DLA Environmental Services
A Pacific Environment company

Remediation Action Plan

Edmondson Park Town Centre
Campbelltown Road
Ingleburn NSW 2565

Frasers Property

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ABBREVIATIONS

ACM	Asbestos Containing Material
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	Above-ground Storage Tank
ASS	Acid Sulfate Soil
B(a)P	Benzo(a)Pyrene
BGL	Below Ground Level
BH	Borehole
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
COC	Chain of Custody documentation
CLM	Contaminated Land Management
DA	Development Application
DEC	Department of Environment and Conservation (NSW)
DECC	Department of Environment and Climate Change (NSW)
DECCW	Department of Environment, Climate Change and Water (NSW)
DLA	DLA Environmental Services
DP	Deposited Plan
DQO	Data Quality Objective
EC	Electrical Conductivity
EIL	Ecological Investigation Level
EMP	Environmental Management Plan
EPA	Environment Protection Authority (NSW)
ESL	Ecological Screening Level
HIL	Health-Based Investigation Level
LOR	Limit of Reporting
MW	Monitoring Well
NATA	National Association of Testing Authorities, Australia
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environmental and Heritage
OPP	Organophosphorus Pesticides
OH&S	Occupational Health and Safety
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PID	Photo-Ionisation Detector
PQL	Practical Quantification Limit
QA/QC	Quality Assurance and Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
SAC	Site Acceptance Criteria
SAQP	Sampling Analysis and Quality Plan
SEPP	State Environmental Planning Policy
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WHS	Work Health Safety

EXECUTIVE SUMMARY

DLA Environmental Services (DLA) was commissioned by Frasers Property to prepare a Remediation Action Plan (RAP) for the property identified as:

Edmondson Park Town Centre, Campbelltown Road, Ingleburn NSW 2565 (the Site).

A RAP has been prepared to address localised contamination identified during previous environmental investigations at the Site, in particular, the presence of bonded and asbestos fines / fibrous asbestos (AF / FA) impacts in soils.

This purpose of this report is to set remediation goals and document the management procedures and environmental safeguards to be implemented to ensure the Site will be rendered suitable for future land use consistent with *Residential A* in the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) ('NEPM', NEPC, 2013), thereby posing no unacceptable risk to the human health or the environment generally.

No evidence can be found from previous investigations to infer chemical contamination of soils by heavy metals, hydrocarbons, pesticides and polychlorinated biphenyls at the Site. Similarly, no further assessment or remediation of groundwater was found to be required under the proposed development given the minor impacts and low migration potential of groundwater in the vicinity of the Site.

The Asbestos Quantification Assessment (**DLA, 2015)** designated the following areas of environmental concern with regard to asbestos contamination:

- Bonded asbestos in soils above the Health Screening Levels (HSLs) at sampling locations R1-3 and R2-3;
- Bonded asbestos impacts in soils at sampling locations W1-1 and W7-5;
- Friable asbestos in soils above the HSLs at sampling locations R1-3 and R2-3;
- Surface fragments of asbestos on Wentworth Road towards R8 and at the surface of R1-3;
- Asbestos pipe was encountered in R2-3 at a depth of approximately 1.2m below ground level. It is possible that similar asbestos pipe infrastructure may be present underlying the Site; and,
- A Telstra pit likely constructed of asbestos materials in the south-western corner of W7. It is possible that similar Telstra pits may be located across the Site.

Refer to **Figure 4** – Remediation Areas.

The Site strategy selected must be the most cost-effective solution, which does not bring about unacceptable long-term liabilities, and which does not impose unreasonable constraints on future Site developments or present operations. The strategy must also be capable of achieving the technical, environmental and economic objectives outlined in this report.

Based on the analysis undertaken in previous sections, the preferred method is **Excavation and Off-Site Disposal.**

The proposed remediation strategy incorporates the following elements:

1. Stakeholder consultation;
2. Implementation of an accepted Site Environmental Management Plan (SEMP);
3. Site Establishment and Pre-Remedial Works;
4. Remediation Works, including the remediation of asbestos hotspots, asbestos infrastructure and surface asbestos fragments; and,
5. Validation Plan.

Validation activities will be required for the following areas:

- Validation of asbestos hotspot areas (R1-3, R2-3, W1-1 and W7-5);
- Validation of asbestos infrastructure removal;
- Clearance of overlying spoil for asbestos conduit trenches;
- Clearance of hand-picked areas; and,
- Stockpile Footprints.

At the completion of the remediation activities, a Validation Report documenting the works as completed will be prepared. The Validation Report will describe the strategic works undertaken at the Site, assess the result of the validation testing, demonstrate that the objectives of this RAP have been achieved and provide justifications for any deviation, statistically confirm that the remediated Site complies with the Validation Criteria and include any other information as deemed appropriate.

The Site can be made suitable for the intended land-use through remedial action as part of the redevelopment works in accordance with State Environmental Planning Policy No.55 (SEPP 55). In conclusion this RAP:

- Has been developed in a manner consistent with current industry practice;
- Has selected a preferred remediation strategy based on the site-specific issues and currently available technologies;

- Has presented an outline of the Site Environmental Management Plan (SEMP) and associated health and safety and remediation management plans to ensure human health and the environment are appropriately protected during the proposed works (**Appendix A**);
- Has presented an information and consultation program to ensure the stakeholders are informed of the works as they proceed (**Appendix A**); and,
- Has outlined the means of validation for the completed works.

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1.0 INTRODUCTION

1.1 General

DLA Environmental Services (DLA) was commissioned by Frasers Property to prepare a Remediation Action Plan (RAP) for the property identified as:

Edmondson Park Town Centre, Campbelltown Road, Ingleburn NSW 2565 (the Site).

A RAP has been prepared to address localised contamination identified during previous environmental investigations at the Site, in particular, the presence of bonded and asbestos fines / fibrous asbestos (AF / FA) impacts in soils.

1.2 Objectives

This purpose of this report is to set remediation goals and document the management procedures and environmental safeguards to be implemented to ensure the Site will be rendered suitable for future land use consistent with *Residential A* in the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) ('NEPM', NEPC, 2013), thereby posing no unacceptable risk to the human health or the environment generally.

In achieving this end, the report will provide:

- Brief summary of the history and environmental setting of the Site;
- Summary of the previous environmental investigations at the Site;
- Definition of the extent of remediation required;
- Review of the currently available remediation options;
- Details of the preferred remediation strategy and an outline of the methodology for the implementation of the selected strategy;
- Document appropriate procedures for the handling and tracking of materials;
- Details of the adopted validation programme;
- Brief outline of environmental pollution control, community health and safety, and occupational health and safety measures that should be implemented during remedial works;
- Outline of regulatory approvals and licenses which may be required; and,
- Outline any potential ongoing monitoring or management requirements to ensure the continued protection of human health and the environment.

1.3 Remediation Guidelines

The RAP has been prepared with consideration to the following guidelines and legislation:

- *Australian and New Zealand Guidelines for Assessment and Management of Contaminated Sites* (ANZECC, 1992);
- *Code of Practice for the Safe Removal of Asbestos,* (NOHSC, 2nd ed., 2005);
- *Contaminated Sites: Guidelines for Assessing Service Station Sites* (NSW EPA, 1994);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 2011);
- *Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006);
- *Contamination Sites: Sampling Design Guidelines* (EPA, 1995);
- *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)* (NEPC, 2013);
- *Managing Land Contamination, Planning guidelines, SEPP 55: Remediation of Land* (DUAP, 1998);
- *How to Safely Remove Asbestos: Code of Practice* (WorkCover, 2011);
- *Storage and Handling of Dangerous Goods Code of Practice 2005*; and,
- *Work Health and Safety Act 2011* (NSW) and associated regulations.

2.0 SITE DESCRIPTION

2.1 Site Identification

The Site identification details are summarised in **Table 2a** below:

Table 2a – Site Identification Summary

ITEMS	DETAILS
Site Name	Edmondson Park Town Centre
Address	Campbelltown Road, Ingleburn NSW 2565
Local Government Authority	Liverpool City Council
Lot and Deposited Plan	Lot 1 and 2 DP831152
Development Controls	SEPP (Major Development) Edmondson Park South 2005
Site Zoning	B4 – Mixed Use
Previous Use	Former Ingleburn Defence Site
Current Use	Vacant Land
Proposed Use (NEPM 2013 Schedule B7)	Town Centre Development (*Residential A*)
Site Area (approx.)	280,000m^2 (28ha) 220,000m^2 (22ha) with proposed open space excluded
Locality Map	Refer to **Figure 1** – Site Location

Site description is available in the report titled, '*Validation Report – Ingleburn Defence Site, Stage 3 Remediation Works*' (ERM, 13 July 2011, ref: 0113181RP07_Final) and is summarised below:

2.2 Boundaries and Surrounding Land Use

The boundary and surrounding landscape features of the Site are summarised in **Table 2b** below:

Table 2b – Boundaries and Surrounding Land Use

DIRECTION	DETAILS
North	Edmondson Park Train Station, agricultural and rural residential properties.
East	Forested area, decommissioned sewage treatment plant and residential and rural areas.

DIRECTION	DETAILS
South	Former Ingleburn Defence Site (IDS), rural and residential areas with Ingleburn Industrial zone beyond.
West	Forested area, rural residential properties with a religious complex beyond.

2.3 Site Geology and Soils

According to Geological Series Sheet 9030 (1:100 000) (Geological Survey of NSW, 1991) the Site is underlain by Bringelly Shale of the Wiannamatta Group which comprises shale, carbonaceous claystone, claystone, laminite and fine to medium grained lithic sandstone, rare coal and tuff. Across the Site, the base of the Bringelly Shale is expected to be approximately 10 to 20 m below ground surface (m bgl), dependent on surface elevation, and is underlain by Minchinbury Sandstone and Ashfield Shale.

In the vicinity of the Site, residual soils are classified in the Soil Landscape Series Map of Penrith 1:100,000 (Sheet 9130, 1983) as part of the Blacktown Group. The soils are described as shallow to moderately deep red and brown Podzolic clay soils on crests, upper slopes and well-drained areas, with deep yellow coloured Podzolic clay soils and Soloths on lower slopes and in areas of poor drainage. Soils of the Blacktown Group are moderately reactive, highly plastic clay soils characterised by low fertility and poor drainage.

Excavation works completed at the Site confirmed the presence of red and brown clay soils which were generally observed to be dry with medium to high plasticity.

2.4 Acid Sulphate Soils

No acid sulfate soils were identified during previous investigations or are expected to be present on the Site.

2.5 Hydrology

Shallow groundwater has been identified during previous investigations within the natural silty clays and weathered shales at depths of between 2.8 and 5.5 m bgl underlying the Site. A deeper, regional groundwater aquifer is expected to be present within the shale bedrock at depth.

