Helena East Precinct Remediation and Redevelopment

Midland Redevelopment Authority

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
24/05/04	**Level of Assessment set (following any appeals upheld)**	
10/04/06	**Proponent Document Released for Public Comment**	**97**
08/05/06	**Public Comment Period Closed**	**4**
09/08/06	**Final Proponent response to the issues raised**	**13**
16/10/06	**EPA report to the Minister for the Environment**	**10**

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Summary and recommendations

The Midland Redevelopment Authority proposes to remediate 17 hectares (ha) of land in the central portion (known as Helena East) of the former Midland Railway Workshop sites. Part of the remedial works involves moving low-level contaminated soils to a proposed containment cell located at the western edge of the Midland Saleyards site currently operated by the Meat Industry Association (MIA). This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the *Environmental Protection Act 1986.*

Relevant environmental factors and principles

The EPA decided that the following environmental factors relevant to the proposal required detailed evaluation in the report:

(a) Soil contamination – to protect groundwater, the Helena River and public health;

(b) Groundwater contamination – to protect the Helena River and public health from any potential contamination by groundwater; and

(c) Protection of the Helena River and the surrounding ecosystem.

There were a number of other factors which were very relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

(a) The precautionary principle;

(b) The principle of intergenerational equity; and

(c) The principle of waste minimisation.

Conclusion

The EPA has considered the proposal by the Midland Redevelopment Authority to remediate and redevelop the Helena East Precinct and Southern Embankment to a standard suitable for residential, community, commercial and education purposes. Part of the remedial works involves moving low-level contaminated soils to a proposed containment cell (CC) located at the western edge of the Midland Saleyards site currently operated by the Meat Industry Association (MIA).

The remediation of the Midland Railway Workshops Helena East Precinct and Southern Embankment site can be achieved by a combination of:

- On-site treatment and re-use;
- On-site containment using a geotextile warning barrier and clean fill cover;
- On-site relocation to the MIA Containment Cell; and
- Disposal off-site to an appropriate landfill.

The EPA considers that the above remediation strategy is consistent with the EPA Guidance 17 *Guidance for Remediation Hierarchy for Contaminated Land* (EPA, 2000).

The EPA notes that investigations show that soil and groundwater in the Helena East Precinct and Southern Embankment are contaminated. The contamination profile is similar to that which existed in Helena West before the site was remediated. The EPA considers that removal of the contaminated soil and waste fill and the high attenuation capacity of the soil to adsorb contaminants is adequate to manage the risk of contaminated groundwater reaching Helena River to an acceptable level.

The EPA considers, on advice from the Department of Health, that onsite containment using a geotextile warning barrier and a minimum of 1m and 0.5m of clean fill for residential and commercial/industrial areas respectively, is acceptable to ensure that residual contamination does not pose a risk to public health and the environment. The EPA also considers that hardstand or equivalent treatment on areas where the minimum amount of clean fill cannot be achieved will minimise risk to an acceptable level.

The EPA considers that the onsite containment of contaminated soil at the MIA CC can be managed through the capping design, annotations on the land title, monitoring of cap erosion and groundwater monitoring around the MIA CC. The EPA also considers that the minimum 0.5m of clean fill over the clay cap is adequate to minimise human exposure to the contamination as there will be no active landuses on the site, due to zoning constraints.

The EPA notes that dense non-aqueous phase liquid (DNAPL) investigations are still ongoing and considers that delineation of the DNAPL contamination and preparation of a DNAPL Management Plan to the satisfaction of the Department of Environment and Conservation will reduce the risk of the contamination to the Leederville Aquifer and the Helena River.

The EPA notes that the Southern Embankment is adjacent to the Helena River Floodplain which is categorized as a Conservation Category Wetland (CCW) (Floodplain) (UFI 13628) in the *Geomorphic Wetlands Swan Coastal Plain Dataset*. The EPA considers that the proposed remediation work on the Southern Embankment will reduce the volume of contaminated soil and subsequently reduce the risk of contaminants reaching the CCW. The EPA considers that the remediation and recontouring works should be managed to minimise the risk of erosion, siltation and contamination to the CCW.

Post-remediation long-term management

The EPA considers that implementation of long-term management which includes:

- Approval of the Site Validation Report by the Department of Environment and Conservation;
- Groundwater monitoring around Helena East Precinct, Southern Embankment and MIA CC;
- Surface water monitoring of the Helena River;
- Annotations of any residual soil and groundwater contamination on land titles; and
- Constraints on subsurface activities,

will further reduce the risk of contamination to the Helena River and human health.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarized in Section 4.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the remediation and redevelopment of the Helena East Precinct and Southern Embankment to a standard suitable for residential, community, commercial, education and mixed use purposes. Part of the remedial works involves relocating low-level contaminated soils to a proposed Containment Cell located at the western edge of the Midland Saleyards site currently operated by the Meat Industry Association;
2. That the Minister considers the report on the relevant environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4; and
4. That the Minister imposes the conditions recommended in Appendix 4 of this report.

Conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Midland Redevelopment Authority to remediate and redevelop Helena East Precinct and Southern Embankment, including partial relocation to the MIA CC, is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following requirements:

(a) to remediate the site to appropriate remediation criteria (condition 5) and validated (condition 6) to the satisfaction of the Department of Environment and Conservation;

(b) to include management methods in revised *Site Environmental Management Plans* (condition 7) in Appendix 12 of the Public Environmental Review document (March 2006, Version 3) to minimise risk of contamination to the Helena River Floodplain during remediation work in the Southern Embankment;

(c) a minimum thickness of clean fill where residual contamination is left onsite (condition 8);

(d) to delineate and manage the dense non-aqueous phase liquid contamination (condition 9);

(e) to revise the Dust and Air Quality Management Plan to the satisfaction of the Department of Environment and Conservation and Department of Health (condition 10) and to implement the plan during remediation works;

(f) to develop and implement a Meat Industry Association Containment Cell Construction and Management Plan (condition 11) to outline the construction, design and structure, rehabilitation, management and ownership of the containment cell after closure;

(g) to monitor surface water in the Helena River and groundwater in the Helena East Precinct, Southern Embankment and MIA CC (condition 12);

(h) to annotate land titles stating the presence of any residual soil and/or groundwater contamination (condition 13); and

(i) to validate soil to demonstrate that soil is not contaminated prior to subsurface activities (condition 14).

Contents

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors and principles relevant to the proposal by Midland Redevelopment Authority (MRA), to remediate 17 hectares (ha) of land in the central portion (known as the Helena East Precinct) of the former Midland Railway Workshops site and the Southern Embankment which abuts the southern boundary of the Helena East Precinct. These areas are to be remediated to a standard which is suitable for land uses including:

- residential (low to medium density);
- community (e.g. public open space, museum);
- commercial;
- education; and
- mixed use (commercial/residential).

The proposal also includes a Containment Cell currently operated by the Meat Industry Association (MIA) located at the western edge of the Midland Saleyards site, bounded by Lloyd Street to the west and Clayton Street to the north (Figure 1). As part of the remedial works, MRA proposes to move low-level contaminated soils to the Containment Cell (CC). As per the MRA-MIA Cabinet Decision issued by the Minister for Agriculture, Forestry and Fisheries on 23 September 2004, the MIA site containing the Containment Cell will be sold to the MRA. This site should be available to the MRA by late 2006/early 2007.

The Midland Railway Workshops site, occupying an approximate area of 70ha, is located south of the Midland Township and is bounded by the Helena River floodplain to the south (Figure 1). Within the Workshops site, the 17ha Helena East Precinct is bounded by rail lines to the north and the Helena River floodplain to the south. The Precinct is also bordered by the Helena West and Helena Street Extension Precincts to the west and Centennial Place and the Western Australian Police Service to the east (Figure 1). The Helena East Precinct is the oldest area of the Workshops and historically where the majority of railway maintenance and manufacturing activities were undertaken at Midland. The site has a large number of Heritage-listed buildings, which will be restored by the MRA.

As a result of approximately 100 years of past intensive industrial and waste-disposal practices, the soil and groundwater in Helena East has been contaminated. Helena East is the oldest area of the Workshops and was used for the fabrication, maintenance and repair of locomotives and other rolling stock.

Since January 2000, the MRA has overseen the remediation, restoration and redevelopment of approximately 75% of the former Workshops area.

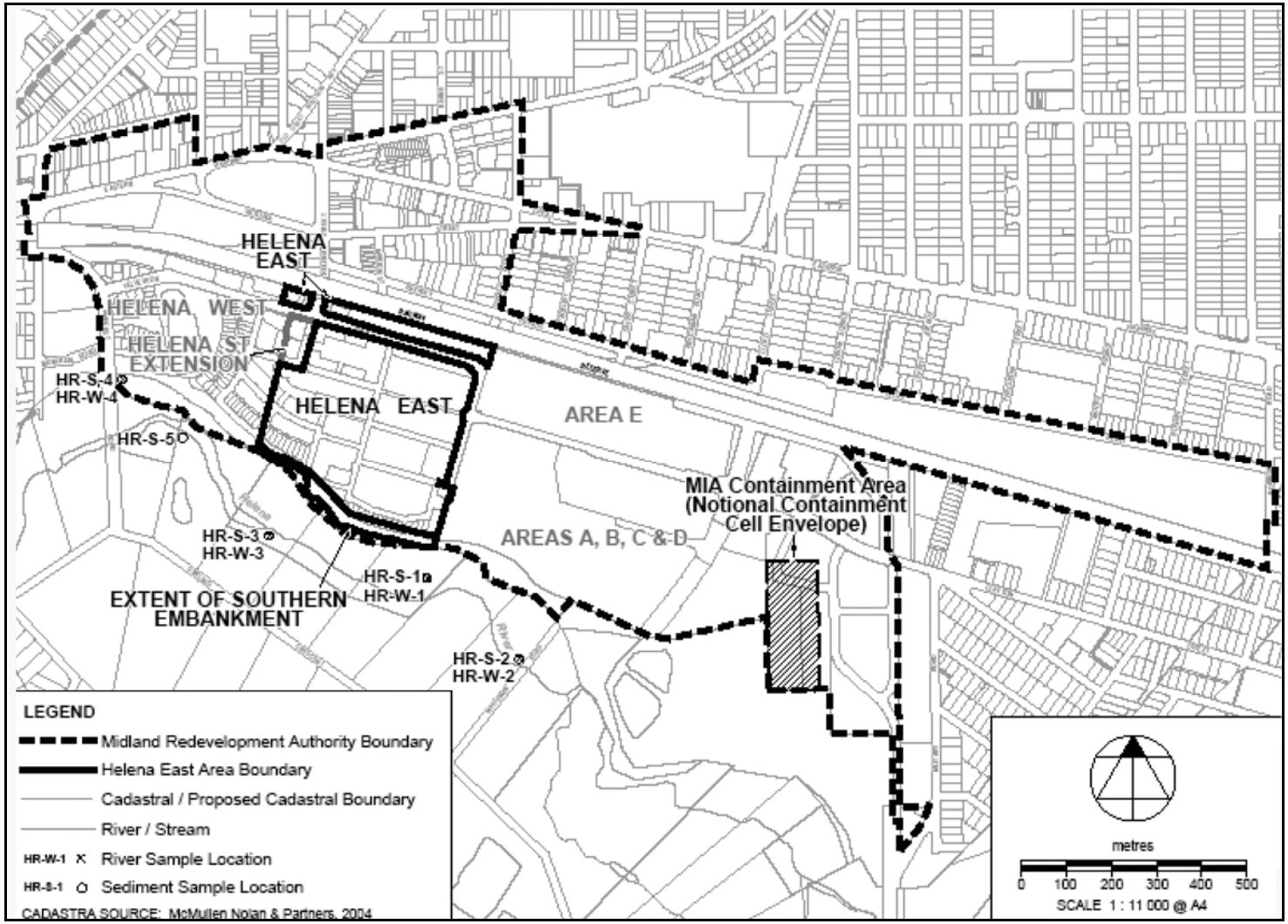

Figure 1: ***Midland Railway Workshops – Location of Helena East Precinct, Southern Embankment and Meat Industry Association Containment Cell***

The Helena East Precinct is the final major area to be remediated and redeveloped. Previously the Midland Railway Workshops site was subjected to 3 formal EPA assessments:

- Clayton Precinct, area E (Assessment 1401, Bulletin 1030) – Ministerial Statement 583 approved on 1 February 2002;
- Areas B, C and D (Assessment 1349, Bulletin 1057) – Ministerial Statement 612 approved on 25 November 2002; and
- Helena West Precinct (Assessment 1488, Bulletin 1111) – Ministerial Statement 640 approved on 2 December 2003.

The EPA's decision to assess the proposal at the level of Public Environmental Review (PER) was based on 3 main factors, namely

(a) Soil contamination – to protect groundwater, the Helena River and public health;

(b) Groundwater contamination – to protect the Helena River and public health from any potential contamination by groundwater; and

(c) Protection of Helena River and the surrounding ecosystem.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors and principles relevant to the proposal. The conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides other advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's recommendations.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

2. The proposal

The Midland Redevelopment Authority proposes to remediate 17 ha of land in the central portion (known as Helena East) of the former Midland Railway Workshop sites (Figure 1). Part of the remedial works involves moving low-level contaminated soils to a proposed Containment Cell located at the western edge of the Midland Saleyards site currently operated by the Meat Industry Association (MIA) (Figure 1).

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Sections 2, 3 and 6 of the PER (ATA Environmental, 2006).

Table 1: Summary of key proposal characteristics

Characteristic	Description
Location of site	Figure 1; Lot 9006 DP 44198; Lot 14241 on Plan 27672, Reserve 42712.
Nature of contaminants	*Waste Fill* Waste fill consisting of coal cinder, foundry slag, building rubble, sand, steel and occasional asbestos products in the Helena East Precinct and Southern Embankment. *Soil* Soil in the Helena East Precinct and Southern Embankment affected by metals, hydrocarbons and/or solvents and localised cyanide contamination. *Groundwater* Widespread low-level metal contamination. Localised hydrocarbon and solvent contamination within areas where extensive hydrocarbons and/or solvents were identified in soil.
Total volume of contaminated soil and waste fill	119,000m^3
Remediation activities	Excavate approximately 59,000m^3 of contaminated soil and waste fill and either: - Subject to treatment and reuse; - Relocate to onsite containment cell; or - Direct offsite for disposal or treatment. Residual contamination will be contained onsite using a geotextile warning barrier covered by clean fill. Contaminated groundwater encountered during excavation will be treated either onsite or offsite.
Containment cell	Construct containment cell with a clean clay base not less than 300mm thick. Cap containment cell with a compacted clay layer with a permeability of not more than 10^{-9} m/s and cover with a layer of clean free draining soil not less than 500mm thick, which is stabilised with shallow rooted native vegetation. Containment cell will contain not more than 80,000m^3 of material. Height of the cell will be not more than 12m.
End land uses	In accordance with the Midland Redevelopment Scheme and the *Midlandmetro Concept Plan 2010*

A detailed description of the proposal is provided in Sections 2, 3 and 6 in the PER (ATA Environmental, 2006). The potential impacts of the proposal and their proposed

management are provided in Appendix 11 and Appendix 12 of the proponent's document (ATA Environmental, 2006).

3. Relevant environmental factors and principles

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the relevant factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below.

It is the EPA's opinion that the following environmental factors relevant to the proposal require detailed evaluation in this report:

(a) Soil contamination – to protect groundwater, the Helena River and public health;

(b) Groundwater contamination – to protect the Helena River and public health from any potential contamination by groundwater; and

(c) Protection of Helena River and the surrounding ecosystem.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factors and their assessment are contained in Sections 3.1 to 3.3. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

(a) The precautionary principle;

(b) The principle of intergenerational equity; and

(c) The principle of waste minimisation.

3.1 Soil contamination

Description

Approximately 119,000 m^3 of waste fill and soil at Helena East and Southern Embankment is contaminated with heavy metals, asbestos, total petroleum hydrocarbons (TPHs), benzene, toluene, ethylene and xylene (BTEX) and organic solvents.

