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3130 Oxley Highway – Site Remediation and Validation

ASEBSTOS CONTAMINATION AND REMEDIATION WORKS

Gunnedah Shire Council P.O. Box 63, Gunnedah NSW 2380

November 2020

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EXECUTIVE SUMMARY

Gunnedah Shire Council instructed SMK Consultants to compete a final site inspection and validation sampling of the land referred to as 3,130 Oxley Highway. Council is proposing to develop the site as a Koala Sanctuary which will include facilities for treatment of injured animals and a small wildlife park in which Koalas and other species can be housed, recuperate and be released into the wild.

The primary aim of the assessment was to undertake a final remediation validation inspection and sampling event at the proposed development site. The land has been previously contaminated with various amount of dumped asbestos and waste materials. Remediation works have taken place over a 12-month period to remove contamination where possible and remediate the site to a standard appropriate for the planned recreational land use. Remediation works were completed based on recommendations made by several contamination investigations completed by EastWest EnviroAg, and EnviroScience Solutions.

All contaminated soil stockpiles have been sieved by Licenced Asbestos Removalist removing approximately 3.2 tonnes of asbestos containing material. Treated soil was then spread across the site and covered with a 100mm layer of clean excavated natural material. SMK completed extensive sampling across the site determining that asbestos contamination was at a level that posed little to no risk to human health and the environment.

All concrete material that was also sieved out of the soil was stored on site. This material was later crushed to be used for road base. SMK Consultants supervised and conducted air monitoring during the first crushing day. Representative sampling of the crushed material on site detected no asbestos fibres within the material.

Chemical soil sampling in areas of heavy metal and hydrocarbon contamination was also completed. All concentrations were found below adopted HIL C Recreational land use criteria.

This investigation concluded that the remediation work undertaken has removed all visible hazardous material. Contamination still exists at the site; however, it is at levels that do not pose a significant risk to human health or the environment in accordance with relevant guidelines. A minimum 100mm cover of clean, excavated material has further reduced the likelihood contamination exposure. The fill has passed appropriate testing as Excavated Natural Material as it contains no traces of contamination.

This risk of asbestos must be managed into the future with an appropriate and scheduled monitoring plan as outlined in Appendix 1, Action 2.

If the appropriate actions to manage the asbestos into the future, the property is considered suitable for use as a Koala Sanctuary and possible tourist facility.

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1 Introduction and Scope of Works

Gunnedah Shire Council instructed SMK Consultants to undertake a final remediation validation inspection and sampling event at 3,130 Oxley Highway, Gunnedah. Council is proposing to utilise the land for the establishment of a Koala Sanctuary and native animal facility. The land has been previously contaminated with various amount of dumped asbestos and waste materials. Remediation works have taken place to remove contamination where possible and remediate the site to a standard appropriate for the planned recreational land use.

The scope of the report involves several steps as identified below:

- Site walkover and evaluation of remediation works
- Sampling and analysis of soil in eight locations which had previously exceeded selected environmental and human health criteria
- Inspection and sampling of crushed concrete piles to determine whether asbestos materials had contaminated the material
- Provide a written report of results and recommendations

This report presents the results and recommendations of this investigation.

2 Site Details

2.1 Location and Adjoining Land Use

The property is located at 3,130 Oxley Highway on the western side of Gunnedah. The land is owned by Council and has an area of approximately 18 hectares. The eastern and southern boundary adjoins rural residential development. Land to the immediate west has been developed for a Go Kart and motorbike racing precinct which is operated by local community clubs. Land to the north is residential land with a quarry located some 800m to the north. Land to the western side of the racing precinct is utilised as open grazing land.

The property includes Lot 329 in DP 755503. Official access to the land is obtained from the southern entrance from the Oxley Highway. Unofficial access is available via tracks through the racing precinct and land to the north.

Site history indicates that the property has been utilised by Council for quarrying of gravel material and stockpiling of concrete, spoil and other material produced from a range of Council projects. The land shows signs of extensive clearing and dozing of gravel material from the surface. A larger quarry area remains in the central northern section of the property. Spoil material in the form of topsoil material has been spread onto areas adjoining the previously active quarry sites.

The area supports a range of woodlands including Cypress pine and White wood areas. The grass layer is limited as a result of rocky soil and lack of topsoil due to disturbance. The understorey layer includes a range of Acacia shrubs (wattle) and other species. The area is

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impacted by a range of weeds which appear to have been introduced or migrated from adjoining properties. Such species include Mother of Millions (*Bryophyllum delagoense*).

The following figure 1 provides a 2017 aerial image of the land. The boundary of Lot 329 is outlined. Actual fencing on the property varies from the boundary of Lot 329. Parts of the racing precinct have extended into Lot 329 as Council own both areas of land.

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Figure 1: Aerial image of Lot 329 DP755503



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The property has a general slope to the west. The land to the north is slightly steeper as a result of quarry operations. The upper batters of the quarried areas have been remediated in the form of sloping. The southern section of the property slopes slightly south but would drain west.

The northern section of the property includes two small dams. The dams have been constructed to provide a water supply to the two race circuits. Neither dam appears to be actively used at present. The dams fill with runoff from Lot 329.

2.2 Historical Land Use

The land has historically been owned by Council. Aerial imagery suggests that larger quarry operations within the site continued up until approximately 2012 before ceasing. After 2012, the larger cleared area within the central northern sector of the property appears to have been utilised for stockpiling of a range of material associated with Council operations within Gunnedah. This includes stockpiling of gravel and soil material. Aerial imagery sequences indicate that material was stockpiled within the site, and then removed over time.

Council has also utilised the property for storage of a range of other materials. This includes excavated material from municipal activity including repairs and maintenance work. Various stockpiles of material within this site contained asbestos based pipe material ranging in diameter from 100mm to 450mm. This would have been obtained during maintenance or replacement of water mains within Gunnedah. On occasion, this occurred as an emergency and therefore outside of the landfill hours.

The property has also been open to public access via adjoining tracks and on occasions when the front gate may have been left open. As a result, the site has been subject to random dumping of waste materials. A wide range of waste was identified within the site including household non-putrescible waste, building waste and asbestos materials. The northern sector of the property has also been exposed to disposal of tyres. This waste appears to have been left onsite for Council to clean up.

The resulting activity on this site has left several internal vehicle tracks through the centre of the property that lead to the northern end of the property. These were originally formed to allow access to the quarry areas. The western side of these internal roads have been levelled with spoil material from the quarry areas or spoil brought to the property. The levelled areas have provided turning areas for trucks. The fill is mainly soil and a mixture of clay and gravel from preparation works for the quarry operations. A steeper bank has been created along the western side of this fill material as per following image. The area supports extensive regrowth which shows the depth of capping over the fill.



Figure 2: Steep batter on west side of main quarry site formed with fill

Recent activity on the property has reduced. This has allowed some regrowth of ground cover and sucker growth of trees. The woodland in the southern section is dominated by younger trees (10 to 20-years of age). The northern section of the woodland is dominated by older, mature trees (>40-years).

3 Previous Investigations

Council provided three reports from work undertaken on the property as part of investigations for site contamination. SMK Consultants were also engaged in December 2020 completing a SEPP 55 Investigation. These reports and their scopes are as follows:

- Contaminated Site Investigation Check, Aug 2019, East West Enviro Ag Pty Ltd
 - o Initial investigation to determine soil contamination status of site
 - 40 soil samples taken in a grid pattern and screened for asbestos, pH, EC, hydrocarbons and BTEX.
- Asbestos Site Assessment and Scope of Works for Remediation, Aug 2020, EnviroScience Solutions
 - $\circ~$ Site assessment to log and map the extent and volume of asbestos contamination across the site
 - Provide recommendations for the remediation and encapsulation of asbestos containing soils
 - \circ $\;$ Recommended that asbestos contaminated soil is sieved to 7mm $\;$
 - $\circ\,$ Recommended that a more detailed Contaminated Site Assessment be conducted.
- Contaminated Site Assessment, Sep 2020, EnviroScience Solutions
 - \circ $\;$ Further 30 soil samples taken and screened for contaminants of concern
 - o Site assessment and desktop study
 - o Report concluded that no contaminants of concern are present on site
- SEPP 55 Investigation, December 2020, SMK Consultants
 - o Characterisation and sampling of asbestos contamination on site

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- o Recommendations for final stages of remediation works
- Recommendations for concrete crushing works

The following plan shows the location of the 40-test pit sites taken in the CSI by East West AgEnvrio.

Figure 3: Test hole locations for Contaminated Site Investigation

(East West Envrio Ag, 2019)



Figure 2 A mud map of approximate sample locations 🛞

The investigation identified the presence of bitumen/asphalt and asbestos as contaminants of concern. The bitumen/asphalt was deemed to be isolated and required removal from the site. The asbestos appeared to be highly visible, and the report recommended removal of such.

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Additional testing was undertaken during this 2019 investigation to determine the presence of asbestos fibres in the soil stockpiles where asbestos was observed. The results indicated that total asbestos and friable asbestos levels in these three samples were below detectable levels. Eight sample locations (SP5, SP7, SP8, SP10, SP11, SP16, SP25 and SP27) were noted for exceeding the absolute maximum concentration for chemical contamination of either benzo(a)pyrene, zinc or lead.

The report concluded that results indicated that site was below thresholds of NEPM Health Investigation Levels for contamination for Residential A and Open Spaces C Zoning.

The report also identified that the stockpiled soil could not be classified as Excavated Natural Material (ENM) as a result of the presence of inert waste, bitumen and asbestos.

Council commissioned the second site investigation in September 2020. This involved a Preliminary Contaminated Site Investigation undertaken by Enviro Science Solutions. This investigation concentrated on the southern section of the property and followed the format of a formal NSW EPA site investigation including a Conceptual Site Model to identify potential pathways and impacts of contamination on the property. Samples were collected and tested for TRH, BTEXN, PAH, OCP, OPP, PCB, Herbicides and heavy metals. Thirty (30) new samples were collected and tested.

The following provides a site location plan showing the extent of this second investigation.



