Prepared for

Lendlease Building Pty Ltd

Prepared by

Ramboll Environ Australia Pty Ltd

Date

February 2017

Project Number

AS122038

Audit Number

GN 540A

SITE AUDIT REPORT

WESTERN SYDNEY STADIUM REMEDIAL ACTION PLAN

RAMBOLL ENVIRON

RAMBOLL ENVIRON

6 February 2017

Lendlease Building Pty Ltd
Attn.: Paul Jerogin
Level 14, Tower Three, International Towers Sydney
Exchange Place, 300 Barangaroo Avenue
Barangaroo NSW 2000

Dear Paul,

SITE AUDIT REPORT - WESTERN SYDNEY STADIUM REMEDIAL ACTION PLAN

I have pleasure in submitting the Site Audit Report for the subject site. The Site Audit Statement, produced in accordance with the NSW *Contaminated Land Management Act 1997*, follows this letter. The Audit was commissioned by Lendlease Building Pty Ltd to assess the suitability of a remedial action plan.

Development consent to Application No. SSD 7534 requires site auditor approval of remedial action plans submitted for future development applications. The audit therefore becomes statutory when submitted.

Thank you for giving me the opportunity to conduct this Audit. Please call me on 9954 8100 if you have any questions.

Ramboll Environ Australia
Level 3, 100 Pacific Highway
PO Box 560
North Sydney NSW 2060

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F +61 2 9954 8150
www.ramboll-environ.com

Ref AS122038

Yours faithfully,
Ramboll Environ Australia Pty Ltd

Graeme Nyland
EPA Accredited Site Auditor 9808

cc: NSW EPA – Statement only
City of Parramatta Council

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 31st October 2012. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. GN 540A

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:	Graeme Nyland	Company:	Ramboll Environ Australia Pty Ltd
Address:	Level 3, 100 Pacific Highway (PO Box 560)		
	North Sydney NSW	Postcode:	2060
Phone:	02 9954 8100	Fax:	02 9954 8150

Site details

Address: 11-13 O'Connell Street, Parramatta NSW

Postcode: 2150

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

Lots 951, 952, 953, 954, 955, 956, 957, 958, 959, 961, 962, 963 and 964 DP 42643 and Crown Land 80-3000 (see attachment at the end of Part I of this statement)

Local Government Area: City of Parramatta Council

Area of site (e.g. hectares): 92,887 m^2 Current zoning: RE1 Public Recreation and RE2 Private Recreation

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

Declaration/Order/Agreement/Proposal/Notice* no(s): N/A

Strike out as appropriate

Site audit commissioned by

Name: Paul Jerogin Company: Lendlease Building Pty Ltd

Address: Level 14, Tower Three, International Towers Sydney, 300 Barangaroo Avenue, Barangaroo

Postcode: 2000

Phone: 9236 6111 Fax: N/A

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

N/A

Purpose of site audit

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

~~**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])*

Sports stadium

Information sources for site audit

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

- Douglas Partners Pty Ltd (Douglas)
- JBS&G Australia Pty Ltd (JBS&G)
- Senversa Pty Ltd (Senversa)

Title(s) of report(s) reviewed:

- 'Report on Desktop Study, Western Sydney Stadium, Parramatta Stadium, Parramatta' dated 31 May 2016, prepared by Douglas.
- 'Infrastructure NSW, Environmental Site Assessment, Western Sydney Stadium, O'Connell Street, Parramatta, NSW' dated 12 July 2016, prepared by JBS&G.
- 'Infrastructure NSW, Additional Environmental Site Assessment, Western Sydney Stadium, O'Connell Street, Parramatta, NSW' dated 15 November 2016, prepared by JBS&G.
- 'Remedial Action Plan, Western Sydney Stadium Redevelopment' dated 2 February 2017, prepared by Senversa.

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

N/A

Strike out as appropriate

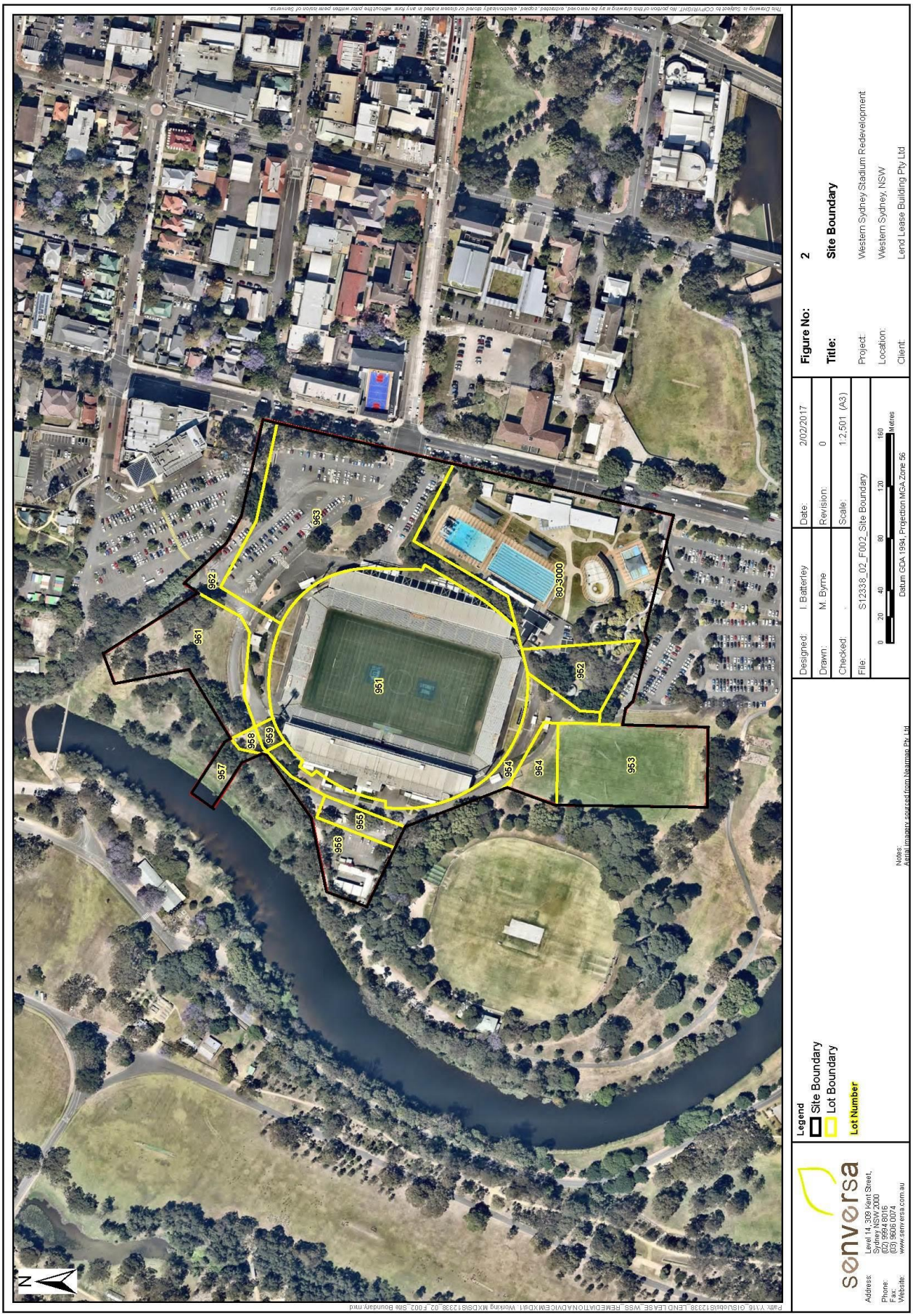
Site audit report

Title: Site Audit Report – Western Sydney Stadium Remedial Action Plan

Report no. GN 540A (Ramboll Environ Ref: AS122038)

Date: February 2017

Strike out as appropriate



Strike out as appropriate

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 site 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)* ……

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

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:

Section B

Purpose of the plan[1] which is the subject of the audit was to present a remediation strategy that could be used during redevelopment of the site as a sports stadium.

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) …Sports Stadium and associated infrastructure as described in Remedial Action Plan referenced below……..*

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

'Remedial Action Plan, Western Sydney Stadium Redevelopment' dated 2 February 2017, prepared by Senversa Pty Ltd

subject to compliance with the following condition(s):

A Section A site audit statement (SAS) and accompanying site audit report (SAR) are to be prepared at the completion of remediation and validation certifying suitability for the proposed use, subject to compliance with a long-term environmental management plan.

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

**** Strike out as appropriate***

Overall comments

Investigations identified fill material across the site, however the thickness and composition varied significantly over the site. The most significant thicknesses of fill material were identified in the northern fill mound, to the west of the stadium, beneath the training field in the south of the site, in the north-eastern fill mound, the northern stadium terrace and the southern stadium terrace.

Fill material typically comprised sand, slay and silt with some gravel. Slag and ash were often noted in the northern fill mound and beneath the training field. Concrete and brick were noted in many locations, with tile, glass, plastic, metal and terracotta also noted in some locations. Fill material was underlain by natural alluvial clay and alluvial sand.

Asbestos was identified as fragments of asbestos containing material (ACM) observed in fill material or detections of ACM and fibrous asbestos (weathered ACM <7 mm and fibre bundles) in samples analysed by the laboratory. Asbestos was identified in areas of the site where the most significant thicknesses of fill material were identified, as wells as beneath the eastern grandstand and one location in the south of the PSC.

Some data gaps were identified in the RAP, which are to be addressed by additional site investigation prior to remediation commencing. The scope of the additional investigation is to be detailed in a sampling and analysis quality plan to be provided to the Auditor for review.

The referenced remedial action plan provides a strategy to retain fill material beneath the proposed stadium and associated buildings, beneath hardstand paving (roads and pathways) or under a capping layer in landscaped and lawn areas. Further details of the remediation and validation strategy are to be provided to the Auditor in a Works Plan and validation sampling and analysis quality plan (VSAQP) to be reviewed prior to remediation commencing. An asbestos management plan (AMP) is also to be provided for review.

A long-term environmental management plan will be prepared following remediation to maintain site surfaces and limit exposure to underlying fill material.

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. 9808).

