The WorkCover search also suggested that the correct decommissioning procedures were not followed for two USTs (20,000L capacity each) located north of the maintenance buildings which were located approximately 125m east and upgradient of the proposed Building 1 and 125m northeast and upgradient of the proposed Building 3. The letter indicated that the petrol tank was removed and the diesel tank was filled with sand/soil, but there was no written history.

The closest storage containers to the proposed Buildings 1 and 3 were the two former USTs (mentioned above, two ASTs (15,000L & 20,000L) containing boiler oil 100m to the east-southeast and a number of gas cylinders approximately 125m to the east and upgradient of Building 1 and 3. The closest storage containers to the proposed Building 2 are: a liquid oxygen AST 25m to the west and a UST (12,000L) and generator containing diesel fuel approximately 75m to the south which are both upgradient of Building 2.

4.1.2 Building 1

Aerial photographs and anecdotal evidence indicated that up until the mid 1990s the study area comprised vacant grassed areas and bush land. From the mid 1990s to date the study area was noted as being an asphalt paved carpark which was constructed at the same time of the stores/laundry building to the immediate east. The 1951 to 1986 aerial photographs indicated several structures to the west and southwest of Building 1. Anecdotal evidence suggested that the structures were former sewerage works and incinerator buildings which ceased operations in the 1970s.

4.1.3 Building 2

Aerial photographs indicated that up until the 1960s the study area was vacant rural land with agricultural landuses at the western portion of this area. A dairy was noted to be located west of the proposed Building 2 study area. The 1970 and 1986 aerial photograph indicated the southeast corner of Building 2 was paved carpark until the mid 1990s at which point the Building 2 area became an asphalt paved carpark. Anecdotal evidence suggested the Operating Theatre block (located immediately south of the Building 2 area) was approximately 11 years old and prior to its construction the area was for growing vegetables in gardens. Anecdotal evidence also suggested the SAN Clinic located immediately south of the southeast corner of the Building 2 was originally constructed of concrete, metal sheeting, brick and fibre cemented sheeting which was later removed.

4.1.4 Building 3

The 1951 to 1978 aerial photographs indicated the area was predominantly vacant grassed areas. The 1986 and 1994 aerial photographs indicated the presence of bare soil mounds located within the centre of the Building 3. Anecdotal evidence suggested the soil mounds comprised fill soils sourced offsite and ‘cut’ soils from other areas within the SAN Hospital grounds, used for the construction of the retention basin. The 2005 aerial photograph shows this area to be landscaped and grass covered. Anecdotal evidence suggested one source of fill material used to create the basin (approximately 40-50%) was from cut earthworks activities at other locations with the SAN Hospital. The main source of fill (approximately 50-60%) used for the basin’s construction was from a shopping centre development on Pennant Hills Road located approximately 1km to 1.5km west of the site approximately 10 years ago.

4.1.5 Building 4

The area where Building 4 is located appears to have been occupied by this (or a similar) structure since at least 1951 and likely to have been used as a hospital ward building.

The results of the above mentioned site history searches are included in Appendix A.

4.1.6 Gaps in the Site History

Following the review of the site history information the followings gaps in site history are noted relating to the areas being assessed:

- The activities associated with the incinerator located west of the proposed Building 1 including disposal of incinerator wastes;
- The exact nature of agricultural activities in areas surrounding the hospital;
- The quality of fill soils imported to the site for retention basin construction.

4.2 Site Observations

An environmental scientist and a geotechnical engineer made observations of the general site and study areas at the time of fieldwork on the 10 March 2008 and an Associate Geotechnical Engineer on the 28 March 2008 during a site walkover. The proposed improvement layouts are shown on Figures 3 and 4. Selected site photographs are included in Appendix F.

4.2.1 Building 1

The proposed Building 1 site was located along the western perimeter of the hospital where currently a level asphalt surface car park was situated. The land adjacent to the car park generally slopes downwards to the west, with the car park having been cut into the slope along the eastern boundaries and filled along the western boundaries. The fill was estimated to be 2m high at the north western end of the car park.

To the west of the car park was a well maintained grassed strip of land approximately 20m wide. Further west, the land falls sharply and the vegetation consists of bushes and mature trees.

To the east of the car park the Stores and Business Offices were located approximately 3m to 4m above the ground surface of the car park with garden beds, bushes, trees and maintained grassed areas dividing the two areas. The Stores and Business Office buildings were noted as being constructed of metal sheeting and brick.

A stormwater drain oriented in a north-south direction was noted through the centre of the carpark area as evident by several steel grates and access pits.

4.2.2 Building 2

The proposed Building 2 site was located along the central northern perimeter of the hospital where an asphalt surface car park was situated. In this area, the land falls to the north at an angle of 3 to 4 degrees with the car park terraced over 3 levels to accommodate the slope. There was minor cut and fill earthworks estimated at 1m height associated with the terracing. The eastern end of the car park was lower than the western end and has been filled where a former gully was located.

Adjacent to the north west of the car park was a maintained grassed drainage basin. The basin was approximately 2m deep and in the base was a galvanised steel grill probably associated with a drainage system. Beyond the basin the land slopes downwards to the north towards Coups Creek where dense vegetation was present.

Adjacent to the western portion of the carpark an aboveground storage tank containing liquid nitrogen was noted within a steel fence compound. Immediately to the south and southeast, the carpark was bound by the Operating Theatre Block and the SAN clinic. Additional carpark areas and the Fox Valley Centre were located to the east and northeast approximately 1m to 2m above ground surface level of the study area.

The car park terraces were separated by garden beds approximately 1m to 2m in width. The garden beds were noted to be filled with bark chip and leaf litter from the tall trees (approximately 15 to 20m in height) which were generally the only plant species identified in the garden beds.

4.2.3 Building 3

The detail and location of proposed Building 3 was not finalised at the time this report was prepared, however we understand it is to be located adjacent and to the south of the proposed Building 1 site. In this area is a maintained grassed drainage basin. The basin is approximately 2m to 3m deep and has a galvanised steel grill and manhole in the base. The southern and western batter faces within the basin are garden beds which have been barked chipped with overgrown shrub and grass plants species noted.

At the western end of the basin was a 6m wide well maintained grassed crest. At the western edge of the grassed crest, a 2m wide strip used for the dumping of grass cuttings was noted. Beyond this, the land falls at an angle of approximately 18 degrees to the west and was vegetated with thick grass. Fragments of broken brick observed on the surface suggest that the basin walls may have been constructed using fill material. To the southwest the land falls at an angle of approximately 18 degrees to the south and was a maintained grass slope. At the base of the slopes are mature trees and bushes.

Adjacent to the south of the basin was a car park. The south western end of the car park has been raised approximately 1.5m above the surrounding ground level. To the east of the basin the Staff Amenities Buildings are located, comprising two single storey buildings. An in-ground swimming pool is located to the northeast of the basin.

Approximately 20m to 30m to the south and southeast of the carpark, the surrounding landuse was a childcare centre and residential housing.

4.2.4 Building 4

Observations of the Building 4 were carried out by an Associate Geotechnical Engineer on the 28 March 2008. Building 4 was an existing three storey brick structure located in the eastern area of the hospital. The building is a brick structure used as a hospital ward

The building has a basement along its south eastern side and is inter-connected to new structures along the north western and south western walls. The land surrounding the building generally slopes down to the east.

A stairway leads to the basement from within the building. Within the basement in rooms titled “South Wing Switch Room” and the “Electrical Store Room”, brick strip footings supporting a concrete slab associated with the ground floor were visible. The footings were resting on shale which was clearly visible since the basement had been cut into it.

5 POTENTIAL AREAS OF ENVIRONMENTAL CONCERN (AEC) AND CHEMICALS OF CONCERN (COC)

Based on the site history information and site observations potential Areas of Environmental Concern (AEC) and Chemicals of Concern (COCs) were identified. These are summarised in the following table

TABLE 2 SUMMARY OF POTENTIALLY CONTAMINATING ACTIVITIES, AREAS OF ENVIRONMENTAL CONCERN, LIKELIHOOD OF CONTAMINATION AND CHEMICALS OF CONCERN

Potentially Contaminating Activity	Sub Component / Description	Potential Areas of Environmental Concern	Likelihood of Contamination*	Potential Chemicals of Concern
AEC 1 **Potential Weathering of hazardous building materials and demolition of site structures**	Weathering of hazardous building materials such as lead paint, fibro and galvanised iron. Potentially present from former and existing site structures. Also includes possible use of pesticides near buildings.	**Building 1**: The eastern boundary of the proposed building footprint is adjacent to existing buildings which have been refurbished and the southwestern boundary adjacent to the former incinerator and sewerage treatment works. **Building 2**: The south eastern and southern areas of the proposed Building 2 footprint is located adjacent to former buildings of current buildings that have undergone demolition or refurbishment. Contamination (if present) would typically be located in near surface soils adjacent to former structures. Soil media are likely to be potentially impacted.	Low likelihood of contamination within the areas being assessed.	Lead, zinc, asbestos and OCP
AEC 2 **Fill of unknown origin and quality**	Fill soils potentially imported to alter site levels and for construction purposes	The building 3 area from the construction of the retention basin. The western part of building 1 and the eastern part of building 2. Soil media likely to be potentially impacted	**Building 1 & 2**: Low likelihood of contamination. Based on the site topography fill was unlikely to have been used to raise site levels significantly. Some fill may have been brought to the site and used under pavements. **Building 3**: Low to moderate likelihood of contamination. Based on observations of the site topography during the site walkover and anecdotal evidence, it is likely that a relatively large volume of fill were brought to this area to create the retention basins located within the central portion of Building 3 and north of Building 1. The source of the material was from a nearby construction project and likely to comprise mainly natural soils, but this cannot be confirmed.	TPH, BTEX, PAH, OCP, PCB, heavy metals and asbestos.
AEC 3 **Potential application of pesticides and associated agricultural activities**	Possible use of pesticides in areas where current or previous agricultural activities take place.	**Building 2**: Based on anecdotal evidence and a review of historical aerial photographs, the western areas of the study area appeared to possibly have been previously used for agricultural purposes such as the growing of crops. Soil media are likely to be potentially impacted	Low likelihood of contamination due to the activities and also due to the time lapsed since these activities took place.	OCP, OPP, heavy metals, herbicides

Notes:

** It is important to note that this is not an assessment of financial risk associated with the AEC in the event contamination is detected, but a qualitative assessment of probability of contamination being detected at the potential AEC, based on the site history study and field observations.*

TPH = Total Petroleum Hydrocarbons BTEX = Benzene, Toluene, Ethylbenzene, Xylene PAH = Polycyclic Aromatic Hydrocarbons Heavy Metals = arsenic, cadmium, chromium, copper, lead, nickel, mercury, zinc OCP = Organochlorine Pesticides PCB = Polychlorinated Biphenyl

6 SAMPLING AND ANALYSIS PLAN

The site sampling and analysis plan was designed to check for soil contamination for proposed building areas 1, 2 and 3.

The proposed developments for Building 4 were indicated to involve the adjustment of internal walls and possible height adjustments to the building. As the development works do not involve disturbance to the subsurface conditions, no sampling was proposed within the Building 4 study area.

A total of 27 sampling locations including 25 boreholes and two surface samples were drilled across the three study areas. Sampling locations are shown in Figures 3 and 4.

The majority of the sampling locations for the investigation were pre-positioned for geotechnical purposes and were also used to collect soil samples for environmental purposes. Eight additional locations were used to complement these locations for environmental purposes. At the time of the field work and service location the areas indicated to be the study areas for the proposed Buildings 1, 2 and 3 were identified larger than what is presented in Figures 3 and 4. In total twenty-seven sampling locations were positioned for geotechnical and environmental purposes for Building 1, 2 and 3. Of the twenty-seven locations, seventeen sampling locations were identified to be outside and immediately adjacent to the three study areas, but were within reasonably close proximity to give an indication of the possibility for contamination to exist based on the general broad potential contamination sources.

To assess a site with an area of 1,584m^2 with respect to contamination for Building 1, the NSW EPA (1995) Sampling Design Guidelines recommends seven sampling locations, subject to the results of the site history. This is based on detecting a circular hotspot of approximately 19.9m in diameter with 95% confidence. At the time of the fieldwork seven geotechnical sampling locations were used to assess the potential for contamination to exist at the proposed Building 1 study area.

To assess a site with an area of 3,515m^2 with respect to contamination for Building 2, the NSW EPA (1995) Sampling Design Guidelines recommends eleven sampling locations, subject to the results of the site history. This is based on detecting a circular hotspot of approximately 22.5m in diameter with 95% confidence. At the time of the fieldwork thirteen sampling locations were positioned to assess the potential for contamination to exist at the proposed Building 2 study area.

