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PROPOSED RESIDENTIAL SUBDIVISION
LOTS 11 & 12 IN DP522660 AND PART LOT 101 IN DP564332
O'CONNELL STREET AND CADDENS ROAD
ORCHARD HILLS (KINGSWOOD)

DETAILED CONTAMINATION ASSESSMENT & REMEDIAL ACTION PLAN

REPORT NO 12486/2-AA 10 OCTOBER 2011

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Job No: 12486/2
Our Ref: 12486/2-AA

10 October 2011

Orchard Homes Pty Ltd
c/- LivLand Property Pty Ltd
P O Box 555
SWANSEA NSW 2001

Attention: Mr B Judge
e-mail: brad@rcsurveys.com.au

Dear Sir

re: **Proposed Residential Subdivision**
Lots 11 & 12 in DP522660 and Part Lot 101 in DP564332
O'Connell Street and Caddens Road, Orchard Hills (Kingswood)
Detailed Contamination Assessment & Remedial Action Plan

This report presents a detailed contamination assessment (DCA) and remedial action plan (RAP), which once implemented and validated, will render the above site suitable for the proposed end use, which we understand will be a residential subdivision development. The report has been prepared to supplement the findings and address the recommendations presented in the *Preliminary Contamination Assessment* Report No 12486/1-AA dated 28 June 2011 prepared by Geotechnique Pty Ltd (Geotechnique).

If you have any questions relating to this report, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECHNIQUE PTY LTD

JOHN XU
Associate
BE, MEngSc, MIEAust

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EXECUTIVE SUMMARY

This executive summary presents a synopsis of a detailed contamination assessment (DCA) and remedial action plan (RAP) prepared for the site comprising a parcel of land registered as Lots 11 and 12 in DP522660 and Part Lot 101 in DP5564332, located at O'Connell Street and off Caddens Road, Orchard Hills (Kingswood), as shown on Figure 1 (page 1 of the report).

It is understood that the site is proposed for residential subdivision development.

A (Phase 1) *Preliminary Contamination Assessment* (PCA) Report 12486/1-AA dated 28 June 2011 prepared by Geotechnique Pty Ltd (Geotechnique) revealed that elevated concentrations of copper (Cu), nickel (Ni) and/or zinc (Zn) were identified in soils at a number of isolated locations. Scattered bonded asbestos-cement pieces were encountered on the ground surface IN a localised area. Asbestos was also detected in one soil sample. As such, some form of remediation was deemed necessary.

Council requires a (Phase 2) DCA / detailed site investigation (DSI), as per the SEPP 55, as the site has been identified as potentially contaminated land.

The objective of the Phase 2 DCA / DSI is to delineate the extents of contamination at the locations of concern.

After delineation, a RAP providing details for remediation and validation has been prepared. The objectives of the RAP are to ensure all remediation works are carried out with due regard to the protection of the environment, in a responsible manner, presenting no risk of harm to the public or to workers within the site, and comply with current regulations and guidelines, as well as provide details on the validation methodology and clean up levels/acceptance criteria that will ensure the suitability of the site for standard residential (with accessible soil) use.

In order to achieve the objectives of the DCA and the RAP, the scope of work included review and summary of the previous contamination assessment applicable to the site, delineation of the extent of identified metals and asbestos contamination and development of appropriate remedial strategies, culminating in preparation of the RAP.

As shown on Drawing 12486/1-AA1, the site measures approximately 262 metres (m) along the O'Connell Street frontage, with a depth of approximately 411m along the western boundary. The site area is approximately 8.8 hectares (ha).

An Environmental Scientist carried out an inspection of the site at the time of the field work (9 and 13 September 2011) for this Phase 2 DCA. There were no distinct changes to the site conditions and neighbouring properties since the PCA in June 2011.

At the time of inspection, the site was partly rural residential land. The north western portion of the site (Lot 11 in DP522660) is occupied by a brick house with tile roof and a swimming pool, brick shed with tile roof, disused garden nursery, disused timber shed with asbestos roof, disused kiosk, galvanised iron (GI) shed, disused shed with corrugated fibro walls and GI roof, and a tennis court. Lot 11 also contained areas with scattered fibro/asbestos-cement pieces, asphalt, concrete, paving and gravel, above-ground oil tank and a dam with water. The south western portion of the site (Part Lot 101 in DP564332) contained a dam with water and a disused GI & timber shed. The rest of the site, including Lot 12 in DP522660 was grass-covered with scattered trees. The above features are indicated on Drawing 12486/1-AA1.

In order to delineate the lateral extent of areas of contamination, a number of surface soil samples were recovered from the vicinity of sample locations with metals (Cu, Ni and Zn) of concern and asbestos identified during the Phase 1 PCA.

Delineation of the vertical extent of contamination was generally established by recovering a deeper sample from the location with the contaminated surface soil.

The sample locations and laboratory test results are presented on Drawings 12486/2-AA1 to 123486/2-AA6.

Based on the field work and the laboratory test results, seven remediation areas (Areas 1 to 7) were developed through grouping of sample locations and estimating the likely extents of contamination.

Drawing 12486/2-AA7 is a master plan showing all remediation areas. Included on the master plan is a table indicating the estimated areas (in square metres), volumes of contaminated soils, contaminants associated with each area, as well as remediation methods for each area. It is reiterated that the defined remediation areas are estimates only and could extend beyond the estimated boundaries shown. This will be confirmed by the necessary validation sampling and testing.

The RAP has been prepared to provide guidance to contractors cleaning up the contaminated areas (Areas 1 to 7) identified on Drawing 12486/2-AA7. Based on the advantages, disadvantages and risks of each of the remediation options, it is our opinion that the following remediation options are considered appropriate for the site, as detailed in Section 13.4 of the report:

- Areas 1 to 4 — Stripping, Stockpiling and Reassessment
- Area 5 — Excavation, Segregation, Stockpiling & Retesting of Segregated Soil
- Area 6 — Landfill Disposal
- Area 7 — Hand-picking and Landfill Disposal

For landfill disposal purposes, the asbestos cement pieces in Areas 5 to 7, as well as asbestos contaminated soil in Area 6 were classified as “Asbestos Waste”.

If landfill disposal of unsuccessfully remediated soils in Areas 1 to 5 is required, the Cu, Ni and Zn contaminated soil in Area 5 was classified as “General Solid Waste (Non-putrescible)”.

The proposed remediation works are considered to be Category 2 (subject to approval by Penrith City Council).

A site-specific Environmental Management Plan, Occupational Health & Safety Plan and Contingency Plan, to be implemented during the remediation works, are outlined and included in Sections 14.0, 15.0 and 17.0 of the RAP.

The following additional works should be implemented prior to remediation works, site preparation and earthworks:

1. A contractor appropriately licensed by WorkCover must carry out demolition of features / structures containing asbestos. The asbestos-cement must be disposed of at an appropriately licensed landfill facility. Validation / certification by a qualified consultant / occupational hygienist should be carried out after removal of any asbestos materials.

2. Assessment of soil beneath the site features. The purpose of this is to ascertain the presence of "suspect" materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos, ash particles, etc.) and fill.

   Additional soil sampling and testing might be required (at feature locations not already part of a remediation area) to ascertain the requirement for remediation. Reference may be made to Drawing 12486/1-AA1 for details of soils beneath site features requiring assessment.

3. Assessment of the dam water prior to de-watering, to determine the contamination status of the water and recommend de-watering method.

4. On completion of de-watering, the sediment should be excavated from the dams and stockpiled on site for contamination assessment and determination of suitability for retention on-site.

5. Assessment of the dam walls to determine the contamination status and suitability for retention on-site.

The results of the above additional works may trigger a supplementary report to this RAP.

After complete disposal of the contaminated soil, all the disposal dockets / transaction records shall be provided to Geotechnique for inclusion in a final validation report.

Following completion of the remediation works, a suitable validation sampling and testing plan, as outlined in Section 16.0 of the report, must be implemented. On completion of validation, a report will be prepared to recommend the suitability of the site for the proposed residential subdivision development.

Reference must be made to Section 18.0 of the report, which sets out details of the limitations of the DCA and RAP.

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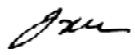

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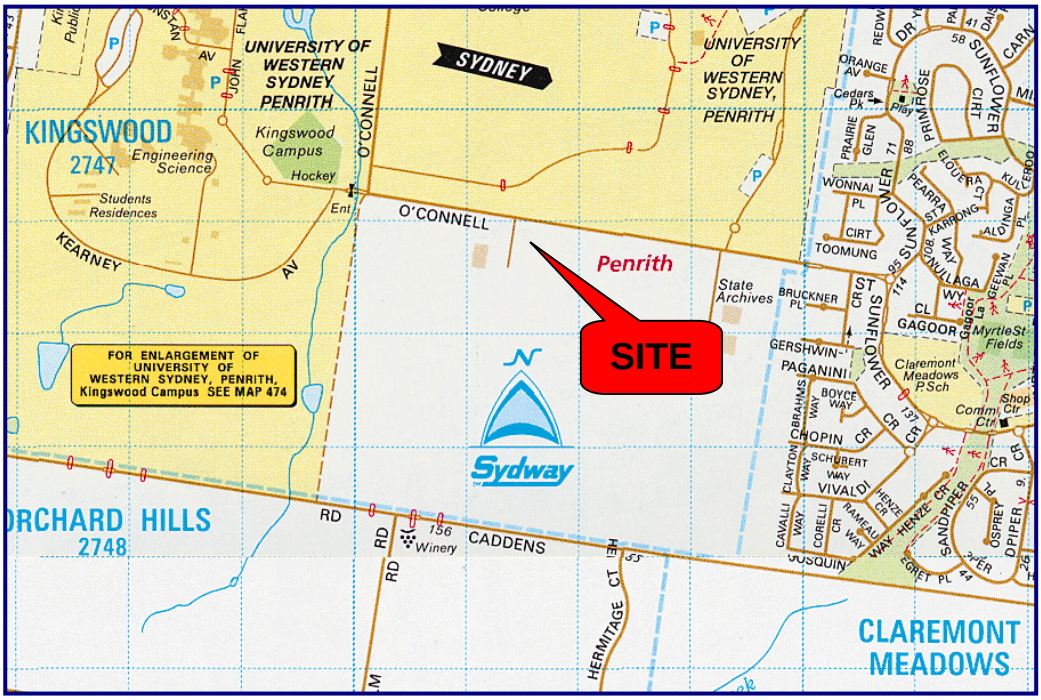
1.0 INTRODUCTION

This report presents a detailed contamination assessment (DCA) and remedial action plan (RAP) for the site comprising a parcel of land registered as Lots 11 and 12 in DP522660 and Part Lot 101 in DP5564332, located at O'Connell Street and off Caddens Road, Orchard Hills (Kingswood), as indicated on Figure 1 below. It is the professional opinion of Geotechnique Pty Ltd (Geotechnique) that once the RAP is implemented and validated, the site will be environmentally suitable for the proposed end uses.

FIGURE 1



It is understood that the site is proposed for residential subdivision development.

A (Phase 1) *Preliminary Contamination Assessment* (PCA) (Report 12486/1-AA dated 28 June 2011) carried out by Geotechnique revealed the following (refer to Drawing 12486/1-AA3R1):

- Elevated concentrations of copper (Cu), nickel (Ni) and/or zinc (Zn) were identified in soils at a number of isolated locations TP10, TP11, TP14, TP19, TP22, TP26 and TP27. The concentrations of Cu, Ni and Zn would potentially affect the growth of certain plant species, but would not present a risk of harm to human health with regard to the proposed residential development.
- Scattered bonded asbestos-cement pieces were encountered on the ground surface at a localised area. Asbestos was also detected in surface soil sample A1.

As such, some form of remediation will be required.

Council requires a (Phase 2) DCA / detailed site investigation (DSI), as per the SEPP 55, as the site has been identified as potentially contaminated land.

The objective of the Phase 2 DCA / DSI is to delineate the extents of contamination at the locations of concern shown on Drawing 12486/1-AA3R1.

After delineation, a RAP providing details for remediation and validation has been prepared. The objectives of the RAP are to:

- Ensure all remediation works are carried out with due regard to the protection of the environment.
- Ensure all remediation works are carried out in a responsible manner, presenting no risk of harm to the public or to workers within the site.
- Ensure all remediation works comply with current regulations and guidelines.
- Provide details on the validation methodology.
- Provide clean up levels/acceptance criteria that will ensure the suitability of the site for standard residential (with accessible soil) use.

2.0 SCOPE OF WORK

In order to achieve the objectives of the DCA and RAP, the following scope of work was conducted:

- Review and summary of the previous contamination assessment applicable to the site, also prepared by Geotechnique.
- Detailed contamination assessment (by sampling and testing) in order to delineate the lateral and vertical extents of contamination, and to determine the quantities of soils requiring remediation.
- Classification of the soil of concern.
- Developing appropriate remedial strategies and devising details for validation, culminating in preparation of the RAP.

3.0 SITE IDENTIFICATION

The site is located on the southern side of O'Connell Street at Orchard Hills (Kingswood) in the local government area of Penrith, as indicated on Figure 1 (page 1). At the time of conducting a search of Land Titles on 19 May 2011, the site was registered to:

- Danielle Ayoub as Lot 11 in DP522660 (117-127 O'Connell)
- Landcom (Land Commission of New South Wales) as Lot 12 in DP522660 (129-141 O'Connell Street) and Part Lot 101 in DP564332 (185 Caddens Road)

As shown on Drawing 12486/1-AA1, the site measures approximately 262 metres (m) along the O'Connell Street frontage, with a depth of approximately 411m along the western boundary. The site area is approximately 8.8 hectares (ha).

It is understood that the proposed development will include residential subdivision after demolition of site features.

4.0 SITE HISTORY

Geotechnique carried out a review of site history information as part of the Phase 1 PCA. The review included historical aerial photographs, NSW Department of Lands and Council records, Planning Certificates under Section 149 (2 &5) of the Environmental Planning and Assessment Act 1979 & Council Records, WorkCover NSW information pertaining to storage of dangerous goods, Department of Defence records and NSW Department of Environment, Climate Change and Water (DECCW) contaminated land records. For details, reference should be made to Report 12486/1-AA.

The aerial photographs reveal that the site and immediately surrounding properties have been part of rural residential land since the 1947. Orchard/market garden activities have taken place within the site during the period from 1947 to 1961 and the adjoining property to the south east during the period from 1961 to 1994.

NSW Department of Lands records indicate various current and past owners of the site (either private or commercial). Based on the records, farming and orchard activities might have occurred in the past.

The Section 149 (2 & 5) Planning Certificates for the site indicate that the lots contain areas of potential contamination identified in Part 3.10 of Penrith Development Control Plan 2006, Caddens Amendment.

Lots 11 and 12 in DP522660 are zoned R1 General Residential and Lot 101 in DP564332 is zoned R1 General Residential & RE1 Public Recreation.

Council building and development application records indicated that the site was used for residential and garden nursery activities.

A search of the Stored Chemical Information Database (SCID) and the microfiche records by WorkCover NSW did not locate records pertaining to the site.

A search of the records of NSW DECCW reveals no DECCW Notices issued for the site.

5.0 SITE CONDITIONS AND SURROUNDING ENVIRONMENT

An Environmental Scientist carried out an inspection of the site at the time of the field work (9 and 13 September 2011) for this Phase 2 DCA. There were no distinct changes to the site conditions and neighbouring properties since the PCA in June 2011.

The site was partly rural residential land. The north western portion of the site (Lot 11 in DP522660) is occupied by a brick house with tile roof and a swimming pool, brick shed with tile roof, disused garden nursery, disused timber shed with asbestos roof, disused kiosk, galvanised iron (GI) shed, disused shed with corrugated fibro walls and GI roof, and a tennis court. Lot 11 also contained areas with scattered fibro/asbestos-cement pieces, asphalt, concrete, paving and gravel, above-ground oil tank and a dam with water. The south western portion of the site (Part Lot 101 in DP564332) contained a dam with water and a disused GI & timber shed. The rest of the site, including Lot 12 in DP522660, was grass-covered with scattered trees. The above features are indicated on Drawing 12486/1-AA1.

There were no signs of soil staining, plant distress or other visible indicators of potential contamination. There were no olfactory indicators of potential contamination. There were no visual indicators of underground storage tanks (bowser, breather pipe, inlet valve and piping), past or present. There were no air emissions emanating from the site.

There were no air emissions emanating from the site and neighbouring properties.

The site is bound to the north by O'Connell Street and to the south, east and west by rural land.

6.0 TOPOGRAPHY, GEOLOGY AND HYDROGEOLOGY

The regional topography around the site is gently undulating. The north western portion of the site is on the top of a hill and the site slope varies in direction, as shown on Drawing 12486/1-AA1. As such, surface run-off from the adjoining properties is considered unlikely. The regional ground surface gently slopes towards the north east.

The Soil Landscape Map of Penrith (Soil Landscape Series Sheet 9030, Scale 1:100,000, 1989), prepared by the Soil Conservation Service of NSW, indicates that the site is located within the Luddenham landscape area, with undulating to rolling low hills on Wianamatta Group shale, often associated with Minchinbury Sandstone and typically consists of localised impermeable, moderately reactive, highly plastic subsoil.

The Geological Map of Penrith (Geological Series Sheet 9030, Scale 1:100,000, Edition 1, 1991), published by the Department of Minerals and Energy, indicates the residual soils within the site to be underlain by Triassic Age Shale of the Wianamatta Group, comprising carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal tuff.

Field work for the PCA encountered fill materials at depths ranging from about 0.15m to about 2.8m below existing ground level (EGL). Based on information from all test pits, the sub-surface profile across the site was generalised as follows:

Type 1 fill	Sand, medium to coarse grained
Type 2 fill	Silty gravel, fine to coarse grained
Type 3 fill	Gravelly ash (based on the field work for this DCA, the Type 3 fill in fact comprises gravelly silt)
Type 4 fill	Gravelly silty clay, low plasticity, dark grey
Type 5 fill	Silty sand, fine to medium grained, pale brown
Type 6 fill	Silty clay, medium plasticity, orange-brown
Type 7 fill	Sandy silty clay, low plasticity, pale brown
Type 8 fill	Silty clay, low plasticity, brown, brick, wood & plastic fragments and scrap metals
Type 9 fill	Gravelly silty clay, low plasticity, brown, with tile fragments and root fibres
Type 10 fill	Gravelly sand, medium to coarse grained, brown
Topsoil, comprising silty clay, low to medium plasticity, brown, with root fibres	

The abovementioned fill or topsoil was underlain by natural soil, generally comprising silty clay or sandy clay, low to medium plasticity, red-brown, grey, orange–brown, yellow-brown.

No asbestos-cement pieces were noted in the excavated test pits and/or the recovered soil samples, however, scattered asbestos pieces were noted, and are shown on Drawing 12486/1-AA1.

Localised fill was generally encountered in Lot 11 and the north western portion of Lot 101.

Based on the contents of the materials, the profiles of natural soils within the site, as well as regional geological information, it appears that the fill might have resulted from formation of the dams and/or levelling the ground during construction of the buildings.

Reference should be made to Table 1 in Appendix A for descriptions of the soils encountered during sampling for this assessment. Based on information from all test pits, the sub-surface profiles across the investigated areas are generalised as follows:

- Type 2 fill (silty gravel), was encountered at and in the vicinity of test pit TP10.
- Type 5 fill (silty sand), Type 3 fill (gravelly silt) and/or Type 2 fill (silty gravel), underlain by natural silty clay, were encountered around TP11.
- Type 3 fill (gravelly silt) and/or Type 5 fill (silty sand), underlain by natural silty clay, were encountered at and in the vicinity of TP14.
- Topsoil (silty clay), Type 5 fill (silty sand) and/or Type 3 fill (gravelly silt), underlain by natural silty clay, were encountered around TP19.
- A thin layer of coal ash (thickness of about 100mm) were encountered beneath the Type 3 fill at TP19-2.
- Topsoil (silty clay), Type 6 fill (silty clay) and Type 7 fill (sandy silty clay), underlain by natural silty clay, were encountered at and in the vicinity of TP22.

  Inclusion of brick and concrete fragments, scrap metal and/or bonded asbestos-cement pieces was noted in the layer of the abovementioned fill.
- Type 10 fill (gravelly sand), fill comprising silty clay and/or Type 7 fill (sandy silty clay), underlain by natural silty clay, were encountered around TP26.

  Inclusion of brick and concrete fragments, ash, scrap metal and/or bonded asbestos-cement pieces were noted in some fill layers.
- Type 3 fill (gravelly silt), Type 6 fill (silty clay) and Type 7 fill (sandy silty clay), underlain by natural silty clay, were encountered in the vicinity of TP27.

  Inclusion of brick and concrete fragments, scrap metal and/or bonded asbestos-cement pieces was noted in some fill layers
- Topsoil (silty clay), Type 5 fill (silty sand) and/or Type 3 fill (gravelly silt), underlain by natural silty clay, were encountered around sample location A1.

Reference may be made to Drawings 12486/2-AA1 to 12486/2-AA6 for details of the above-mentioned test pit locations.

Groundwater level or seepage was not encountered during sampling to a depth of 2.8m from existing ground surface. It should be noted that fluctuations in the level of groundwater might occur due to variations in rainfall and/or other factors not evident during investigation.

There is no waterbody such as a creek, river or wetland close to the site. Claremont Creek is located about 750m to the south east of the site, and an unnamed creek about 400m to the west of the site. There are two farm dams with water within the site.

A site-specific groundwater assessment was not considered necessary at the time of conducting this and previous contamination assessments, as the initial appreciation of site issues did not identify a potential for groundwater contamination. However, in order to obtain some understanding of regional groundwater conditions, a search was carried out in the previous PCA through the website of the Department of Natural Resources for any registered groundwater bore data within a radius of 2km of the site, and the search revealed only two bores with limited information. The bores were authorised and intended for domestic and irrigation. The information obtained is summarised in the following table.

Bore	Date	Authorised/ Intended Purpose	AMG coordinates	Water Bearing Zone (m)	Standing Water Level (m)	Salinity (mg/L)
GW060794	1.2.1985	Domestic Bore	$_{2}89.484_{E}$ & $_{62}49.385_{N}$	18.8-18.9 75.0-75.2	No Details	No Details
GW103764	6.10.1995	Irrigation	$_{2}89.362_{E}$ & $_{62}59.844_{N}$	208.0-209.5 216.5-219.0	No Details	No Details

7.0 SITE ASSESSMENT BACKGROUND

Geotechnique carried out a PCA at the subject site in June 2011. The results of the PCA were presented in Report 12486/1-AA.

This section presents a summary of the scope of work involved in the PCA, the subsequent findings and recommendations.

The objectives of the PCA were to ascertain if the site presented a risk of harm to human health and/or the environment, and to determine the suitability of the site under the conditions for the proposed residential subdivision development.

In order to achieve the objectives of the assessment, the scope of work included a review of site history information, a site inspection, soil sampling, laboratory testing and preparation of this report.

At the time of inspection during the period 18 to 20 May 2011, the site was partly rural residential land. The north western portion of the site (Lot 11 in DP522660) was occupied by a brick house with tile roof and a swimming pool, brick shed with tile roof, disused garden nursery, disused timber shed with asbestos roof, disused kiosk, galvanised iron (GI) shed, disused shed with corrugated fibro walls and GI roof, and a tennis court. Lot 11 also contained areas with scattered fibro-cement pieces, asphalt, concrete, paving and gravel, above-ground oil tank and a dam with water. The south western portion of the site (Part Lot 101 in DP564332) contained a dam with water and a disused GI & timber shed. The rest of the site, including Lot 12 in DP522660, was grass-covered with scattered trees. The above features are indicated on Drawing 12486/1-AA1.

Localised fill and topsoil underlain by residual natural soil was encountered during field sampling.

Based on the contents of the materials, the profiles of natural soils within the site, as well as regional geological information, it appears that the fill might have resulted from formation of the dams and/or levelling the ground during construction of the buildings.

No asbestos-cement pieces were noted in the excavated test pits and/or the recovered soil samples, however, scattered pieces were noted and shown on Drawing 12486/1-AA1.

There were no obvious ash materials, features associated with underground storage tanks (bowser, breather pipe, inlet valve and piping), odour, discolouration of the soils and vegetation or petroleum hydrocarbon staining on the ground surface of the site that would indicate the potential for contamination.

The soils landscape map does not place the site in an area of significant human disturbance. However, due to site levelling, it is considered that there is potential for filling to have taken place in the footprints of the site features, including buildings and sheds for dwelling and nursery related activities.

The site history, existing conditions and field work revealed potential for contamination due to the following:

- Orchard and market garden activities within the site and adjoining property to the south east.
- The presence of a garden nursery in the past.
- The presence of localised fill.
- Buildings containing metal and GI features.
- Potential for pest control undertaken around the houses.
- Potential for filling to have taken place in the footprints of the site features.
- Potential for contaminants to accumulate in the dam water and sediment from surface water run-off.
- The features / structures might contain asbestos due to the age of the buildings.

Potential contaminants resulting from past and present activities, as well as the presence of fill, site features and two dams, include the following:

- Metals, including arsenic (As), cadmium (Cd), chromium (Cr), Cu, lead (Pb), mercury (Hg), Ni and Zn
- Total Petroleum Hydrocarbons (TPH)
- Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Organochlorine Pesticides (OCP)
- Polychlorinated Biphenyls (PCB)
- Asbestos

As part of the PCA, a sampling and testing plan was implemented to address the environmental concerns. Based on the "*Sampling Design Guidelines for Contaminated Sites*" 1995, EPA, for a site area of about 8.8 ha, 112 sampling positions were adopted (refer to Drawing 12486/1-AA2R1).

Topsoil and fill soil samples were recovered for chemical testing of a combination of analytes, including metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), TPH, BTEX PAH, OCP and PCB. Fibro-cement pieces and soil samples were recovered for analysis of asbestos from suspected fill/soil.

The assessment criteria adopted were the available risk-based Health Investigation Levels (HIL 'A') for residential with access to soil, the provisional phytotoxicity based investigation levels (PPBIL) and the suggested Levels in the EPA service station guidelines.

For asbestos assessment, the site must be free of asbestos-cement pieces and no asbestos fibre detected in the soils.

Based on the PCA, the majority of the laboratory results satisfied the criteria for stating that the analytes selected were either not present (i.e. concentrations less than laboratory LOR), or present in the sampled soils at concentrations that did not pose a risk of hazard to human health or the environment, under a "residential with access to soil" form of development. The exceptions included the following identified locations of concern, as indicated and tabulated on Drawing 12486/1-AA3R1:

- Locations where elevated concentrations of Cu, Ni, and Zn could potentially impact on the growth of certain plant species if retained on site, but would not present a risk of harm to human health.
- Scattered bonded asbestos-cement pieces encountered on the ground surface at a localised area. Asbestos was also detected in surface soil sample A1.

Based on the PCA, the site was considered environmentally suitable for the proposed residential subdivision development, subject to implementation of the following recommendations, prior to site preparation and earthworks.

1) Assessment of soil beneath the site features should be carried out. The purpose of this is to ascertain the presence of "suspect" materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos, ash particles, etc.) and fill.
2) Detailed assessment to delineate the extent of contamination would be required at the locations of concern shown on Drawing 12486/1-AA3R1.
3) Some form of remediation would be required at and in the vicinity of the locations of concern shown on Drawing 12486/1-AA3R1.
4) Waste classification would be required for any contaminated soil that requires landfill disposal.
5) Assessment of the dam water should be carried out prior to de-watering, to determine the contamination status of the water and recommend de-watering method.
6) On completion of de-watering, the sediment should be excavated from the dams and stockpiled on site for contamination assessment and determination of suitability for retention on-site.
7) The dam walls should be assessed to determine the contamination status and suitability for retention on-site.
8) A contractor appropriately licensed by WorkCover must carry out demolition of features / structures containing asbestos. The asbestos-cement must be disposed of at an EPA licensed landfill. Validation / certification by a qualified consultant / occupational hygienist should be carried out after removal of any asbestos materials.

8.0 SOIL SAMPLING FOR DELINEATION, ANALYSIS PLAN & SAMPLING METHODOLOGY

Further to sampling for the Phase 1 PCA in May 2011, a further site inspection and delineation sampling for this assessment was carried out on 9 and 13 September 2011, by an Environmental Scientist from Geotechnique.

In order to delineate the lateral extent of areas of contamination, a number of surface soil samples were recovered from the vicinity of sample locations with metals (Cu, Ni and Zn) of concern and asbestos identified during the Stage 2 DCA.

Delineation of the vertical extent of contamination was generally established by recovering a deeper sample from the location(s) with the contaminated surface soil.

The test pit and sample locations are shown on Drawings 12486/2-AA1 to 12486/2-AA6.

The sampling and decontamination procedures adopted were as follows:

- The sample location was excavated to a predetermined depth using a standard backhoe. Thereafter, the sample was recovered from the backhoe bucked using a stainless steel trowel.
- The stainless steel trowel was decontaminated prior to use, in order to prevent cross contamination. Decontamination of the trowel included:
  - Removal of soils adhering to the trowel by scrubbing with a brush;
  - Washing the trowel thoroughly in a solution of phosphate free detergent (Decon 90) using brushes and disposable towels (Bucket 1);
  - Rinsing the trowel thoroughly with distilled water (Bucket 2);
  - Repeating the washing / rinsing steps and rinsing with water (Bucket 3);
  - Drying the trowel with a clean cloth.
- The recovered soil sample was transferred into a labelled small plastic bag. The small plastic bags were placed inside a large plastic bag.