The direction of groundwater flow beneath the Site has not been determined due to the limited number of groundwater monitoring wells on-site (which often have limited groundwater within

them), however previous investigations infer that groundwater generally flows in accordance with the Site topography, towards the creeks and drainage lines present on and adjacent to the Site.

Previous investigations report slow recharge of monitoring wells during sampling, suggesting low hydraulic conductivity within the water-bearing zones. The low hydraulic conductivity was expected to result in limited migration of any contaminants from sources identified across the Site.

2.6 Site History Summary

The Site formed part of the Ingleburn Defence Site (IDS) which was first occupied by Defence in 1939, when a camp was built during WWII for infantry training. Although the IDS was primarily used for infantry training, the IDS was also occupied by artillery, engineers, transport, signals, medical, and ordnance corps.

The parcel of the IDS comprising the Site was used for former scout troop headquarters, a general store, butchers shop and hall, all of which were burned by arsonists in 1999. The Site also includes Bardia Village, the administration of which was transferred to Defence Housing Australia in 1988. Many of the houses have been demolished.

3.0 SUMMARY OF PREVIOUS INVESTIGATIONS

3.1 Previous Reports

As part of the *Environmental Investigation* (2015), Golder Associates reviewed the following reports as part of the assessment process, which were also made available to DLA:

- *Investigation and Validation of Underground Storage Tanks – Ingleburn Defence Site* (URS, 27 November 2003, ref: 12343_558/UST Removal/UST VAL_REV1);
- *Investigation of Maintenance Compounds and POL Stores – Ingleburn Defence Site* (URS, 6 May 2004, ref: 12343/324/REPORTS/REPORT_REV1);
- *Post Activity Report, Unexploded Ordinance Surveys – Defence Site, Ingleburn NSW* (G-Tek Australia, 14 July 2011, ref: 08027ADOD);
- *Development Environmental Management Plan – Former Ingleburn Defence Site* (ERM, July 2011, ref: 0113181RP08_Final);
- *Long Term Environmental Management Plan, Proposed National Park, Nature Reserve and Open Space Areas – Former Ingleburn Defence Site* (ERM, July 2011, ref: 0113181RP12_Final);
- *Long Term Environmental Management Plan, Mess Hall and Lecture Theatre Areas – Former Ingleburn Defence Site* (ERM, July 2011, ref: 0113181RP14_Final);
- *Site Audit Report – Ingleburn Defence Site* (Frank Mohen, AECOM, 25 July 2011, ref: 60152865);
- *Unexploded Ordinance Works – Defence Site, Ingleburn NSW 1998-2011* (CSG, 21 July 2011, ref: CSG/110620/RPT/1);
- *Validation Report – Ingleburn Defence Site, Stage 3 Remediation Works* (ERM, 13 July 2011, ref: 0113181RP07_Final) [**ERM 2011**];
- *Environmental Investigation – Proposed Town Centre Development, Edmondson Park NSW* (Golder Associates, 12 May 2015, ref: 1419891-001-R-Rev1) [**Golder 2015a**]; and,
- *Remediation Strategies and Cost Estimate – Proposed Town Centre Development, Edmondson Park NSW* (Golder Associates, 12 May 2015, ref: 1419891_005_L_Rev1) [**Golder 2015b**].

Many of the reports do not specifically address the Site and are instead intended for the greater IDS. The most recent environmental investigation prepared specifically for the Site was **Golder (2015a)** and has been summarised below:

3.2 Environmental Investigation [Golder, 2015a]

The purpose of the **Golder (2015a)** investigation was to complement previous investigations undertaken at the Site; in doing so, characterising and semi-quantifying the volume of fill materials. 20 previous reports were reviewed documenting dumped waste, UST removals, hazardous materials surveys,

assessment of the nearby Sewage Treatment Plant, validation of remediation works for temporary occupation of the Site during the construction of the South-West Rail Link, Unexploded Ordinance (UXO) clearances and Items of Military Origin clearances. The key findings of the assessment were:

- **Chemical Contamination:** concentrations of heavy metals, hydrocarbons, pesticides and polychlorinated biphenyls within both fill and natural soils were compliant with adopted assessment guidelines for both residential and commercial/industrial land uses. A single sample associated with building waste slightly exceeded the ecological screening level for benzo(a)pyrene. Preliminary analysis of soil samples indicates no material exceeded thresholds for General Solid Waste;

- **Asbestos Containing Material (ACM)**: ACM was identified at the surface of the Site in three locations and within the fill material at an additional five locations. No quantification of ACM was undertaken at the impacted locations. No asbestos fines/fibrous asbestos (AF/FA) were found to be present in any soil sample collected from the Site. It was also noted that ACM associated with water infrastructure pipes, communication pits and kerb and guttering formwork has been encountered in other parts of the Edmondson Park area and is reasonably suspected of being present. Approximately 5,805m^3 (including an assumed 250m^3 related to former infrastructure) of material was identified as being asbestos impacted; and,

- **Construction/Demolition Rubble Impacted Fill Materials**: fill materials on-site were identified to be primarily re-worked locally sourced clays with some areas impacted by building waste such as bricks and tiles. 14 areas, totalling approximately 10,640m^3 were identified to be impacted by building waste.

Refer to **Figure 3** – Golder (2015a) Remediation Areas.

3.3 Asbestos Quantification Assessment [DLA, 2015]

The objectives of this Asbestos Quantification Assessment were to quantify the concentrations of asbestos in insitu soils in the areas previously identified in **Golder (2015a)** as containing ACM and to evaluate the potential for any unacceptable risks to human health or the environment with regards to the presence of asbestos in soils. Test pits were also excavated in areas previously identified in **Golder (2015a)** as containing building waste to visually assess for the presence of asbestos.

Asbestos quantification was undertaken at 42 test pit locations. Soils were field screened with suspected ACM observed in six test pits. Subsequent laboratory analysis showed two sampling locations (R1-3-AS and R2-3-A) where the concentrations of bonded ACM in soils were above the

screening level for a *Residential A* land use. Following field screening, soils were laboratory tested for AF/FA content. Detections were recorded in two of the 42 samples analysed (R1-3 and R2-3), the concentrations of which were in excess of the HSLs for both samples. All other areas of the Site reported no detections of AF/FA in the samples submitted for analysis and are deemed suitable for the proposed land use.

It should be noted that exceedances of the HSLs for bonded and friable asbestos occurred at the same locations, designating these test pits as areas of concern. It is therefore envisaged that the areas corresponding to test pits R1-3 and R2-3 would require further investigation and/or remediation and form part of a remedial strategy prepared for the Site.

Golders (2015a) noted that UrbanGrowth NSW have encountered ACM in other areas of the Edmondson Park development associated with water infrastructure (pipes), form works associated with kerb and guttering and communication pits. An asbestos pipe was encountered in test pit R2-3 at a depth of approximately 1.2m below ground level (bgl). The purpose of the pipe is unknown, however, it is assumed to be related to a fire hydrant system and travels parallel to Oxley Road. Upon encountering the pipe, it was damaged during excavation and it is possible that the detections of friable asbestos in sample R2-3 were related to this action.

A Telstra pit was identified in the south-western corner of W7 which is likely constructed of ACM considering the age and typical construction of these pits. Knowledge of the Edmondson Park development would indicate that there is a potential for similar pit structures to be encountered across the Site. DLA are therefore of the opinion that asbestos infrastructure is present at the Site which will require management to ensure that exposure risks remain acceptable under the proposed land use.

Intrusive visual inspections across areas W1 to W14 demonstrated that where foreign material was present in fill materials, it was only in minor quantities and generally consisted of concrete, glass, brick and plastic. No ACM was observed in the test pits, with the exception of test pits W1-1 and W7-5. The areas corresponding to W1-1 and W7-5 were therefore designated as areas of concern. The outcomes of visual inspections in the remaining W1 to W14 areas have shown an absence of ACM and indicate that the risk of asbestos impact is low. It is not considered that further investigation or management of asbestos in these areas is warranted.

Surface fragments of ACM sheeting were identified on Wentworth Road towards R8. Weathered fragments of ACM were observed in the vicinity of R1-3. These areas will require remediation and subsequent clearance. The proposed remediation areas are shown in **Figure 4**.

It is noted that several stockpiles are present at the Site to the right of Oxley Road. The stockpiles were not observed to contain visible fragments of asbestos and appear to have been generated from roadworks associated with the construction of Soldiers Parade and Edmondson Park railway station. The stockpiles contained minor foreign material impact.

3.4 Contamination Status

3.4.1 Soils

The concentrations of chemicals in fill and natural soils were found to be below the Health Investigation Levels (HILs). The Ecological Investigation Levels (EILs) were marginally exceeded in one instance for benzo(a)pyrene which, given the low concentration and isolated occurrence, is not expected to present an unacceptable ecological risk. On this basis, no evidence can be found to infer chemical contamination of soils by heavy metals, hydrocarbons, pesticides and polychlorinated biphenyls at the Site.

3.4.2 Groundwater

The following report was available to DLA and not reviewed as part of **Golder (2015a)**: *Groundwater, Surface Water and Sediment Report – Ingleburn Defence Site* (Sinclair Knight Merz, November 2008, ref: Final V4). The following conclusions were made:

- The groundwater chemical analysis results indicate that groundwater has not been significantly impacted by historical activities undertaken at the IDS at most of the locations tested;
- Further investigation of groundwater quality in the vicinity of monitoring well near the Site was not deemed necessary; and,
- Metal concentrations in groundwater were recorded below the ANZECC 95% Freshwater Criteria, adjusted for hardness at most sampling locations.

Golder (2015a) makes reference to a *Phase II Environmental Site Assessment, Sewage Treatment Plant – Campbelltown Road, Ingleburn* (ERM, October 2010), which was not supplied to DLA. According to Golder Associates, the Phase II reported:

- Elevated concentrations of inorganic compounds including ammonia in groundwater, which were related to the operation of the Sewage Treatment Plant, located down hydraulic gradient and approximately 170m north-east of the Site; and,
- Elevated concentrations of heavy metals in groundwater, but were considered likely to represent background concentrations within the shale aquifer.

Groundwater is expected to flow parallel to a creek north of the Sewage Treatment Plant, running in an east-west direction. As stated in **Golder (2015a)**, it was considered unlikely that contamination has migrated from sources onto the Site or nearby due to the low hydraulic conductivity of the groundwater. The Sewage Treatment Plan is located down hydraulic gradient to the Site is therefore unlikely to pose an unacceptable risk of groundwater underlying the Site. On the basis of this information, DLA is of the opinion that no further assessment or remediation of groundwater would be required under the proposed development.

