



4.5 Heritage Aspects

The archaeological assessment undertaken by Banksia Heritage and Archaeology (Banksia Heritage and Archaeology, 2004) indicates that all structural remains of the retort house and gas governor are likely to have been removed, with these features now providing negligible significance in regards to heritage aspects.

The retaining wall is also considered to be of low significance and is a common modern type - rail infrastructure item.



5 Review of Previous Investigations

This section of the report provides an assessment of the site contamination data provided in previous investigations conducted at the Former Gasworks site and the overall Macdonaldtown Triangle area. The available information is initially identified (Section 5.1) followed by an assessment of the main investigation reports (Sections 5.2 to 5.4). Information obtained from an early site inspection conducted by SKM is then presented (Section 5.5). Assessments of the available data are then provided (Section 5.6), which include an analysis of soil data from the Former Gasworks site, a groundwater analysis and the identification of data uncertainties. The data provided by the previous investigations is then used to define a conceptual contamination model for the site (Section 5.7). This model is then used to determine the data gaps that existed in the information provided by the previous investigations (Section 5.8), which forms the basis for the design of the investigation program undertaken for this study.

5.1 Available Information

Stage 1 and 2 Environmental Assessments were undertaken at the Former Gasworks site by CH2MHill in June 2000 and additional investigations were undertaken at the Site and in the surrounding area in November 2001.

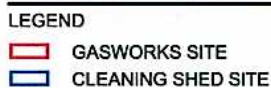
SKM has reviewed all available site contamination reports previously undertaken at the Macdonaldtown Triangle area, which comprise in chronological order:

- IT Environmental (April 1999). *"Environmental Condition Audit, 4GT Maintenance Facility – Eveleigh Rail Yards"*;
- CH2MHill (13 June 2000) *"Macdonaldtown Triangle Phase 1 and 2 Environmental Site Assessments"*;
- CH2MHill (November 2000) *"Vegetable, soil and sediment sampling from the Former Gasworks Area of the Macdonaldtown Triangle, Erskineville, New South Wales"*; and
- CH2MHill (November 2001) *"Soil and Groundwater Investigations of the Former Gasworks Area and Off Site, Macdonaldtown Triangle, Erskineville"*;

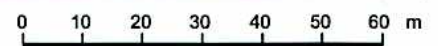
The information obtained by the IT (April 1999) report was included as part of the CH2MHill (June 2000) report, with the main findings summarised in **Section 5.2**. The main findings of the two later CH2MHill reports are summarised in **Sections 5.3** and **5.4**, followed by a review of the groundwater data in **Section 5.5**.

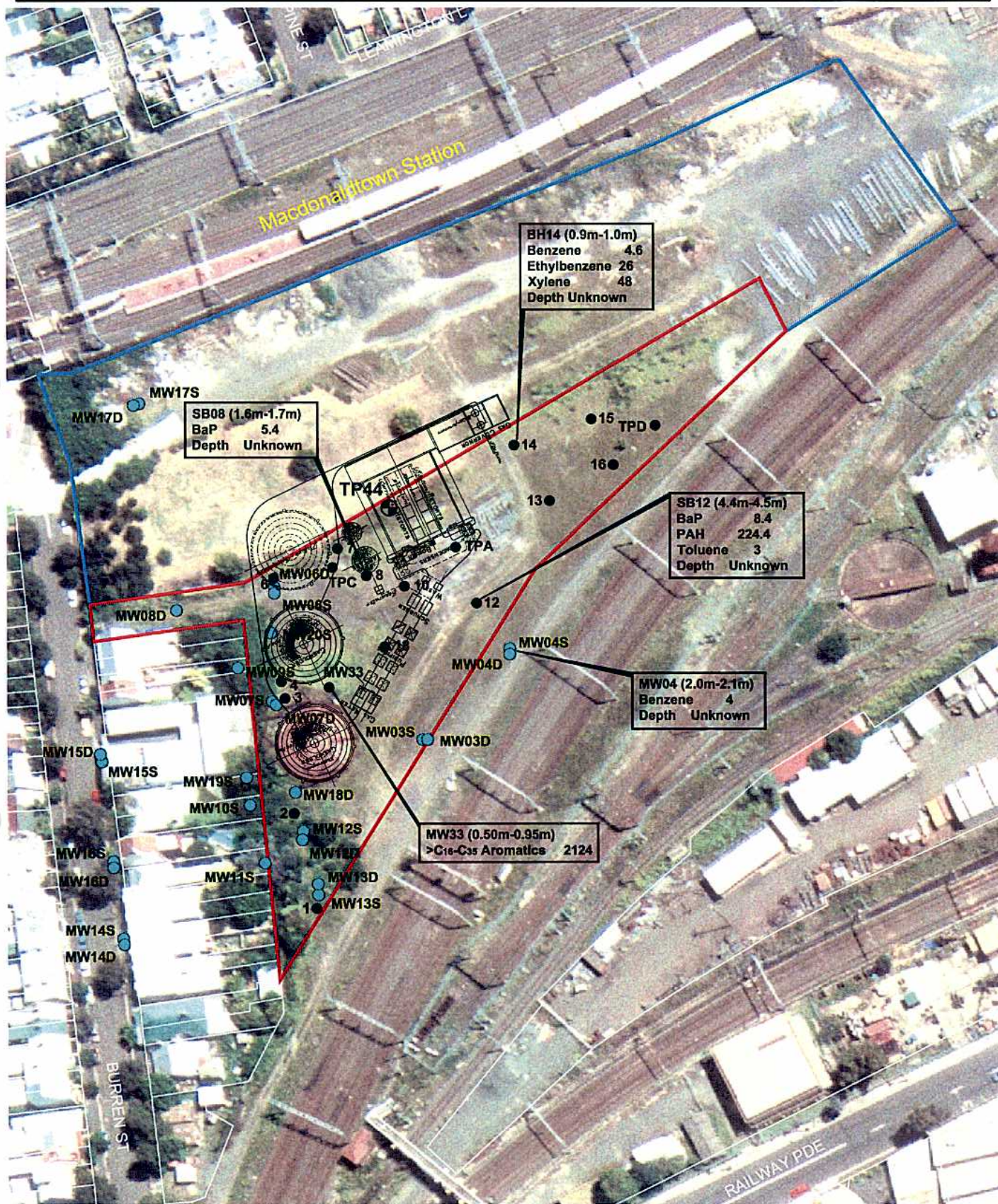
The locations where contamination was found by previous investigations to exceed Investigation Levels are shown in **Figures 7** and **8**, with copies of figures from earlier reports showing all sampling locations provided in **Appendix G**.