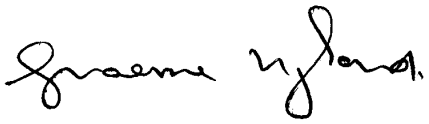
I certify that:

- 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…6 February 2017

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:

EPA (NSW)
Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
nswauditors@epa.nsw.gov.au

AND

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

CONTENTS

LIST OF TABLES

APPENDICES

LIST OF ABBREVIATIONS

Measures

%	per cent
µg/L	Micrograms per Litre
µg/m^3	Micrograms per Cubic Metre
ha	Hectare
km	Kilometres
m	Metre
mAHD	Metres Australian Height Datum
mbgl	Metres Below Ground Level
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
mg/m^3	Milligrams per Cubic Metre
mm	Millimetre
ng/L	Nanograms per Litre
ppm	Parts Per Million

General

ACM	Asbestos Containing Material
ADWG	Australian Drinking Water Guidelines
AF	Asbestos Fines
AHD	Australian Height Datum
AMP	Asbestos Management Plan
ANZECC	Australian and New Zealand Environment and Conservation Council
ASS	Acid Sulfate Soils
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes & Naphthalene
CEC	Cation Exchange Capacity
CLM Act	NSW Contaminated Land Management Act 1997
COC	Chain of Custody
Council	City of Sydney Council
CSM	Conceptual Site Model
DA	Development Application
Douglas	Douglas Partners Pty Ltd
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EIS	Environmental Investigation Services
ENM	Excavated Natural Material
EPA	Environment Protection Authority (NSW)
ESA	Environmental Site Assessment
ESL	Ecological Screening Level
FA	Fibrous Asbestos
GIL	Groundwater Investigation Level
HASP	Health and Safety Plan
HIL	Health Investigation Level
HSL	Health Screening Level
JBS&G	JBS&G Australia Pty Ltd
Lendlease	Lendlease Building Pty Ltd
LEP	Local Environment Plan
LTEMP	Long-Term Environment Management Plan
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury
ML	Management Limits
NEPC	National Environmental Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NL	Non-Limiting
n	Number of Samples
OCPs	Organochlorine Pesticides
OEH	Office of Environment and Heritage

OH&S	Occupational Health & Safety
OPPs	Organophosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
pH	A measure of acidity, hydrogen ion activity
PID	Photoionisation Detector
PQL	Practical Quantitation Limit
PSC	Parramatta Swimming Centre
PSH	Phase Separated Hydrocarbon
QA/QC	Quality Assurance/Quality Control
RAP	Remediation Action Plan
RPD	Relative Percent Difference
SAR	Site Audit Report
SAS	Site Audit Statement
Senversa	Senversa Pty Ltd
SWL	Standing Water Level
TEQ	Toxicity Equivalent Quotient
TRHs	Total Recoverable Hydrocarbons
VHC	Volatile Halogenated Compounds
VENM	virgin excavated natural material
VSAQP	Validation Sampling Analysis Quality Plan
WSP	WSP Australia
-	On tables is "not calculated", "no criteria" or "not applicable"

1. INTRODUCTION

A site contamination audit has been conducted in relation to the site at 11-13 O'Connell Street, Parramatta.

The Audit was conducted to provide an independent review by an EPA Accredited Auditor of the suitability and appropriateness of a remedial action plan (RAP) i.e. a "Site Audit" as defined in Section 4 (1) (b) (v) of the NSW *Contaminated Land Management Act 1997* (the CLM Act).

Development consent to Application No. SSD 7534 requires site auditor approval of remedial action plans submitted for future development applications. The audit therefore becomes statutory when submitted.

1.1 Scope of the Audit

Details of the Audit are:

Requested by:	Paul Jerogin on behalf of Lendlease Building Pty Ltd
Request/Commencement Date:	12 September 2016
Auditor:	Graeme Nyland
Accreditation No.:	9808

The scope of the Audit included:

- Review of the following reports:
  - 'Report on Desktop Study, Western Sydney Stadium, Parramatta Stadium, Parramatta' dated 31 May 2016, prepared by Douglas Partners Pty Ltd (Douglas).
  - 'Infrastructure NSW, Environmental Site Assessment, Western Sydney Stadium, O'Connell Street, Parramatta, NSW' dated 12 July 2016(a), prepared by JBS&G Australia Pty Ltd (JBS&G) (*the ESA*).
  - 'Infrastructure NSW, Additional Environmental Site Assessment, Western Sydney Stadium, O'Connell Street, Parramatta, NSW' dated 15 November 2016(b), prepared by JBS&G (*the Additional ESA*).
  - 'Remedial Action Plan, Western Sydney Stadium Redevelopment' dated 2 February 2017, prepared by Senversa Pty Ltd (Senversa) (*the RAP*).
- A site visit by the Auditor's assistant on 3 February 2017. The Auditor previously visited the site in May 2016 as part of a previous related audit.
- Discussions with Lendlease and with Senversa, who prepared the RAP.

The investigations were either completed prior to the Auditor's engagement or under separate engagements by Venues NSW. No discussion with Douglas and JBS&G was undertaken.

An additional eleven investigation reports completed by Douglas, WSP Australia (WSP), Environmental Investigation Services (EIS), AECOM and JBS&G are summarised in JBS&G (2016a). These reports were not provided to the Auditor for review. They were undertaken between 1984 and 2015 and included a geotechnical investigation undertaken prior to construction of the current stadium (1984), investigation of the car park (2007) and upgrades to the stadium (2014 and 2015). Results of the investigations have been included in the site audit report (SAR) where relevant.

2. SITE DETAILS

2.1 Location

The site locality is shown on Attachment 1, Appendix A.

The site details are as follows:

Street address:	11-13 O'Connell Street, Parramatta NSW 2150
Identifier:	Lots 951, 952, 953, 954, 955, 956, 957, 958, 959, 961, 962, 963 and 964 DP 42643 and Crown Land 80-3000
Local Government:	City of Parramatta Council (Council)
Owner:	Venues NSW and Crown Land
Site Area:	92,887 m^2

The boundaries of the site are not well defined. A plan showing the site boundary is provided as Attachment 2 in Appendix A.

2.2 Zoning

JBS&G (2016a) report that the zoning of the site is RE2 Private Recreation under the Parramatta City Centre Local Environmental Plan (LEP) 2007. The Auditor notes that LEP 2011 gives a zoning of RE1 Public Recreation and RE2 Private Recreation.

2.3 Adjacent Uses

The site is located within an area of primarily recreational use. The surrounding site use includes:

North: Parramatta Leagues Club and associated car parking facilities.

East: O'Connell Street then a former school.

South: Parramatta Park including the Old Kings Oval, then Parramatta River.

West: Parramatta River and riparian zone.

The Parramatta River is located to the west of the site and approximately 100 m to the south of the site.

JBS&G and Senversa did not identify any adjacent activities with the potential to impact the site.

2.4 Site Condition

JBS&G (2016a) inspected the site and undertook intrusive investigations in 2016. They report that the site comprises Parramatta Stadium, Parramatta Swimming Centre (PSC), parts of Parramatta Park, internal roads, footpaths, car parking facilities, vegetated areas, a training field and electrical transformers, and is shown in Attachment 2 in Appendix A.

The stadium comprises a rectangular playing field with spectator stands to the east and west. To the north and south of the playing field was concrete terraced seating and soil mounds surfaced with turf and asphalt. Other features included light towers, viewing screens and food and beverage facilities.

To the west of the stadium are a number of weatherboard/clad single storey buildings, which appeared to be used as the groundskeeper's office, workshop and equipment store.

The PSC comprised five in-ground swimming pools and associated infrastructure. Surrounding areas were paved and grassed. Several water slides were constructed on a raised mound in the south.

The ground levels at the site vary as a result of historical earthworks. Filled areas include the terraced areas to the north and south of the playing field, which were 4.5 to 6 m higher than the playing surface. An 'L' shaped earthen mound was present in the northeast of the site, which was

vegetated and had an up to 2 m high retaining wall. A vegetated filled area was present to the north of the stadium. The training field in the south of the site was also elevated above adjacent areas.

The following was noted during site visits by the Auditor and assistant:

- Electrical kiosks are present on the eastern boundary of the site (2), to the northeast of the stadium (1) and to the northwest of the stadium (2).
- Suspected fragments of ACM were present on the ground surface at the base of the fill mound to the north of the stadium.

2.5 Proposed Development

The proposed development comprises a 30,000 seat stadium with surrounding landscaped areas and car parking (Attachment 3, Appendix A). The development will result in the demolition of the existing stadium and PSC.

The proposed development is considered to fall within a 'public open space' exposure scenario. The 'commercial/industrial' scenario may also be applicable to some aspects of the stadium operation.

3. SITE HISTORY

JBS&G (2016a) provided a site history based on aerial photographs, NSW EPA records, Australian Heritage Trust records, NSW Heritage Inventory records, Council planning records and AECOM (2016) report *Western Sydney Stadium Technical Working Paper: Historical Heritage*. The AECOM report was not provided to the Auditor for review.

The site history is summarised in Table 3.1.

Table 3.1: Site History

Date	Activity
1788-1801	Farm established on the site and greater area. Farming ceased in 1801.
1789-1866	A grain mill and dams operated on the site and surrounding area.
1850s-1885	The site was used as a racecourse, with horse training conducted until 1893.
1883-1981	The site and surrounding areas were set aside as a park, comprising two sports ovals, grassed areas and ornamental tree plantings. The 1930 aerial photograph shows the stadium area occupied by a sports ground known as Cumberland Oval. The ground includes a small stand on the western edge. The remainder of the site was grassed with some areas appearing to be playing fields. The oval was redeveloped for rugby league use in 1939 by construction of a sunken ovoid field surrounding be earth embankments. The grandstand was expanded/redeveloped.
1958-1966	Construction of the PSC commenced in 1958 with one pool evident in the 1961 aerial photograph. Additional pools were present in the 1970 and 1994 photographs. The water slides were evident in the 1994 aerial photograph (date of construction unknown).
1981	The western grandstand of the former Cumberland Oval was destroyed by fire in 1981, and was no longer evident in the 1982 aerial photograph. Redevelopment of the site was approved by the NSW Government in 1983.
1986	The current stadium was constructed and opened in 1986. Douglas report that the playing surface was lowered by up to 4 m during redevelopment. The 1994 aerial photograph shows the stadium largely complete, with the exception of seating at the northern and southern ends which were added in 2002.
2005	Buildings to the west of the stadium used by the groundskeeper were evident in the aerial photograph.

The summary indicates that the site has been used for recreational purposes for the last approximately 160 years.

3.1 Auditor's Opinion

In the Auditor's opinion, the site history provides an adequate indication of past activities. The Auditor is satisfied that there is no evidence of past uses that have significant potential to contaminate the site. The greatest potential for contamination is fill material imported to the site during redevelopment of the stadium, PSC, carparks, etcetera. Fill mounds are present on the site at the northern and southern ends of the stadium, to the north of the stadium, in the

northeast of the site, and beneath the training field in the south of the site. The sources of fill material were not identified in the site history information presented.

4. CONTAMINANTS OF CONCERN

JBS&G (2016a) provided a list of the contaminants of concern and potentially contaminating activities. These have been tabulated in Table 4.1.