Approximately 9,000 m^3 of heavily contaminated material will be disposed offsite at an appropriate landfill. Approximately 50,000 m^3 of low-level contaminated material

from the Helena East site will be relocated to a 2 ha portion of the Meat Industry Authority (MIA) Saleyards containment cell (CC) (Figure 1). The remaining 60,000m^3 of contaminated material will be contained on-site.

Stratigraphy of the site

The stratigraphy of the site comprises four main units in the upper 30m below ground level (BGL), described in order of increasing depth as Inert Fill, Waste Fill, Upper Clays, and Lower Sands (Table 2).

Table 2: Stratigraphic summary of site

Unit	Description	**Approx. Depth mBGL**
Inert Fill	Gravel, limestone roadbase.	0m – 0.3m
Waste Fill	Ash, cinder, metal fragments, rubble. Most extensive along the southern boundary of Helena East and in the Southern Embankment.	0.3m – 0.5m
Upper Clays	Clay-rich strata with some sand and silt, complexly interbedded with discontinuous coarser-grained lenses of sand to sandy clay	0.5m – 10m
Lower Sands	Unconsolidated sands with some silt, slightly indurated sandstone	10m – approx 25m Approx 25m – 40m
Shale	Grey to black shale	More than approx 40m

Extent of contamination

Heavy metal contamination in the soil is primarily confined to the Waste Fill. The metal concentrations in Waste Fill commonly exceed Ecological Investigation Levels (EIL) guidelines for copper, lead and zinc. The EIL concentrations are the recommended levels established for soil cleanup for environmental purposes.

Asbestos contamination is primarily confined to the Waste Fill in the southern half of Helena East and in the Southern Embankment. Asbestos was also detected in surface soil in localised areas in central and southern portions of the Helena East Precinct.

Natural soil around the site is also contaminated with total petroleum hydrocarbons (TPHs), polycyclic aromatic hydrocarbons (PAHs) and solvents comprising volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene and xylene (BTEX), and halogenated aliphatic and aromatic hydrocarbons. Hydrocarbon contamination is more localised than the metal contamination.

Natural soil is also impacted by localised contamination of cyanide in the southern area of the Helena East Precinct, near the boundary of Southern Embankment.

Remediation strategy

The proposed remediation options include:

- On-site treatment and re-use;

- On-site containment using a geotextile warning barrier and clean fill cover;
- On-site relocation to the MIA Containment Cell; and
- Disposal off-site to an appropriate landfill.

The proponent has considered on-site treatments such as screening, bioremediation and thermal desorption. Screening or sieving is a simple physical process that can be used to separate particles of different sizes from soil. Bioremediation relies on the ability of microbial organisms to break down contaminants into less harmful by products. Thermal desorption systems operate by subjecting hydrocarbon-impacted soils to elevated temperatures to desorb the hydrocarbons into a gas stream, which is then treated to either capture the hydrocarbons in a condenser/carbon filter combination or destroy them in a 'thermal oxidation' unit or incinerator.

In the Helena East Precinct, the MRA proposes to excavate as much of the Waste Fill as practicable given the heritage constraints (which involves the retaining of heritage buildings and therefore retention of some contaminants on-site) treat on-site and re-use or dispose off-site. The options of on-site treatment and re-use and disposal off-site will also apply to soil that is contaminated with hydrocarbon.

In the Southern Embankment, the MRA proposes to excavate waste fill heavily contaminated with hydrocarbons and metals. The contaminated materials will be sent to an appropriate landfill approved by the Department of Environment and Conservation (DEC). The remaining low-level contaminated materials will be contained on-site by placement of:

- A geotextile visual warning barrier; and
- At least 1m of clean fill.

Excavated soils will be stockpiled for sampling and assessment. Options to re-use or off-site disposal of the soil will be based on these assessments. Heavily contaminated soils will be stockpiled on an impermeable liner or hardstand to prevent the potential for contamination of underlying soils.

The MRA proposes to remediate contaminated soils in the Helena East and Southern Embankment to the Health Investigation Levels (HIL) criteria recommended for residential and commercial land uses. Table 3 shows the recommended soil remediation criteria, HILs and EIL, for the protection of public health and the environment respectively.

Table 3: Soil Remediation Targets

Guideline	**EIL** (Ecological Receptors)	**HIL-A** (Standard Residential)	**HIL- D** (High-density Residential)	**HIL-E** (Parks, Schools)	**HIL-F** (Commercial)
Metals (mg/kg)					
Arsenic	20	100	400	200	500
Cadmium	3	20	80	40	100
Copper	60	1,000	4,000	2,000	5,000
Chromium (total)	50	210	NV	NV	NV
Chromium (III)	NV	12%	48%	24%	60%
Chromium (VI)	NV	100	400	200	500
Lead	300	300	1,200	600	1,500

Guideline	**EIL** (Ecological Receptors)	**HIL-A** (Standard Residential)	**HIL- D** (High-density Residential)	**HIL-E** (Parks, Schools)	**HIL-F** (Commercial)
Tin	50	46,900	NV	NV	100,000
Zinc	200	7,000	28,000	14,000	35,000
Total Petroleum Hydrocarbons (mg/kg)					
C_{6-9}	100	NV	NV	NV	NV
C_{10-14}	500	NV	NV	NV	NV
C_{15-28}	1000	NV	NV	NV	NV
$>C_{16}-C_{35}$ (aromatic)	NV	90	360	180	450
$>C_{16}-C_{35}$ (aliphatic)	NV	5,600	22,400	11,200	28,000
Solvents (mg/kg)					
Benzene	1	1	NV	NV	1.5
Toluene	3	520	NV	NV	520
Eythlbenzene	5	230	NV	NV	230
Xylenes	5	210	NV	NV	210
Polycyclic Aromatic Hydrocarbons					
Naphthalene	5	60	NV	NV	190

Source: DoE (2003) *Assessment Levels for Soil, Sediment and Water*
NV indicates no value provided.

Remediation strategy near and adjacent to heritage buildings

Contamination beneath and immediately adjacent to heritage buildings and structures cannot be excavated due to engineering constraints. The MRA proposes to adopt the following remediation strategy near and adjacent to heritage buildings (Figure 2):

- Within the buffer zone of 2m around the Heritage structures, the maximum excavation depth will be approximately 300mm;
- Beyond this buffer zone, the wall of the excavation will be excavated on a 1:1 slope to either the maximum depth of contamination or the maximum depth possible given the presence of other Heritage structures; and
- Where residual contamination levels exceed the assigned remediation targets, a visual warning barrier will be placed on the excavated surface and clean fill placed over the barrier.

MIA containment cell

The proponent proposes to contain low-level contaminated materials on-site in the MIA containment cell following arrangements with the MIA to have this land vested under the MRA control. The MIA CC is located within the Midland Railway Workshops boundaries (Figure 1) and an inter-agency agreement exists to transfer the MIA site to the control of the MRA by late 2006/2007. After the transfer, the site will be vested with MRA and come under its planning controls.

Previously, investigations on similar contaminated materials at the Helena West Precinct and Areas B, C and D demonstrated that the materials have low leachability. The EPA has also previously approved the on-site containment of the contaminated material from Helena West precinct to Area C (EPA Bulletin 1057, 2002).

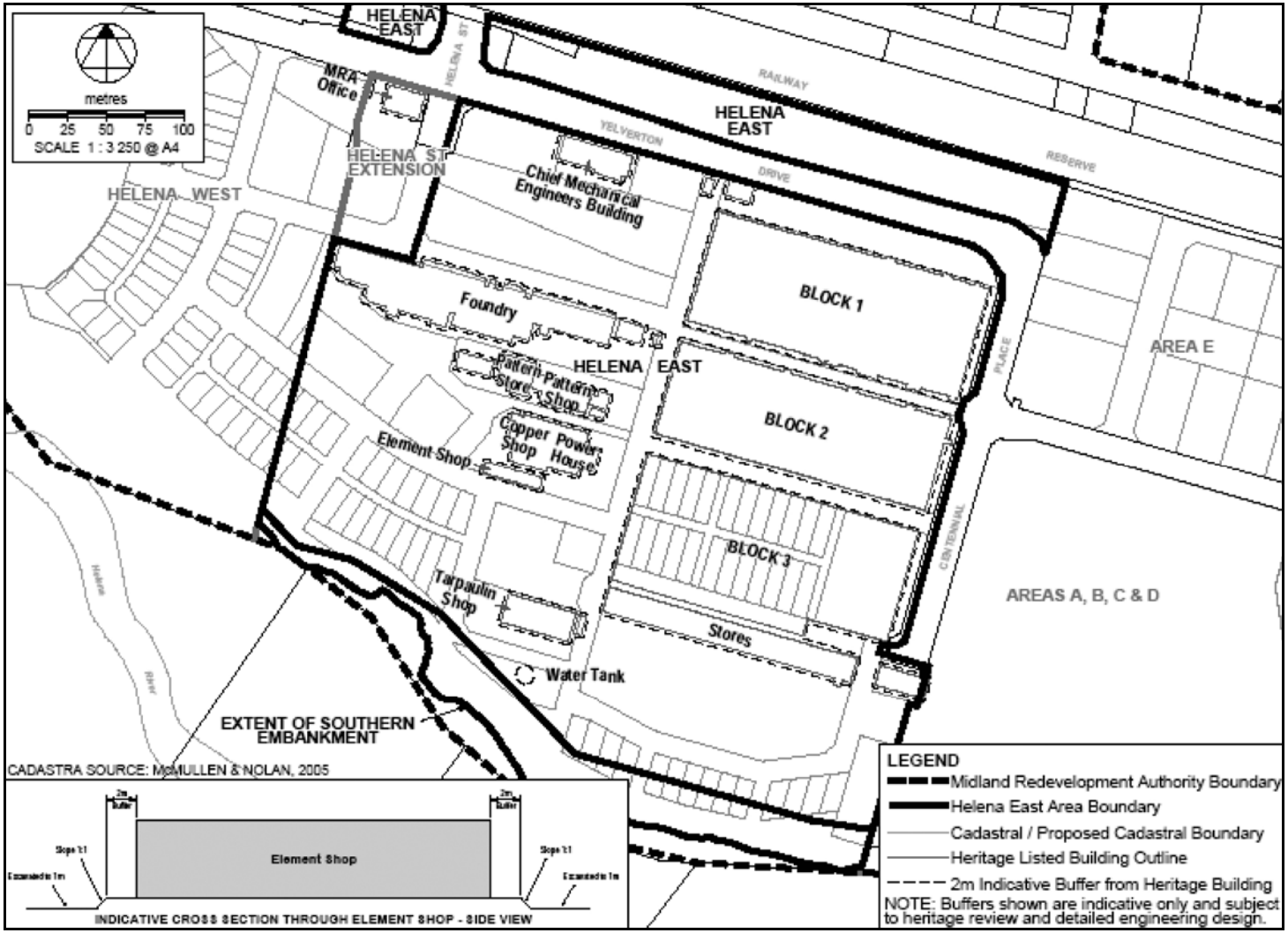

Figure 2: Indicative buffer around heritage buildings and cross section through a typical heritage structure

The CC will be designed and managed with the following features:

- Cell base to be not less than 300mm of clay compacted and leveled to provide a stable non-eroding surface;
- Placement of 50,000m^3 of low-level contaminated material from Helena East and Southern Embankment;
- Compaction of waste into a stable landform that will drain readily following capping.
- Maximum cell height will be 12m; and
- Capped with:
    - A 300 to 500mm layer of clay cap compacted to achieve a nominal permeability of not more than 10^{-9} m/s;
    - At least 500mm of clean free-draining soil with drainage structures incorporated into the cell to prevent erosion; and
    - Planted with shallow-rooted shrubs and grasses to achieve a stable landform consistent with the amenity of the area.

Long-term post-remediation management of site

To ensure that the long-term management of the Helena East Precinct, Southern Embankment and containment cell does not pose a risk to the environment, the proponent will:

- Place memorials on land titles identifying the potential for groundwater contamination and/or residual soil contamination;
- Monitor groundwater in accordance with the proposed Groundwater and Helena River Management and Contingency Plan;
- Monitor the water quality of the Helena River in accordance with the Helena River Surface Water Management Plan, to be developed within six months after completion of remediation;
- Place memorials on the land title of the CC to identify the presence of the contaminated soils;
- Assess the surface of the CC annually for at least 3 years; and
- Implement contingency measures in the unlikely event of offsite export of contamination.

Submissions

Concerns were raised about the proponent's contingency plans in the event the MIA CC is not ready to receive the contaminated soil at the start of remediation works and long-term management and ownership of the CC. The Western Australia Police Services raised concerns on air quality relating to the proximity of the MIA CC to their Mounted Police training ground, design of the cell cap and long-term monitoring and management of erosion of the cap.

Concerns were also raised regarding dust and particulate management during remediation, annotating the land titles with memorials and public availability of remediation and monitoring reports.

The Heritage Council raised a concern regarding the effects of the remediation works on the structure of the heritage buildings around the Helena East Precinct.

Assessment

The EPA's environmental objective for this factor is to protect groundwater, the Helena River and public health by:

- Ensuring that the site is rehabilitated to an acceptable standard that is compatible with the intended land use, consistent with appropriate criteria including Australia and New Zealand Environment and Conservation Council (ANZECC) guidelines, health risk assessment criteria and applicable international standards;
- Ensuring that the remediation strategy is consistent with the objectives of the EPA's hierarchy approach for site remediation (EPA Guidance Statement 17 (2000) *Guidance for Remediation Hierarchy for Contaminated Land*);
- Ensuring that the contaminated material is treated and/or disposed of in an environmentally secure manner and presents minimal environmental risk in the long term; and
- Ensuring that the dust and other air pollution levels generated by the remediation works do not adversely impact welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.

Remediation Strategy

The EPA notes the proponent proposes to remediate the site using:

- On-site treatment and re-use;
- On-site containment using a geotextile warning barrier and clean fill cover;
- On-site relocation to the MIA Containment Cell; and
- Disposal off-site to an appropriate landfill.

The EPA considers that the above remediation strategy is consistent with the EPA Guidance 17 *Guidance for Remediation Hierarchy for Contaminated Land* (EPA, 2000).

The EPA notes the site will be remediated to a criteria appropriate for each land use according to the Department of Environment (DoE) *Assessment Levels for Soil, Sediment and Water (Draft)* (2003). The EPA considers that the proposed remediation will be to the following criteria:

- HIL-A (DoE, 2003) for areas zoned Residential (A);
- HIL-D (DoE, 2003) for areas zoned Residential (D);
- HIL-E (DoE, 2003) for areas zoned Public Open Space and Education; and
- HIL-F (DoE, 2003) for areas zoned Commercial.

The EPA notes that where residual contaminated soil is left on-site due to heritage constraints, the proponent proposes to reduce the risk of exposure to the public by placing a geotextile warning barrier over the contaminated material followed by a clean fill cover. The EPA considers, on advice from the Department of Health (DoH), that where heritage constraints are present, this method of containment is acceptable to manage the on-site residual contamination.

The EPA considers that, where residual contaminated soil is left on-site due to heritage constraints, a clean fill of at least 1m in residential zones and 0.5m in commercial zones should be placed above the warning barrier and residual

contamination. For residential zones, a minimum cover of 1m clean fill cover in areas zoned residential is consistent with the management method approved for Areas B, C and D (EPA Bulletin 1057) (EPA, 2002) and Helena West (EPA Bulletin 1111) (EPA, 2003). For commercial zones, the National Environment Protection Measure (NEPM) guidelines prescribe a minimum of 0.5m of clean fill.

The EPA notes that in some areas, due to heritage constraints, contaminated soils may not be accessible. In these areas, it may not be possible to achieve clean fill cover of at least 1m in residential zones and 0.5m in commercial zones. In these areas, the EPA considers that the ground surface in these areas should be treated using hardstand or an equivalent treatment as approved by the Department of Environment and Conservation (DEC) and EPA to minimise risk of contaminant exposure to the public.

The EPA considers that, after the completion of remediation works, a Site Validation Report should be submitted to the DEC for approval and made publicly available.