In order to ensure the analytical performance of the primary laboratory, duplicate and split samples were prepared for analyses. Samples were kept in small plastic bags, which were placed inside a large plastic bag.

A rinsate water sample was collected each sampling day and placed in a plastic bottle supplied by the laboratory. The fully filled bottle was labelled and placed in a large plastic bag.

The day after field work, the large plastic bags were forwarded under chain of custody (COC) conditions to the primary laboratory, SGS Environmental Services (SGS), and the secondary laboratory, Envirolab Services Pty Ltd (Envirolab), both NATA accredited.

On receipt of the samples, the laboratories returned the Sample Receipt Advice included in Appendix B of this report, verifying the integrity of all samples received.

The soil samples recovered for delineation sampling and the rinsate water samples were analysed for Cu, Ni, Zn and/or asbestos. The rinsate water samples were analysed for Cu, Ni and/or Zn

9.0 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

In order to ensure the integrity and reliability of the chemical analysis carried out, the following QA/QC procedures were implemented for the sampling and analytical program.

Reference may be made to Appendix B of this report for actual details of the laboratory test results.

9.1 Rinsate Samples

Rinsate water samples (Rinsates R1 and R2) were recovered over the course of the field work (one for each day), in order to identify possible cross contamination between the sampling locations. A sample of the same water source used for cleaning the equipment (clean distilled water) was previously analysed by the primary laboratory, thus with known concentrations of the selected analytes. The concentrations of the analytes in the rinsate sample were then compared with the results of the original distilled water.

The rinsate water samples were analysed for Cu, Ni and/or Zn. The test results for the rinsate water and distilled water samples are summarised in Table A. The laboratory analytical report from SGS is included in Appendix B.

As indicated in Table A, the concentrations of Cu, Ni and Zn were not significantly different to those of the distilled water sample, indicating that the cleaning and decontamination processes adopted in the field were adequate.

9.2 Duplicate Samples

Field duplicate samples were prepared in the field through the following process:

- A larger than normal quantity of soil was collected from the sample location selected for duplication.
- The sample was placed in a decontaminated stainless bowl and divided into two portions, using the decontaminated trowel.
- One portion of the sub-sample was immediately transferred, using the decontaminated trowel, into a labelled (as the duplicate sample) small plastic bag. The small plastic bags were placed inside a large plastic bag.
- The remaining portion was stored in the same way and labelled as the original sample.

Duplicate samples were prepared based on sample numbers recovered during the field work. The duplicate sample frequency was computed using the total number of samples analysed as part of this assessment. The duplicate sample frequencies computed are as follows:

Cu:	26 samples analysed;	1 duplicate;	4% frequency
Ni:	37 samples analysed;	2 duplicates;	5% frequency
Zn:	38 samples analysed;	2 duplicates;	5% frequency

The duplicate frequency adopted generally complies with the NEPM, which recommends a duplicate frequency of at least 5%.

The duplicate samples test results are presented with the analytical reports from SGS in Appendix B and summarised in Table B.

A comparison was made of the laboratory test results for the duplicate samples with the original samples and the Relative Percentage Differences (RPD) were computed in order to assess the accuracy of the laboratory test procedures. RPD within 50% are generally considered acceptable. However, this variation can be higher for low concentrations of analytes.

As shown in Table B, the comparisons between the duplicate and corresponding original samples indicated generally acceptable RPD, with the exception of RPD for Ni (51%) marginally in excess of 50%, mainly due to low concentrations of the analyte in the samples analysed.

Based on the above, the variations are not considered critical. Based on the overall duplicate sample numbers and comparisons, it is considered that the laboratory test data provided by SGS are of adequate accuracy and reliability for this assessment.

9.3 Inter-laboratory Duplicate (Split) Samples

The inter-laboratory duplicate (split) sample provides a check on the analytical performance of the primary laboratory. Split samples were prepared based on sample numbers recovered during the field work, and the analyses undertaken by the primary laboratory.

The split samples were prepared in the same manner as the duplicate samples. Reference should be made to Section 9.2.

The split samples were forwarded to a secondary laboratory (Envirolab) for analysis.

The split sample frequency was computed using the total number of samples analysed as part of this assessment. The split sample frequencies computed are as follows:

Cu:	26 samples analysed;	1 split;	4% frequency
Ni:	37 samples analysed;	2 splits;	5% frequency
Zn:	38 samples analysed;	2 splits;	5% frequency

The split sample frequency adopted generally complies with the NEPM, which recommends a frequency of 5%.

The laboratory test results certificate from Envirolab is included in Appendix B of this report. The results are also summarised in Table C.

Based on Schedule B (3) of the NEPM, the difference in the results between the split samples should generally be within 30% of the mean concentration determined by both laboratories, i.e., RPD should be within 30%. However, this variation can be higher for low concentrations of analytes.

As shown in Table C, in general, the comparisons between the split and corresponding original samples indicated acceptable RPD, with the exception of the RPD of Zn (53%), which were marginally in excess of 30%.

The RPD of Zn in Table C was comparatively high, however, both the Zn concentrations (150mg/kg and 87mg/kg) detected were well below the PPBIL of 200mg/kg and the HIL 'A' of 7000mg/kg; therefore the RPD were not considered crucial for this assessment.

It should be noted that the splits were prepared from fill samples and therefore, heterogeneity of the samples might result in relatively higher RPD.

Based on the above, the variations are not considered critical. Based on the overall split sample numbers and comparisons, it is concluded that the test results provided by the primary laboratory can be relied upon for this assessment.

10.0 LABORATORY QUALITY ASSESSMENT AND QUALITY CONTROL

Only laboratories accredited by the NATA for chemical analyses were used for analysis of samples recovered as part of this assessment. The laboratory must also incorporate quality laboratory management systems to ensure that trained analysts, using validated methods and suitably calibrated equipment, produce reliable results.

In addition to the quality control samples, the laboratory must also ensure that all analysts receive certification as to their competence in carrying out the analyses and participate in national and international proficiency studies. SGS and Envirolab, the two laboratories used for this assessment, are both accredited by NATA. The two laboratories also operate Quality Systems that are designed to comply with ISO/IEC 17025.

The allowable holding time for analysis of metals (Cu, Ni and Zn) is six months, as detailed in Schedule B (3) of the National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 1999) in the National Environment Protection Council (NEPC) publication.

It should be noted that there is no specific holding time for asbestos analysis.

All analyses were conducted within the relevant holding times. Reference may be made to the laboratory analytical reports / certificate of analysis issued by SGS and Envirolab in Appendix B for details of the actual holding times of the two laboratories used for this assessment.

The test methods and LOR / Practical Quantitation Limits (PQL) adopted by SGS and Envirolab are indicated with the laboratory analytical reports / certificate of analysis in Appendix B.

All reported laboratory LOR / PQL were less than the assessment criteria adopted for each analyte.

SGS and Envirolab incorporate QA / QC procedures in order to demonstrate the following:

- Method proficiency within the laboratory.
- Conformance to the performance characteristics expected of the method.
- Confidence in the results produced.

As part of the analytical run for the project, the laboratories included laboratory blanks, duplicate samples, laboratory control samples and matrix spikes.

We have checked the QA/QC procedures and results adopted by the laboratories against the appropriate guidelines. The quality control sample numbers adopted by SGS and Envirolab are considered to be adequate for the analyses undertaken, and generally conform to the recommendations provided in the National Environment Protection Measure (NEPM) 1999 "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*" and Australian and New Zealand Environment and Conservation Council (ANZECC) -1996 "*Guidelines for the Laboratory Analysis of Contaminated Soils*".

Overall, it is considered that the quality assurance and quality control data quality indicators have been complied with, both in the field and in the laboratory. As such, it is concluded that the laboratory test data obtained as part of this assessment is reliable and useable for this assessment.

11.0 LABORATORY TEST RESULTS, ASSESSMENT & DISCUSSION

The test results for the samples recovered for delineation of the lateral and vertical extent of contamination are presented in the tables on Drawings 12486/2-AA1 to 12486/2-AA6. Reference may be made to Appendix B of this report for actual details of the laboratory test results.

As indicated in the table on Drawing 12486/2-AA1, the highlighted Zn concentrations (ranging from 210mg/kg to 230mg/kg) for some of the delineation samples around the previously identified contaminated location TP10 were in excess of the PPBIL of 200mg/kg, but below the HIL 'A' of 7000mg/kg.

As shown in the table on Drawing 12486/2-AA2, the delineation samples around the previously identified contaminated location TP11 were found to contain Ni concentrations (ranging from 64mg/kg to 92mg/kg) in excess of the PPBIL of 60mg/kg, but below the HIL 'A' of 600mg/kg.

As presented in the table on Drawing 12486/2-AA3, the highlighted Ni concentrations (ranging from 76mg/kg to 80mg/kg) for some of the delineation samples around the previously identified contaminated location TP14 were in excess of the PPBIL of 60mg/kg, but below the HIL 'A' of 600mg/kg.

As summarised in the table on Drawing 12486/2-AA4, the highlighted Ni concentrations (68mg/kg and 86mg/kg) for some of the delineation samples around the previously identified contaminated location TP19 were in excess of the PPBIL of 60mg/kg, but below the HIL 'A' of 600mg/kg.

As shown in the relevant tables on Drawing 12486/2-AA5, the delineation samples around the previously identified contaminated locations TP22, TP26 and TP27 were found to contain:

- Cu concentrations generally below the HIL 'A' of 1000mg/kg and the PPBIL of 100mg/kg, with the exception of highlighted concentration of 180mg/kg in sample TP26-4 (1.0-1.3m), which was in excess of the PPBIL of 100mg/kg, but below the HIL 'A' of 1000mg/kg;
- Ni concentrations (61mg/kg and 67mg/kg), as highlighted, for some of the delineation samples around the previously identified contaminated locations TP26 and TP27 were in excess of the PPBIL of 60mg/kg, but below the HIL 'A' of 600mg/kg;
- Zn concentrations (ranging from 370mg/kg to 1200mg/kg), as highlighted, for some of the delineation samples around the previously identified contaminated locations TP22 and TP26 were in excess of the PPBIL of 200mg/kg, but below the HIL 'A' of 7000mg/kg.
- Bonded asbestos-cement pieces in some fill layers around the previously identified contaminated locations TP22, TP26 and TP27, however no asbestos was detected in the soil samples recovered.

The laboratory test results in the table on Drawing 12486/2-AA6 revealed that some of the delineation soil samples recovered around the previously identified contaminated location A1 contained asbestos.

Based on the site inspection for this assessment, scattered bonded asbestos-cement pieces were noted on the ground surface in an area located at the north western portion of the site, as shown on Drawing 12486/1-AA3R1.

The foregoing information (i.e. contaminants, concentrations and locations of contaminants of concern) was considered sufficient to devise remedial strategies (refer to Section 13.0) that would involve combining all identified Cu, Ni, Zn and asbestos contaminated locations into seven distinct areas (Areas 1 to 7), as indicated on Drawing 12486/2-AA7. It should be noted that that the defined remediation areas are estimates only and could extend beyond the boundaries shown.

12.0 SITE CHARACTERISATION

As presented in Report 12486/1-AA and this assessment, the majority of the laboratory test results satisfied the criteria for stating that the analytes selected are either not present (i.e. concentrations less than laboratory LOR), or present in the sampled soils at concentrations that do not pose a risk of hazard to human health or the environment, under a "residential with access to soil" form of development. The exceptions included the following identified locations of concern, as indicated and tabulated on Drawing 12486/1-AA3R1:

- Locations where elevated concentrations of Cu, Ni, and Zn could potentially impact on the growth of certain plant species if retained on site, but would not present a risk of harm to human health.
- Asbestos was detected in one surface soil sample.
- Scattered bonded asbestos-cement pieces encountered on the ground surface at a localised area.

Off-site impacts of contaminated soil are generally governed by the transport media available and likely receptors. The most common transport medium is water, whilst receptors include groundwater, surface waterbodies, humans, flora & fauna.

Migration of soil contaminants to the deeper soils or groundwater regime would generally be via leaching of contaminants from the surface soil or fill, facilitated by infiltration of surface water. Groundwater or seepage was not encountered during sampling for this assessment. Given that some of the naturally occurring soils (silty clay) beneath the site are relatively impermeable, the potential for migration of contaminants from within the site to the groundwater table below is considered low.

There is no waterbody such as a creek, river or wetland close to the site. Claremont Creek is located about 750m to the south east of the site, and an unnamed creek about 400m to the west of the site. There are two farm dams with water in the site. There is potential for off-site impact of the contaminants in the waterbodies due to surface water run-off from the site, if significant chemical concentrations are detected in soil and dam water samples.

Potential off-site impacts of contaminants beneath the site on groundwater and waterbodies are considered to be low.

13.0 REMEDIAL ACTION PLAN

Based on the Phase 1 PCA and this assessment, it was determined that isolated locations within the site contain soils with Cu, Ni and Zn concentrations of concern and asbestos contamination. Therefore, some form of remediation and/or management processes is required.

13.1 Site Remediation Policy

Under the *Protection of the Environment Operations Act* (PEO Act), and in accordance with the NSW DEC (2006), *Guidelines for the NSW Site Auditor Scheme* (2nd edition), the preferred options for remediation and/or management of contaminated land are summarised as follows, in order of preference:

1. On-site treatment of the soils, so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, then re-use of the soils on site.
2. Off-site treatment of excavated soils, so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site for re-use.
3. Removal of contaminated soils to an approved site or facility, followed by replacement with clean fill.
4. Consolidation and isolation of the soils on-site by containing within a properly designed barrier.

The criteria for disposal of contaminated soils are generally governed by the "Waste *Classification Guidelines Part 1: Classifying Waste*", the NSW Department of Environment and Climate Change (DECC) December 2009. This guideline outlines a clear, step-by-step process for classifying waste. There are six waste classes to be used:

- Specific Waste, including clinical and related waste, asbestos waste, as well as waste tyres
- Liquid Waste
- Hazardous Waste
- Restricted Solid Waste
- General Solid Waste (Putrescible)
- General Solid Waste (Non-putrescible)

Each of the previously mentioned categories has separate requirements, in terms of licensing, for transportation and landfill sites. NSW DECCW consent is required for disposal, treatment and/or storage of Hazardous waste.

13.2 Remediation Goal

The goal of remediation is to be able to provide a statement declaring that the site is environmentally suitable for the proposed land uses of residential with accessible soil.

13.3 Remediation Areas

Based on the test results for the Phase 1 PCA and this Phase 2 DCA, seven remediation areas were developed, designated Areas 1 to 7. Drawing 10076/1-AC7 shows all the remediation areas. Included on the drawing is a table indicating the estimated areas (in square metres) and volumes of contaminated soils and contaminants associated with each area.

It is reiterated that the defined remediation areas are estimates only and could extend beyond the estimated boundaries shown. This will be confirmed by the necessary validation sampling and testing.

13.4 Remediation Options

As discussed in this report, the contaminants identified on-site are primarily Cu, Ni, Zn and asbestos in localised areas. Based on the estimated volumes of contaminated soils and the contaminants identified (refer to Drawing 12486/2-AA7), the following remediation options were considered:

ADVANTAGES AND DISADVANTAGES OF REMEDIATION OPTIONS

REMEDIATION METHOD	ADVANTAGE	DISADVANTAGE	REMAINING SITE RISK
Excavation and Landfill Disposal	- Approval is not required from council; - Simple & straightforward process; - Short time frame; - Minimal expertise required; - All contaminants removed from site; - Not overly expensive.	- Adds to already filling landfill; - Requires movement of contaminated soil on public roads; - Importing clean fill required to fill void.	None
On-site Burial and Containment	- Retains soils within the site, thereby minimising land filling; - Cost saving (of Landfill Disposal) for large volumes; - Short time frame; - Minimal expertise required;	- May be subject to Council approval; - Retains contaminants within the site; - Additional investigations required prior to on-site burial; - Requires preparation, implementation and monitoring of an ongoing environmental management plan; - Long term cost involved; - Owner of contaminated soils remains liable; - Notation on Section 149 Certificates may be required; - Potential devaluation of land.	- Breaching of capping layer; - Potential hindrance to plant growth; - Potential leaching of contaminants to groundwater
Stripping, Stockpiling & Reassessing	- Cost saving (of Landfill Disposal); - Alternative method for remediating large quantities of soils with low levels of contamination; - Reducing contaminant concentrations to acceptable levels.	- May be subject to council approval; - Constraints on segregation; - Trial & error process; - Disposal of some contaminated soils may still be required.	- Some "hot spots" may still remain; - Potential hindrance to plant growth.
Excavation, Segregation, Stockpiling & Retesting of Segregated Soils	- Cost saving (of Landfill Disposal); - Alternative method for remediating large quantities of soils with low levels of contamination; - Reducing contaminant concentrations to acceptable levels.	- May be subject to council approval; - Trial & error process; - Disposal of some contaminated soils may still be required.	- Some "hot spots" may still remain; - Potential hindrance to plant growth.
Phytotoxicity Assessment	- Remediation may not be warranted or may minimise the required remediation areas; - Cost advantage for large volumes; - Minimises land filling.	- May be subject to council approval; - Long time frame; - Additional testing might be required; - Final outcome might still require remediation; - No significant cost saving for small volumes; - Justification of findings may not be accepted by governing parties.	- Potential hindrance to plant growth in isolated locations.

Many factors, such as advantages, disadvantages, risks and the costs of separating relatively small amounts of waste, compared to apparently less complicated disposal off-site, etc., need to be considered in adoption of the final remediation strategy for each area.

Based on the advantages, disadvantages and risks of each of the remediation options, it is our opinion that the following remediation options (also indicated on Drawing 12486/2-AA7) are considered appropriate for the site:

Areas 1 to 4	Stripping, Stockpiling and Reassessment
Area 5	Excavation, Segregation, Stockpiling & Retesting of Segregated Soil
Area 6	Landfill Disposal
Area 7	Hand-picking and Landfill Disposal

13.4.1 Stripping, Stockpiling and Reassessment – Areas 1 to 4

Areas 1 to 4 were defined by the elevated but relatively low-level concentrations of Ni (ranging from 63mg/kg to 92mg/kg) or Zn (ranging from 230mg/kg to 730mg/kg), generally less than two times the PPBIL of 60mg/kg and 200mg/kg for Ni and Zn respectively, which pose no risk to human health, but might impact on the growth of certain plant species. Some of the concentrations of Zn are more than two times the relevant PPBIL. Therefore, the Ni or Zn contaminated soils in Areas 1 to 4 could be remediated by stripping and stockpiling, using a backhoe/excavator.

The "stripping, stockpiling and reassessment " method involves stripping the full depth of topsoil, then stockpiling for re-sampling and testing.

This process is expected to result in significant distribution of Ni or Zn throughout the stripped soils and might require several stages (i.e. trial and error) to achieve the ultimate goal of producing environmentally re-useable soils. However, should the process be unsuccessful, the soils could require off-site disposal.

13.4.2 Excavation, Segregation, Stockpiling & Retesting of Segregated Soil – Area 5

Area 5 was defined by the elevated but relatively low concentrations of Cu (ranging from 120mg/kg to 240mg/kg) and Zn (ranging from 230mg/kg to 1200mg/kg), generally less than two times the PPBIL of 100mg/kg and 200mg/kg for Cu and Zn respectively, which pose no risk to human health, but might impact on the growth of certain plant species. Some of the concentrations of Cu and Zn are more than two times the relevant PPBIL.

In addition, the soil in Area 5 contained Ni concentrations (61mg/kg and 70mg/kg), less than two times the PPBIL of 60mg/kg, which pose no risk to human health, but might impact on the growth of certain plant species.

The soil in Area 5 also contained scrap metals, bonded asbestos-cement pieces, brick and concrete. Bonded asbestos-cement pieces pose a potential risk to human health, whilst scrap metals could be sources of ongoing metal contamination.

As such, excavation, segregation and stockpiling of the soil in Area 5 is considered to be the most appropriate remediation strategy, due to the nature of the soils (topsoil, comprising silty clay and fill comprising gravelly sand, sandy silty clay, silty clay, gravelly silt & silty gravel, generally with inclusion of scrap metals, bonded asbestos-cement pieces, brick and/or concrete) and concentrations of Cu, Ni and/or Zn exceeding the relevant PPBIL.

The following sequence is recommended:

Step 1: Excavate the topsoil and/or fill in Area 5, as indicated in Drawing 12486/2-AA7, to the full depth, spread the excavated soils out to not more than 50mm thick, then "sparrow picking" bonded asbestos-cement pieces, in conjunction with raking by the NSW WorkCover licensed AS2 bonded asbestos removal contactor (hereafter known as AS2), as well as hand picking the scrap metals, which could be sources of ongoing metals contamination.

Step 2: The asbestos-cement pieces removal process would involve at least three passes over the area, collecting surface and sub-surface asbestos-cement pieces with a manual or mechanical rake capable of probing to 10 centimetres (cm). The spacing between the rake teeth should be at most 7mm. Picking and raking should be done on a grid basis. If a pass across the impacted area results in no bonded asbestos-cement pieces being found, then the soil in the area can be considered effectively free of asbestos-containing materials.

Any asbestos cement pieces noted on the ground surface and in the soil should be hand-picked by an appropriately licensed contractor and placed into plastic bags, in accordance with the requirements specified in the WorkCover *Working with Asbestos Guide 2008*.

Step 3: Disposal of the asbestos-cement pieces as Asbestos Waste at an appropriately licensed landfill facility.

Recycle or dispose of the scrap metals.

Step 4: For asbestos validation, Area 5 must be visually free of asbestos-cement pieces. Soil sampling and testing of asbestos is not required.

Step 5: Stockpile the segregated soils after the clearance of the bonded asbestos-cement pieces.

Step 6: Recover a sufficient number of samples from the stockpile(s).

Step 7: Forward the samples to NATA registered laboratories for analysis of Cu, Ni and Zn, the previously identified contaminants.

Contractors should be aware of constraints with this process, such as the clayey nature of some of the soils.

13.4.3 Landfill Disposal – Area 6

Asbestos cement pieces were noted, and asbestos was detected at surface soil in Area 6. Remediation of the area by landfill disposal would be appropriate.

The asbestos contaminated soil will be excavated to a depth of about 150mm and disposed of, along with the asbestos cement pieces, at an appropriately licensed landfill facility.

13.4.4 Hand-pick and Landfill Disposal – Area 7

Scattered asbestos cement pieces were noted on the ground surface in Area 7. Remediation of Area 7 by hand-picking and landfill disposal would be appropriate.

Any asbestos cement pieces noted on the ground surface will be hand-picked by an appropriately licensed contractor and placed into plastic bags, in accordance with the requirements specified in the WorkCover *Occupational Health & Safety Regulation 2001* (OH & S Regulation 2001), the NSW *Protection of the Environment Operations (Waste) Regulation 2005* (POEO Waste Regulation 2005), as well as the NSW *Protection of the Environment Operation Amendment (Scheduled Activities and Waste) 2008*.

The asbestos cement pieces collected from the area will be disposed of at an appropriately licensed landfill facility.

13.5 Soil Classification

Waste classification is required to provide information to the nominated landfill facility regarding classification of the contaminated material / soils to be disposed.

According to the "Waste *Classification Guidelines Part 1: Classifying Waste*", the NSW DECC 2009, the asbestos cement pieces in Areas 5 to 7, as well as asbestos contaminated soil in Area 6 were classified as "Asbestos Waste".

If landfill disposal of unsuccessfully remediated soils in Areas 1 to 5 is required, according to the abovementioned Guidelines, the soil profile, as well as based on the total concentrations and the Toxicity Characteristics Leaching Procedure (TCLP) concentrations of Ni, the Cu, Ni and Zn contaminated soil in Area 5 was classified as "General Solid Waste (Non-putrescible)". Reference may be made to Tables C1 to C3 in Appendix C of this report for details of classification. It should be noted that the data for Cu and Zn were not included in Table C3, as Cu and Zn were not required for classification.

All landfill delivery dockets shall be provided to Geotechnique for inclusion in a final validation report.

13.6 Prior to Remediation

Prior to conducting remedial works on-site, the following procedures will be carried out:

- The category of remedial works proposed is considered to be Category 2 (subject to agreement by Penrith City Council), as defined under the "*Managing Land Contamination: Planning Guidelines*"-1998, developed by the Department of Urban Affairs and Planning and the NSW EPA. Development consent to carry out the works is not likely to be required. Under Clause 16 of the "*State Environmental Planning Policy No 55 – Remediation of Land*", a minimum of 30 days notice of the intention to proceed with remedial works must be given to Penrith City Council **whether or not** development consent for the remediation is required.
- Precise marking of all the contaminated areas by an Environmental Representative and fencing off with red ribbon to prevent / minimise access during any future works.
- All intended environmental management measures (refer to Section 14.0) will be installed by the appointed contractor. Geotechnique will inspect all measures prior to remedial works commencing.
- Seek approval from an appropriately licensed landfill facility, prior to disposal of the any contaminated soils. Geotechnique can assist with the application.
- No waste should be transported before acceptance of the application.
- Signage will be placed at the site entrance, identifying the contact details of the appointed remediation contractor.
- The site will remain secure (with a padlock) during non-working hours.
- The nominated licensed landfill will be contacted and informed of the soil classification details in order to obtain an approval for acceptance of the contaminated soils. All documentation required by the landfill facility will be completed as required.
- Provide a remediation schedule to Geotechnique, once the site owners or relevant party, has authorised the remediation.

13.7 During Remediation

The following procedures will be carried out during the remedial works:

- Remediation of Area 7 by hand-picking of bonded asbestos-cement pieces and disposal of at an appropriately licensed landfill, followed by visual inspection to confirm the complete removal of asbestos-cement pieces.
- Remediation by landfill disposal of Area 6, prior to remediation by stripping, stockpiling and reassessment of Areas 1 to 4 and excavation, segregation, stockpiling and reassessment of Area 5. Validation sampling and testing will be carried out following the remediation.
- Excavation/stripping of the soils within each identified remediation area will be instructed / supervised by the Environmental Consultant. The degree of involvement of the Environmental Consultant during the remediation works will be governed by the requirements of the site owners or relevant party.
- All environmental management items will be monitored and maintained during the course of the remediation works. The site superintendent appointed by the remediation contractor will carry out monitoring.
- The site will be fully secured during and after working hours.
- The remediation contractor will keep all landfill delivery dockets, with copies forwarded to Geotechnique.
- Should any asbestos (or suspected asbestos) be uncovered in areas other than Areas 5 to 7 during the course of the remediation works, Geotechnique will be contacted for assessment and direction.

13.8 Remediation Schedule

This section provides a summary, as well as additional information associated with the schedule of remediation works. The appointed site remediation contractor may submit a works method statement for approval, offering an alternative works schedule:

- Hand-picking of bonded asbestos-cement pieces in Area 7, in conjunction with demolition / removal of features / structures containing asbestos material by a contractor appropriately licensed by WorkCover and disposal at an appropriately licensed landfill, followed by visual inspection to confirm the complete removal of asbestos cement pieces.
- Demolition and removal of the site features.
- Assessment by inspection, sampling and/or testing of soils beneath the former features, where considered necessary.
- Disposal of contaminated soil in Area 6 at an appropriately licensed landfill, followed by validation sampling and testing, in order to ascertain whether further excavation is required.
- Stripping and stockpiling of Areas 1 to 4, followed by validation sampling and testing, in order to ascertain whether further stripping and stockpiling is required.
- Excavation, segregation and stockpiling of Area 5, separate (by hand picking) inclusions such as asbestos-cement pieces, scrap metal, brick, concrete, etc., for recycling and/or disposal, followed by validation sampling and testing, in order to ascertain whether further excavation and stockpiling is required.
- Backfilling of the excavated areas with validated soils, once all remediation is complete.

14.0 ENVIRONMENTAL MANAGEMENT PLAN

The appointed remediation contractor will be provided with a copy of this RAP and made aware of the contamination status of the soils and the remediation methodology to be adopted.

All remediation works will be carried out with due regard to the environment and to all statutory requirements. The works shall comply with the requirements of the following Acts and Regulation:

- Protection of the Environment (Operations) Act
- Construction Safety Act
- Occupational Health and Safety Act
- Occupational Health & Safety Regulation

Specifically, all site works will comply with the provisions set out in the following:

- National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos – 1998
- WorkCover Occupational Health & Safety Regulation 2001 (OH & S Regulation 2001)
- NSW DECC Contaminated Sites: Guidelines for the NSW Site Auditor Scheme – 2006
- Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land – Department of Urban Affairs and Planning / NSW EPA 1998

In addition to any statutory requirements, the contractor will be responsible for carrying out the remediation works with all due care to ensure that the following conditions are specifically complied with:

- Minimal wind borne dust leaves the confines of the site. This will be continually monitored.
- Water containing suspended matter or contaminants will not leave the confines of the site, as this may pollute watercourses, either directly or indirectly through the stormwater drainage system.
- Material from exposed, non-validated surfaces is not to be tracked onto other areas of the site by personnel or equipment.
- Vehicles will be cleaned and secured, so that mud, soil or water, is not deposited on any public roadway or adjacent areas. A truck wash area will be set up for this purpose.
- Noise levels at the site boundaries will comply with the noise quality objectives of the region, and/or legislative requirements.

The Environmental Representative employed by Geotechnique will ensure that the contractor and the contractor's employees are familiar with the contents of the RAP and in particular, the Environmental Management Plan.

The following sub-sections provide details of the environmental management practices to be employed at the site in order to comply with the statutory requirements, Penrith City Council Development Control Plan and the previously mentioned items.