Table 4.1: Contaminants of Concern

Area	Activity	Potential Contaminants
Filled areas of the site, including terraces and landscape mounds	Filling with contaminated material to generate current site levels and mounds	Metals, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs) and asbestos
Hazardous building materials	Deterioration or demolition of existing and former buildings	Asbestos, lead and PCBs
Western area of the site	Maintenance of plant including lawnmowers etc.	TRH, benzene, toluene, ethylbenzene and xylenes (BTEX), PAHs, phenols and volatile halogenated compounds (VHCs)
Whole of site	Storage and application of pest control chemicals	OCPs, organophosphorus pesticides (OPPs) and metals
Western area of the stadium	Fire damage to former grandstand	Asbestos, PAHs and metals
Northern portion of the site	Leaks from electrical transformers	TRH and PCBs

4.1 Auditor's Opinion

JBS&G did not identify BTEX and OCPs as potential contaminants of concern in fill material, however were included in the analytical suite for samples collected during the ESA and Additional ESA.

The Auditor considers that the analyte list used by JBS&G adequately reflects the site history and condition.

5. STRATIGRAPHY AND HYDROGEOLOGY

Following a review of the reports provided, a summary of the site stratigraphy and hydrogeology was compiled as follows.

5.1 Stratigraphy

JBS&G (2016a) reviewed the geological maps and reported that the site is underlain by Ashfield Shale of the Wianamatta Group, which comprises claystone-siltstone and fine sandstone-siltstone laminite. Douglas (2016) reported that the site is located close to the boundary between Hawkesbury Sandstone and Ashfield Shale, which are often separated by Mittagong Formation sandstone.

The stadium and PSC are located in an area of 'no known occurrence of Acid Sulfate Soils'. Sediments in the nearby Parramatta River have a high probability of being acid sulfate soils (ASS).

The sub-surface profile of the site summarised in Table 5.1 is based on geotechnical investigations undertaken by Douglas and boreholes and test pits by JBS&G.

Table 5.1: Stratigraphy

Depth (mbgl)	Subsurface Profile
0 to greater than 6 mbgl	Fill material comprising sand, clay and silt with some gravel. Slag and ash were often noted in the north and training field. Concrete and brick were noted in many locations. Asbestos as fragments of asbestos containing material (ACM) and friable asbestos was noted in some locations. Tile, glass, plastic, metal and terracotta were also noted in some locations.
Variable depending on overlying fill thickness	Interbedded alluvial clay and alluvial sand.
Identified at depths of 7 to 16 mbgl	Weathered shale and medium strength sandstone.

mbgl – metres below ground level

Fill material was identified across the site, however thickness varied significantly over the site.

Fill was shallowest (typically 0.1-0.2 m) in the PSC, in the paved area around the stadium and in the carpark in the northeast and comprised hardstand paving (asphalt or concrete) and roadbase. A greater thickness of fill material was identified in the northern fill mound (1.2 to >6 m), to the west of the stadium (0.7 to >2.5 m), below the southern training field (1.2-2.8 m), the north-eastern fill mound (0.2 to 0.95 m), the northern terrace (0.5 to 3.7 m) and the southern terrace (>0.8 to 3 m).

Boreholes beneath the stadium grandstands and terraces, within the northern fill mound, to the west of the stadium and in the south of the PSC were often terminated in fill material.

5.2 Hydrogeology

JBS&G undertook a search of registered groundwater bores within 1.5 km of the site. They identified one bore registered for domestic use located approximately 370 m to the east of the site. The bore was installed to 60.5 mbgl and had a standing water level of 6.2 mbgl. Water bearing zones were identified at 46.1-46.3 m and 56.5-56.6 mbgl. Other bores were located greater than 1 km from the site and were registered for industrial or monitoring purposes. JBS&G concluded that regional groundwater occurs within sandstone and shale bedrock at significant depths.

JBS&G installed six groundwater monitoring wells around the stadium and sampled each well once. The site-specific hydrogeology based on the investigation is provided in Table 5.2.

Table 5.2: Site-Specific Hydrogeology

Aspect	**Details**
Geology Investigated	Silty clay
Depth to Water	3.45 to 8.9 mbgl (3.94 to 6.70 mAHD)
Phase Separated Hydrocarbon (PSH) presence and thickness	Not present
Hydraulic Parameters	Not reported by JBS&G
Interpreted Flow Direction	Northwest towards Parramatta River
Groundwater Quality	Groundwater was considered to be neutral to slightly acidic, poorly oxygenated, mildly reducing and with low conductivity (fresh). Groundwater quality parameters reported by JBS&G (2016a) included: • Dissolved oxygen ranged from 0.74 to 5.3 ppm • Electrical conductivity ranged from 427.6 to 1300 µS/cm • pH ranged from 5.43 to 6.75 • Redox potential ranged from 90 to 186.5 mV • Temperature ranged from 18 to 24°C

5.3 Auditor's Opinion

The heterogeneity and extent of fill material has the greatest potential to impact the remediation of the site. Further investigation to characterise fill material is not considered necessary prior to demolition and remediation given the access restrictions due to site infrastructure and limitations of borehole investigations.

The geology and hydrogeology of the site is considered sufficiently characterised for the purposes of remedial planning.

6. EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL

The Auditor has assessed the overall quality of the data by review of the information presented in the referenced reports, supplemented by field observations. The data sources are summarised in Table 6.1.

Table 6.1: Summary of Investigations

Investigations	Field Investigations	Analytical Data Obtained
JBS&G (June 2016)	15 boreholes (BH21-BH35) within the playing surface of the stadium. 42 boreholes (BH01-BH20, BH36-BH53 and MW01-MW04) to the west, north and east of the stadium and in the north-eastern carpark. Four were converted to groundwater monitoring wells (MW01, MW02, MW03 and MW04a).	Soil: asbestos, metals, PAHs, TRH, BTEX, OCP, OPP, herbicides, PCB and leachable metals/PAHs Groundwater: TRH, BTEXN, metals, ammonia and nitrate
JBS&G (October 2016)	59 boreholes (BH01-BH47 and HA01-HA12) in the PSC, northern carpark and western area. Two were converted to groundwater monitoring wells (GW01 and GW02). 9 locations (SHA01-SHA09) within the stadium terrace.	Soil: asbestos, metals, PAHs, TRH, BTEX, OCP, OPP, herbicides, PCB, phenols and VOCs Groundwater: TRH, BTEXN, metals, ammonia and nitrate

Previous investigations undertaken by Douglas, WSP, EIS and JBS&G were not provided to the Auditor for review. They included investigation of the north-eastern car park by WSP in 2007 and investigations by EIS and JBS&G in 2014 and 2015 prior to upgrades to the stadium. Results of the investigations have been included in this SAR were relevant, however a review of the overall quality of the data is not possible. The investigation locations are shown on Attachments 4 and 5 in Appendix A.

The Auditor's assessment of the data follows in Tables 6.2 and 6.3.

Table 6.2: QA/QC – Sampling and Analysis Methodology Assessment

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
Data Quality Objectives (DQO) JBS&G (2016a and 2016b) defined specific DQOs in accordance with the seven step process outlined in DEC (2006) *Guidelines for the NSW Site Auditor Scheme*.	These were considered appropriate for the investigations conducted.
Sampling pattern and locations *Soil:* Investigation locations were spaced to gain coverage of the majority of the site. Fill materials at the site were typically targeted for sampling. *Groundwater:* Monitoring wells were placed around the stadium (MW01-MW04a) and along the eastern boundary of the site in up-gradient positions (GW01 and GW02).	In the Auditor's opinion these investigation locations adequately target the main areas of concern. Some areas of the site have a low density of sampling or were not sampled, including Lot 957 in the northeast of the site, beneath the seating areas of the stadium, and

Table 6.2: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Plan and Sampling Methodology	**Auditor's Opinion**
	beneath buildings and pools in the PSC. Further investigation of Lot 957 is proposed in the RAP, and other areas of the site can be managed during the remediation process following demolition of structures.
Sampling density *Soil:* The sampling density of 187 locations (all investigation, not just JBS&G) over approximately 9.3 ha exceeds the minimum recommended by EPA (1995) *Sampling Design Guidelines*. The coverage provides a 95% confidence of detecting a residual hot spot of approximately 26 m diameter. Investigation locations targeted to particular areas/sources were sampled from appropriate depths and analysed for the contaminants of concern. Asbestos field quantification was undertaken at 139 locations, which is less than twice the EPA (1995) *Sampling Design Guidelines* required for site where asbestos impact is likely or known. *Groundwater*: A total of six groundwater wells were installed at the site.	With regards asbestos, given that fill will require management during redevelopment of the site, the Auditor is satisfied that the sampling was appropriate for remedial planning.
Sample depths Samples were collected and analysed from a range of depths, however were primarily from fill material. Sample depths were dependent on the depth of fill material and underlying natural material. Field quantification of asbestos by JBS&G during the ESA were undertaken on samples collected over 1 m intervals (0-1, 1-2, etc.). Individual samples were collected from fill and natural material in some instances. This was also the case for a number of samples during the Additional ESA. Other samples were collected over shorter sampling intervals (typically 0.1 m).	Asbestos quantification over 1 m intervals would result in the dilution, particularly in samples collected across fill and natural material. It is not clear how a 10 L sample was collected using solid flight augers over the short sampling intervals. There is some doubt about the results of these samples. In the Auditor's opinion, this sampling strategy for chemical contaminants was appropriate and adequate to characterise the primary material types present on site.
Well construction Monitoring well construction details were only provided for GW01 and GW02. The wells were installed to depths of 6-7 mbgl, with screen intervals of 3 m placed in gravel. Wells were constructed of 50 mm uPVC. A bentonite seal of 0.2-1 m thickness was placed above the screen and the well	In the Auditor's opinion the well construction was acceptable where provided.

