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Report on
Supplementary Contamination Assessment

Seniors Housing Croydon Project
Croydon Avenue, Croydon

Prepared for
Catholic Healthcare Ltd

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Executive Summary

To be included in final report.

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Report on Supplementary Contamination Assessment
Seniors Housing Croydon Project
Croydon Avenue, Croydon, NSW

1. Introduction

This report presents the methodology and results of a Supplementary Contamination Assessment conducted by Douglas Partners Pty Ltd (DP) at the Seniors Housing Croydon Project, Lot 4 in Deposited Plan 1073577, Croydon Avenue, Croydon (the site). The assessment was conducted for Catholic Healthcare Ltd.

An *in situ* waste classification is also included as part of this assessment.

The site was previously part of a larger (approximately 2.4 ha) lot which was subject to a contamination assessment and Site Audit in 2002. The previously assessed land was then subdivided with the northern portion developed as a nursing home. The southern portion comprises the current subject site which was used for site sheds and other construction support purposes during the development of the northern portion. A recent site inspection (8 December 2011) observed that ground levels at the Site had changed since the previous assessment, and no records of imported materials or re-contouring works were available. Additional testing has therefore been undertaken to assess the current contamination status of the site.

2. Scope of Works

The scope of works comprised:

- Review of previous reports and any other relevant information provided by the client;
- Collection of soil samples from 14 test pits excavated over the site to a depth of approximately 0.5 m into natural materials. Samples were collected at regular intervals based on field observations. The test locations targeted areas of filling and provided coverage for the waste classification assessment (to be issued separately). Test pit locations are provided on Drawing 1 in Appendix A.
- Analysis at a NATA accredited laboratory of selected samples for the following potential contaminants:
  - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc) (21 samples)
  - Polycyclic aromatic hydrocarbons (PAH) (21 samples)
  - Total recoverable hydrocarbons (TRH) (21 samples)
  - Monocyclic aromatic hydrocarbons (benzene, toluene, ethyl benzene and total xylenes - BTEX and methyl tert-butyl ether - MTBE) (21 samples)
  - Phenols (15 samples)

- Polychlorinated biphenyls (15 samples)
- Organochlorine pesticides (15 samples)
- Asbestos (filling material only) (15 samples)
- Toxicity Characteristic Leaching Procedure (TCLP) for heavy metals and/or PAH (as required for waste classification purposes) (9 samples)
- Quality control/quality assurance sampling and analysis, comprising:
    - Intra-laboratory replicate sample (heavy metals and PAH) (1 sample)
    - Inter-laboratory replicate sample (heavy metals and PAH) (1 sample)
    - Trip blank sample (TRH C_6-C_9, BTEX) (1 sample)
    - Trip spike sample (BTEX) (1 sample)

- Data analysis and preparation of this report.

The results of the above works are discussed in the following sections.

3. Data Quality Objectives and Project Quality Procedures

The data qualitative objectives (DQO) are qualitative and quantitative statements that specify the quality of the data required for the assessment, as stipulated in the NSW Office of Environment and Heritage (OEH) *Contaminated Sites Guidelines for Consultants Reporting on Contaminated Sites* (2011). The DQO must ensure that the data obtained are sufficient to achieve the objectives of the assessment.

The DQO were developed for this Contamination Assessment in accordance with the Australian Standards "*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 seven step DQO process is as follows:

a) State the Problem

b) Identify the Decision

c) Identify Inputs to the Decision

d) Define the Boundary of the Assessment

e) Develop a Decision Rule

f) Specify Acceptable Limits on Decision Errors

g) Optimise the Design for Obtaining Data.

(a) Stating the Problem

The site was historically residential properties, before their demolition and construction of a hospital. A contamination assessment was undertaken following demolition of the hospital, and no contamination

of concern was identified at this time. Subsequent to this contamination assessment the site has been used as a support area for adjacent construction works (for site sheds, parking etc). Inspection of the site in December 2011 indicated that site levels had changed since the previous contamination assessment. The main aim of the current assessment is therefore to identify the current contamination status of the site, with specific reference to areas which appear to have undergone earthworks since the previous contamination assessment.

(b) Identifying the Decisions

The decisions to be made in the assessment are as follows:

- Is the site suitable for the proposed development?
- Can the site be rendered suitable for the proposed development?
- Are any additional contamination assessment or management works required?
- Is there a duty to report contamination issues at the site to the NSW EPA?

(c) Identify Inputs to the Decision

The inputs into the decision process are as follows:

- Historical information regarding past land uses and features;
- Site operations and field observation details;
- Soil sampling for site characterisation;
- Soil profile information obtained through the sampling phase;
- Chemical test data on analysed soil samples; and
- Assessment of test data against applicable site assessment criteria.

(d) Define the Boundary of the Assessment

The boundary of the assessment is shown on Drawing 1, Appendix A.

(e) Develop a Decision Rule

The information obtained through this assessment will be used to make an assessment regarding contamination at the site. The decision rule in conducting this assessment is the site assessment criteria as defined in Section 7.

(f) Specify Acceptable Limits on Decision Errors

The limits on decision errors for this assessment are as follows:
In order to ensure the quality of the data, appropriate and adequate quality assurance and quality control (QA/QC) measures and evaluations have been incorporated into the sampling and testing regime as follows:

- A field and laboratory QA/QC regime, comprising the collection and analysis of Inter- and Intra-laboratory replicate samples, trip blank and trip spike samples and (where re-usable sampling equipment is used) rinsate blank samples will be implemented to meet the requirements associated with the following data quality indicators (DQIs);
- conformance with specified holding times;
- accuracy of spiked samples within the laboratory's acceptable range (typically 70-130% for inorganic contaminants and greater for some organic contaminants);
- field and laboratory duplicate and replicate samples will have a precision average of +/- 30% relative percent difference (RPD) for inorganic analytes and +/- 50% RPD for organic analytes;
- field replicates will be collected at a frequency of at least 10% of all samples (comprising 5% intra-laboratory replicates and 5% inter-laboratory replicates); and
- rinsate blank samples will show that the sampling equipment is free of introduced contaminants, i.e. the analytes show that the rinsate is within the normal range for deionised water.

(g) Optimise the Design for Obtaining Data

In order to collect data that is reasonably representative of the overall site conditions. Fourteen (14) test pits boreholes were excavated by means of a backhoe to 0.5 m into natural soils or prior refusal (whichever was the lesser) in an approximate grid square pattern at the site.

The previous contamination assessment included sampling from 19 test locations, which in conjunction with the 14 current test locations provides a total of 33 test locations over the site. This is more than the NSW EPA *Contaminated Sites Sampling Design Guidelines* (1995) recommended minimum sampling density of 22 to 23 locations for a 1.2 ha site.

Procedures for the collection of environmental samples, as described in the QA/QC section in Appendix F, were developed prior to undertaking the assessment phase of works. These are in line with OEH guidelines and current industry practice.

DP employed NATA accredited analytical laboratories to conduct sample analysis.

4. Site Information

4.1 Site Identification

The site comprises Lot 4 in Deposited Plan 1073577, covering an area of 12,045 m^2 (1.2 ha). The site has street frontages to Croydon Avenue to the east and Brighton Street to the west and is located at Croydon, NSW in the Burwood local government area. A site drawing showing the site boundary and location is presented on Drawing 1, Appendix A.

4.2 Site Description

The site is almost square except for the south eastern corner, where a small rectangular residential property is situated as shown on Drawing 1, Appendix A.

The site is grassed apart from a small hardstand area of approximately 400 m² at the eastern boundary of the site and a small asphalt road accessing a gate along the fence defining the northern boundary with the adjacent nursing home. Semi-mature to mature trees are present along the western and southern boundaries of the site.

The topography of the site falls from the north to the south. Along the northern boundary there is a steep fall in comparison to the rest of the site from the edge of the nursing home to around 15 m inside the Lot. This is likely to be an embankment built up during previous earthworks to allow for construction levels for the nursing home buildings to be formed. Another small raised area is located along the western boundary where TP2 was excavated.

A bund has been constructed from the boundary of the south-eastern property running almost the full length of the southern boundary which ranges in height between 1 - 1.5 m and, like the majority of the site, this feature is grassed. A small drainage ditch is present along the fence line that separates the Lot from neighbouring properties and, at the time of current testing, it was found to be intermittently wet, although some ponding of surface water was also observed during the previous site inspection (8 December 2011).

4.3 Adjacent Site Use

The surrounding land usage is as follows:-

- North – Nursing home (Holy Spirit, Croydon);
- East – Croydon Avenue and then Residential;
- South – Residential;
- West –Brighton Street and then Residential.

Given the residential land uses of the surrounding area, it is considered that there is little potential for migration of contaminants onto the subject site.

4.4 Proposed Development

The proposed development comprises an aged care facility with basement parking. It is understood that the site is to be excavated to a level of approximately 21.2 m AHD (i.e. between approximately 1 to 6 m below current site levels) to accommodate a basement.

Spoil excavated during earthworks is to be disposed of site.

4.5 Geology

Reference to the Sydney 1:100 000 Geological Series Sheet 9130 (Edition 1, 1983) indicates the site is underlain by Bringelly Shale of Triassic age which is the upper formation of the Wianamatta Group of sedimentary rock types. It also indicates that the Ashfield Shale unit, which is the basal formation of the Wianamatta Group and underlies the Bringelly Shale unit, outcrops nearby.

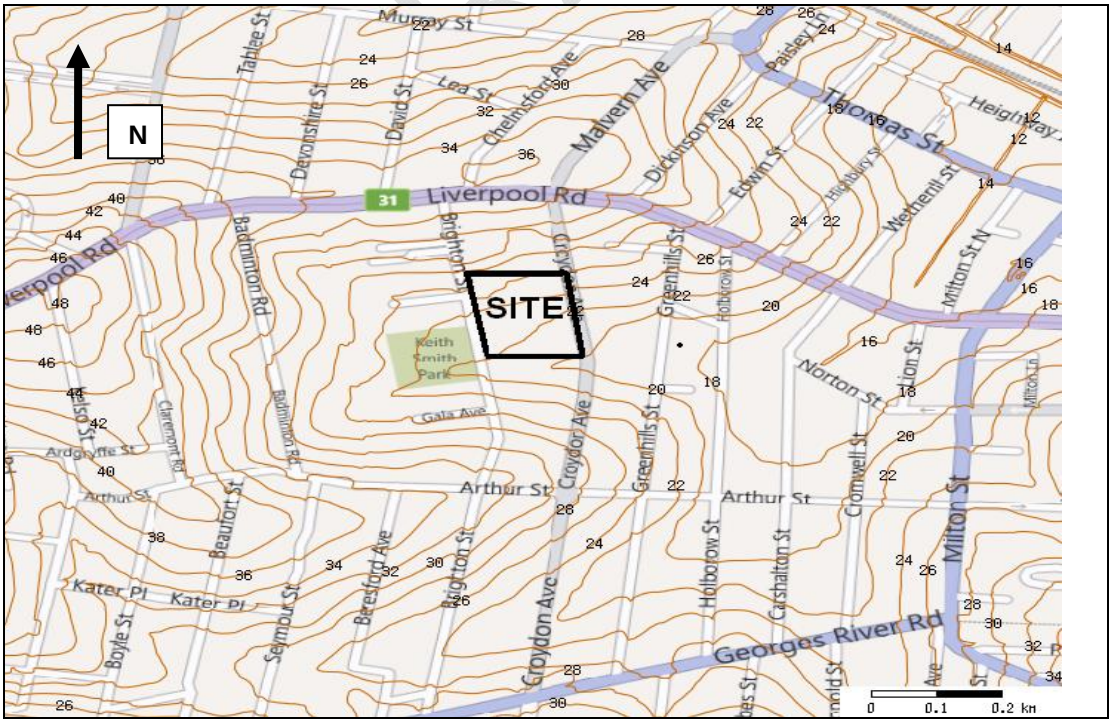
Bringelly Shale in this area typically comprises beds of shale, claystone, laminite and fine to medium grained lithic sandstone. The geological unit is prone to relatively shallow weathering, forming medium to high plasticity clays.

The previous DP site investigation has confirmed the geological mapping encountering relatively uniform sub-surface stratification comprising limited amounts of filling underlain by stiff, becoming hard, residual clays overlying extremely low to low strength, highly weathered siltstone/shale with the strength increasing with depth.

4.6 Topography

The topography of the site falls from the north to the south and is likely engineered due to bulk earthworks that have occurred previously at the site. However, regional topography shows a fall immediately to the east of the site then changing to the north east with figure 1, possibly a former creek line, running west to east at the southern end of the site.

Figure 1: Regional Topography



4.7 Hydrology and Hydrogeology

On site there is a small drainage channel running along the southern boundary which site observations found it to be intermittently wet. The course of the drainage channel also appeared to be contained entirely on site as no culverts were seen at either end of this feature. Surface water from the site is expected to drain into the local stormwater system.

Whilst the nearest watercourse is the Cooks River located approximately 1.6 km south of the site, the regional topography indicates that surface water drains east, and then north east, towards the Parramatta River. The regional topography is shown in Figure 1, Section 4.5.

A monitoring bore was installed by DP in 2002 and standing water levels were found to be 1.4 – 2.3 m below ground level (bgl) over a period of two months. These levels may represent a perched water table above the clay found in the natural soil profiles of the site, prior to the changing of site topography through earthworks conducted *circa* 2003.

A groundwater bore search was undertaken using data from the NSW Office of Water. One bore, constructed for monitoring purposes, is registered within a 1 km radius of the subject site. The standing water level within this bore was observed at approximately 31.0 m below ground level.

Groundwater is considered likely to flow in a generally north east direction towards Parramatta River, although this has not been confirmed.

4.8 Acid Sulphate Soils

Data supplied by NSW Department of Environment and Climate Change (now Environment Protection Authority - EPA) based on published 1:25,000 Acid Sulphate Soil Risk Mapping, 1994-1998, was reviewed with respect to Acid Sulphate Soil (ASS) potential. The mapping shows the site as having a low probability of ASS, the nearest area with a high probability of occurrence of ASS is located 1.5 km to the north of the site. In support of this, the level of the site is approximately 22 to 28 m AHD and ASS is generally found at a level of less than 5 m AHD

5. Previous Reports

A contamination assessment has previously been conducted at the site, as provided in DP's "*Report on Contamination Assessment, Inner West Health Centre 24 Liverpool Street, Croydon"* reference 20289B, dated May 2002 (DP 2002). DP (2002) covered both the current subject site as well as an area to the northern portion of the site which has since been developed into a nursing home facility (Holy Spirit Croydon).

DP (2002) included a review of site history (as summarised in Section 6 of this report), intrusive sampling, laboratory analysis and preparation of a report. Intrusive sampling was conducted from a total of 38 test locations, 19 of which were located within the current site boundaries. The site drawing and test pit logs from the previous report are included in Appendix B.

Heavy metals, TRH, BTEX, PAH, phenols and OCP testing was conducted during the 2002 investigation. All results were within the current site assessment criteria with the exception of two exceedances of PAH. These PAH exceedances were both located in the north western corner of the northern portion of the former site, i.e. to the north of the current site and were remediated as part of the development of the Holy Spirit nursing home. The PAH exceedances were identified in surface samples from pits 104 and 113, with a maximum concentration of total PAH of 284.4 mg/kg and maximum concentration of benzo(a)pyrene of 20 mg/kg. TCLP analysis of the two PAH exceedances recorded all results to be less than the laboratory practical quantitation limit. The PAH exceedances where interpreted as being associated with observed charred timber fragments.

Groundwater assessment was undertaken and comprised one installed piezometer at location TB102, which was primarily used to determine groundwater levels and be used for sampling purposes. Water samples were taken and analysed for pH, EC, heavy metals, TRH, BTEX, PAH, anions (chloride, phosphate and sulphate) and cations (calcium, potassium and sodium, and nitrogen). All results were within the GIL with the exception of cadmium, chromium, lead, nickel, zinc which exceeded the criteria, however, these concentrations were not considered to be significant as results only marginally exceeded criteria. Background concentrations were unable to be determined.

The DP (2002) contamination assessment was audited by an EPA accredited, contaminated land auditor, however, a copy of the Site Audit report has not been provided to DP.

6. Site History

DP (2002) identified the history of the site, and should be referenced for full details, In summary:

- The historical title deeds indicate that the site originally comprised various individually owned lots. These lots were incrementally passed to the Western Suburbs Hospital between 1931 and 1984, which was originally built in the north west of the site before expanding to the south and east of the site. The original lots were likely residential properties with a large manor type house present in the north east of the site;
- Between 1930 and 1951 aerial photographs show additional buildings were constructed on the site, likely to have been the expansion of the hospital;
- Between 1951 and 1970 considerable changes to the site occurred with many of the previous buildings appearing to have been demolished and the vacant area used for car parking;
- Between 1970 and 1991 three buildings had been constructed along the eastern portion of the site; and
- The hospital was demolished in 1994/1995 in preparation for the construction of the nursing home in the northern portion of the original site. The site remained vacant until 2003 when major earthworks were conducted on the property altering the topography of the site.

Since the previous investigation, aerial photography and anecdotal evidence has determined the following changes on site:

- Between 2003 and 2005 the nursing home was constructed to the north of the site and the site was used for support infrastructure (site sheds etc).

- A survey plan with contours of the site prepared following construction of the nursing home is provided in Appendix A and closely matches the contours currently present, with the contours different than those shown on the survey plan used in the previous contamination assessment;
- Between 2007 and 2009 the bund in the southern portion of the site was constructed.

6.1 Regulatory Notices Search

The EPA publishes records of contaminated sites under Section 58 of the *Contaminated Land Management Act 1997* (CLM Act) on a public database accessed on the OEH website. The Notices relate to investigation and/or remediation of contaminated sites considered to be significantly contaminated under the definition in the CLM Act. More specifically, the Notices cover the following:

- actions taken by the EPA under Section 15, 17, 19, 231, 23, 26 or 28 of the CLM Act;
- actions taken by the EPA under Section 35 or 36 of the Environmentally Hazardous Chemicals Act 1985;
- site audit statements provided to the EPA under Section 52 of the CLM Act on sites subject to an in-force declaration or order.

A search of the public database on 2 February 2012 revealed that the subject site is not listed and no other properties were listed in the near vicinity.

The EPA also issues environmental protection licences to the owners or operators of various industrial premises under the *Protection of the Environment Operations* Act 1997 (POEO Act). Licence conditions relate to pollution prevention and monitoring, and cleaner production through recycling and reuse and the implementation of best practice.

The EPA has made available a public register of licences under Section 308 of the *Protection of the Environment Operations Act 1997* (POEO Act). The register contains:

- environment protection licences;
- applications for new licences and to transfer or vary existing licences;
- environment protection and noise control notices;
- convictions in prosecutions under the POEO Act;
- the results of civil proceedings;
- licence review information;
- exemptions from the provisions of the POEO Act or Regulations;
- approvals granted under clause 9 of the POEO (Control of Burning) Regulation; and
- approvals granted under clause 7A of the POEO (Clean Air) Regulation.

A search of the public register under the POEO Act on 2 February 2012 did not locate a listing for the site. Only one nearby site has a surrendered licence that included two variations and a clean-up action under the POEO Act as follows:

- 34 Cheltenham Road, Croydon, NSW, 2132 (Waste disposal by application to land – licence surrendered) – This location is now Burwood Girls High School and is located 1.5 km to the north and is down-gradient from the site.

7. Assessment Criteria

7.1 Contamination Assessment

Field results will be reviewed and any aesthetic issues (e.g. odours, staining, significant inclusions of anthropogenic materials) will be assessed for their impact on the proposed development.

Laboratory results from the previous and current assessments have been compared with the health-based investigation levels for residential land use with minimal access to soils. This is based on the proposed residential land use with basement parking. The thresholds are referred to herein as the Site Assessment Criteria (SAC)

The SAC have been sourced from the following documents:

- NSW Department of Environment and Conservation (DEC) *Guidelines for the NSW Site Auditor Scheme (2nd Edition)*, 2006 (HIL Column 2, Appendix II) (for residential land use with minimal access to soils); and NSW Environmental Protection Agency (EPA) *Contaminated Sites Guidelines for Assessing Service Station Sites (1994)* will be adopted for health based levels associated with hydrocarbons (for all land uses).