On-site containment in the MIA Containment Cell

The EPA notes, from correspondence with ATA Environmental on 15 August 2006, that the Western Australian MIA has signed a Memorandum of Understanding which will facilitate the sale of the MIA CC (Figure 1) to the proponent. If the MIA CC is not ready to accept excavated materials at the commencement of remediation works, the EPA notes that the proponent will dispose of the excavated materials at an appropriate landfill approved by the DEC. The EPA considers that this method of managing excavated contaminated soil is acceptable to minimise the stockpiling time of the excavated soil.

The EPA notes that material to be contained in the MIA CC will be similar to the criteria for a Class 1 Landfill as defined in the *Landfill Waste Classification and Waste Definitions 1996 (as amended)* (DoE, 2005).

The EPA considers that the preliminary design of the CC will ensure that risk of groundwater contamination is environmentally acceptable.

The EPA considers that the minimum 500mm of clean free-draining soil over the compacted clay cap is adequate as there will be no active landuse on the MIA CC. The EPA also considers that the cell cap design will minimise the infiltration of stormwater into the cell and potential leaching of contaminants into the groundwater. The EPA considers that the integrity and stability of the final landform and rehabilitation efforts on the CC should be managed and monitored.

The EPA notes that:

- Annotations will be placed on the land title for the CC to describe the contaminants contained; and
- Any proposed subsurface disturbance to the CC will require approval from the DEC.

The EPA considers that any potential redevelopment proposed on the MIA CC will be considered a rezoning process and should be referred to the EPA for further assessment.

The EPA considers that the annotations on the CC land title and constraints on subsurface disturbances to the CC will reduce the risk to an acceptable level.

The EPA considers that a Meat Industry Association Containment Cell Construction and Management Plan should be developed to the satisfaction of the DEC to ensure that the cell does not pose any significant risk to public health and the environment.

Air quality management during remediation works

The EPA notes that residential areas are located in the Helena West Precinct approximately 250m to the west and 200m to the north of the remediation site. The EPA also notes that there are semi-rural residences located approximately 180m from the site and two primary schools located 800m both north and west of the site respectively.

The EPA notes the proponent's commitment to prepare and implement an effective Dust and Air Quality Management Plan (DAQMP) and that consultation with the DEC and DoH on the adequacy of the DAQMP has commenced. The EPA notes that the draft DAQMP includes "target" and "absolute" criteria for air quality. If "target" levels are exceeded the proponent should immediately modify activities on the project site to achieve levels below "target" levels as soon as possible and report the incident to the DEC. If "absolute" levels are exceeded the proponent should immediately cease all activities on the project site and not recommence until an investigation report has been prepared and submitted to the DEC and approval to recommence has been given by the DEC. The EPA considers that the approach of establishing "target" and "absolute" levels for management action is acceptable to minimise risks of contamination to the public.

The EPA notes the concerns raised by submitters with regard to air quality during remediation works. The EPA considers that consultation with the DEC and DoH will result in the development and implementation of an effective DAQMP which should be implemented during the remediation works to minimise the risk of the contaminants affecting sensitive receptors around the Helena East Precinct and MIA CC.

Long-term post-remediation management of site

The EPA notes that the proponent has outlined procedures for subsurface works in areas with residual contamination and will develop a Subsurface Constraints Register, which identifies the location and describes the nature of the contamination, in the Subsurface Management Plan. The EPA also notes that the proponent is proposing that memorials on residual soil contamination be placed on land titles for areas that cannot be remediated to the soil target criteria appropriate for the land zoning. The EPA considers that the implementation of the Subsurface Management Plan and the requirement for memorials will reduce the risk to an acceptable level.

Summary

Having particular regard to:

(a) EPA Guidance 17 *Guidance for Remediation Hierarchy for Contaminated Land* (EPA, 2000);

(b) The proposed soil remediation strategy;

(c) Advice from DEC and DoH;

(d) NEPM Guidelines;

(e) Recommended conditions 5 and 6, which require the proponent to remediate the site to appropriate remediation criteria and validated to the satisfaction of the DEC;

(f) Recommended condition 8, which requires the proponent to place a minimum 1m and 0.5m of clean fill where residual contamination is left onsite in residential and commercial areas respectively;

(g) Recommended condition 10, which requires the proponent to incorporate the comments of the Department of Environment and Conservation and the Department of Health into the Dust and Air Quality Management Plan to be implemented during remediation works;

(h) Recommended condition 11, which requires the proponent to develop and implement a Meat Industry Association Containment Cell Construction and Management Plan to outline the construction, design and structure, rehabilitation plans, management and ownership of the containment cell after closure;

(i) Recommended condition 13, which requires the proponent to annotate land titles stating the presence of any residual soil and/or groundwater contamination; and

(j) Recommended condition 14, which requires the proponent to validate soil prior to any post-remediation subsurface activities,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.2 Groundwater Contamination

Description

Groundwater investigations at the Helena East Precinct and Southern Embankment indicate that there are two superficial groundwater systems: the upper Shallow Superficial Aquifer (SSA) and the Lower Superficial Aquifer (LSA). The SSA is perched above the Upper Clays while the LSA is partially capped by the Upper Clays.

The general direction of flow in the SSA is to the south-west with low velocities and large hydraulic gradients as a result of the low permeability sediments (Crisalis, 2005). The SSA is considered to be in limited connection with the underlying LSA, which is in turn is considered not to be in hydraulic connection with the underlying Leederville Aquifer.

Groundwater in the LSA flows to the north-west (ENV, 2003; Crisalis, 2005). The sediments of the LSA are more permeable than those of the SSA and this aquifer appears to extend off-site, creating a potential pathway for contaminants to migrate offsite from Helena East and the Southern Embankment.

Investigation data show that the SSA is contaminated with cadmium, copper, mercury, and zinc at concentrations greater than acceptable ANZECC levels for Fresh and Marine Water quality (ANZECC, 2000). The hydrocarbon contamination in the SSA is more localised than metals contamination. PAHs and VOCs were detected at concentrations above acceptable ANZECC levels (ANZECC, 2000) in the central and southern regions of the Helena East Precinct (Figure 3). TPHs were also detected in these two areas (Figure 3).

Metal contamination above acceptable ANZECC levels is also extensive in the LSA. In addition, Dense Non-Aqueous Phase Liquid (DNAPL) was detected in concentrations greater than acceptable guidelines in the central region of Helena East Precinct (Figure 4). Additional investigations to delineate the extent of the DNAPL contamination and to assess the risk to external receptors are currently being carried out.

Remediation strategy

The proposed groundwater remediation strategy includes:

- Removing the contamination source (contaminated soil);
- Treatment and removal of contaminated groundwater encountered during soil excavation; and
- Installing impermeable warning barriers over residual areas of contaminated soil.

Post-remediation monitoring and long-term management

Groundwater will be monitored following remediation to assess the effectiveness of remediation. The objective of the proposed remediation strategy is to ensure that groundwater exiting the site is similar to the regional groundwater quality.

Land titles will be annotated with memorials to indicate the presence of contaminated groundwater beneath the Helena East Precinct and Southern Embankment areas. The memorials will also prohibit use of groundwater in these areas.

MIA Containment Cell

The MIA CC is located in an area of clay rich soils similar to the soils in the Helena East Precinct. The cell design will ensure that the potential for leaching of material from stormwater infiltration will be low. Investigations at the Helena East Precinct show that it is unlikely that contaminants will be transported offsite due to the high adsorption capacity of the clayey soils.

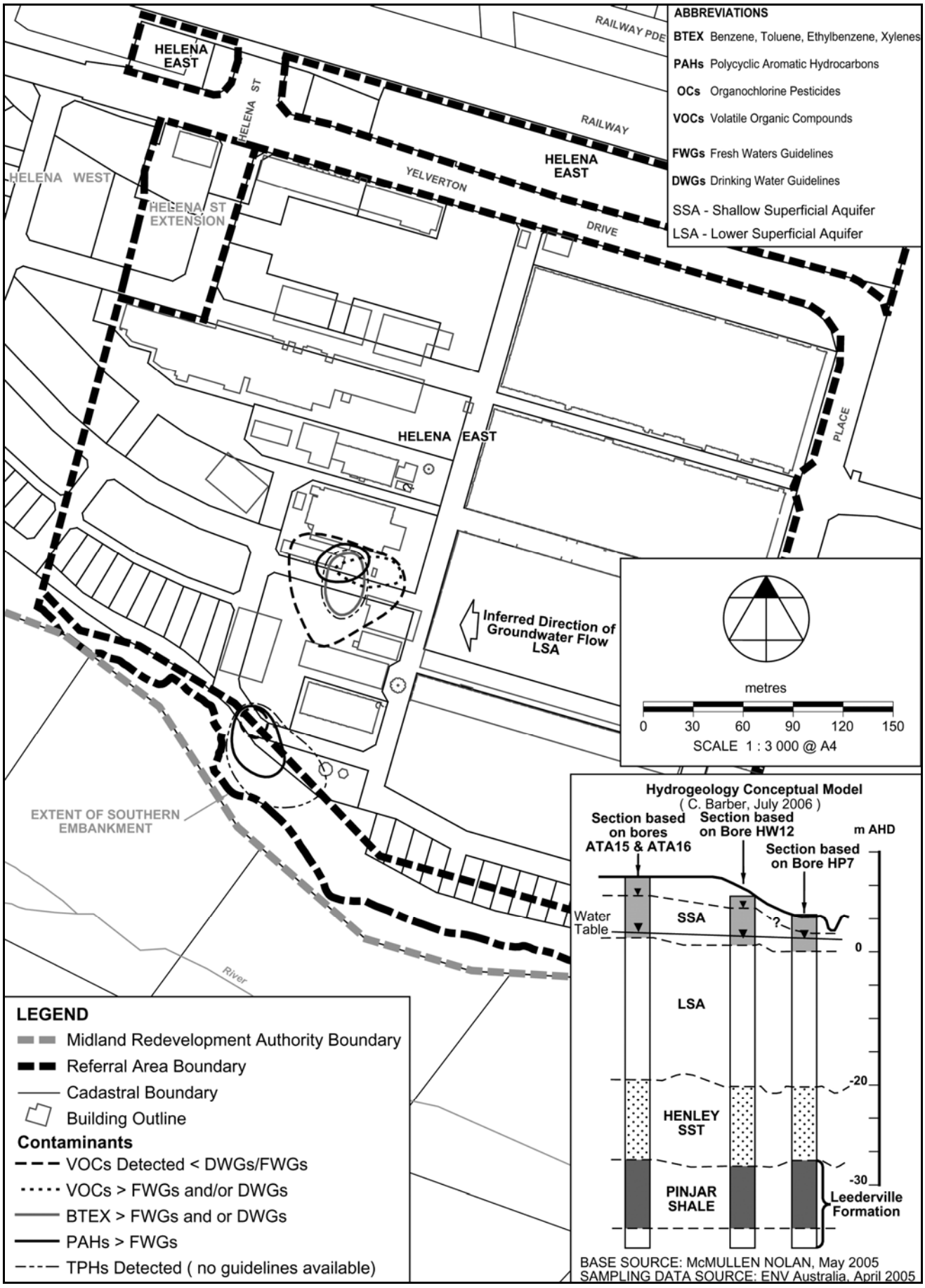

Figure 3: Location of hydrocarbon contamination in groundwater

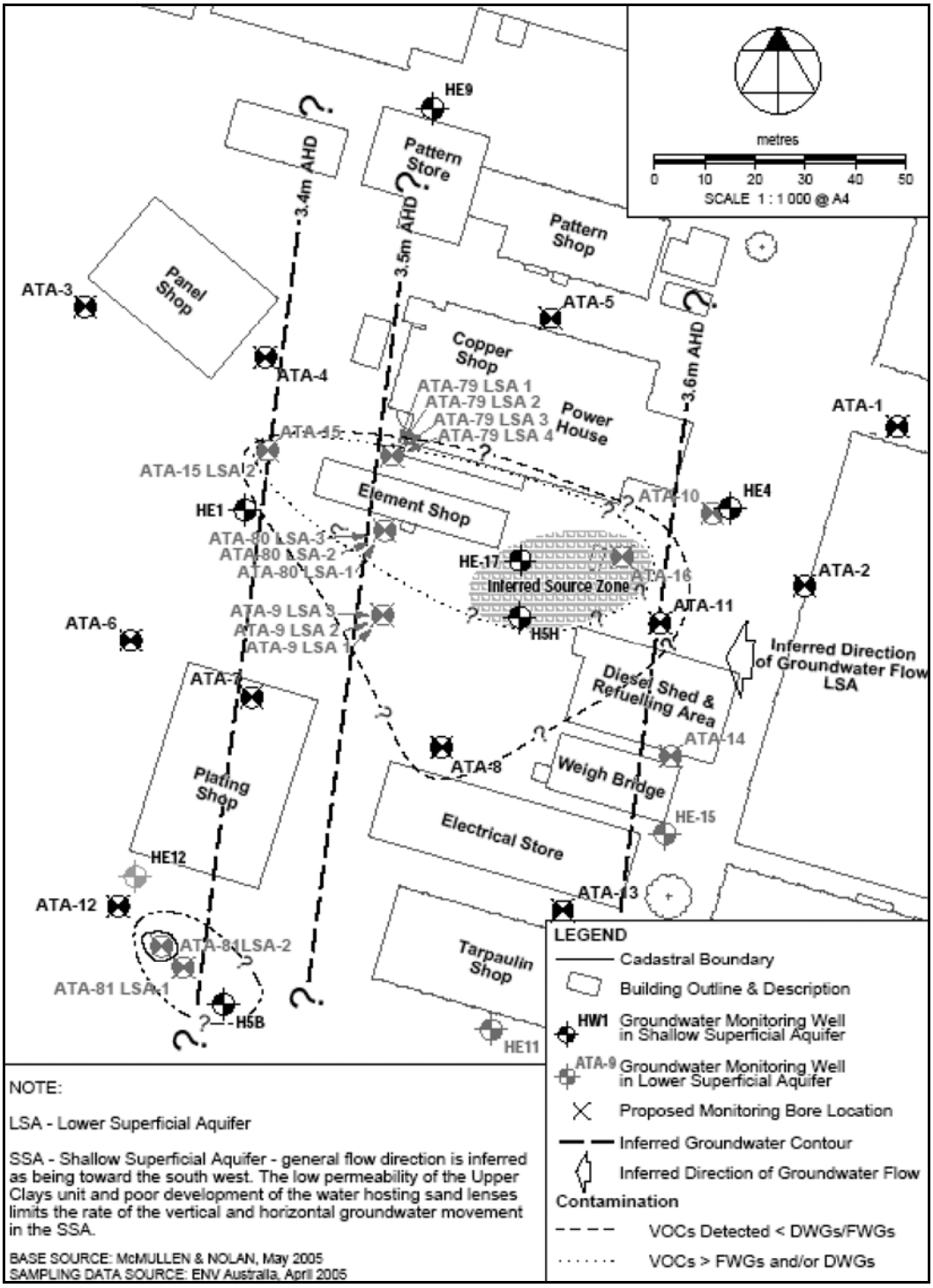

Figure 4: Location of current DNAPL contamination in groundwater

Submissions

Issues were raised about the investigation, delineation and management of the DNAPL detected in the LSA and the need for groundwater monitoring and contingency plans for the Helena East Precinct, Southern Embankment and MIA CC.

Assessment

The EPA's environmental objective for this factor is to protect the Helena River and public health by maintaining or improving the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the DoE *Assessment Levels for Soil, Sediment and Groundwater* (2003), ANZECC *Australian Water Quality Guidelines for Fresh and Marine Water Quality* (2000) and the NHMRC / ARMCANZ *Australian Drinking Water Guidelines - National Water Quality Management Strategy* (1996).