Table 6.2: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Plan and Sampling Methodology	**Auditor's Opinion**
backfilled to the ground surface. Wells were screened across natural silty clay or sandy clay Construction details for MW1-MW04a were not provided, however JBS&G report that the wells were installed to a maximum depth of 10.5 mbgl, *"with appropriate gravel packs, bentonite seals, and lockable well caps"*.	
Sample collection method *Soil*: Sample collection was via pushtube or from solid flight augers. A hand auger was used in areas not accessible to a drill rig. *Groundwater*: Wells were installed by solid flight augers, developed with a stainless steel or disposable bailer and samples were collected using a low flow peristaltic pump. New disposable tubing was used for each well.	Sample collection from the auger flights is not ideal as it can result in loss of volatiles and sample cross contamination, and limits the ability to observe fill material composition. Given the key contaminants at the site are asbestos, loss of volatiles is not considered to be a significant issue. The extensive use of boreholes would result in some uncertainty regarding the presence and extent of ACM within fill material. Overall, in consideration of the contamination encountered, the sample collection method was found to be acceptable for remediation planning purposes.
Decontamination procedures *Soil:* Sampling equipment was scrubbed with a wire brush to remove gross contamination, cleaned with Decon 90 detergent and potable water solution, and rinsed with potable water. New nitrile gloves were used for each new sample. *Groundwater*: Dedicated sampling equipment was used for each well.	Acceptable
Sample handling and containers Samples were placed into prepared and preserved sampling containers provided by the laboratory and chilled during storage and subsequent transport to the labs. Samples for asbestos analysis were placed in plastic zip-lock bags. Groundwater samples to be analysed for heavy metals were field filtered.	Acceptable
Chain of Custody (COC) Completed chain of custody forms were provided in the report.	Acceptable

Table 6.2: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Plan and Sampling Methodology	**Auditor's Opinion**
Detailed description of field screening protocols *Soil:* Field screening for volatiles was undertaken using a photoionisation detector (PID). Soil sub-samples were placed in ziplock plastic bags and the headspace measured for VOCs after allowing 5 minutes for equilibration. *Groundwater:* Field parameters were measured during well sampling.	Acceptable
Calibration of field equipment Calibration certificates from the equipment supplier were provided. Field records were provided for checking the response of the PID.	Acceptable
Sampling logs Soil logs are provided within the report, indicating sample depth, PID readings and lithology. Groundwater field sampling records were provided, indicating standing water level (SWL), field parameters, methodology and observations.	Acceptable

Table 6.3: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor's Opinion**
Field quality control samples Field quality control samples including trip blanks, trip spikes, rinsate blanks, field intra-laboratory and inter-laboratory duplicates were undertaken.	Acceptable
Field quality control results The results of field quality control samples were generally within appropriate limits. The following exceptions were noted: • RPDs for the intra-laboratory soil duplicate samples for metals (52-152%), TRH (62-169%) and PAHs (67-113%) exceeded desirable limits. • RPDs for the inter-laboratory soil duplicate samples for metals (53-148%), TRH (82-109%) and PAHs (57-82%) exceeded desirable limits. • TRH fractions were reported in a rinsate blank during the ESA soil sampling. JBS&G attributed the elevated RPDs to soil heterogeneity.	The elevated RPDs were typically in samples with low contaminant concentration. Overall, in the context of the dataset reported, the elevated RPD results are not considered significant and the field quality control results are acceptable.
NATA registered laboratory and NATA endorsed methods	Acceptable

Table 6.3: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor's Opinion**
Laboratories used included: Eurofins | mgt (primary) and Envirolab (secondary). Laboratory certificates were NATA stamped, however asbestos quantification was not NATA accredited.	
Analytical methods Analytical methods were included in the laboratory test certificates. Asbestos identification was conducted by Envirolab using polarised light microscopy with dispersion staining by method AS4964-2004 *Method for the Qualitative Identification of Asbestos Bulk Samples*.	The analytical methods are considered acceptable for the purposes of the site audit, noting that the AS4964-2004 is currently the only available method in Australia for analysing asbestos. DOH (2009) and enHealth (2005) state that *"until an alternative analytical technique is developed and validated the AS4964-2004 is recommended for use"*.
Holding times Review of the COCs and laboratory certificates indicate that the holding times were generally met. JBS&G reported that analysis was outside the holding time by one day for vinyl chloride, styrene and 2-chloroethyl vinyl ether.	Acceptable given that these were not identified as contaminants of concern.
Practical Quantitation Limits (PQLs) *Soil:* PQLs (except asbestos) were less than the threshold criteria for the contaminants of concern. *Asbestos:* The limit of detection for asbestos in soil was 0.001% w/w, however this is not a NATA accredited method. *Groundwater:* PQLs were less than the threshold criteria.	*Soil (except asbestos):* Overall the soil PQLs are acceptable. *Asbestos:* In the absence of any other validated analytical method, the detection limit for asbestos is acceptable. A detection of asbestos fibres should be considered as part of a weight of evidence approach to assess the significance, accounting for the history of the site and frequency of the occurrence. *Groundwater*: Acceptable
Laboratory quality control samples Laboratory quality control samples including laboratory control samples, matrix spikes, surrogate spikes, blanks, internal standards and duplicates were undertaken by the laboratory.	Acceptable
Laboratory quality control results The results of laboratory quality control samples were generally within appropriate limits, with the following exceptions: • Surrogate recoveries for PAHs were significantly elevated during analysis of soil samples during the ESA. • Relative percentage differences (RPDs) for TRH analysis	In the context of the dataset reported, the exceedances are not considered significant and the laboratory quality control results are acceptable.

Table 6.3: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor's Opinion**
in two laboratory duplicates were marginally outside of the control limits. • Elevated RPDs were reported for arsenic and cadmium in two separate laboratory duplicate samples.	
Data Quality Indicators (DQI) and Data Evaluation (completeness, comparability, representativeness, precision, accuracy) Predetermined DQIs were set for laboratory analyses including blanks, replicates, duplicates, laboratory control samples, matrix spikes, surrogate spikes and internal standards. These were discussed with regard to the five category areas. JBS&G conclude that *"the soil and groundwater data are of an acceptable quality upon which to draw conclusions regarding the environmental condition of the Study Area"*.	An assessment of the data quality with respect to the five category areas has been undertaken by the auditor and is summarised below.

In considering the data as a whole the Auditor concludes that:

- Asbestos data is unlikely to be representative of conditions where samples were collected over fill and natural material. Data for other contaminants of concern is likely to be representative of site conditions.
- The data is largely complete. Some areas were not investigated or were investigated at a low density. These can be addressed by further investigation proposed in the RAP or during remediation of the site.
- There is a high degree of confidence that data is comparable for each sampling and analytical event, with the same consultant, field procedures and analytical laboratories utilised.
- The primary laboratory provided sufficient information to conclude that data is of sufficient precision.
- The data is likely to be accurate.

7. ENVIRONMENTAL QUALITY CRITERIA

The Auditor has assessed the results against Tier 1 criteria from National Environmental Protection Council (NEPC) *National Environmental Protection (Assessment of Site Contamination) Measure 1999*, as Amended 2013 (NEPM, 2013). Other guidance has been adopted where NEPM (2013) is not applicable or criteria are not provided. Based on the proposed development (stadium and surrounding landscaped areas and car parking), the criteria for 'public open space' were typically referred to.

The Auditor has assessed the **soil** data provided with reference to Tier 1 (screening) criteria from the following:

- Human Health Assessment
  - Health Based Investigation Levels (HIL C)
  - Soil Health Screening Levels (HSL D) for Vapour Intrusion. The criteria adopted assumed depth to source <1 m and sand.
  - CRC CARE (2011) Direct Contact (HSL C and intrusive maintenance worker)
- Terrestrial Ecological Assessment
  - Ecological Screening Levels (ESL Urban Residential) assuming coarse soil.
  - Ecological Investigation Levels (EIL Urban Residential). Site specific EILs have been derived assuming the contamination is "aged", no lead background concentrations, high traffic volume, old suburb, 10% clay content and using site specific pH (8.4) and cation exchange capacity (CEC) values (average of 7.4 $_c$molc/kg).
- Management Limits (ML Residential/Open Space) assuming coarse soil.
- Aesthetics
  - The Auditor has considered the need for remediation based on the 'aesthetic' contamination as outlined in the NEPM (2013).

The Auditor has assessed the **groundwater** data provided with reference to Tier 1 (screening) criteria from the following:

- Human Health Assessment
  - NEPM (2013) Groundwater Health Screening Levels (HSL D) for vapour intrusion (clay, 4 to <8 m)
  - NHMRC and NRMMC (2011) *Australian Drinking Water Guidelines* (ADWG) for potable use, or where HSLs are not applicable
  - With respect to screening criteria for recreational use, the NEPM (2013) refers to the National Health and Medical Research Council (NHMRC) (2008) 'Guidelines for Managing Risks in Recreational Water'. The guidelines indicate that a qualitative assessment of recreational use can be undertaken using 10 times the concentrations of chemicals stipulated in the Australian Drinking Water Guidelines (ADWG) (NHMRC, 2011). This is based on an assumed contribution for swimming equivalent to 10% of drinking water consumption.
- Ecological Assessment
  - Groundwater Investigation Levels (GILs) listed in NEPM (2013) for protection of aquatic ecosystems referenced in ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. The GILs are concentrations that, if exceeded, indicate a potential environmental problem at the point of use and 'trigger' further investigation. The

freshwater 95% level of protection was adopted. Some have been modified based on bioaccumulation or acute-toxicity or potential toxicity to particular species.

Criteria for **asbestos** are provided in the NEPM (2013). Criteria considered by the Auditor are for recreational use and are summarised as follows:

- Less than 0.02% asbestos as ACM
- Less than 0.001% asbestos as asbestos fines (AF) or fibrous asbestos (FA)
- No visible asbestos on the surface

The environmental quality criteria referenced by the Auditor are consistent with those adopted by JBS&G and Senversa, with the exception of the following:

- JBS&G adjusted groundwater criteria from ANZECC (2000) using an average hardness value of groundwater. This was not adopted by the Auditor given that the criteria are protective of the receptor (Parramatta River), not groundwater.

Given the results obtained, the Auditor considers that these discrepancies do not affect the overall conclusions reached by JBS&G and the Auditor.

8. EVALUATION OF SOIL ANALYTICAL RESULTS

Sampling and analysis was undertaken from approximately 187 locations across the site (Attachments 4 and 5, Appendix A). The investigations resulted in approximately 253 samples of fill material and 34 samples of natural material being analysed for a variety of contaminants. Samples collected by WSP have not been considered as it is not known if they represent fill material or natural material.

Asbestos quantification was undertaken at 139 investigation locations. Asbestos results are summarised in Table 8.1, with observations and detections shown on Attachments 4 and 5 in Appendix A.

