Remediation of the Midland Railway Workshops – Areas B, C and D for the Proposed Police Operations Support Facility, Midland

---

Midland Redevelopment Authority

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 1057
August 2002

ISBN. 0 7307 6692 6
ISSN. 1030 - 0120
Assessment No. 1349

Summary and recommendations

The Midland Redevelopment Authority proposes to remediate 15.5 hectares of land referred to as the Clayton Precinct which comprises the eastern part of the Midland Railway Workshops site located immediately south of the Midland town centre in Midland. The proposal is to remediate the 15.5 hectares identified as Areas B, C and D for the development of a Police Operations Support Facility. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment and Heritage 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 and Heritage 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.

Relevant environmental factors

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 public health and Helena River; and

(c) Protection of Helena River – from future contamination by groundwater.

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

Conclusion

The EPA has considered the proposal by the Midland Redevelopment Authority to remediate 15.5 hectares of land referred to as the Clayton Precinct and has concluded that the relevant factors of soil contamination, groundwater contamination and protection of Helena River can be managed to meet the EPA's objectives of protection of groundwater and the Helena River ecosystems, and protection of human health, provided that the use of contaminated groundwater is prohibited and an effective cover of clean fill is placed over asbestos contaminated areas and there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, which includes the proponent's commitments.

The EPA notes that the main issue for the satisfactory remediation of this site involves the management of the waste fill containing asbestos and the hydrocarbon contaminated soil. The EPA notes that the risk posed by the waste fill is principally from potential exposure to airborne asbestos fibres and dust containing heavy metals. The EPA recognises that risk of exposure varies with land use, therefore the potential risk of exposure in areas which are sealed, such as those used for car park and hardstand, for example, would be less than that for more sensitive areas where soil is

continually disturbed such as those used for landscaping, horse training and horse paddocks.

The EPA, in summary, has concluded that the remediation of the Midland Railway Workshops Site Areas B, C and D can be achieved by a combination of:

- On-site treatment;
- Off-site disposal; and
- On-site relocation and containment on site.

The EPA considers the proposal to relocate approximately 50,000m^3 of low contamination waste fill from the western part of the site and to replace it over the top of the existing waste material in the eastern part of the site is the minimum required to reduce groundwater contamination.

The EPA also considers that the on-site remediation of the hydrocarbon contaminated material using land farming methods is acceptable provided the remediation is carried out on a staged trial basis and the proponent prepares a Hydrocarbon Management Plan and a contingency plan for the removal of material off-site, on the decision of the EPA, if there are concerns by the EPA that the trials indicated potential for unacceptable off-site impacts.

In regard to asbestos, on-site containment of the waste fill is acceptable provided a minimum cover of 1 metre clean fill is placed over the waste fill areas within Areas B, C and D. The minimum 1 metre cover would apply to all uncovered open space areas such as horse training grounds, horse paddocks, landscaped gardens and lawns. However, for those portions of Area B where development would consist of 'hardstands' or 'buildings', the NEPM guideline of 0.5 metre cover of clean fill over the top of the geotextile warning barrier is the minimum. The proposed cover of between 0.8 up to 1.5 metre cover as proposed in the risk assessment report is acceptable within these areas. This is based on a minimum 0.5 metre clean fill cover in combination with a geotextile barrier and a 0.3 metre sub-base under sealed surfaces.

Services such as power, drainage and telephone should be installed within the cover material. Where services are located below the cover then soil validation would be required to demonstrate that the soil is not contaminated. In the event of contamination, appropriate health procedures will need to be applied.

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 proponent's commitments and the recommended conditions set out in Appendix 4 and summarized in Section 4.1.

Recommendations

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

1. That the Minister notes that the proposal being assessed is for the remediation of 15.5 hectares of land referred to as the Clayton Precinct which comprises the eastern part of the Midland Railway Workshops site located immediately south of the Midland town centre in Midland;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that the proposal by Midland Redevelopment Authority can be managed to meet the EPA's objectives, subject to the EPA's recommended conditions (Appendix 4), including the proponent's management commitments.
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by the Midland Redevelopment Authority to remediate 15.5 hectares of land referred to as the Clayton Precinct is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4, which include the preparation and implementation of the following management plans for:

- Waste management
- Hydrocarbon management;
- Asbestos waste management;
- Groundwater monitoring and contingency management;
- Fate and transport modeling;
- Dust and air quality management;
- Stormwater management;
- Noise and vibration management; and
- Irrigation management.

(b) a requirement for the on-site containment of waste fill (Condition 6);

(c) a requirement for the treatment and management of hydrocarbon contaminated soil (Condition 7); and

(d) a requirement for memorials on titles to ban groundwater use, if necessary.

Contents

Tables

Figures

Appendices

1. List of submitters
2. References
3. Identification of relevant environmental factors
4. Recommended Environmental Conditions and Proponent's Consolidated Commitments
5. Summary of submissions and Proponent's response to submissions

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal by the Midland Redevelopment Authority (MRA), to remediate 15.5 hectares of land referred to as the Clayton Precinct, which comprises the eastern part of the Midland Railway Workshops site (Figure 1) located immediately south of the Midland town centre in Midland. The proposal is to remediate the 15.5 hectare area identified as Areas B, C and D for the development of a Police Operations Support Facility which will consist of:

- Area B (2.6 hectares) – car parking, helipad and multiple recreational uses;
- Area C (10.4 hectares) – kennels, stables, paddocks and training areas for canine and mounted horse divisions; and
- Area D (2.5 hectares) – development for commercial uses and area not required by the Police.

The Midland Railway Workshops site occupies an approximate area of 70 hectares, is located south of the Midland Township and is bounded by the Helena River floodplain to the south. The site is surrounded by the police facility to the northwest, the Midland Railway Workshops site to the north and west, the WA Meat Industry Sale Yards to the east and Metro Bricks brickworks to the southeast.

The nearest residential area is approximately 300 metres to the north across Railway Parade in Midland. Semi-rural holdings exist in Hazelmere and are within 250 metres of the southern boundary of the site. The Hazelmere area to the south is mostly cleared paddocks used by the sale yards for temporary holding of livestock. The closest primary schools are approximately 1 kilometre both east and west of the site at Bellevue and West Midland.

The workshops were commissioned in 1904 and operated until 1994. The workshop site contains a large number of heritage buildings and represents the most substantial industrial complex established by the state government in the period around the turn of the century. The site was used for waste filling and pasture.

Areas B, C and D of the workshop site occupies 15.5 hectares and is about 750 metres by 200 metres. The southern boundary is adjacent to the Helena River floodplain. Approximately 5.4 hectares of the site is located on low lying pastoral land which is part of the Helena River floodplain. The land is above the 1 in 100 year flood contour but is subject to localized winter inundation due to poor drainage.

The remainder of the site contains fill material ranging in depth from less than 0.5 metres up to 6 metres. Areas B, C and D are contaminated with waste fill material which consists of inert material such as building rubble, sand and steel (50%) with coal cinder from steam trains (40%) and slags and foundry sands (10%) and some asbestos products. The estimated amount of waste is approximately 230,000 m^3 of waste fill. The western part of the site is contaminated with hydrocarbons including chlorinated solvents (Figure 2).

The underlying groundwater has been contaminated with low levels of heavy metals and with hydrocarbons specifically at the dump site. There is also concern that contaminated groundwater could leave the site via stormwater drains which discharge into the Helena River. At the present moment, there is no evidence to suggest that sediment and water quality of the Helena River has been affected from the waste fill contained on site.

The EPA's decision to assess the proposal at the level of PER was based on three main factors, namely (a) Soil contamination- to protect groundwater, the Helena River and public health (b) Groundwater contamination – to protect public health and Helena River (c) Protection of Helena River – from future contamination by groundwater.

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

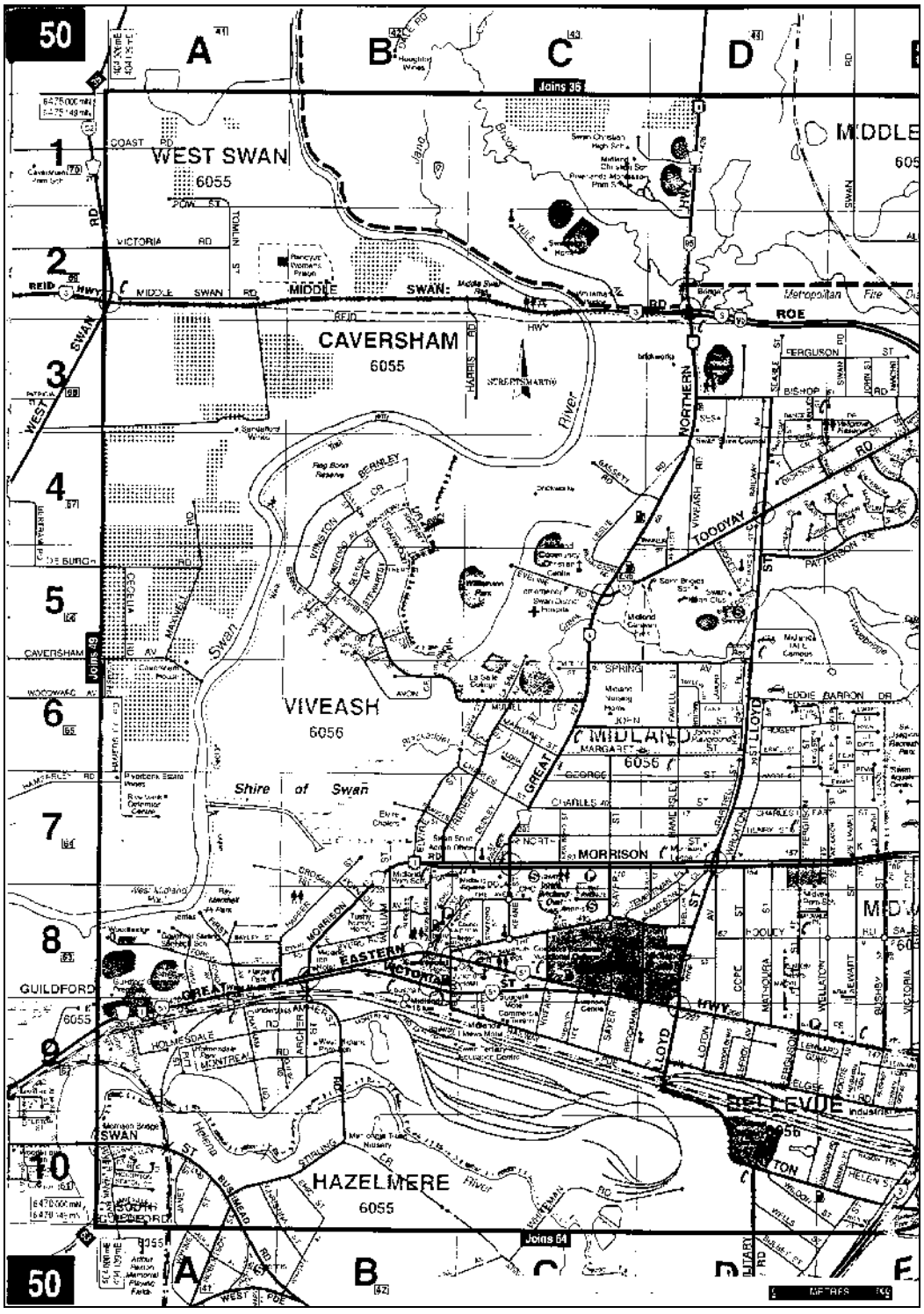

Figure 1 Location of the Midland Railway Workshop site in Midland

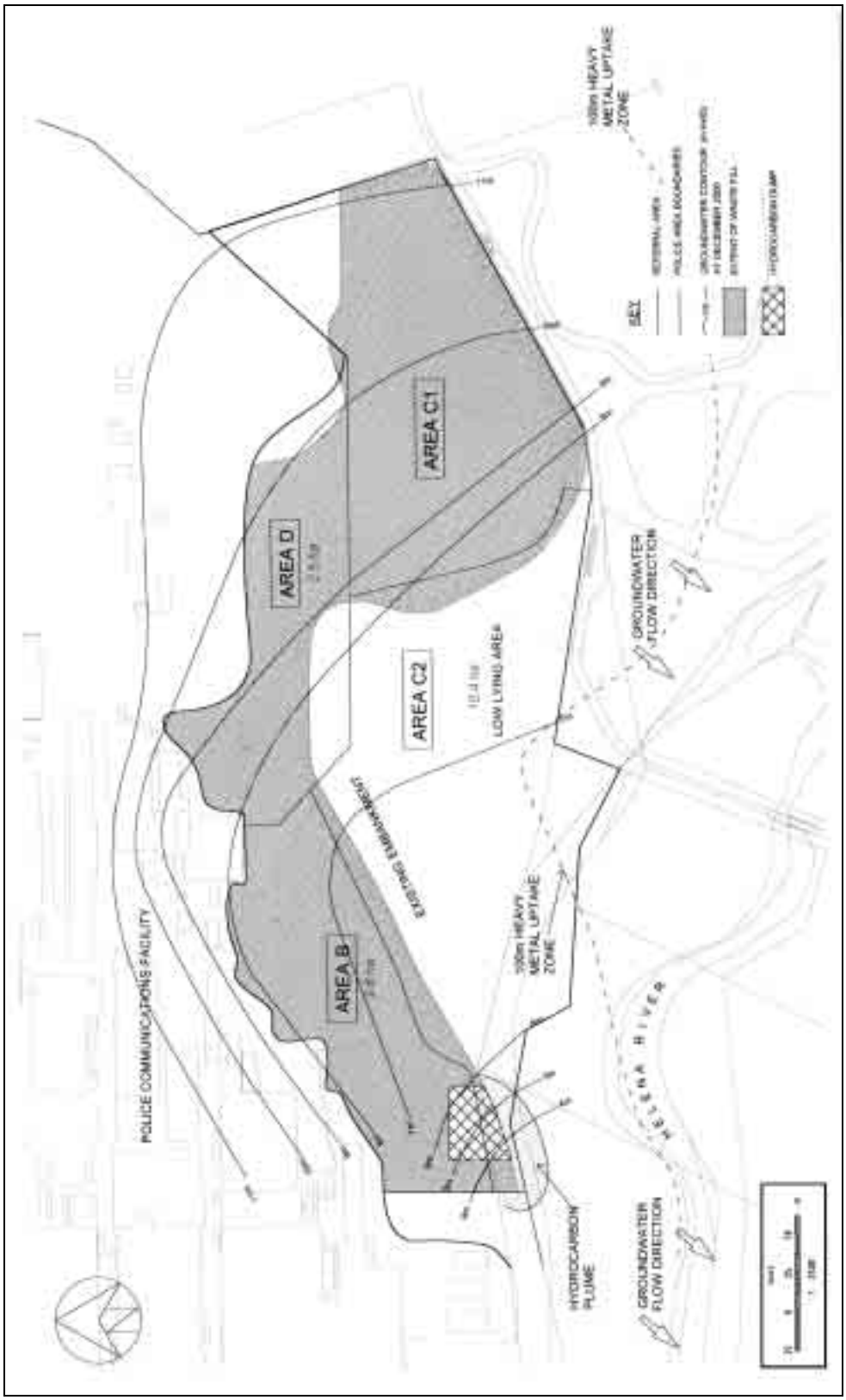

Figure 2 ***Project area showing waste fill and hydrocarbon contamination on Midland Railway Workshop site – Areas B, C and D***

2. The proposal

The Midland Redevelopment Authority (MRA) proposes to remediate 15.5 hectares of the 70 hectare Midland Workshop site (Figure 1) located immediately south of the Midland town centre in Midland. The proposal is to remediate the 15.5 hectare area identified as Areas B, C and D for the development of a Police Operations Support Facility (Figure 2).