To assess a site with an area of 960m^2 with respect to contamination for Building 3, the NSW EPA (1995) Sampling Design Guidelines recommends six sampling locations, subject to the results of the site history. This is based on detecting a circular hotspot of approximately 15.2m in diameter with 95% confidence. At the time of the fieldwork seven sampling locations were selected to assess the potential for contamination to exist at the proposed Building 3 study area.

The geotechnical boreholes were spread across each of the study areas in a rough grid based pattern, with the spacing between locations ranging between 10m and 20m. The additional environmental sampling locations were positioned between the geotechnical locations to better assess areas within the proposed Building 1, 2 and 3 footprints.

Samples were generally collected at the depth intervals of 0.0-0.1m, 0.5m, 1.0m and every 1.5m thereafter where deeper fill was encountered. Samples at the base of fill and the underlying natural soils were also collected. A minimum of two samples at each location were selected for analysis with additional samples from deeper fill soil also selected for analysis.

Selected soil samples collected from borehole locations were analysed for a suite of common potential chemicals of concern, as assessed from the site history. Samples for TPH and BTEX analysis were selected based on field screening and field evidence of potential contamination.

A direct assessment of groundwater quality was not carried out, as part of this preliminary investigation.

6.1 Quality Assurance/Quality Control

A quality assurance/quality control plan was designed to achieve the predetermined data quality objectives (DQOs) and to demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated and the procedures for assessing the DQOs are met. The results of the laboratory quality control are discussed in Section 9.3.1.

7 ASSESSMENT CRITERIA

7.1 Soil Vapour Criteria

For the purposes of this report the generalised soil vapour criteria presented in Table 3 have been used as a guide to the potential for hydrocarbon contamination. These criteria have been developed by Coffey Environments based on our experience (where monitoring for volatile organic compounds has occurred) to assist in the assessment of hydrocarbon contamination levels in soil. It is important to note that these generalised criteria are only a guide and that the PID has a different response to different chemicals.

Table 3: Generalised Soil Gas Criteria

PID reading as ppm isobutylene	Generalised soil gas content description relating to petroleum hydrocarbon contamination
<20 ppm	NEGLIGIBLE
20 to 60 ppm	LOW
60 - 300 ppm	MODERATE
>300 ppm	SIGNIFICANT

7.2 Soil Investigation Levels (SILs)

In order to assess the degree of contamination in soils on the site, the results of soil analyses were compared with guidelines in the following references:

- NSW Department of Environment and Conservation (2006) Guidelines for the NSW Auditor Scheme (2nd Edit.);
- NSW EPA (1994) Guidelines for Assessing Service Station Sites; and
- NEPC (1999) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) – Schedule B (1) Guideline on Investigation levels for Soil and Groundwater.

The NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme and the NEPM summarise the National Environmental Health Forum (NEHF) investigation levels for protection of human health for different landuses. The references also provide guidelines for provisional phytotoxicity based investigation levels, (referred to as environmental investigation levels in the NEPM (EILs)) for a range of contaminants in soils.

The NEHF F investigation levels are applicable for commercial/industrial landuse. The NEHF-F guidelines have been applied to soil samples collected from the proposed commercial development including the construction of hospital buildings in each of the study areas within the site.

The NSW EPA (1994) guidelines provide acceptable cleanup levels at Service Station Sites, which are to be redeveloped for a sensitive use such as residential. The NSW DECC also recommends the use of these guidelines for assessing hydrocarbon contaminants for sites with less sensitive landuses (such as residential). Based on use of the site for commercial purposes, these criteria are used to supplement the NEHF commercial/industrial investigation levels. The NSW DEC (2006) guidelines provide human health criteria for petroleum hydrocarbons based on speciation of aliphatic and aromatic compounds for different landuses.

There are currently no national or NSW guidelines for asbestos in soil. The NSW DECC has advised that asbestos is a human health issue and not an environmental issue. On the advice of the NSW Department of Health, the NSW DECC has advised NSW Site Auditors (Site Auditors Meeting 1 March 2000) that “no asbestos in the soil at the surface is permitted”. Enhealth (2005) provides some guidance on assessing and managing asbestos in soil although does not provide a threshold concentration or investigation level for asbestos.

The adopted Soil Investigation Levels (SILs) are summarised in Tables 4, 5 and 6.

7.3 Waste Classification Criteria

In order to assess the waste classification of the site soils on a preliminary level, the results of soil analysis were compared to the NSW DECC (2008) Waste Classification Guidelines.

The guidelines provide threshold values for total concentrations and leachable concentrations based on TCLP test results for a list of about 50 contaminants and groups of contaminants. For a waste to be classified under a given category (i.e. special, liquid, hazardous, restricted solid, general solid (putrescible and non-putrescible), both total and leachable concentrations of the waste should meet the respective threshold concentrations. The waste may be classified solely based on total concentrations (i.e. without undertaking leachability testing), but the applicable threshold concentrations when leachability testing is not undertaken are significantly lower (i.e. more stringent) than would apply when leachability testing is undertaken.

8 FIELD INVESTIGATIONS

Field investigations were carried between the 10 and 25 March 2008 in the full time presence of a geotechnical engineer from the Lane Cove Office who recorded an engineering log of the subsurface conditions observed at each location and collected soil samples.

Twenty-five (25) boreholes, designated CBH1 to CBH25 were drilled using a truck mounted drilling rig equipped with a continuous flight auger, to depths ranging between 1m and 12.36m. The boreholes were drilled in soils using 100mm solid flight augers and a steel V shaped bit (V-bit) or tungsten carbide bit (TC-bit). Standard Penetration Testing was carried out in all boreholes to assess soil strength and to obtain samples for logging and laboratory analysis. Upon encountering rock, diamond coring techniques were used to advance the boreholes and to obtain core for analysis.

Two sampling locations, designated CBH26 and CBH27 were drilled using a hand auger to depths of 0.1m and 0.2m respectively. The sampling locations were placed within garden beds of the Building 2 study area where the drill rig could not gain access.

Water level readings were collected from boreholes at times and under conditions stated on the borehole logs. In cored boreholes, water was used as a drilling fluid and groundwater levels could not be monitored. It must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors.

The approximate locations of the boreholes and surface samples were measured relative to existing site features using a measuring wheel and/or tape and are shown in Figures 3 and 4. Test elevations were measured by staff and dumpy level to a datum of 162.541m AHD located within the hospital grounds. Engineering logs of the boreholes are included in Appendix B with explanatory sheets defining the terms and symbols used.

8.1 Soil Sampling

During drilling, soil samples were generally collected directly off the auger or the hand auger head within the upper 1m thereafter with a Standard Penetration Test (SPT) tube sampler. Between sampling locations the augers and hand auger were washed by brush scrubbing with a phosphate free detergent and finally rinsed with potable water. The SPT tube sampler was also washed with a phosphate free detergent, rinsed with potable water followed by rinsing with distilled water between sampling locations. Soil samples were collected with a new pair of latex gloves between sampling locations.

Soil samples were generally collected within the fill soils and upper residual layers. Samples were also collected where there was visual evidence of potential contamination (if observed) or at major changes in stratigraphy. The soil was placed into clean 250mL glass jars, which were sealed with Teflon lined caps, labelled and placed directly into ice cooled chests.

Soil vapour testing was carried out using a Mini Rae 2000 photoionisation detector (PID) fitted with a 10.6eV lamp and calibrated with isobutylene gas at a concentration of 100ppm. This instrument allows rapid, semi quantitative analysis of ionisable volatile organic compounds in the soil.

Soil samples for chemical analysis were collected in duplicate into tightly sealed plastic bags. The headspace air above each sample was measured with the PID. The results of the soil vapour testing are presented in Appendix C.

8.2 Field Quality Control Procedures

The field quality control was generally in accordance with the quality control plan and consisted of the following:

- Sampling was performed generally in accordance with the procedures outlined in Coffey Environments relevant standard operating procedures, which are based on industry accepted protocols for environmental sampling;
- Calibration of field instruments in accordance with manufacturers instructions;
- Collection and analysis of eight blind coded intra laboratory duplicate soil samples and three inter laboratory duplicate samples, which are summarised in Table 4;
- One rinsate blank sample designated RB102 was collected from the V-bit and solid stem augers and analysed for heavy metals, TPH, BTEX, PAH, OCP and PCB to check sampling equipment had been correctly decontaminated between sampling locations;
- Primary samples were transported in ice-cooled chests to the contract laboratory, MGT Environmental Consulting Pty Ltd (MGT) in Victoria who is NATA accredited for the analysis performed, under chain of custody conditions. A copy of the chain of custody is included in Appendix D;
- Three duplicate samples were selected for analysis at the secondary laboratory. Samples were transported in ice-cooled chests to the contract laboratory, SGS Environmental Pty Ltd (SGS) in Alexandria, New South Wales who is NATA accredited for the analysis performed, under chain of custody conditions. A copy of the chain of custody is included in Appendix D;

Table 4: Summary of Duplicate Soil Samples

Primary Sample ID	Duplicate Soil Sample ID	Duplicate Type		Analysis						
		Intra Laboratory	Inter Laboratory	TPH	BTEX	PAH	OCP	PCB	Heavy Metals	Asbestos
CBH1/0.0-0.1	QC100	✓	-	-	-	-	-	-	✓	-
CBH11/0.2-0.3	QC106	✓	-	-	-	✓	-	-	✓	-
CBH14/0.3-0.5	QC108	✓	-	✓	✓	✓	✓	-	✓	-
CBH14/0.3-0.5	QC109	-	✓	✓	✓	✓	✓	-	✓	-
CBH17/0.2-0.3	QC110	✓	-	-	-	-	-	-	✓	-
CBH17/0.2-0.3	QC111	-	✓	-	-	-	-	-	✓	-
CBH6/0.2-0.3	QC114	✓	-	-	-	-	-	-	✓	-
CBH21/1.0-1.45	QC118	✓	-	✓	✓	✓	-	-	✓	-
CBH21/1.0-1.45	QC119	-	✓	✓	✓	✓	-	-	✓	-
CBH23/0.8-1.0	QC120	✓	-	✓	✓	-	-	-	✓	-
CBH6/0.0-0.1	QC122	✓	-	✓	✓	-	-	✓	-	-
Total		**8**	**3**	**6**	**6**	**5**	**2**	**1**	**10**	**0**
Total Primary Samples Analysed				**38**	**38**	**39**	**17**	**11**	**62**	**12**

8.3 Laboratory Analysis

Samples were selected for analysis mainly based on geological origin/fill type of the material, soil sample depth, site location, PID screening and field observations.

The following is a summary of the primary sample analysis for the proposed Building 1 area:

- 14 samples for heavy metals;
- 7 samples for BTEX and TPH;
- 8 samples for PAH;
- 2 samples for OCPs;
- 2 samples for PCBs;
- 1 samples for asbestos; and
- 1 samples for TCLP Heavy Metals

- 1 samples for TCLP PAH Benzo(a)pyrene

The following is a summary of the primary sample analysis for the proposed Building 2 area:

- 26 samples for heavy metals;
- 15 samples for BTEX and TPH;
- 13 samples for PAH;
- 7 samples for OCPs;
- 1 samples for PCBs;
- 4 samples for asbestos; and
- 2 samples for TCLP Heavy Metals

The following is a summary of the primary sample analysis for the proposed Building 3 area:

- 23 samples for heavy metals;
- 17 samples for BTEX and TPH;
- 20 samples for PAH;
- 6 samples for OCPs;
- 4 samples for PCBs;
- 3 samples for asbestos; and
- 2 samples for TCLP Heavy Metals
- 1 samples for TCLP PAH Benzo(a)pyrene

Original laboratory sheets and analytical procedures are included in Appendix D.

9 RESULTS OF FIELD AND LABORATORY INVESTIGATIONS

9.1 Subsurface Conditions

The generalised subsurface conditions encountered across the site from the boreholes are summarised below:

ASPHALT

(Unit 1)

Bitumen and Roadbase materials for boreholes excavated in car parking areas within the proposed Building 1 and 2 footprints.

Thickness in proposed Building 1: 0-0.3m encountered at CBH2, CBH6, CBH8, CBH15, CBH19, CBH22

Thickness in proposed Building 2: 0-0.4m encountered at CBH4, CBH5, CBH9, CBH10, CBH12 to CBH14, CBH17 and CBH23 to CBH25.

FILL

(Unit 2)

Silty sand, clayey sand, sandy clay and clay, with some sandstone gravel up to cobbles size, concrete rubble, organic fragments and trees roots.

Thickness in proposed Building 1: 0-2.5m encountered at CBH11, CBH15, CBH19, CBH22

Thickness in proposed Building 2: 0.15m-3.14m encountered at CBH2, CBH12, CBH13, CBH14, CBH17 and CBH23 to CBH27

Thickness in proposed Building 3: 0-6.85m encountered at CBH1, CBH3, CBH7, CBH16, CBH18, CBH20, CBH21

A sandstone boulder was encountered at 1.0-1.2m for CBH11 within the proposed Building 1 footprint.