(Enviro Science Solutions, 2020)

Figure 4: Plan showing inspection area for second site investigation

Figure 1-Site Location

Site observations during this investigation indicated "the site shows no evidence of imported material on site and did not reveal any potential locations of buried waste." The one site that contained an elevated level of benzo(a)pyrene should be disregarded as the sample was obtained from the boundary fence adjacent to the highway. The sample appeared to have included some bitumen. The outcome from this report included a recommendation that there is little risk of exposure from previous site uses and that works may continue within the area. As noted from the site plan, the area under consideration was isolated to the southern portion of land adjoining the proposed Koala sanctuary that was subject to tree planting.

Council commissioned a third report which was prepared in September 2020. This third report prepared by Enviro Science Solutions involved an Asbestos Site Assessment and Scope of Works for Remediation. The purpose of this report was to determine the extent of asbestos at 3130 Oxley Highway. This report utilised previous assessments of the site to characterise the site and the risk of asbestos presence. The report identified some limitation due to dense ground cover making it difficult to determine the extent of asbestos in some areas.

This third report concluded that "an important outcome of the remediation is that the top 10cm of soil should be free of all visible asbestos".

The report recommended that the stockpiles be dismantled to assess homogenous soil properties to enable the removal of asbestos or encapsulation to move forward with the development. Several options were identified in the report with the primary scope of separating asbestos from the soil to an acceptable level in accordance with Guidelines. This report provided Council with a remediation plan for the property.

4 Implementation of Remedial Action Plan

4.1 Initial Works

Council utilised the results of the four reports to commence remediation of the site. The remediation aimed to target the presence of asbestos on this site in addition to separation of other inert waste materials. As identified above, the asbestos was present in various forms. Larger pieces of asbestos pipe were present in stockpiled soil and concrete waste. Smaller pieces of asbestos were present in small box trailer loads dumped by local residents. Other larger pieces of asbestos were present in the form of a section of "super-six" roof materials. Other contamination on the site included steel, timber, tyres and concrete waste in addition to minor amounts of household non-putrescible waste. (Old toys, tents, rotten timber, broken chairs).

Following the procedures identified in the Remediation Report, Council engaged the services of a Licensed Asbestos Removalist to commence remediation works. The work procedures involved the following general steps:

• Collection, wrapping and disposal of all visible surface asbestos material at the local landfill

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- Sieving of all stockpiled waste material to separate concrete, steel, timber, asbestos, other foreign materials, including spreading of stockpiles to enable hand picking of smaller pieces of asbestos
- Separation of all concrete and removal to the open quarry area for further processing.
- Site inspection by a Licensed Asbestos Assessor to review work procedures and asbestos management actions including separation of asbestos, risk of asbestos exposure/disturbance and review of general remediation process
- Excavation and scraping of older fill areas
- Daily emu bobbing and raking of work areas to collect any asbestos exposed in surface materials
- Collection and removal of all other waste (tyres, timber, household materials) for disposal at local landfill

The remediation work involved opening up each stockpile and separating waste from raw soil. Once the soil had been spread and cleared of all visible materials including asbestos, steel, concrete and timber, the soil was then moved to expose the original surface.

Figure 5: Treated soil from stockpiles



The contractor indicated that approximately 3.2 tonnes of asbestos material was removed from the site during the work associated with sieving of the stockpiles. This was bagged and disposed of at the Gunnedah landfill. An additional 20 kg or more of smaller pieces of asbestos were hand-picked from the treated stock pile once this material was spread out over previously cleaned areas. The treated soil is shown in the above image.

The remediation management process undertaken by the Licensed Asbestos Removalist and assessed by a Licensed Asbestos Assessor (Peter Taylor LAA 000 180) involved the following basic principles:

- Locate, mark and collect all smaller asbestos waste materials associated with random dumping from local residents.
- Identify all sections of stockpiles and disturbed soil where building material was present to allow more detailed sieving and separation of any asbestos material.
- Separate all asbestos pipe from stockpiled materials including concrete stockpiles, and remove the asbestos from the site.

- Coarse sieve all stockpiles and soil containing building waste using an excavator sieve bucket for the initial investigation and separation process.
- Spread stockpiles or other fill material into thin layers to allow visible identification of asbestos and collect this asbestos before moving the soil.
- Continue daily emu-bob inspections of all sieved and spoil material
- For onsite re-use of treated stockpiles, utilise the high-risk material that may contain more asbestos as a base layer for deeper fill as a priority. Lower risk material is to be placed over the higher-risk material.

This work was undertaken over a period of several weeks. Once the work was approaching completion of separating all visibly identifiable asbestos on this site, SMK Consultants were engaged to undertake an initial Validation Inspection of the property. The purpose of this inspection was firstly to quantify the outcome of the remediation work and secondly to provide recommendations for any additional remediation and/or future management of this site in relation to asbestos. The outcome of this validation inspection is outlines in greater detail in a SEPP 55 – Remediation of Land Report.

The method adopted for soil sampling and sieving during the SEPP 55 Investigation Works involved judgemental sampling of the top 300-400mm layer of treated fill material. The soil samples were screened by hand through a 7mm sieve as recommended under the adopted Guidelines.

Twelve (12) samples were selected from the treated stockpiled soil material that was observed to contain asbestos when initial works commenced. The judgemental selection pattern involved the Asbestos Removalist identifying the most contaminated sections of the fill material. Six (6) of the samples were obtained from these sections. The remaining six samples from stockpiles were obtained from other treated stockpiles.

An additional five (5) samples were selected from the location of the Koala sanctuary building which would be subject to works, such as digging of foundations and trenches for plumbing and electricity installations.

The following table presents the results of soil sieving through the 7mm sieve.

тн #	Soil weight (Kg)	Actual Weight of ACM fragments (grams)	Estimated weight of asbestos in samples (15% of fragment)	% W/W
1	18	9	1.35	0.0075
2	24.2	0	0	0
3	22	0	0	0
4	22	0	0	0
5	21.5	4	0.6	0.0028
6	20	0	0	0

Table 1: Results of Validation Sieving through a 7mm sieve

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TH #	Soil weight (Kg)	Actual Weight of ACM fragments (grams)	Estimated weight of asbestos in samples (15% of fragment)	% W/W
7	23	0	0	0
8	21	0	0	0
9	23	0	0	0
10	23	0	0	0
11	24	7	1.05	0.0044
12	21	0	0	0
13	22	0	0	0
14	22	0	0	0
15	17	0	0	0
16	24	0	0	0
17	24	0	0	0
Total weight	371.7 kg	20	3	0.00081

Three of the 17-soil samples contained pieces of fibro material suspected to be asbestos. Each piece was visually identified to contain asbestos on the basis of the presence of dimples and the density of the material. All three pieces were in a bonded form.

No ash or signs of friable asbestos were identified in any of the 371.1 kg of soil that was hand sieved.

Based on the recommended method, the % W/W of asbestos in all soil samples is below the most stringent threshold level for bonded asbestos as presented for standard residential use of land, being:

• 0.01% w/w asbestos in ACM – standard residential use

Out of the 371.1 kg of soil excavated from the site, three pieces of asbestos weighing a total of 20 grams were uncovered during the field analysis. This weight included a thin layer of soil that covered each piece of asbestos. Using the WE Health equation, the net average weight of asbestos in the soil is below 0.001 % w/w which is the threshold if friable asbestos is present.

To determine whether friable asbestos was present in the soil, four soil samples were forwarded to a NATA accredited laboratory for asbestos fibre testing. The certificate of analysis is presented in Appendix 2. The analysis indicates that no asbestos fibres were present in the soil.

Friable samples	Lat	Long	Asbestos detected
20-359-1	30.98316	150.22264	No
20-359-2	30.98212	150.22248	No
20-359-3	30.07387	150.23071	No
20-359-4	30.97991	150.22129	No

Table 2: Summary of soil samples analysed for asbestos content and asbestos fibres

Based on the above results, no additional asbestos related soil testing was deemed necessary.

4.2 100mm ENM Cover

At the conclusion of the SEP55 Report, SMK Recommended that treated soil be covered with a 100 mm layer of VENM. These works were completed after Gunnedah Shire Council sourced VENM from a nearby property. This excavated natural material was tested by SMK Consultants in December 2020 and sampled for heavy metals. Appendix 3 outlines the results in the SMK's report *Excavated Natural Material Certificate*.

Once the material was confirmed as being free of contamination, spreading of 100mm of soil over remediated and treated areas in the final landform commenced.

4.3 Concrete Crushing

The sieved and washed concrete pile resulting from separation works was also inspected for asbestos containing materials before being crushed. The material is to be recycled around the site for access roads. SMK attended the first day of crushing works to observe procedures and conduct air monitoring. Two air monitors were placed downwind of the crusher collecting dust at 4 L/min for a 120-minute period. Both monitors retuned results with fibre concentrations less than <0.01 fibres/mL. This is the threshold level for asbestos fibre emissions and therefore the crushing work was considered to be safe, although no asbestos was visibly present during the work.

Crushing continued for a one-week period. Consistent rainfall wet the concrete pile, reducing dust emissions. Two stockpiles of crushed concrete are now piled in the quarry area (**Error! Reference source not found.**). An estimated 425 m³ of material is present in the piles.

During the remedial validation site visit, SMK completed an inspection and remedial sampling of the two piles.



Figure 6: Northern stockpile from top of Southern stockpile

5 Remediation Sampling and Analysis Plan

This Validation Investigation scope of works involved:

- Undertake a visual examination of all areas where soil had been treated/remediated
- Undertake soil sampling of eight sites where chemical contamination had exceeded VENM criteria in Enviro Ag Science Report
- Inspect the crushed concrete stockpile for the presence of asbestos materials
- Obtain representative material samples for analysis of the presence of asbestos fibres in the crushed concrete stockpiles
- Prepare a report outlining the site investigation results
- Prepare an Asbestos Management Plan for ongoing use of the property including a proposal for unexpected hazardous materials discovery, post remediation (immediate response actions).

5.1 Soil Sampling

The sampling was undertaken in accordance with SMK Consultants' standard protocol, presented in Appendix 4. This ensures thorough decontamination of all field equipment between samples. Samplers utilised clean nitrile gloves during sampling and a stainless-steel trowel which was washed between sample events. Samples were placed in clearly labelled, sterilised glass sample containers provided by a NATA accredited laboratory.