SINCLAIR KNIGHT MERZ



NOTE
ALL CONTAMINANT CONCENTRATIONS IN mg/kg





LEGEND
 [Red Outline] GASWORKS SITE
 [Blue Outline] CLEANING SHED SITE

NOTE
 ALL CONTAMINANT CONCENTRATIONS IN mg/kg

0 10 20 30 40 50 60 m





5.2 CH2MHill 13 June 2000

This Phase 1 and 2 Environmental Site Assessment involved an investigation across the Macdonaldtown Triangle area that included sampling soils at 50 locations and the investigation of groundwater at 3 shallow (up to 2m) and 3 deep (up to 10m) monitoring wells designated MW 03S, MW 03D, MW 04S, MW 04D, MW 06S and MW 06D. The main findings made by the investigation are as follows.

Former Cleaning Shed Area

- Fill consisting of sand, gravel, ballast, ash and coke is widespread across the area at varying depths of between 0.2 to 2.5m.
- 25 sampling locations were investigated across the Former Cleaning Shed Site with 40 samples analysed for heavy metals, 39 samples analysed for PAHs; 5 samples analysed for VOCs; 29 samples analysed for BTEX, and 3 samples analysed for TPH, phenols, OCPs and PCBs.
- Soil samples analysed were generally below the *Investigation Levels*, however isolated hot spots of contamination were identified including PAHs, benzene and toluene.

Former Gasworks Area

- Fill material was found to be widespread across the Former Gasworks area, varying between 0.1 to 3.2m in depth.
- Contamination including TPH, PAH and BTEX is widespread throughout the fill material but not in the underlying natural soils, as shown in **Figures 7 and 8**.

Groundwater Assessment

- Groundwater investigations of both the surficial and Ashfield Shale aquifer were only undertaken in the former gasworks area due to the thin layer of fill and the extensive nature of a concrete slab identified below the surface of the former cleaning shed area.
- For the surficial aquifer, PAH, TPH, metals, phenols and BTEX contamination was identified exceeding the ANZECC 1992 criteria by up to three orders of magnitude. The groundwater is expected to flow towards the south south-east but may be affected by underground structures. There is also the potential for surficial groundwater to seep out along fill material into an open drain adjacent the southwestern boundary and/or onto residential properties.
- Concentrations of PAHs, benzene, heavy metals and phenols in the fractured Ashfield Shale Aquifer exceeded the ANZECC 1992 Guidelines. The groundwater in this aquifer is expected to flow in a south south-east direction but may be affected if any of the remaining structures extend to its depth.



Recommendations

The recommendations made by the Phase 1 and 2 Environmental Site Assessment were:

- Notification to the EPA with respect to the potential for the Site to pose a “significant risk of harm”.
- Cessation of all works in the former gasworks area.
- Minimise activities in the Former Cleaning Shed area for access purpose only.
- Cessation of public access and usage of the Site by local residents.
- Development of an EMP, OH&S, and RAP for the Macdonaldtown Triangle area.
- Development of a community information strategy to inform all relevant stakeholders.
- Undertake a soil gas survey, surface soil sampling and surficial groundwater sampling program within the residential properties bounding the south-western portion of the Site.
- Collection of soil samples from vegetable gardens currently being used by local residents on Site.
- More detailed assessment of the groundwater quality of both the shallow aquifer and deeper fractured Ashfield Shale aquifer.
- Prior to future development to the north east of the area, soil sampling should be undertaken in this area to assess whether the soil contamination identified in the Former Cleaning Shed area extends across the investigation boundary.