RESIDUAL

(Unit 3)

Typically

- Sandy clay and clay: stiff, low to high plasticity, orange brown, pale grey and red
- Silty sand and sand: fine to medium grained, brownish grey

Thickness: 0 to 1.2m

SANDSTONE

(Unit 4)

Unit 3A typically:

- Very low to medium strength, yellow, red, orange, grey, extremely to moderately weathered

Thickness: 0 to 3.7m

Unit 3B typically:

- Medium to high strength, grey, yellow, orange, red and brown, moderately weathered to fresh

Continued

SHALE (Unit 5)	Found only beneath Building 4. Very low to medium strength, highly to moderately weathered, grey and orange shale.

Notes:
(1) The unit thickness and base of unit values are based on the boreholes and may not represent the extremes (maximum or minimum) values across the site.
(2) Rock classified in accordance with Pells *et al* (1998) "Foundations on Sandstone and Shale in the Sydney Region" Aust. Geomech. Jnl, Dec 1998.

Apart from the fill, the subsurface conditions encountered are consistent with the published geological information.

Organic odours were noted at borehole locations CBH1, CBH3 and CBH11. No unusual odours or oily sheens were noted in soils during sampling at remaining locations. A black coloured material was noted at about 4.05m to 4.25m in CBH16 in the Building 3 area. The material did not have an unusual odour.

Groundwater inflows were noted in three boreholes (CBH1, CBH7 and CBH18) surrounding the proposed Building 3 footprint within the fill soils at depths of 3.5m, 1.0m and 5.5m respectively. A groundwater inflow was also noted within the fill soils at CBH2B at a depth of 1.5m which was located within the proposed Building 1 footprint. These groundwater inflows are considered to represent 'perched' groundwater located within the clayey fill and unlikely to represent local groundwater.

Within the cored boreholes, water was used as a drilling fluid which prevented groundwater observations. No groundwater was encountered during drilling or within the period they were open.

It should be noted that groundwater levels are subject to variation due to the influence of rainfall, temperature, local drainage and the seasons. There may also be the potential for development of perched groundwater tables following periods of rainfall.

9.2 Soil Vapour

Results of the soil gas headspace measurements are presented in Appendix C.

Soil samples tested recorded negligible to low readings ranging from 0 to 34.5ppm. The sample PID results were generally consistent with field observations and the laboratory-tested soil samples.

9.3 Soil Contamination

9.3.1 Quality Assurance/Quality Control

A data validation report for each batch of samples were prepared by Coffey Environments as part of the quality assurance programme and are included in Appendix E. Following review of laboratory reports, the following comments can be made:

- A laboratory prepared trip spike was not taken into the field for this round of fieldwork. An assessment of potential loss of volatiles through this method cannot be made. This is not considered significant as soils screened in the field with a PID indicated a low likelihood for volatile contamination to exist on the site.

- Several BTEX surrogates recorded recoveries ranging between 50% and 58% for the soil samples CBH4/0.05-0.2m, CBH7/1.0-1.3m, CBH7/2.8-2.9m, CBH8/0.4-0.5m, CBH11/0.9-1.05m, CBH18/0.3-0.5m and CBH21/1.0-1.45m, which is below the lower control limit of 60%. This result may indicate that lower concentrations of BTEX may have been recorded than what was actually present for these samples. This result is not considered significant as screening results and observations suggested that volatile contaminants were unlikely to be present.
- Several laboratory spikes for PAHs and a PAH surrogate recorded recoveries above the upper control limit of 110% for the sample CBH21/0.4-0.5m. These results may indicate that some concentrations of PAHs for this sample may have been reported higher than what were actually present.
- RPDs ranging between 55% and 108% above the control limit of 50%, were recorded for the copper, mercury, nickel, zinc and the PAH Phenanthrene for the soil duplicate pairs CBH1/0.0-0.1m and QC100; CBH11/0.2-0.3m and QC106; CBH17/0.2-0.3m and QC110; CBH17/0.2-0.3m and QC111; CBH21/1.0-1.45m and QC119; and CBH21/1.0-1.45m and QC119. These results are considered to be attributed to the heterogeneous nature of the contaminant distribution throughout the soil/fill matrix.
- Several inconsistencies were noted between the duplicate pairs CBH1/0.0-0.1m and QC100; CBH2/0.15-0.25m and QC102; CBH17/0.2-0.3m and QC111; CBH6/0.2-0.3m and QC114; CBH21/1.0-1.45m and QC118 and QC119, for arsenic, copper, lead, nickel, zinc. These results are not considered significant as concentrations of the primary and duplicates samples were close to the LOR.

Apart from the above, the QA/QC was considered generally appropriate for the purposes of this assessment.

Data Quality Indicators (DQI) (completeness, comparability, representativeness, precision and accuracy) for both field and laboratory procedures have been checked. Based on the assessment it is considered that the data collected for this assessment is adequate and meets the objectives of the QA/QC plan.

9.3.2 Comparison of Results to Soil Investigation Levels

The laboratory test results for soil samples collected within or immediately adjacent to the proposed development areas of Buildings 1, 2 and 3 are summarised in Tables 5, 6 and 7 respectively.

Concentration of the COCs tested were generally low and below the adopted SILs and/or below the laboratory reporting limits.

For the proposed Building 1 study area concentrations of PAHs, arsenic, chromium, copper, lead, nickel and zinc were generally low and below the adopted SILs. Concentrations of TPH, BTEX, OCP, PCB, cadmium, mercury and asbestos were below the laboratory limits of reporting (LOR).

For the proposed Building 2 study area concentrations of TPH C_{10}-C_{36}, PAHs, arsenic, chromium, copper, lead, nickel and zinc were generally low and below the adopted SILs. Concentrations of BTEX, OCP, PCB, cadmium, mercury and asbestos were below the laboratory LOR.

For the proposed Building 3 study area concentrations of PAHs, arsenic, chromium, copper, lead, nickel and zinc were generally low and below the adopted SILs. Concentrations of TPH, BTEX, OCP, PCB, cadmium, mercury and asbestos were below the laboratory limits LOR.

9.3.3 Comparison of Results to Waste Classification Guidelines

The laboratory test results were compared to waste classification criteria. Results for Buildings 1, 2 and 3 are summarised in Tables 8, 9 and 10, respectively.

The laboratory results were compared to the guidelines presented in the NSW DECC (2008) Waste Classification Guidelines. Based on this assessment the soils for the proposed Buildings 1, 2 and 3 were assessed to classify as General Solid Waste for landfill disposal.

10 DISCUSSION

10.1 Building 1

Fieldwork results indicated that this area had fill soils ranging in depth between 0.2m to 2.5m (generally increasing in depth from east to west). The fill soils were typically clayey sands and sandy clays. Some brick and terracotta pieces were noted in CBH15 at a depth of about 2m. The soils are likely to be natural site soils from cut and fill activities (although this cannot be confirmed). No obvious evidence of contamination was noted. Sixteen (16) samples selected for analysis from the fill soils at various depth intervals did not indicate concentrations of the potential COCs tested above the adopted SILs.

10.2 Building 2

Fieldwork results indicated that this area had fill soils ranging in depth between 0.2m to 3.2m (generally increasing in depth from south-west to north-east). The fill soils were typically clayey sands and clay. No obvious evidence of contamination was noted. Thirty three (33) samples selected for analysis from the fill soils at various depth intervals did not indicate concentrations of the potential COCs tested above the adopted SILs.

10.3 Building 3

Fieldwork results indicated that this area had fill soils ranging in depth between 2.7m to 6.9m (generally increasing in depth from north-east to south-west). The fill soils were typically clayey sands, clays and sandy clays. A black coloured material was noted at about 4.05m to 4.25m in CBH16 in the Building 3 area. The material did not have an unusual odour and was insufficient for a sample. Apart from this no obvious evidence of contamination was noted. Twenty seven (27) samples selected for analysis from the fill soils at various depth intervals did not indicate concentrations of the potential COCs tested above the adopted SILs.

10.4 Building 4

The site history and site observations made as part of this assessment did not indicate obvious potential sources of contamination. The results from other areas would suggest that the likelihood for this area to be affected by contamination is low.

Groundwater quality at the site was not directly assessed as part of this study. It would generally appear that the likelihood for groundwater contamination to be present at the proposed building areas that would adversely affect the proposed development form a contamination perspective is low. Some USTs exist on the site further upslope of the areas being assessed which could act potential contamination sources to groundwater. Their distance and previous usage would suggest that if contamination occurred, the likelihood of it impacting these areas is likely to be relatively low.

11 CONCLUSIONS

The results of the site history study indicated that the site has been used for hospital related purposes since at least 1951 and possibly since 1903. The proposed building areas have generally been undeveloped with part of Building 2 possibly having been used for some agricultural use and Buildings 1 and 3 recording some filling. Building 3 received larger quantities of fill to raise levels and create a retention pond. Generally the likelihood for the areas assessed to be affected by contamination was assessed to be low.

Field investigations confirmed the presence of fill soils in the three study areas ranging between 0.2m and 6.9m in depth. Building area 3 recorded the deeper fill profile with shallower fill at proposed Building areas 1 and 2. No obvious evidence of contamination was noted and samples selected for analysis for a suite of potential COCs did not record concentrations exceeding the adopted SILs for a commercial landuse.

A direct assessment of the groundwater quality was not made as part of this study. Based on the soil laboratory results, the anticipated depth to groundwater and lack of nearby contamination sources, the likelihood of groundwater contamination adversely affecting the proposed development is considered low.

Based on the results of this study it is considered that the potential for the areas assessed to be affected by land contamination that would adversely affect the proposed development is low and therefore the areas are considered suitable for proposed commercial use.

A preliminary assessment of the fill soils waste classification was made as part of this study. Based on the results the fill soils are likely to classify as general solid waste for offsite disposal to a licensed facility. Natural soils underlying the fill are likely to classify as Virgin Excavated Natural Material (VENM), subject to the soils not being mixed with other fill soils or wastes.

12 LIMITATIONS

The findings contained in this report are the result of discrete/specific methodologies used in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site at the time the investigations were carried out.

Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points. Should any site conditions be encountered during construction that vary significantly from those discussed in this report, Coffey Environments should be advised and appropriate action taken.

This report does not provide geotechnical information or information about hazardous building materials in site structures.

13 REFERENCES

1. EnHealth Council (2005), *Management of Asbestos in the Non-Occupational Environment*
2. NEPC (1999), *National Environment Protection (Assessment of Site Contamination) Measure*
3. NSW EPA (1994), *Guidelines for Assessing Service Station Sites*
4. NSW EPA (1995), *Sampling Design Guidelines*
5. NSW EPA (1997), Guidelines for Consultants Reporting on Contaminated Sites
6. NSW DEC (2006), Guidelines for the NSW Auditor Scheme 2nd Ed.
7. NSW DECC (2008), Waste Classification Guidelines

Tables

CONTAMINATION ASSESSMENT - SAN Hospital
185 Fox Valley Road, Wahroonga

TABLE 5:

SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES FROM PROPOSED BUILDING 1

Heavy Metals, TPH, BTEX, PAH, OCP, PCB and Asbestos

(All results in mg/kg)

