

Core Project Group

Proposed Development

12 Stewart Ave, Newcastle West

Remedial Action Plan

Report No. RGS01102.1-AH

15 August 2016

REGIONAL
GEOTECHNICAL SOLUTIONS





Manning-Great Lakes

Port Macquarie

Coffs Harbour

RGS01102.1-AH

15 August 2016

Core Project Group
122a Hannell St
WICKHAM NSW 2293

Attention: Tom Elliot

Dear Tom,

**RE: Remedial Action Plan
Proposed Development
12 Stewart Ave, 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.

Three previous contamination assessments have been carried out on the site, as outlined below:

- Phase 1 Site Contamination Assessment Report by Prensa (Ref: 11128 dated August 2012);
- Preliminary Site Contamination Assessment by RGS (Ref: RGS01102.1-AD dated 14th April 2016);
- Phase 2 Site Contamination Assessment by RGS (Ref: RGS01102.1-AF dated 15th August 2016).

The previous assessments identified localised asbestos in soil in one part of the site, in what was likely to be a result of the demolition of former structures on the site.

Heavy metals (predominantly lead) contamination has been previously identified in near surface soils comprised of fill adjacent to the existing building in the northern part of the site.

In order for the proposed development to proceed, fill material in the areas outlined above will need to be remediated by way of removal and disposal to a licenced landfill. This report outlines the remediation methodology proposed for the site.

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



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



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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 12 Stewart Ave, Newcastle West. The location of the site is shown in Section 3.

Three previous contamination assessments have been carried out on the site. These are outlined below:

- Phase 1 Site Contamination Assessment Report by Prensa (Ref: 11128 dated August 2012);
- Preliminary Site Contamination Assessment by RGS (Ref: RGS01102.1-AD dated 14 April 2016);
- Phase 2 Site Contamination Assessment by RGS (Ref: RGS01102.1-AF dated 15 August 2016).

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

The previous assessments identified localised asbestos in soil in one part of the site, in what was likely to be a result of the demolition of former structures on the site.

Heavy metals (predominantly lead) contamination has been previously identified in near surface soils comprised of fill adjacent to the existing building in the northern part of the site.

The proposed development of the site will require fill material in the areas outlined above to be remediated. The proposed remedial strategy is to remove and dispose of asbestos and heavy metals (predominantly lead) impacted fill materials to a licenced landfill. The remaining voids should be filled with certified Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM), or suitable site won soils. RGS has assessed the natural Aeolian sandy soils below 1.5m deep in the proposed car park area on the site as being VENM. The findings of the VENM assessment are presented in RGS report RGS01102.1-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 two lots; Lot 20 and 21 DP 1217043, is irregular in shape and occupies a parcel of land of about 4,290m². The site is located on the western side of



Stewart Avenue, Newcastle West. The site is bound by Stewart Avenue to the southeast, Hunter Street to the northeast, and existing single and double storey industrial/commercial structures to the northwest and southwest.

3.2 Topography and Drainage

The site is located within a region characterised by a flat alluvial plain associated with the Hunter River catchment. Topographically, the site is near level with minor slope variations of less than 2°, predominantly comprising a slight slope to the south towards Stewart Avenue. The southern half of the site is covered with existing hardstand pavements and remnants of the former structures that occupied the site. The northern half previously contained a building that has since been demolished. The area is vacant with sand exposed at the surface.



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.

A summary of the subsurface materials encountered within boreholes during the previous RGS Site Contamination Assessment (Ref: RGS01102.1-AD) is presented in Table 2.



Table 2: Summary of Subsurface Materials

Material Unit	Material	Material Description	Depth to Base of Material Layer (m)						
			BHR1	BHR2	BHR3	BHR4	BHR5	BHR6	BHR7
1	Fill	Gravelly SAND and Silty SAND and SAND, some rubble	0.85	1.1	0.5	1.6	0.6	0.9	1.2
2	Aeolian Sand and Indurated Sand	Loose Aeolian layers and lenses of dense to very dense indurated sand	--	≥4.2	≥1.5	≥2.8	≥2.7	2.0	≥2.7
3	Marine Sand	SAND, medium dense to dense and very dense	--	--	--	--	--	≥2.7	--

Notes: -- Indicates that the material was not encountered within the borehole
 ≥ Indicates that the base of the material layer was not encountered within the borehole

Groundwater inflows were encountered in boreholes during the two previous RGS investigations at depths of between 2.5m and 3.0m 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.