In assessing the analytical data against the SAC, the contaminant can be stated to meet SAC if:

- All results are within the adopted criteria; or
- The 95% Upper Confidence Limit (UCL) of the average concentrations for a data set of samples of like material complies with the adopted criteria; and
- Individual concentrations of analytes (non-volatile) are less than 250% of the adopted guideline value; and
- The standard deviation of the population is <50% of the guideline.

7.2 Waste Classification

The threshold criteria for waste classification were sourced from:

- NSW DECC *Waste Classification Guidelines* 2008, revised July 2009.

8. Results

Details of the results are provided in the Appendices, including Drawing 1 showing the test pit locations (Appendix A), test pit logs (Appendix C), a summary of analytical results (Appendix D) and NATA laboratory reports (Appendix E). The results are discussed below.

8.1 Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) were an integral part of the investigation. The QA/QC procedures and results are provided in the laboratory reports in Appendix E and further detailed in the QA/QC procedures and results in Appendix F. Based on the results of the QA/QC assessment it is considered that the data is suitable for use in this assessment.

8.2 Field Results

Fourteen test pits (TP1-TP14) were excavated using a 3-tonne backhoe excavator across the site to a depth of approximately 0.5 m into natural materials. Samples were collected at regular intervals based on field observations, the soils profile was also logged with the test pit logs found in Appendix C of this report. Test pit locations are provided on Drawing 1 in Appendix A.

Filling comprising clay, silts, sands and gravels was observed across the entire site ranging in depth from 0.4 – 2.1 m. Inclusions of demolition materials were observed in all but two locations (TP1 and TP13), ash was observed at two locations (TP6 and TP14) and fibre-cement fragments were observed in TP2, 0-0.2 m. A slight hydrocarbon odour was noted at TP3, 0.0 – 0.4 m.

Natural soils comprise friable clays and, based on *in situ* field testing using a pocket penetrometer, range in strength from 50 KPa to >400 KPa. Within some of the test pits topsoil that has likely been buried by filling during previous earthworks was also found to be present.

8.3 Laboratory Results

NATA laboratory reports are provided in Appendix E and a summary of laboratory results is provided in Table 2, Appendix D.

The following contaminants have been detected above the HIL:

TP3/0.0 - 0.4 m:

- Total PAH (1,195.6 mg/kg compared to the HIL of 80 mg/kg);
- Benzo(a)pyrene (BaP - a PAH compound) (91 mg/kg compared to the HIL of 4 mg/kg);
- TRH C_{10}-C_{36} (2,960 mg/kg compared to the HIL of 1,000 mg/kg);

The high TRH result is strongly associated with the high PAH result.

TP2/0.0 - 0.2 m:

- Chrysotile Asbestos detected in fibre-cement fragment

All other PAH and TRH results were within the SAC. No PAH or TRH were detected above the laboratory practical quantitation limit (PQL) in the sample collected from TP3/0.5-0.7 m.

BTEX, PCB and phenols were all found to be below laboratory PQL in all samples analysed.

All OCP results were within the SAC although trace concentrations of DDT were detected above the laboratory PQL at two locations, TP8/0.9 – 1.1 m (0.7 mg/kg) and TP14/0.0 – 0.2 m (0.1 mg/kg), compared to the SAC of 800 mg/kg.

9. Waste Classification

The waste classification was generally conducted in accordance with NSW DECC *Waste Classification Guidelines* 2008, revised July 2009. The DECC (now EPA) guideline does not specify the sampling density for waste classification.

Waste Classification of the material was generally conducted in accordance with the six step process as set out in the DECC (2009) and summarised in Table 1 below.

Table 1: Six Step Classification

Step	Classification	Rationale
1. Is it special waste?	No - apart from area around TP3	Waste around TP3 contains asbestos-cement fragments. All other test pit locations appear to be free of asbestos-cement fragments.
2. Is it liquid waste?	No	Waste composed of soil matrix (i.e. no liquids)
3. Is the waste "pre-classified"?	No	Waste not observed to contain coal tar, batteries, lead paint or dangerous goods containers.
4. Does the waste have hazardous waste characteristics?	No	Waste not observed to/ or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances or corrosive substances.
5. Chemical Assessment	Undertaken	Not liquid waste, apart from area around TP3, does not possess hazardous characteristics. TP3 soils will be further assessed with *ex situ* sampling during bulk earthworks
6. Is the waste putrescible?	No	All observed components of material composed of materials pre-classified as non-putrescible (i.e. soil and slag). Root content is assessed to be minor.

With regards to chemical contaminants in filling materials, all total and leachable results were within the General Solid Waste thresholds with the exception of sample TP3/0.0 – 0.2 m. The total PAH and Benzo(a)pyrene results from this sample were above the SCC2 thresholds of Table 2 (DECC 2009) for Restricted Solid Waste, although the TCLP Benzo(a)pyrene was within the TCLP2 threshold. A summary of the results and the waste classification criteria used for comparison can be found in Table 3, Appendix D.

With respect to asbestos, asbestos-cement was recorded in only one test pit, however, demolition debris was observed thirteen of the test pits across the site. The presence of demolition debris can be an indicator for asbestos and, therefore, an elevated risk of asbestos contamination in the filling materials is indicated.

On this basis the provisional waste classification for the filling materials comprises:

- Materials around TP2 impacted by fibre cement – Special Waste (asbestos);
- Materials around TP3 – provisionally classifiable as Hazardous Waste, however, additional testing is recommended to allow further inspection for a possible source of the contamination and to confirm that the detected results are characteristic of materials in this location and, if they are, to determine the extent of the contamination. It is recommended that a final classification, if *in situ* testing confirms the presence of the contamination, be conducted *ex situ* on materials excavated from the identified area of contamination;
- Other filling materials are provisionally classifiable as General Solid Waste (non-putrescible) subject to inspection during excavation to confirm that no asbestos-containing materials (e.g. fibre cement) are present. If asbestos is observed, the soil containing the asbestos should be stockpiled separately and classified as Special Waste (Asbestos).

With respect to natural materials the underlying natural soils had no obvious signs of contamination (e.g. staining or chemical odours) or indicators of acid sulphate soils (e.g. sulphur odours) and laboratory testing showed analytes to be below the published natural background levels. It is noted, however, that TP5 0.5-0.7 recorded low levels of PAH, which may be above the local background PAH concentration.

The natural soils are therefore likely to classify as virgin excavated natural material (VENM) provided no signs of concern are observed natural materials following removal of filling and further assessment in the area of TP5 find the PAH to be localised/ consistent with natural conditions. If the natural materials are mixed with fill, have chemical odours or staining or contains anthropogenic materials it cannot be classified as VENM. Confirmation of the VENM status is required following removal of the fill and prior to export of the natural materials off site as VENM.

10. Discussion

The historical information indicates that the site was likely to have been used for residential purposes prior to redevelopment for a hospital between 1930 and 1951. The hospital was demolished between 1994 and 1995, and a contamination assessment conducted in 2002 did not record any contaminants

above the site assessment criteria (SAC) at the subject site (although localised PAH contamination was detected in the northern portion of the former hospital site).

Since the previous contamination assessment (DP 2002) the site appears to have been filled and/ or re-contoured when it was used as a support area for the construction of the adjacent nursing home. A temporary car park and earthworks for drainage and/or /collection of surface run off were also likely to have been constructed at this time. No records of materials imported or re-contouring works during this time were available for review.

Filling was identified in all 14 test pits from the current assessment, to depths 0.4 –2.1 m bgl. Demolition materials were observed in 12 of the test pits, ash was observed at two locations (TP6 and TP14) and fibre-cement fragments were observed in TP2, 0-0.2 m. A slight hydrocarbon odour noted at TP3/0.0 – 0.4 m.

Contamination was detected above the SAC at two locations. The first location, TP2, 0.0 – 0.2 m, recorded asbestos cement fragments, along with various demolition materials. This test pit was located on an area which appeared to have been built up and levelled, possibly for the storage or vehicle turning/parking during the earlier nursing home development to the north. Various demolition materials were observed in filling materials in 12 of the 14 test pits excavated over the site, indicating an elevated risk of the asbestos contamination being more extensive than that identified during this assessment. This risk would need to be taken into account in the proposed development works (in terms of its potential impact on waste classification and site suitability).

The other location with exceedances of the SAC was TP3. Sample TP3/0.0 – 0.2 m recorded TRH C_{10}-C_{36}, total PAH and benzo(a)pyrene all at "hotspot" concentrations (i.e. more than 250% of the SAC), whilst sample TP3/0.5 – 0.7 m, collected deeper in the test pit, did not contain detectable levels of TRH or PAH (including benzo(a)pyrene). TCLP analysis of PAH in Sample TP3/0.0 – 0.2 m recorded only low levels of leachable PAH (total TCLP PAH of 0.004 mg/L and TCLP benzo(a)pyrene less than 0.001 mg/L). These results show that the potential for leaching of the PAH is very low and the contaminant appears to be generally immobilised within the filling.

A review of the test pit log for TP3 did not indicate any obvious source of the PAH contamination, although a slight hydrocarbon odour was noted. A review of the chromatogram for TRH C_{10}-C_{36} (provided in Appendix E with the NATA accredited laboratory reports) indicated that whilst the chromatogram did not match any of the library records, it appeared to be more similar to coal and asphalt than the petroleum fuel compounds. The PAH is a mixture of shorter and longer chain PAH compounds. On this basis possible source materials for the PAH include asphalt, coal or ash.

Based on the above results, remediation will be required at the site. Given that bulk earthworks will remove between 1 and 6 m of soil to facilitate development, this will likely mean that the majority, if not all, the filling will be excavated and removed from the site. As such the most straightforward remediation action is to excavate the contaminated material and disposed of it off-site prior to bulk excavation. Alternatively, the current results indicate that all of the contaminated material would be suitable for on-site capping and containment. Whilst on-site containment would result in ongoing management of the contamination on the site, it may be a more cost effective method of managing the PAH contaminated materials than off-site disposal (depending on the final waste classification of the PAH contaminated materials) but would have implications with respect to an annotation on the Title and may affect the overall value of the land.

11. Conclusions

Based on the site history, field observations and laboratory results it is considered that the site can be rendered suitable for the proposed development subject to remediation of the detected asbestos, TRH and PAH (including benzo(a)pyrene).

It is recommended that further investigation (possibly including *in situ* delineation and/ or *ex situ* confirmatory waste classification) be conducted prior to remediation/ disposal of the PAH to confirm its extent and classification.

A Remediation Action Plan (RAP) should be prepared detailing the remediation and validation requirements for the development. It is foreseen that all filling materials will be removed for the proposed basement, and as such the remediation works are likely to comprise management and validation of the contaminated materials during excavation and disposal. Alternatively on-site capping and containment of the contaminated materials would also be a suitable remediation strategy from a contamination management perspective but would have implications in ongoing management and value of the land.

An unexpected finds protocol will need to be in place for any bulk excavation works in filling materials and will require inspection of excavated materials for signs of concern (e.g. fibre cement) prior to disposal and outline the management requirements if any signs of concern are observed.

An *in situ* waste classification is provided in Section 9 of this report. All materials to be disposed off site must be classified, managed and disposed in accordance with the *Protection of the Environment Operation Act*, 1997.

12. Limitations

The scope of the site assessment activities and consulting services undertaken by DP were limited to those agreed with Catholic Healthcare Ltd.

DP's assessment is necessarily based upon the result of the site investigation and the program of surface and subsurface sampling, screening and laboratory testing as discussed in this report. DP cannot provide unqualified warranties nor assumes any liability for site conditions not observed, or accessible, during the time of the investigations.

Despite all reasonable care and diligence, the ground conditions encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change at any time in response to variations in natural conditions, chemical reactions and other events, e.g. groundwater movement and or spillages of contaminating substances. These changes may occur subsequent to DP's investigations and assessment.

This report, its associated documentation and the information herein have been prepared solely for the use of Catholic Healthcare Ltd. Any reliance assumed by third parties on this report shall be at such

parties' own risk. Any ensuing liability resulting from use of the report by third parties cannot be transferred to DP.

Douglas Partners Pty Ltd

Appendix A

Notes About this Report and Drawings

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

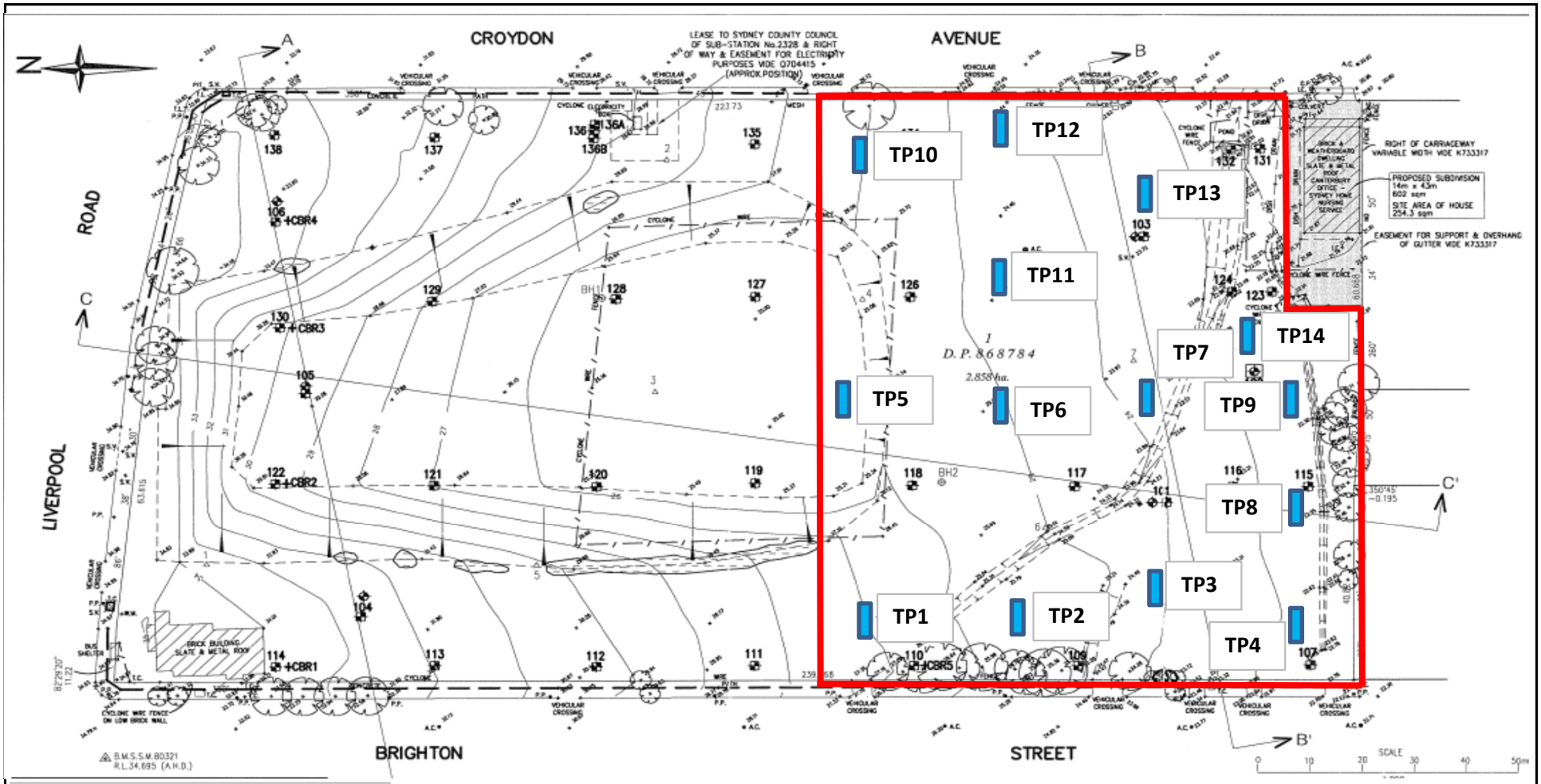
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



Legend:

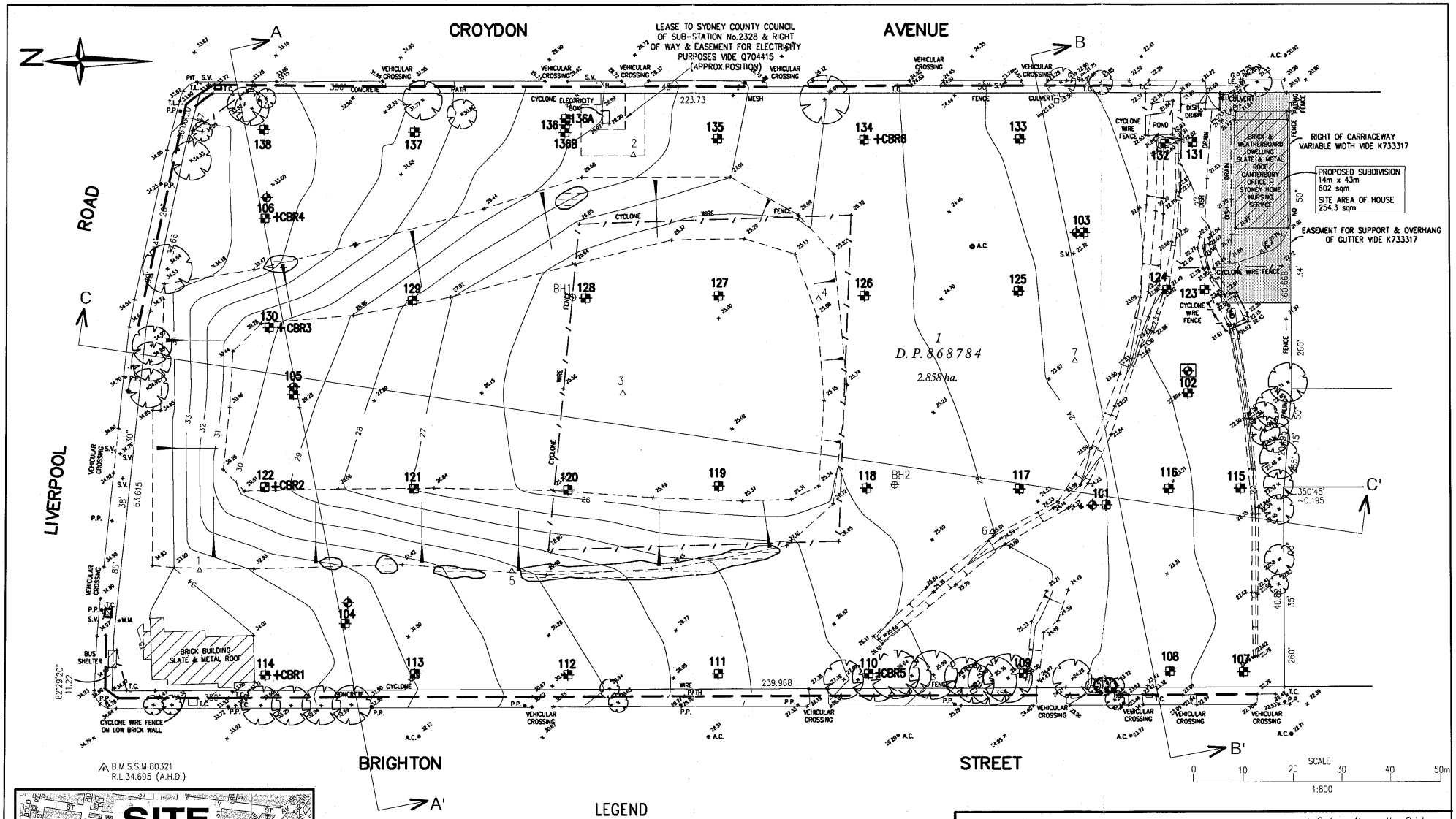
Site Boundary

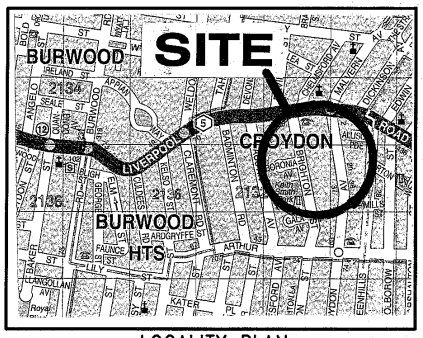
TP — Test Pit Location

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Catholic Healthcare Ltd	**Test Pit Location Plan**	PROJECT No: 20289.1
	OFFICE: Sydney		DWG No: 1
	DATE: 1 Feb 2012		REVISION: -

