Core Project Group

Proposed Development

498-500 King Street, Newcastle West

Remedial Action Plan

Report No. RGS01219.1-AJ 28 October 2016

REGIONAL
GEOTECHNICAL SOLUTIONS

REGIONAL GEOTECHNICAL SOLUTIONS

Manning-Great Lakes

Port Macquarie

Coffs Harbour

RGS01219.1-AJ

28 October 2016

Core Project Group
122a Hannell St
WICKHAM NSW 2293

Attention: Tom Elliot

Dear Tom,

RE: Remedial Action Plan
Proposed Development
498-500 King Street, Newcastle West

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has prepared a Remedial Action Plan (RAP) for the proposed multistorey development at the above site.

A number of previous investigations have been carried out on the site, as outlined below:

- Underground Tank Inspection by MJM Environmental Pty Ltd (MJM), dated 24th February 2015;
- Groundwater Monitoring Report by MJM Environmental Pty Ltd, (Ref: 142-1323), dated 21st January 2015, – December 2014;
- UPSS Site Validation reporting by MJM Environmental Pty Ltd, dated 12 February 2015;
- Site Contamination Assessment by RGS (Ref: RGS01219.1-AF dated 4th April 2016); and
- Additional Site Contamination Assessment – Workshop Area by RGS (Ref: RGS01219.1-AI dated 13th October 2016);

Based on the previous MJM reports, it is apparent that the existing fuel tanks are still in-situ on the site. The results of groundwater sampling and analysis undertaken indicated some elevated heavy metal concentrations in groundwater beneath the site, however, no petroleum hydrocarbon or BTEX compounds were encountered in any of the samples tested.

The results of soil sampling during the two RGS investigations found contaminant concentrations to be either at levels below the laboratory detection limits, or below the adopted assessment criteria for commercial/industrial landuse. Both RGS reports concluded that the site soils were suitable for the proposed development (from a contamination viewpoint) and that further assessment regarding site contamination was not required.

It was concluded that the soils immediately surrounding the existing underground fuel storage tanks and associated infrastructure on Lot 8 DP95173 are likely to contain potentially small areas of contamination in the form of TPH, lead and PAH even though the tanks and infrastructure have been previously validated. It was therefore recommended that during the removal of the tanks and excavation of the surrounding soils (if required), a number of steps be undertaken, the details of which are to be outlined in accordance with the Remedial Action Plan (RAP).

In addition, it was recommended that at the time of the demolition of the workshop building and removal of the slab, a similar validation approach to that described above be adopted. This would involve visual assessment of the exposed soil for identification of grossly contaminated areas as well as surface soil sampling on a systematic grid basis to validate that the remaining soils meet the requirements for commercial/industrial landuse.

The RGS investigation also found that asbestos was not identified in any of the soil samples tested during the investigations. However, asbestos may be encountered during demolition of existing structures. After the demolition and removal of the buildings, some soil sampling within the building footprint should be undertaken to verify that there is no asbestos remaining within the soils underlying the building. An asbestos management plan should be prepared by a suitably qualified person to manage the safe removal of asbestos if encountered.

The RAP is contained herein.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Steve Morton

Principal

Table of Contents

Figures

Appendices

1 INTRODUCTION

1.1 General

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) presents this Remedial Action Plan (RAP) to Core Project Group for the proposed multistorey development at 498-500 King St, Newcastle West. The location of the site is shown in Section 3.

A number of previous investigations have been carried out on the site, as outlined below:

- Underground Tank Inspection by MJM Environmental Pty Ltd (MJM), dated 24th February;
- Groundwater Monitoring Report by MJM Environmental Pty Ltd, (Ref: 142-1323), dated 21st January 2015, – December 2014;
- UPSS Site Validation reporting by MJM Environmental Pty Ltd, dated 12 February 2015;
- Site Contamination Assessment by RGS (Ref: RGS01219.1-AF dated 4th April 2016); and
- Additional Site Contamination Assessment – Workshop Area by RGS (Ref: RGS01219.1-AI dated 13th October 2016);

A summary of the findings from the previous assessments is provided in Section 4.

The previous assessments have indicated that there was no evidence of soil and/or groundwater contamination in samples collected during those investigations, however, there is expected to be small areas of contamination in the form of TPH, lead and PAH encountered during the removal of the existing underground fuel tanks which are known to be still in-situ.

The previous assessments did not identify asbestos on the site, however, asbestos may be encountered during demolition of existing structures.

The proposed development of the site will require fill material to be placed into the areas to be remediated. The proposed remedial strategy is to remove and dispose of any impacted soils associated with the existing underground fuel storage tanks, workshop area, sumps, and asbestos removal following the demolition of existing structures. The remaining voids should be filled with certified Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM). RGS has assessed the natural aeolian and marine soils at the site. The findings of the VENM assessments are presented in RGS reports RGS1219.1-AF and RGS1219.1-AG.

This report was prepared in accordance with the relevant sections of the NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites.

1.2 Objectives

The objective of the RAP is to provide guidance on the remediation and management activities to be undertaken in order to render the site suitable for the proposed multistorey development.

1.3 RAP Requirements

The NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites provides requirements that are to be considered in the preparation of RAPs. As such, this document addresses the following requirements:

- Remediation goals;

- Discussion of the extent of remediation required;
- Discussion of possible remediation options;
- Rationale for selecting the preferred remedial option;
- Proposed validation testing;
- Contingency plans for unexpected findings; and
- Health, Safety, Security and Environmental (HSSE) requirements.