3.4 Hydrogeology

Groundwater was previously encountered at the site within natural Aeolian and Marine layers at depths of between 2.5m and 3.0m. Groundwater would be expected to have an overall flow towards Newcastle Harbour located approximately 350m 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 25m 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. It is known that the adjacent car wash to the south of the site uses a groundwater bore.



4 REVIEW OF PREVIOUS ASSESSMENTS

4.1 Prensa (2012) – Phase 1 Site Contamination Assessment

The Prensa assessment included a review of historical documentation as well as undertaking soil and groundwater testing.

A review of the findings of the site history study indicates:

- The north-eastern and eastern sections of the site were used as a combination of commercial retail outlets and repair stores since the 1920s;
- Eight underground storage tanks were removed from the footpath to the east of the buildings in the northeast section of the site in 2000. A soil and groundwater investigation by RCA in 2002 found elevated concentrations of copper and Total Recoverable Hydrocarbons (TRH) in soil to the west of the excavations;
- A hazardous materials assessment was undertaken on buildings that previously existed in the northeast of the site in 2002 and identified asbestos, PCBs and lead based paint within the building materials;
- Concentrations of PAH and Benzo-a-pyrene (BaP) from soil samples recovered from fill during the Prensa assessment exceeded the NEPM guidelines for a Commercial/Industrial site; and
- No 'significant' contamination was found within groundwater samples recovered and tested during the Prensa assessment.

4.2 Regional Geotechnical Solutions (2016) – Preliminary Site Contamination Assessment

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

- Friable asbestos was found at two locations and was likely to be present as a result of the demolition of the former structures at the site. It was recommended that further quantitative testing be undertaken to determine whether the percentage of asbestos present exceeds the health screening levels for contamination in soil;
- The near surface soils comprised of fill in the northern part of the site (around borehole BHR4) contained high lead concentrations. It was recommended that the area be remediated by way of the removal and disposal of the lead affected soils to a licenced landfill. It was recommended that a Remedial Action Plan (RAP) be prepared to manage the remediation works.

4.3 Regional Geotechnical Solutions (2016) – Phase 2 Site Contamination Assessment

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

- Results of laboratory testing identified Chrysotile Asbestos (also known as White Asbestos) in sample S201 only which was collected from the surface in the south eastern part of the site.



Whilst no free asbestos fibres were identified the percentage of friable asbestos present in the sample exceeds the health screening level for contamination in soil;

- Based on the results of the asbestos testing, it is recommended that the immediate areas within a 5m radius surrounding the sample locations where asbestos was detected during both the current (S201) and previous investigations (S111) be remediated by way of removal and offsite disposal. The affected soils should be disposed as asbestos waste to a landfill licenced to accept asbestos waste;
- The results of laboratory analysis of samples recovered from the area adjacent to the existing building in the northern part of the site, which has previously been identified as containing lead impacted soils, indicate that three samples exceeded the requirement for Restricted Solid Waste for BaP and lead, and one sample exceeded the requirement for Restricted Solid waste for nickel, without TCLP testing. One sample also exceeded the requirement for General Solid waste for Chromium, without TCLP testing; and
- Based on these results, subsequent TCLP testing resulted in the classification being reduced to General Solid Waste as the concentrations of BaP, lead, nickel and chromium were below both the TCLP1 and SCC1 threshold limits.

The preferred remedial strategy is discussed in Section 5.