14.1 Working Hours

All remediation works would be carried out between 7:00am and 5:00pm, Monday to Friday; 8:00am and 4:00pm, Saturday or between the hours designated by Penrith City Council. No remediation works will be carried out on Sunday and Public Holidays.

14.2 Security / Safety Measures

Prior to any remediation works being carried out, the existing fence line will be inspected and repaired, if required, to ensure no public access during the remediation works. The front gate will be closed and padlocked at the completion of each day. Adequate signage, containing a "no unauthorised entry" statement, as well as the contractor's name and contact details, both during and after working hours, will be erected at the site entrance.

A site superintendent, appointed by the remediation and/or earthworks contractor, will be present for the duration of the works to ensure implementation of the day-to-day works and maintenance of the environmental safeguards. The superintendent will also be responsible for locking the gates at the completion of each day.

All earthworks machinery used on the site will be fitted with warning lights and reversing signals.

14.3 Traffic Management / Truck Monitoring

Access into the site will be via the gate on O'Connell Street entry. Prior to exiting the site, trucks will pass over a shaker grid or truck wash bay.

At completion of each working day, or as required during the course of each day, the adjacent public road will be inspected for any soil deposits from exiting trucks, which will be cleaned up and returned to the site. If excess or regular deposits are occurring, the truck cleaning procedure will be reviewed and refined as necessary.

All loaded trucks will be fitted with secured covers over the entire load, thereby preventing any loss of the load on public roads.

14.4 Dust Control

Dust might be generated during the excavation process. Generation of dust will be kept to a minimum at all times. The potential for dust and/or odour impacts will be minimised by the following construction practices:

- Trucks entering and leaving the site will be tarped to prevent materials from leaving the trailer of the truck.
- Remediation areas will be kept grassed until excavation and disposal is proposed.
- If excessive dust is being produced, as determined by the Environmental Representative or Site Superintendent, works will cease until the dust is suppressed sufficiently by a water truck.
- During non-working hours, all soil stockpiles and exposed excavation faces will be covered with plastic and/or tarpaulins, securely weighted to ensure they are not blown away by strong winds.

A complaints register will be set up on site for recording complaints from residents, with regard to dust and/or odours. The complaints register will be completed by the Site Superintendent, as well as the corrective actions implemented. Once a complaint is received, the site superintendent will implement a corrective action to rectify any problems associated with the odour or dust source.

14.5 Sediment and Stormwater Containment

Sediment control fencing will be installed along site boundaries, and/or downslope of the remediation areas (to be determined by the appointed contractor in consultation with the Environmental Consultant). The fencing will comprise geofabric filter stretched between posts at 2m to 3m spacing. The base of the fabric will be buried a minimum 200mm into the ground. The fabric will be an approved material, such as Bidim A24, Terram 1000 or similar.

In areas identified as potentially being subject to excessive stormwater water flow during rain periods, additional rows of sediment fencing and/or hay bales will be placed to minimise flow rates.

A temporary sediment basin will be formed at the lowest elevation in the site. Bunds will be formed where possible to direct stormwater water flows into the basin.

The remediation process will be carried out through stripping/excavation, segregation and/or stockpiling of the contaminated soils in Areas 1 to 5 for reassessment. The following management procedures will be adopted:

- No stockpiling will take place during windy conditions.
- Sediment control fencing will be installed around the stockpile area(s).
- The stockpile will be covered and secured overnight or during sudden windy conditions.

For Area 6, the remediation process will be carried out through excavation of contaminated soil and immediate loading on dump trucks for disposal. If, for any reason, a temporary stockpile of contaminated soil is formed, the above management procedures will be adopted. In addition, once the stockpile is removed, the surface soils beneath will be sampled and tested to ensure no contaminants have affected the soils from the stockpiles. The sampling frequency will be as per the validation requirements (refer to Section 16.1)

The sediment control measures will be regularly inspected and maintained by the site foreman / superintendent. The Environmental Representative will also carry out regular inspections. Should any section be damaged or not perform to satisfaction, it will be immediately repaired or replaced.

14.6 Noise Management

Noise impacts will generally result from the excavators and truck movements within the site and surrounding streets, all of which have noise levels within levels normally expected at a construction site.

In order to minimise noise impacts during the remediation works, the following measures will be implemented:

- Construction noise will be confined to the hours of 7:00am-5.00pm, Monday to Friday; 8:00am-4.00pm, Saturday or the hours of operation as permitted by Penrith City Council. No machinery / trucks will be permitted to access the site outside these hours of operation.
- Signage at the site entrance providing contact details for the site superintendent so that noise complaints can be readily addressed.
- Establishment and monitoring of a complaints log.

14.7 Waste and Asbestos Management

Disposal of contaminated soils (waste) generated by the remediation works will be in accordance with section 13.0 of this RAP.

The following remediation procedures will be implemented during removal of the soil from Area 6 with asbestos cement pieces and fibres:

- According to the "Waste *Classification Guidelines Part 1: Classifying Waste*", the NSW DECCW 2009, the soil contaminated with asbestos and asbestos-cement pieces are classified as "Asbestos Waste''. Approval from the landfill must be provided prior to disposal, and 24 hours notice is required.
- A licensed contractor must transport the asbestos contaminated soil. A contractor, with NSW WorkCover AS1 Licence for friable asbestos, must supervise excavation and loading of the asbestos contaminated soil.
- Asbestos fibres monitoring devices will be set up on site boundaries and at strategic locations as determined and monitored by a suitably experienced consultant.
- If monitoring indicates the presence of airborne asbestos, all works must cease immediately and the remediation methods re-assessed.
- During working hours, a water cart should be used to suppress any dust. Water used for dust suppression will be only the minimum required and will not be allowed to escape the confines of the site.
- A covered, leak-proof vehicle must transport the asbestos contaminated soil.

The remediation contractor will keep records of all off-site waste disposals.

The works area will be kept in a tidy condition so that waste materials generated by the earthworks or workers on-site will be contained. Rubbish disposal bins with heavy lids will be provided within the site compound for personal litter. These bins will be monitored and emptied on a regular basis when near full. Any loose rubbish generated by the earthworks, capable of being blown off the site in high winds, will be hand collected and deposited into the bins provided. No burning of rubbish will be permitted.

All employees will be informed of the necessity to maintain a tidy environment. The site superintendent will carry out a daily inspection at the completion of works, prior to leaving the compound.

Waste materials that may be generated by the works (apart from the asbestos and/or non-recyclable materials possibly generated through the remediation works) include tree and shrub vegetation, domestic and human waste. The disposal methods for these types of waste will be as follows:

- Portable toilet and hand cleaning facilities will be provided on-site. The resultant sewerage will be collected and regularly disposed of off-site, by contract, in accordance with the relevant regulations.
- Domestic waste will be stored in secure waste bins and appropriately disposed of on a regular basis to a licensed landfill.

14.8 Contact Personnel

In the event of complaints, incidents or other matters associated with the site remediation works, the following contacts are applicable:

Project Manager:	LivLand Property Pty Ltd	4971 2992
	Mr B Judge	
Environmental Consultant:	Geotechnique Pty Ltd	4722 2700
	John Xu	
Remediation Contractor:	Not yet appointed	
Fire Brigade:		000

15.0 OCCUPATIONAL HEALTH & SAFETY PLAN

A site-specific Occupational Health and Safety (OH&S) Plan has been developed to ensure that the remediation works are conducted in a safe manner. Personnel working on the site are required to read and understand the OH&S Plan prior to works commencing.

15.1 Potential Contaminants Associated with Human Health Issue

The contaminant identified in the soils and associated with human health issue is listed below, with brief descriptions of physical form and some general health and safety information. Note that the effects listed are usually the result of prolonged exposure to high concentrations. These extremes are not likely to be achieved during the works proposed.

> ***Asbestos***: Bonded asbestos pieces/fragments generally do not present a significant health risk unless tooled, cut, sanded, abraded or machined, which may release asbestos dust or fibres. Asbestos dust contains tiny, almost indestructible fibres, which can cause damage to the lungs when breathed in.
>
> According to the International Agency for Research on Cancer (IARC), asbestos is a listed known human carcinogen. Asbestos mainly affects the lungs and the membrane that surrounds the lungs. Breathing high levels of asbestos fibres for a long time may result in scar-like tissue in the lungs and in the pleural membrane (lining) that surrounds the lung. This disease is called asbestosis and is usually found in workers exposed to asbestos, but not in the general public. People with asbestosis have difficulty breathing, often a cough, and in severe cases heart enlargement. Asbestosis is a serious disease and can eventually lead to disability and death. Breathing lower levels of asbestos may result in changes called plaques in the pleural membranes. Pleural plaques can occur in workers and sometimes in people living in areas with high environmental levels of asbestos. Effects on breathing from pleural plaques alone are not usually serious, but higher exposure can lead to a thickening of the pleural membrane that might restrict breathing.

Contact of the contaminated soils with the skin and eyes, or inhalation of associated dust, should be prevented.

Other metal contaminants (Cu, Ni and Zn) might be identified to have association with human health issues during the remediation works. The OH&S requirements will provide adequate protection for workers and/or the public during the works.

15.2 Personal Protective Equipment

In order to minimise exposure to the contaminants within the soils and to ensure the safety of workers, the minimum level of personal protective equipment for workers actively involved in handling the potentially contaminated soils (particularly asbestos) includes:

- Disposable long sleeve worker coveralls / overalls to be disposed of at the completion of each day.
- Highly visible safety vests.
- Waterproof boots with steel toe and shank, complying with AS2210 "Occupational Protective Footwear".
- Safety glasses with side shields, complying with AS1337 "Eye Protection for Industrial Applications".
- Hard hat, meeting AS1801 "Occupational Protective Helmets".
- Dust mask or half-face respirator with particulate filter. If significant amounts of asbestos-cement pieces are encountered and air monitoring for dust and asbestos fibres indicates the presence of airborne asbestos (this is not expected), full-face respirator with particulate filter should be worn.
- Nitrile work gloves, complying with AS2161 "Occupational Protective Gloves".

It should be noted that wearing personal protective equipment can reduce the dexterity of workers and senses of vision, hearing and smell. Heat stress is another important consideration that must be taken into account during hot weather.

Smoking, eating or drinking on-site will only be carried out in a designated lunchroom. Hands are to be washed thoroughly upon completion of work and prior to eating, drinking or any other hand-to-mouth activity.

Visitors to the site, who will be observing activities being undertaken in or around excavations, should follow appropriate guidelines to prevent excessive dermal contact or inhalation of dust arising from the handling of contaminated materials. All visitors should wear the following personal protective equipment during remediation works:

- Highly visible safety vests.
- Waterproof boots with steel toe and shank, complying with AS2210.
- Safety glasses with side shields, complying with AS1337.
- Hard hat, meeting AS1801.
- Dust masks.

The abovementioned personal protective equipment will also be required for site workers, or consultants not directly associated with the remedial works, but present on the site.

15.3 Safety Measures around Excavations

The safety measures to be adopted during any deep excavation works (i.e. deeper than 1.2m) are as follows:

- Only the minimum number of workers necessary will be used to adequately and safely complete the job at hand.
- During non-working hours, the entire site will be secured.

- All personnel performing the works in and around the excavation will wear appropriate personal protective equipment, as listed above.
- Environmental conditions will be monitored prior to excavation, including wind direction, wind speed, temperature and the likelihood of rain. Excavation works will not take place during periods of high wind, elevated temperature or heavy rain.
- Any deep excavation that is to remain open during non-working hours will be subject to dust suppression controls in the form of water sprinklers and/or protective plastic coverings.

16.0 SITE VALIDATION

Validation sampling and testing forms a crucial part of the site remediation process, in that it monitors the success or otherwise of the adopted remediation strategies and confirms the suitability of the site for residential (with accessible soil) use.

The objective of the site validation plan is to obtain sufficient information and data to make the following conclusions:

1. All previously identified contaminated soil is appropriately remediated.
2. The site is suitable for residential (with accessible soil) use.

16.1 Sampling and Testing Plan

Following completion of the remediated areas, as directed by this RAP and shown on Drawing 12486/2-AA7, Geotechnique will carry out validation.

The sampling strategy will involve sampling the sidewalls and base of the stripped / excavated areas and the resultant stockpiles. The following samples will be recovered from Areas 1 to 5:

- Sidewall samples, generally spaced at about 5m to 10m centres, recovered from the full depths of the stripping / excavation in Areas 1 to 4 and 6.
- Sidewall samples, generally spaced at about 5m to 10m centres, recovered from the full depths of the excavation in Area 5. One soil sample will be recovered at every 500mm interval of height along the walls.
- Base samples, generally spaced at about 5m to 10m centres, recovered from the excavation base surface to a depth of 0.15m.
- Stockpile samples; One sample will be recovered for laboratory analysis per 50 to 100 cubic metres (m^3) of stockpiled soils, or at least three soil samples from the resultant stockpile for each area if the total volume of the stockpile for the area is less than 100 m^3.

The recovered samples will be forwarded to NATA accredited laboratories for analysis of the contaminants identified at each remediation area. All recovered samples will be forwarded under COC prepared by Geotechnique.

Copies of delivery dockets from the Landfill facility are to be provided for completion of a validation report.

The site is proposed for residential subdivision development. The assessment criteria adopted were the available PPBIL for Areas 1 to 5. The acceptance criteria to be adopted for the validation process will be as follows:

Analyte	PPBIL (mg/kg)
Copper	100
Nickel	60
Zinc	200

For an area/stockpile (Areas 1 to 5) to be considered not to impact on the growth of certain plant species, the individual test result of the analyte should be less than the relevant PPBIL.

For asbestos validation, the area must be visually free of asbestos-cement pieces (Areas 5, 6 and 7) and no asbestos fibres detected in the soil validated by sampling and testing (Area 6).

Validation sampling of the exposed soils will be carried out progressively with the remedial works, so that any additional stripping / excavation required is identified.

If the validation test results fall below the adopted acceptance criteria, the remediation area/stockpile will be deemed as satisfactorily remediated. If the validation test results do not meet the validation criteria, soil stripping / excavation will continue, followed by additional validation sampling and testing. This process will continue until the test results meet the acceptance criteria.

16.2 Imported Material

Any material imported to the site will be validated as being suitable for use within the site prior to use. The validation process will be as follows:

- Review of any validation reports made available by the supplier of the materials.
- Inspection of incoming material at the source site and during importation, if the validation reports provided are found to be adequate, to ensure the material comply with those validated.
- If the validation report provided is found to be inadequate or if the incoming material is suspect, appropriate sampling and testing will be carried out by Geotechnique prior to acceptance within the site.
- Only once approved by Geotechnique can any material be imported for use as fill within the site.

16.3 Quality Assurance / Quality Control

A qualified Environmental Representative from Geotechnique will undertake all validation sampling. The sampling equipment will essentially be a stainless steel trowel. The trowel will be regularly decontaminated using Decon 90 and rinse water. Samples of the rinse water will be retained and forwarded to the testing laboratory for analysis, in order to assess any cross-contamination issues.

The data qualitative objectives (DQO) for the validation process will be developed in accordance with the NSW DECC, 2006, Guidelines for the NSW Site Auditor Scheme (2nd edition), as well as in accordance with the Australian Standard "*Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds*" (AS4482.1-2005) and "*Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 2: Volatile substances*" (AS4482.2-1999).

The performance of validation in achieving the DQO will be assessed through the application of Data Quality Indicators (DQI), defined as follows:

Precision: A quantitative measure of the variability (or reproducibility) of data;

Accuracy: A quantitative measure of the closeness of reported data to the "true" value;

Representativeness: The confidence (expressed qualitatively) that data is representative of each media present on the site;

Completeness: A measure of the amount of useable data from a data collection activity;

Comparability: The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

The following table provides a list of the DQI for the proposed validation and the methods adopted in ensuring that the DQI are met.

DATA QUALITY INDICATOR	METHODS OF ACHIEVEMENT
Documentation Completeness	Preparation of COC records Laboratory sample receipt information NATA registered laboratory results certificates
Data Completeness	Validation sampling density is sufficient to make appropriate judgemental decisions on the probability of contamination On-site visual assessment of soil On-site assessment of odours and vapours Analysis for all potential contaminants of concern
Data Comparability	Using appropriate techniques for sample recovery Using appropriate sample storage and transportation methods Use of a NATA registered laboratory
Data Representativeness	Reasonable validation sampling coverage Representative validation sampling Representative coverage of potential contaminant through analysis
Data Precision and Accuracy	Use of trained and qualified field staff Appropriate industry standard sampling equipment and decontamination procedures Field duplicate (minimum 5% of samples analysed), inter-laboratory duplicate / split (minimum 5% of samples analysed), and rinsate blank water samples prepared and analysed Acceptable RPD for duplicate and split sample comparison Acceptable concentrations in rinsate blank water sample(s) Check of laboratory quality control methods and results

17.0 CONTINGENCY PLAN

In some circumstances, remediation works can be unpredictable. The following table presents anticipated possible problems or events and the corresponding corrective actions to be implemented:

Incident / Event	Corrective Action
If the proposed stripping / excavation / segregation, stockpiling and reassessment and/or excavation and disposal of contaminated soils fails to remove all contaminants	Stripping / excavation / segregation, stockpiling and reassessment and/or excavation and disposal will continue until all contaminants are removed and the site assessment criteria is met
Spillage/leakage of oil, hydraulic fluid, or other fuels from the excavator and/or trucks	For major spill; place sandbags down slope, cover area in sand, excavate impacted sand and soils and dispose of at an appropriate licensed landfill facility. For minor spill; cover area in sand, excavate impacted sand and soils and dispose at an appropriately licensed landfill facility. Stop spillage/leakage where apparent. In the event of a major spill or leak, the OEH / EPA will be contacted, in keeping with the Protection of the Environment Operations Act.
Failure of sediment control measures	Replace or repair failed control measure. Determine reason for failure and ensure no repeat. Clean up any materials penetrating the safeguard and return to either the stockpile or excavation (origin).
Excessive dust generation	Cease activities until more appropriate dust control measures can be implemented. Cover all areas generating dust with plastic sheeting. Improve water control (i.e. sprays) where appropriate. Assess measures being implemented.
Discovery of asbestos cement pieces / fragments in areas other than Areas 5 to 7 during remediation	Cease all activities at the location Environmental Consultant to assess and direct action.
Discovery of unexpected contamination and suspect materials that are not identified from the previous assessments	Cease all activities at the location Environmental Consultant to assess and direct action.
Excessive noise	Identify source and add or amend noise attenuation equipment.

18.0 CONCLUSIONS, RECOMMENDATIONS AND REPORT / ASSESSMENT LIMITATIONS

Based on this and the previous assessments, virtually all laboratory test results satisfied the criteria for stating that the analytes selected are either not present, or present in the sampled soils at concentrations that do not pose a risk of hazard to human health or the environment, under the conditions for the proposed residential subdivision development. However, the results of the sampling and testing indicated isolated locations / areas (refer to Drawings 12486/1-AA3R1 and 12486/2-AA7) of soil contamination, with the identified contaminants being Cu, Ni, Zn and asbestos. Remediation is therefore deemed necessary, as detailed in Section 13.0 of the report.

This RAP has been prepared to provide guidance to contractors cleaning up the contaminated areas (Areas 1 to 7) identified on Drawing 12486/2-AA7. The purpose of remediation is to ensure the suitability of the site for the proposed residential subdivision development.

Based on the advantages, disadvantages and risks of each of the remediation options, it is our opinion that the following remediation options are considered appropriate for the site, as detailed in Section 13.4 of the report:

Areas 1 to 4	Stripping, Stockpiling and Reassessment
Area 5	Excavation, Segregation, Stockpiling & Retesting of Segregated Soil
Area 6	Landfill Disposal
Area 7	Hand-picking and Landfill Disposal

For landfill disposal purposes, the asbestos cement pieces in Areas 5 to 7, as well as asbestos contaminated soil in Area 6 were classified as "Asbestos Waste".

If landfill disposal of unsuccessfully remediated soils in Areas 1 to 5 is required, the Cu, Ni and Zn contaminated soil in Area 5 was classified as "General Solid Waste (Non-putrescible)".

The proposed remediation works are considered Category 2 (subject to approval by Penrith City Council).

The Site Management Plan, Occupational Health & Safety Plan, Site Validation and Contingency Plan, outlined in Sections 14.0, 15.0, 16.0 and 17.0 of the report, should be implemented to ensure:

- Remediation works are carried out in accordance with the relevant environmental statutory requirements.
- Good environmental practices are adopted.
- Minimal environmental degradation.
- Minimal impact of works on areas outside the site and on the community.
- Corrective actions are performed in a timely manner.

The following additional works should be implemented prior to remediation works, site preparation and earthworks;

1. A contractor appropriately licensed by WorkCover must carry out demolition of features / structures containing asbestos. The asbestos-cement must be disposed of at an appropriately licensed landfill facility. Validation / certification by a qualified consultant / occupational hygienist should be carried out after removal of any asbestos materials.
2. Assessment of soil beneath the site features. The purpose of this is to ascertain the presence of "suspect" materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos, ash particles, etc.) and fill.

   Additional soil sampling and testing might be required (at feature locations not already part of a remediation area) to ascertain the requirement for remediation. Reference may be made to Drawing 12486/1-AA1 for details of soils beneath site features requiring assessment.
3. Assessment of the dam water prior to de-watering, to determine the contamination status of the water and recommend de-watering method.

4. On completion of de-watering, the sediment should be excavated from the dams and stockpiled on site for contamination assessment and determination of suitability for retention on-site.
5. Assessment of the dam walls to determine the contamination status and suitability for retention on-site.

The results of the above additional works may trigger a supplementary report to this RAP.

After complete disposal of the contaminated soil, all the disposal dockets / transaction records shall be provided to Geotechnique for inclusion in a final validation report.

On completion of validation (refer to Section 16.0), a report will be prepared by Geotechnique to recommend the suitability of the site for the proposed residential subdivision development.

Within the scope of works outlined in the fee proposal dated 6 September 2011 (Reference DS.JX.pb/Q12486-2AA), the services performed by Geotechnique in preparing this RAP were conducted in a manner consistent with the level of quality and skill generally exercised by members of the profession and consulting practice.

This report is for the use of Orchard Homes via LivLand Property Pty Ltd, for the purpose stated within. Penrith City Council and any relevant authorities for development and building application assessment processes can also rely upon this report. Any reliance on this report by third parties shall be at such parties' sole risk, as the report might not contain sufficient information for the purposes of other parties or for other uses. This report shall only be presented in full and may not be used to support any other objective than those set out in the report, except where written approval is provided by Geotechnique.

The information in this report is considered accurate at the date of the field sampling (13 September 2011) for carrying out DCA and preparation of RAP, in accordance with the current conditions of the site. Any variations to the site form or use beyond this date may nullify the conclusions stated.

No contamination assessment can eliminate all risk; even a rigorous professional assessment might not detect all contamination within a site.

Presented in Appendix D is a document entitled "Environmental Notes", which should be read in conjunction with this report.

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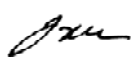

LIST OF REFERENCES

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Australian Standard "Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 2: Volatile substances" (AS4482.2-1999)

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Contaminated Sites: Sampling Design Guidelines - NSW Environment Protection Authority 1995

Environmental Planning and Assessment Act - 1979

Geology of Penrith 1:100,000 Sheet (9030) – Geological Survey of New South Wales, Department of Minerals and Energy 1991

Guidelines for Consultants Reporting on Contaminated Sites" – NSW Environment Protection Authority 1997

Guidelines for the Laboratory Analysis of Contaminated Soils - Australian and New Zealand Environment and Conservation Council (ANZECC) 1996

Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land – Department of Urban Affairs and Planning / NSW Environment Protection Authority 1998

National Environment Protection (Assessment of Site Contamination) Measures – National Environmental Protection Council 1999

Protection of the Environment Operations Act – 1997

Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation – 2008

Protection of the Environment Operations (General) Regulation – 1998

Protection of the Environment Operations (Waste) Regulation – 2005

Soil Landscape of Penrith 1:100,000 Sheet (9030) – Soil Conservation Service Survey of NSW 1989

Waste Avoidance and Resource Recovery Act 2001

Waste Classification Guidelines Part 1: Classifying Waste – 2008

WorkCover Occupational Health & Safety Regulation 2001 (OH & S Regulation 2001)

Working with Asbestos: Guide WorkCover 2008

DRAWINGS

Drawing 12486/1-AA3R1	*Locations of Contamination*
Drawing 12486/1-AA1	*Site Features*
Drawing 12486/1-AA2R1	*Test Pit Locations*
Drawing 12486/2-AA1	*Detailed Test Pit Locations around TP10*
Drawing 12486/2-AA2	*Detailed Test Pit Locations around TP11*
Drawing 12486/2-AA3	*Detailed Test Pit Locations around TP14*
Drawing 12486/2-AA4	*Detailed Test Pit Locations around TP19*
Drawing 12486/2-AA5	*Detailed Test Pit Locations around TP22, TP26 & TP27*
Drawing 12486/2-AA6	*Detailed Test Pit Locations around A1*
Drawing 12486/2-AA7	*Areas to Be Remediated*

Sample Location	Depth (m)	Contaminant	Concentration (mg/kg)
TP10	0-0.1	zinc (Zn)	**420**
TP11	0.15-0.3	nickel (Ni)	**79**
	0.3-0.6	Ni	**88**
TP14	0-0.15	Ni	**77**
TP19	0-0.1	Ni	**63**
TP22	0-0.1	Zn	**360**
TP26	0-0.3	Zn	**230**
	0.5-0.8	Zn	**280**
	1.0-1.3	copper (Cu), Zn	**240, 460**
	1.5-1.8	Cu, Zn	**120, 740**
	2.0-2.3	Zn	**240**
	2.5-2.8	Zn	**420**
TP27	0-0.1	Ni	**70**
A1	-	Asbestos-cement pieces	**-**
A1	0-0.1	Asbestos	-
Assessment Criteria (mg/kg)		Cu = **100** (PPBIL) & **1000** (HIL "A") Ni = **60** (PPBIL) & **600** (HIL "A") Zn = **200** (PPBIL) & **7000** (HIL "A")	

Notes: PPBIL = Provisional Phytotoxity-Based Investigation Level

HIL "A" = Health Investigation Level for Residential with gardens and accesible soil

LEGEND

- Site Boundary
- Test Pit
- Area with scattered fibro/asbestos-cement pieces on ground surface

0 15 30 45 60 75m

Scale 1:1500

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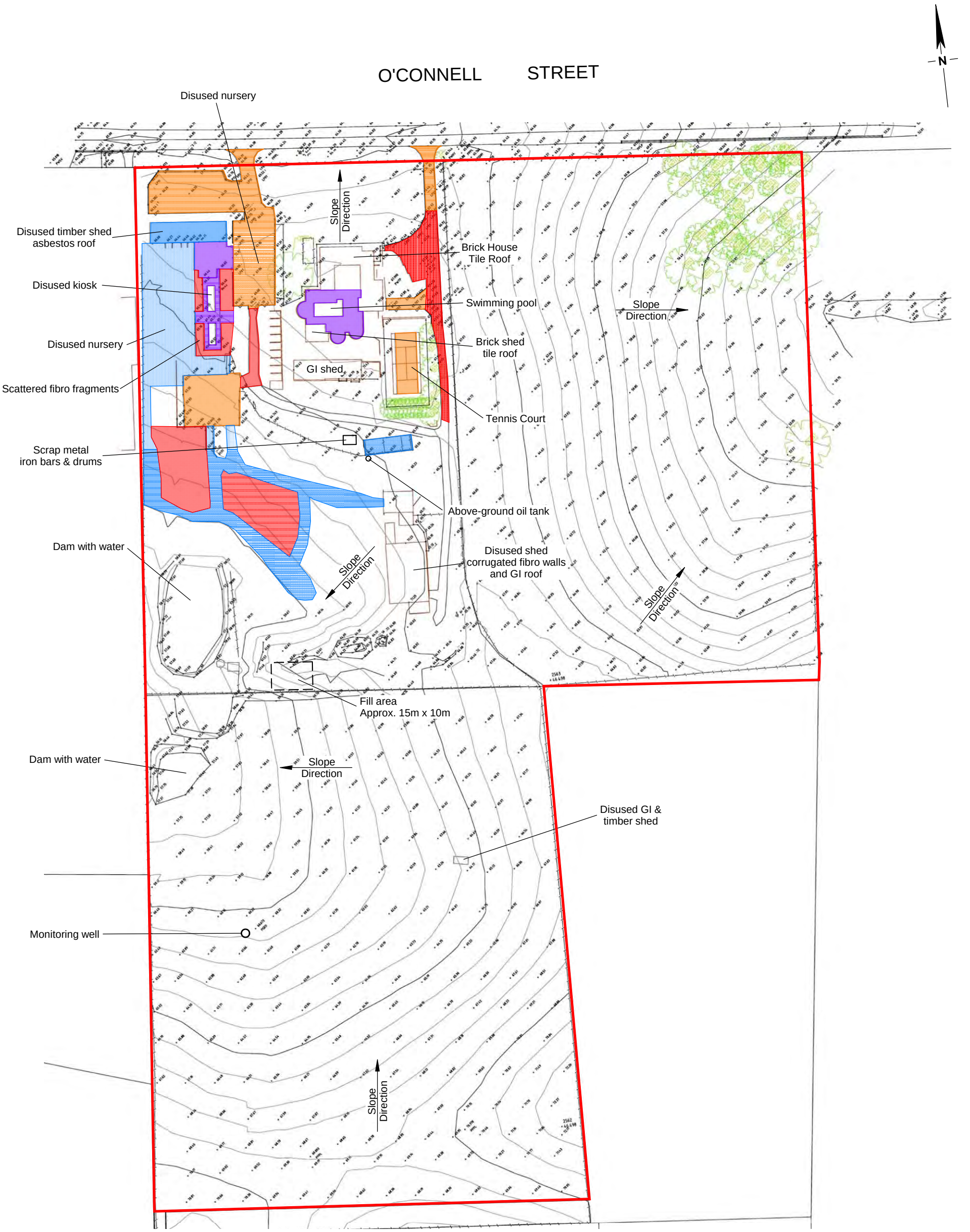
Part Lot 101 in DP 564332
O'Connell Street, Kingswood

