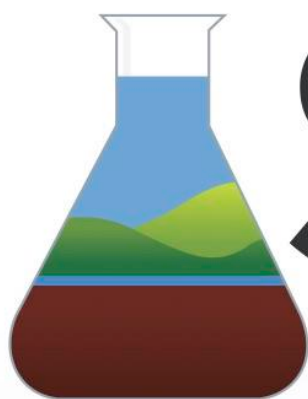




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**Draft Environmental Management Plan
For Principal Healthcare Finance Pty Ltd
Garden Street, Warriewood NSW**

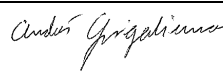
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FIGURES

Figure 1 – Site Area Subject to EMP

Figure 2 – Exceedance in Soil and Remedial Areas

Figure 3 – Asbestos Impacted Areas

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ABBREVIATIONS

AEC	Areas of Environmental Concern
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
CSM	Conceptual Site Model
DEC	Department of Environment and Conservation NSW
DSI	Detailed Site Investigation
EPA	NSW Environmental Protection Authority
HSLs	Health Screening Levels
NEPM	National Environment Protection Measure
OEH	Office of Environment and Heritage NSW
RAP	Remedial Action Plan
SESL	SESL Australia Pty Limited

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1. INTRODUCTION

SESL Australia Pty Ltd (SESL) was engaged by Stephen Edwards Constructions on behalf of Opal Seaside Aged Care Pty Ltd to prepare an EMP for the future management of capped contamination upon the completion of the Remedial Action Plan (RAP) (JBSG, 2019).

The site which the EMP is prepared for is located at 184-194 Garden Street, Warriewood NSW (the site). The site covers an area of 1.17 hectares and is currently used as an aged care facility. The site contains of one occupied single storey building on the north-western portion of the site, and a vacant two storey building occupied the south western portion of the site. The remaining portions of the site is covered with asphalt – paved carpark, open spaced courtyards within the buildings, and paved access walkways around the perimeter of the site. The current land use of the surrounding properties includes:

- North – Residential properties;
- East: Garden street followed by Warriewood Wetlands and Mullet Creek;
- South: Mullet Creek and associated vegetated areas;
- West: Residential properties followed by Banksia Parade.

The site will be redeveloped as a new residential aged care facility that includes car park areas and landscaping. Redevelopment of the existing facility will be carried out in two stages with the construction of two buildings providing 127 bedrooms and 37 car spaces. The remainder of the site will be comprised of a combination of landscaping areas and walkways/pavements. Stage 1 of the project includes developing the southern portion of the site (currently unoccupied) followed by the northern portion (Stage 2) currently occupied by an aged care facility. The current and proposed future land use for the site is equivalent to residential land use with gardens and accessible soils (NEPC 2013). The requirement for an EMP arises from the identification of asbestos-containing material (ACM) fragments on the surface and in the fill of the site. Remedial actions adopted to mitigate the potential risk that this contamination poses to current site users, visitors and neighbours. This EMP is designed to be predictive of the site conditions expected at the completion of remediation and is required to be updated following completion of remediation. Additionally, the updated EMP will include details of the final capping position of contaminated materials.

This EMP has been prepared to manage the potential risks to human health and the environment posed by presence of asbestos in fill soils. Asbestos impacted areas subject to this EMP will be isolated below the concrete slab and a marker layer (orange geotextile) related to the overlying proposed building and associated infrastructure (new aged care facility building). Where no hardstand can be constructed due to structural stability of final design levelling issues, a physical separation remedial strategy will be implemented that includes:

- Fill material to be removed to an additional depth of 0.5m below ground level within grass/shrub areas and 1.5m for trees and/or reduced to include future pavements and carparks; and
- Installation of a marker layer (orange geofabric) above the fill material;
- Backfilling of at least 0.5m of chemically suitable fill material above the orange geotextile for grass/garden areas;
- Backfilling of at least 1.5m of chemically suitable fill material above the orange geotextile for tree areas
- Establishment above the marker layer of a sub-grade layer with environmental suitable soils within pavement and carparks;
- Underground services trenches to be placed above the marker layer within suitable materials for potential human and/or ecological exposure.

The area subject to this EMP is shown in Figure 1.

SESL understands that the site is subject to an audit process and the present EMP has been provided to the appointed Site Auditor for review and approval. SESL understands that for the site to be considered suitable for the proposed land use, the site is conditioned on the appropriate implementation of this EMP.

This EMP covers the future use of the site as an aged care centre. Any intrusive or disruptive works must be undertaken in accordance with the Intrusive Works procedures outlined in this EMP (See Section 7). 'Intrusive works' are defined as any maintenance activities (excluding substantial redevelopment) that have the potential to expose people or the environment to the encapsulated contaminants on the site. All capped fill/soil managed by this EMP is to be considered as asbestos impacted. The main objectives of this EMP are to:

- Describe the future location and extent of the contamination that will require management for ongoing use of the site;
- Describe the future management of the contaminated material required to ensure the site remains suitable for the future use;
- Outline ongoing management/monitoring of the capping required to ensure the effectiveness of the risk mitigation measures implemented at the site;
- Provide information relevant to any future intrusive works, including assessment and validation requirements;
- Outline a protocol in the case of unexpected finds during future intrusive works; and
- Be legally enforceable and recorded in the land title for perpetuity, unless alternate remediation occurs.