4.4 Summary of Previous Soil Laboratory Results

A summary of previous soil analytical results and relevant investigation 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 – Commercial/Industrial Land Use ²	Samples Exceeding Adopted Criteria
Benzo(a)pyrene	8	<0.5 – 8.9	40	0.7	7 - ecological criteria only
Chromium	8	2 - 273	3600	-	-
Lead	8	6 - 2530	1500	-	1 – BHR4 0.0 – 0.4m
Nickel	8	2 - 249	6000	-	-
Asbestos	4	-	0.001% (w/w) for friable asbestos in soil	-	2 – S11 and S201

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 areas on the site requiring remediation. These are the area adjacent to the existing building in the northern part of the site, which has previously been identified as containing heavy metals (lead) impacted soils, and a small isolated area in the south eastern part of the site where the percentage of friable asbestos was identified in surface soils which exceeded the health screening level for contamination in soil.

For the heavy metals impacted area, it is recommended that the existing fill materials be excavated to a depth of approximately 1.5m until the underlying natural Aeolian sand is encountered. The excavation should extend to encompass the areas identified as containing lead contaminated soil, as shown on Figure 2. The excavated materials should then be disposed offsite to a landfill licenced to accept General Solid Waste.

For asbestos impacted area, it is recommended that the existing surface fill materials be excavated to a depth of 0.2m bgs and extend laterally to a radius of 5m from the sample location where the asbestos was identified as shown on Figure 3. The excavated materials should then be disposed



offsite to a landfill licenced to accept asbestos waste by a specialist asbestos removal contractor licenced to handle asbestos waste.

The remaining voids should be backfilled with certified Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM), or site won soils 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 materials excavated from the basement level of the proposed car park.

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 should not be encountered during excavations as it is below the limit of excavation for remediation purposes. As such, dewatering of excavations will not be required.

Step 2 – Excavation of Contaminated Soils

Heavy Metal Impacted Fill - Area Adjacent to Existing Building (Northern Part of the Site)

Concentrations of heavy metals (predominantly lead) exceeding guidelines for Commercial/Industrial land use were identified in fill materials located in an area adjacent to the existing building in the northern part of the site (shown on Figure 2). The impacted fill materials will require excavating to a depth of approximately 1.5m until the underlying natural Aeolian sand is encountered.

The excavation works should be undertaken by a suitably qualified licenced and experienced earth works contractor engaged by the client. RGS will guide the contractor in the areas requiring remediation to ensure that the impacted fill materials have been removed to the required extents.

It is recommended that fill material to be emplaced in the remaining excavation void be site-won materials from the on site car park basement excavation, or 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 from elsewhere, 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.

Asbestos Impacted Soil – South Eastern Part of the Site

A small isolated area near the existing site entrance in the southern part of the site has been identified as containing unacceptable concentrations of friable asbestos in surface fill material (shown on Figure 3). The asbestos is likely to be a result of the demolition of the former structures on the site.

It is recommended that the existing surface fill materials be excavated to a depth of 0.2m and extend laterally to a radius of 5m from the sample location where the asbestos was identified as shown on Figure 3. The excavated materials should be stockpiled separately from the material described above 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.

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 recommendation made above regarding backfilling of voids and supervision are the same for the asbestos impacted area.

Step 3 – Disposal of Material Offsite

Heavy Metal Impacted Fill - Area Adjacent to Existing Building (Northern Part of the Site)

The heavy metals impacted fill materials have been assessed as General Solid Waste in accordance with the NSW EPA (2014) Waste Classification Guidelines and can be disposed of to an appropriately licensed facility.

Asbestos Impacted Soil – South Eastern Part of the Site

The asbestos impacted fill materials have been assessed as waste in accordance with the NSW EPA (2014) Waste Classification Guidelines and disposed of to an appropriately licensed facility.

The waste classification for these soils is Asbestos Waste.



6 VALIDATION PROGRAM

Validation soil sampling will be undertaken to confirm that impacted material has been excavated to required extents. 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
Chromium	3600	-
Lead	1500	-
Nickel	6000	-
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; and
- Validation soil samples will be taken at a ratio of:
 - Excavation Base: 1 sample from each excavation base per 25m²; 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 banded, 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 $<5^\circ$;
- 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 considered 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 11.1 (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

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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*.

Prensa (2012). *Phase 1 Site Contamination Assessment*, 11128, August 2012.

Regional Geotechnical Solutions Pty Ltd (2016). *Preliminary Site Contamination Assessment*, RGS01102.1-AD, dated 14 April 2016.