Sample ID	THRESHOLD CONCENTRATION	CBH2	CBH6	CBH6	CBH8	CBH8	CBH11	CBH11	CBH11	CBH15	CBH15	CBH19	CBH19	CBH22	CBH22	CBH22	CBH22
Material		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling	HIL	10-Mar-08	12-Mar-08	12-Mar-08	13-Mar-08	13-Mar-08	14-Mar-08	14-Mar-08	14-Mar-08	18-Mar-08	18-Mar-08	20-Mar-08	20-Mar-08	25-Mar-08	25-Mar-08	25-Mar-08	25-Mar-08
Depth (m)		0.15-0.25	0.2-0.3	0.4-0.5	0.15-0.30	0.4-0.5	0.0-0.2	0.2-0.3	0.90-1.05	0.3-0.5	1.00-1.45	0.3-0.5	1.10-1.45	0.2-0.3	0.4-0.5	1.00-1.35	2.0-2.2
HEAVY METALS																	
Arsenic	500 [1]	5.8	2.7	3.8	2.4	< 2	4.3	5.6	3.8	< 2	< 2	2.5	< 2	< 2	-	-	< 2
Cadmium	100 [1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	< 0.5
Chromium (III)	600,000 [1]	14	88	16	27	10	14	16	42	12	7.4	16	9	11	-	-	22
Copper	5,000 [1]	< 5	28	5.9	11	< 5	20	20	< 5	< 5	< 5	< 5	< 5	< 5	-	-	< 5
Lead	1,500 [1]	16	< 5	9.2	6	< 5	70	75	10	13	7.6	13	8.1	14	-	-	< 5
Nickel	3,000 [1]	< 5	67	< 5	25	< 5	< 5	< 5	< 5	< 5	< 5	6.3	< 5	5	-	-	< 5
Zinc	35,000 [1]	19	53	19	23	< 5	99	140	12	16	8.7	25	7.3	16	-	-	6.1
Mercury	75 [1]	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	< 0.1
TOTAL PETROLEUM HYDROCARBONS																	
C6 - C9 Fraction	65 [2]	< 20	-	< 20	-	< 20	-	-	< 20	<20	-	-	<20	-	< 20	-	-
C10 - C14 Fraction		< 50	-	< 50	-	< 50	-	-	< 50	< 50	-	-	< 50	-	< 50	-	-
C15 - C28 Fraction		< 100	-	< 100	-	< 100	-	-	< 100	< 100	-	-	< 100	-	< 100	-	-
C29 - C36 Fraction		< 100	-	< 100	-	< 100	-	-	< 100	< 100	-	-	< 100	-	< 100	-	-
Total C10-C36	1000 [2]	ND	-	ND	-	ND	-	-	ND	ND	-	-	ND	-	ND	-	-
BTEX																	
Benzene	1 [2]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
Toluene	130 [2]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
Ethylbenzene	50 [2]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
Total Xylene	25 [2]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
POLYCYCLIC AROMATIC HYDROCARBONS																	
Benzo(a)pyrene	5 [1]	-	< 0.1	0.3	< 0.1	< 0.1	-	0.4	-	-	< 0.1	< 0.1	-	-	-	< 0.1	-
Total PAH	100 [1]	-	ND	3.9	0.3	ND	-	7.9	-	-	ND	ND	-	-	-	ND	-
ORGANOCHLORINE PESTICIDES																	
Heptachlor	50 [1]	-	-	-	-	< 0.05	-	-	-	-	-	-	-	< 0.05	-	-	-
Chlordane	250 [1]	-	-	-	-	< 0.1	-	-	-	-	-	-	-	< 0.1	-	-	-
Aldrin + Dieldrin	50 [1]	-	-	-	-	ND	-	-	-	-	-	-	-	ND	-	-	-
DDT + DDE + DDD	1000 [1]	-	-	-	-	ND	-	-	-	-	-	-	-	ND	-	-	-
Other OCP		-	-	-	-	ND	-	-	-	-	-	-	-	ND	-	-	-
TOTAL PCB	50 [1]	-	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-
ASBESTOS	ND [3]	-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-

NOTES:

[redacted] Concentration exceeds the Human Health Investigation Levels (HIL)

[1] Based on NSW DEC (2006), Guidelines for the NSW Site Auditor Scheme 2nd Edition. and NEPM (1999) (Commercial/Industrial - NEHF F)

[2] Based on NSW EPA (1994), Guidelines for Assessing Service Station Sites

[3] On the advice of the NSW Department of Health, the NSW EPA have advised NSW Site Auditors (Site Auditors Meeting 1 March 2000) that "no asbestos in the soil at the surface is permitted". The phrase 'at the surface' has not been defined.

ND Not Detected

- Not Analysed

See original laboratory reports for detection limits

TABLE 6:

SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES FROM PROPOSED BUILDING 2

Heavy Metals, TPH, BTEX, PAH, OCP, PCB and Asbestos

(All results in mg/kg)

Sample ID	THRESHOLD CONCENTRATION	CBH4	CBH4	CBH4	CBH5	CBH5	CBH5	CBH9	CBH9	CBH9	CBH10	CBH10	CBH10	CBH12	CBH12	CBH12	CBH12	CBH13	CBH13
Material		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling	HIL	11-Mar-08	11-Mar-08	11-Mar-08	11-Mar-08	11-Mar-08	11-Mar-08	13-Mar-08	13-Mar-08	13-Mar-08	14-Mar-08	14-Mar-08	14-Mar-08	17-Mar-08	17-Mar-08	17-Mar-08	17-Mar-08	17-Mar-08	17-Aug-08
Depth (m)		0.05-0.20	0.3-0.5	0.7-1.0	0.05-0.25	0.3-0.4	0.4-0.5	0.0-0.2	0.3-0.4	0.4-0.5	0.25-0.30	0.3-0.5	0.7-0.9	0.3-0.5	1.00-1.25	1.25-1.45	2.5-2.9	0.3-0.5	0.7-1.0
HEAVY METALS																			
Arsenic	500 [1]	5.9	11	-	3	2.6	7.2	2.8	-	5	10	8.7	-	4.8	-	10	< 2	2.6	-
Cadmium	100 [1]	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5	-
Chromium (III)	600,000 [1]	33	29	-	95	22	28	91	-	30	32	27	-	14	-	20	14	21	-
Copper	5,000 [1]	14	< 5	-	31	7.3	7.2	32	-	< 5	14	12	-	< 5	-	< 5	< 5	< 5	-
Lead	1,500 [1]	13	15	-	< 5	17	11	< 5	-	< 5	14	17	-	15	-	120	9.4	14	-
Nickel	3,000 [1]	16	< 5	-	71	9.8	8.3	79	-	< 5	14	9.5	-	< 5	-	< 5	< 5	< 5	-
Zinc	35,000 [1]	28	5.9	-	52	19	16	91	-	< 5	23	13	-	6.2	-	81	< 5	7.9	-
Mercury	75 [1]	0.1	< 0.1	-	< 0.1	<0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	-	< 0.1	-	< 0.1	< 0.1	< 0.1	-
TOTAL PETROLEUM HYDROCARBONS																			
C6 - C9 Fraction	65 [2]	< 20	-	< 20	< 20	< 20	-	-	-	< 20	-	-	< 20	-	< 20	-	-	< 20	-
C10 - C14 Fraction		< 50	-	< 50	< 50	< 50	-	-	-	< 50	-	-	< 50	-	< 50	-	-	< 50	-
C15 - C28 Fraction		< 100	-	< 100	< 100	< 100	-	-	-	< 100	-	-	< 100	-	< 100	-	-	< 100	-
C29 - C36 Fraction		< 100	-	< 100	< 100	< 100	-	-	-	< 100	-	-	< 100	-	< 100	-	-	< 100	-
Total C10-C36	1000 [2]	ND	-	ND	ND	ND	-	-	-	ND	-	-	ND	-	ND	-	-	ND	-
BTEX																			
Benzene	1 [2]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-
Toluene	130 [2]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-
Ethylbenzene	50 [2]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-
Total Xylene	25 [2]	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-
POLYCYCLIC AROMATIC HYDROCARBONS																			
Benzo(a)pyrene	5 [1]	< 0.1	-	-	< 0.1	-	-	< 0.1	-	-	-	< 0.1	-	-	-	< 0.1	-	< 0.1	-
Total PAH	100 [1]	ND	-	-	0.4	-	-	0.6	-	-	-	0.6	-	-	-	ND	-	ND	-
ORGANOCHLORINE PESTICIDES																			
Heptachlor	50 [1]	-	-	-	-	<0.05	-	-	< 0.05	-	-	< 0.05	-	-	-	-	< 0.05	< 0.05	-
Chlordane	250 [1]	-	-	-	-	<0.1	-	-	< 0.1	-	-	< 0.1	-	-	-	-	< 0.1	< 0.1	-
Aldrin + Dieldrin	50 [1]	-	-	-	-	ND	-	-	ND	-	-	ND	-	-	-	-	ND	ND	-
DDT + DDE + DDD	1000 [1]	-	-	-	-	ND	-	-	ND	-	-	ND	-	-	-	-	ND	ND	-
Other OCP		-	-	-	-	ND	-	-	ND	-	-	ND	-	-	-	-	ND	ND	-
TOTAL PCB	50 [1]	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
ASBESTOS	ND [3]	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND

NOTES:

[redacted] Concentration exceeds the Human Health Investigation Levels (HIL)

[1] Based on NSW DEC (2006), Guidelines for the NSW Site Auditor Scheme 2nd Edition. and NEPM (1999) (Commercial/Industrial - NEHF F)

[2] Based on NSW EPA (1994), Guidelines for Assessing Service Station Sites

[3] On the advice of the NSW Department of Health, the NSW EPA have advised NSW Site Auditors (Site Auditors Meeting 1 March 2000) that "no asbestos in the soil at the surface is permitted". The phrase 'at the surface' has not been defined.

ND Not Detected

- Not Analysed

See original laboratory reports for detection limits

TABLE 6 (CONTINUED):

SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES FROM PROPOSED BUILDING 2

Heavy Metals, TPH, BTEX, PAH, OCP, PCB and Asbestos

(All results in mg/kg)

Sample ID	THRESHOLD	CBH13	CBH14	CBH14	CBH14	CBH17	CBH17	CBH17	CBH23	CBH23	CBH24	CBH24	CBH25	CBH25	CBH26	CBH27
Material	CONCENTRATION	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling	HIL	17-Mar-08	17-Mar-08	17-Mar-08	17-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08
Depth (m)		1.00-1.06	0.3-0.5	1.00-1.45	2.50-2.65	0.2-0.3	0.4-0.5	2.70-2.95	0.3-0.4	0.8-1.0	0.4-0.5	0.8-1.0	0.3-0.4	0.7-0.8	0.0-0.1	0.1-0.2
HEAVY METALS																
Arsenic	500 [1]	2.1	-	3.5	2.8	< 2	-	< 2	< 2	3.4	7.3	< 2	< 2	2	3.3	2.2
Cadmium	100 [1]	< 0.5	-	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium (III)	600,000 [1]	19	-	19	19	40	-	17	51	11	21	< 5	46	23	22	16
Copper	5,000 [1]	< 5	-	6.5	11	40	-	< 5	17	< 5	< 5	< 5	14	< 5	15	14
Lead	1,500 [1]	13	-	19	14	7.8	-	6.4	< 5	< 5	11	14	13	11	55	55
Nickel	3,000 [1]	< 5	-	< 5	< 5	36	-	< 5	42	< 5	5.1	< 5	32	< 5	7	7.9
Zinc	35,000 [1]	< 5	-	< 5	10	19	-	< 5	29	< 5	< 5	< 5	29	5.1	62	45
Mercury	75 [1]	< 0.1	-	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TOTAL PETROLEUM HYDROCARBONS																
C6 - C9 Fraction	65 [2]	-	< 20	-	-	-	<20	-	-	< 20	< 20	-	-	< 20	< 20	< 20
C10 - C14 Fraction		-	< 50	-	-	-	< 50	-	-	< 50	< 50	-	-	< 50	< 50	< 50
C15 - C28 Fraction		-	< 100	-	-	-	< 100	-	-	< 100	< 100	-	-	< 100	< 100	< 100
C29 - C36 Fraction		-	< 100	-	-	-	< 100	-	-	< 100	< 100	-	-	< 100	< 100	110
Total C10-C36	1000 [2]	-	ND	-	-	-	ND	-	-	ND	ND	-	-	ND	ND	110
BTEX																
Benzene	1 [2]	-	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
Toluene	130 [2]	-	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
Ethylbenzene	50 [2]	-	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
Total Xylene	25 [2]	-	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
POLYCYCLIC AROMATIC HYDROCARBONS																
Benzo(a)pyrene	5 [1]	-	-	< 0.1	-	-	-	< 0.1	< 0.1	-	-	< 0.1	< 0.1	-	< 0.1	< 0.1
Total PAH	100 [1]	-	-	ND	-	-	-	ND	ND	-	-	ND	ND	-	0.7	0.1
ORGANOCHLORINE PESTICIDES																
Heptachlor	50 [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.05	< 0.05
Chlordane	250 [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.1	< 0.1
Aldrin + Dieldrin	50 [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND
DDT + DDE + DDD	1000 [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND
Other OCP		-	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND
TOTAL PCB	50 [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ASBESTOS	ND [3]	-	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-

NOTES:

[redacted] Concentration exceeds the Human Health Investigation Levels (HIL)

[1] Based on NSW DEC (2006), Guidelines for the NSW Site Auditor Scheme 2nd Edition. and NEPM (1999) (Commercial/Industrial - NEHF F)

[2] Based on NSW EPA (1994), Guidelines for Assessing Service Station Sites

[3] On the advice of the NSW Department of Health, the NSW EPA have advised NSW Site Auditors (Site Auditors Meeting 1 March 2000) that "no asbestos in the soil at the surface is permitted". The phrase 'at the surface' has not been defined.