The EPA notes that groundwater beneath the project area is contaminated with metals and hydrocarbons and poses a risk to the Helena River and public health. The EPA notes that the source of the groundwater contamination (i.e. contaminated soil) will be removed where possible and that contaminated groundwater encountered during soil excavation will be treated on-site or if not possible, transported to an offsite treatment facility. The EPA also notes that investigations show that soil and groundwater profiles in the Helena East Precinct and Southern Embankment is similar to that in Helena West and that the clay-rich soils have limited the mobility of contaminants in the groundwater. The EPA considers that removal of the source of groundwater contamination combined with the high attenuation capacity of the soil in Helena East would ensure that the risk of contamination to groundwater is managed to an environmentally acceptable level.

The remediation works have the potential to contribute to groundwater pollution through surface runoff. The EPA considers that the implementation of a Surface and Groundwater Management Plan, which addresses:

- Methods of containing surface water runoff on-site through the construction of earth bunds and perimeter drains; and
- Monitoring of surface water quality leaving the site,

will reduce the risk to groundwater and the Helena River to an acceptable level.

Post-remediation monitoring and long-term management

The EPA notes that groundwater will be monitored following remediation of the site to ensure that the site has been remediated to an environmentally acceptable level.

The EPA considers on advice of the DEC that groundwater should also be monitored around the boundary of the CC to ensure that the cell is managed in an environmentally acceptable manner.

In the event that groundwater monitoring indicates that groundwater quality is being impacted by the remediation works, the EPA considers that the implementation of a Surface and Groundwater Monitoring and Management Plan provides for contingency measures to address the impacts.

The EPA considers that a requirement to place memorials on land titles to prohibit the installation of bores in the area will ensure that public health is protected.

DNAPL delineation and management

The EPA considers that DNAPL detected in the lower superficial aquifer poses a risk to groundwater and the Helena River. The proponent has undertaken preliminary investigation work, which indicated that the DNAPL contamination is mainly detected around the Element Shop (Figure 4) in the central portion of the Helena East Precinct. The EPA considers that the proponent needs to undertake a more detailed investigation to fully delineate the extent and nature of contamination and develop a management strategy for this contamination.

The proponent should, in consultation with the DEC, develop a DNAPL management plan (condition 9) to address:

- Delineation of the extent and nature of the DNAPL contamination;
- The proposed remediation strategy, if any;
- The proposed monitoring and management plans; and
- A contingency plan.

The EPA considers that the DNAPL investigations can proceed in an environmentally acceptable manner concurrently with the remediation works. The EPA considers that a requirement to prepare and implement a Dust and Air Quality Management Plan to the requirements of the Department of Health will ensure that air quality will be managed to an acceptable level.

Summary

Having particular regard to:

(a) Advice of DEC;

(b) Recommended condition 9, which requires the proponent to delineate and manage the dense non-aqueous phase liquid contamination;

(c) Recommended condition 12, which requires the proponent to monitor surface water in the Helena River and groundwater in the Helena East Precinct, Southern Embankment and MIA CC; and

(d) Recommended condition 13, which requires the proponent to annotate land titles stating presence of any residual groundwater contamination,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.3 Protection of the Helena River and the surrounding ecosystem

Description

The Helena River floodplain is adjacent to the Southern Embankment and is categorised as a Conservation Category Wetland (Floodplain) (UFI 13628) in the *Geomorphic Wetlands Swan Coastal Plain Dataset*. The Helena River is a major tributary of the Swan River.

Groundwater is not regarded as a significant pathway for contaminant migration from the Helena East Precinct and Southern Embankment site to the Helena River. The channel of the Helena River is incised into impermeable clays and there is no significant groundwater recharge to the river.

Baseline sampling of the Helena River water and sediments has been conducted upstream and downstream of the river. Results show that there is no evidence of contamination as a result of past industrial and waste disposal activities at the Midland Railway Workshops.

Stormwater management

Surface water discharged off-site and into the Helena River Floodplain will comply with DoE *Assessment Levels for Soil, Sediment and Water* (2003) and the ANZECC *Australian Water Quality Guidelines for Fresh and Marine Waters* (2000) guidelines. Stormwater will be captured in piped drainage systems and directed to the Helena River floodplain via sedimentation and nutrient stripping basins.

Surface water runoff from the MIA CC poses a potential risk to the Helena River Floodplain. The MIA CC will incorporate the following features to prevent contamination of stormwater:

- Contours of the cell cap will minimise erosion and ponding of stormwater while facilitating the shedding of drainage water;
- A clay cap will prevent infiltration of stormwater into the cell;
- Cell will incorporate drainage features stabilised with either aggregate or geotextile to provide preferred drainage paths for stormwater generated from the cap in extreme rainfall events; and
- Small swales or infiltration basins will be provided around the base of the cell to detain these flows before they discharge into the local stormwater system.

Submissions

The DEC raised concerns about the need for review of the proponent's Groundwater and Helena River Management and Contingency Management Plan (Public Environmental Review document (March 2006, Version 3)) by decision-making authorities. Concerns were also raised regarding stormwater management during and after remediation and effects of discharging stormwater into the Helena River Floodplain.

Assessment

The EPA's environmental objective for this factor is to:

- Maintain or improve the quality of Helena River to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the DoE *Assessment Levels for Soil, Sediment and Water* (2003) and ANZECC *Australian Water Quality Guidelines for Fresh and Marine Water Quality* (2000); and
- Ensure that remediation and redevelopment of the site is consistent with the objectives of the EPA Draft Guidance Statement No 33 *Environmental Guidance for Planning and Development*.

Remediation and recontouring works on the Southern Embankment

Section 3.1 describes the proposed remediation and recontouring works on the Southern Embankment. The EPA considers that the proposed remediation work on the Southern Embankment will reduce the volume of contaminated soil and subsequently reduce the risk of contaminants reaching the Helena River Floodplain.

Guidance Statement 33 (Draft) on *Environmental Guidance for Planning and Development* does not recommend works within 0.5m of the 100 year flood level of a floodplain. The EPA notes that proposed works on the Southern Embankment may pose risks of erosion, siltation and contamination to the floodplain. The EPA considers that the proponent should prepare and implement measures to minimise the risk of erosion, siltation and contamination to the floodplain during the remediation and recontouring works. The EPA also considers that after remediation, the areas affected in the Southern Embankment should be rehabilitated with native species of grasses and shrubs local to the Helena River Floodplain.

Stormwater management

The proponent has prepared a Surface and Groundwater Management Plan to manage the risk of contaminated surface water reaching the Helena River and the surrounding floodplain. The EPA considers that the construction of earth bunds and perimeter drains around areas of known contamination at the time of excavation is necessary to prevent surface water flows into or out of contaminated areas.

The proponent will prepare a Stormwater Management Plan (proponent's commitments) which incorporates the Stormwater Drainage Strategy prepared by EGIS Consulting (2002). The EPA considers that the incorporation of the Strategy is acceptable as it was previously approved by Department of Environment (now DEC) for implementation on the entire MRA site, including the Helena East Precinct.

The proponent will construct small swales or infiltration basins around the base of the CC to detain stormwater flows before discharging into the local stormwater system and will incorporate drainage features stabilised with either aggregate or geotextile to provide preferred drainage paths for stormwater generated during extreme rainfall events. The EPA considers that the design will adequately manage stormwater runoff from the CC.

Post-remediation long term management

The EPA notes the advice of DEC that the proponent's Groundwater and Helena River Management and Contingency Management Plan (Public Environmental Review document (March 2006, Version 3)) needs to be reviewed by decision-making authorities before implementation.

The EPA considers that the requirement to prepare and implement the Surface and Groundwater Monitoring and Management Plan to the approval of the DEC will ensure that long term management of the Helena River will be managed to an

environmentally acceptable level. The EPA also considers that the Surface and Groundwater Monitoring and Management Plan should be made publicly available.

Summary

Having particular regard to:

(a) Recommended condition 7, which requires the proponent to revise the *Site Environmental Management Plans* in Appendix 12 of the Public Environmental Review document (March 2006, Version 3) and include management methods for the remediation and recontouring works on the Southern Embankment; and

(b) Recommended condition 12, which requires the proponent to monitor surface water in the Helena River,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.4 Relevant environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the *Environmental Protection Act (1986).* Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Midland Redevelopment Authority to remediate and redevelop Helena East Precinct and Southern Embankment, including partial relocation to the MIA CC, is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following requirements:

(a) to remediate the site to appropriate remediation criteria (condition 5) and validated (condition 6) to the satisfaction of the Department of Environment and Conservation;

(b) to include management methods in revised *Site Environmental Management Plans* (condition 7) in Appendix 12 of the Public Environmental Review document (March 2006, Version 3) to minimise risk of contamination to the Helena River Floodplain during remediation work in the Southern Embankment;

(c) a minimum thickness of clean fill where residual contamination is left onsite (condition 8);

(d) to delineate and manage the dense non-aqueous phase liquid contamination (condition 9);

(e) to revise the Dust and Air Quality Management Plan to the satisfaction of the Department of Environment and Conservation and Department of Health (condition 10) and to implement the plan during remediation works;

(f) to develop and implement a Meat Industry Association Containment Cell Construction and Management Plan (condition 11) to outline the construction, design and structure, rehabilitation, management and ownership of the containment cell after closure;

(g) to monitor surface water in the Helena River and groundwater in the Helena East Precinct, Southern Embankment and MIA CC (condition 12);

(h) to annotate land titles stating the presence of any residual soil and/or groundwater contamination (condition 13); and

(i) to validate soil to demonstrate that soil is not contaminated prior to subsurface activities (condition 14).

5. Other Advice

Heritage structures

The Heritage Council has advised on the requirement of a formal referral to the Council for any remediation works within the Midland Railway Workshops, which is entered on the State Register of Heritage Places in accordance to the *Heritage of Western Australia Act (1990)*.

Residential development in the Southern Embankment

The proposed residential development in the Southern Embankment may encroach into the Helena River floodway or flood fringe buffer zone, as defined in Draft EPA Guidance Statement 33. The EPA advises the proponent to consult with the relevant agencies such as the Department of Water, Department of Environment and Conservation and Western Australia Planning Commission (WAPC) prior to commencing subdivision works to identify whether approvals under other legislation are required.

In Section 3.3, the EPA notes that the Helena River Floodplain is categorised as a CCW (Floodplain) in the *Geomorphic Wetlands Swan Coastal Plain Dataset*. The EPA advises the proponent to consider and seek advice from relevant agencies on buffer guidelines for various land uses near CCWs. These guidelines include the WAPC *Guideline for the Determination of Wetland Buffer Requirements* (2005) and the Water and Rivers Commission *Position Statement: Wetland* (2001).

6. Conclusions

The EPA has considered the proposal by the Midland Redevelopment Authority to remediate and redevelop the Helena East Precinct and Southern Embankment to a standard suitable for residential, community, commercial and education purposes. Part of the remedial works involves moving low-level contaminated soils to a proposed containment cell (CC) located at the western edge of the Midland Saleyards site currently operated by the Meat Industry Association (MIA).

The remediation of the Midland Railway Workshops Helena East Precinct and Southern Embankment site can be achieved by a combination of:

- On-site treatment and re-use;
- On-site containment using a geotextile warning barrier and clean fill cover;
- On-site relocation to the MIA Containment Cell; and
- Disposal off-site to an appropriate landfill.

The EPA considers that the above remediation strategy is consistent with the EPA Guidance 17 *Guidance for Remediation Hierarchy for Contaminated Land* (EPA, 2000).

The EPA notes that investigations show that soil and groundwater in the Helena East Precinct and Southern Embankment are contaminated. The contamination profile is similar to that which existed in Helena West before the site was remediated. The EPA considers that removal of the contaminated soil and waste fill and the high attenuation capacity of the soil to adsorb contaminants is adequate to manage the risk of contaminated groundwater reaching Helena River to an acceptable level.

The EPA considers, on advice from the Department of Health, that onsite containment using a geotextile warning barrier and a minimum of 1m and 0.5m of clean fill for residential and commercial/industrial areas respectively, is acceptable to ensure that residual contamination does not pose a risk to public health and the environment. The EPA also considers that hardstand or equivalent treatment on areas where the minimum amount of clean fill cannot be achieved will minimise risk to an acceptable level.

The EPA considers that the onsite containment of contaminated soil at the MIA CC can be managed through the capping design, annotations on the land title, monitoring of cap erosion and groundwater monitoring around the MIA CC. The EPA also considers that the minimum 0.5m of clean fill over the clay cap is adequate to minimise human exposure to the contamination as there will be no active landuses on the site, due to zoning constraints.

The EPA notes that dense non-aqueous phase liquid (DNAPL) investigations are still ongoing and considers that delineation of the DNAPL contamination and preparation of a DNAPL Management Plan to the satisfaction of the Department of Environment and Conservation will reduce the risk of the contamination to the Leederville Aquifer, the Helena River.

The EPA notes that the Southern Embankment is adjacent to the Helena River Floodplain which is categorized as a Conservation Category Wetland (CCW) (Floodplain) (UFI 13628) in the *Geomorphic Wetlands Swan Coastal Plain Dataset*. The EPA considers that the proposed remediation work on the Southern Embankment will reduce the volume of contaminated soil and subsequently reduce the risk of contaminants reaching the CCW. The EPA considers that the remediation and recontouring works should be managed to minimise the risk of erosion, siltation and contamination to the CCW.

Post-remediation long-term management

The EPA considers that implementation of long-term management which includes:

- Approval of the Site Validation Report by the Department of Environment and Conservation;
- Groundwater monitoring around Helena East Precinct, Southern Embankment and MIA CC;
- Surface water monitoring of the Helena River;
- Annotations of any residual soil and groundwater contamination on land titles; and
- Constraints on subsurface activities,

will further reduce the risk of contamination to the Helena River and human health.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarized in Section 4.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the remediation and redevelopment of the Helena East Precinct and Southern Embankment to a standard suitable for residential, community, commercial, education and mixed use purposes. Part of the remedial works involves relocating low-level contaminated soils to a proposed Containment Cell located at the western edge of the Midland Saleyards site currently operated by the Meat Industry Association;
2. That the Minister considers the report on the relevant environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4; and
4. That the Minister imposes the conditions recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:

Environmental Protection Authority Service Unit (EPA SU)
Department of Environment and Conservation (DEC)
Western Australia Police Service (WAPS)
Heritage Council of Western Australia
Department of Health (DoH)
Department of Water (DoW)

Individuals:

Anonymous Submitter

Appendix 2

References

ANZECC (2000) *Australian Water Quality Guidelines for Fresh and Marine Water Quality* Australian and New Zealand Environment and Conservation Council.

ATA Environmental (2006) *Helena East Precinct Remediation and Redevelopment: Public Environmental Review Volumes I and II*. Prepared for Midland Redevelopment Authority, March 2006.