Samples were taken from the top 100 mm of soil. They were placed on ice immediately after sampling. Samples were kept below 4 °C in a sealed esky until their arrival at the laboratory.

The eight soil sample locations selected were based upon the 8 VENM exceedance locations for zinc, lead and benzo(a)pyrene identified in the East West Enviro Ag Contaminated Site Investigation Check. Details of each sample are outlined below in

Sample ID	Depth (mm)	Northing	Easting	Analytes	Comments
21-SP5	0-100	-30.983007	150.222539	Lead, Zinc	Treated fill
21-SP7	0-100	-30.982496	150.222837	Benzo(a)pyrene	Treated fill
21-SP8	0-100	-30.982586	150.222553	Lead	Treated fill
21-SP10	0-100	-30.982105	150.222174	Benzo(a)pyrene	Treated fill
21-SP11	0-100	-30.981997	150.222456	Lead, Benzo(a)pyrene	Treated fill
21-SP16	0-100	-30.981376	150.221936	Benzo(a)pyrene	Natural fill
21-SP25	0-100	-30.979866	150.222386	Benzo(a)pyrene	Natural fill
21-SP27	0-100	-30.980493	150.222199	Benzo(a)pyrene	Treated fill

Table 3: Chemical Soil Analysis Samples

Sample locations are presented on the East West EnviroAg mud map in Figure 3.

5.2 Crushed Concrete Sampling

Following the initial inspection of the two crushed concrete stockpiles, 8 composite samples were taken across the stockpile surface.

The sampler was wearing a P2 mask and nitrile gloves throughout the sample process. One sample was taken from each face of the two stockpiles. Composite samples targeted the full breadth of the stockpile from top to bottom. A trowel was used taking small amounts of material approximately 10 times per sample from the stockpile face. Each trowel scoop was passed through a 7 mm sieve into the soil bag. Gravel and concrete pieces larger than 7mm in size were discarded. This sieving process reduced the amount of large concrete pieces collected in the sample and completed the first step of the laboratory analysis.

Each sample was approximately 500 grams in size. Samples were sealed in plastic zip lock bags and labelled. Samples were sent to a NATA Accredited Laboratory and analysed for the presence of free fibres and fibrous asbestos materials.

The following depicts the outline of crushed concrete materials as well as sample locations. A handheld GPS was used to create a string around the base of each stockpile and note the location of each sample.



5.3 Quality Assurance and Quality Control

As this is a preliminary assessment, no duplicate field samples were obtained. Appropriate quality assurance was adopted through SMK Consultants' standard sampling methodology as well as the use of chain of custody documentation.

Quality control of sample analysis is achieved by utilising a NATA accredited laboratory. These laboratories follow ASTM standard methods which are supported by internal duplicates and blanks, surrogate spikes and matrix spikes. ALS Laboratories provide the details of surrogates and spikes, percent recoveries of surrogates and spikes used as well as instrument detection limits within the certificate of analysis.

Field observations are also compared with laboratory results. If inconsistencies are detected, re-sampling and re-analysis of a sample is undertaken.

6 Relevant Guidelines

6.1 Soil Sampling

The National Environmental Protection Measure 2013 (NEPM) provides a nationally consistent approach to the assessment of site contamination and presents a range of soil parameters and contaminants that are recommended levels in soil before they have the potential to affect human health or the environment. The guideline values or site criteria are referred to as "Health Based Investigation Levels (HIL's) and Groundwater Investigation Levels (GIL's). NSW EPA and National Authorities have prepared other similar documents to provide additional Threshold Levels for contaminants. The following list of Guidelines were utilised to determine acceptable levels of contamination during the preparation of this report:

- (1) National Environment Protection (Assessment of Site Contamination) Measure 2013
- (2) Contaminated Sites Guidelines for Assessing Former Orchards and Market Gardens, NSW EPA, 2005
- (3) Contaminated Sites Guidelines for the NSW Site Auditor Scheme NSW EPA 1998
- (4) Contaminated Sites Guidelines for Assessing Service Station Sites NSW EPA 1994
- (5) *Health based soil investigation levels,* National Environmental Health Forum (NEHF), 1999

The Guidelines for maximum threshold levels are based on the existing or potential land use for the site investigation area. The chosen guideline levels should be based on criteria of land use and therefore risk of exposure to the contaminant material. In this case, the proposed use of the site is for a Wildlife and Koala Sanctuary. Risk of direct contact with the soil is therefore considered moderate.

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In consideration of the potential impact pathway, the threshold criteria to be adopted on this site is:

HIL C (Recreational) Table 1A (1) of Schedule B1 – Guideline to Investigating Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure 2013]

The available threshold levels from this guideline are presented with the results of sample analysis included in the following section.

6.2 Gravel Sampling

Guidelines utilised include NSW Office of Environmental and Heritage (OEH) Guidelines and NEPM Schedule B1 (Guideline on Investigation Levels for Soil and Groundwater). The Guidelines refer to using the "Guidelines for the Assessment Remediation and Management of Asbestos-Contaminated Sites in Western Australia' (WA Health, 2009). These WA standards indicate that the concentration for "ACM in sound condition (non-friable, bonded) in soil are:

- 0.001 % w/w asbestos for fibrous asbestos and asbestos fines all site uses
- 0.01 % w/w asbestos in ACM standard residential use
- 0.04 % w/w asbestos in ACM residential with minimal soil access
- 0.02 % w/w asbestos in ACM parks, etc
- 0.05 % w/w asbestos in ACM commercial/industrial.

It should be noted that the National Environment Protection Measure (NEPM) guidelines also define friable asbestos as any asbestos material which passes through a 7mm sieve. This definition is based on the assumption that such small pieces of asbestos must have been subjected to crushing or damage resulting in the fine pieces of asbestos and therefore this crushing may have generated asbestos fibres that could become separated from the small pieces of asbestos.

7 Validation Results

7.1 Soil Sampling

The following table presents the results of soil samples and published threshold levels. Any sample results above Limits of Reporting (LOR) have been presented in **Bold**. The LOR is based on the laboratory to reliably test for a specific parameter using normal laboratory equipment. In most circumstances, concentrations below the LOR are considered safe.

Analytes		Depth	Moisture Content	Lead	Zinc	Benzo(a)pyrene
Unit		mm	%	mg/kg	mg/kg	mg/kg
LOR	L	1	1	5	5	0.5
HIL C Recre	ational	-	-	600	30,000	3
	SP5	0-100	12.2	10	66	-
	SP7	0-100	8.7	-	-	<0.5
	SP8	0-100	4.2	13	-	-
Sampla	SP10	0-100	3.7	-	-	<0.5
Sample	SP11	0-100	8.5	15	-	<0.5
	SP16	0-100	5.5			1.6
	SP25	0-100	9.8			2.2
	SP27	0-100	6.8	-	-	<0.5

Table 4: Soil Remediation Validation Results

Notes:

1 - LOR = Limit of Reporting

The results indicated no exceedances of Lead, Zinc or Benzo(a)pyrene in the samples analysed. Detectable concentrations of benzo(a)pyrene were found in SP16 and SP27. Both locations were the only two sample locations not covered by clean fill. Each location is also located immediately off the main access track. This suggests the detectable levels are a result of the runoff from the access track which is likely to have been covered in treated gravels in the past. Sample SP16 and SP25 were both below HIL C Recreational Criteria and are therefore not considered to pose a risk to human health.

7.2 Gravel Sampling

Eight stockpile samples were taken across the two crushed concrete stockpiles. Samples were screened for asbestos fibres and fines. An estimated 2,555m³ of material is stored in the stockpiles. The following table outlines the results of each composite sample. The Laboratory Certificate of Analysis is attached in Appendix 2.

Location	Sample	Dry sample weight	Asbestos Detected	Asbesto s (trace)	Asbestos Fines & Fibrous <7mm	Fibrous Asbestos >7mm
	LOR	0.01	0.1	5	0.0004	0.0004
	Unit	g	g/kg	fibres	g	g
South stockpile, West face	21-G1	638	No	No	<0.0004	<0.0004

Table 5:	Gravel	Sampling	Results
10010 01	Giuici	Gaussian	11000100

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Location	Sample	Dry sample weight	Asbestos Detected	Asbesto s (trace)	Asbestos Fines & Fibrous <7mm	Fibrous Asbestos >7mm
	LOR	0.01	0.1		0.0004	0.0004
	Unit	g	g/kg	fibres	g	g
South stockpile, South face	21-G2	567	No	No	<0.0004	<0.0004
South stockpile, East face	21-G3	470	No	No	<0.0004	<0.0004
South stockpile, North face	21-G4	471	No	No	<0.0004	<0.0004
North stockpile, South face	21-G5	452	No	No	<0.0004	<0.0004
North stockpile, west face	21-G6	547	No	No	<0.0004	<0.0004
North stockpile, North face	21-G7	571	No	No	<0.0004	<0.0004
North stockpile, East face	21-G8	513	No	No	<0.0004	<0.0004

No asbestos fibres were detected in any of the 8 composite samples taken across the stockpile surface. The investigation detected no visible suspected asbestos containing materials. The stockpile consisted of gravel, sand, concrete and some small amounts of household plastics and PVC pipe.

The gravel therefore complies with the adopted guidelines which allow all site use for material with less than 0.001 % w/w asbestos for fibrous asbestos and asbestos fines. As the entire stockpile could not be tested, the risk for asbestos containing material still exists however, it is unlikely to be present in levels greater than adopted thresholds.

8 Conclusions and Recommendations

Previous investigations of this site determined that asbestos material was present in the surface layer of soils and within some stockpiles across the site. Council proceeded with remediation works as outlined in the recommended remediation process. Visible asbestos was removed, and the stockpiles were sieved. This was accompanied by daily emu-bobs across the site. The remediated soil was then covered in a 100mm layer of excavated natural material to reduce exposure risk.