Table 8.1: Evaluation of Asbestos Results

Sample	Location	Depth (m)	Fill/Natural	Asbestos Observed?	ACM (% w/w)	FA & AF (% w/w)
B8	East of Stadium	-	-	Yes	-	-
BH8	North of Stadium	3.6-3.7	Fill	Yes	-	-
BH8	North of Stadium	5.2-5.4	Fill	Yes	-	-
BH8	North of Stadium	5.9-6	Fill	Yes	-	-
BH9	North of Stadium	2.95-3	Fill	Yes	-	-
BH10	North of Stadium	4.4-4.5	Fill	Yes	-	-
BH101	Training Field	1.9-2	Fill	Yes	-	-
BH201	Training Field	1.3, 1.9	Fill	Yes	-	-
BH203	Training Field	2.4	Fill	Yes	-	-
BH204	Training Field	1.3, 2.2, 2.4	Fill	Yes	-	-
BH205	Training Field	1.4, 2.2, 2.5	Fill	Yes	-	-
BH207	Training Field	1.3	Fill	Yes	-	-
BH209	Training Field	1.4	Fill	Yes	-	-
BH210	Training Field	1-1.5	Fill	Yes	-	-
BH211	Training Field	1.0-2.2	Fill	Yes	-	-
BH212	Training Field	0.5-0.95, 2.5	Fill	Yes	-	-
BH213	Training Field	0.3-0.5	Fill	Yes	-	-
TP01	Southern Terrace	0.3-0.5	Fill	No	Detection <PQL	<PQL
TP03	Southern Terrace	0.3-0.5	Fill	No	Detection <PQL	<PQL
TP07	Southern Terrace	1.3-1.5	Fill	No	<PQL	Detection <PQL
TP08	Southern Terrace	0.3-0.5	Fill	No	Detection <PQL	<PQL

Table 8.1: Evaluation of Asbestos Results

Sample	Location	Depth (m)	Fill/Natural	Asbestos Observed?	ACM (% w/w)	FA & AF (% w/w)
CTP02	North of Stadium	0.2-0.3	Fill	No	<PQL	Detection <PQL
CTP04	North of Stadium	0.2-0.3	Fill	No	<PQL	Detection <PQL
CTP05	North of Stadium	0.4-0.5	Fill	No	<PQL	**0.225**
TP11	Southern Terrace	0.2-0.3	Fill	No	<PQL	Detection <PQL
TP13	Southern Terrace	0.9-1	Fill	No	<PQL	Detection <PQL
TP03-S	Southern Terrace	0.3-0.4	-	-	<PQL	Detection <PQL
TP02-W	West of Stadium	0.2-0.3	Fill	No	Detection <PQL	**0.0044**
TP03-W	West of Stadium	0.6-0.7	Fill	No	<PQL	Detection <PQL
BH12	North of Stadium	1-2	Across fill and natural	No	<PQL	**0.0022**
BH13	North of Stadium	0-1	Across fill and natural	No	<PQL	0.0001
BH14	North of Stadium	1-2	Across fill and natural	No	<PQL	**0.007**
BH17	East of Stadium	0-1	Across fill and natural	No	<PQL	0.0007
BH37	Southern Terrace	1-2	Across fill and natural	No	<PQL	0.0001
BH44	NE Car Park	0-1	Across fill and natural	No	<PQL	0.0008
BH47	East of Stadium	1-2	Natural	No	<PQL	0.0003
MW03	NE Car Park	0.2-0.3	-	-	<PQL	**0.0041**
BH38	NE Fill Mound	0-0.4	Fill	No	<PQL	0.0008
BH39	NE Fill Mound	0-0.8	Fill	Yes	0.009	-
BH42	NE Fill Mound	0-0.4	Fill	Yes	**0.43**	<PQL
BH47	West of Site	0.05-1	Fill	Yes	**0.55**	**0.342**
SHA02	Northern Terrace	0-1	Fill	No	0.0021	**0.0018**
SHA07	Eastern Grandstand	1-1.7	Fill	No	<PQL	0.0004
HA07	South of PSC	Surface	Fill	Yes	<PQL	<PQL

Bold Exceeds HSL
\- Information not available
ACM Asbestos Containing Material

AF	Asbestos Fines
FA	Fibrous Asbestos

Asbestos was identified in fill material at 42 investigation locations from the northern terrace and southern terrace of the stadium, the eastern grandstand, the southern training field, the western building area, the northern fill area, to the northeast of the stadium, the north-eastern fill mound and at one location in the south of the PSC.

Concentrations of ACM exceeded the HSL (0.02% w/w) in two samples, with observations in an additional eighteen samples of fill material. Concentrations of AF and FA exceeded the HSL (0.001% w/w) in seven samples, with concentrations less than the HSL in an additional fourteen samples. It is noted that six samples collected by JBS&G (2016a) were from fill and natural material over a 1 m interval. The asbestos concentrations in these samples may be diluted by natural material and should be assumed to contain concentrations exceeding the HSL.

Asbestos was typically identified as fragments of ACM, weathered ACM <7 mm and fibre bundles.

The Auditor assessed the laboratory analytical results for other contaminants and notes the following:

- Metals concentrations were typically less than the adopted human health criteria. One exception was a sample of natural clay underlying the mound of fill material in the northeast of the site that contained a copper concentration of 21,000 mg/kg, exceeding the HIL of 17,000 mg/kg (BH39 at 0.8-0.9 mbgl). The sample was collected from natural material at the interface with overlying fill material containing concrete and metal wire.
- Metals concentrations were typically less than the ecological criteria. A limited number of samples contained concentrations of nickel (12 samples), copper (2 samples) and zinc (3 samples) exceeded the ecological criteria. The nickel exceedances and one copper exceedance were typically in samples of bitumen and roadbase from locations around the stadium.
- TRH detections were typically low and in the $>C_{16}$ fractions. Five samples had a TRH $>C_{16}$-C_{34} concentrations exceeding the ecological criteria (300 mg/kg), including: a duplicate of a fill sample collected to the east of the stadium (BH20 0-0.1); two from around the water slides in the PSC (HA01 0-0.1 and HA07 0.9-1.0) and two from the fill mound in the northeast of the site (BH37 0.3-0.4 and BH39 0.8-0.9). The TRH $>C_{10}$-C_{16} concentration in HA07 (1,800 mg/kg) exceeded the management limit (1,000 mg/kg), however no detections exceeded the human health criteria.
- Benzo(a)pyrene toxicity equivalent quotient (TEQ) concentrations exceeded the human health criteria (3 mg/kg) in two samples from a borehole (BH39) in the fill mound in the northeast of the site. The samples were from a depth of 0.4-0.5 mbgl (fill) and 0.8-0.9 mbgl (natural). The concentrations were 3.1 mg/kg and 5.1 mg/kg, respectively, and therefore were less than 250% of the criteria. Concentrations of naphthalene and total PAHs were less than the human health criteria.
- Benzo(a)pyrene concentrations exceeded the ecological criteria (0.7 mg/kg) in one sample from the southern terrace (BH2_2.8-2.3), one sample in the southeast of the site (BH20 0-0.1) and three samples from the fill mound in the northeast of the site (BH39 0.4-0.5 and 0.8-0.9 and BH44 0-0.1).
- Low ethylbenzene and xylene concentrations were detected in surface fill material at two locations in the south of the PSC (BH3_0.0-0.1 and BH7_0.0-0.1) and one in the west of the PSC (BH30_0.0-0.1). Detections were less than the adopted criteria. Benzene and toluene were not detected.
- Low concentrations of dieldrin (0.36 mg/kg and 0.19 mg/kg) and endosulfan (0.07 mg/kg) were detected in surface sample from the PSC. The concentrations were less than the

adopted criteria (10 mg/kg and 340 mg/kg, respectively). Other OCPs were less than the detection limit.

- Concentrations of PCBs, phenols, OPPs and herbicides were less than the detection limit.

8.1 Auditor's Opinion

In the Auditor's opinion, the results indicate that fill materials typically contain asbestos as bonded ACM and friable ACM and fibres. Concentrations exceeding the human health criteria were reported in samples from the north, northeast, south and west of the site, as well as in the northern and southern terraces of the stadium. Fill material will require management during demolition of the existing stadium and redevelopment of the site.

Other contaminants were typically less than the human health criteria. Further investigation or management with respect to chemicals contaminants is not currently required, however some data gaps were noted (Section 10). Further investigation is to be undertaken to address these data gaps.

9. EVALUATION OF GROUNDWATER ANALYTICAL RESULTS

JBS&G (2016a) installed groundwater monitoring wells MW01-MW04a, GW01 and GW02 around the perimeter of the stadium (Attachments 4 and 5, Appendix A) and collected samples for analysis in June and October 2016. The analytical results are summarised below in Table 9.1.

Table 9.1: Summary of Groundwater Investigation Analytical Results (µg/L)

Analyte	n > HSL	n > ADWG	n > ANZECC	MW01	MW02	MW03	MW04a	GW01	GW02
TRH C_6-C_{10} less BTEX (F1)	6,000	-	-	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
TRH >C_{10}-C_{16} less naphthalene (F2)	NL	-	-	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
TRH >C_{16}-C_{34}	-	-	-	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
TRH >C_{34}-C_{40}	-	-	-	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Benzene	5,000	1	950	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Toluene	NL	800	180	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Ethylbenzene	NL	300	50	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Total Xylenes	NL	600	75	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Naphthalene	NL	-	16	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Arsenic	-	10	24	4	5	<PQL	<PQL	<PQL	<PQL
Cadmium	-	2	0.06	0.1	0.2	0.2	<PQL	<PQL	<PQL
Chromium	-	50	3.3	<PQL	3	<PQL	<PQL	<PQL	<PQL
Copper	-	2,000	1.4	<PQL	**23**	**2**	<PQL	1	1
Lead	-	10	3.4	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Mercury	-	1	0.06	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Nickel	-	20	8	**10**	**13**	**11**	8	4	4
Zinc	-	-	8	**17**	**130**	**49**	**31**	**12**	**12**
Ammonia	-	-	900	140	470	150	30	130	<PQL
Nitrate	-	50,000	-	1,700	8,300	2,200	NA	2,600	1,600

n number of samples
\- No criteria available/used
NA Not analysed

In assessing the analytical results, the Auditor makes the following observations:

- Hydrocarbon concentrations were less than the detection limit. Well placement was adequate to assess widespread contamination from onsite or offsite sources. Wells were not placed within or downgradient of the groundskeeper's buildings in the west of the site, which was identified as a potential source of hydrocarbons. Soil samples did not contain elevated hydrocarbon concentrations and no signs of potential contamination such as surface staining or elevated PID readings were noted. There is therefore considered to be a low potential for significant groundwater contamination to be present in this area. Inspection during and

following demolition of infrastructure should be undertaken to confirm an absence of potential sources of groundwater contamination.

- Concentrations of copper, nickel and zinc exceeded the ecological criteria. The results are considered to be indicative of regional groundwater quality typical of an urban environment. In addition, onsite sources of metals contamination to groundwater were not identified during the site inspection or soil investigation. Other metals were less than the adopted criteria.

9.1 Auditor's Opinion

In the Auditor's opinion, the groundwater monitoring undertaken was adequate to assess the potential for significant groundwater contamination at the site. Further investigation or management of groundwater is not considered to be required based on the results. Any unexpected finds with the potential to impact groundwater would require further investigation.

10. EVALUATION OF CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of the source, pathway and receptor linkages at a site. JBS&G (2016a) developed a CSM based on a desktop review of historical information and investigation of soil and groundwater conditions. The CSM was updated by JBS&G (2016b) following the additional investigation. The RAP (Senversa, 2017) provides a summary of the CSM.

Table 10.1 provides the Auditors review of the final CSM used by Senversa to inform the remedial strategy.