Locations and Area of Contamination

Drawing No: 12486/1-AA3R1
Job No: 12486/1
Drawn By: MH
Date: 6 October 2011
Checked By: DS/JX

File Ref: Drawing 12486-1
Layers: 0, AA3R1



LEGEND

- Site Boundary
- Asphalt
- Concrete
- Paving
- Gravel

0 15 30 45 60 75m

Scale 1:1500

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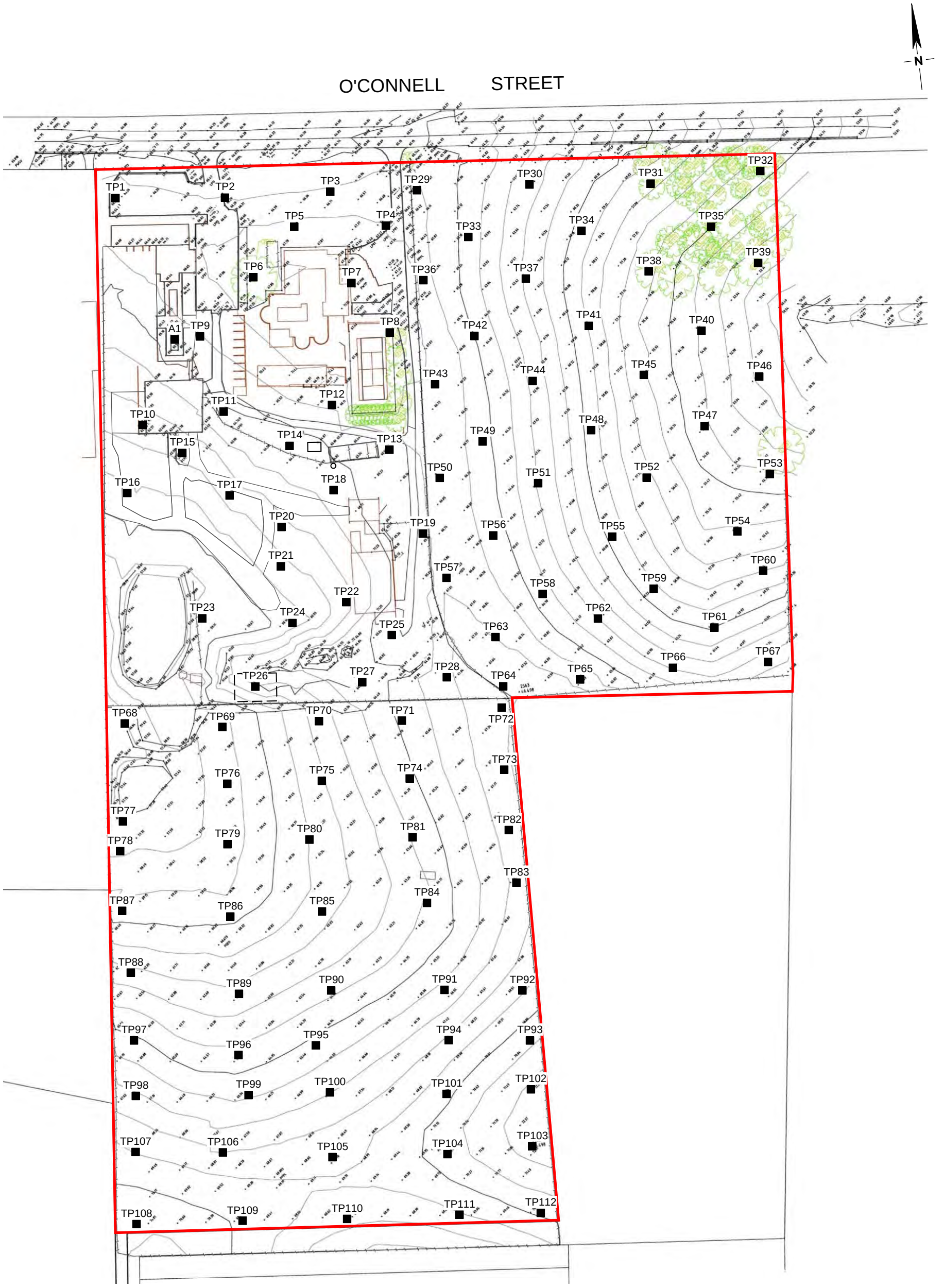
O'Connell Street, Kingswood

Site Features

Drawing No: 12486/1-AA1
Job No: 12486/1
Drawn By: MH
Date: 28 June 2011
Checked By: DS/JX

File Ref: Drawing 12486-1
Layers: 0, AA1



LEGEND

Site Boundary

Test Pit

0 15 30 45 60 75m

Scale 1:1500

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Livland Property Pty Ltd
Lots 11 & 12 in DP522660 and
Part Lot 101 in DP 564332
O'Connell Street, Kingswood

Test Pit Locations

Drawing No: 12486/1-AA2R1
Job No: 12486/1
Drawn By: MH
Date: 26 October 2011
Checked By: DS/JX

File Ref: Drawing 12486-1
Layers: 0, AA2R1

LEGEND

■ Test Pit

Sample Location	Depth (m)	ZINC (mg/kg)
Surface Samples		
TP10	0-0.1	**420**
TP10-1	0-0.1	**730**
TP10-2	0-0.1	110
TP10-3	0-0.1	**230**
TP10-4	0-0.1	**230**
TP10-5	0-0.1	130
TP10-6	0-0.1	150
TP10-7	0-0.1	180
TP10-8	0-0.1	**210**
TP10-9	0-0.1	110
TP10-10	0-0.1	130
Deeper Sample		
TP10-a	0.1-0.2	70
Limit Of Reporting (LOR)		0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (1999)		
Health Investigation Level [a] (HIL 'A')		7000
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)		
Provisional Phytotoxity-Based Investigation Level		200

a: Residential with garden/accessible soil including children's day-care centres kindergartens, preschools & primary schools

N

0 5 10 15 20 25m

Scale 1:500

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Livland Property Pty Ltd
Lots 11 & 12 in DP522660 and
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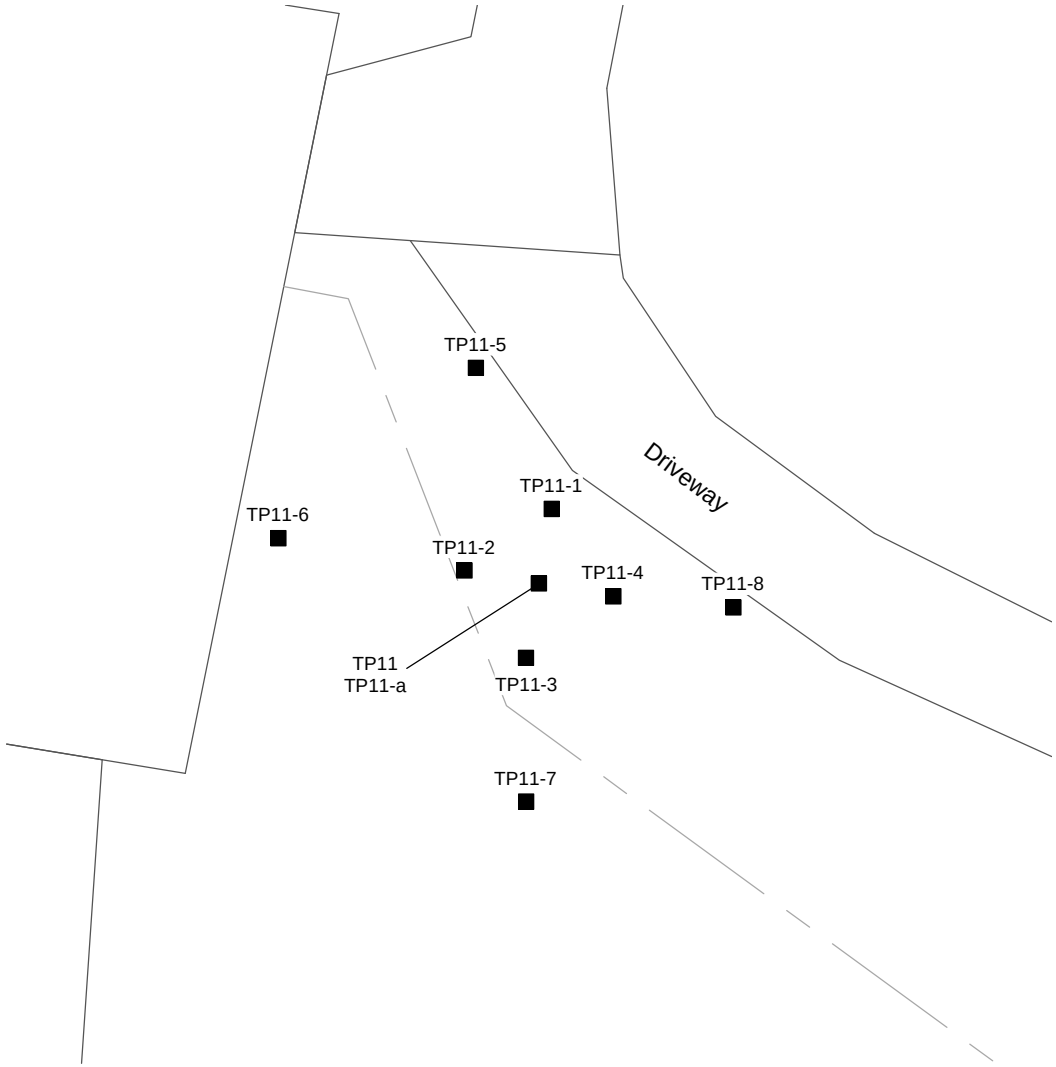
O'Connell Street, Kingswood

Detailed Test Pit Locations around TP10

Drawing No: 12486/2-AA1
Job No: 12486/2
Drawn By: MH
Date: 6 October 2011
Checked By: JX

File No: 12486-2
Layers: 0, AA1



Sample Location	Depth (m)	NICKEL (mg/kg)
Fill Samples		
TP11	0.15-0.3	**79**
TP11	0.3-0.6	**88**
TP11-1	0.1-0.3	**79**
TP11-1	0.3-0.6	**92**
TP11-2	0-0.3	**72**
TP11-2	0.4-0.6	**64**
TP11-3	0-0.3	**76**
TP11-3	0.4-0.6	25
TP11-4	0.15-0.3	**82**
TP11-4	0.3-0.6	37
TP11-5	0-0.2	**64**
TP11-6	0-0.3	16
TP11-7	0-0.3	23
TP11-8	0-0.3	**92**
Natural Soil Sample		
TP11-a	0.75-0.85	20
Limit Of Reporting (LOR)		0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (1999)		
Health Investigation Level [a] (HIL 'A')		600
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)		
Provisional Phytotoxity-Based Investigation Level		60

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N

LEGEND

Test Pit

0 3 6 9 12 15m

Scale 1:300

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Livland Property Pty Ltd
Lots 11 & 12 in DP522660 and
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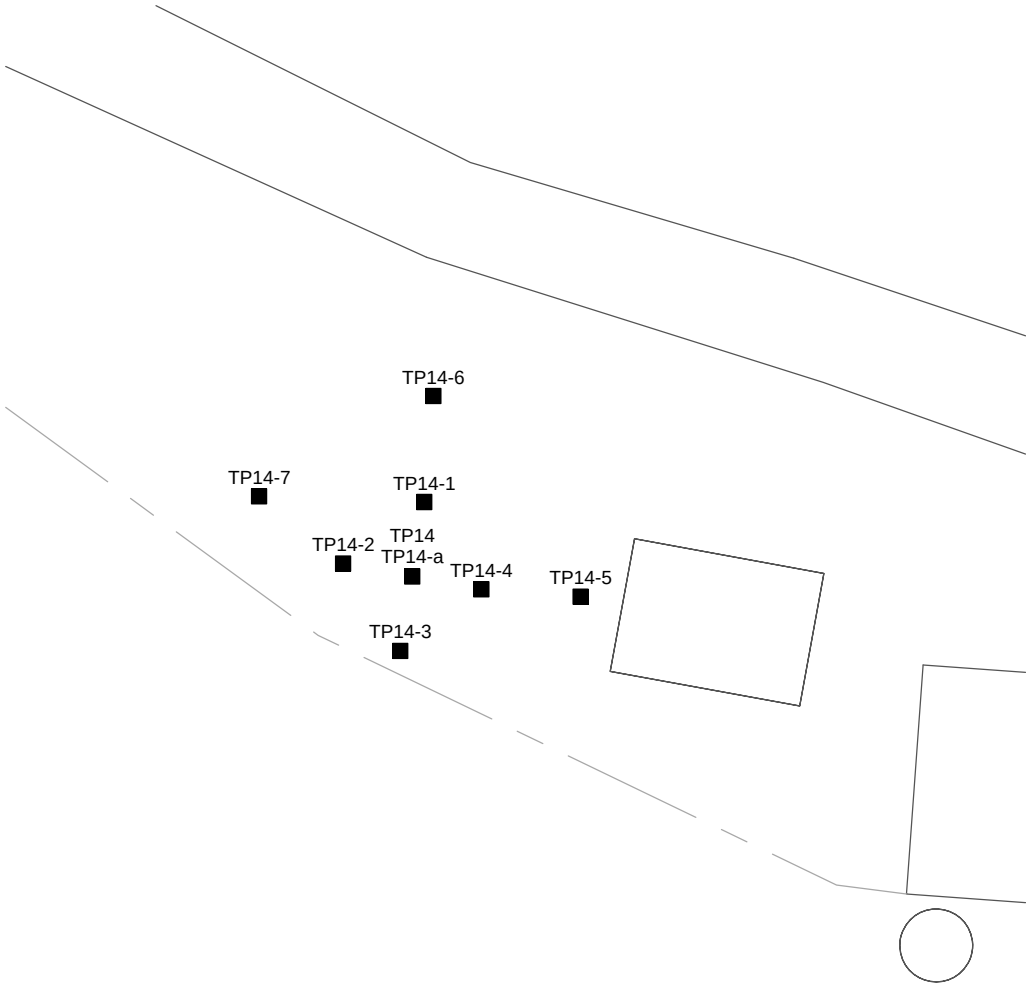
O'Connell Street, Kingswood

Detailed Test Pit Locations around TP11

Drawing No: 12486/2-AA2
Job No: 12486/2
Drawn By: MH
Date: 6 October 2011
Checked By: JX

File No: 12486-2
Layers: 0, AA2



Analyte / Sample Location	Depth (m)	NICKEL (mg/kg)
Surface Samples		
TP14	0-0.15	**77**
TP14-1	0-0.2	**83**
TP14-2	0-0.15	**77**
TP14-3	0-0.15	**80**
TP14-4	0-0.15	48
TP14-5	0-0.2	45
TP14-6	0-0.3	25
TP14-7	0-0.2	**76**
Deeper Sample		
TP14-a	0.2-0.3	24
Limit Of Reporting (LOR)		0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (1999)		
Health Investigation Level [a] (HIL 'A')		600
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)		
Provisional Phytotoxity-Based Investigation Level		60

a: Residential with garden/accessible soil including children's day-care centres kindergartens, preschools & primary schools

N

LEGEND

■ Test Pit

0 2 4 6 8 10m

Scale 1:200

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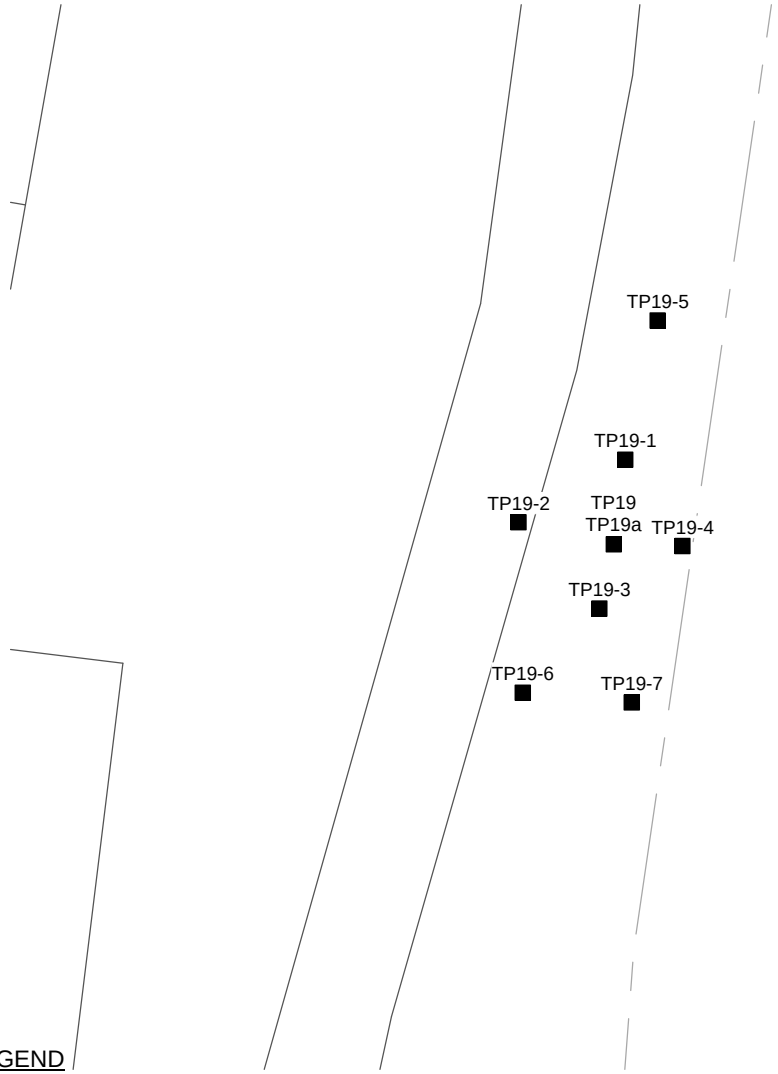
Livland Property Pty Ltd
Lots 11 & 12 in DP522660 and
Part Lot 101 in DP564332
O'Connell Street, Kingswood

Detailed Test Pit Locations around TP14

Drawing No: 12486/2-AA3
Job No: 12486/2
Drawn By: MH
Date: 6 October 2011
Checked By: JX

File No: 12486-2
Layers: 0, AA3



LEGEND

■ Test Pit

Sample Location	Depth (m)	NICKEL (mg/kg)
Surface Samples		
TP19	0-0.1	**63**
TP19-1	0-0.1	53
TP19-2	0-0.1	42
TP19-3	0-0.1	60
TP19-4	0-0.1	36
TP19-5	0-0.2	49
TP19-6	0-0.2	**68**
TP19-7	0-0.2	**86**
Deeper Sample		
TP19-a	0.15-0.25	34
Limit Of Reporting (LOR)		0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (1999)		
Health Investigation Level [a] (HIL 'A')		600
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)		
Provisional Phytotoxity-Based Investigation Level		60

a: Residential with garden/accessible soil including children's day-care centres kindergartens, preschools & primary schools

N

0 2 4 6 8 10m

Scale 1:200

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Livland Property Pty Ltd
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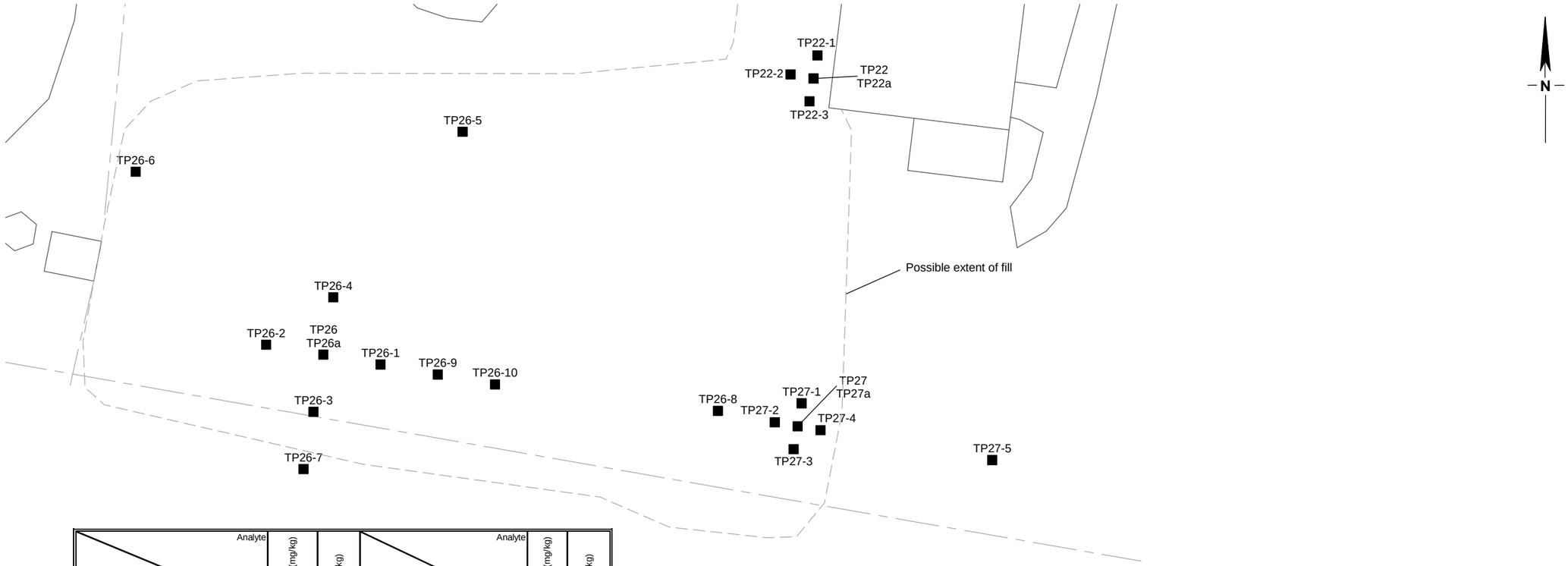
Part Lot 101 in DP564332
O'Connell Street, Kingswood

Detailed Test Pit Locations around TP19

Drawing No: 12486/2-AA4
Job No: 12486/2
Drawn By: MH
Date: 6 October 2011
Checked By: JX

File No: 12486-2
Layers: 0, AA4



Sample Location	Depth (m)	ZINC (mg/kg)
Surface Samples		
TP22	0-0.1	**360**
TP22-1	0-0.1	**390**
TP22-2	0-0.1	170
TP22-3	0-0.1	**610**
Deeper Sample		
TP22	0.1-0.4	79
Limit Of Reporting (LOR)		0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (1999)		
Health Investigation Level [a] (HIL 'A')		7000
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)		
Provisional Phytotoxity-Based Investigation Level		200

a: Residential with garden/accessible soil including children's day-care centres kindergartens, preschools & primary schools

Sample Location	Depth (m)	COPPER (mg/kg)	ZINC (mg/kg)
Fill Samples			
TP26	0-0.3	-	**230**
TP26	0.5-0.8	-	**280**
TP26	1.0-1.3	**240**	**460**
TP26	1.5-1.8	**120**	**740**
TP26	2.0-2.3	-	**240**
TP26	2.5-2.8	-	**420**
TP26-1	0-0.3	54	200
TP26-1	0.5-0.8	19	62
TP26-1	1.0-1.3	13	17
TP26-2	0-0.3	56	120
TP26-2	0.5-0.8	38	38
TP26-2	1.0-1.3	42	**460**
TP26-2	1.5-1.8	-	**880**
TP26-2	2.0-2.3	32	90
TP26-3	0-0.3	35	100
TP26-3	1.0-1.3	32	170
TP26-4	0-0.3	53	120
TP26-4	0.5-0.8	49	90
TP26-4	1.0-1.3	**180**	**1200**
Limits Of Reporting (LOR)		0.5	0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (1999)			
Health Investigation Levels [a] (HIL 'A')		1000	7000
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)			
Provisional Phytotoxity-Based Investigation Levels		100	200

Sample Location	Depth (m)	COPPER (mg/kg)	ZINC (mg/kg)
Fill Samples			
TP26-4	1.5-1.8	39	**370**
TP26-5	0-0.3	21	63
TP26-5	0.5-0.8	40	40
TP26-5	1.0-1.3	29	55
TP26-6	0-0.3	12	34
TP26-7	0-0.15	22	99
TP26-8	0-0.1	55	81
TP26-9	0-0.3	54	150
TP26-9	0.3-0.6	36	56
TP26-9	1.2-1.5	31	63
TP26-9	2.2-2.5	28	130
TP26-10	0-0.3	34	61
TP26-10	1.0-1.3	29	**740**
TP26-10	1.5-1.8	-	**720**
TP26-10	2.0-2.3	66	**1200**
Natural Soil Sample			
TP26-10	2.45-2.55	30	63
		0.5	0.5
		1000	7000
		100	200

a: Residential with garden/accessible soil including children's day-care centres kindergartens, preschools & primary schools

Sample Location	Depth (m)	NICKEL (mg/kg)
Surface Samples		
TP27	0-0.1	**70**
TP27-1	0-0.15	38
TP27-2	0-0.1	**61**
TP27-2	0.1-0.4	24
TP27-3	0-0.3	27
TP27-4	0-0.1	47
TP27-5	0-0.1	46
TP26-8	0-0.1	**67**
Deeper Sample		
TP27-a	0.15-0.25	15
TP27-2	0.1-0.4	24
TP27-2	0.6-0.9	20
Limit Of Reporting (LOR)		0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (1999)		
Health Investigation Level [a] (HIL 'A')		600
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)		
Provisional Phytotoxity-Based Investigation Level		60

a: Residential with garden/accessible soil including children's day-care centres kindergartens, preschools & primary schools

Sample Location	Depth (m)	Result
Fibro-cement Piece		
TP22-1	0.1-0.4	**Amosite & Chrysotile Asbestos Detected**
TP26-1	0-0.3	**Amosite, Chrysotile & Crocidolite Asbestos Detected**
TP26-1	1.5-1.8	No Asbestos Detected
TP26-4	1.5-1.8	**Amosite & Chrysotile Asbestos Detected**
TP26-10	1.5-1.8	**Amosite, Chrysotile & Crocidolite Asbestos Detected**
TP27-2	0.1-0.4	**Amosite & Chrysotile Asbestos Detected**
TP27-3	0-0.3	**Amosite & Chrysotile Asbestos Detected**
Soil Sample		
TP22-1	0.1-0.4	No Asbestos Detected
TP26-1	0-0.3	No Asbestos Detected
TP26-4	1.5-1.8	No Asbestos Detected
TP26-10	1.5-1.8	No Asbestos Detected
TP27-2	0.1-0.4	No Asbestos Detected
TP27-3	0-0.3	No Asbestos Detected

LEGEND

■ Test Pit

0 4 8 12 16 20m

Scale 1:400

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2. Site features are shown at approximate locations and are not to scale.