The project manager who is responsible for the compliance of this EMP has willingly agreed to implement the following requirements and guidance. A letter of agreement has been appended in Appendix A.

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2. SCOPE OF WORKS

This EMP describes the location and extent of the contained asbestos contamination likely to be impacted by the day to day operation of the site or future construction/landscaping works at the site. This EMP must be read and understood by all staff or contractors proposing to engage the subsoil materials beneath the geo-textile layer at the site following completion of remediation. This EMP applies to the area presented in Figure 1.

This EMP does not remove the requirement of Construction Management Plan (CMP), Remedial Action Plan (RAP) or similar, prior to commencing future intrusive works. Contamination outside of the scope of this EMP is to be managed under alternate strategies.

3. ROLES & RESPONSIBILITY

This EMP is designed to be managed under the responsibilities outlined below in Table 1. As such, the future owner (Opal Aged Care) is responsible for the overall implementation and maintenance of the EMP and for ensuring that staff members and contractors have been informed of the requirements of the EMP. The supervisor or person-in-charge of daily operations is responsible for implementing the requirements of the EMP during the course of that day's work. The supervisor is also responsible to legally enforce the implementation of the EMP while the capped material remains on site.

Table 1 outlines the main parties that have involvement in the EMP, and their respective roles and responsibilities. This table does not intend to list all responsibilities under relevant legislation, but is a brief clarification of the roles and responsibilities in implementing this EMP.

Table 1 – Roles & Responsibilities

Title	Responsible Persons	Responsibilities
Opal Seaside Aged Care	Nominated Representative	- Appoint Contractors with the relevant experience and skills. - Incorporate EMP into relevant policies and procedures. - Undertake induction to contractors or staff proposing to engage in intrusive works of the requirement of this EMP. Induction records that include as a minimum the name of the person inducted, date of induction, signature of inductee and activity to be performed are to be maintained within the site. - Understanding the implementation of the EMP so auditing can be undertaken. - Ensure appointed contractors implement the EMP. - Conduct site inspections for conformance.
Staff, Contractors and Maintenance Workers	All	- Implementing the EMP. - Understanding and implementing the EMP in relation to any property management issues for the site. - All subcontractors are required to comply with the EMP and to comply with directions from SESL and / or the site owner in this respect.
Environmental Consultant	Nominated Representative TBC	- Technical support for EMP works. - Preparation of an Environmental Management Plan

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An Auditor	An appointed Site Auditor	For certification and approval that the site or relevant portion(s) are suitable for the proposed uses.
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4. PREVIOUS WORKS AND INVESTIGATIONS

The following details are a summarised version of the previous works description detailed in the RAP prepared for the site (JBS&G 2019). The RAP has been used to guide the remediation actions to mitigate the risks associated with asbestos exposure that future residents and workers could have faced.

4.1 PRELIMINARY AND UPDATED CONCEPTUAL SITE MODEL

A preliminary conceptual site model (CSM) was developed for the Opal Seaside Aged Care redevelopment site based on the information obtained prior to the DSI, including desktop review, site walkover and review of the preliminary site investigation (Douglas Partners 2017).

This review of information prior to the DSI identified the following potential Areas of Environmental Concern (AEC):

- AEC 1: Fill material from unknown sources used to raise the site level
- AEC 2: Fill material resulted from demolition and construction works between 1982 and 1986
- AEC 3: Application of pesticides during historical agricultural land use prior to development at the site
- AEC 4: Potential hazardous materials associated with structures at the site

4.2 SUMMARY – PRELIMINARY SITE INVESTIGATION WITH LIMITED SAMPLING (DOUGLAS PARTNERS, MARCH 2015)

A preliminary site investigation with limited sampling was completed by Douglas Partners (DP) in March 2015 for the entire development. The primary contamination concerns identified by DP were the potential historical use of pesticides over the area and various potential contaminants resulted from the imported contaminated filling to the site and demolition of previous structures (Report on Preliminary Site Investigation for Contamination with Limited Sampling).

Twelve (12) sampling points were selected for soil sampling to cover the accessible areas. Two sampling points were converted to groundwater monitoring wells near the southern and eastern boundaries respectively. Samples collected were analysed for 8 heavy metals, TRH & BTEX, PAH, OCP/PCB, total phenols and asbestos. The results of the analysis were compared to the adopted assessment criteria suitable for the proposed development including the Health Investigation Level – Residential A criteria adopted from National

Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 (NEPC 2013), Ecological Investigation Levels for Urban Residential areas adopted from NEPM (NEPC 2013) and phytotoxicity criteria.

The test results of the soil samples showed that the concentrations of PAH, TRH, BTEX, OCP, OPP, PCB and total phenols were all within the respective HIL and EIL. Elevated copper content was detected in a few samples. Chrysotile asbestos was identified in two filling samples.

