Randwick City Council

Asbestos in Soil Remedial Action Plan

Jack Vanny Reserve
Marine Parade, Maroubra, NSW

24 July 2018
54640/116190 (Rev C)
JBS&G

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1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Randwick City Council (RCC, the Client) to prepare a Remedial Action Plan (RAP) to manage identified ground surface and subsurface asbestos impacted soils at the Jack Vanny Reserve located at Marine Parade, Maroubra, NSW (the site).

Figure 1 presents the site location and **Figure 2** presents the site layout.

The site is currently utilised as public open space and is proposed to continue as this land use into the future.

Previous investigations of the site, as discussed in **Section 3**, were completed at the site in response to a NSW Environmental Protection Authority (NSW EPA) issued Clean-Up Notice (#1559630) relating to the occurrence of asbestos containing materials (ACM) to ground surfaces within a specific area in the northern portion of the site (refer to **Figure 2**). Following receipt of this clean-up notice, intrusive subsurface investigations were completed by JBS&G to assess the extent and condition of ACM contamination within soils, initially within this specific area, and then subsequently across the broader site area.

Friable and non-friable asbestos hazards were identified in varying concentrations within the specific area covered by the NSW EPA Clean Up Notice and across the broader site area.

1.2 Objectives

The objectives of this RAP are to document:

- The procedures and standards to be followed in order to address the friable and non-friable asbestos contamination identified at the site;
- The requirements to ensure the protection of human health and the surrounding environment; and
- The procedures to ensure contamination is remediated / managed in such a manner as to make the site suitable for the proposed ongoing use as public open space.

2. Site Condition & Surrounding Environments

2.1 Site Identification

The site is identified as the Jack Vanny Reserve and is located to the east front of Marine Parade, Maroubra NSW. The site details are summarised in **Table 2.1** and described in more detail in the following sections. The location of the site is shown on **Figures 1 and 2**.

Table 2.1 Summary Site Details

Lot/DP	Lot 1 Section 3 DP758649
Address	Marine Pde, Maroubra NSW
Local Government Authority	Randwick City Council
Site Zoning	Open Space / Recreational
Current Use	Jack Vanny Reserve, open space / recreational / car parking
Proposed Use	Ongoing open space / recreational / car parking
Geographical Co-ordinates	E339470, N6248820
Area of the site	Approximately 4 hectares

2.2 Site Description

The site is observed to extend across the area of headland to the east of Marine Parade, north of Maroubra Beach. The site is characterised as being substantially longer in a south-west to north-east direction (approximately 600 m) and of variable extent in a north-west to south-east direction, being as great as 130 at the northern portion of the site.

Site features are restricted to a car park in the central portion of the site, pathways through other areas of the site, concrete paved and brick construction amenities area to the mid-eastern boundary and general level / grassed areas elsewhere. The south-eastern, north-eastern and northern boundaries of the site are characterised as being rock shelfs with no soils present. A steep and substantial drop to the Pacific Ocean is present at these boundaries to the site. Some more densely vegetated areas of the site are present at the north-eastern portion of the site and in the central portion of the site.

2.3 Surrounding Land-use

The surrounding land-uses of the site are detailed below.

- North-East and South-East – rock shelves and Pacific Ocean.
- North-West –Low density residential properties, consisting a range of low density and medium density detached / semi-detached dwellings are present on the opposite side of Marine Parade; and
- South-West – Maroubra Beach is present further south-west of the site, along the coastline.

2.4 Topography

By comparison of the site level to the adjoining ocean, it is estimated that the site is present between 10 and 20 m AHD.

2.5 Geology and Soil

Soils on the site have been observed to generally consist of a shallow depth of sands overlying a sandstone bedrock. The sandstone can be observed to outcrop in several areas of the site, particularly in proximity of the eastern boundary with the Ocean. The majority of the site is observed to have further sand based fill material placed over the assumed naturally occurring sands.

Review of eSPADE[1] indicated that the site soils are constituted of the Newport soil landscape which comprises interbedded laminite, shale and quartz to lithic quartz sandstone, typically overlying Hawkesbury Sandstone.

Previous investigations (summarised in **Section 3**) have confirmed a disturbed terrain (fill material) over the site area with depth of fill materials varying between 0.2 m and up to 3.0 m below ground surface (bgs). Areas of deeper fill materials were observed to be predominantly located to the western extent of the site toward Marine Parade.

2.6 Acid Sulfate Soils

Review of eSPADE[2] indicated that there are no known suspected occurrences of acid sulfate soils expected to be present at the site.

2.7 Meteorology

A review of average climatic data for the nearest Bureau of Meteorology monitoring location (Sydney Airport) indicates the site is located within the following meteorological setting:

- Average minimum temperatures vary from 7.2 in July to 19.1 in February;
- Average maximum temperatures vary from 17.0 in July to 26.5 in January;
- The average annual rainfall is approximately 1083.7 mm with rainfall greater than 1 mm occurring on an average of 95.9 days per year; and

Monthly rainfall varies from 60.3 mm in September to 122.5 mm in June with the wettest periods occurring on average in March and June.

[1] http://www.environment.nsw.gov.au/eSpade2WebApp#. Department of Environment and Heritage, NSW Government. Accessed 22/02/2018.
[2] http://www.environment.nsw.gov.au/eSpadeWeB(a)Pp/. Department of Environment and Heritage, NSW Government. Accessed 22/02/2018.

3. Previous Site Investigations

Previous intrusive asbestos investigations completed at the site that have been reviewed as part of the preparation of the RAP are as follows:

- *Detailed Asbestos Assessment – Jack Vanny Reserve, Marine Parade, Maroubra NSW*. JBS&G Australia Pty Ltd, March 2018 (JBS&G 2018a)
- *Human Health Risk Assessment for Asbestos Impacted Soils – Jack Vanny Reserve, Marine Parade, Maroubra, NSW.* JBS&G Australia Pty Ltd, April 2018 (JBS&G 2018b)

The following sections present a summary of relevant information included in each of the above reports.

3.1 Detailed Asbestos Assessment (JBS&G 2018a)

JBS&G 2018a was initially requested in response to the NSW EPA issued Clean Up Notice and was completed within the specified area to the northern portion of the site (refer to **Figure 2**).

A summary of the relevant works and findings of JBS&G 2018a are as follows:

- The investigation area was approximately 3,200 m^2.
- The investigation area was observed to be densely vegetated with dune shrubs and some sensitive flora species.
- A total of 22 test pits were installed across the investigation area on an approximate 12 x 12 m grid. Test pits were installed via mechanical or hand excavation to the depth of fill materials which was observed to range between 0.2 and 3.0 m below ground surface (bgs).
- Representative samples were collected from surface soils (0-0.1 m bgs), near surface soils (0.2-0.3 m bgs) and then at half metre intervals for any lower levels of fill materials observed.
- Friable and/or non-friable asbestos hazards were reported to be present in 19 out of the 22 installed test pit locations at various depths below ground surface and in varying quantities and types.
- It was concluded that all fill materials within the investigation area were potentially impacted by friable and/or non-friable asbestos hazards

3.2 Human Health Risk Assessment for Asbestos Impacted Soils (JBS&G 2018b)

JBS&G 2018b was a human health risk assessment (HHRA) to determine whether levels of asbestos present in soils on the Jack Vanny Reserve site posed a potential human health risk as per an ongoing recreational / open space use of the site and to further determine if levels posed a potential health risk to potentially sensitive receptors in proximity of the site.

A summary of the relevant works and findings of JBS&G 2018b are as follows:

- The investigation area was approximately 4 hectares (40,000 m^2).
- The investigation area was observed to be a publicly accessible park/open space, with grassed areas, concrete paved footpaths, scattered vegetation and rocky outcrops, a large asphalt carpark area and a public amenities block all contained within the investigation area.
- A total of 81 test pits were installed in accessible ground surfaces across the site area on an approximate 20 m x 20 m grid. Test pits were installed via mechanical or hand excavation to the depth of fill materials which was observed to range between 0.2 and 3.0 m below ground surface (bgs).

- An asbestos quantification was completed for each metre depth of soil at each test pit location in accordance with Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, 2009, Western Australian Department of Health (WA DoH, 2009) and endorsed in the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) (NEPC 2013).
- Representative samples were collected from each asbestos quantified zone (i.e. one per metre depth bgs).
- Friable and/or non-friable asbestos hazards were observed or reported to be present in submitted representative samples in 39 out of the 81 installed test pit locations at various depths below ground surface and in varying concentrations and types.
- It was concluded in JBS&G 2018b that levels of asbestos identified within the investigation area did not pose an unacceptable health risk to current / future site users as consistent with a recreational land use, nor nearby residential occupants in proximity of the site.
- It was recommended that a site asbestos register be prepared to detail the locations and depths of asbestos within soil as identified during JBS&G 2018b and JBS&G 2018a and in accordance with current Work Health and Safety Regulation (2017) requirements.
- An additional recommendation was made to remove all visible ground surface occurrences of ACM.

4. Summary Site History

A summary site history relating to the Jack Vanny Reserve is presented below. This is based on limited available historical information obtained to date.

Table 4.1: Jack Vanny Reserve, Lot 1 in DP 758649, History Summary

Period	Activity	Source
1943	Public Space – accessible cliff tops and rocky outcrops	NSW Government Aerial Imagery Spatial Services[3]
2000	Public Space – accessible open space/parklands	NSW Government Aerial Imagery Spatial Services
Present	Public Space – accessible open space/parklands	NSW Government Aerial Imagery Spatial Services

[3] http://maps.six.nsw.gov.au/ Department of Finance, NSW Government, accessed 11 June 2018

5. Contamination Status

5.1 Summary of Known Asbestos Contamination

Contamination of land is defined by the CLM Act[4] as "the presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment."

Based on the previously completed investigations at the site, friable asbestos and or asbestos fines (FA/AF) and non-friable asbestos contamination of fill materials is present across the site area above and below NEPC 2013 health screening levels (HSL) for the current land use as open space (HSL-C) as per the criteria detailed below in **Table 5.1.**

Table 5.1: Recreational (HSL-C) Health Screening Levels for Asbestos Contamination in Soil

Form of Asbestos	Health Screening Level – Open Space/Recreational (HSL-C)
Bonded (non-friable) ACM (>7 mm fraction)	0.02 % w/w
FA and AF (friable asbestos)	0.001 % w/w
All forms of asbestos (non-friable and friable)	No visible asbestos for surface soils / ground surfaces

Consideration to the concentration of asbestos contamination and the accessibility of contaminated soils (i.e. ground surface contamination, depth of contamination below ground surface) has been given in the development of this RAP.

Locations of identified asbestos contaminated soils based on the reported findings of previously completed asbestos investigations at the site (**Section 3**) are shown in **Figure 4** and **Figure 5** and detailed below in **Table 5.2**.

Table 5.2: Known Asbestos Contamination Summary

Contamination Type	Locations
Friable asbestos contaminated fill materials 0-1.0 m bgs and above HSL-C	B4, C4, C5, C6, C20, D5, D6, D7, E5, E6 and E7
Friable asbestos contaminated fill materials 1.0-2.0 m bgs and above HSL-C	B7, C9 and D5
Non-friable asbestos contaminated fill materials 0-1.0 m bgs and above HSL-C	A5, B7, B27, C3, C7, C9, C10, C18, D3, D4, D9, D21 and E4
Non-friable asbestos contaminated fill materials 1.0m bgs and-deeper and above HSL-C	A28, A29, B27, C5, C7 and C10

[4] *Contaminated Land Management Act 1997* (CLM Act).

6. Remediation Options

Remedial options are based on the known identified asbestos contamination and their extent at the site based on investigations to date. The proposed remedial options are based on the site's ongoing land use as public open space and the accessibility of identified asbestos contamination.

For the purposes of this RAP, remediation is proposed to be undertaken of soils where FA/AF has been identified at levels that exceed the adopted HSL in soils (0.001% w/w) between 0 and 1.0 m depth bgs. Remediation shall be undertaken to a depth of 0.5 m bgs only, as capping of residual asbestos impacted fill materials shall then subsequently be completed with a marker layer and imported clean materials.

Remediation shall also be completed of soils where non-friable ACM has been identified at levels that exceed the adopted HSL in soils (0.02% w/w) between 0 and 1.0 m depth bgs. Remediation shall be undertaken to a depth of 0.5 m bgs, with additional asbestos quantification works to be completed to confirm non-friable ACM levels in remediated soils are below the adopted HSL.

Occurrences of visible asbestos contamination to ground surfaces across the site area shall also be remediated as required.

The site would be subject of ongoing management under an appropriate Asbestos Management Plan.