Table 10.1: Review of the Conceptual Site Model

Element of CSM	Consultant	Auditor Opinion
Contaminant source and mechanism	Fill material impacted with asbestos. Chemical contaminants were considered to present a low risk.	The sources of contamination and contaminants of concern have been identified and described.
Affected media	Fill material present in *"many areas extending to depths below current ground surface of between 0.1 to greater than 3 m"*.	The potentially affected media have been identified and were investigated.
Receptor identification	Receptors with a moderate to high risk of a complete pathway linkage were considered to be current and future site users, workers carrying out demolition and construction works, and adjacent sensitive receptors.	The human and ecological receptors have been identified.
Exposure pathways	The exposure pathways with a moderate to high risk of being complete were considered to be inhalation of contaminated dust and transport of contamination through windblown emissions and mechanical transport. Pathways with low risk were dermal contact, incidental ingestion and transport of contamination to underlying groundwater.	Potential and complete exposure pathways have been identified.
Presence of preferential pathways for contaminant movement	Not discussed by Senversa. JBS&G (2016b) identified underground services infrastructure and areas of fill material as potential preferential pathways.	These are not considered to apply to asbestos contaminated fill material.
Evaluation of data gaps	Not discussed by JBS&G. Senversa (2017) identified the	Senversa have identified the data gaps and suggested investigation of Lot 957 be

Table 10.1: Review of the Conceptual Site Model		
Element of CSM	**Consultant**	**Auditor Opinion**
	following data gaps: • Lot 957 in the northwest of the site had not been assessed. • The vertical extent of fill material was not delineated in some areas. • Uncertainty with the extent of asbestos in fill material as a result of previous investigations utilising boreholes. • Potential for additional areas of fill material. • Leachable concentrations of contaminants in Remediation Area B.	undertaken, which is to be detailed in a SAQP. The other data gaps are to be managed during remediation of the site.

11. EVALUATION OF REMEDIATION

Based on the investigations completed by JBS&G, Senversa considered that remediation of the site is required to address asbestos contaminated fill material present within large areas of the site. The asbestos is present as fragments of ACM, AF and FA.

Senversa (2017) report that the volume of impacted fill material requiring remediation was estimated by Lendlease to be 25,000 m^3. The remediation area for asbestos contaminated fill material is shown as 'Remediation Area A' in Attachment 6 in Appendix A. The extent shown is considered to be the minimum potential lateral extent of asbestos contaminated fill material given the limitations of the borehole investigation undertaken by JBS&G. The extent, and therefore volume, of fill material requiring remediation may be greater than that estimated by Senversa and Lendlease.

Areas where zinc and benzo(a)pyrene TEQ concentrations exceeded the human health criteria and TRH concentrations exceeded the management limits are shown as 'Remediation Area B' in Attachment 6 in Appendix A. The north-eastern area coincides with asbestos contamination.

The Auditor has assessed the RAP by comparison with the checklist included in OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*. The RAP was found to address the required information, as detailed in Table 11.1, below.

Table 11.1: Evaluation of Remedial Action Plan

Remedial Action Plan	Auditor Comments
Remedial Goal The RAP gives the remedial objectives as follows: • *"Develop and implement strategy to ensure the Site is suitable for the use as a recreational sports facility.* • *Mitigate risks to human health during and following the remedial works.* • *Manage potential environmental impacts during and following the remedial works.* • *Validate the completed remedial works as satisfactorily allowing the WSS development.* • *Meeting regulatory requirements prescribed by relevant regulatory agencies to carry out the remedial works and for site use."*	In the Auditor's opinion, this goals are considered appropriate.
Discussion of the extent of remediation required The extent of remediation required is discussed in the RAP and shown on Attachment 6 in Appendix A. Senversa (2017) note that *"...the lateral extent of the Remediation Areas is considered an indicative minimum extent that may be subject to change based on conditions encountered during remediation and validation works"*. Additional investigation is required to address data gaps in Lot 957. The proposed works are to	The extent shown is considered to be the minimum potential lateral extent of asbestos contaminated fill material given the limitations of the borehole investigation undertaken by JBS&G. The extent, and therefore volume, of fill material requiring remediation may be greater than that estimated by Senversa and Lendlease.

Table 11.1: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
be documented in an Additional Investigation SAQP.	
Remedial Options Remedial options were considered and included onsite containment, offsite beneficial reuse and offsite disposal to a licensed landfill.	The Auditor considers that an appropriate range of options were considered.
Selected Preferred Option and Rationale The preferred option was onsite containment. The proposed containment approach is discussed below. The option was considered to be the most pragmatic, cost-effective and sustainable. The other options considered were not considered feasible given that asbestos cannot be destroyed or treated and disposal to landfill was considered to be expensive and not consistent with waste minimisation and sustainability goals.	The Auditor considers the preferred option to be appropriate.
Containment A Work Plan is to be prepared presenting the final development plans, the volume of fill material, the placement location for excavated fill material, revised remediation areas (if required) and inclusion of a validation SAQP. Asbestos impacted fill material is to be partially excavated and placed in areas that require filling to achieve design levels, with some fill likely to remain unexcavated. Consolidated and remaining fill material will be capped to provide physical separation between site users and impacted material. The capping layer will comprise a marker layer and a minimum of 0.5 m of clean material. Road paving and concrete building slabs will also comprise capping layers, with a minimum thickness of 0.5 m. A marker layer is not proposed beneath concrete slabs of buildings and other permanent structures. In the constructed playing surfaces the capping layer was to comprise the playing surface, the underlying subgrade, then an additional 0.5 m of clean fill and a marker layer. In landscaped areas, the capping layer will be a sufficient thickness that the root zone of trees is free from contamination.	The capping detail proposed is an acceptable concept, however details need to be provided in the Works Plan to ensure it is practical for future management.
Proposed Validation Testing	The VSAQP should be provided to the Auditor

Table 11.1: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
The RAP proposes that a validation sampling analysis quality plan (VSAQP) is prepared to detail the validation strategy. The RAP notes that the following validation will be required: • Excavations in Remediation Area A and Remediation Area B. • Material from Remediation Area B to ensure it is suitable for retention onsite. • Survey to demonstrate capping layer thickness (as well as fill extent to note in the management plan). • Imported material. Material requiring offsite disposal will require classification in accordance with the NSW EPA guidance. A material tracking register is to be prepared documenting excavated material, placed material, imported material and waste.	for review. It should also detail the additional investigation required in Lot 957 and sampling required of material from Remediation Area B. The Auditor notes that imported material must either be virgin excavated natural material (VENM), excavated natural material (ENM) or be classified under a Resource Recovery Exemption. The density of testing would need to be commensurate with the documentation provided and the consistency of the results.
Interim Site Management Plan (before remediation) Not included in the RAP and not proposed.	Interim site management is not considered to be required.
Unexpected Finds The RAP details a process for addressing unexpected finds, including ceasing work, characterising the contamination, and assessing the need for remediation.	Considered acceptable
Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and OH&S The RAP includes a site management plan discussing asbestos, OH&S, dust and odour. An asbestos management plan (AMP) is to be prepared for works involving asbestos impacted material, such as asbestos location/extent, risks, control measures, procedures, monitoring, responsibilities, emergency procedures and training requirements. A Health and Safety Plan (HASP) is to be prepared by the contractor / environmental consultant.	The site management plan is adequate for remedial planning. The AMP is to be provided to the Auditor for review.
Contingency Plan if Selected Remedial Strategy Fails	The capacity of the site to accommodate the anticipated volume of contaminated material has not been adequately detailed in the RAP.

Table 11.1: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
The contingency plan for an increase in the volume of contaminated material requiring remediation was *"The site has a number of areas requiring fill material that can be utilised for placement of additional contaminated material"*. If the volume of impacted material exceeds the capacity of the site, contingency options include over-excavation of placement locations or offsite disposal.	The volume of material requiring management on the site and the capacity of the site to accept the material is to be considered during the detailed design of the development and is to be documented in the Works Plan. The contingency plan to address this may require further consideration in the Works Plan.
Contingency Plans to Respond to site Incidents A number of scenarios area considered and corrective actions provided.	The Auditor notes that the corrective actions provided for the contingency scenarios are brief and may require further consideration in the event they occur.
Remediation Schedule and Hours of Operation The typical hours of operation would be Monday to Friday 7am to 6pm and Saturday 8am to 1pm. The proposed remediation start date and duration were not provided.	Acceptable
Licence and Approvals The RAP notes that the remedial works will be covered by the existing development application (DA) or detailed design DA. Notification to SafeWork NSW will be required prior to commencement of works.	The RAP should detail licences to be held by the Contractor (i.e. friable asbestos license from SafeWork NSW) and other requirements for the disposal of asbestos and contaminated waste. An appropriately licensed landfill should be selected and the material tracked from the Site to the landfill.
Contacts/Community Relations The RAP includes contact for Lendlease, Senversa and Ramboll. Contact details for the site superintendent and remediation contractor are to be confirmed. A sign displaying contact details of the contractor will be displayed. A complaints register will be maintained. Direct community consultation is not proposed.	Acceptable.
Staged Progress Reporting Not proposed	Acceptable
Long term site management plan A long-term Environment Management Plan (LTEMP) is proposed to document the site condition following remediation of the site, including the extent of placed and residual	The LTEMP is to be provided to the Auditor for review. It is not stated who will be responsible for implementation of the LTEMP. It is not clear if Venues NSW and/or Parramatta Park Trust

Table 11.1: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
asbestos contaminated fill material, capping layers, marker layers and the site boundary. It is to document the limitations on the site use, environmental and health and safety processes and procedures, management processes, and responsibilities of future site users. The LTEMP is to be practical and legally enforceable.	have accepted responsibility for implementation of the LTEMP.

11.1 Auditor's Opinion

It is considered that the remediation approach recommended by Senversa is appropriate. In the Auditors' opinion, the proposed remediation works should ensure that the site is suitable for the proposed land uses through appropriate long-term management beneath a capping layer. Sufficient capacity for the contaminated material will be required, as well as adequate capping. A Works Plan and validation SAQP are required to provide additional detail on the remediation and validation of the site.

12. CONTAMINATION MIGRATION POTENTIAL

Fill material containing asbestos has been identified across the site.

Remediation of the site will involve management of contaminated fill material through onsite containment below structures or a 0.5 m thick capping layer. A LTEMP will be prepared to manage fill material containing asbestos. The potential for off-site migration of asbestos in surface water or dust is considered low following redevelopment due to the proposed capping layer and structures.

Assessment of groundwater at the site did not identify significant groundwater contamination. The generally low contaminant concentrations detected in soil at the site have not adversely affected groundwater quality except possibly locally. As the highest concentrations in soil are to be removed as part of the remediation works, ongoing impacts are unlikely.

In the Auditor's opinion, there is no evidence of significant migration of contamination under current conditions. Remediation of the site as part of the proposed redevelopment should limit the potential for future migration of contamination if undertaken in accordance with the RAP.

13. ASSESSMENT OF RISK

The site history indicates that there have been no major polluting industries on the site and there does not appear to be any major sources in the near vicinity. Site investigations identified asbestos in fill material as fragments of ACM, FA and AF, which was used to build up the site during previous developments. Remediation of the site is required to make the site suitable for the proposed redevelopment. The proposed remediation is detailed in the RAP prepared by Senversa.