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Appendix 3

Summary of identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
1. Flora and fauna	A Conservation Category Wetland (Floodplain) abuts the southern side of the Southern Embankment. The remediation of the contaminated soil and groundwater in the Helena East Precinct and Southern Embankment will reduce the risk of the contaminants currently present on the flora and fauna in the Southern Embankment and the CCW areas.	**Public Submission (Anonymous):** • More comprehensive survey for flora, vegetation and fauna should be conducted on the Helena River Floodplain	A survey conducted on 1 December 2005 showed that the remaining vegetation in the Helena East, Southern Embankment and MIA CC is a highly degraded representation of the Swan Complex and confined to the Southern Embankment. According to Bush Forever ranking, the three vegetation types found were to be in a Degraded or Completely Degraded condition. The degraded nature of the vegetation and potentially high number of feral mammals present implies that the remediation site has limited faunal conservation value. The MRA has adequately addressed the concerns of this submitter in Appendix 5 (Question 6.1). Condition 8 in Appendix 4 requires the proponent to consider rehabilitation of remediated areas in the Southern Embankment with vegetation native to the area. **Not considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
2. Management of soil contamination	The Midland Redevelopment Authority proposes to remediate 17 ha of land in the central portion (known as Helena East) of the former Midland Railway Workshop sites. Part of the remedial works involves moving lightly contaminated soils to a proposed Containment Cell (CC) located at the western edge of the Midland Saleyards site and is currently operated by the Meat Industry Association (MIA). The soil and groundwater has been contaminated from past activities. Contamination includes mostly inert material such as building rubble, sand, coal cinders, heavy metals particularly copper, lead and zinc, asbestos and petroleum hydrocarbon compounds including chlorinated solvents. The site contains approximately 80,000m^2 of contaminated materials over the Helena East Precinct and Southern Embankment. The remediated land will be developed for various land uses including low	**EPA SU:** • Concerned about the lack of a contingency plan in the event the MIA CC is not ready to receive the material after remediation works have commenced; and • Concerned about the uncertainty over the proposed long-term management of the MIA CC including the responsible agency for long-term monitoring, maintenance and operation of the site. **WAPS** • Concerned about proximity of Mounted Section training ground to the MIA CC; • Concerned about the discrepancy between the 0.5m of clean fill for the MIA CC and the 1.0m required clean fill for the Police Operations Support Facility (OSF); and • Concerned about long term monitoring and management of erosion of the MIA CC cap. **DoH:** • The PER indicates that the contamination issues associated with the Helena East redevelopment will be suitably managed to address potential impacts to public health. The use of visual barriers and annotations on the title to indicate the presence of residual contamination in proximity to heritage buildings is considered an appropriate measure to manage the ongoing contamination for the site.	**Considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	to medium density residential, community (e.g. public open space, museum), commercial, education and mixed use (commercial/residential). The remediation proposal involves: • Excavating waste fill and highly contaminated soil subject to heritage constraints; • Relocating approximately 50,000m^2 to the MIA CC • Replacing contaminated soil with clean fill; • Placing a geotextile warning barier between waste fill and clean fill cover for areas with residual waste fill; and • Final soil remediation targets will be according to land use zones.		
3. Management of groundwater contamination	Groundwater is contaminated with heavy metals, at concentrations greater than Australia and New Zealand Environment and Conservation Council (ANZECC) guidelines. Groundwater is also contaminated with hydrocarbons	**EPA SU:** • Indicated the need for assessment of the potential risk of contaminants including asbestos from the MIA CC on the environment. No assessment of the fate and transport of such contaminants from the MIA CC was made; and • Concerned about the timelines of the DNAPL delineation investigations and preparation of the management plan as indicated in the proponent's PER document.	**Considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	particularly polycyclic aromatic hydrocarbons and chlorinated solvents. Dense Non-Aqueous Phase Liquids were also detected in the groundwater. Contamination of the underlying groundwater has the potential to affect the Helena River and future users of the land. Helena East Precinct and Southern Embankment has similar soil to the Helena West Precinct. A qualitative ecological risk assessment performed in Helena West Precinct indicates that the natural soil has the capacity to attenuate the heavy metals. The remediation proposal involves: • No active remediation of groundwater proposed; • Onsite or offsite treatment of contaminated groundwater encountered during soil excavation; • Placing memorials on Certificate of Titles to ban the use of groundwater for domestic use; and	**DEC:** • Concerned that the DNAPL contamination at the site has not been fully delineated and a management plan has not been prepared; • Indicated that the DEC would like to review the DNAPL monitoring and management plan; and • Recommended that some groundwater monitoring downgradient of the MIA CC is required so that significant impacts can be detected prior to reaching sensitive receptors. **WAPS** • Concerned about the impacts of the contaminants contained in the MIA CC on the groundwater monitoring data for the police site and increase the extent of the remedial actions that WA Police may be required to undertake. **Public Submission (Anonymous):** • Indicated that a monitoring program on the site should be ongoing during remediation works; • Concerned that the DNAPL contamination at the site has not been fully delineated and a management plan has not been prepared; • Indicated that any further development on the site should come with a Memorial on the Title that prohibits the use of unlicensed or licensed bored for garden water; and • Indicated that a groundwater monitoring regime should be implemented to assess the fate of contaminants in the MIA CC.	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	• Groundwater contingency plan should groundwater monitoring indicate that contaminated groundwater poses a significant risk to the Helena River and other beneficial uses.		
4. Protection of the Helena River and the surrounding floodplain	The Helena East Precinct and Southern Embankment abuts the Helena River floodplain to the south. The floodplain is categorized as a Conservation Category Wetland (Floodplain) (UFI 13628) in the *Geomorphic Wetlands Swan Coastal Plain Dataset*. Testing of the sediments and surface water quality of the Helena River shows no evidence of contamination as a result of past industrial and waste disposal activities at the Midland Railway Workshop sites. There is risk of contamination of the Helena River and its floodplain by contaminated surface water runoff, erosion and siltation during the remediation works. Infiltration basins and gross pollutant traps will be	**DEC** • Indicated that the DEC would like to review the Groundwater and Helena River Management and Contingency Plan. **WAPS** • Concerned about management of stormwater runoff from the MIA CC. **Public Submission (Anonymous)** • Concerned about risk of contaminants moving through groundwater to the Helena River during remediation works; • Concerned about the current and planned stormwater management systems that discharges into the Helena River Floodplain; and • Concerns about the risk of remodeling and recontouring of the Southern Embankment to the floodplain.	**Considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	installed prior to remediation works commencing.		
5. Air quality – dust	There is a minimum buffer distance of approximately 180m between the site and the nearest residential site. The proposal may generate dust during: • Excavation and relocation of soil and waste fill; • Movement of trucks and earthmoving equipment; and • Placement of clean fill.	**WAPS** • Concerned about air quality during filling of the MIA CC. **Public Submission (Anonymous):** • Concerned about air quality and risk to sensitive receptors during remediation works.	**Proponent commitments:** Prepare a Dust and Air Quality Management Plan (DAQMP) including: • Dust control measured approved by the DEC; • Monitoring program • Hydro mulching of stockpile area; • Cleaning of machinery used in excavation; and • Asbestos monitoring. This factor can be adequately managed through the recommended condition for the implementation of the DAQMP (Condition 10 in Appendix 4). **Considered to be a relevant environmental factor. Assessment of this factor is grouped with Management of Soil Contamination.**
6. Noise and vibration	There is a minimum buffer distance of approximately 180m between the site and the nearest residential site. The proposal will generate noise	The issue of noise and vibration was not raised in government and public submissions.	**Proponent commitments:** Prepare Noise and Vibration Management Plan including: • Good working equipment with effective silencers;

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	during: • Movement of trucks and earthmoving equipment; and • Compaction during site remediation.		• Comply with Worksafe WA requirements for occupational noise exposure; • Comply with Environmental Protection (Noise) Regulations 1997; and • Noise monitoring and mitigation measures implemented if complaints are received. This factor can be adequately managed via proponent's commitments. **Not considered to be a relevant environmental factor.**
SOCIAL SURROUNDINGS			
7. Heritage – Aboriginal	The remediation works along the banks and floodplain of the Helena River has been approved by the Hon. Minister for Indigenous Affairs on 23 April 2004.	The issue of noise and vibration was not raised in government and public submissions.	The proponent has consulted with obtained approval from the Hon. Minister for Indigenous Affairs. **Not considered to be a relevant environmental factor.**
8. Heritage – Non-aboriginal	The site of the former Midland Railway Workshops is included on the: • Heritage Council of Western Australia's Register of Heritage Places; • Australian Heritage Commission's Register of	**Heritage Council** • Concerns regarding the addition of clean fill on top of the warning barrier separating remnant contamination and clean fill. Recommended that a conservation professional should be consulted for each affected building; and • Advises that a formal referral to the Heritage Council is required for any remediation works in accordance to the Act.	The proponent has prepared the *Heritage Strategy for the Midland Central Redevlopment Area*, which outlines the integration of the historical and heritage values of the former Workshops into the redevelopment. During remediation works, the

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	the National Estate; and • City of Swan's Municipal Heritage Inventory. The site is also classified by the National Trust of Australia (WA) and has statutory protection through the provision of *Heritage of Western Australia Act 1990* ("the Act").		following strategy will be adopted: • There will be a buffer zone of 2m around the heritage structures where maximum excavation is 300mm; and • Excavation will proceed at a 1:1 slope after the 2m buffer to a maximum of 1m. Remediation proposal will be referred to Heritage Council in accordance to the Act. **Not considered to be a relevant environmental factor.**
9. Community consultation	The proposal will involve regular updates on the progress of the remedial works through the local press, MRA website, community feedback line, and community information sessions.	**Public Submission (Anonymous)** • Concerned about the public availability of compliance information	**Proponent Commitments:** Continue to consult with stakeholders and keep the community informed on the progress of the remediation project as outlined in the Community Consultation Plan. This factor can be adequately managed via proponent's commitments and recommended conditions requiring the public availability of management plans and monitoring reports. **Not considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
10. Traffic	Remediation will require transportation of bulk soils or contaminated materials to either landfill or for placement at the MIA Containment Cell. The MRA estimates that up to 40 to 50 vehicles movements per day will be required to and from the site. All vehicles are expected to enter and leave the site via Centennial Place and Clayton Street. No vehicles are intended to travel along Yelverton Drive and Amherst Drive.	The issue of traffic was not raised in government and public submissions.	**Proponent Commitments:** Prepare a Traffic Management Plan prior to remediation works which includes: • Measures to manage traffic movements and potential road safety conflicts; and • Discussion with and agreement by Main Roads Western Australia and the City of Swan before implementation. This factor can be adequately managed via proponent's commitments. **Not considered to be a relevant environmental factor.**

PRINCIPLES		
Principle	**Relevant Yes/No**	**If yes, Consideration**
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*		
	Yes	In considering this proposal, the EPA notes that: • although there is still exists uncertainty about the movement groundwater

PRINCIPLES		
		contaminants and it's impacts on external sensitive receptors, the remediation works will reduce environmental risk to external receptors; • the proponent is committed to remove most of the source of contamination and replace with clean fill; • where contamination is left on site, the proponent will cover the soil with a barrier and clean fill, and annotate the land title with a memorial; and • removal of the waste fill and contaminated soil, which is the source of groundwater contamination, will reduce the risk of contaminants to external sensitive receptors.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*		
	Yes	In considering this proposal, the EPA notes that: • the remediation works and management measures after the works will reduce risk to future land users; and • the proponent is committed to preserving the historical and heritage values of the site.
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*		
	No	In considering this proposal, the EPA notes that: • the remediation site has low biodiversity value due to past landuse • the site abuts a conservation category wetland to the south. Remediation works will reduce the risk of contaminants reaching the wetland.
4. Principles relating to improved valuation, pricing and incentive mechanisms i. *Environmental factors should be included in the valuation of assets and services.* ii. *The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* iii. *The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.* iv. *Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimise costs to develop their own solution and responses to environmental problems.*		
	No	

PRINCIPLES		
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*		
	Yes	In considering this proposal, the EPA notes that contaminated soil and waste fill will be treated and reused as clean fill or contained onsite, either • contained and capped in the Meat Industry Association Containment Cell (MIA CC); or • contained onsite due to heritage constraints and covered with a warning barrier and clean fill. Only heavily contaminated soil that cannot be reused or contained in the MIA CC will be transported to an appropriate landfill.

Appendix 4

Recommended Environmental Conditions

Statement No.

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

HELENA EAST PRECINCT REMEDIATION AND REDEVLOPMENT
MIDLAND, CITY OF SWAN

Proposal: The remediation of approximately 17 hectares of land, known as the Helena East Precinct and Southern Embankment located centrally in the Midland Railway Workshops area, which includes relocation of contaminated soil to an area located immediately east of the Police Operations Support Facility known as the Meat Industry Association Containment Cell as documented in schedule 1 of this statement.

Proponent: Midland Redevelopment Authority

Proponent Address: Cnr Helena Street and Yelverton Drive, MIDLAND WA 6056

Assessment Number: 1524

Report of the Environmental Protection Authority: Bulletin 1234

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for the Environment under sections 38(6) or 38(7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer of the Department of Environment and Conservation (CEO) of any change of the name and address of the proponent for the serving of a notice or other correspondence within 30 days of such change.

Published on

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall submit to the CEO environmental compliance reports annually reporting on the previous twelve-month period, unless required by the CEO to report more frequently.

4-2 The environmental compliance reports shall address each element of an audit program approved by the CEO and shall be prepared and submitted in a format acceptable to the CEO.

4-3 The environmental compliance reports shall:

1. be endorsed by signature of the proponent's chief executive officer or a person, approved in writing by the CEO, delegated to sign on behalf of the proponent's chief executive officer;

2. state whether the proponent has complied with each condition and procedure contained in this statement;

3. provide verifiable evidence of compliance with each condition and procedure contained in this statement;

4. state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement;

5. provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement;

6. identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance or non-conformance;

7. provide an assessment of the effectiveness of all corrective and preventative actions taken; and

8. describe the state of implementation of the proposal.

4-4 The proponent shall make the environmental compliance reports required by condition 4-1 publicly available in a manner approved by the CEO.

5 Soil Remediation Criteria

5-1 Within the areas without "heritage constraints", the proponent shall remediate the land to the "appropriate remediation criteria" for the land use zones.

Note:

1. "Heritage constraints" in the Helena East Precinct dictates that within a notional 2-metre buffer zone from heritage structures excavation can only occur to a maximum depth of 300mm. Beyond the buffer zone, the wall of the excavation will be excavated on a 1:1 slope to either the maximum depth of contamination or the maximum depth possible given the presence of other heritage structures.

2. "Appropriate remediation criteria" is the Health Investigation Levels, defined in the Department of Environment (2003) *Assessment Levels for Soil, Sediment and Water*, that corresponds to the land use zoning. The appropriate remediation criteria for areas zoned:
    1. Residential (A) is Health Investigation Levels-A;
    2. Residential (D) is Health Investigation Levels-D;
    3. Public Open Space/Education is Health Investigation Levels -E; and
    4. Commercial is Health Investigation Levels -F.

6 Site Validation

6-1 Within one month following the completion of remediation works, the proponent shall carry out validation investigations of the soil in the Helena East Precinct and the Southern Embankment and prepare a Site Validation Report.

6-2 Prior to issuing land titles, the proponent shall submit the Site Validation Report referred to in condition 6-1 to the Department of Environment and Conservation for approval.

6-3 The proponent shall make the Site Validation Report required by condition 6-1 publicly available in a manner approved by the CEO.

7 Remediation Work in the Southern Embankment

7-1 Prior to commencing remediation works on the Southern Embankment, the proponent shall revise the *Site Environmental Management Plans: Remediation of Helena East Precinct Former Railway Workshops, Midland* (March 2006, Version 2) included in Appendix 12 of the Public Environmental Review document (March 2006, Version 3) and include management methods for the remediation and recontouring works on the Southern Embankment.

The management methods shall be consistent with the Environmental Protection Authority's Guidance Statement 33 on *Environmental Guidance for Planning and Development* and shall address:

1. risk of erosion and siltation during works on the Southern Embankment;
2. measures to minimise these risks;

3. rehabilitation of the area by planting with local native species of vegetation; and
4. monitoring of the final surface of the recontoured area for stability and erosion.

7-2 The proponent shall make the revised Site Environmental Management Plans required by condition 7-1 publicly available in a manner approved by the CEO.

8 Onsite Containment of Residual Contamination

8-1 For areas where soil does not meet the "appropriate remediation criteria" required by condition 5-1, the proponent shall cover the residual waste fill with a geotextile visual warning barrier, which shall be either A12 Bidim cloth or Max 30 Enkagrid or a similar material approved by the CEO.

8-2 For areas zoned "residential", the proponent shall provide a cover of not less than one metre of "clean fill" over the geotextile visual warning barrier.

Note:
1. "Clean fill" is defined as soil meeting the Ecological Investigation Levels criteria defined in the document *Assessment Levels for Soil, Sediment and Water*, Department of Environment (2003).

8-3 Where there are "heritage constraints", described in note 1 condition 5, and one metre of clean fill is not possible, the proponent shall manage the area to minimise erosion using treatment, such as hard stand or equivalent, as approved by the CEO.

8-4 For areas zoned other than residential, the proponent shall provide a cover of not less than 0.5 metres of clean fill over the geotextile visual warning barrier.

8-5 Where there are "heritage constraints", described in note 1 condition 5, and 0.5 metre of clean fill is not possible, the proponent shall manage the area to minimise erosion using treatment, such as hard stand or equivalent, as approved by the CEO.