6.1 Extent of Asbestos Impacted Fill Remediation

FA/AF and/or non-friable asbestos was detected above the adopted criteria (HSL-C) in fill materials between 0 and 1.0 m depth bgs at the locations shown in **Figure 4** and summarised in **Table 5.2**. Each location is representative of a 20 m x 20 m area surrounding the sample location.

Ground surface occurrences of visible asbestos are extensive. A detailed surface inspection is proposed to be completed across the entire site area as part of this RAP and the requirements of the existing site Asbestos Management Plan (AMP, JBS&G 2018c[5]).

The extent of areas of known FA/AF and non-friable asbestos impacted fill between 0 and 1.0 m bgs reported above the adopted HSL criteria is shown on **Figure 4.**

The extent of areas of known FA/AF and non-friable asbestos impacted fill from 1.0 m bgs and deeper reported above the adopted HSL criteria is shown on **Figure 5.**

The vertical extent of remediation is proposed to extend to a depth of 0.5 m bgs as detailed in **Section 7.3.3**, with consideration to localised conditions within each remediation area, i.e. areas where there is less 0.5 m depth of fill materials shall be remediated to the depth of natural materials or bedrock, whichever is shallower.

6.2 Remediation Objectives

The remediation objectives are outlined as follows:

- Removal of accessible unacceptable risks to human health and the environment from the identified asbestos contaminated fill at the site, such that the site is suitable for the proposed ongoing land use as open space/parklands with respect to the identified asbestos contamination;

[5] *Asbestos Management Plan – Jack Vanny Reserve, Marine Parade, Maroubra, NSW*. JBS&G Australia Pty Ltd, June 2018 (JBS&G 2018c)

- Validate the remedial works in accordance with the relevant NSW EPA Guidelines and with reference to the adopted site criteria, or, install suitable control measures to manage future risks posed by residual asbestos contamination; and
- Document the validation and/or management process.

This RAP has been prepared with reference to the following guidelines and legislation:

- *Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land*; (DUAP 1998).
- *Contaminated Sites: Sampling Design Guidelines*, September 1995 (EPA 1995).
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, August 2011 (OEH 2011).
- *Contaminated Sites: Guidelines for NSW Site Auditor Scheme – 3rd Edition*, October 2017 (NSW EPA 2017).
- *National Environment Protection (Assessment of Site Contamination Measure) Measure 1999*, as amended 2013, National Environment Protection Council (NEPC 2013).
- *Work Health and Safety Act* 2011 (WHS Act).
- *Work Health and Safety Regulation* 2017 (WHS Reg.).
- *How to safely remove asbestos - Code of Practice*, Safe Work Australia, 2011 (SWA 2016a).
- *How to manage and control asbestos in the workplace - Code of Practice*, Safe Work Australia, 2011 (SWA 2016b).
- *Management of asbestos in the non-occupational environment*, enHealth Council, 2005 (enHealth 2005).
- *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia,* WA Department of Health, 2009 (WA DoH 2009).

6.3 Consideration of Possible Remediation Options

6.3.1 NSW EPA 2017 Guidance

The preferred hierarchy of options for remediation (clean up) and/or management adopted by NSW EPA has been established within the NEPC (2013) Assessment of Site Contamination Policy Framework as follows:

- On-site treatment of the soil so that the contaminant is either destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or

if the above options are not practicable:

- Consolidation and isolation of the soil on site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material; or

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

In addition, when deciding which option to choose, consideration is also required to be given to the sustainability (environmental, economic and social) aspects of each option to ensure an appropriate balance between the benefits and effects of undertaking remedial/management options.

In cases where no readily available or economically feasible method is available for remediation, it may be possible to adopt appropriate regulatory controls or develop other forms of remediation.

Consideration of each of the approaches (EPA 2017), is presented in **Section 6.4, Table 6.1**.

6.3.2 WA DoH 2009 Guidance

WA DoH 2009 provides specific guidance in the remediation and management of asbestos.

WA DoH 2009 note the following considerations as important when assessing the acceptability of any remediation:

- Minimisation of public risk;
- Minimisation of contaminated soil disturbance; and
- Minimisation of contaminated material/soil moved to landfill.

Consideration of each of the WA DOH 2009 guidance is presented in **Table 6.1**, taking into account the proposed ongoing use as publicly accessible open space/parklands.

6.4 Possible Remedial Options

Table 6.1: Remedial Options Matrix

Option of Treatment	Discussion	Conclusion
Option 1: On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level.	FA / AF are typically heterogeneously distributed throughout impacted soils and are not readily visible to the naked eye. On this basis, there is no option considered appropriate to remove asbestos fibres from impacted soils on site. Furthermore, attempted removal of FA / AF from impacted soil would results in increased disturbance of FA / AF impacted soils. This option is considered a feasible approach for areas where non-friable ACM impacts have been identified. Hand removal of visible ACM can be completed from soils, and a re-quantification of remaining soils completed to confirm the suitability of the materials to remain at the site within the 0 – 0.5 m bgs profile.	**The preferred option for areas of non-friable ACM impacted soils only**
Option 2: Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site.	Off site treatment of FA/AF and non-friable ACM impacted soils is not a viable option.	Not a suitable Option.
Option 3: Removal of contaminated soil to an approved site or facility, followed where necessary by replacement with clean fill.	There are currently suitably licensed waste facilities in the Sydney region capable of accepting asbestos contaminated soils. Offsite disposal of FA / AF impacted soils is likely the fastest method of remediation, but also involves significant disturbance of the FA / AF impacted materials and should be limited to accessible impacted soils (i.e. 0-0.5 m bgs) that have the potential to become disturbed over time via erosion or other factors that may alter the current site condition. This option generates the highest quantity of waste, since the materials are disposed to landfill rather than treated and reused (i.e. Options 1 & 2) or retained on site (Option 4). This option also generates additional truck movements and associated fuel/emissions.	**The preferred option in conjunction with Options 1 & 4**
Option 4: Consolidation and isolation of the soil on-site by containment within a properly designed barrier.	Given the extent of FA / AF impacted soils at the site, a remediation objective was to minimise disturbance of FA / AF impacted soils where possible, which is in accordance with guidance provided by WA DoH 2009. It is considered that extensive remediation, removal and disposal of FA / AF heavily impacted soils would cause a greater adverse effect than if the impacted soils remain in-situ where possible and are contained and managed in the long term. It is noted that containment of contaminated soil would require the potential exposure to contamination to be managed by the implementation of a Long Term Asbestos Management Plan (LTAMP). There must be acceptance by the ultimate custodian of the land that future controls will be implemented, and that a notation will be made on the Title of the land. Implementation of a LTAMP is considered feasible for the site given the depth of contamination in a number of areas and the option for capping of residual asbestos contamination considered to be feasible.	**The preferred option in conjunction with Options 3 & 1**

6.5 Preferred Remedial Strategy

A number of potential remedial options have been outlined in **Table 6.1**. The preferred remedial strategy for the site is:

- Excavation and off site disposal of heavily impacted areas to the northern portion of the site including the area subject to the Clean Up Notice, as indicated in **Figure 6,** specifically, occurrences of FA/AF and non-friable ACM contamination**,** within fill materials between 0 and 0.5 m bgs that have been identified as above health screening levels for open space/recreational use (HSL-C);
- Installation of a marker layer to excavation surfaces and reinstatement of any excavated areas with clean imported materials to encapsulate any residual asbestos impacted fill materials that exceed the health screening levels for open space/recreational land use (HSL-C);
- Hand remediation of visible ACM from areas of non-friable asbestos contamination only, as indicated in **Figure 6**, within fill materials between 0 and 0.5 m bgs that have been identified as above health screening levels for open space/recreational use (HSL-C) and have not reported any occurrence of FA/AF;
- Re-quantification of soils in areas of hand remediation to confirm concentrations of non-friable ACM are below health screening levels for open space/recreational use (HSL-C) and are suitable to be reinstated to the site in the 0 – 0.5m bgs profile;
- Re-vegetation of excavation areas with consistent vegetation prior to remediation works commencing;
- Removal and off site disposal of all ground surface asbestos contamination; and
- Implementation of a LTAMP for the site to manage asbestos hazards posed by any residual occurrences of asbestos contamination at the site.

The proposed remediation areas at the site are shown in **Figure 6**.

7. Remediation Plan

7.1 Approvals, licences and notifications

The proposed remediation works are considered Category 2 remediation works, based on the following assessment of clause 9 of SEPP 55:

- the work is not considered Designated Development.
- the work is not on land identified as critical habitat.
- the work is not likely to have a significant effect on threatened species, populations, ecological communities or their habitats.
- is carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:
    - coastal protection;
    - conservation or heritage conservation (it is noted that the existence of heritage listed structures is, or has previously been, present within the site area, however, based on information provided by the client, heritage listed items have already been addressed under separate approvals for demolition works);
    - habitat area, habitat protection area, habitat or wildlife corridor,
    - environment protection;
    - escarpment, escarpment protection or escarpment preservation;
    - floodway;
    - littoral rainforest;
    - nature reserve;
    - scenic area or scenic protection; and
    - wetland.
- is not carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated.

Category 2 remediation works require that notice is given to the Randwick City Council at least 30 days prior to the commencement of the works. A notice complying with the requirements of Clause 16(3) of SEPP 55 should be prepared. Notice of completion of remediation works must also be provided within 30 days after completion of the work, consistent with clauses 17(2 & 3) and 18.

Clause 21 of SEPP 55 notes SEPP 55 does not apply to remediation done for the purpose of complying with a clean-up notice may be completed without development consent.

An appropriately experienced and licensed Class A asbestos remediation Contractor (the remediation contractor) is required to undertake the works, under the supervision of an appropriately qualified and experienced Remediation Consultant. The remediation consultant shall also be a SafeWork NSW (or equivalent) Licensed Asbestos Assessor (LAA). The Class A licensed contractor must submit a site specific permit application to SafeWork NSW to undertake friable asbestos works at the site. This permit application must be made at least seven working days before any friable asbestos works are commenced.

Remediation works shall not commence until all required approvals, licences and notifications have been granted and/or received.

Furthermore, all required environmental and health and safety documentations must be completed prior to the commencement of remedial works including a Work Health and Safety Plan (WHSP), as detailed in **Section 11**.

7.2 Site Establishment

The boundaries of the identified remediation areas will be defined by the Remediation Consultant. The appointed remediation contractor shall secure these areas to ensure that all safety and environmental controls are implemented. These controls will include, but not be limited to:

- Locate and isolate all required utilities in the proximity of the works;
- Assess need for and implement any necessary traffic controls;
- Work area security fencing;
- Site signage and contact numbers;
- Stabilised site entry gate;
- Appropriate decontamination areas for personnel and plant;
- Sediment fencing (attached to security fencing) where necessary; and
- Stormwater runoff and sediment controls (e.g. silt fences and hay bales) where necessary.

7.3 Asbestos in Soil Remediation Plan

Fill materials at the site have been identified to contain friable and/or non-friable asbestos contamination. Given the potential for friable asbestos to be present in areas that it has not previously been identified, all asbestos remediation works shall be completed under friable asbestos removal conditions and in accordance with the following requirements.

The remediation areas at the site are shown in **Figure 6** and have been identified as:

- Heavily impacted areas (FA/AF and non-friable ACM impacted areas above HSL-C to the northern portion of the site between 0 and 1.0 m bgs);
- Less impacted areas (non-friable ACM impacted areas above HSL-C and no detections of FA/AF between 0 and 1.0 m bgs); and
- Ground surface impacted areas.

7.3.1 Preliminaries

The remediation contractor shall prepare all required documentation in accordance with their asbestos removal licence and the proposed friable asbestos remediation works, including, but not limited to:

- A Safe Work NSW permit to remove friable asbestos application (refer **Section 7.1**);
- An Asbestos Removal Control Plan (ARCP); and
- Safe Work Method Statements (SWMS).

The remediation consultant shall undertake airborne asbestos fibre monitoring during all asbestos removal works (refer to **Section 10.9.1**). Full time supervision by the remediation consultant is recommended to ensure that asbestos removal works are conducted appropriately and in accordance with this RAP.

The proposed asbestos remediation works cannot commence until the above preliminary requirements have been met.