Regional Geotechnical Solutions Pty Ltd (2016). *Phase 2 Site Contamination Assessment*, RGS01102.1-AF, dated 10 August 2016.

Regional Geotechnical Solutions Pty Ltd (2016). *Virgin Excavated Natural Material, Proposed New Car Park*, RGS01102.1-AG, dated 28 July 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



Appendix A

Tables

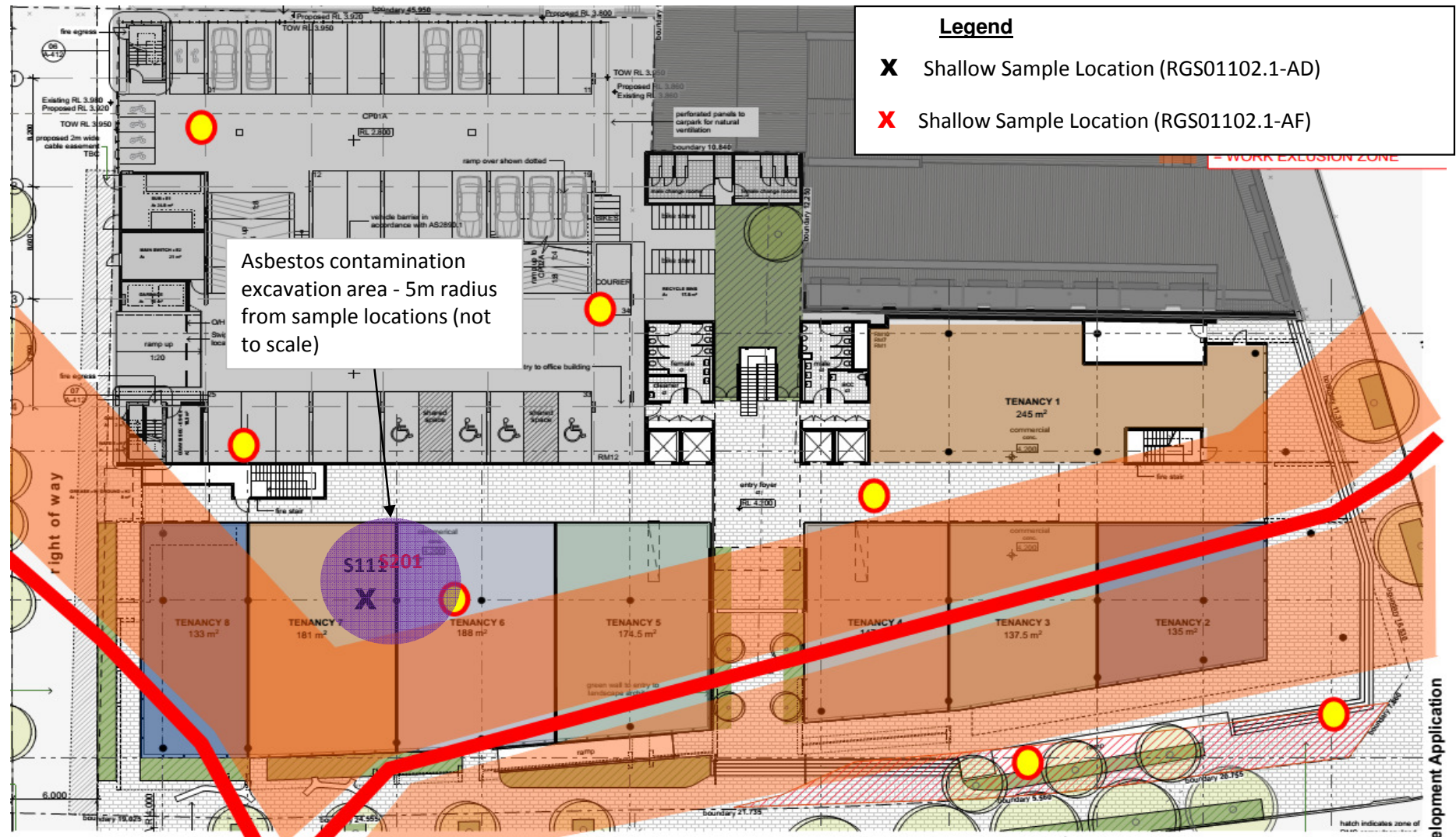


Appendix B

Groundwater Bore Search



Figures



	Client:	Core Project Group	Job No.	RGS01102.1
	Project:	Proposed Multistorey Commercial Development & Carpark	Drawn By:	APH
		12 Stewart Avenue, Newcastle West	Scale:	NTS
	Title:	Excavation Area - Asbestos Contamination	Date:	11-Aug-16
			Drawing No.	Figure 3



