Douglas Partners
Geotechnics • Environment • Groundwater

REPORT
ON
REMEDIATION AND VALIDATION ASSESSMENT

AUBURN HOSPITAL, STAGE 1B
CORNER OF NORVAL AND HARGRAVE STREET
AUBURN

Prepared for
BROOKFIELD MULTIPLEX CONSTRUCTIONS PTY LTD

Project 45686
October 2009

Douglas Partners Pty Ltd
ABN 75 053 980 117
96 Hermitage Road
West Ryde NSW 2114
Australia

PO Box 472
West Ryde NSW 1685

Phone (02) 9809 0666
Fax (02) 9809 4095
sydney@douglaspartners.com.au

EXECUTIVE SUMMARY

This report details the methodology and results of remediation and validation works undertaken by Douglas Partners Pty Ltd (DP), at the Stage 1B Development Site (the Site) of the Auburn Hospital redevelopment on the corner of Hargrave Road and Norval Street, Auburn. The investigation was commissioned by Brookfield Multiplex Constructions Pty Ltd.

The assessment process, remediation and validation works is subject to a Statutory Site Audit by a NSW DECCW (Department of Environment, Climate Change and Water) (incorporating NSW EPA) accredited Site Auditor under Part 4 of the Contaminated Land Management (CLM) Act 1997. Mr Andrew Lau of JBS Environmental has been appointed as the Site Auditor.

The remediation and validation works consists of a review of the previous reports that relate to the site, additional waste classification assessments of contaminated materials, a review of the remediation of the impacted soils via excavation and disposal (undertaken by the remediation contractor) and validation of the remediated areas and building footprints at the completion of the works.

The demolition and remediation contractor was Cardinal Project Services, who holds an A1 licensed for asbestos removal.

The objective of the assessment is to verify the suitability of the site for the proposed development of the Stage 1B area into a community health facility and an on-grade car park.

This validation report documents the works carried out and the validation sampling undertaken to verify that the site has been successfully remediated to a standard suitable for the proposed community health facility and on-grade car park following the identification of contamination on the site.

The scope of the current remediation and validation assessment by DP was based on the DP Remedial Action Plan May 2009. The work was conducted in a staged manner, pursuant to the conditions encountered during the remediation works and the site restrictions, as outlined in the following section.

- Waste Classification of North West Corner – 11 June 09 (reported 16 June 09) [Note: the North West portion of the site was the only area accessible for remediation initially].
- Stage 1 Remediation - Remediation and Validation of the North West Corner of the site – 16, 18, 19, 22, 23 and 24 June 2009 and reported (covered in interim report dated 23 July 2009). Note that the extent of this initial remediation area was limited by the site access constraints.

- Removal of asbestos building materials from the existing hospital building and hospital demolition by Cardinal, with Noel Arnold and Associates engaged as the occupational hygienist.
- Radiological Clearance by ANSTO – 18 August 2009.
- Validation and waste classification of an asbestos pipe found in Stage 1B – 14 August 2009 (reported 20 August 2009).
- Assessment of asbestos contaminated soils and waste classification – A continuation of the Stage 1 Remediation, with the assessment extended to cover the previously inaccessible areas: “Step out” remediation excavation of the North West Section – 18 August 2009 (reported 23 August 2009).
- Further Assessment to ascertain the extent of asbestos contaminated soils over the site - 26 August 2008 (email dated 26 August 2009).
- Stage 2 Remediation - Remediation and validation of asbestos contaminated soil located over the rest of the site (i.e. not associated with the NW corner) and validation of former hospital footprint – 24 August to 2 September (interim reports dated 4 September 2009 and 9 September 2009).
- Importation of VENM to backfill remedial excavations.

On the basis of DP’s investigations and the results of validation sampling, DP considers that the remedial works has been undertaken in general accordance with the RAP and that all final validation results met the RAC, such that the site has been rendered suitable for the intended community health centre and on-grade car park.

Glossary of Terms

AC	asbestos cement
AGST	above ground storage tank
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environmental & Conservation Council
As	arsenic
Ba	Barium
B(a)P	benzo(a)pyrene (a polycyclic aromatic hydrocarbon compound)
Be	Berrylium
bgl	below ground level
BTEX	benzene, toluene, ethyl benzene, total xylenes (monocyclic aromatic hydrocarbons)
Cd	cadmium
CN	cyanide
Co	Cobalt
Cr	chromium (total)
Cr(III)	chromium with oxidation state III (stable in normal environments)
Cr(VI)	chromium with oxidation state VI (typically not stable in normal environments)
CT	contaminant threshold (screening criteria for waste classification assessment)
Cu	copper
C_6–C_9	light hydrocarbon chain groups
C_{10}–C_{14}	medium hydrocarbon chain groups
C_{15}–C_{28}	heavy hydrocarbon chain groups
C_{29}–C_{36}	heavy hydrocarbon chain groups
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure, Planning and Natural Resources
DP	Douglas Partners Pty Ltd
ec	electric conductivity
EPA	Environmental Protection Authority

GW	groundwater
ha	hectares
HIL	NSW EPA Contaminated Sites: *Guidelines for the NSW Site Auditors Scheme, 1998*. Health-based investigation levels (Columns 1 to 4)
Hg	mercury
m	metres
Mn	Manganese
mg/kg	milligrams per kilogram (or parts per million)
mg/L	milligrams per litre (or parts per million)
NATA	National Association of Testing Authorities
NEPM	National Environmental Protection Measure
Ni	nickel
NSW	New South Wales
ND(nd)	Not detected above the PQL
OCP	organochlorine pesticides
OPP	organophosphate pesticides
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyls
pH	unit measure of acidity/ alkalinity
PID	photoionisation detector
ppb	parts per billion
PPIL	NSW EPA Contaminated Sites: *Guidelines for the NSW Site Auditors Scheme, 1998*. Provisional phytotoxicity-based investigation levels for sandy loams (Column 5)
PQL	practical quantitation limit
RL	reduced level
%RPD	relative percentage difference
Sb	Antimony
SEPP 55	State Environmental Planning Policy No. 55 – Remediation of Land
Sn	Tin

SWL	standing water level
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TRH	total recoverable hydrocarbons
Va	Vanadium
VCH	Volatile organic compound
VOC	Volatile chlorinated hydrocarbons

TABLE OF CONTENTS

TABLE OF CONTENTS

KP:jlb
Project 45686
26 October 2009

REPORT ON
REMEDIATION AND VALIDATION ASSESSMENT
AUBURN HOSPITAL STAGE 1B
CORNER OF NORVAL AND HARGRAVE STREETS
AUBURN

1. INTRODUCTION

This report details the methodology and results of remediation and validation works undertaken by Douglas Partners Pty Ltd (DP), at the Stage 1B Development Site (the Site) of the Auburn Hospital redevelopment on the corner of Hargrave Road and Norval Street, Auburn. The investigation was commissioned by Brookfield Multiplex Constructions Pty Ltd.

The assessment process, remediation and validation works is subject to a Statutory Site Audit by a NSW DECCW (Department of Environment, Climate Change and Water) (incorporating NSW EPA) accredited Site Auditor under Part 4 of the Contaminated Land Management (CLM) Act 1997. Mr Andrew Lau of JBS Environmental has been appointed as the Site Auditor.

The remediation and validation works consists of a review of the previous reports that relate to the site, additional waste classification assessments of contaminated materials, a review of the remediation of the impacted soils via excavation and disposal (undertaken by the remediation contractor) and validation of the remediated areas and building footprints at the completion of the works.

The demolition and remediation contractor was Cardinal Project Services, who hold an A1 license for asbestos removal.

The objective of the assessment is to verify the suitability of the site for the proposed development of the Stage 1B area into a community health facility and an on-grade car park.

This validation report documents the works carried out and the validation sampling undertaken to verify that the site has been successfully remediated to a standard suitable for the proposed community health facility and on-grade car park following the identification of contamination on the site.

2. BACKGROUND

2.1 Site Description

The site is located at Norval Street between Hargrave and Hevington Roads in Auburn. The Auburn Hospital site is identified as Lots 5 to 16 in D.P. 873, Lot B in D.P. 102293 and Lot X in D.P. 102994. It is noted that Stage 1B of the development site (i.e. the current investigation site) consists of Lots 8 to 13 and part of Lots 7 and 14, Section 4 of D.P. 873. The site has an area of approximately 8500 m^2 and is located in the local government area of Auburn. A locality map is shown in Drawing 1, Appendix A.

The remediation works were conducted in stages, starting from the north-western corner of the site. At the commencement of the works, the temporary demountables located at the north-western corner had been removed from the site and demolition works on the hospital building were about to commence. General building demolition works were undertaken in July and August 2009. At the completion of the remediation works, the site was vacant (except for the site sheds along Norval Street) with the majority of the site striped to natural clay or shale.

2.2 Proposed Development

According to the initial development plan, the Stage 1B area is to be developed as an on-grade carpark to service the hospital building. It is understood that the plan has been modified such that approximately half of the site (the western half) will be developed as an on-grade car park, whilst the remaining half of the site will be developed as a "community hub" (community health centre) and parking. Drawing 10, Appendix A, shows the proposed layout. It is noted that at this stage that the design of the community health centre has been completed but yet to be approved (although approval is expected to be forthcoming)

In the long run (say in ten years), the site may be further redeveloped. Conceptually this may involve the development of the site into a multi-storey car park, residential apartment blocks and a hospital (St Joseph's).

2.3 Previous Reports

The following Contamination Investigation/assessments of the site have previously been conducted:

- *Report on Preliminary Contamination Assessment, Auburn Hospital, Auburn*. Prepared by Douglas Partners, October 2006, DP job number 44214A;
- *Site Radiological Survey of the Auburn Hospital for Earth Air Water Consulting and Monitoring Pty Ltd (EAW) 23rd February – 11th April 2007 by ANSTO;*
- *Report on Phase 2 Contamination Assessment, Stage 1B Auburn Hospital, Corner of Hargrave and Norval Street, Auburn,* DP project 45686 dated April 2009;
- *Report on Remediation Action Plan, Stage 1B Auburn Hospital, Corner of Hargrave and Norval Street, Auburn,* DP project 45686 dated May 2009;
- *Report on Waste Classification Assessment, North West Section, Stage 1B* dated 16 June, 2008.

In addition during the remediation and validation works a number of letter reports and interim reports were issued including;

- Radiological Clearance Statement. ANSTO Report S-ROH-F-017 dated 15 June 2009.
- *Waste Classification Assessment, North West Section, Auburn Hospital Stage 1B*. DP Project 45686 dated 16 June 2009.
- *Interim Report on Remediation and Validation of North West Section, Auburn Hospital Stage 1B*. DP Project 45686 dated 23 July 2009.
- *Validation and Waste Classification Assessment, Asbestos Cement Pipe Removal, Stage 1B, Auburn Hospital*. DP Project 45686 dated 20 August 2009.
- *Assessment of Asbestos Contaminated Soils and Waste Classification, Extension of North West Section, Auburn Hospital Stage 1B*. DP Project 45686 dated 20 August 2009.

- *Email dated 26 August 2009* – Further Assessment of Asbestos Impacted Filling.
- *Interim Report – Validation Results, Building Footprint and Asbestos Chaseout, Auburn Hospital Stage 1B*. DP Project 45686 dated 4 September 2009.
- *Interim Report 2 – Validation Results, Building Footprint and Asbestos Chaseout, Auburn Hospital Stage 1B*. DP Project 45686 dated 9 September 2009.

During the Phase 2 Contamination assessment PAH and asbestos impacted soils were identified in the north western corner of the site, where some of the original hospital buildings were located. Following subsequent demolition and excavation works at the site, asbestos contaminated soils were identified in other areas of the site. On the basis of the investigation findings, a substantial portion of the asbestos contaminated soils could be attributed to the demolition of the original hospital buildings (which is shown in Drawing 2, Appendix A.

The locations where elevated levels of contaminants in excess of the site assessment criteria were identified during the Phase 2 Assessment as well as during the remedial works are presented in Drawing 3, Appendix A. The extent of PAH and asbestos impacted soils is shown in Drawing 4 (blue outlined area) and the extent asbestos (only) impacted soils in

Drawing 4, Appendix A (orange outline, including location of a asbestos pipe uncovered during the works).

It is also noted that some minor PPIL (provisional phytotoxicity based investigation levels) were noted in Stage 1B but these were assessed to not be significant in view of the minor nature of the exceedance, the proposed form of the development (car park and community health centre) and the fact that no observable effect on plant growth had been noted.

The results of the interim reports are discussed in the relevant sections of this report.

2.4 Contaminants of Concern

Based on the results of the previous investigations the principal contaminants of concern were asbestos and Polycyclic aromatic hydrocarbons (PAH). The RAC (remediation action criteria) for the contaminants of concern are shown in Table 1, Section 4. In view of the uncontrolled nature of the filling a broader range of contaminants were also included in the validation testing including heavy metals (arsenic, cadmium, chromium, copper, lead, nickel mercury and zinc), organochlorine pesticides (OCPs), organophosphate pesticides (OPP) phenols, polychlorinated biphenyl's (PCBs) and volatile organic compounds (VOCs).

2.5 Site Geology and Hydrogeology

Following is a description of the regional geology, topography and hydrogeology.

Reference to the Sydney 1:100 000 Scale Series Geological Sheet indicates that the site is located close to a boundary between Bringelly Shale and Ashfield Shale of the Wianamatta Group of Triassic Age. Bringelly Shale typically constitutes shale, carbonaceous claystone, laminite, fine to medium grained-grained lithic sandstone and rare coal, while Ashfield Shale consists of black to dark grey shale and laminite. Both formations typically weather in the upper zones to produce moderately to highly reactive clays. Minchinbury Sandstone, a fine to medium-grained lithic sandstone is sometimes encountered between the two shale formations. The investigation generally confirmed this geological mapping.

Reference to the NSW Department of Infrastructure and Natural Resources (DIPNR – now Office of Water in DECCW) *Salinity Potential in Western Sydney 2002* map indicates that the site is located in an area that has a moderately salinity potential and that the opposite side of Norval Street has a high salinity potential. Salinity is not, however, a contamination issue, but rather a geotechnical and site management issue.

According to the Soil Landscapes of the Sydney 1:100,000 Sheet the site is mapped as being part of the Blacktown soil group. Soils of the Blacktown group are typically found in landscapes characterised by gently undulating slopes and rises on Wianamatta group shales and Hawkesbury Shales with local relief of up to 30 m and slopes usually less then 5%. Broad rounded crests and ridges with gently inclined slopes, cleared woodlands and tall open forest are also characteristic of this group.

The soils of the Blacktown Group are typically shallow to moderately deep (<100 cm) red brown and brown podzolic soils on crests and upper slopes (and well drained areas) and deep (150 - 200 cm) yellow podzolic and soloth soils on lower slopes and areas of poor drainage. These soils typically are moderately reactive, highly plastic, have low fertility and have poor soil drainage.

Surface water runoff drains into stormwater drains on site. These drains are situated in various locations of the site. The site naturally slopes sloped towards the north-east. The nearest water bodies are Haslams Creek in the north-east and Duck Creek to the west. Given the local topography it is anticipated that the regional direction of groundwater flow would be towards the north east (or Haslams Creek). Based on the measured groundwater levels the local direction of groundwater flow would appear to be to the south west. It is likely that the local groundwater flow has been affected by a groundwater “trough” created as a result of the basement excavations undertaken to the south of Stage 1B. It is noted however that the previous EAW contamination assessment for Stage 1A assessed the local direction of groundwater flow to be east to northeast. The EAW assessment was based on a larger number of bores over a wider area and is therefore considered more reliable then the limited data from the current assessment.

3. STAGES OF REMEDIATION AND SCOPE OF WORKS

The scope of the current remediation and validation assessment by DP was based on the DP Remedial Action Plan May 2009. The work was conducted in a staged manner, pursuant to the conditions encountered during the remediation works and the site restrictions, as outlined in the following section.

The various stages of remediation were summarised as follows:-

- Waste Classification of North West Corner – 11 June 09 (reported 16 June 09) [Note: the North West portion of the site was the only area accessible for remediation initially];
- Stage 1 Remediation - Remediation and Validation of the North West Corner of the site – 16, 18, 19, 22, 23 and 24 June 2009 and reported (covered in interim report dated 23 July 2009). Note that the extent of this initial remediation area was limited by the site access constraints;
- Removal of asbestos building materials from the existing hospital building and hospital demolition by Cardinal, with Noel Arnold and Associates engaged as the occupational hygienist;
- Radiological Clearance by ANSTO – 18 August 2009;
- Validation and waste classification of an asbestos pipe found in Stage 1B – 14 August 2009 (reported 20 August 2009);
- Assessment of asbestos contaminated soils and waste classification – A continuation of the Stage 1 Remediation, with the assessment extended to cover the previously inaccessible areas : “Step out” remediation excavation of the North West Section – 18 August 2009 (reported 23 August 2009);
- Further Assessment to ascertain the extent of asbestos contaminated soils over the site - 26 August 2008 (email dated 26 August 2009);
- Stage 2 Remediation - Remediation and validation of asbestos contaminated soil located over the rest of the site (ie not associated with the NW corner) and validation of former hospital footprint – 24 August to 2 September (interim reports dated 4 September 2009 and 9 September 2009);
- Importation of VENM to backfill remedial excavations.

Waste Classification of NW Corner – 11 June 2009

Due to access constraints, the initial phase of the remediation was restricted to the north-west portion of the site.