2.1 Soil contamination

Soil contamination over the 15.5 hectare site (Areas B, C and D) is almost exclusively related to the presence of waste fill material deposited over the natural soil.

The waste fill consists of mostly inert material such as building rubble, sand and steel including coal cinder, slag and foundry sands and a small quantity of asbestos. The waste fill also contains heavy metals principally copper, lead, manganese, arsenic, chromium and zinc at varying concentrations ranging from below environmental investigation levels (EILs) to above health investigation levels (HILs).

The waste fill occupies approximately 9.5 hectares of the total area of 15 hectares of Areas B, C and D. The extent of the fill area is shown in Figure 3. It is estimated that the waste fill covers approximately 100% of Area B, 40% of Area C and 90% of Area D. The estimated volume of waste fill in Areas B, C and D is 230,000m^3. The balance of the site consists of uncontaminated natural ground.

The extent and nature of soil contamination for heavy metals has been investigated and carried out in accordance with the Department of Environmental Protection's Sampling and Analysis Plan. A total of 159 test pits and soil bores were installed down to the base of the waste fill over a total area of 9 hectares and a total of 58 test pits and soil bores installed to a depth of 1 metre in the 6.5 hectares of natural ground outside of the waste fill area. The soil data represents the vertical and lateral distribution of contaminants for Areas B, C and D.

The areas beneath the waste fill and the natural soil around the waste fill areas also showed the presence of heavy metals but at concentrations significantly lower than observed for the waste fill. Table 1 shows the percentage of samples collected from the waste fill, beneath waste fill and natural soil which show heavy metal concentrations in excess of EIL.

Table 1: Percentage of sample in waste fill, beneath waste fill and in natural soil with heavy metal concentrations greater than EIL.

Heavy metal	% samples > EIL concentration		
	Waste fill	Beneath waste fill	Natural soil
Copper	79.2	2.8	8.7
Lead	49.7	1.9	2.2
Manganese	39.2	3.8	7.9
Chromium	31.2	1.9	5.4
Zinc	57.4	1.0	5.4
Arsenic	37.9	1.9	1.1

Details of heavy metal and hydrocarbon contamination at the sites are provided in the PER report (Midland Redevelopment Authority, 2001)

The potential for heavy metals in waste fill to leach to groundwater was also determined using Austalian Standard Leachability Potential (ASLP) tests. Laboratory testwork on 43 waste fill samples show it to be relatively resistant to leaching. Less than 2% of the metal content within the fill is potentially leachable under normal conditions. This is consistent with the low contaminant levels observed in both the underlying natural soil and groundwater.

Limited sampling for asbestos fibres in soil indicates that asbestos is randomly present in the waste fill. The source of the asbestos fibres is believed to be asbestos clad buildings, drainage and water pipes, brakes linings and lagging used in carriages and as an insulation. Asbestos fibres in the form of amosite (brown asbestos) and chrysotile (white asbestos) were also detected in approximately 30% of the samples tested.

In addition, approximately 5,000m^3 of waste fill in the western part of the site is contaminated with hydrocarbon including chlorinated solvents (Figure 4) and benzene in excess of EIL's and HIL's.

Contaminated waste fill poses a threat to human health through direct contact and can also act as an ongoing source for groundwater contamination. It also poses a risk to the Helena River ecosystem, if contaminated groundwater was to flow to the river.

Remediation proposal

The proposal is to contain and manage all waste fill on-site except for any hydrocarbon contaminated material which is not effectively treated by landfarming on site. Approximately 50,000m^3 of waste fill will be relocated from the western part of the site and placed on top of the existing waste material in the far eastern part of the site to level the ground surface in Area B as it dips towards the embankment (Figure 3). The remaining 180,000m^3 of waste fill will remain undisturbed.

Following relocation of the waste fill, a proposed cover of 0.5 to 1 metre clean fill over the top of a geotextile warning barrier will be laid over the entire waste fill area. The clean fill cover is to prevent the potential risk of dust containing asbestos fibres being generated from the site.

In addition, approximately 5,000 m^3 of hydrocarbon contaminated waste fill will be removed to an approved location on-site and treated using a landfarming bioremediation method to reduce the hydrocarbon contaminant concentration before relocating the treated soil to the far eastern part of the site.

It is proposed to prepare and implement a Waste Management Plan that addresses the excavation, transport and relocation of the waste fill to ensure the safe and efficient relocation of waste fill material. It is proposed to prepare and implement an Asbestos Management Plan for the safe handling of asbestos contaminated soil and long term management of the site to prevent exposure to asbestos fibres. It is also proposed to prepare and implement a Hydrocarbon Management Plan, to ensure that remediation of the hydrocarbon contaminated material poses no significant health risk to workers and the public, and that the remediation is carried out in an environmentally acceptable manner so that there are no long term risks to the Helena River due to the potential leaching of contaminants. It is proposed to remove to landfill hydrocarbon contaminated material that cannot be effectively treated. In addition, soil validation testing will be carried out following remediation of the hydrocarbon contaminated material to ensure that the site is suitable for commercial/industrial land use.

It is also proposed to prepare and implement a long term management plan to prevent uncontrolled excavations into the waste fill, and an irrigation management plan to maximise water efficiency and to reduce the infiltration of irrigation water into the waste fill to prevent leaching from it.

2.2 Groundwater contamination

Groundwater beneath the waste fill has been contaminated with elevated levels of copper and zinc due to leaching from the waste fill. These concentrations are above environmental criteria set for the protection of aquatic environments. Groundwater quality beneath and downgradient of the hydrocarbon contaminated material is also affected due to the presence of total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX) and volatile organic compounds (VOCs) as a result of leaching. The hydrocarbon dump has created a distinct plume that could potentially affect the Helena River, if the contaminants remained undissociated and were to reach the river.

Groundwater movement in the floodplain down gradient of the site is relatively slow due to the impermeable clayey nature of the aquifer. The contamination plume is moving slowly and is approximately 250 metres from the River. The plume has travelled less than 80 metres over the last 50 years.

Groundwater has been monitored at 16 locations upgradient of the site, 7 locations immediately beneath the waste fill and 33 locations down gradient on the floodplain between the waste fill and the Helena River (Figure 4).

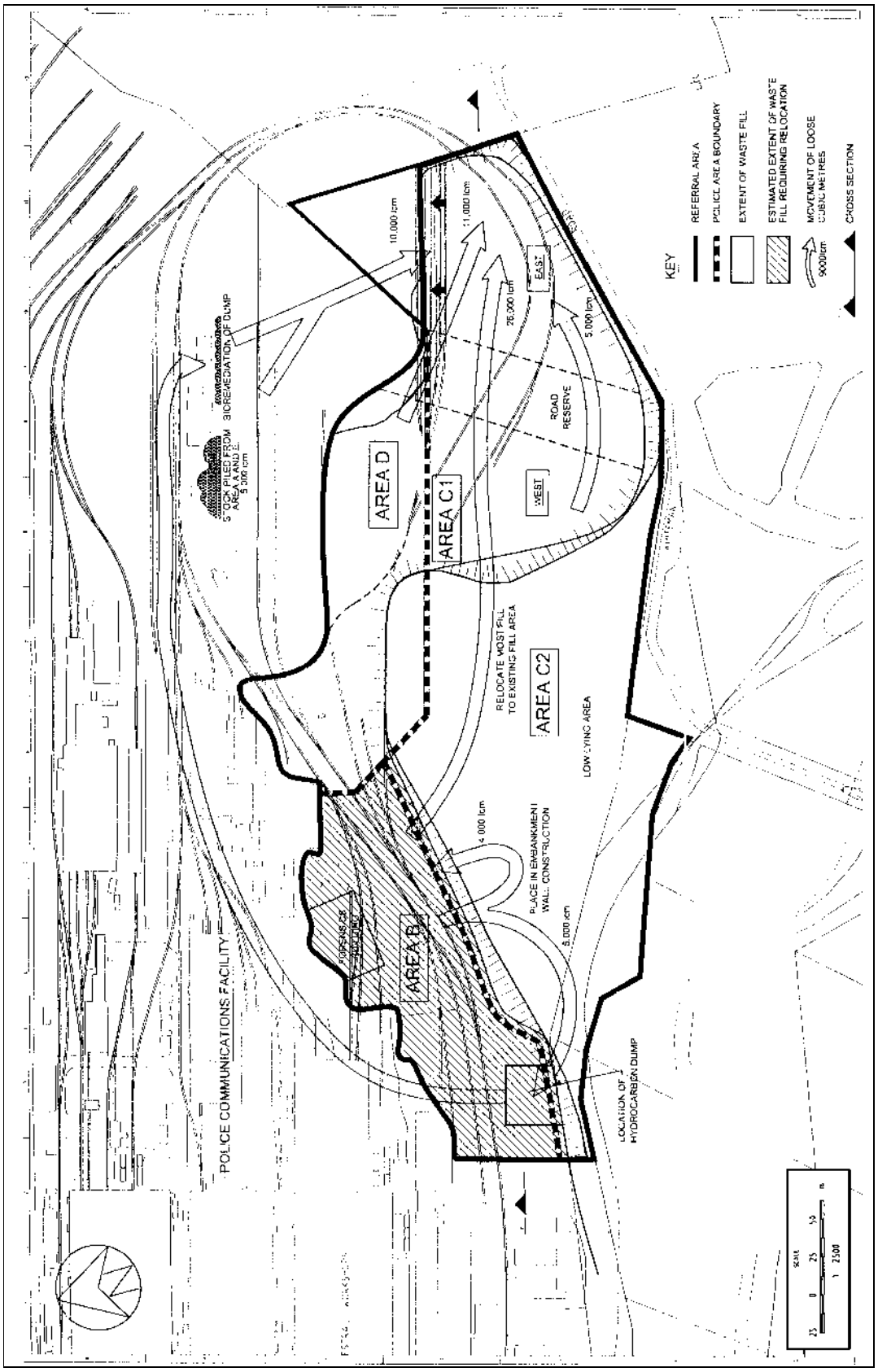

Figure 3 Proposed relocation of waste fill on Midland site

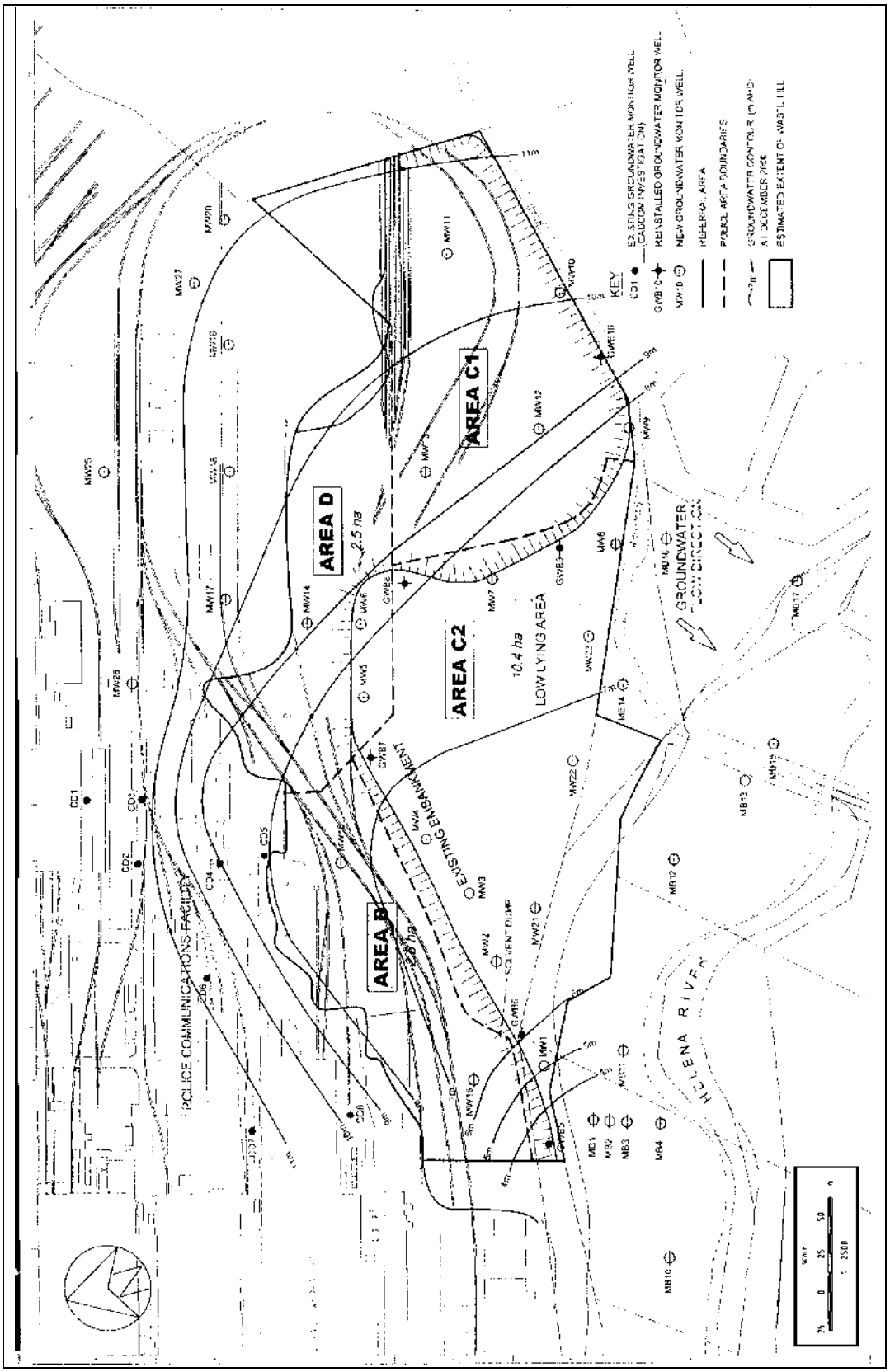

Figure 4 Location of groundwater bores at and around the site

Remediation proposal

The proposal is to remove the source of hydrocarbon contaminated soil to an approved site within the Midland Railway Workshop for on-site treatment using a landfarming bioremediation method. No active remediation of groundwater is proposed. Potential impacts of heavy metals to groundwater and the Helena River will be managed by relocation of the waste fill from the Western part of the site and by natural attenuation. Potential impacts to groundwater and the Helena River will be determined by groundwater monitoring upgradient of the River.