Appendix A

Tables

Summary Table - Comparison of Chemical Analysis Results (concentrations in mg/kg) **for a 'COMMERCIAL/INDUSTRIAL' Site.**

National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013)



Client: Core Project Group
Job No. RGS01102.1-AF
Project: Proposed Development
Location: 12 Stewart Avenue, Newcastle West

Location	DEPTH (m)	MATERIAL	ASBESTOS PRESENCE	TOTAL RECOVERABLE HYDROCARBONS					PAH		BTX	HEAVY METALS							
				C6-C10	C10-C16	C16-C34	C34-C40	TOTAL 10-40	Total	b-a-p		As	Cd	Cr*	Cu	Pb	Ni	Zn	Hg
BHL1	0.2 - 0.5	Fill	--	<10	<50	240	<100	240	46.2	3	<0.2	6	<1	9	930	127	27	252	0.2
BHL2	0.2 - 0.5	Fill	--	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<5	<1	3	23	6	2	28	<0.1
BHL3	0.2 - 0.5	Fill	--	<10	<50	700	160	860	118	7.6	<0.2	27	1	19	10700	449	48	1240	0.1
BHL4	0.2 - 0.5	Fill	--	<10	<50	1710	610	2320	82.5	5.4	<0.2	<5	<1	2	21	9	2	22	<0.1
BHL5	0.2 - 0.5	Fill	--	<10	<50	1090	320	1410	83.7	5.4	<0.2	23	1	46	2520	408	66	1050	0.2
BHL6	0.2 - 0.5	Fill	--	<10	<50	770	220	990	28.7	2.4	<0.2	47	2	127	10100	874	292	1740	0.2
BHS1	0.8 - 1.0	Aeolian	--	<10	<50	<100	<100	<50	4.4	0.6	0.3	<5	<1	6	58	49	17	57	0.1
BHS1	1.9 - 2.1	Marine	--	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<5	<1	<2	<5	<5	<2	<5	<0.1
BHS1	2.6 - 2.8	Marine	--	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<5	<1	<2	<5	<5	<2	<5	<0.1
BHS2	1.1 - 1.3	Fill	--	<10	<50	1490	450	1940	274	26.2	<0.2	7	<1	25	99	1410	120	116	0.3
BHS2	1.8 - 2.0	Marine	--	37	<50	120	<100	120	0.5	<0.5	0.5	<5	<1	4	22	24	5	53	0.1
BHS2	2.5 - 2.7	Marine	--	<10	<50	<100	<100	<50	<0.5	<0.5	<0.2	<5	<1	<2	5	<5	<2	<5	<0.1
S200	surface	Fill	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S201	surface	Fill	Yes - 0.003%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D1 (BHL1 0.2 - 0.5 duplicate)	0.2 - 0.5	Fill	--	<10	<50	180	<100	180	24.1	1.8	<0.2	<5	<1	6	136	111	12	194	0.1
Health Based Soil investigation Level:			0.001% (w/w)	1000	800				4000	40	NL	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

No Limit available

Limit of Reporting

Summary Table - Comparison of Groundwater Chemical Analysis Results (concentrations in ug/L) **for 'Aquatic Ecosystems'**



Client: Core Project Group
Job No. RGS01102.1-AF
Project: Proposed Development
Location: 12 Stewart Avenue, Newcastle West