4.3 SUMMARY – DETAILED SITE INVESTIGATION (JBS&G, MARCH 2019)

To supplement the existing data and investigate the areas of concern, a Detailed Site Investigation (DSI) was required by Northern Beaches Council and prepared by JBS&G in March 2019. The investigation comprised advancement of an additional 41 locations across the site, from which selected samples were submitted for laboratory analysis to sufficiently characterise site conditions. The conclusions of the DSI are summarised as below.

- No indicators of ASS or PASS were observed in any sample locations.
- Several types of fill materials were encountered across the site, but the dominant fill consisted of grey/brown heterogeneous gravelly silty sand and sandy clay.
- The fill contained a large amount of anthropogenic inclusions of bricks, concrete boulders, metals, plastic, timber and terracotta pipe fragments at all test pits.
- There was no evidence of staining or odours observed in any of the sampling locations across the site.
- Visible fragments of asbestos containing material (ACM) were observed in 17 out of 40 sample locations. Fibrous asbestos (FA) was encountered at one location at a concentration exceeding the adopted health-based criterion. Asbestos fibres (AF) was also reported at one location but didn't exceed the adopted criterion.
- Concentration of lead (Pb) exceeded the adopted EIL at one location.
- Elevated concentrations of Zn, TRH, Benzo(a)pyrene, PAHs were detected, but should not pose an unacceptable risk to the proposed residential land use as an aged care facility, according to relevant guidelines.

4.4 UPDATED CONCEPTUAL SITE MODEL

The conceptual site model (CSM) for the site was updated following the additional data obtained through the sampling and analysis undertaken as part of this DSI. The updated CSM was developed based on the actual sources of impact, chemical concern, transport mechanisms and receptors. Based on the analysis of soil samples, this investigation has been able to determine that the area of environmental concern is the fill material containing various types of contaminants.

The contaminants of concern are Pb in one location and asbestos (mainly bonded) across the site. Further details regarding the updated CSM can be found in the RAP (JBS&G 2019) prepared to guide the remediation actions on the site.

The present EMP should be updated once the site has successfully been remediated as per March 2019 Remedial Action Plan.

4.5 PATHWAYS AND MIGRATION MECHANISM

Transport of the PCoCs described in the RAP prepared by JBS& G 2019 (Job ref: 55792) to site soils applies to the surface soils and the soil at the deepest depth.

Potentially contaminated soils and fill pose a number of exposure pathways, including:

- Direct contact with contaminated soils (ingestion, dermal absorption and inhalation); and
- Inhalation of friable asbestos contained soils or dust. Bonded asbestos only poses a significant risk to site users when crushed, broken or weathered and causing the release of asbestos fibres.

The generated runoff is managed on site is expected to be collected by the site's stormwater drainage network and transferred to the regional stormwater infrastructure on Garden Street. As soil contaminants are generally in a solid form (asbestos), hence it is unlikely that to represent a risk to groundwater or surface water. JBS& G (2019) carried out a limited assessment of leachability of contaminants for the sample contained elevated Lead concentration which was exceeding the adopted human health criteria. The leachate results indicated that the concentration is within the adopted site criteria and therefore, the potential for the migration of Lead leachate is considered very low.

4.5.1 Potential Surrounding Receptors

The potential human and ecological receptors are as follow:

- Site workers coming into direct contact with impacted soils during excavation, construction and maintenance;
- Future occupants and visitors to the site;
- Potential ecological receptors and any future vegetation in to site soils;

5. REMEDIATION STRATEGY AND DESIGN

5.1 PREFERRED REMEDIAL STRATEGY

According to the RAP developed by JBS&G (2019), the preferred remedial strategy for this site is summarised as followed:

- Offsite disposal of material impacted with lead;
- Offsite disposal of material impacted with FA; and
- Cap/cover remedial strategy for remaining site fill materials impacted with bonded asbestos (ACM) and aesthetics (i.e., significant amount of construction/building rubbles).

5.2 REMEDIATION TARGETS

5.2.1 Excavation of contaminated soil

Upon completion of the site remediation, the soils impacted by lead or FA should be excavated and disposed of in appropriately licenced waste facilities. The excavation should be validated as per RAP. Following the validation, the excavated areas should be backfilled using fill material validated in accordance with the RAP.

5.2.2 Cap/cover remedial strategy

Remaining fill material across the site is considered to be impacted with non-friable (bonded) asbestos which is non-leachable or has low leachability. The fill material will be retained on site, with the cover strategy detailed below.