Further more conservative fate and transport modelling will be undertaken to predict hydrocarbon plume movement and to assess the risk of residual dissolved hydrocarbons in groundwater to Helena River. In the event that groundwater monitoring and fate and transport modelling indicate that significant environmental impacts are likely to occur, a groundwater contingency plan for remedial action is to be prepared and implemented. The plan will describe measures to ameliorate such impacts, and consider practical management options such as groundwater abstraction, pump and treat and containment.

The proposal also includes banning the use of contaminated groundwater for domestic and irrigation supplies, by placing memorials on titles until the groundwater quality becomes acceptable.

The main characteristics of the proposal are summarised in Table 2 below. A detailed description of the proposal is provided in Section 5 of the CER (Midland Redevelopment Authority, 2001).

Table 2: Key proposal characteristics

Element	Description
SITE IDENTIFICATION	The development site is identified as part of Reserve 2299 on Swan Location 12698. The site occupies an area of approximately 15.5 hectares and is located in the south-east part of the Midland Railway Workshops site.
CURRENT ZONING	Industrial
PROPOSED ZONING	Public purposes, commercial, service and light industrial.
DEMOLITION	Nil (There are buildings and structures within the project area)
NATURE OF CONTAMINANTS	*Waste Fill:* Approx 230,000 cubic metres of waste fill over 9 hectare of the 15.5 hectare site consists of coal cinder, foundry slag, building rubble, sand, steel and occasional asbestos products. *Soil:* low concentrations of heavy metal and hydrocarbon contamination at the base of the waste fill. *Groundwater:* low concentrations of heavy metals and hydrocarbons. *Helena River:* no trace of contamination found in sediment and water.
REMEDIATION AND MANAGEMENT	
Soil/Waste Fill	• relocate 50,000 cubic metres of waste fill from the western part of site and place in the far eastern part of the site. Remaining 180,000m^3 of waste fill will stay as is. Prepare and implement a management program to ensure the safe and efficient relocation of waste fill material. • Remove the hydrocarbon dump (approx 5,000 cubic metres) and treat on-site using landfarming bioremediation method before relocating to the far eastern part of the site. Prepare and implement a Hydrocarbon Management Plan for the remediation works. • Place between 0.5metres to 1 metre clean soil cover over a clearly visible, tear-resistant geotextile warning barrier over the waste fill area. • Prepare and implement a Waste Management Plan to ensure that excavations, transport and relocation of waste fill is carried out in a safe and environmentally acceptable manner. • Prepare an Asbestos Management Plan. • Prepare and implement an Irrigation Management Plan to minimise water entering the waste fill so as to prevent accelerated leaching of the fill
Groundwater Helena River	• Natural attenuation of contaminants by clay soils which exhibit a strong capacity to adsorb heavy metals and hydrocarbons. • Prepare and implement a Groundwater Management Plan where groundwater will be regularly monitored at the source and downgradient to check the effectiveness of natural attenuation. • Ban the use of contaminated groundwater by placing memorials on titles. • Prepare a Groundwater Contingency Plan to be implemented if groundwater monitoring indicates a risk to the Helena River. • Replace the existing stormwater infrastructure to prevent the leakage of contaminated groundwater into the stormwater system. • Prepare and implement a Stormwater Management Plan to improve water quality entering the river system.
Dust	• Prepare and implement a Dust and Air Quality Management Plan for excavation and transportation activities including an extensive air monitoring program.
Noise and vibration	• Prepare and implement a Noise and Vibration Management Plan outlining noise mitigation measures and monitoring requirements.

3. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage 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 public health and Helena River;

(c) Protection of Helena River – from future contamination by groundwater.

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 - 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.

3.1 Soil contamination

Description

Soil contamination over the 15.5 hectare site is mainly due to the presence of waste fill that has been deposited over the natural soil. Approximately 230,000m^3 of waste fill has been deposited over an area of approximately 9.5 hectares. It is estimated that the waste fill covers approximately 100% of Area B, 40% of Area C and 90% of Area D.

Numerous investigations were undertaken to delineate the extent and nature of the contamination in the waste fill and the natural ground immediately beneath and outside the waste fill areas. In addition to the waste fill contamination, approximately 5,000m^3 of waste fill in the western part of the site is contaminated with hydrocarbon including chlorinated solvents and benzene in excess of EILs and HILs.

Asbestos fibres were also identified in the waste fill. The potential risk is the inhalation of fibres of asbestos, or dust containing it. The fibres or dust may be released into the atmosphere from materials present on the site, including materials buried at insufficient depth, by weathering, erosion or disturbance. Disturbance could result from vehicle movements, construction work or from horse training and paddocks, as proposed for the Midland Railway Workshop site. The contaminated waste fill also has the potential to affect human health through direct contact, and is also an ongoing source for groundwater contamination.

Proposed remediation options

To manage the impact of the waste fill on the environment and human health, the proponent has investigated the following remediation options:

- On-site treatment;
- Disposal off-site; and
- On-site relocation and containment using a clean-fill cover.

The proponent has considered treatment options such as on-site treatment using bioremediation and natural attenuation, off-disposal to landfill, on-site relocation and containment of waste fill using a clean fill cover over the waste fill areas. The main contaminants at the site include heavy metals, petroleum hydrocarbons and a small quantity of asbestos.

Bioremediation relies on the ability of microbial organisms to break down contaminants into harmless byproducts. This can be achieved either in- or ex-situ, however the latter is generally considered more effective. Bioremediation is ideally suited to organic compounds. The presence of heavy metals can adversely affect the process of bioremediation. For the technique to be effective, the contaminated material needs to be in contact with the microorganism for a period of time, especially if the organic contaminants are initially resistant to break-down.

Natural attenuation is the process for naturally occurring biophysical and chemical processes to occur in soil and groundwater to reduce the mass of contaminants. The disposal option involves the total removal of all waste fill and contaminated soil with contaminants above the EIL to an appropriate landfill site. Landfill disposal of contaminated soil is the most common approach to remediation in Western Australia. However, the landfill disposal option is generally not the preferred option according to EPA Guidance Statement 17 and is not usually considered where there is a significant volume of waste to be removed as in this case.

The on-site containment options included:

1. Placement of a clean soil cover over the top of an impervious cover such as a compacted clay cap or geofabric barrier;
2. Placement of a clean fill cover over the waste; and
3. Construction of a dedicated, lined containment cell and relocation of all waste into this cell and cover with an impervious cap and clean soil.

The preferred option is to remediate the site by:

- On-site treatment; and
- On-site containment using a clean fill cover over the geotextile barrier.

Submissions

Concerns were raised by government agencies about the effectiveness of the proposed 0.5 metre clean fill cover over the waste fill in relation to the management of asbestos fibres in soil. The Health Department of Western Australia and the Department of Environmental Protection indicated that where clean-up to Health Investigational Level-F were adopted, then the land can only be used for commercial/industrial purposes unless health risk assessments are carried out to demonstrate that more sensitive land uses will not impact on human health. The Health Department were concerned that the risk of asbestos related material to public health was not mentioned from the onset along with the potential risk associated with the hydrocarbons and heavy metals.

The Department of Environmental Protection and the Water and Rivers Commission supported the proposal to place memorials on land titles to ensure that the human health of future land users are not affected by the site. The Swan River Trust commented that selective removal of the most severely contaminated soil is the most appropriate remediation option for the site.

Concerns were also raised about the sampling for hydrocarbons and the proposed bioremediation and management of the hydrocarbon contaminated soil. The City of Swan recommended that a Hydrocarbon Management Plan should be prepared to address the remediation of the hydrocarbon dump.

Assessment

The area considered for assessment of this factor is the 15.5 ha of land referred to as the Clayton Precinct which comprises the eastern part of the Midland Railway Workshop site located immediately south of the Midland town center in Midland.

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

- Ensuring that the extent and nature of soil contamination is fully determined so that appropriate remedial and management options can be implemented for the rehabilitation of the site.
- Ensuring the rehabilitation of the site to an acceptable standard that is compatible with the intended land use, consistent with appropriate criteria including 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 Final Guidance Statement No 17).

According to the EPA Guidance Statement No 17, the preferred hierarchal approach for site remediation is for contaminated material to:

- Be treated on-site and the contaminants reduced to acceptable levels; or
- Be treated off-site and returned for reuse after the contaminants have been reduced to acceptable levels.

Disposal to an approved landfill and 'cap and contain' isolation measures should only be used if the preferred approaches are not practicable and if undertaken in an environmentally acceptable manner.

Waste characterization

The EPA considers that the extent and nature of heavy metal contamination in the waste fill and soil adjacent to and beneath the waste fill has been adequately determined for the purposes of this assessment. The EPA notes that limited sampling indicates that asbestos fibres exists randomly in soil. The EPA also considers, on advice from the Department of Environmental Protection and the Health Department of Western Australia, that a lesser frequency of sampling was used to determine the hydrocarbon contamination.

Disposal to landfill

The EPA considers that the option to dispose of waste fill to a landfill is not practical due to the nature of the contaminants and the significant volume of contaminated soil to be removed.

On-site treatment for hydrocarbon contamination

The EPA considers that removal of the hydrocarbon dump to an alternative part of the site for on-site treatment will improve groundwater quality and reduce the potential risk to the river environment.

In its assessment of the on-site treatment of hydrocarbon contaminated soil, the EPA considers that the on-site remediation of hydrocarbon contaminated soil using land farming methods is acceptable provided the treatment is based on a staged approach with the initial treatment being no more than 20 percent of the available contaminated soil. The EPA also considers that the hydrocarbon concentrations in the treated soil should be cleaned-up to the EILs if remediated soil is to be re-instated on the site as proposed.

In the case of chlorobenzene, where an EIL is not available, the proponent is required to demonstrate through appropriate risk assessment and management that the residual chlorobenzene does not pose a risk of leaching to groundwater and to public health, if it proposes to re-instate the remediated hydrocarbon soil back to the site.

The EPA considers that the hydrocarbon contaminated soil should be removed off-site should there be concerns by the EPA that the trials indicated unacceptable air quality impacts off-site.

On-site relocation and containment using a clean fill cover for heavy metals and asbestos contamination

The EPA considers that the relocation of approximately 50,000m3 of low contamination waste fill from the western part of the site to the eastern part of the site is the minimum required to reduce groundwater contamination. The EPA considers that the relocation of waste fill would result in the low heavy metal contamination waste fill being further away from the Helena River and therefore would reduce the risk to the river. The waste fill will be removed and relocated to an area approximately 300 metres from the river. The increased separation distance between the waste fill and the river will reduce the risk of contamination to the Helena River.

Having regard to the limited presence of asbestos, the EPA considers that on-site containment of the waste fill is acceptable provided a minimum cover of 1 metre clean fill is placed over the waste fill area within Areas B, C and D. The EPA considers, on advice of the Health Department of Western Australia, that a minimum 1 metre cover should apply to all uncovered open space area such as horse training grounds, horse paddocks, landscaped gardens and lawns. However, for those portions of Area B where development will consist of 'hardstands' or 'buildings', the EPA considers that the NEPM guideline of 0.5 metre cover of clean fill over the top of the geotextile warning barrier is the minimum required. The EPA considers that the proposed cover of between 0.8 and up to 1.5 metre cover as proposed in the risk assessment report is acceptable within these areas.

The EPA considers that services such as power, drainage and telephone should be installed within the clean cover material. The EPA considers that where services are located below the cover, soil validation is required to demonstrate that the soil is not contaminated. In the event of contamination, the EPA considers that appropriate health procedures should be applied. The EPA considers that the cover of clean fill over the geotextile warning barrier over the waste fill will reduce the potential risk of exposure to asbestos fibres.

In relation to heavy metals in the waste fill and its potential effect on public health and the environment, the EPA considers that studies carried out by the CSIRO indicate that the soil has a natural attenuation capacity to adsorb heavy metals due to its clay content. The EPA notes these studies also showed that the natural ground between the waste fill and the river exhibited a strong capacity to bind heavy metals. The EPA considers that, based on the results of CSIRO studies (CSIRO, 2001), the potential risk of groundwater contamination and to public health is minimal.

In addition, the EPA considers that the 1 metre clean fill cover over a geotextile fabric barrier will ensure that exposure to heavy metals in the waste fill will be significantly reduced. The EPA believes that with the additional requirement (Condition 6) for the installation of services, the potential for exposure to the waste fill is further reduced.

Proponent's management commitments

In response to public submissions, the proponent has made commitments to undertake to prepare and implement a hydrocarbon management plan (Commitments 3 and 4), to remove hydrocarbon material to a suitable landfill if on-site treatment of hydrocarbon contaminated soil is ineffective (Commitment 5), and to undertake validation tests of soil after hydrocarbon treatment to ensure soils have been cleaned up to required levels (Commitment 6). In addition, the proponent is required to provide a cover of not less than 1 metre of clean fill over all "uncovered open space areas" over the waste fill, such as horse training grounds, horse paddocks, landscaped gardens and lawns (Condition 6).

The proponent has also made commitments to prepare and implement a dust and air quality management plan to address air quality monitoring, asbestos monitoring and dust management (Commitments 7 and 8). In addition, the proponent has committed to prepare a sub-surface constraints register detailing location and depth of retained waste fill, including details of cover (Commitment 22) and to prepare and implement a noise and vibration management plan to address prevention of excessive noise (Commitment 23).

Summary

Having particular regard to the:

(a) proposed site remediation;

(b) proponent's management commitments;

(c) advice from the WRC, DEP and Health Department; and

(e) recommended condition 6, which requires the proponent to place a cover of not less than one metre of clean fill over all "uncovered open space areas" over the waste fill, and a cover of not less than 0.5 metres for those areas where development will consist of "hardstands" or "buildings" and the satisfactory implementation by the proponent of the recommended condition 2, which requires the proponent to implement the consolidated environmental management commitments, including:

- hydrocarbon management plan;
- health risk assessment;
- waste management plan;
- asbestos management plan;
- groundwater management plan;
- dust and air quality management;
- stormwater management;
- noise and vibration management; and
- irrigation management,

it is the EPA's opinion that the proposal can be managed in an environmental acceptable manner.

3.2 Groundwater contamination

Description

Superficial groundwater beneath the waste fill has been contaminated due to the leaching of heavy metals over many years. Groundwater quality investigations have been undertaken at sites beneath the waste fill, downgradient and upgradient of the site.

Groundwater quality data show that elevated levels of copper, manganese and zinc have been detected beneath the waste fill at levels above the environmental levels set for the protection of aquatic environments. In addition, high concentrations of benzene and chlorobenzenes have been detected beneath the hydrocarbon dump. All other contaminant levels were below environmental investigation levels.

Groundwater quality, immediately down gradient of the waste fill, indicates that chlorobenzene levels are significantly lower than those beneath the waste fill. It is evident that the waste fill is degrading the underlying groundwater. In relation to the hydrocarbon contamination, a distinct plume has migrated approximately 80 metres over the past 50 years and is expected to reach the river eventually, if the source is not removed.