Appendix B

Drawing and Test Pit Logs from Previous Contamination Assessment





LOCALITY PLAN

LEGEND

- SHALE OUTCROP
- CURRENT TEST PIT LOCATION
- CURRENT TEST BORE LOCATION
- TEST BORE AND PIEZOMETER LOCATION
- CBR SAMPLE LOCATION
- PREVIOUS DP TEST BORE LOCATION (SEPT.1994)
- APPROXIMATE JACK TEST BORE LOCATION (1993)

Douglas Partners
Geotechnics, Environment, Groundwater

Sydney, Newcastle, Brisbane, Melbourne, Perth, Wyong, Campbelltown, Townsville Cairns, Wollongong

TITLE: Location of Test Bores & Test Pits
Inner West Health Centre
24 Liverpool Road
CROYDON

CLIENT: Bovis Lend Lease			
DRAWN BY: PSCH	SCALE: As shown	PROJECT No: 20289A	OFFICE: SYDNEY
APPROVED BY: KLM		DATE: 19.3.2002	DRAWING No: 1

F:\DRAWINGS\2002\MARCH\20022\20289B-1.dwg, 10/04/02 12:38:45

TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 22.9

TEST PIT No. 102
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0				
0.05	TOPSOIL – dark brown, silty sand filling with organic rootlets			
	FILLING – light brown sand filling with sandstone gravel, cobbles and boulders and some clay and concrete rubble (crushed sandstone filling)			
	– lens of ash between 0.35 to 0.4m	D	0.5	PID <1
	– lens of dark brown silt with some clay and siltstone gravel at 0.5 – 0.55m			
0.9		D	0.9	PID <1
1.0	SILTY CLAY – very stiff, yellow brown and red brown silty clay with fine ironstone gravel		0.9	pp=250kPa
	TEST BORE DISCONTINUED AT 1.0 METRES – target depth reached			

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

Douglas Partners
Geotechnics • Environment • Groundwater

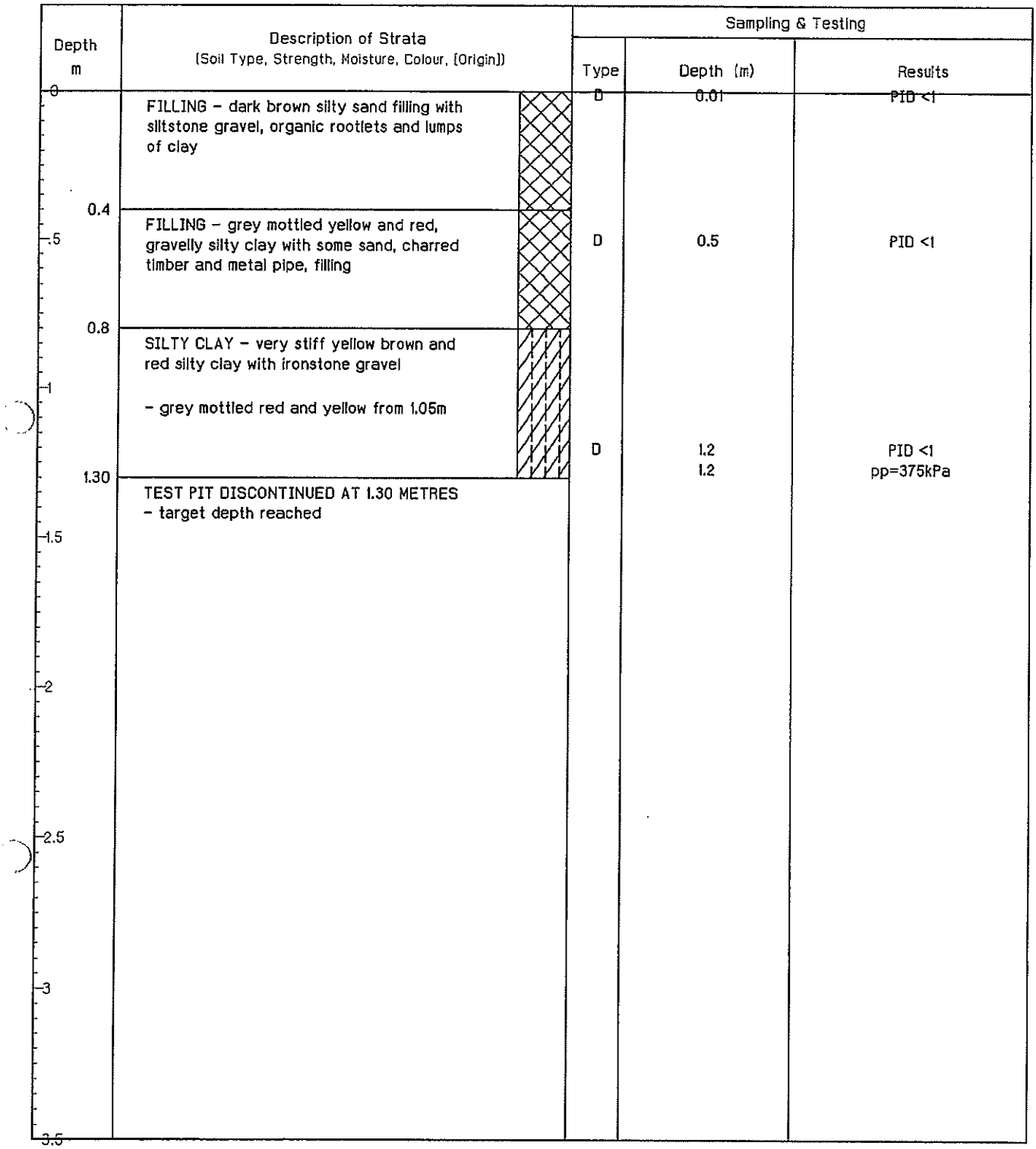
TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 23.7

TEST PIT No. 103
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, (Origin))	Sampling & Testing		
		Type	Depth (m)	Results
0	FILLING – dark brown silty sand filling with siltstone gravel, organic rootlets and lumps of clay	D	0.01	PID <1
0.4	FILLING – grey mottled yellow and red, gravelly silty clay with some sand, charred timber and metal pipe, filling	D	0.5	PID <1
0.8	SILTY CLAY – very stiff yellow brown and red silty clay with ironstone gravel – grey mottled red and yellow from 1.05m	D	1.2 1.2	PID <1 pp=375kPa
1.30	TEST PIT DISCONTINUED AT 1.30 METRES – target depth reached			



RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 22.8

TEST PIT No. 107
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – dark brown gravelly sandy silt with organic material and and brick rubble filling	D	0.01	PID <1
0.25	FILLING – dark brown and orange gravelly silty clay filling	D	0.5	PID <1
0.7	SILTY CLAY – very stiff, red brown and yellow brown silty clay with fine ironstone gravel		0.7	pp=300kPa
1.0			1.0	pp=450kPa
1.10	SILTY CLAY – very stiff to hard, grey mottled red and yellow silty clay with low to medium strength ironstone gravel		1.1	PID <1
	TEST PIT DISCONTINUED AT 1.10 METRES – target depth reached			

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 23.3

TEST PIT No. 108
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – dark brown gravelly sandy silt filling with organic rootlets	D	0.5 0.5	pp=300kPa PID <1
0.6	SILTY CLAY – very stiff, yellow and red brown mottled grey silty clay with fine ironstone gravel			
1.2	SILTY CLAY – very stiff to hard, grey mottled red and yellow silty clay with low to medium strength ironstone bands		1.2	pp=425kPa
1.4				
1.5	SHALE – extremely low to very low strength, highly weathered, grey shale with low to medium strength ironstone bands	D	1.5	PID <1
1.5	TEST PIT DISCONTINUED AT 1.5 METRES – refusal on low to medium strength ironstone			

RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 25.2

TEST PIT No. 109
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0		D	0.01	PID <1
0.05	TOPSOIL – dark brown silty sand filling with organic rootlets			
0.3	FILLING – red and brown clayey sand with ironstone gravel and cobbles filling			
	FILLING – brown sandy silt filling			
0.5		D	0.5	PID <1
	FILLING – brown and red gravelly silty clay and ironstone gravel with organic rootlets filling			
0.7			0.7	pp=350kPa
	SILTY CLAY – very stiff, red and brown silty clay with ironstone gravel and organic rootlets			
1.2	TEST PIT DISCONTINUED AT 1.2 METRES – target depth reached	D	1.2	PID <1
1				
1.5				
2				
2.5				
3				
3.5				

RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 26.7

TEST PIT No. 110
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, (Origin))	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – dark brown silty sand with gravel filling and organic rootlets			
0.3	SILTY CLAY – very stiff, brown and red silty clay with ironstone gravel and organic rootlets		0.3	pp=350kPa
.5		D	0.5	PID <1
		B+	0.5	pp=350kPa
			0.5	CBR=4%
0.9	SILTY CLAY – very stiff, grey mottled red and yellow silty clay with very low strength grey shale			
1				
1.1	SHALE – extremely low to low strength, extremely to highly weathered grey shale with low to medium strength ironstone bands			
1.3		D	1.3	PID <1
1.5	TEST PIT DISCONTINUED AT 1.3 METRES – refusal on low to medium strength ironstone bands			
2				
2.5				
3				
3.5				

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

+DENOTES SAMPLE FOR CBR5

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KCM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 22.4

TEST PIT No. 115
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0				
0.05	TOPSOIL – dark brown silty sand with some gravel filling and organic rootlets			
	FILLING – light brown sand with some clay and sandstone gravel, cobbles and boulders filling (crushed sandstone filling)			
.5	– layer of dark brown silt with some clay and siltstone gravel between 0.5 – 0.55m	D	0.5	PID <1
0.85	SILTY CLAY – very stiff, red brown mottled yellow brown silty clay		0.85	pp=275kPa
1				
1.3	SILTY CLAY – stiff to very stiff, grey mottled red and yellow silty clay with ironstone gravel		1.3	pp=350kPa
1.5		D	1.5	PID <1
1.9	SHALE – very low to low strength, highly weathered, grey shale with low to medium strength ironstone bands, moist			
2				
2.1	TEST PIT DISCONTINUED AT 2.1 METRES – refusal on low to medium strength ironstone bands	D	2.1	PID <1
2.5				
3				
3.5				

RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KCM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 23.2

TEST PIT No. 116
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0				
0.05	TOPSOIL – dark brown silty sand with some gravel filling and organic rootlets			
	FILLING – light brown clayey sand with sandstone gravel, cobbles and boulders (crushed sandstone) filling			
.5	– pocket of dark brown and grey clayey silt filling with siltstone gravel at 0.5 – 0.65m	D	0.5	PID <1
0.7	SILTY CLAY – very stiff, red brown mottled yellow brown silty clay with fine ironstone gravel		0.7	pp=250kPa
1				
1.3	SILTY CLAY – very stiff, grey mottled red and yellow silty clay with fine ironstone gravel and low to medium strength ironstone cobbles		1.3	pp=400kPa
1.5		D	1.5	PID <1
1.95	SHALE – very to low strength, highly weathered, grey shale with low to medium strength ironstone bands, moist			
2				
2.2	TEST PIT DISCONTINUED AT 2.2 METRES – refusal on low to medium strength ironstone bands			
2.5				
3				
3.5				

RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 24.7

TEST PIT No. 117
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	TOPSOIL – dark brown silty sand with some gravel filling and organic rootlets	D*	0.01	PID <1
0.25	SILTY CLAY – very stiff, red and brown silty clay with ironstone gravel	D	0.5 0.5	pp=400kPa PID <1
1.0	SILTY CLAY – very stiff, grey mottled red and yellow silty clay with ironstone gravel	D	1.15 1.15	pp=375kPa PID <1
1.15	TEST PIT DISCONTINUED AT 1.15 METRES – target depth reached			

RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

*DENOTES FIELD REPLICATE Z7 TAKEN

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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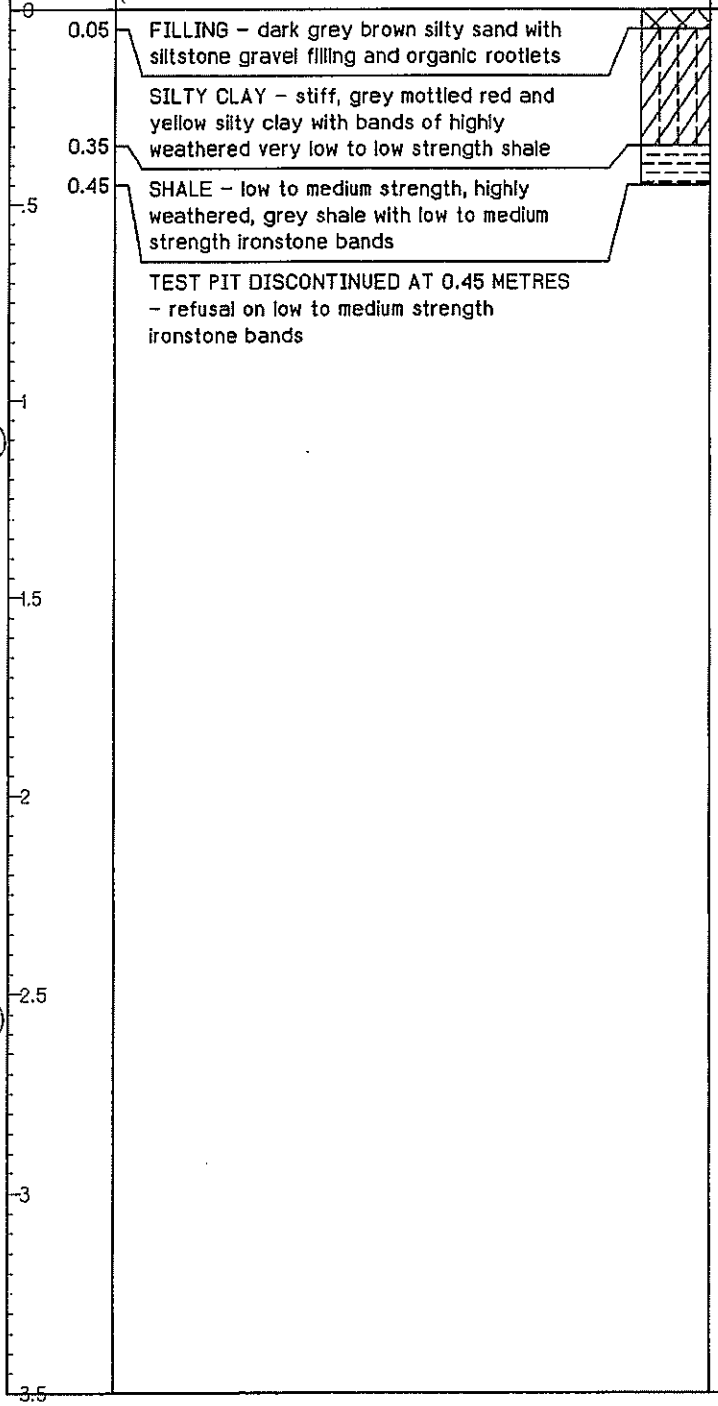
TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 25.8

TEST PIT No. 118
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0.05	FILLING – dark grey brown silty sand with siltstone gravel filling and organic rootlets		0.05	pp=200kPa
0.35	SILTY CLAY – stiff, grey mottled red and yellow silty clay with bands of highly weathered very low to low strength shale			
0.45	SHALE – low to medium strength, highly weathered, grey shale with low to medium strength ironstone bands	D*	0.45	PID <1
	TEST PIT DISCONTINUED AT 0.45 METRES – refusal on low to medium strength ironstone bands			



RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

*DENOTES FIELD REPLICATE Z6 TAKEN

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 22.2

TEST PIT No. 123
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – dark brown/grey gravelly silty sand filling with organic rootlets	D	0.01	PID <1
0.2	FILLING – grey mottled red and yellow gravelly silty clay filling	D	0.5	PID <1
0.8	FILLING – brown and orange gravelly silty clay filling	D	1.0	PID <1
1.0	TEST PIT DISCONTINUED AT 1.0 METRES – target depth reached			

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KCM
Date: 16/4/02

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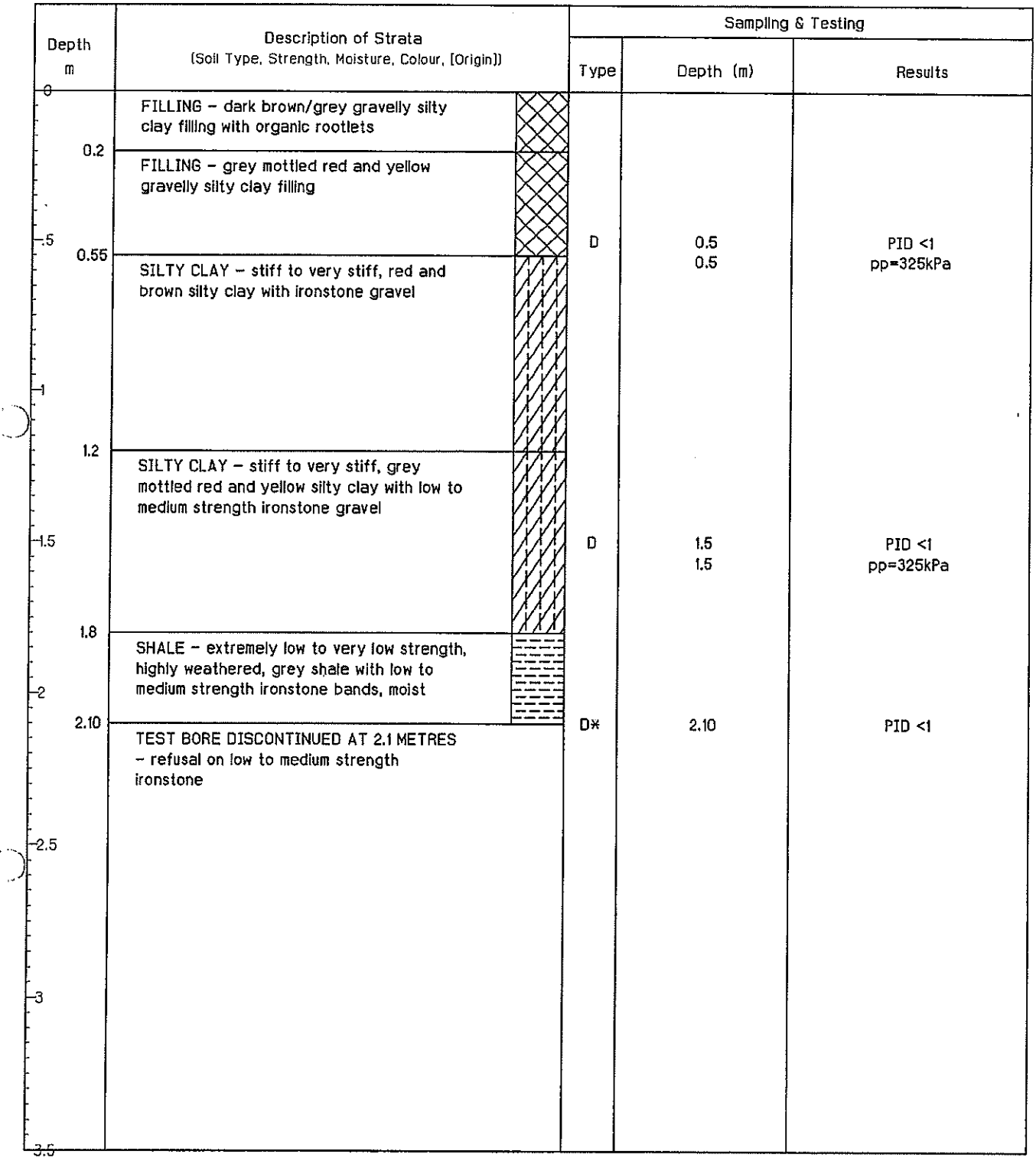
TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 22.5

TEST PIT No. 124
SHEET 1 OF 1



Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – dark brown/grey gravelly silty clay filling with organic rootlets			
0.2	FILLING – grey mottled red and yellow gravelly silty clay filling	D	0.5 0.5	PID <1 pp=325kPa
0.55	SILTY CLAY – stiff to very stiff, red and brown silty clay with ironstone gravel			
1.2	SILTY CLAY – stiff to very stiff, grey mottled red and yellow silty clay with low to medium strength ironstone gravel	D	1.5 1.5	PID <1 pp=325kPa
1.8	SHALE – extremely low to very low strength, highly weathered, grey shale with low to medium strength ironstone bands, moist			
2.10	TEST BORE DISCONTINUED AT 2.1 METRES – refusal on low to medium strength ironstone	D*	2.10	PID <1

RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

*DENOTES FIELD REPLICATE Z8 TAKEN

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KCM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 24.2

TEST PIT No. 125
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	TOPSOIL – dark brown silty sand with some gravel filling and organic rootlets			
0.15	FILLING – light brown clayey sand with sandstone gravel, cobbles and boulders (crushed sandstone filling), with tiles and brick rubble filling	D	0.5	PID <1
0.9	SILTY CLAY – very stiff, grey mottled red and yellow silty clay with ironstone gravel		0.9	pp=325kPa
		D	1.3	PID <1
1.4	SHALE – extremely low to very low strength, highly weathered, grey shale with low to medium strength ironstone bands			
1.5	TEST PIT DISCONTINUED AT 1.5 METRES – refusal on low to medium strength ironstone			

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 25.5

TEST PIT No. 126
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0		D	0.01	PID <1
0.1	FILLING – grey gravelly silty clay filling with organic rootlets			
0.15	SHALE – very low to low strength, highly weathered, grey shale with low to medium strength ironstone bands			
	TEST PIT DISCONTINUED AT 0.15 METRES – refusal on low to medium strength ironstone			
0.5				
1				
1.5				
2				
2.5				
3				
3.5				

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

80mm SURFACE WATER PRESENT AT SAMPLING LOCATION

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KCM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 21.8

TEST PIT No. 131
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – grey silty clay with ironstone and siltstone gravel and cobbles filling			
		D	0.5	PID <1
	– layer of moist, black and grey sand filling with pvc pipe and vitreous ceramic tiles from 0.7 to 0.9m			
0.9			0.9	pp=350kPa
	SILTY CLAY – very stiff, yellow brown and red brown silty clay with fine ironstone gravel			
		D	1.5	PID <1
1.9	SHALE – extremely low to very low strength, extremely to highly weathered, grey shale with low to medium strength ironstone bands			
2.1		D	2.1	PID <1
	TEST PIT DISCONTINUED AT 2.1 METRES – refusal on low to medium strength ironstone			

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KCM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 22.4

TEST PIT No. 132
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – dark grey/brown gravelly silty sand filling with organic rootlets	D	0.01	PID <1
0.2	FILLING – grey silty clay with ironstone and siltstone gravel filling	D	0.5	PID <1
0.8	TEST PIT DISCONTINUED AT 0.8 METRES – refusal on ironstone and siltstone			
1				
1.5				
2				
2.5				
3				
3.5				

RIG: BACKHOE
LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 24.7

TEST PIT No. 133
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0	FILLING – dark brown silty sand with some gravel, brick rubble and crushed roof tiles filling and organic rootlets			
0.4	SILTY CLAY – very stiff to hard, brown and red silty clay with ironstone gravel (possibly filling)	D	0.5 0.5	PID <1 pp=450kPa
0.7	SILTY CLAY – very stiff, grey mottled red and yellow silty clay with low to medium strength ironstone cobbles		0.7	pp=375kPa
1.35	SHALE – very low to low strength, highly weathered, shale with low to medium strength ironstone bands	D	1.3	PID <1
1.6	TEST PIT DISCONTINUED AT 1.6 METRES – refusal on low to medium strength ironstone			

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

SAMPLING & TESTING

A Auger sample	pp Pocket Penetrometer (kPa)
B Bulk sample	PID Photo Ionisation Detector
D Disturbed sample	Ux x mm dia. tube
M Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KCM
Date: 16/4/02

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TEST PIT REPORT

CLIENT: BOVIS LEND LEASE
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 24 LIVERPOOL ROAD, CROYDON

DATE: 15 MARCH 02
PROJECT No.: 20289B
SURFACE LEVEL: 25.4

TEST PIT No. 134
SHEET 1 OF 1

Depth m	Description of Strata (Soil Type, Strength, Moisture, Colour, [Origin])	Sampling & Testing: Type	Depth (m)	Results
0		D	0.01	PID <1
0.15	FILLING – dark brown gravelly silty sand filling with organic rootlets			
0.25	BASECOURSE – brown silty sand filling with blue metal gravel			
	FILLING – yellow brown mottled orange clay with ironstone gravel filling	D B+	0.5 0.5	PID <1 CBR=4%
0.9	SILTSTONE – very low to low strength, highly weathered, grey siltstone with low to medium strength ironstone bands			
1.15	TEST PIT DISCONTINUED AT 1.15 METRES – target depth reached	D	1.15	PID <1
3.5				

RIG: BACKHOE

LOGGED: MANNELL

GROUND WATER OBSERVATIONS: NO FREE GROUNDWATER OBSERVED

REMARKS: INTERPOLATED FROM SURVEY PLAN REF: 19598T1 BY CRAIG & RHODES PTY LTD

+DENOTES SAMPLE FOR CBR6

SAMPLING & TESTING		
A	Auger sample	pp Pocket Penetrometer (kPa)
B	Bulk sample	PID Photo Ionisation Detector
D	Disturbed sample	Ux x mm dia. tube
M	Moisture content (%)	Wp Plastic limit

CHECKED:
Initials: KLM
Date: 16/4/02

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Appendix C

Notes on Soil Descriptions

Test Pit Logs

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

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Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Symbols & Abbreviations

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Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General


Asphalt


Road base


Concrete


Filling

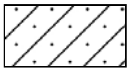
Soils


Topsoil

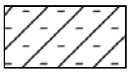

Peat


Clay

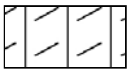

Silty clay

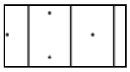

Sandy clay

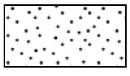

Gravelly clay

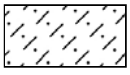

Shaly clay

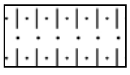

Silt


Clayey silt


Sandy silt

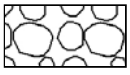

Sand

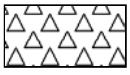

Clayey sand


Silty sand


Gravel


Sandy gravel


Cobbles, boulders

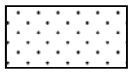

Talus

Sedimentary Rocks

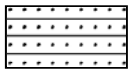

Boulder conglomerate

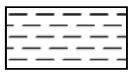

Conglomerate


Conglomeratic sandstone

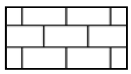

Sandstone


Siltstone


Laminite

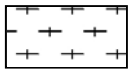

Mudstone, claystone, shale

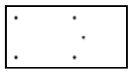

Coal


Limestone

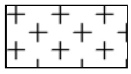
Metamorphic Rocks

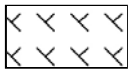

Slate, phyllite, schist

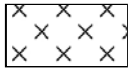

Gneiss

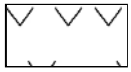

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 22.09 AHD
EASTING: 3255268
NORTHING: 6248669
DIP/AZIMUTH: 90°/--

PIT No: TP1
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
22	0.0	FILLING - brown, very sandy gravel. Sand is medium to coarse, gravel fine to coarse, sub-angular of sandstone. Humid		E	0.0				
					0.2				
	0.5	CLAY - very stiff, brown grey mottled, slightly friable clay. Damp		E	0.5		pp~370kPa		
					0.7				
	1			E	1.0				1
21	1.1	Pit discontinued at 1.1m - natural proved			1.1				
	2								2
20									
	3								3
19									
	4								4
18									

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 20.91 AHD
EASTING: 325269
NORTHING: 6248641
DIP/AZIMUTH: 90°/--

PIT No: TP2
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
					0.0		(fibrous cement sample)		5 10 15 20
	0.2	FILLING - black brown, slightly silty, clay filling (topsoil) with fibrous cement fragments (asbestos/chrysotile confirmed). Humid		E*		bag			
		FILLING - grey brown, slightly sandy clay filling with frequent brick and metal fragments. Humid to damp		E	0.2				
	0.5	TOPSOIL - brown, silty clay topsoil with occasional rootlets. Humid to damp		E	0.5				
					0.7		pp = 320		
20	0.9	CLAY - stiff to very stiff, orange brown grey mottled, friable clay. Damp		E					1
	1				1.2				
	1.5	Pit discontinued at 1.5m - natural proved							
19	2								2
18	3								3
17	4								4
16									

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate sample BD1/230112 at 0.0m to 0.2m (fibrous cement sample)

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 19.02 AHD
EASTING: 325273
NORTHING: 6248605
DIP/AZIMUTH: 90°/--

PIT No: TP3
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
19		FILLING - brown, gravelly sand filling with frequent boulders and cobbles of sandstone, gravel is fine to medium, sub-angular of sandstone. Slight hydrocarbon odour. Humid		E	0.0 0.2				
	0.4	FILLING - black brown clayey silt filling with occasional fragments of brick. Humid		E	0.4 0.5		pp>400		
	0.5	CLAY - very stiff, orange brown clay with rare fine, angular gravel of ironstone. Some turbation structures present. Damp		E	0.7				
18	1								1
	1.1	Pit discontinued at 1.1m - natural proved							
17	2								2
16	3								3
15	4								4

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 18.11 AHD
EASTING: 325275
NORTHING: 6248584
DIP/AZIMUTH: 90°/--

PIT No: TP4
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
18	0.0								
	0.2	FILLING - black brown, silty gravelly clay filling (topsoil). Gravel fine to coarse, angular to sub-angular of brick and basalt aggregate. Humid		E	0.0				
		FILLING - yellow brown, medium to coarse sand filling with frequent whole bricks (probable foundation). Humid			0.2				
	0.5	CLAY - firm to stiff, orange brown grey mottled, friable clay with rare rootlets. Damp		E	0.3				
				E*	0.5		pp = 120		
	1.0	Pit discontinued at 1.0m - natural proved			0.7				
17	1								1
16	2								2
15	3								3
14	4								4

5 10 15 20

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate sample BD2/230112 at 0.5m to 0.7m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 21.91 AHD
EASTING: 325314
NORTHING: 6248679
DIP/AZIMUTH: 90°/--

PIT No: TP5
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
21	0.0	FILLING - grey brown, clayey gravel filling. Gravel is fine to coarse, angular of shale. Humid		E	0.0				
					0.2				
				E	0.5				
					0.7				
	0.8	FILLING - grey brown, slightly gravelly clay filling. Gravel is fine to coarse, angular to sub-angular of shale and concrete. Damp to moist							
	1			E	1.5				1
					1.7				
20	2								2
	2.1	CLAY - soft, grey brown clay. Wet		E	2.1		pp = 50	▼ 23-01-12	
	2.2	Pit discontinued at 2.2m groundwater ingress causing test pit collapse			2.2				
19	3								3
18	4								4
17									

RIG: Backhoe Excavator - CAT CR305
LOGGED: RMcA/JP
SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater observed at 2.1m - moderate seepage

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 19.96 AHD
EASTING: 325317
NORTHING: 6248650
DIP/AZIMUTH: 90°/--

PIT No: TP6
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
19.96	0.0	FILLING - brown clayey topsoil filling with frequent rootlets. Humid		E	0.0				
	0.2	FILLING - black brown, ashy, silty clay filling with frequent angular, coarse gravel of brick, concrete and sandstone. Humid		E*	0.2				
	0.4	CLAY - stiff to very stiff, orange brown, grey mottled clay with rare medium, angular gravel of ironstone. Damp		E	0.4		pp = 240		
19	1 1.0	Pit discontinued at 1.0m - natural proved			0.6				1
18	2								2
17	3								3
16	4								4
15									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate sample BD3/230112 at 0.2m to 0.4m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 18.70 AHD
EASTING: 325328
NORTHING: 6248629
DIP/AZIMUTH: 90°/--

PIT No: TP7
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
18	0.0	FILLING - black brown clayey filling (topsoil) with frequent roots. Humid		E	0.0				
	0.2	FILLING - yellow brown, medium to coarse sand filling with frequent whole brick and boulders of concrete. Some ceramic pipe and re-bar present. Humid		E	0.2				
	0.4	FILLING - black brown sandy clay filling with some brick fragments. Humid to damp		E	0.4				
	0.6	CLAY - stiff to very stiff, orange brown friable clay. Damp		E	0.6		pp = 270		
	0.8				0.8				
	1.1	Pit discontinued at 1.1m - natural proved							

RIG: Backhoe Excavator - CAT CR305
LOGGED: RMcA/JP
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed - possibly perched

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 18.68 AHD
EASTING: 325306
NORTHING: 6248592
DIP/AZIMUTH: 90°/--

PIT No: TP8
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
18	0.0	FILLING - brown, sandy gravelly clay filling. Sand is fine to medium grained, gravel medium to coarse, angular to sub-angular of brick and concrete. Humid		E*	0.0 - 0.2				
	0.7	FILLING - yellow brown, very sandy gravelly clay filling. Sand is medium to coarse grained, gravel fine to coarse, angular to sub-angular of brick. Humid to damp		E	0.7 - 0.9				
	0.9	FILLING - black brown clayey silt filling with infrequent timber and sandstone gravel (re-worked alluvium?). Humid to damp		E	0.9 - 1.1				
17	1.3	CLAY - very stiff, orange brown, very friable clay. Damp		E	1.3 - 1.5		pp = 330		
	1.8	Pit discontinued at 1.8m - natural proved							
16									
15									
14									

1 2 3 4 (Depth)
1 2 3 4 (Dynamic Penetrometer Test)
5 10 15 20

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate sample BD4/230112 at 0.0m to 0.2m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 18.73 AHD
EASTING: 325329
NORTHING: 6248599
DIP/AZIMUTH: 90°/--

PIT No: TP9
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
18	0.0	FILLING - brown, sandy gravelly clay filling. Sand is fine to coarse grained, gravel medium to coarse, angular to sub-angular of brick, concrete and sandstone. Humid		E	0.0 – 0.2				
	0.3	FILLING - yellow brown, very sandy gravelly clay filling. Sand is medium to coarse grained, grave fine to coarse, angular to sub-angular of brick. Large sandstone boulders present. Humid to damp		E	0.5 – 0.7				
	1								1
	1.2	FILLING - black brown, clayey silt filling with fine to medium, angular to sub-angular sandstone gravel. Damp		E	1.2 – 1.4				
17	1.7	CLAY - stiff to very stiff, orange brown grey mottled clay. Damp		E	1.7 – 1.9		pp = 240		
	2								2
	2.2	Pit discontinued at 2.2m - natural proved							
16									
	3								3
15									
	4								4
14									

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 21.59 AHD
EASTING: 325360
NORTHING: 6248690
DIP/AZIMUTH: 90°/--

PIT No: TP10
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
21	0.0	FILLING - grey brown, very clayey gravel filling. Gravel fine to coarse, angular of shale. Humid		E	0.0				
					0.2				
	0.7	FILLING - black brown, slightly gravelly silty clay filling. Gravel fine to medium, angular to sub-angular of brick and shale. Damp		E	0.7				
	0.9	CLAY - very stiff, orange brown, grey mottled clay with rare fine to medium angular gravel of ironstone		E*	0.9		pp = 280		
					1.1				
	1.4	Pit discontinued at 1.4m - natural proved							

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate sample BD5/230112 at 0.9m to 1.1m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 19.38 AHD
EASTING: 325337
NORTHING: 6248645
DIP/AZIMUTH: 90°/--

PIT No: TP11
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
19	0.0	FILLING - grey, very sandy gravel filling. Sand is fine to coarse grained, gravel fine to coarse, sub-angular to sub-rounded of brick and concrete. Humid		E	0.0				
					0.2				
	0.3	FILLING - black brown, gravelly clayey silt filling. Gravel fine to coarse, angular to sub-angular of brick. Some wood fragments. Humid to damp		E*	0.3				
					0.5				
	0.9	CLAY - stiff to very stiff, orange brown, mottled grey, friable clay. Some fine to medium, angular to sub-angular gravel of ironstone present. Damp		E	0.9		pp = 240		
18	1.4				1.1				
		Pit discontinued at 1.4m - natural proved							
17									
16									
15									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20; 1, 2, 3, 4

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate sample BD6/230112 at 0.3m to 0.5m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 19.23 AHD
EASTING: 325371
NORTHING: 6248650
DIP/AZIMUTH: 90°/--

PIT No: TP12
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
19	0.0	FILLING - grey, very sandy gravel filling. Sand is fine to coarse grained, gravel fine to coarse, sub-angular to sub-rounded of concrete. Humid		E	0.0 - 0.2				
	0.4	FILLING - grey brown, sandy, gravelly clay filling. Sand is fine to coarse grained, gravel fine to coarse, angular to sub-angular of shale. Damp		E	0.4 - 0.6				
	0.8	CLAY - firm to stiff, red brown, very friable clay with occasional fine to medium, angular to sub-angular gravel of ironstone. Damp		E	0.8 - 1.0		pp = 210		
18	1								1
	1.3	Pit discontinued at 1.3m - natural proved							
17	2								2
16	3								3
15	4								4

5 10 15 20

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 18.33 AHD
EASTING: 325360
NORTHING: 6248624
DIP/AZIMUTH: 90°/--

PIT No: TP13
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
18	0.0	FILLING - grey brown, clayey gravel filling. Gravel fine to coarse, angular to sub-angular of shale. humid to damp		E	0.0				
					0.2				
				E	0.5				
					0.7				
17	1.0	CLAY - firm to stiff, orange brown grey mottled clay. Damp		E	1.0		pp = 470		1
					1.2				
	1.5	Pit discontinued at 1.5m - natural proved							
16	2								2
15	3								3
14	4								4

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Catholic Healthcare Ltd
PROJECT: Supplementary Contamination Assessment
LOCATION: Croydon Avenue, Croydon

SURFACE LEVEL: 19.00 AHD
EASTING: 325337
NORTHING: 6248610
DIP/AZIMUTH: 90°/--

PIT No: TP14
PROJECT No: 20289.10
DATE: 23/1/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
19	0.0	FILLING - brown, gravelly clay filling. Gravel is fine to coarse, angular to sub-angular of shale. Humid to damp		E*	0.0 - 0.2				
	0.6	FILLING - black brown, ashy clayey silt filling with frequent fine to coarse, angular to sub-angular gravel of brick and concrete. Humid to damp		E	0.6 - 0.8				
18	0.9	CLAY - very stiff, orange brown red mottled clay. Damp		E	0.9 - 1.1				
	1.4	Pit discontinued at 1.4m - natural proved							
17	2								
16	3								
15	4								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: Backhoe Excavator - CAT CR305

LOGGED: RMcA/JP

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate sample BD7/230112 at 0.0m to 0.2m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Appendix D

Summary of Laboratory Results

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Table 2: Results of Soil Analysis (All results in mg/kg unless otherwise stated)