The auditor considers that there is a risk of undetected contamination or the contamination extent being greater than anticipated in the RAP. Further investigation is proposed in the RAP and the extent of contamination will become evident following removal of existing infrastructure. Any unexpected finds or additional contamination during remediation and redevelopment can be managed by the RAP, which includes an unexpected finds protocol.

14. COMPLIANCE WITH REGULATORY GUIDELINES AND DIRECTIONS

The Auditor has used guidelines currently approved by the EPA under section 105 of the NSW *Contaminated Land Management Act 1997*.

The investigation was generally conducted in accordance with SEPP 55 Planning Guidelines and reported in accordance with the OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*. The checklist included in that document has been referred to. The EPA's *Checklist for Site Auditors using the EPA Guidelines for the NSW Site Auditor Scheme 1998* (December 1999) has also been referred to.

Development consent to Application No. SSD 7534 requires site auditor approval of remedial action plans submitted for future development applications. This SAR and accompanying SAS have been completed in order to comply with the condition.

15. CONCLUSIONS AND RECOMMENDATIONS

Senversa (2017) prepared a conceptual working plan to remediated impacted fill material at the site. They considered that *"…the impacted portion of the Site identified within previous site investigations could be rendered suitable for the WSS development"*.

Based on the information presented in the reports listed in Section 1 of the SAR, and with reference to the NSW EPA (2011) *Guidelines for Consultants Reporting on Contaminated Sites*, the site can be made suitable for the proposed use if remediated in accordance with the following remedial action plan:

- 'Remedial Action Plan, Western Sydney Stadium Redevelopment', dated 2 February 2017, Senversa.

The Remedial Action Plan includes the following undertakings:

1. A Sampling and Analysis Quality Plan detailing the additional investigation works is to be prepared and provided to the Auditor for review.
2. A Works Plan and validation Sampling and Analysis Quality Plan detailing the remediation and validation is to be prepared and provided to the Auditor for review prior to remediation commencing.
3. An asbestos management plan is to be prepared and provided to the Auditor for review prior to remediation commencing.
4. A Long Term Environmental Management Plan is to be prepared for the ongoing management of the site following remediation and development.

It is recommended that a Section A Site Audit Statement and accompanying Site Audit Report is prepared at the completion of remediation and validation certifying suitability for the proposed use.

16. OTHER RELEVANT INFORMATION

This Audit was conducted on the behalf of Lendlease for the purpose of assessing the suitability and appropriateness of a remedial action plan (RAP) i.e. a "Site Audit" as defined in Section 4 (definition of a 'site audit' (b)(iii)).

This summary report may not be suitable for other uses. JBS&G and Senversa included limitations in their reports. The Audit must also be subject to those limitations. The Auditor has prepared this document in good faith, but is unable to provide certification outside of areas over which the Auditor had some control or is reasonably able to check.

The Auditor has relied on the documents referenced in Section 1 of the Site Audit Report in preparing the Auditors' opinion. If the Auditor is unable to rely on any of those documents, the conclusions of the audit could change.

It is not possible in a Site Audit Report to present all data which could be of interest to all readers of this report. Readers are referred to the referenced reports for further data. Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

APPENDIX A
ATTACHMENTS

senversa

Address: Level 14, 309 Kent Street, Sydney NSW 2000
Phone: (02) 9994 8016
Fax: (03) 9606 0074
Website: www.senversa.com.au

Legend

Site Boundary

Designed:	I. Batterley	Date:	11/01/2017
Drawn:	M. Byrne	Revision:	0
Checked:	.	Scale:	1:100,000(A3)
File:	S12338_02_F001_Site Location		

0 1,000 2,000 4,000 6,000 8,000 Metres

Datum GDA 1994, Projection MGA Zone 56

Figure No: 1

Title: Site Location

Project: Western Sydney Stadium Redevelopment

Location: Western Sydney, NSW

Client: Lend Lease Building Pty Ltd

Attachment 1: Site Locality Plan

senversa

Address: Level 14, 309 Kent Street, Sydney NSW 2000
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Fax: (03) 9606 0074
Website: www.senversa.com.au

Legend

Site Boundary

Lot Boundary

Lot Number

Notes:
Aerial imagery sourced from Nearmap Pty Ltd

Designed:	I. Batterley	Date:	2/02/2017
Drawn:	M. Byrne	Revision:	0
Checked:	.	Scale:	1:2,501 (A3)
File:	S12338_02_F002_Site Boundary		

0 20 40 80 120 160 Metres

Datum GDA 1994, Projection MGA Zone 56

Figure No: 2

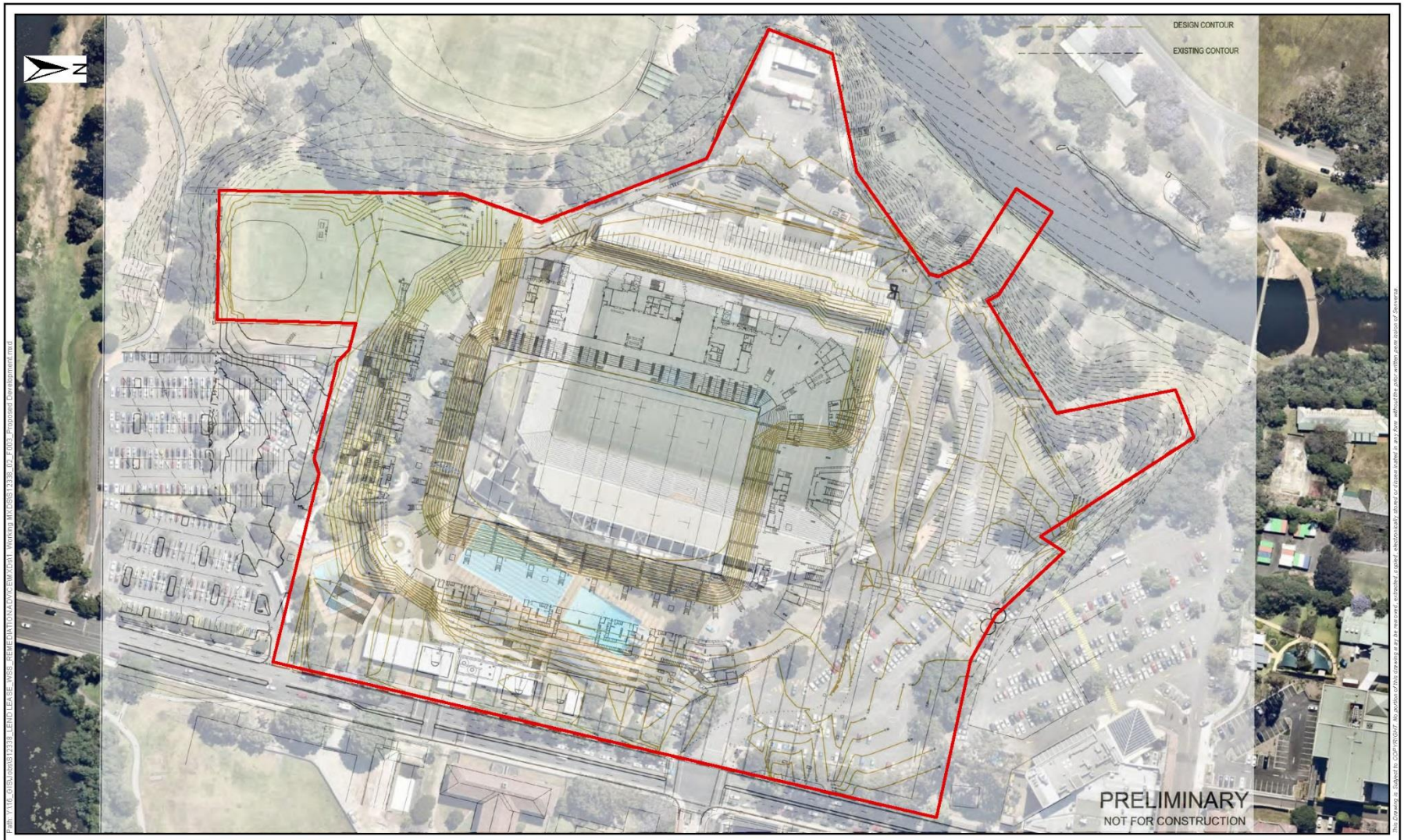
Title: Site Boundary

Project: Western Sydney Stadium Redevelopment

Location: Western Sydney, NSW

Client: Lend Lease Building Pty Ltd

Attachment 2: Site Layout



senversa

Address: Level 14, 309 Kent Street, Sydney NSW 2000
Phone: (02) 9994 8016
Fax: (03) 9606 0074
Website: www.senversa.com.au

Legend

Site Boundary

Notes:
Aerial imagery sourced from Nearmap Pty Ltd

Designed:	I. Batterley	Date:	2/02/2017
Drawn:	M. Byrne	Revision:	0
Checked:	.	Scale:	1:1,650 (A3)
File:	S12338_02_F003_Proposed Development		