Livland Property Pty Ltd
Lots 11 & 12 in DP522660 and
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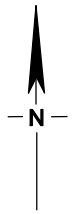
O'Connell Street, Kingswood

Detailed Test Pit Locations around TP22, TP26 & TP27

Drawing No: 12486/2-AA5
Job No: 12486/2
Drawn By: MH
Date: 6 October 2011
Checked By: JX

File Ref: 12486-2-A3L
Layers: 0, AA5



Sample Location	Depth (m)	Result (Analyte)
Fibro-cement Piece		
A1	-	**Chrysotile Asbestos Detected**
Soil Sample		
A1	0-0.1	**Chrysotile Asbestos Detected**
A1-1	0-0.1	No Asbestos Detected
A1-2	0-0.1	**Chrysotile Asbestos Detected**
A1-3	0-0.1	No Asbestos Detected
A1-4	0-0.1	No Asbestos Detected
A1-5	0-0.1	**Chrysotile Asbestos Detected**
A1-6	0-0.1	No Asbestos Detected

LEGEND

■ Test Pit

0 2 4 6 8 10m

Scale 1:200

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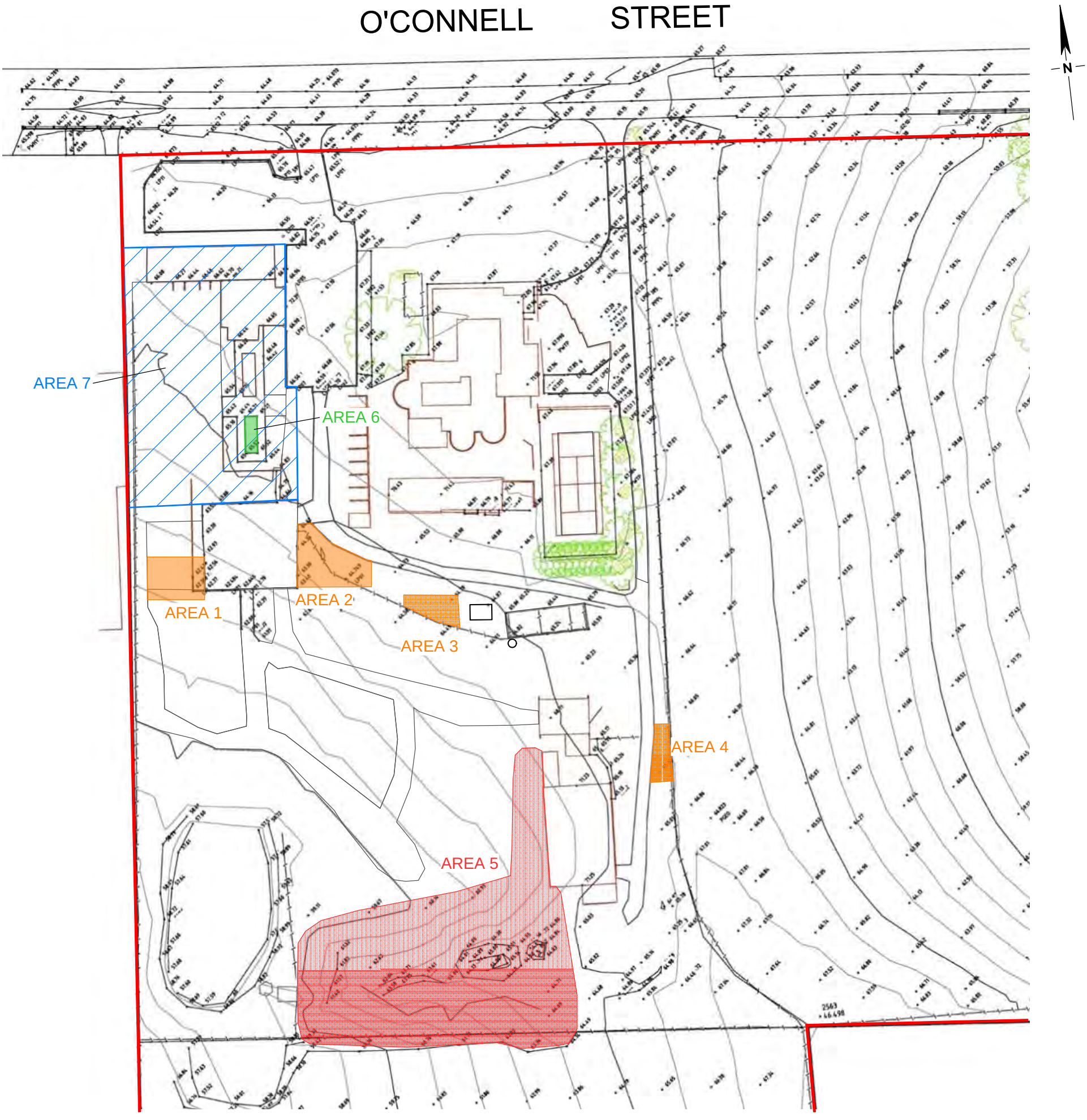
Livland Property Pty Ltd
Lots 11 & 12 in DP522660 and
Part Lot 101 in DP564332
O'Connell Street, Kingswood

Detailed Test Pit Locations around A1

Drawing No: 12486/2-AA6
Job No: 12486/2
Drawn By: MH
Date: 6 October 2011
Checked By: JX

File No: 12486-2
Layers: 0, AA6



AREA	MATERIAL	ESTIMATED AREA (sq. m)	ESTIMATED DEPTH	ESTIMATED VOLUME (cu. m)	CONTAMINANT	REMEDIATION METHOD
1	Fill (Silty Gravel)	140	100mm	14	Zinc (Zn)	Stripping, Stockpiling and Reassessment
2	Fill (Gravelly Silt & Silty Gravel)	190	700mm	133	Nickel (Ni)	Stripping, Stockpiling and Reassessment
3	Fill (Gravelly Silt)	70	300mm	21	Ni	Stripping, Stockpiling and Reassessment
4	Topsoil (Silty Clay) & Fill (Gravelly Silt & Silty Sand)	60	200mm	12	Ni	Stripping, Stockpiling and Reassessment
5	Topsoil (Silty Clay) & Fill (Gravelly Sand, Sandy Silty Clay, Silty Clay, Gravelly Silt & Silty Gravel)	2500	ranging from 100mm to 2.8m	3800	Copper (Cu), Ni, Zn and bonded asbestos-cement pieces	Excavation, Segregation # & Stockpiling of segregated soil
6	Topsoil (Silty Clay)	25	100mm	2.5	Asbestos-cement pieces & fibre	Landfill Disposal as "Asbestos Waste"
7	-	2400	-	-	Bonded asbestos-cement pieces	Hand-pick and Landfill Disposal as "Asbestos Waste"

Note: # scrap metals, bonded asbestos-cement pieces, brick and/or concrete

LEGEND

Site Boundary

Test Pit

0 10 20 30 40 50m

Scale 1:1000

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Livland Property Pty Ltd
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Part Lot 101 in DP 564332
O'Connell Street, Kingswood

Areas to be Remediated

Drawing No: 12486/2-AA7
Job No: 12486/2
Drawn By: MH
Date: 6 October 2011
Checked By: DS/JX

File Ref: 12486-2-A3P
Layers: 0, AA7

TABLES

TABLE A
RINSATE SAMPLES
(Ref No: 12486/2-AA)

ANALYTE	RINSATE SAMPLE (mg/L)	CLEAN DISTILLED WATER (mg/L)
	R1	
METALS	**09.09.2011**	
Copper	<0.01	<0.01
Zinc	<0.01	<0.010
	R2	
METALS	**13.09.2011**	
Nickel	<0.01	0.011
Zinc	<0.01	<0.010

TABLE B
DUPLICATE SAMPLES
(Ref No: 12486/2-AA)

ANALYTE	ORIGINAL SAMPLE mg/kg	DUPLICATE SAMPLE mg/kg	RELATIVE PERCENTAGE DIFFERENCE %
	TP26-2 0-0.3m	**D1**	
Copper	56	51	9
Zinc	120	200	50
	TP10-5 0-0.1m	**D2**	
Zinc	130	140	7
	TP11-6 0-0.3m	**D3**	
Nickel	16	27	51
	TP14-1 0-0.2m	**D4**	
Nickel	83	60	32

TABLE C
SPLIT SAMPLES
(Ref No: 12486/2-AA)

ANALYTE	ORIGINAL SAMPLE mg/kg (SGS)	SPLIT SAMPLE mg/kg (Envirolab)	RELATIVE PERCENTAGE DIFFERENCE %
	TP26-3 0-0.3m	**S1**	
Copper	35	29	19
Zinc	100	76	27
	TP10-6 0-0.1m	**S2**	
Zinc	150	87	53
	TP11-7 0-0.3m	**S3**	
Nickel	23	26	12
	TP14-2 0-0.15m	**S4**	
Nickel	77	77	0

APPENDIX A

TABLE 1
SAMPLE DESCRIPTIONS

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA1**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP10-1	0.0-0.1	0.0-0.1	13/09/2011	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-2	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-3	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-4	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-a	0.0-0.1	No Sample (NS)	"	-	FILL: Silty Gravel, fine to coarse grained, yellow-brown	
	0.1-0.2	0.1-0.2	"	-	FILL; Gravelly Silty Clay, low plasticity, dark grey	
TP10-5	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-6	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-7	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-8	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-9	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-10	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-11	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-12	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-13	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-14	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

GEOTECHNIQUE PTY LTD

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA1**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP10-15	0.0-0.1	0.0-0.1	13/09/2011	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-16	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-17	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP10-18	0.0-0.1	0.0-0.1	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA2**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP11-1	0.0-0.1	0.0-0.1	13/09/2011	-	FILL; Silty Sand, fine to medium grained, pale brown	
	0.1-0.3	0.1-0.3			FILL; Gravelly Silt, grey	
	0.3-0.6	0.3-0.6			FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP11-2	0.0-0.4	0.0-0.3	"	-	FILL; Gravelly Silt, grey	
	0.4-0.6	0.4-0.6			FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP11-3	0.0-0.4	0.0-0.3	"	-	FILL; Gravelly Silt, grey	
	0.4-0.6	0.4-0.6			FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP11-4	0.0-0.15	0.0-0.15	"	-	FILL; Silty Sand, fine to medium grained, pale brown	
	0.15-0.3	0.15-0.3			FILL; Gravelly Silt, grey	
	0.3-0.6	0.3-0.6			FILL; Silty Gravel, fine to coarse grained, yellow-brown	
TP11-5	0.0-0.2	0.0-0.2	"	-	FILL; Gravelly Silt, grey	
	0.2-0.7	NS			(CI-CH) Silty CLAY, medium to high plasticity, brown	
TP11-6	0.0-0.5	0.0-0.3	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
	0.5-0.9	0.5-0.8			FILL; Silty Sand, fine to medium grained, pale brown, with brick and concrete fragments	
	0.9-1.4	NS			(CI-CH) Silty CLAY, medium to high plasticity, brown	
TP11-7	0.0-0.3	0.0-0.3	"	-	FILL; Silty Gravel, fine to coarse grained, yellow-brown	
	0.3-0.8	NS			(CI-CH) Silty CLAY, medium to high plasticity, brown	
TP11-8	0.0-0.4	0.0-0.3	"	-	FILL; Silty Sand, fine to medium grained, pale brown	
	0.4-0.9	NS			(CI-CH) Silty CLAY, medium to high plasticity, brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA2**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP11-a	0.0 – 0.15	0.0 – 0.15	13/09/2011	-	FILL: Silty Sand, fine to medium grained, pale brown	
	0.15 – 0.3	0.15 – 0.3			FILL: Gravelly Silt, grey	
	0.3 – 0.7	0.3 – 0.6			FILL: Silty Gravel, fine to coarse grained, yellow-brown	
	0.75-0.85	0.75-0.85			(CI) Silty CLAY, medium plasticity, red-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA3**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP14-1	0.0-0.2	0.0-0.2	13/09/2011	-	FILL; Gravelly Silt, grey	
	0.2-0.5	0.2-0.5			FILL; Silty Sand, fine to medium grained, pale brown	
	0.5-1.0	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP14-2	0.0-0.15	0.0-0.15	"	-	FILL; Gravelly Silt, grey	
	0.15-0.3	0.15-0.3			FILL; Silty Sand, fine to medium grained, pale brown	
	0.3-0.8	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP14-3	0.0-0.15	0.0-0.15	"	-	FILL; Gravelly Silt, grey	
	0.15-0.5	0.15-0.45			FILL; Silty Sand, fine to medium grained, yellow-brown, with crushed sandstones	
	0.5-1.0	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP14-4	0.0-0.15	0.0-0.15	"	-	FILL; Gravelly Silt, grey	
	0.15-0.3	0.15-0.3			FILL; Silty Sand, fine to medium grained, yellow-brown, with crushed sandstones	
	0.3-0.8	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP14-5	0.0-0.2	0.0-0.2	"	-	FILL; Gravelly Silt, grey	
	0.2-0.7	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP14-6	0.0-0.4	0.0-0.3	"	-	FILL; Silty Sand, fine to medium grained, pale brown	
	0.4-0.9	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP14-7	0.0-0.2	0.0-0.2	"	-	FILL; Silty Sand, fine to medium grained, pale brown	
	0.2-0.6	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP14-a	0.0 – 0.15	NS	"	-	FILL; Gravelly Silt, grey	
	0.15-0.3	0.2-0.3			(CL) Silty CLAY, low plasticity, orange-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA4**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP19-1	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
	0.1-0.5	NS			(CL) Silty CLAY, low plasticity, orange-brown	
TP19-2	0.0-0.1	0.0-0.1	"	-	FILL; Gravelly Silt, grey	
	0.1-0.2	0.1-0.2			FILL; Coal Ash, grey	
	0.2-0.5	NS			(CL) Silty CLAY, low plasticity, orange-brown	
TP19-3	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
	0.1-0.3	NS			(CL) Silty CLAY, low plasticity, orange-brown	
TP19-4	0.0-0.5	0.0-0.1	"	-	(CL) Silty CLAY, low plasticity, orange-brown	
TP19-5	0.0-0.2	0.0-0.2	"	-	FILL; Silty Sand, fine to medium grained, pale brown	
	0.2-0.3	0.2-0.3			FILL; Gravelly Silt, grey	
	0.3-0.5	NS			(CL) Silty CLAY, low plasticity, orange-brown	
TP19-6	0.0-0.2	0.0-0.2	"	-	FILL; Silty Sand, fine to medium grained, pale brown	
	0.2-0.4	NS			(CL) Silty CLAY, low plasticity, orange-brown	
TP19-7	0.0-0.2	0.0-0.2	"	-	FILL; Gravelly Silt, grey, trace of charcoal	
	0.2-0.4	NS			(CL) Silty CLAY, low plasticity, orange-brown	
TP19-a	0.0-0.1	NS	"	-	TOPSOIL: Silty Clay, low to medium plasticity, brown with root fibres	
	0.1-0.25	0.15-0.25			(CL) Silty CLAY, low plasticity, orange-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA5**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP22-1	0.0-0.1	0.0-0.1	13/09/2011	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
	0.1-1.0	0.1-0.4			FILL; Silty Clay, medium plasticity, orange-brown, trace of gravel, brick and concrete fragments	Possible ASBP noted
	1.0-1.2	NS			(CL) Silty CLAY, low plasticity, orange-brown	
TP22-2	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
	0.1-1.4	NS			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
	1.4-1.6	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP22-3	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
	0.1-0.5	NS			FILL; Silty Clay, medium plasticity, orange-brown, trace of gravel, brick and concrete fragments	
	0.5-0.7	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP22-a	0.0 – 0.1	NS	"	-	TOPSOIL: Silty Clay, low to medium plasticity, brown with root fibres	
	0.1 – 1.3	NS			FILL: Silty Clay, medium plasticity, orange-brown	
	1.3-1.45	1.35-1.45			(CL) Silty CLAY, low plasticity, orange-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA5**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP26-1	0.0-0.5	0.0-0.3	09/09/2011	-	FILL; Gravelly Sand, fine to coarse grained, dark brown, trace of roots, ash and scrap metal	Possible ASBP noted
	0.5-1.0	0.5-0.8			FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
	1.0-2.0	1.0-1.3			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
		1.5-1.8			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	Possible ASBP noted
	2.0-				Refusal at 2.0m on concrete boulder	
TP26-2	0.0-0.5	0.0-0.3	"	-	FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
	0.5-1.0	0.5-0.8			FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
	1.0-2.0	1.0-1.3			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
		1.5-1.8			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
	2.0-2.3	2.0-2.3			FILL; Gravelly Sand, fine to coarse grained, dark brown, trace of roots, ash and scrap metal	
	2.3-				Refusal at 2.3m on concrete boulder	
TP26-3	0.0-1.5	0.0-0.3	"	-	FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
		0.5-0.8			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
		1.0-1.3			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
	1.5-				Refusal at 1.5m on concrete boulder	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA5**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP26-4	0.0-0.3	0.0-0.3	09/09/2011	-	FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
	0.3-1.0	0.5-0.8			FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
	1.0-2.1	1.0-1.3			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
		1.5-1.8			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	Possible ASBP noted
	2.1-2.3	2.15-2.25			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP26-5	0.0-0.5	0.0-0.3	"	-	FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
	0.5-1.0	0.5-0.8			FILL; Silty Clay, medium plasticity, orange-brown, trace of gravel, brick and concrete fragments	
	1.0-1.5	1.0-1.3			FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
	1.5-2.0	1.55-1.65			(CH) Silty CLAY, high plasticity, orange-brown	
TP26-6	0.0-0.5	0.0-0.3	"	-	FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
	0.5-1.0	0.55-0.65			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP26-7	0.0-0.2	0.0-0.15	"	-	(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP26-8	0.0-0.1	0.0-0.1	"	-	FILL; Gravelly Sand, fine to coarse grained, dark grey	
	0.1-0.6	0.15-0.25			(CH) Silty CLAY, high plasticity, orange-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA5**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP26-9	0.0-0.3	0.0-0.3	09/09/2011	-	FILL; Gravelly Sand, fine to coarse grained, dark brown, trace of roots, ash and scrap metal	
	0.3-1.2	0.3-0.6			FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
		0.8-1.1			FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
	1.2-2.2	1.2-1.5			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
		1.7-2.0			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
	2.2-2.6	2.2-2.5			FILL; Gravelly Sand, fine to coarse grained, dark brown, trace of roots, ash and scrap metal	
	2.6-				Refusal at 2.6m on concrete boulder	
TP26-10	0.0-1.0	0.0-0.3	"	-	FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
		0.5-0.8			FILL; Silty Clay, high plasticity, orange, grey, trace of gravel	
	1.0-2.0	1.0-1.3			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
		1.5-1.8			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	Possible ASBP noted
	2.0-2.4	2.0-2.3			FILL; Gravelly Sand, fine to coarse grained, dark brown, trace of roots, ash and scrap metal	
	2.4-3.0	2.45-2.55			(CI-CH) Silty CLAY, medium to high plasticity, red-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA5**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
TP27-1	0.0-0.1	0.0-0.1	13/09/2011	-	FILL; Gravelly Silt, grey	
	0.1-0.7	NS			FILL; Silty Clay, medium plasticity, orange-brown, trace of gravel, brick and concrete fragments	
	0.7-0.9	NS			(CH) Silty CLAY, high plasticity, orange-brown	
TP27-2	0.0-0.1	0.0-0.1	"	-	FILL; Gravelly Silt, grey	
	0.1-0.9	0.1-0.4			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	Possible ASBP noted
		0.6-0.9			FILL; Sandy Silty Clay, pale brown, with brick and concrete fragments, trace of scrap metal	
TP27-3	0.0-0.4	0.0-0.3	"	-	FILL; Silty Clay, medium plasticity, orange-brown, trace of gravel, brick and concrete fragments	Possible ASBP noted
	0.4-0.6	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP27-4	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
	0.1-0.3	NS			FILL; Silty Clay, medium plasticity, orange-brown, trace of gravel, brick and concrete fragments	
	0.3-0.5	NS			(CI-CH) Silty CLAY, medium to high plasticity, orange-brown	
TP27-5	0.0-0.2	0.0-0.2	"	-	FILL; Gravelly Silt, grey	
	0.2-0.5	NS			(CH) Silty CLAY, high plasticity, orange-brown	
TP27-a	0.0 – 0.1	NS	"	-	FILL: Silty Gravel, fine to coarse grained, yellow-brown	
	0.1-0.6	0.15-0.25			(CL) Silty CLAY, low plasticity, orange-brown	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

Project	**Proposed Residential Subdivision Development**	**Job No**	**12486/2**
Location	**Lots 11 & 12 in DP52260 Part Lot 101 in DP515678**	**Refer to Drawing No**	**12486/2-AA6**
	O'Connell Street & Caddens Road, Orchard Hills (Kingswood)	**Logged & Sampled by**	**AN**

TABLE 1

Test Pit	Depth (m)	Sample Depth (m)	Date	Time	Material Description	Remarks*
A1-1	0.0-0.1	0.0-0.1	13/09/2011	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
A1-2	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
A1-3	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
A1-4	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
A1-5	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	
A1-6	0.0-0.1	0.0-0.1	"	-	TOPSOIL; Silty Clay, low to medium plasticity, brown, with root fibres and gravel	

*Odour (O), Discolouration (D), Petroleum Hydrocarbon Staining (PHS), Asbestos Pieces (ASBP), Ash Material (ASHM), Demolition Waste (DW), Groundwater (GW), Perched Water (PW) PID reading etc.

APPENDIX B

SGS ANALYTICAL REPORTS
AND
ENVIROLAB CERTIFICATE OF ANALYSIS

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	John Xu	Manager	Huong Crawford
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Project	**12486-2 - Kingswood**	SGS Reference	SE101847 R0
Order Number	(Not specified)	Report Number	0000007839
Samples	77	Date Reported	22 Sep 2011
		Date Received	14 Sep 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Inorganics Metals Team Leader

Huong Crawford
Laboratory Manager

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847.001 Soil 13 Sep 2011 TP10-1 0-0.1	SE101847.002 Soil 13 Sep 2011 TP10-2 0-0.1	SE101847.003 Soil 13 Sep 2011 TP10-3 0-0.1	SE101847.004 Soil 13 Sep 2011 TP10-4 0-0.1	SE101847.005 Soil 13 Sep 2011 TP10-5 0-0.1
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320								
Copper, Cu	mg/kg	0.5		-	-	-	-	-
Nickel, Ni	mg/kg	0.5		-	-	-	-	-
Zinc, Zn	mg/kg	0.5		**730**	**110**	**230**	**230**	**130**
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321								
Copper, Cu	mg/L	0.01		-	-	-	-	-
Nickel, Ni	mg/L	0.01		-	-	-	-	-
Zinc, Zn	mg/L	0.01		-	-	-	-	-
Moisture Content Method: AN234								
% Moisture	%	0.5		**19**	**11**	**11**	**11**	**11**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847.006 Soil 13 Sep 2011 TP10-6 0-0.1	SE101847.007 Soil 13 Sep 2011 TP10-a 0.1-0.2	SE101847.008 Soil 13 Sep 2011 TP11-1 0.1-0.3	SE101847.009 Soil 13 Sep 2011 TP11-1 0.3-0.6	SE101847.010 Soil 13 Sep 2011 TP11-2 0-0.3
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320								
Copper, Cu	mg/kg	0.5		-	-	-	-	-
Nickel, Ni	mg/kg	0.5		-	-	**79**	**92**	**72**
Zinc, Zn	mg/kg	0.5		**150**	**70**	-	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321								
Copper, Cu	mg/L	0.01		-	-	-	-	-
Nickel, Ni	mg/L	0.01		-	-	-	-	-
Zinc, Zn	mg/L	0.01		-	-	-	-	-
Moisture Content Method: AN234								
% Moisture	%	0.5		**6.8**	**18**	**8.2**	**7.8**	**6.0**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847.011 Soil 13 Sep 2011 TP11-2 0.4-0.6	SE101847.012 Soil 13 Sep 2011 TP11-3 0-0.3	SE101847.013 Soil 13 Sep 2011 TP11-3 0.4-0.6	SE101847.014 Soil 13 Sep 2011 TP11-4 0.15-0.3	SE101847.015 Soil 13 Sep 2011 TP11-4 0.3-0.6
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320								
Copper, Cu	mg/kg	0.5		-	-	-	-	-
Nickel, Ni	mg/kg	0.5		**64**	**76**	**25**	**82**	**37**
Zinc, Zn	mg/kg	0.5		-	-	-	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321								
Copper, Cu	mg/L	0.01		-	-	-	-	-
Nickel, Ni	mg/L	0.01		-	-	-	-	-
Zinc, Zn	mg/L	0.01		-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.011 Soil 13 Sep 2011 TP11-2 0.4-0.6	SE101847.012 Soil 13 Sep 2011 TP11-3 0-0.3	SE101847.013 Soil 13 Sep 2011 TP11-3 0.4-0.6	SE101847.014 Soil 13 Sep 2011 TP11-4 0.15-0.3	SE101847.015 Soil 13 Sep 2011 TP11-4 0.3-0.6
Moisture Content Method: AN234							
% Moisture	%	0.5	**8.8**	**8.1**	**11**	**7.4**	**13**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.016 Soil 13 Sep 2011 TP11-5 0-0.2	SE101847.017 Soil 13 Sep 2011 TP11-6 0-0.3	SE101847.018 Soil 13 Sep 2011 TP11-7 0-0.3	SE101847.019 Soil 13 Sep 2011 TP11-8 0-0.3	SE101847.020 Soil 13 Sep 2011 TP11-a 0.75-0.85
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	-	-	-	-	-
Nickel, Ni	mg/kg	0.5	**64**	**16**	**23**	**92**	**20**
Zinc, Zn	mg/kg	0.5	-	-	-	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	**7.1**	**12**	**8.2**	**8.3**	**16**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.021 Soil 13 Sep 2011 TP14-1 0-0.2	SE101847.022 Soil 13 Sep 2011 TP14-2 0-0.15	SE101847.023 Soil 13 Sep 2011 TP14-3 0-0.15	SE101847.024 Soil 13 Sep 2011 TP14-4 0-0.15	SE101847.025 Soil 13 Sep 2011 TP14-5 0-0.2
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	-	-	-	-	-
Nickel, Ni	mg/kg	0.5	**83**	**77**	**80**	**48**	**45**
Zinc, Zn	mg/kg	0.5	-	-	-	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	**9.6**	**16**	**11**	**12**	**9.5**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.026 Soil 13 Sep 2011 TP14-6 0-0.3	SE101847.027 Soil 13 Sep 2011 TP14-7 0-0.2	SE101847.028 Soil 13 Sep 2011 TP14-a 0.2-0.3	SE101847.029 Soil 13 Sep 2011 TP19-1 0-0.1	SE101847.030 Soil 13 Sep 2011 TP19-2 0-0.1
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	-	-	-	-	-
Nickel, Ni	mg/kg	0.5	**25**	**76**	**24**	**53**	**42**
Zinc, Zn	mg/kg	0.5	-	-	-	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	**8.6**	**9.1**	**22**	**17**	**5.8**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.031 Soil 13 Sep 2011 TP19-3 0-0.1	SE101847.032 Soil 13 Sep 2011 TP19-4 0-0.1	SE101847.033 Soil 13 Sep 2011 TP19-5 0-0.2	SE101847.034 Soil 13 Sep 2011 TP19-6 0-0.2	SE101847.035 Soil 13 Sep 2011 TP19-7 0-0.2
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	-	-	-	-	-
Nickel, Ni	mg/kg	0.5	**60**	**36**	**49**	**68**	**86**
Zinc, Zn	mg/kg	0.5	-	-	-	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	**20**	**16**	**4.8**	**9.1**	**5.7**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.036 Soil 13 Sep 2011 TP19-a 0.15-0.25	SE101847.037 Soil 13 Sep 2011 TP22-1 0-0.1	SE101847.038 Soil 13 Sep 2011 TP22-2 0-0.1	SE101847.039 Soil 13 Sep 2011 TP22-3 0-0.1	SE101847.040 Soil 09 Sep 2011 TP26-1 0-0.3
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	-	-	-	-	**54**
Nickel, Ni	mg/kg	0.5	**34**	-	-	-	-
Zinc, Zn	mg/kg	0.5	-	**390**	**170**	**610**	**200**
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847.036 Soil 13 Sep 2011 TP19-a 0.15-0.25	SE101847.037 Soil 13 Sep 2011 TP22-1 0-0.1	SE101847.038 Soil 13 Sep 2011 TP22-2 0-0.1	SE101847.039 Soil 13 Sep 2011 TP22-3 0-0.1	SE101847.040 Soil 09 Sep 2011 TP26-1 0-0.3
Moisture Content Method: AN234								
% Moisture	%	0.5		21	16	11	17	17

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847.041 Soil 09 Sep 2011 TP26-1 0.5-0.8	SE101847.042 Soil 09 Sep 2011 TP26-1 1.0-1.3	SE101847.043 Soil 09 Sep 2011 TP26-2 0-0.3	SE101847.044 Soil 09 Sep 2011 TP26-2 0.5-0.8	SE101847.045 Soil 09 Sep 2011 TP26-2 1.0-1.3
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320								
Copper, Cu	mg/kg	0.5		19	13	56	38	42
Nickel, Ni	mg/kg	0.5		-	-	-	-	-
Zinc, Zn	mg/kg	0.5		62	17	120	38	460
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321								
Copper, Cu	mg/L	0.01		-	-	-	-	-
Nickel, Ni	mg/L	0.01		-	-	-	-	-
Zinc, Zn	mg/L	0.01		-	-	-	-	-
Moisture Content Method: AN234								
% Moisture	%	0.5		11	13	18	18	16

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847.046 Soil 09 Sep 2011 TP26-2 2.0-2.3	SE101847.047 Soil 09 Sep 2011 TP26-3 0-0.3	SE101847.048 Soil 09 Sep 2011 TP26-3 1.0-1.3	SE101847.049 Soil 09 Sep 2011 TP26-4 0-0.3	SE101847.050 Soil 09 Sep 2011 TP26-4 0.5-0.8
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320								
Copper, Cu	mg/kg	0.5		32	35	32	53	49
Nickel, Ni	mg/kg	0.5		-	-	-	-	-
Zinc, Zn	mg/kg	0.5		90	100	170	120	90
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321								
Copper, Cu	mg/L	0.01		-	-	-	-	-
Nickel, Ni	mg/L	0.01		-	-	-	-	-
Zinc, Zn	mg/L	0.01		-	-	-	-	-
Moisture Content Method: AN234								
% Moisture	%	0.5		19	10	9.1	14	19

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.051 Soil 09 Sep 2011 TP26-4 1.0-1.3	SE101847.052 Soil 09 Sep 2011 TP26-5 0-0.3	SE101847.053 Soil 09 Sep 2011 TP26-5 0.5-0.8	SE101847.054 Soil 09 Sep 2011 TP26-5 1.0-1.3	SE101847.055 Soil 09 Sep 2011 TP26-6 0-0.3
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	180	21	40	29	12
Nickel, Ni	mg/kg	0.5	-	-	-	-	-
Zinc, Zn	mg/kg	0.5	1200	63	40	55	34
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	13	11	5.0	11	12