Groundwater in the deeper isolated confined Leederville aquifer has been tested and is free of contamination.

Preliminary computer model predictions of the fate and transport of the hydrocarbon contamination indicates that the plume will reach the river in less than 30 years. However, these concentrations are expected to be below the aquatic protection criteria.

Proposed remediation options

To manage the impact of the groundwater contamination on the environment and human health, the proponent has investigated the following remediation options:

- Natural attenuation;
- Monitoring groundwater quality and movement by carrying out fate and transport modelling;
- Banning use of groundwater; and
- Contingency management using either pump and treat methods and/or interception trenches.

Natural attenuation is the process whereby naturally occurring biophysical and chemical processes occur in the groundwater aquifer to reduce the mass of contaminants. The proponent has engaged the services of CSIRO to study the process of natural attenuation at the site, particularly for the removal of heavy metals The mass balance adsorption studies predict that heavy metals will be attenuated by natural processes and that active treatment of groundwater is not required.

In addition to the mass balance studies, fate and transport modelling has also been carried out by the proponent's consultants to predict the behaviour and movement of the hydrocarbon contaminants in groundwater. The fate and transport model was run on the assumption that the hydrocarbon source in soil was removed and that the only risk to the River was the presence of residual dissolved hydrocarbon in the groundwater plume. Initial model predictions indicate that hydrocarbon concentrations will be significantly reduced by the time the plume reached the river. However, there is a need to re-run the model with more conservative input data to examine the worst case scenario. The fate of the hydrocarbon contaminants requires confirmation in terms of the degradation rates used in the model. This is currently being undertaken by the proponent in consultation with the Water and Rivers Commission.

The proponent will prepare a contingency plan which considers all practical management techniques including groundwater extraction, treatment and containment options, if fate and transport modelling indicates that there is insufficient natural attenuation occurring and there is risk to the Helena River. The proponent has made a commitment to manage groundwater by banning the use of superficial groundwater by placing memorials on titles.

Submissions

Concerns were raised by government agencies regarding the discharge of contaminated water from dewatering operations beneath the hydrocarbon dump on water resources. The Water and Rivers Commission and the Swan River Trust raised concerns regarding the construction and management of the embankment to ensure that contaminants do not move towards the Helena River. The Health Department of Western Australia raised concern regarding the lack of investigations to determine the potential impact to groundwater supplies and advised that there was a potential risk to human health if contaminated groundwater is used for domestic purposes.

Assessment

The area considered for assessment of this factor is the groundwater underneath and down gradient of the 15.5 ha of land referred to as the Clayton Precinct which comprises the eastern part of the Midland Railway Workshop site located immediately south of the Midland town centre in Midland.

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

- Maintaining or improving the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993) and the NHMRC / ARMCANZ Australian Drinking Water Guidelines - National Water Quality Management Strategy.
- Maintaining (sufficient) quantity of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.

The EPA notes that groundwater beneath the project area is contaminated with heavy metals, zinc and copper, and hydrocarbons and poses a risk to the Helena River. The EPA notes that groundwater beneath and downgradient of the site has significantly been affected by hydrocarbons and that the hydrocarbon contamination is principally in the form of chlorinated benzenes. The EPA also notes that the hydrocarbon contamination is present in the residual dissolved phase in groundwater and is not as a free phase.

The EPA also notes that hydrocarbon levels in groundwater downgradient of the site are lower than those beneath the site and that there is a distinct plume that has moved approximately 80 metres over the past 50 years and is expected to reach the river in 15 to 30 years, if the source is not removed.

The EPA notes the advice from the Health Department of Western Australia, that the use of contaminated groundwater as a domestic supply poses a significant risk to public health. The EPA considers that removal of the hydrocarbon contaminated soil from the site will remove the on-going source but will leave a residual concentration of dissolved hydrocarbons in groundwater. The EPA notes that the fate and transport modelling was based on this residual hydrocarbon concentration in groundwater and that the initial predictions indicate that the hydrocarbon contaminants would reach the Helena River in approximately 15 to 30 years at concentrations below the recommended fresh and marine water criteria.

The EPA notes that the predicted model outcomes have been assessed by the Water and Rivers Commission which has advised that some additional model runs should be performed without the use of dispersion. This would provide a more conservative estimate of the predicted movement of the plume and would represent a worst case scenario in terms of contaminants levels predicted to reach the river. Such a model would rely only on natural degradation methods to reduce the hydrocarbon contaminant, rather than by both degradation and dispersion methods.

The EPA considers that banning the use of contaminated groundwater will further reduce the risk to public health. The EPA considers that natural attenuation of heavy metals in soil will significantly reduce the risk of contamination to groundwater. The EPA considers that ongoing groundwater monitoring will assist in validating the fate and transport predictions. Should groundwater fate and transport modelling indicate that there is potential for the discharge of contaminated groundwater to the Helena River, the proponent will implement contingency measures which will include the treatment of contaminated groundwater to ensure that unacceptable contaminant levels do not reach the river.

The proponent has committed to restrict groundwater use by placing memorials on titles (Commitment 18).

Summary

Having particular regard to:

(a) the proposed site remediation;
(b) the proponent's management commitments;
(c) WRC, DEP and Health Department advice; and
(d) Recommended condition 2, which require the proponent to implement the consolidated environmental management commitments which include:

- Groundwater monitoring;
- Fate and transport modelling;
- Memorial on titles to ban the use of groundwater for domestic purposes;
- Contingency plan for groundwater management (a) should fate and transport modelling indicate a risk to Helena River and (b) should groundwater monitoring show potential unacceptable risk to groundwater and the Helena River;
- Placement of memorials on Certificate of Titles, prior to subdivision, or sale of any existing lot to prevent the abstraction of superficial groundwater for domestic use; and
- Preparation of a sub-surface constraints Register providing details of the contamination.

it is the EPA's opinion that the proposal can be managed in a environmentally acceptable manner.

3.3 Protection of Helena River

Description

The discharge of contaminated groundwater poses a risk to the Helena River. The Helena River environment will be maintained by ensuring that groundwater quality is within guidelines set for the protection of fresh and marine waters as recommended by ANZECC.

Contaminated stormwater leaving the Midland Railways Workshop site also poses a risk to the river. A major stormwater pipe servicing the Bellevue Industrial area traverses the site, collecting on-site stormwater.

Testing of the sediments and surface water quality of the Helena River has been conducted upstream, downstream and alongside the Midland Railway Workshop site. Results show that there is no evidence of contamination as a result of past industrial and waste disposal activities at the Midland Railway Workshop site.

The proposed approach to protection of the Helena River is:

- Groundwater monitoring to ensure that groundwater quality leaving the site is uncontaminated and does not pose a risk;
- Re-running of the fate and transport model to validate earlier predictions that there are no unacceptable impacts to Helena River;
- Prepare a Stormwater Management Plan to ensure design and treatment are addressed.

Submissions

Submissions from government agencies commented that an effective stormwater treatment system is essential due to the proximity of the site to the Helena River. There were suggestions that the stormwater management plans should include details of stormwater drainage infrastructure.

Concerns were also raised by the Water and Rivers Commission that the parameters used in the Groundwater Model and the tabulated rates of degradation may not be appropriate for this site. Other concerns raised included the need to monitor water quality of the Helena River to ensure that there are no unacceptable impacts from groundwater entering the river.

Assessment

The area considered for assessment of this factor is the Helena River downgradient of the 15.5 ha of land referred to as the Clayton Precinct which comprises the eastern part of the Midland Railway Workshop site located immediately south of the Midland town center in Midland.

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 draft WA Guidelines for Fresh and Marine Waters (WA, 1993).

The EPA notes that sediment and water quality data indicate that the Helena River has not been affected by groundwater. However, there is a potential for the river environment to be affected, if contaminated groundwater and stormwater were to enter the river.

The EPA considers that with ongoing groundwater quality monitoring and the implementation of a Stormwater Management Plan, the risk of contamination to the Helena River will be reduced. The EPA also considers that on advice of the Water and Rivers Commission, a re-run of the fate and transport model using a conservative approach will afford a better understanding of the behaviour and movement of the hydrocarbon contaminants and their potential to affect the river.

In summary, the EPA considers that the additional work, which includes the validation of the fate and transport predictions, ongoing groundwater monitoring and the implementation of a contingency plan to reduce impacts to or below acceptable levels should groundwater monitoring indicate there is a potential risk of off-site contamination, will ensure that the river environment is adequately protected.

In response to public submissions, the proponent has made commitments to re-run additional fate and transport modeling trials (Commitment 15), to monitor groundwater quality (Commitment 13), prepare and implement a groundwater Management plan (Commitment 13 and 14) and a stormwater management plan (Commitment 19).

Summary

Having particular regard to:

(a) the WRC advice;
(b) the proponent's commitments; and
(c) recommended condition 2 which requires the proponent to implement the consolidated environmental management commitments which include:

- Fate and transport modelling;
- A contingency plan for groundwater management should fate and transport modelling indicate a risk to Helena River;

it is the EPA's opinion that the proposal can be managed in a environmentally acceptable manner.

4. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage 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.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if

necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 3, should be made enforceable.

4.2 Recommended conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by the Midland Redevelopment Authority to remediate 15.5 hectares of land referred to as the Clayton Precinct is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) the proponent shall fulfill the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4, which include the preparation and implementation of the following management plans for:

- Waste management
- Hydrocarbon management;
- Asbestos waste management;
- Groundwater monitoring and contingency management;
- Dust and air quality management;
- Stormwater management;
- Noise and vibration management; and
- Irrigation management.

(b) a requirement for the on-site containment of waste fill (Condition 6);

(c) a requirement for the treatment and management of hydrocarbon contaminated soil (Condition 7); and

(d) a requirement for memorials on titles to ban groundwater use, if necessary

5. Conclusions

The EPA has considered the proposal by the Midland Redevelopment Authority to remediate 15.5 hectares of land referred to as the Clayton Precinct and has concluded that the proposed can be managed to meet the EPA's objectives of protection of groundwater and the Helena River ecosystems, and protection of human health, provided that the use of contaminated groundwater is prohibited and there is

satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 which includes the proponent's commitments.

The remediation of the Midland Railway Workshops Site B, C and D can be achieved by a combination of:

- On-site treatment;
- Off-site disposal; and
- On-site relocation and containment on site.

The EPA considers the proposal to relocate approximately 50,000m^3 of low contamination waste fill from the western part of the site and to place it over the top of the existing waste material in the eastern part of the site is the minimum required to reduce heavy metal contamination of groundwater.

The EPA also considers that the on-site remediation of the hydrocarbon contaminated material using land farming methods is acceptable provided the remediation is carried out on a staged trial basis and the proponent prepares a Hydrocarbon Management Plan and a contingency plan for the removal of material off-site, on the decision of the EPA, if there were concerns by the EPA that the trials indicated potential for off-site impacts.

In regard to asbestos, on-site containment of the waste fill is acceptable provided a minimum cover of 1 metre clean fill is placed over the waste fill areas within Areas B, C and D. The minimum 1 metre cover would apply to all uncovered open space areas such as horse training grounds, horse paddocks, landscaped gardens and lawns. However, for those portions of Area B where development would consist of 'hardstands' or 'buildings', the NEPM guideline of 0.5 metre cover of clean fill over the top of the geotextile warning barrier is the minimum. The proposed cover of between 0.8 up to 1.5 metre cover as proposed in the risk assessment report is acceptable within these areas. This is based on a minimum 0.5 metre clean fill cover in combination with a geotextile barrier and a 0.3 metre sub-base under sealed surfaces.

Services such as power, drainage and telephone should be installed within the cover material. Where services are located below the cover then soil validation would be required to demonstrate that the soil is not contaminated. In the event of contamination, appropriate health procedures will be applied.

6. Recommendations

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

1. That the Minister notes that the proposal being assessed is for the remediation of 15.5 hectares of land referred to as the Clayton Precinct which comprises the eastern part of the Midland Railway Workshops site located immediately south of the Midland town centre in Midland;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that the proposal by Midland Redevelopment Authority can be managed to meet the EPA's objectives, subject to the EPA's recommended conditions (Appendix 4), including the proponent's management commitments.
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:

Water and Rivers Commission
Public Health Department of Western Australia
Department of Environmental Protection
Ministry for Planning and Infrastructure
City of Swan

Individuals:

Nil

Appendix 2

References

Midland Redevelopment Authority (2001). Remediation of the Midland Railway Workshops Site Area B, D and D for the proposed Police Operations Support Facility. Public Environmental Review.

Midland Redevelopment Authority (2001). Assessment of the Fate and Transport of Contaminants in Areas B, C and D in accordance with WRC requirement.

ANZECC/NHMRC (1992). Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites. January 1992.

Environmental Protection Authority (EPA)(1993). Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters. Environmental Protection Authority Bulletin No 711, October 1993.

Environmental Protection Authority (EPA)(1997). Guidance Statement for Remediation Hierarchy for contaminated Land. July 2000. Policy No 17.