2 ROLE AND RESPONSIBILITIES

Table 1 summarises the roles and responsibilities for the project.

Table 1: Roles and Responsibilities

Role	Responsibilities
Principal/Site Owner – Core Project Group	- To engage suitable qualified personnel/companies to carry out the works.
Contractor – TBA	- Only engaging suitably qualified and competent staff and contractors. - Enforcing the implementation of this plan on the site by staff, subcontractors and visitors. - Authorised to stop work as deemed necessary where unsafe activities are being carried out or where this plan is not being followed. - Overseeing the proper use and maintenance of site safety equipment, including staff Personal Protective Equipment (PPE) and first aid equipment.
Environmental Consultant – Regional Geotechnical Solutions Pty Ltd (RGS)	- To monitor processes affecting the quality of the cap. - To provide advice regarding the management of contaminated materials. - Authorised to stop work as deemed necessary where unsafe activities are being carried out or where this plan is not being followed.
Site Workers	- Taking reasonable care for their own safety and the safety of others. - Following site rules and work instructions. - Taking immediate action to rectify hazards that may arise during the course of the work. - Complying with this plan, relevant OHS legislation and industry standards. - Establish and maintain a positive safety climate on the project.

3 SITE DESCRIPTION

3.1 Site Identification

The proposed development area is made up of Lot 6-7 DP95174 and Lot 8 DP95173.

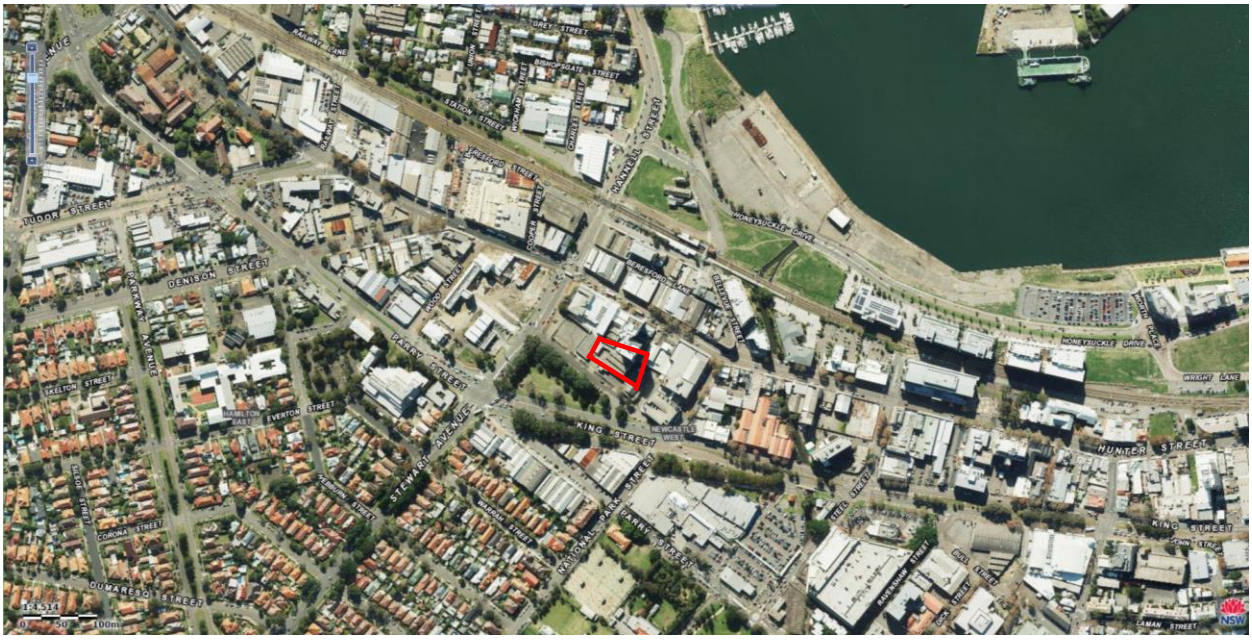
The approximately 9,380m^2 irregular shaped site is bound by King Street to the southwest, Stewart Avenue to the northwest, existing multistorey commercial developments and Hunter Street to the northeast and by multistorey commercial developments to the southeast.

3.2 Topography and Drainage

The site is located within a region characterised by a flat alluvial plain associated with the Hunter River catchment. The site is near level with minor slope variations of less than 2°, predominantly comprising a slight slope to the south towards King Street. The site is covered with existing hardstand pavements and buildings, with minor garden beds along the King Street boundary.

The majority of the site was formerly occupied by a car dealership (including a large workshop building) and comprises hardstand pavements and single storey structures. Ageing single and double storey structures and associated car parking cover the remainder of the site. Drainage is via overland flow into the existing onsite and street drainage systems.

An aerial photograph from the NSW DPI 'Six Viewer' is reproduced below.



Proposed development area outlined in red.

3.3 Subsurface Conditions

The 1:250,000 Geological Series Sheet of Newcastle indicates the site to be underlain by Quaternary marine and freshwater deposits comprising sand, silt, clay and gravel. The 100,000 Newcastle Coalfield Regional Geology Map indicates the Quaternary deposits are in turn underlain

by the Lambton Subgroup (comprising the Borehole coal seam) and Waratah Sandstone which form the lower lithologies of the Newcastle Coal Measures.