3.4.3 Asbestos

The Asbestos Quantification Assessment (**DLA, 2015)** designated the following areas of environmental concern with regard to asbestos contamination:

- Bonded asbestos in soils above the Health Screening Levels (HSLs) at sampling locations R1-3 and R2-3;
- Bonded asbestos impacts in soils at sampling locations W1-1 and W7-5;
- Friable asbestos in soils above the HSLs at sampling locations R1-3 and R2-3;
- Surface fragments of asbestos on Wentworth Road towards R8 and at the surface of R1-3;
- Asbestos pipe was encountered in R2-3 at a depth of approximately 1.2m below ground level. It is possible that similar asbestos pipe infrastructure may be present underlying the Site; and,
- A Telstra pit likely constructed of asbestos materials in the south-western corner of W7. It is possible that similar Telstra pits may be located across the Site.

Refer to **Figure 4** – Remediation Areas.

4.0 SELECTION OF PREFERRED REMEDIAL STRATEGY

4.1 Overview

The *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006) outlines the hierarchical management of wastes as preferred by the EPA. According to this document, the order of preference for soil remediation and management is:

- On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
- 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;
- Removal of contaminated soil to an approved site or facility, followed where necessary by replacement with clean fill; and,
- Consolidation and isolation of the soil on-site by containment within a properly designed barrier.

This scheme adopts the *Australian and New Zealand Guidelines for Assessment and Management of Contaminated Sites* (ANZECC, 1992). In addition, it is also a requirement that remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the Site undisturbed (DEC, 2006).

4.2 Technical Appraisal

Important considerations (from a technical perspective) in selecting and effectively implementing one of the available remediation strategies for the Site are provided below in **Table 4a**. Due to the nature of the identified contamination; being, asbestos, on-site or off-site treatment was not considered to be a viable method of remediation. On-site and off-site treatment have not therefore been considered in the selection of the preferred remediation strategy for the Site.

Table 4a – Technical Considerations

Technical Considerations	OPTION 1 Capping & Containment	OPTION 2 Excavate and Off-Site Disposal
Human Health Risks	Low – contaminants do not generally constitute a significant risk when contained. Limited personal contact.	Low – excavation and direct off-site disposal will minimise personal contact.
Reliability	Sound – some potential may exist for contaminant break though if cap breached or not maintained properly. Design and manage-ment will ensure minimal access to cap surface is possible.	Excellent – system ensures the removal of all contaminated materials.
Regulatory Approvals	Satisfactory – whilst on-site containment is not the EPA's preferred option; it is often accepted as a feasible option.	Satisfactory – waste will satisfy the *Waste Classification Guidelines* (NSW EPA, 2014).
Site Suitability	Poor – widespread contamination is not present at the Site. Contamination materials are anticipated to be small in quantity.	Good – Site is accessible by road transport, areas of remediation are not widespread.
Disruption to Site Structures and Activities	High – need to design and allocated an area for containment cell.	Moderate – remediation areas can be excavated and treated.
Ongoing Liabilities	Moderate – capping system needs to be maintained and noted on title.	Minimal – all contaminated materials removed.
Contractor Experience	Moderate – contractors available with experience in the implementation of cap and containment systems.	Good – relatively simple strategy involving only basic technologies.
Availability of Disposal Sites	NA.	Good – landfills available to accept waste.
Implementation Time Frame	Short to moderate.	Short.

Based on the analysis undertaken in **Table 4**, the following salient conclusions are made regarding the technical suitability of the various remediation options available for the Site:

- Excavation and off-site disposal is time efficient and offers no constraints on future land use. The option is also highly suitable for the Site as the quantities of contaminated material are anticipated to be low and remediation areas are localised and not widespread;
- Capping and containment method has low health risks as it does not involve a substantial disturbance of the contaminated soils. The option is also a reliable technology and can be implemented in a short time frame; and,
- The major disadvantages associated with the capping and containment method include maintenance requirements and notation that the Site is regarded as containing contamination and is titled accordingly.

Consideration must also be given to the EPA endorsed remediation hierarchy of the *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006) where excavation and disposal are preferable to capping and containment.

The *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (Western Australia Department of Health, 2009) provide predisposing conditions for site remediation options. Management of any asbestos contamination through a containment mechanism is better suited where the asbestos is:

- Buried reasonably deeply;
- Poorly delineated vertical and lateral distribution;
- Covers a large area (e.g. greater than 2,000m^2); and,
- Includes significant AF/FA.

The nature of asbestos contamination at the Site does not reflect these predisposing conditions and is instead characterised by shallow, well-delineated and localised asbestos impacts. Removal off-site is a more favoured approach in these circumstances.

4.3 Economic Appraisal

DLA has performed a precursory cost-benefit analysis to assess the viability of the two most applicable remediation options for the Site – Excavation and Off-Site Disposal and Capping and Containment. A review of typical project component costs, in conjunction with wider considerations regarding long-term liabilities and potential impacts on property value, have concluded that the option of Excavation and Off-Site Disposal is expected to produce the most beneficial economic outcome. This assumption is based on an efficient regime of classification, segregation and disposal under the Excavation and Off-Site Disposal strategy.

4.4 Preferred Strategy

The Site strategy selected must be the most cost-effective solution, which does not bring about unacceptable long-term liabilities, and which does not impose unreasonable constraints on future Site developments or present operations. The strategy must also be capable of achieving the technical, environmental and economic objectives outlined in this report.

Based on the analysis undertaken in previous sections, the preferred method is **Excavation and Off-Site Disposal.**

Relative benefits of the Excavate and Dispose strategy are as follows:

- The remediation areas are well-defined and not widespread;
- Potential risks of asbestos are removed from the Site;
- The strategy would ensure end land-use suitability with no ongoing liability following remediation;
- The time frame for implementation of the remediation system is relatively short; and,
- No future ongoing monitoring or management would be required.

5.0 IMPLEMENTATION OF SELECTED STRATEGY

5.1 General

The proposed remediation strategy incorporates the following elements:

6. Stakeholder consultation;
7. Implementation of an accepted Site Environmental Management Plan (SEMP);
8. Site Establishment and Pre-Remedial Works;
9. Remediation Works; and,
10. Validation Plan.

5.2 Stakeholder Consultation

On approval of the strategy, the Stakeholders including on-site Management and relevant regulatory bodies will be informed of the intentions and the progress at all stages of the remediation works.

5.3 Implementation of Site Environmental Management Plan

A Site Environmental Management Plan (SEMP) covering the remedial works has been prepared for the Site. Before work commences it is imperative that all issues relating to potential impacts have been reviewed. The SEMP including Remediation Works Management and Health and Safety Plans has been included as **Appendix A**.

5.4 Site Establishment and Pre-Remedial Works

5.4.1 Site Establishment

Initial activities at the Site shall involve the establishment of all plant and equipment necessary for the remediation works. This shall include:

- Establishment of a Project Manager/Contractor's site office of temporary work sheds and amenities for Site workers;
- Establishment of a car parking area for Site workers and visitors to the Site; and,
- Establish the Site Environmental Monitoring Program.

Prior to the commencement of any earthmoving activities, it will also be necessary to install environmental protection safeguards, as well as Site security measures. These measures are included as part of the SEMP contained in **Appendix A**.

5.5 Remediation Works

The remedial works envisioned at the Site and in the following staging order are:

5.5.1 Remediation of Asbestos Hotspots

The Asbestos Quantification Assessment (**DLA, 2015)** identified the following areas of concern with regards to asbestos contamination:

- Bonded and friable asbestos in soils above the HSLs at sampling locations R1-3 and R2-3; and,
- Bonded asbestos impacts in soils at sampling locations W1-1 and W7-5.

These areas will be treated as hotspot areas for the purposes of this RAP and involve the following remediation steps:

1. The hotspot areas will be delineated by initially marking a 5m x 5m grid centred on the previous borehole, or based on signs of concern (e.g. visible ACM);

2. Excavation of hotspot area to the top of natural material, estimated to be approximately 300mm below ground level;

3. Stockpiling of excavated soil by the Contractor for waste classification assessment in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014);

4. Validation of hotspot excavation in accordance with **Section 6.0**. Provision of advice from the Validation Consultant whether the contamination has been successfully removed;

5. Further excavation and validation of any remaining contamination in residual soils using the above process (as required);

6. Soils will be loaded into trucks for transport and disposal at licensed receiving facility. The load will be wetted down and covered prior to transport;

7. Air monitoring will be carried out during excavation, stockpiling and disposal; and,

8. Backfilling of excavation with material meeting the requirements of **Section 6.0** and any geotechnical requirements; and,

9. Validation of all stockpile footprints in accordance with **Section 6.0**.

5.5.2 Remediation of Asbestos Infrastructure

An asbestos pipe was encountered in R2-3 at a depth of approximately 1.2m below ground level. A Telstra pit likely constructed of asbestos materials was identified in the south-western corner of W7. **Golder (2015a)** also noted that ACM has been found in other areas of Edmondson Park development and associated with water infrastructure (especially, conduits), kerb guttering and communication pits (e.g. Telstra pits). An allowance therefore needs to be made for the discovery, remediation and validation of any ACM infrastructure underlying the Site.

The following procedure will be implemented following the identification of asbestos infrastructure or where suspect asbestos infrastructure is encountered (such as during the removal of services across the Site):

1. Prior to the commencement of bulk excavation works, an survey will be performed by way of visual inspection, 'Dial Before You Dig' information and excavation (most likely, pot holing) to identify the orientation of suspect asbestos infrastructure, including conduit, guttering and pits;

2. For asbestos conduit, the material overlying the conduit will be excavated to within 0.1m of the conduit and stockpiled parallel to the trench by the Contractor. The conduit will not be exposed during this process, with only preliminary excavation undertaken to expose the conduit intermittently to check the depth of the pipe. This will be performed to ensure an appropriate buffer is present to prevent disturbance. This material not in contact with asbestos conduit is considered suitable to remain on-site for beneficial reuse.

3. The conduit and associated soils will then be exposed and removed with caution by the Contractor and stockpiled on the opposite side of the trench to the overlying spoil. The soils will remain segregated from other material at all times to prevent cross-contamination;

4. The stockpile of asbestos conduit and associated soils will be classified in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014);

5. Validation of trench excavation in accordance with **Section 6.0**. Provision of advice from the Validation Consultant whether the contamination has been successfully removed;

6. Further excavation and validation of any remaining contamination in residual soils using the above process (as required);

7. Soils will be loaded into trucks for transport and disposal at licensed receiving facility. The load will be wetted down and covered prior to transport;

8. Air monitoring will be carried out during excavation, stockpiling and disposal;

9. Backfilling of excavation with material meeting the requirements of **Section 6.0** and any geotechnical requirements; and,

10. Validation of all stockpile footprints in accordance with **Section 6.0**.

5.5.3 Remediation of Surface Asbestos Fragments

Surface fragments of asbestos were found on Wentworth Road towards R8 and at the surface of R1-3. The following remediation protocol applies to the remediation of these fragments and any potential surface fragments encountered during on-site Works.