Appendix 3

Summary of identification of relevant environmental factors

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL*			
POLLUTION			
Management of soil Contamination	The proponent proposes to remediate approximately 15.5 hectares of land referred to as the Clayton Precinct which comprises the eastern part of the Midland Railways Workshop site located south of the Midland town centre and bounded by the Helena River floodplain to the south. Land has been contaminated due to past industrial activities including train servicing, foundry, painting, electroplating, boiler shops, metal work, asbestos removal, sandblasting, flashbutting, chemical storage and fuel storage. Contamination includes mostly inert material such as building rubble, sand, steel including galvanized material and coal cinders, heavy metals particularly copper, lead and zinc, asbestos and petroleum hydrocarbon compounds including chlorinated solvents. The site contains approximately 230,000m^3 of waste fill over 9 hectares of the site. The remediated land will be developed for use as a Police Operations Support Facility.	**Government Agencies:** **Water and Rivers Commission** • More leachate testing should be carried out to determine the actual quantity of contaminated soil that can be left in situ; • Supports the proposal to use memorials on land titles to ensure that the human health of future land users are not affected by the site. **Swan River Trust** • The soil investigation appears to satisfactorily characterise the extent and severity of contamination at the site; • Selective removal of the most severely contaminated soil is the most appropriate remediation option for the site. **Department of Environmental Protection** • Concerned about the effectiveness of the proposed 0.5 metre clean fill cover over the contamination; • Memorials on certificate of Title should be used to transfer information on residual contamination of the remediated site to potential purchasers or occupiers of the site to prevent inappropriate redevelopment of the site; this is particularly relevant where clean up levels are other that Environmental Investigation Levels or Health Investigation Level A; • DEP advised that where no environmental impacts is occurring, the Health Investigational Levels (HILs) may be applied; • DEP advised that where HIL-$_F$ clean up levels are adopted, then the land can only be used for commercial/industrial purposes unless health risk assessments are carried out to demonstrate that more sensitive land uses will not impact on human health. • Concerned that adequate sampling in the vicinity of the hydrocarbon contamination has not been carried out to delineate the northern boundary of the contaminated material; • All hydrocarbon contaminated material is to be removed using soil validation sampling; where validation sampling indicate	**Considered to be a relevant environmental factor**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	The remediation proposal involves: • Relocating approximately 50,000m^3 of waste fill from the western part of the site to the eastern part. This fill will be placed on top of the existing waste material in the eastern part of the site; • Retaining the remaining 180,000m^3 of waste fill as is; • Placing a 0.5 to 1 metre cover of clean soil over the fill material; • Placing a geotextile warning barrier between the waste fill and the clean fill cover; and • Removing the hydrocarbon contaminated soil to an on-site hardstand area for landfarming to remove volatile compounds prior to reinstatement back into the waste fill and soil cover/barrier.	contamination, then further excavation would be required.. **Department of Heath** • Concerned about the comparatively lesser frequency of sampling for hydrocarbon and the source of contamination; • Concerned about the 0.5 metre clean fill cover to be placed over the contamination and recommends that the whole site should have a cover of at least one metre to ensure there is no disturbance of contaminated material and that the potential human health risks are kept at acceptable levels; • Concerned about the proposed bioremediation and management of the hydrocarbon contaminated soil; • Concerned that the risk of asbestos related material to public health was not mentioned from the onset along with the hydrocarbons and heavy metals; • Concerned about the proposed clean up HIL_F levels and indicated that the proposed HIL_F levels is only appropriate as a clean-up criteria if the land use is for commercial and industrial purposes; these levels would not be appropriate to protect public health if officers occupied the site for more than 8 hours a day. **Ministry for Planning** • Concerned about the risks to human health during relocation and remediationof waste fill; • Should clearly justify why the ANZECC guidelines of a *minimum* soil cover of 0.5 metres with a geogrid warning barrier should apply at this site; • Concerned about the management of the site by Police and in relation to the protection of public health; • The health risk to children if brought to the site has not been addressed in the health risk assessment. **City of Swan** • A Hydrocarbon Management Plan should be prepared to address the remediation of the hydrocarbon dump.	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Management of groundwater contamination	Groundwater quality has been contaminated with heavy metals, particularly copper and zinc, that have leached from the waste fill. Heavy metal concentrations exceed the aquatic protection levels. Groundwater has also been contaminated with significant levels of petroleum hydrocarbons, particularly Total Petroleum Hydrocarbons (TPH), benzene, chlorobenzene and dichlorobenzene. Contamination of the underlying groundwater has the potential to affect the Helena River. The contaminated groundwater has migrated in a south westerly direction towards the Helena River, however, there are no downgradient groundwater users. A qualitative ecological risk assessment indicates that the natural soil has the capacity to remove (attenuate) the heavy metals. The remediation proposal involves: • No active remediation of groundwater eg. No extraction, treatment proposed; • Placing memorials on	**Government Agencies:** **Water and Rivers Commission** • Concerned about the impact of discharge of contaminated dewater from the hydrocarbon dump to water resources; • Concerned about the stability of the embankment during and after remediation, particularly in relation to the potential embankment collapse and transportation of contaminants to the Helena River. **Swan River Trust** • Concerned about the steepness of the embankment and requires that an engineering assessment of its stability be carried out and a remediation strategy be developed to minimize potential embankment collapse to ensure that contaminants do not move towards the Helena River; • Concerned about the discharge of dewater and its impact on water resources as a result of remediating the hydrocarbon dump; • Recommends that a minimum buffer of at least 50 metres should be established between the edge of the wetland dependent vegetation of the Helena River and the boundary of the proposed development. **Department of Health** • Concerned about the lack of investigations carried out to determine the potential impact of contamination on groundwater supplies; • Concerned about the potential risk to public health if contaminated groundwater is to be used for domestic purposes; • Concerned about the potential risk to human health of groundwater contaminated with volatile organic coupounds (VOC). **City of Swan** • Requires a Groundwater Contingency Plan to be prepared prior to remediation in order to establish appropriate methods to prevent seepage entering the Helena River.	**Considered to be a relevant environmental factor**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	Certificate of Title to ban the use of groundwater for domestic use; • Groundwater monitoring to validate fate and transport modeling of hydrocarbon; • Groundwater contingency plan should groundwater monitoring indicate that contaminated groundwater poses a significant risk to the Helena River and beneficial uses.		
Surface water (stormwater runoff)	The remediation of the site will include the decommissioning of the existing stormwater system, which is old and limited in capacity. A Major stormwater pipe servicing the Bellevue Industrial area traverses through the site collecting on-site stormwater. There is potential for contaminated stormwater to leave the site, if not managed in an environmentally acceptable manner.	**Government Agencies:** **Swan River Trust** • Indicated that an effective stormwater treatment system is essential due to the proximity of site to the Helena River; • The nutrient stripping channels within the floodplain of the Helena River need to be modified to be consistent with the WRC Manual for Managing Urban Stormwater Quality in WA. **City of Swan** • The Stormwater Management Plan should include details of nutrient stripping processes and stormwater drainage infrastructure. **Ministry for Planning and Infrastructure** • Concerned about the potential impact of proposal on Helena River and floodplain outside of the Police site as floodplain contains a number of Aboriginal sites.	**Proponent commitments:** Prepare a Stormwater Management Plan including: • Treatment of first flush discharges; • Settlement and nutrient removal; • Design of pipe outlets; • Capacity of stormwater conveyance system; • Stormwater quality monitoring; • Retention drains; • Overflow management. This factor can be adequately managed via proponent commitment. **Not considered to be an environmental factor**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Protection of Helena River water and sediment quality	Testing of the sediments and surface water quality of the Helena River has been conducted upstream, downstream and alongside the WA Police Services site. Results show no evidence of contamination as a result of past industrial and waste disposal activities at the Midland Railways Workshop site.	**Government Agencies:** **Water and Rivers Commission** • Concerned that the parameters used in the Groundwater Model and the tabulated rates of degradation may not be appropriate for the site; • Concerned that the initial groundwater model predictions may not be appropriate for local conditions. **City of Swan** • Water quality monitoring of Helena River should be carried out, and • Concerned about the rehabilitation of the floodplain area of the Helena River including landscaping and revegetation.	**Considered to be a relevant environmental factor**
Air Quality			
Dust	There is a minimum buffer distance of approximately 300 metres between the contaminated site and the nearest residential area to the north. The proposal may generate dust during: • Excavation and relocation of the waste fill; • Movement of trucks and earthmoving equipment; • Placement of clean fill.	**Government Agencies:** • The Dust and Air Quality Management Plan (DAQMP) should be developed in liaison with the Health Department of WA; • Concerned about the potential odours produced during the remediation of the hydrocarbon dump.	**Proponents commitments:** Prepare a Dust and Air Quality Management Plan (DAQMP) including: • Dust control measures approved by DEP; • Monitoring program; • Hydro mulching of stockpile area; • Cleaning of machinery used in excavation; and • Asbestos monitoring. This factor can be adequately managed via proponent commitments. **Not considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Noise and Vibration	There is a minimum buffer distance of approximately 300 metres between the contaminated site and the nearest residential area to the north. The proposal will generate noise during: • Movement of trucks and earthmoving equipment; • Compaction during site remediation.	The issue of noise and vibration was not raised in the government submissions.	**Proponent commitments:** Prepare Noise and Vibration Management Plan including: • Good working equipment with effective silencers; • Comply with Worksafe WA requirements for occupational noise exposure; • Comply with Environmental Protection (Noise) Regulations 1997; and • Noise monitoring and mitigation measures. This factor can be adequately managed via proponent commitments. **Not considered to be relevant environmental factor.**
SOCIAL SURROUNDINGS			
Road Traffic Safety	There will be no transportation of waste along public roads, as the waste material will be shifted internally within the site. However, the proposal will involve an increase in traffic volume along Montreal Road and Clayton Street in the order of approximately 2,000 vehicle movements into and out of the site per month. This is mainly due to delivery of clean fill.	The issue of road traffic safety was not raised in the submissions.	**Proponent commitments:** Prepare transport management plan including: • Cover requirements for trucks carting clean fill; • Identify destination of proposed landfills, if required; • Use roadworthy vehicles, underload and comply with the Road Traffic Act (1974). **Not considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Community consultation	The proposal will involve regular updates on the progress of the remedial works through the local press, MRA website and community information session.	**Ministry for Planning and Infrastructure** • Concerned about the lack of information regarding the community consultation process to address health and safety and public amenity issues.	**Proponent commitments:** Consult with interest groups and keep the local community informed on the progress of the remediation works. The information provided will include: • Results of dust and air quality monitoring, and • Nature of complaints and any corrective action undertaken. This factor can be adequately managed via proponent commitments. **Not considered to be a relevant environmental factor.**

Appendix 4

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No.

RECOMMENDED ENVIRONMENTAL CONDITIONS

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

REMEDIATION OF THE MIDLAND RAILWAY WORKSHOPS SITE
AREAS B, C AND D FOR THE POLICE OPERATIONS SUPPORT FACILITY,
MIDLAND

Proposal: The remediation of 15.5 hectares (Areas B, C and D) of the 70 hectare Midland Railway Workshops site located immediately south of the Midland town centre in Midland. The proposal is for the development of a Police Operations Support Facility, as documented in Schedule 1 of this statement.

Proponent: Midland Redevelopment Authority

Proponent Address: Railway Institute Building
Midland Railway Workshop Site
Montreal Road East
Midland WA 6056

Assessment Number: 1349

Report of the Environmental Protection Authority: Bulletin 1057

The proposal referred to above may be implemented subject to the following conditions and procedures:

Procedural conditions

1 Implementation and Changes

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

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of the conditions in this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment and Heritage, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

- The environmental factors of the proposal have not changed significantly;
- New, significant environmental issues have not arisen; and

- All relevant government authorities have been consulted.

Note: The Minister for the Environment and Heritage may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

Environmental conditions

5 Compliance Audit and Performance Review

5-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Department of Environmental Protection which address:

- The implementation of the proposal as defined in schedule 1 of this statement;
- Evidence of compliance with the conditions and commitments; and
- The performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement. Usually, the Department of Environmental Protection prepares an audit table that can be utilised by the proponent, if required, to prepare an audit program to ensure that the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

6 On-site Containment of Waste Fill

6-1 The proponent shall provide a cover of not less than one metre of clean fill over the waste fill in all "uncovered open space areas", such as horse training grounds, horse paddocks, landscaped gardens and lawns.

6-2 For those areas where development will consist of "hardstands" or "buildings", the proponent shall provide a cover of clean fill of not less than 0.5 metres.

6-3 It is preferable that all services such as power, drainage and telephone be installed within the cover material, however where there is a need to locate services below the cover, prior to installation of such services, the proponent shall carry out soil validation tests to demonstrate that the soil is not contaminated, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: The National Environment Protection Measure recommends a minimum cover of 0.5 metre for a "commercial/industrial" land use.

7 Hydrocarbon-Contaminated Soil

7-1 Prior to ground-disturbing activities, the proponent shall prepare a Hydrocarbon Management Plan to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

The objectives of this plan are to:

- Protect public health; and
- Achieve effective and timely on-site treatment of contaminated soil.

This Plan shall address the following:

(1) Remediation trials using landfarming methods for initial treatment on site of not more than 20 percent of the available contaminated soil;
(2) Staged treatment;
(3) Air quality monitoring designed to protect public health;
(4) Remediation to Environmental Investigational Levels (EILs) or level acceptable to the Environmental Protection Authority, if remediated soil is to be re-instated on the site (see Ref.doc.)
(5) Contingency plan(s) for removal and treatment/disposal off-site of contaminated soil, whether or not remediation has begun, if deemed necessary by the Environmental Protection Authority.

7-2 The proponent shall implement the Hydrocarbon Management Plan required by condition 7-1 to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7-3 The proponent shall make the Hydrocarbon Management Plan required by condition 7-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Ref.doc: Department of Environmental Protection's Draft Guidelines *"Assessment Levels for Soil, Sediment and Water" (December, 2001*) and its revisions.

Procedures

1 Where a condition states "to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority", the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

Note

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

Schedule 1

Proposal

The remediation of 15.5 hectare (Area B, C and D) of the 70 hectare Midland Railway Workshops site located immediately south of the Midland town centre in Midland. The proposal is for the development of a Police Operations Support Facility on the remediated land.

Table 1: Key proposal characteristics

Element	Description
SITE IDENTIFICATION	The development site is identified as part of Reserve 2299 on Swan Location 12698. The site occupies an area of approximately 15.5 hectares and is located in the south-east part of the Midland Railway Workshops site.
CURRENT ZONING	Industrial
PROPOSED ZONING	Public purposes, commercial, service and light industrial.
DEMOLITION	Nil (There are buildings and structures within the project area)
NATURE OF CONTAMINANTS	*Waste Fill:* Approx 230,000 cubic metres of waste fill over 9 hectare of the 15.5 hectare site consists of coal cinder, foundry slag, building rubble, sand, steel and occasional asbestos products. *Soil:* low concentrations of heavy metal and hydrocarbon contamination at the base of the waste fill. *Groundwater:* low concentrations of heavy metals and hydrocarbons. *Helena River:* no trace of contamination found in sediment and water.
REMEDIATION AND MANAGEMENT	
Soil/Waste Fill	• relocate 50,000 cubic metres of waste fill from the western part of site and place in the far eastern part of the site. Remaining 180,000m^3 of waste fill will stay as is. Prepare and implement a management program to ensure the safe and efficient relocation of waste fill material. • Remove the hydrocarbon dump (approx 5,000 cubic metres) and treat on-site using landfarming bioremediation method before relocating to the far eastern part of the site. Prepare and implement a Hydrocarbon Management Plan for the remediation works. • Place between 0.5metres to 1 metre clean soil cover over a clearly visible, tear-resistant geotextile warning barrier over the waste fill area. • Prepare and implement a Waste Management Plan to ensure that excavations, transport and relocation of waste fill is carried out in a safe and environmentally acceptable manner. • Prepare an Asbestos Management Plan. • Prepare and implement an Irrigation Management Plan to minimise water entering the waste fill so as to prevent accelerated leaching of the fill
Groundwater	• Natural attenuation of contaminants by clay soils which exhibit a strong capacity to adsorb heavy metals and hydrocarbons. • Prepare and implement a Groundwater Management Plan where groundwater will be regularly monitored at the source and downgradient to check the effectiveness of natural attenuation. • Ban the use of contaminated groundwater by placing memorials on titles. • Prepare a Groundwater Contingency Plan to be implemented if groundwater monitoring indicates a risk to the Helena River.
Helena River	• Replace the existing stormwater infrastructure to prevent the leakage of contaminated groundwater into the stormwater system. • Prepare and implement a Stormwater Management Plan to improve water quality entering the river system.
Dust	• Prepare and implement a Dust and Air Quality Management Plan for excavation and transportation activities including an extensive air monitoring program.
Noise and vibration	• Prepare and implement a Noise and Vibration Management Plan outlining noise mitigation measures and monitoring requirements.