- Cover of fill materials by buildings – installation of a marker layer overlying potentially contaminated material to denote the extent of retained fill. The engineered concrete floor slab shall act as a physical barrier. In areas where impermeable hardstand layers are proposed, no additional works are required, as these layers are considered suitable for encapsulating the contaminants, and preventing potential contact with site users;
- Cover of fill materials by permanent paved areas beyond building footprints – installation of a marker layer overlying potentially contaminated material followed by sub-grade material validated as environmentally suitable materials for human/ecological exposure (where required) and then the permanent pavement and hardstands for carparks (i.e. concrete, asphalt, pavers, etc.);
- Capping of fill materials in landscaped areas – in areas where accessible soils are proposed, contaminated materials must be encapsulated through the installation of a geotextile marker layer and a soil capping layer to prevent contact between site users and the known contamination. This layer must be installed at the top of contaminated soils at a minimum depth of 0.4 m below final finished site levels in areas of shallow planting (for grasses and shrubs), or a depth required for tree pit

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planting, with environmentally suitable materials placed above to the final levels. The layer must be permeable in order to allow for water and gaseous exchange. The material used for this layer must be approved for use by the validating consultant prior to installation;

- When installing the marker layer, the fabric should be pegged under hardstand materials where possible. Where this is not possible, pegs must be used to hold the fabric in place. There must be no gaps in the coverage of the layer. Upon completion of the marker layer installation, the validating consultant must conduct an inspection, and give approval to proceed before moving on to the next stage of the remediation works;
- The option for installation for a deeper capping layer should be considered in landscaping areas with deep root systems and underground services;
- Following the installation of marker layer, fill materials must be imported on to the site for use as the capping layer. These materials must be approved prior to importation and visually inspected by the validating consultant at the time of importation to make sure that material descriptions match those detailed on the accompanying classified certificates/reports. Prior to installation of these materials, they must be subject to assessment to confirm suitability for use. Sampling and analysis of imported materials must be conducted by the validating consultant to a ratio of 1 sample per 250 m³. In the event that material volumes from a single source are <750m³, a minimum of three (3) validation samples must be collected and analysed to confirm suitability. The results from this assessment must be compared against the Remediation Acceptance Criteria. the imported material acceptance criteria have been derived from the NSW EPA excavated natural material order, 2014;
- For imported materials classified as VENM, the supporting consultant's report must be prepared with consideration of the information suggested by NSW EPA for the classification of VENM, with addition of chemical validation at a ratio of 1 sample per 500 m³ with a minimum of three (3) samples per source. Analysis schedule to include TRH, BTEX, PAH, OCP, PCB, Metals (8) and asbestos;
- Following the approval of the imported materials by the validating consultant, the media capping layer must be installed to create a physical barrier to the contaminated materials beneath the marker layer. This soil capping layer must be installed at a minimum depth of 0.4m across all areas of accessible soils; and
- Within underground services trenches – in the event underground services trenches are to be installed, they will be required to be installed above a marker layer with suitable materials for potential human and/or ecological exposure.

5.2.3 Tree Protection Zone

Due to the potential requirement to protect the root zone of significant trees located in the east corner of the site along Garden Street, the addition of 400mm capping is not appropriate as it may result in tree decline due to changes in soil aeration or root destruction. The following procedure must be implemented;

- An inspection must be conducted by a consultant, involving a grid inspection within the TPZ with a minimum of two passes at 90 degrees to each other;
- Surface soil sampling can be conducted at a ratio of 1 location per 100m²; and
- Analysis of contaminated of concern (asbestos) for assessment against HIL A.

6. HAZARD ASSESSMENT

6.1 SITE SPECIFIC HAZARDS

As reported in the DSI, the visible fragments of ACM are expected to be observed in the fill materials across the site. There is also risk of encountering fibrous asbestos (FA) and asbestos fibres (AF). Upon the completion of the remediation, the contaminated soils with hazardous Pb levels and FA (two hotspots identified in the DSI) should be removed from the area. The ACM and asbestos fibres should be capped as described in the RAP and this EMP. In its remediated state, the asbestos does not pose a risk to current or future site users. Should the capping implemented as part of the RAP be compromised, a potential exposure pathway will be created. The contaminants, associated risk and exposure pathways are detailed below in Table 2.

Table 2 – Contaminant Risk and Exposure Pathways

Contaminant of Concern	Source	Physiological Effect and Key Facts	Exposure Pathway
Asbestos	Fill of unknown origin	Inhalation of asbestos fibres is known to cause lung cancer, mesothelioma, cancer of the larynx and ovary, asbestosis.	- Inhalation of dusts generated during excavation and soil disturbance - Ingestion of contaminated soil or dust

6.2 RISK TO THE ENVIRONMENT

Environmental impacts are limited to the migration of asbestos fibres during soil disturbance. The presence of asbestos in the environment poses a risk to human health and are not considered to pose an environmental risk.

6.3 ODOURS

There is no risk of odour emissions from the identified contaminants at the site.

6.4 HEALTH RISK FOR NON-INTRUSIVE SITE USE

SESL has adopted Health Screen Levels (HSLs) from National Environmental Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013) to apply the relevant health risk criteria for the site. When the test pit footprints are capped, for general site use involving non-intrusive activities, human exposure to contaminated soil is low, provided the integrity of the encapsulation is maintained. The potential risk arises at the site if site users have contact with soils beneath the geo-textile fabric at the site. As such, the integrity of the encapsulation and accordance with the guidance of this EMP is imperative to the protection of current and ongoing site users until the site is redeveloped.