1. Delineate areas subject to hand-picking by marking out surface soils impacted by ACM;

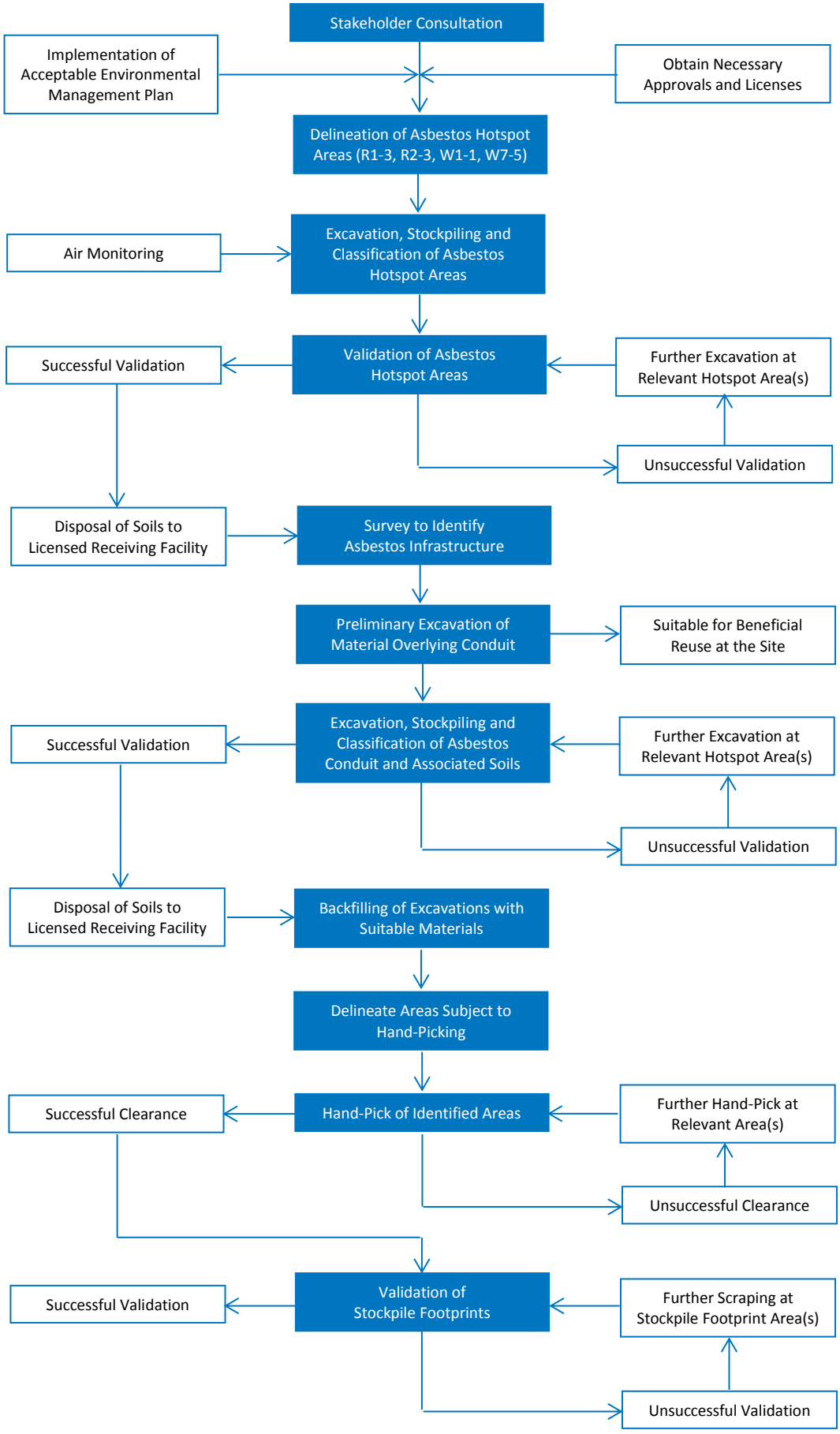
2. Hand-pick of identified areas by Contractor, using techniques such as tining or raking;

3. A visual clearance inspection will be performed in accordance with **Section 6.0** to ensure that surface soils are absent of visible ACM;

4. Provision of advice from the Validation Consultant whether the contamination has been successfully removed; and,

5. Hand-picked material will be appropriately bagged, weighed (if necessary) and disposed of to a licensed receiving facility;

REMEDIATION PROCESS



6.0 VALIDATION PLAN

6.1 Extent of Validation

Validation activities will be required for the following areas:

- Validation of asbestos hotspot areas (R1-3, R2-3, W1-1 and W7-5);
- Validation of asbestos infrastructure removal;
- Clearance of overlying spoil for asbestos conduit trenches;
- Clearance of hand-picked areas; and,
- Stockpile Footprints.

6.2 Validation Procedure

6.2.1 Validation of Asbestos Hotspot Footprints

The Validation of the asbestos hotspot footprints will be performed by way of visual inspection and soil sampling.

Visual inspection will comprise systematically visually inspecting the hotspot footprint in a back and forth fashion by an independent occupational hygienist in 1m transects. The area will be inspected thoroughly for the presence of surface fragments of ACM. Upon completion of the remediation process and satisfactory visual inspection results, asbestos validation soil sampling will be conducted within the hotspot footprint.

Considering the expected dimensions (5m x 5m) and depth (approximately 0.3m) of the hotspot excavations, it is considered adequate to divide the hotspot excavation into two equal grids and collect a validation sample from each grid. Bulk soil sampling will be employed for the purposes of validating the asbestos footprint. The samples must be kept below 500 grams to allow the NATA Laboratory to analyse the entire sample in accordance with Australian Standard *AS4964 – 2004 Method for the Qualitative Identification of Asbestos in Bulk Samples*. The entire sample will then be analysed for positive or negative asbestos detection analysis.

6.2.2 Validation of Asbestos Infrastructure Removal

The Validation of any asbestos infrastructure removal will be performed by way of visual inspection and soil sampling.

Visual inspection will comprise systematically visually inspecting the trench by an independent occupational hygienist. The area will be inspected thoroughly for the presence of fragments of ACM. Upon completion of the remediation process and satisfactory visual inspection results, asbestos validation soil sampling will be conducted within the trench excavation.

Considering the expected dimensions and depth of asbestos conduit, a validation sample will be collected from the base of the trench including the immediately adjacent walls at 25m intervals along the length of the trench or part thereof. Bulk soil sampling will be employed for the purposes of validating the trench excavation. The samples must be kept below 500 grams to allow the NATA Laboratory to analyse the entire sample in accordance with Australian Standard *AS4964 – 2004 Method for the Qualitative Identification of Asbestos in Bulk Samples*. The entire sample will then be analysed for positive or negative asbestos detection analysis.

6.2.3 Clearance of Overlying Spoil

For asbestos conduit, the material overlying the conduit will be excavated to within 0.1m of the conduit and stockpiled parallel to the trench by the Contractor. Validation of the overlying spoil will be performed by way of visual inspection.

Visual inspection will comprise systematically visually inspecting the hand-picked areas in a back and forth fashion by an independent occupational hygienist in 1m transects. The area will be inspected thoroughly for the presence of surface fragments of ACM and ensure that no asbestos conduit was exposed in this process.

6.2.4 Clearance of Hand-Picked Areas

The Validation of the hand-picked areas will be performed by way of visual inspection.

Visual inspection will comprise systematically visually inspecting the hand-picked areas in a back and forth fashion by an independent occupational hygienist in 1m transects. The area will be inspected thoroughly for the presence of surface fragments of ACM.

6.2.5 Validation of Stockpile Footprints

The Validation of the stockpile footprints will be performed by way of visual inspection and soil sampling.

Visual inspection will comprise systematically visually inspecting the stockpile footprint in a back and forth fashion by an independent occupational hygienist. The area will be inspected thoroughly for the presence of surface fragments of ACM. Upon completion of the remediation process and satisfactory visual inspection results, asbestos validation soil sampling will be conducted within the stockpile footprint.

Sampling numbers will conform to the following as a minimum:

- **Footprint:** one sample per 25m^2 or part thereof.

Bulk soil sampling will be employed for the purposes of validating the stockpile footprints. The samples must be kept below 500 grams to allow the NATA Laboratory to analyse the entire sample in accordance with Australian Standard *AS4964 – 2004 Method for the Qualitative Identification of Asbestos in Bulk Samples*. The entire sample will then be analysed for positive or negative asbestos detection analysis.

6.3 Validation Guidelines

Criteria and methods for assessing acceptable concentrations of contaminants at the Site were derived from the following publications:

- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 2011);
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006);
- *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)* (NEPC, 2013);
- *Contaminates Sites: Guidelines on Duty to Report Contamination under the Contamination Land Management Act 1997* (NSW DECC, 2009); and,
- *Guidelines for the Assessment of On-Site Containment of Contaminated Soil* (ANZECC, 1999);

6.3.1 Soil Criteria

To determine Site suitability following remedial works, criteria from the NEPM (NEPC, 2013) Schedule B1 were utilised for Tier 1 validation. As asbestos is the only contaminant of concern under this RAP, criteria for other contaminants have been excluded from this section.

Table 6a – Asbestos Criteria

ANALYTES	RESIDENTIAL A	SOURCE
Bonded ACM [1]	0.01 %w/w	NEPM (NEPC, 2013) Schedule B1, Table 7
Asbestos Fines [2] **/Friable Asbestos** [3]	0.001%w/w	
Surface Asbestos (0.1m)	No Visible ACM	

1 – **Bonded ACM (bonded Asbestos) -** asbestos-containing-material which is in sound condition and where the asbestos is bound in a matrix such as cement or resin (e.g. asbestos fencing and vinyl tiles). Bonded ACM refers to, in this instance, material that cannot pass a 7 mm x 7 mm sieve.

2 – **Bonded Fibrous Asbestos -** friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This material is in a degraded condition such that it can be broken or crumbled by hand pressure.

3 – **Asbestos Fines -** AF includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

6.4 Validation Report

At the completion of the remediation activities, a Validation Report documenting the works as completed will be prepared. The Validation Report will describe the strategic works undertaken at the Site, assess the result of the validation testing, demonstrate that the objectives of this RAP have been achieved and provide justifications for any deviation, statistically confirm that the remediated Site complies with the Validation Criteria and include any other information as deemed appropriate.