Soil validation sampling results indicated concentrations of Lead, Zinc or Benzo(a)pyrene did not exceed adopted HIL C Recreation Criteria. Detectable levels of Benzo(a)pyrene were

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found in samples SP16 and SP25. Neither sample location has been covered in clean soil as no asbestos contamination was detected in the area. The detectable levels are most likely a result of runoff from the access track which is likely to have been covered in treated gravels in the past. Sample SP16 and SP25 were both below HIL C Recreational Criteria and are therefore not considered to pose a risk to human health.

The crushed concrete stockpiles were also inspected during the final site validation walkover. The stockpiles were found to contain sand, concrete, gravel and mixed household plastics. No suspected asbestos containing material was identified during the visual inspection. Asbestos fibres were not detected in air monitoring samples taken during the first day of crushing. Similarly, no asbestos fines or fibres were detected in the 8 composite samples taken across the stockpiles. The risk for the gravel stockpiles to contain friable, crushed asbestos materials does exist; however, the likelihood of it existing in levels greater than adopted guidelines is very low. All concrete was sieved, separated and washed prior to crushing. The material has been deemed suitable to spread as required across site a road base and building foundation material.

The SEPP55 remediation investigation report conducted by SMK determined that the level of asbestos remaining at the site is well below threshold levels of even the most stringent site use. Coupled with the 100mm cover layer, the risk of exposure to asbestos at the site is considered acceptable in accordance with relevant guidelines.

The final site validation walkover completed on the 30th of March 2021 noted all areas previously identified as being remediated for asbestos were covered in the excavated natural material. Any remaining asbestos present in the soil is considered to be stable and would remain as such unless disturbed.

The intended landuse on this site includes establishment of a facility to provide a Koala sanctuary and associated walks within a confined Koala rehabilitation park. The building to be located on this site will require foundation filling and levelling of the foundations to a depth of 1m or more. This 1m of gravel and soil would provide an additional encapsulation layer over any random remaining pieces of asbestos.

SMK Consultants and previous investigations have identified that the site was contaminated with asbestos, heavy metals and hydrocarbons (benzo(a)pyrene). The complete removal of contaminants of concern is considered impossible, without stripping all topsoil and all fill across this property. This would also require the removal of all trees. This is not considered feasible. This validation investigation has determined that the level of contamination remaining is considered below threshold levels for the most stringent use of the site which would involve residential use. The risk of exposure to asbestos, heavy metals and hydrocarbons is therefore considered to remain but the level of risk is acceptable.

Possible receptors on this site will include the local community, site visitors and service workers, including gardeners. Exposure risks associated with heavy metals and hydrocarbons in the soil is low as direct ingestion would be required to cause concern. This is deemed unlikely considering the site use.

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The path of risk for asbestos exposure would include crushing or pulverising of non-friable asbestos to cause the release of asbestos fibres. At present, any remaining contamination is in a stable state in the soil, underneath a minimum 100mm layer of clean soil. The risk of fibre exposure from non-friable asbestos buried in the soil is considered acceptable under adopted guidelines.

On this basis, it is accepted that there is still a minor risk of asbestos being encountered during the proposed development works and potentially once the site becomes operational. On this basis, a management plan is recommended. This needs to consist of an unexpected fines policy which includes relevant actions for those that find any material that is suspected to contain asbestos.

Current guidelines were used to determine an acceptable management approach to the asbestos on this site. The document "Guidance Note on the Identification, Assessment and Management of Asbestos Contamination in Regional Public Areas (WA Health 2011) was reviewed. Where no friable asbestos material is present, the Guide recommends the following strategy:

- Erection of warning signs as to the possible presence of asbestos material in the area;
- Providing a public factsheet about the asbestos in the area; (Council already provides public fact sheets for asbestos);
- Providing some type of receiving and disposal service for asbestos fragments found by the public (Park manager contact details, disposal bins);
- Undertaking an annual hand pick (emu-bob) of any emergent asbestos material, preferably before a primary holiday period such as before Christmas holidays.

A detailed Management Plan to be adopted for construction works and ongoing management of this site is presented in Appendix 1.

Prepared by:

Kyra O'Sullivan

Kyra O'Sullivan BENG (Hon) MIEAust. Environmental Engineer SMK Consultants

Peter Taylor

Peter Taylor _{B.Sc. MEIANZ CIAg LAA} Licensed Asbestos Assessor LAA 000 180 SMK Consultants

SMK Consultants

Limitations

This report is based on observation at the time of the investigation and history of the site. The conclusions and recommendations are based on the scope of works adopted, the methodology presented in this report and the results of laboratory analysis undertaken for this investigation.

9 References

- Guidance note on the identification, assessment and management of asbestos contamination in regional public areas. (WA Department of Health, 2011)
- Guidelines for the assessment and Management of Asbestos-Contaminated sites in Western Australia (WA Department of Health, 2009)
- Management of small-scale low-risk soil asbestos contamination (WA Government, 2009)
- Managing asbestos in or on Soil, (NSW Government, 2014)
- Protection of the Environment Operations (Waste) Regulation 2014
- Gunnedah Shire Council Contaminated Site Investigation Check (Eastwest Geo Ag Enviro, 2019)
- Preliminary Contaminated Site Assessment of 3130 Oxley Highway, Gunnedah (Enviro Science Solutions, 2020)
- Asbestos Site Assessment and Scope of Works for Remediation at 3130 Oxley Highway, Gunnedah (Enviro Science Solutions, 2020)

Appendix 1 – Asbestos Management for 3,130 Oxley Highway

Process 1 – Placement of Cover Layer

Guidelines recommend a minimum of 100mm of clean fill over the affected area for bushland parks or nature reserves. Alternatively, a vegetation cover such as grass or mulch can be established over the area to be utilised for parks or a bushland reserve where public access is available. The preference is for a minimum of 0.5m of fill beneath buildings where sub-surface utilities are to be installed.

For the proposed Park, this would involve fill beneath any building site to a minimum depth of 0.5m where previous fill had been placed. Additionally, the placement of fill on roads, fill over areas adjoining roads, and for any pathways created within the Park, a fill depth of 100mm or more is required as a barrier to these accessible areas.

In this case, it is recommended that a minimum of 100mm of loamy soil is placed over any open areas that would not be filled for building construction. This may include picnic areas or playgrounds. The potential is available to seal playgrounds with artificial turf or similar layers of recycled rubber. Where possible, the remaining surfaces that would actively be used by guests to the site should be topsoiled, grassed and an automatic irrigation system installed to maintain the grass cover.

The addition of turf or grass over this area is also recommended to provide additional cover. If grass is placed over this area, a watering system would be required to maintain the grass. The grass would also provide a protective cover over the soil to avoid erosion from either wind or rain and therefore protect the soil layers to minimise the potential emergence of additional asbestos fragments. The addition of a water system would also allow Council to maintain the surface soils in a moist condition. The moist condition would prevent any release of asbestos fibres if they were present and stabilise the soil to prevent or minimise the risk of new pieces of asbestos emerging from the soil.

Process 2 - Asbestos Inspection Protocol

General

The Park area will retain a minor risk that asbestos material is encapsulated within the top 100-300 mm layer of soil beneath the site once development is completed. The facility will be used by a range of people including the local community, visitors, employees and Council staff. The asbestos encapsulated in the soil has been identified to have a low risk of asbestos fibre release in accordance with current guidelines. A minor risk remains that some asbestos fragments may naturally rise to the surface of the soil over time.

The following provides a management and monitoring protocol to be adopted by Council as the owner of the land and therefore responsible for the health and wellbeing of facility users:

Notification SMK Consultants

- Council is required to advise all construction workers of the potential risk that asbestos may be present on this site, prior to construction work commencing
- Council should require appropriate signage to be present within the facility with contact details if suspected asbestos fragment/s are found.
- The sign should contain phone contact details for a Council supervisor who can provide appropriate advice and collect the suspected asbestos material.

Action 1: Bi-Annual Inspection and Emu-bob

- Conduct an emu-bob survey of the exposed surface of areas within the facility to identify and pick-up any suspected asbestos containing fragments or fibro like materials.
- Emu-bob to cover all open spaces available for picnicking and walking trails.
- Asbestos material to be placed in an asbestos disposal bag for disposal at an appropriate facility.
- Staff involved in the inspection are to wear appropriate Personal Protection Equipment including a P2 dust mask (or better) and gloves.
- Where a site is identified with more than 20 cm² of asbestos fragments per square metre, the area is to be subject to further investigation to determine the extent and form of the asbestos.
- If the site of concern contains a spread of asbestos fragments in excess of 20 cm² per square metre, the area can be raked, and pieces collected or alternatively the area is to be covered by 300mm or more of clean fill.
- Council should maintain a record of inspections and the results of inspections
- Where larger extents of concentrated asbestos fragments or friable asbestos is identified, management should immediately contact an appropriately qualified asbestos consultant to provide advice on the site.

Appendix 2 – Certificate of Analyses

Gravel Crushing – Air monitoring

LS) Environmental

CERTIFICATE OF ANALYSIS							
Work Order	EN2101466	Page	: 1 of 2				
Client	SMK CONSULTANTS PTY LTD	Laboratory	: Environmental Division Newcastle				
Contact	: Kyra O'Sullivan	Contact	:				
Address	P.O.Box 774 39 FROME STREET MOREE NSW, AUSTRALIA 2400	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304				
Telephone	:	Telephone	: +61 2 4014 2500				
Project	: 21-359 Gunnedah Shire Koala Park	Date Samples Received	: 01-Mar-2021 09:00				
Order number	:	Date Analysis Commen	ced : 01-Mar-2021				
C-O-C number	:	Issue Date	: 02-Mar-2021 10:19				
Sampler	: SMK Consultants		Hac-MRA NAIA				
Site	:						
Quote number	: EN/333		Accordition No. 835				
No. of samples received	: 2		Accredited for compliance with				
No. of samples analysed	: 2		ISO/IEC 17025 - Testing				

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

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SMK Consultants

Page	: 2 of 2
Work Order	: EN2101466
Client	: SMK CONSULTANTS PTY LTD
Project	21-359 Gunnedah Shire Koala Park

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

• EA205: Analysis conducted in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)] and ALS supplementary method EA205.

EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL

Analytical Results

Sub-Matrix: FILTER			Sample ID	21-359-A1	21-359-A2	 	
(Matrix: AIR)				3130 Oxley Highway	85 Boston Street		
					Moree		
		Sampli	ing date / time	25-Feb-2021 00:00	25-Feb-2021 00:00	 	
Compound	CAS Number	LOR	Unit	EN2101466-001	EN2101466-002	 	
				Result	Result	 	
EA205: Asbestos Fibre Count by MFM							
ø Fibre Concentration		0.01	fibres/mL	<0.01	<0.01	 	
Fibre Count		0.5	No.	<0.5	1.0	 	
Fields Counted		20	No.	100	100	 	
ø Volume		1	L	844	824	 	
APPROVED COUNTER:		-	-	A. SMYLIE	A. SMYLIE	 	



Soil Validation Sampling

ALS) Environmental

CERTIFICATE OF ANALYSIS							
Work Order	: ES2111947	Page	: 1 of 5				
Client	SMK CONSULTANTS PTY LTD	Laboratory	: Environmental Division S	Sydney			
Contact	: Kyra O'Sullivan	Contact	: Customer Services ES				
Address	P.O.Box 774 39 FROME STREET MOREE NSW, AUSTRALIA 2400	Address	: 277-289 Woodpark Road	d Smithfield NSW Australia 2164			
Telephone	:	Telephone	: +61-2-8784 8555				
Project	: GUNNESDAH SHIRE KOALA PARK	Date Samples Received	: 01-Apr-2021 08:28	SWIIID.			
Order number	: 20-359	Date Analysis Commenced	: 06-Apr-2021				
C-O-C number	:	Issue Date	: 12-Apr-2021 15:13	NATA			
Sampler	: Kyra O'Sullivan			Hac-MRA NATA			
Site	:						
Quote number	: EN/333			Accreditation No. 825			
No. of samples received	: 8			Accredited for compliance with			
No. of samples analysed	: 8			ISO/IEC 17025 - Testing			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

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Page	: 2 of 5
Work Order	: ES2111947
Client	: SMK CONSULTANTS PTY LTD
Project	: GUNNESDAH SHIRE KOALA PARK



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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- Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting
 - * = This result is computed from individual analyte detections at or above the level of reporting
 - ø = ALS is not NATA accredited for these tests.
 - ~ = Indicates an estimated value.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG005: Poor precision was obtained for Zinc on sample ES2111722-#028. Results have been confirmed by re-extraction and reanalysis.
- EP075(SIM): Surrogate recovery bias low due to sample matrix interferences.

Page : 3 of 5 Work Order : ES2111947 Client : SMK CONSULTANTS PTY LTD Project : GUNNESDAH SHIRE KOALA PARK



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	21-359-SP5	21-359-SP7	21-359-SP8	21-359-SP10	21-359-SP11
		Sampl	ing date / time	30-Mar-2021 00:00				
Compound	CAS Number	LOR	Unit	ES2111947-001	ES2111947-002	ES2111947-003	ES2111947-004	ES2111947-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105	-110°C)							
Moisture Content		0.1	%	12.2	8.7	4.2	3.7	8.5
EG005(ED093)T: Total Metals by ICP-A	ES							
Lead	7439-92-1	5	mg/kg	10		13		15
Zinc	7440-66-6	5	mg/kg	66				
EP075(SIM)B: Polynuclear Aromatic H	ydrocarbons							
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5		<0.5	<0.5
EP075(SIM)S: Phenolic Compound Su	rrogates							
Phenol-d6	13127-88-3	0.5	%		87.7		91.8	93.9
2-Chlorophenol-D4	93951-73-6	0.5	%		85.6		88.4	89.9
2.4.6-Tribromophenol	118-79-6	0.5	%		41.5		42.1	45.1
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%		97.9		101	102
Anthracene-d10	1719-06-8	0.5	%		108		113	112
4-Terphenyl-d14	1718-51-0	0.5	%		88.1		91.3	92.8

Page : 4 of 5 Work Order : ES2111947 Client : SMK CONSULTANTS PTY LTD Project : GUNNESDAH SHIRE KOALA PARK



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	21-359-SP16	21-359-SP25	21-359-SP27		
		Sampli	ing date / time	30-Mar-2021 00:00	30-Mar-2021 00:00	30-Mar-2021 00:00		
Compound	CAS Number	LOR	Unit	ES2111947-006	ES2111947-007	ES2111947-008		
				Result	Result	Result		
EA055: Moisture Content (Dried @ 105-	110°C)							
Moisture Content		0.1	%	5.5	9.8	6.8		
EP075(SIM)B: Polynuclear Aromatic Hyd	drocarbons							
Benzo(a)pyrene	50-32-8	0.5	mg/kg	1.6	2.2	<0.5		
EP075(SIM)S: Phenolic Compound Surr	ogates							
Phenol-d6	13127-88-3	0.5	%	94.8	94.0	89.6		
2-Chlorophenol-D4	93951-73-6	0.5	%	90.6	89.9	87.6		
2.4.6-Tribromophenol	118-79-6	0.5	%	57.4	56.1	52.6		
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	102	101	101		
Anthracene-d10	1719-06-8	0.5	%	108	107	112		
4-Terphenyl-d14	1718-51-0	0.5	%	89.4	89.8	89.6		

Page : 5 of 5 Work Order : ES2111947 Client : SMK CONSULTANTS PTY LTD Project : GUNNESDAH SHIRE KOALA PARK

ALS

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery	Limits (%)
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129

Crushed Concrete Samples

LS) Environmental

CERTIFICATE OF ANALYSIS								
Work Order	EN2102581	Page	: 1 of 4					
Client	SMK CONSULTANTS PTY LTD	Laboratory	: Environmental Division Newcastle					
Contact	: Kyra O'Sullivan	Contact	:					
Address	P.O.Box 774 39 FROME STREET	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304					
	MOREE NSW, AUSTRALIA 2400							
Telephone	:	Telephone	: +61 2 4014 2500					
Project	: 21-359 - Gravel Stockpile Sampling - Gunnedah Koala Park	Date Samples Received	: 01-Apr-2021 17:00					
Order number	:	Date Analysis Commenced	: 08-Apr-2021					
C-O-C number	:	Issue Date	: 09-Apr-2021 13:49					
Sampler	: SMK Consultants		Hac-MRA NAIA					
Site	:							
Quote number	: EN/333		Apprediction No. 825					
No. of samples received	: 8		Accredited for compliance with					
No. of samples analysed	: 8		ISO/IEC 17025 - Testing					

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

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Page : 2 of 4 Work Order : EN2102581 Client : SMK CONSULTANTS PTY LTD Project : 21-359 - Gravel Stockpile Sampling - Gunnedah Koala Park



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

- LOR = Limit of reporting
- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- EA200N: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.
 - Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present)
 - The Asbestos (Fines and Fibrous) weight is calculated from the extracted Fibrous Asbestos and Asbestos Fines as an equivalent weight of 100% Asbestos Percentages for Asbestos content in ACM are based on the 2013 NEPM default values.
 - All calculations of percentage Asbestos under this method are approximate and should be used as a guide only.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200N: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No" No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Page : 3 of 4 Work Order : EN2102581 Client : SMK CONSULTANTS PTY LTD Project : 21-359 - Gravel Stockpile Sampling - Gunnedah Koala Park



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	21-359-G1	21-359-G2	21-359-G3	21-359-G4	21-359-G5
		Sampli	ng date / time	30-Mar-2021 00:00				
Compound	CAS Number	LOR	Unit	EN2102581-001	EN2102581-002	EN2102581-003	EN2102581-004	EN2102581-005
				Result	Result	Result	Result	Result
EA200: AS 4964 - 2004 Identification of	Asbestos in Soils							
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-		-	-	-	-	-
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	No	No
Sample weight (dry)		0.01	g	638	567	470	471	452
Synthetic Mineral Fibre		0.1	g/kg	No	No	No	No	No
Organic Fibre		0.1	g/kg	No	No	No	No	No
APPROVED IDENTIFIER:		-		A. SMYLIE				
EA200N: Asbestos Quantification (non-	NATA)							
ØAsbestos (Fines and Fibrous	1332-21-4	0.0004	g	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
<7mm)								
Ø Asbestos (Fines and Fibrous FA+AF)		0.001	% (w/w)	<0.001	<0.001	<0.001	<0.001	<0.001
ø Weight Used for % Calculation		0.0001	kg	0.638	0.567	0.470	0.471	0.452
ø Fibrous Asbestos >7mm		0.0004	g	< 0.0004	<0.0004	<0.0004	<0.0004	<0.0004

Page : 4 of 4 Work Order : EN2102581 Client : SMK CONSULTANTS PTY LTD Project : 21-359 - Gravel Stockpile Sampling - Gunnedah Koala Park



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	21-359-G6	21-359-G7	21-359-G8	
		Sampli	ng date / time	30-Mar-2021 00:00	30-Mar-2021 00:00	30-Mar-2021 00:00	
Compound	CAS Number	LOR	Unit	EN2102581-006	EN2102581-007	EN2102581-008	
				Result	Result	Result	
EA200: AS 4964 - 2004 Identification of A	Asbestos in Soils						
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	
Asbestos Type	1332-21-4	-		-	-	-	
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	
Sample weight (dry)		0.01	g	547	571	513	
Synthetic Mineral Fibre		0.1	g/kg	No	No	No	
Organic Fibre		0.1	g/kg	No	No	No	
APPROVED IDENTIFIER:		-		A. SMYLIE	A. SMYLIE	A. SMYLIE	
EA200N: Asbestos Quantification (non-h	NATA)						
ØAsbestos (Fines and Fibrous <7mm)	1332-21-4	0.0004	g	<0.0004	<0.0004	<0.0004	
Ø Asbestos (Fines and Fibrous FA+AF)		0.001	% (w/w)	<0.001	<0.001	<0.001	
ø Weight Used for % Calculation		0.0001	kg	0.547	0.571	0.513	
ø Fibrous Asbestos >7mm		0.0004	g	<0.0004	<0.0004	<0.0004	

Analytical Results

Descriptive Results

Sub-Matrix: SOIL

Method: Compound	Sample ID - Sampling date / time	Analytical Results					
EA200: AS 4964 - 2004 Identification of Asbestos	EA200: AS 4964 - 2004 Identification of Asbestos in Soils						
EA200: Description	21-359-G1 - 30-Mar-2021 00:00	Mid brown soil.					
EA200: Description	21-359-G2 - 30-Mar-2021 00:00	Mid brown soil.					
EA200: Description	21-359-G3 - 30-Mar-2021 00:00	Mid brown soil.					
EA200: Description	21-359-G4 - 30-Mar-2021 00:00	Mid brown soil.					
EA200: Description	21-359-G5 - 30-Mar-2021 00:00	Mid brown soil.					
EA200: Description	21-359-G6 - 30-Mar-2021 00:00	Mid brown soil.					
EA200: Description	21-359-G7 - 30-Mar-2021 00:00	Mid brown soil.					
EA200: Description	21-359-G8 - 30-Mar-2021 00:00	Mid brown soil.					