Seven test pits were excavated in the north-west corner of the site, where asbestos contaminated filling was previously identified in the Phase 2 Assessment. This was conducted on 11 June 2009 and included a waste classification assessment. The scope of the works included

- Review of previous analytical results relating to the north west section of the site;
- An inspection of the area by an environmental scientist;
- Excavation of 7 test pits using a 15 tonne excavator (provided by Cardinal, the remediation contractor);
- Collection of representative soil samples from the test pits at broadly regular intervals or upon signs of contamination, including the collection of 5 % interlaboratory and 5% interlaboratory replicate samples for QA/QC purposes;
- Laboratory analysis conducted on 7 selected filling samples at a NATA accredited analytical laboratory for the following contaminants of concern;

  Every Sample – (7 samples)

  - heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
  - Polycyclic aromatic hydrocarbons (PAH); and
  - Asbestos.

  Every Third Sample – (3 samples):

  - Total petroleum hydrocarbons (TPH)
  - Monocyclic aromatic hydrocarbons (BTEX – benzene, toluene, ethyl benzene and xylenes);
  - Phenols (total);
  - Organochlorine and organophosphate pesticides (OCP/OPP);

  - Polychlorinated biphenyl (PCB);
  - TCLP for heavy metals and PAH and pH.
- Conduct QA/QC analysis for 1 interlaboratory and 1 intralaboratory replicate for full suite of above analytes at NATA accredited laboratories;
- Store remaining samples not analysed for a period of 1 month;
- Review of the findings of a radiological survey of the site. The survey was conducted by ANSTO using direct probe measurements prior to bulk excavation. The report confirmed the absence of radiological risk;
- Preparation of a waste classification assessment report dated 16 June 2009 for the fill material in the area under investigation.

North West Corner Remediation and Validation 17 to 24 June 2009

PAH and asbestos impacted soils were excavated and removed from the site by the remediation contractor**,** Cardinal Project Services ("Cardinal", an asbestos removal contractor holding an AS1 license). The works were undertaken over a 6 day period (17, 18, 19, 22, 23 and 24 June 2009). Validation sampling was conducted on the final day at the completion of the remedial excavation.

The scope of the validation assessment was undertaken as per the requirements of the Remedial Action Plan. The scope included the following;

- Collection of Validation samples from the base and walls of the remedial excavation as per the requirements of the RAP (i.e. 1 base sample per 10 by 10 m grid and 1 wall sample per 10 m);
- A systematic visual inspection of the excavation on 2.5 m centre overlapping transects across 5 m by 5 m grid sections across the excavation to visually assess signs of concern such as cement sheeting;
- Collection of QA/QC samples including 5 % interlaboratory and 5% interlaboratory replicate samples, trip spikes, trip blanks and rinsate samples;
- Analysis of 13 selected wall validation and 14 base validation samples by a NATA accredited analytical laboratory for the following contaminants of concern;

Every Sample – (13 wall and 14 base samples). Analysis for the identified contaminants of concern, viz.

- Polycyclic aromatic hydrocarbons (PAH); and
- Asbestos.

Every Third Sample – (5 wall and 5 base samples). Analysis of common contaminants:

- heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- Total petroleum hydrocarbons (TPH)
- Monocyclic aromatic hydrocarbons (BTEX – benzene, toluene, ethyl benzene and xylenes);
- Phenols (total);
- Organochlorine and organophosphate pesticides (OCP/OPP);
- Polychlorinated biphenyl (PCB);

- QA/QC analysis for 2 interlaboratory and 2 intralaboratory replicates for full suite of above analytes at NATA accredited laboratories;
- Additional QA analysis – 1 trip spike (BTEX), 1 trip blank (PAH, heavy metals, TPH and BTEX) and 1 rinsate sample (PAH, heavy metals, TPH, BTEX, OCP, OPP, PCB and phenols);
- Preparation of an Interim validation assessment report for the north-west corner dated 23 July 2009.

Noel Arnold and Associates was engaged by Cardinal to conduct asbestos fibre monitoring during the removal works.

Building Demolition and Asbestos Removal Works

Cardinal was responsible for the building demolition works at the site which was conducted during the period between May and August 2009. Asbestos containing materials were removed prior to the commencement of general demolition works on each floor. The completeness of the removal of asbestos containing materials was checked and validated by Noel Arnold and Associates who would then issue an asbestos clearance prior to the

commencement of the main demolition works. Noel Arnold was also responsible for asbestos fibre monitoring during the demolition works. The adopted practice ensured that the demolition rubble arisen through the general demolition works would not be impacted by asbestos containing building materials (which were removed separately prior to the building demolition).

Following demolition of the structures, the building rubble was disposed from the site. DP had no direct involvement in the building demolition works. The waste disposal records and air monitoring results were, however, provided to DP by the client for review.

Final Radiological Clearance – 15 August 2009

ANSTO were engaged to conduct a final radiological clearance of the site using direct probe measurements of the exposed soils on 15 August 2009 following building demolition. The results were reported in an addendum report. No radiological impacts were noted.

Disposal and Validation of Asbestos Pipe: Waste Classification and Validation – 13 August 2009

During demolition and earthworks, a fibre-cement pipe was uncovered beneath the former hospital building following removal of a concrete floor slab in the eastern portion of the site in the North-South Wing. Subsequently, the area was fenced off and the asbestos pipe was exposed and removed by Cardinal. The remedial works by Cardinal resulted in the excavation of a trench of approximately 35 m long by 1.5 m wide [depth?] and the removal of the asbestos pipe and associated soil in the trench. The spoil and asbestos pipe from the trench was placed in a stockpile of approximately 115 m^3. Upon request from BM, DP visited the site on 13 August 2009 to validate the pipe trench. Drawing 4, Appendix A shows the approximate location of the pipe trench and the stockpile.

The DP field visit included a visual inspection along the length of the pipe trench, collection of three samples (ASB-Pipe-01, ASB-Pipe-02 and ASB-Pipe-03) from the pipe trench for validation purposes, collection of one sample from the uncovered fibre-cement pipe (Asbestos Pipe) to confirm the presence of asbestos and the collection of three samples from the stockpile of material excavated from the trench (ASB-SOP-01, ASB-SOP-02 and ASB-SOP-03) for waste classification purposes. In view of the fact that fill soils in the eastern portion of

eastern portion of the site had been previously waste classified with respect to general chemical contaminants, the samples collected during the current round were analysed for asbestos only.

The results were presented in an Interim report dated 20 August 2009.

Assessment of Asbestos Contaminated Soils – NW Corner Extension 18 and 26 August 2009

This was the continuation of the Stage 1 Remediation, comprising the excavation of the asbestos contaminated soil extending from the north western part of the site into previously inaccessible areas.

Prior to and during the remediation excavation works DP excavated a series of inspection pits to determine the extent and depth of asbestos contaminated soils at the site. The test pits were excavated using plant provided by Cardinal on 18 and 26 August 2009. The test pits were excavated to the depth of natural soils.

Test pits TP8 to TP14 were excavated on 18 August and TP15 to T21 on 26 August. In addition, samples ACM1 to ACM5, (asbestos cement sheeting fragment samples) were collected from the exposed near surface soil on 18 August 2009.

The location of he test pits and the ACM samples are shown in Drawing 1, Appendix A.

The likely extent of asbestos contaminated soils was determined based on a visual assessment of the test pit excavated, cross-referenced with bore log records obtained during the original assessment of the hospital site (focusing particularly on test locations with building rubble filling noted), and laboratory analysis results.

Laboratory analysis was conducted on suspected asbestos cement piece (ACM1 to ACM5), to confirm asbestos was present) and in addition 3 samples were analysed (1 from each of TP15, TP16 and TP17) to confirm that no asbestos was detected in residual topsoil in the former garden strip running along the Norval Street boundary. Given that the principle intention of the test pitting exercise was to conduct a visual check of the subsurface condition of the area, analysis was not conducted from the other test pits.

The results were presented in an Interim report dated 23 August 2009 and a follow up email dated 26 August 2009. The identified asbestos contaminated filling was excavated and removed at the time of the Stage 2 Remediation, along with the asbestos contaminated filling found in other areas of the site.

Stage 2 Remediation – 18 August 2009 to 2 September 2009

Stage 2 remediation was undertaken after the completion of the demolition of the former hospital building. It involved the removal of all residual building rubble left on the hospital footprint using a sieve bucket such that practically all concrete fragments above 10 cm in diameter were removed and the underlying shale or natural clay was exposed and the excavation and removal of asbestos contaminated soils from the remainder of the site by Cardinal. The extent of the building footprint is shown in Drawing 4, Appendix A (Yellow outline) and the Additional Asbestos contaminated soils in Drawing 4 and Drawing 5, Appendix A (orange outline).

DP frequently checked the remediation works conducted at the site, generally with 2 site visits on each weekday between 24 August and 2 September 2009

Validation sampling was conducted in stages as the work progressed and the various sections were cleared as follows;

- The south east corner on 180909 (Samples Bld 24 plus 2 replicates)
- The majority of the area on 280909
- The Final clearance area on 310809 and 010909

Soil Samples from the building footprint (samples Bld1 to Bld30 were analysed as per the RAP for the following potential contaminants;

Every Sample (30) for:

- Heavy metals;
- TPH/BTEX;
- PAH; and
- Asbestos.

Two out of every three (20) samples for:

- OPP/OCP;
- Phenols;
- PCB.

Every Third (10) Samples for:

- Volatile organic compounds (VOCs).

Soil samples in the extended asbestos contaminated soils area were analysed for the following potential contaminants (focusing on asbestos).

Base Samples (B15 to B30):

- Every sample (16) for asbestos
- Every third sample (5) for TPH, BTEX, PAH, heavy metals, OCP, OPP, phenols and PCB

The additional base samples also included a validation sample (B30) beneath the footprint of the asbestos pipe stockpile.

Wall Samples (W14 to W21)

- Every sample (8) for asbestos
- Every third sample (3) for TPH, BTEX, PAH, heavy metals, OCP, OPP, phenols and PCB

Based on the validation assessment findings, additional contamination "chaseout" work was conducted around the locations of sample Bld 10 and an additional validation sample (Bld10-A) collected to verify whether the residual asbestos contamination detected in Sample Bld 10 has been removed. The additional "chaseout excavation" was 0.2 m in depth over an area of 10 m by 10 m centre over Bld10.

The locations of the validation samples are shown in Drawings 7 and 8 Appendix A.

In addition, 5 inter-laboratory and 5 intra-laboratory replicates were collected during the remediation works. The replicate samples were analysed for the full suite of the primary sample. Two trip spikes were also collected and analysed by BTEX and two trip blanks for TPH, BTEX, PAH and heavy metals.

Two interim validation reports were issued dated 4 and 9 September 2009.

4. REMEDIATION ASSESSMENT CRITERIA

4.1 Soil Remediation Assessment Criteria

The remediation action criteria with respect to the identified contaminants are presented in Table 1.

Based on the previous assessments asbestos and PAH contamination was identified in the surfical filling, particularly in the western portion of the site.

Remediation and validation works, therefore, focused on the identified areas of concern and their associated contaminants identified previously; and at the footprints of the former buildings. In order to provide for contingency situations, however, RAC were also established for other contaminants. These criteria were, however, only used as and when required (e.g. if signs of contaminants are observed, suspected or found). To further ensure that no other forms of contamination was present at the site, selective validation samples were analysed for these other “common” contaminants.

It is understood that at the redevelopment plan of the site included an on-grade car park with minor landscaping and a community hub (community health facility). In the long run (say in ten years time) the site may be further redeveloped. The conceptual plan involves a multi-storey car park, a hospital and residential units.

In view of the intended land use and the known redevelopment plans, a conservative approach has been adopted in selecting the health based assessment criteria. The selected RAC for the site are based on the NSW EPA health-based investigation levels for residential land use with gardens and accessible soils. In the case of petroleum hydrocarbons, where comprehensive health-based criteria are not available, other relevant NSW EPA guidelines such as the NSW EPA threshold concentrations for sensitive land use are to be used.

A contaminant concentration in soil/ filling material is considered to be significant if:

1. The concentration of the contaminant is more than 2.5 times the health-based RAC. Any location more than 2.5 times the RAC is classified as a 'hotspot', requiring further assessment/ management.
2. The calculated 95% Upper Confidence Limit (UCL) average (excluding any 'hotspot' concentrations) of the data set for the contaminant exceeds the health-based RAC;
3. The standard deviation of the results is greater than 50% of the health-based RAC.

Providing that the 95% UCL average is within the RAC, and no concentrations of the contaminants are at hotspot level, minor exceedances of the RAC may be considered to pose insignificant human health risk under the proposed land-use.

Table 1 – Remediation Acceptance Criteria for Soil/ Filling

Contaminant	RAC	Rationale
TRH $C_6 – C_9$ $C_{10} – C_{36}$	 65 mg/kg 1000 mg/kg	NSW EPA[1] Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994) threshold concentrations for sensitive land use-soils. These guidelines are applicable to all land uses. It is noted that NSW DECC guidelines for specific land uses are available for the aromatic and aliphatic fractions of the medium to heavy portions of TPH, but these guidelines do not cover the full range of the TRH and have not been referenced here.
BTEX Benzene Toluene Ethylbenzene Xylene	 1 mg/kg 1.4 mg/kg 3.1 mg/kg 14mg/kg	
Metals Arsenic (total) Cadmium Chromium Copper Lead Mercury Nickel Zinc	 100 mg/kg 20 mg/kg 12% 1000 mg/kg 300 mg/kg 15 mg/kg 600 mg/kg 7000 mg/kg	NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Soil Investigation Levels for Urban Redevelopment Sites in NSW Heath-based investigation levels for Residential Sites with accessible soil (HIL Column 1).
Total Phenols	8500 mg/kg	
PAH Total Benzo(a)Pyrene	 20 mg/kg 1 mg/kg	
PCB	10 mg/kg	
OCP aldrin + dieldrin chlordane DDT (including DDD, DDE, DDT) Heptachlor	 10 mg/kg 50 mg/kg 200 mg/kg 10 mg/kg	
OPP	-	No current NSW EPA endorsed guideline levels were available.
VOCs	-	No current NSW EPA endorsed guideline levels were available.
Asbestos	No visible asbestos and no asbestos via laboratory analysis at the limit of reporting (0.1 g/kg)	No current NSW EPA endorsed guideline levels were available.

1. now part of DECC

The surfaces of the nominated areas for radiological survey were checked using field instrumentation for the presence of radioactive materials or contaminants above natural background levels.

These surface areas will receive radiological clearance and declared to have "no radioactive sources or contamination" where:

i. There are no reproducible levels detected above natural background (identified as a 'critical limit' of counts with 95% confidence); or

ii. Reproducible levels above natural background are less than limits as specified in applicable guidance material. The radiological exposure to a person shall be less than 0.03 m Sv per year above natural background levels, above which level a recommendation will be made to carry out a cost benefit analysis for remediation.

4.2 Groundwater Investigation Levels (GILs)

Groundwater Investigation levels were defined in the RAP, however, groundwater remediation was not required as part of the remediation and validation works. Therefore the defined GILs are not reproduced in this report.

4.2 Waste Classification of Soils

Materials requiring off-site disposal were assessed in accordance with *Waste Classification Guidelines 2008.*

5. REMEDIATION AND VALIDATION METHODOLOGY

The remedial works and subsequent validation was conducted in a staged manner, generally in line with the site demolition and development sequence, with reference to the results of the validation testing. The detailed assessment for each round of validation is provided in Section 3 and is discussed further in Section 5.

5.1 Validation Sampling Analysis Plan and Procedures

The sampling locations and sample density were based on NSW EPA publication *Sampling Design Guidelines* (1995) and good practice principles. Table 2 summarises the samples taken.

Table 2 - Validation Sampling and Analysis

Round/Event	Sample Location	Dimensions/Volume/area	Number of Samples (excluding QA samples	Collection frequency	Sample ID/ (Various Sample depths)	Analysis Details	QA samples for Round
NW Corner Waste Classification	TP1 to TP7	1500 to 1800 m^2	9	2 per test pit	TP#/depth	3 suite 1 4 suite 2	1 Interlaboratory replicate 1 intralaboratory replicates
NW Corner Validation	B1 to B14 W1 to W13	1400 m^2	14 Base 13 Wall	1 per 10 x 10 m 1 per 10 m	B# for base samples W# for wall samples	PAH and Asbestos 10 Suite 1	1 interlaboratory 1 intralaboratory replicates 1 trip spikes 1 trip blanks
Asbestos Pipe Waste Classification and Validation	Asb-pipe-01 to 03 Asb-sop-01 to o1 Asbestos Pipe	1.5 m by 35 m 115 m^3 -	3 3 1	1 per 10 m 1per 40 m^3 -	Asb-pipe-0103 Asb-sop-01-03 Asbestos Pipe	Asbestos	-
Assessment and Waste Classification of Asbestos Contaminated Soils	Centre of site TP8 to TP21 ACM1 to 5	2500 m^2	8	2 per pile	TP8-TP21 ACM1 tp ACM5	Asbestos	-
Validation of Building Footprint and Asbestos Contaminated Soils	Building footprint Asbestos Contaminated Area	3000 2500 m^2	30 16 base 8 wall	1 per 100 m^3 1 per 10 x 10 m 1 per 10 m as available	Bld1 to Bld30 B15 to B30 W14 to W21	Suite 1 and 2 and Asbestos as required	5 interlaboratory sample 5 interlaboratory sample 2 trip spike 2 trip blank

Suite 1 heavy metals, PAH, OCP, OPP, PCB, phenols, asbestos, TPH and BTEX,
Suite 2 heavy metals, PAH,, asbestos,

Table 3 - Laboratory Analysis

Sample Location	Heavy Metals	TPH/BTEX	PAH	OCP/PCB/Phenols	Asbestos	VOC	TCLP
NW Corner Waste Classification	7	3	7	3	7	-	2
TP1-TP7	1	1	1	1	1	-	-
Interlab	1	1	1	1	1	-	-
Intralab							
NW Corner Waste Validation							
	5	5	14	5	14	-	-
B1 to B14	5	5	13	5	13	-	-
W1 to W13	2	2	2	2	2	-	-
Interlab	2	2	2	2	2	-	-
Intralab	-	1	-	-	-	-	-
Trip Spike	1	1	1	-	-	-	-
Trip blank	1	1	1	1	-	-	-
Rinsate							
Asbestos Pipe							
Asb-pipe-01-03	-	-	-	-	3	-	-
Asb-Sop-01-03	-	-	-	-	3	-	-
Asbestos pipe	-	-	-	-	1	-	-
Assessment of Asbestos Contaminated Soils	-	-	-	-	-	3	-
TP8-TP21	-	-	-	-	-	5	-
ACM1 to 5							
Stage 2 Validation	30	20	30	20	30	10	-
Building	5	5	5	5	16	-	-
Asbestos base	3	3	3	3	8	-	-
Asbestos wall	5	10	10	8	5	1	-
Interlab	5	10	10	8	5	1	-
Intralab	-	2	-	-	-	-	-
Trip spike	2	2	2	-	-	-	-
Trip Blank							

A total of 112 soil samples were submitted for laboratory analysis as part of the current validation assessment comprising 96 soil samples, 16 field replicates (8 interlaboratory replicates and 8 intralaboratory replicates. In addition, 3 trip spikes and 3 trip blanks were analysed in soil.