6.5 Quality Control

The Quality Assurance (QA) program for the Site will ensure the representativeness and integrity of samples and accuracy and reliability of the analysis results. This includes cleaning of tools before and between sampling, cleaning of containers and delivery of samples to the laboratory within holding times, and in good condition.

The Quality Control (QC) program for the Site will monitor and measure the effectiveness of the QA procedures. This will involve the use of field duplicates, inter and intra laboratory checks and the use of laboratory internal standards. Duplicate samples will be collected to verify the QA/QC of the soil samples collected at a frequency of 1/10 (10%) intra-laboratory, and 1/20 (5%) inter-laboratory. The samples will be transported in a chilled and security sealed esky to a NATA registered laboratory and analysed for asbestos.

7.0 CONTINGENCY PLAN

7.1 Remediation Contingency

If there are events or discoveries made at the Site that would prevent the proposed works complying with the Validation Criteria, or if the selected remediation strategy is not able to proceed, then the following contingencies are devised and should be discussed with the Site Auditor prior to implementation:

Excavation does not effectively remove all buried / contaminated material or widespread asbestos contamination is encountered:

Option A	Continue controlled excavation until validation is achieved.
Option B	Reassessment of remedial options for excavated materials, including the feasibility of the Capping and Contain remedial strategy.

7.2 Unexpected Finds

This Unexpected Finds Protocol (UFP) has been developed as part of the construction planning for implementation during Site activities primarily associated with excavation and civil activities. It has been prepared to ensure appropriate management of natural soils / fill which may contain undefined levels of asbestos contamination or unidentified asbestos infrastructure should they be encountered during Site works.

Refer to **Appendix B** – Unexpected Findings Protocol.

8.0 CONCLUSION

The Site can be made suitable for the intended land-use through remedial action as part of the redevelopment works in accordance with State Environmental Planning Policy No.55 (SEPP 55).

In conclusion this RAP:

- Has been developed in a manner consistent with current industry practice;
- Has selected a preferred remediation strategy based on the site-specific issues and currently available technologies;
- Has presented an outline of the Site Environmental Management Plan (SEMP) and associated health and safety and remediation management plans to ensure human health and the environment are appropriately protected during the proposed works (**Appendix A**);
- Has presented an information and consultation program to ensure the stakeholders are informed of the works as they proceed (**Appendix A**); and,
- Has outlined the means of validation for the completed works.

9.0 REFERENCES

- *Australian and New Zealand Guidelines for the Management of Contaminated Sites* (ANZECC/NHMRC 1992);
- *Australia and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000);
- *Australian Drinking Water Guidelines, National Water Quality Management Strategy* 2011;
- Chapman, G A, Murphy, C L, Tille, P J, Atkinson, G and Morse, R J, *Sydney Soil Landscapes Map*, Series 9130 (1989);
- *Code of Practice for the Safe Removal of Asbestos* (NOHSC, 2nd ed., 2005);
- *Contaminated Land Management Act 1997* (NSW);
- *Contaminated Sites: Assessing Service Station Sites, 1994* (NSW EPA, 1994);
- *Contaminated Site: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 2011);
- *Contaminates Sites: Guidelines on Duty to Report Contamination under the Contamination Land Management Act 1997* (NSW DECC, 2009);
- *Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination* (NSW DEC, 2007);
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006);
- *Contaminated Sites: Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report* (NSW EPA 1999);
- *Contaminated Sites: Sampling Design Guidelines* (NSW EPA 1995);
- *Environmental Guidelines: Solid Waste Landfills* (NSW EPA, 1996);
- *Guidelines for the Assessment of On-Site Containment of Contaminated Soil* (ANZECC, 1999).
- *Health - Based Soil Investigation Levels, Imray, P & Langley, A, National Environmental Health Forum Monographs, Soil Series No. 2 (2nd Ed), South Australian Health Commission* (NEHF 1998b);
- *How to Safely Remove Asbestos: Code of Practice* (WorkCover, 2011);
- *National Environment Protection (Assessment of Site Contamination) Measure (No.1)* (NEPC, 2013);
- *Managing Land Contamination: Planning Guidelines, SEPP 55 - Remediation of Land* (DUAP, 1998);
- *Storage and Handling of Dangerous Goods Code of Practice 2005*;
- Pacific Southwest, Region 9 Regional Screening Levels (US EPA, 2014);
- *Waste Avoidance and Resource Recovery Act 2001* (NSW);
- *Waste Classification Guidelines* (NSW EPA, 2014); and,
- *Work Health and Safety Act 2011* (NSW) and associated regulations.

FIGURE 1 – SITE LOCATION

DLA environmental Unit 2b/30 Leighton Place Hornsby, NSW 2077	**DESIGNED:** DLA	SITE LOCATION	
	COMPILED: NL	**CLIENT:** Australand	**DRAWING:** 19.05.15
	PROJ. No. DL3551	**LOCATION:** Edmondson Park Town Centre	**FIGURE:** 1

FIGURE 2 – SITE LAYOUT

Legend

Approximate Site Boundary

Approximate Scale

0m 10m 20m

DLA Environmental Services
A Pacific Environment company

Sydney Office
Phone (02) 9476 1765
Fax (02) 9476 1557

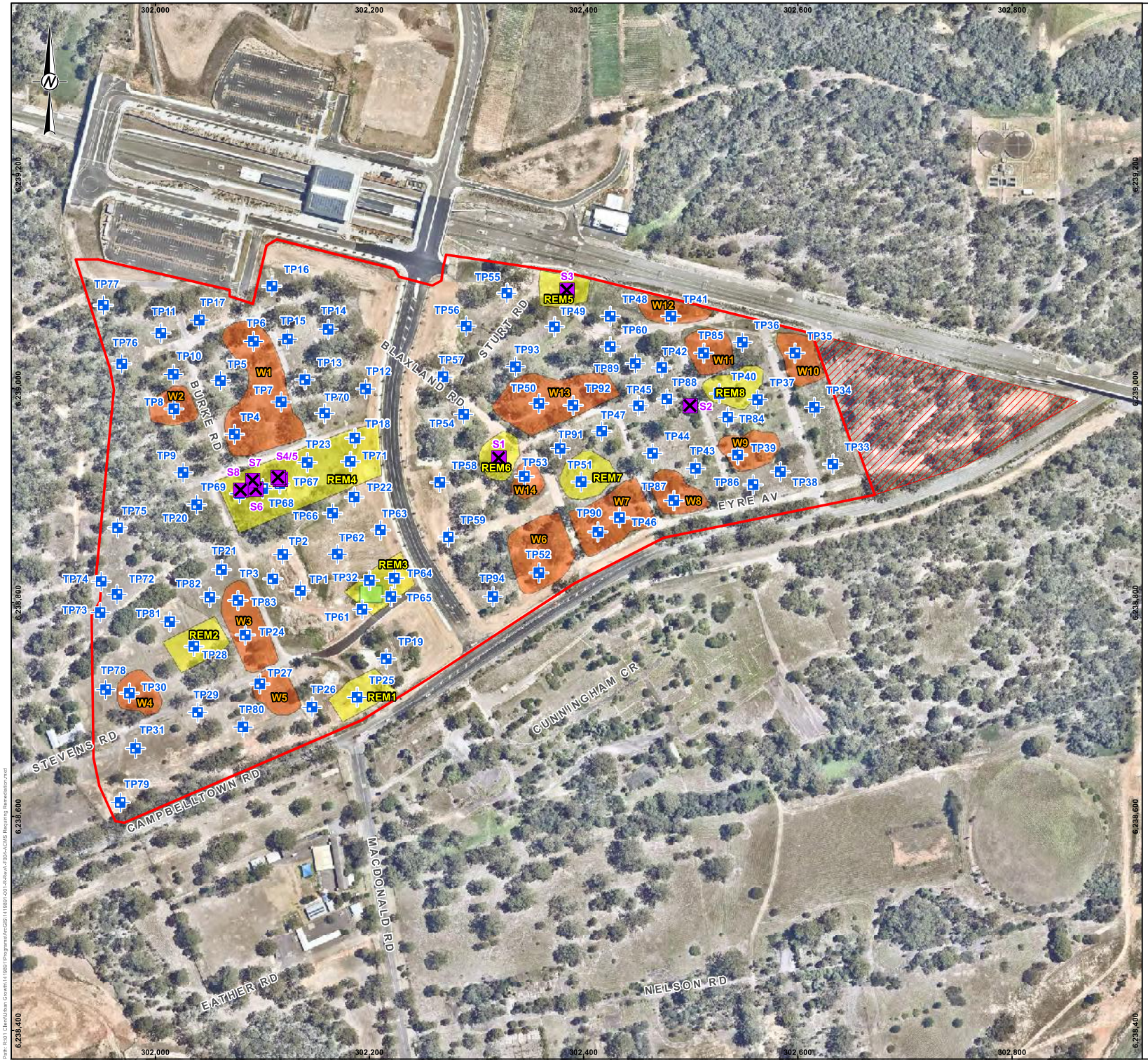
Maitland Office
Phone (02) 4933 0001

Title: Site Layout

Client: Frasers Property

Project No.	Figure No	Date
DL3550	2	18.11.15
Scale	Compiled	Revision
As Shown	NL	R00

FIGURE 3 – GOLDER (2015a) SAMPLING LOCATIONS



LOCATION MAP

LEGEND

- Test Pit
- Surface ACM
- Boundary for Slab of Old Boiler
- Area Impacted by Building Waste & ACM (Areas Requiring Remediation)
- Area of Associated Building Waste (Potential Areas of Remediation)
- Site Boundary
- Public Open Space

NOTES

1. Imagery dated Jan 2015.

COPYRIGHT

0 50 100 150 200 250
METRES

REFERENCE SCALE: 1:3,500 (at A3)

PROJECTION: GDA 1994 MGA Zone 56

CLIENT
URBAN GROWTH

PROJECT
PROPOSED TOWN CENTRE DEVELOPMENT
EDMONDSON PARK, NSW

TITLE
ACMS REQUIRING REMEDIATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-05-12
PREPARED	SL
DESIGN	SL
REVIEW	OB
APPROVED	OB

PROJECT No. 1419891 | CONTROL 001 | Rev. 1 | FIGURE 4

FIGURE 4 – REMEDIATION AREAS

Legend

- Approximate Site Boundary
- Proposed Remediation Areas
- Removal of Surface Asbestos Fragments
- Potential Area of Remediation (Depending on Extent of Asbestos Pipe

Approximate Scale

0m 10m 20m

DLA Environmental Services
A Pacific Environment company

Sydney Office
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Title: Remediation Areas

Client: Frasers Property

Project No.	Figure No	Date
DL3550	4	06.10.15
Scale	Compiled	Revision
As Shown	NL	R00

APPENDIX A – SITE ENVIRONMENTAL MANAGEMENT PLAN

DLA Environmental Services
A Pacific Environment company

Site Environmental Management Plan

Edmondson Park Town Centre
Campbelltown Road
Ingleburn NSW 2565

Frasers Property

DL3550

November 2015

PROJECT NAME	Edmondson Park Town Centre
PROJECT ID	DL3550
PREPARED FOR	Frasers Property
APPROVED FOR RELEASE BY	David Lane
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DOCUMENT CONTROL

VERSION	DATE	COMMENT	PREPARED BY	REVIEWED BY
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Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by the client or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to DLA is both complete and accurate. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s), unless explicitly stated otherwise.