7.3.2 Asbestos Remediation Area Establishment

The proposed asbestos remediation areas shall be established at the site with temporary fencing installed surrounding the asbestos removal zone. A summary of the requirements for the establishment of the asbestos remediation areas prior to asbestos removal works commencing is as follows:

- The asbestos remediation area/s shall be marked out by the remediation contractor in consultation with the remediation consultant. Temporary fencing, or other easily recognisable barriers may be used to demarcate the proposed asbestos removal area.
- The remediation contractor shall install asbestos warning signs to asbestos removal works boundaries for the duration of the asbestos removal works and until final validation and clearance has been provided by the remediation consultant.
- A decontamination area shall be established for site personnel to enter and exit any asbestos removal area.
- The remediation consultant shall install static asbestos air monitors at locations surrounding the all asbestos remediation works. Air monitoring shall be conducted for the duration of each shift and shall be completed in accordance with the National Occupational Health and Safety Commission's *Guidance Note on the Membrane Filter method for Estimating Airborne Asbestos Fibres – 2nd Edition* [NOHSC: 3003 (2005)] (refer **Section 11.9.1**).
- The remediation contractor shall be responsible for undertaking a pre-start 'toolbox' talk with all personnel involved. No unauthorised/non-inducted personnel may enter any asbestos removal area.
- The remediation contractor shall ensure that sufficient asbestos related personal protective equipment (PPE), in addition to normal site PPE requirements, is available for all personnel for the duration of the proposed asbestos remediation works including:
    - Disposable coveralls;
    - P3 half face respirator (or higher class);
    - Disposable gloves; and
    - Rubber footwear or disposable boot covers.

7.3.3 Heavily Impacted Areas Remediation Works

A summary of the requirements for the heavily impacted areas remediation works, as shown in **Figure 6**, is as follows:

- The Class A contractor shall have total control of the asbestos work area for the duration of the asbestos remediation works and shall undertake all works in accordance with the requirements of their Class A licence.
- All personnel entering the asbestos remediation area shall do so through the decontamination area/unit and don the required PPE at all times when within the asbestos removal area.
- The proposed asbestos remediation area shall be kept damp by water spraying at all times during disturbance to reduce the possibility of dust generation.

- Bulk excavation of the heavily asbestos impacted soils shall be undertaken via excavator to a depth of 0.5 m bgs.
- Excavated asbestos impacted soils shall be loaded directly into suitable transport vehicles for immediate off site disposal. Given the public and sensitive nature of the site, there is to be no storage or stockpiling of any contaminated materials at the site during the remedial program.
- Following the removal of asbestos impacted soils to a depth of 0.5 m bgs, the resultant excavation base is presumed to still be impacted by FA/AF and/or non-friable ACM. Validation sampling of resultant excavation surfaces is, therefore, not proposed to be undertaken. Consideration may be given to surveying the final excavation areas for future management of the site.
- Resultant excavation surfaces shall be encapsulated with a marker layer that shall consist of an easily identifiable non-woven permeable polyester continuous filament or PET (such as non-woven geotextiles) or similar with a minimum density of approximately 150 grams per square metre (or equivalent). The marker layer must:
    - Be easily recognisable within soils (e.g., bright orange in colour, or otherwise contrasting with the surrounding soil colour);
    - Be labelled with 'Danger – Asbestos' markings or similar to ensure any future person/s that encounter the marker layer can easily deduce the contamination that is encapsulated;
    - Be durable as a long term marker layer (i.e., > 150 grams per square metre); and
    - Maintain integrity during remedial/civil works such as capping layer installation.
- The remediation consultant shall inspect and document the installation of geofabric marker layers.
- The specific details of the marker layer are required to be included in the LTAMP documents (**Section 8.4.2**).
- Imported materials to site must be certified to comprise Virgin Excavated Natural Materials (VENM), Excavated Natural Materials (ENM) or any other suitable material granted an applicable EPA Exemption under the Protection of the Environment Operations (Waste) Regulation 2005. Imported materials will require validation by the remediation consultant prior to being imported to site (refer **Section 8.2.5**).
- In the event that imported material are observed to visually differ from previously approved imported materials, these must be removed from the site immediately and the event recorded on a 'rejected imported materials register' or similar.

7.4 Less Impacted Areas Remediation Works

A summary of the requirements for the less impacted areas remediation works, as shown in **Figure 6**, is as follows:

- The Class A contractor shall have total control of the asbestos work area for the duration of the asbestos remediation works and shall undertake all works in accordance with the requirements of their Class A licence.
- All personnel entering the asbestos remediation area shall do so through the decontamination area/unit and don the required PPE at all times when within the asbestos removal area.

- The proposed asbestos remediation area shall be kept damp by water spraying at all times during disturbance to reduce the possibility of dust generation.
- Soils to a depth of 0.5 m bgs shall be excavated and spread in a suitable manner to allow the Class A contractor to remove all visible ACM. All removed ACM shall be disposed of to a suitably licensed waste facility in accordance with NSW EPA waste classification guidelines (NSW EPA 2014).
- Once completed the remediation consultant shall undertake a visual assessment of the resultant soils and then undertake asbestos quantification works in accordance with WA DoH 2009, with a representative volume of soils inspected for the presence of visible ACM to determine their concentration in soils.
- Disturbed areas of soil shall be covered with a temporary geotextile cover until receipt of laboratory results and asbestos quantification data.
- Remediated soils shall be deemed suitable to remain at the site if the re-quantification works report ACM concentrations in soil as less than the adopted HSL-C threshold.
- If remediated soils are determined to be unsuitable to remain at the site within the ground surface to 0.5 m bgs profile, they shall be excavated and disposed off site and the requirements outlined in **Section 7.3** for heavily impacted areas shall apply.

7.5 Ground Surface Asbestos Removal Plan

The ground surface asbestos removal works shall be completed in accordance with the requirements outlined in the existing site AMP (JBS&G 2018c).

A summary of the requirements for the ground surface asbestos removal works, as is outlined in the site AMP, is as follows:

- A detailed inspection of all ground surfaces of the site by a Class A licensed contractor and a SafeWork NSW Licensed Asbestos Assessor (LAA).
- The Class A contractor shall submit a SafeWork NSW application to remove non-friable asbestos at least 5 business days prior to completing the detailed site ground surface inspection, unless it is proposed to be completed in conjunction with the remediation works outlined in **Section 7.3** and **Section 7.4.**
- Removal by hand of any occurrences of visible ACM or suspected ACM observed to the ground surface.
- All removed asbestos waste shall be placed into 200 µm thick ness plastic waste bags, labelled as ‘Asbestos Waste’. Waste bags shall not be filled past 50% of their volume and bags shall be sealed via ‘goose-neck’ tie and securing with duct tape, or similar
- During the detailed site ground surface inspection, any occurrences of ACM that is identified to be in quantities or conditions that are unable to be removed by hand (e.g. partially buried sheeting, friable asbestos materials), shall be either:
    - Excavated via more rigorous hand excavation (e.g. shovels); or
    - Removed as part of the site remediation works as detailed in **Section 7.3**
- All removed ACM and any associated soils shall be disposed of to a suitably licensed waste facility in accordance with NSW EPA waste classification guidelines (NSW EPA 2014). Waste dockets shall be provided by the Class A contractor to the LAA to form part of the ground surface clearance report.

The LAA shall complete a follow up ground surface inspection to confirm the absence of visible ACM to ground surfaces in the site area. Once satisfied, a ground surface clearance report shall be issued by the LAA.

8. Validation Plan

8.1 Overview

The effectiveness of the remedial works and installation of residual asbestos hazard control measures is required to be validated by the remediation consultant to confirm the final site condition as being suitable for the proposed ongoing use as publicly accessible open space / parklands.

The following sections establish the Data Quality Objectives (DQOs) to be adopted during validation of the site remediation works.

8.2 Data Quality Objectives

Data Quality Objectives (DQO's) have been developed for the site validation and are discussed in the following sections.

8.2.1 State the Problem

The site is proposed to continue use as publicly accessible open space/parklands. Previous investigations, as detailed in **Section 3**, have identified FA/AF and non-friable asbestos in fill materials at varying depths across the soil profile at the site.

8.2.2 Identify the Decision

The following decisions are required to be made during the validation works:

- Have identified accessible heavily asbestos impacted soils been successfully excavated from the proposed asbestos remediation areas?
- Have residual asbestos impacted soils been successfully encapsulated with appropriate marker layer in excavation areas prior to placement of imported materials in accordance with RAP requirements?
- Have identified less asbestos impacted areas been adequately remediated to remain on site in the surface to 0.5 m bgs profile?
- Have all occurrences of ground surface ACM been removed?
- Have waste materials been suitability classified and lawfully disposed?
- Have imported materials been suitably characterised prior their importation to site?
- Is a Long Term Environmental Management Plan required?
- Is the site suitable for the proposed future land use?

8.2.3 Identify Inputs to the Decision

The inputs to the decision are:

- Field observations, sampling and analytical data for off-site disposal of waste materials;
- Observation and photographic log of encapsulation works to excavation areas;
- Survey data for final excavation and capping areas (if completed);
- Field observations, sampling and analytical data of any unexpected finds;
- Documentation of appropriate classification of imported materials;
- Documentation of appropriate classification and disposal of exported waste materials; and

- Environmental monitoring data to demonstrate that potential airborne asbestos contamination as generated by the handling of asbestos impacted materials on the site has not impacted off-site locations.

8.2.4 Define the Study Boundary

The study boundaries of the site are defined as follows:

- Those areas of the site that have been identified as being impacted by FA/AF and/or non-friable asbestos that exceeds the adopted HSL-C criteria and is found between the ground surface and 1.0 m bgs, as shown in **Figure 4**; and
- The vertical extent of remediation works in FA/AF and non-friable asbestos impacted areas is defined as 0.5 m bgs.

8.2.5 Develop a Decision Rule

Analytical data will be initially assessed against EPA published / endorsed criteria for constituents of concern:

- NSW EPA (2017), Guidelines for the NSW Site Auditor Scheme 3rd Edition, October 2017;
- NEPC (2013), National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council, 1999; and
- NSW EPA (2014) Waste Classification Guidelines. Part 1: Classifying Waste, November 2014.

The decision rules adopted to answer the decisions identified in **Section 8.2.2** are discussed below.

Have identified accessible heavily asbestos impacted soils been successfully excavated from the proposed asbestos remediation areas?

The heavily asbestos impacted area to the north of the site must be excavated to a depth of 0.5 m bgs. The remediation consultant shall confirm that sufficient asbestos impacted materials have been removed from the identified remediation area. Residual asbestos impacted soils have been identified to exist in soils below this depth and, as such, require to be encapsulated with a marker layer and overlying imported materials.

Have residual asbestos impacted soils been successfully encapsulated with appropriate marker layer in excavation areas prior to placement of imported materials in accordance with RAP requirements?

The remediation consultant shall supervise the installation of marker layers to resultant excavation faces. Photographic logs shall be maintained for encapsulated remediation areas for inclusion in the LTAMP for the site. The remediation consultant shall confirm that the marker layer installation is satisfactory prior to the placement of overlying imported materials

Have identified less asbestos impacted areas been adequately remediated to remain on site in the surface to 0.5 m bgs profile?

The less asbestos impacted areas must be remediated to remove all evidence of visible ACM from soils between ground surface and 0.5 m bgs. The remediation consultant must undertake re-quantification of ACM in these areas. Remediated soils must return re-quantification results of ACM in soils at less than the adopted HSL-C threshold to be deemed suitable to remain at the site.

Have all occurrences of ground surface ACM been removed?

Visible ACM contamination to ground surfaces across the site must be removed. The remediation consultant shall undertake a clearance inspection to confirm the absence of visible ACM from all ground surfaces and shall issue a ground surface clearance report to confirm the absence of residual ground surface ACM.

Have waste materials been suitability classified and lawfully disposed?

All waste requiring off-site disposal must be suitably characterised and classified in accordance with *Waste Classification Guidelines* (NSW EPA 2014), and disposed to appropriately licensed waste disposal facilities. The Remediation Contractor will be required to provide all waste tracking and disposal documentation for wastes removed from the site, including individual tipping dockets.

Have imported materials been suitably characterised prior their importation to site?

All imported materials proposed to be imported to site must be characterised as VENM, ENM or any other suitable material granted an applicable NSW EPA Exemption under the Protection of the Environment Operations (Waste) Regulation 2005.

The remediation consultant must review all associated documentation for proposed imported materials, or where documentation is not available, undertake characterisation works to confirm the materials suitability for use prior to their importation to the site.

Where ENM is proposed and deemed suitable to be imported to the site, ongoing validation of the imported materials is required to be completed at the site by the supervising remediation consultant, including:

- Visual assessment of imported material characteristics to confirm they are consistent with previously approved materials; and
- Collection of representative samples at the rate of one sample per 100 m^3 of imported materials to be tested in accordance with NSW EPA requirements for assessing any materials as ENM.

Any materials deemed to be inconsistent with previous assessments will not be permitted to be used at the site and shall be returned to the source site immediately.

Is a Long Term Environmental Management Plan required?