Schedule 2

Proponent's Consolidated Environmental Management Commitments

August 2002

REMEDIATION OF MIDLAND RAILWAY WORKSHOP SITE AREAS B, C AND D FOR THE POLICE OPERATIONS SUPPORT FACILITY, MIDLAND

MIDLAND REDEVELOPMENT AUTHORITY

PROPONENT'S ENVIRONMENTAL MANAGEMENT COMMITMENTS - REMEDIATION OF AREAS B, C & D, CLAYTON PRECINCT, MIDLAND RAILWAY WORKSHOPS MIDLAND REDEVLOPMENT AUTHORITY (Assessment No 1349)

No.	Topic	Action	Objectives	Timing	Advice
1.	Rehabilitation	Determine an appropriate cover thickness based on an assessment of risk exposure to the waste fill as a consequence of the proposed land use.	To prevent exposure to contaminated material by future users of the site.	Prior to commencement of ground-disturbing activities	DOH
2.	Rehabilitation	Remove waste material to an acceptable landfill which cannot be accommodated on site due to potential changes in final design levels	To prevent contaminated material removed from the western part of the site being relocated inconsistent with the final plans for the Police development.	During remediation	DOH
3.	Remediation	Prepare a Hydrocarbon Management Plan addressing: • bioremediation process • validation testing • assessment of residual leachate potential.	To ensure the safe and effective treatment of impacted fill to remove potential of waste material to degrade underlying groundwater.	Prior to commencement of ground-disturbing activities	
4.	Remediation	Implement the Hydrocarbon Management Plan.	To ensure the safe and effective treatment of impacted fill to remove potential of waste material to degrade underlying groundwater.	During remediation	
5.	Remediation	Remove to suitable landfill that hydrocarbon impacted fill that is not effectively treated by remediation.	To prevent contamination of groundwater from leaching of contaminants from the waste fill.	During remediation	
6.	Compliance	Undertake validation testing of excavation once hydrocarbon impacted fill has been removed.	To demonstrate hydrocarbon impacted fill has been removed.	During remediation	
7.	Air Emissions	Prepare a Dust and Air Quality Management Plan addressing: • air quality monitoring • asbestos monitoring • dust management practices.	To ensure nuisance and contaminated dust including asbestos fibres potentially generated from remedial works comply with regulatory standards protective of human health.	Prior to commencement of ground-disturbing activities	DOH

No.	Topic	Action	Objectives	Timing	Advice
8.	Air Emissions	Implement the Dust and Air Quality Management Plan.	To ensure nuisance and contaminated dust including asbestos fibres potentially generated from remedial works comply with regulatory standards protective of human health.	Prior to commencement of ground-disturbing activities	DOH
9.	Waste Relocation	Prepare a Waste Management Plan for the excavation, transport and relocation of the waste fill.	To ensure that the relocation of the waste fill on site is carried out in an environmentally acceptable manner.	Prior to commencement of ground-disturbing activities	
10.	Waste Relocation	Implement the Waste Management Plan.	To ensure that the relocation of the waste fill on site is carried out in an environmentally acceptable manner.	During remediation	
11.	Groundwater Quality	Prepare an Irrigation Management Plan addressing: • water balance, • subsurface drainage • overall irrigation strategy	To reduce subsurface drainage and enhanced leaching of contaminants into the underlying groundwater.	Post remediation	WRC
12.	Groundwater Quality	Implement the Irrigation Management Plan.	To reduce subsurface drainage and enhanced leaching of contaminants into the underlying groundwater.	Post remediation	
13.	Groundwater Quality	Prepare a Groundwater Management Plan addressing: • monitoring of groundwater levels; • monitoring of groundwater quality.	To monitor the performance of remedial works and attenuation of contaminants from groundwater into natural soils To monitor trends in groundwater levels	Prior to commencement of ground-disturbing activities	WRC
14.	Groundwater Quality	Implement the Groundwater Management Plan.	To monitor the performance of remedial works and attenuation of contaminants from groundwater into natural soils To monitor trends in groundwater levels	Post remediation	WRC
15.	Groundwater Quality	Re-run the fate and transport groundwater model for hydrocarbon contaminants without the use of the dispersion factor and using site-specific degradation rates.	To demonstrate that natural attenuation alone will degrade contaminants to levels acceptable for discharge into the Helena River.	Prior to commencement of ground-disturbing activities	WRC

No.	Topic	Action	Objectives	Timing	Advice
16.	Groundwater Quality	Prepare a Groundwater Contingency Plan addressing: • treatment of contaminated groundwater • management of any groundwater impact.	To prevent elevated contaminant levels from reaching and potentially harming the aquatic environment of the Helena River.	Prior to commencement of ground-disturbing activities	WRC
17.	Groundwater Quality	Implement the Groundwater Contingency Plan in the event that monitoring shows that elevated contaminant levels will reach the Helena River.	To prevent elevated contaminant levels from reaching and potentially harming the aquatic environment of the Helena River.	Post remediation (dependent on monitoring results)	
18.	Groundwater Usage	Restrict groundwater usage in all impacted areas by placing memorials on titles.	To prevent use of contaminated groundwater unsuitable for irrigation purposes.	Post remediation	DPI
19.	Surface water Quality	Prepare a Stormwater Management Plan for managing stormwater discharging from the site, addressing: • drainage patterns; • stormwater quality monitoring program;	To monitor the performance of the stormwater system in attenuating contaminants.	Prior to commencement of ground-disturbing activities	WRC
20.	Surface water Quality	Implement the Stormwater Management Plan.	To monitor the performance of the stormwater system in attenuating contaminants.	Prior to commencement of ground-disturbing activities	
21.	Surface water Quality	Finalise design of stormwater disposal system according to best management practice.	To ensure the stormwater system does not collect contaminants from waste fill areas and discharge these directly into the Helena River.	Prior to commencement of ground-disturbing activities	WRC
22.	Soil Quality	Prepare a Sub-surface Constraints Register detailing: • location; • depth of retained waste fill; • details of cover.	To prevent uncontrolled contact with the waste fill	Post remediation	
23.	Noise and Vibration	Prepare a Noise and Vibration Management Plan addressing: • prevention of excessive and nuisance noise; • prevention of damage due to vibration.	To prevent noise emissions and vibration during remedial works exceeding regulatory standards.	Prior to commencement of ground-disturbing activities	

No.	Topic	Action	Objectives	Timing	Advice
24.	Noise and Vibration	Implement the Noise and Vibration Management Plan	To prevent noise emissions and vibration during remedial works exceeding regulatory standards.	Prior to commencement of ground-disturbing activities	
25.	Community Consultation	Consult with interest groups and keep the local community informed on the progress of the remedial works.	To inform, seek feedback and address community concerns about the project.	Prior to commencement of ground-disturbing activities	
26.	Transport	Prepare a Transport Management Plan addressing: • transport route; • vehicle roadworthiness; and • covering of loads. • Emergency response	To reduce disruption and nuisance to the local community during the transport of clean fill to the site	Prior to commencement of ground-disturbing activities	
27.	Transport	Implement Transport Management Plan.	To reduce disruption and nuisance to the local community during the transport of clean fill to the site	Prior and during commencement of ground-disturbing activities	
•	Asbestos	Prepare an Asbestos Waste Management Plan addressing: • handling and relocation of contaminated waste fill during the remediation; • long term management of the waste fill.	To prevent the release of asbestos fibres from the waste fill during the remediation and post development of the site.	Prior to commencement of ground-disturbing activities	DOH
•	Asbestos	Implement the Asbestos Waste Management Plan.	To prevent the release of asbestos fibres from the waste fill during the remediation and post development of the site.	Prior and during commencement of ground-disturbing activities. Post remediation.	DOH

Legend

DEP	Department of Environmental Protection
EPA	Environmental Protection Authority
DOH	Department of Health
WRC	Water and Rivers Commission

DPI	Department of Planning and Infrastructure

Appendix 5

Summary of Submissions and
Proponent's Response to Submissions

ISSUE 1: GROUNDWATER CONTAMINATION

Question 1.1

The Health Department of Western Australia (HDWA) indicated that investigations would need to be carried out to determine the potential impact of contamination on groundwater supplies used for domestic irrigation and to clarify that there is no risk to public health especially in light of the high Volatile Organic Carbon(VOC) levels reported beneath the site. How does the proponent respond to the above concern?

Response

The hydrocarbon impacted groundwater will not be used for domestic irrigation. The impacted aquifer is low yielding and unlikely to be suitable in terms of salinity. Nevertheless, the proponent will impose a memorial on title to prevent the abstraction of groundwater from the superficial aquifer for the entire site.

By preventing abstraction of the groundwater at the hydrocarbon dump site, there will be no exposure pathway to the impacted groundwater, thus site occupants and the public will be afforded protection.

Fate and transport modelling shows that the dissolved phase hydrocarbon groundwater contamination will degrade once the source is removed.

Question 1.2

The Water and Rivers Commission and the Swan River Trust indicated that dewatering discharge from the hydrocarbon dump represents a pollution risk to water resources and management of dewatering needs to be discussed further with the WRC and SRT to ensure adequate controls are in place. How does the proponent respond to the above concern?

Response

Dewatering of the hydrocarbon dump is a possibility but is considered unlikely given the small volume of fill required to be removed below the water table. A Hydrocarbon Remediation Plan will be developed in consultation with the DEP (PER Commitment #3) and advice sought from the WRC and SRT to ensure adequate controls are in place. As stated in S5.10.3 of the PER, any water from dewatering will be either disposed or treated on-site prior to recharge.

Question 1.3

The HDWA indicated that no 'active remediation'(section 5.10) of groundwater may pose a risk to public health if residents are able to access this groundwater from their residential bores. The proponent would need to ensure that groundwater contaminated with high levels of VOC does not affect nearby residence. How does the proponent respond to the above concern?

Response

As per response 1.1, the proponent will not allow abstraction of groundwater from the superficial aquifer. It should be noted that there are no proposals for residential development either on the referral area or off-site and down gradient of the hydrocarbon dump.

Question 1.4

The PER indicates a process for the management of groundwater likely to be encountered in excavating the hydrocarbon waste. It suggests that some of this water may need to be removed off-site. The proponent needs to explain how this will be done, and clarify the options of disposal, ie larger volumes may be pumped to the abandoned Wastewater Treatment Plant located near the subject land or a temporary clay earthen bund. How does the proponent respond to the above concern?

Response

As per response 1.2, the proponent will prepare a Hydrocarbon Remediation Plan that details the effective management of dewatering any contaminated groundwater.

Question 1.5

The City of Swan has recommended that:

- *The Groundwater Contingency Plan be prepared by the proponent <u>prior</u> to remediation in order to establish appropriate methods to prevent seepage entering the Helena River;*
- *The Groundwater Contingency Plan should also include the development of suitable procedures for long-term groundwater level management;*
- *The Groundwater Contingency Plan should also contribute to application and management of standards for the containment of waste in landfill sites;*
- *The modelling analysis for predicting the flow of ground water into the Helena River should be re-run and the results referred to the Water and Rivers Commission prior to the commencement of works.*

How does the proponent respond to this concern?

Response

The proponent reaffirms the commitment to prepare a Groundwater Contingency Plan – GCP (PER Commitment #17&18). The GCP will be prepared prior to remedial works.

The issues of managing long term groundwater levels and quality will be described in detail. This will include potential remedial measures should groundwater quality pose a threat to the aquatic environment of the Helena River.

The proposed remediation is to rehabilitate derelict land containing a large volume of relatively environmentally benign material with no putrescible waste. The area under consideration is not a landfill nor is it considered that it needs to be managed as a landfill.

The fate and transport modelling will be re-run excluding dispersion as stated in PER commitment #16 prior to commencement of remedial works.

ISSUE 2: GROUNDWATER AND SOIL SAMPLING

Question 2.1

There appears to be no justification as to why hydrocarbons were sampled at a lower frequency. The HDWA does not understand what the proponent is referring to when he states that the hydrocarbon contamination arises from " … formulations and cleaning agents". The proponent needs to clarify what formulations are.

How does the proponent respond to this concern?

Response

Hydrocarbons were sampled at a lower frequency than other parameters due to the low potential for them to occur throughout the fill. It is our experience that hydrocarbons at relatively high concentrations can be readily identified during field investigations. Where visual observations suggested hydrocarbon contamination, comprehensive testing was undertaken (for example the hydrocarbon dump). Hydrocarbon contamination was not observed in the vast majority of trenches dug into the dump. The sampling rationale was provided to the DEP for review and comment prior to the investigation phase.

The hydrocarbon contamination arises from the localised disposal of waste solvents. These solvents were used on-site for cleaning purposes and in chemical and paint formulations.

Question 2.2

The report does not state whether or not hydrocarbons or pesticides were assessed in the storm water run off. As it used to be standard practice to treat railway sleepers with organ chlorines when this site was operational, the monitoring of pesticide run off would be important to determine the impacts of this type of contamination on the Helena River. How does the proponent respond to the above concern?

Response

Stormwater runoff was not tested for hydrocarbons or pesticides. As the entire system is to be replaced, testing of current stormwater would not reflect the future quality. Where the stormwater discharges onto natural ground, the soil has been tested for hydrocarbons which were not detected. Pesticides were tested but not found in the waste fill at concentrations above the laboratory detection limit of 0.1 mg/kg. Given the above monitoring was not performed.

Question 2.3

It is the HDWA's understanding that the Police Department do not have any specific training in managing contaminated sites, so the statement "…..police would have effective institutional management and control of activities… " will need to be explained further to justify the elected minimum 0.5 m of clean fill on top of the waste fill. The HDWA recommends that all underground service lines be put in prior to the addition of clean fill and that the whole site has a cover of one metre to ensure no contamination disturbance. How does the proponent respond to the above concern?

Response

The Police Department have an effective management structure conducive to the long term management of the waste fill area. However an Environmental Management System (S6.12 of the PER) will also be put in place to assist the Police in maintaining long term effective management of the site. The Police will need to engage the services of an environmental professional to maintain the EMS.

Refer Attachment on 0.5 m cover justification.

Question 2.4

The SRT and WRC indicate that the soil and groundwater investigation program appears to satisfactorily characterise the extent and severity of contamination at the site. However, to determine the amount of contaminated soil that can be left in situ, and the amount that must be disposed of off-site to protect health and the environment further leachate testing should be required. How does the proponent respond to the above concern?

Response

The waste fill has been subject to an intensive leachate test work program that is considered sufficient to characterise the leachability of the fill. In addition, the total leachable load from the waste fill was exaggerated in calculations by one order of magnitude when assessing the environmental risk as a conservative measure. Consequently this exaggerated the leachate potential of the material used in the mass balance calculation.

A total 43 ASLP tests have been performed only on fill which exceeds the EIL. Testing has therefore been skewed towards the contaminated component of the fill. Of the waste samples analysed, (approx 300 in total) 30% of those with contaminant levels above the EIL were tested. The overall leachate test rate is approximately 1 per 5,000 m^3 of fill.