Boreholes drilled the first of the previous RGS investigations (RGS01219.1-AF), encountered a thin layer of gravelly clay fill overlying sand fill and gravelly sand fill to depths of between 0.2m and 1.3m. The fill overlies very loose to medium dense Aeolian sand.

Groundwater inflows were encountered in boreholes during the previous RGS investigations at depths of between 1.8m and 2.1m below the existing ground surface (bgs) during the limited time they remained open at the time of the field investigations.

It is noted that groundwater levels fluctuate as a result of climatic conditions, tide etc. that may not be apparent during the investigation.

Further details regarding the underlying subsurface conditions are presented within the RGS geotechnical report for the site (RGS01219.1-AD).

3.4 Hydrogeology

Groundwater was previously encountered at the site within natural Aeolian and Marine layers at depths of between 1.8m and 2.1m. Groundwater would be expected to have an overall flow towards Newcastle Harbour located approximately 400m to the northeast of the site, but tidal influences may push flows back towards the south on an incoming tide.

A search of the NSW Department of Primary Industries (Office of Water) registered groundwater bores located within a 500m radius of the site was undertaken. The results indicate that licensed water bore GW200855 is located on Lot 7054 DP1074173 approximately 130m to the south west of the site, below extracted from the register database.

The bore record indicates that it was approved for use as a test bore and its current status is cancelled. It was constructed in 2010 and the profile observed during drilling is recorded as sands and muds to 6m. The water bearing zone was present from 1.5m to 6.0m.

4 REVIEW OF PREVIOUS ASSESSMENTS

4.1 MJM Environmental Reports - 2015

RGS was provided with the following reports relating to th existing underground fuel storage tanks located on Lot 8:

- Underground Tank Inspection by MJM Environmental Pty Ltd (MJM), dated 24th February 2015;
- Groundwater Monitoring Report by MJM Environmental Pty Ltd, (Ref: 142-1323), dated 21st January 2015, – December 2014;
- UPSS Site Validation reporting by MJM Environmental Pty Ltd, dated 12 February 2015;

Based on these reports it is apparent that the existing fuel tanks are still in situ on the site. The work undertaken included location of three of the four tanks on site, and installation of three groundwater monitoring wells in the vicinity of the tanks. The results of groundwater sampling and

analysis undertaken indicates some elevated heavy metal concentrations in groundwater beneath the site, however, no petroleum hydrocarbon or BTEX compounds were encountered in any of the samples tested, which would normally be expected if contamination due to leakage from underground fuel storage tanks was occurring.

4.2 Regional Geotechnical Solutions (2016) – Site Contamination Assessment

With respect to this RAP, the first of the two RGS assessments made the following conclusions and recommendations:

- The results of soil sampling found contamination concentrations to be either at levels below the laboratory detection limits, or below the adopted assessment criteria for commercial/industrial landuse;

- The site soils were suitable for the proposed development (from a contamination viewpoint) and that further assessment regarding site contamination was not required;

- It was concluded that the soils immediately surrounding the existing underground fuel storage tanks and associated infrastructure on Lot 8 DP95173 are likely to contain potentially small areas of contamination in the form of TPH, lead and PAH even though the tanks and infrastructure have been previously validated;

- It was recommended that during removal of the tanks and excavation of the surrounding soils, the following process be undertaken:

    - An experienced environmental consultant be engaged to work with the contractor removing the tanks to develop a site management and validation plan;

    - The tank removal is to be undertaken by an appropriately licensed contractor, experienced in the decommissioning and removal of underground fuel storage tanks;

    - Excavation and removal of the tanks is to be undertaken in accordance with NSW State Government regulations and Newcastle City Council requirements. The tanks and associated piping are to be removed from the site to an appropriately licensed landfill or recycling facility;

    - The process is to be undertaken in the presence of an environmental consultant who will monitor the soils surrounding the tanks for the presence of contamination by visual assessment and screening of soil vapours by Photoionisation Detector. Affected soils should be removed to an appropriate off site location in accordance with the management plan prepared for the work (Step 1 above); and

    - Soils remaining within the sides and base of the excavation are to be sampled in accordance with industry protocols to confirm that soils remaining on site meet the NEPM 2013 guidelines for the proposed commercial land use. Should results indicate soils remain that exceed these guidelines, additional soil should be excavated until remaining soils meet the guideline limits.

- The RGS investigation also found that asbestos was not identified in any of the soil samples tested during the investigations. However, asbestos may be encountered during demolition of existing structures, After the demolition and removal of the building, some soil sampling

within the building footprint should be undertaken to verify that there is no asbestos remaining within the soils underlying the building.

4.3 Regional Geotechnical Solutions (2016) – Additional Site Contamination Assessment – Workshop Area

With respect to this RAP, the second of the two RGS assessments made the following conclusions and recommendations:

- Both the RGS reports, and the previous MJM Environmental reports that address the underground storage tanks, recognise that there will be a need to remediate and validate soils in the vicinity of the tanks at the time of removal, and propose a Remedial Action Plan (RAP) be adopted for this process. This is considered appropriate practice for the removal of the tanks; and

- Based on the additional walkover assessment undertaken in the workshop area it is recommended that at the time of the demolition of the building and removal of the slab, a similar validation approach be adopted. This would involve visual assessment of the exposed soil for identification of grossly contaminated areas as well as surface soil sampling on a systematic grid basis to validate that the remaining soils meet the requirements for commercial/industrial land use.