Sample ID	Sampling Date	Soil Type	Heavy Metals								Polycyclic Aromatic Hydrocarbons (PAH)		Total Petroleum Hydrocarbons (TPH) [2]		BTEX [2]				Asbestos	Polychlorinated Biphenyls (PCB)	Organochlorine Pesticides (OCP)[3]	Phenols
			Arsenic	Cadmium	Chromium[1]	Copper	Lead	Mercury	Nickel	Zinc	B(a)P	Total PAH	C6-C9	C10-C36	Benzene	Toluene	Ethylbenzene	Total Xylene				
2002 DP Contamination Assessment Results																						
102/0.5	Mar-02	Fill	20	<1	39	15	120	0.12	4	160	0.92	10.99	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1.2
102/0.9	Mar-02	Natural	14	<1	36	7	17	<0.05	<4	14	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1.6
103/SS	Mar-02	Fill	10	<1	14	45	100	0.05	30	210	0.36	5.14	-	-	-	-	-	-	-	-	-	-
103/1.2	Mar-02	Natural	11	<1	16	17	14	<0.05	<4	16	<0.05	<1.55	-	-	-	-	-	-	-	-	-	-
107/SS	Mar-02	Fill	10	<1	23	130	180	0.09	40	220	2.8	36.97	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	0.76	1.3
107/1.1	Mar-02	Natural	7	<1	27	8	18	<0.05	<4	10	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1.2
108/0.5	Mar-02	Natural	16	<1	34	4	26	<0.05	<4	23	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	
109/SS	Mar-02	Fill	230	<1	19	6	44	<0.05	<4	76	<0.05	0.25	-	-	-	-	-	-	-	-	-	-
109/0.5	Mar-02	Fill	22	<1	39	<3	22	<0.05	<4	24	<0.05	<1.55	-	-	-	-	-	-	-	-	-	-
110/0.5	Mar-02	Natural	11	<1	26	21	17	<0.05	<4	15	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1.2
110/1.3	Mar-02	Natural	21	<1	9	24	16	<0.05	<4	19	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1
115/0.5	Mar-02	Fill	38	<1	22	53	330	0.35	9	330	1.8	19.49	-	-	-	-	-	-	-	-	-	-
116/0.5	Mar-02	Fill	11	<1	24	9	51	0.06	<4	130	0.42	3.89	-	-	-	-	-	-	-	-	-	-
117/SS	Mar-02	Fill	14	<1	21	30	120	0.09	10	160	2.4	28.57	-	-	-	-	-	-	-	-	-	-
118/0.45	Mar-02	Natural	<5	<1	12	20	84	0.06	7	95	<0.05	<1.55	-	-	-	-	-	-	-	-	-	-
123/SS	Mar-02	Fill	7	<1	9	42	17	<0.05	21	120	<0.05	<1.55	-	-	-	-	-	-	-	-	-	-
124/0.5	Mar-02	Fill	6	<1	8	24	20	<0.05	<4	30	0.12	1.42	-	-	-	-	-	-	-	-	-	-
125/0.5	Mar-02	Fill	10	<1	22	25	160	0.06	12	100	0.17	2.17	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1.1
125/1.3	Mar-02	Natural	15	<1	12	21	11	<0.05	<4	15	1.1	14.41	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	0.83
126/SS	Mar-02	Fill	12	<1	12	32	48	<0.05	7	58	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	-
131/0.5	Mar-02	Fill	8	<1	7	21	25	<0.05	<4	22	0.68	9.08	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1.1
131/1.5	Mar-02	Natural	<5	<1	12	8	16	<0.05	<4	7	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	1.1
132/SS	Mar-02	Fill	9	<1	10	42	18	<0.05	26	150	<0.05	<1.55	-	-	-	-	-	-	-	-	-	-
133/0.5	Mar-02	Natural	31	<1	60	<3	32	<0.05	<4	38	<0.05	<1.55	<20	<120	<0.5	<0.5	<0.5	<1.5	-	<0.9	<0.5	-
134/SS	Mar-02	Fill	6	<1	22	41	85	<0.05	55	110	1.5	24.7	-	-	-	-	-	-	-	-	-	-
2012 DP Contamination Assessment																						
TP1 0.0-0.2	23/01/2012	Filling	6	<0.5	12	20	32	<0.1	4	29	1.6	12.7	<25	120	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP2 0.0-0.2	23/01/2012	Filling	13	<0.5	20	10	24	<0.1	2	14	0.12	1.62	<25	<250	<0.2	<0.5	<1	<3	Detected	<0.7	<2.0	<5
TP2 0.2-0.5	23/01/2012	Filling	17	<0.5	16	15	54	0.1	2	140	2.9	36.5	<25	200	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP2 0.9-1.2	23/01/2012	Natural	9	<0.5	18	10	14	<0.1	1	4	<0.05	1.55	<25	<250	<0.2	<0.5	<1	<3	ND	-	-	-
TP3 0.0-0.2	23/01/2012	Filling	11	<0.5	14	55	100	0.2	17	140	91	1195.5	<25	2960	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP3 0.5-0.7	23/01/2012	Filling	7	<0.5	23	10	27	<0.1	2	11	<0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	-	-	-
TP4 0.3-0.5	23/01/2012	Filling	12	<0.5	21	9	19	<0.1	2	4	<0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP5 0.5-0.7	23/01/2012	Filling	10	<0.5	7	27	37	<0.1	9	51	0.4	5.7	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP5 2.1-2.2	23/01/2012	Natural	6	<0.5	5	22	26	<0.1	6	43	0.34	4.24	<25	<250	<0.2	<0.5	<1	<3	ND	-	-	-
TP6 0.2-0.4	23/01/2012	Filling	8	<0.5	17	6	23	<0.1	2	4	1.3	13.2	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP7 0.2-0.4	23/01/2012	Filling	7	<0.5	16	27	110	1.3	17	140	<0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP8 0.9-1.1	23/01/2012	Filling	11	<0.5	24	73	410	0.3	12	520	0.25	2.75	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	2.5	<5
TP8 1.3-1.5	23/01/2012	Natural	12	<0.5	28	7	22	<0.1	2	11	<0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	-	-	-
TP9 0.5-0.7	23/01/2012	Filling	7	<0.5	9	32	50	<0.1	19	93	1.2	14.3	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP9 1.7-1.9	23/01/2012	Natural	6	<0.5	20	13	14	<0.1	1	4	<0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	-	-	-
TP10 0.0-0.2	23/01/2012	Filling	6	<0.5	7	24	25	<0.1	7	40	0.13	2.03	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP11 0.3-0.5	23/01/2012	Filling	17	<0.5	21	32	140	0.2	4	98	0.98	9.68	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP11 0.9-1.1	23/01/2012	Natural	11	<0.5	23	15	21	<0.1	1	10	<0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	-	-	-
TP12 0.0-0.2	23/01/2012	Filling	6	<0.5	6	39	30	0.1	21	91	0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP13 0.0-0.2	23/01/2012	Filling	7	<0.5	6	38	16	<0.1	10	77	<0.05	<1.55	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	<2.0	<5
TP14 0.0-0.2	23/01/2012	Filling	25	<0.5	15	33	100	1	7	110	1.1	11.7	<25	<250	<0.2	<0.5	<1	<3	ND	<0.7	2	<5
BD1/23012012	23/01/2012	Filling	9	<0.5	18	12	22	<0.1	2	15	0.21	2.71	-	-	-	-	-	-	-	-	-	-
BD6/23012013	24/01/2012	Filling	20	1	22	57	440	0.47	6.4	450	1.5	17	-	-	-	-	-	-	-	-	-	-
TB1/23012012	23/01/2012	-	-	-	-	-	-	-	-	-	-	-	<25	-	<0.2	<0.5	<1	<3	-	-	-	-
TS/23012012	23/01/2012	-	-	-	-	-	-	-	-	-	-	-	-	-	99%	101%	100%	101%	-	-	-	-
Site Assessment Criteria																						
SAC			400	80	400,000	4,000	1,200	60	2,400	28,000	4	80	65	1000	1	1.4	3.1	14	ND	40	40/200/800/40	34,000

Notes

SAC	NSW EPA Contaminated Sites: Guidelines for the NSW Site Auditors Scheme, 2006. Health-based guidelines for resedential with accessible soil sites (HIL, Column 1)
	Result exceeding the SAC
1	Chromium is assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) will be too reactive and unstable under the normal environment
2	SAC sourced from NSW EPA *Contaminated Sites Guidelines for Assessing Service Station Sites* (1994)
3	Aldrin+Dieldrin/Chlordane/ DDD+DDE+DDT/Heptachlor
Bold	Reported above laboratory PQL
<x.x	Below Laboratory Practical Quantification Limit for Analyte or sum of analytes
-	Not Tested
ND	None detected
BD1/23012012	Field Replicate of TP2 0.0-0.2m

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Table 3: Results of Laboratory Analysis for Waste Classification

Sample ID	Sampling Date	Soil Type	Heavy Metals									PAH				TPH		Benzene	Toluene	Ethyl-Benzene	Total Xylene	Total Phenols	PCB	OCP	asbestos
			As	Cd	Cr 1	Cu	Pb	Pb (TCLP)	Hg	Ni	Zn	Total PAH 2	Total PAH (TCLP)	Benzo(a) Pyrene	Benzo(a)pyrene (TCLP)	C6-C9	C10-C36								
TP1 0.0-0.2	23/01/2012	Filling	6	<0.5	12	20	32	-	<0.1	4	29	12.7	<0.016	1.6	<0.001	<25	120	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP2 0.0-0.2	23/01/2012	Filling	13	<0.5	20	10	24	-	<0.1	2	14	1.62	-	0.12	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	Detected
TP2 0.2-0.5	23/01/2012	Filling	17	<0.5	16	15	54	-	0.1	2	140	36.5	<0.016	2.9	<0.001	<25	200	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP2 0.9-1.2	23/01/2012	Natural	9	<0.5	18	10	14	-	<0.1	1	4	1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	-	-	-	ND
TP3 0.0-0.2	23/01/2012	Filling	11	<0.5	14	55	100	-	0.2	17	140	1195.5	**0.017**	91	<0.001	<25	2960	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP3 0.5-0.7	23/01/2012	Filling	7	<0.5	23	10	27	-	<0.1	2	11	<1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	-	-	-	ND
TP4 0.3-0.5	23/01/2012	Filling	12	<0.5	21	9	19	-	<0.1	2	4	<1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP5 0.5-0.7	23/01/2012	Filling	10	<0.5	7	27	37	-	<0.1	9	51	5.7	-	0.4	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP5 2.1-2.2	23/01/2012	Natural	6	<0.5	5	22	26	-	<0.1	6	43	4.24	-	0.34	-	<25	<250	<0.2	<0.5	<1	<3	-	-	-	ND
TP6 0.2-0.4	23/01/2012	Filling	8	<0.5	17	6	23	-	<0.1	2	4	13.2	<0.016	1.3	<0.001	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP7 0.2-0.4	23/01/2012	Filling	7	<0.5	16	27	110	**0.05**	1.3	17	140	<1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP8 0.9-1.1	23/01/2012	Filling	11	<0.5	24	73	410	**0.2**	0.3	12	520	2.75	-	0.25	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	2.5	ND
TP8 1.3-1.5	23/01/2012	Natural	12	<0.5	28	7	22	-	<0.1	2	11	<1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	-	-	-	ND
TP9 0.5-0.7	23/01/2012	Filling	7	<0.5	9	32	50	-	<0.1	19	93	14.3	<0.016	1.2	<0.001	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP9 1.7-1.9	23/01/2012	Natural	6	<0.5	20	13	14	-	<0.1	1	4	<1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	-	-	-	ND
TP10 0.0-0.2	23/01/2012	Filling	6	<0.5	7	24	25	-	<0.1	7	40	2.03	-	0.13	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP11 0.3-0.5	23/01/2012	Filling	17	<0.5	21	32	140	**0.3**	0.2	4	98	9.68	<0.016	0.98	<0.001	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP11 0.9-1.1	23/01/2012	Natural	11	<0.5	23	15	21	-	<0.1	1	10	<1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	-	-	-	ND
TP12 0.0-0.2	23/01/2012	Filling	6	<0.5	6	39	30	-	0.1	21	91	<1.55	-	0.05	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP13 0.0-0.2	23/01/2012	Filling	7	<0.5	6	38	16	-	<0.1	10	77	<1.55	-	<0.05	-	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	<2.0	ND
TP14 0.0-0.2	23/01/2012	Filling	25	<0.5	15	33	100	-	1	7	110	11.7	<0.016	1.1	<0.001	<25	<250	<0.2	<0.5	<1	<3	<5	<0.7	2	ND
BD1/23012012	23/01/2012	Filling	9	<0.5	18	12	22	-	<0.1	2	15	2.71	-	0.21	-	-	-	-	-	-	-	-	-	-	-
BD6/23012013	24/01/2012	Filling	20	1	22	57	440	-	0.47	6.4	450	17	-	1.5	-	-	-	-	-	-	-	-	-	-	-
Waste Classification Criteria [3]																									
Criteria for Waste Classification - No TCLP testing																									
General Solid Waste CT1 (mg/kg)			100	20	100	-	100	-	4	40	-	-	-	0.8	-	-	-	10	288	600	1000	288	-	-	-
Restricted Solid Waste CT2 (mg/kg)			400	80	400	-	400	-	16	120	-	-	-	3.2	-	-	-	40	1152	2400	4000	1152	-	-	-
Criteria for Waste Classification - with TCLP testing																									
General Solid Waste SCC1 and TCLP1 (mg/kg)			-	-	-	-	1500	5	-	-	-	200	-	10	0.04	650	10000	-	-	-	-	-	<50	<50	-
Restricted Solid Waste SCC2 and TCLP2 (mg/kg)			-	-	-	-	6000	20	-	-	-	800	-	23	0.16	10000	40000	-	-	-	-	-	<50	<50	-
Published Background Concentrations for Austrlian Soils																									
NEPC (1999) National Environment Protection Measure (Assessment of Site Contamination) Schedule B1, Table 5-A, Background Ranges			1-50	1	5-1000	2-100	2-200	-	0.03	5-500	10-300	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZECC/NHMRC (1992) Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Environmental Soil Quality Guidelines Background A [ANZECC A];			0.2-30	0.04-2	0.5-110	1-190	<2-200	-	0.001-0.1	2-400	2-180	0.95-5	-	-	-	-	-	0.05-1	0.1-1	-	-	0.03-0.5	0.02-0.1	<0.001-0.97	-
ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3, Table 9.2.16 Datasets used to derive suggested upper background values for uncontaminated Australian soils			1-53	0.016-0.78	2.5-673	0.4-412	2-81	-	-	1-517	1-263	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1	All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) will be too reactive and unstable in normal environmental conditions
2	Concentrations of individual compounds less than PQL have been assumed equal to PQL
3	NSW DECC *Waste Classification Guidelines* (Table 2) April 2008, updated 2009
ND	Not detected at reporting limit of 0.1g/kg
-	Not analysed / Not applicable
BD1/23012012	Field Replicate of TP2 0.0-0.2m
BD6/23012012	Field Replicate of TP11 0.3-0.5m
	Exceeds General Solid Waste Criteria

Appendix E

NATA Laboratory Results

Douglas Partners
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for results please also send to ross.mcalpine@douglaspartners.com.au

1 of 2

CHAIN OF CUSTODY

Project Name: Croydon
Project No: 20289.10 Sampler: AMCA
Project Mgr: Mob. Phone: NERILEE EDWARDS
Email: nerilee.edwards@douglaspartners.com.au
Date Required: STANDARD TAT Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 68036
Date Received: 24/1/12
Time Received: 13:30
Received by: JHie
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: HM (8)	PAH	TPH, BTEX MTBE	OCP/PCB	Phenols	Asbestos							Other	Notes
TP1	0.0-0.2	1	23/1	S	G+B	X	X	X	X	X	X								
	0.5-0.7	2				—	—	—	—	—	—								
	1.0-1.1	3				—	—	—	—	—	—								
TP2	0.0-0.2	4				X	X	X	X	X	X								2x BAGS ONE WITH FRAGMENT ONE WITH SOIL PLEASE LOOK AT BOTH.
	0.2-0.5	5				X	X	X	X	X	X								
	~~0.5-0.7~~	~~0.9~~ 6				—	—	—	—	—	—								
	0.9-1.2	7				X	X	X											
TP3	0.0-0.2	8				X	X	X	X	X	X								
	0.4-0.5	9				—	—	—	—	—	—								
	0.5-0.7	10				X	X	X											
TP4	0.0-0.2	11				—	—	—	—	—	—								
	0.3-0.5	12				X	X	X	X	X	X								

Lab Report No.
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by:	Signed:	Date & Time:	Received By: JHie	Date & Time: 24/1/12	13:30.
Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:	

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: CROYDON
Project No: 20259.10 Sampler: AMCA
Project Mgr: Mob. Phone: NERILEE EDWARDS
Email: nerilee.edwards@douglaspartners.com.au
Date Required: STD DAY TAT Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID 68036	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: HM (8)	PAH	TPH, BTEX MTBE	OCP/PCB	Phenols	ABN ESTOS							Other	Notes
TP4	0.5-0.7	13	23/1	S	G+B														
TP5	0.0-0.2	14																	
	0.5-0.7	15				X	X	X	X	X	X								
	1.5-1.7	16																	
	2.1-2.2	17				X	X	X											
TP6	0.0-0.2	18																	
	0.2-0.4	19				X	X	X	X	X	X								
	0.4-0.6	20																	
TP7	0.0-0.2	21																	
	0.2-0.4	22				X	X	X	X	X	X								
	0.4-0.6	23																	
	0.6-0.8	24																	

Lab Report No.
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time: 24/1/12	13:30
Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:	

Douglas Partners
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CHAIN OF CUSTODY

Project Name: Croydon
Project No: 20259.10 Sampler: RMCA
Project Mgr: Mob. Phone: NERIDA EDWARDS
Email: neridaedwards@douglaspartners.com.au
Date Required: STD DAY TAT Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID (68036)	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: HM (8)	PAH	TPH, BTEX, MTBE	OCP/PCB	Phenols	Asbestos							Other	Notes
TP8	0.0-0.2	25	23/1	S	G+B	(	(												
	0.7-0.9	26					(												
	0.9-1.1	27				X	X	X	X	X	X								
	1.3-1.5	28				X	X	X											
TP9	0.0-0.2	29				(					(								
	0.5-0.7	30				X	X	X	X	X	X								
	1.2-1.4	31				(					(								
	1.7-1.9	32				X	X	X											
TP10	0.0-0.2	33				X	X	X	X	X	X								
	0.7-0.9	34				(					(								
	0.9-1.1	35				(					(								
			↓	↓	↓														

Lab Report No.
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:
			Julie	24/1/12 13:30
Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: CROYDON
Project No: 70289.10 Sampler: AMCA
Project Mgr: Mob. Phone: NERILEE EDWARDS
Email: nerilee.edwards@douglaspartners.com.au
Date Required: STD 5 DAY TA Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID (68086)	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: HM (8)	PAH	TPH, BTEX, MTBE	OCP/PCB	Phenols	Asbestos							Other	Notes
TP11	0.0-0.2	36	23/1	S	G+B	—	—	—	—	—	—								
	0.3-0.5	37	↓	↓	↓	X	X	X	X	X	X								
	0.9-1.1	38				X	X	X											
TP12	0.0-0.2	39				X	X	X	X	X	X								
	0.4-0.6	40				—	—	—	—	—	—								
	0.8-1.0	41				—	—	—	—	—	—								
TP13	0.0-0.2	42				X	X	X	X	X	X								
	0.5-0.7	43				—	—	—	—	—	—								
	1.0-1.2	44				—	—	—	—	—	—								
TP14	0.0-0.2	45				X	X	X	X	X	X								
	0.6-0.8	46				—	—	—	—	—	—								
	0.9-1.1	47	↓	↓	↓	—	—	—	—	—	—								

Lab Report No.
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

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Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:	

Douglas Partners
Geotechnics - Environment - Groundwater

CHAIN OF CUSTODY

Project Name: Croydon
Project No: 20259.10 Sampler: Fonca
Project Mgr: Mob. Phone: Nerilee Edwards
Email: nerilee.edwards@douglaspartners.com.au
Date Required: ST 5 DAY TA Lab Quote No.