A suitable Long Term Asbestos Management Plan (LTAMP) is required at the site due to the remaining asbestos hazards within inaccessible soils. The LTAMP will detail the management strategies required to ensure the residual asbestos contamination at the site does not pose a health risk to future site occupants and users, and outlines the control measures required to manage the residual asbestos hazards for the site ongoing use.

Is the site suitable for the proposed open space use?

The site will be considered suitable for the proposed use if the following conditions are met:

- Remediation and encapsulation works have been completed in accordance with this RAP;
- Ground surface asbestos removal works are completed successfully and a ground surface clearance report is issued by the remediation consultant acting as LAA;
- Waste materials have been suitably characterised and lawfully disposed;
- Imported materials have been suitable characterised and satisfactorily reinstated in excavation areas; and

- A suitable Long Term Asbestos Management Plan will be implemented at the site.

8.2.6 Specify Limits of Decision Error

A qualitative assessment shall be undertaken of potential decision errors associated with the data, in accordance with the provisions in NEPC 2013.

8.2.7 Optimise the Design for Obtaining Data

The validation sampling design for each specific type of validation works anticipated is discussed in detail in **Section 8.3**. The general sampling methodologies are discussed below.

8.2.7.1 Soil Sampling Methodology

Soil sampling will be conducted by the Remediation Consultant for waste classification and imported materials characterisation only. The soil sampling method shall be determined by the Remediation Consultant as consistent with the observations of subject materials appropriate to generate representative samples.

8.2.7.2 Soil Sample Containers

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination shall be noted on field reporting sheets / field logs.

Collected soil samples shall be immediately transferred to sample containers of appropriate composition (glass jars) fitted with Teflon sealed lids for chemical analysis.

Minimum 500 mL samples shall be collected and placed in new zip lock bags where asbestos analysis is required.

Sample labels shall record sample identification number and date and time of sampling. Sample containers shall be transferred to a chilled ice box for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form shall be completed and forwarded with the samples to the testing laboratory.

8.3 Validation Inspections

8.3.1 Excavation Area Inspection

Visual inspection will be undertaken by the Remediation Consultant to verify the removal of sufficient asbestos impacted soils from accessible areas (i.e. to a depth of 0.5 m bgs) and placement of overlying marker layer. Photographic records of the marker layer installation and details to the vertical and lateral extents of remediation, will be retained for inclusion in the LTAMP.

8.3.2 Capping Layer Validation

It is proposed that each excavation area will be overlayed with suitable imported material above the marker layer, to the required levels for the sites ongoing use. If survey measurements of the final excavation areas are to be completed, they shall be completed prior to, and post the placement of capping materials to assess the depth and extent of capping materials.

Photographic records of the capping layer installations and details regarding approximate lateral and vertical extents, will be retained for inclusion in the LTAMP.

8.3.3 Waste Disposal Off-site

All wastes requiring off-site disposal must be classified in accordance with *Waste Classification Guidelines* (NSW EPA 2014). The Contractor is responsible for the lawful disposal of the classified waste to a licensed waste disposal facility lawfully able to accept the waste.

Disposal dockets for each individual off-site waste disposal load must be provided to the Remediation Consultant by the remediation Contractor to demonstrate appropriate off-site disposal of waste occurred. The Contractor must advise the Consultant of the disposal facilities for all waste loads prior to removal.

8.4 Reporting

8.4.1 Ground Surface Asbestos Clearance Report

Following the completion of the ground surface asbestos removal program and successful clearance inspection, the inspecting LAA shall prepare a ground surface asbestos clearance report for the site. The clearance report shall detail:

- Details of the Class A contractor who completed the asbestos removal works;
- The date/s of asbestos removal works;
- Details of the inspecting LAA;
- The clearance inspection methodology;
- Results of the clearance inspection; and
- A statement pertaining to the site ground surface areas suitability, with reference to visible ACM, for ongoing occupation as a publicly accessible open space.

8.4.2 Remedial Works Summary Report

At the completion of the remedial works program, JBS&G shall prepare a remedial works summary report (RWSP).

The RWSP shall detail, but will not be limited to:

- The completed remedial works at the site, including depths of excavation;
- Class A contractor and LAA details;
- Details of off site disposal of asbestos impacted waste and total volumes;
- Waste disposal documentation;
- Details of imported material characterisations (e.g. VENM certificate, ENM assessment, etc) and total volumes;
- Details of completed air monitoring works;
- Details of final site condition;
- A statement discussing the sites suitability for the ongoing future land use with reference to the recently remediated asbestos hazards.

8.4.3 Long Term Asbestos Management Plan

The proposed remediation of accessible asbestos impacted soils only shall result in residual asbestos contamination remaining at the site. The residual asbestos hazards will require long term management for the ongoing operation of the site.

The LTAMP is required to document the following elements:

- A statement of the objectives of the LTAMP – i.e., to manage the residual asbestos hazards at the site and to ensure continued suitability of the site's land use following remediation.

- Identification of residual asbestos contamination issues at the site that require ongoing management/monitoring to meet the LTAMP objectives, including the type of contamination and location within the site (to be presented as an updated asbestos register).
- Documentation of asbestos management measures which have been implemented to address the identified asbestos issues at the site.
- Description of management controls to limit the exposure of site users to known areas of asbestos contamination to acceptable levels.
- Description of responsibilities for implementing various elements of the provisions contained in the LTAMP.
- Timeframes for implementing the various control/monitoring, etc. elements outlined in the LTAMP.
- Asbestos monitoring and reporting requirements (if required) for the future management of asbestos impact underlying the site including:
    - Appropriate monitoring locations relating to any residual contamination;
    - Relevant assessment criteria to be used in evaluating monitoring results;
    - Frequency of monitoring and reporting;
    - Process for reviewing monitoring data and how decisions will be made regarding the ongoing management strategy; and
    - The length of time for which monitoring is expected to continue.
- Health and safety requirements for particular activities;
- A program of review and audits;
- The provisions in the LTAMP are feasible (i.e., able to be implemented) and able to be legally enforceable (i.e., a mechanism exists, such as development consent conditions, to give the plan a basis in law);
- The relevant consent authority is satisfied that the inclusion of a development consent condition relating to the implementation of the LTAMP is acceptable; and
- Corrective action procedures to be implemented where LTAMP assessment criteria are breached.

9. Contingency Plan

A review of remediation works has been undertaken to identify potential risks to meeting the required site conditions following remediation and management of the identified asbestos hazards. A number of potential risks have been identified. These are listed following with contingencies that will be implemented to ensure that validation criteria are met.

Additionally, the associated remedial works health and environmental risks/hazards and their minimisation/mitigation are further discussed in **Sections 10** and **11**.

9.1 Unexpected Finds Protocol

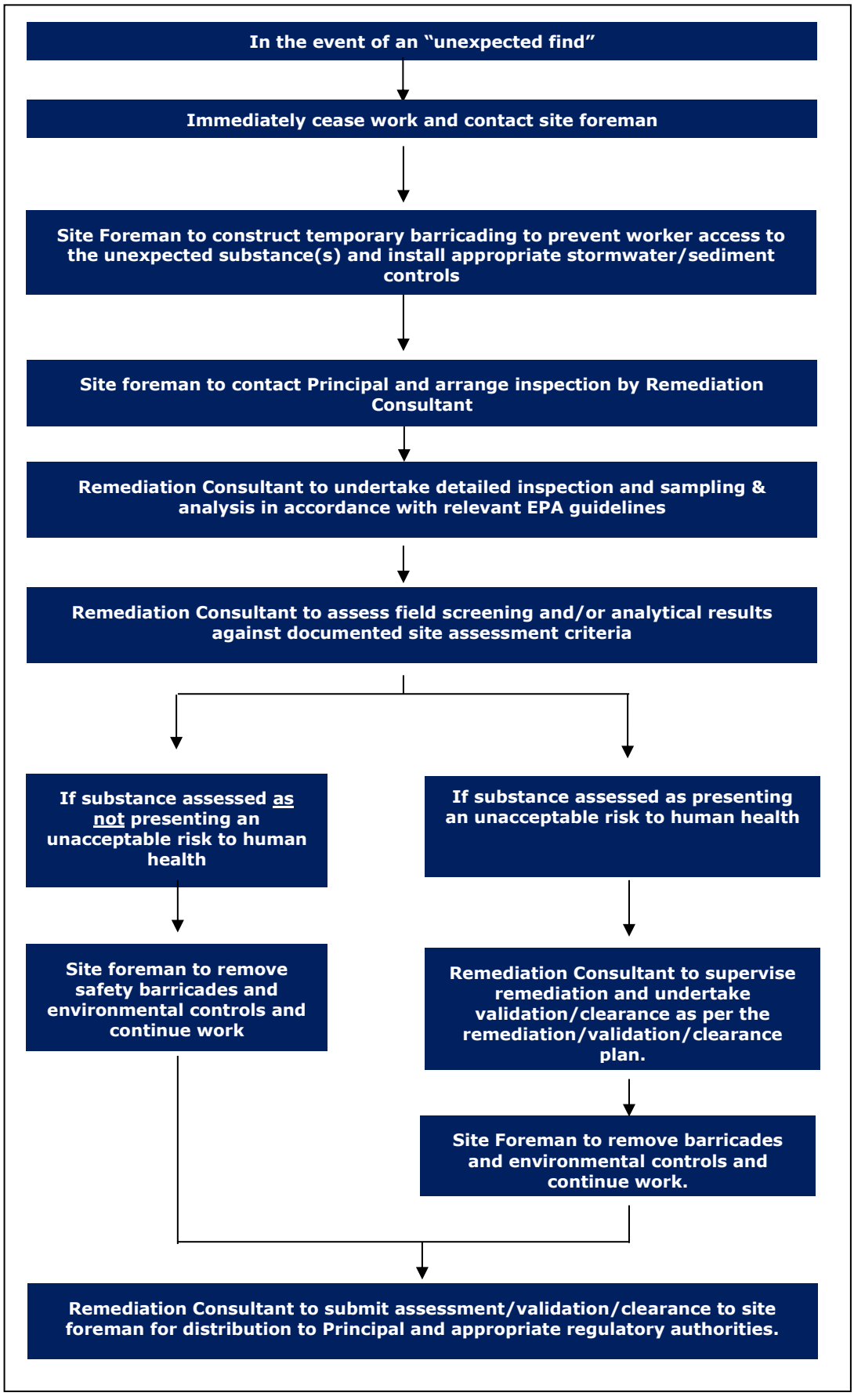
It is acknowledged that previous investigations of the site have been undertaken to assess the presence of asbestos hazards in soils at the site. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations during remediation. The nature of any residual hazards which may be present at the site are generally detectable through visual or olfactory means, for example (presented in **Appendix B** for use on-site):

- Large quantities of ACM fragments encountered in one location (visible) outside the extent of asbestos impacted fill materials that are known to exceed adopted HSL-C criteria;
- Friable asbestos such as lagging (visible) encountered outside of the extent of known asbestos impacted fill materials that are known to exceed adopted HSL-C criteria;
- Re-quantification works in remediated areas previously identified as less asbestos impacted, report ACM as above the adopted HSL-C threshold, or occurrences of FA/AF in any quantity;
- bottles / containers of chemicals (visible);
- construction / demolition waste (visible);
- ash and/or slag contaminated soils / fill materials (visible);
- petroleum contaminated soils (odorous, staining / discolouration visible) beyond the identified impact, or at levels that prevent off-site disposal without treatment; and
- volatile organic compound contaminated soils (odorous).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances be identified (or any other unexpected potentially hazardous substance), the procedure summarised in **Flowchart 10.1** is to be followed.

An enlarged version of the unexpected finds protocol, suitable for use on-site, should be posted in the Site Office and referred to during the site specific induction by the appointed Class A Contractor.

Flowchart 10.1 – Unexpected Finds Protocol



9.2 Contingency Scenarios

9.2.1 Remedial Strategy Constraints

In the event that the proposed remedial works are found not to appropriately remove the identified asbestos hazards from accessible soil locations, or if the selected remedial strategy is not able to proceed, the following actions will be considered to ensure, firstly, the safety and health of people and the environment and, secondly, that the overall project objectives are achieved:

- Reassessment of remedial options for FA/AF and non-friable asbestos contaminated soils; and
- Continued controlled excavation of potential impacted soils.

9.2.2 Containment of Asbestos Contaminated Soils

Given the known distribution of asbestos impacted and contaminated fill across the site, any observed or detected asbestos contaminated soils that are found to exceed the adopted HSL-C criteria in areas deemed accessible to future site users (i.e. between 0 and 0.5 m bgs) will constitute an unexpected find to be managed under the procedure detailed in **Section 9.1**. Additional asbestos remediation works may then be required to be completed in accordance with **Section 7.3.**

9.2.3 Material Storage Breach

In the event any stockpiled or capped materials escape (or have the potential to escape), then the management controls shall be rectified and investigations undertaken to review the adequacy of the controls and any improvements implemented. Given the current approach is to contain only asbestos-impacted material, which is immobile in the subsurface, a breach of containment is considered unlikely.