Location	TOTAL RECOVERABLE HYDROCARBONS					PAH (Total)	BTEX	HEAVY METALS							
	C6-C9	C10-C14	C15-C28	C29-C36	TOTAL 10-36			As	Cd	Cr*	Cu	Pb	Ni	Zn	Hg
MWS1	<20	80	<100	<50	80	<0.5	<1	44	0.9	67	148	228	40	235	0.3
D1	<20	70	<100	<50	70	<0.5	<1	49	0.8	74	168	248	43	221	0.2
CRITERIA (ANZECC 2000) - 95% Protection of Species for Aquatic Ecosystems	NL	NL	NL	NL	NL	3	NL	24	5.5	27.4	1.3	4.4	70	15	0.4
CRITERIA (NEPM 2013) - GIL for Marine Waters	NL	NL	NL	NL	NL	NL	NL	24	1	27.4	1.3	4.4	7	15	0.1
NSW Clean Waters Act					10*										

NOTES:

Denotes concentration exceeds adopted guideline criteria

*TRH Criteria based on NSW Clean Waters Act criteria for oil and grease entering waters

NL No Limit available

LOR Limit of Reporting



Client: Core Project Group
Job No. RGS01102.1-AG
Project: Proposed Development
Location: 12 Stewart Avenue, Newcastle West