0 15 30 60 90 120 Metres

Datum GDA 1994, Projection MGA Zone 56

Figure No: 3

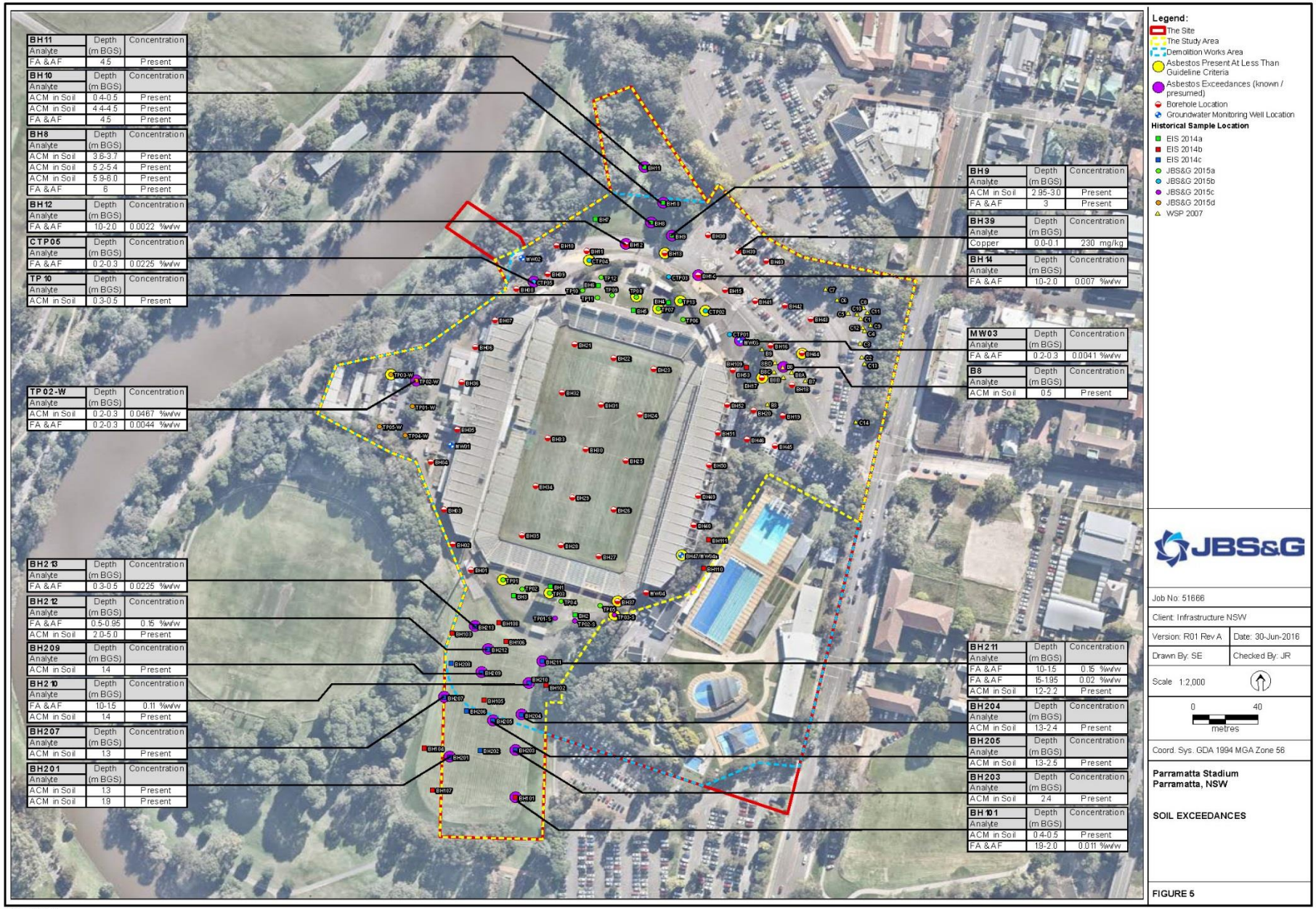
Title: **Proposed Development**

Project: Western Sydney Stadium Redevelopment

Location: Western Sydney, NSW

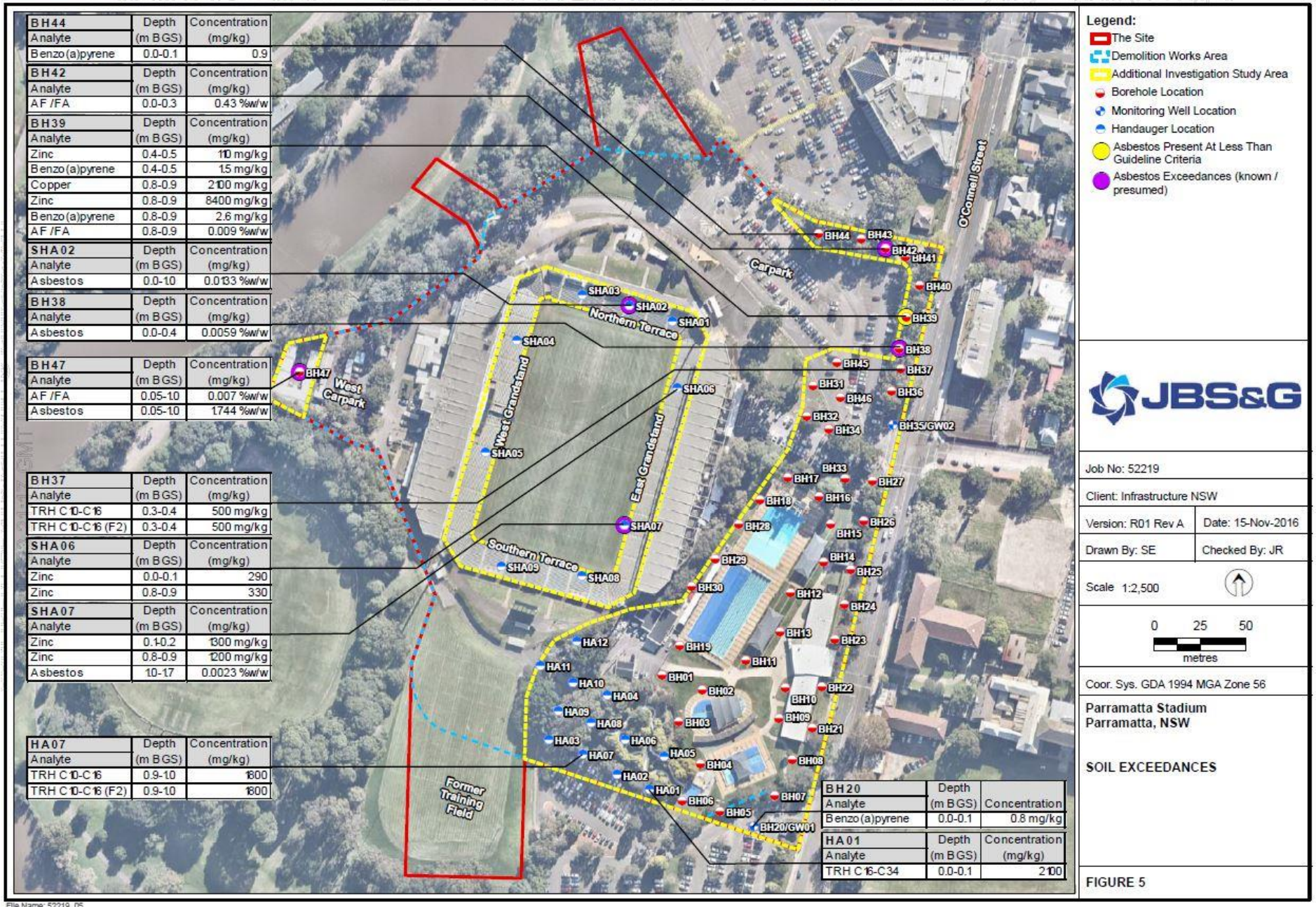
Client: Lend Lease Building Pty Ltd

Attachment 3: Proposed Development Layout



File Name: 51666_05
Reference: Near Map www.nearmap.com, imagery date 06-05-2016

Attachment 4: Investigation Locations (1 of 2)



Attachment 5: Investigation Locations (2 of 2)

senversa

Address: Level 14, 309 Kent Street, Sydney NSW 2000
Phone: (02) 9954 8096
Fax: (03) 9936 0174
Website: www.senversa.com.au

Legend

- Site Boundary
- Additional Investigation Area
- Remediation Area A Asbestos in Soil Remediation Extent
- Remediation Area B Chemical CoPC Remediation Extent

Notes:
Aerial imagery sourced from Nearmap Pty Ltd

Designed:	I. Bethenay	Date:	2/02/2017
Drawn:	M. Byrne	Revision:	0
Checked:	.	Scale:	1:2,000 (A3)
File:	S12338_02_F005_Areas Requiring Remediation		

0 15 30 60 90 120 Metres

Datum GDA 1994, Projection MGA Zone 56

Figure No: 5

Title: Areas Requiring Remediation

Project: Western Sydney Stadium Redevelopment
Location: Western Sydney, NSW
Client: Lend Lease Building Pty Ltd

Attachment 6: Remediation Areas

APPENDIX B
EPA GUIDELINES

Guidelines made or approved by the EPA under section 105 of the *Contaminated Land Management Act 1997*

(as of: 13 October 2015)

Section 105 of the *Contaminated Land Management Act 1997* (CLM Act) allows the Environment Protection Authority (EPA) to make or approve guidelines for purposes connected with the objects of the Act. These guidelines must be taken into consideration by the EPA whenever they are relevant and by accredited site auditors when conducting a site audit. They are also used by contaminated land consultants in undertaking investigation, remediation, validation and reporting on contaminated sites.

A current list of guidelines made or approved by the EPA under the CLM Act appears below. To obtain hard copies of the guidelines, contact Environment Line on 131 555.

Guidelines made by the EPA

- Guidelines for the Vertical Mixing of Soil on Former Broad-acre Agricultural Land (2003028VerticalMixGuidelines.pdf, 148KB) (January 1995)
- Sampling Design Guidelines (9559sampgdlne.pdf, 2MB) (September 1995)
- Guidelines for Assessing Banana Plantation Sites (bananaplantsite.pdf; 586KB) (October 1997)
- Guidelines for Consultants Reporting on Contaminated Sites (20110650consultantsglines.pdf; 428KB) (reprinted August 2011)
- Guidelines for Assessing Former Orchards and Market Gardens (orchardgdlne.pdf; 172KB) (June 2005)
- Guidelines for the NSW Site Auditor Scheme, 2nd edition (auditorglines06121.pdf; 510KB) (April 2006)
- Guidelines for the Assessment and Management of Groundwater Contamination (groundwaterguidelines07144.pdf; 604KB) (March 2007)
- Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (150164-report-land-contamination-guidelines.pdf; 412KB) (September 2015)

Note: All references in the EPA's contaminated sites guidelines to:

- the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, November 1992) are replaced as of 6 September 2001 by references to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, October 2000)
- the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 1999) are replaced as of 16 May 2013 by references to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013)

subject to the same terms.

Guidelines approved by the EPA

ANZECC publications

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality, published by ANZECC and the Agriculture and Resource Management Council of Australia and New Zealand, Paper No. 4 (October 2000)

EnHealth publications (formerly National Environmental Health Forum monographs)

- Composite Sampling, Lock, W. H., National Environmental Health Forum Monographs, Soil Series No.3, 1996, SA Health Commission, Adelaide
- Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia (2012)

National Environment Protection Council publications

- National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013)

The NEPM consists of a policy framework for the assessment of site contamination, Schedule A (Recommended General Process for the Assessment of Site Contamination) and Schedule B (Guidelines).

Schedule B guidelines include:

Guideline on Investigation Levels for Soil and Groundwater
Guideline on Site Characterisation
Guideline on Laboratory Analysis of Potentially Contaminated Soils
Guideline on Site-specific Health Risk Assessment Methodology
Guideline on Ecological Risk Assessment
Guideline on Methodology to Derive Ecological Investigation Levels in Contaminated Soils
Guideline on Ecological Investigation Levels for Arsenic, Chromium(III), Copper, DDT, Lead, Naphthalene, Nickel and Zinc
Guideline on the Framework for Risk-based Assessment of Groundwater Contamination
Guideline on Derivation of Health-based Investigation Levels
Guideline on Community Engagement and Risk Communication
Guideline on Competencies and Acceptance of Environmental Auditors and Related Professionals

More details on the amended NEPM and the transitional arrangements for its implementation

Other documents

- Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes, NSW Agriculture and CMPS&F Environmental (February 1996)
- Australian Drinking Water Guidelines, NHMRC and Natural Resource Management Ministerial Council of Australia and New Zealand (2011)
- Further guidance webpage