ND Not Detected

- Not Analysed

See original laboratory reports for detection limits

TABLE 7:

SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES FROM PROPOSED BUILDING 3

Heavy Metals, TPH, BTEX, PAH, OCP, PCB and Asbestos

(All results in mg/kg)

Sample ID	THRESHOLD	CBH1	CBH1	CBH1	CBH3	CBH3	CBH3	CBH7	CBH7	CBH7	CBH16	CBH16	CBH16	CBH16	CBH18	CBH18	CBH18	CBH18	CBH18
Material	CONCENTRATION	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling	HIL	10-Mar-08	10-Mar-08	10-Mar-08	10-Mar-08	10-Mar-08	10-Mar-08	12-Mar-08	12-Mar-08	12-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08
Depth (m)		0.0-0.1	1.2-1.45	2.65-2.95	0.00-0.15	2.65-2.90	5.7-5.95	0.00-0.15	1.0-1.3	2.8-2.9	0.1-0.2	1.15-1.30	2.60-2.75	4.25-4.39	0.3-0.5	1.2-1.3	1.30-1.45	2.60-2.95	4.10-4.45
HEAVY METALS																			
Arsenic	500 [1]	< 2	-	< 2	6.4	-	< 2	22	3.2	5.7	2.4	2.4	2.3	2.9	< 2	-	< 2	-	2.7
Cadmium	100 [1]	< 0.5	-	< 0.5	< 0.5	-	< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	-	< 0.5
Chromium (III)	600,000 [1]	20	-	5.9	25	-	25	26	7.8	120	20	21	22	19	20	-	25	-	13
Copper	5,000 [1]	10	-	< 5	29	-	< 5	27	5.8	< 5	11	6.3	6.7	< 5	15	-	12	-	13
Lead	1,500 [1]	21	-	11	280	-	17	12	18	< 5	29	17	17	22	32	-	16	-	27
Nickel	3,000 [1]	11	-	< 5	51	-	< 5	11	< 5	< 5	8.3	8.2	< 5	< 5	9.9	-	20	-	5.7
Zinc	35,000 [1]	21	-	< 5	120	-	< 5	29	35	5.2	31	30	16	29	39	-	18	-	21
Mercury	75 [1]	< 0.1	-	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1	-	< 0.1
TOTAL PETROLEUM HYDROCARBONS																			
C6 - C9 Fraction	65 [2]	-	-	< 20	-	-	< 20	-	< 20	< 20	<20	<20	<20	<20	<20	-	-	<20	-
C10 - C14 Fraction		-	-	< 50	-	-	< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	-	-	< 50	-
C15 - C28 Fraction		-	-	< 100	-	-	< 100	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	-	-	< 100	-
C29 - C36 Fraction		-	-	< 100	-	-	< 100	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	-	-	< 100	-
Total C10-C36	1000 [2]	-	-	ND	-	-	ND	-	ND	ND	ND	ND	ND	ND	ND	-	-	ND	-
BTEX																			
Benzene	1 [2]	-	-	< 0.05	-	-	< 0.05	-	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	< 0.05	-
Toluene	130 [2]	-	-	< 0.05	-	-	< 0.05	-	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	< 0.05	-
Ethylbenzene	50 [2]	-	-	< 0.05	-	-	< 0.05	-	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	< 0.05	-
Total Xylene	25 [2]	-	-	< 0.05	-	-	< 0.05	-	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	< 0.05	-
POLYCYCLIC AROMATIC HYDROCARBONS																			
Benzo(a)pyrene	5 [1]	-	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1	-	< 0.1
Total PAH	100 [1]	-	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6	-	ND	-	ND
ORGANOCHLORINE PESTICIDES																			
Heptachlor	50 [1]	< 0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	-	-	< 0.05	-	-	-	-	-
Chlordane	250 [1]	< 0.1	-	-	-	-	-	< 0.1	< 0.1	< 0.1	< 0.1	-	-	< 0.1	-	-	-	-	-
Aldrin + Dieldrin	50 [1]	ND	-	-	-	-	-	ND	ND	ND	ND	-	-	ND	-	-	-	-	-
DDT + DDE + DDD	1000 [1]	ND	-	-	-	-	-	ND	ND	ND	ND	-	-	ND	-	-	-	-	-
Other OCP		ND	-	-	-	-	-	ND	ND	ND	ND	-	-	ND	-	-	-	-	-
TOTAL PCB	50 [1]	ND	-	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-
ASBESTOS	ND [3]	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	ND	-	-	-

NOTES:

[redacted] Concentration exceeds the Human Health Investigation Levels (HIL)

[1] Based on NSW DEC (2006), Guidelines for the NSW Site Auditor Scheme 2nd Edition. and NEPM (1999) (Commercial/Industrial - NEHF F)

[2] Based on NSW EPA (1994), Guidelines for Assessing Service Station Sites

[3] On the advice of the NSW Department of Health, the NSW EPA have advised NSW Site Auditors (Site Auditors Meeting 1 March 2000) that "no asbestos in the soil at the surface is permitted". The phrase 'at the surface' has not been defined.

[ND] Not Detected

[-] Not Analysed

See original laboratory reports for detection limits

TABLE 7 (CONTINUED):

SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES FROM PROPOSED BUILDING 3

Heavy Metals, TPH, BTEX, PAH, OCP, PCB and Asbestos

(All results in mg/kg)

Sample ID	THRESHOLD	CBH18	CBH20	CBH20	CBH20	CBH20	CBH21	CBH21	CBH21	CBH21
Material	CONCENTRATION	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling	HIL	19-Mar-08	20-Mar-08	20-Mar-08	20-Mar-08	20-Mar-08	25-Mar-08	25-Mar-08	25-Mar-08	25-Mar-08
Depth (m)		5.60-5.95	0.3-0.5	2.60-2.95	4.1-4.45	6.74-6.80	0.4-0.5	1.00-1.45	2.70-2.95	4.10-4.45
HEAVY METALS										
Arsenic	500 [1]	< 2	3.2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Cadmium	100 [1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium (III)	600,000 [1]	12	15	20	18	16	9.2	16	21	6.1
Copper	5,000 [1]	5.1	20	15	< 5	< 5	6.5	8.2	17	7.6
Lead	1,500 [1]	21	44	24	21	9.4	16	20	26	58
Nickel	3,000 [1]	< 5	6.2	15	8.3	< 5	< 5	5.1	13	< 5
Zinc	35,000 [1]	22	49	25	66	< 5	25	25	43	70
Mercury	75 [1]	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TOTAL PETROLEUM HYDROCARBONS										
C6 - C9 Fraction	65 [2]	<20	-	<20	<20	<20	< 20	< 20	< 20	-
C10 - C14 Fraction		< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	-
C15 - C28 Fraction		< 100	-	< 100	< 100	< 100	< 100	< 100	< 100	-
C29 - C36 Fraction		< 100	-	< 100	< 100	< 100	< 100	< 100	< 100	-
Total C10-C36	1000 [2]	ND	-	ND	ND	ND	ND	ND	ND	-
BTEX										
Benzene	1 [2]	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-
Toluene	130 [2]	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-
Ethylbenzene	50 [2]	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-
Total Xylene	25 [2]	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-
POLYCYCLIC AROMATIC HYDROCARBONS										
Benzo(a)pyrene	5 [1]	< 0.1	0.2	< 0.1	< 0.1	-	0.2	< 0.1	< 0.1	-
Total PAH	100 [1]	ND	1.2	ND	ND	-	1.7	ND	ND	-
ORGANOCHLORINE PESTICIDES										
Heptachlor	50 [1]	-	-	-	-	-	-	-	-	-
Chlordane	250 [1]	-	-	-	-	-	-	-	-	-
Aldrin + Dieldrin	50 [1]	-	-	-	-	-	-	-	-	-
DDT + DDE + DDD	1000 [1]	-	-	-	-	-	-	-	-	-
Other OCP		-	-	-	-	-	-	-	-	-
TOTAL PCB	50 [1]	-	-	-	-	-	-	-	-	-
ASBESTOS	ND [3]	-	-	ND	-	-	-	-	-	-

NOTES:

[redacted] Concentration exceeds the Human Health Investigation Levels (HIL)

[1] Based on NSW DEC (2006), Guidelines for the NSW Site Auditor Scheme 2nd Edition. and NEPM (1999) (Commercial/Industrial - NEHF F)

[2] Based on NSW EPA (1994), Guidelines for Assessing Service Station Sites

[3] On the advice of the NSW Department of Health, the NSW EPA have advised NSW Site Auditors (Site Auditors Meeting 1 March 2000) that "no asbestos in the soil at the surface is permitted". The phrase 'at the surface' has not been defined.

ND Not Detected

- Not Analysed

See original laboratory reports for detection limits

TABLE 8:
SUMMARY OF LABORATORY RESULTS FOR PRELIMINARY WASTE CLASSIFICATION - BUILDING 1
TPH, BTEX, PAH and Heavy Metals
(All results in mg/kg, except TCLP concentrations in mg/L)

Sample ID	THRESHOLD CONCENTRATIONS		CBH2	CBH6	CBH6	CBH8	CBH8	CBH11	CBH11	CBH11	CBH15	CBH15	CBH19	CBH19	CBH22	CBH22	CBH22	CBH22
Material			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling			10-Mar-08	12-Mar-08	12-Mar-08	13-Mar-08	13-Mar-08	14-Mar-08	14-Mar-08	14-Mar-08	18-Mar-08	18-Mar-08	20-Mar-08	20-Mar-08	25-Mar-08	25-Mar-08	25-Mar-08	25-Mar-08
Depth (m)			0.15-0.25	0.2-0.3	0.4-0.5	0.15-0.30	0.4-0.5	0.0-0.2	0.2-0.3	0.90-1.05	0.3-0.5	1.00-1.45	0.3-0.5	1.10-1.45	0.2-0.3	0.4-0.5	1.00-1.35	2.0-2.2
HEAVY METALS (Total)																		
Arsenic	500 [1]	2000 [4]	5.8	2.7	3.8	2.4	< 2	4.3	5.6	3.8	< 2	< 2	2.5	< 2	< 2	-	-	< 2
Cadmium	100 [1]	400 [4]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-	< 0.5
Chromium	1900 [1]	7600 [4]	14	88	16	27	10	14	16	42	12	7.4	16	9	11	-	-	22
Lead	1500 [1]	6000 [4]	16	< 5	9.2	6	< 5	70	75	10	13	7.6	13	8.1	14	-	-	< 5
Nickel	1050 [1]	4200 [4]	< 5	67	< 5	25	< 5	< 5	< 5	< 5	< 5	< 5	6.3	< 5	5	-	-	< 5
Mercury	50 [1]	200 [4]	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	< 0.1
HEAVY METALS TCLP																		
Arsenic	5.0 [2]	20 [5]	-	-	-	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-
Cadmium	1.0 [2]	4 [5]	-	-	-	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-
Chromium	5 [2]	20 [5]	-	-	-	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-
Lead	5 [2]	20.0 [5]	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Nickel	2 [2]	8 [5]	-	-	-	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-
Mercury	0.2 [2]	0.8 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL PETROLEUM HYDROCARBONS																		
C6 - C9 Fraction	650 [1]	2600 [4]	< 20	-	< 20	-	< 20	-	-	< 20	< 20			< 20	-	< 20	-	-
C10 - C14 Fraction			< 50	-	< 50	-	< 50	-	-	< 50	< 50	-	-	< 50	-	< 50	-	-
C15 - C28 Fraction			< 100	-	< 100	-	< 100	-	-	< 100	< 100	-	-	< 100	-	< 100	-	-
C29 - C36 Fraction			< 100	-	< 100	-	< 100	-	-	< 100	< 100	-	-	< 100	-	< 100	-	-
Total C10-C36	10000 [1]	40000 [4]	ND	-	ND	-	ND	-	-	ND	ND	-	-	ND	-	ND	-	-
BTEX																		
Benzene	10 [3]	40 [6]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
Toluene	288 [3]	1152 [6]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
Ethylbenzene	600 [3]	2400 [6]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
Total Xylene	1000 [3]	4000 [6]	< 0.05	-	< 0.05	-	< 0.1	-	-	< 0.1	< 0.05	-	-	< 0.05	-	< 0.05	-	-
POLYCYCLIC AROMATIC HYDROCARBONS																		
Benzo(a)pyrene	10 [1]	23 [4]	-	< 0.1	0.3	< 0.1	< 0.1	-	0.4	-	-	< 0.1	< 0.1	-	-	-	< 0.1	-
Total PAH*	200 [1]	800 [4]	-	ND	3.9	0.3	ND	-	7.9	-	-	ND	ND	-	-	-	ND	-
PAH TCLP																		
Benzo(a)pyrene	0.04 [2]	0.16 [5]	-	-	-	-	-	-	< 0.001	-	-	-	-	-	-	-	-	-
Total PAH*																		
OCP			-	-	-	-	ND	-	-	-	-	-	-	-	ND	-	-	-
PCB	<50 [1]	<50 [4]	-	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-
Asbestos			-	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-

NOTES:

Concentration exceed the respective General Solid Waste Criteria
Concentration exceed the respective Restricted Solid Waste Criteria
Based on NSW DEC (2004) Environmental Guidelines Assessment, Classification & Management of Liquid and Non-Liquid Wastes.
[1] Specific Contaminant Concentration (SCC1) for General Solid Waste
[2] Leachable Concentration (TCLP1) for General Solid Waste
[3] Contamination Threshold Value (CT1) for General Solid Waste
[4] Specific Contaminant Concentration (SCC2) for Restricted Solid Waste
[5] Leachable Concentration (TCLP2) for Restricted Solid Waste
[6] Contamination Threshold Value (CT2) for Restricted Solid Waste
[ND] Not Detected
- Not Tested
* Total PAHs is the sum of detectable concentrations of individual PAH compounds
See original laboratory reports for detection limits

TABLE 9:
SUMMARY OF LABORATORY RESULTS FOR PRELIMINARY WASTE CLASSIFICATION - BUILDING 2
TPH, BTEX, PAH and Heavy Metals
(All results in mg/kg, except TCLP concentrations in mg/L)

Sample ID	THRESHOLD CONCENTRATIONS		CBH4	CBH4	CBH4	CBH5	CBH5	CBH5	CBH9	CBH9	CBH9	CBH10	CBH10	CBH10	CBH12	CBH12	CBH12	CBH12	CBH13	CBH13	CBH13
Material			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling			11-Mar-08	11-Mar-08	11-Mar-08	11-Mar-08	11-Mar-08	11-Mar-08	13-Mar-08	13-Mar-08	13-Mar-08	14-Mar-08	14-Mar-08	14-Mar-08	17-Mar-08	17-Mar-08	17-Mar-08	17-Mar-08	17-Mar-08	17-Aug-08	17-Mar-08
Depth (m)			0.05-0.20	0.3-0.5	0.7-1.0	0.05-0.25	0.3-0.4	0.4-0.5	0.0-0.2	0.3-0.4	0.4-0.5	0.25-0.30	0.3-0.5	0.7-0.9	0.3-0.5	1.00-1.25	1.25-1.45	2.5-2.9	0.3-0.5	0.7-1.0	1.00-1.06
HEAVY METALS (Total)																					
Arsenic	500 [1]	2000 [4]	5.9	11	-	3	2.6	7.2	2.8	-	5	10	8.7	-	4.8	-	10	< 2	2.6	-	2.1
Cadmium	100 [1]	400 [4]	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	-	< 0.5	-	< 0.5	< 0.5	< 0.5	-	< 0.5
Chromium	1900 [1]	7600 [4]	33	29	-	95	22	28	91	-	30	32	27	-	14	-	20	14	21	-	19
Lead	1500 [1]	6000 [4]	13	15	-	< 5	17	11	< 5	-	< 5	14	17	-	15	-	120	9.4	14	-	13
Nickel	1050 [1]	4200 [4]	16	< 5	-	71	9.8	8.3	79	-	< 5	14	9.5	-	< 5	-	< 5	< 5	< 5	-	< 5
Mercury	50 [1]	200 [4]	0.1	< 0.1	-	< 0.1	<0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	-	< 0.1	-	< 0.1	< 0.1	< 0.1	-	< 0.1
HEAVY METALS TCLP																					
Arsenic	5.0 [2]	20 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.01	-	-	-	-
Cadmium	1.0 [2]	4 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.01	-	-	-	-
Chromium	5 [2]	20 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.01	-	-	-	-
Lead	5 [2]	20.0 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-
Nickel	2 [2]	8 [5]	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	< 0.01	-	-	-	-
Mercury	0.2 [2]	0.8 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL PETROLEUM HYDROCARBONS																					
C6 - C9 Fraction	650 [1]	2600 [4]	< 20	-	< 20	< 20	< 20	-	-	-	< 20	-	-	< 20	-	< 20	-	-	< 20	-	-
C10 - C14 Fraction			< 50	-	< 50	< 50	< 50	-	-	-	< 50	-	-	< 50	-	< 50	-	-	< 50	-	-
C15 - C28 Fraction			< 100	-	< 100	< 100	< 100	-	-	-	< 100	-	-	< 100	-	< 100	-	-	< 100	-	-
C29 - C36 Fraction			< 100	-	< 100	< 100	< 100	-	-	-	< 100	-	-	< 100	-	< 100	-	-	< 100	-	-
Total C10-C36	10000 [1]	40000 [4]	ND	-	ND	ND	ND	-	-	-	ND	-	-	ND	-	ND	-	-	ND	-	-
BTEX																					
Benzene	10 [3]	40 [6]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-	-
Toluene	288 [3]	1152 [6]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-	-
Ethylbenzene	600 [3]	2400 [6]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-	-
Total Xylene	1000 [3]	4000 [6]	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	< 0.1	-	-	< 0.1	-	< 0.05	-	-	< 0.05	-	-
POLYCYCLIC AROMATIC HYDROCARBONS																					
Benzo(a)pyrene	10 [1]	23 [4]	< 0.1	-	-	< 0.1	-	-	< 0.1	-	-	-	< 0.1	-	-	-	< 0.1	-	< 0.1	-	-
Total PAH*	200 [1]	800 [4]	ND	-	-	0.4	-	-	0.6	-	-	-	0.6	-	-	-	ND	-	ND	-	-
PAH TCLP																					
Benzo(a)pyrene	0.04 [2]	0.16 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PAH*																					
OCP			-	-	-	-	ND	-	-	ND	-	-	ND	-	-	-	-	ND	ND	-	-
PCB	<50 [1]	<50 [4]	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos			-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-

NOTES:

[redacted] Concentration exceed the respective General Solid Waste Criteria
Concentration exceed the respective Restricted Solid Waste Criteria
Based on NSW DEC (2004) Environmental Guidelines Assessment, Classification & Management of Liquid and Non-Liquid Wastes.
[1] Specific Contaminant Concentration (SCC1) for General Solid Waste
[2] Leachable Concentration (TCLP1) for General Solid Waste
[3] Contamination Threshold Value (CT1) for General Solid Waste
[4] Specific Contaminant Concentration (SCC2) for Restricted Solid Waste
[5] Leachable Concentration (TCLP2) for Restricted Solid Waste
[6] Contamination Threshold Value (CT2) for Restricted Solid Waste
ND Not Detected
- Not Tested
* Total PAHs is the sum of detectable concentrations of individual PAH compounds
See original laboratory reports for detection limits

TABLE 9 (Continued):

SUMMARY OF LABORATORY RESULTS FOR PRELIMINARY WASTE CLASSIFICATION - BUILDING 2

TPH, BTEX, PAH and Heavy Metals

(All results in mg/kg, except TCLP concentrations in mg/L)

Sample ID	THRESHOLD CONCENTRATIONS		CBH14	CBH14	CBH14	CBH17	CBH17	CBH17	CBH23	CBH23	CBH24	CBH24	CBH25	CBH25	CBH26	CBH27
Material			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling			17-Mar-08	17-Mar-08	17-Mar-08	19-Mar-08	19-Mar-08	19-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08	26-Mar-08
Depth (m)			0.3-0.5	1.00-1.45	2.50-2.65	0.2-0.3	0.4-0.5	2.70-2.95	0.3-0.4	0.8-1.0	0.4-0.5	0.8-1.0	0.3-0.4	0.7-0.8	0.0-0.1	0.1-0.2
HEAVY METALS (Total)																
Arsenic	500 [1]	2000 [4]	-	3.5	2.8	< 2	-	< 2	< 2	3.4	7.3	< 2	< 2	2	3.3	2.2
Cadmium	100 [1]	400 [4]	-	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1900 [1]	7600 [4]	-	19	19	40	-	17	51	11	21	< 5	46	23	22	16
Lead	1500 [1]	6000 [4]	-	19	14	7.8	-	6.4	< 5	< 5	11	14	13	11	55	55
Nickel	1050 [1]	4200 [4]	-	< 5	< 5	36	-	< 5	42	< 5	5.1	< 5	32	< 5	7	7.9
Mercury	50 [1]	200 [4]	-	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
HEAVY METALS TCLP																
Arsenic	5.0 [2]	20 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	1.0 [2]	4 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	5 [2]	20 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	5 [2]	20.0 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	2 [2]	8 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.2 [2]	0.8 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL PETROLEUM HYDROCARBONS																
C6 - C9 Fraction	650 [1]	2600 [4]	< 20	-	-		< 20		-	< 20	< 20	-	-	< 20	< 20	< 20
C10 - C14 Fraction			< 50	-	-	-	< 50	-	-	< 50	< 50	-	-	< 50	< 50	< 50
C15 - C28 Fraction			< 100	-	-	-	< 100	-	-	< 100	< 100	-	-	< 100	< 100	< 100
C29 - C36 Fraction			< 100	-	-	-	< 100	-	-	< 100	< 100	-	-	< 100	< 100	110
Total C10-C36	10000 [1]	40000 [4]	ND	-	-	-	ND	-	-	ND	ND	-	-	ND	ND	110
BTEX																
Benzene	10 [3]	40 [6]	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
Toluene	288 [3]	1152 [6]	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
Ethylbenzene	600 [3]	2400 [6]	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
Total Xylene	1000 [3]	4000 [6]	< 0.05	-	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05
POLYCYCLIC AROMATIC HYDROCARBONS																
Benzo(a)pyrene	10 [1]	23 [4]	-	< 0.1	-	-	-	< 0.1	< 0.1	-	-	< 0.1	< 0.1	-	< 0.1	< 0.1
Total PAH*	200 [1]	800 [4]	-	ND	-	-	-	ND	ND	-	-	ND	ND	-	0.7	0.1
PAH TCLP																
Benzo(a)pyrene	0.04 [2]	0.16 [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PAH*																
OCP			-	-	-	-	-	-	-	-	-	-	-	-	ND	ND
PCB	<50 [1]	<50 [4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos			-	ND	-	ND	-	-	-	-	-	-	-	-	-	-

NOTES:

Concentration exceed the respective General Solid Waste Criteria

Concentration exceed the respective Restricted Solid Waste Criteria

Based on NSW DEC (2004) Environmental Guidelines Assessment, Classification & Management of Liquid and Non-Liquid Wastes.

[1] Specific Contaminant Concentration (SCC1) for General Solid Waste

[2] Leachable Concentration (TCLP1) for General Solid Waste

[3] Contamination Threshold Value (CT1) for General Solid Waste

[4] Specific Contaminant Concentration (SCC2) for Restricted Solid Waste

[5] Leachable Concentration (TCLP2) for Restricted Solid Waste

[6] Contamination Threshold Value (CT2) for Restricted Solid Waste

ND Not Detected

- Not Tested

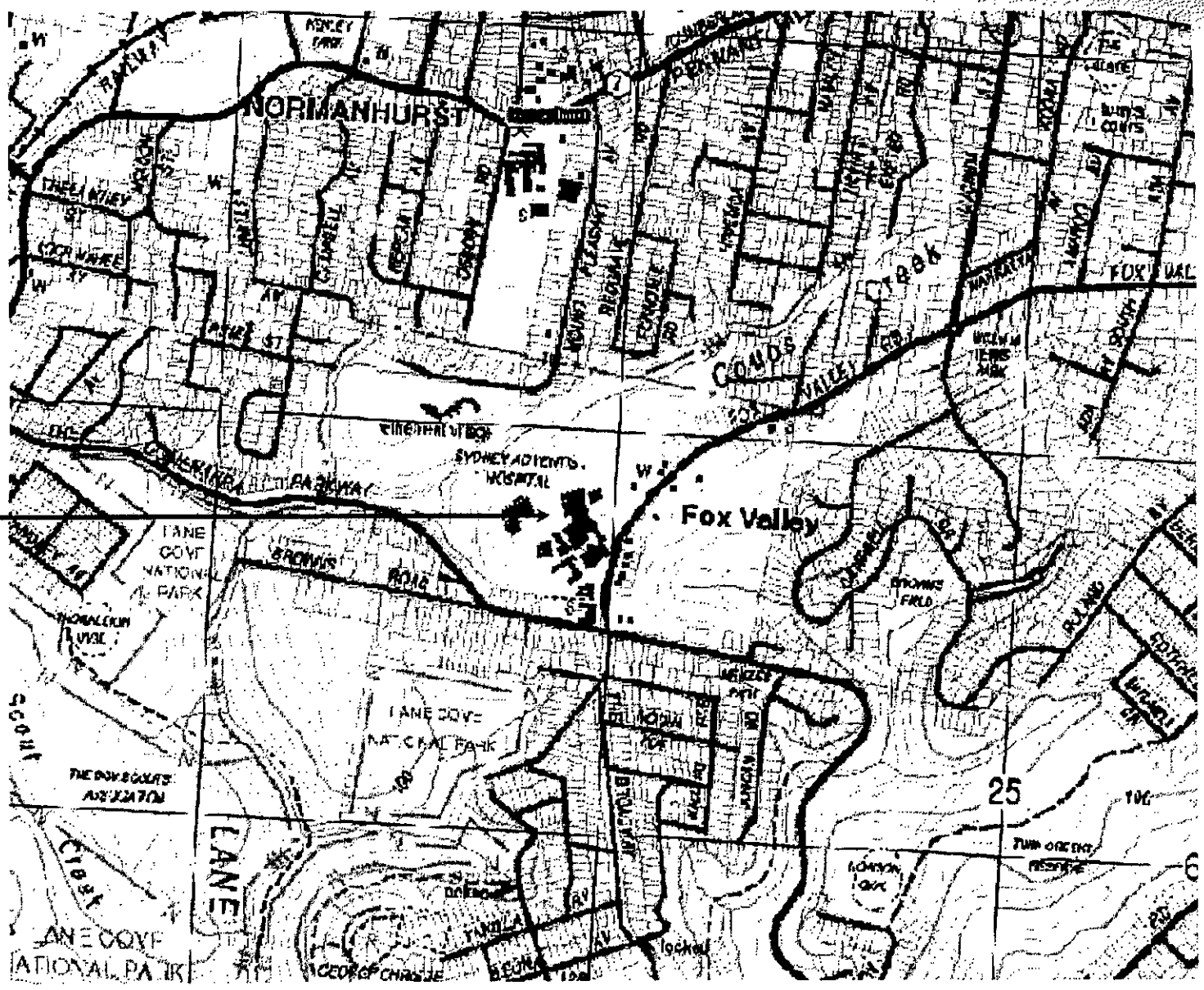
* Total PAHs is the sum of detectable concentrations of individual PAH compounds