SAMPLE	DEPTH (m)	MATERIAL	TPH		PAH			BTEX								HEAVY METALS												
			C6-C9	C10-C36	Total	BaP	TCLP	B	TCLP	T	TCLP	E	TCLP	X	TCLP	As	TCLP	Cd	TCLP	Cr*	TCLP	Pb	TCLP	Ni	TCLP	Hg	TCLP	
BHL1	0.2 - 0.5	Fill	<10	280	46.2	3	<0.5	<0.2		<0.5		<0.5		<0.5		6		<1		9		127		27		0.2		
BHL2	0.2 - 0.5	Fill	<10	<50	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		<1		3		6		2		<0.1		
BHL3	0.2 - 0.5	Fill	<10	790	118	7.6		<0.2		<0.5		<0.5		<0.5		27		1		19		449	0	48		0.1		
BHL4	0.2 - 0.5	Fill	<10	1980	82.5	5.4		<0.2		<0.5		<0.5		<0.5		<5		<1		2		9		2		<0.1		
BHL5	0.2 - 0.5	Fill	<10	1240	83.7	5.4		<0.2		<0.5		<0.5		<0.5		23		1		46		408		66		0.2		
BHL6	0.2 - 0.5	Fill	<10	860	28.7	2.4		<0.2		<0.5		<0.5		<0.5		47		2		127	<0.1	874	1	292	0.4	0.2		
BHS1	0.8 - 1.0	Aeolian	<10	<50	4.4	0.6		0.3		<0.5		<0.5		<0.5		<5		<1		6		49		17		0.1		
BHS1	1.9 - 2.1	Marine	<10	<50	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		<1		<2		<5		<2		<0.1		
BHS1	2.6 - 2.8	Marine	<10	<50	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		<1		<2		<5		<2		<0.1		
BHS2	1.1 - 1.3	Fill	<10	1710	274	26.2		<0.2		<0.5		<0.5		<0.5		7		0.2		25		1410		120		0.3		
BHS2	1.8 - 2.0	Marine	<10	170	0.5	<0.5		<0.2		<0.5		<0.5		0.5		<5		0.3		4		24		5		0.1		
BHS2	2.5 - 2.7	Marine	<10	<50	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		0.3		<2		<5		<2		<0.1		
TPE1	0.0 - 1.0	Fill	--	<50	11	0.8		<0.2		<0.5		<0.5		<0.5		2.8		0.2		6.2		148		15		0.2		
TPE1	1.0 - 1.5	Aeolian	--	<50	8.7	0.8		<0.2		<0.5		<0.5		<0.5		3.0		0.3		5.6		195		14		0.2		
TPE2	0.0 - 1.0	Fill	--	<50	12	1.1		<0.2		<0.5		<0.5		<0.5		2.7		0.3		5.3		141		16		0.3		
TPE2	1.0 - 1.5	Aeolian	--	<50	9.3	0.9		<0.2		<0.5		<0.5		<0.5		1.3		0.1		3.8		106		7		0.4		
TPE3	0.0 - 1.0	Fill	--	<50	<0.5	<0.05		<0.2		<0.5		<0.5		<0.5		<1		<0.1		0.5		2		<1		0.0		
TPE3	1.0 - 1.5	Aeolian	--	<50	11	1		<0.2		<0.5		<0.5		<0.5		1.7		<0.1		2.7		16		1		0.1		
TPE4	0.0 - 1.0	Fill	--	<50	<0.5	<0.05		<0.2		<0.5		<0.5		<0.5		1.7		<0.1		2.9		2		<1		0.0		
TPE4	1.0 - 1.5	Aeolian	--	<50	<0.5	<0.05		<0.2		<0.5		<0.5		<0.5		0.6		<0.1		3.1		2		<1		0.0		
TPE5	0.0 - 1.0	Fill	--	<50	14	1.2		<0.2		<0.5		<0.5		<0.5		3.7		0.3		11.7		226		31		0.4		
TPE5	1.0 - 1.5	Aeolian	--	<50	<0.5	<0.05		<0.2		<0.5		<0.5		<0.5		<1		<0.1		1.6		7		1		0.0		
TPE6	0.0 - 1.0	Fill	--	<50	<0.5	<0.05		<0.2		<0.5		<0.5		<0.5		0.9		<0.1		<1		2		<1		<0.01		
TPE6	1.0 - 1.5	Aeolian	--	<50	<0.5	<0.05		<0.2		<0.5		<0.5		<0.5		<1		<0.1		<1		1		<1		<0.01		
TPE7	0.0 - 1.0	Fill	--	<50	<0.5	<0.05		<0.2		<0.5		<0.5		<0.5		<1		<0.1		0.8		3		<1		0.0		
TPE7	1.0 - 1.5	Aeolian	--	<50	0.6	0.4		<0.2		<0.5		<0.5		<0.5		1.5		<0.1		2.3		27		2		0.0		
TP01	1.4 - 1.5	Aeolian	<10	<50	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		<1		5.0		<5		<2		<0.1		
TP02	1.0 - 1.1	Aeolian	<10	<50	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		<1		<2		<5		<2		<0.1		
TP03	1.4 - 1.5	Aeolian	<10	530	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		<1		<2		12		6		<0.1		
TP4	1.5 - 1.6	Aeolian	<10	<50	<0.5	<0.5		<0.2		<0.5		<0.5		<0.5		<5		<1		6.0		<5		<2		<0.1		
THRESHOLD LIMITS																												
GENERAL SOLID WASTE		CT1	650	10,000	200	0.8		10		288		600		1,000		100		20		100*		100		40		4		
		SCC1	650	10,000		10.0		18		518		1,080		1,800		500		100		1,900		1,500		1,050		50		
		TCLP1					0.04		0.5		14.4		30		50		5		1		5		5		2		0.2	
RESTRICTED SOLID WASTE		CT2	2,600	40,000	800	3.2		40		1,152		2,400		4,000		400		80		400*		400		160		16		
		SCC2	2,600	40,000		23.0		72		2,073		4,320		7,200		2,000		400		7,600		6,000		4,200		200		
		TCLP2					0.16		2.0		57.6		120		200		20		4		20		20		8		0.8	

NOTES

CT Contaminant Threshold (without TCLP)
SCC Specific Contaminant Concentrations (used with TCLP)
TCLP Toxicity Characteristics Leaching Procedure (used with SCC)
Shaded Exceeds General Solid Waste Threshold = Restricted Solid Waste
BOLD and Shaded Exceeds Restricted Solid Waste Threshold = Hazardous Waste



Appendix B

Groundwater Bore Search



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All Groundwater
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- ☐ All Groundwater Map
 - ☐ North Coast Region
 - ☐ Hunter Region
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 - Hunter River Basin**
 - Macquarie Tuggerah Lakes Basin
 - ☐ Greater Sydney Region
 - ☐ South Coast Region
 - ☐ Northwest Region
 - ☐ Central West Region
 - ☐ Southwest Region
 - ☐ Far West Region
 - ☐ Great Artesian Basin
 - ☐ Coal Basins

bandwidth ☒ high ☐ low

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Hunter River Basin

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Map