In this regard, it is noted that Procedure B of the NSW EPA 1995 Sampling Design Guidelines Procedure B provides a formula to determine the number of validation samples required to calculate the average concentration as shown below.

$$n = (6.2^c \delta)/(C_s-\mu)^2$$

where;

n= number of samples needed

δ= estimated standard deviation of contaminant concentrations in sampling area (mg/kg)

μ = estimated average concentration in sampling area (mg/kg) and

C_s = acceptable limit in mg/kg

The sampling densities adopted for sampling of stockpiles, characterisation of filling in landscaping areas and validation samples were considered to be appropriate.

As the primary contaminant of concern is asbestos, no “contaminant concentrations” would be reported as the analytical results will be reported only as either positive or negative. The above formula, therefore, doesn’t apply to asbestos.

As a result, a review of the appropriateness of the adopted sampling frequency was undertaken on the other principal contaminant, viz. PAH.

It is that the validation samples were collected from either the shale bedrock or natural clay. The situation was different from that encountered during the Phase 2 and the Supplementary assessment, where the samples were generally collected from the overlying filling. The standard deviations and mean values obtained at the earlier assessment are therefore not considered to be representative of the current situation, where the characteristics of most of the natural soil/shale samples would be similar, i.e. detectable PAHs would not be expected. For the purpose of the evaluation, a conservative standard deviation value of 1 mg/kg was adopted.

Similarly, a conservative expected mean value of 5 mg/kg has been adopted in the evaluation. This value was based on the published background concentrations for PAH given in Environmental Soil Quality Guidelines, Column A Background as given in Table 2, Australian and New Zealand Guidelines for the Assessment Of Contaminated Sites, ANZECC and NHMRC 1992).

The adopted values were considered conservative as in reality the majority of samples were expected to be within the laboratory PQL such that the actual mean and standard deviation

values would be significantly lower. The adopted values, nevertheless, provides an indication on the adequacy of the adopted validation frequency.

In summary, the assumed values were:
δ= 1 mg/kg
μ = 5 mg/kg
C_s = 20 mg/kg

Using this assumption, only 1 validation sample would be required. The results indicate that Procedure B would not be applicable for the current assessment. The evaluation nevertheless indicated that the adopted validation sampling regime provides an appropriate level of validation data for the site.

5.2 Data Quality Objectives

The scope of the supplementary contamination assessment works has been devised broadly in accordance with the seven step data quality objective process, as defined in Australian Standard *Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds* (AS 4482.1 – 1997). The DQO process is outlined in Appendix L.

5.3 Sampling Procedures

Environmental sampling was performed according to standard operating procedures outlined in the DP *Field Procedures Manual*. All sampling data was recorded on DP chain of custody sheets. The soil sampling procedure was conducted in the manner set out below.

5.3.1 Soil Sampling Procedures

Test Pits

A total of twenty one test pits were excavated during the filling classification assessment (Test Pits TP1 to TP21). The test pits were excavated using a excavators provided by the remediation contractor. Samples were collected at broadly regular intervals, or based on field observations. Samples were collected from the excavator bucket by hand using disposable gloves which were changed after each sampling event.

Validation samples were collected during the waste classification and validation assessment of the north-western corner, on 11 June and during subsequent assessment of asbestos contaminated soils on 18 and 26 August 2009. Samples were not collected from the contact points of the blade of the excavator bucket, but from collected the centre of the soil mass to avoid potential cross contamination.

Validation Samples

Validation samples were collected from 30 “base locations” within the footprint of the former hospital, 21 “wall locations” along the walls of the remedial excavation. Thirty additional base samples were collected from areas outside the building footprint that were identified previously as being contamination by asbestos and/or PAH. Validation samples from the base were collected at a rate of 1 per 10 x 10 m area and from available walls at a rate of 1 per 10 or 15 m.

Validation samples were collected by hand using disposable gloves to prevent cross contamination of samples or using a stainless steel trowel that was decontaminated in between samples. New gloves were used for each sample.

5.3.2 Soil Sample Management

The environmental sampling was performed according to standard operating procedures outlined in the DP *Field Procedures Manual*. In summary, all sampling data was recorded on DP chain of custody sheets. Each sample was placed into laboratory prepared glass jars with a minimal disturbance and capped immediately with Teflon lined lids.

Disposable sampling equipment was used to collect the samples from the auger/excavator bucket for each sampling event to limit the potential for cross-contamination and therefore decontamination of sampling equipment was not required. Similarly, disposable sampling equipment was used during validation sampling events except the sampling at the North West section conducted on 24 June 2009. During this event a stainless steel trowel was used. The trowel was decontaminated between samples and a rinsate sample (R1) collected to demonstrate that adequate decontamination had been performed.

A replicate sample was collected for each soil sample in a zip-lock plastic bag for volatile organics screening using a calibrated Photoionisation Detector (PID). Service records and daily calibration records for the PID are included in Appendix J. PID results are presented in Test Pit and Sample Log Sheets, Appendix D. After labelling the sample containers with individual and unique identification, including project number, sample location and sample depth, samples were placed into a cooled and insulated container for transport to the laboratory.

In addition to the sampling program an additional 10% replicate samples (5% inter-laboratory and 5% intra-laboratory replicates) were collected for QA/QC purposes as a check for the accuracy, precision and repeatability of the results. Field replicate samples for soil were collected from the same location and at the same depth to the primary sample. Given the nature of the samples (typically asbestos cement fragments or clay/shale) the replicate pairs were not homogenised in a bowl and then split. This will also prevent the loss of volatiles from the soil, if any. Both primary samples and replicates were placed into the sampling jars and sealed. Replicate samples were labelled with a DP identification number, recorded on DP bore logs, so as to conceal their relationship to their primary sample from the analysing laboratory. A discussion of the analytical quality assurance and quality control is presented in Appendix L.

Laboratory prepared trip spikes and trip blank were taken out into the field, unopened with each major sampling event.

Envirolab Services was employed to conduct the sample analysis. ASET was employed to conduct some of the asbestos analysis. Labmark Environmental Laboratories was employed for the analysis of inter-laboratory samples. All laboratories engaged during the project are

project are accredited by the NATA. The laboratories are required to carry out routine in-house QC procedures.

6. REMEDIATION AND VALIDATION RESULTS AND DISCUSSION

6.1 Remediation and Validation Sequence

The stages of remediation and validation works involved the following components which are discussed in the subsequent sections:-

- Waste Classification of North West Corner – 11 June 09 (reported 16 June 09);
- Stage 1 Remediation - Remediation and Validation of North West Corner – 16, 18, 19, 22, 23 and 24 June 2009 and reported (interim 23 July 2009);
- Asbestos removal from existing hospital and hospital demolition by Cardinal;
- Radiological Clearance by ANSTO;
- Validation and waste classification of an uncovered asbestos pipe in Stage 1B – 14 August 2009 (reported 20 August 2009);
- Assessment of Asbestos Contaminated Soils and Waste Classification – practically a continuation of the remediation of the North West Section, with the subsequent remedial excavation extended into the previously inaccessible areas – 18 August 2009 (reported 23 August 2009);
- Further Assessment of the extent of asbestos contaminated soils over the site - 26 August 2008 (email dated 26 August 2009);
- Stage 2 Remediation - Remediation and validation of asbestos contaminated outside NW corner and validation of former hospital footprint – 24 August to 2 September (interim reports dated 4 September 2009 and 9 September 2009);
- Importation of VENM to backfill remedial excavations.

6.2 Waste Classification of NW Corner

Prior to the commencement of remedial excavation seven test pits (TP1 to TP7) were excavated in the north west corner of the site to further assess and provide a final waste classification of asbestos and PAH impacted soils identified in the Phase 2 Assessment. The location of the Test Pits is shown in Drawing 1, Appendix A.

The filling encountered over the area of investigation typically consisted of brown silty and sandy clays, silts and sands. Building rubble inclusions such as old style bricks, footings of the old former buildings and general demolition debris such as concrete and sandstone boulders were noted sporadically throughout the filling in the area. Ash and slag was also noted in some locations, particularly along the western side of the site. The observations were consistent with the findings of the Phase 2 assessment. The depth of filling ranged from 0.3 to 1.1 m with the average depth of filling of 0.5 m. The deepest filling was associated with a footing block located at the south western end of the excavation. Photograph 1, appendix B shows the area at the time of the investigation and Photo 2 shows a typical test pit.

The filling was underlain by natural red and grey silty clay.

Apart from asbestos, ash and slag, no other discernible signs of contamination (eg hydrocarbons) were observed in the Test Bores and all PID screening results were less than 1 ppm, indicative of “background” levels. A copy of the test pit results are provided in Appendix D.

Whilst the results of most of the soil samples from the north west section were within the adopted RAC in both the Phase 2 Assessment and the subsequent waste classification assessment, a number of exceptions were noted, as follows;

- Sample 203A/0.3-0.5 - benzo(a)pyrene = 15 mg/kg and total PAH = 157.8 mg/kg;
- Sample BD3 060209 (which was an intralaboratory replicate sample of 204/0.1-0.2) benzo(a)pyrene = 1.1 mg/kg;
- 202/0.1-0.3 - amosite and chrysotile asbestos detected;
- Sample A2 (collected at 0.3 m in Test Pit TP1) – chrysotile asbestos detected;

- Sample A3 – (collected at 0.2 m in Test Pit TP7) – chrysotile asbestos detected.

The laboratory results from the waste classification are provided in Tables C2 and C3 (and full reports in Appendix K) and the results from the previous Phase 2 in Tables C4 to C8, Appendix C.

On the basis of on-site observations, at least a substantial portion of the building rubble waste appeared to be sourced from the former (original) hospital buildings, as the brick and footings debris noted in the fill were of a different (older) era from those removed from the recently removed demountables. Building rubble / debris was present sporadically throughout the bulk of the fill material placed in the north western section.

Due to the uncontrolled nature of the fill, and the sporadic nature of the building rubble inclusions, the potential for asbestos contamination was considered to be high. This was further supported by the identification of asbestos fragments (both visually and by analysis) in a number of fill samples. Effective segregation of any asbestos contamination was not considered to be practical. In this light, it was considered that all filling impacted with building rubble from the old hospital was considered to be asbestos contaminated soil.

Ash and slag inclusions were also noted in the filling, particularly in the western portion of this area. Ash and slag are recognised to be the sources of elevated PAH. In this regard, the elevated levels of PAH and benzo(a)pyrene detected in the Phase 2 assessment (in excess of the RAC) were attributed to the ash and slag inclusions in the fill material.

Therefore, based on the test results and onsite observations the filling was not considered suitable to be retained on the site. It was considered that the impacted filling would most likely extended beyond the north-west corner along the original hospital footprint, but that extended area could not be investigated at the time due to access restraints.

Prior to the commencement of the Stage works, a further radiological survey of the area of investigation was conducted by ANSTO on 15 June 2009. No evidence of radiological impacts were detected in the area. The clearance report is provided in Appendix I.

With respect to asbestos contamination, on the basis of the on-site observations and the relevant test results obtained from both the Phase 2 Contamination Assessment and the

subsequent waste classification the filling impacted by building rubble, ash and slag, found in the north west section of the Auburn Hospital Stage 1B was classified as Special Waste - Asbestos Contaminated Waste due to the asbestos impact.

From a chemical contaminant the results were within the general solid waste guidelines. The following was however noted;

- Sample 203A/0-0.2 had a total benzo(a)pyrene concentration of 15 mg/kg which is in excess of the General Soil Waste Guidelines with TCLP. However, ash and slag were noted in the sample and the elevated level benzo(a)pyrene was attributed to the presence of ash/slag in the fill. In this regard, the soil can be classified on the basis of TCLP results only as per the DECC's general approval of immobilisation of contaminants in waste, Approval Number 1999/05. Taking this into account, based on the low leachability of the sample, *from a chemical contaminant standpoint* the sample is classifiable as general solid waste.

In overall terms, however, all waste must be given the highest waste class. Based on this principle, and noting the presence of asbestos contamination in the uncontrolled fill, the ash, slag and building rubble containing fill was classified as **Asbestos Waste**.

6.3 North West Corner Remediation and Validation

Soil excavation and disposal works were carried out by Cardinal. The works were undertaken over a 6 day period (17, 18, 19, 22, 23 and 24 June 2009). Validation sampling was conducted on the final day at the completion of the remedial excavation.

The extent of the remedial excavation is shown in Drawing 4, Appendix A. The remedial excavation was extended to a depth of between 0.3 m and 1.1 m until the underlying residual natural clay had been exposed. The depth was greatest in the south-west corner due to the presence of deeper footings and associated filling around the footing structure of the former hospital buildings.

The base of the excavation was taken to the natural clays (with an average depth of between 0.3 and 0.5 m). Filling soils were present in the walls of the excavation on all sides. The excavation was practically extended to the site boundary on the northern and western side of

side of the excavation (typically within 0.5 m of boundary such that further excavation would affect the integrity of the pavements of the adjacent streets). The filling material at the exposed walls of the excavation generally had some sporadic building rubble inclusions as well as some trace amounts of ash and slag (on the western and eastern boundaries of the excavation). Photos of the north-west corner are provided in Photos 3 and 4, Appendix B.

All PID screening results were less then 1 ppm, indicative of "background" levels. A copy of the sample log with sample descriptions and filling depths is provided in Appendix D.

Soils excavated from the north-west corner were disposed of at the SITA landfill in Kemps Creek as Asbestos Contaminated Waste. A total of 1468 T of soil were disposed of. The complete dockets are included in Appendix E.

The walls of the excavation were extended to the practical extent of excavation. The northern and western walls were extended to the practical site boundary and the eastern and southern walls were extended to the furthest extent possible at that stage of development (further excavation to be undertaken as the site became accessible). The results of the validation assessment for wall samples were generally within the adopted RAC with the exception of the following wall samples;

- W2 – B(a)P = 26 mg/kg and Total PAH = 335.6; and
- W4 – B(a)P = 1.9 mg/kg.

In addition, sample W1 exceeded the PPIL for zinc (220 mg/kg)

Laboratory results are summarized in Table C1, Appendix C and full laboratory reports presented in Appendix K.

However, the above exceedances were collected along the edge of the site and the practical limits of excavation (i.e. the site boundary). In other words, all contaminated filling within the Stage 1 Remediation area of the site has been removed, and that the results of the western wall samples only reflects the boundary condition. Further excavation along the western site boundary is not necessary (or possible).

It is also noted that no asbestos fibres were detected in all soil samples during remedial works. Asbestos fibre monitoring reports are a provided in Appendix H.

6.4 Building Demolition

Cardinal Project Services were responsible for the building demolition works at the site between May and August 2009. Asbestos containing materials were removed prior to the commencement of general demolition works on each floor and the completeness of the asbestos removal inspected and validated by Noel Arnold and Associates prior to main demolition works. Noel Arnold was also responsible for asbestos fibre monitoring during the demolition works.

In view of the process adopted (with the complete removal of asbestos prior the bulk demolition), and noting the Noel Arnold clearance reports it is considered that the risk of asbestos present in the newer hospital had been removed prior to demolition and therefore it was unlikely that asbestos would be generated via the subsequent general demolition works such that any asbestos identified in the soils at the site subsequent to the demolition were likely to be sourced from the previous demolition of the original hospital buildings.

Tipping records for the removal of the building materials are summarised in Section 9 and the tipping records provided in Appendix E. It is noted that for building rubble only the summaries have been included in Appendix E (not the individual dockets) due to the volume of dockets (approximately 700). DP has nonetheless been provided with these dockets and reviewed them. The records were kept on file by DP.

It is therefore considered that the demolition works have been conducted in an appropriate manner and that the bulk of the building rubble removed from the site.

6.5 Radiological Clearance

Following the completion of demolition works ANSTO were engaged to conduct a final site radiological survey and validation.

As noted in Section 6.2 a survey of the NW corner was conducted on 15 June prior to the Stage 1 Remediation works with no signs of radiological impacts detected. Once the hospital demolition works were completed ANSTO conducted a direct probe radiation survey over the entire site on 15 August 2009. The survey was conducted in 1 m strips to ensure complete coverage of the site.

The results of the survey are presented in *Addendum No. 2 to Report by ANSTO of 30th May 2007 titled: Site Radiological Survey of Auburn Hospital for Earth Air Water Consulting and Monitoring Pty Ltd*, dated 22 September 2009 provided in Appendix I.