See original laboratory reports for detection limits

Figures

CONTAMINATION ASSESSMENT - SAN Hospital
185 Fox Valley Road, Wahroonga

(A)



(B)

Reference:

Department of Lands - Spatial Information Exchange

(A) Hornsby 1:25,000 Topographic Map 91304S
(B) Sydney-Newcastle Aerial Photo 2008

drawn	DJD
approved	*JMF*
date	*30/5/08*
scale	AS SHOWN
original size	A3

coffey environments
SPECIALISTS IN LIVING AND WORKING PLACES

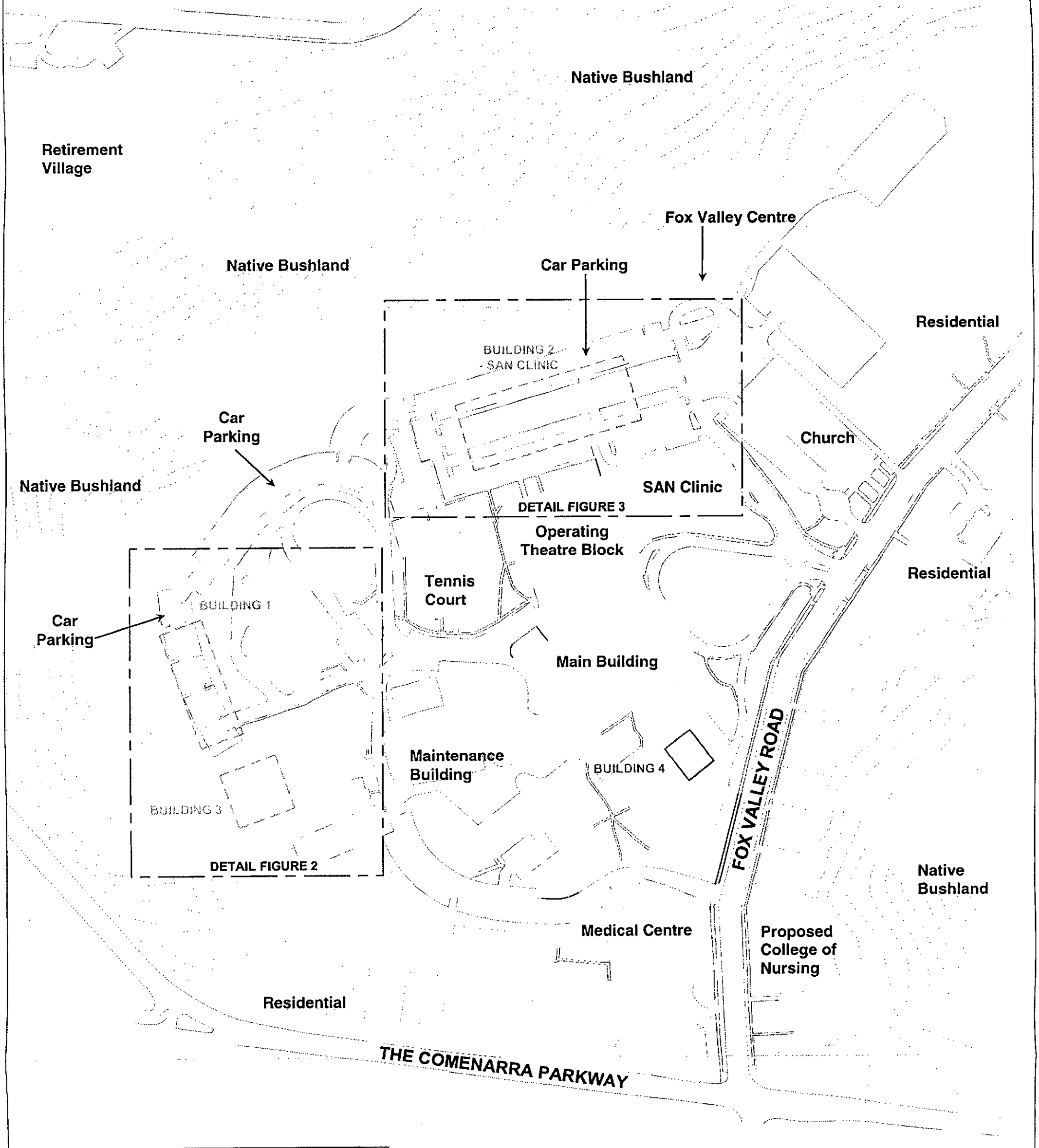
client: TAYLOR THOMSON WHITTING

project: CONTAMINATION ASSESSMENT - SAN HOSPITAL
185 FOX VALLEY ROAD
WAHROONGA, NSW

title: SITE LOCALITY PLAN

project no: GEOTLCOV23462AA-AG

figure no: 1



LEGEND:

PROPOSED BUILDING (LOCATIONS TO BE CONFIRMED)

EXISTING BUILDING

drawn	SH/LT/DJD
approved	*JMF*
date	*30/5/08*
scale	1:2000
original size	A3

coffey environments
SPECIALISTS IN LIVING AND WORKING PLACES

client: TAYLOR THOMSON WHITTING

project: CONTAMINATION ASSESSMENT - SAN HOSPITAL
185 FOX VALLEY ROAD
WAHROONGA, NSW

title: SITE LAYOUT PLAN

project no: GEOTLCOV23462AA-AG

figure no: 2

Car Parking

JACARANDA LODGE

STORES/ BUSINESS OFFICE

A

CBH11

CBH8

BUILDING 1

B'

CBH19

CBH6

B

CBH22

CBH2

CBH2A

CBH2B

CBH15

A'

EXISTING SWIMMING POOL

CBH7

E

CBH1

Retention Pond

BUILDING 3

CBH3

STAFF AMENITIES

CBH20

CBH16

F'

CBH21

CBH18

F

E'

EXISTING CAR PARK

LEGEND:

PROPOSED BUILDING (LOCATIONS TO BE CONFIRMED)

APPROXIMATE BOREHOLE LOCATION

A A' GEOTECHNICAL LONG SECTION (See GEOTLCOV23462AA-AD Report)

drawn	DJD
approved	*JMF*
date	*30/5/08*
scale	1:500
original size	A3

coffey environments
SPECIALISTS IN LIVING AND WORKING PLACES

client: TAYLOR THOMSON WHITTING

project: CONTAMINATION ASSESSMENT - SAN HOSPITAL
185 FOX VALLEY ROAD
WAHROONGA, NSW

title: PLAN OF PROPOSED BUILDING 1 & 3 SHOWING BOREHOLE LOCATIONS

project no: GEOTLCOV23462AA-AG

figure no: 3

Native Bushland

Retention Pond

C'

CBH12

CBH17

EXISTING CAR PARK

CBH10

CBH23

CBH26

C

CBH9

Liquid Oxygen AST

BUILDING 2 - SAN CLINIC

CBH27

CBH14

D'

CBH25

CBH24

CBH13

CBH4

D

CBH5

SAN Clinic

Operating Theatre Block

LEGEND:

PROPOSED BUILDING (LOCATIONS TO BE CONFIRMED)

APPROXIMATE BOREHOLE LOCATION

A A' GEOTECHNICAL LONG SECTION (See GEOTLCOV23462AA-AD Report)

revision	description	drawn	approved	date

0 5 10 20 30

Horizontal Scale (metres)

drawn	SH/LT/DJD
approved	*JMF*
date	*30/5/08*
scale	1:500
original size	A3

coffey environments

SPECIALISTS IN LIVING AND WORKING PLACES

client: TAYLOR THOMSON WHITTING

project: CONTAMINATION ASSESSMENT - SAN HOSPITAL
185 FOX VALLEY ROAD
WAHROONGA, NSW

title: DETAILED PLAN OF PROPOSED BUILDING 2SHOWING BOREHOLE LOCATIONS

project no: GEOTLCOV23462AA-AG | figure no: 4

Appendix A
Site History and Groundwater Bore Search Results

CONTAMINATION ASSESSMENT - SAN Hospital
185 Fox Valley Road, Wahroonga

A1 LAND TITLE SEARCH

A search through land titles dating back to 1870 was carried out by Advance Legal Search Pty Ltd at the Lands Title Office, for Lot 62 DP1017514 within which the proposed Buildings 1 to 3 are located.

The title records indicate that between 1870 and 1903, the registered proprietors included individuals with occupations of business manager, physician, minister of gospel, architect, widow, grantee and esquire.

From 1903 to 1918, the Sydney Sanitarium and Benevolent Associate Limited were the registered proprietors for several portions of the site. From 1918 to date, the registered proprietors for the majority of the site were the Australian Conference Centre Limited.

It is noted that from 1918 to 1935, one portion of the site was under the ownership of an esquire. From 1935 to 1941 the registered proprietor for this portion of the site was the Perpetual Trustee Company (Limited) before falling under the ownership of the Australian Conference Associate Limited to date.

A2 AERIAL PHOTOGRAPH REVIEW

Aerial photographs dating back to 1951 were purchased by Coffey Environments from the Department of Lands and reviewed on the 13 March 2008. Table A1 summarises the observations made:

TABLE A1 – AERIAL PHOTOGRAPH REVIEW

DATE	OBSERVATIONS
May 1951 (black & white)	The site is bound to the south and east by Fox Valley Road and Comenarra Parkway which are visible. The hospital grounds are surrounded by trees and bush to the west and north where a gully is noted. Trees/bushes are located on the eastern side of Fox Valley Road. Residential developments are noted to the south and northeast of the hospital grounds. The hospital grounds of the site are indicated by vacant grassed areas and a number of buildings in the central eastern portions of the site. There are also a number of vacant areas that are roughly rectangular in shape of different colours possibly cultivated areas. *Proposed Building 1* - The area appears to be generally vacant with sparse trees noted. A circular shaped structure appears to be located near the south western portion of this area with a large square shaped area noted immediately to the east. *Proposed Building 2* - The area appears to be vacant grassed areas with two rectangular structures located on the southwest corner. One large building structure is also noted near the southeastern corner of the area. *Proposed Building 3* - The area appears to be vacant grassed areas with some large trees noted. A roughly circular shaped vacant area appears to be present in a position similar to that of the current retention basin. There is a house structure located immediately east of the area.

TABLE A1 – AERIAL PHOTOGRAPH REVIEW (CONTINUED)

DATE	OBSERVATIONS
1961 (black & white)	The area of the hospital grounds where the sites are located and surrounding properties appear relatively unchanged from the previous aerial photograph except for some minor changes in some of the hospital buildings. The roughly rectangular vacant areas identified in the previous photo appear to be cultivated garden beds. *Proposed Building 1* - The area appears relatively unchanged since the previous aerial photo except for the circular shaped object which is now roughly square in shape. There also appears to be a few trees missing. *Proposed Building 2* - The area appears to be relatively unchanged since the previous aerial photo except for the cultivated garden beds which are more evident on the south western corner of the area. *Proposed Building 3* - The area appears to have fewer trees than the previous aerial photograph and the roughly circular vacant area is not as evident
07/07/1970 (black & white)	The area of the hospital grounds where the sites are located and surrounding properties appear relatively unchanged from the previous aerial photograph except for some minor changes in some of the hospital buildings. *Proposed Building 1* - The area appears relatively unchanged since the previous aerial photo except for the circular shaped object which is appears to have a number of smaller structures surrounding it. A number of rectangular shaped vacant areas of different colour appear to be present in the northern portions of this area. The roughly square shaped vacant area east of this area appears to be tennis courts. *Proposed Building 2* - The area appears to be relatively unchanged since the previous aerial photo except for the car parking areas near the southeast portions of the area. *Proposed Building 3* - The area appears to be vacant and grassed.