The preferred remedial strategy is discussed in Section 5.

4.4 Summary of Previous Soil Laboratory Results

A summary of the previous soil analytical results from the first RGS investigation, and relevant guideline criteria with regard to this RAP are presented in Table 3 below and also in attachment Appendix B.

Table 3 – Soil contaminant Ranges and Adopted Guideline Exceedances (concentrations in mg/kg unless stated otherwise)

Analyte	Number of samples analysed	Reported Concentration Range	Human Health Investigation and Screening Levels – Commercial/Industrial Land Use [1,2]	Ecological Investigation and Screening Levels – Commericial/Industrial Land Use [2]	Samples Exceeding Adopted Criteria
Benzo(a)pyrene	5	<0.5 – 13	40	0.7	3 - ecological criteria only
PAH	5	<0.5 – 67.6	4000	-	-
TRH C6-C10	5	<10	100	215	-
TRH C10-C16	5	<50	800	170	-
BTEX	5	<0.2	-	75	-
Lead	5	<5 - 164	1500	-	-
Asbestos	5	Absent	0.001% (w/w) for friable asbestos in soil	-	-

Notes:

1 - NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Table 1A(1): Health Investigation Levels- HILD

2 - NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Ecological Investigation and Screening Levels

5 REMEDIATION PROGRAM

The remediation goal for the site, with respect to contamination, is to remediate the site to a condition that is suitable for the proposed multistorey development, within a commercial/industrial landuse setting.

5.1 Remediation Hierarchy

The NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) provides a preferred hierarchy of option for site clean-up and/or management which is outlined as followed:

- If practicable, on-site treatment for the contamination so that it is destroyed and the concentrations are reduced below the adopted site clean-up criteria; or
- Offsite treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level.

If the above is not practicable:

- Consolidation and isolation of the soil on site by containment within a properly designed barrier; or
- Removal of contaminated material to an approved facility followed, where necessary, by replacement with appropriate material; or
- Where the assessment indicated remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

5.2 Preferred Remedial Strategy

Based on the findings of the previous contamination assessments, estimated costs of remediation options, and discussions with the client, the preferred remedial strategy for the site is to remove the impacted fill materials and dispose offsite to an appropriately licenced landfill.

There are two main areas on the site requiring remediation, both on Lot 8. These are the underground fuel storage tanks which remain in-situ and the workshop area which are located in the south western area and northern area of the lot respectively. These areas are identified on Figure 1.

The remaining voids should be backfilled with certified Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) to finished ground surface level within the proposed multistorey development.

5.3 Proposed Remediation Plan

Step 1 – Setout and Site Preparation

The site surface will be pegged prior to remediation to mark out the extent of proposed excavations and to allow an estimate of the quantity of soil required to backfill the voids.

It is proposed to backfill the voids using imported fill material as the current site surface level is to be raised by around 0.5m to 1.0m to achieve the design surface level.

The earth works will be carried out by a suitably qualified licensed and experienced earth works contractor.

Erosion and sedimentation controls should be implemented throughout the works.

Based on previous investigations, groundwater is likely to be encountered during tank removal works. As such, groundwater cut-off measures (such as sheet piling) and dewatering of the excavations is likely to be required.

Step 2 – Excavation of Contaminated Soils

Existing Underground Fuel Storage Tanks

Concentrations of hydrocarbons exceeding guidelines for commercial/industrial landuse were not identified during in site soils in the immediate vicinity of the underground tanks and associated infrastructure during the previous investigations. However, the soils are likely to contain potentially small areas of contamination in the form of TPH, lead and PAH.

A site management plan and validation plan should be developed by an experienced environmental consultant to facilitate the removal of the tanks and excavation of the surrounding soils.

The tank removal is to be undertaken by an appropriately licensed contractor, experienced in the decommissioning and removal of underground fuel storage tanks. Excavation and removal of the tanks is to be undertaken in accordance with NSW State Government regulations and Newcastle City Council requirements. The tanks and associated piping are to be removed from the site to an appropriately licensed landfill or recycling facility

The remediation process is to be undertaken in the presence of an environmental consultant who will monitor the soils surrounding the tanks for the presence of contamination by visual assessment and screening of soil vapours by Photoionisation Detector (PID). Affected soils should be removed to an appropriate off site location in accordance with the management plan prepared for the work.

It is recommended that fill material be emplaced in the remaining excavation voids with imported material which would be required to be either VENM or ENM as defined in the POEO Act 1997 and POEO Amendment (Scheduled Activities and Waste) Regulation 2008.

If VENM is to be sourced, then a certificate from the source will be requested confirming the type of material.

If the proposed fill material is off-site material with an ENM exemption, then the material will need to have been assessed in accordance with the Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014. Relevant ENM exemption information, required to be recorded by the generator under the ENM order 2014, will be reviewed by RGS, prior to importation of the material to site. If the material has not been assessed by others, then RGS may, if directed by the site owner, carry out an assessment of the material in accordance with the ENM order prior to importation of the material to site.

Observations will be made by RGS of the material as it is delivered to site on the first occasion, to check that the material appears to be consistent with the source and that there is no apparent potential contamination such as chemical staining, odours or anthropogenic materials.