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID 68036	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: HM(8)	PAH	TPH, BTEX, MTBE	OCP/PCB	Phenols	Asbestos		TPH C6-C9	BTEX				Other	Notes
BD1/230112		48	23/1	S	G+B	X	X												INTRA LAB SAMPLE
BD2/230112		49																	
BD3/230112		50																	
BD4/230112		51																	
BD5/230112		52																	
BD6/230112		-				X	X												INTEX LAB SAMPLE
BD7/230112		53																	
TB1/230112		54											X	X					
TS1/230112		55												X					

Lab Report No.
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:	24/1/12 13:30
Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:	

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 68036

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Nerilee Edwards, Ross McAlpine

Sample log in details:

Your Reference:	**20289.10, Croydon**		
No. of samples:	55 soils		
Date samples received / completed instructions received	24/01/12	/	24/01/12

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:	1/02/12	/	31/01/12
Date of Preliminary Report:	Not issued		

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Results Approved By:

Nancy Zhang
Chemist

Rhian Morgan
Reporting Supervisor

Nick Sarlamis
Inorganics Supervisor

Paul Ching
Approved Signatory

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

vTRH & BTEX in Soil						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-7	68036-8
Your Reference	----------	TP1	TP2	TP2	TP2	TP3
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.9-1.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	26/01/2012	26/01/2012	26/01/2012	26/01/2012	26/01/2012
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
MTBE	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	110	116	105	98	128

vTRH & BTEX in Soil						
Our Reference:	UNITS	68036-10	68036-12	68036-15	68036-17	68036-19
Your Reference	----------	TP3	TP4	TP5	TP5	TP6
Depth	----------	0.5-0.7	0.3-0.5	0.5-0.7	2.1-2.2	0.2-0.4
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	26/01/2012	26/01/2012	26/01/2012	26/01/2012	26/01/2012
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
MTBE	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	113	114	110	115	117

vTRH & BTEX in Soil						
Our Reference:	UNITS	68036-22	68036-27	68036-28	68036-30	68036-32
Your Reference	----------	TP7	TP8	TP8	TP9	TP9
Depth	----------	0.2-0.4	0.9-1.1	1.3-1.5	0.5-0.7	1.7-1.9
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	26/01/2012	26/01/2012	27/01/2012	27/01/2012	27/01/2012
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
MTBE	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	117	113	110	116	112

vTRH & BTEX in Soil						
Our Reference:	UNITS	68036-33	68036-37	68036-38	68036-39	68036-42
Your Reference	----------	TP10	TP11	TP11	TP12	TP13
Depth	----------	0.0-0.2	0.3-0.5	0.9-1.1	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
MTBE	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	119	113	118	108	114

vTRH & BTEX in Soil				
Our Reference:	UNITS	68036-45	68036-54	68036-55
Your Reference	----------	TP14	TB1/230112	TS1/230112
Depth	----------	0.0-0.2	-	-
Date Sampled		23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012
vTRH C_6 - C_9	mg/kg	<25	<25	[NA]
MTBE	mg/kg	<0.50	<0.50	NA
Benzene	mg/kg	<0.2	<0.2	99%
Toluene	mg/kg	<0.5	<0.5	101%
Ethylbenzene	mg/kg	<1	<1	100%
m+p-xylene	mg/kg	<2	<2	101%
o-Xylene	mg/kg	<1	<1	101%
Surrogate aaa-Trifluorotoluene	%	115	116	100

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-7	68036-8
Your Reference	----------	TP1	TP2	TP2	TP2	TP3
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.9-1.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	100	<100	2,100
TRHC$_{29}$ - C$_{36}$	mg/kg	120	<100	100	<100	860
Surrogate o-Terphenyl	%	102	108	123	95	#

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	68036-10	68036-12	68036-15	68036-17	68036-19
Your Reference	----------	TP3	TP4	TP5	TP5	TP6
Depth	----------	0.5-0.7	0.3-0.5	0.5-0.7	2.1-2.2	0.2-0.4
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	117	104	75	74	76

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	68036-22	68036-27	68036-28	68036-30	68036-32
Your Reference	----------	TP7	TP8	TP8	TP9	TP9
Depth	----------	0.2-0.4	0.9-1.1	1.3-1.5	0.5-0.7	1.7-1.9
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	84	78	88	68	107

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	68036-33	68036-37	68036-38	68036-39	68036-42
Your Reference	----------	TP10	TP11	TP11	TP12	TP13
Depth	----------	0.0-0.2	0.3-0.5	0.9-1.1	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	86	130	75	69	98

sTRH in Soil (C10-C36)		
Our Reference:	UNITS	68036-45
Your Reference	----------	TP14
Depth	----------	0.0-0.2
Date Sampled		23/01/2012
Type of sample		Soil
Date extracted	-	25/01/2012
Date analysed	-	25/01/2012
TRHC$_{10}$ - C$_{14}$	mg/kg	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100
Surrogate o-Terphenyl	%	91

PAHs in Soil						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-7	68036-8
Your Reference	----------	TP1	TP2	TP2	TP2	TP3
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.9-1.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Naphthalene	mg/kg	<0.1	<0.1	0.1	<0.1	6.7
Acenaphthylene	mg/kg	0.2	<0.1	0.6	<0.1	24
Acenaphthene	mg/kg	<0.1	<0.1	0.1	<0.1	4.1
Fluorene	mg/kg	<0.1	<0.1	0.4	<0.1	22
Phenanthrene	mg/kg	0.6	<0.1	5.5	<0.1	200
Anthracene	mg/kg	0.3	<0.1	1.2	<0.1	48
Fluoranthene	mg/kg	1.4	0.1	6.5	0.1	220
Pyrene	mg/kg	1.5	0.1	5.9	<0.1	190
Benzo(a)anthracene	mg/kg	0.8	<0.1	2.6	<0.1	92
Chrysene	mg/kg	0.8	<0.1	2.5	<0.1	75
Benzo(b+k)fluoranthene	mg/kg	2.1	<0.2	4.3	<0.2	130
Benzo(a)pyrene	mg/kg	1.6	0.12	2.9	<0.05	91
Indeno(1,2,3-c,d)pyrene	mg/kg	1.4	<0.1	1.4	<0.1	46
Dibenzo(a,h)anthracene	mg/kg	0.2	<0.1	0.3	<0.1	8.7
Benzo(g,h,i)perylene	mg/kg	1.5	<0.1	1.2	<0.1	38
Surrogate p-Terphenyl-d_{14}	%	114	113	109	114	103

PAHs in Soil						
Our Reference:	UNITS	68036-10	68036-12	68036-15	68036-17	68036-19
Your Reference	----------	TP3	TP4	TP5	TP5	TP6
Depth	----------	0.5-0.7	0.3-0.5	0.5-0.7	2.1-2.2	0.2-0.4
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.1	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.9	0.4	1.2
Anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	0.3
Fluoranthene	mg/kg	<0.1	<0.1	1	0.7	2.2
Pyrene	mg/kg	<0.1	<0.1	0.9	0.7	2.3
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.4	0.3	1.1
Chrysene	mg/kg	<0.1	<0.1	0.4	0.3	1.0
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	0.6	0.5	1.9
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.40	0.34	1.3
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.2	0.2	0.7
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.2	0.2	0.6
Surrogate p-Terphenyl-d_{14}	%	108	117	103	111	111

PAHs in Soil						
Our Reference:	UNITS	68036-22	68036-27	68036-28	68036-30	68036-32
Your Reference	----------	TP7	TP8	TP8	TP9	TP9
Depth	----------	0.2-0.4	0.9-1.1	1.3-1.5	0.5-0.7	1.7-1.9
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	1.8	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
Fluoranthene	mg/kg	<0.1	0.3	<0.1	2.6	<0.1
Pyrene	mg/kg	<0.1	0.4	<0.1	2.7	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.2	<0.1	1.1	<0.1
Chrysene	mg/kg	<0.1	0.2	<0.1	1.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.4	<0.2	1.7	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.25	<0.05	1.2	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	<0.1	0.6	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.1	<0.1	0.6	<0.1
Surrogate p-Terphenyl-d_{14}	%	111	107	115	107	114

PAHs in Soil						
Our Reference:	UNITS	68036-33	68036-37	68036-38	68036-39	68036-42
Your Reference	----------	TP10	TP11	TP11	TP12	TP13
Depth	----------	0.0-0.2	0.3-0.5	0.9-1.1	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	0.8	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	1.7	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.3	1.6	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	0.8	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	0.8	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.2	1.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.13	0.98	<0.05	0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.5	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	109	111	112	110	109

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	68036-45 TP14 0.0-0.2 23/01/2012 Soil	68036-48 BD1/230112 - 23/01/2012 Soil
Date extracted	-	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	0.2	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	1.1	0.2
Anthracene	mg/kg	0.3	<0.1
Fluoranthene	mg/kg	2.0	0.4
Pyrene	mg/kg	2.0	0.4
Benzo(a)anthracene	mg/kg	1	0.2
Chrysene	mg/kg	0.9	0.2
Benzo(b+k)fluoranthene	mg/kg	1.6	0.3
Benzo(a)pyrene	mg/kg	1.1	0.21
Indeno(1,2,3-c,d)pyrene	mg/kg	0.6	0.1
Dibenzo(a,h)anthracene	mg/kg	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.5	0.1
Surrogate p-Terphenyl-d_{14}	%	102	110

Organochlorine Pesticides in soil						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-8	68036-12
Your Reference	----------	TP1	TP2	TP2	TP3	TP4
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.0-0.2	0.3-0.5
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	28/01/2012	28/01/2012	28/01/2012	28/01/2012	28/01/2012
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	0.5	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	114	113	115	107	112

Organochlorine Pesticides in soil						
Our Reference:	UNITS	68036-15	68036-19	68036-22	68036-27	68036-30
Your Reference	----------	TP5	TP6	TP7	TP8	TP9
Depth	----------	0.5-0.7	0.2-0.4	0.2-0.4	0.9-1.1	0.5-0.7
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	28/01/2012	28/01/2012	28/01/2012	28/01/2012	28/01/2012
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	0.6	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	105	110	121	122	120

Organochlorine Pesticides in soil						
Our Reference:	UNITS	68036-33	68036-37	68036-39	68036-42	68036-45
Your Reference	----------	TP10	TP11	TP12	TP13	TP14
Depth	----------	0.0-0.2	0.3-0.5	0.0-0.2	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	28/01/2012	28/01/2012	28/01/2012	28/01/2012	28/01/2012
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	116	118	120	75	86

PCBs in Soil						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-8	68036-12
Your Reference	----------	TP1	TP2	TP2	TP3	TP4
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.0-0.2	0.3-0.5
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	28/01/2012	28/01/2012	28/01/2012	28/01/2012	28/01/2012
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCLMX	%	114	113	115	107	112

PCBs in Soil						
Our Reference:	UNITS	68036-15	68036-19	68036-22	68036-27	68036-30
Your Reference	----------	TP5	TP6	TP7	TP8	TP9
Depth	----------	0.5-0.7	0.2-0.4	0.2-0.4	0.9-1.1	0.5-0.7
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	28/01/2012	28/01/2012	28/01/2012	28/01/2012	28/01/2012
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	105	110	121	122	120

PCBs in Soil						
Our Reference:	UNITS	68036-33	68036-37	68036-39	68036-42	68036-45
Your Reference	----------	TP10	TP11	TP12	TP13	TP14
Depth	----------	0.0-0.2	0.3-0.5	0.0-0.2	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	28/01/2012	28/01/2012	28/01/2012	28/01/2012	28/01/2012
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	116	118	120	75	86

Total Phenolics in Soil						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-8	68036-12
Your Reference	----------	TP1	TP2	TP2	TP3	TP4
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.0-0.2	0.3-0.5
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Date analysed	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	68036-15	68036-19	68036-22	68036-27	68036-30
Your Reference	----------	TP5	TP6	TP7	TP8	TP9
Depth	----------	0.5-0.7	0.2-0.4	0.2-0.4	0.9-1.1	0.5-0.7
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Date analysed	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Total Phenolics in Soil						
Our Reference:	UNITS	68036-33	68036-37	68036-39	68036-42	68036-45
Your Reference	----------	TP10	TP11	TP12	TP13	TP14
Depth	----------	0.0-0.2	0.3-0.5	0.0-0.2	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Date analysed	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Acid Extractable metals in soil						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-7	68036-8
Your Reference	----------	TP1	TP2	TP2	TP2	TP3
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.9-1.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Arsenic	mg/kg	6	13	17	9	11
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	12	20	16	18	14
Copper	mg/kg	20	10	15	10	55
Lead	mg/kg	32	24	54	14	100
Mercury	mg/kg	<0.1	<0.1	0.1	<0.1	0.2
Nickel	mg/kg	4	2	2	1	17
Zinc	mg/kg	29	14	140	4	140

Acid Extractable metals in soil						
Our Reference:	UNITS	68036-10	68036-12	68036-15	68036-17	68036-19
Your Reference	----------	TP3	TP4	TP5	TP5	TP6
Depth	----------	0.5-0.7	0.3-0.5	0.5-0.7	2.1-2.2	0.2-0.4
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Arsenic	mg/kg	7	12	10	6	8
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	23	21	7	5	17
Copper	mg/kg	10	9	27	22	6
Lead	mg/kg	27	19	37	26	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	2	9	6	2
Zinc	mg/kg	11	4	51	43	4

Acid Extractable metals in soil						
Our Reference:	UNITS	68036-22	68036-27	68036-28	68036-30	68036-32
Your Reference	----------	TP7	TP8	TP8	TP9	TP9
Depth	----------	0.2-0.4	0.9-1.1	1.3-1.5	0.5-0.7	1.7-1.9
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Arsenic	mg/kg	7	11	12	7	6
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	16	24	28	9	20
Copper	mg/kg	27	73	7	32	13
Lead	mg/kg	110	410	22	50	14
Mercury	mg/kg	1.3	0.3	<0.1	<0.1	<0.1
Nickel	mg/kg	17	12	2	19	1
Zinc	mg/kg	140	520	11	93	4

Acid Extractable metals in soil						
Our Reference:	UNITS	68036-33	68036-37	68036-38	68036-39	68036-42
Your Reference	----------	TP10	TP11	TP11	TP12	TP13
Depth	----------	0.0-0.2	0.3-0.5	0.9-1.1	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Arsenic	mg/kg	6	17	11	6	7
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	7	21	23	6	6
Copper	mg/kg	24	32	15	39	38
Lead	mg/kg	25	140	21	30	16
Mercury	mg/kg	<0.1	0.2	<0.1	0.1	<0.1
Nickel	mg/kg	7	4	1	21	10
Zinc	mg/kg	40	98	10	91	77

Acid Extractable metals in soil				
Our Reference:	UNITS	68036-45	68036-48	68036-56
Your Reference	----------	TP14	BD1/230112	TP7 - Triplicate
Depth	----------	0.0-0.2	-	0.2-0.4
Date Sampled		23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil
Date digested	-	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	25/01/2012	25/01/2012	25/01/2012
Arsenic	mg/kg	25	9	4
Cadmium	mg/kg	<0.5	<0.5	<0.5
Chromium	mg/kg	15	18	16
Copper	mg/kg	33	12	17
Lead	mg/kg	100	22	45
Mercury	mg/kg	1.0	<0.1	0.5
Nickel	mg/kg	7	2	19
Zinc	mg/kg	110	15	86

Moisture						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-7	68036-8
Your Reference	----------	TP1	TP2	TP2	TP2	TP3
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.9-1.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Moisture	%	14	17	18	23	10

Moisture						
Our Reference:	UNITS	68036-10	68036-12	68036-15	68036-17	68036-19
Your Reference	----------	TP3	TP4	TP5	TP5	TP6
Depth	----------	0.5-0.7	0.3-0.5	0.5-0.7	2.1-2.2	0.2-0.4
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Moisture	%	25	16	9.9	18	16

Moisture						
Our Reference:	UNITS	68036-22	68036-27	68036-28	68036-30	68036-32
Your Reference	----------	TP7	TP8	TP8	TP9	TP9
Depth	----------	0.2-0.4	0.9-1.1	1.3-1.5	0.5-0.7	1.7-1.9
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Moisture	%	9.5	15	20	14	25

Moisture						
Our Reference:	UNITS	68036-33	68036-37	68036-38	68036-39	68036-42
Your Reference	----------	TP10	TP11	TP11	TP12	TP13
Depth	----------	0.0-0.2	0.3-0.5	0.9-1.1	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/01/2012	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
Moisture	%	9.5	17	18	12	14

Moisture			
Our Reference:	UNITS	68036-45	68036-48
Your Reference	----------	TP14	BD1/230112
Depth	----------	0.0-0.2	-
Date Sampled		23/01/2012	23/01/2012
Type of sample		Soil	Soil
Date prepared	-	25/01/2012	25/01/2012
Date analysed	-	27/01/2012	27/01/2012
Moisture	%	11	17

Asbestos ID - soils						
Our Reference:	UNITS	68036-1	68036-4	68036-5	68036-8	68036-12
Your Reference	----------	TP1	TP2	TP2	TP3	TP4
Depth	----------	0.0-0.2	0.0-0.2	0.2-0.5	0.0-0.2	0.3-0.5
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Sample mass tested	g	Approx 70g	Approx 70g	Approx 70g	Approx 70g	Approx 70g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	68036-15	68036-19	68036-22	68036-27	68036-30
Your Reference	----------	TP5	TP6	TP7	TP8	TP9
Depth	----------	0.5-0.7	0.2-0.4	0.2-0.4	0.9-1.1	0.5-0.7
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Sample mass tested	g	Approx 70g	Approx 70g	Approx 70g	Approx 70g	Approx 70g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	68036-33	68036-37	68036-39	68036-42	68036-45
Your Reference	----------	TP10	TP11	TP12	TP13	TP14
Depth	----------	0.0-0.2	0.3-0.5	0.0-0.2	0.0-0.2	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/01/2012	30/01/2012	30/01/2012	30/01/2012	30/01/2012
Sample mass tested	g	Approx 70g	Approx 70g	Approx 70g	Approx 70g	Approx 70g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Inorg-030	Total Phenolics - determined colorimetrically following disitillation, based upon APHA 21st ED 5530 D.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-4	25/01/2012
Date analysed	-			26/01/2012	68036-1	26/01/2012 || 26/01/2012	LCS-4	26/01/2012
vTRH C_6 - C_9	mg/kg	25	Org-016	<25	68036-1	<25 || <25	LCS-4	135%
MTBE	mg/kg	0.5	Org-014	<0.50	68036-1	<0.50 || <0.50	[NR]	[NR]
Benzene	mg/kg	0.2	Org-016	<0.2	68036-1	<0.2 || <0.2	LCS-4	134%
Toluene	mg/kg	0.5	Org-016	<0.5	68036-1	<0.5 || <0.5	LCS-4	127%
Ethylbenzene	mg/kg	1	Org-016	<1	68036-1	<1 || <1	LCS-4	132%
m+p-xylene	mg/kg	2	Org-016	<2	68036-1	<2 || <2	LCS-4	140%
o-Xylene	mg/kg	1	Org-016	<1	68036-1	<1 || <1	LCS-4	129%
Surrogate aaa-Trifluorotoluene	%		Org-016	120	68036-1	110 || 117 || RPD: 6	LCS-4	124%

QUALITY CONTROL sTRH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-4	25/01/2012
Date analysed	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-4	25/01/2012
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	68036-1	<50 || <50	LCS-4	94%
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	68036-1	<100 || 110	LCS-4	91%
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	68036-1	120 || 220 || RPD: 59	LCS-4	80%
Surrogate o-Terphenyl	%		Org-003	84	68036-1	102 || 115 || RPD: 12	LCS-4	118%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-5	25/01/2012
Date analysed	-			27/01/2012	68036-1	27/01/2012 || 27/01/2012	LCS-5	27/01/2012
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	<0.1 || <0.1	LCS-5	120%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	0.2 || 0.3 || RPD: 40	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	<0.1 || <0.1	LCS-5	121%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	0.6 || 0.8 || RPD: 29	LCS-5	117%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	0.3 || 0.4 || RPD: 29	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	1.4 || 2.1 || RPD: 40	LCS-5	118%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	1.5 || 2.3 || RPD: 42	LCS-5	124%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	0.8 || 1.4 || RPD: 55	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	0.8 || 1.4 || RPD: 55	LCS-5	120%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	68036-1	2.1 || 3.0 || RPD: 35	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	68036-1	1.6 || 2.3 || RPD: 36	LCS-5	128%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	1.4 || 2.0 || RPD: 35	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	0.2 || 0.4 || RPD: 67	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	68036-1	1.5 || 2.0 || RPD: 29	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012 subset	117	68036-1	114 || 106 || RPD: 7	LCS-5	118%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-4	25/01/2012
Date analysed	-			28/01/2012	68036-1	28/01/2012 || 28/01/2012	LCS-4	28/01/2012
HCB	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	108%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	103%
Heptachlor	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	103%
delta-BHC	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	94%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	107%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	102%
Dieldrin	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	110%
Endrin	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	107%
pp-DDD	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	109%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	LCS-4	109%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-005	136	68036-1	114 || 109 || RPD: 4	LCS-4	108%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-4	25/01/2012
Date analysed	-			28/01/2012	68036-1	28/01/2012 || 28/01/2012	LCS-4	28/01/2012
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	68036-1	<0.1 || <0.1	LCS-4	126%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	68036-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	136	68036-1	114 || 109 || RPD: 4	LCS-4	107%
QUALITY CONTROL Total Phenolics in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2012	68036-1	30/01/2012 || 30/01/2012	LCS-1	30/01/2012
Date analysed	-			30/01/2012	68036-1	30/01/2012 || 30/01/2012	LCS-1	30/01/2012
Total Phenolics (as Phenol)	mg/kg	5	Inorg-030	<5	68036-1	<5 || <5	LCS-1	87%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-1	25/01/2012
Date analysed	-			25/01/2012	68036-1	25/01/2012 || 25/01/2012	LCS-1	25/01/2012
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	68036-1	6 || 8 || RPD: 29	LCS-1	104%
Cadmium	mg/kg	0.5	Metals-020 ICP-AES	<0.5	68036-1	<0.5 || <0.5	LCS-1	103%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	68036-1	12 || 17 || RPD: 34	LCS-1	105%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	68036-1	20 || 22 || RPD: 10	LCS-1	106%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	68036-1	32 || 35 || RPD: 9	LCS-1	103%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	68036-1	<0.1 || <0.1	LCS-1	121%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	68036-1	4 || 4 || RPD: 0	LCS-1	106%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	68036-1	29 || 33 || RPD: 13	LCS-1	105%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	[NT]