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.056 Soil 09 Sep 2011 TP26-7 0-0.15	SE101847.057 Soil 09 Sep 2011 TP26-8 0-0.1	SE101847.058 Soil 09 Sep 2011 TP26-9 0-0.3	SE101847.059 Soil 09 Sep 2011 TP26-9 0.3-0.6	SE101847.060 Soil 09 Sep 2011 TP26-9 1.2-1.5
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	22	55	54	36	31
Nickel, Ni	mg/kg	0.5	-	67	-	-	-
Zinc, Zn	mg/kg	0.5	99	81	150	56	63
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	21	11	26	16	10

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.061 Soil 09 Sep 2011 TP26-9 2.2-2.5	SE101847.062 Soil 09 Sep 2011 TP26-10 0-0.3	SE101847.063 Soil 09 Sep 2011 TP26-10 1.0-1.3	SE101847.064 Soil 09 Sep 2011 TP26-10 2.0-2.3	SE101847.065 Soil 13 Sep 2011 TP27-1 0-0.15
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	28	34	29	66	-
Nickel, Ni	mg/kg	0.5	-	-	-	-	38
Zinc, Zn	mg/kg	0.5	130	61	740	1200	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.061 Soil 09 Sep 2011 TP26-9 2.2-2.5	SE101847.062 Soil 09 Sep 2011 TP26-10 0-0.3	SE101847.063 Soil 09 Sep 2011 TP26-10 1.0-1.3	SE101847.064 Soil 09 Sep 2011 TP26-10 2.0-2.3	SE101847.065 Soil 13 Sep 2011 TP27-1 0-0.15
Moisture Content Method: AN234							
% Moisture	%	0.5	**16**	**17**	**14**	**18**	**9.1**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.066 Soil 13 Sep 2011 TP27-2 0-0.1	SE101847.067 Soil 13 Sep 2011 TP27-2 0.6-0.9	SE101847.068 Soil 13 Sep 2011 TP27-3 0-0.3	SE101847.069 Soil 13 Sep 2011 TP27-4 0-0.1	SE101847.070 Soil 13 Sep 2011 TP27-5 0-0.1
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	-	-	-	-	-
Nickel, Ni	mg/kg	0.5	**61**	**20**	**27**	**47**	**46**
Zinc, Zn	mg/kg	0.5	-	-	-	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	**13**	**15**	**17**	**13**	**13**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.071 Soil 13 Sep 2011 TP27-a 0.15-0.25	SE101847.072 Soil 09 Sep 2011 Duplicate D1	SE101847.073 Soil 13 Sep 2011 Duplicate D2	SE101847.074 Soil 13 Sep 2011 Duplicate D3	SE101847.075 Soil 13 Sep 2011 Duplicate D4
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Copper, Cu	mg/kg	0.5	-	**51**	-	-	-
Nickel, Ni	mg/kg	0.5	**15**	-	-	**27**	**60**
Zinc, Zn	mg/kg	0.5	-	**200**	**140**	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321							
Copper, Cu	mg/L	0.01	-	-	-	-	-
Nickel, Ni	mg/L	0.01	-	-	-	-	-
Zinc, Zn	mg/L	0.01	-	-	-	-	-
Moisture Content Method: AN234							
% Moisture	%	0.5	**13**	**17**	**15**	**7.6**	**13**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE101847.076 Water 09 Sep 2011 Rinsate R1	SE101847.077 Water 13 Sep 2011 Rinsate R2
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320				
Copper, Cu	mg/kg	0.5	-	-
Nickel, Ni	mg/kg	0.5	-	-
Zinc, Zn	mg/kg	0.5	-	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321				
Copper, Cu	mg/L	0.01	<0.01	<0.01
Nickel, Ni	mg/L	0.01	<0.010	<0.010
Zinc, Zn	mg/L	0.01	<0.01	<0.01
Moisture Content Method: AN234				
% Moisture	%	0.5	-	-

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Copper, Cu	LB005536	mg/kg	0.5	<0.5	0 - 9%	103 - 105%	62 - 184%
Nickel, Ni	LB005536	mg/kg	0.5	<0.5	7 - 11%	104 - 106%	61%
Zinc, Zn	LB005536	mg/kg	0.5	<0.5	1 - 3%	105 - 106%	-222 - 66%

Metals in Water (Dissolved) by ICPOES **Method: ME-(AU)-[ENV]AN320/AN321**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Copper, Cu	LB005539	mg/L	0.01	<0.01	103%
Nickel, Ni	LB005539	mg/L	0.01	<0.010	101%
Zinc, Zn	LB005539	mg/L	0.01	<0.01	102%

Moisture Content **Method: ME-(AU)-[ENV]AN234**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB005361	%	0.5	0 - 6%
	LB005362	%	0.5	8 - 9%
	LB005363	%	0.5	3%
	LB005364	%	0.5	1%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

STATEMENT OF QA/QC PERFORMANCE AGAINST DATA QUALITY OBJECTIVES

SE101847 R0

CLIENT DETAILS

Contact	John Xu
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Project	**12486-2 - Kingswood**
Order Number	(Not specified)
Samples	77

LABORATORY DETAILS

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SGS Reference	SE101847 R0
Report Number	0000007840
Date Reported	22 Sep 2011

COMMENTS

All the laboratory data for each environmental matrix was compared to the SGS Environmental Services' stated data quality objectives (DQO).
Comments arising from the comparison were made and are reported below.
The data relating to sampling was taken from the chain of custody document and was supplied by the client.
This QA/QC statement must be read in conjunction with the referenced analytical report.
The statement and the analytical report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

MS	Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY)	6 Items

SAMPLE SUMMARY

Sample counts by matrix	75 Soils, 2 Waters	Type of documentation received	Email
Date documentation received	15/9/11@11:04	Samples received in good order	Yes
Samples received without headspace	n/a	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE101847 R0

HOLDING TIMES

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field sampling guide for containers and holding time” (Ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

The extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and Analysis dates are shown in **Green** when within suggested criteria and in **Bold** with an appended dagger symbol and Red† when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY)		Method: ME-(AU)-[ENV]AN040/AN320						
TP10-1 0-0.1	SE101847.001	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP10-2 0-0.1	SE101847.002	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP10-3 0-0.1	SE101847.003	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP10-4 0-0.1	SE101847.004	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP10-5 0-0.1	SE101847.005	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP10-6 0-0.1	SE101847.006	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP10-a 0.1-0.2	SE101847.007	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-1 0.1-0.3	SE101847.008	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-1 0.3-0.6	SE101847.009	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-2 0-0.3	SE101847.010	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-2 0.4-0.6	SE101847.011	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-3 0-0.3	SE101847.012	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-3 0.4-0.6	SE101847.013	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-4 0.15-0.3	SE101847.014	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-4 0.3-0.6	SE101847.015	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-5 0-0.2	SE101847.016	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-6 0-0.3	SE101847.017	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-7 0-0.3	SE101847.018	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-8 0-0.3	SE101847.019	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP11-a 0.75-0.85	SE101847.020	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-1 0-0.2	SE101847.021	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-2 0-0.15	SE101847.022	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-3 0-0.15	SE101847.023	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-4 0-0.15	SE101847.024	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-5 0-0.2	SE101847.025	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-6 0-0.3	SE101847.026	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-7 0-0.2	SE101847.027	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP14-a 0.2-0.3	SE101847.028	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-1 0-0.1	SE101847.029	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-2 0-0.1	SE101847.030	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-3 0-0.1	SE101847.031	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-4 0-0.1	SE101847.032	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-5 0-0.2	SE101847.033	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-6 0-0.2	SE101847.034	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-7 0-0.2	SE101847.035	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP19-a 0.15-0.25	SE101847.036	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP22-1 0-0.1	SE101847.037	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP22-2 0-0.1	SE101847.038	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP22-3 0-0.1	SE101847.039	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP26-1 0-0.3	SE101847.040	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-1 0.5-0.8	SE101847.041	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-1 1.0-1.3	SE101847.042	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-2 0-0.3	SE101847.043	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-2 0.5-0.8	SE101847.044	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-2 1.0-1.3	SE101847.045	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-2 2.0-2.3	SE101847.046	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-3 0-0.3	SE101847.047	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-3 1.0-1.3	SE101847.048	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-4 0-0.3	SE101847.049	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-4 0.5-0.8	SE101847.050	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011

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Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP26-4 1.0-1.3	SE101847.051	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-5 0-0.3	SE101847.052	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-5 0.5-0.8	SE101847.053	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-5 1.0-1.3	SE101847.054	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-6 0-0.3	SE101847.055	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-7 0-0.15	SE101847.056	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-8 0-0.1	SE101847.057	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-9 0-0.3	SE101847.058	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-9 0.3-0.6	SE101847.059	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-9 1.2-1.5	SE101847.060	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-9 2.2-2.5	SE101847.061	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-10 0-0.3	SE101847.062	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-10 1.0-1.3	SE101847.063	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP26-10 2.0-2.3	SE101847.064	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
TP27-1 0-0.15	SE101847.065	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP27-2 0-0.1	SE101847.066	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP27-2 0.6-0.9	SE101847.067	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP27-3 0-0.3	SE101847.068	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP27-4 0-0.1	SE101847.069	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP27-5 0-0.1	SE101847.070	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
TP27-a 0.15-0.25	SE101847.071	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
Duplicate D1	SE101847.072	LB005536	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
Duplicate D2	SE101847.073	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
Duplicate D3	SE101847.074	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
Duplicate D4	SE101847.075	LB005536	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011

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Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Metals in Water (Dissolved) by ICPOES Method: ME-(AU)-[ENV]AN320/AN321								
Rinsate R1	SE101847.076	LB005539	09 Sep 2011	14 Sep 2011	07 Mar 2012	21 Sep 2011	07 Mar 2012	22 Sep 2011
Rinsate R2	SE101847.077	LB005539	13 Sep 2011	14 Sep 2011	11 Mar 2012	21 Sep 2011	11 Mar 2012	22 Sep 2011
Moisture Content Method: ME-(AU)-[ENV]AN234								
TP10-1 0-0.1	SE101847.001	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP10-2 0-0.1	SE101847.002	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP10-3 0-0.1	SE101847.003	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP10-4 0-0.1	SE101847.004	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP10-5 0-0.1	SE101847.005	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP10-6 0-0.1	SE101847.006	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP10-a 0.1-0.2	SE101847.007	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-1 0.1-0.3	SE101847.008	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-1 0.3-0.6	SE101847.009	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-2 0-0.3	SE101847.010	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-2 0.4-0.6	SE101847.011	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-3 0-0.3	SE101847.012	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-3 0.4-0.6	SE101847.013	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-4 0.15-0.3	SE101847.014	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-4 0.3-0.6	SE101847.015	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-5 0-0.2	SE101847.016	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-6 0-0.3	SE101847.017	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-7 0-0.3	SE101847.018	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-8 0-0.3	SE101847.019	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP11-a 0.75-0.85	SE101847.020	LB005361	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-1 0-0.2	SE101847.021	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-2 0-0.15	SE101847.022	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-3 0-0.15	SE101847.023	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-4 0-0.15	SE101847.024	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-5 0-0.2	SE101847.025	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-6 0-0.3	SE101847.026	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-7 0-0.2	SE101847.027	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP14-a 0.2-0.3	SE101847.028	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-1 0-0.1	SE101847.029	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-2 0-0.1	SE101847.030	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-3 0-0.1	SE101847.031	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-4 0-0.1	SE101847.032	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-5 0-0.2	SE101847.033	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-6 0-0.2	SE101847.034	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-7 0-0.2	SE101847.035	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP19-a 0.15-0.25	SE101847.036	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP22-1 0-0.1	SE101847.037	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP22-2 0-0.1	SE101847.038	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP22-3 0-0.1	SE101847.039	LB005362	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-1 0-0.3	SE101847.040	LB005362	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-1 0.5-0.8	SE101847.041	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-1 1.0-1.3	SE101847.042	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-2 0-0.3	SE101847.043	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-2 0.5-0.8	SE101847.044	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-2 1.0-1.3	SE101847.045	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-2 2.0-2.3	SE101847.046	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-3 0-0.3	SE101847.047	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011

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Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP26-3 1.0-1.3	SE101847.048	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-4 0-0.3	SE101847.049	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-4 0.5-0.8	SE101847.050	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-4 1.0-1.3	SE101847.051	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-5 0-0.3	SE101847.052	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-5 0.5-0.8	SE101847.053	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-5 1.0-1.3	SE101847.054	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-6 0-0.3	SE101847.055	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-7 0-0.15	SE101847.056	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-8 0-0.1	SE101847.057	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-9 0-0.3	SE101847.058	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-9 0.3-0.6	SE101847.059	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-9 1.2-1.5	SE101847.060	LB005363	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-9 2.2-2.5	SE101847.061	LB005364	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-10 0-0.3	SE101847.062	LB005364	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-10 1.0-1.3	SE101847.063	LB005364	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP26-10 2.0-2.3	SE101847.064	LB005364	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP27-1 0-0.15	SE101847.065	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP27-2 0-0.1	SE101847.066	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP27-2 0.6-0.9	SE101847.067	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP27-3 0-0.3	SE101847.068	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP27-4 0-0.1	SE101847.069	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP27-5 0-0.1	SE101847.070	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
TP27-a 0.15-0.25	SE101847.071	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
Duplicate D1	SE101847.072	LB005364	09 Sep 2011	14 Sep 2011	23 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
Duplicate D2	SE101847.073	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
Duplicate D3	SE101847.074	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011
Duplicate D4	SE101847.075	LB005364	13 Sep 2011	14 Sep 2011	27 Sep 2011	19 Sep 2011	24 Sep 2011	20 Sep 2011

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, which is typically 2.5 times the statistically determined method detection limit (MDL).
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

Parameter	Units	Control LOR	BLK MB
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**			
LB005536.001			
Copper, Cu	mg/kg	0.5	<0.5
Nickel, Ni	mg/kg	0.5	<0.5
Zinc, Zn	mg/kg	0.5	<0.5
LB005536.025			
Copper, Cu	mg/kg	0.5	<0.5
Nickel, Ni	mg/kg	0.5	<0.5
Zinc, Zn	mg/kg	0.5	<0.5
LB005536.049			
Copper, Cu	mg/kg	0.5	<0.5
Nickel, Ni	mg/kg	0.5	<0.5
Zinc, Zn	mg/kg	0.5	<0.5
LB005536.073			
Copper, Cu	mg/kg	0.5	<0.5
Nickel, Ni	mg/kg	0.5	<0.5
Zinc, Zn	mg/kg	0.5	<0.5
Metals in Water (Dissolved) by ICPOES **Method: ME-(AU)-[ENV]AN320/AN321**			
LB005539.001			
Copper, Cu	mg/L	0.01	<0.01
Nickel, Ni	mg/L	0.01	<0.010
Zinc, Zn	mg/L	0.01	<0.01

Duplicates are calculated as relative percent difference (RPD) using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
Where the MaxAllowableDifference evaluates to a number larger than 200 it is displayed as 200.
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

	Sample Name		SE101847.010-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320						
LB005536.014						
Nickel, Ni	mg/kg	0.5	72	70	31	2
Moisture Content Method: ME-(AU)-[ENV]AN234						
LB005361.011						
% Moisture	%	0.5	6.0	6.0	38	0

	Sample Name		SE101847.020-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320						
LB005536.028						
Nickel, Ni	mg/kg	0.5	20	19	33	4
Moisture Content Method: ME-(AU)-[ENV]AN234						
LB005361.022						
% Moisture	%	0.5	16	15	33	6

	Sample Name		SE101847.030-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320						
LB005536.040						
Nickel, Ni	mg/kg	0.5	42	39	31	7
Moisture Content Method: ME-(AU)-[ENV]AN234						
LB005362.011						
% Moisture	%	0.5	5.8	5.4	39	9

	Sample Name		SE101847.040-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320						
LB005536.054						
Copper, Cu	mg/kg	0.5	54	51	31	5
Zinc, Zn	mg/kg	0.5	200	210	30	3
Moisture Content Method: ME-(AU)-[ENV]AN234						
LB005362.022						
% Moisture	%	0.5	17	16	33	8

Duplicates are calculated as relative percent difference (RPD) using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
Where the MaxAllowableDifference evaluates to a number larger than 200 it is displayed as 200.
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

	Sample Name		SE101847.050-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB005536.066						
Copper, Cu	mg/kg	0.5	49	49	31	0
Zinc, Zn	mg/kg	0.5	90	100	31	11
Moisture Content **Method: ME-(AU)-[ENV]AN234**						
LB005363.011						
% Moisture	%	0.5	19	18	33	3

	Sample Name		SE101847.060-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB005536.080						
Copper, Cu	mg/kg	0.5	31	28	32	9
Zinc, Zn	mg/kg	0.5	63	62	31	1
Moisture Content **Method: ME-(AU)-[ENV]AN234**						
LB005363.022						
% Moisture	%	0.5	10	11	35	3

	Sample Name		SE101847.070-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB005536.092						
Nickel, Ni	mg/kg	0.5	46	51	31	11
Moisture Content **Method: ME-(AU)-[ENV]AN234**						
LB005364.011						
% Moisture	%	0.5	13	13	34	1

	Sample Name		SE101847.075-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB005536.095						
Nickel, Ni	mg/kg	0.5	60	64	31	6

Duplicates are calculated as relative percent difference (RPD) using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
Where the MaxAllowableDifference evaluates to a number larger than 200 it is displayed as 200.
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Sample Name	SE101857.001-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Moisture Content Method: ME-(AU)-[ENV]AN234						
LB005364.018						
% Moisture	%	0.5	18	18	33	1

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022).
For more information refer to the footnotes in the concluding page of the report.
Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Control	LCS STD			
Parameter	Units	LOR	Result	Expected Result	Criteria %	Recovery %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB005536.002						
Copper, Cu	mg/kg	0.5	52	50	80 - 120	104
Nickel, Ni	mg/kg	0.5	53	50	80 - 120	105
Zinc, Zn	mg/kg	0.5	53	50	80 - 120	105
LB005536.026						
Copper, Cu	mg/kg	0.5	51	50	80 - 120	103
Nickel, Ni	mg/kg	0.5	52	50	80 - 120	104
Zinc, Zn	mg/kg	0.5	53	50	80 - 120	106
LB005536.050						
Copper, Cu	mg/kg	0.5	53	50	80 - 120	105
Nickel, Ni	mg/kg	0.5	53	50	80 - 120	106
Zinc, Zn	mg/kg	0.5	53	50	80 - 120	106
LB005536.074						
Copper, Cu	mg/kg	0.5	52	50	80 - 120	103
Nickel, Ni	mg/kg	0.5	52	50	80 - 120	104
Zinc, Zn	mg/kg	0.5	53	50	80 - 120	106
Metals in Water (Dissolved) by ICPOES **Method: ME-(AU)-[ENV]AN320/AN321**						
LB005539.002						
Copper, Cu	mg/L	0.01	2.1	2	80 - 120	103
Nickel, Ni	mg/L	0.01	2.0	2	80 - 120	101
Zinc, Zn	mg/L	0.01	2.0	2	80 - 120	102

Matrix spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of the report. Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Control	MS			
Parameter	Units	LOR	Result	Original Result	Spike Added	Recovery %
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB005536.004						
Zinc, Zn	mg/kg	0.5	620	730	50	**-222†**
Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).						
LB005536.030						
Nickel, Ni	mg/kg	0.5	110	77	50	**61†**
Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).						
LB005536.056						
Copper, Cu	mg/kg	0.5	150	56	50	**184†**
Zinc, Zn	mg/kg	0.5	150	120	50	**66†**
Recovery failed acceptance criteria due to matrix interference.						
Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).						
LB005536.082						
Copper, Cu	mg/kg	0.5	97	66	50	**62†**
Zinc, Zn	mg/kg	0.5	1000	1200	50	**-407†**
Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).						
Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).						

Matrix spike duplicates are calculated as relative percent difference using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The original result is the analyte concentration of the matrix spike and the replicate result is the analyte concentration of the matrix spike duplicate.
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Matrix Spike Duplicates were required for this job.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	NATA Accreditation does not cover this analysis.
^	Performed by outside laboratory.
LOR	Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
NA	The sample was not analysed for this analyte

Samples analysed as received.
Solid samples expressed on a dry weight basis.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

SAMPLE RECEIPT ADVICE

SE101847

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood**
Order Number	(Not specified)
Samples	77

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 14/9/2011
Report Due	Thu 22/9/2011
SGS Reference	**SE101847**

SUBMISSION DETAILS

This is to confirm that 77 samples were received on Wednesday 14/9/2011. Results are expected to be ready by Thursday 22/9/2011. Please quote SGS reference SE101847 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	75 Soils, 2 Waters	Type of documentation received	Email
Date documentation received	15/9/11@11:04	Samples received in good order	Yes
Samples received without headspace	n/a	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

37 Soils on hold

SAMPLE RECEIPT ADVICE

SE101847

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil by ICPOES from EPA 200.8 Digest	Moisture Content
001	TP10-1 0-0.1	1	1
002	TP10-2 0-0.1	1	1
003	TP10-3 0-0.1	1	1
004	TP10-4 0-0.1	1	1
005	TP10-5 0-0.1	1	1
006	TP10-6 0-0.1	1	1
007	TP10-a 0.1-0.2	1	1
008	TP11-1 0.1-0.3	1	1
009	TP11-1 0.3-0.6	1	1
010	TP11-2 0-0.3	1	1
011	TP11-2 0.4-0.6	1	1
012	TP11-3 0-0.3	1	1
013	TP11-3 0.4-0.6	1	1
014	TP11-4 0.15-0.3	1	1
015	TP11-4 0.3-0.6	1	1
016	TP11-5 0-0.2	1	1
017	TP11-6 0-0.3	1	1
018	TP11-7 0-0.3	1	1
019	TP11-8 0-0.3	1	1
020	TP11-a 0.75-0.85	1	1
021	TP14-1 0-0.2	1	1
022	TP14-2 0-0.15	1	1
023	TP14-3 0-0.15	1	1
024	TP14-4 0-0.15	1	1

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

SAMPLE RECEIPT ADVICE

SE101847

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil by ICPOES from EPA 200.8 Digest	Moisture Content
025	TP14-5 0-0.2	1	1
026	TP14-6 0-0.3	1	1
027	TP14-7 0-0.2	1	1
028	TP14-a 0.2-0.3	1	1
029	TP19-1 0-0.1	1	1
030	TP19-2 0-0.1	1	1
031	TP19-3 0-0.1	1	1
032	TP19-4 0-0.1	1	1
033	TP19-5 0-0.2	1	1
034	TP19-6 0-0.2	1	1
035	TP19-7 0-0.2	1	1
036	TP19-a 0.15-0.25	1	1
037	TP22-1 0-0.1	1	1
038	TP22-2 0-0.1	1	1
039	TP22-3 0-0.1	1	1
040	TP26-1 0-0.3	2	1
041	TP26-1 0.5-0.8	2	1
042	TP26-1 1.0-1.3	2	1
043	TP26-2 0-0.3	2	1
044	TP26-2 0.5-0.8	2	1
045	TP26-2 1.0-1.3	2	1
046	TP26-2 2.0-2.3	2	1
047	TP26-3 0-0.3	2	1
048	TP26-3 1.0-1.3	2	1

CONTINUED OVERLEAF

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SAMPLE RECEIPT ADVICE

SE101847

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil by ICPOES from EPA 200.8 Digest	Moisture Content
049	TP26-4 0-0.3	2	1
050	TP26-4 0.5-0.8	2	1
051	TP26-4 1.0-1.3	2	1
052	TP26-5 0-0.3	2	1
053	TP26-5 0.5-0.8	2	1
054	TP26-5 1.0-1.3	2	1
055	TP26-6 0-0.3	2	1
056	TP26-7 0-0.15	2	1
057	TP26-8 0-0.1	3	1
058	TP26-9 0-0.3	2	1
059	TP26-9 0.3-0.6	2	1
060	TP26-9 1.2-1.5	2	1
061	TP26-9 2.2-2.5	2	1
062	TP26-10 0-0.3	2	1
063	TP26-10 1.0-1.3	2	1
064	TP26-10 2.0-2.3	2	1
065	TP27-1 0-0.15	1	1
066	TP27-2 0-0.1	1	1
067	TP27-2 0.6-0.9	1	1
068	TP27-3 0-0.3	1	1
069	TP27-4 0-0.1	1	1
070	TP27-5 0-0.1	1	1
071	TP27-a 0.15-0.25	1	1
072	Duplicate D1	2	1

CONTINUED OVERLEAF

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Testing as per this table shall commence immediately unless the client intervenes with a correction.

SAMPLE RECEIPT ADVICE

SE101847

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil by ICPOES from EPA 200.8 Digest	Metals in Water (Dissolved) by ICPOES	Moisture Content
073	Duplicate D2	1	-	1
074	Duplicate D3	1	-	1
075	Duplicate D4	1	-	1
076	Rinsate R1	-	3	-
077	Rinsate R2	-	3	-

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Testing as per this table shall commence immediately unless the client intervenes with a correction.

coc received 14/9/11 @ 11:04 am

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: Normal Turnaround Time

Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn						KEEP SAMPLE
1	TP10-1	0-0.1	13/09/2011	-	SP				✓						YES
2	TP10-2	0-0.1	13/09/2011	-	SP				✓						YES
3	TP10-3	0-0.1	13/09/2011	-	SP				✓						YES
4	TP10-4	0-0.1	13/09/2011	-	SP				✓						YES
5	TP10-5	0-0.1	13/09/2011	-	SP				✓						YES
6	TP10-6	0-0.1	13/09/2011	-	SP				✓						YES
	TP10-7	0-0.1	13/09/2011	-	SP										YES
	TP10-8	0-0.1	13/09/2011	-	SP										YES
	TP10-9	0-0.1	13/09/2011	-	SP										YES
	TP10-10	0-0.1	13/09/2011	-	SP										YES
	TP10-11	0-0.1	13/09/2011	-	SP										YES
	TP10-12	0-0.1	13/09/2011	-	SP										YES
	TP10-13	0-0.1	13/09/2011	-	SP										YES
	TP10-14	0-0.1	13/09/2011	-	SP										YES
	TP10-15	0-0.1	13/09/2011	-	SP										YES

SGS
Received By: SS 13/09/14
Time: 2:00PM
Temperature On Receipt: 2.1°C
Storage Location: W173, Cool Room Shelf
SGS REF No: SB 101847

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Subaraj		14/09/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: Normal Turnaround Time

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn							KEEP SAMPLE
TP10-16	0-0.1	13/09/2011	-	SP											YES
TP10-17	0-0.1	13/09/2011	-	SP											YES
TP10-18	0-0.1	13/09/2011	-	SP											YES
7 TP10-a	0.1-0.2	13/09/2011	-	SP				✓							YES
TP11-1	0-0.1	13/09/2011	-	SP											YES
8 TP11-1	0.1-0.3	13/09/2011	-	SP			✓								YES
9 TP11-1	0.3-0.6	13/09/2011	-	SP			✓								YES
10 TP11-2	0-0.3	13/09/2011	-	SP			✓								YES
11 TP11-2	0.4-0.6	13/09/2011	-	SP			✓								YES
12 TP11-3	0-0.3	13/09/2011	-	SP			✓								YES
13 TP11-3	0.4-0.6	13/09/2011	-	SP			✓								YES
TP11-4	0-0.15	13/09/2011	-	SP											YES
14 TP11-4	0.15-0.3	13/09/2011	-	SP			✓								YES
15 TP11-4	0.3-0.6	13/09/2011	-	SP			✓								YES
16 TP11-5	0-0.2	13/09/2011	-	SP			✓								YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Subaraj		14/09/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: Normal Turnaround Time

	Sampling details			Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn						KEEP SAMPLE
17	TP11-6	0-0.3	13/09/2011	-	SP			✓							YES
	TP11-6	0.5-0.8	13/09/2011	-	SP										YES
18	TP11-7	0-0.3	13/09/2011	-	SP			✓							YES
19	TP11-8	0-0.3	13/09/2011	-	SP			✓							YES
20	TP11-a	0.75-0.85	13/09/2011	-	SP			✓							YES
21	TP14-1	0-0.2	13/09/2011	-	SP			✓							YES
	TP14-1	0.2-0.5	13/09/2011	-	SP										YES
22	TP14-2	0-0.15	13/09/2011	-	SP			✓							YES
	TP14-2	0.15-0.3	13/09/2011	-	SP										YES
23	TP14-3	0-0.15	13/09/2011	-	SP			✓							YES
	TP14-3	0.15-0.45	13/09/2011	-	SP										YES
24	TP14-4	0-0.15	13/09/2011	-	SP			✓							YES
	TP14-4	0.15-0.3	13/09/2011	-	SP										YES
25	TP14-5	0-0.2	13/09/2011	-	SP			✓							YES
26	TP14-6	0-0.3	13/09/2011	-	SP			✓							YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Sebaraj		15/09/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN

Job No: 12486/2

Project:

Project Manager: JX

Location: Kingswood

Results required by: Normal Turnaround Time

	Location	Depth (m)	Date	Time	Sample type: Soil	Sample type: Water	Cu	Ni	Zn							KEEP SAMPLE
27	TP14-7	0-0.2	13/09/2011	-	SP			✓								YES
28	TP14a	0.2-0.3	13/09/2011	-	SP			✓								YES
29	TP19-1	0-0.1	13/09/2011	-	SP			✓								YES
30	TP19-2	0-0.1	13/09/2011	-	SP			✓								YES
	TP19-2	0.1-0.2	13/09/2011	-	SP											YES
31	TP19-3	0-0.1	13/09/2011	-	SP			✓								YES
32	TP19-4	0-0.1	13/09/2011	-	SP			✓								YES
33	TP19-5	0-0.2	13/09/2011	-	SP			✓								YES
	TP19-5	0.2-0.3	13/09/2011	-	SP											YES
34	TP19-6	0-0.2	13/09/2011	-	SP			✓								YES
35	TP19-7	0-0.2	13/09/2011	-	SP			✓								YES
36	TP19-a	0.15-0.25	13/09/2011	-	SP			✓								YES
37	TP22-1	0-0.1	13/09/2011	-	SP				✓							YES
	TP22-1	0.1-0.4	13/09/2011	-	SP											YES
38	TP22-2	0-0.1	13/09/2011	-	SP				✓							YES
39	TP22-3	0-0.1	13/09/2011	-	SP				✓							YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Sebastian		14/9/14