The earthworks site contractor will be responsible for tracking of materials that are imported to the site. Copies of weighbridge dockets pertaining to imported soils will be retained by the contractor to confirm the source, type and quantities of materials. A copy of these dockets will be provided to RGS for review.

Workshop Area

During the demolition of the existing building and removal of the concrete slab, a similar approach to that described above be adopted for remediation of the work shop area. This involves visual assessment of the exposed soil for identification of grossly contaminated areas. There may be potentially small areas immediately surrounding the remnant oil sumps and oil separator may be have been impacted by hydrocarbons in the form of TPH, lead and PAH.

In this case, the recommendations made above regarding management and validation plans, excavation, offsite removal, backfilling of voids and supervision are the same for any hydrocarbon impacted areas.

Possible Asbestos Impacted Soil

Following the demolition and removal of the buildings, some soil sampling within the building footprint should be undertaken to verify that there is no asbestos remaining within the soils underlying the building. An asbestos management plan should be prepared by a suitably qualified person to manage the safe removal of asbestos if encountered.

Materials affected by asbestos (if any) should be stockpiled separately from other materials on thick plastic sheeting, or placed directly into plastic lined trucks or skips for removal from the site as asbestos waste and disposal to an appropriately licenced facility.

It is recommended that a specialist asbestos removal contractor licenced to handle asbestos waste be engaged for this portion of the remedial works when required.

RGS will guide the asbestos removal contractor in the areas requiring remediation to ensure that the asbestos impacted fill materials have been removed to the required extents.

The recommendations made above regarding backfilling of voids and supervision are the same for any asbestos impacted areas.

Step 3 – Disposal of Material Offsite

Hydrocarbon Impacted Soils

Soils suspected of being contaminated with hydrocarbons following removal of the tanks, oil sumps, oil separator and associated infrastructure should be stockpiled separately from other materials on thick plastic sheeting, or placed directly into plastic lined trucks or skips ready for removal from the site and disposal to an appropriately licenced facility.

RGS will collect samples of the potentially impacted soils and submit for laboratory analysis to assess the waste classification of the materials.

The impacted materials will be assessed in accordance with the NSW EPA (2014) Waste Classification Guidelines to facilitate disposal to an appropriately licensed facility.

Hydrocarbon impacted materials cannot be removed from the site until the waste classification process has been undertaken.

Asbestos Impacted Soil

Materials suspected of having been contaminated with asbestos be encountered following the demolition of the existing structures should be stockpiled separately from other materials on thick plastic sheeting, or placed directly into plastic lined trucks or skips ready for removal from the site and disposal to an appropriately licenced facility.

RGS will collect samples of the potentially impacted soils and submit for laboratory analysis to determine if asbestos is present. If so, the impacted materials will be assessed in accordance with the NSW EPA (2014) Waste Classification Guidelines to facilitate disposal to an appropriately licensed facility.

Asbestos impacted materials cannot be removed from the site until the waste classification process has been undertaken.

6 VALIDATION PROGRAM

Validation soil sampling will be undertaken within the sides and base of excavations to confirm that impacted material has been excavated to required extents. Should results indicate soils remain that exceed these guidelines, additional soil should be excavated until remaining soils meet the guideline limits.

The validation sampling process is discussed in the sections below.

6.1 Investigation Levels

The health and ecological investigation levels for soil, presented in the *National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), NEPC 2013*, Canberra (referred to as NEPM 2013) are generally used in NSW when selecting investigation levels for chemical contaminants in soil.

The purpose of the NEPM (2013) is to '*establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry*'.

NEPM (2013) provides health and ecological investigation and screening levels for different exposure scenarios based on a proposed land use. Health and ecological investigation and screening levels are applicable to the first stage (Tier 1) of site assessment and are used to assist in the iterative development of a Conceptual Site Model (CSM). They are adopted as concentrations of a contaminant above which either further appropriate investigation and/or evaluation will be required, or development of an appropriate management strategy (including remediation).

Health Investigation Levels (HILs) and Health Screening levels (HSLs) are applicable for assessing human health risk via relevant exposure pathways.

The HILs were developed for a broad range of metals and organic substances. These are generic to all soil types.

The HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via inhalation and direct contact with soil and groundwater. The HSLs depend on specific soil physicochemical properties, building configurations, land use scenarios and the depth that groundwater is encountered.

Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) are applicable for assessing risk to terrestrial ecosystems under residential, open space and commercial/industrial land use scenarios. They apply to the top 2m of soil, which corresponds to the root zone and habitation zone of many species.

The EILs are associated with selected metals and organic compounds. The EILs are site specific and are determined by calculating an Ambient Background Concentration (ABC) and an Added Contaminant Limit (ACL) for the site, which are added together to get the EIL. In the absence of ambient background concentration data, a generic ACL, based on the soils pH, Cation Exchange Capacity (CEC) and clay content, has been adopted.

The ESLs are associated with petroleum compounds and fractions and are dependent on specific soil physical properties (i.e. coarse and fine-grained soil).

For validation purposes, the adopted remediation levels (for commercial/industrial land use) are listed in Table 4 below.