Appendix 3 – ENM Classification Certificate

SMK CONSULTANTS

surveying – irrigation – environmental – planning ABN 63 061 919 003 39 Frome Street PO Box 774 Moree NSW 2400 Ph 02 6752 1021 Fax 02 6752 5070 ptaylor@smk.com.au

www.smk.com.au



3130 Oxley Highway

EXCAVATED NATURAL MATERIAL CERTIFICATE

Gunnedah Shire Council P.O. Box 63, Gunnedah NSW 2380

December 2020

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surveying – irrigation – environmental – planning ABN 63 061 919 003

DOCUMENT CONTROL

Project Name	3,130 Oxley Highway SEPP 55 Investigation
Proponent	Gunnedah Shire Council
Project Reference	20-359
Report Number	20-359 ENM Certificate
Prepared for	Gunnedah Shire Council P.O. Box 63 Gunnedah NSW 2380
Prepared by	SMK Consultants 39 Frome Street Moree, NSW 2400
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Reviewed By					
Peter Taylor					
Name	Peter Taylor BSC. MEIANZ CIAg LAA				
Position	Environment and Resource Consultant				
Company	SMK Consultants				

Revision History							
Version Number	Date	Authority	Details				
0	December 2020	Kyra O'Sullivan	Release to Council				

1 Introduction

Gunnedah Shire Council instructed SMK Consultants to undertake sampling of stockpiled soil material located at a property on Preston Road, 5km South of Gunnedah NSW. The soil was stockpiled when cleaning out Turners Gully which traverses the property. Gunnedah Shire Council aims to utilise the soil as clean fill for the proposed Koala Park development at 3130 Oxley Highway, Gunnedah.

The soil is a light brown sandy clay with interspersed angular gravels throughout. The stockpile can be seen in Figure 1, while the stockpile locality is depicted in Figure 2.

There are two properties upstream of the stockpiled soil. Turners gully originates from hills and bushland 3 km to the south. No known contamination events have occurred directly onsite or upstream. However, the material cannot be classed as Virgin Excavated Natural Material (VENM) as it is not possible to confirm whether contamination has occurred as a result of agricultural or horticultural activities onsite in the past.

As VENM could not be confirmed with complete certainty, it was decided to test chemically for Excavated Natural Material (ENM). ENM is defined as naturally occurring rock and soil that:

- a) Has been excavated from the ground
- b) Contains at least 98 % w/w natural material
- c) Does not meet the definition of Virgin Excavated Natural Material

According to the NSW EPAs Excavated Natural Material Order (2014), ENM does not include material that has been processed in a hotspot, asbestos, acid sulphate soils, potential acid sulphate soils or sulfidic ores. The site has been used for grazing and broadacre cropping since clearing and therefore none of these risk factors are present at the site. Acid sulphate soils risk is considered low in the Gunnedah region.

Therefore, the material in the stockpile is classed as ENM. However, this must be chemically validated to ensure it meets the required criteria for reuse on another site.



Figure 1: Stockpiled material looking South - Turners Gully, Gunnedah



Figure 2: Stockpiled Soil Location on Preston Road, Gunnedah

2 Sampling and Analysis Plan

2.1 Sample Program

Sampling followed guidelines outlined in the NSW EPA's "Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation" 2014.

The estimated size of the stockpile on site was between 500-1000 tonnes. A stockpile of this size requires four (4) samples according to the ENM Order (2014).

Four composite samples of the stockpile were taken using a stainless-steel trowel and nitrile gloves. Samples were labelled and placed on ice in a sealed container. The samples were sent to a NATA Accredited Laboratory for sampling and kept at 4°C or lower during transit.

Contamination as a result of the use of agricultural fertilisers is most likely to alter heavy metal concentrations. As a result, a suite screening for metals, pH and Electrical Conductivity (EC) was selected.

With a site history of grazing and broadacre agriculture the samples were not screened for hydrocarbon contamination or foreign material testing. There was little potential for this contamination to occur within the sites' use. There was also no evidence of hydrocarbon or foreign material contamination noted during the site walkover.

Results of the analysis are presented alongside ENM maximum average concentration threshold levels in Table 1. Any exceedances are bolded or highlighted in yellow depending on the level of exceedance.

2.2 Quality Assurance and Quality Control

The sampling was undertaken in accordance with SMK Consultants standard protocol as presented in Appendix 1. This ensures thorough decontamination of all field equipment. Samplers utilised clean nitrile gloves during sampling and a stainless steel trowel was used for the sampling process. The clearly labelled samples were placed on ice immediately and kept in a sealed cooler below 4°C until their arrival at the laboratory.

Quality control of sample analysis is achieved by utilising a NATA accredited laboratory. These laboritories follow ASTM standard methods which are supported by internal duplicates and blanks, surrogate spikes and matrix spikes. ALS Laboritories provide the details of surrogates and spikes, percent recoveries of surrogates and spikes used, as well as instrument detection limits within the certificate of analysis.

Field observsations are also compared with laboratory results. If inconsistencies are detected re-sampling and re-analysis of a sample is undertaken.

3 Results and Analysis

Results of the analysis are presented alongside ENM max average concentration threshold levels below in Table 1.

			ENM Max	ENM Max ENM Absolute		Sample			
Analyte	Unit	LOR ¹	average concentration	Max average concentration	20-359- 5	20-359- 6	20-359- 7	20-359- 8	AVERAGE
pH Value	pH Unit	0.1	5-9	4.5-10	8.5	8.6	8.6	8.5	8.6
Electrical Conductivity @ 25°C	μS/cm	1	1500	3000	110	91	93	100	98.5
Moisture Content	%	1.0	-	-	2.2	17.2	16.7	11.2	11.8
Arsenic	mg/kg	5	20	40.0	<5	<5	<5	<5	<5
Cadmium	mg/kg	0.4	0.5	1	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	75	150	36	46	35	41	39.5
Copper	mg/kg	5	100	200.0	22	28	22	24	24.0
Lead	mg/kg	5	50	100	9	10	9	9	9.3
Nickel	mg/kg	2.0	30.0	60	60	75	55	64	63.5
Zinc	mg/kg	5.0	150.0	300	38	45	39	43	41.3
Mercury	mg/kg	0.1	0.5	1	<0.1	<0.1	<0.1	<0.1	<0.1

Table 1: Results for ENM Classification Suite against ENM Criteria

As seen in Table 1, there was an exceedance of the ENM absolute maximum average concentration for nickel. All other analytes presented concentrations less than adopted criteria. The average nickel concentration across the four samples was 63.5 mg/kg which exceeds the ENM absolute maximum average concentration of 60.0 mg/kg. As the exceedance was only minor, another four samples were sent to the laboratory for sampling and screened for the same analytes. The full results for this test are outlined in the certificate of analysis in Appendix 2.

Nickel was again found to consistently exceed maximum average concentrations with an average concentration across the additional four samples reaching 64.3 mg/kg. No other exceedances occurred in the second round of testing. With the total 8 samples analysed, the average concentration of nickel in the stockpile is 63.9 mg/kg, a 6.5% exceedance of the ENM maximum concentration of 60.0 mg/kg.

Background nickel concentrations vary naturally in soils from 3 to 1000 mg/kg. This variance depends significantly on the parent rock (Iyaka, 2011). Geology in the Gunnedah Basin and areas upstream of the gully are dominated by Jurassic mafic intrusions and alkali dolerite. Nickel deposits are often found in such intrusions which may be the cause of increased background nickel levels in the stockpiled soil.

Agricultural activities and the use of commercial fertilisers are also linked to imbalances in nickel levels in soils.

To ensure nickel was presenting in background concentrations from parent rock material in the Gunnedah region and not due to contamination, leachate sampling was undertaken.

Four (4) samples were put through a toxicity characteristic leaching procedure (TCLP) for Nickel. Results are outlined below in Table 2. The full certificate of analysis provided by the laboratory can be found in Appendix 2.

			Sample				
Analyte	Unit	LOR ¹	20-359- 9	20-359- 10	20-359- 11	20-359- 12	
Initial pH	0.1	pH Unit	9.2	9.2	9.1	9.0	
After HCl pH	0.1	pH Unit	1.4	1.4	1.3	1.4	
Extraction Fluid Number	1	-	1	1	1	1	
Final pH	0.1	pH Unit	6.0	6.1	6.1	6.1	
Nickel	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	

Table 2: TCLP Results for Nickel

All four samples presented a Nickel content in the leachate water of <0.1 mg/kg. This suggests that nickel contamination in the soil is very unlikely and that the slightly elevated levels in the stockpile are consistent with background levels due to nickel deposits found in parent rock in the Gunnedah Basin.

4 Discussion and Conclusions

All analytes, with the exception of nickel, were found below Excavated Natural Material (ENM) criteria across the eight (8) samples taken and analysed for heavy metals, pH and EC. Nickel was found to exceed the ENM maximum average criteria by 6.5% of the maximum level. Four (4) samples were put through a toxicity characteristic leaching procedure (TCLP) for nickel. This determined whether the increased nickel levels could be attributed to higher background levels caused by nickel deposits in the parent rock in the Gunnedah region, or whether contamination had occurred due to the use of commercial fertilisers.