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

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email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: Normal Turnaround Time

	Sampling details			Sample type											
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn						KEEP SAMPLE
	TP22-a	1.35-1.45	13/09/2011	-	SP										YES
40	TP26-1	0-0.3	9/09/2011	-	SP		✓		✓						YES
41	TP26-1	0.5-0.8	9/09/2011	-	SP		✓		✓						YES
42	TP26-1	1.0-1.3	9/09/2011	-	SP		✓		✓						YES
	TP26-1	1.5-1.8	9/09/2011	-	SP										YES
43	TP26-2	0-0.3	9/09/2011	-	SP		✓		✓						YES
44	TP26-2	0.5-0.8	9/09/2011	-	SP		✓		✓						YES
45	TP26-2	1.0-1.3	9/09/2011	-	SP		✓		✓						YES
	TP26-2	1.5-1.8	9/09/2011	-	SP										YES
46	TP26-2	2.0-2.3	9/09/2011	-	SP		✓		✓						YES
47	TP26-3	0-0.3	9/09/2011	-	SP		✓		✓						YES
	TP26-3	0.5-0.8	9/09/2011	-	SP										YES
48	TP26-3	1.0-1.3	9/09/2011	-	SP		✓		✓						YES
49	TP26-4	0-0.3	9/09/2011	-	SP		✓		✓						YES
50	TP26-4	0.5-0.8	9/09/2011	-	SP		✓		✓						YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011			16/09/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

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TO: SGS ENVIRONMENTAL SERVICES
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33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: Normal Turnaround Time

	Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn						KEEP SAMPLE
51	TP26-4	1.0-1.3	9/09/2011	-	SP		✓		✓						YES
	TP26-4	1.5-1.8	9/09/2011	-	SP										YES
	TP26-4	2.15-2.25	9/09/2011	-	SP										YES
52	TP26-5	0-0.3	9/09/2011	-	SP		✓		✓						YES
53	TP26-5	0.5-0.8	9/09/2011	-	SP		✓		✓						YES
54	TP26-5	1.0-1.3	9/09/2011	-	SP		✓		✓						YES
	TP26-5	1.55-1.65	9/09/2011	-	SP										YES
55	TP26-6	0-0.3	9/09/2011	-	SP		✓		✓						YES
	TP26-6	0.55-0.65	9/09/2011	-	SP										YES
56	TP26-7	0-0.15	9/09/2011	-	SP		✓		✓						YES
57	TP26-8	0-0.1	9/09/2011	-	SP		✓	✓	✓						YES
	TP26-8	0.15-0.25	9/09/2011	-	SP										YES
58	TP26-9	0-0.3	9/09/2011	-	SP		✓		✓						YES
59	TP26-9	0.3-0.6	9/09/2011	-	SP		✓		✓						YES
	TP26-9	0.8-1.1	9/09/2011	-	SP										YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Subaro		16/9/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

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PENRITH NSW 2751

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email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN

Project Manager: JX

Job No: 12486/2

Project:

Location: Kingswood

Results required by: Normal Turnaround Time

	Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn						KEEP SAMPLE
60	TP26-9	1.2-1.5	9/09/2011	-	SP		✓		✓						YES
	TP26-9	1.7-2.0	9/09/2011	-	SP										YES
61	TP26-9	2.2-2.5	9/09/2011	-	SP		✓		✓						YES
62	TP26-10	0-0.3	9/09/2011	-	SP		✓		✓						YES
	TP26-10	0.5-0.8	9/09/2011	-	SP										YES
63	TP26-10	1.0-1.3	9/09/2011	-	SP		✓		✓						YES
	TP26-10	1.5-1.8	9/09/2011	-	SP										YES
64	TP26-10	2.0-2.3	9/09/2011	-	SP		✓		✓						YES
	TP26-10	2.45-2.55	9/09/2011	-	SP										YES
65	TP27-1	0-0.15	13/09/2011	-	SP			✓							YES
66	TP27-2	0-0.1	13/09/2011	-	SP			✓							YES
	TP27-2	0.1-0.4	13/09/2011	-	SP										YES
67	TP27-2	0.6-0.9	13/09/2011	-	SP			✓							YES
68	TP27-3	0-0.3	13/09/2011	-	SP			✓							YES
69	TP27-4	0-0.1	13/09/2011	-	SP			✓							YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011			16/9/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

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TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: Normal Turnaround Time

	Sampling details			Sample type											
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn						KEEP SAMPLE
70	TP27-5	0-0.1	13/09/2011	-	SP			✓							YES
71	TP27-a	0.15-0.25	13/09/2011	-	SP			✓							YES
72	Duplicate D1	-	9/09/2011	-	SP		✓		✓						YES
73	Duplicate D2	-	13/09/2011	-	SP				✓						YES
74	Duplicate D3	-	13/09/2011	-	SP			✓							YES
75	Duplicate D4	-	13/09/2011	-	SP			✓							YES
76	Rinsate R1	-	9/09/2011	-		WP	✓		✓						YES
77	Rinsate R2	-	13/09/2011	-		WP		✓	✓						

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Subaraj		16/09/11

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
FCP Fibro Cement Piece
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Asbestos**
Order Number	(Not specified)
Samples	7

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847A R0
Report Number	0000007745
Date Reported	22/09/2011 3:07:08PM
Date Received	14 Sep 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

S. Ravensdale.

Ravee Sivasubramaniam
Hygienist

ANALYTICAL REPORT

RESULTS

Fibre ID in bulk materials — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w
SE101847A.078	TP22-1 0.1-0.4	Other	75x60x6mm Cement sheet fragments	13 Sep 2011	Amosite & Chrysotile Asbestos Detected	
SE101847A.079	TP26-1 0-0.3	Other	70x60x5mm Cement sheet fragments	09 Sep 2011	Amosite, Chrysotile & Crocidolite Asbestos Detected	
SE101847A.080	TP26-1 1.5-1.8	Other	80x60x5mm Cement sheet fragments	09 Sep 2011	No Asbestos Detected Organic Fibres Detected	
SE101847A.081	TP26-4 1.5-1.8	Other	120x70x5mm Cement sheet fragments	09 Sep 2011	Amosite & Chrysotile Asbestos Detected	
SE101847A.082	TP26-10 1.5-1.8	Other	140x60x10mm Cement sheet fragments	09 Sep 2011	Amosite, Chrysotile & Crocidolite Asbestos Detected	
SE101847A.083	TP27-2 0.1-0.4	Other	60x40x10mm Cement sheet fragments	13 Sep 2011	Amosite & Chrysotile Asbestos Detected	
SE101847A.084	TP27-3 0-0.3	Other	50x40x5mm mm Cement sheet fragments	13 Sep 2011	Amosite & Chrysotile Asbestos Detected	

METHOD SUMMARY

SE101847A R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed Not Required
Crocidolite	-	Blue Asbestos	*	-	Not Accredited

AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:
"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client

Where reported: 'Asbestos Detected':
Asbestos detected by polarized light microscopy, including dispersion staining

Where reported: 'No Asbestos Found':
No Asbestos Found by polarized light microscopy, including dispersion staining

Where reported: 'UMF Detected':
Mineral fibres of unknown type detected by polarized light microscopy, including dispersion staining.
Confirmation by another independent analytical technique may be necessary

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy.
This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

COC received 14/9/14 @ 11.04 am

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

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email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN
Job No: 12486/2
Project:
Project Manager: JX
Location: Kingswood

Results required by: Normal Turnaround Time

	Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Material	ASBESTOS								KEEP SAMPLE
	TP22-1	0.1-0.4	13/09/2011	-	SP										YES
78	TP22-1	0.1-0.4	13/09/2011	-		FCP	✓								YES
	TP26-1	0-0.3	9/09/2011	-	SP										YES
79	TP26-1	0-0.3	9/09/2011	-		FCP	✓								YES
	TP26-1	1.5-1.8	9/09/2011	-	SP										YES
80	TP26-1	1.5-1.8	9/09/2011	-		FCP	✓								YES
	TP26-4	1.5-1.8	9/09/2011	-	SP										YES
81	TP26-4	1.5-1.8	9/09/2011	-		FCP	✓								YES
	TP26-10	1.5-1.8	9/09/2011	-	SP										YES
82	TP26-10	1.5-1.8	9/09/2011	-		FCP	✓								YES
	TP27-2	0.1-0.4	13/09/2011	-	SP										YES
83	TP27-2	0.1-0.4	13/09/2011	-		FCP	✓								YES
	TP27-3	0-0.3	13/09/2011	-	SP										YES
84	TP27-3	0-0.3	13/09/2011	-		FCP	✓								YES

SGS
Received 14/09/14
By SB 2.20 pm
Temperature on Receipt 21.5°C
Storage Location ASB, Cool Room Shelf
SGS REF No SE1018474

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Silvana		14/09/14

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
FCP Fibro Cement Piece
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

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PENRITH NSW 2751

Tel: (02) 4722 2700
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TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: Normal Turnaround Time

Sampling details				Sample type										
Location	Depth (m)	Date	Time	Soil	Material	ASBESTOS								KEEP SAMPLE
A1-1	0-0.1	13/09/2011	-	SP										YES
A1-2	0-0.1	13/09/2011	-	SP										YES
A1-3	0-0.1	13/09/2011	-	SP										YES
A1-4	0-0.1	13/09/2011	-	SP										YES
A1-5	0-0.1	13/09/2011	-	SP										YES
A1-6	0-0.1	13/09/2011	-	SP										YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011			

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE101847A

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Asbestos**
Order Number	(Not specified)
Samples	7

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 14/9/2011
Report Due	Thu 22/9/2011
SGS Reference	**SE101847A**

SUBMISSION DETAILS

This is to confirm that 7 samples were received on Wednesday 14/9/2011. Results are expected to be ready by Thursday 22/9/2011. Please quote SGS reference SE101847A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	7 Soils	Type of documentation received	Email
Date documentation received	15/9/11@11:04	Samples received in good order	Yes
Samples received without headspace	n/a	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

13 Samples on hold

SAMPLE RECEIPT ADVICE

SE101847A

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Asbestos

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil
078	TP22-1 0.1-0.4	2
079	TP26-1 0-0.3	2
080	TP26-1 1.5-1.8	2
081	TP26-4 1.5-1.8	2
082	TP26-10 1.5-1.8	2
083	TP27-2 0.1-0.4	2
084	TP27-3 0-0.3	2

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	John Xu	Manager	Huong Crawford
Client	Geotechnique	Laboratory	SGS Alexandria Environmental
Address	P.O. Box 880 PENRITH NSW 2751	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	02 4722 2700	Telephone	+61 2 8594 0400
Facsimile	02 4722 6161	Facsimile	+61 2 8594 0499
Email	john.xu@geotech.com.au	Email	au.environmental.sydney@sgs.com
Project	**12486-2 - Kingswood - Additional**	SGS Reference	SE101847B R0
Order Number	(Not specified)	Report Number	0000008505
Samples	6	Date Reported	29 Sep 2011
		Date Received	14 Sep 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Edward Ibrahim
Business Manager

Ravee Sivasubramaniam
Hygienist

Parameter	Units	LOR	Sample Number: SE101847B.085 Sample Matrix: Soil Sample Date: 13 Sep 2011 Sample Name: TP22-1 0.1-0.4
Fibre Identification in soil **Method: AN602**			
FibreID			
Asbestos Detected	No unit	-	No
SemiQuant			
Estimated Fibres	%w/w	0.01	<0.01

Parameter	Units	LOR	Sample Number: SE101847B.086 Sample Matrix: Soil Sample Date: 09 Sep 2011 Sample Name: TP26-1 0-0.3	SE101847B.087 Soil 09 Sep 2011 TP26-4 1.5-1.8	SE101847B.088 Soil 09 Sep 2011 TP26-10 1.5-1.8	SE101847B.089 Soil 13 Sep 2011 TP27-2 0.1-0.4	SE101847B.090 Soil 13 Sep 2011 TP27-3 0-0.3
Fibre Identification in soil **Method: AN602**							
FibreID							
Asbestos Detected	No unit	-	No	No	No	No	No
SemiQuant							
Estimated Fibres	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

No QC samples were reported for this job.

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

STATEMENT OF QA/QC PERFORMANCE AGAINST DATA QUALITY OBJECTIVES

SE101847B R0

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847B R0
Report Number	0000008506
Date Reported	29 Sep 2011

COMMENTS

All the laboratory data for each environmental matrix was compared to the SGS Environmental Services' stated data quality objectives (DQO).
Comments arising from the comparison were made and are reported below.
The data relating to sampling was taken from the chain of custody document and was supplied by the client.
This QA/QC statement must be read in conjunction with the referenced analytical report.
The statement and the analytical report must not be reproduced except in full.

All Data Quality Objectives were met.

SAMPLE SUMMARY

Sample counts by matrix	6 Soils	Type of documentation received	Email
Date documentation received	27/9/11@3:53pm	Samples received in good order	Yes
Samples received without headspace	n/a	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE101847B R0

HOLDING TIMES

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field sampling guide for containers and holding time” (Ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

The extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and Analysis dates are shown in **Green** when within suggested criteria and in **Bold** with an appended dagger symbol and Red† when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Fibre Identification in soil Method: ME-(AU)-[ENV]AN602								
TP22-1 0.1-0.4	SE101847B.085	LB006023	13 Sep 2011	14 Sep 2011	12 Sep 2012	28 Sep 2011	12 Sep 2012	29 Sep 2011
TP26-1 0-0.3	SE101847B.086	LB006023	09 Sep 2011	14 Sep 2011	08 Sep 2012	28 Sep 2011	08 Sep 2012	29 Sep 2011
TP26-4 1.5-1.8	SE101847B.087	LB006023	09 Sep 2011	14 Sep 2011	08 Sep 2012	28 Sep 2011	08 Sep 2012	29 Sep 2011
TP26-10 1.5-1.8	SE101847B.088	LB006023	09 Sep 2011	14 Sep 2011	08 Sep 2012	28 Sep 2011	08 Sep 2012	29 Sep 2011
TP27-2 0.1-0.4	SE101847B.089	LB006023	13 Sep 2011	14 Sep 2011	12 Sep 2012	28 Sep 2011	12 Sep 2012	29 Sep 2011
TP27-3 0-0.3	SE101847B.090	LB006023	13 Sep 2011	14 Sep 2011	12 Sep 2012	28 Sep 2011	12 Sep 2012	29 Sep 2011

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, which is typically 2.5 times the statistically determined method detection limit (MDL).
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Method Blanks were required for this job.

Duplicates are calculated as relative percent difference (RPD) using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
Where original and duplicate results are both zero, the Criteria and RPD are not applicable.
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Duplicates were required for this job.

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022).
For more information refer to the footnotes in the concluding page of the report.
Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No LCS were required for this job.

Matrix spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of the report. Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Matrix Spikes were required for this job.

Matrix spike duplicates are calculated as relative percent difference using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The original result is the analyte concentration of the matrix spike and the replicate result is the analyte concentration of the matrix spike duplicate.
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Matrix Spike Duplicates were required for this job.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	NATA Accreditation does not cover this analysis.
^	Performed by outside laboratory.
LOR	Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
NA	The sample was not analysed for this analyte

Samples analysed as received.
Solid samples expressed on a dry weight basis.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847B R0
Report Number	0000008507
Date Reported	29/09/2011 7:25:36PM
Date Received	14 Sep 2011

COMMENTS

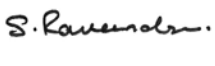
The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Edward Ibrahim
Business Manager



Ravee Sivasubramaniam
Hygienist

ANALYTICAL REPORT

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w
SE101847B.085	TP22-1 0.1-0.4	Soil	10g Soil,rocks	13 Sep 2011	No Asbestos Found	<0.01
SE101847B.086	TP26-1 0-0.3	Soil	17g Soil,rocks	09 Sep 2011	No Asbestos Found Synthetic Mineral Fibres Detected Organic Fibres Detected	<0.01
SE101847B.087	TP26-4 1.5-1.8	Soil	11g Soil,rocks	09 Sep 2011	No Asbestos Found Organic Fibres Detected	<0.01
SE101847B.088	TP26-10 1.5-1.8	Soil	10g Soil,rocks	09 Sep 2011	No Asbestos Found Organic Fibres Detected	<0.01
SE101847B.089	TP27-2 0.1-0.4	Soil	11g Soil,rocks	13 Sep 2011	No Asbestos Found	<0.01
SE101847B.090	TP27-3 0-0.3	Soil	17g Soil,rocks	13 Sep 2011	No Asbestos Found Organic Fibres Detected	<0.01

METHOD SUMMARY

SE101847B R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed Not Required
Crocidolite	-	Blue Asbestos	*	-	Not Accredited

AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:
"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client

Where reported: 'Asbestos Detected':
Asbestos detected by polarized light microscopy, including dispersion staining

Where reported: 'No Asbestos Found':
No Asbestos Found by polarized light microscopy, including dispersion staining

Where reported: 'UMF Detected':
Mineral fibres of unknown type detected by polarized light microscopy, including dispersion staining.
Confirmation by another independent analytical technique may be necessary

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy.
This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

CoC received 27/9/11 @ 3:53pm

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: 29/09/2011 (Normal Turnaround Time)
(SGS Ref. SE101847A)

Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Material	ASBESTOS								KEEP SAMPLE
85	TP22-1	0.1-0.4	13/09/2011	-	SP		✓					SGS Ref: SE101847B			YES
86	TP26-1	0-0.3	9/09/2011	-	SP		✓								YES
87	TP26-4	1.5-1.8	9/09/2011	-	SP		✓								YES
88	TP26-10	1.5-1.8	9/09/2011	-	SP		✓					Date Due: 29/9/11			YES
89	TP27-2	0.1-0.4	13/09/2011	-	SP		✓								YES
90	TP27-3	0-0.3	13/09/2011	-	SP		✓					TAT: STANDARD			YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	23/09/2011			27/9/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE101847B

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 14/9/2011
Report Due	Thu 29/9/2011
SGS Reference	**SE101847B**

SUBMISSION DETAILS

This is to confirm that 6 samples were received on Wednesday 14/9/2011. Results are expected to be ready by Thursday 29/9/2011. Please quote SGS reference SE101847B when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	6 Soils	Type of documentation received	Email
Date documentation received	27/9/11@3:53pm	Samples received in good order	Yes
Samples received without headspace	n/a	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

SAMPLE RECEIPT ADVICE

SE101847B

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil
085	TP22-1 0.1-0.4	2
086	TP26-1 0-0.3	2
087	TP26-4 1.5-1.8	2
088	TP26-10 1.5-1.8	2
089	TP27-2 0.1-0.4	2
090	TP27-3 0-0.3	2

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

ANALYTICAL REPORT

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	5

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847C R0
Report Number	0000008874
Date Reported	05 Oct 2011
Date Received	14 Sep 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Inorganics Metals Team Leader

Huong Crawford
Laboratory Manager

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847C.091 Soil 09 Sep 2011 TP26-2 1.5-1.8	SE101847C.092 Soil 09 Sep 2011 TP26-4 1.5-1.8	SE101847C.093 Soil 09 Sep 2011 TP26-10 1.5-1.8	SE101847C.094 Soil 09 Sep 2011 TP26-10 2.45-2.55	SE101847C.095 Soil 13 Sep 2011 TP27-2 0.1-0.4
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320								
Copper, Cu	mg/kg	0.5		-	**39**	-	**30**	-
Nickel, Ni	mg/kg	0.5		-	-	-	-	**24**
Zinc, Zn	mg/kg	0.5		**880**	**370**	**720**	**63**	-
Moisture Content Method: AN234								
% Moisture	%	0.5		**20**	**13**	**14**	**16**	**17**

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery	MS %Recovery
Copper, Cu	LB006206	mg/kg	0.5	<0.5	97%	
Nickel, Ni	LB006206	mg/kg	0.5	<0.5	98%	
Zinc, Zn	LB006206	mg/kg	0.5	<0.5	98%	-280%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

STATEMENT OF QA/QC PERFORMANCE AGAINST DATA QUALITY OBJECTIVES

SE101847C R0

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	5

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847C R0
Report Number	0000008876
Date Reported	05 Oct 2011

COMMENTS

All the laboratory data for each environmental matrix was compared to the SGS Environmental Services' stated data quality objectives (DQO).
Comments arising from the comparison were made and are reported below.
The data relating to sampling was taken from the chain of custody document and was supplied by the client.
This QA/QC statement must be read in conjunction with the referenced analytical report.
The statement and the analytical report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Moisture Content	5 Items
MS	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY)	1 Item

SAMPLE SUMMARY

Sample counts by matrix	5 Soils	Type of documentation received	COC
Date documentation received	29/09/2011@3:05pr	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Two Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE101847C R0

HOLDING TIMES

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field sampling guide for containers and holding time” (Ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

The extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and Analysis dates are shown in **Green** when within suggested criteria and in **Bold** with an appended dagger symbol and Red† when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Moisture Content Method: ME-(AU)-[ENV]AN234								
TP26-2 1.5-1.8	SE101847C.091	LB006397	09 Sep 2011	14 Sep 2011	23 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
TP26-4 1.5-1.8	SE101847C.092	LB006397	09 Sep 2011	14 Sep 2011	23 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
TP26-10 1.5-1.8	SE101847C.093	LB006397	09 Sep 2011	14 Sep 2011	23 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
TP26-10 2.45-2.55	SE101847C.094	LB006397	09 Sep 2011	14 Sep 2011	23 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
TP27-2 0.1-0.4	SE101847C.095	LB006397	13 Sep 2011	14 Sep 2011	27 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320								
TP26-2 1.5-1.8	SE101847C.091	LB006206	09 Sep 2011	14 Sep 2011	07 Mar 2012	30 Sep 2011	07 Mar 2012	04 Oct 2011
TP26-4 1.5-1.8	SE101847C.092	LB006206	09 Sep 2011	14 Sep 2011	07 Mar 2012	30 Sep 2011	07 Mar 2012	04 Oct 2011
TP26-10 1.5-1.8	SE101847C.093	LB006206	09 Sep 2011	14 Sep 2011	07 Mar 2012	30 Sep 2011	07 Mar 2012	04 Oct 2011
TP26-10 2.45-2.55	SE101847C.094	LB006206	09 Sep 2011	14 Sep 2011	07 Mar 2012	30 Sep 2011	07 Mar 2012	04 Oct 2011
TP27-2 0.1-0.4	SE101847C.095	LB006206	13 Sep 2011	14 Sep 2011	11 Mar 2012	30 Sep 2011	11 Mar 2012	04 Oct 2011

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, which is typically 2.5 times the statistically determined method detection limit (MDL).
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

Parameter	Units	Control LOR	BLK MB
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**			
LB006206.001			
Copper, Cu	mg/kg	0.5	<0.5
Nickel, Ni	mg/kg	0.5	<0.5
Zinc, Zn	mg/kg	0.5	<0.5

Duplicates are calculated as relative percent difference (RPD) using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
Where the MaxAllowableDifference evaluates to a number larger than 200 it is displayed as 200.
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Sample Name
Parameter	**Units**	**LOR**

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022).
For more information refer to the footnotes in the concluding page of the report.
Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

	Control		LCS STD			
Parameter	Units	LOR	Result	Expected Result	Criteria %	Recovery %
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB006206.002						
Copper, Cu	mg/kg	0.5	48	50	80 - 120	97
Nickel, Ni	mg/kg	0.5	49	50	80 - 120	98
Zinc, Zn	mg/kg	0.5	49	50	80 - 120	98

Matrix spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of the report. Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Control	MS			
Parameter	Units	LOR	Result	Original Result	Spike Added	Recovery %
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB006206.004						
Zinc, Zn	mg/kg	0.5	740	880	50	**-280†**

Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).

Matrix spike duplicates are calculated as relative percent difference using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The original result is the analyte concentration of the matrix spike and the replicate result is the analyte concentration of the matrix spike duplicate.
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Matrix Spike Duplicates were required for this job.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	NATA Accreditation does not cover this analysis.
^	Performed by outside laboratory.
LOR	Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
NA	The sample was not analysed for this analyte

Samples analysed as received.
Solid samples expressed on a dry weight basis.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

CoC received 29/9/2011@3:05pm.

SGS REF: - SE101847C
DUE DATE: - 4/10/2011
TAT: 2 DAYS.

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: 4/10/2011 (2d TAT)
(SGS Ref. SE101847)

	Sampling details				Sample type											
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn							KEEP SAMPLE
91	TP26-2	1.5-1.8	9/09/2011	-	SP				✓							YES
92	TP26-4	1.5-1.8	9/09/2011	-	SP		✓		✓							YES
93	TP26-10	1.5-1.8	9/09/2011	-	SP				✓							YES
94	TP26-10	2.45-2.55	9/09/2011	-	SP		✓		✓							YES
95	TP27-2	0.1-0.4	13/09/2011	-	SP			✓								YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	29/09/2011	Angela	Angela	29/9/2011@3:05pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)	* Purge & Trap
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required	

SAMPLE RECEIPT ADVICE

SE101847C

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	5

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 14/9/2011
Report Due	Tue 4/10/2011
SGS Reference	**SE101847C**

SUBMISSION DETAILS

This is to confirm that 5 samples were received on Wednesday 14/9/2011. Results are expected to be ready by Tuesday 4/10/2011. Please quote SGS reference SE101847C when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	5 Soils	Type of documentation received	COC
Date documentation received	29/09/2011@3:05pm	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Two Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

Instructions received 29/09/2011@3:05pm.

SAMPLE RECEIPT ADVICE

SE101847C

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Moisture Content	Total Recoverable Metals in Soil by ICPOES from
091	TP26-2 1.5-1.8	1	1
092	TP26-4 1.5-1.8	1	2
093	TP26-10 1.5-1.8	1	1
094	TP26-10 2.45-2.55	1	2
095	TP27-2 0.1-0.4	1	1

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847D R0
Report Number	0000008836
Date Reported	5/10/2011 4:09:31PM
Date Received	14 Sep 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.
Sample # 97 : 1-4mm length fibre bundles found loose in sample and found in 6x3x2mm cement sheet fragments.
Sample # 100 : 1-4mm length fibre bundles found loose in sample and found in 10x4x2mm cement sheet fragments.

No respirable fibres detected using trace analysis technique.