Table 4: Adopted Remediation Levels for Human Health and Environment

COC	**Human Health Investigation Levels (mg/kg)[1]**	**Ecological Investigation and Screening Levels (Commercial/Industrial) (mg/kg)[2]**
Benzo-a-pyrene	40	0.7
PAH	4000	-
TRH C6-C10	1000	215
TRH C10-C16	800	170
BTEX	-	75
Lead	1500	-
Asbestos	0.001% (w/w) for friable asbestos in soil	-

Notes:

1 - NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Table 1A(1): Health Investigation Levels- HILD

2 - NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Ecological Investigation and Screening Levels

6.2 Site Validation Strategy

In order to assess the effectiveness of the remediation works and assess the suitability of the site for future commercial/industrial land use, validation of the site will be undertaken.

This section summarises the scope of works for the validation program.

Soil Validation Strategy

Validation soil sampling will be completed in accordance with the following guidelines:

- Australian Standard AS 4482.1 (1997) Guide to the Sampling and Investigation of Potentially Contaminated Sites; and
- NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure.

In order to validate the excavations, the following works will be undertaken:

- The excavations will be visually assessed to confirm that the impacted soils have been removed as required;
- The excavations will be screened for soil hydrocarbon vapours by PID; and
- Validation soil samples will be taken at a ratio of:
    - Excavation Base: 1 sample from each excavation base per 25m^2; and
    - Excavation Walls: 1 sample per 10 lineal metres from each excavation wall.

The following steps will be undertaken in order to obtain representative validation samples for laboratory analysis:

- Samples will be collected from the excavated areas directly by hand or by using hand tools (stainless steel shovels or trowels);
- Samples will be placed into laboratory-supplied glass jars;
- Hand tools used during sample collection will be decontaminated between samples by rinsing with phosphate-free detergent and potable water;
- A clean pair of disposable nitrile gloves will be worn when handling samples;
- Samples will be placed into secure containers after collection; and
- Samples will be submitted to a NATA-accredited laboratory under chain of custody conditions.

Quality Assurance / Quality Control

In order to assess field quality assurance / quality control (QA/QC) procedures, one field duplicate sample will be collected and analysed with every 10 primary validation samples.

Reporting

A validation report will be prepared, following the soil remediation works, summarising the results of the soil remediation, validation of the site. The report will be written in accordance with relevant

sections of the NSW OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*. The report will also provide a statement as to the suitability of the site for the proposed land use.

7 MANAGING UNEXPECTED OCCURRENCES

If during the remediation work, material is encountered which appears to be potentially contaminated and appears different from soils described in previous assessment reports, the following procedures will apply:

1. Suspicious material/soils which has already been excavated should be bunded, placed in a skip bin and/or stockpiled on low-density polyethylene plastic sheeting and protected from erosion and seepage.
2. Excavation works at that part of the site where the suspicious material (soil) was encountered should cease until an inspection is carried out by RGS.
3. Based on visual inspection, RGS will provide interim advice on health and safety of remedial works, soil storage and soil disposal to allow remediation to proceed if possible.
4. Based on sampling and analysis of the material, RGS will provide advice as to remedial requirements for the material.

   Suspicious material/soils may include fibrous, oily or odours materials/soil, drums, metal or plastic chemical containers or brightly coloured material.

8 SITE MANAGEMENT PLAN

The management strategies for environmental issues that may arise during site works are discussed in the sections below. These strategies are considered a minimum requirement to be followed by the remediation contractor before and during remediation activities. It is envisaged that the remediation contractor will develop site specific environmental work plans for soil excavation and placement.

8.1 Air Emissions and Odours

Contaminants identified on the site are unlikely to generate odours during excavation and disposal of the impacted fill materials.

The Contractors will properly maintain and operate machinery to reduce engine emissions and exhaust.

8.2 Dust

The remediation works will involve excavation of the subsurface, movement of soils, and general vehicular movements across the site. As such, dust generation is considered a potential environmental impact to the surrounding environment and the public.

The following management measures should be implemented to prevent dust impacts:

- A communications and complaints register should be kept on site to ensure that concerns of local residents and workers are recorded and addressed;

- Boundary fences should be maintained around the perimeter of the site;
- Excavations in areas of asbestos impacted soils should be watered as work progresses prevent dust generation;
- If dust migration from excavation areas is considered excessive due to high winds, the works should be delayed or limited during these periods;
- Trucks removing material from the site should have loads covered;
- Vehicular movements entering and exiting the site should be kept to a minimum;
- Machinery should be floated onto and off the site;
- Machinery should be washed down prior to leaving the site; and
- Works should be limited during times of high winds.

8.3 Noise Controls

Noise will be generated during site works, and is considered an important environmental issue. The noise that will be generated is anticipated to be mainly derived from excavation and truck movements. It is anticipated that the level of noise generated will not exceed that of a typical construction site.

Noise limitations imposed by Newcastle City Council are to be adhered to. This may include restrictions on working days and hours, and acceptable noise levels.

8.4 Stormwater and Soil Management

Adequate stormwater run-off, run-on and sediment control measures will be put in place for the works.

Where temporary stockpiling of material is required, the stockpile would need to be managed in a way to prevent movement of material beyond the site boundaries. The following recommendations provide guidance on managing stockpiled material:

- Access to the stockpiled material should be limited, keeping the stockpile within site fences;
- Stockpiles should be placed on level ground or ground with sloped of <5˚;
- Contaminated material should be placed on either impermeable pavement such as concrete or bitumen or on strong impermeable plastic sheeting to prevent contamination of the underlying soils; and
- Adequate straw bales and/or silt fences should be placed around the perimeter of the stockpile area to filter runoff from the stockpiles and prevent overland stormwater flow affecting the base of the stockpile.