Results from the TCLP procedure revealed <0.01 mg/kg of nickel in the leachate water suggesting increased nickel levels in the soil are consistent with background levels in the region from nickel deposits in parent rock material.

If the fill material is used at another site, there is no risk of nickel leaching and contaminating the soil lithology or waterways downstream of the site.

It is therefore deemed suitable for the stockpiled soil material in Turners Gully to be used as an Excavated Natural Material to assist in the remediation works at 3130 Oxley Highway, Gunnedah.

SMK Consultants consider this stockpiled material to be free of any significant contamination which may place the site at 3130 Oxley Highway at risk of further contamination. It is suitable for re-use as a surface fill material.

Prepared by:

Kyra O'Sallivar

Kyra O'Sullivan _{BEng (Hon)} Contaminated Land Consultant SMK Consultants

Limitations

This report is based on observation at the time of the investigation and history of the site. The conclusions and recommendations are based on the scope of works adopted, the methodology presented in this report and the results of laboratory analysis undertaken for this investigation.

5 References

- Iyaka, Y. (2011). Nickel in soils: A review of its distribution and impacts. Scientific Research And Essays, 6(33). doi: 10.5897/srex11.035
- Guidance note on the identification, assessment and management of asbestos contamination in regional public areas. (WA Department of Health, 2011)
- Guidelines for the assessment and Management of Asbestos-Contaminated sites in Western Australia (WA Department of Health, 2009)
- Management of small-scale low-risk soil asbestos contamination (WA Government, 2009)
- Managing asbestos in or on Soil, (NSW Government, 2014)
- Protection of the Environment Operations (Waste) Regulation 2014
- Gunnedah Shire Council Contaminated Site Investigation Check (Eastwest Geo Ag Enviro, 2019)
- Preliminary Contaminated Site Assessment of 3130 Oxley Highway, Gunnedah (Enviro Science Solutions, 2020)
- Asbestos Site Assessment and Scope of Works for Remediation at 3130 Oxley Highway, Gunnedah (Enviro Science Solutions, 2020)

Appendix 1 – SMK Consultants

SMK Consultants - Soil Sampling, Storage, Transport and Laboratory Procedures

- 1. Field sampling
 - **Preparation of Equipment** All equipment to be utilised for the excavation, collection and storage of field samples is to be cleaned prior to entering the investigation site.
 - **Onsite Sampling** All equipment used for sample collection and excavation is to be cleaned between sampling action. Cleaning to be done using clean water and cleaning equipment to be dried prior to the next sampling action to ensure that all soil and water is removed from the sampling implement.
 - Field Observations The sampler is to record date of sampling, location of sampling, conditions of sampling (weather), observation of condition of soil, odours, potential contamination, level and type of contamination.
 - Sampling Order Where it is envisaged that parts of the investigation area are more contaminated than other parts, the less contaminated areas are to be sampled before contaminated areas.

2. Sample Storage

- All samples are to be placed in cold storage (esky, fridge) and chilled to approximately 3-4 C⁰ as soon as practicable.
- All samples are to be documented and forwarded to the selected laboratory as soon as practicable.

3. Transport of Samples

- Chain of Custody forms are to be prepared for inclusion with samples for Transport. Forms are to include project reference, Client, date of sampling, listing of laboratory testing to be done on each sample, sample container description, date of transport, and condition of samples at time of despatch.
- Laboratory to be advised by fax/email of pending arrival date for samples and type of testing to be done. (E.g. Forward a copy of COC form)
- Samples to be securely packed in esky with sufficient ice to maintain the sample temperature at the required level until received by the Laboratory.
- Courier to be contacted for pick-up of samples at latest possible time

4. Laboratory Analysis

- The laboratory is to prepare a response COC to indicate that samples were delivered in suitable condition to maintain integrity of samples, a list of testing required was received and expected date for issue of results.
- The Laboratory is to undertake the required and documented QC/QA procedures as set out by the national Association of Testing Authorities (NATA)
- Where the Laboratory has its own procedures, these procedures are to be documented and noted on the test results.
- Laboratory to maintain their appropriate system of internal check samples, duplicates and external laboratory comparisons.

5. Correlation of Field Observations and Laboratory Results

- Field observations are to be correlated with laboratory results.
- Where a laboratory results does not correlate with a field observation, the investigation must consider re-sampling of the site to provide additional evidence to determine whether the contamination is present.
- 6. Laboratory Duplication Requirements
 - Laboratory duplications are required during a detailed site investigation where the risk of contamination and the potential consequences of contamination are considered as significant to human health or the environment, or where the laboratory operates this procedure as part of standard quality assurance management practices.
 - Duplications are to be in two forms when it is determined that duplications are required.

- Field duplications are to be undertaken at a rate of one sample per 10-field samples. The field duplicate preparation involves obtaining sufficient sample material from the randomly selected point to prepare two samples. The duplicate is to be identified with a reference known to the sampler to ensure that the laboratory is unaware of the field duplicate identification or reference. The duplicate sample is to be tested for the same parameters as the original sample and then results are to be compared once laboratory results are provided. The scientist/sampler is then required to assess the results for the duplicated sample to determine variations in laboratory results. If a significant variation is noted, the laboratory should be advised to enable retesting of the sample to determine whether the results are correct or whether procedural errors have occurred in the laboratory.
- Laboratory duplicates and external duplicates to be determined by the Laboratories QC/QA system. Laboratory to be advised of duplicate requirements prior to submission of samples

Appendix 2 – Certificate of Analysis for soil samples

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: ES2039546	Page	: 1 of 4
Client	SMK CONSULTANTS PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Kyra O'Sullivan	Contact	: Customer Services ES
Address	P.O.Box 774 39 FROME STREET MOREE NSW, AUSTRALIA 2400	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: Gunnedah Shire - Koala Park	Date Samples Received	: 10-Nov-2020 09:00
Order number	: 20-359	Date Analysis Commenced	: 12-Nov-2020
C-O-C number	:	Issue Date	: 17-Nov-2020 11:13
Sampler	: Kyra O'Sullivan		Hac-MRA NATA
Site	·		
Quote number	: EN/333		Accreditation No. 825
No. of samples received	: 8		Accredited for compliance with
No. of samples analysed	: 8		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

Page	: 2 of 4
Work Order	: ES2039546
Client	: SMK CONSULTANTS PTY LTD
Project	: Gunnedah Shire - Koala Park

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

- LOR = Limit of reporting
- ^ = This result is computed from individual analyte detections at or above the level of reporting
- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- EA200N: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.

Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present)

The Asbestos (Fines and Fibrous) weight is calculated from the extracted Fibrous Asbestos and Asbestos Fines as an equivalent weight of 100% Asbestos Percentages for Asbestos content in ACM are based on the 2013 NEPM default values.

All calculations of percentage Asbestos under this method are approximate and should be used as a guide only.

- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200N: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.



Page : 3 of 4 Work Order : ES2039546 Client : SMK CONSULTANTS PTY LTD Project : Gunnedah Shire - Koala Park



Analytical Results

Sub-Matrix: SOIL		Cli	ent sample ID	20-359-1	20-359-2	20-359-3	20-359-4	20-359-5		
(Matrix: SOIL)										
	C	lient sampli	ng date / time	06-Nov-2020 00:00						
Compound	CAS Number	LOR	Unit	ES2039546-001	E\$2039546-002	E\$2039546-003	E\$2039546-004	E\$2039546-005		
				Result	Result	Result	Result	Result		
EA002: pH 1:5 (Soils)										
pH Value		0.1	pH Unit					8.5		
EA010: Conductivity (1:5)										
Electrical Conductivity @ 25°C		1	µS/cm					110		
EA055: Moisture Content (Dried @ 105-1	110°C)									
Moisture Content	·	1.0	%					2.2		
EA200: AS 4964 - 2004 Identification of	Asbestos in Soil	s								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No			
Asbestos Type	1332-21-4	-		-	-	-	-			
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	No			
Sample weight (dry)		0.01	g	90.1	102	113	132			
Synthetic Mineral Fibre		0.1	g/kg	No	No	No	No			
Organic Fibre		0.1	g/kg	No	No	No	No			
APPROVED IDENTIFIER:		-		A. SMYLIE	A. SMYLIE	A. SMYLIE	A. SMYLIE			
EA200N: Asbestos Quantification (non-l	NATA)									
ØAsbestos (Fines and Fibrous <7mm)	1332-21-4	0.0004	g	<0.0004	<0.0004	<0.0004	<0.0004			
ø Asbestos (Fines and Fibrous FA+AF)		0.001	% (w/w)	<0.001	<0.001	<0.001	<0.001			
ø Weight Used for % Calculation		0.0001	kg	0.0901	0.102	0.113	0.132			
Ø Fibrous Asbestos >7mm		0.0004	g	<0.0004	<0.0004	<0.0004	<0.0004			
EG005(ED093)T-MW: Total Metals by nit	tric acid microwa	ve digesti	on / ICP-AES							
Arsenic	7440-38-2	5	mg/kg					<5		
Cadmium	7440-43-9	0.4	mg/kg					<0.4		
Chromium	7440-47-3	2	mg/kg					36		
Copper	7440-50-8	5	mg/kg					22		
Lead	7439-92-1	5	mg/kg					9		
Nickel	7440-02-0	2	mg/kg					60		
Zinc	7440-66-6	5	mg/kg					38		
EG035T-MW: Total Recoverable Mercury	y by nitric acid m	nicrowave	digestion / Fl	MS						
Mercury	7439-97-6	0.1	mg/kg					<0.1		

Page : 4 of 4 Work Order : ES2039546 Client : SMK CONSULTANTS PTY LTD Project : Gunnedah Shire - Koala Park



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID			20-359-6	20-359-7	20-359-8	
	Cl	ient sampli	ng date / time	06-Nov-2020 00:00	06-Nov-2020 00:00	06-Nov-2020 00:00	
Compound	CAS Number	LOR	Unit	E\$2039546-006	E\$2039546-007	E\$2039546-008	
				Result	Result	Result	
EA002: pH 1:5 (Soils)							
pH Value		0.1	pH Unit	8.6	8.6	8.5	
EA010: Conductivity (1:5)							
Electrical Conductivity @ 25°C		1	µS/cm	91	93	100	
EA055: Moisture Content (Dried @ 105-11	10°C)						
Moisture Content		1.0	%	17.2	16.7	11.2	
EG005(ED093)T-MW: Total Metals by nitri	ic acid microwa	ve digest	ion / ICP-AES				
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	
Cadmium	7440-43-9	0.4	mg/kg	<0.4	<0.4	<0.4	
Chromium	7440-47-3	2	mg/kg	46	35	41	
Copper	7440-50-8	5	mg/kg	28	22	24	
Lead	7439-92-1	5	mg/kg	10	9	9	
Nickel	7440-02-0	2	mg/kg	75	55	64	
Zinc	7440-66-6	5	mg/kg	48	39	43	
EG035T-MW: Total Recoverable Mercury	by nitric acid m	icrowave	digestion / Fl	MS			
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	

Analytical Results

Descriptive Results

Sub-Matrix: SOIL

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results							
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
EA200: Description	20-359-1 - 06-Nov-2020 00:00	Mid brown soil.							
EA200: Description	20-359-2 - 06-Nov-2020 00:00	Mid brown soil.							
EA200: Description	20-359-3 - 06-Nov-2020 00:00	Mid brown soil.							
EA200: Description	20-359-4 - 06-Nov-2020 00:00	Mid brown soil.							