ABBREVIATIONS

ACM	Asbestos Containing Material
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	Above-ground Storage Tank
ASS	Acid Sulfate Soil
B(a)P	Benzo(a)Pyrene
BGL	Below Ground Level
BH	Borehole
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
COC	Chain of Custody documentation
CLM	Contaminated Land Management
DA	Development Application
DEC	Department of Environment and Conservation (NSW)
DECC	Department of Environment and Climate Change (NSW)
DECCW	Department of Environment, Climate Change and Water (NSW)
DLA	DLA Environmental Services
DP	Deposited Plan
DQO	Data Quality Objective
EC	Electrical Conductivity
EIL	Ecological Investigation Level
EMP	Environmental Management Plan
EPA	Environment Protection Authority (NSW)
ESL	Ecological Screening Level
HIL	Health-Based Investigation Level
LOR	Limit of Reporting
MW	Monitoring Well
NATA	National Association of Testing Authorities, Australia
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environmental and Heritage
OPP	Organophosphorus Pesticides
OH&S	Occupational Health and Safety
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PID	Photo-Ionisation Detector
PQL	Practical Quantification Limit
QA/QC	Quality Assurance and Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
SAC	Site Acceptance Criteria
SAQP	Sampling Analysis and Quality Plan
SEPP	State Environmental Planning Policy
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WHS	Work Health Safety

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 General

LA Environmental Services (DLA) was commissioned by Frasers Property to prepare a Site Environmental Management Plan (SEMP) for the property identified as:

Edmondson Park Town Centre, Campbelltown Road, Ingleburn NSW 2565 (the Site).

A major component of the remedial works shall involve the installation and maintenance of a SEMP. The SEMP will provide details of the environmental protection and pollution control measures to be implemented during the operational phase of the remedial works. This SMP applies to the maintenance of the Site prior to redevelopment and during the construction phase of redevelopment.

1.2 Preamble

The pollution control measures listed in this plan have the objective of removing/minimising any adverse impact on the surrounding environment. Details of the pollution control measures to be implemented are documented in the Environmental Management Plan (EMP) for the remediation works which is prepared (and approved) prior to commencement of remedial works.

In order to prepare the SEMP for the remedial works, a review will be undertaken to identify possible impacts on the surrounding environment. For each potential impact identified the range of pollution control measure(s) available for mitigating the impact was reviewed and the most practicable, efficient and cost effective are identified for implementation.

The following sections outline various pollution control measures that would be implemented during most elements of the remedial works. These form the basis of the Environmental Management Plan that should be read in conjunction with this document. It is appropriate for the Contractor to develop control measures for their component of the works based on the broad guidelines of the Remediation Action Plan.

2.0 ENVIRONMENTAL WORKS MANAGEMENT

2.1 Erosion Sedimentation Control Plan

Erosion and run-off control measures will be implemented during all elements of remedial works undertaken. Typically, these measures will be designed to prevent the transport of pollutants (including sediments) out of the remediation area via stormwater/surface run-off.

Generally, no surface run-off and/or water from excavations/pits and trenches within the remediation area will be permitted to discharge, without regulatory authority approval, to the surrounding environment. Run-off control measures will be developed giving consideration to the site conditions in each remediation area, and are likely to include (but not necessarily be limited to) the following:

Table 2a – Erosion Sedimentation Controls

#	CONTROLS
1	Diversion drains, berms, sumps and pumping systems to prevent runoff entering or leaving excavation areas. All water in contact with works will be diverted through the treatment system.
2	Truck cleaning areas for use in washing down all vehicles potentially coming into contact with contaminated soil leaving a remediation area.
3	Use of silt fencing, hay bales and/or oil absorbing booms, as required.

2.2 Noise Control Plan

The impact of noise associated with the site remediation works is acknowledged as a potentially important environmental effect. It will be necessary to minimise noise in accordance with OEH Standards. The methods used to control noise will be dependent upon the equipment being used for particular remedial activities however, it would be expected that the methods would include those commonly used during normal construction and demolition works.

Noise control measures will be developed giving consideration to the site conditions in each remediation area, and are likely to include (but not necessarily be limited to) the following:

Table 2b – Noise Controls

#	CONTROLS
1	Site work will be restricted to the hours specified below in **Section 2.6**.
2	The use of construction vehicles on-site will be kept to a minimum.
3	All equipment in operation in open areas on-site shall comply with the requirements of AS2436-1981 *Guide to Noise Control on Construction, Maintenance and Demolition Sites.*
4	Noise monitoring may be conducted during the site remediation program.

2.3 Dust Control Plan

During the course of remediation works, dust control measures shall be undertaken to ensure that dust generated from the site is controlled within acceptable levels. These control measures will be developed giving consideration to the site conditions in each remediation area, and are likely to include (but not necessarily be limited) to the following:

Table 2c – Dust Controls

#	CONTROLS
1	All vehicles leaving the site will be cleaned on site to remove any potentially contaminated dust.
2	Access to water sprays shall be available to water down the excavation/loading if dust generation becomes significant.
3	Plastic sheeting shall be available to cover excavation faces and stockpiles.
4	An ambient air-monitoring program shall monitor dust levels at the site boundary, as necessary.

2.4 Odour Control Plan

During the course of remediation works, odour control measures shall be undertaken to ensure that possible odours generated on-site are controlled to within acceptable levels. These control measures will be developed giving consideration to the site conditions in each remediation area, and are likely to include (but not necessarily be limited) to the following:

Table 2d – Odour Controls

#	CONTROLS
1	The prevailing weather conditions shall be considered in the manner in which work is undertaken.
2	Plastic sheeting (such as VLDPE or PVC) will be made available at all times on-site to allow for any excavated or disturbed contaminated soils to be covered, if necessary to reduce odour.
3	Odour masking agents (such as Biosolve) will be available for use on-site to suppress any nuisance odours not controlled by the above actions, so that ambient air quality at the site boundary is not adversely impacted.
4	Application of Biosolve at a rate of 1 part to 5 parts water will be by way of hand held pressure applicator.

2.5 Vehicle Cleaning and Operation

The following controls will be placed on operation and movement of vehicles:

Table 2e – Vehicle Cleaning Controls

#	CONTROLS
1	The surface of internal access roads carrying vehicular traffic will be kept clean.
2	Vehicles carrying fill materials sourced from the Site shall at all times be covered with an “enviro-tarp” or similar impervious material to prevent the escape of dust or other material.
3	A log of all trucks removing fill material from the Site or importing soil to the Site will be kept in a Truck Log book.
4	The wheels and wheel arches of all vehicles having had access to the residual fill material will be inspected and if required, cleaned by the use of a broom or water spray to prevent mud and sediment from being deposited on Council roadways.

2.6 Hours of Operation

Working hours for any on-site remedial works would be set in consultation with the Council, but it is envisaged the likely hours would be as follows:

Mondays to Fridays	7:00 am to 5:00 pm
Saturdays	7:00 am to 3:00 pm
Sundays and Public Holidays	No Work Permitted

2.7 Emergency and Out of Hours Contact Numbers

DLA	94761765	**NSW EPA**	131 555
David Lane	0410494810	**WorkCover NSW**	13 10 50
Frasers Property	(02) 9263 8888		

3.0 HEALTH AND SAFETY

3.1 Workplace Health and Safety

A Workplace Health and Safety (WHS) plan is an essential part of all remediation projects, to ensure the health and safety of all personnel working on or visiting the site. All remediation work would be undertaken in accordance with the provisions set out by the *Work Health and Safety Act 2011* (NSW) and associated *Work Health and Safety Regulation 2011* (NSW), and any other regulations or directions set out by regulatory authorities.

Typically the WHS plan would consider a broad range of issues including (but not limited to) the following:

Table 3a – WHS Plan Components

#	COMPONENTS
1	Evaluation of the Site hazards and the risks associated with these hazards.
2	Definition of the risk control measures.
3	Definition of the Personal Protection Equipment (PPE) required.
4	Details on work practices and restrictions, assessment of anticipated protection levels, controls on access to the Site and decontamination.
5	Supervision of work practices at the Site.
6	The notification of accidents and other matters.
7	Environmental monitoring protocols.
8	Risk assessment methods.

Workplace health and safety involves the development and implementation of systems and procedures into a Health and Safety Plan included in a site Work Method statement. The objectives of these documents are to ensure the health and safety of those undertaking specific tasks on site and the wider community if necessary. A Health and Safety Plan should be developed for any site work and would typically include the following:

- A clear health and safety policy;
- Requirements for worker health assessments and inductions;

- Identified health and safety training requirements;
- Requirements for occupational health protection and monitoring;
- Site/location specific emergency plan;
- Site/location specific emergency contact details;
- Permit to work/clearance procedures, and
- Task specific safe work method statements.

3.2 Site Induction

All workers and visitors will be required to attend a site-specific health and safety induction before entry to the Site is allowed. It is recommended that as a minimum, the following items be presented in the Site induction:

Table 3b – Site Induction Components

#	COMPONENTS
1	General overview of the work to be conducted.
2	Overview of the contamination issues at the Site.
3	Contamination concerns and associated exposure risks.
4	Hazard identification and prevention.
5	PPE.
6	The notification of accidents and other matters.
7	Environmental monitoring protocols.
8	Risk assessment methods.

All workers and visitors to the Site will be required to sign an induction log which signifies that they have been inducted, understand the issues and agree to follow the SSSP and this SMP.

3.3 Personal Hygiene and Decontamination

Appropriate hygiene and decontamination assists with minimising worker exposure and the transportation of potentially contaminated materials from the site to more sensitive home environments.

The following activities are prohibited while working in the hazardous materials area:

- Eating;
- Drinking;
- Chewing gum, and;
- Smoking.

Practices that involve contact between the hands and the mouth increase the risk of chemical ingestion. Hands should be thoroughly washed with soap and water after completing work activities and before meal breaks. Personal decontamination is required to minimise workers' exposure to, and indirect transportation of potential chemicals of concern.