8.5 Traffic

No major traffic disruptions are expected during the works.

8.6 Working Hours

Working hours are to be consistent with Newcastle City Council requirements. These are likely to be 7am to 6pm Monday to Friday and 7am to 12pm on Saturdays.

8.7 Access Restrictions

As the site will be classified as a construction area, it is necessary to restrict access solely to authorised staff and contractors who have appropriate levels of personal protective equipment. The existing site fencing is to be maintained, and unauthorised personnel are to be kept outside.

9 OCCUPATIONAL HEALTH AND SAFETY

Prior to the commencement of site works, the remediation contractor should prepare Safe Work Method Statements (SWMS) for their activities. The SWMS should contain the following information:

- The steps of the activity to be performed;
- Hazards and perceived risks for each step of the activity;
- Control measures to be adopted to eliminate or minimise the hazards;
- The persons responsible for implementing control measures;
- In addition, RGS will prepare a Health, Safety, Security and Environmental (HSSE) Plan for the validation soil sampling program. The HSSE Plan will include the following information:
- Likely hazards and control measures;
- Emergency assembly areas;
- Emergency contact numbers;
- Site security procedures;
- First aid wardens on the site;
- Procedures for the safe handling of chemicals and contaminated soil and groundwater; and
- The HSSE Plan will be reviewed when new tasks are undertaken. The HSSE Plan will be updated as required to cover the tasks undertaken.

10 LICENCES AND APPROVALS

In accordance with State Environmental Planning Policy (SEPP) 55 – Remediation of Land, Newcastle City Council should be notified by the client or the remediation contractor regarding the dates when remediation works will be carried out, and the proposed scope of the remediation works. The neighbouring site owners/occupiers should also be notified of the works.

The volume of material being removed from the site should be documented by the client and/or the remediation contractor, supported by material tracking sheets and waste disposal dockets if available.

11 CONTACT DETAILS AND COMMUNITY RELATIONS

11.1 Contact Details

Contact details for the principal contractor and subcontractor are provided in Table 5 (below).

Table 5 – Contact details

Contact Name	Contact Number
Principal/Site Owner – Core Project Group (Andrew Brinkworth)	Mobile – 0499 990 516
Contractor – TBA	TBA
Environmental Consultant – RGS Andrew Hills	Mobile – 0417 276 751

11.2 Community Relations

Every effort should be made to ensure that the community is appropriately involved as necessary. Enquiries regarding environmental and communication issues from members of the local community and neighbouring properties should be documented and referred to the client.

12 CONTINGENCY PLAN / UNEXPECTED FINDS

A contingency plan is provided below in Table 6, for the management of unexpected conditions.

Table 6 – Contingency Plan and Unexpected Finds

Unexpected Conditions	Proposed Action
Unidentified contaminated materials	Cease works in the affected areas. Contact the Environmental Consultants Project Manager
Validation samples not meeting assessment criteria	Continue excavations and re-sample or assess other remediation options

Complaints from residents regarding noise pollution, dust and odours	Increased monitoring, revision of management plans. Investigate and manage source of complaint

13 REFERENCES

Friebel & Nadebaum (2011). *Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater* (technical paper No.10) Guidelines, CRC for Contamination Assessment and Remediation of the Environment (CRC CARE).

MJM Environmental Ltd (2015), *Underground Tank Inspection*, dated 24 February 2015.

MJM Environmental Ltd (2015), *Groundwater Monitoring Report,* 142-1323, dated 24 February 2015.

MJM Environmental Ltd (2015), UPSS Site *Validation Reporting,* dated 12 February 2015.

NEPC (2013). *National Environmental Protection (Assessment of Site Contamination)* Measure 1999, as amended in 2013, National Environment Protection Council.

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

Regional Geotechnical Solutions Pty Ltd (2016). *Geotechnical Assessment*, RGS01219.1-AD, dated 24 March 2016.

Regional Geotechnical Solutions Pty Ltd (2016). *Site Contamination Assessment*, RGS01219.1-AF, dated 4 April 2016.

Regional Geotechnical Solutions Pty Ltd (2016). *Site Contamination Assessment – Workshop Area*, RGS01219.1-AI, dated 13 October 2016.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