The report concluded that "as no radiation or external sources of radiative contaminants was detected at all during the survey, then the potential exposure measured by the direct probe monitoring methodology at the site is consistent with the natural background levels only. There is no risk to the public through future land use from a radiation point of view and therefore no site remediation (with respect to radiological impact) is necessary.

6.6 Asbestos Pipe Validation and Waste Classification

During demolition and earthworks, a fibre-cement pipe was uncovered beneath the former hospital building following removal of a concrete floor slab in the eastern portion of the site in the North-South Wing.

DP conducted a visual inspection along the length of the pipe trench following the removal of the pipe and associated contaminated filling, collection of three samples (ASB-Pipe-01, ASB-Pipe-02 and ASB-Pipe-03, refer to Drawing 7, Appendix A for sample locations) from the pipe trench for validation purposes, collection of one sample from the uncovered fibre-cement pipe (Asbestos Pipe) to confirm the presence of asbestos and the collection of three samples from the stockpile (ASB-SOP-01, ASB-SOP-02 and ASB-SOP-03) for waste classification purposes.

In view of the fact that fill soils in the eastern portion of the site had been previously waste classified with respect to general chemical contaminants, the samples collected during the current round were analysed for asbestos only. In this regard, it is noted that the results of the previous assessments have shown that the fill material in the eastern portion of the site would be classifiable as General Solid Waste (non-putrescible) with respect to other (non-asbestos) chemical contaminants.

Field observations after removal of the pipe did not indicate the presence of visible asbestos fragments along the length of the pipe trench. Further, the analytical results showed that no asbestos was detected in the three validation samples. Therefore, based on the field observations and the analytical results of the validation samples, the pipe trench in the eastern portion of the site is considered to be validated.

The analytical results of the sample collected from the fibre-cement pipe confirmed the presence of the Chrysotile and Amosite asbestos.

With respect to the analytical results for the waste classification samples, no asbestos or respirable asbestos fibres were detected in the soil samples collected from the stockpile containing the excavated asbestos pipe and spoil from the trench. However, in view of the asbestos fragments (from the uncovered pipe) observed in the stockpile during the field visit, the stockpiled material sourced from the pipe trench was classified as **SPECIAL WASTE (Asbestos Waste)**.

Laboratory results are summarized in Table C1, Appendix C and full laboratory reports presented in Appendix K.

6.7 Assessment of Asbestos Contaminated Soils

Prior to and during the bulk remediation works DP excavated a series of test pits to determine the extent and depth of asbestos contaminated soils at the site. The test pits were excavated using plant provided by Cardinal on 18 and 26 August 2009. The test pits were excavated to the depth of natural soils.

Test pits TP8 to TP14 were excavated on 18 August and TP15 to T21 on 26 August. In addition, samples ACM1 to ACM5, asbestos cement sheeting fragments noted on the ground surface, were collected on 18 August 2009

The location of the test pits and the ACM samples are shown in Drawing 1, Appendix A.

The extent of asbestos contaminated soils was based on a visual assessment of "older style" building rubble filling from the original hospital and with laboratory analysis. Laboratory analysis was conducted on suspected asbestos cement piece (ACM1 to ACM5), to confirm asbestos was present). In addition, 3 samples were collected from three test pits (1 from each of test pits TP15, TP16 and TP17). These samples were analysed to confirm the visual assessment, i.e. that no asbestos was present in residual topsoil filling along the former garden area along the Norval Street side. Analysis was not conducted from the other test pits as previous results and on site observations were relied upon for the assessment and waste classification of the filling.

In summary, building rubble impacted filling was encountered in TP9 to TP14 and TP18 to TP21. Fibre cement was also observed in TP12 (with sample ACM1 collected), and TP21. The building rubble appeared to be consistent (in appearance and form) to those noted in the asbestos contaminated filling in the north-west corner. The filling typically extended to a depth of between 0.3 to 0.5 m with a maximum depth of approximately 1 m. The depth of filling observed in shown in Drawing 4, Appendix A.

The filling was underlain by natural clays.

The laboratory results of the suspected asbestos samples collected were as follows.

- ACM1 – chrysoltile and amosite asbestos detected
- ACM2 - chrysoltile and amosite asbestos detected
- ACM3 – chrysotile asbestos detected
- ACM4 - chrysotile asbestos detected
- ACM5 - chrysotile asbestos detected

Full laboratory reports are summarised in Table C1, Appendix C and full reports and chain of custody information are in Appendix K.

It was therefore considered that the area marked orange in Drawing 4, Appendix A was effected by asbestos contaminated soils/filling. The impacted soil must be classified as Special Waste – Asbestos, and should be removed offsite to render the site suitable for the proposed development.

No signs of fibre cement were noted in the subsoils of Test pits TP15, 16 and 17. The observation was in agreement with the findings of the Phase 2 Assessment, and was supported by the subsequent laboratory analysis on samples collected from these test pits (provided in Table C1). The analytical results confirmed that there was no detectable asbestos in all samples collected in the green outlined area shown in Drawing 4, Appendix A. There were no signs of building rubble in the filling (other then the building rubble generated from the recent demolition found on the ground surface). Based on the analytical results (including the previous Phase 2 Assessment results), there were no signs of asbestos contamination in this area. No remedial works were considered to be required for this area. The bitumen pavement in this area was subsequently removed, exposing the underlying natural soils (refer to Drawing 4)

One of the test pits, viz. TP8 was excavated within the footprint of the main hospital building. Whilst some building rubble type filling was encountered in the surface horizon of this test pit, based on the type of building rubble inclusions observed, it appeared that the building rubble was from a more recent era, most probably generated from the recent demolition works of the main hospital building. No signs of asbestos containing materials such as fibre cement fragments were noted in the test pit. As all asbestos containing materials were removed from the hospital building prior to the commencement of the bulk demolition works, it is, thus, envisaged that the building rubble generated from the recent demolition works would not include asbestos materials and hence would not result in asbestos contamination. This was in agreement with the on-site observations (i.e. no asbestos was identified). In this light, no soil remediation is considered necessary for the footprint of the main building. It was recommended, however, that the building rubble be separated from the general filling/soil using a grader and removed separately leaving behind the filling/soil such that large, (say, fist size or larger) discernible pieces of concrete are removed. After which the area was re-inspected to verify the assessment.

Photos 7 to 10, Appendix B were taken during the additional assessment process.

6.8 Stage 2 Validation Works18 August 2009 to 2 September 2009

Stage 2 remediation involved the removal of all residual building rubble from the hospital footprint using a sieve bucket such that practically all concrete fragments above 10 cm in diameter were removed and the underlying shale or natural clay was exposed and the excavation and removal of asbestos contaminated soils identified from the yet to be validated (non-Stage 1) portion of the site by Cardinal. The extent of the building footprint is shown in Drawing 4, Appendix A (Yellow outline) and the Additional Asbestos contaminated soils in Drawing 4 and Drawing 5, Appendix A (orange outline).

DP supervised the remediation conducted at the site with site visits on each week days between 24 August and 2 September 2009. It is noted that during the excavation works a localised pocket of asbestos sheeting was placed in a 5 m by 5 m area in the south west corner of the site (Photo 11, Appendix B and Drawing 4, Appendix A). The asbestos sheeting and surrounding soils was excavated up to the western side boundary such that all the noted asbestos sheeting and contaminated spoil located within the site boundary was removed (although it is possible that further asbestos sheeting may be present outside the site, beneath the council footpath). Validation samples were collected from the base of the area (B20, B21 and B22) and the wall along the boundary of the area/site (W19, W20 and W21). No asbestos was found in any of these samples.

Validation sampling was conducted in stages as the sections were cleared as follows;

- The south east corner on 180909 (Samples Bld 24)
- The majority of the area on 280909
- The Final clearance area on 310809 and 010909

[Kurt, suggest we'll clarify during which of the above stages did we validate the asbestos sheeting pocket]

The base validation samples (Bld 1 to Bld 30 and B15 to B30) were collected from the exposed clay and shale (samples logs are included in Appendix D). There were no signs of contamination including building rubble (with the exception of minor amounts of small concrete fragments) and all PID readings were below 1 ppm. Site photos at the completion of the remediation works are provided in Photos 12 to 22, Appendix B.

The laboratory results from the validation sampling (are provided in the attached table (Table C1, Appendix C).

Based on the laboratory results the following is noted;

- The concentration of heavy metals, TPH, PAH, OCP, OPP, PCB, phenols and VOCs in all samples were within the human health based investigation levels
- Three samples exceeded the PPIL namely;
  - Sample Bld 22 – mercury – 1.7 mg/kg
  - Sample Bld 23 – zinc- 580 mg/kg
  - Sample Bld 29 – arsenic – 24 mg/kg

It is noted, however, that these samples were collected from the eastern half of the site where the proposed community health centre is to be located and there is no landscaping planned. Furthermore samples Bld 22 and Bld 23 were collected from the exposed shale bedrock, which would not support plant/root growth. It is also noted that these samples were collected at levels in excess of 1.5 m below the street level and as such it is envisaged that the levels will need to be raised by verified clean fill. No remediation is therefore considered necessary with respect to the PPIL exceedances.

- Asbestos was not detected in any of the samples with the exception of sample Bld 10, in which amosite fibres were detected. Sample Bld 10 was collected on the surface of natural clay. Subsequently, a further 100 mm of soil was excavated over a 10 m by 10 m area, centred on Bld 10 and disposed of as asbestos contaminated soils. An additional validation sample was collected following the additional excavation. Sample Bld 10-A was free of asbestos. Photo 23, Appendix B shows the additional excavation and Drawing 8, Appendix A.

Approximately 2600 m^3 of asbestos contaminated soils was excavated and removed during the works (refer to Section 9 and Appendix E).

It is also noted that Noel Arnold conducted asbestos fibre monitoring during the excavation works (included in Appendix H) and no fibres were detected.

No unacceptable signs of concern were noted in the available records and all contamination issues have been satisfactorily addressed during the remedial works, as supported by DP's site inspections, and all final validation results met the RAC specified. On the basis of the validation assessment findings, it is considered that the site has been remediated such that it is suitable for residential land use with accessible soils.

7. IMPORTATION OF VENM MATERIAL

Virgin excavated natural material (VENM) sourced from the validated, north east corner of Stage 1A of the Auburn Hospital site was used to backfill the remedial excavations created..

Approximately 50 m^3 of clay and shale was sourced from the north east corner of Stage 1A of the Auburn Hospital site. Asbestos conduits were identified in this area during the initial site works in the area. The asbestos conduits and surrounding impacted soils were excavated and disposed from the site and the area inspected and validated on 15 July 2009. Based on the results of the inspection and subsequent laboratory validation results it was considered that the asbestos containing materials and impacted soils had been removed and that the remaining soils were VENM suitable to be used to backfill areas in Stage 1B

The clay and shale material was transferred from the north east corner of Stage 1A to the north-west corner of Stage 1B in August 2009 and stockpiled awaiting final placement at the completion of all remedial works. The validation report for the VENM material is included in Appendix F.

At this stage no other materials have been imported to the site and there is no expectation (at this stage) that any additional materials will be required.

8. QA/QC PROCEDURES AND RESULTS

The QA/QC procedures and results have been included in Appendix L of this report. Reference should be made to Appendix L of this report for further details on the QA/QC procedures and results.

9. DISPOSAL OF MATERIAL OFF-SITE

Although direct control over the loading and management of trucks and disposal at the landfill was not DP's responsibility, off-site disposal of excavated material was observed by DP during the regular site visits undertaken. No signs of concern were noted. Documentation regarding disposal as provided to DP is presented in Appendix E.

The filling was disposed of as Special Waste - Asbestos. The tonnages, based on landfill documentation provided by Brookfield Multiplex Constructions and waste types disposed to landfill are shown in Table 4 and the disposal dockets are provided in Appendix E. Based on the available disposal records, whilst taking into consideration the on-site observations, it is considered that the wastes generated from the remediation works have been properly disposed offsite in accordance with the requirements of the relevant authorities, and as outlined in the RAP.

Table 4 - Details of Off-site Disposal of Material

TIPPING PERIOD			CONCRETE RECYLCERS		RECYCLED RESOURCES		REEFWAY AUBURN	REEFWAY ALEXANDRIA	SELL & PARKER	SITA		Glenfield Waste		BORAL
			Brick	Concrete	Brick	Concrete	General Waste	General Waste	Metals	Asbestos	Asbestos Soil	Asbestos	Asbestos Soil	Bitumen
Tuesday, May 26, 2009	to	Monday, June 01, 2009	60				178.19		9.78					
Tuesday, June 02, 2009	to	Monday, June 08, 2009					203.84		8.36	6.18				
Tuesday, June 09, 2009	to	Monday, June 15, 2009	20				149.38		14.5	11.9				
Tuesday, June 16, 2009	to	Monday, June 22, 2009					73.9		1.84	1275.98				
Tuesday, June 23, 2009	to	Monday, June 29, 2009					160.6		77.52	201.22				
Tuesday, June 30, 2009	to	Monday, July 06, 2009	800				134.98		81.23					
Tuesday, July 07, 2009	to	Monday, July 13, 2009	600	20			10.46		120.71					
Tuesday, July 14, 2009	to	Monday, July 20, 2009					51.76		98					
Tuesday, July 21, 2009	to	Monday, July 27, 2009	882				112.26		122.2					
Tuesday, July 28, 2009	to	Monday, August 03, 2009	2300	20	417.41		91.12		348.79					
Tuesday, August 04, 2009	to	Monday, August 10, 2009			6927.25		548.66		300.08					
Tuesday, August 11, 2009	to	Monday, August 17, 2009			3075.61		124.66		82.38					
Tuesday, August 18, 2009	to	Monday, August 24, 2009			2237.39		250.82		67.44					
Tuesday, August 25, 2009	to	Monday, August 31, 2009			1442.51		122.4		13.38				2568.74	20
Total	to		4662	40	14100.17	0	2213.03	0	1346.21	1495.28	0	0	2568.74	20

10. CONCLUSION AND NEED FOR FURTHER WORK

On the basis of DP's investigations and the results of validation sampling, DP considers that the remedial works has been undertaken in general accordance with the RAP and that all final validation results met the RAC, such that the site has been rendered suitable for the intended community health centre and on-grade car park.

This report has been prepared to facilitate the provision of a Statutory Site Audit Statement under Part 4 of the Contaminated Land Management Act (1997) for the site.

11. LIMITATIONS OF THIS REPORT

The scope of the site assessment activities and consulting services undertaken by DP were limited to those detailed in this report.

DP's assessment is necessarily based upon the result of a limited site investigation and the restricted program of surface and subsurface sampling, screening and laboratory testing which was set out in the proposal. DP cannot provide unqualified warranties nor assumes any liability for site conditions not observed, or accessible, during the time of the investigations or remediation.

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

This report, its associated documentation and the information herein have been prepared solely for the use of Brookfield Multiplex Constructions Pty Ltd. Any reliance assumed by third parties on this report shall be at such parties' own risk. Any ensuing liability resulting from use of the report by third parties cannot be transferred to DP.

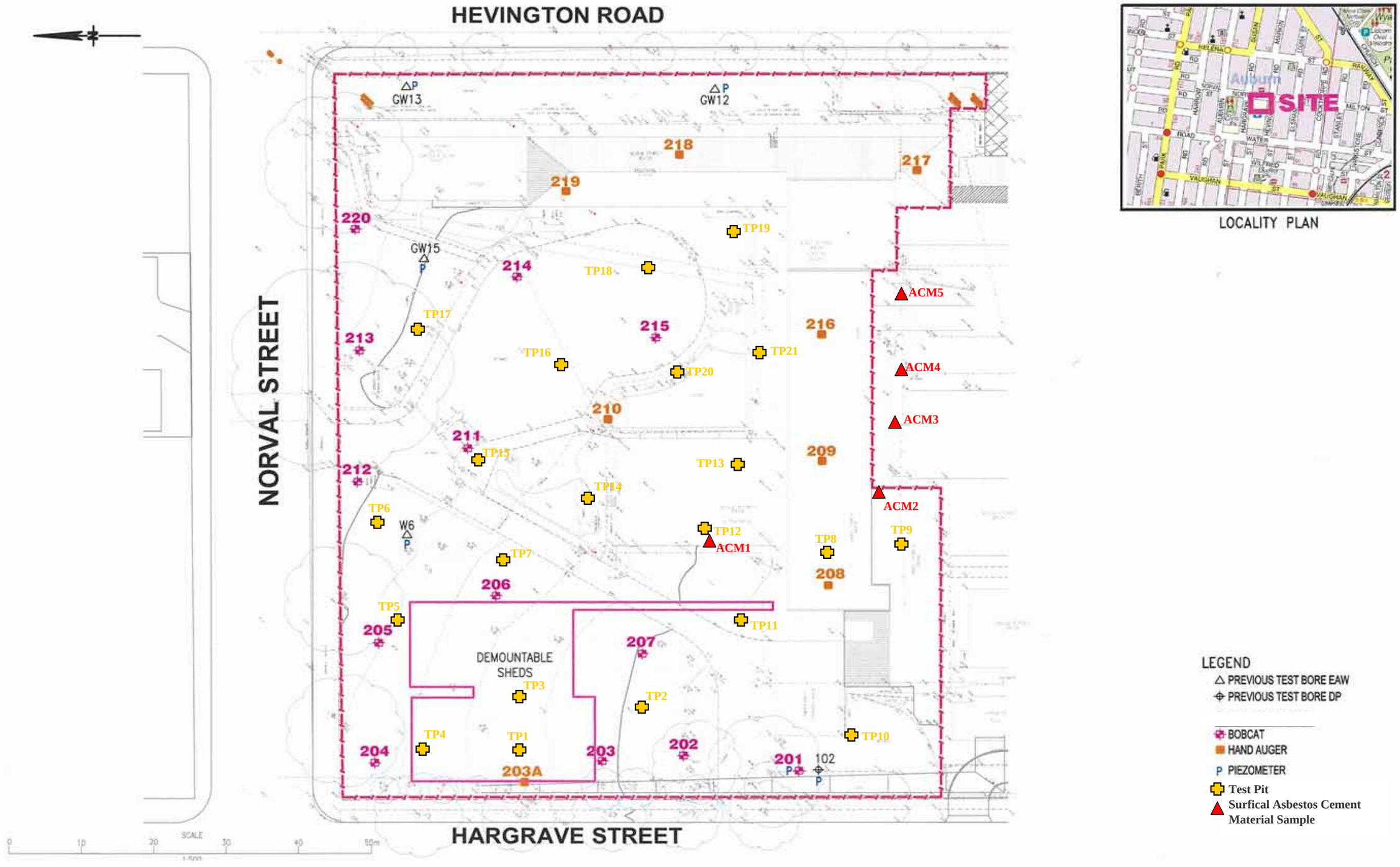
DOUGLAS PARTNERS PTY LTD

Reviewed by:

Kurt Plambeck
Environmental Scientist

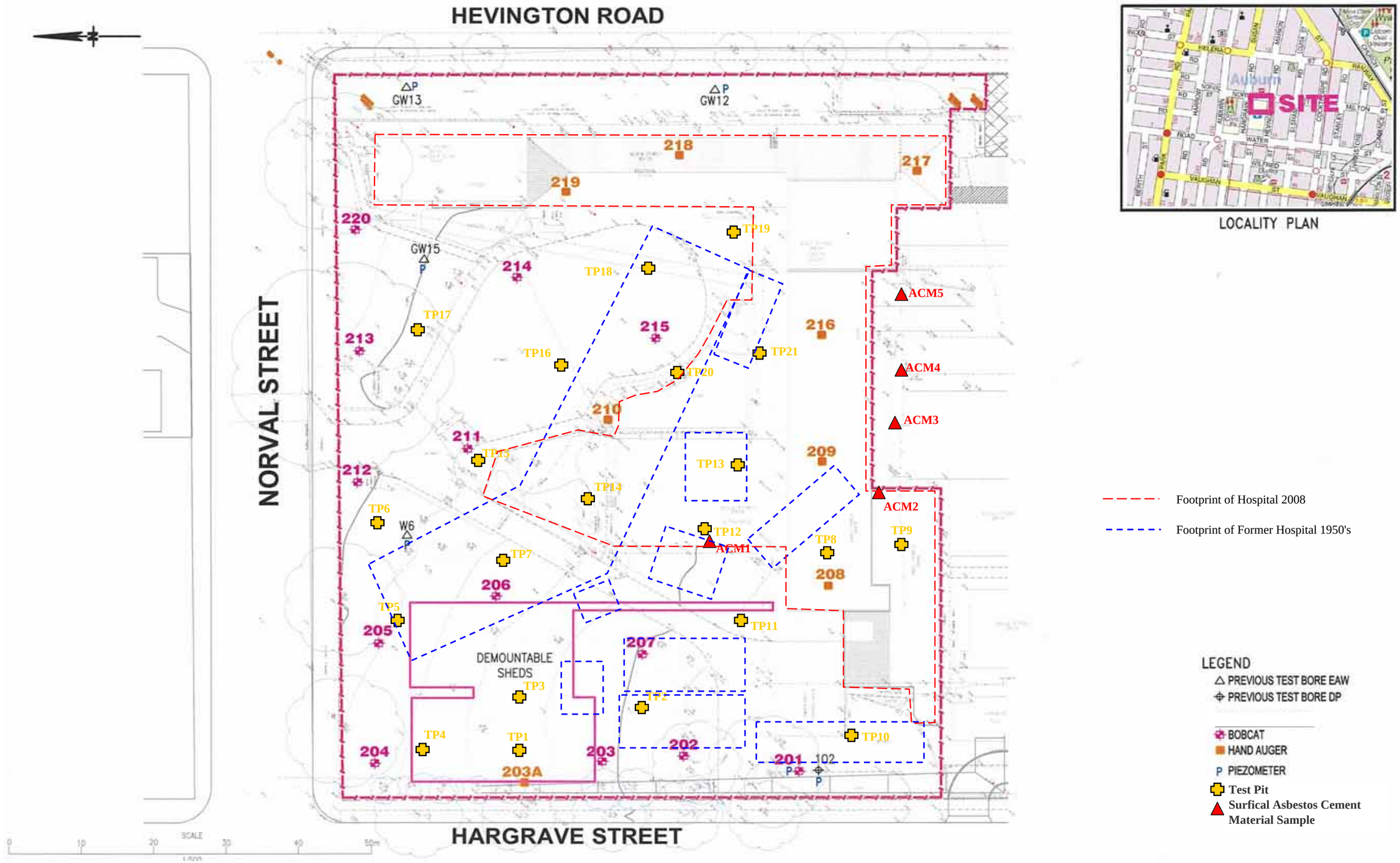
Ronnie Tong
Principal

APPENDIX A
Notes Relating to This Report
Site Drawings



LOCALITY PLAN

Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Location of Test Bores, Test Pits and Surficial Asbestos Material Samples**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	**Final Validation Assessment**	Drawing No: 1
	APPROVED BY		DATE: 12.10.09	**Stage 1B, Auburn Hospital**	Revision: A



Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Former Building Footprints**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	**Final Validation Assessment**	Drawing No: 2
	APPROVED BY		DATE: 12.10.09	**Stage 1B, Auburn Hospital**	Revision: A

HEVINGTON ROAD

NORVAL STREET

HARGRAVE STREET

GW13

GW12

GW15

W6

DEMOUNTABLE SHEDS

SCALE

0 10 20 30 40

LOCALITY PLAN

chrysotile asbestos detected

ACM5

chrysotile asbestos detected

ACM4

chrysotile asbestos detected

ACM3

ACM2

chrysotile and amosite asbestos detected

ACM1

chrysotile and amosite asbestos detected

A3@0.2 m Chrysotile Asbestos

204/0.1-0.2 (BD3 060209) B(a)P - 1.1 mg/kg

A2 @0.3 m Chrysotile Asbestos

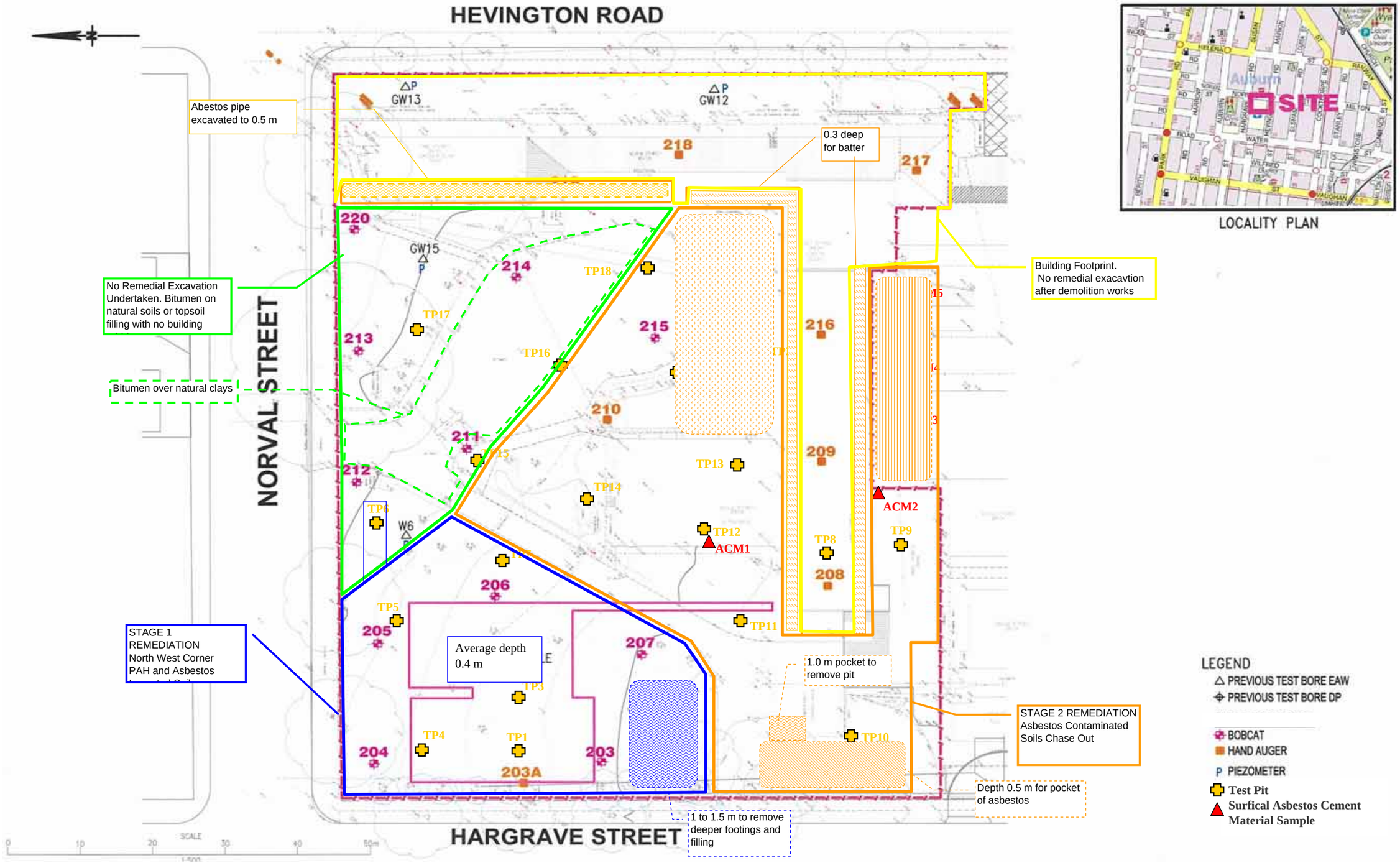
203A/0-0.2 Total PAH - 157.8 mg/kg B(a)P - 15 mg/kg

202/0.1-0.3 Chrysotile and amosite Asbestos

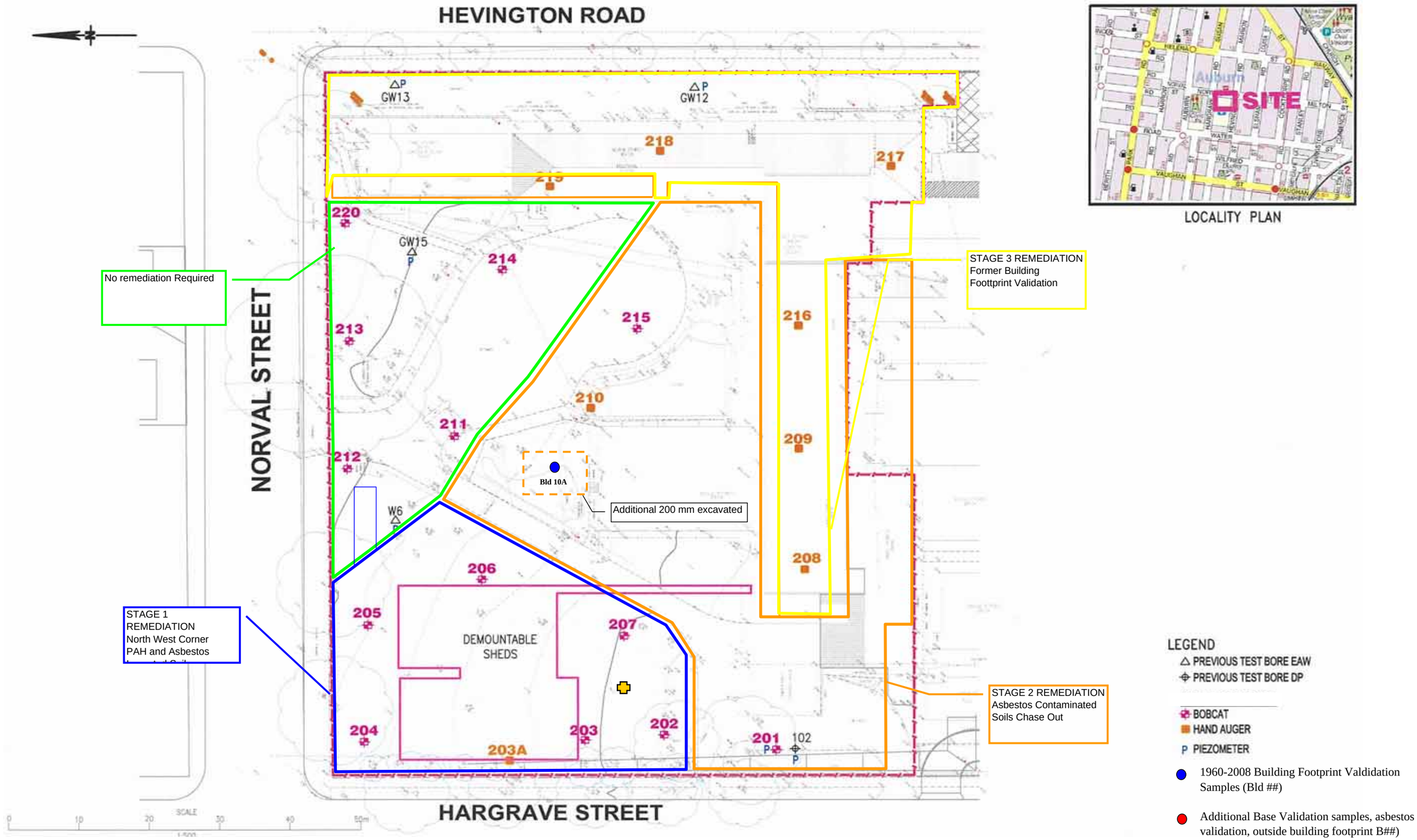
LEGEND

- PREVIOUS TEST BORE EAW
- PREVIOUS TEST BORE DP
- BOBCAT
- HAND AUGER
- P PIEZOMETER
- Test Pit
- Surfical Asbestos Cement Material Sample

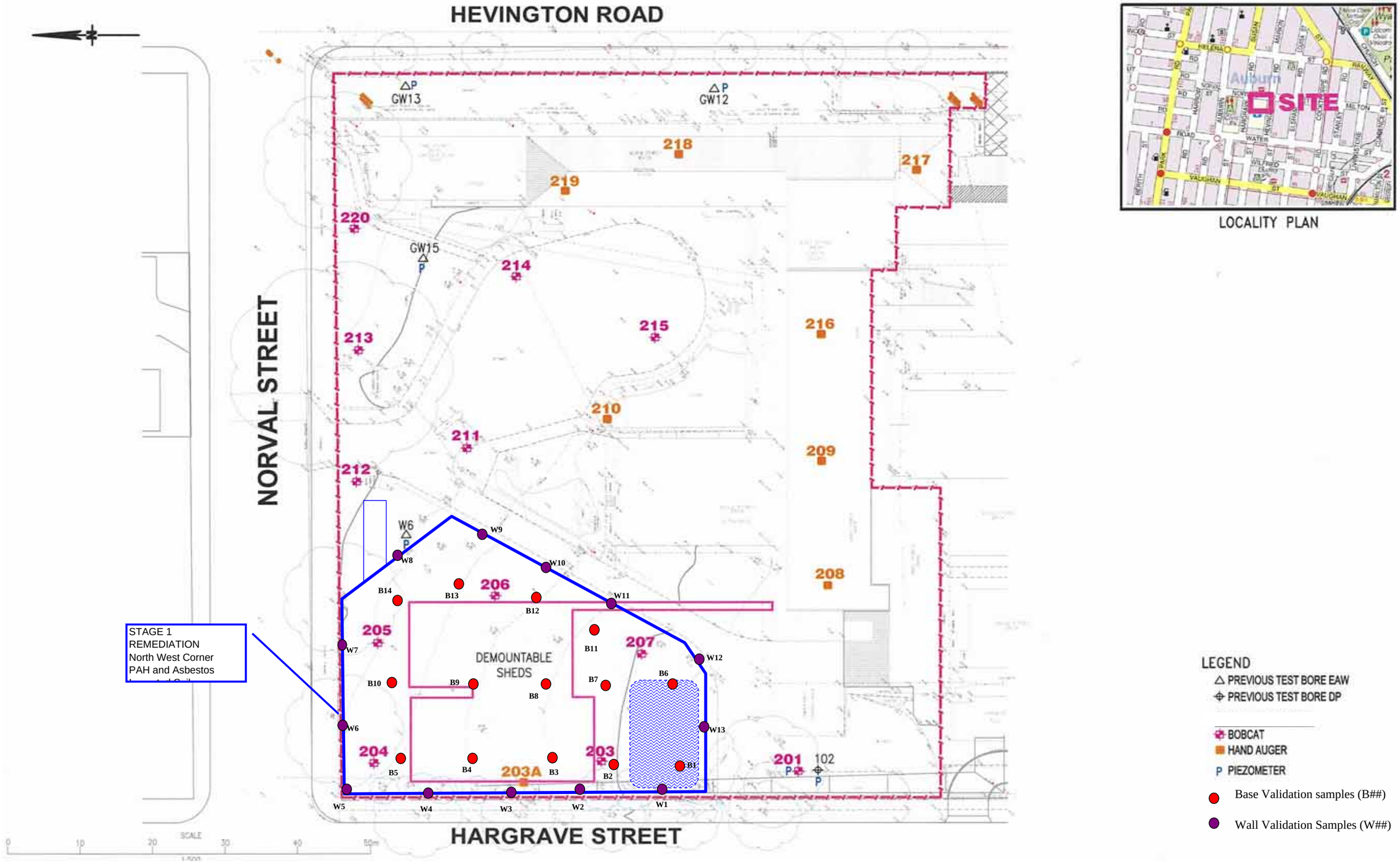
Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	Location of Exceedances	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	Final Validation Assessment	Drawing No: 3
	APPROVED BY		DATE: 4.9.09	Stage 1B, Auburn Hospital	Revision: A



Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Extent of Contaminated Soils and Remedial Excavations**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	**Final Validation Assessment**	Drawing No: 4
	APPROVED BY		DATE: 12.10.09	**Stage 1B, Auburn Hospital**	Revision: A

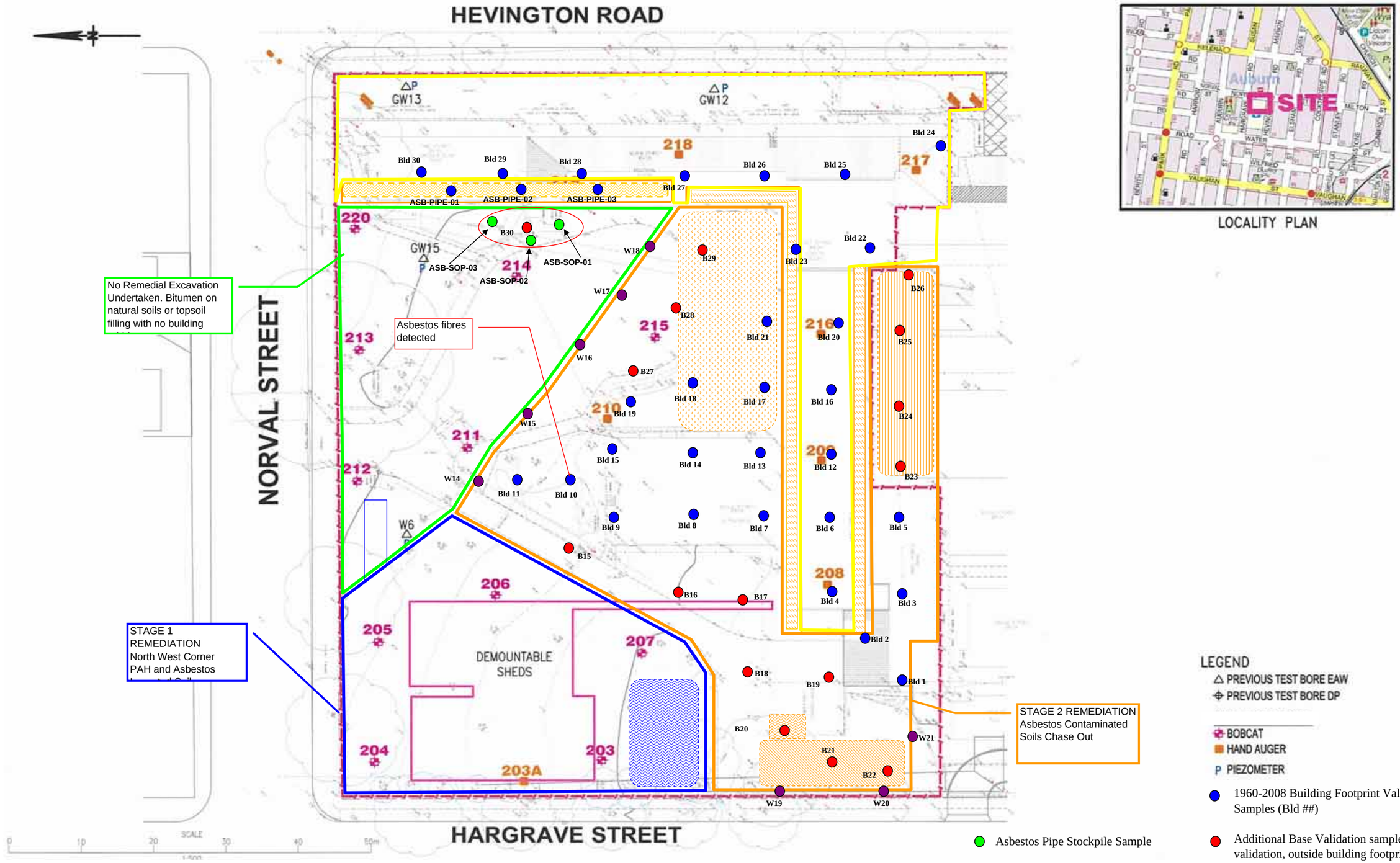


Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Remediation and Validation Staging**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	**Final Validation Assessment**	Drawing No: 5
	APPROVED BY		DATE: 12.10.09	**Stage 1B, Auburn Hospital**	Revision: A



LOCALITY PLAN

Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Stage 1 NW Corner Validation**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	**Final Validation Assessment**	Drawing No: 6
	APPROVED BY		DATE: 12.10.09	**Stage 1B, Auburn Hospital**	Revision: A

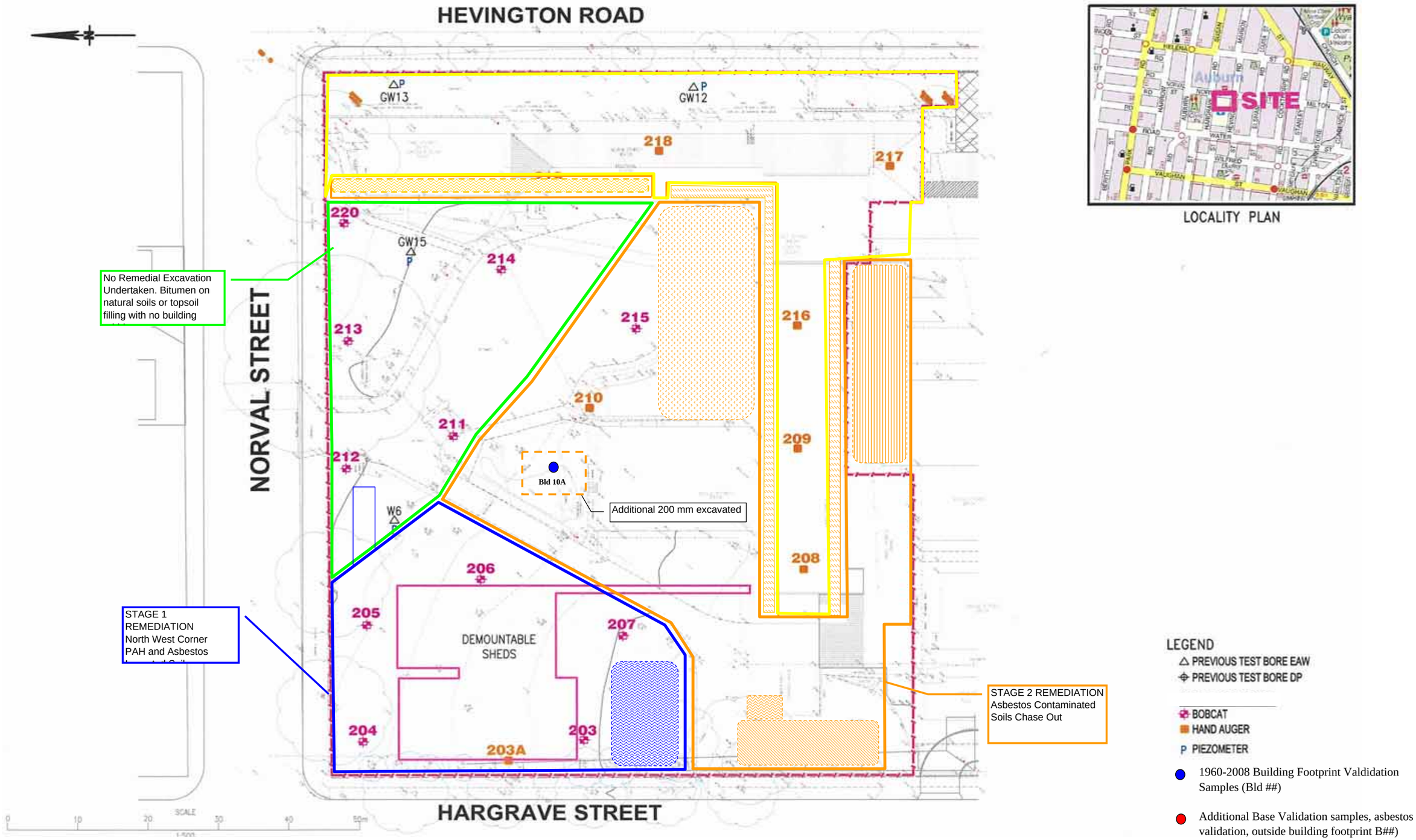


LOCALITY PLAN

LEGEND

- △ PREVIOUS TEST BORE EAW
- ⊕ PREVIOUS TEST BORE DP
- BOBCAT
- HAND AUGER
- P PIEZOMETER
- 1960-2008 Building Footprint Valdidation Samples (Bld ##)
- Additional Base Validation samples, asbestos validation, outside building footprint B##)
- Additional Wall Validation Samples (W##)
- Asbestos Pipe Stockpile Sample

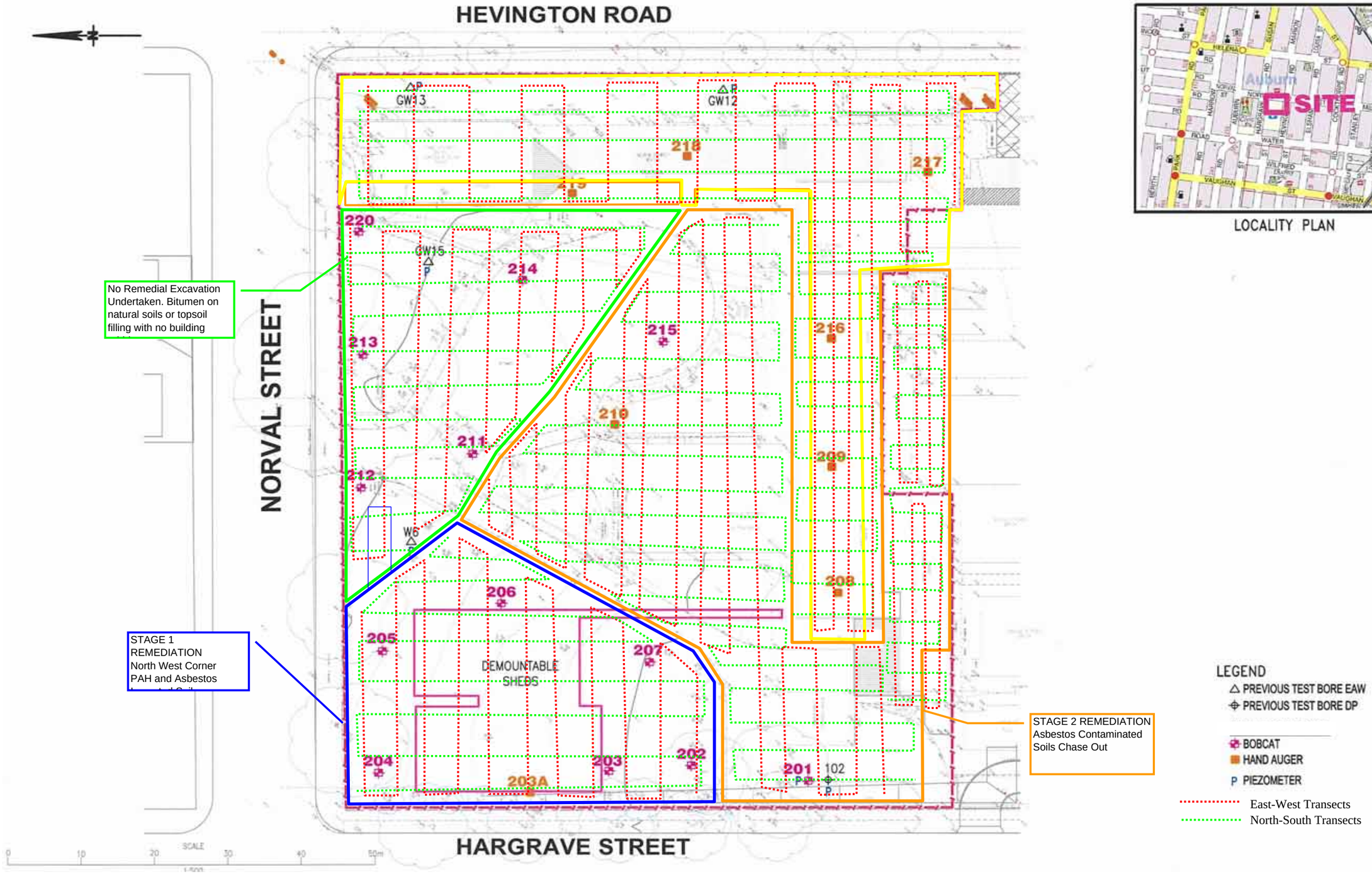
Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Stage 2 Validation Sampling Locations**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown		**Final Validation Assessment**	Drawing No: 7
	APPROVED BY	DATE: 12.10.09		**Stage 1B, Auburn Hospital**	Revision: A



LOCALITY PLAN

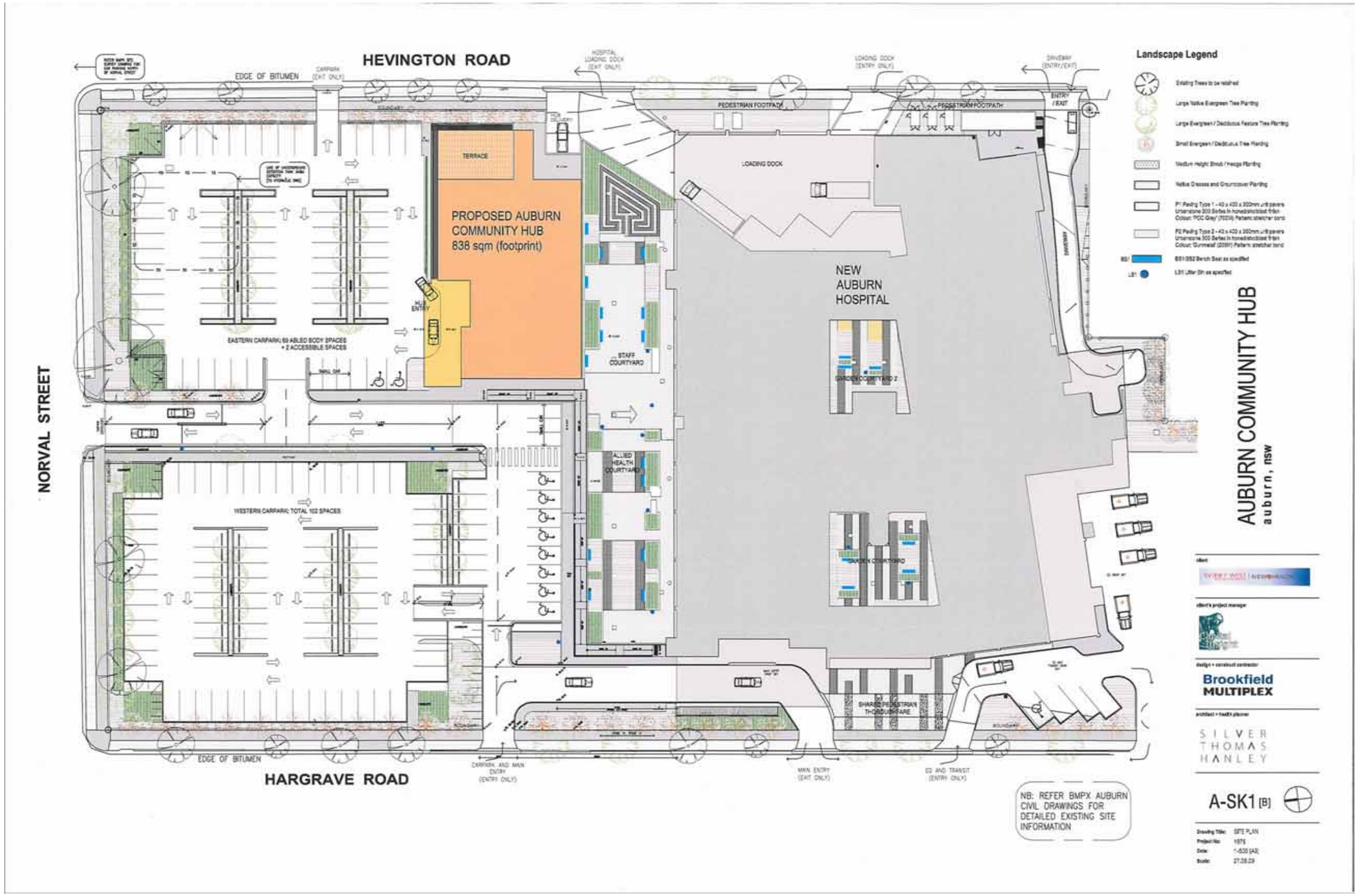
Douglas Partners
Geotechnics · Environment · Groundwater

CLIENT: Brookfield Multiplex			TITLE:	**Sample Bld 10 Chaseout**	Project No: 45686
DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney		**Final Validation Assessment**	Drawing No: 8
APPROVED BY		DATE: 12.10.09		**Stage 1B, Auburn Hospital**	Revision: A



LOCALITY PLAN

Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Site Walkover Transects**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	**Final Validation Assessment**	Drawing No: 9
	APPROVED BY		DATE: 12.10.09	**Stage 1B, Auburn Hospital**	Revision: A



Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: Brookfield Multiplex		TITLE:	**Proposed Site Redevelopment Layout**	Project No: 45686
	DRAWN BY: KDP	SCALE: As shown	OFFICE: Sydney	**Final Validation Assessment**	Drawing No: 10
	APPROVED BY		DATE: 12.10.09	**Stage 1B, Auburn Hospital**	Revision: A