ALS Environmental

CERTIFICATE OF ANALYSIS								
Work Order	ES2041776	Page	: 1 of 2					
Client	SMK CONSULTANTS PTY LTD	Laboratory	: Environmental Division S	sydney				
Contact	: Kyra O'Sullivan	Contact	: Customer Services ES					
Address	P.O.Box 774 39 FROME STREET MOREE NSW, AUSTRALIA 2400	Address	: 277-289 Woodpark Road	I Smithfield NSW Australia 2164				
Telephone	:	Telephone	: +61-2-8784 8555					
Project	: Gunnedah Shire - Koala Park	Date Samples Received	: 25-Nov-2020 10:30	ANUUL.				
Order number	: 20-359	Date Analysis Commenced	: 25-Nov-2020					
C-O-C number	:	Issue Date	: 26-Nov-2020 16:47					
Sampler	: Kyra O'Sullivan			HAC-MRA NATA				
Site	:							
Quote number	: EN/333			Accreditation No. 825				
No. of samples received	: 4			Accredited for compliance with				
No. of samples analysed	: 4			ISO/IEC 17025 - Testing				

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

Page	: 2 of 2
Work Order	: ES2041776
Client	: SMK CONSULTANTS PTY LTD
Project	Gunnedah Shire - Koala Park

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	20-359-9	20-359-10	20-359-11	20-359-12	
		Sampli	ing date / time	24-Nov-2020 00:00	24-Nov-2020 00:00	24-Nov-2020 00:00	24-Nov-2020 00:00	
Compound	CAS Number	LOR	Unit	E\$2041776-001	ES2041776-002	E\$2041776-003	ES2041776-004	
				Result	Result	Result	Result	
EA002: pH 1:5 (Soils)								
pH Value		0.1	pH Unit	8.4	8.6	8.7	8.7	
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C		1	µS/cm	80	69	71	76	
EA055: Moisture Content (Dried @ 105-	110°C)							
Moisture Content		1.0	%	<1.0	<1.0	<1.0	<1.0	
EG005(ED093)T-MW: Total Metals by nit	tric acid microwa	ve digest	ion / ICP-AES					
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	
Cadmium	7440-43-9	0.4	mg/kg	<0.4	<0.4	<0.4	<0.4	
Chromium	7440-47-3	2	mg/kg	31	39	39	35	
Copper	7440-50-8	5	mg/kg	23	23	24	22	
Lead	7439-92-1	5	mg/kg	9	10	9	8	
Nickel	7440-02-0	2	mg/kg	64	65	64	64	
Zinc	7440-66-6	5	mg/kg	33	35	37	33	
EG035T-MW: Total Recoverable Mercur	y by nitric acid m	icrowave	digestion / FI	MS				
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	



ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	ES2042264	Page	: 1 of 4
Client	SMK CONSULTANTS PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Kyra O'Sullivan	Contact	: Customer Services ES
Address	P.O.Box 774 39 FROME STREET MOREE NSW, AUSTRALIA 2400	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	:	Telephone	: +61-2-8784 8555
Project	: Gunnedah Shire - Koala Park	Date Samples Received	: 27-Nov-2020 16:10
Order number	: 20-359	Date Analysis Commenced	: 30-Nov-2020
C-O-C number		Issue Date	: 01-Dec-2020 14:29
Sampler	:		Hac-MRA NATA
Site	:		
Quote number	: EN/333		Accreditation No. 825
No. of samples received	: 4		Accredited for compliance with
No. of samples analysed	: 4		ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category

Celine Conceicao

Senior Spectroscopist

Sydney Inorganics, Smithfield, NSW

RIGHT SOLUTIONS | RIGHT PARTNER

 Page
 : 2 of 4

 Work Order
 : ES2042264

 Client
 : SMK CONSULTANTS PTY LTD

 Project
 : Gunnedah Shire - Koala Park

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

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~ = Indicates an estimated value.



Page : 3 of 4 Work Order : ES2042264 Client : SMK CONSULTANTS PTY LTD Project : Gunnedah Shire - Koala Park



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	20-359-9	20-359-10	20-359-11	20-359-12		
Sampling date / time				24-Nov-2020 00:00	24-Nov-2020 00:00	24-Nov-2020 00:00	24-Nov-2020 00:00		
Compound	CAS Number	LOR	Unit	ES2042264-001	E\$2042264-002	E\$2042264-003	ES2042264-004		
				Result	Result	Result	Result		
EN33: TCLP Leach - Inorganics/Non-Vola	EN33: TCLP Leach - Inorganics/Non-Volatile Organics (Glass Vessel)								
Initial pH		0.1	pH Unit	9.2	9.2	9.1	9.0		
After HCI pH		0.1	pH Unit	1.4	1.4	1.3	1.4		
Extraction Fluid Number		1	-	1	1	1	1		
Final pH		0.1	pH Unit	6.0	6.1	6.1	6.1		

ENM Classification Certificate

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 : 4 of 4

 Work Order
 : ES2042264

 Client
 : SMK CONSULTANTS PTY LTD

 Project
 : Gunnedah Shire - Koala Park



Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)			Sample ID	20-359-9	20-359-10	20-359-11	20-359-12	
Sampling date / time			24-Nov-2020 00:00	24-Nov-2020 00:00	24-Nov-2020 00:00	24-Nov-2020 00:00		
Compound	CAS Number	LOR	Unit	ES2042264-001	E\$2042264-002	E\$2042264-003	E\$2042264-004	
				Result	Result	Result	Result	
EG005(ED093)C: Leachable Metals by ICPAES								
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	

Appendix 4 – Standard Sampling Procedure

SMK Consultants - Soil Sampling, Storage, Transport and Laboratory Procedures

1. Field sampling

- **Preparation of Equipment** All equipment to be utilised for the excavation, collection and storage of field samples is to be cleaned prior to entering the investigation site.
- **Onsite Sampling** All equipment used for sample collection and excavation is to be cleaned between sampling action. Cleaning to be done using clean water and cleaning equipment to be dried prior to the next sampling action to ensure that all soil and water is removed from the sampling implement.
- Field Observations The sampler is to record date of sampling, location of sampling, conditions of sampling (weather), observation of condition of soil, odours, potential contamination, level and type of contamination.
- **Sampling Order** Where it is envisaged that parts of the investigation area are more contaminated than other parts, the less contaminated areas are to be sampled before contaminated areas.

2. Sample Storage

- All samples are to be placed in cold storage (esky, fridge) and chilled to approximately 3-4 C⁰ as soon as practicable.
- All samples are to be documented and forwarded to the selected laboratory as soon as practicable.

3. Transport of Samples

- Chain of Custody forms are to be prepared for inclusion with samples for Transport. Forms are to include project reference, Client, date of sampling, listing of laboratory testing to be done on each sample, sample container description, date of transport, and condition of samples at time of despatch.
- Laboratory to be advised by fax/email of pending arrival date for samples and type of testing to be done. (E.g. Forward a copy of COC form)
- Samples to be securely packed in esky with sufficient ice to maintain the sample temperature at the required level until received by the Laboratory.
- Courier to be contacted for pick-up of samples at latest possible time

4. Laboratory Analysis

- The laboratory is to prepare a response COC to indicate that samples were delivered in suitable condition to maintain integrity of samples, a list of testing required was received and expected date for issue of results.
- The Laboratory is to undertake the required and documented QC/QA procedures as set out by the national Association of Testing Authorities (NATA)
- Where the Laboratory has its own procedures, these procedures are to be documented and noted on the test results.
- Laboratory to maintain their appropriate system of internal check samples, duplicates and external laboratory comparisons.
- 5. Correlation of Field Observations and Laboratory Results
 - Field observations are to be correlated with laboratory results.
 - Where a laboratory results does not correlate with a field observation, the investigation must consider re-sampling of the site to provide additional evidence to determine whether the contamination is present.

6. Laboratory Duplication Requirements

- Laboratory duplications are required during a detailed site investigation where the risk of contamination and the potential consequences of contamination are considered as significant to human health or the environment, or where the laboratory operates this procedure as part of standard quality assurance management practices.
- Duplications are to be in two forms when it is determined that duplications are required.
- Field duplications are to be undertaken at a rate of one sample per 10-field samples. The field duplicate preparation involves obtaining sufficient sample material from the randomly selected point to prepare two samples. The duplicate is to be identified with a reference known to the sampler to ensure that the laboratory is unaware of the field duplicate identification or reference. The duplicate sample is to be

tested for the same parameters as the original sample and then results are to be compared once laboratory results are provided. The scientist/sampler is then required to assess the results for the duplicated sample to determine variations in laboratory results. If a significant variation is noted, the laboratory should be advised to enable retesting of the sample to determine whether the results are correct or whether procedural errors have occurred in the laboratory.

• Laboratory duplicates and external duplicates to be determined by the Laboratories QC/QA system. Laboratory to be advised of duplicate requirements prior to submission of samples