9.2.4 Complaints

Due to the nature of the public location of the site, the proposed remediation activities and type of contamination identified at the site, there is a potential for complaints to be received from members of the public relating to environmental emissions including:

- Dust emissions arising from asbestos contaminated soil excavation, material handling, transport, placement and capping; and
- Noise and vibration from excavation.

Monitoring of environmental emissions shall be undertaken as detailed in **Section 10.9** and appropriate actions taken to further control emissions following receipt of a complaint. Such additional controls may include the following actions:

- Disturbance of soils during meteorologically favourable periods only; and/or
- Increasing environmental controls including covering and/or wetting down soils which are generating dust.

9.2.5 Lack of Available Space

The proposed asbestos remedial works have the potential to be hindered by available temporary storage space for excavated materials.

In the event that temporary storage of excavated materials becomes difficult, works should cease until an appropriate management plan can be developed to appropriately manage and store excavated materials safely until such time as they can be appropriately disposed off site.

9.2.6 Severe Weather

Weather will be monitored on a daily basis via checking an internet based weather service provider. Should severe weather be forecast, especially strong winds, works will stop until safe to re-commence. All site management controls will be implemented to the extent practicable as outlined in **Section 10** prior to any severe weather events.

9.2.7 Odours from Works

Based on the nature of the identified contaminants, off-site odour complaints are considered unlikely. Where complaints occur, the following will be undertaken:

- Installation of an odour screening / masking system at the remediation area boundaries; and/or
- Disturbance of soils during meteorologically favourable periods only; and/or
- The use of odour suppressant additives to water used to keep impact soils/ stockpiles moist; and or
- Covering of impacted soils.

10. Site Management Plan

The site management plan is largely based on the Randwick City Council's *Contaminated Land Policy* and other relevant policies and guidelines. This section contains procedures and requirements that are to be implemented as a minimum requirement during the remedial works at the site.

10.1 Hours of Operation

Randwick City Council permits remediation works to be conducted at the following times:

- Monday to Friday: 7am to 6pm.;
- Saturday: 8am to 1pm; and
- Sunday and public holidays: No work permitted.

10.2 Soil and Water Management

A Soil and Water Management Plan (SWMP) shall be prepared and submitted to Randwick City Council for approval prior to remediation works commencing onsite. The SWMP shall be developed with regard to the requirements detailed in the Southern Sydney Regional Organisation of Councils brochure "Soil and Water Management for Urban Development".

Sediment control structures shall be provided to prevent sediment entering drainage systems or directly into the adjoining Pacific Ocean, particularly where surfaces are exposed or where soil is stockpiled.

All erosion and sediment control measures must be maintained in a functional condition throughout the remediation works.

10.3 Stockpile Management

All materials stockpiled onsite will be managed by the appointed remediation contractor. The following procedures will be implemented by the remediation contractor:

- No stockpiles of contaminated materials are permitted to be stored at the site at any stage during the remedial program;
- No stockpiles of soil or other materials shall be placed on footpaths or nature strips unless prior Council approval has been obtained;
- All stockpiles of soil or other materials shall be placed away from drainage lines gutters or stormwater pits or inlets; and
- All stockpiles of soil or other materials likely to generate dust or odours shall be covered (where practical).

10.4 Site Access

All vehicle access to the site shall be stabilised to prevent the tracking of sediment onto the roads and footpaths. All materials must be removed from the roadway on a daily or as required basis. Soil washings from wheels shall be collected and disposed of in a manner that does not pollute waters. Any personnel, equipment, plant or vehicles that enter an asbestos works zone must be appropriately decontaminated prior to exiting.

10.5 Excavation Pump-out

Any excavation pump out water shall be sampled by the consultant for analysis for total suspended solid concentrations, turbidity, pH and the identified contaminants of concern prior to

release to stormwater with permission from Council, sewer (only if trade waste permit obtained) or licensed liquid waste Contractor.

Excavation pump out from excavations is not anticipated with the general shallow nature of remediation works minimising ground disturbance and groundwater not anticipated to be encountered. Pump out following accumulation of surface water is the most likely scenario for water disposal.

10.6 Landscaping / Rehabilitation

All exposed soils shall be progressively stabilised and revegetated with vegetation consistent with those prior to remedial works, or resealed on the completion of remedial works.

10.7 Noise

Remediation work shall not give rise to 'offensive noise' as defined in the *Protection of the Environment Operations* (POEO) Act 1997. All equipment and machinery associated with the remediation work shall be operated by the Contractor in accordance with the POEO Act 1997 and its *Noise Control Regulations 2000*.

The remediation works shall comply with the NSW EPA's *Environmental Noise Control Manual* for the control of noise from construction sites which specifies that:

- For a cumulative period of up to 4 weeks, the noise level as measured by the LA10 (15 minute) emitted by the works to specific residences should not exceed the background noise level, LA 90 (15 minute), by more than 20dB(A);
- For a cumulative period of between 4 and 26 weeks, the noise level as measured by the LA10 (15 minute) emitted by the works to specific residences should not exceed the background noise level, LA 90 (15 minute), by more than 10dB(A); and
- For a cumulative period greater than 26 weeks, the noise level as measured by the LA10 (15 minute) emitted by the works to specific residences should not exceed the background noise level, LA 90 (15 minute), by more than 5dB(A).

All machinery and equipment used on site will be in good working order and with the fitted with appropriate silencers when necessary.

10.8 Vibration

The use of plant and machinery by the Contractor shall not cause vibrations to be felt or capable to be measured at any premises.

10.9 Air Quality

During remedial works, dust emissions and any odours will be confined within the site boundary. This will be assessed by a program of air monitoring undertaken by the remediation consultant for all remediation works and implemented by air emission controls as required by the remediation Contractor. Air monitoring requirements are summarised in this section. General procedures to be considered as a minimum by the remediation contractor to reduce levels of airborne dusts / fibres and odours are discussed in **Sections 10.9.1** and **10.9.2.**

10.9.1 Airborne Asbestos Fibre Monitoring

Airborne asbestos fibre monitoring will be conducted by the remediation consultant that is also a SafeWork NSW (or equivalent) Licensed Asbestos Assessor in accordance with the requirements of the National Occupational Health and Safety Commission (NOHSC*) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres – 2nd Edition* [NOHSC 3002:2005]. The LAA shall undertake airborne asbestos fibres monitoring at a minimum of eight

static locations daily during remediation works that will disturb asbestos impacted materials. Monitoring locations will include site perimeter locations and downwind locations of proposed work areas, stockpiled asbestos contaminated materials, proposed load out areas and neighbouring receptors.

Air filters shall be analysed by a NATA accredited laboratory and results shall be required to be below 0.01 fibres/mL.

If respirable asbestos fibres are confirmed and present between 0.01 and 0.02 fibres/ml, the following controls must be implemented by the remediation contractor, in accordance with SWA 2016a:

- Review control measures;
- Investigate the cause; and
- Implement controls to eliminate or minimise exposure and prevent further release.

If respirable asbestos fibres are confirmed and present above 0.02 fibres/mL, the following controls must be implemented by the licensed asbestos removalist, in accordance with SWA 2011:

- Stop work;
- Notify SafeWork NSW by phone, then by fax or written statement that work has ceased;
- Investigate the cause;
- Implement controls to eliminate or minimise exposure and prevent further release; and
- Do not recommence removal work until further air monitoring is conducted and fibre levels are detected below 0.01 fibres/ml.

A daily report air monitoring report will be prepared documenting the previous/same days airborne asbestos fibre air monitoring results. This report will be made available to all relevant stakeholders and site workers.

10.9.2 Dust Control

During the remedial works, as necessary, excavation areas will be wetted down using a water spray to minimise the potential for dust to be generated by the remediation contractor. A wetting or bonding agent may be used to further bind the soil to minimise asbestos fibre release.

All asbestos impacted soils must be wetted (but not flooded) prior to and during excavation and movement of the soils. To control dust in significant areas of exposed asbestos contaminated fill, industrial misting fans, placed at the outer extents of remedial/excavation areas, must be utilised by the remediation contractor.

Meteorological conditions will be monitored by the Remediation Consultant and Contractor. Remedial work will be stopped or modified where meteorological conditions are adverse (i.e. dry conditions and strong winds towards sensitive receptors).

Plant and vehicles should limit their speed when working within asbestos exclusion zones and only traverse wetted haul roads. Only essential vehicles are permitted to traverse the asbestos exclusion zone.

10.9.3 Odour / Volatile Emissions Control

No odours should be detectable at the site boundary and volatile emissions of other potentially volatile substances shall be controlled. Appropriate actions will be taken by the remediation

contractor to reduce the odours, which may include: increasing the amount of covering of excavations / stockpiles; mist sprays; odour suppressants; and maintenance of equipment.

Records of volatile emissions and odours shall be kept by the remediation contractor. Equipment and machinery will be adequately maintained to minimise exhaust emissions. No materials shall be burnt on the site

10.9.4 Staging of Asbestos Disturbance Works

Where practicable, asbestos disturbance works will be conducted exclusively (i.e., with no other dust generating earthworks occurring simultaneously) with the application of a marker layer/s as soon as practicable subsequent to site levels being achieved.

The objective of this is to separate all potential asbestos and non-asbestos dust generating activities so appropriate levels of control can implemented for each type of activity.

10.10 Transport of Material Offsite

Trucks will be loaded in designated areas. The Contractor shall ensure that there is no material tracked out onto the street and that the load is securely covered. In addition, all site vehicles must leave the site in a forward direction.

The Contractor shall also log truck movements and approximate volume, via registration number and consignment number (where applicable), into and out of the site.

All appropriate road rules shall be observed and state roads will be selected as far as practicable over local roads when deciding on the transport route to the off-site material disposal location.

Plant and vehicles should limit their speed when working within asbestos exclusion zones and only traverse wetted haul roads.

10.11 Hazardous Materials

Hazardous and / or intractable wastes arising from the remediation work shall be removed and disposed of in accordance with the requirements of NSW EPA, SafeWork NSW and the relevant regulations by the Contractor.

In particular, any hazardous wastes will be transported by a NSW EPA licensed transporter.

10.12 Disposal of Contaminated Soil

All soils will be classified, managed and disposed in accordance with the *Waste Classification Guidelines* (EPA 2014). Documentary evidence for all soil disposal shall be kept for inclusion in the Validation Report/s.

It is required under the *Protection of the Environment Operations (Waste) Regulations 2014* (POEO Reg 2014) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m^2 of asbestos sheeting. Each load will be assigned a unique consignment code to allow NSW EPA to monitor their movement from site of generation to disposal.

In addition, the *proximity principle*, under POEO Reg 2014, makes it an offence to transport waste generated in NSW by motor vehicle for disposal more than 150 kilometres from the place of generation, unless the waste is transported to one of the two nearest lawfully disposal facilities to the place of generation.

10.13 Imported Fill

Any materials imported on site by the Contractor to re-establish ground levels or to be applied as a capping layer must be validated as environmentally suitable material (i.e. VENM, ENM or other,

as described in **Section 7.3.3**). Additionally, the imported fill should also be compatible with required geotechnical constraints and the existing soils characteristic for site drainage purposes.

10.14 Groundwater

It is anticipated no dewatering will be required for the remediation works, given the depth to groundwater is anticipated to be greater than all proposed excavation depths. If dewatering is required as part of the remediation works, a licence shall be applied for from the Office of Water for approval to extract groundwater.

10.15 Site Signage and Contact Numbers

A sign/s shall be displayed adjacent to the site access point/s throughout the duration of the works with the contact details of the remediation contractor and project manager as provided and maintained by the remediation contractor.

10.16 Site Security

The remedial areas shall be secured against unauthorised access by means of an appropriate fence or barricade by the remediation contractor. All persons working in asbestos remedial areas must be inducted, have undertaken required training and don appropriate PPE. The access gates will be locked at all times when remedial works are not occurring.

10.17 Community Consultation

The client will be responsible for any community consultation that may be required in relation to the remediation works.

11. Health and Safety Management Plan

11.1 Overview

This health and safety plan contains procedures and requirements that are to be implemented as a minimum during the remediation works.

The objectives of the health and safety plan are:

- To apply standard procedures that reduce risks to acceptable levels resulting from the remedial works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards and mandatory safety practices and procedures; and
- Provision for contingencies that may arise while operations are being conducted at the site.