7. INTRUSIVE WORKS AND FUTURE MANAGEMENT

The remedial actions undertaken to cap surface asbestos associated with the site is described in Section 5.2. This EMP is to ensure these areas are not disturbed and any intrusive works at the site manage asbestos impacted soils appropriately. The risk of human exposure to asbestos is most likely to occur as a result of soil disturbance and/or any intrusive works.

7.1 ASSESSMENT CRITERIA

Following the implementation of the capping, the site surface must be maintained to satisfy the following criteria.

Health screening levels for asbestos in soil are adopted from the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013). The Health Screening Levels (HSL) for asbestos contamination in soil that is appropriate for the site is considered HSL A for low-density residential with garden accessible soils. A summary of the asbestos HSLs that have been adopted for assessing the clearance of the site are provided in Table 3 below.

Table 3 – Health Investigation Levels for Soil Contaminants

Form of asbestos	Health Screening Level (w/w)			
	Residential A	Residential B	Recreational C	Industrial D
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF (friable asbestos)	0.001%			

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All forms of asbestos	No visible asbestos for surface soil
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7.2 RISK OF DISTURBANCE OF SOILS

Asbestos has been detected on the soil surface at known locations and has been capped. Given the presence of the identified contaminant (asbestos) within the encapsulated soils, the health risks to site users are elevated during soil disturbance. As a result of soil disturbance, the potential for inhalation of asbestos fibres by site workers and visitors is significantly increased. As such, the disturbance of capped material and any site soils should be avoided if possible, and the integrity of the capping should be maintained at all times. If disturbance of encapsulated soils is required at the site, soils should be managed as detailed in Section 7.4.

7.3 CAPPING INTEGRITY

The undertaking of intrusive works during any surface maintenance works within the vicinity of capped material may compromise the integrity of the capping as the capping layer may be disturbed. To maintain the capping layer integrity the following must be adhered to:

- Avoid undertaking intrusive works or works that have the potential to disturb the capping are to be conducted above the capping (see Figure 1 for capped areas). If disturbance of the capping layer is not possible, the procedures outlined in Section 7.4 below are required to be implemented;
- Bi-Annual inspections by the site owner are to be undertaken to identify any signs the cap may have been compromised e.g. accidental disturbance, rainfall erosion, incorrectly executed intrusive works etc. During and after significant weather events inspection frequency may need to be increased; and
- Do not remove the capping layer, or part thereof, unless undertaken under the guidance of a qualified environmental professional under a RAP with appropriate asbestos mitigation measures.

7.4 INTRUSIVE WORKS

As a result of encapsulated contaminated soils, intrusive works within the investigation area pose significant risk of creating exposure pathways, and therefore pose a health risk to future site users and persons undertaking the works. These issues should be specifically addressed during the preparation of the Construction EMP, Site Safety Management Plan (SSMP) and the Safe Work Method Statements (SWMS) for any proposed intrusive works.

Based on the depth of the intrusive work to be undertaken, the risk can be divided in two types as follows:

1. Low risk works: related to the intrusive works to be conducted above the maker layer within the capping material where no impacted soils are to be disturbed. No particular action is required for this type of

work besides reinstating the area once the activity is finished. The site manager should assess the excavation works to ensure that the marker layer is not damaged and contaminated fill exposed and certify that the site has been reinstated appropriately; and

2. High risk work: related to the intrusive works where the marker layer is penetrated, and contaminated fill material exposed. The methodology for managing high risk works are outlined in Sections 7.4.1, 7.4.2, 7.4.3 and 7.5 below.

7.4.1 Low Risk Intrusive Work Management Strategies

For low risk intrusive works carried out above the geotextile liner (i.e. no contaminated material encountered, only repair of capping required) should ensure that the site is suitable for ongoing use at the completion of low risk intrusive works by following the procedures and guidelines outlined below.

- a. Before any works commences, all parties participating in intrusive low risk related work is to be provided with site plans, a document outlining the works to be done, risk management strategies, and depth of marker layer, and a debrief meeting before work commences discussing the work to be done, risk management strategies and marker layer depth.
- b. The project or site manager is to act as a supervisor or “spotter” for the low risk intrusive works, making sure the marker layer is not accidentally penetrated.
- c. The extent of disturbance shall be minimised wherever possible;
- d. Any excavated material from low risk works must be stockpiled in an appropriate manner in order to more easily backfill material after the completion of works
- e. The media layer (mulch) should be stockpiled separately for final reinstatement as a capping layer following the completion of the works;
- f. Upon the completion of low risk intrusive work, any excavated material is to be filled in appropriate location and order, with the mulch layer applied as a final capping layer.

7.4.2 High Risk Intrusive Work Management Strategies

For high risk intrusive works carried out below the geotextile liner (contaminated material encountered, and repair of capping required) should ensure that the site is suitable for ongoing use at the completion of high-risk intrusive works by following the procedures outlined below.

- a. Prior to starting the works, a Licenced Asbestos Assessor (Class A licence) is required to be engaged to undertake asbestos air monitoring for the duration of the works, in particular near the material stockpiling area.