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

QUALITY CONTROL vTRH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
Date analysed	-	68036-22	26/01/2012 || 26/01/2012	68036-4	26/01/2012
vTRH C_6 - C_9	mg/kg	68036-22	<25 || <25	68036-4	123%
MTBE	mg/kg	68036-22	<0.50 || <0.50	[NR]	[NR]
Benzene	mg/kg	68036-22	<0.2 || <0.2	68036-4	129%
Toluene	mg/kg	68036-22	<0.5 || <0.5	68036-4	123%
Ethylbenzene	mg/kg	68036-22	<1 || <1	68036-4	113%
m+p-xylene	mg/kg	68036-22	<2 || <2	68036-4	125%
o-Xylene	mg/kg	68036-22	<1 || <1	68036-4	127%
Surrogate aaa-Trifluorotoluene	%	68036-22	117 || 116 || RPD: 1	68036-4	132%

QUALITY CONTROL sTRH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
Date analysed	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
TRH C_{10} - C_{14}	mg/kg	68036-22	<50 || <50	68036-4	126%
TRH C_{15} - C_{28}	mg/kg	68036-22	<100 || <100	68036-4	117%
TRH C_{29} - C_{36}	mg/kg	68036-22	<100 || <100	68036-4	106%
Surrogate o-Terphenyl	%	68036-22	84 || 87 || RPD: 4	68036-4	104%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
Date analysed	-	68036-22	27/01/2012 || 27/01/2012	68036-4	27/01/2012
Naphthalene	mg/kg	68036-22	<0.1 || <0.1	68036-4	119%
Acenaphthylene	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	68036-22	<0.1 || <0.1	68036-4	117%
Phenanthrene	mg/kg	68036-22	<0.1 || <0.1	68036-4	114%
Anthracene	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	68036-22	<0.1 || <0.1	68036-4	120%
Pyrene	mg/kg	68036-22	<0.1 || <0.1	68036-4	125%
Benzo(a)anthracene	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	68036-22	<0.1 || <0.1	68036-4	118%
Benzo(b+k)fluoranthene	mg/kg	68036-22	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	68036-22	<0.05 || <0.05	68036-4	121%
Indeno(1,2,3-c,d)pyrene	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	68036-22	111 || 111 || RPD: 0	68036-4	109%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
Date analysed	-	68036-22	28/01/2012 || 28/01/2012	68036-4	28/01/2012
HCB	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	68036-22	<0.1 || <0.1	68036-4	109%
gamma-BHC	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	68036-22	<0.1 || <0.1	68036-4	104%
Heptachlor	mg/kg	68036-22	<0.1 || <0.1	68036-4	104%
delta-BHC	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	68036-22	<0.1 || <0.1	68036-4	95%
Heptachlor Epoxide	mg/kg	68036-22	<0.1 || <0.1	68036-4	108%
gamma-Chlordane	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	68036-22	<0.1 || <0.1	68036-4	103%
Dieldrin	mg/kg	68036-22	<0.1 || <0.1	68036-4	111%
Endrin	mg/kg	68036-22	<0.1 || <0.1	68036-4	111%
pp-DDD	mg/kg	68036-22	<0.1 || <0.1	68036-4	110%
Endosulfan II	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	68036-22	<0.1 || <0.1	68036-4	112%
Methoxychlor	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	68036-22	121 || 117 || RPD: 3	68036-4	108%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
Date analysed	-	68036-22	28/01/2012 || 28/01/2012	68036-4	28/01/2012
Arochlor 1016	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	68036-22	<0.1 || <0.1	68036-4	124%
Arochlor 1260	mg/kg	68036-22	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	68036-22	121 || 117 || RPD: 3	68036-4	109%
QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	68036-33	30/01/2012 || 30/01/2012	68036-4	30/01/2012
Date analysed	-	68036-33	30/01/2012 || 30/01/2012	68036-4	30/01/2012
Total Phenolics (as Phenol)	mg/kg	68036-33	<5 || <5	68036-4	96%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
Date analysed	-	68036-22	25/01/2012 || 25/01/2012	68036-4	25/01/2012
Arsenic	mg/kg	68036-22	7 || <4	68036-4	76%
Cadmium	mg/kg	68036-22	<0.5 || <0.5	68036-4	89%
Chromium	mg/kg	68036-22	16 || 15 || RPD: 6	68036-4	91%
Copper	mg/kg	68036-22	27 || 17 || RPD: 45	68036-4	107%
Lead	mg/kg	68036-22	110 || 31 || RPD: 112	68036-4	87%
Mercury	mg/kg	68036-22	1.3 || 0.5 || RPD: 89	68036-4	116%
Nickel	mg/kg	68036-22	17 || 20 || RPD: 16	68036-4	93%
Zinc	mg/kg	68036-22	140 || 88 || RPD: 46	68036-4	104%
QUALITY CONTROL sTRH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	LCS-5	25/01/2012
Date analysed	-	[NT]	[NT]	LCS-5	25/01/2012
TRHC$_{10}$ - C$_{14}$	mg/kg	[NT]	[NT]	LCS-5	87%
TRHC$_{15}$ - C$_{28}$	mg/kg	[NT]	[NT]	LCS-5	82%
TRHC$_{29}$ - C$_{36}$	mg/kg	[NT]	[NT]	LCS-5	73%
Surrogate o-Terphenyl	%	[NT]	[NT]	LCS-5	107%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	LCS-2	25/01/2012
Date analysed	-	[NT]	[NT]	LCS-2	25/01/2012
Arsenic	mg/kg	[NT]	[NT]	LCS-2	106%
Cadmium	mg/kg	[NT]	[NT]	LCS-2	106%
Chromium	mg/kg	[NT]	[NT]	LCS-2	107%
Copper	mg/kg	[NT]	[NT]	LCS-2	109%
Lead	mg/kg	[NT]	[NT]	LCS-2	104%
Mercury	mg/kg	[NT]	[NT]	LCS-2	119%
Nickel	mg/kg	[NT]	[NT]	LCS-2	107%
Zinc	mg/kg	[NT]	[NT]	LCS-2	107%

Report Comments:

Total Recoverable Hydrocarbons (semi volatile) in soil: # Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 30-40g of sample in its own container.

Acid Extractable Metals in Soil: The laboraotory RPD acceptance criteriae has been exceeded for 68036-22 for Lead & Mercury. Therefore a triplicate result has been issued as laboratory sample number 68036-56.

PCB's in Soil:
PQL has been raised due to interference from analytes(other than those being tested) in the sample/s.

Asbestos ID was analysed by Approved Identifier: Alex Tam
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
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

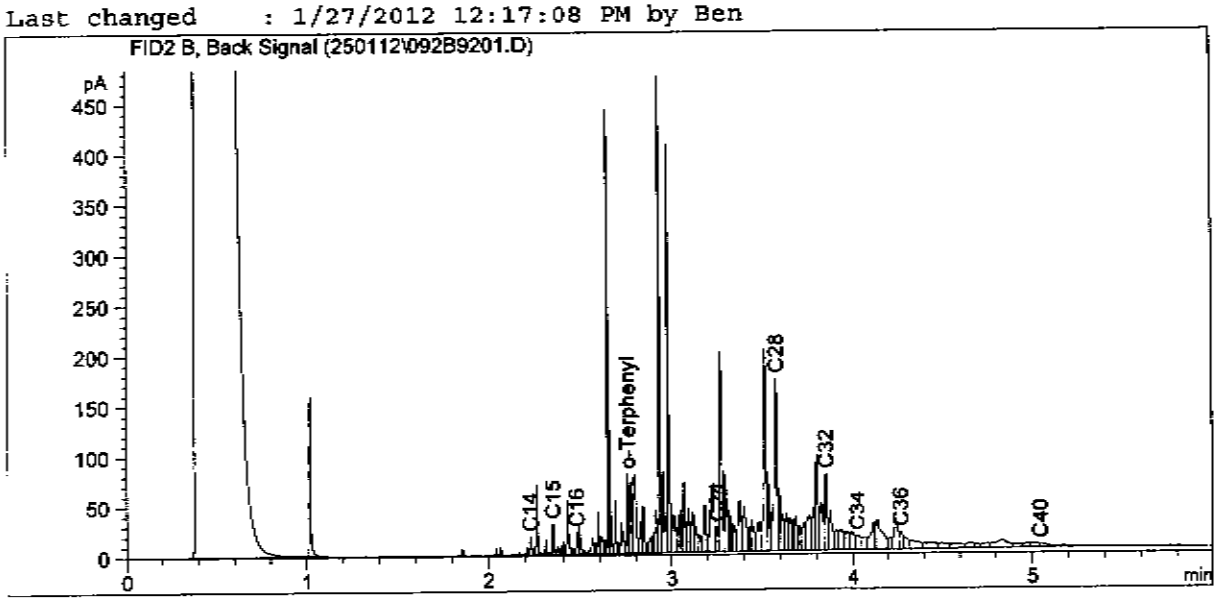
Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance 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.

ta File C:\CHEM32\1\DATA\01_12\250112\092B9201.D
mple Name: 68036-8

Acq. Operator : Ben
Seq. Line : 92
Acq. Instrument : Instrument 1
Location : Vial 92
Injection Date : 1/26/2012 5:07:28 AM
Inj : 1
Inj Volume : 1 µl

Acq. Method : C:\CHEM32\1\METHODS\1312 MMI TEST.M
Last changed : 1/25/2012 4:26:41 PM by Ben
Analysis Method : C:\CHEM32\1\METHODS\01_12\250112B.M
Last changed : 1/27/2012 12:17:08 PM by Ben



External Standard Report

Sorted By : Signal
Calib. Data Modified : Wednesday, January 25, 2012 3:44:36 PM
Multiplier: : 1.0000
Dilution: : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: FID2 B, Back Signal

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ng/ul]	Grp	Name
1.286		-	-	-	1	C9
1.541		-	-	-	1	C10
2.225	VV	9.99244	2.93227e-1	2.93005	1	C14
2.346	VV	13.11461	3.04097e-1	3.98812	2	C15
2.474	VV	12.02194	3.15775e-1	3.79622	2	C16
2.758	VV	41.22240	2.90400e-1	11.97097		o-Terphenyl
3.251	VV	20.18305	3.19086e-1	6.44013	2	C24
3.579	VV	178.94272	3.29997e-1	59.05064	2	C28
3.849	VV	64.86627	3.42315e-1	22.20473	3	C32
4.025	VV	30.90600	3.44763e-1	10.65524	3	C34
4.269	VV	24.81969	3.48503e-1	8.64974	3	C36
5.043	VV	10.97900	3.70771e-1	4.07070	3	C40
Totals :				133.75655		

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CERTIFICATE OF ANALYSIS 68036-A

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Nerilee Edwards, Ross McAlpine

Sample log in details:

Your Reference:	**20289.10, Croydon**
No. of samples:	Additional Testing on 1 Material
Date samples received:	24/01/12
Date completed instructions received:	01/02/12

Analysis Details:
Please refer to the following pages for results and methodology summary.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Note, even after disintegration it can be difficult to detect the presence of asbestos in some asbestos -containing bulk materials using PLM and dispersion staining. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Report Details:

Date results requested by:	1/02/12
Date of Preliminary Report:	Not issued
Issue Date:	1/02/12

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Asbestos was analysed by Approved Identifier:	Paul Ching
Asbestos was authorised by Approved Signatory:	Paul Ching

Paul Ching
Approved Signatory

Client Reference: **20289.10, Croydon**

Envirolab Ref: –	Sample ID: –	Date analysed -	Mass / Dimension of Sample -	Sample Description -	Asbestos ID in materials -
68036-A-4	TP2	1/02/2012	30x15x3mm	Beige fibre cement material	Chrysotile asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

Aileen Hie

From: Ross McAlpine [Ross.McAlpine@douglaspartners.com.au]
Sent: Wednesday, 1 February 2012 10:10 AM
To: Aileen Hie
Cc: Nerilee Edwards
Subject: Croydon TCLP testing

Hi Aileen

From our project (Ref 20289.10) at Croydon can you please run TCLP on the following samples and analytes.

TP1 0.0-0.2m (68036-1): Benzo(a)pyrene

TP2 0.2-0.5m (68036-5): Benzo(a)pyrene

TP3 0.0-0.2m (68036-8): Benzo(a)pyrene, PAH

TP6 0.2-0.4m (68036-19): Benzo(a)pyrene

TP7 0.2-0.4m (38036-22): Lead

TP8 0.9-1.1m (38036-27): Lead

TP9 0.5-0.7m (68036-~~28~~ 30): Benzo(a)pyrene

TP11 0.3-0.5m (68036-37): Benzo(a)pyrene, lead

TP14 0.0-0.2m (68036-45): Benzo(a)pyrene

Thanks for your time and help

Kind regards

Ross McAlpine

Enviro lab Ref: 68036 B
Due: 8/2/12
Std T/A.

Ross McAlpine | Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | F: 02 9809 4095 | E: Ross.McAlpine@douglaspartners.com.au

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 68036-B

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Nerilee Edwards, Ross McAlpine

Sample log in details:

Your Reference:	**20289.10, Croydon**
No. of samples:	Additional Testing on 9 Soils
Date samples received / completed instructions received	24/01/12 / 01/02/12

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:	8/02/12 / 7/02/12
Date of Preliminary Report:	Not issued

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Results Approved By:

Giovanni Agosti
Technical Manager

Jeremy Faircloth
Chemist

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Metals in TCLP USEPA1311						
Our Reference:	UNITS	68036-B-1	68036-B-5	68036-B-8	68036-B-19	68036-B-22
Your Reference	----------	TP1	TP2	TP3	TP6	TP7
Depth	----------	0.0-0.2	0.2-0.5	0.0-0.2	0.2-0.4	0.2-0.4
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	02/02/2012	02/02/2012	02/02/2012	02/02/2012	02/02/2012
Date analysed	-	[NA]	[NA]	[NA]	[NA]	02/02/2012
pH of soil for fluid# determ.	pH units	7.6	7.8	7.2	7.1	7.0
pH of soil for fluid # determ. (acid)	pH units	1.7	1.7	1.6	1.6	1.6
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.0	5.0
Lead in TCLP	mg/L	[NA]	[NA]	[NA]	[NA]	0.05

Metals in TCLP USEPA1311					
Our Reference:	UNITS	68036-B-27	68036-B-30	68036-B-37	68036-B-45
Your Reference	----------	TP8	TP9	TP11	TP14
Depth	----------	0.9-1.1	0.5-0.7	0.3-0.5	0.0-0.2
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	02/02/2012	02/02/2012	02/02/2012	02/02/2012
Date analysed	-	02/02/2012	[NA]	02/02/2012	[NA]
pH of soil for fluid# determ.	pH units	7.3	7.4	7.5	8.0
pH of soil for fluid # determ. (acid)	pH units	1.6	1.6	1.6	1.6
Extraction fluid used	-	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.0
Lead in TCLP	mg/L	0.2	[NA]	0.3	[NA]

PAHs in TCLP (USEPA 1311)						
Our Reference:	UNITS	68036-B-1	68036-B-5	68036-B-8	68036-B-19	68036-B-30
Your Reference	----------	TP1	TP2	TP3	TP6	TP9
Depth	----------	0.0-0.2	0.2-0.5	0.0-0.2	0.2-0.4	0.5-0.7
Date Sampled		23/01/2012	23/01/2012	23/01/2012	23/01/2012	23/01/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2012	03/02/2012	03/02/2012	03/02/2012	03/02/2012
Date analysed	-	04/02/2012	04/02/2012	04/02/2012	04/02/2012	04/02/2012
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	0.002	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Surrogate p-Terphenyl-d_{14}	%	91	94	102	107	90

PAHs in TCLP (USEPA 1311)			
Our Reference:	UNITS	68036-B-37	68036-B-45
Your Reference	----------	TP11	TP14
Depth	----------	0.3-0.5	0.0-0.2
Date Sampled		23/01/2012	23/01/2012
Type of sample		Soil	Soil
Date extracted	-	03/02/2012	03/02/2012
Date analysed	-	04/02/2012	04/02/2012
Naphthalene in TCLP	mg/L	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001
Surrogate p-Terphenyl-d_{14}	%	95	109

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 21st ED, 4500-H+.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			02/02/2012	[NT]	[NT]	LCS-W2	02/02/2012
Date analysed	-			02/02/2012	[NT]	[NT]	LCS-W2	02/02/2012
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W2	99%
QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			03/02/2012	[NT]	[NT]	LCS-W1	03/02/2012
Date analysed	-			04/02/2012	[NT]	[NT]	LCS-W1	04/02/2012
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	92%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	92%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	82%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	85%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	91%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	85%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	106%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012	66	[NT]	[NT]	LCS-W1	79%

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.

Douglas Partners
Geotechnics · Environment · Groundwater

TO SGS

3 of 3

CHAIN OF CUSTODY

Project Name: CROYDON
Project No: 202891 0 Sampler: EMMA
Project Mgr: Mob. Phone: MERILEE EDWARDS
Email: merilee.edwards@douglaspartners.com.au
Date Required: STANDARD Lab Quote No. .....

To: Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID 68036	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: HM(8)	PAH	TPH, BTEX MTBE	OCP/PCB	Phenols	Asbestos		TPH C6-C9	BTEX				Other	Notes
BD1/230112		48	23/1	S	G+B	X	X												INTRA LAB SAMPLE
BD2/230112		49				—	—	—	—	—	—								
BD3/230112		50				—	—	—	—	—	—								
BD4/230112		51				—	—	—	—	—	—								
BD5/230112		52				—	—	—	—	—	—								
BD6/230112		-				X	X											(SGS)	INTER LAB SAMPLE
BD7/230112		53				—	—	—	—	—	—								
TB1/230112		54											X	X					
TS1/230112		55	↓	↓	↓									X					

SGS
Received 27/1/12
By SS
Time 1:30 PM
Samples intact Y
Esky/Cooler Pack Y
Temperature on Receipt 2.7
SE108
SE101972

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by:		Signed:	Date & Time:	Received By:		Date & Time:	24/1/12 13:30
Relinquished by:	Sophie	Signed:	Date & Time: 25/01 11:30	Received By:		Date & Time:	27/1/12 1:30 pm

Form COC Rev0/November 2006

SGS

AUSTRALIA – ENVIRONMENTAL SERVICES SYDNEY – PROFORMA FORM

SAMPLE INFORMATION

Approved: D. Liang

JOB No. SE 104972

Sample No.	P 100ml UP	P 250ml UP	P 500ml UP	P 1L UP	G 100 Amber UP	G 200 Amber UP	G 500 Amber UP	G 1L Amber UP	G 40ml vial Up	G 40ml Vial HCl	P 100ml HCl	G 40ml Vial H2SO4	P 100ml H2SO4	P 250ml H2SO4	G 500ml Amber H2SO4	G 1L H2SO4	P 100/250ml HN03 Total	P 100ml HN03 Filtered	P 250ml NaOH	P 250ml Zn Acetate	Plastic Bag	G 250ml Soil Jar				Sample Matrix	Lab Bottles Supplied By	Comments
1																						1				Soil	Envirolab	Full

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Nerilee Edwards	Manager	Huong Crawford
Client	DOUGLAS PARTNERS PTY LTD	Laboratory	SGS Alexandria Environmental
Address		Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	02 9809 0666	Telephone	+61 2 8594 0400
Facsimile	02 9809 4095	Facsimile	+61 2 8594 0499
Email	nerilee.edwards@douglaspartners.com.au	Email	au.environmental.sydney@sgs.com
Project	**2028910 - Croydon**	SGS Reference	SE104972 R0
Order Number	(Not specified)	Report Number	0000017315
Samples	1	Date Reported	03 Feb 2012
		Date Received	27 Jan 2012

COMMENTS

Whilst SGS laboratories conform to ISO:17025 standards, results of analysis in this report fall outside of the current scope of NATA accreditation

SIGNATORIES

Andy Sutton
Organics Chemist

Huong Crawford
Laboratory Manager

Parameter	Units	LOR	Sample Number SE104972.001 Sample Matrix Soil Sample Date 23 Jan 2012 Sample Name BD6/230112
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420			
Naphthalene	mg/kg	0.1	**0.1**
2-methylnaphthalene	mg/kg	0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1
Acenaphthylene	mg/kg	0.1	**0.4**
Acenaphthene	mg/kg	0.1	<0.1
Fluorene	mg/kg	0.1	**0.2**
Phenanthrene	mg/kg	0.1	**2.3**
Anthracene	mg/kg	0.1	**0.8**
Fluoranthene	mg/kg	0.1	**3.5**
Pyrene	mg/kg	0.1	**3.3**
Benzo(a)anthracene	mg/kg	0.1	**1.9**
Chrysene	mg/kg	0.1	**1.1**
Benzo(b)fluoranthene	mg/kg	0.1	**2.1**
Benzo(k)fluoranthene	mg/kg	0.1	**0.6**
Benzo(a)pyrene	mg/kg	0.1	**1.5**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.8**
Dibenzo(a&h)anthracene	mg/kg	0.1	**0.2**
Benzo(ghi)perylene	mg/kg	0.1	**0.9**
Total PAH	mg/kg	0.8	**17**
Surrogates			
d5-nitrobenzene (Surrogate)	%	-	**96**
2-fluorobiphenyl (Surrogate)	%	-	**103**
d14-p-terphenyl (Surrogate)	%	-	**109**
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320			
Arsenic, As	mg/kg	3	**20**
Cadmium, Cd	mg/kg	0.3	**1.0**
Chromium, Cr	mg/kg	0.3	**22**
Copper, Cu	mg/kg	0.5	**57**
Lead, Pb	mg/kg	1	**440**
Nickel, Ni	mg/kg	0.5	**6.4**
Zinc, Zn	mg/kg	0.5	**450**
Mercury in Soil Method: AN312			
Mercury	mg/kg	0.05	**0.47**
Moisture Content Method: AN234			
% Moisture	%	0.5	**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.