Question 2.5

The SRT and WRC indicated that the proposal to use memorials on land titles for the long-term management of health issues at the site is acceptable. The effect of residual contaminated soil of groundwater quality has been inferred from a limited number of adsorption tests. It is recommended that, as a minimum, there is also a commitment to a long term groundwater monitoring program from existing bores to demonstrate that there are no groundwater impacts. It is also recommended that the proponents develop a contingency groundwater management program to prevent impacts on the river should levels of groundwater contamination increase in monitoring bores.

How does the proponent respond to the above concern?

Response

The proponent reaffirms the commitment to place memorials on titles as outlined in the PER.

The proponent reaffirms the commitment to continue monitoring existing wells as outlined in S5.10.4 of the PER which will be described in the Groundwater Monitoring Plan (PER commitment #14&15).

The proponent reaffirms the commitment to prepare a Groundwater Contingency Plan (PER Commitment #17&18). The issues of managing long term groundwater levels and quality will be described in detailed. This will include potential remedial measures should groundwater quality pose a threat to the aquatic environment of the Helena River.

3 ISSUE: SURFACE WATER

Question 3.1

The WRC indicated that the Groundwater Model parameters used to predict the fate and transport of contaminants in groundwater and their potential impact on Helena River may not be appropriate for local conditions in the development site. The WRC indicated that the modelling has confirmed that the most important factors controlling the concentrations of contaminants that may ultimately discharge to the river are the rates of microbiological degradation in soil and groundwater. The rate of degradation of contaminants below the ground is highly variable, and depends to a large extent on the availability of oxygen and other electron acceptors, and the availability of sufficient carbon compounds to support microbiological activity. The proponents have used tabulated degradation rates from the literature that may not be appropriate for local conditions in the development site. If there is little or no degradation, then the current level of contamination will remain unchanged when the groundwater contamination plume eventually reaches the river.

The key question that needs to be answered by the proponents is does the current level of groundwater contamination pose an environmental risk to the river on discharge? If the answer is "Yes", then further work is required to confirm whether contamination is degrading as expected if the current remediation strategy of leaving waste in situ is pursued. This would need to be done using protocols developed overseas for assessing natural attenuation (natural attenuation is not code for "doing nothing"; confirmation that sub-surface chemical and microbiological processes are taking place requires that extensive laboratory and field measurements are made).

How does the proponent respond to the above concern?. Is the proponent prepared to carry out further site specific tests to address soil capability to facilitate microbiological degradation of contaminants?

Response

The proponent concurs that degradation rates are the most important factor controlling the concentrations of contaminants in the groundwater. Aquifer parameters such as dissolved oxygen levels, chemical oxygen demand and the organic carbon content of the aquifer were determined prior to modelling, to confirm that conditions conducive to biodegradation existed. They do exist and are described in the PER (S5.4.2 & 5.4.4) and in the Fate and Transport Study report attached as Appendix D of the PER.

The degradation rates used in the model are conservative textbook values derived in North America. Warmer conditions in WA could potentially result in higher degradation rates. Nevertheless, aquifer conditions should be assessed for the presence of microbial activity. The proponent will monitor groundwater for microbial activity in hydrocarbon impacted wells and compare against microbial activity in clean background wells.

It should be noted that the source of the hydrocarbon contamination will be removed and that only residual dissolved phase impact in the groundwater will remain. The proponent agrees to further site specific tests in consultation with the WRC to assess soil capability in facilitating microbial degradation of contaminants.

3.2 Question

The City of Swan has indicated that the following stormwater management issues need to be considered in the Stormwater Management Plan:

- *Details of the quantity of run-off from the site;*
- *Details of the size, location, management and monitoring of the settlement and nutrient stripping channels; with these details included in the Stormwater Management Plan;*
- *Proposal for new settlement and nutrient stripping channels, to be located along the Helena River flood plain, to be referred to the Swan River Trust;*
- *Location of stormwater drainage infrastructure to be in clean fill only.*

How does the proponent respond to the above concern?

Response

The proponent commits to producing a Stormwater Management Plan (PER Commitment #19&20). The basis of the plan is described in S5.7 of the PER and will include details on run-off volumes, dimensions of treatment systems and management of these along with monitoring requirements. A stormwater strategy is currently being developed for the entire Workshops site in consultation with the WRC. This strategy will detail the location and method of dispersing stormwater into the Helena River system. The strategy outcome will form the basis for the Stormwater Management Plan for the project area.

All stormwater infrastructure will be installed into trenches backfilled with clean soil including a warning barrier to prevent contact with the waste fill.

3.3 Question

The SRT and WRC have indicated that an effective stormwater treatment system is essential as the site is in close proximity to the Helena River and because of the history of contamination at the site. How does the proponent respond to the above concern?

Response

The proponent concurs with the WRC and SRT on the need for an effective stormwater system. A new stormwater system will be developed for the entire Workshops site that will result in acceptable stormwater quality suitable for discharge into the Helena River. Refer to response 3.2.

3.4 Question

In relation to surface runoff, addressed in Sections 5.7 and 6.7, the PER indicates that the entire stormwater system will be reconstructed during remediation works so that there will be no potential for interception of contaminated groundwater and, subject to further consultation with the DEP, WRC and local Aboriginal groups a Stormwater Management Plan will be prepared.

The Ministry for Planning indicated that additional information should be provided to explain stormwater management of the subject site during remediation works such that any runoff containing contaminants will be minimal and environmentally acceptable. The key objective should be to ensure that there is no direct discharge of low-grade stormwater into the Helena River. How does the proponent respond to the above concern?

Response

The waste fill is permeable with no drainage systems on the surface. A small number of stormwater pipes have been installed through the fill in the past that convey water to the floodplain. Remedial works are proposed to commence in summer when the potential for runoff is low. The PER (S6.7) states that all runoff will be contained on-site and allowed to infiltrate into the fill. There will be no discharge of runoff from remedial works including stockpiles into the existing stormwater system and thus the Helena River floodplain.

3.5 Question

The Ministry for Planning indicated that the Helena River and floodplain contains a number of Aboriginal sites and that the proposal will not physically alter the Helena River and floodplain outside of the Police site. This point should be clarified for the portion of the site on the foreshore (Area C2). How does the proponent respond to the above concern?

Response

A search of the Aboriginal site database identified three sites within the project area. The proposed remedial works will not interfere with natural ground, only that which is covered with waste fill. The developer of the site being the Police will be required to confirm the importance of these sites. Contingent on their importance, the Police maybe required to preserve and protect these sites.

3.6. Question

The SRT and WRC have indicated that the proposed "nutrient stripping channels" in Area C2 within the floodplain of the Helena River need to be modified to be consistent with the WRC Manual for Managing Urban Stormwater Quality in WA.

The design concept should include rehabilitation of the floodplain, establishing wetland areas to filter pollutants before discharging stormwater to the river.

How does the proponent respond to the above concern?

Response

The proponent is currently working with the WRC to prepare a stormwater strategy for the entire Workshops site (refer response 3.2). The final stormwater strategy will utilise the principals put forward in the WRC manual for Managing Urban Stormwater Quality in WA.

3.7 Question

The SRT and WRC have indicated that the method for managing contaminated runoff during site remediation requires further development in the EMP. How does the proponent respond to the above concern?

Response

Management of stormwater during the remediation phase will be outlined in the Waste Management Plan (PER Commitment #10&11). Refer response 3.4 for proposed management.

3.8 Question

The SRT and WRC have indicated that the use of the western part of Area C2 as a horse training yard has the potential to result in the contamination of the river by animal wastes. The area of infilling of up to 1m abuts the Helena River floodway. A strategy for ensuring animal wastes are prevented from contaminating the river needs to be developed and the potential effect of the filling on flood flows needs to be further assessed. Both will require further consultation with the SRT. How does the proponent respond to the above concern?

Response

The issue of animal waste management is introduced in S6.13.2 of the PER. As part of development approval, the Police will provide more detailed information with regard to animal waste management.

There will be no infilling of natural ground with waste fill as part of the remedial works, only relocation onto existing fill areas, therefore the issue of effects on flood flows is not relevant.

3.9 Question

The SRT and WRC have indicated that a buffer of at least 50 metres should be established between the edge of the wetland dependent vegetation of the Helena River and the boundary of the development. How does the proponent respond to the above concern?

Response

The proposed remedial works will come no closer than some 75 m of the Helena River. Fringing wetland vegetation currently exists within 10 m of the toe of the waste fill embankment. The remedial works will involve ground disturbance only in the waste fill area, natural ground on the floodplain will not be effected. The issue of a buffer zone between the future development and the wetland vegetation will be addressed by the Police development process. Conceptual design details for the Police site show no development within 50 m of the fringing river vegetation.

3.10. Question

The City of Swan has indicated that the following should be addressed in relation to riverine water quality protection:

- *monitoring and collection of water quality data for the Helena River; and*
- *the MRA rehabilitate the floodplain area of the Helena River;*

How does the proponent respond to the above concern?

Response

The Helena River was monitored as part of the assessment to support the remediation strategy put forward in the PER. No impact attributable to the Workshops site was detected in either the sediments or water (refer 2.11.11 to 2.11.13 of the PER). Due to the absence of contamination in the river, regular monitoring is not proposed unless there is a decline in groundwater quality migrating towards the river (refer S5.11 of the PER).

The floodplain part of the Helena River will ultimately be rehabilitated and developed into the Helena River Park, this is outside of the project area subject to the PER.

ISSUE 4: HUMAN HEALTH RISK

Question 4.1

The HDWA states that human exposure settings (HILs, Health Investigational Levels) based on land uses have been established. The use of HIL F in the report reflects the commercial/industrial setting, which includes such premises as shops and offices as well as factories and industrial sites. The use of this guideline is appropriate if there are not going to be officers at the site for more than 8 hours a day. In area B it is proposed that there will be multiple recreational uses that would be best suited to guideline levels in accordance with HILs. How does the proponent respond to the above concern?

Response

The Health Investigation Level (f) settings have been used in the PER simply to provide an indication of the contamination status of the fill, they are not intended to be used as clean-up levels. The proposed remediation strategy is to cover the waste fill with a warning barrier and a minimum 0.5 m clean soil cover. The soil cover will be clean with no contaminants above the DEP Ecological Investigation Level. There will be no direct contact with contaminated fill.

Question 4.2

It is not clear why the asbestos is not mentioned from the onset as a risk to human health from the contamination, along with hydrocarbons and heavy metals. How does the proponent respond to the above concern?

Response

Tables 1 and S2.11.3 of the PER describe asbestos as a contaminant and as one that is a potential risk to human health.

Question 4.3

The Ministry for Planning indicated that Appendix D relating to "Environmental Risk"(section 3.2) appears to be missing. "Risk' should be clarified. In this section and also Section 3.3 the PER should be more specific in relation to the risks to human health and environmental values posed by the waste fill contaminants, particularly during relocation and remediation. Although the PER advises that the minimum ANZECC Guidelines for the Assessment of On-site Containment of Contaminated Soil 1999 will be followed (i.e. a minimum soil cover of 0.5 m with a geogrid warning barrier - plastic warning layer, brightly coloured with a printed warning about the presence of asbestos) it should provide a clear explanation as to why the minimum ANZECC guideline is appropriate, how Police management of the site will be ensure an ongoing high level of protection and how people employed in or accessing future commercial uses in Area D will have a high level of protection. How does the proponent respond to the above concern?

Response

Appendix D of the PER is the Fate and Transport Study which is stated in Section 3.2.

Refer Attachment on 0.5 m cover justification.

The Police will be able to manage the site effectively in the long term as it will be secure with no public access. The Police also have a regimented management structure in place conducive to controlling activity on-site. In addition an EMS will be put in place (refer response 2.3). As well as the Police site, future commercial land in Area D will also be subject to memorials on titles controlling activity and land use.

Question 4.4

Children have not been included in the assessment indicating that there will be no childcare facilities or children brought to the work place for the police workers at this site. This will need to be clarified in the report. How does the proponent respond to the above concern?

Response

Any future child care facilities would be constructed on natural ground as the waste fill is unsuitable for building structures from a geotechnical perspective. As per response 4.1 there will be a warning barrier and clean soil cover over the waste fill. Should the Police construct such facilities in the future it will be located on natural ground within Area A (CADCOM site) which is free of soil contamination.

Question 4.5

Despite all the disadvantages to removing the impacted hydrocarbon waste to a

land fill facility, this is the preferred method of remediation for the site. The ongoing management of the site may prove to be difficult and the removal of the hydrocarbon dump will ensure that no further ground water contamination occurs.

The excavation and movement of waste into an appropriately impervious cell is sufficient for asbestos and heavy metal contamination and for the prevention of further contamination of groundwater. After removal of surface contamination a metre cover of clean fill should be placed on areas where contamination is likely to be present. Physical cover over the rest of the entire site should be sufficient to contain asbestos and heavy metal contamination. How does the proponent respond to the above concern?

Response

The proponent reaffirms the commitment to remove hydrocarbon contaminated fill so as to improve groundwater quality.

The proposed remediation approach involves the relocation of a portion of the waste fill from the western end of the site into the far eastern part. A warning barrier and 0.5 m minimum clean soil cover will then be placed over all of the fill. There is no proposal to create an impervious cell. Refer Attachment on 0.5 m cover justification.

Question 4.6

The reinstatement of the hydrocarbon contamination to the site once it is deemed suitable is not explained clearly. What the proponent deems suitable should be clearly outlined in the PER. The proponent should note that the investigation levels that are outlined in the ***National Environmental Protection (Assessment of Site Contamination) Measure 1999*** *document are not clean up levels but rather trigger values to indicate whether or not further investigation is necessary. How does the proponent respond to the above concern? Could the proponent clearly explain and describe the management of the hydrocarbon contamination including clean-up levels, additional investigations for both soil and water?*

Response

A Hydrocarbon Remediation Plan will be developed in consultation with the DEP (PER Commitment #2&3). The Hydrocarbon dump will be considered removed once contaminant levels comply with the HIL (f) criteria and the leachable component complies with criteria set for an inert landfill. Adoption of HIL (f) criteria takes into account the potential diffusion of volatile compounds through the cover into the ambient atmosphere. Full details will be outlined in the Hydrocarbon Remediation Plan.

ISSUE 5: DUST AND AIR QUALITY

Question 5.1

The Dust and Air Quality Management Plan (DAQMP) must be agreed to by relevant authorities including the Department of Health prior to commencement of this project. How does the proponent respond to the above concern?

Response

The proponent reaffirms the commitment to prepare a Dust and Air Quality Management Plan (PER commitment #8&9) to the satisfaction of the DEP and Health Department.

Question5.2

Section 5.5 "Remediation of Hydrocarbon Dump" indicates that the intended bioremediation involves mixing an organic nutrient source with the hydrocarbon waste and that this mix will be kept damp. The PER should state whether this could result in potential odour and, if so, how this will be addressed (in Section 6 "Environmental Management"). How does the proponent respond to the above concern?

