



29/05/2015

QB10706

Desktop Contamination Assessment – Singleton Railway Underpass

1. Introduction

Jacobs Group (Australia) Pty Ltd (Jacobs) has been commissioned to undertake a desktop contamination assessment for the upgrade of the New England Highway Singleton Railway Underpass, Singleton NSW (herein after referred to as the site).

The objectives of the desktop contamination assessment were to assess potential areas of environmental concern (with respect of contamination) to support the Review of Environmental Factors (REF) for the proposed upgrade of the underpass.

The potential for contamination has been considered in context of historical and current activities/operations likely to have been undertaken on and/or adjoining the site and assessed with respect to contamination source, migration pathway and receptor relationships by development of a preliminary risk assessment (PRA). The PRA provides a matrix where contamination potential/risk can be quantified through intrusive investigations (should risks be identified).

The contamination risks have only been assessed in context of potential exposure to workers of other site users during construction activities which will include excavation or a degree of ground disturbance.

2. Historical Landuse

Current and historical activities/operations likely to have been undertaken on and/or adjoining the site has been assessed by reviewing the following available information sources:

- NSW EPA contaminated land database
- Singleton U0995-8 Orthophoto Map 1:4000 Series (aerial imagery dates 2 February 1979)
- Google Earth imagery.

2.1 Imagery Review

Imagery from the Singleton U0995-8 1:4000 Orthophoto Map and Google Earth were examined to assess current and historical activities/operations likely to have been undertaken on and/or adjoining the site. The findings of the imagery review are presented in **Table 2.1**.

Table 2.1: Imagery Review

Date of imagery	Subject site	Surrounding area
1979	The site appears as the current underpass.	The surrounding area comprises road and railways corridor extending into areas of recreational open space (Gowrie Park) and low density residential to north east and rural/residential properties regionally. The current suburb Darlington (to the south east of the site), golf course and caravan park (to the west of the site) are yet to be constructed. A Department of Main Roads (former Roads and Maritime Services) office is located approximately 0.5 km to the west of the site. Some minor land disturbance is apparent to the south east and west of the site.
2015	The site appears as the current underpass.	The surrounding area comprises road and railways corridor extending into areas of recreational open space (Gowrie Park and golf course), low density residential and rural/residential properties.

2.2 NSW EPA Database

At the time of preparing this report, a search of the NSW EPA Contaminated Sites Register and Record of Notices (under Section 58 of the Contaminated Land Management Act 1997) indicated that there were no sites registered to the NSW EPA within one kilometre of the site that were either regulated or had been notified.

A search of the Protection of the Environment Operations Act 1997 public register showed that no licences and no notices are on record for properties or operations carried out within and/or next to the study area. The nearest licenced operations (asphalt plant) was located approximately 900 metres south east of the proposal area. The license was surrendered in 2002.

2.3 Potential Contamination Sources

Based on the information reviewed, historical and current land uses undertaken on and/or adjacent to the site which could have caused potential contamination of the site include:

- Agricultural land use – Agricultural activities may have been undertaken historically on and/or surrounding the site
- Railway abutments – Potential use of fill of unknown quality during the construction of the existing railway bridges
- Bridge Structure: Degradation of structure materials and surfaces, pesticide treatment of wooden structures (where present)
- Railway Corridor: Degradation of the surfaces of structures, pesticide treatment of railway sleepers, spills/leaks/emissions from rolling stock, and coal.
- Road Corridor: Degradation of road surfaces, spills/leaks from vehicles, exhaust particulates.

The current surrounding land uses including open space and residential development are unlikely to represent a significant contamination source (if any) to the site.

3. Preliminary Risk Assessment

The Preliminary Risk Assessment (PRA) provides a qualitative (Level 1) risk assessment based on identifying potential contaminant sources–pathways-receptor linkages.

The PRA has been developed in general accordance with the requirements for a qualitative risk assessment as outlined in AS/NZS 4360:2004 *Risk Management Guidelines* and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (as revised 2013) guidelines.

3.1 Conceptual Site Contamination Model

The following conceptual site model (CSM) has been developed to outline potential contamination source/pathway/receptor relationships which may be present at the site. If any of the above relationship items do not exist, then there is no risk. The CSM is outlined in **Table 3.1**.

Table 3.1: Conceptual Site Contamination Model

Source	Contaminant	Distribution	Exposure	Receptor
Historical agricultural land use	Heavy metals, pesticides	Shallow soils	INH, DER, ING	Construction workers and site users
Degradation of painted surfaces	Paint – heavy metals namely lead.	Shallow soils in the vicinity of structures	INH, DER, ING	Construction workers and site users
Pesticide treatment of wooden structures	Pesticides, hydrocarbons, heavy metals	Shallow soils in the vicinity of wooden structures	INH, DER, ING	Construction workers and site users
Railway sleepers	Pesticides, hydrocarbons, heavy metals	Shallow soils in the vicinity of sleepers	INH, DER, ING	Construction workers and site users
Spill and leaks from trains, coal dust	Hydrocarbons	Shallow soils in the rail corridor	INH, DER, ING	Construction workers and site users
Brake pads	Asbestos	Shallow soils in the rail corridor	INH	Construction workers and site users
Spill and leaks from vehicles	Hydrocarbons	Shallow soils in the vicinity of the road verge	INH, DER, ING	Construction workers and site users
Degradation of road surfaces	Hydrocarbons – mainly PAHs from asphalt	Shallow soils in the vicinity of the road verge	INH, DER, ING	Construction workers and site users
Exhaust particulates	Heavy metals and hydrocarbons (PAHs)	Shallow soils in the vicinity of the road verge	INH, DER, ING	Construction workers and site users

Notes

INH - Outdoor inhalation of soil/dust particulates
 DER - Dermal contact with soil/dust
 ING - Incidental ingestion of dust particulates
 PAH – Polycyclic Aromatic Hydrocarbons

3.2 Risk Assessment

The following provides a preliminary risk assessment (qualitative risk assessment) for human receptors associated with potential contamination from the site and adjoining areas as detailed in the conceptual site model. The risk assessment has included a consideration of the sources of risk, negative consequences and the likelihood that those consequences may occur with the resulting risk analysed by combining consequences and their likelihood.