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB013287	mg/kg	0.05	<0.05	0%	105%	63%

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

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB013161	%	0.5	3 - 10%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Naphthalene	LB013071	mg/kg	0.1	<0.1	118%
2-methylnaphthalene	LB013071	mg/kg	0.1	<0.1	NA
1-methylnaphthalene	LB013071	mg/kg	0.1	<0.1	NA
Acenaphthylene	LB013071	mg/kg	0.1	<0.1	121%
Acenaphthene	LB013071	mg/kg	0.1	<0.1	128%
Fluorene	LB013071	mg/kg	0.1	<0.1	NA
Phenanthrene	LB013071	mg/kg	0.1	<0.1	124%
Anthracene	LB013071	mg/kg	0.1	<0.1	117%
Fluoranthene	LB013071	mg/kg	0.1	<0.1	121%
Pyrene	LB013071	mg/kg	0.1	<0.1	125%
Benzo(a)anthracene	LB013071	mg/kg	0.1	<0.1	NA
Chrysene	LB013071	mg/kg	0.1	<0.1	NA
Benzo(b)fluoranthene	LB013071	mg/kg	0.1	<0.1	NA
Benzo(k)fluoranthene	LB013071	mg/kg	0.1	<0.1	NA
Benzo(a)pyrene	LB013071	mg/kg	0.1	<0.1	120%
Indeno(1,2,3-cd)pyrene	LB013071	mg/kg	0.1	<0.1	NA
Dibenzo(a&h)anthracene	LB013071	mg/kg	0.1	<0.1	NA
Benzo(ghi)perylene	LB013071	mg/kg	0.1	<0.1	NA
Total PAH	LB013071	mg/kg	0.8	<0.8	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
d5-nitrobenzene (Surrogate)	LB013071	%	-	117%	115%
2-fluorobiphenyl (Surrogate)	LB013071	%	-	107%	109%
d14-p-terphenyl (Surrogate)	LB013071	%	-	115%	121%

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

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB013283	mg/kg	3	<3	45%	97%	92%
Cadmium, Cd	LB013283	mg/kg	0.3	<0.3	0 - 10%	101%	95%
Chromium, Cr	LB013283	mg/kg	0.3	<0.3	1 - 4%	98%	94%
Copper, Cu	LB013283	mg/kg	0.5	<0.5	1 - 5%	100%	84%
Lead, Pb	LB013283	mg/kg	1	<1	2 - 5%	100%	-122%
Nickel, Ni	LB013283	mg/kg	0.5	<0.5	4 - 5%	100%	95%
Zinc, Zn	LB013283	mg/kg	0.5	<0.5	2%	101%	-1%

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.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
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.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

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

SE104972 R0

CLIENT DETAILS

Contact	Nerilee Edwards
Client	DOUGLAS PARTNERS PTY LTD
Address	
Telephone	02 9809 0666
Facsimile	02 9809 4095
Email	nerilee.edwards@douglaspartners.com.au
Project	**2028910 - Croydon**
Order Number	(Not specified)
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
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SGS Reference	SE104972 R0
Report Number	0000017316
Date Reported	03 Feb 2012

COMMENTS

All the laboratory data for each environmental matrix was compared to 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:

Duplicate	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item
Matrix Spike	Mercury in Soil	1 item
	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	2 items

SAMPLE SUMMARY

Sample counts by matrix	1 Soil	Type of documentation received	COC
Date documentation received	27/1/2012	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	2.7°C
Sample container provider	Other Lab	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

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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.

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 or **Red** with an appended dagger symbol (†) 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.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/230112	SE104972.001	LB013287	23 Jan 2012	27 Jan 2012	20 Feb 2012	02 Feb 2012	20 Feb 2012	02 Feb 2012

Moisture Content

Method: ME-(AU)-[ENV]AN234

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/230112	SE104972.001	LB013161	23 Jan 2012	27 Jan 2012	06 Feb 2012	31 Jan 2012	05 Feb 2012	01 Feb 2012

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/230112	SE104972.001	LB013071	23 Jan 2012	27 Jan 2012	06 Feb 2012	30 Jan 2012	10 Mar 2012	03 Feb 2012

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/230112	SE104972.001	LB013283	23 Jan 2012	27 Jan 2012	21 Jul 2012	02 Feb 2012	21 Jul 2012	02 Feb 2012

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 **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — **Method: ME-(AU)-[ENV]AN420**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BD6/230112	SE104972.001	%	60 - 130%	103
d14-p-terphenyl (Surrogate)	BD6/230112	SE104972.001	%	60 - 130%	109
d5-nitrobenzene (Surrogate)	BD6/230112	SE104972.001	%	60 - 130%	96

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB013287.001	Mercury	mg/kg	0.05	<0.05

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB013071.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	117
		2-fluorobiphenyl (Surrogate)	%	-	107
		d14-p-terphenyl (Surrogate)	%	-	115

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB013283.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE104977.008	LB013287.014	Mercury	mg/kg	0.05	NVL	<0.05	200	0
SE104977.017	LB013287.024	Mercury	mg/kg	0.05	NVL	<0.05	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN234

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE104973.001	LB013161.011	% Moisture	%	0.5	8.394160583	9.2547169811	36	2
SE104976.009	LB013161.022	% Moisture	%	0.5	11	12	34	10
SE104976.022	LB013161.028	% Moisture	%	0.5	13	12	34	3

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105076.002	LB013283.014	Arsenic, As	mg/kg	3	38	24	40	45†
		Cadmium, Cd	mg/kg	0.3	0.4	0.4	103	10
		Chromium, Cr	mg/kg	0.3	25	25	31	1
		Copper, Cu	mg/kg	0.5	33	33	32	1
		Lead, Pb	mg/kg	1	27	26	34	5
		Nickel, Ni	mg/kg	0.5	28	27	32	4
		Zinc, Zn	mg/kg	0.5	84	82	31	2
SE105078.008	LB013283.027	Arsenic, As	mg/kg	3	<3	<3	165	0
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	9.0	9.4	33	4
		Copper, Cu	mg/kg	0.5	4.0	4.2	42	5
		Lead, Pb	mg/kg	1	6	6	46	2
		Nickel, Ni	mg/kg	0.5	4.5	4.8	41	5
		Zinc, Zn	mg/kg	0.5	9.9	10	35	2

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 this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013287.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	105

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013071.002		Naphthalene	mg/kg	0.1	4.7	4	60 - 140	118
		Acenaphthylene	mg/kg	0.1	4.8	4	60 - 140	121
		Acenaphthene	mg/kg	0.1	5.1	4	60 - 140	128
		Phenanthrene	mg/kg	0.1	5.0	4	60 - 140	124
		Anthracene	mg/kg	0.1	4.7	4	60 - 140	117
		Fluoranthene	mg/kg	0.1	4.8	4	60 - 140	121
		Pyrene	mg/kg	0.1	5.0	4	60 - 140	125
		Benzo(a)pyrene	mg/kg	0.1	4.8	4	60 - 140	120
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	115.0	100	60 - 140	115
		2-fluorobiphenyl (Surrogate)	%	-	109.0	100	60 - 140	109
		d14-p-terphenyl (Surrogate)	%	-	121.0	100	60 - 140	121

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013283.002	Arsenic, As	mg/kg	3	49	50	80 - 120	97
	Cadmium, Cd	mg/kg	0.3	50	50	80 - 120	101
	Chromium, Cr	mg/kg	0.3	49	50	80 - 120	98
	Copper, Cu	mg/kg	0.5	50	50	80 - 120	100
	Lead, Pb	mg/kg	1	50	50	80 - 120	100
	Nickel, Ni	mg/kg	0.5	50	50	80 - 120	100
	Zinc, Zn	mg/kg	0.5	51	50	80 - 120	101

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 this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE104972.001	LB013287.004	Mercury	mg/kg	0.05	0.59	0.47	0.2	63 ⑨

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE104972.001	LB013283.004	Arsenic, As	mg/kg	3	65	20	50	92
		Cadmium, Cd	mg/kg	0.3	49	1.0	50	95
		Chromium, Cr	mg/kg	0.3	69	22	50	94
		Copper, Cu	mg/kg	0.5	99	57	50	84
		Lead, Pb	mg/kg	1	380	440	50	-122 ⑤
		Nickel, Ni	mg/kg	0.5	54	6.4	50	95
		Zinc, Zn	mg/kg	0.5	450	450	50	-1 ⑤

MATRIX SPIKE DUPLICATES

SE104972 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC 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

*	Non-accredited analysis.
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	Refer to Analytical Report comments for further information.

Appendix F

QA/QC Report

QA/QC PROCEDURES AND RESULTS

Q1. FIELD QUALITY ASSURANCE AND QUALITY CONTROL

The field QC procedures for sampling as prescribed in Douglas Partners *Field Procedures Manual* were followed at all times during the assessment.

Q1.1 Sampling Team

Field sampling was undertaken by DP Engineer Ross McAlpine. Soil samples were collected on 23 January 2012. Sampling was undertaken during fine or overcast weather conditions.

Q1.2 Sample Collection

Sample were collected using disposable sampling equipment and soils decanted into a glass jar with Teflon lined screw on lid. Each sample was referenced with the test pit location number and depth the soil was sampled from. Samples were kept cool and sent with a chain of custody to a NATA accredited laboratory.

Q1.3 Logs

Logs for each sampling location were recorded in the field. The individual samples were recorded on the field logs along with the sample identity, location, depth, initials of sampler, duplicate locations, duplicate type, site observations. Analysis to be performed on each sample and the dispatch courier were recorded on the COC, Appendix E. Logs are presented in Appendix C.

Q1.4 Chain of Custody

Chain of custody information was recorded on the Chain of Custody (COC) sheets and accompanied samples to the analytical laboratory. Signed copies of COCs are presented in Appendix E, following the laboratory reports.

Q1.5 Sample Splitting Techniques

Replicate and triplicate samples were collected in the field as a measure of accuracy, precision and repeatability of the results. Field replicate samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the primary sample were placed into the sampling jars and sealed. The sample was not homogenised in a bowl and then split to prevent the loss of volatiles from the soil. Replicate samples were labelled with a DP identification number, recorded on DP bore logs, so as to conceal their relationship to their primary sample from the analysing laboratory.

Q1.6 Duplicate Frequency

Field sampling comprised replicate and triplicate sampling, at a rate of approximately one duplicate sample for every ten original samples for intra-laboratory analysis.

Q1.7 Field Blank Results

A field blank is a sample taken as an indication to demonstrate correct field handling. A rinsate sample was not required within the scope of the current assessment. This is further discussed in Section Q1.8.

Q1.8 Rinsate Samples

Soil samples were collected from auger cuttings and test pit returns by hand while wearing disposable gloves which were changed between samples. Therefore no rinsate sample was required. It also noted that the results of the soil samples do not show any evidence of cross contamination.

Q1.9 Trip Spikes

According to *the NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (1997)*, laboratory prepared trip spikes are to be taken into the field, subjected to the same preservation methods as the field samples, then analysed, for the purposes of determining the losses in volatile organics incurred prior to reaching the laboratory.

The practicalities of trip spikes are currently being debated and a detailed procedure is yet to be finalised. Discussions with the laboratory indicated that trip spikes are generally prepared as aqueous solutions. The laboratory prepared an a soil trip spikes which were preserved in the standard manner and taken into the field unopened. The volatile organic recovery rates are shown below. At this stage, the laboratory has no standard acceptance limits in recovery rates as results from in-house laboratory controls often vary. Results (Table D1) indicate that the percentage loss for BTEX during the trip was minimal and therefore appropriate preservation techniques were employed.

Table D1: Trip Spike Results

Sample ID	Matrix	Recovery (%)			
		Benzene	Toluene	Ethyl Benzene	Total xylene
Trip Spike 23012012	soil	99%	101%	100%	101%

Q1.10 Trip Blanks

Laboratory prepared soil trip blanks were taken out to the field unopened, subjected to the same preservation methods as the field samples, then analysed for the purposes of determining the transfer of contaminants into the blank sample incurred prior to reaching the laboratory. The result of the laboratory analysis for the trip blanks is shown in Tables D2.

Table D2: Trip Blank Results – TPH/BTEX mg/kg

Sample ID	matrix	Benzene	Toluene	Ethyl Benzene	Total xylene
Trip Blank 23012012	soil	<0.5	<0.5	<1	<3

Levels of analytes were all below detection limits for soil indicating that cross contamination had not occurred during the course of the round trip from the site to the laboratory.

Q1.11 Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for duplicate samples. A RPD of +/- 30% is generally considered typically acceptable for inorganic analytes by EPA, although in general a wider RPD range (50%) may be acceptable for organic analytes.

Q1.11.1 Intra-Laboratory Analysis

Intra-laboratory duplicates were conducted as an internal check of the reproductively within the primary laboratory (Envirolab Services Pty Ltd) and as a measure of consistency of sampling techniques. Replicate samples were collected at a rate of approximately one replicate sample for every ten original samples collected and also analysed at a rate of 10% of primary samples analysed. In total, one soil sample and their intra-laboratory replicate pairs were analysed for heavy metals and PAHs.

The comparative results of analysis between original and duplicate samples are summarised in the tables below.

Table D3: Intra-laboratory Soil Results Heavy Metals

	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
TP2/ 0.0 – 0.2	13	<0.5	20	10	24	<0.1	2	14
BD1/ 23012012	9	<0.5	18	12	22	<0.1	2	15
Difference	4	0	2	2	2	0	0	1
RPD (%)	**36**	**0**	**11**	**18**	**9**	**1**	**0**	**7**

Table D4: Intra-laboratory Soil Results PAH

	Total PAH	Benzo(a)pyrene
TP2/ 0.0 – 0.2	1.62	0.12
BD1/ 23012012	2.71	0.21
Difference	1.09	0.09
RPD (%)	**50**	**55**

Most of calculated RPD values were within the acceptable range of ± 30 for inorganic analytes (± 50% for organic) for the sample and its duplicates with the exception of Arsenic and Benzo(a)pyrene. However, this is not considered to be of concern due to:

The low actual differences in the concentrations of the replicate pairs;

- Replicates, rather than homogenised duplicates were used to avoid volatile loss;
- The duplicate samples being collected in filling material which is heterogeneous in nature, therefore differences are representative of the material and not the result inconsistencies in the sampling technique or laboratory precision; and
- Most of the recorded concentrations being at/ close to the practical quantitation limit.
- All other QA/QC parameters met the DQI's

Q2. LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Q2.1 Chain of Custody

Chain of custody information was recorded on the Chain of Custody (COC) sheets and accompanied samples to the analytical laboratory. COCs contained receipt date and time and the identity of samples. Signed copies of COCs are presented in Appendix E, following the laboratory reports.

Q2.2 Holding Times

A review of the laboratory report sheets and chain-of-custody documentation indicated that holding times were met, as summarised in the table below.

Table D5: Holding Times

Matrix	Analyte	Recommended maximum holding time	Holding time met
Soil	Heavy Metals: As, Cd, Cr, Cu, Pb, Hg, Ni, Zn	6 months	Yes
	TPH C_6-C_9	14 days	Yes
	TPH C_{10}-C_{36}	14 days	Yes
	BTEX	14 days	Yes
	PAH	14 days	Yes
	OCP	14 days	Yes
	OPP	14 days	Yes
	PCB	14 days	Yes
	Phenols	14 days	Yes
	pH	7 days	Yes
	Asbestos	Nil	yes
	EC	7 days	Yes
	pH	7 days	Yes
	Sulphate	28 days	Yes
	Chloride	28 days	Yes

Q2.3 Analytical Laboratory

Samples were submitted to the following laboratories for analysis:

- Primary Laboratory: Envirolab Services Pty Ltd (Chatswood);

- Secondary Laboratory: SGS Laboratories (Alexandria)

Both laboratories are NATA accredited. Envirolab's accreditation number is 2901 and is accredited for compliance with ISO/IEC 17025. Envirolab tests comply with NATA and NEPM. In house procedures are employed by Envirolab in the absence of documented standards.

SGS' accreditation number is 2562 and is accredited for compliance with ISO/IEC 17025. SGS' tests comply with NATA and NEPM. In house procedures are employed by SGS in the absence of documented standards.

Q2.4 Analytical Methods

The laboratory analytical methods are provided on the laboratory certificates in Appendix E.

The following QA/QC procedures were conducted by the laboratory. The results are included in the laboratory reports in Appendix E.

Q2.5 Surrogate Spike

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis. These results are within acceptance limits as specified in Envirolab Services Pty Ltd report, indicating that the extraction technique was effective.

The laboratory acceptance criteria for surrogate samples is generally 60-140% for organics; and 10-140% for SVOC and speciated phenols.

Q2.6 Practical Quantitation Limits - PQLs

The PQL is the lowest quantity of an analyte which can be detected during the analysis. PQLs at different analytical laboratories can differ based on the analytical techniques.

Q2.7 Reference and Daily Check Sample Results – Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand or water) with a known concentration of specific analytes. The LCS is then analysed and results compared against each other to determine how the laboratory has performed with regard to sample preparation and analytical procedure. LCSs are analysed at a frequency of 1 in 20, with a minimum of one analysed per batch.

The laboratory acceptance criteria for LCS samples is generally 70-130% for inorganic/ metals; and 60-140% for organics; and 10-140% for SVOC and speciated phenols.

Q2.8 Laboratory Duplicate Results

These are additional portions of a sample which are analysed in exactly the same manner as all other samples. The laboratory acceptance criteria for duplicate samples is: in cases where the level is <5xPQL – any RPD is acceptable; and in cases where the level is >5xPQL – 0-50% RPD is acceptable.

Q2.9 Laboratory Blank Results

The laboratory blank, sometimes referred to as the method blank or reagent blank is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, it can be determined by processing solvents and reagents in exactly the same manner as for samples. Laboratory blanks are analysed at a frequency of 1 in 20, with a minimum of one per batch.

Q2.10 Matrix Spike

This is a sample duplicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis. The laboratory acceptance criteria for matrix spike samples is generally 70-130% for inorganic/metals; and 60-140% for organics; and 10-140% for SVOC and speciated phenols.

Q2.11 Results of Laboratory QA

The laboratory QA for surrogate spikes, LCS, laboratory duplicate results, method blanks and matrix spikes were generally within the acceptance standards.

It was therefore considered that an acceptable level of laboratory precision and consistency was achieved and that surrogate spikes, LCS, laboratory duplicate results, method blanks and matrix spike results were of an acceptable level.