9 Dense Non-Aqueous Phase Liquid Delineation and Management

9-1 Prior to issuing land titles in any area affected or potentially affected by the dense non-aqueous phase liquid (DNAPL) in groundwater, the proponent shall carry out investigations to fully delineate the DNAPL contamination in the Helena East Precinct and shall report results of the investigations to the Environmental Protection Authority at the completion of these investigations.

This report shall:
1. delineate the nature and extent of the DNAPL contamination laterally and vertically; and
2. provide a risk-based assessment of the contamination to the Leederville Aquifer, the Helena River and offsite groundwater.

9-2 Prior to issuing land titles in any area affected or potentially affected by the DNAPL in groundwater, the proponent shall develop a DNAPL Management Plan with the objective of mitigating the risk of the DNAPL contamination to the Leederville Aquifer,

the Helena River and offsite groundwater to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This Plan shall address:

1. remediation strategy and actions and validation program;
2. monitoring requirements;
3. long-term management measures for the DNAPL contamination;
4. reporting requirements; and
5. contingency plans.

9-3 The proponent shall implement the DNAPL Management Plan required by condition 9-2.

9-4 The proponent shall make the DNAPL investigation report and the DNAPL Management Plan, required by conditions 9-1 and 9-2 respectively, publicly available in a manner approved by the CEO.

10 Dust and Air Quality

10-1 Prior to ground-disturbing activity, the proponent shall revise the *Dust and Air Quality Management Plan* (March 2006, Version 2) included in Appendix 11 of the Public Environmental Review document (March 2006, Version 3) in consultation with the Department of Environment and Conservation and the Department of Health.

10-2 Prior to ground-disturbing activity, the proponent shall implement the revised Dust and Air Quality Management Plan required by condition 10-1.

10-3 The proponent shall make the revised Dust and Air Quality Management Plan, required by condition 10-1 publicly available in a manner approved by the CEO.

11 Meat Industry Association Containment Cell

11-1 Prior to use of the Meat Industry Association Containment Cell, the proponent shall prepare a Meat Industry Association Containment Cell Construction and Management Plan.

This Plan shall address:

1. Design of the Cell;
2. Detailed construction plan of the Cell;
3. Criteria for materials placed in the Cell;
4. Erosion monitoring and management of the cap;
5. Rehabilitation of the Cell with shallow-rooted native vegetation;
6. Long-term management and ownership of the Cell, including ownership of the land, responsibility for post-closure management and monitoring, and annotations on the land title.

This Plan shall be submitted to the Department of Environment and Conservation for approval prior to ground-disturbing works.

11-2 The proponent shall restrict the materials placed in the Meat Industry Association Containment Cell to those which comply with the following criteria:

- The average plus standard deviation of concentration results is less than twice the Concentration Limit Criteria for a Class 1 Landfill or 95% Upper Confidence Limit is less that twice the concentration limits for a Class 1 Landfill; and
- The average plus standard deviation of Australian Standard Leachability Potential results is less than the Australian Standard Leachability Potential criteria for a Class 1 Landfill or 95% Upper Confidence Limit is less than the Australian Standard Leachability Potential criteria for a Class 1 Landfill.

11-3 The proponent shall cap materials placed in the Meat Industry Association Containment Cell with a layer of compacted clay of minimum thickness of 300mm and with nominal permeability of less than 10^{-9} metres per second, followed by at least 500mm of "Clean fill" as defined in condition 8-2 (note 1).

11-4 The proponent shall maintain the cap of the Meat Industry Association Containment Cell, referred to in condition 11-3, with shallow-rooted native vegetation local to the area.

11-5 The proponent shall implement the Meat Industry Association Containment Cell Construction and Management Plan required by condition 11-1.

11-6 The proponent shall make the Meat Industry Association Containment Cell Construction and Management Plan, required by condition 11-1 publicly available in a manner approved by the CEO.

11-7 The proponent shall place an annotation on the land title of the lot containing the Containment Cell describing the nature of the material placed in the Containment Cell and indicating that any proposed disturbance to the Containment Cell will require an approval from the Department of Environment and Conservation and may require a referral to the Environmental Protection Authority.

12 Surface and Groundwater

12-1 Within six months following completion of remediation, the proponent shall prepare and submit to the CEO for approval a Post-remediation Surface and Groundwater Monitoring and Management Plan.

This Plan shall address:

1. monitoring of groundwater at existing and any additional locations around Helena East Precinct, the Southern Embankment and the Meat Industry Association Containment Cell, as determined by the Department of Environment and Conservation;
2. water quality monitoring of the Helena River;
3. contingency plans; and
4. irrigation management to minimise leaching of water through remaining waste fill on the Southern Embankment.

12-2 The proponent shall develop groundwater and surface water monitoring targets for groundwater and surface water quality which shall be consistent with background

groundwater and surface water quality established during baseline studies or, in decreasing order of preference, the Department of Environment (2003) *Assessment Levels for Soil, Sediment and Water* and any future versions and the Australia and New Zealand Environment and Conservation Council (2000) *Australian Water Quality Guidelines for Fresh and Marine Water Quality*.

12-3 In the event that the target levels referred to in condition 12-2 are exceeded, the proponent shall immediately modify activities on the project site to achieve levels below target levels as soon as possible.

If target levels are exceeded, the proponent shall take steps to

1. identify the source of the contamination;
2. analyse significance of the contamination and need for remediation;
3. if feasible, remediate the source of contamination and implement a specific monitoring regime to demonstrate that groundwater impacts have been addressed;
4. install an impermeable barrier or use a technique such as a Permeable Reactive Barrier or other suitable technique if remediation is not feasible; and
5. submit a report to the Department of Environment and Conservation outlining actions taken to achieve levels below the target, including time to be taken.

12-4 The proponent shall monitor the groundwater around the Helena East Precinct, the Southern Embankment and the Meat Industry Association Containment Cell and the water of the Helena River in accordance with sampling locations and a schedule approved by the CEO.

12-5 After not less than three years of groundwater and surface water monitoring, the proponent shall consult with the Department of Environment and Conservation to determine when groundwater and surface water monitoring may cease.

12-6 The proponent shall make the Post-remediation Surface and Groundwater Monitoring and Management Plan, required by condition 12-1 publicly available in a manner approved by the CEO.

12-7 The proponent shall make monitoring reports required in the Post-Remediation Surface and Groundwater Monitoring and Management Plan publicly available in a manner approved by the CEO.

13 Memorials on Land Titles

13-1 Prior to issuing land titles, the proponent shall place annotations on land titles stating the presence of residual soil contamination where residual soil contamination is present in the Helena East Precinct and the Southern Embankment.

These annotations shall also require the proponent and the City of Swan to be alerted to any subsurface activities to be carried out on the land. The proponent shall require persons carrying out the works to comply with the Subsurface Management Plan as required by condition 14-1.

13-2 Prior to issuing land titles, the proponent shall place annotations on all land titles stating the presence of contaminated groundwater and prohibiting use of the groundwater.

14 Post-remediation Subsurface Activities

14-1 Within three months following completion of remediation works, the proponent shall submit a Subsurface Management Plan to the CEO for approval.

14-2 The proponent shall implement the Subsurface Management Plan required by condition 14-1.

14-3 In the event that services or subsurface activities need to be located or to take place, respectively, below the clean fill cover, prior to the installation of such services, the proponent shall carry out soil validation tests to demonstrate that the soil is not contaminated.

Note:
1. It is preferable that all services such as power, drainage and telephone be installed within the clean fill (see condition 8-2, note 1) cover material.

14-4 In the event that the soil is contaminated, the proponent shall advise the Department of Environment and Conservation and complete the works in accordance with the Subsurface Management Plan required by condition 14-1.

14-5 The proponent shall make the Subsurface Management Plan required by condition 14-1 publicly available in a manner approved by the CEO.

Notes

1. Where a condition states "on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.

2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.

3. The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.

Schedule 1

The Proposal (Assessment No. 1524)

General description

The proposal is to remediate land in the Helena East Precinct and Southern Embankment of the former Midland Railway Workshop Site, shown in Figure 1. The land is to be prepared to a standard suitable for the land uses agreed in the Midland Redevelopment Scheme and *Midlandmetro Concept Plan 2010*.

The remediation activities are described in the following document - Helena East Precinct Remediation and Redevelopment: Public Environmental Review, Version 3 March 2006.

A summary of the key proposal characteristics are listed in Table 1.

Table 1 – Summary of the Key Proposal Characteristics

Element	Description
Location of site	Figure 1; Lot 9006 DP 44198; Lot 14241 on Plan 27672, Reserve 42712.
Nature of contaminants	*Waste Fill* Waste fill consisting of coal cinder, foundry slag, building rubble, sand, steel and occasional asbestos products over the Helena East Precinct and Southern Embankment. *Soil* Soil over the Helena East Precinct and Southern Embankment affected by metals, hydrocarbons and/or solvents and localised cyanide contamination. *Groundwater* Widespread low-level metal contamination. Localised hydrocarbon and solvent contamination within areas where extensive hydrocarbons and/or solvents were identified in soil.
Total volume of contaminated soil and waste fill	119,000m^3

Element	Description
Remediation activities	Excavate approximately 59,000m^3 of contaminated soil and waste fill and either: - Subject to treatment and reuse; - Relocate to onsite containment cell; or - Direct offsite for disposal or treatment. Residual contamination will be contained onsite using a geotextile warning barrier covered by clean fill. Contaminated groundwater encountered during excavation will be treated either onsite or offsite.
Containment cell	Construct containment cell with a clean clay base not less than 300mm thick. Cap containment cell with a compacted clay layer with a permeability of not more than 10^{-9} m/s and cover with a layer of clean free draining soil not less than 500mm thick, which is stabilised with shallow rooted native vegetation. Containment cell will contain not more than 80,000m^3 of material. Height of the cell will be not more than 12m.
End land uses	In accordance with the Midland Redevelopment Scheme and the *Midlandmetro Concept Plan 2010*

Figures (attached)

Figure 1 - Location Plan.

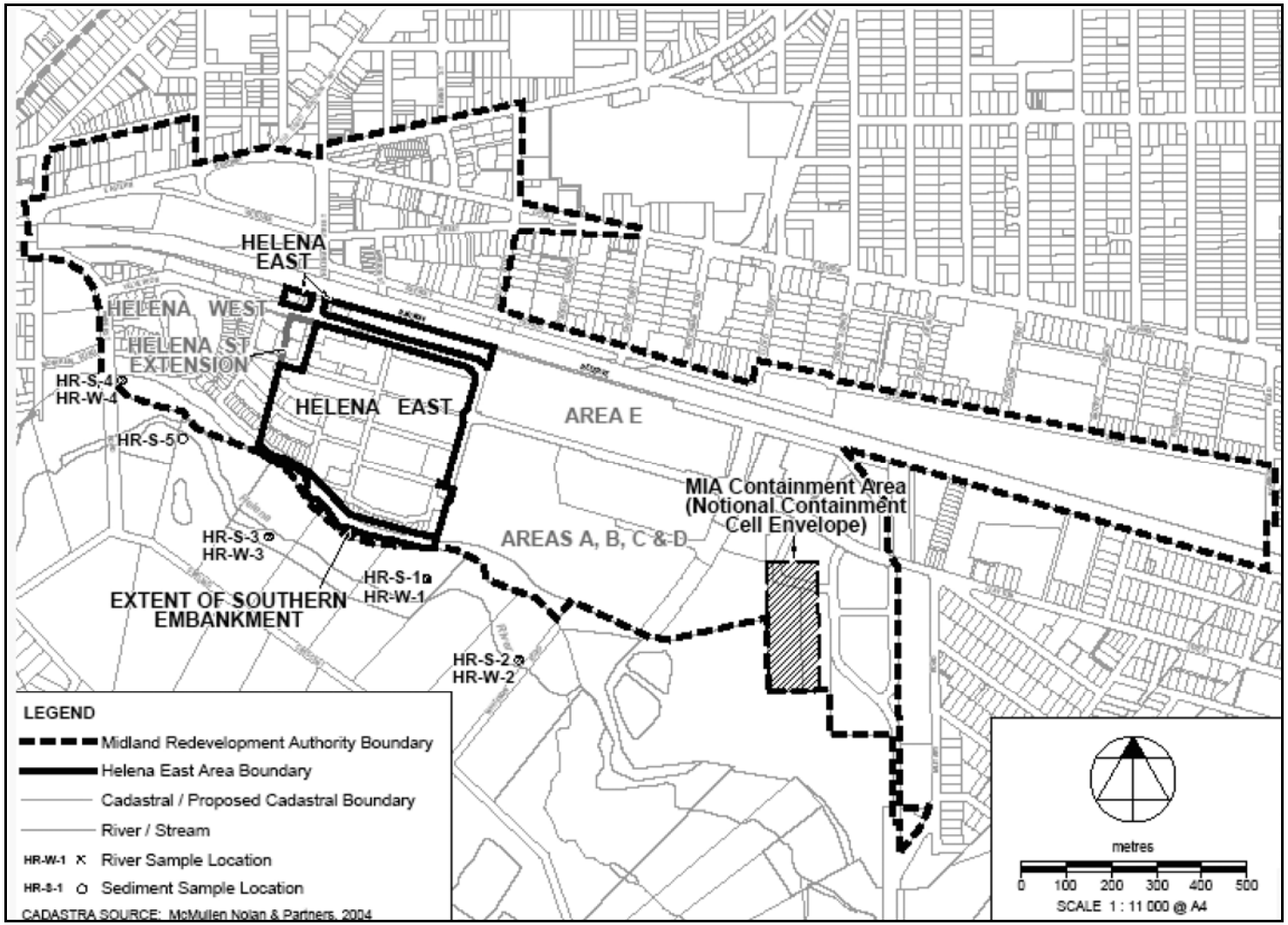

Figure 1: Location Plan

Appendix 5

Summary of Submissions and
Proponent's Response to Submissions

Issue 1: Soil Contamination

Question 1.1 - **Management of Waste Fill Should the MIA Containment Cell not be available**

MIA land may be available late 2006/early 2007 for use as a containment site. The Proponent has not indicated how the waste fill material will be managed should remediation commence before the MIA land is ready for use. There is no contingency plan provided by the proponent on interim measures to manage the wastefill.

Submitter: Environmental Protection Agency Service Unit (EPA SU)

Response

The MIA land may be available in late 2006/early 2007 for use as a containment site. The MRA understands that the EPA SU would like more information on how the waste fill material will be managed should remediation commence before the MIA land is ready for use.

The MRA, as a government entity, is committed to manage the identified waste material in an environmentally responsibly manner. The proposed use of the MIA Containment Cell is the MRA's preferred approach (as opposed to sending material to landfill), in terms of environmental suitability. Some of the advantages of the Containment Cell include saving landfill space and avoiding greenhouse gas emissions associated with transport of the material to a landfill facility. As described in Section 4 of the PER, this approach is broadly based on the preferred hierarchy of options for site clean-up and/or management (national site contamination assessment approach) outlined in the *National Environment Protection (NEPM)(Assessment of Site Contamination) Measure 1999* (NEPC, 1999). As per the *NEPM,* "consolidation and isolation of the soil on site by containment with a properly designed barrier" is preferable to "removal of contamination material to an approved site or facility".

If due to overarching timeframes remedial works are required to commence before the MIA land is ready for use, the contaminated material originally destined for onsite containment will be disposed offsite to landfill. In order to be prepared for this eventuality, MRA currently has the resources and the ability to dispose of all material offsite to landfill should this be required. In addition (and to complement this approach), alternative technologies for the treatment of the hydrocarbon contaminated soils are being considered on a cost/benefit basis.

Question 1.2 - **Long Term Management of MIA Containment Cell**

There is uncertainty concerning the proposed long-term management of the MIA land (containment cell) post construction of cell. There is no mention of who will be responsible for long-term monitoring, maintenance and operation of this site.

Submitter: EPA SU

Response

Further information has been requested on the long-term management of the MIA Containment Cell. Additional information is provided under the following three points below:

1. Ownership and Control
2. Siting, design, operation and capping
3. Post-Closure Management

These points are discussed in more detail below.