The process for the assessment of consequence, likelihood and associated risk levels are provided in **Tables 3.2, 3.3 and 3.4** below with the risk ranking detailed in **Table 3.5**.

Table 3.2: Consequence Scale

Level	Descriptor	Consequence on Health
5	Severe	Single fatality or permanent disability.
4	Major	Chronic health issues.
3	Moderate	Short to medium term health issues.
2	Minor	Minor short term health effects.
1	Negligible	No measurable health effects.

Table 3.3: Likelihood Scale

Level	Descriptor	Description	Frequency
A	Almost Certain	Frequent occurrence	Daily
B	Likely	Regular occurrence	Weekly
C	Possible	Random occurrence	Monthly/Yearly
D	Unlikely	Unlikely occurrence	Yearly
E	Rare	Almost impossible	Once every 100 years

Table 3.4: Risk Matrix

Likelihood Level	Consequence Level				
	1	2	3	4	5
A	Moderate	High	High	Very High	Very High
B	Moderate	Moderate	High	High	Very High
C	Low	Moderate	High	High	High
D	Low	Low	Moderate	Moderate	High
E	Low	Low	Moderate	Moderate	High

Table 3.5: Risk Ranking

Source	Exposure Pathways	Receptors to Contamination	Consequence	Likelihood	Risk Ranking
Soils contaminated by historical agricultural land use	INH, DER, ING	Construction workers and site users	Minor (2)	Unlikely (D)	Low
Soils contaminated by degradation of painted surfaces	INH, DER, ING	Construction workers and site users	Moderate (3)	Unlikely (D)	Moderate
Soils contaminated by pesticide treatment of wooden structures	INH, DER, ING	Construction workers and site users	Minor (2)	Unlikely (D)	Low
Soils contaminated by railway sleepers	INH, DER, ING	Construction workers and site users	Moderate (3)	Unlikely (D)	Moderate
Soils contaminated by spills and leaks from trains and coal dust	INH, DER, ING	Construction workers and site users	Moderate (3)	Unlikely (D)	Moderate
Soils contaminated by asbestos from brake pads	INH	Construction workers and site users	Moderate (3)	Unlikely (D)	Moderate
Soils contaminated by spills and leaks from vehicles	INH, DER, ING	Construction workers and site users	Minor (2)	Unlikely (D)	Low
Soils contaminated by degradation of road surfaces	INH, DER, ING	Construction workers and site users	Minor (2)	Unlikely (D)	Low
Soils contaminated by exhaust particulates	INH, DER, ING	Construction workers and site users	Minor (2)	Unlikely (D)	Low

3.3 Risk to Human Health

There are no very high to high perceived risks to human health from any of the potential contamination sources from the site or adjoining areas. Moderate perceived risk to human health exists for the following receptors:

- **Moderate Risk** – Construction workers and site users to contaminant residues adjacent to underpass structures, railway sleepers, spills and leaks and asbestos fibres from trains. The moderate risk is associated with these contaminants likely to more localised and sporadic than the low risk items detailed above which are likely to be more diffuse in nature.

It was considered that the risk of exposure to potential contamination from other potential sources detailed in **Table 3.5** was low because:

- The contamination if present associated with agricultural activities is likely to be very diffuse in nature for example for broad acre pesticide application (ie. low concentrations across large areas rather than high concentrations across smaller areas).
- It is unlikely that significant wooden structures are present within the railway overpass.
- It is unlikely that the traffic flow within this section of the New England Highway would be significantly “stop start”. Therefore, higher contamination potential from “stop start” traffic (associated with vehicles constantly breaking and sitting in traffic whilst running) is not expected in this area.
- Contamination from degradation of road surfaces (ie. asphalt) is likely to be bound in the matrix of the materials and unlikely to be readily available to human health and environmental receptors.

4. Conclusion and Recommendations

Jacobs have undertaken a desktop contamination assessment for the proposed upgrade of the New England Single Railway Underpass.

Based on the understanding of historical and current land use of the site, a number of potential contamination sources have been identified which could pose an exposure to workers or other site users during construction activities. These include:

- Moderate Risk – Construction workers and site users to contaminant residues adjacent to underpass structures, railway sleepers, spills and leaks and asbestos fibres from trains.
- Low Risk - Construction workers and site users to contamination associated with possible historical agricultural and road corridor use.

To quantify these potential risks, it is recommended that samples are collected from surface soils in the vicinity of the proposal and analysed for the contaminants of concern, as part of a Contamination Assessment. The assessment would be completed during the detailed design phase to determine if the proposal triggers any requirements to carry out any site remediation.

5. Closure

Should you require any further information, please do not hesitate to contact the undersigned on (02) 9032 1467.

Regards,

Michael Stacey
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