APPENDIX B
Site Photos

APPENDIX C
Results Tables

Douglas Partners
Geotechnics - Environment - Groundwater

Table 1 - Validation Laboratory Results

Sample Location	Heavy Metals								PAH		TPH		Benzene	Toluene	Ethyl-benzene	Total Xylene	OCP[3]	OPP	PCB	Total Phenols	VOC[3]	Asbestos
	As	Cd	Cr[1]	Cu	Pb	Hg	Ni	Zn	B(a)P[2]	Total +ve PAH[3]	C6-C9	C10-C36										
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total												
NW Corner Valdiation Samples - Refer to Report Dated 23 July 2009																						
Wall Validation Samples																						
W1	9	<0.5	17	34	220	<0.1	10	220	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
BD1 240609[5]	5	<0.1	12	27	78	0.16	7	147	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	<0.05	<0.5	<0.5	<6.5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W2	-	-	-	-	-	-	-	-	26	335.6	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W3	-	-	-	-	-	-	-	-	0.7	6.4	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W4	6	<0.5	19	40	170	<0.1	10	180	1.9	25.5	<25	250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W5	-	-	-	-	-	-	-	-	0.5	5.3	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W6	-	-	-	-	-	-	-	-	0.3	3.3	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W7	12	<0.5	20	19	49	<0.1	5	91	0.09	0.69	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W8	-	-	-	-	-	-	-	-	0.1	1.5	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W9	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W10	<4	<1	9	80	10	<0.1	61	44	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W11	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W12	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
W13	6	<0.5	16	39	77	<0.1	16	82	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
Base Samples																						
B1	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B2	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B3	10	<0.5	19	24	21	<0.1	5	21	0.08	0.68	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
BD4 240609[4]	13	0.6	15	36	29	<0.1	4	36	0.2	2.4	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B4	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B5	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B6	4	<0.5	13	20	19	<0.1	3	20	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B7	-	-	-	-	-	-	-	-	0.4	3.6	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B8	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B9	8	<0.5	17	20	19	<0.1	3	15	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B10	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B11	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B12	-	-	-	-	-	-	-	-	<0.05	<0.1	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B13	<4	<0.5	12	19	26	<0.1	2	14	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
BD2 240609[5]	9	<0.1	13	21	13	<0.05	2	16	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	<0.05	<0.5	<0.5	<6.5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
B14	5	<0.5	12	19	26	<0.1	3	18	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
BD3 240609[4]	5	<0.5	8	23	160	<0.1	1	15	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected at 0.1g/kg respirable fibres not detected
Building Footprint Validation Samples																						
Bld 1	4	<0.5	7	31	11	<0.1	3	14	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
BD1 280809[4]	4	<0.5	9	36	13	<0.1	2	12	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Bld 2	8	0.6	15	59	34	<0.1	4	26	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 3	6	<0.5	8	28	17	<0.1	10	39	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
BD2 280809[4]	<4	<0.5	6	26	16	<0.1	4	110	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 4	23	<0.5	5	21	13	<0.1	2	14	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Bld 5	8	<0.5	10	31	17	<0.1	2	15	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Bld 6	4	<0.5	5	38	14	<0.1	3	25	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
BD3 280809[4]	<4	<0.5	6	32	34	<0.1	5	34	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 7	6	<0.5	9	41	16	<0.1	2	20	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Bld 8	<4	<0.5	7	31	25	<0.1	2	13	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 9	7	<0.5	15	21	18	<0.1	2	10	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Bld 10	5	<0.5	7	20	140	0.5	2	85	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	**Amosite Asbestos Detected**
Bld 10 -A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Bld 11	<4	<5	5	12	8	<0.1	<1	5	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Bld 12	<4	<0.5	4	21	27	<0.1	2	13	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Bld 13	<4	<0.5	10	32	13	<0.1	14	32	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 14	<4	<0.5	6	15	26	<0.1	2	18	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Bld 15	5	<0.5	9	17	13	<0.1	1	7	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 16	<4	<0.5	6	28	18	0.2	5	56	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 17	<4	<0.5	4	20	13	<0.1	1	10	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
BD4 280809[5]	3	<0.1	6	27	15	<0.05	2	13	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	<0.05	<0.5	<0.5	2.6	-	No asbestos detected
B18	5	<0.5	7	15	10	<0.1	1	10	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
B19	7	<0.5	17	19	39	0.2	6	84	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Bld 20	<4	<0.5	4	21	11	0.2	4	31	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
BD 5 280809[5]	4	<0.1	5	25	16	0.31	9	53	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	<0.05	<0.5	<0.5	3.8	-	No asbestos detected
Bld 21	8	<0.5	8	15	12	<0.1	2	11	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Bld 22	6	<0.5	6	31	13	1.7	25	85	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
Bld 23	5	<0.5	12	32	25	0.2	13	580	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Bld 24	<4	<0.5	6	22	16	<0.1	20	120	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
BD1 180809[4]	9	<0.5	6	40	19	<0.1	16	130	<0.05	<0.1	>25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
BD2 180809[5]	4	<0.1	4	25	13	0.05	14	94	<0.5	<0.5	<10	<250	<0.5	<0.5	<0.5	<1.5	<0.05	<0.5	<0.5	<6.5	<5/<0.5	No asbestos detected
Bld 25	5	<0.5	6	34	18	0.2	28	130	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected

Douglas Partners
Geotechnics - Environment - Groundwater

Table 1 - Validation Laboratory Results

Sample Location	Heavy Metals								PAH		TPH		BTEX				OCP[3]	OPP	PCB	Total Phenols	VOC[3]	Asbestos
	As	Cd	Cr[1]	Cu	Pb	Hg	Ni	Zn	B(a)P[2]	Total +ve PAH[3]	C6-C9	C10-C36	Benzene	Toluene	Ethyl-benzene	Total Xylene						
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total												
Bld 26	7	<0.5	14	32	16	0.4	22	85	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Bld 27	<4	<0.5	2	33	9	<0.1	16	49	<0.05	0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Bld 28	8	<0.5	9	37	18	<0.1	34	140	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Bld 29	24	<0.5	8	25	17	0.3	6	42	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	No asbestos detected
BD2 310809[5]	16	<0.1	8	28	15	0.07	12	63	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	-	-	-	-		No asbestos detected
Bld 30	8	<0.5	13	17	18	<0.1	3	24	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
BD1 310809[4]	8	<0.5	9	25	23	<0.1	6	45	0.08	0.88	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	No asbestos detected
Additional Base Samples - Outside Building Footprint																						
B15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B16	<4	<0.5	4	15	8	<0.1	1	8	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
B17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B19	8	<0.5	12	34	89	0.2	14	140	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
B20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B22	<4	<0.5	10	45	19	<0.1	2	34	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
B23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B25	<4	<0.5	9	42	18	<0.1	11	100	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
BD6 280809[5]	4	<0.1	6	16	11	<0.05	9	10	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	<0.05	<0.5	<0.5	<6.5	-	No asbestos detected
B26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
B29	9	<0.5	10	23	15	<0.1	5	32	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Footprint of Asbestos pipe contaminated soils Stockpile																						
B30	8	0.5	20	16	26	<0.1	-	-	-	-	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
Additional Wall Samples -																						
W14	8	<0.5	13	17	20	<0.1	2	26	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
W15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
W16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
W17	8	<0.5	16	16	16	0.2	4	20	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
W18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
W19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
W20	12	0.6	24	27	79	<0.1	8	57	0.1	1.5	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	No asbestos detected
W21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Results from Test Pits in Building Rubble Free Zone																						
TP15/0-0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
TP16/0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
TP17/0.1-0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Abestos Pipe Validation and Waste Classification																						
Asb-pipe-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Asb-pipe-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Asb-pipe-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Asb-Sop-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Asb-Sop-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Asb-Sop-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos detected
Abestos pipe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**Chrysotile and Amosite Asbestos detected**
													SAC									
HIL[7]	100	20	12%	1000	300	15	600	7000	1	20	65	1000	1[8]	1.4/130[8]	3.1/50[8]	14/25[8]	10/50/200/10[6]	ND	10	8500	-	None detected in surface soils
PPIL[9]	20	3	400	100	600	1	60	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1	All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) is too reactive and unstable under the normal environment
2	benzo(a)pyrene
3	where results less than practical quantitative limit (PQL), quoted as less than PQL for most individual compounds
4	Intralaboratory Duplicate of sample listed above
5	Interlaboratory duplicate of sample listed above
6	OCP SACs given in order Aldrin+Dieldrin/Chlordane/ DDD+DDE+DDT/Heptachlor
7	NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Soil Investigation Levels for Urban Redevelopment Sites in NSW Heath-based investigation levels for Commercial and Industrial sites (HIL Column 4).
8	NSW EPA Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994)
9	NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Provisional Phytotoxicity Based Investigation Levels (PPIL)
10	Waste Classification Guidelines 2008
11	Material pre-classified as per Waste Classification Guidelines as asphalt waste
Notes	
-	not analysed
ND	Not defined
BOLD	Exceeds SAC
Red	Hotspot Concentration
green	exceeds PPIL

Douglas Partners
Geotechnics · Environment · Groundwater

Table C2 - Waste Classification Results. NW Corner Waste Classification - Heavy Metals and PAH

Bore ID	Sample Depth (m)	Heavy Metals																PAH			
		As		Cd		Cr[1]		Cu		Pb		Hg		Ni		Zn		B(a)P[2]		Total +ve PAH[3]	
		Total	TCLP	Total	TCLP	Total	TCLP	Total	TCLP	Total	TCLP	Total	TCLP	Total	TCLP	Total	TCLP	Total	TCLP	Total	TCLP
TP1	0.2-0.5	9	<0.05	<0.5	<0.01	15	<0.01	28	<0.01	210	0.14	<0.1	<0.0005	8	<0001	87	0.16	<0.05	<0.001	<0.1	<0.001
BD1 110609[5]		6	-	0.2	-	7	-	22	-	241	-	0.26	-	5	-	115	-	<0.5	-	<0.5	-
TP2	0.2-0.5	10	-	<0.5	-	14	-	28	-	89	-	0.1	-	9	-	86	-	0.1	-	0.6	-
TP3	0.1-0.3	6	-	<0.5	-	13	-	32	-	160	-	0.1	-	9	-	240	-	0.4	-	2.8	-
TP4	0.1-0.3	8	<0.05	<0.5	<0.01	17	<0.01	26	0.01	120	<0.03	0.1	<0.0005	6	<0.02	120	0.73	0.4	<0.001	4.1	<0.001
TP5	0.1-0.3	10	-	0.6	-	27	-	210	-	180	-	0.2	-	8	-	79	-	0.1	-	0.9	-
TP6	0.1-0.3	9	-	0.6	-	19	-	27	-	100	-	<0.1	-	5	-	47	-	<0.05	-	<0.1	-
TP7	0.1-0.3	9	<0.05	0.6	<0.01	18	<0.01	30	0.01	480	0.7	0.5	<0.0005	9	<0.02	250	0.82	0.3	<0.001	3.3	<0.001
BD3 110609[4]		6	-	<0.5	-	11	-	26	-	270	-	0.6	-	9	-	140	-	0.1	-	1	-
A1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A2 (TP1)	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A3 (TP7)	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAC																					
HIL[7]		100		20		12%		1000		300		15		600		7000		1		20	
PPIL[9]		20		3		400		100		600		1		60		200		-		-	
Waste Classification Criteria[10]																					
General Solid Waste Without TCLP		100	-	20	-	100	-	-	-	100	-	4	-	40	-	-	-	0.8	-	-	-
General Solid Waste With TCLP		500	5	100	1	1900	5	-	-	1500	5	50	0.2	1050	2	-	-	10	0.04	200	-

Notes

1	All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) is too reactive and unstable under the normal environment
2	benzo(a)pyrene
3	where results less than practical quantitative limit (PQL), quoted as less than PQL for most individual compounds
4	Intralaboratory Duplicate of sample listed above
5	Interlaboratory duplicate of sample listed above
6	OCP SACs given in order Aldrin+Dieldrin/Chlordane/ DDD+DDE+DDT/Heptachlor
7	NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Soil Investigation Levels for Urban Redevelopment Sites in NSW Heath-based investigation levels for Commercial and Industrial sites (HIL Column 4).
8	NSW EPA Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994)
9	NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Provisional Phytotoxicity Based Investigation Levels (PPIL)
10	Waste Classification Guidelines 2008
11	Material pre-classified as per Waste Classification Guidelines as asphalt waste
Notes	
-	not analysed
ND	Not defined
BOLD	Exceeds SAC
Red	Hotspot Concentration
green	exceeds PPIL
Italics	Exceeds General Solid Waste

Douglas Partners
Geotechnics · Environment · Groundwater

Table C3 - Additional Waste Classification Results from Remediation Stage

Bore ID	Sample Depth (m)	TPH C6-C9	TPH C10-C36	Benzene	Toluene	Ethyl-benzene	Total Xylene	OCP[3]	OPP	PCB	Total Phenols	VOCs	pH	Asbestos	Building Rubble Present
North West Corner 110609															
TP1	0.2-0.5	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	7.5	No asbestos/fibre detected	Yes
BD1 110609[5]		<10	<250	<0.2	<0.5	<0.5	<1.5	<0.05	<0.5	<0.5	0.3	-	8	No asbestos/fibre detected	Yes
TP2	0.2-0.5	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos/fibre detected	Yes
TP3	0.1-0.3	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos/fibre detected	No
TP4	0.1-0.3	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos/fibre detected	No
TP5	0.1-0.3	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	6.6	No asbestos/fibre detected	Yes
TP6	0.1-0.3	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos/fibre detected	No
TP7	0.1-0.3	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	8.4	No asbestos/fibre detected	Yes
BD3 110609[4]		<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	8	No asbestos/fibre detected	Yes
A1	0	-	-	-	-	-	-	-	-	-	-	-	-	No asbestos/fibre detected	-
A2 (TP1)	0.3	-	-	-	-	-	-	-	-	-	-	-	-	**chrysotile asbestos detected, respirable fibres not detected**	-
A3 (TP7)	0.2	-	-	-	-	-	-	-	-	-	-	-	-	**chrysotile asbestos detected, respirable fibres not detected**	-
Extention of Asbestos Contaminated Soils Assessment 180909															
ACM1	-	-	-	-	-	-	-	-	-	-	-	-	-	**Chrysotile and amosite asbestos detected**	-
ACM2	-	-	-	-	-	-	-	-	-	-	-	-	-	**Chrysotile and amosite asbestos detected**	-
ACM3	-	-	-	-	-	-	-	-	-	-	-	-	-	**Chrysotile asbestos detected**	-
ACM4	-	-	-	-	-	-	-	-	-	-	-	-	-	**Chrysotile asbestos detected**	-
ACM5	-	-	-	-	-	-	-	-	-	-	-	-	-	**Chrysotile asbestos detected**	-
SAC															
HIL[7]	65	1000	1[8]	1.4/130[8]	3.1/50[8]	14/25[8]	10/50/200/10[6]	ND	10	8500	ND	-		None detected in surface soils	-
PPIL[9]	-	-	-	-	-	-	-	-	-	-	-	-		-	-
Waste Classification Criteria[10]															
General Solid Waste Without TCLP	-	-	10	288	600	1000	-	-	-	288	-	-		Nil Detected	-
General Solid Waste With TCLP	650	10000	18	518	1080	1800	<50	<50	<50	518	-	-		Nil Detected	-

Notes

1 All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) is too reactive and unstable under the normal environment
2 benzo(a)pyrene
3 where results less than practical quantitative limit (PQL), quoted as less than PQL for most individual compounds
4 Intralaboratory Duplicate of sample listed above
5 Interlaboratory duplicate of sample listed above
6 OCP SACs given in order Aldrin+Dieldrin/Chlordane/ DDD+DDE+DDT/Heptachlor
7 NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition
8 NSW EPA Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994)
9 NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Provisional Phytotoxicity Based Investigation Levels (PPIL)
10 Waste Classification Guidelines 2008
11 Material pre-classified as per Waste Classification Guidelines as asphalt waste

Notes

- not analysed
ND Not defined
BOLD Exceeds SAC
Red Concentration
green exceeds PPIL
Italics Exceeds General Solid Waste