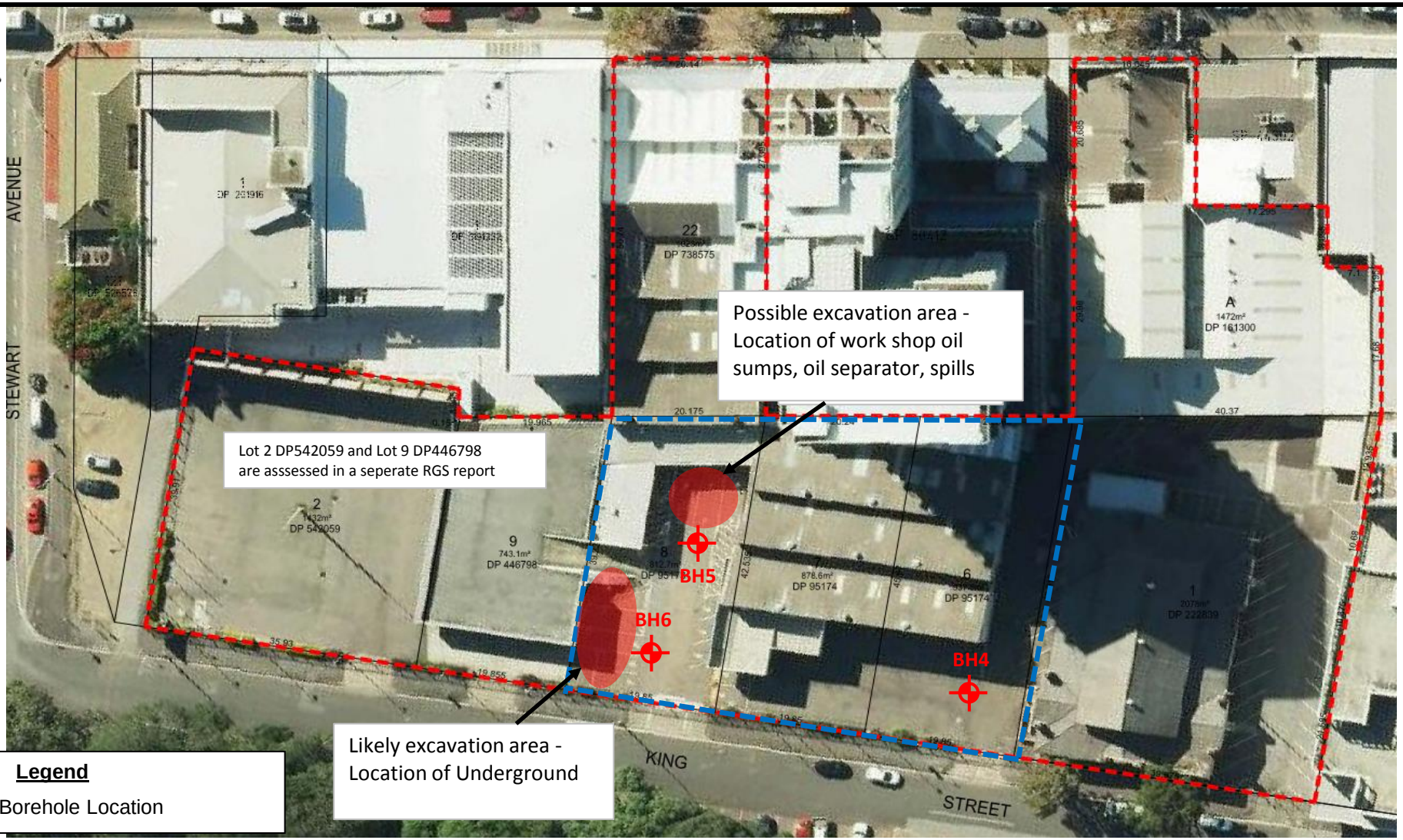
For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Steve Morton

Principal

Figures



REGIONAL GEOTECHNICAL SOLUTIONS	**Client:**	Core Project Group	Job No. RGS01219.1
	Project:	Proposed Development	Drawn By: SK
			Scale: As Shown
		498-500 King Street, Newcastle West	Date: 28-Oct-16
	Title:	Test Location Plan and Excavation Areas	Drawing No. **Figure 1**

Appendix A

Tables

TABLE A1 - RESULTS OF CHEMICAL ANALYSES (concentrations in mg/kg) '**Commercial/Industrial' Site**.

Report No. **RGS01177.1**

Location	DEPTH	Asebestos	TOTAL RECOVERABLE HYDROCARBONS					PAH		OC-OP PESTICIDE	BTEX	PCB	HEAVY METALS							
	(m)		C6-C10	C10-C16	C16-C34	C34-C40	TOTAL 10-40	Total	b-a-p				As	Cd	Cr*	Cu	Pb	Ni	Zn	Hg
BH4	0.4 - 0.5	No	<10	<50	290	110	400	46.1	5	< LOR	<0.2	<0.1	<5	<1	4	29	86	5	94	<0.1
BH5	0.4 - 0.6	No	<10	<50	380	120	500	115	13	< LOR	<0.2	<0.1	28	<1	6	48	164	9	213	0.1
BH5	1.4 - 1.5	No	<10	<50	<100	<100	<50	1.2	<0.5	< LOR	<0.2	<0.1	<5	<1	2	<5	<5	<2	22	<0.1
BH6	0.4 - 0.5	No	<10	<50	<100	<100	<50	67.6	4.7	< LOR	<0.2	<0.1	<5	<1	3	<5	9	<2	21	<0.1
BH6	1.4 - 1.5	No	<10	<50	<100	<100	<50	<0.5	<0.5	< LOR	<0.2	<0.1	<5	<1	4	<5	<5	<2	<5	<0.1
Health Based Soil investigation Level			1000	800				4000	40	45	NL	1	3000	900	3600	240000	1500	6000	400000	730
Ecological Investigation Level (EIL):																				
Ecological Screening Level (ESL):			215	170	1700	3300			0.7		75		**Coarse grained soil in mg/kg**							
			215	170	2500	6600			0.7		95		**Fine grained soil in mg/kg**							

NOTES:

Denotes concentration exceeds health based guideline for Industrial/Commercial land use

Denotes concentration exceeds ecological guideline for Industrial/ Commercial land use

Denotes concentration exceeds health and ecological based guideline for Industrial/ Commercial land use

NL No Limit available

LOR Limit of Reporting

TRH health based guidelines for upper 1m of soil

Appendix B

Groundwater Bore Search

Hunter River Basin

All data times are Eastern Standard Time

Map