5.3 CH2MHill November 2000

The CH2MHill report identified a surface drain located along the western boundary of the former gasworks site that was considered likely to receive surface water from the Former Cleaning Shed and Former Gasworks areas. Investigations conducted as part of the November 2000 report involved the collection of sediment samples at three sampling locations along the drain to assess the potential for contamination to migrate from the Macdonaldtown Triangle area.

The results indicated that concentrations of lead, TPH C₁₀-C₃₆, benzo(a)pyrene and total PAHs were greater than the adopted *Investigation Levels* for commercial/industrial land use. The report concluded that the drain was impacted by contamination from the former gasworks operation, although the migration was considered to be limited, with decreasing contaminant levels away from the investigation area.

5.4 CH2MHill November 2001

The aim of the assessment was to further delineate the status of groundwater quality and soil contamination within the western portion of the former gasworks area together with selected properties to the west along the eastern side of Burren Street.

SINCLAIR KNIGHT MERZ



Twenty-one groundwater wells were constructed that included 12 shallow and 9 deep monitoring wells. The majority of locations comprised a nested pair of shallow and deep wells.

East Burren Street Residential Area

- Soils consisted of fill up to 0.8m deep over natural clays.
- Soil samples collected and analysed from all four residential backyards tested indicated that some potential contaminants of primary concern (CoPC) have been identified that exceed the *Investigation Levels*.
- The CoPC include lead, TPH and PAH.
- The CoPC were identified in both soils at the surface and below the surface.
- Groundwater was recorded at approximately 1m below ground surface.
- Groundwater flows towards the south and south-east.
- Groundwater does not appear to flow from the former gasworks towards the residences along Burren Street.
- Analytical results for samples from both the deep and surficial aquifers in the residential area were either below the Limit of Reading (LOR) or the *Investigation Level*.

Former Gasworks Area

- Fill was encountered between 0.3 and 4.4m deep.
- TPH and PAH levels exceeded commercial/industrial *Investigation Levels* in soil collected from three shallow samples in the fill horizon.
- The hydraulic gradient appears slightly “flatter” within the shallow horizon.
- Shallow groundwater flow appears locally disturbed as a result of the presence of the former gasometers.
- The surface water drain along the north-south boundary between the Burren Street Residential Area and the former gasworks area may be preferentially capturing or redirecting flow from the shallow horizon.
- The volume of groundwater discharging beneath and off the former gasworks area has been estimated at approximately 1,000m³/year and 200m³/year for shallow and deep horizons respectively.
- In general, the CoPC were present at lower concentrations than recorded in the June 2000 investigation.
- CoPC were detected at levels that exceed the nominated criteria.



Recommendations

- Prepare a site-specific Environmental Management and Occupational Health and Safety Management Plan and a Remedial Action Plan;
- Conduct supplementary assessments to clarify uncertainties relating to the degree and extent of environmental issues, these being:
 - ◆ Shallow soil investigations at selected and as yet untested yards located adjacent to the western boundary of the FGW and the EBS to better define the degree and extent of impacted soil in this area;
 - ◆ Evaluate water condition, flow and potential receptors associated with the “dish drain” adjacent the western edge of the former gasworks area;
 - ◆ Evaluate groundwater conditions off-site and down gradient of the southern boundary of the former gasworks area, identify potential receptors and pathways and better define the potential down gradient off-site environmental risks; and
 - ◆ Undertake ongoing monitoring of the groundwater wells to better establish trends for groundwater condition and help to validate the assumptions discussed regarding the local hydrogeological flow regime and allow a more complete and therefore reliable quantitative risk assessment, if appropriate.

5.5 SKM Site Inspection

SKM personnel undertook a site inspection on Thursday 1st April 2004 to check the status of the existing wells to determine whether they were suitable for additional use during additional monitoring events. The inspection found that the majority of the wells installed during the previous investigations were still useable with the exception of two of the wells.

Five monitoring wells were identified at the Macdonaldtown Triangle area that are not located or mentioned in any of the previous reports by CH2MHill. The construction and locks on the monitoring wells suggested that they were installed by CH2MHill. One pair of unknown wells were labelled MW 22S and MW 22D, and the remaining three wells have been labelled MW X, MW Y and MW Z. Four out of the five additional monitoring wells were found to be operational and contained water.

During the inspection of the monitoring wells, water levels were taken to assist in calculating groundwater contours and monitoring wells were purged in order to allow for groundwater recharge. Groundwater was observed to rise and flow from the top of MW14D when it was opened. This well is located on the footpath at Burren Street. Groundwater was also observed to be flowing from MW15D with water flowing out of the top of the well into the street gutter. The workers at the residential property informed SKM that the water had been flowing from the well