Response

The bioremediation of the hydrocarbon dump spoil will be in an isolated part of the Workshops site some 250 m from the nearest receptor being CADCOM. There may be some odour from the addition of organic matter and when the material is turned from time to time. It is important to note that this will be minor in comparison to the Sale Yards adjoining the site which, from time to time, impacts upon the entire Midland township on a southerly wind.

6 ISSUE: NOISE AND VIBRATION

Question 6.1

In relation to noise and vibration (Sections 6.4 and 6.6) the PER advises that a Noise and Vibration Management Plan will be prepared. The PER advises that as there are no close residents this is not expected to be an issue. It is suggested that the PER should state who will approve this Plan and more detail should be provided regarding management of potential noise and vibration related to truck and earth moving machinery movements to and from the subject land. For example, the PER should expand on the statement: "The remediation contractor will be obliged to take every reasonable effort to minimise vibration." How does the proponent respond to the above concern?

Response

The proponent reaffirms the commitment to prepare a Noise and Vibration Dust Plan (PER commitment 23) detailing measures to minimise nuisance noise and damaging vibration. This will be provided to the DEP for comment prior to commencement of remedial works. The issue of excessive noise is controlled by the 1997 Environmental Protection Noise Regulations.

7 ISSUE: REMEDIATION STRATEGY

Question 7.1

In addition to the Subsurface Constraints Register there should be a memorial on the title that outlines the contamination location and type on the land to ensure knowledge of site risk for future land uses. The HDWA agrees with at least a 1metre lateral clean fill distance between the waste fill and the service trenches. How does the proponent respond to the above concern?

Response

Memorials on titles will be placed on all land with residual contamination as described in S6.12 of the PER.

Refer Attachment on 0.5 m cover justification.

Question 7.2

The Department of Health is concerned regarding the amount of clean fill to be placed over the contamination. The setting of the minimum 1.0 m clean fill on top of the hazard cover of grid mesh is considered more appropriate than the 0.5 m cover proposed by the proponent. This increase in cover will ensure that there is minimal risk to receptors from the contaminated soil. How does the proponent address the above concerns of the Health Department? Will the proponent commit to using a 1.0m clean fill to ensure minimal risk to receptor?

Response

Refer Attachment on 0.5 m cover justification.

Question 7.3

The DEP's Contaminated Sites Branch indicated that 0.5m of fill did not appear to be sufficient and that a deeper cover should be considered. The DEP recommended that the advice of the HDWA be sought to determine the most appropriate depth of fill in relation to human health risk associated with the proposed land use. How does the proponent respond to the above concern?

Response

Refer Attachment on 0.5 m cover justification.

The proponent considers a 0.5 m cover to be effective and appropriate.

Question7.4

The DEP's Contaminated Sites Branch indicated that the final PER still only refers to a sub-surface register to detail residual contamination at the site. Memorials should be placed on the Certificates of Title for the property to ensure the transfer of information on residual contamination to any potential purchasers or occupiers of the site. How does the proponent respond to the above concerns?

Response

Memorials on titles will be placed on all land with residual contamination as described in S6.12 of the PER.

Question 7.5

The DEP's Contaminated Sites Branch indicated that clean up to HIL F levels relates to commercial/industrial landuse only. Should redevelopment of the site include residential or community uses (which may be public open space) then HIL-A (residential), HIL-D (high-density residential) or HIL-E (public open space) would be more applicable clean-up levels in the absence of the development of site-specific clean up levels. Where clean-up is to levels other than EIL or HIL-A, which are most sensitive land-use criteria, then the Memorials on the Certificates of Title should state the landuse restrictions, either to commerce/industrial, public open space etc. to prevent inappropriate redevelopment of the site in the future.

How does the proponent respond to the above concerns?

Response

The Health Investigation Level (f) settings have been used in the PER simply to provide an indication of the contamination status of the fill, they are not intended to be used as clean-up levels. The proposed remediation strategy is to cover the waste fill with a warning barrier and a minimum 0.5 m clean soil cover. The soil cover will be clean with no contaminants above the DEP Ecological Investigation Level. There will be no direct contact with contaminated fill.

Question 7.6

The DEP's Contaminated Sites Branch indicated that appears that adequate samples have not been collected to delineate the northern boundary of the contaminated material, however section 5.4.3 of the report indicates that the impacted material will be excavated for bioremediation on-site. It is assumed that following excavation, and prior to infilling of the hole with waste fill as proposed, that validation of the removal of the hydrocarbon contaminated material will occur. Where validation samples indicate contamination, then further excavation would be required. Excavation and validation of the removal of the contaminated material should ensure that all contaminated material is removed, despite the limited sampling points.

How does the proponent respond to the above concerns?

Response

The northern boundary of the hydrocarbon dump has been inferred and drawn as halfway between an impacted and non-impacted sampling location. The exact dimensions of the dump will be determined during the actual clean-up.

A Hydrocarbon Remediation Plan will be developed in consultation with the DEP (PER Commitment #2&3). This will include validation testing of both the walls and base of the excavation in accordance with DEP sampling requirements. The excavation will be backfilled with non-hydrocarbon impacted fill as part of the relocation exercise once validated as removed.

Question 7.7

The preferred remediation option outlined by the proponent includes the reinstatement of the hydrocarbon waste after it is bioremediated. The HDWA considers that it is more appropriate to remove the 5000 m^3 material from the hydrocarbons dump. This will ensure no further contamination to the groundwater in the area and make the management of the site less complicated. This approval is also conditional on Dust and Air Quality Management Plan meeting the requirements of the HDWA.

Response

Once bioremediated the spoil from the hydrocarbon dump will be relocated into the far eastern part of the site. Refer response 4.6.

No remedial works will commence until approval has been granted for all the various management plans and when all the relevant Environmental Conditions have been cleared for the project. The Health Department will be consulted during the preparation of the Dust and Air Quality Management Plan as committed to (PER Commitment #8&9).

Question 7.8

The City of Swan has questioned whether the Hydrocarbon Management Plan would include:

- *a detailed description of the treatment method to be utilised for the remediation of the hydrocarbon dump;*
- *a description of where remediation is to take place on site;*
- *additional details on the proposal to dewater the hydrocarbon dump (including measures to manage contaminated groundwater);*
- *a program to monitor the volatiles being emitted during the remediation of the hydrocarbon impacted soil; and*
- *an outline of the occupational health and safety risks and how they will be minimised or avoided.*

How does the proponent respond to the above concern?

Response

The Hydrocarbon remediation Plan will provide a detailed description of the excavation and treatment method, location of bioremediation site, dewatering and disposal of groundwater. Monitoring of volatile emissions will be provided in the Dust and Air Quality management Plan. Occupational health issues will be outlined in the Occupational Health and Public Safety Plan.

Question 7.9

Section 5.5 of the PER outlines the proposed remediation for the hydrocarbon contaminated soil and stated that:

"It will be necessary to provide a sufficient buffer distance between the bioremediation activities and remedial site work activities due to potential health issues related to volatile vapour emissions"

The Ministry for Planning indicated that more information should be provided to explain what is meant by 'sufficient buffer', i.e. how (and who) will determine and manage a 'sufficient' distance and what are the potential risks to the public and workers on site during remediation and construction. How does the proponent respond to the above concern?

Response

The closest receptor to the proposed bioremediation site is CADCOM at a distance of 250 m to the west. In consultation with the DEP, this distance will be assessed in terms of adequacy as a sufficient buffer. The potential health risk from the bioremediation works is exposure to elevated levels of the volatile compounds: benzene and chlorobenzene.

Air quality outside of the treatment area (50 m downwind) will be monitored for volatile compounds to ensure compliance with occupational standards.

8 ISSUE: COMMUNITY CONSULTATION

Question 8.1

The Ministry for Planning indicated that although the proponent has indicated that the local community will be kept informed of the progress of the remedial works through direct consultation and press release, the proponent should provide further information on the consultation program to address concerns relating to health and safety, environmental impacts and landscape amenity.

Response

The proponent will keep the public informed on the progress of the remediation through direct consultation with interested groups and using reports in local papers. Full details of the consultation strategy will be provided in the Waste Management Plan. This will include a brief summary of monitoring results and measures being used to prevent environmental and human health impacts.

Question 8.2

The mention of the community consultation in the process of this remediation in the PER is acknowledged by the HDWA. In addition, to the PER recommendations the proponent should consider having a local community representative involved in each step of the decision making of the remediation of this site.

Response

The proposed remediation of the site has been developed utilising environmental and engineering expertise. The public has been invited to provide comment through the regulatory review process. The Midland Redevelopment Authority Board (the proponent) includes two elected councillors (including the Mayor) from the City of Swan. The local community has been involved in the decision making of the proposed site remediation.

9 ISSUE: LANDSCAPE

Question 9.1

The City of Swan indicates that a landscape plan should be developed to ensure that plant species native to the area are planted and identified in the Landscape Plan.

Response

Landscaping will be done in a manner that takes in to account the presence of contamination at depth. The advice of landscape architects will be taken in this regard. Landscaping of the site is the responsibility of the developer which is the Police. Selection of species and any

Landscape Plan is outside the scope of the PER which is remediation of the site. However such a plan will be developed and the input of the relevant authorities will be sought.

10 ISSUE: EMS

Question 10.1

The City of Swan indicates that although the PER indicates that an Environmental Management System will be established, further clarity should be provided as to the preparation and management of the EMS. This includes the issues of :

Appointing an Environmental Supervisor in order to:

(1) assist the preparation and administration of the EMS and management plans

(2) progress and update the EMS and Management Plans as required;

(3) control activities on-site;

(4) undertake the monitoring programmes during and after site remediation;

(5) document and assess all data collected;

(6) regularly report to the appropriate authorities (including the City of Swan) on the progress of the EMS; and

(7) manage impacts in consultation with the appropriate authorities.

How does the proponent respond to the above concern?

Response

The proponent acknowledges that the EMS will need to include the items described in the question posed. The EMS will be prepared by a suitably qualified environmental professional. The EMS would be developed post remediation prior to occupation by the Police. Either the proponent or the Police will be responsible for preparing the EMS.

Question 10.2

The SRT and WRC have indicated that as the embankment is fairly steep ranging between 0.5m-7m, engineering assessment of its stability and a remediation strategy is required to minimise potential embankment collapse and transportation of contaminants to the Helena River. How does the proponent respond to the above concern?

Response

The depth of fill ranges from 0.5 m up to 7 m with current embankment heights ranging up to 6 m in parts. The finished embankment heights will be almost all around 4 m on a 1 in 3 slope. Civil engineers have designed the embankments to be stable.

11 ISSUE: SOLID WASTE MANAGEMENT

Question 11.1

The City of Swan has indicated that the PER does not address the management of solid wastes produced on site, and recommends that "collection points" be established for contaminated equipment and waste materials. How does the proponent respond to the above concern?

Response

The remediation contractor will be required to remove any contaminated material or general refuse generated during the remedial works. The proponent notes the recommendation with regard to collection points and will forward it on to the contractor for inclusion.

Question 11.2

The Ministry for Planning indicated that there is some uncertainty whether the proposed volume of waste fill for relocation can be accommodated on site. There is a possibility that excess waste fill will need to be transported offsite to a landfill facility. The proponent should clarify whether offsite cartage to a landfill will occur, and if so, provide more information on the proposed landfill facility and route of truck movements.

The PER proposes that a Waste Management Plan will be provided prior to tendering of the remedial works. Will details of the above issues be addressed in this Plan. How does the proponent respond to the above concern?

Response

The proposed remediation is the partial removal of fill from the western end in order to accommodate a clean cover to allow development. There is no potential for a "blow-out" in volumes as the exercise is to shift a given amount of fill. Removal of fill off-site is unlikely but has been included as an option should the bioremediation of the hydrocarbon dump spoil not be effective or if additional service trenches are installed, or if more clean ground in Area D is to be recovered. The off-site transport route would use the major arterial road network.

The proponent reaffirms the commitment to supply the Waste Management Plan to tenderers so that they contractors are made fully aware of the requirements of the remediation program. The potential for off-site disposal will be included.

12 ISSUE: LANDUSE PLANNING

Question 12.1

The Ministry for Planning indicated that although the proponent has suggested that Area D be used for commercial land use, there are no firm development proposals for this area. Further information (if only conceptual in nature) should be provided in terms of anticipated future uses in relation to the MRA concept plan for the area to provide a land use context for the proposal. How does the proponent respond to the above concern?

Response

Area D according to the draft MRA Concept Plan is to be used for commercial buildings and extensive car parking. Residential use is not proposed.

Question 12.2

The Ministry for Planning indicated that in addition to the information provided on nearby existing land uses and features in the area in section 2.3 "Surrounding Landuses", the proponent should have also provided information about the regional context of the proposal and local sensitive receptors, as required by the EPA environmental review guidelines.

The "Redevelopment Scheme" for the subject area is mentioned in Table 1. However, information about planning for the area should be clarified and expanded i.e. the PER falls short of describing how the proposed facility will relate to or complement planned land uses for the area. Although Figure 3 provides a portion of the MRA concept plan, an additional plan could show the broader area and regional connections. Also, this section refers to the nearest residential zoning (300 m) and this should be shown on a zoning map. Nearby employment areas should be mapped more clearly – Figure 1 is inadequate in this regard.

How does the proponent respond to the above issues and concerns?

Response

The proponent has identified all nearby sensitive receptors and land uses in general. The proposal is to remediate land.

Planning issues for the Midland Redevelopment Area will be addressed in Scheme text for the Clayton Street Precinct. This scheme text has been referred to the DEP as required by the Act under which the Authority operates.

The proponent notes the comment regarding inclusion of existing nearby residential and commercial areas onto Figure 1.

13 ISSUE: LANDFORM AND REHABILITATION

Question 13.1

The Ministry for Planning indicated that the information/mapping about the proposed contour and landscaping details for Areas B, C1, C2 and D should be expanded to show the proposed final form of the subject land. How does the proponent respond to the above concern?

Response

The final landform of the site following remediation is conceptualised in Figure 9 of the PER. Final levels are subject to refinement and will be presented in the Waste Management Plan. Landscaping is conceptualised on Figure 3 of the PER. The Police will be responsible for the final landscape design.

14 ISSUE: IRRIGATION PLAN

Question 14.1

The Ministry for Planning indicated that long term irrigation of the site has the potential to accelerate leaching. The proponent indicates that an Irrigation Management Plan is proposed to be prepared in consultation with the Police. The proponent should indicate which agencies will be consulted and who this plan will be submitted to for advice. How does the proponent respond to the above concern?

Response

The Irrigation Plan represents PER commitments #12 and 13 and will be prepared in consultation with the WRC.

15 ISSUE: OTHER

Question 15.1

The Ministry for Planning indicated that Area A already has environmental approval (section 2.2). Area A should be defined or mapped and information about the 'environmental approval' should be provided to place the remainder of the development in context. How does the proponent respond to the above concern?

Response

The proponent notes the comment and will provide this information to the DEP for the Bulletin.

Question 15.2

Section 6.13.2 does not address public amenity as indicated in page x of the PER. Instead this section relates to Animal Waste Management and the PER should address this oversight.

Response

The proponent notes the comment which should be S6.13.3.