- b. Asbestos air monitoring needs to be compliant with section 8 of the Work, Health and Safety Regulations 2011 (NSW) and the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition (2005).
- c. The extent of disturbance shall be minimised wherever possible;
- d. Any excavated contaminated materials must be stockpiled in a controlled manner that prevents contact with soils from non-contaminated areas on the site;
- e. Stockpiling must be controlled by placing them on impervious plastic sheeting and protected from disturbance by being covered with plastic sheeting. This plastic sheeting is single use only and must be discarded after stockpiles have been reinstated;
- f. The media layer (mulch) should be stockpiled separately for final reinstatement as a capping layer following the completion of the works;
- g. The excavated materials must be backfilled on completion of the works program and all areas inspected to ensure no subsoil materials remain on the surface;
- h. Materials must be reinstated in the order that they were removed to maintain the current soil profile; and
- i. Any materials requiring offsite disposal from the contaminated area should be disposed to appropriately licensed facility. Fill material shall be classified accordance with Waste Classification Guidelines part 1: Classifying Waste, November 2014, NSW EPA (EPA 2014) or an appropriate exception as created under the Protection of the Environment Operations (Waste) regulation 2014. According to JBS& G previous investigation, general site fill materials were preliminary classified as general Solid Waste (asbestos), however, additional waste classification sampling might be required to further classify the waste. Material will require transport and disposal according to regulations to a facility lawfully able to receive it.
- j. The remedial contractor must be aware of and conduct all waste disposal in accordance with all relevant regulations. All waste tracking documentation including disposal dockets must be maintained by the remedial contractor and must be provided to the engaged environmental consultant;
- k. All imported material is required to be accompanied by appropriate documentation that has been verified by the appointed site contamination (environmental) consultant. Imported material will only be accepted to the site if they meet the definition of: virgin Excavated natural material (VEnM) as defined in the protection of the Environment Operations Act (1997) Schedule 1 or materials under an NSW EPA exemption.

7.4.3 Measures to Minimise Exposure to Workers

As human health risks associated with the site in its current condition is confined to the potential exposure of the public and maintenance workers to soil and dust by ingestion, inhalation and dermal contact, management of the risk is largely limited to minimising contact with soil and minimising dust generation during intrusive works.

Measures to minimise exposure to workers from ingestion and inhalation include:

- a. Avoid contact with soils and dust beneath the geotextile fabric;

- b. Do not eat, drink or smoke when undertaking activities which involve disturbance of contaminated soils or dust;
- c. Avoid contact with impacted soils;
- d. Minimise disturbance of dust;
- e. Remove soil using appropriate supervised techniques to minimise dust generation;
- f. Observe good hygiene such as washing the face and hands before eating, drinking or smoking; and
- g. Use appropriate PPE (long trousers, gloves, eye protection and dust mask) when undertaking works at the site.

7.4.4 **Management of Exposure to Dust**

Prior to any intrusive works or other disruptive activities carried out on the site, consideration must be given to how the work or activity can be undertaken with minimal dust generation. The dust control or avoidance measures should be documented in a SWMS prepared for the proposed works. Secondary controls, such as the wearing of dust masks and disposal coveralls should also be considered during potential dust exposure. Further details of OH&S management requirements are provided in Appendix E.

Should any unexpected hazards arise, the Project Manager should be contacted immediately so that the risks (health or safety) can be re-evaluated and the appropriate level of management and/or protection can be implemented prior to the recommencement of any works.

The following procedures and techniques will control dust generation:

- a. A tarpaulin will securely cover all loads of soil contaminated material entering or leaving the site;
- b. Water sprays will be used across the site over unsealed or bare surfaces;
- c. Plastic sheeting will be used to cover excavation faces and stockpiles where necessary;
- d. Materials at the site will be processed, handled, moved and stored in a proper and efficient manner in order to minimise exposure; and
- e. No material processing shall be undertaken on site.

All works should be undertaken with control of dust as a priority. At the conclusion of works, the site must be suitable for management under this EMP.

7.4.5 **Encapsulation Integrity Following Intrusive Works**

The undertaking of intrusive works within the investigation area compromises the integrity of the remediation undertaken at the site, as the geotextile marker layer and capping media will be disturbed as a result of the works. As a result, following all intrusive works, the following must be adhered to:

- a. The geotextile fabric marker layer must be reinstated atop the potentially contaminated soils at the site,
- b. A media capping layer must be installed atop the marker layer using the same material as was present prior to the intrusive works as follows:

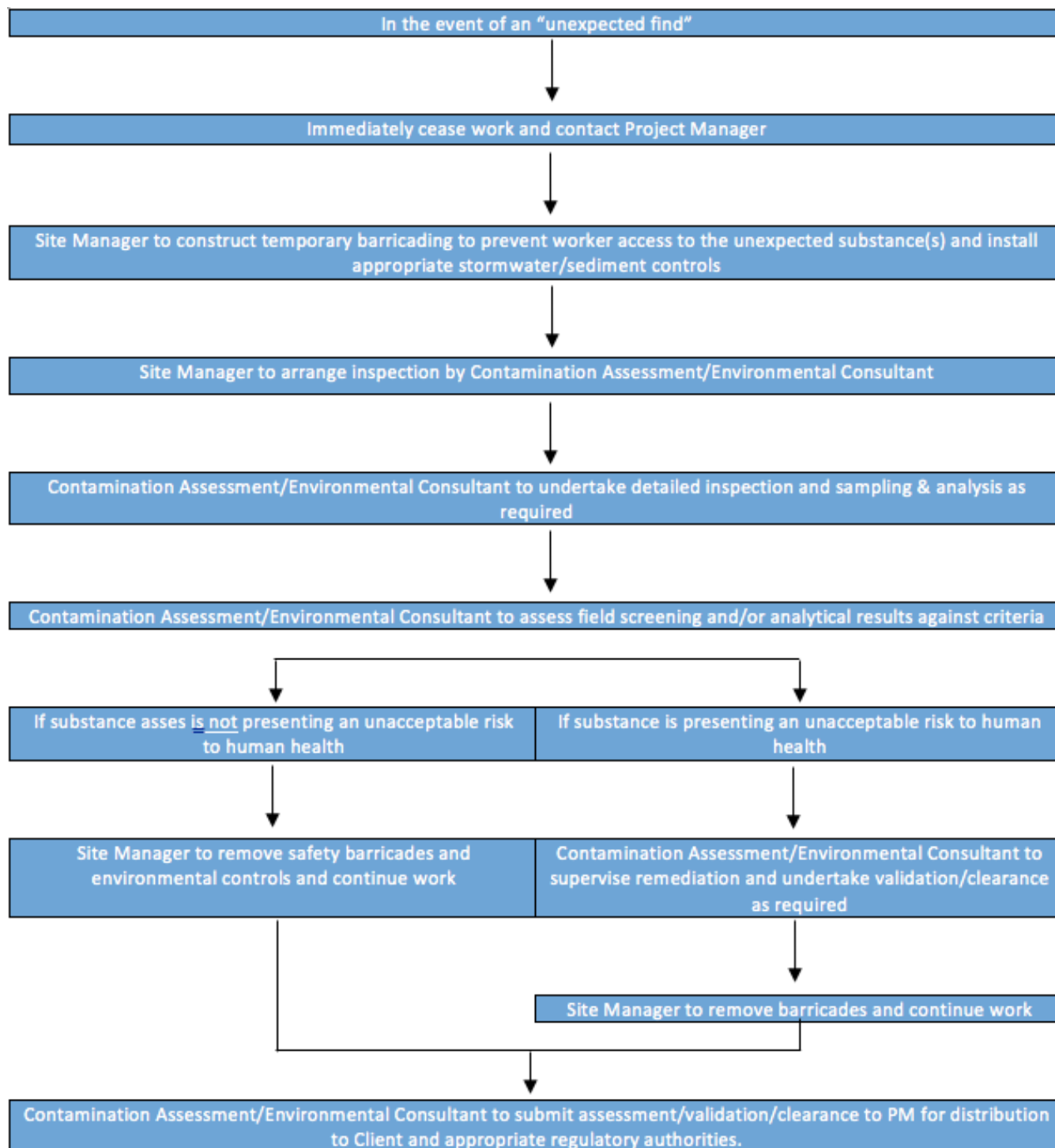
- i. Establishment above the marker layer of a sub-grade layer with environmental suitable soils within pavement and carparks;
 - ii. Backfilling of at least 0.5m of chemically suitable fill material above the orange geotextile for grass/garden areas;
 - iii. Backfilling of at least 1.5m of chemically suitable fill material above the orange geotextile for tree areas; and
 - iv. Underground services trenches to be placed above the marker layer within suitable materials for potential human and/or ecological exposure.
- c. Following the reinstatement of the marker layer and media capping layer, the works should be validated by a suitably qualified environmental consultant, and that the risk that the contamination poses to site users has been mitigated by the reinstatement of the encapsulation.

7.5 UNEXPECTED FINDS PROTOCOL & MANAGEMENT OF MATERIALS UNDER CAPPING LAYER

Although the site has been previously assessed for contamination, there is a risk of unexpected potential hazard may be present on site. This hazard may be detectable via visual or olfactory means. During excavation works, the following potential indicators (not limited to) may indicate the presence of unexpected finds:

- Ash, slag and or tar impacted soils;
- Significant amount of ACM fragments and/or AF/FA impacted materials;
- Hydrocarbon and volatile organic compounds (VOC) impacted soils via odours and/or staining; and
- Underground petroleum storage systems (UPSS) and associate infrastructure;

This procedure details the actions to be taken should any unexpected finds (including all materials underlying the capped surface) be encountered at the site.



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7.6 EMERGENCY RESPONSE

During any activities involving disturbance of the site, a copy of the emergency response information is to be clearly displayed on site showing the emergency meeting point, contact details and the location and route to the nearest hospital with emergency facilities. General emergency contact details are outlined in Table 4.