1. Ownership and Control

The MIA containment cell is located on land that is currently vested with the Meat Industry Authority (MIA). The area of land where the containment cell is proposed to be located is already impacted by the presence of asbestos waste in a below ground containment cell. Prior to the construction of the containment cell, the MIA land in its entirety will be vested with the MRA for uses approved under the planning scheme for the redevelopment area.

The area of the MIA site proposed for locating the containment cell will be excised from the larger MIA title area. The current land use zoning for the area provides for the long term storage of non-hazardous waste material as a permitted use.

While the redevelopment process continues and the MRA continues to exist, the MIA land will remain vested with the MRA and will be managed by the MRA. At the conclusion of the redevelopment process, Section 69(2) of the *Midland Redevelopment Act 1999* provides *inter alias:*

"On the expiry of this Act under subsection (1)-

(a) all real and personal property and every right or interest that immediately before that expiry was vested in the Authority is without any transfer or assignment to pass to and become vested in the Minister;
(b) all rights, liabilities and obligations of the Authority that were in existence immediately before that expiry devolve to the Minister;…"

Practically this means residual property will fall to the Minister for Planning and Infrastructure and consequently probably vest in the Crown as the Minister for Planning is also the Minister for Lands.

As a consequence of this, the MRA Containment Cell will remain in Government ownership and control and the zoning of the land will prevent its redevelopment without a rezoning process that can be called in by the EPA for further assessment, if the issues associated with the containment cell are not addressed.

2. Siting, Design, Operation and Capping

As indicated previously, the site proposed for locating the containment cell was

chosen because this particular area of the MIA land has already been used by the State Government Railways for the burial of asbestos-containing materials and as a result is unsuitable for redevelopment in its current state. The general view is that the risks associated with excavating and moving the asbestos materials currently outweigh the benefits that would accrue. This approach is similar to that implemented at the former James Hardie Industries site at Burswood.

The construction of the proposed containment cell over the top of the existing buried asbestos will provide a further degree of security that the existing asbestos material will not be disturbed.

The containment cell itself poses a very low ongoing environmental risk because of its design and the relatively inert nature of the material proposed for placement in the cell.

As described in the PER, the material to be placed in the cell will be carefully vetted to ensure that it is essentially consistent with the definition of inert waste. Waste material containing minor amounts of asbestos may be placed in the cell, and if so will be managed to minimise potential exposure to human health and the environment. The management objective will be to place any asbestos containing material toward the base of the bund so to maximum the distance any from potential receptors.

The waste will be placed under engineering supervision in a series of lifts so that each layer of waste is well compacted and stable.

Once the final design height is reached the inert waste material will be covered with compacted clay capping that is contoured to minimise erosion and control runoff. The clay cap will then be covered with topsoil and vegetated to provide a stable surface.

Drainage controls will be incorporated into the cap to ensure that it does not erode and expose the inert fill.

The end result should be a stable, vegetated landform that is contoured to fit with the amenity of the area.

It is anticipated that there will be a need for some post-closure management of the cell in the initial years (1-2 years) following construction while the vegetated cover is being established to stabilise the surface. During these initial years, the land will be under the control of the MRA. The MRA has made provision for post-closure management and maintenance of the cell in its budgets

As indicated above in the longer term, the land will remain vested with the Government and if there is evidence that further maintenance of the cell is required the resources of the Government will be available for this to occur. However, it needs to be recognised that the material being placed in the cell largely conforms with the definition of Class 1 (inert) waste and the criteria for Class 1 waste have been developed on the basis that a typical Class 1 landfill site can be closed with out an impermeable cap and without the need for ongoing post-closure management. The position with the containment cell is superior to a Class 1 cell in that the contained material is located inside an engineered cap which prevents infiltration of rainwater

and reduces the likelihood of any disturbance of the deposited material

3. *Post-Closure Management*

The completion of the cell will be achieved when the following have been finalised:-

- the placement of the clay cap
- the application of topsoil
- the construction of drainage controls
- the seeding and/or planting of vegetation.

At this stage, the title for the cell will be annotated with an encumbrance such as the following:

"*This land has been used for the disposal of asbestos wastes below ground and the construction of a capped containment cell above ground containing soils and waste materials containing low concentrations of metals and hydrocarbons at concentrations not exceeding levels twice the Class 1 "Inert" Landfill guidelines described in Landfill Waste Classification and Waste Definition 1996 (as amended).*

The containment cell should not be disturbed without specific approval from the Department of Environment and Conservation or its successor agencies"

The land will be vested with the MRA and will be the subject of annual inspections during at least the first two years following completion. Following these inspections any erosion damage, repairs or other works (including reforming the contours or drainage features of the cell) that may be required will be implemented.

A Containment Cell Management Plan will be prepared which will address long term management of the Containment Cell. The Management Plan will address the following issues:

- Inspection by the consulting team (engineering, environmental and landscape specialists)
- Reporting to EPA indicating condition of (e.g. stable, suitable for passive management or requiring additional work)
- Ongoing maintenance
- Inspection Frequency

Once the stable landform has been achieved, the cell should not require ongoing management. However, if exceptional circumstances (e.g. earthquake or flood) damage the cell, it will remain vested with the Government in perpetuity to ensure that the necessary resources are always available to implement repairs.

In addition to the direct management of the containment cell by the MRA, there will be an ongoing program of surface and groundwater monitoring conducted by the MRA for several years following closure of the cell which will ensure that any unusual changes in water quality will be detected and an appropriate response made.

Question 1.3 - **Proximity of the training ground for the WAPS Mounted Section to the MIA Containment Cell**

The police site master plan, previously provided to the MRA, locates the Mounted Section training ground on the land immediately adjacent to the proposed Containment Cell. This will involve scenario training of police officers and horses in roil and civil disorder situations. This outdoor activity so close to a "containment cell" is of considerable concern. WA Police are still experiencing problems with repugnant odours from the adjacent Brick Works and do not require further impediments to the use of this land.

Submitter: Western Australia Police Service (WAPS)

Response

As indicated in previous responses, the material to be placed in the Containment Cell is quite inert with low concentrations of contaminants and low bioavailability of the contaminants due to their low leachability. As a result, the material represents a low environmental or health risk during the process of placing waste and more particularly following closure and capping.

During the disposal operation, strict dust controls will be in place to minimise dust emissions. As part of the Air Quality Management Plan included with the PER, a commitment has been made to position an air monitoring station on the western side of the WAPS site in proximity to the Flanging Shop to characterise dust (if any). The monitoring site will include air monitors capable of measuring real-time particulate concentrations. In view of the concerns raised by the WA Police Services, the MRA will position a further real-time monitor (Dustrak) on the WAPS site in proximity to the Containment Cell (during Mounted Section use of the training ground) to monitor particulate levels during periods when the waste is being placed in the cell or the cap is being constructed. In the event that the target criteria set in the Air Quality Management Plan are exceeded, dust control practices would be reviewed.

As indicated above, following closure and capping of the containment cell, it will represent no threat to the WAPS site as the soils placed in the cell will be isolated from direct contact and there should be no leaching of contaminants given the low permeability of the compacted clay cap.

Question 1.4 - **Capping Design and Erosion Management of the MIA Containment Cell**

Only a clean soil capping over the Containment Cell mound of 500mm is required. In the remediation strategy for the Police OSF site clean soil capping of 1000mm was required over contaminated soil. Only 500mm clean soil was required if there was to be a hardstand finish (i.e. car park). So 500mm appears too minimal unless there will to be a concrete capping or similar.

What measures will be taken to ensure the prevailing winds over time do not reduce the clean soil capping?

Submitter: WAPS

Response

See previous responses including responses to Question 1.2, Question 3.2 and the PER for a description of the Containment Cell cap design and erosion management of the cap.

Question 1.5 – **Management of Residual Contamination in Helena East and Southern Embankment areas**

The PER provided indicates that the contamination issues associated with the Helena East redevelopment will be suitably managed to address potential impacts to public health. The use of visible barriers and annotations on title to indicate the presence of residual contamination in proximity to heritage buildings is considered an appropriate measure to manage the ongoing contamination for the site.

Submitter: Department of Health

No response required.

Issue 2: Groundwater Contamination

Question 2.1 - **Fate and Transport of Potential Contaminants from MIA Containment Cell (including asbestos)**

Although the MRA has provided information on the extent and nature of contamination under the MIA site, there has been no comment or assessment of the potential risk of contaminants including asbestos on the environment. There is no mention/assessment of the fate and transport of such contaminants from the MIA land.

Submitter: EPA SU

Response

In considering this response please also refer to the information present in the responses to Questions 1.1 and 1.2.

As part of the PER, the EPA identified the need to undertake fate and transport modelling of contaminants from the containment cell in the scoping document. Originally the cell was to comprise a mound of fill covered with topsoil and vegetated. Through the process of preparing the PER, MRA has modified the approach to the containment cell so that it has been upgraded to an engineered containment cell with a low permeability clay cap. The cell will receive only waste that has been vetted to ensure that it contains low concentrations of contaminants which have very low leachability.

The result of this approach is that there is a very low risk of contaminants leaching from the waste because of its inert, non-leachable nature. In addition, the clay cap

will divert stormwater from the waste. The potential quantity of water that may leach through the clay cap is so minimal that it would be difficult to develop a conceptual model for the leaching of contaminants from the deposited waste.

As a consequence, MRA considers that there is no longer a need for fate and transport modelling of the potential contaminants.

However, data gathered as part of the Groundwater and Helena River Management and Contingency Plan (refer Response to Submission 1, Issue 1) will provide an indication of potential contamination transport from MIA containment cell.

Asbestos has historically been recognised as an inert substance. It is not soluble in and/or transported in groundwater so that the potential for impact from the transport of asbestos either present or within the future containment cell is considered unlikely. Issues regarding potential erosion of the cap are discussed in other responses, including response to Question 1.2.

Question 2.2 - **Delineation, remediation and management of the DNAPL issue**

A concern for the DEC was that the extent of some contamination at the site, particularly DNAPL contamination, had not been delineated and that investigations to delineate the contamination should be completed before the PER was finalised. However, the DEC understands that there is an agreement with the MRA that the DNAPL investigations can be completed in parallel with the Public Environmental Review (PER) process. As previously indicated, a commitment has been made to the delineation of the DNAPL plume in the PER. However, this remains to be completed. It is not possible to comment on whether the post-remediation management and monitoring of the DNAPL plume will be sufficient as no details have been provided.

Submitter: DEC

The EPA SU considers that a DNAPL management strategy/plan, following the investigation and delineation of the DNAPL contamination on the Helena East site, should be completed prior to the EPA assessing the project.

Submitter: EPA SU

DNAPLs are the most significant groundwater issue facing the site at the Midland Workshops. How is the proponent dealing with this issue?

Submitter: Anonymous

Response

Work is proceeding on delineating the extent of the DNAPL and the level of threat to

health and the environment. A brief preliminary report will be forwarded to the EPASU within the next few weeks that will:

- summarise findings to date
- outline the need for additional investigations
- examine possible management strategies

A more detailed report which will document the investigations more fully and recommend a management strategy will be forwarded over the coming months. MRA's aim is to agree the management strategy with EPA and the Department prior to the commencement of site works for the soil remediation in the Helena-East Precinct. This timing would allow major civil works (if any required) associated with the management strategy of the DNAPL to be completed as part of the remediation works and prior to subdivisional works commencing.

Question 2.3 - **Regulatory Review of the Groundwater Management Plan for Dense Non Aqueous Phase Liquid (DNAPL) Impacts**

The PER contains a commitment to the development of a management and monitoring plan following the delineation of the DNAPL plume. The delineation of the DNAPL plume is the subject of on-going investigations. It is not clear whether the DEC will be able to review the plan for the monitoring and management of the DNAPL plume when it is developed.

Submitter: DEC

Response

The DEC in its submission wished to confirm that it will have the opportunity to review the results of the current investigations into the Dense Non Aqueous Phase Liquid (DNAPL) Impacts and proposed Groundwater Management Plan.

The MRA confirms that it will present the results of the current investigations into the Dense Non Aqueous Phase Liquid (DNAPL) Impacts at the Helena East site and proposed Groundwater and Helena River Management and Contingency Plan prior to its implementation. This is accordance with Commitment 1 on Table ES1 of the PER.

Question 2.4 - **Groundwater Monitoring for Meat Industrial Authority (MIA) Containment Cell**

The use of the MIA site for a containment cell seems appropriate assuming that the commitments made for the construction of the cell are met and that only low-level waste material is contained in the cell, as indicated in the PER. However, there does not appear to be any commitment to the monitoring of groundwater quality downgradient of the containment cell. It is recommended that some groundwater monitoring downgradient of the cell is required so that significant impacts can be detected prior to sensitive receptors, such as the Helena River, being intersected.

Submitter: DEC

There appears to be minimal detail of the actual structure of the Containment Cell. If there is no concrete base there could be leaching of contaminants into the adjoining land. Under the Environmental Management Plan for the police site we are required to implement a ground water monitoring program for the Operations Support Facility (OSF) site. With such a concentrated storage of contaminants adjacent to the police site, is it possible that this will impact on the reading that WA Police will obtain from their groundwater monitoring program and increase the extent of remedial actiosn that WA Police may be required to undertake?

Submitter: WAPS

Monitoring of the MIA CC should be carried out quarterly for ever to determine the fate of all compounds placed in the containment cell.

Submitter: Anonymous

Response

As outlined in Section 10.2 of the PER, the design of the proposed containment cell on the MIA land (which is in the process of being procured by the MRA) comprises the total encapsulation of the waste fill material by a compacted clay layer that is 500mm thick. The primary aim behind total encapsulation of the waste fill is to shed incident rainfall thereby preventing its ingress into the waste body and the production of potentially contaminated leachate that could move over time into the surrounding environment.

This approach provides an improved environmental outcome with respect to the current situation where large quantities of Waste Fill have been and are currently exposed to the environment and the ingress of rainfall.

This said, it should also be noted that the Waste Fill material proposed to be placed into the containment cell is not relatively heavily contaminated (maximum acceptable concentrations two (2) times the maximum Class 1 limit, ASLP leachate concentration not to exceed the Class 1 ASLP limit). Very large volumes of this waste have also been present on the redevelopment site for up to 100 years and an interesting point is that whilst there are some hotspots of contamination which are associated with known activities at the sites (e.g. nickel contamination at the former

plating shop), groundwater investigations to date have not shown high level, broad scale impacts.

This relative lack of groundwater impact is likely to be as a result of the relatively low leachability characteristics of the contaminants in the Waste Fill and the approximately 8-10m thick layer of clay-rich strata that immediately underlies the Helena East and MIA Containment Cell sites.

Investigations in the vicinity of the Containment Cell footprint have shown that underlying strata comprises Waste Fill (including a purpose built asbestos dump) and up to at least 8m of clay-rich. In the unlikely event that leaching occurs, the presence of clay-rich soils around the containment cell will act to attenuate any low levels of contamination that may leach from the waste.

Groundwater monitoring in the general vicinity of the MIA Containment Cell site has shown that despite the presence of an estimated 20,000m^3 of Waste Fill deposited in the immediate vicinity, where relatively little impact has occurred to date. Groundwater was tested at one location immediately beneath the Waste Fill extending to a depth of approximately 1.5m. The results indicate that groundwater pH was neutral with nickel and zinc levels slightly above Fresh Water Guidelines (FWG). Other potential metal and organic contaminants such as hydrocarbons, phenols, cresols and cyanide were not detected. Also, groundwater tested on MIA land immediately downgradient of the existing waste fill deposits revealed the presence of nickel and zinc levels also slightly above the FWG. Other metal concentrations did not exceed the FWG and none of the other potential contaminants tested were detected at concentrations above Drinking Water Guidelines (DWG). Hydrocarbons, phenols, cresols and cyanide were also not detected.

The nature of the material to be contained together with the design of the containment cell suggests that the cell does not present a significant risk to the environment. However, the need for monitoring is acknowledged and it is proposed that groundwater monitoring bores be installed upgradient and down gradient of the Containment Cell footprint to allow potential impacts of the Containment Cell on groundwater quality to be intercepted and assessed.