This health and safety plan does not provide safety information specific to construction and other demolition or excavation activities carried out by contractors, such as the safe operation, maintenance and inspection of plant, etc. Contractors will be required to prepare their own Safe Work Method Statements for their work activities. All parties working on the site shall comply with all applicable Health and Safety legislation, regulations, codes and guidelines.

11.2 Responsibilities

Remediation Contractor

The Remediation Contractor is responsible for ensuring that the work is carried out in accordance with the health and safety plan. This will include:

- Ensuring a copy of the health and safety plan is available at the site during the remediation/validation activities;
- Confirming individuals are competent in performing allotted tasks;
- Liaison with the contractor representatives, as appropriate, regarding safety matters; and
- Investigation and reporting of incidents and accidents.

Other Members of the Site Workforce

Every individual worker is responsible for conducting their allocated tasks in a safe manner and in accordance with their training and experience. They must give due consideration to the safety of all others in their proximity and cooperate in matters of health and safety. All workers must leave their work areas in such a condition that the location will not be hazardous to others at any time.

11.3 Hazards

The known or potential hazards associated with the remedial work activities are listed below:

- inhalation hazards associated with the presence of asbestos.

- physical hazards, including:
  - work in or near excavations;
  - operating machinery;
  - heat stress and UV exposure;
  - underground or overhead services;
  - manual handling;
  - fauna; and
  - noise.

In the event of the discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, or of any new hazard that could potentially cause serious harm to personnel or the environment, work will be suspended until the client, Remediation Contractor and Remediation Consultant have been notified and appropriate instructions have been provided to field personnel.

11.3.1 Inhalation Hazards

The main inhalation hazards from the remediation and management works are consequent of the presence of asbestos. Measures are required to be put in place to prevent/ minimise the generation of airborne fibres. These have been described in the environmental controls for the works. Where there is a potential for airborne emissions to be generated, PPE shall be required to be worn to prevent potential exposure, as described in **Section 11.4.2.**

11.3.2 Physical Hazards

Operating Machinery

Heavy plant and equipment operating in the vicinity of field personnel presents a risk of physical injury. Personnel should be cognisant of their position in relation to operating machinery at all times.

Never walk behind or to the side of any operating equipment without the operator's knowledge. Do not assume that the operator knows your position. Personnel should stay at least 1 m from the operational area of heavy equipment and should not stand directly below any load or piece of equipment (e.g. excavators).

All persons onsite are to wear high-visibility upper body clothing at all times.

Work In or Near Excavations

No deep excavations are anticipated for the remedial works. All excavations greater than 1.5m in depth shall be shored, sloped or otherwise constructed so as to minimise the potential for collapse.

Cuts and Abrasions

The manual work associated with the remediation works may give rise to the risk of cuts and abrasions to personnel working in the area. As well as the direct consequences of any cut or abrasion, such injuries can lead to the possibility of exposure to contaminants through the wound as well as diseases such as tetanus. To minimise the risk of direct or indirect injury, personnel will wear the personal protective equipment (PPE) described in **Section 11.4.1**.

Heat Stress and UV Exposure

Site personnel may experience heat stress due to a combination of elevated ambient temperatures and the concurrent use of personal protection equipment; this depends in part on the type of work and the time of year.

In addition to heat stress, overexposure to UV radiation in sunlight can result in sunburn to exposed skin. The use of a high protection sunscreen (SPF30+ or greater) on all exposed skin is recommended. Sunscreen should be applied at least 20 minutes prior to the commencement of work and re-applied at least every two hours or more frequently if perspiring.

Hats (including hard hats in specified areas) will also provide additional sun protection during the peak (i.e. 10:00 am to 3:00 PM) sun period. Sunglasses should be worn (where appropriate) to protect eyes from effects of UV exposure.

Underground Services

There is the potential for underground services (electricity, natural gas lines, water, telephone, sewer, and stormwater) to be present beneath the work area. The remediation contractor shall ensure that appropriate procedures will be taken to minimise the risk associated with excavation near services.

Aboveground Electrical Hazards

All electrical plant and equipment must comply with the requirements of Australian Standard AS 3000. Hand held portable tools shall comply with *AS/NZS 3160 "hand-held portable electric tools"* and shall be double insulated. Cord connected portable hand lamps shall comply with AS/NZS 3118. A Residual Current Device (RCD) shall protect plug-in portable equipment, which is connected to a supply above Extra Low Voltage - 12-24volts (including equipment supplied from a generator or welding set). RCD protection shall be provided during maintenance of portable electrical equipment at all times while the equipment is connected to a power supply above Extra Low Voltage, irrespective of whether power is switched ON or OFF. RCD's shall comply with AS 3190 and shall be type II units, rated to trip at or below 30 milliamps within 40 milliseconds.

No excavator, drill rig or crane may work within 6 m of overhead distribution power lines.

Manual Handling

When lifting or handling heavy objects, use correct lifting techniques, bending the knees not the back. If the item to be lifted is too heavy or awkward for one person to lift, seek assistance from other company employees or use mechanical help.

Fauna

The remedial works are within an area of land with trees and grasses, and it is likely that there will be potentially hazardous invertebrate and vertebrate fauna, including but not limited to snakes, lizards, birds, spiders, bees, wasps and ants. Long sleeve shirts, pants and boots should be worn at all times on the site. If snakes are identified on the site during remedial works, an appropriate snake removal service should be contacted to relocate the animal away from the work area.

11.4 Personal Protective Equipment (PPE)

11.4.1 General Site Works PPE

All workers who may come into direct contact with contaminated soil will wear the following personal protective equipment:

- High visibility long sleeved collared shirt;
- Long pants;

- Heavy duty outer gloves (e.g. leather) where there is a risk of cuts or abrasions, otherwise PVC outer gloves if in direct contact with contaminated soil;
- Steel capped boots;
- Safety glasses;
- High visibility vest or jacket (not required if shirt is high-visibility); and
- Hard hat when working near mechanical plant.

11.4.2 PPE for Asbestos Removal Works

During any asbestos remediation/management works, excavation, transport or placement asbestos impacted materials, the following items of PPE are required in addition to any standard PPE required for the specific task, and applies for any ground workers within the asbestos work zone:

- Disposable coveralls must be worn (Type 5, Category 3 or better);
- Disposable gloves – non disposable gloves must be cleaned within the decontamination unit in accordance with SWA (2016b);
- P2 class respirator or higher – non disposable respirators must be cleaned in the decontamination area in accordance with SWA (2016b); and
- Laceless steel capped rubber soled work shoes or gumboots.

Plant operators undertaking sub-surface intrusive works must close cabin doors and windows and set air conditioning to re circulate when operating within the asbestos work zone or wear PPE as listed above.

Further information on PPE requirements for asbestos removal works is provided in SWA (2016b).

The contractor shall supply and keep in good order, two complete sets of protective clothing and respirators for authorised inspection personnel. These will remain the property of the contractor at the end of the contract.

Employees must receive instruction in the correct method of using the respirator and on the importance of correct facial fit and maintenance. No person with a beard shall be allowed within the asbestos work area except using an approved positive pressure continuous airflow hood.

It is further noted that, as part of the WorkCover permitting process, additional PPE may be required. If this occurs, then the above PPE requirements will be upgraded to reflect SafeWork NSW requirements.

11.4.3 Decontamination Procedures

The decontamination procedures specified below will be followed whenever personnel, plant or equipment leave the site.

<u>Personnel</u>

The following steps should be taken to ensure personnel do not leave the site with potentially contaminated clothing:

- Wash boots in clean water;
- Remove outer gloves and store for reuse;
- Remove overalls and place in the skip for the asbestos wastes for disposal;

- Remove respirator and goggles (if used) and store clean for reuse or decontamination, as appropriate; and
- Thoroughly wash hands and face.

Vehicle, Plant and Equipment

All equipment, including personal protective equipment, will be washed or otherwise cleaned to ensure that contaminated soil, water or dust is removed before it leaves the site. All plant and equipment will have their outer bodies thoroughly cleaned of soil and sediment before moving off the site.

11.5 Emergency Response

The remediation contractor will be responsible for preparing an emergency response plan, which will provide details on appropriate action and evacuation procedures in the event of an emergency.

In the event of an emergency arising on the site, appropriate action should be taken. Site evacuation procedures should be followed, as necessary.

In the event of an accident:

- evaluate the seriousness of the injury, and contact emergency services, if necessary;
- provide first aid, as appropriate;
- if working within a Decontamination Zone and it is safe to do so, evacuate the injured person via the Decontamination Zone; and
- make the area as safe as possible without jeopardising safety.

If a serious accident occurs, do not disturb the scene, except to make safe and prevent further injury or damage, and keep all unauthorised people out, and report all accidents to the Project Manager and relevant emergency services and authorities.

12. Regulatory Approvals / Licensing

12.1 State Environmental Planning Policy No. 55 – Remediation of Land (SEPP55)

In accordance with SEPP 55, the proposed remediation works are considered Category 2 remediation works that do not require consent. The land is not affected by any of the listed classifications under an Environmental planning instrument

SEPP 55 still requires that notice must be provided to the Local Government Authority (Randwick City Council, the client) at least 30 days prior to the commencement of remedial works. A notice complying with the requirements of Clause 16(3) of SEPP55 should be prepared. Notice of completion of remediation works must also be provided within 30 days after completion of the work, consistent with clauses 17(2 & 3) and 18.

It is further noted that clause 21 of SEPP 55 indicates SEPP 55 does not apply to remediation for clean up notices, as such, typical SEPP 55 notification periods/approvals are not applicable.

12.2 NSW EPA Clean Up Notice #1559630

The proposed asbestos remediation/management activities must be satisfy the requirements of the NSW EPA issued Clean-Up Notice (#1559630) as issued to Randwick City Council by NSW EPA on 20 December 2017, and included to **Appendix** C of this RAP.

12.3 Protection of the Environment Operations Act 1997

The proposed asbestos remediation/management activities are not required to be licensed under the *Protection of the Environment Operation Act 1997* since the works do not involve:

- treatment otherwise than by incineration and storage of more than 30 000 cubic metres of contaminated soil originating exclusively from the site, or
- disturbance of more than an aggregate area of 3 hectares of contaminated soil originating exclusively from the site. While the site area is measured at approximately 4 hectares, only a portion of this is proposed to be disturbed.

12.4 Protection of The Environment Operations (Waste) Regulation 2014

The regulations make requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site will not require to be licensed.

Section 42 of the Regulation stipulates special transportation, reporting, re-use and recycling requirements relating to asbestos waste and must be complied with regardless whether the activity is licensed.

The requirements for the transportation of asbestos waste include:

- bonded asbestos material must be securely packaged at all times,
- friable asbestos material must be kept in a sealed container,
- asbestos-contaminated soils must be wetted down,
- all asbestos waste must be transported in a covered, leak-proof vehicle.

The transporter of asbestos waste must cause the following information to be given to the EPA prior to the transportation of asbestos waste loads:

- source site details including address, name and contact details;
- date of proposed transportation commencement;
- name, address and contact details of disposal site; and

- approximate weight of each class of asbestos in each load.

The transporter of asbestos waste must ensure the following information is given to the disposal site before or at delivery:

- unique consignment code issued by EPA in relation to that load; and
- any other information specified in the Asbestos and Waste Tyres Guidelines.

The requirements relating to the off-site disposal of asbestos waste are as follows:

- asbestos waste in any form must be disposed of only at a landfill site that may lawfully receive the waste;
- when asbestos waste is delivered to a landfill site, the occupier of the landfill site must be informed by the person delivering the waste that the waste contains asbestos;
- when unloading and disposing of asbestos waste at a landfill site, the waste must be unloaded and disposed of in such a manner as to prevent the generation of dust or the stirring up of dust;
- asbestos waste disposed of at a landfill site must be covered with virgin excavated natural material or other material as approved in the facility's Environment Protection Licence; and
- Section 48 of the Regulation requires that wastes are stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded.

12.5 Waste Classification Guidelines (NSW EPA 2014)

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with this guideline.

12.6 Asbestos Removal Regulations and Code of Practice

The removal and disposal of asbestos will be managed in accordance with the Work Health and Safety Act (2011) and Work Health and Safety Regulation (2017), *How to Manage and Control Asbestos in the Workplace: Code of Practice* (SWA 2011a), "*How to Safely Remove Asbestos: Code of Practice* (SWA 2011b), *Managing Asbestos in or on Soil* (WorkCover 2014) and the NSW EPA Waste Classification Guidelines 2014.

Excavation and removal of friable asbestos contaminated soils are required to be conducted by a Class A licensed contractor. Excavation, onsite remediation and offsite removal of non-friale ACM only contaminated soils are to be conducted by the same Class A licensed contractor.