Table C4. Phase 2 Contamination Assessment Results

Bore ID	Sample Depth (m)	Material Type	Heavy Metals								PAH		TPH		Benzene	Toluene	Ethyl-benzene	Total Xylene	OCP[1]	OPP	PCB	Total Phenols	VOCs	pH	Asbestos
			As	Cd	Cr[1]	Cu	Pb	Hg	Ni	Zn	B(a)P[2]	Total +ve PAH[3]	C6-C9	C10-C36											
DP Preliminary Contamination Assessment 2006																									
102	0.1	Filling	<4	<1	18	57	20	<0.1	*110*	54	<0.05	<0.1	<25	<250	<1	<1	<1	<3	<2	-	<1.5	<5	-	-	-
Current DP Investigation 2009																									
201	0.1-0.2	Filling	<4	<0.5	19	43	26	<0.1	*64*	45	0.2	2.4	<25	<250	<0.5	<0.5	<1	<3	-	<0.1	-	-	-	-	No asbestos/fibre detected
201	0.3-0.5	Filling	11	<0.5	22	28	52	<0.1	18	58	0.3	3.7	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	<10/<1	8.4	No asbestos/fibre detected
201	0.8-1.0	Shale	10	<0.5	10	29	24	<0.1	10	23	0.08	0.58	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
BD1 050209[5]		Shale	8	<0.1	9	22	29	<0.05	10	19	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	-	-	-	-	-	-	-
202	0.1-0.3	Filling	9	<0.5	17	29	*170*	0.2	12	100	0.1	0.7	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	**chrysotile asbestos detected** **Amosite asbestos detected respirable fibres not detected**
202	0.8-1.0	Filling	7	<0.5	14	96	*110*	0.2	8	93	0.1	0.5	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	No asbestos/fibre detected
203	0.1-0.3	Filling	7	<0.5	15	32	*130*	0.2	10	160	0.2	1.7	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	7.1	-
203	0.5-0.6	Filling	9	1	17	32	*150*	0.2	11	650	0.8	8.4	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	No asbestos/fibre detected
203A	0-0.2	Filling	8	<0.5	15	36	*170*	0.2	7	120	***15***	***157.8***	<25	740	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	No asbestos/fibre detected
204	0.1-0.2	Filling	7	<0.5	21	37	*170*	0.1	10	160	0.8	10.4	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	No asbestos/fibre detected
BD3 060209[4]		Filling	8	<0.5	23	34	*140*	0.1	9	110	**1.1**	12	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
204	0.3-0.5	Filling	7	<0.5	20	25	55	<0.1	10	58	0.06	0.26	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	No asbestos/fibre detected
205	0.1-0.3	Filling	8	<0.5	20	29	*130*	0.2	8	140	0.1	0.9	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	<10/<1	8.3	No asbestos/fibre detected
205	0.7-0.9	Shale	7	<0.5	15	23	61	0.1	4	61	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
206	0.1-0.3	Filling	7	<0.5	13	28	94	0.2	5	130	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	No asbestos/fibre detected
206	0.5-0.7	Shale	6	<0.5	10	34	51	0.1	5	67	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
207	0.1-0.3	Filling	9	<0.5	15	39	*140*	0.1	8	100	0.09	0.59	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	-	No asbestos/fibre detected
207	0.7-1.0	Silty Clay	4	<0.5	9	37	25	<0.1	4	37	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
208	0-0.1	Filling	8	<0.5	7	45	20	0.1	17	71	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	8.2	No asbestos/fibre detected
209	0-0.2	Filling	5	<0.5	7	42	22	<0.1	10	52	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	0.5	-	-	-	-	-	No asbestos/fibre detected
209	0.5-0.6	Filling	5	<0.5	9	38	22	<0.1	6	49	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	0.2	<0.1	<0.1	<5	-	-	-
210	0.1-0.2	Filling	7	<0.5	15	24	60	0.3	4	26	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	7.9	No asbestos/fibre detected
211	0.1-0.3	Filling	5	<0.5	17	18	14	<0.1	10	10	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	<10/<1	5.3	No asbestos/fibre detected
211	0.4-0.45	Shale	<4	<0.5	43	28	31	<0.1	29	23	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
212	0.1-0.3	Filling	9	<0.5	19	22	43	0.1	5	30	0.1	1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	-	-	No asbestos/fibre detected
213	0.1-0.3	Filling	7	<0.5	19	49	100	0.3	8	120	0.2	1.2	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	No asbestos/fibre detected
213	0.3-0.6	Filling	8	<0.5	19	33	55	0.1	5	61	0.2	1.8	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	No asbestos/fibre detected
214	0.25-.04	Filling	7	<0.5	48	27	50	0.2	*42*	66	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	<10/<1	8.5	No asbestos/fibre detected
214	0.8-1	Silty Clay	8	<0.5	18	17	21	<0.1	7	22	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
215	0.3-0.5	Filling	7	<0.5	25	25	72	0.3	18	100	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	7.6	No asbestos/fibre detected
215	1.8-2	Shale	<4	<0.5	5	49	12	<0.1	12	91	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
216	0.3-0.4	Filling	5	<0.5	7	36	16	<0.1	29	130	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	<10/<1	11.1	No asbestos/fibre detected
217	0.25-0.35	Filling	10	<0.5	8	40	27	0.1	26	82	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	No asbestos/fibre detected
BD1 030209[5]		Filling	10	0.1	7	42	21	0.07	22	81	<0.5	<0.5	<10	<250	<0.2	<0.5	<0.5	<1.5	<0.05	-	<0.5	<0.5	-	-	-
218	0.4-0.6	Filling	14	<0.5	6	49	17	0.2	*58*	160	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	<0.1	<0.1	<5	<10/<1	-	No asbestos/fibre detected
BD2 030209[4]		Filling	19	<0.5	6	47	18	0.1	*65*	190	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	-
219	0.4-0.5	Filling	<4	<0.5	3	33	9	<0.1	4	23	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	No asbestos/fibre detected
219	0.9-1.0	Shale	<4	<0.5	2	31	8	<0.1	3	17	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
220	0-0.2	Filling	6	<0.5	14	31	51	0.1	10	67	0.1	0.5	<25	<250	<0.5	<0.5	<1	<3	-	<0.1	-	-	<10/<1	7.6	-
220	0.4-0.6	Filling	11	<0.5	17	21	53	0.2	6	770	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	<0.1	-	<0.1	<5	-	-	No asbestos/fibre detected
220	1.3-1.5	Shale	11	<0.5	11	30	22	0.1	5	100	<0.05	<0.1	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-	-	-
Waterproof Membrane		material	-	-	-	-	-	-	-	-	0.8	11.3	<25	***24000***	<0.5	<0.5	<1	<3	-	-	-	-	-	-	no asbestos detected
SAC																									
HIL[7]			100	20	12%	1000	300	15	600	7000	1	20	65	1000	1[8]	1.4/130[8]	3.1/50[8]	14/25[8]	10/50/200/10[6]	ND	10	8500	ND	-	None detected in surface soils
PPIL[9]			20	3	400	100	600	1	60	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Classification Criteria[10]																									
General Solid Waste Without TCLP			100	20	100	-	100	4	40	-	0.8	-	-	-	10	288	600	1000	-	-	-	288	-	-	Nil Detected
General Solid Waste With TCLP			500	100	1900	-	1500	50	1050	-	10	200	650	10000	18	518	1080	1800	<50	<50	<50	518	-	-	Nil Detected

Notes

1. All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) is too reactive and unstable under the normal environment
2. benzo(a)pyrene
3. where results less than practical quantitative limit (PQL), quoted as less than PQL for most individual compounds
4. Intralaboratory Duplicate of sample listed above
5. Interlaboratory duplicate of sample listed above
6. OCP SACs given in order Aldrin+Dieldrin/Chlordane/ DDD+DDE+DDT/Heptachlor
7. NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Soil Investigation Levels for Urban Redevelopment Sites in NSW Heath-based investigation levels for Commercial and Industrial sites (HIL Column 4).
8. NSW EPA Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994)
9. NSW DECC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006) Provisional Phytotoxicity Based Investigation Levels (PPIL)
10. Waste Classification Guidelines 2008
11. Material pre-classified as per Waste Classification Guidelines as asphalt waste

Notes

- not analysed
ND Not defined
BOLD Exceeds SAC
Red Hotspot Concentration
green exceeds PPIL
Italics Exceeds General Solid Waste without TCLP

Douglas Partners
Geotechnics · Environment · Groundwater

Table C5 Phase 2 Assessment Groundwater Results

Sample ID	Heavy Metals								Hardness ($mgCaCO_3/L$)	pH	PCBs						
	As	Cd	Ch	Cu	Pb	Hg	Ni	Zn			Total[3]	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254
EAW Investigation Results 2007																	
GW6	70	0.3	21	8	36	<0.1	71	134	-	-	<1	-	-	-	-	-	-
GW12	4	0.5	12	31	40	<0.1	16	164	-	-	-	-	-	-	-	-	-
GW13	8	0.8	13	26	18	<0.1	34	124	-	-	-	-	-	-	-	-	-
GW15	2	1.1	20	33	37	<0.1	30	164	-	-	-	-	-	-	-	-	-
DP Results 2009 (current)																	
GW6	2.6	<0.1	<1	<1	<1	<0.5	8.6	4.3	2700	6.6	<0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GW12	1	<0.1	4.8	2.3	<0.5	<0.5	5.1	35	53	8	<0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GW13	<1	0.1	<1	<1	<1	<0.5	4.4	56	560	6.6	<0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GW15	<1	0.8	<1	<1	<1	<0.5	22	61	1700	6.6	<0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
201-GW	1.1	0.1	<1	1.8	<1	<0.5	6.8	25	2900	6.7	<0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BD1 160209[1]	1.6	0.1	<1	1.4	<1	<0.5	5.8	28	-	-	<0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BD2 160209[2]	<10	0.1	<5	<4	<1	<0.1	7	22	-	-	<0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Guidelines																	
ANZECC	13	0.2	1	1.4	3.4	0.06	11	8	Not Specified	-	Not Specified	0.001	1	0.3	0.3	0.3	0.01
HMTV[4]	-	2	8.4	12.6	90.8	-	99	72	-	-	-	-	-	-	-	-	-

Notes:

1 Intra-laboratory Duplicate of 201-GW
2 Inter-laboratory duplicate of 201-GW
3 Given as sum of PQL of all analytes in list where all analytes below PQL
4 Hardness modified trigger value for extremely hard waters (hardness 400)

Shading Exceeds GIL

Douglas Partners
Geotechnics · Environment · Groundwater

Table C6 Phase 2 Assessment Groundwater Results

	TPH		BTEX				PAH						Phenols
Sample ID	**C6-C9**	**C10-C36**	**Benzene**	**Toluene**	**Ethyl benzene**	**Xylenes**	**Total[3]**	**Benzo(a)Pyrene**	**Naphthalene**	**Anthracene**	**Phenanthrene**	**Fluoranthene**	**Total**
EAW Investigation Results 2007													
GW6	<20	<250	<1	<2	<2	<2	<7	<1	<1	<1	<1	<1	
GW12	<20	<250	<1	<2	<2	<2	-	-	-	-	-	-	
GW13	<20	<250	<1	<2	<2	<2	-	-	-	-	-	-	
GW15	<20	<250	<1	<2	<2	<2	-	-	-	-	-	-	
DP Results 2009 (current)													
GW6	<10	<250	<1	<1	<1	<3	<1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<50
GW12	<10	<250	<1	<1	<1	<3	<1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<50
GW13	<10	<250	<1	<1	<1	<3	<1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<50
GW15	<10	<250	<1	<1	<1	<3	<1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<50
201-GW	<10	<250	<1	<1	<1	<3	<1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<50
BD1 160209[1]	<10	<250	<1	<1	<1	<3	<1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<50
BD2 160209[2]	<50	<300	<5	<5	<5	<15	0.7	<0.05	<0.1	<0.1	0.2	0.2	<34
Guidelines													
	150	600	950	180	80	550	Not Specified	0.2	16	0.4	2	1.4	320

Notes:

1 Intra-laboratory Duplicate of 201-GW
2 Inter-laboratory duplicate of 201-GW
3 Given as sum of PQL of all analytes in list where all analytes below PQL

Table C7 - Phase 2 Groundwater Results

	OCPs						OPP								
Sample ID	**Total[3]**	**Chlordane**	**DDT**	**Endosulfan**	**Endrin**	**Heptachlor**	**Total[3]**	**Demonton-S-methyl**	**Diazinon**	**Dimethoate**	**Chloropyrifos**	**Malathion**	**Azinophos Methyl**	**Fenitrothion**	**Parathion (ethyl)**
EAW Investigation Results 2007															
GW6	<0.5	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	-
GW12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DP Results 2009 (current)															
GW6	<0.022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GW12	<0.022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GW13	<0.022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GW15	<0.022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
201-GW	<0.022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BD1 160209[1]	<0.022	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-
BD2 160209[2]	<0.19	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-
Guidelines															
	Not Specified	0.08	0.01	0.2	0.02	0.09	Not Specified	0.4	0.01	0.15	0.01	0.05	0.02	0.2	0.004

Notes:

1 Intra-laboratory Duplicate of 201-GW
2 Inter-laboratory duplicate of 201-GW
3 Given as sum of PQL of all analytes in list where all analytes below PQL

Table C8. Phase 2 Assessment Groundwater Results

Analyte	Sample ID								ANZECC	Dutch	Region 9
	GW6	GW12	GW13	GW15	201-GW	BD1 160209[1]	BD2 160209[2]				
Dichlorodifluoromethane	<10	<10	<10	<10	<10	<10	<50		-	-	-
Chloromethane	<10	<10	<10	<10	<10	<10	<50		-	-	160
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<50		100	-	0.02
Bromomethane	<10	<10	<10	<10	<10	<10	<50		-	-	8.7
Chloroethane	<10	<10	<10	<10	<10	<10	<50		-	-	4.6
Trichlorodifluoromethane	<1	<1	<1	<1	<1	<1	<5		-	-	1300
1,1-Dichloroethene	<1	<1	<1	<1	<1	<1	<5		700	-	340
Trans-1,2-dichloroethene	<1	<1	<1	<1	<1	<1	<5		-	-	120
1,1-dichloroethane	<1	<1	<1	<1	<1	<1	<5		90	900	810
Cis-1,2-dichlorethene	<1	<1	<1	<1	<1	<1	<5		-	-	61
Bromochloromethane	<1	<1	<1	<1	<1	<1	<5		-	-	-
Chloroform	<1	<1	<1	<1	<1	<1	<5		370	400	0.17
2,2-dichlorpropane	<1	<1	<1	<1	<1	<1	<5		-	-	-
1,2-dichloroethane	<1	<1	<1	<1	<1	<1	<5		1900	400	0.12
1,1,1-trichloroethane	<1	<1	<1	<1	<1	<1	<5		270	300	3200
1,1-dichloropropene	<1	<1	<1	<1	<1	<1	<5		500	-	-
Carbon tetrachloride	<1	<1	<1	<1	<1	<1	<5		240	-	0.17
Benzene	<1	<1	<1	<1	<1	<1	<5		950	30	-
Dibromomethane	<1	<1	<1	<1	<1	<1	<5		-	-	-
Trichloroethene	<1	<1	<1	<1	<1	<1	<5		330	-	0.028
Bromodichloromethane	<1	<1	<1	<1	<1	<1	<5		-	-	1.15
trans-1,3-dichloropropene	<1	<1	<1	<1	<1	<1	<5		-	-	-
cis-1,3-dichloropropene	<1	<1	<1	<1	<1	<1	<5		-	-	-
1,1,2-trichloroethane	<1	<1	<1	<1	<1	<1	<5		1900	130	0.25
Toluene	<1	<1	<1	<1	<1	<1	<5		180	1000	720
1,3-dichloropropane	<1	<1	<1	<1	<1	<1	<5		1100	-	120
Dibromochloromethane	<1	<1	<1	<1	<1	<1	<5		-	-	0.13
1,2-dibromoethane	<1	<1	<1	<1	<1	<1	<5		-	-	0.0056
Tetrachloroethene	<1	<1	<1	<1	<1	<1	<5		70	40	0.1
1,1,1,2-tetrachloroethane	<1	<1	<1	<1	<1	<1	<5				0.43
Chlorobenzene	<1	<1	<1	<1	<1	<1	<5		55	-	110
Ethylbenzene	<1	<1	<1	<1	<1	<1	<5		80	150	1300
Bromoform	<1	<1	<1	<1	<1	<1	<5		-	-	8.55
m+p-xylene	<2	<2	<2	<2	<2	<2	<10		200+75	-	-
Styrene	<1	<1	<1	<1	<1	<1	<5		-	300	2100
1,1,2,2-tetrachloroethane	<1	<1	<1	<1	<1	<1	<5		400		0.055
o-xylene	<1	<1	<1	<1	<1	<1	<5		350	-	210
1,2,3-trichloropropane	<1	<1	<1	<1	<1	<1	<5		-	-	0.0056
Isopropylbenzene	<1	<1	<1	<1	<1	<1	<5		30	-	6.2
Bromobenzene	<1	<1	<1	<1	<1	<1	<5		-	-	20
n-propyl benzene	<1	<1	<1	<1	<1	<1	<5		-	-	240
2-chlorotoluene	<1	<1	<1	<1	<1	<1	<5		-	-	-
4-chlorotoluene	<1	<1	<1	<1	<1	<1	<5		-	-	-
1,3,5-trimethyl benzene	<1	<1	<1	<1	<1	<1	<5		-	-	12
Tert-butyl benzene	<1	<1	<1	<1	<1	<1	<5		-	-	240
1,2,4-trimethyl benzene	<1	<1	<1	<1	<1	<1	<5		-	-	12
1,3-dichlorobenzene	<1	<1	<1	<1	<1	<1	<5		260	-	180
Sec-butyl benzene	<1	<1	<1	<1	<1	<1	<5		-	-	240
1,4-dichlorobenzene	<1	<1	<1	<1	<1	<1	<5		60	-	0.5
4-isopropyl toluene	<1	<1	<1	<1	<1	<1	<5		-	-	-
1,2-dichlorobenzene	<1	<1	<1	<1	<1	<1	<5		160	-	370
n-butyl benzene	<1	<1	<1	<1	<1	<1	<5		-	-	-
1,2-dibromo-3-chloropropane	<1	<1	<1	<1	<1	<1	<5		-	-	0.048
1,2,4-trichlorobenzene	<1	<1	<1	<1	<1	<1	<5	Guidelines	80	-	-
Hexachlorobutadiene	<1	<1	<1	<1	<1	<1	<5		-	-	0.86
1,2,3-trichlorobenzene	<1	<1	<1	<1	<1	<1	<5		3	-	-

Notes:

1 Intra-laboratory duplicate of 201-GW
2 Inter-laboratory duplicate of 201-GW

APPENDIX D
Test Bore/Pit Logs, Record of Samples and Notes Relating to this Report

APPENDIX E
Material Disposal Documentation

APPENDIX F
Imported VENM Certificates

APPENDIX G
Building Demolition Asbestos Clearance Reports

APPENDIX H
Asbestos Fibre Monitoring Reports

APPENDIX I
ANSTO Reports

APPENDIX J
PID Calibration Certificates

APPENDIX K
Laboratory Reports and Chain of Custody Information

APPENDIX L
Quality Assurance and Quality Control