The MRA is developing an integrated groundwater monitoring regime for the entire redevelopment area. This monitoring system will be subject to approval by the Land and Water Quality Branch of the Department of Environment and the EPA. The system will be designed to assess any changes in the regional groundwater quality and will also identify parts of the redevelopment area that have been the subject of more intense remediation activities.

The bores will be installed at strategic locations to ensure their longevity following the completion of the construction of the Containment Cell. The monitoring requirements will be included in the Groundwater and Helena River Management and Contingency Plan (post-remediation) as indicated by the MRA in Commitment 6 of Table ES1 in the PER.

Question 2.5 - **Remediation management plans, monitoring programmes, trigger points and interventions to ensure safe groundwater following remediation**

What ongoing monitoring programme will be put in place during the remediation phase? What management plans and trigger points and interventions will be put in place should heavy metals, VOC's and other pollutants in stormwater or groundwater exceed national safe water levels?

Submitter: Anonymous

Response

Prior to commencement of remediation, a Remediation and Validation Management Plan will be prepared and submitted to the EPA for review. The Plan will document methods of remediation and discuss the validation sampling that will be undertaken. The objective of the Plan is to document that remediation is undertaken such that the site is suitable for the proposed uses.

The monitoring of groundwater will be undertaken post remediation to assess the impact of the remediation on groundwater and River quality over time. On behalf of MRA, a Groundwater and Helena River Management and Contingency Plan (post remediation) will be prepared as per Commitment 6, Table ES1 of the PER. This Plan will be reviewed by the DEC prior to implementation. Groundwater monitoring will continue several years after completion of the remediation.

Question 2.6 - **Memorial on titles – assessment of requirement for memorials**

It is recommended that any further development on the site should come with a Memorial on the Title that prohibits the use of unlicensed or licensed bores for garden water. The likelihood that the SSA and LSA will remain contaminated is implicit in the PER and as such, future residents and users of this land should be made aware of the past history.

Submitter: Anonymous

Response

During the normal process of creating land (subdivision process) MRA refers plans to DEC (and others) for comment. For example recently Sector 11C was referred to the DEC. DEC referred to compliance with Ministerial Statements (relating to the remediation works) in its response to the MRA, which included the need to put a memorial on the title restricting groundwater use. Accordingly, each title now created for Sector 11C has a memorial that prohibits bores being used to extract groundwater.

Therefore it is advised that through the lot creation process the MRA will recommend to the Minister for Planning (who approves subdivisions at MRA) that there will be a memorial on each of the titles, so long as it is a Ministerial requirement to do so.

Issue 3: Protection of Helena River and the Surrounding Floodplain

Question 3.1 - **Regulatory Review of the Groundwater and Helena River Management and Contingency Plan**

A commitment is provided by the MRA to the Development of a Groundwater and Helena River Management and Contingency Plan within six months of the remediation of the site. The details of the management plan will determine whether it is effective in achieving the required objectives. It is unclear whether the LWQB will have an opportunity to review the groundwater management plan.

Submitter: DEC

Response

The DEC in its submission wished to confirm that it will have the opportunity to review the proposed Groundwater and Helena River Management and Contingency Plan (post remediation).

The MRA confirms that it will present the Groundwater and Helena River Management and Contingency Plan to the DEC for review prior to its finalisation and implementation.

Question 3.2 - **Control of Stormwater for the MIA Containment Cell**

The containment cell mound runs down onto the Police site and stormwater runoff after heavy rain is often of concern. How will this be controlled?

Submitter: WAPS

Response

The MIA containment cell has been designed with an impermeable clay cap to prevent stormwater from contacting the inert waste contained in the cell. The clay cap will be covered with a layer of top-soil and will be vegetated to produce a stable and attractive landform.

The design of the cell incorporates the following features:

- The slope of the cap and sides have been chosen to facilitate the shedding of drainage water while avoiding erosion or ponding of stormwater.

- The cap will consist of 500 mm of compacted clay to prevent stormwater infiltrating into the soils placed in the Containment Cell thereby preventing contamination of stormwater. The clay cap will be covered by approximately 500mm-1000 mm of topsoil which will be planted with shallow rooted species to stabilise the topsoil and prevent erosion

- The cell will incorporate specific drainage features stabilised with either aggregate or geotextile to provide preferred drainage paths for stormwater generated from the cap in extreme rainfall events. Small swales or infiltration basins will be provided around the base of the cell to detain these flows before they discharge into the local stormwater system.

These features will act to prevent contamination of stormwater while also ensuring the integrity of the cap.

Question 3.3 - **Groundwater Management Post Remediation**

The issue of heavy metals, hydrocarbons, volatile organic compounds and asbestos contamination is a crucial issue for the health of the Helena, Swan and Canning Rivers. The Southern Embankment is conservatively estimated to contain 70,000m^3 of "building rubble, coal cinders, ash/clicker, foundry slag, occasional asbestos products and hydrocarbon contaminated materials" (PER, p.21). The proximity to the Helena River should be a concern for the continued leakage of contaminant and pollutants towards groundwater.

Any disruption to soil profiles across the site has the likelihood of mobilizing heavy metals further downstream and deeper into the shallow and deeper superficial aquifers on site. That these contaminated soils are continuing to discharge into the river is of grave environmental concern.

Submitter: Anonymous

Response

The monitoring of groundwater will be undertaken post remediation to assess the impact of the remediation on groundwater and river quality over time. On behalf of MRA, a Groundwater and Helena River Management and Contingency Plan (post remediation) will be prepared as per Commitment 6, Table ES1 of the PER. This Plan will be reviewed by the DEC prior to implementation.

Question 3.4 - **Current and Future Stormwater Drainage Systems**

It is of extreme concern that stormwater management appears to be very quickly distributed to the conservation category wetland (CCW) floodplain of the Helena River. Gross pollutant traps and detention basins are not enough to slow the infiltration of suspended pollutants that are present on the surface of the Midland Workshops site.

Also of concern is the lack of mention in the PER of the existing stormwater drainage system that continues to drain the workshops site and occasionally the mounding groundwater during winter directly into the Helena River floodplain CCW.

The proposed method of disposing of contaminated stormwater and the intersections with contaminated groundwater is wholly inadequate. The full details of dealing with contaminated stormwater should be present in this PER and not referred to another document. How is the proponent to be made compliant to the requirements of the PER and subsequent EPA report if the management protocols are not methodically and transparently laid out?

Submitter: Anonymous

Response

To assist with this response the specific text from Anonymous Submission is presented below:

"Also of concern is the lack of mention in the PER of the existing stormwater drainage system that continues to drain the workshops site and occasionally the mounding groundwater during winter directly into the Helena River floodplain CCW."

The remediation of the site will remove the vast majority of contamination that is present, with that remaining being largely contained adjacent to or under buildings or hardstand. This action should result in a substantial improvement in the quality of stormwater discharged from the site.

All other stormwater from the Helena-East Precinct will be captured in piped drainage systems and directed via sedimentation and nutrient stripping basins to the Helena River floodplain as per the approved stormwater strategy by EGIS (2002), *Stormwater Discharge Strategy from the Midland Redevelopment Authority into the Helena River Flood Plain* (March 2002).

Question 3.5 - **Works in proximity to the Helena River Floodplain (buffers to proposed Southern Embankment excavation area)**

Because of the proximity and steepness of the Southern Embankment to the floodplain of the Helena River, what management plans will avoid interference with the statutory minimum buffer between the CCW of the Helena River and the proposed excavation of the Southern Embankment?

It appears from the PER page 78 that the proponent will extensively remodel and recontour the Southern Embankment. This is likely to infringe into the floodplain of the CCW. What alternative methods have been discussed and presented to the public as a means of dealing with this problem?

Submitter: Anonymous

Response

To assist with this response the specific text from Anonymous Submission is presented below:

"Because of the proximity and steepness of the southern embankment to the floodplain of the Helena River, what management plans will avoid interference with the statutory minimum buffer between the conservation category wetland of the Helena River and the proposed excavation of the Southern Embankment ?"

The proposed Southern Embankment is at a greater elevation than the adjacent Helena River Floodplain Conservation Category Wetland and as a consequence any proposed remodelling and excavation of the Southern Embankment is unlikely to have a deleterious impact on the floodplain.

There is currently no statutory minimum buffer or setback required between waterways classified as conservation category wetlands and any proposed development. The Environmental Protection Authority's (EPA's) Draft Guidance Statement No. 33 *Environmental Guidance for Planning and Development* (EPA, 2005) outlines methodology for assessing appropriate buffers to waterways This assessment is based on a range of biological and physical criteria recommended in the methodology accepted by the Department of Environment/Environmental Protection Authority (EPA) (i.e. Chapter B5 (Attachment B5-1) and the former Water and Rivers Commissions Water Note No. 23 "Determining Foreshore Reserves" (WRC, 2001).

Based on these factors, no specific management plans have been proposed.

Issue 4: Air Quality

Question 4.1 - **Dust Management during construction of MIA Containment Cell**

How will WA Police personnel be protected from airborne contaminants during the filling of the containment cell?

Submitter: WAPS

Response

See information in previous responses including responses to Questions 1.2 and 1.3.

Question 4.2 - **Dust and Particulate management during remedial works**

The site is flat and subject to seasonal easterly winds during all hours of the day during summer. It is recommended that any excavation do not occur when wind speeds exceeds 10 km/her due to the proximity of housing, shopping and business precincts. Airborne particulates in this corridor are already of concern due to the prevalence of brickworks in the region and any additional dust and contaminated particulates is likely to further add to the detriment of public and environmental health.

Submitter: WAPS

Response

The MRA have committed to implement an approved Dust and Air Quality Management Plan, addressing dust management practices during remedial works as stated in Commitment 13, Table ES1 of the PER. The objective of the DAQMP is to ensure that there is no health risk or loss of amenity due air emission, to the environment.

Issue 5: Heritage – Non-aboriginal

Question 5.1 - **Management of remediation finished levels with respect to building levels**

Depending on the construction and age of adjacent building fabric, raised levels caused by the added fill layer have the potential to cause conservation issues with the physical fabric. A conservation professional should be consulted to provide specific advice on this aspect of remediation for each of the affected buildings.

Submitter: Heritage Council

Response

The MRA consultant team includes architects specialising in Heritage restoration and preservation. As part of the Heritage Preservation Project at the former workshops site (funded separately and running concurrently with the remediation works for site contamination) the MRA has recognised that the levels to which remediation works are undertaken is closely tied to the floor levels of the heritage listed buildings onsite.

At the moment and as a consequence, the MRA is in the planning phase of the contamination remediation works and is placing considerable emphasis on how the Heritage Preservation Project and Contamination Remediation Projects interrelate. An example of this is that it is anticipated that levels of the warning barrier proposed to

cover residual contamination abutting the heritage listed buildings will be at fixed depth below the finished ground levels which will in turn be dictated by the floor levels of the building in question.

Question 5.2 - **Formal Referral of the proposed remediation works to the Heritage Council**

The *Heritage of Western Australia Act (1990)* ("the Act") is applicable to the site and should have been included in Table 2 – Key Legislation and Laws. A formal referral to the Heritage Council is required for any remediation works within the Registered area, in accordance with the Act.

Submitter: Heritage Council

Response

The MRA commit to formally referring the Remediation and Validation Plan to the Heritage Council of WA for comment once it is approved by the Environmental Protection Authority.

Issue 6: Flora and Fauna

Question 6.1 - **Fauna and Flora Assessment undertaken as part of the PER**

The floodplain and riverbed of the Helena River is a Conservation Category Wetland (CCW) and has important vegetation and biodiversity attributes. The Helena River provides an important ecological linkage and migration route for avifauna and terrestrial fauna and is one of the few routes that still link between the Swan Coastal Plain and the nearby Darling Scarp without major obstacles such as highways and railways.

It is of concern that only one site visit was conducted in summer to search for significant fauna. It does not take into account migratory usage of the site by threatened species.

It is also of concern that an EPA compliant flora and vegetation survey has yet to be conducted. Surveys should be conducted in both spring and autumn to determine floristic abundance and distribution in order to comply with the EPA Guidance Statement number 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2004)*. The Workshop site covers 70 hectares and is adjacent to a CCW. This should qualify the project as medium risk as a minimum.

Why have there been no Conservation and Land Management Declared Rare Flora or Priority searches undertaken for the study area?

Submitter: Anonymous

Response

Flora

The proponent's environmental consultant ATA Environmental conducted a Level 1 flora and vegetation survey of the proposal area on 1 December 2005. While the survey wasn't technically conducted during spring (i.e 1 December), the mild start to summer meant that climatic conditions at the time of the survey were typical of spring, and ephemeral species, if present, would have been recorded.

Additionally, the vegetation associated with the proposal area was relatively degraded, weed infested, small in area and supported very few native plant species (7 species only). All species recorded from the area were confirmed as non-significant taxa and the area was highly unlikely to support any significant flora at either the State or Commonwealth level. As a consequence a CALM Declared Rare Flora and Priority database search was not considered necessary.

It should also be noted that whilst this issue has been raised in a submission to the EPA the Helena River Floodplain does not lie within the current referral area (comprising the areas described in the PER as Helena East and the Southern Embankment). The floodplain area and its management immediately to the south of the referral area has already been subject to formal environmental assessment via the Helena West referral that was approved by the Minister for the Environment via Ministerial Statement 640.

Fauna

It is acknowledged that the Helena River provides an important ecological linkage and migration route for avifauna and terrestrial fauna and that it is one of the few routes that still link the Swan Coastal Plain and the Darling Scarp. However, the referral area only abuts onto a small portion of the Helena River floodplain via the Southern Embankment. It is considered that although the whole floodplain area may be used as a migration route by fauna species, the remediation and redevelopment of the Helena East Precinct adjacent to a small linear portion of the Helena River floodplain is unlikely to have a significant impact on any species of conservation significance.

ATA Environmental conducted a Level 1 fauna assessment of the referral area, including a site investigation, on 23 January 2006 to verify the results of a desktop assessment and assess the likelihood of the area supporting viable fauna habitat. Given the potential area of impact, this level of assessment (including the single site visit in January) is considered to be compliant with the EPA's Guidance Statement No. 56. While the assessment found that as many as 11 species of conservation significant fauna had the potential to occur in the vicinity of the proposal area, none of these species were considered likely to rely on the habitat in the area for survival. This included the Priority 5 taxa, Quenda (*Isoodon obesulus fasciventer*), a species whose presence in an area is distinguished by distinctive scratching and diggings. No such scratchings or diggings were recorded from the referral area during the 23 January site investigation, nor was any suitable dense understorey habitat present.

In conclusion, the remediation of the Southern Embankment Area will not significantly impact on the function of the Helena River and floodplain as a corridor for fauna movement. Any species of conservation significance that may be present

within the project area are likely to move into similar adjacent habitat within the Helena River floodplain during disturbance and are unlikely to be significantly impacted upon by the proposed redevelopment provided the area is appropriately fenced.

Issue 7: Community Consultation

Question 7.1 - **Public availability of information regarding remediation management plan compliance**

What transparency of information will be made available to the public to ensure that the proponent is complying with the management plan?

Submitter: Anonymous

Response

The progress of the remediation works will be provided on the MRA website. Remediation validation and water and air monitoring reports will be submitted to the Department of Environment or the EPA, as required.

The MRA will continue communication with the local community and key stakeholders in relation to the remediation and environmental monitoring though established mechanisms such as:

- The Environmental Reference Group
- Newsletters and media releases; and
- Meetings with organisations such as City of Swan

In addition, the MRA will continue to use the established complaint response procedures including the toll free phone number (1800 224 552) which is monitored 24 hours a day seven days per week. The complaint response procedures allow information to be provided to members of the community who may have concerns in either written to verbal format. The MRA does not believe it is appropriate or necessary to publish detailed monitoring reports on the MRA website as the level of detail in such technical reports would mean that very few people will be able to interpret them correctly and may lead to misunderstanding.