Decontamination involves physically removing material from personnel and equipment. Protective equipment, tools and other equipment are decontaminated by cleaning with detergent water using a soft-bristle brush followed by rinsing with a sufficient quantity of water. Decontamination should be conducted before meal breaks, and at the end of a day's work

3.4 Community Health and Safety

The health and safety of the surrounding community is very important for any remediation works. While it is possible to control the activities of personnel within the remediation area (e.g. ensuring appropriate WHS procedures and equipment are utilised), it is not normally possible to control the activities of the surrounding community. Therefore, to protect the community health and safety, it is necessary to control the remedial works so that no fugitive emissions occur during the remedial works that could have an adverse impact on the surrounding community.

These controls are documented in the Environment Management Plan for the remedial works, although monitoring requirements to confirm the effectiveness of the measures may also be documented in the WHS Plan. The methodology that would normally be used to develop the control measures is described below.

Firstly, the portions of the community that may be impacted by any fugitive emissions will be identified. Secondly an assessment of the hazard posed by the contaminants and the proposed remedial methodology/technology would be undertaken. This assessment would define the hazard posed by the particular contaminants present in the remediation area using risk assessment techniques (i.e. identifying the hazard or contaminants and the exposure pathway that the potentially at risk community could be exposed to the hazard).

Once these have been identified, a review will be undertaken of control measures available to remove or minimise the risk posed to the surrounding community during the remedial works. Typically the control measures would comprise removal/minimisation of the exposure pathway to the community. As indicated above it may be necessary to undertake monitoring to confirm the effectiveness of the control measures, and if the monitoring indicates a possibility for exposure then contingency measures may need to be implemented. By way of example control mechanisms could include (but not necessarily limited to) the following:

- Site security measures to prevent access to the contaminated material by the public;
- Dust suppression measures to minimise inhalation and ingestion exposure; and,
- Not undertaking certain work if winds are unfavourable etc.

3.5 Traffic Control Plan

Movement of excavation equipment, trucks and other vehicles involved in the remediation works, to and from the site will be strictly controlled and restricted to a minimum and only take place during approved working hours. All potentially contaminated vehicles leaving the site will be decontaminated in an appropriate truck wash-down area. All vehicles will be visually free of soil before permission to leave a remediation area is granted.

4.0 WASTE MANAGEMENT AND MINIMISATION

All waste disposal activities should be undertaken in accordance with *the Waste Classification Guidelines* (NSW EPA, 2014), the *Waste Avoidance and Resource Recovery Act 2001* (NSW), the *Protection of the Environment Operations Act 1997* (NSW) and other relevant legislation.

4.1 Excavation and Reinstatement

Any spoil excavated from the Site should be used as backfill in the void from which it was sourced. The following shall apply:

Table 4a – Excavation and Reinstatement Controls

#	CONTROLS
1	Excavated material should be reinstated in the excavation in the reverse order to which they were excavated. A minimum 100mm layer of clean material shall be placed over the excavation as an interim capping layer.
2	Open excavations should be backfilled as soon as practicable.
3	Unmanaged excavated spoil must not remain at the surface of the Site.
4	Depending on the size of the excavation(s) at the Site, backfill materials may need compaction. In this event, advice from appropriately qualified civil engineer or geotechnical consultant should be sought.

4.2 Disposal of Material

Any fill materials (and soil) excavated from the Site that are surplus to requirements must be characterised and removed in accordance with the Waste Classification Guidelines (NSW EPA, 2014). Characterisation of excavated materials and their subsequent disposal to an appropriately licensed landfill facility would include:

Table 4b – Disposal Controls

#	CONTROLS
1	A qualified environmental consultant should be engaged to undertake characterisation sampling.
2	Samples should be analysed for contaminants of concern.
3	The rate of sample collection will depend on the volume of material that is to be characterised.

#	CONTROLS
4	Depending on results, additional tests by the Toxicity Characteristic Leachate Procedure (TCLP) methodology may be required.
5	The results of the laboratory analyses should be compared to the waste classification criteria provided in the *Waste Classification Guidelines* (NSW EPA, 2014).
6	A waste classification letter should be prepared by the Environmental Consultant and provided to a landfill facility. The facility will then confirm that it will accept the waste. When the landfill facility has confirmed that the waste is acceptable, transport the waste to the landfill facility.
7	Copies of all weighbridge dockets should be provided to the Site Owner and Environmental Consultant to confirm that the material tracking has been 'cradle-to-grave'.
8	All soil waste must be handled, managed and transported in accordance with the *Protection of the Environment Operations (Waste) Regulations 2014* (NSW).

4.3 Importation on Materials

In the event that use of imported fill material at the Site is required, the following will apply:

Table 4c – Importation Controls

#	CONTROLS
1	Virgin Excavated Natural Materials (VENM) or Excavated Natural Material (ENM) should be used. A certificate should be obtained from the supplier confirming that classification of the material as VENM or ENM.
2	An appropriately qualified environmental consultant should be engaged to undertake characterisation sampling.
3	Where necessary, the environmental consultant should inspect the VENM or ENM source.
4	The materials(s) should have been sampled and analysed to validate suitability for the proposed land use. Sampling and analyses should have been undertaken at an appropriate rate to enable statistical validation of the material's suitability for the proposed land use.
5	Samples should be analysed for TRH, BTEX, PAH, OCP, suite of eight metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) and asbestos.

In the event that VENM or ENM is not used, any fill materials that are validated as suitable for the proposed land use could be used. Validation would include the relevant bullet points provided above.

5.0 REMEDIATION WORKS MANAGEMENT

5.1 Regulatory Approvals/Licenses

5.1.1 State Environmental Planning Policy (SEPP) 55 'Remediation of Land'

SEPP 55 relates to the decision making process in undertaking remediation of land and making planning decisions in regard to contaminated and potentially contaminated land. It is understood that the proposed remediation works are considered to be classified as 'Category 2' Remediation Works – i.e., not requiring consent.

The remediation work is verified not to be Category 1 by reference to the following information:

- The work is not designated development under Schedule 3 of the *Environmental Planning and Assessment Act 1979* (NSW) or under a planning instrument;
- The work proposed is not on land identified as critical habitat under the *Threatened Species Conservation Act 1995* (NSW);
- Consideration of Section 5 of the *Environmental Planning and Assessment Act 1979* (NSW) indicates that the remediation work is not likely to have a significant effect on threatened species, populations or ecological communities;
- The work is not proposed in an zone identified in a planning instrument as being of environmental significance; and,
- The work does not require consent under another SEPP.

5.1.2 Environmental Planning and Assessment Act, 1979

This Act provides a framework for the development of land within NSW, including division of planning responsibilities between tiers of government and requirements for assessment in relation to development of sites for specific uses. This Act provides for the enforcement of conditions upon use of the land via planning instruments including state environmental planning policies such as State Environmental Planning Policy (SEPP) – No 55 – Remediation of Land.

5.1.3 Contaminated Land Management Act, 1997

This Act controls the assessment of contamination and management of contaminated soils and groundwater. The Act also contains guidance for the determination of whether a site is considered to be a Significantly Contaminated Site and allows for accreditation of Site Auditors.

5.1.4 Protection of the Environment Operations Act, 1997

This Act provides a regulatory framework for matters affecting the environment including environmental protection measures. The Act provides for the licensing of activities with the potential to cause harm to human health and/or degradation of the environment, including waste disposal.

The proposed remediation / validation works are not required to be licensed under the *Protection of the Environment Operations Act 1997* (NSW). The works do not comprise:

- Treatment otherwise than by incineration and storage of more than 30,000 cubic metres of contaminated soil originated exclusively from the Site; and,
- Disturbance of more than an aggregate area of three hectares of contaminated soil originating exclusively from the Site.

5.1.5 Work Health and Safety Regulation, 2011

This regulation details the duties for employers to achieve required employee health and safety performance. The requirements of these regulations will require incorporation in the WHS plan and Safe Work Method Statements.

6.0 ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL

6.1.1 General

When the remedial works are being planned an assessment of potential mechanism for fugitive emissions from the remediation area will be completed. Contingency plans shall then be developed to deal with any identified emissions. The contingency plans will detail the response procedures to be implemented immediately after detection of a fugitive emission to the surrounding environment. The contingency plan will include details of the potential emissions identified and the appropriate response measures. The following outlines some examples of unexpected situations that may arise and may require response measures:

- Dust, noise, odour levels measured at site boundary may exceed acceptable levels; or,
- Surface water run-off may leave the site.

Typically, in cases where fugitive emissions are identified, the Project Manager/Superintendent will stop work and appropriate situation specific responses will be taken. By way of example these could include: reducing dust by further water spraying, reducing machinery on-site to minimise noise, intercepting run-off with diversion drains and a pumping system, backfilling an excavation to remove an unpleasant odour etc.

6.1.2 Buffer Zone

Wherever possible, a buffer zone will be established around remedial works. The effect of this buffer zone will to minimise the potential for impacts on the surrounding open space and residential areas as well as the community as a whole. The location and layout of the buffer zone will be determined by consideration of (but not necessarily limited to) the following:

- Hazards associated with, and exposure pathways to the main contaminants in the remediation area;
- Surrounding land uses;
- Prevailing weather conditions; and,
- Existing physical barriers (e.g. fences, buildings etc.).

Access to the area within the buffer zone would be restricted to persons directly involved in the remedial works. If it is not possible to establish an adequate buffer zone in some areas where remedial works are to be undertaken, consideration will be given to other means of ensuring that there are no adverse impacts on the surrounding land users. This could include, for example,

minimising or restricting the extent of any excavations or other activities that would effectively limit exposure to contamination.

6.2 Groundwater Management

Management considerations for groundwater encountered during construction (if required) include:

Table 6a – Groundwater Controls

#	CONTROLS
1	Minimise contact with the groundwater.
2	Groundwater pumped from any excavations could be re-injected into the aquifer beneath the Site. This would require installation of appropriately licensed injection wells however, hydrogeological advice may be required. Alternatively, a soak pit could be excavated at the Site (requirements of the SMP apply) and groundwater pumped into the pit for dissipation into the aquifer.
3	If groundwater accumulates in excavations and requires removal: – Any discharge of groundwater to sewer or council stormwater systems should only be undertaken with the appropriate permission from the relevant authority. This may require sampling and analysis for characterisation purposes to obtain permission for discharge. – A licensed contractor should be engaged to dispose of the groundwater to an appropriately licensed facility.
4	Subject to characterisation sampling results, some treatment of groundwater may be required prior to discharge to sewer and/or stormwater. This could include pumping groundwater into a temporary holding tank for treatment, followed by discharge. The type of treatment required is beyond the scope of this SMP but would be subject to analysis results and (likely) a pilot trial to assess the effectiveness of the proposed treatment methodology.

