/gap between foot path and kerb

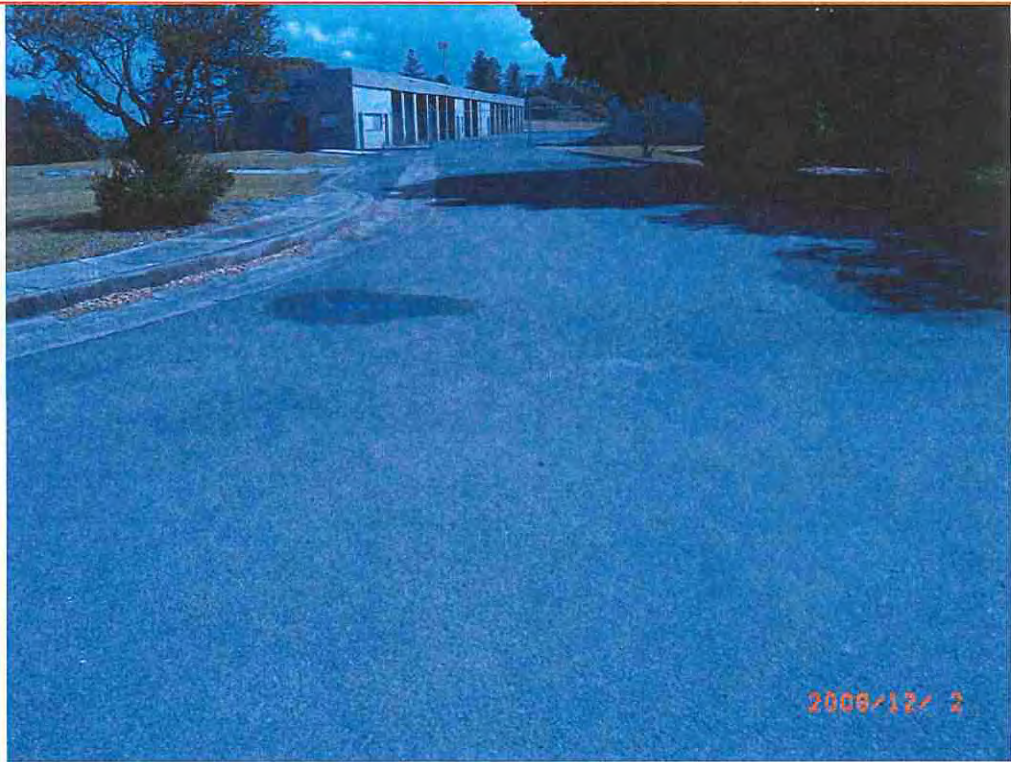


Photo 3 - Pooling of water in surface

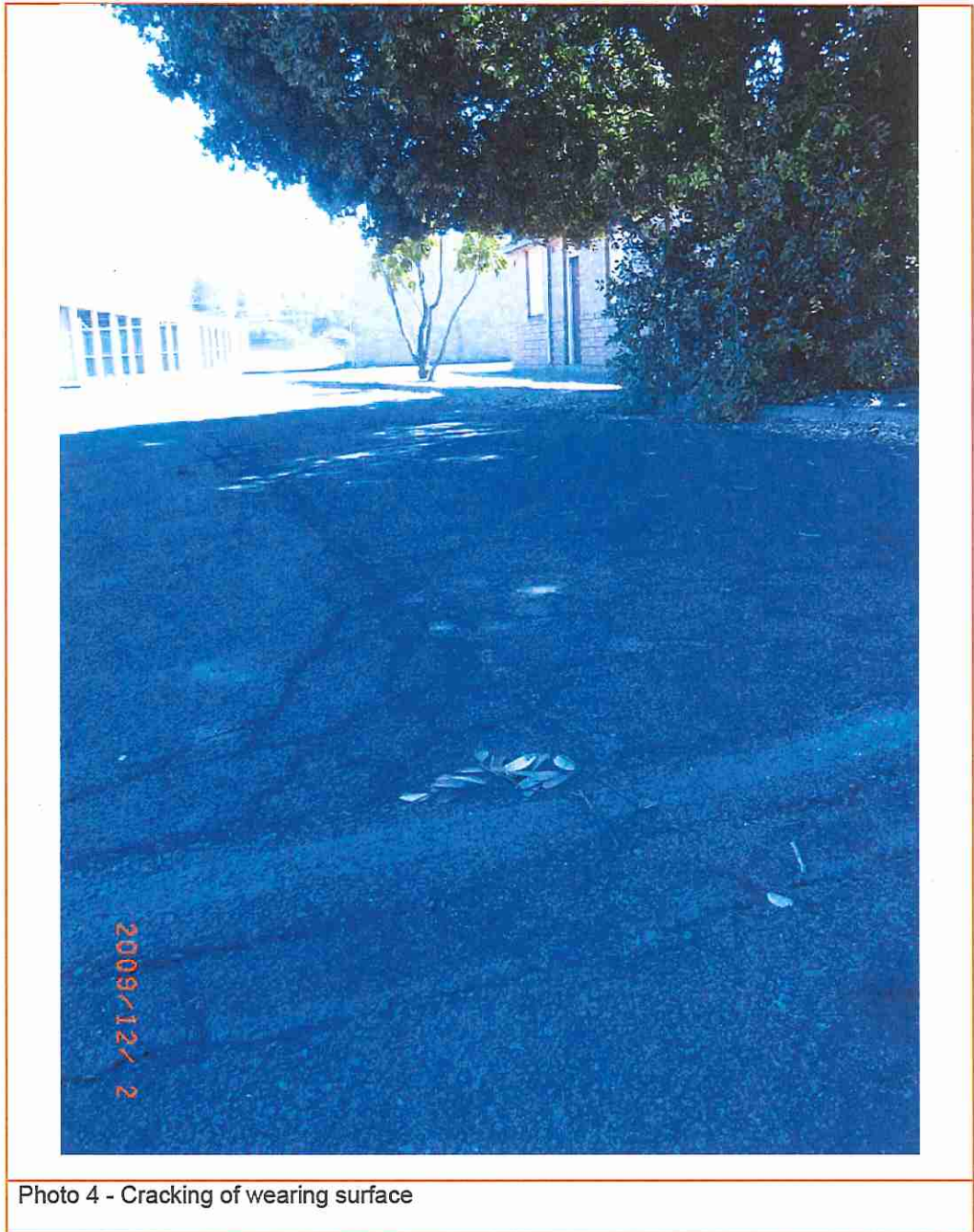


Photo 4 - Cracking of wearing surface



Photo 5 - Pothole



Photo 6 - Crack in concrete slab