SIGNATORIES

S. Ravensdale.

Ravee Sivasubramaniam
Hygienist

ANALYTICAL REPORT

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w
SE101847D.096	A1-1 0-0.1	Soil	19g Soil,rocks,plant matter	13 Sep 2011	No Asbestos Found Organic Fibres Detected	<0.01
SE101847D.097	A1-2 0-0.1	Soil	16g Soil,rocks,plant matter	13 Sep 2011	Chrysotile Asbestos Found Organic Fibres Detected	>0.01
SE101847D.098	A1-3 0-0.1	Soil	11g Soil,rocks,plant matter	13 Sep 2011	No Asbestos Found Organic Fibres Detected	<0.01
SE101847D.099	A1-4 0-0.1	Soil	8g Soil,rocks,plant matter	13 Sep 2011	No Asbestos Found	<0.01
SE101847D.100	A1-5 0-0.1	Soil	20g Soil,rocks,plant matter	13 Sep 2011	Chrysotile Asbestos Found Organic Fibres Detected	>0.01
SE101847D.101	A1-6 0-0.1	Soil	7g Soil,rocks,plant matter	13 Sep 2011	No Asbestos Found Organic Fibres Detected	<0.01

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed Not Required
Crocidolite	-	Blue Asbestos	*	-	Not Accredited

AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:
"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client

Where reported: 'Asbestos Detected':
Asbestos detected by polarized light microscopy, including dispersion staining

Where reported: 'No Asbestos Found':
No Asbestos Found by polarized light microscopy, including dispersion staining

Where reported: 'UMF Detected':
Mineral fibres of unknown type detected by polarized light microscopy, including dispersion staining.
Confirmation by another independent analytical technique may be necessary

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy.
This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

COC received 30/9/11 @ 10:23am

SGS REF:- SE101847D

DUE DATE:- 5/10/2011

TAT:- 2 DAYS

14/9/2011 @2:00pm

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: 05/10/2011 (2d TAT)
(SGS Ref. SE101847A)

Sampling details				Sample type											
	Location	Depth (m)	Date	Time	Soil	Material	ASBESTOS								KEEP SAMPLE
96	A1-1	0-0.1	13/09/2011	-	SP		✓								YES
97	A1-2	0-0.1	13/09/2011	-	SP		✓								YES
98	A1-3	0-0.1	13/09/2011	-	SP		✓								YES
99	A1-4	0-0.1	13/09/2011	-	SP		✓								YES
100	A1-5	0-0.1	13/09/2011	-	SP		✓								YES
101	A1-6	0-0.1	13/09/2011	-	SP		✓								YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	30/09/2011	Angela	Angela	30/9/2011 @ 10:23am

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

SAMPLE RECEIPT ADVICE

SE101847D

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 14/9/2011
Report Due	Wed 5/10/2011
SGS Reference	**SE101847D**

SUBMISSION DETAILS

This is to confirm that 6 samples were received on Wednesday 14/9/2011. Results are expected to be ready by Wednesday 5/10/2011. Please quote SGS reference SE101847D when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	6 Soils	Type of documentation received	COC
Date documentation received	30/09/2011@10:23am	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Two Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

SAMPLE RECEIPT ADVICE

SE101847D

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil
096	A1-1 0-0.1	2

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

SAMPLE RECEIPT ADVICE

SE101847D

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil
097	A1-2 0-0.1	2
098	A1-3 0-0.1	2
099	A1-4 0-0.1	2
100	A1-5 0-0.1	2
101	A1-6 0-0.1	2

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847E R0
Report Number	0000009210
Date Reported	10 Oct 2011
Date Received	14 Sep 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Huong Crawford
Laboratory Manager

Parameter	Units	LOR	Sample Number SE101847E.009 Sample Matrix Soil Sample Date 13 Sep 2011 Sample Name TP11-1 0.3-0.6
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006			
pH 1:20	pH Units	-	**8.1**
pH 1:20 plus HCL	pH Units	-	**1.9**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**13**
Volume of ExtractionSolution Used*	mL	-	**250**
pH TCLP after 18 hours	pH Units	-	**5.0**
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321			
Nickel, Ni	mg/L	0.01	**0.090**

Parameter	Units	LOR	Sample Number SE101847E.021 Sample Matrix Soil Sample Date 13 Sep 2011 Sample Name TP14-1 0-0.2
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006			
pH 1:20	pH Units	-	**8.3**
pH 1:20 plus HCL	pH Units	-	**1.8**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**13**
Volume of ExtractionSolution Used*	mL	-	**250**
pH TCLP after 18 hours	pH Units	-	**5.0**
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321			
Nickel, Ni	mg/L	0.01	**0.016**

Parameter	Units	LOR	Sample Number SE101847E.035 Sample Matrix Soil Sample Date 13 Sep 2011 Sample Name TP19-7 0-0.2
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006			
pH 1:20	pH Units	-	**8.0**
pH 1:20 plus HCL	pH Units	-	**1.8**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**13**
Volume of ExtractionSolution Used*	mL	-	**250**
pH TCLP after 18 hours	pH Units	-	**5.1**
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321			
Nickel, Ni	mg/L	0.01	**0.11**

Parameter	Units	LOR	Sample Number SE101847E.066 Sample Matrix Soil Sample Date 13 Sep 2011 Sample Name TP27-2 0-0.1
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006			
pH 1:20	pH Units	-	**8.2**
pH 1:20 plus HCL	pH Units	-	**1.8**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**13**
Volume of ExtractionSolution Used*	mL	-	**250**
pH TCLP after 18 hours	pH Units	-	**4.9**
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321			
Nickel, Ni	mg/L	0.01	<0.010

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Metals in Soil (TCLP) by ICPOES **Method: ME-(AU)-[ENV]AN320/AN321**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Nickel, Ni	LB006611	mg/L	0.01	<0.010	103%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

STATEMENT OF QA/QC PERFORMANCE AGAINST DATA QUALITY OBJECTIVES

SE101847E R0

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847E R0
Report Number	0000009211
Date Reported	10 Oct 2011

COMMENTS

All the laboratory data for each environmental matrix was compared to the SGS Environmental Services' stated data quality objectives (DQO).
Comments arising from the comparison were made and are reported below.
The data relating to sampling was taken from the chain of custody document and was supplied by the client.
This QA/QC statement must be read in conjunction with the referenced analytical report.
The statement and the analytical report must not be reproduced except in full.

All Data Quality Objectives were met.

SAMPLE SUMMARY

Sample counts by matrix	4 Soils	Type of documentation received	COC
Date documentation received	30/09/2011@11:28	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Three Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE101847E R0

HOLDING TIMES

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field sampling guide for containers and holding time” (Ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

The extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and Analysis dates are shown in **Green** when within suggested criteria and in **Bold** with an appended dagger symbol and Red† when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Metals in Soil (TCLP) by ICPOES	**Method: ME-(AU)-[ENV]AN320/AN321**							
TP11-1 0.3-0.6	SE101847E.009	LB006611	13 Sep 2011	14 Sep 2011	11 Mar 2012	10 Oct 2011	11 Mar 2012	10 Oct 2011
TP14-1 0-0.2	SE101847E.021	LB006611	13 Sep 2011	14 Sep 2011	11 Mar 2012	10 Oct 2011	11 Mar 2012	10 Oct 2011
TP19-7 0-0.2	SE101847E.035	LB006611	13 Sep 2011	14 Sep 2011	11 Mar 2012	10 Oct 2011	11 Mar 2012	10 Oct 2011
TP27-2 0-0.1	SE101847E.066	LB006611	13 Sep 2011	14 Sep 2011	11 Mar 2012	10 Oct 2011	11 Mar 2012	10 Oct 2011
TCLP (Toxicity Characteristic Leaching Procedure) for Metals	**Method: ME-(AU)-[ENV]AN006**							
TP11-1 0.3-0.6	SE101847E.009	LB006585	13 Sep 2011	14 Sep 2011	12 Dec 2011	07 Oct 2011	12 Dec 2011	10 Oct 2011
TP14-1 0-0.2	SE101847E.021	LB006585	13 Sep 2011	14 Sep 2011	12 Dec 2011	07 Oct 2011	12 Dec 2011	10 Oct 2011
TP19-7 0-0.2	SE101847E.035	LB006585	13 Sep 2011	14 Sep 2011	12 Dec 2011	07 Oct 2011	12 Dec 2011	10 Oct 2011
TP27-2 0-0.1	SE101847E.066	LB006585	13 Sep 2011	14 Sep 2011	12 Dec 2011	07 Oct 2011	12 Dec 2011	10 Oct 2011

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, which is typically 2.5 times the statistically determined method detection limit (MDL).
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

Parameter	Units	Control LOR	BLK MB
Metals in Soil (TCLP) by ICPOES Method: ME-(AU)-[ENV]AN320/AN321			
LB006611.001			
Nickel, Ni	mg/L	0.01	<0.010

Duplicates are calculated as relative percent difference (RPD) using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
Where original and duplicate results are both zero, the Criteria and RPD are not applicable.
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Duplicates were required for this job.

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022).
For more information refer to the footnotes in the concluding page of the report.
Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Control	LCS STD			
Parameter	Units	LOR	Result	Expected Result	Criteria %	Recovery %
Metals in Soil (TCLP) by ICPOES **Method: ME-(AU)-[ENV]AN320/AN321**						
LB006611.002						
Nickel, Ni	mg/L	0.01	2.1	2	80 - 120	103

Matrix spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of the report. Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Matrix Spikes were required for this job.

Matrix spike duplicates are calculated as relative percent difference using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The original result is the analyte concentration of the matrix spike and the replicate result is the analyte concentration of the matrix spike duplicate.
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Matrix Spike Duplicates were required for this job.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	NATA Accreditation does not cover this analysis.
^	Performed by outside laboratory.
LOR	Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
NA	The sample was not analysed for this analyte

Samples analysed as received.
Solid samples expressed on a dry weight basis.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

SAMPLE RECEIPT ADVICE

SE101847E

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood - Additional**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 14/9/2011
Report Due	Thu 6/10/2011
SGS Reference	**SE101847E**

SUBMISSION DETAILS

This is to confirm that 4 samples were received on Wednesday 14/9/2011. Results are expected to be ready by Thursday 6/10/2011. Please quote SGS reference SE101847E when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	4 Soils	Type of documentation received	COC
Date documentation received	30/09/2011@11:28pm	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Three Days
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

SAMPLE RECEIPT ADVICE

SE101847E

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil (TCLP) by ICPOES	TCLP (Toxicity Characteristic Leaching
009	TP11-1 0.3-0.6	1	6
021	TP14-1 0-0.2	1	6

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

SAMPLE RECEIPT ADVICE

SE101847E

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil (TCLP) by ICPOES	TCLP (Toxicity Characteristic Leaching
035	TP19-7 0-0.2	1	6

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

SAMPLE RECEIPT ADVICE

SE101847E

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood - Additional

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil (TCLP) by ICPOES	TCLP (Toxicity Characteristic Leaching
066	TP27-2 0-0.1	1	6

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

COC received 30/9/11 @11:28am

SGS REF: SE101847 E.
DUE DATE: - 6/10/2011
TAT:- 3 DAYS.

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: 6/10/2011 (3d TAT)
(SGS Ref. SE101847)

	Location	Depth (m)	Date	Time	Sample type: Soil	Sample type: Water	TCLP for Ni									KEEP SAMPLE
9	TP11-1	0.3-0.6	13/09/2011	-	SP		✓									YES
21	TP14-1	0-0.2	13/09/2011	-	SP		✓									YES
35	TP19-7	0-0.2	13/09/2011	-	SP		✓									YES
66	TP27-2	0-0.1	13/09/2011	-	SP		✓									YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	30/09/2011	Angela	Angela	30/9/2011

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

ANALYTICAL REPORT

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood -Additional Analysis**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847F R0
Report Number	0000008943
Date Reported	06 Oct 2011
Date Received	14 Sep 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Inorganics Metals Team Leader

Huong Crawford
Laboratory Manager

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE101847F.102 Soil 13 Sep 2011 TP10-7 0-0.1	SE101847F.103 Soil 13 Sep 2011 TP10-8 0-0.1	SE101847F.104 Soil 13 Sep 2011 TP10-9 0-0.1	SE101847F.105 Soil 13 Sep 2011 TP10-10 0-0.1
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Zinc, Zn	mg/kg	0.5		180	210	110	130
Moisture Content Method: AN234							
% Moisture	%	0.5		12	12	12	14

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Moisture Content **Method: ME-(AU)-[ENV]AN234**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB006327	%	0.5	2 - 8%

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Zinc, Zn	LB006331	mg/kg	0.5	<0.5	1%	105%	-6%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

STATEMENT OF QA/QC PERFORMANCE AGAINST DATA QUALITY OBJECTIVES

SE101847F R0

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood -Additional Analysis**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	SE101847F R0
Report Number	0000008944
Date Reported	06 Oct 2011

COMMENTS

All the laboratory data for each environmental matrix was compared to the SGS Environmental Services' stated data quality objectives (DQO).
Comments arising from the comparison were made and are reported below.
The data relating to sampling was taken from the chain of custody document and was supplied by the client.
This QA/QC statement must be read in conjunction with the referenced analytical report.
The statement and the analytical report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Moisture Content	4 Items
MS	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY)	1 Item

SAMPLE SUMMARY

Sample counts by matrix	4 Soils	Type of documentation received	Email
Date documentation received	04/10/2011@12:37p	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE101847F R0

HOLDING TIMES

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field sampling guide for containers and holding time” (Ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

The extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and Analysis dates are shown in **Green** when within suggested criteria and in **Bold** with an appended dagger symbol and Red† when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Sample Name	Sample Number	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Moisture Content Method: ME-(AU)-[ENV]AN234								
TP10-7 0-0.1	SE101847F.102	LB006327	13 Sep 2011	14 Sep 2011	27 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
TP10-8 0-0.1	SE101847F.103	LB006327	13 Sep 2011	14 Sep 2011	27 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
TP10-9 0-0.1	SE101847F.104	LB006327	13 Sep 2011	14 Sep 2011	27 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
TP10-10 0-0.1	SE101847F.105	LB006327	13 Sep 2011	14 Sep 2011	27 Sep 2011	**05 Oct 2011†**	10 Oct 2011	05 Oct 2011
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320								
TP10-7 0-0.1	SE101847F.102	LB006331	13 Sep 2011	14 Sep 2011	11 Mar 2012	05 Oct 2011	11 Mar 2012	06 Oct 2011
TP10-8 0-0.1	SE101847F.103	LB006331	13 Sep 2011	14 Sep 2011	11 Mar 2012	05 Oct 2011	11 Mar 2012	06 Oct 2011
TP10-9 0-0.1	SE101847F.104	LB006331	13 Sep 2011	14 Sep 2011	11 Mar 2012	05 Oct 2011	11 Mar 2012	06 Oct 2011
TP10-10 0-0.1	SE101847F.105	LB006331	13 Sep 2011	14 Sep 2011	11 Mar 2012	05 Oct 2011	11 Mar 2012	06 Oct 2011

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, which is typically 2.5 times the statistically determined method detection limit (MDL).
Result is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

Parameter	Units	Control LOR	BLK MB
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**			
LB006331.001			
Zinc, Zn	mg/kg	0.5	<0.5

Duplicates are calculated as relative percent difference (RPD) using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
Where the MaxAllowableDifference evaluates to a number larger than 200 it is displayed as 200.
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

	Sample Name		SE102310.003-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Moisture Content Method: ME-(AU)-[ENV]AN234						
LB006327.011						
% Moisture	%	0.5	27.3	27	32	2

	Sample Name		SE102310.004-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Moisture Content Method: ME-(AU)-[ENV]AN234						
LB006327.013						
% Moisture	%	0.5	20.5	22	32	8

	Sample Name		SE102330.005-DUP			
Parameter	Units	LOR	Original Result	Duplicate Result	Criteria %	RPD %
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320						
LB006331.013						
Zinc, Zn	mg/kg	0.5	22.4791687259068	23	32	1

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022).
For more information refer to the footnotes in the concluding page of the report.
Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Control	LCS STD			
Parameter	Units	LOR	Result	Expected Result	Criteria %	Recovery %
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) **Method: ME-(AU)-[ENV]AN040/AN320**						
LB006331.002						
Zinc, Zn	mg/kg	0.5	52	50	80 - 120	105

Matrix spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of the report. Recovery is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

		Control	MS			
Parameter	Units	LOR	Result	Original Result	Spike Added	Recovery %
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: ME-(AU)-[ENV]AN040/AN320						
LB006331.004						
Zinc, Zn	mg/kg	0.5	170	180	50	**-6†**

Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).

Matrix spike duplicates are calculated as relative percent difference using the formula RPD = | OriginalResult - ReplicateResult | x 100 / Mean
The original result is the analyte concentration of the matrix spike and the replicate result is the analyte concentration of the matrix spike duplicate.
The RPD is evaluated against the maximum allowable RPD criteria and can be graphically represented by a curve calculated from the statistical detection limit and limiting repeatability using the formula: MaxAllowableDifference = 100 x StatisticalDetectionLimit / Mean + LimitingRepeatability
RPD is shown in **Green** when within suggested criteria or **Bold** with an appended dagger symbol and Red† when outside suggested criteria.

No Matrix Spike Duplicates were required for this job.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	NATA Accreditation does not cover this analysis.
^	Performed by outside laboratory.
LOR	Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
NA	The sample was not analysed for this analyte

Samples analysed as received.
Solid samples expressed on a dry weight basis.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

SAMPLE RECEIPT ADVICE

SE101847F

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12486-2 - Kingswood -Additional Analysis**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Wed 14/9/2011
Report Due	Wed 5/10/2011
SGS Reference	**SE101847F**

SUBMISSION DETAILS

This is to confirm that 4 samples were received on Wednesday 14/9/2011. Results are expected to be ready by Wednesday 5/10/2011. Please quote SGS reference SE101847F when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	4 Soils	Type of documentation received	Email
Date documentation received	04/10/2011@12:37pm	Samples received in good order	Yes
Samples received without headspace	N/A	Sample temperature upon receipt	21.5°C
Sample container provider	Client	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

SAMPLE RECEIPT ADVICE

SE101847F

CLIENT DETAILS

Client	Geotechnique	Project	12486-2 - Kingswood -Additional Analysis

SUMMARY OF ANALYSIS

No.	Sample ID	Moisture Content	Total Recoverable Metals in Soil by ICPOES from
102	TP10-7 0-0.1	1	1
103	TP10-8 0-0.1	1	1
104	TP10-9 0-0.1	1	1
105	TP10-10 0-0.1	1	1

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

COC received 4/10/2011 @ 12:37pm

SGS REF:- SE 101847F
DUE DATE:- 5/10/2011
TAT:- 1 DAY.

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN **Job No:** 12486/2

Project:

Project Manager: JX **Location:** Kingswood

Results required by: 5/10/2011 (1d TAT)
(SGS Ref. SE101847)

	Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Zn								KEEP SAMPLE
102	TP10-7	0-0.1	13/09/2011	-	SP		✓								YES
103	TP10-8	0-0.1	13/09/2011	-	SP		✓								YES
104	TP10-9	0-0.1	13/09/2011	-	SP		✓								YES
105	TP10-10	0-0.1	13/09/2011	-	SP		✓								YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	4/10/2011			

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

ANALYTICAL REPORT

28 September 2011

Geotechnique
P.O. Box 880
PENRITH
NSW 2751

Attention: **Danda Sapkota**

Your Reference: 12486-1 - Kingswood - Additional Analysis

Our Reference: SE87838C-R Samples: 1 Soil
Received: 23/5/11

Preliminary Report Sent: Not Issued

These samples were analysed in accordance with your written instructions.

This report cancels and supersedes report No. SE87838C issued by SGS Environmental Services due to the addition of Zn result.

For and on Behalf of:
SGS ENVIRONMENTAL SERVICES

Sample Receipt:	Angela Mamalicos	AU.SampleReceipt.Sydney@sgs.com
Production Manager:	Huong Crawford	Huong.Crawford@sgs.com

Results Approved and/or Authorised by:

Dong Liang
Inorganic/Metal Supervisor

Huong Crawford
Metals Signatory

SGS Australia Pty Ltd
ABN 44 000 964 278
Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia
t +61 (0)2 8594 0400 f + 61 (0)2 8594 0499 www.au.sgs.com

Metals in Soil by ICP-OES		
Our Reference:	UNITS	SE87838C-R-27
Your Reference	----------	TP22
Composite Reference	----------	-
Depth		0.1-0.4
Sample Matrix		Soil
Date Sampled		18/05/2011
Date Extracted (Metals)		20/09/2011
Date Analysed (Metals)		20/09/2011
Nickel	mg/kg	25
Zinc	mg/kg	79

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ABN 44 000 964 278

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Moisture Our Reference:	UNITS	SE87838C-R-27
Your Reference	----------	TP22
Composite Reference	----------	-
Depth		0.1-0.4
Sample Matrix		Soil
Date Sampled		18/05/2011
Date Analysed (moisture)		16/09/2011
Moisture	%	11

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Method ID	Methodology Summary
AN320	Determination of elements by ICP-OES following appropriate sample preparation / digestion process. Based on USEPA 6010C / APHA 21st Edition, 3120B.
AN002	Preparation of soils, sediments and sludges undergo analysis by either air drying, compositing, subsampling and 1:5 soil water extraction where required. Moisture content is determined by drying the sample at 105 ± 5°C.

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QUALITY CONTROL Metals in Soil by ICP-OES	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted (Metals)				20/09/2011	[NT]	[NT]	LCS	20/09/2011
Date Analysed (Metals)				20/09/2011	[NT]	[NT]	LCS	20/09/2011
Nickel	mg/kg	0.5	AN320	<0.5	[NT]	[NT]	LCS	105%
Zinc	mg/kg	0.5	AN320	<0.5	[NT]	[NT]	LCS	101%

QUALITY CONTROL Moisture	UNITS	LOR	METHOD	Blank
Date Analysed (moisture)				[NT]
Moisture	%	1	AN002	<1

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Result Codes

[INS] : Insufficient Sample for this test
[NR] : Not Requested
[NT] : Not tested
[LOR] : Limit of reporting
[RPD] : Relative Percentage Difference
* : Not part of NATA Accreditation
[N/A] : Not Applicable

Report Comments

Samples analysed as received. Solid samples expressed on a dry weight basis.
Date Organics extraction commenced:
NATA Corporate Accreditation No. 2562, Site No 4354
Note: Test results are not corrected for recovery (excluding Air-toxics and Dioxins/Furans*)

Quality Control Protocol

Method Blank: An analyte free matrix to which all reagents are added in the same volume or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. A method blank is prepared every 20 samples.
Duplicate: A separate portion of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.
Surrogate Spike: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. Surrogates are added to samples before extraction to monitor extraction efficiency and percent recovery in each sample.
Internal Standard: Added to all samples requiring analysis for organics (where relevant) or metals by ICP after the extraction/digestion process; the compounds/elements serve to give a standard of retention time and/or response, which is invariant from run-to-run with the instruments.
Laboratory Control Sample: A known matrix spiked with compound(s) representative of the target analytes. It is used to document laboratory performance. When the results of the matrix spike analysis indicates a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.
Matrix Spike: An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Quality Acceptance Criteria

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

SGS Australia Pty Ltd
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Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia
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SGS REF: SE87838C

DUE DATE: - 22/9/2011

TAT:- STANDARD.

COC 27/9/2011 @ 2:44pm.

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 **FAX:** 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AJP **Job No:** 12486/1

Project:

Project Manager: DS **Location:** Kingswood

Results required by: 21/09/2011 (Normal Turnaround Time)
SGS NO: SE87838

	Sampling details				Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Ni	Zn							KEEP SAMPLE
#27.	TP22	0.1-0.4	18/05/2011	-	SG		✓	✓							YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	Angela	Angela	27/9/2011 @2:44pm

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle			✓	Test required

* Purge & Trap

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 61812

Client:
Geotechnique Pty Ltd
PO Box 880
Penrith
NSW 2751

Attention: John Xu

Sample log in details:

Your Reference:	**12486/2, Kingswood**		
No. of samples:	4 soils		
Date samples received / completed instructions received	15/09/11	/	15/09/11

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	22/09/11	/	22/09/11
Date of Preliminary Report:	Not issued		

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Rhian Morgan
Reporting Supervisor

Acid Extractable metals in soil					
Our Reference:	UNITS	61812-1	61812-2	61812-3	61812-4
Your Reference	----------	S1	S2	S3	S4
Date Sampled	----------	09/09/2011	13/09/2011	13/09/2011	13/09/2011
Type of sample		Soil	Soil	Soil	Soil
Copper	mg/kg	29	[NA]	[NA]	[NA]
Nickel	mg/kg	[NA]	[NA]	26	77
Zinc	mg/kg	76	87	[NA]	[NA]

Moisture					
Our Reference:	UNITS	61812-1	61812-2	61812-3	61812-4
Your Reference	----------	S1	S2	S3	S4
Date Sampled	----------	09/09/2011	13/09/2011	13/09/2011	13/09/2011
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	20/09/2011	20/09/2011	20/09/2011	20/09/2011
Date analysed	-	21/09/2011	21/09/2011	21/09/2011	21/09/2011
Moisture	%	6.3	7.1	5.8	10

Method ID	Methodology Summary
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Arsenic	mg/kg	4	Metals-020 ICP-AES	[NT]	[NT]	[NT]	LCS-1	20/09/2011
Cadmium	mg/kg	0.5	Metals-020 ICP-AES	[NT]	[NT]	[NT]	LCS-1	20/09/2011
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NR]	[NR]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NR]	[NR]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	[NT]	[NT]	[NT]	[NR]	[NR]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	102%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			20/09/2011
Date analysed	-			21/09/2011
Moisture	%	0.1	Inorg-008	[NT]

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 61812

Date Received: 15/9/11 } COC
Time Received: 17:30

Received by: JHie

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Samples received: 14/9/11 17:15.

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: **ENVIROLAB SERVICES PTY LD**
12 ASHLEY STREET
CHATSWOOD NSW 2067

PH: **02 9910 6200** FAX: **02 9910 6201**

ATTN: AILEEN HIE

Sampling By: AN

Project Manager: JX

Job No: 12486/2

Project:

Location: Kingswood

Results required by: Normal Turnaround Time

Sampling details				Sample type											
	Location	Depth (m)	Date	Time	Soil	Water	Cu	Ni	Zn						KEEP SAMPLE
1	S1	-	9/09/2011	-	SP		✓		✓						YES
2	S2	-	13/09/2011	-	SP				✓						YES
3	S3	-	13/09/2011	-	SP			✓							YES
4	S4	-	13/09/2011	-	SP			✓							YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	15/09/2011	JHie		15/9/11

Legend:

WG	Water sample, glass bottle	SG	Soil sample (glass jar)	SP	Soil sample (plastic bag)
WP	Water sample, plastic bottle	FCP	Fibro Cement Piece	✓	Test required

* Purge & Trap

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

Geotechnique Pty Ltd
PO Box 880
Penrith NSW 2751

ph: 02 4722 2700
Fax: 02 4722 6161

Attention: John Xu

Sample log in details:

Your reference:	**12486/2, Kingswood**
Envirolab Reference:	**61812**
Date received:	15/09/11
Date results expected to be reported:	**22/09/11**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	4 soils
Turnaround time requested:	Standard
Temperature on receipt	Ambient
Cooling Method:	None

Comments:

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

APPENDIX C

WASTE CLASSIFICATION

TABLE C1
NICKEL (Ni) TEST RESULTS - DISCRETE SAMPLES
(Ref No: 12486/2-AA)

Sample Location	Depth (m)	NI (mg/kg)	Sample Location	Depth (m)	NI (mg/kg)
TP11	0.15-0.3	79	TP14-5	0-0.2	45
TP11	0.3-0.6	88	TP14-6	0-0.3	25
TP11-1	0.1-0.3	79	TP14-7	0-0.2	76
TP11-1	0.3-0.6	92	TP19	0-0.1	63
TP11-2	0-0.3	72	TP19-1	0-0.1	53
TP11-2	0.4-0.6	64	TP19-2	0-0.1	42
TP11-3	0-0.3	76	TP19-3	0-0.1	60
TP11-3	0.4-0.6	25	TP19-4	0-0.1	36
TP11-4	0.15-0.3	82	TP19-5	0-0.2	49
TP11-4	0.3-0.6	37	TP19-6	0-0.2	68
TP11-5	0-0.2	64	TP19-7	0-0.2	86
TP11-6	0-0.3	16	TP27	0-0.1	70
TP11-7	0-0.3	23	TP27-1	0-0.15	38
TP11-8	0-0.3	92	TP27-2	0-0.1	61
TP14	0-0.15	77	TP27-2	0.1-0.4	24
TP14-1	0-0.2	83	TP27-3	0-0.3	27
TP14-2	0-0.15	77	TP27-4	0-0.1	47
TP14-3	0-0.15	80	TP27-5	0-0.1	46
TP14-4	0-0.15	48	TP26-8	0-0.1	67
Procedure D [a] (Normal Distribution)					
Number of Samples					38
Mean [b]					59
Standard Deviation					22
Coefficient of Variance					0.4
95% Upper Confidence Limit (UCL)					*65*

Note a: Contaminated Sites: "Sampling Design Guidelines", 1995, EPA.

TABLE C2
NICKEL TCLP TEST RESULTS
(Ref No: 12486/2-AA)

Sample Location	Date	NICKEL (mg/L)
TP11-1	0.3-0.6	0.090
TP14-1	0-0.2	0.016
TP19-7	0-0.2	0.11
TP27-2	0-0.1	<0.010

TABLE C3
WASTE CLASSIFICATION OF COPPER, NICKEL AND/OR ZINC CONTAMINATED SOIL (AREAS 1-5)
(LANDFILL DISPOSAL)
O'CONNELL STREET, KINGSWOOD
(Ref No: 12486/2-AA)

Analyte	Total Concentration (mg/kg)					Leachable Concentration (mg/L)			Classification
	95% UCL	CT1	CT2	SCC1	SCC2	Maximum	TCLP1	TCLP2	
Nickel	65	40	160	1050	4200	0.11	2	8	General Solid

NOTES:

UCL:	Upper Confidence Limit
ND:	Not Determined
TCLP:	Toxicity Characteristic Leaching Procedure
CT1:	Contaminant concentration for defining General Solid Waste (without TCLP)
CT2:	Contaminant concentration for defining Restricted Solid Waste (without TCLP)
SCC1:	Contaminant concentration for defining General Solid Waste when combined with TCLP
SCC2:	Contaminant concentration for defining Restricted Solid Waste when combined with TCLP
TCLP1:	Leachable concentration for defining General Solid Waste when combined with SCC1
TCLP2:	Leachable concentration for defining Restricted Solid Waste when combined with SCC2

APPENDIX D

ENVIRONMENTAL NOTES

IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by Geotechnique Pty Ltd, using guidelines prepared by the ASFE (Associated Soil and Foundation Engineers). The notes are offered to assist in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre-acquisition assessment on behalf of a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has changed, e.g. from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of e.g. a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible quantify the risks that unrecognised contamination poses to the ongoing proposed activity. Such risks may be financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment might not detect all contamination within a site. Contaminants could be present in areas that were not surveyed or sampled, or migrate to areas that did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant that may occur; only the most likely contaminants are screened.

AN ENVIRONMENTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

In the following events and in order to avoid cost problems, you should ask your consultant to assess any changes in the conclusion and recommendations made in the assessment:

- When the nature of the proposed development is changed e.g. if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered e.g. if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientists and opinions are drawn about the overall sub-surface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason site owners should retain the services of their consultants throughout the development stages of the project in order to identify variances, conduct additional tests that may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by Geotechnique Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data that may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs of specific individuals e.g. an assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another consulting civil engineer.

An assessment should not be used by other persons for any purpose or by the client for a different purpose. No individual, other than the client, should apply an assessment, even for its intended purpose, without first conferring with the consultant. No person should apply an assessment for any purpose other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FROM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists, based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these would not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. Should this occur, delays and disputes, or unanticipated costs may result.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion; therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.