Before starting any affected works, the appointed contractor is required to obtain a site-specific permit approving the proposed friable asbestos works from SafeWork NSW. A permit will not be granted without a current licence and the permit application must be made at least seven days before the work is due to commence.

13. Conclusions

Overall, it is considered that the proposed actions outlined in this RAP conform to the requirements of the *Contaminated Sites Guidelines for the NSW Site Auditor Scheme (3rd Edition)* (NSW EPA 2017) because they are: technically feasible; environmentally justifiable; and consistent with relevant laws, policies and guidelines endorsed by NSW EPA.

Subject to the successful implementation of the measures described in this RAP and the limitations in **Section 14**, it is concluded that the identified asbestos contamination at the site can be remediated / managed in such a way to be appropriately protective of human health and the environment, such that the site can be made suitable for the ongoing land use publicly accessible open space /parklands.

14. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

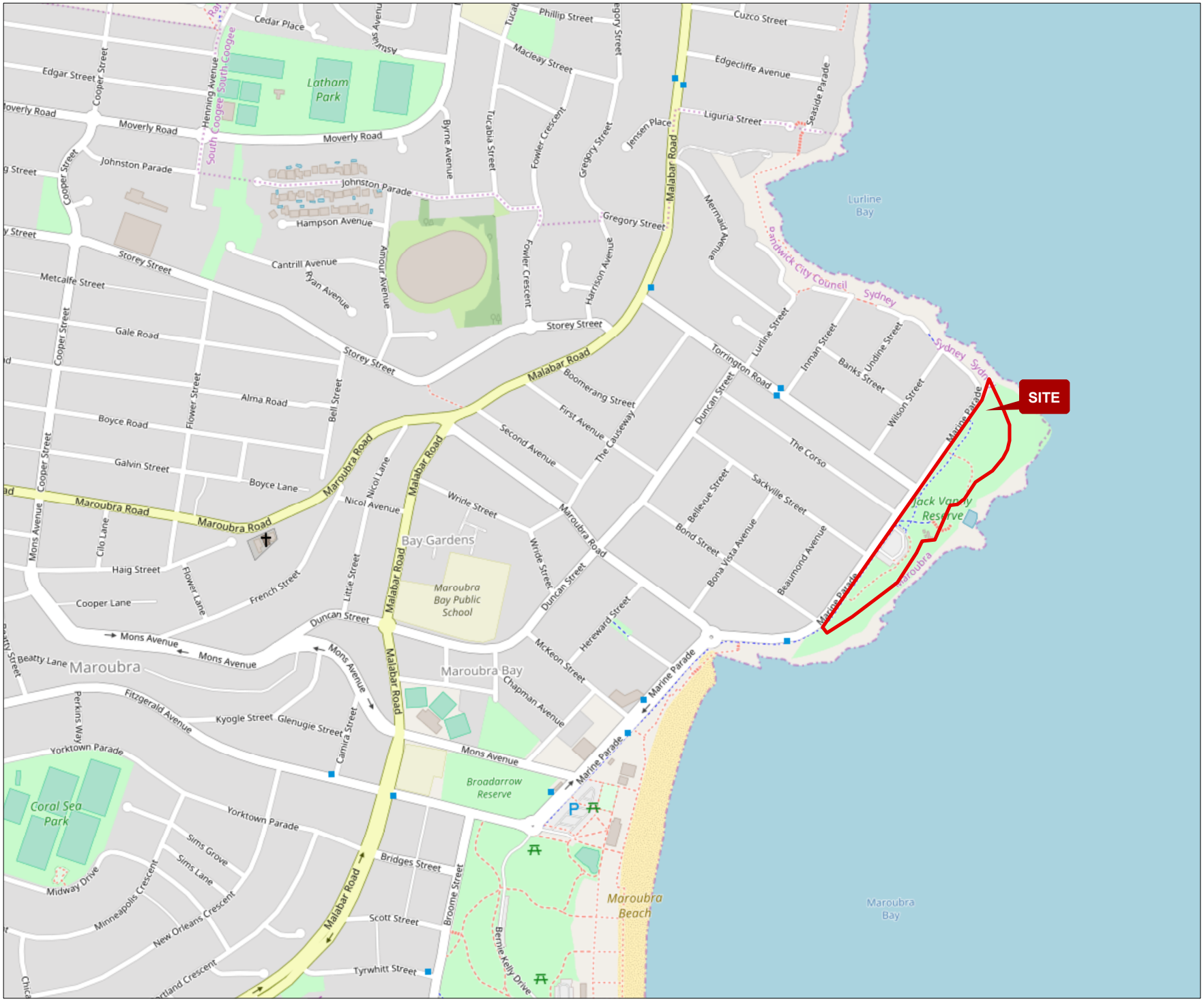
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

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

Figures



Legend:

Approximate Site Boundary - Jack Vanny Reserve

JBS&G

Job No: 54640

Client: Randwick City Council

Version: R03 Rev A	Checked By: MS
Date 22/06/2018	Drawn By: AV

Scale 1:10,000

0 120 240
metres

Coor. Sys. GDA 1994 MGA Zone 56

Marine Parade
Maroubra Randwick, NSW

Lot 1 Section 3 DP758649

SITE LOCATION

FIGURE: 1

File Name: 54640_01_site location
Reference: © OpenStreetMap (and) contributors, CC-BY-SA

Legend:

- Approximate Site Boundary - Jack Vanny Reserve
- Carpark
- NSW EPA Clean Up Notice

JBS&G

Job No: 54640

Client: Randwick City Council

Version: R03 Rev A	Checked By: MS
Date 22/06/2018	Drawn By: AV

Scale 1:2,900

0 30 60
metres

Coor. Sys. GDA 1994 MGA Zone 56

Marine Parade
Maroubra Randwick, NSW

Lot 1 Section 3 DP758649

SITE LAYOUT

FIGURE: 2

File Name: 54640_02_site layout
Reference: Nearmap - http://maps.au.nearmap.com - Imagery 19-01-2018

Legend:

- Approximate Site Boundary - Jack Vanny Reserve
- NSW EPA Clean Up Notice Area
- Grid 20x20m

JBS&G

Job No: 54640

Client: Randwick City Council

Version: R03 Rev A	Checked By: MS
Date 22/06/2018	Drawn By: AV

Scale 1:2,800

0 30 60
metres

Coor. Sys. GDA 1994 MGA Zone 56

Marine Parade
Maroubra Randwick, NSW

Lot 1 Section 3 DP758649

PREVIOUS SAMPLE LOCATIONS

FIGURE: 3

File Name: 54640_03_sample locations
Reference: Nearmap - http://maps.au.nearmap.com - Imagery 19-01-2018

Legend:

- Approximate Site Boundary - Jack Vanny Reserve
- NSW EPA Clean Up Notice Area
- Grid 20x20m
- ACM < HSL-C Criteria
- ACM > HSL-C Criteria
- FA/AF < HSL-C Criteria
- FA/AF > HSL-C Criteria

JBS&G

Job No: 54640

Client: Randwick City Council

Version: R03 Rev A	Checked By: MS
Date 22/06/2018	Drawn By: AV

Scale 1:2,800

0 30 60
metres

Coor. Sys. GDA 1994 MGA Zone 56

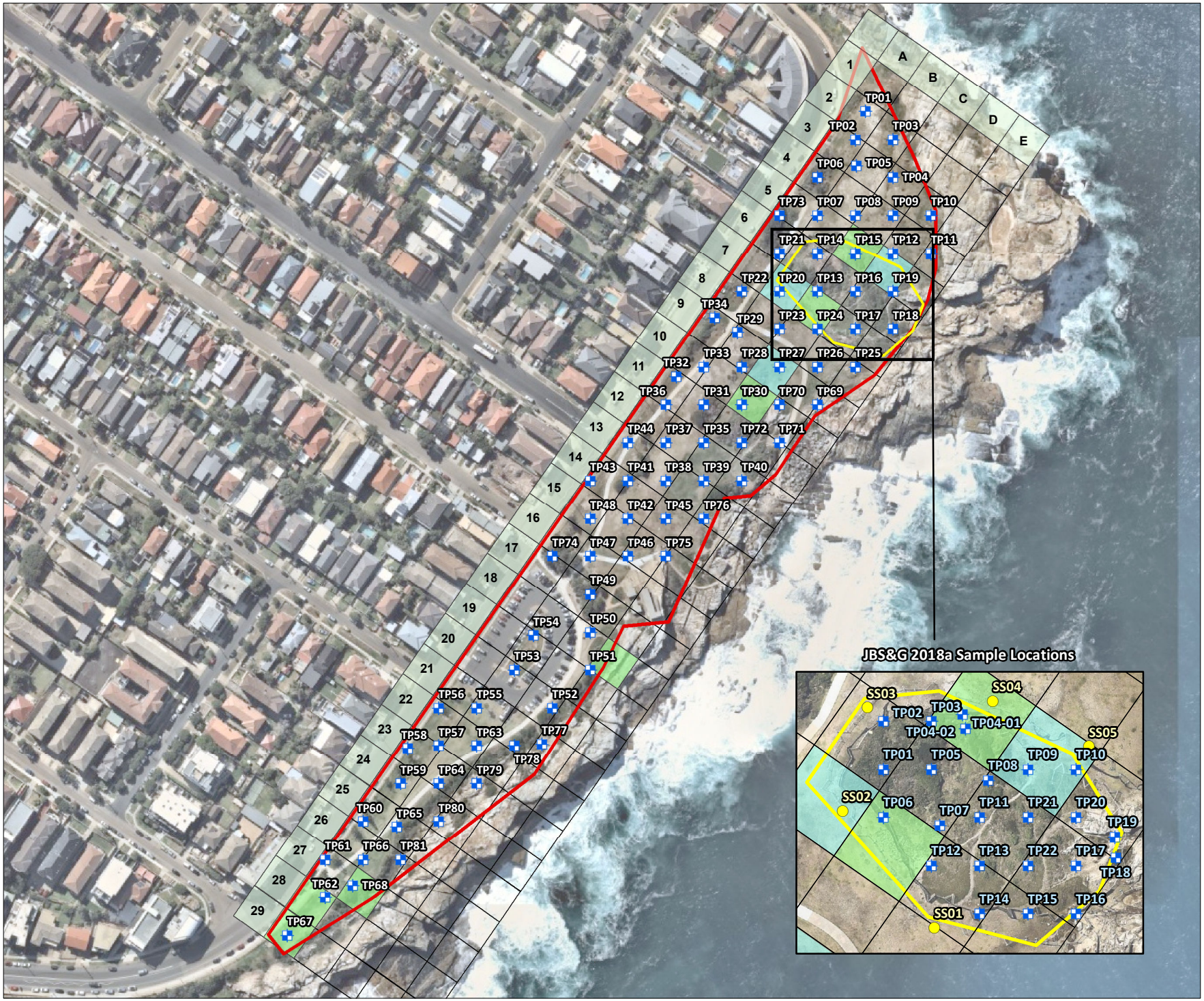
Marine Parade
Maroubra Randwick, NSW

Lot 1 Section 3 DP758649

IDENTIFIED ASBESTOS CONTAMINATION 0-1.0M BELOW GROUND SURFACE

FIGURE: 4

File Name: 54640_04_asbestos
Reference: Nearmap - http://maps.au.nearmap.com - Imagery 19-01-2018



Legend:

- Approximate Site Boundary - Jack Vanny Reserve
- NSW EPA Clean Up Notice Area
- Grid 20x20m
- ACM > HSL-C Criteria
- FA/AF > HSL-C Criteria
- ACM < HSL-C Criteria
- FA/AF > HSL-C Criteria

JBS&G

Job No: 54640

Client: Randwick City Council

Version: R03 Rev A	Checked By: MS
Date 22/06/2018	Drawn By: AV

Scale 1:2,800

0 30 60
metres

Coor. Sys. GDA 1994 MGA Zone 56

Marine Parade
Maroubra Randwick, NSW

Lot 1 Section 3 DP758649

IDENTIFIED ASBESTOS CONTAMINATION 1.0M AND DEEPER

FIGURE: 5

File Name: 54640_05_asbestos
Reference: Nearmap - http://maps.au.nearmap.com - Imagery 19-01-2018

Legend:

- Approximate Site Boundary - Jack Vanny Reserve
- NSW EPA Clean Up Notice Area
- Grid 20x20m

Proposed Remediation Areas

- Excavation & Off Site Disposal Remediation Area
- Hand Remediation & Re-quantification Areas