7.0 COMMUNITY RELATIONS PLAN

7.1 Communications Plan

Extensive consultation has been conducted on the Project to date. Meetings with stakeholders have kept information on the Project flowing to involved groups. It is envisaged that the remediation program will be developed in consultation with the stakeholders prior to implementation. It is likely that the plan would intend to:

Table 7a – Communications Plan Components

#	CONTROLS
1	Provide the stakeholders with information about the remedial works project.
2	Enable the stakeholders to raise questions/concerns and other suggestions regarding the remedial works project.
3	Co-ordinate matters of concern in relation to the remedial works project with Council and Regulatory Authorities with a stake in the project.

7.2 Complaint Response Measures

A complaint response system has been developed for dealing with any complaints received. The system includes:

Table 7b – Complaint Response Measures

#	CONTROLS
1	Identification of the individuals (e.g. Project Manager, etc.) with overall responsibility of ensuring all complaints are dealt with in an appropriate manner.
2	A clearly documented procedure for receiving, logging and passing on details of any complaints to the appropriate personnel.
3	Clearly defined roles for personnel working on the project in relation to complaint reporting and response.
4	A complaint register, which will record details of complaints, the party making the complaint, the parties, notified of the complaint, and actions arising from the complaint.
5	Mechanisms for advising Council and Regulatory Authorities of complaints in their jurisdiction.

#	CONTROLS
6	Mechanisms for disseminating information (as appropriate) to the local community and/or committee regarding complaints and the response to the complaints.
7	Procedure for following up on the satisfactory resolution of any complaints.

7.3 Staged Progress Reporting

It is envisaged that staged progress reporting will be undertaken throughout the remedial works program. It is likely that these will comprise preparation and submission of regular status reports to the appropriate interested parties. The status reports would be expected to include a summary of:

Table 7c – Staged Progress Reporting

#	CONTROLS
1	Results of any monitoring work undertaken during the reporting period.
2	Details of the work undertaken during the reporting period.
3	Details of any environmental incidents during the reporting period and the actions arising from these incidents.
4	Details of any unexpected situations encountered in undertaking the remedial work during the reporting period and the response to these situations.
5	Details of any variations required to the RAP for which approval has been sought.
6	Updates on project schedule.

Additionally, the occurrence of any event which causes or is likely to cause substantial pollution of the environment or represents a human health risk would be notified to the appropriate Regulatory Authority(s) as soon as practicable after it becomes known to the Project Manager, Remediation Contractor or Council. Should such an event occur, a written report shall be supplied to the appropriate Regulatory Authority(s) within 21 days of the event. Such a report would include full details of the incident, including time and duration of the event, the type and volume of any pollutants discharged, any remedial activities undertaken and any measures taken to prevent or mitigate against a recurrence of such an event. Upon completion of the site remediation works, a Validation Report shall be prepared and issued. The report will be prepared in accordance with the *Guideline for Consultants Reporting on Contaminated Sites* (OEH, 2011) and the NEPM (NEPC, 2013).

APPENDIX B – UNEXPECTED FINDINGS PROTOCOL

DLA Environmental Services
A Pacific Environment company

Frasers Property
Level 3, Building C, 1 Homebush Bay Drive
Rhodes NSW 2138

To whom it may concern,

Re: Unexpected Findings Protocol (UFP) – Edmondson Park Town Centre, Campbelltown Road, Ingleburn NSW 2565.

DLA Environmental Services (DLA) was commissioned by Frasers Property to prepare an Unexpected Findings Protocol (UFP) for the property identified as:

Edmondson Park Town Centre, Campbelltown Road, Ingleburn NSW 2565 (the Site).

This Unexpected Findings Protocol (UFP) has been developed as part of the construction planning for implementation during Site works primarily associated with excavation and civil activities. It has been prepared to ensure appropriate management of natural soils / fill which may contain undefined levels of TRH / BTEX, asbestos contamination should they be encountered during Site works.

DLA Environmental Services
Unit 3/38 Leighton Place
Hornsby NSW 2077

42B Church St
Maitland NSW 2320

(ASX: PEH) ABN: 80 601 661 634
sydney@dlaenvironmental.com.au
Ph: +61 2 9476 1765

1.0 INTRODUCTION

The Site formed part of the Ingleburn Defence Site (IDS) which was first occupied by Defence in 1939, when a camp was built during WWII for infantry training. Although the IDS was primarily used for infantry training, the IDS was also occupied by artillery, engineers, transport, signals, medical, and ordnance corps.

The parcel of the IDS comprising the Site was used for former scout troop headquarters, a general store, butchers shop and hall, all of which were burned by arsonists in 1999. The Site also includes Bardia Village, the administration of which was transferred to Defence Housing Australia in 1988. Many of the houses have been demolished.

Due to the history of the Site (both past and present) and the outcomes of previous environmental investigations and audits, there is potential (albeit, very low) for Underground Storage Tanks (USTs), asbestos materials or other unidentified contamination to be present in soils. These materials may require additional assessment or management. It is imperative that the potential for such material to impact Site workers and the remainder of the Site is minimised during remedial and construction works.

Although no evidence of resultant contamination could be found with the exception of the area identified for remediation, it is thought prudent to implement a UFP to cover all possible potential contamination scenarios. Potential contamination on the Site which may exist outside the scope of the past environmental investigations will be managed through the following UFP.

2.0 TYPICAL FEATURES OF 'UNEXPECTED FINDINGS'

The main features to look for are:

- Material containing anthropogenic artefacts such as rubble, plastics, metal etc.;
- Material with an obvious unnatural odour, i.e. fuel, solvent, burnt odour;
- Material that is noticeably stained in colour;
- Asbestos or suspected asbestos containing material;
- Material with fibres visible;
- Presence of USTs and associated contamination; and,
- Any material that has evidently been dumped at the Site.

3.0 IMPLEMENTATION OF THE PROTOCOL

3.1 General

Prior to the commencement of any excavation or construction works onsite, an occupational health and safety induction should be attended by all Site staff. The aim and importance of the UFP and how it is to be implemented should be discussed at this time. Responsibility for its implementation will be assigned to the Principal Contractor.

Monitoring of environmental issues will be undertaken on a daily basis. If an unexpected finding is revealed during Site works, the following protocol is to be followed.

3.2 Implementation Process

1. Cease disturbance of the affected portion of the site and evacuate the immediate area.

2. Contact the Principal Contractor and the Contractors Environmental Representative (CER).

3. Principal Contractor and CER to conduct an assessment of the location and extent of the unexpected finding.

4. High risk areas should be isolated and secured against unintended access.

5. Temporary encapsulation (sealing) of the high risk area to ensure no airborne spread of contamination occurs may be appropriate. This may involve clean soil, plastic sheeting, etc.

6. Dust should be prevented by wetting the soil and drainage controls should be arranged where there is a potential for runoff to occur (runoff should be minimised).

7. Warning signs should be placed in the vicinity.

8. If the Principal Contractor and CER considers that the material warrants further investigation, the area is to be barricaded to provide an exclusion zone.

9. If necessary, environmental controls should be established to minimise the potential for migration of contaminants from the impacted area.

10. Principal Contractor to complete UFP form (refer to **Section 4.0**) and issue to all relevant stakeholders.

11. Further visual assessment and sample collection and analysis undertaken by a qualified environmental consultant. If necessary, samples will be sent to a NATA registered laboratory.

12. Evaluation of analytical data with respect to specific health screening levels to be undertaken. Contaminated soil incident report amended with final classification of soils, including whether the soils are suitable for the proposed land use, need to be remediated or disposed of offsite to a suitably licensed facility. If soils are suitable to remain on-site and/or the area is found to be clean, a work instruction will be provided by the CER to this effect. A waste classification letter must be provided prior to any offsite disposal.

13. If the material is subsequently found to contain asbestos, an appropriately licensed contractor will be employed to remove it.

14. Affected areas will be reopened for earthworks following a clearance of the location and issuance of a report by CER.

3.3 Notes

1. Any suspected asbestos containing should be left in place and not disturbed. The CER will organise appropriate environmental professionals for further investigation purposes.

2. It is essential that material of differing compositions not be mixed.

3. All sampling for validation, waste classification or characterisation purposes will be carried out in accordance with the following documents:

- *Contaminated Sites: Sampling Design Guidelines* (NSW EPA, 1995);
- *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)* (NEPC, 2013);
- *Contaminated Sites: Guidelines for Assessing Service Station Sites* (NSW EPA, 1994);
- *Waste Classification Guidelines* (NSW EPA, 2014).

4. Any unexpected findings encountered should be listed on a UFP register, which should include the action taken and the status of the unexpected find. A suitable register is included in **Section 5.0**.

5. Once an unexpected find has been identified and a UFP form filled in the Principal Contractor and CER should liaise with the client as to the appropriate means of managing the situation. This should include discussions around the handling, treatment and disposal of material, OH&S considerations and how the affected area will be validated and reopened for works.

6. Prior to closing out an unexpected find it will be important to ensure the appropriate documentation is obtained, such as: photographs, the UFP form, waste classification letter(s) and a validation report or letter.

7. A UFP form should be completed on each day of the remedial works as part of the daily site records. This will ensure that the process is being undertaken even if no unexpected findings are encountered. The form should include the name, company and the position of the person undertaking the field observations.

4.0 UNEXPECTED FINDINGS PROTOCOL FORM

To be completed by the Site Controller/Environmental Representative

SITE: _____

PERSONNEL ON-SITE: _____

DATE: _____

DAILY SUMMARY:

1.	Suspect material encountered during daily activities: (if YES, compete 2 to 5)	YES	☐	NO	☐
2.	CER contacted:	YES	☐	NO	☐
3.	UFP Reference Number (label occurrences sequentially 1, 2, 3, etc.).	_____			

DESCRIPTION OF MATERIAL ENCOUNTERED:

4.	Asbestos or suspected ACM present:	YES	☐	NO	☐
5.	Brief written description of material:				
	☐				
6.	Material isolated:	YES	☐	NO	☐
7.	Location of contaminated material (incl. field sketch/map if required):				
8.	Photographs taken:	YES	☐	NO	☐

NAME: _____ **SIGNATURE:** _____

5.0 UNEXPECTED FINDINGS REGISTER

UNEXPECTED FINDINGS REGISTER						
UFP No.	**Date Found**	**Suspect Material**	**Description**	**Recorded on UFP Form**	**Action Taken**	**Status**
				YES ☐ NO ☐		
				YES ☐ NO ☐		
				YES ☐ NO ☐		
				YES ☐ NO ☐		
				YES ☐ NO ☐		
				YES ☐ NO ☐		