Table 4 – Emergency Response Contact Details

Resource	Contact Name	Phone
Ambulance	Ambulance Service of NSW	000
Police	NSW Police Service	000
Fire Department	NSW Fire Brigade	000
SafeWork NSW	-	13 10 50
Poison Information Centre	-	131 126
Environmental Consultant TBC	Authorised Representative TBC	
Opal Aged Care	Authorised Representative TBC	

7.7 REVIEW OF THIS ENVIRONMENTAL MANAGEMENT PLAN

This EMP should be reviewed prior to any changes to the current or proposed land use. A review of this EMP should also be considered if changes occur relating to access control, capping integrity, changes of use, change of ownership etc. Any works undertaken and changes to site conditions will be documented.

Council is the entity legally responsible of ensuring that the EMP is implemented for the site and the document is required as long as the contaminated material remains on site. The Aged Care Administrator/Manager is responsible for maintaining the EMP and relevant records as current at the point of use. Types of documents and records include:

- The site monitoring, inspection and compliance reports/records;
- Correspondence with public authorities;
- Internal and external audit reports;
- Induction and training records including:
 - i. Awareness of waste disposal protocols training; and
 - ii. Presence of any weeds and the management actions taken.

- Reports on environmental incidents, other environmental non-conformances, complaints and follow-up action;
- Community engagement information; and
- Minutes of EMP review meetings and evidence of any action taken.

The EMP should be subject to ongoing review and continual improvement. Only the Aged Care Administrator/Manager, or delegate, has the authority to change any of the EMP.

With regard to the document control, the Aged Care Administrator/Manager will coordinate the preparation, review and distribution, as appropriate, of the EMP and records listed above. The EMP and records will be stored at the Aged Care administration office.

The procedure will also ensure that documentation is:

- Developed, reviewed and approved prior to issue;
- Issued for use;
- Controlled and stored for the legally required timeframe;
- Removed from use when superseded or obsolete; and
- Archived.

A register and distribution list will identify the current revision of the EMP, records or data.

A document review process ensures that the EMP is updated as appropriate for the specific works that are occurring on-site. This includes the management review process described above.

7.8 REQUIRED RECORD KEEPING FOR ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION.

In order to efficiently manage and maintain the procedures outlined in this EMP, a number of documents should be filled and updated on a regular basis. The following documents should be maintained to demonstrate appropriate implementation of the EMP.

- Safe Work Method Statements
- Site Safety Management Plans
- Induction Register
- Unexpected Finds Documentation Form
- Capping Layer Maintenance Procedures during Intrusive Works
- EMP Amendment and Revisions Document

Examples of the aforementioned documentation will be appended for the final version of the EMP.

8. REFERENCES

National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013) (NEPC 2013, Canberra)

NSW DEC (2006) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*

NSW EPA (2014) *Waste Classification Guidelines Part 1: Classifying Waste*

NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*

NSW EPA (1999) *Contaminated Sites: Guidelines of Significant Risk of Harm from Contaminated Land and the Duty to Report*

NSW OEH (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*

SESL (2019) J001046 Remedial Action Plan

WA DoH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (2009)

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9. LIMITATIONS

This report only covers the conditions at the time of investigation. Should there be any variation in the conditions beyond this date, further assessment will be required.

This report is for the use of the client and any relevant authorities that rely on the information for development applications and approval processes. Any reliance on this report by third parties shall be at such parties' sole risk. This report shall only be presented in full and may not be used to support any other objective other than those set out in the report.

SESL's assessment is necessarily based on the result of limited site investigations and upon the restricted program of visual assessment of the surface and consultation of available records. Neither SESL, nor any other reputable consultant, can provide unqualified warranties nor does SESL assume any liabilities for site conditions not observed, or accessible during the time of investigations.

No site investigations can be thorough enough to provide absolute confirmation of the presence or absence of substances, which may be considered contaminating, hazardous or polluting. Similarly, the level of testing undertaken cannot be considered to unequivocally characterise the degree or extent of contamination on site. In addition, regulatory or guideline criteria for the evaluation of environmental soil and groundwater quality are frequently being reviewed and concentrations of contaminants which are considered acceptable at present may in the future be considered to exceed acceptance criteria. Similar changes over time may prevail regarding site remediation standards as different regulatory mechanisms are developed and implemented.

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10. APPENDICES

Appendix A – Letter of Agreement

Appendix B – Documentation Templates (to be added with final version)

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specialist aged care

16 October 2019

Northern Beaches Council
725 Pittwater Road
Dee Why NSW 2099

DA No. N01123/17 - 184 Garden Street, Warriewood, NSW 2102

We write with reference to the Environmental Management Plan required under the above referenced Development Consent.

On behalf of Opal, we confirm our willingness to implement the requirements of this EMP upon receipt of the relevant occupation certificate and commencement of our operations.

Regards,

John Cole-Clark

**Senior Project Manager
Opal Aged Care**

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Figure 1

Figure 2

Figure 3