JBS&G

Job No: 54640

Client: Randwick City Council

Version: R03 Rev A	Checked By: MS
Date 22/06/2018	Drawn By: AV

Scale 1:2,800

0 30 60
metres

Coor. Sys. GDA 1994 MGA Zone 56

Marine Parade
Maroubra Randwick, NSW

Lot 1 Section 3 DP758649

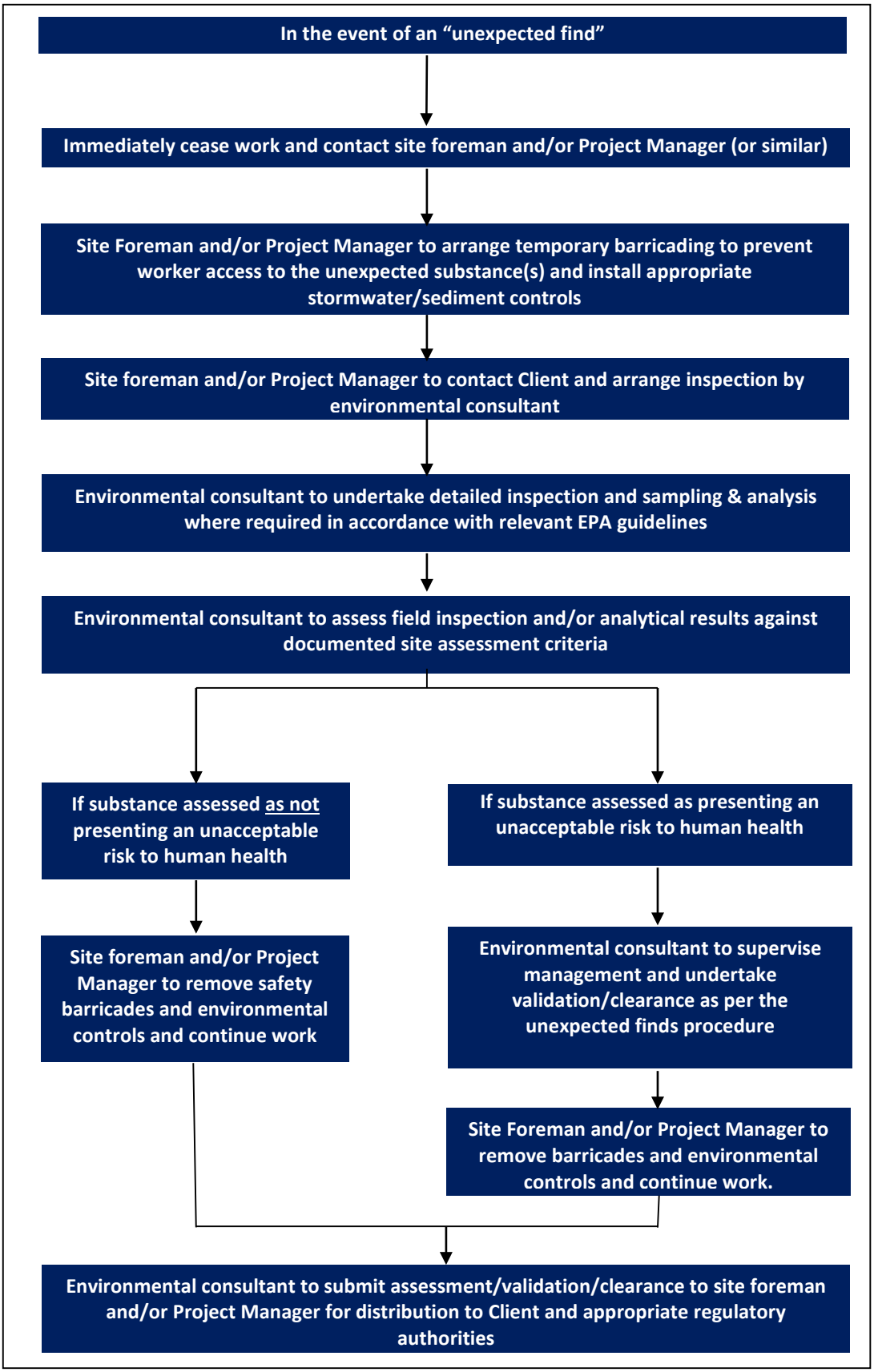
PROPOSED REMEDIATION AREAS

FIGURE: 6

File Name: 54640_06_remediation
Reference: Nearmap - http://maps.au.nearmap.com - Imagery 19-01-2018

Appendix A: Unexpected Finds Protocol

Unexpected Finds Protocol Flowchart



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Appendix B: NSW EPA Clean-Up Notice #1559630

Clean-Up Notice

RANDWICK CITY COUNCIL
Trading as RANDWICK CITY COUNCIL
ABN 77 362 844 121
30 Frances Street
RANDWICK NSW 2031

Attention: Todd Clarke

Notice Number	1559630
File Number	EF17/14159
Date	20-Dec-2017

Dear Mr Brownlee,

The Environment Protection Authority provided Randwick City Council with a draft Notice of Clean-Up Action for comment on 14 December 2017 in relation to the land application of waste at Lot 1 Section 3 in Deposited Plan 758649, Mistral Point, Marine Pde, Maroubra.

Comments were received from Randwick City Council on 19 December 2017.

The EPA considered your comments and has issued the Notice.

NOTICE OF CLEAN-UP ACTION

BACKGROUND

1. The Environment Protection Authority (**the EPA**) is responsible for the administration and enforcement of the *Protection of the Environment Operations Act 1997* (**the POEO Act**), including the processing, transport and disposal of waste.
2. Section 6 of the POEO Act provides that the EPA is the Appropriate Regulatory Authority (**ARA**) for activities carried on by a state or public authority.
3. Under section 91(1) of the POEO Act, the EPA as the ARA may direct a person that is reasonably suspected of causing or having caused a pollution incident to take clean-up action.
4. The POEO Act defines "waste" to include:
   a. any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment, or
   b. any discarded, rejected, unwanted, surplus or abandoned substance, or

c. any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, processing, recovery or purification by a separate operation from that which produced the substance, or

d. any processed, recycled, re-used or recovered substance produced wholly or partly from waste that is applied to land, or used as fuel, but only in the circumstances prescribed by the regulations, or

e. any substance prescribed by the regulations to be waste.

A substance is not precluded from being waste for the purposes of the POEO Act merely because it is or may be processed, recycled, re-used or recovered.

5. "Asbestos waste" is defined for the purposes of Schedule 1 of the POEO Act to mean any waste that contains asbestos. The EPA *Waste Classification Guidelines* provides that any waste that contains asbestos is "asbestos waste" and is classified as "special waste"

6. On 11 December 2017, EPA officers conducted an inspection (**the Inspection**) of Lot 1 of Section 3 in Deposited Plan 758649, Marine Parade, Maroubra NSW 2035 (**the Premises**). The specific area inspected by EPA officers is shown on Map 1 attached (**the Impacted Area**).

7. During the Inspection, EPA officers inspected the walking trails from the top of the Impacted Area to the bottom of the Impacted Area at the rock shelf. It appears that fill material was placed in the Impacted Area some time ago, and vegetation has grown over the fill material. It is likely that the fill material was contaminated and over time, contaminants from the fill have been liberated from the fill and have been transported downhill.

8. EPA officers observed suspected asbestos fragments along most of the walking trails in the Impacted Area; within some of the vegetation in the Impacted Area; and around and on top of the rock shelf. Some of the suspected asbestos fragments appeared quite weathered. Several larger pieces of suspected asbestos piping was also found in the Impacted Area. EPA officers also observed brick, concrete, tile and glass along the pathways and in some of the vegetation in the Impacted Area. Photos have been attached to this Notice for your information.

9. EPA officers obtained 19 samples of suspected asbestos fragments from the Impacted Area. The samples were analysed with the EPA's microPHAZIR and all returned a positive reading for chrysotile asbestos. The samples have been submitted for laboratory analysis.

10. The EPA notes that the Impacted Area at the Premises can be accessed easily by the public. The EPA is concerned about the presence of multiple asbestos fragments observed during the Inspection and its impact on human health and the environment.

11. The EPA reasonably suspects that the application of asbestos waste to land at the Premises has resulted in land pollution which has occurred or is occurring as it:

a) is causing or likely to cause the degradation of the land, and

b) has potential human health and environmental impacts caused by the asbestos waste.

12. Land pollution or pollution of land means placing in or on, or otherwise introducing into or onto, the land (whether through an act or omission) any matter, whether solid, liquid or gaseous:

a) that causes or is likely to cause degradation of the land, resulting in actual or potential harm to the health or safety of human beings, animals or other terrestrial life or ecosystems, or actual or potential loss or property damage, that is not trivial, or

b) that is of a prescribed nature, description or class that does not comply with any standard prescribed in respect of that matter.

13. The EPA reasonably suspects that a land pollution incident is occurring and has occurred at the Premises. The EPA reasonably suspects that land pollution has occurred from the application of asbestos waste to land.
14. The EPA understands that Council is the occupier of the Premises and has management control of the Premises.
15. The EPA requires Council to take the clean-up actions as set out below.

DIRECTION TO TAKE CLEAN-UP ACTION

The Environment Protection Authority (EPA) directs RANDWICK CITY COUNCIL to take the following clean-up action:

A. **Immediately** secure the Impacted Area as identified in Map 1 at the Premises to prevent access to the Impacted Area by members of the public. Continue to prevent public access to the Impacted Area unless advised by the EPA.

B. Do not import any material to the Premises.

C. Do not export any material from the Premises, unless it has been classified in accordance with the EPA's *Waste Classification Guidelines.*

D. By **5pm Friday 29 December 2017,** engage an occupational hygienist (that is registered with the Australian Institute of Occupational Hygienists Inc) to determine the extent of the asbestos contamination in the Impacted Area. Asbestos fragments on the surface of the Impacted Area

E. By **5pm Friday 29 December 2017,** engage a suitably qualified expert to conduct a Waste Classification of the fill material that has been land applied in the Impacted Area at the Premises.

F. By **5pm Wednesday 31 January 2018,** provide a copy of the Waste Classification of the fill material (as required above) to the EPA and advise the EPA as to Council's proposed actions in relation to the fill material and remediation of the Impacted Area.

FEE TO BE PAID

- You are required by law to pay a fee of $535 for the administrative costs of issuing this notice. An invoice for the fee has been attached to this notice.
- It is an offence not to pay this fee. However you can apply for an extension of time to pay the fee or for the fee to be waived. At the end of this notice there is information about how and when to pay the fee and how to apply for an extension or a waiver of the fee.

Clean-Up Notice

Celeste Forestal

Unit Head

Waste & Resource Recovery

(by Delegation)

INFORMATION ABOUT THIS CLEAN-UP NOTICE

- This notice is issued under section 91 of the Protection of the Environment Operations Act 1997.
- It is an offence against the Act not to comply with a clean-up notice unless you have a reasonable excuse.

Penalty for not complying with this notice

- The maximum penalty for a corporation is $1,000,000 and a further $120,000 for each day the offence continues. The maximum penalty for an individual is $250,000 and a further $60,000 for each day the offence continues.

Cost recovery from the person who caused the incident

- If you comply with this clean-up notice but you are not the person who caused the pollution incident to which the notice relates, you have a right to go to court to recover your costs of complying with the notice from the person who caused the incident.

Deadline for paying the fee

- The fee must be paid by **no later than 30 days after the date of this notice**, unless the EPA extends the time to pay the fee, or waives the fee.

How to pay the fee

- Possible methods of payment are listed on the last page of the attached invoice/statement.
- Please include the payment slip from the attached invoice/statement with your payment.

How to apply for an extension of time to pay/waive the fee

- Any application for and extension of time to pay the fee or for the fee to be waived should be made in writing to the EPA. The application should set out clearly why you think your application should be granted.

Clean-Up Notice

Other costs

- The Protection of the Environment Operations Act allows the EPA to recover from you reasonable costs and expenses it incurs in monitoring action taken under this notice, ensuring the notice is complied with and associated matters. (If you are going to be required to pay these costs and expenses you will later be sent a separate notice called a "Notice Requiring Payment of Reasonable Costs and Expenses").

Continuing obligation

- Under section 319A of the Act, your obligation to comply with the requirements of this notice continues until the notice is complied with, even if the due date for compliance has passed.

Variation of this notice

- This notice may only be varied by subsequent notices issued by the EPA.

Clean-Up Notice

MAP 1

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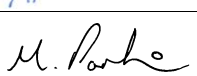
Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A	Michael Samuel	Matthew Bennett	Matthew Bennett		22/06/2018
B	Michael Samuel	Matthew Bennett	Matthew Bennett		6/07/2018
C	Michael Samuel	Matthew Parkinson	Matthew Parkinson		24/07/2018