TABLE A1 – AERIAL PHOTOGRAPH REVIEW (CONTINUED)

DATE	OBSERVATIONS
29/03/1978 (black & white)	The area of the hospital grounds where the sites are located and surrounding properties appear relatively unchanged from the previous aerial photograph except for some changes in some of the hospital buildings and paved access pathways through the hospital grounds. *Proposed Building 1* - The area appears relatively unchanged since the previous aerial photo except for an access pathway of bare soils now present in this area orientated north south. The previously identified circular shaped structures (i.e. incinerators) no longer appear to be present. *Proposed Building 2* - The area appears to be relatively unchanged since the previous aerial photograph except for the building (i.e. SAN Clinic) noted immediately adjacent to the southeast corner of the study area. Parking spaces are noted within the south eastern portions of the study area. The cultivated garden beds and a rectangular structure in the western portions of the study area appear to be present. *Proposed Building 3* - The area appears to be vacant and grassed with what appears to be a rectangular shaped structure which appears to be a swimming pool to the east.
03/08/1986 (colour)	The area of the hospital grounds where the sites are located and surrounding properties appear relatively unchanged from the previous aerial photograph except for some minor changes in some of the hospital buildings. *Proposed Building 1* - The area appears relatively unchanged since the previous aerial photo except for the access pathway of bare soils which is no longer present. Areas within the building footprint appear to be vacant and grassed except for the rectangular garden beds and a rectangular shaped structure which are present in the northern parts of the study area. *Proposed Building 2* - The area appears to be relatively unchanged since the previous aerial photo. *Proposed Building 3* - The area appears to be vacant and grassed with sparse trees and what appears to be a mound of bare soils (i.e. the sediment retention basin).

TABLE A1 – AERIAL PHOTOGRAPH REVIEW (CONTINUED)

DATE	OBSERVATIONS
10/10/1994 (colour)	The area of the hospital grounds where the sites are located and surrounding properties appear relatively unchanged from the previous aerial photograph except for some changes in some of the hospital buildings. *Proposed Building 1* - the study area is occupied by parking spaces and paved access pathways similar to that currently on site. The tennis courts located immediately east of the study area are now located southwest of the of proposed building 2 study area (i.e. adjacent to the operating theatre block) *Proposed Building 2* - A large structure is adjacent to the south western corner of the study area (i.e. operating theatre block). The study area is now occupied by car parking spaces similar to that currently on the proposed building footprint. The cultivated garden beds and rectangular structure are no longer present. Bare vacant soils appear to be present on the northern side of the parking spaces. *Proposed Building 3* - The area appears to be vacant and with sparse grass cover and trees. The majority of the site is occupied by bare soils and a mound of soils (i.e. the sediment detention basin). The aerial photograph indicates a site located to the east which may be the potential source material.
10/12/2005 (colour)	The area of the hospital grounds where the sites are located and surrounding properties appear relatively unchanged from the previous aerial photograph except for some minor changes to some of the hospital buildings. *Proposed Building 1* - the study area appears to be relatively unchanged since the previous photograph except for tree growth on the eastern portions of the study area. *Proposed Building 2* - the study area appears relatively unchanged since the previous aerial photograph except for the bare vacant soils to the north which are now grass covered and vacant. *Proposed Building 3* - The sediment retention basin appears to be complete and is similar to what is currently on site. The study area appears to have more grass cover.

A.3 COUNCIL RECORDS

A request to review Ku-Ring-Gai Council (Council) records was submitted by an environmental scientist on 7 March 2008. Council staff had indicated that there were approximately 164 files on records relating to various development and upgrade works associated with the SAN Hospital grounds. A list of those records was provided to Coffey Environments and is included at the end of this Appendix A.

The list of records suggest various alterations and additions to the hospital. A development application in 1994 suggested the onsite disposal of excavated material. A development application in 2002 suggested the demolition of sheds and a fuel area.

The list of Council records also indicated that the site is zoned 5(a) Special Uses (Hospital) and Part Recreation 6(b).

A.4 INTERVIEWS

An interview with a staff member of the SAN Hospital who was familiar with the history of the site was carried out on the 10 March 2008. A summary of the relevant information from the interview is summarised below. Refer to Figures 3 and 4 for the approximate location of site features.

MR BRIAN HUDSON (ENGINEERING & WORKS COORDINATOR, SAN HOSPITAL)

Mr Hudson is the SAN Hospital Engineering & Works Coordinator and has been associated with the hospital for 20 years.

With regards to the proposed Building 1, Mr Hudson indicated that until the mid 1990s the study area was vegetated bush land at which point the Store/Business office, Laundry and the Jacaranda lodge located immediately east of the study area were constructed. The carpark areas that make up the study area were constructed at the same time as the Store/Business office and have always been asphalt paved carpark areas. Mr Hudson indicated the former sewerage works building and incinerator were located west of the proposed building area and were used for the treating of hospital grade waste prior to 1970. Following 1970, hospital waste was disposed/treated offsite by licensed/registered contractors.

With regards to the proposed Building 2, Mr Hudson indicated this portion of the site has been an asphalt sealed paved carpark area since 1973. Mr Hudson indicated the Operating Theatre block located immediately south of the Building 2 study area was approximately 11 years old which prior that was gardens used for growing vegetables. The SAN Clinic located approximately 10m south of the southeast corner of the proposed Building 2 study area was originally constructed of concrete, metal sheeting, brick and fibre cemented sheeting. Mr Hudson indicated that the fibre cement sheeting had been removed under AS1 conditions. He was not able to provide Coffey Environments with a date of removal or the contractors used for the demolition works. Mr Hudson indicated the tennis court located south of the southeast corner of the proposed Building 2 study area was also previously a vegetable garden and there was also a swimming pool. The tennis court was indicated to be approximately 11 years old. West of the proposed Building 2 study area and northwest of the tennis court Mr Hudson indicated that a dairy was once located. Mr Hudson indicated the dairy had not been in operation during his time as Engineering and Works Coordinator at the SAN Hospital. He had no knowledge of the practices at the dairy but he did indicate that the former cottage and dairying shed may have been painted with lead paint. The retention pond located immediately north of the study area was constructed approximately 5 years ago.

With regards to the proposed Building 3, Mr Hudson indicated that the sediment retention pond currently located within the central portion of the proposed Building 3 study area was constructed approximately 10 years ago. Mr Hudson indicated the sediment retention pond located north of the proposed Building 2 study area was constructed at the same time as the one within the Building 3 study area. Mr Hudson indicated one of the sources of fill material (approximately 40-50%) to create the retention ponds was from cut earthworks activities that had been carried out as part of hospital upgrade works south of proposed Building 2. The main source of fill (approximately 50-60%) used for the basin's construction was from a shopping centre development on Pennant Hills Road located approximately 1.0km to 1.5km west of the site approximately 10 years ago. Mr Hudson indicated that he was not aware of the fill materials classification and that locally sourced boulders of sandstone were used at the base of the pond.

The 'Tower' building (also known as the Main Operating Theatre Building) centrally located within the SAN Hospital was built in 1973. Northwest of the 'Tower' the now vacant land was once a Sanitarium. Southwest of 'Tower' the maternity wards were located. West of 'Tower's Hunter indicated the site has been unused and vacant for the duration of his time on site.

Mr Hudson indicated that electrical substations and diesel fuelled generators were located within some of the main hospital buildings located within the central portions of the site. An electrical substation located northeast of the physio/maternity ward located near the central eastern boundary of the SAN Hospital grounds had been previously decommissioned by Energy Australia (date not known).

Mr Hudson was able to supply Coffey Environments with a number of site plans for the SAN Hospital dated from 1970 to 2006. The plans are included at the end of Appendix A. A site plan dated 19/7/2006 indicated the location of gas, liquid, chemical and fuel tanks stored on the site. Within each of the study areas, Mr Hudson was able to confirm that no USTs or ASTs were previously located. He did indicate that leading up to the year 2000, the SAN hospital had installed a number of USTs near some the hospital main buildings for the storage of diesel and oil to be used for backup diesel generators and boilers. A number of the tanks were decommissioned shortly after. Mr Hudson also indicated that a bowser and two USTs used for storing unleaded and lead petrol were located in the area now encompassed by the carpark located immediately north of the maintenance building. Mr Hudson indicated that validation of the tank/bowser removal was carried out but he was unsure of the contractors/consultants used to carry out the works.

Mr Hudson indicated that generally there were no incidents of burning, illegal dumpings, chemical spills or fuel spills that he could recall for the SAN Hospital grounds. He also indicated that site was not used for the disposal/burial of human matter, tissue, fluids or corpses. Hospital grade waste up until 1970 had been treated at the incinerator located southwest of proposed Building 1, at which point waste was disposed of offsite.

A.5 DECC NOTICES

A search of the NSW DECC Contaminated Land Record website on the 7 March 2008 indicated that there were no notices issued for the site under the Environmentally Hazardous Chemicals Act (1985) or the Contaminated Land Management Act (1997). A copy of the search results is attached at the end of this Appendix.

A search of the NSW DECC public register for Licenses, Applications and Notices website on the 7 March 2008 indicated that the site has an EPA license for Hazardous, Industrial or Group A waste generation or storage (73) up to 100T under section 308 of the Protection of the Environment Operations Act 1997. No breaches or notices have been issued for the site under the license (No. 6546)

A.6 WORKCOVER RECORDS

The WorkCover search of the Stored Chemical Information Database (SCID) for licenses to keep dangerous goods indicated that a license (No.35/0174066) which had information of a number of dangerous goods stored at various locations throughout the SAN Hospital. The license details indicated that as of 11/6/2004 up to 20 storage areas including ASTs, compressed gas cylinders, toxic and liquid cabinets were used for the storage of refrigerated oxygen, ethanol, petroleum, diesel, motor spirit, hydrochloric acid, hydrogen peroxide, hypochlorite, heating oil and various compressed gases (including air, carbon dioxide, helium, nitrogen, nitrous oxide and argon). The location for each of the storage areas is indicated on a map contained at the end of this Appendix. None of the above mentioned storage containers were noted to be within each of the study areas. No evidence of former storage containers within the study areas was also noted.

The WorkCover search also confirmed the location of two USTs with capacity of 20,000L each and a bowser within carpark areas immediately north of the maintenance buildings which is located approximately 125m east of the proposed building 1 and 125 northeast of the proposed building 3. A letter to WorkCover by the SAN Hospital engineer confirms that the correct procedures were not followed in notification for its decommissioning. The letter indicates that the petrol tank was removed with the diesel fuel tank filled with sand/soil, with no records or history written on these activities.

The closest storage containers to the proposed buildings 1 and 3 are the above mentioned former USTs 125m to the east, two ASTs (15,000L & 20,000L) containing boiler oil 100m to the east-southeast and a number of gas cylinders approximately 125m to the east.

The closest storage containers to the proposed building 2 are a liquid oxygen AST 25m to the west and a UST (12,000L) and generator containing diesel fuel approximately 75m to the south.

The results to the WorkCover search are attached at the end of this Appendix.

Appendix B
Engineering Logs of Boreholes, with explanation notes

CONTAMINATION ASSESSMENT - SAN Hospital
185 Fox Valley Road, Wahroonga

Appendix not provided as it is not relevant to this application

Appendix C
Soil Vapour Results

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Appendix not provided as it is not relevant to this application

Appendix D
Laboratory Reports

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Appendix not provided as it is not relevant to this application

Appendix E
Data Validation Report

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Appendix not provided as it is not relevant to this application

Appendix F
Site Photographs

CONTAMINATION ASSESSMENT - SAN Hospital
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Photo1: Looking east from the north western corner of the proposed Building 3 towards the retention basin centrally located within the study area

Photo 2: Looking west along the fill batter slope located immediately south of the proposed Building 3 southern boundary. The slope was covered with grass cuttings and overgrown vegetation with fragments of brick and concrete also noted

Photo 3: The footing access area for the basement of Building 4. Note the shale located immediately beneath the footings and other service pipes/cables

Photo 4: Looking south near the north western corner of the proposed Building 2 study area. Note the liquid oxygen tank located west of the study area.

Photo 5: The retention pond located north of the carpark and the proposed Building 2 foot print.

Photo 6: Looking east towards the car parking area and proposed Building 2 footprint. Note the gradual slope of the study area from the higher southern boundary to the to the lower northern boundary

Photo 7 (Above): Looking northwest towards the car parking area of the proposed Building 1 footprint.

Photo 8 (Left): Looking north along the car parking area of the proposed Building 1 footprint.