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Licensed for:  
Friable & Bonded Asbestos  
Unrestricted Demolition

## REMEDIATION CONTRACTOR PEER REVIEW REPORT

### SITE REMEDIATION WORKS

181 JAMES RUSE DRIVE, CAMELLIA, NSW

12<sup>TH</sup> DECEMBER 2014

12<sup>TH</sup> December 2014

Moran Corporation P/L  
C/o Statewide Planning P/L  
7 Charles Street  
Parramatta NSW 2150

Attention: Mr Rusty Moran

**RE: REMEDIATION CONTRACTOR PEER REVIEW REPORT, SITE REMEDIATION WORKS, 181 JAMES RUSE DRIVE, CAMELLIA, NSW**

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RMA Contracting P/L T/As RMA Group presents below remediation contractor peer review report on the proposed methodology and work method statements to undertake site remediation works at 181 James Ruse Drive, Camellia, NSW.

We consider that there has been adequate site contamination characterisation, including sampling, analysis and reporting of key chemical of concern identified at the site. RMA senior remediation and asbestos management team have carried out a general review of the project documentation to come to our conclusion and present the contractor peer review letter report attached herein following the covering letter.

Due to the current level of public awareness on this particular site, being formerly owned and operated for manufacturing (using asbestos containing materials) purposes by James Hardie, the current "Bad Press" with regards to James Hardie and this particular site, and also the increase in the incidence of Asbestos related illness throughout Australia and the World in recent years, (which is on the rise over the next 10 or more years due to the latency period of the development of asbestos related disease's), we wish to make the following general comments.

We are in general agreement that this particular site has significant asbestos and other ground contamination issues. As the site stands undisturbed in its present form, it poses a negligible airborne asbestos related health risk as long as the ground remains undisturbed. We are also in general agreement, that this is a prime piece of significant development land, which has been dormant for many years and it would be in all our and the communities interests to have this site made safe from asbestos and any other environmental contamination issues currently identified below the ground surface.

We support the developer Statewide Planning, for taking on such a site, and also for looking at all the responsible measures to ensure the safety of all people who may now, during remediation works and into the future, come into contact with the site.

This particular site over the years, has generated some serious social, emotional and at times emotive circumstances. To the point now, that to remediate the site from its current form will be under very strict surveillance and scrutiny from members of the public, government utilities, unions and concerned health organisations. Particularly, from asbestos related associations whom are or have been taking on corporations, with regards to the asbestos industry and its past and present corporate environmental practices.

With regards to future remediation works at the site, it is recognised that there will be extensive media press and public interest, throughout the process, until the site is deemed "Safe" for normal construction activities to proceed and unprotected personnel / people to safely occupy the site.

Due to the additional public interest at the site, any remediation methods adopted, even though safe, and in general accordance with all NSW and other relevant regulatory requirements and codes of practice, will often come into some form of scrutiny or possibly be criticised.

The commencement of pilot trials and subsequent full scale remediation works at the site in the future, will draw attention to the media and the public. Potentially the developer and its representatives, the principal remediation contractor executing the works and others associated, may be the target of such scrutiny. That is the unfortunate situation, particularly with regards to the Asbestos Industry, even though the Asbestos Removal Contractor is there to rectify "Wrongs of the Past", by rectifying the asbestos contaminated issue, as soon as for example safety signage is erected on site, as required by law, attention is immediately drawn to the site and at times emotional and emotive issues take over. This needs to be taken into consideration by all parties involved on this project.



We wish to emphasise that at all times RMA Contracting takes on a "No Exposure is the Best Exposure" philosophy and endeavours to not only comply, but exceed any legislative requirements, with strict adherence to best Occupational Health and Safety standards on a national and international level.

As far as we are concerned, our organisation would use our standard accepted methods of work. These methods are accepted by Work Cover NSW and other related legislators in a general accordance with all the required standards. RMA Contracting would use our standard Accredited Quality Management and Health and Safety Systems as well as our standard RMA Contracting policies and procedures.

Taking the above into account with regards to management of the remediation works at the Camellia Site, if RMA were selected as principal remediation contractor, we would aim to ensure a clear communication path is maintained with all key stakeholders including the wider general community and always take on a proactive approach to protecting the health and safety of the general public as well as all the workers at the site. We would ensure at all times that we demonstrate that the methods adopted to remediate the site are appropriate and that no individual is exposed to an unacceptable risk of to any form of contaminant identified at the site.

We trust that we have satisfied your requirements at this stage, if you require any further clarification on the peer review information presented herein, please do not hesitate to contact the undersigned.

A handwritten signature in black ink, appearing to read 'Miguel Canas'.

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## 1. Introduction

This Remediation Contractor Peer Review Report has been prepared by RMA Contracting Pty Ltd (RMA) for Moran Corporation P / L on behalf of Statewide Planning P / L (Statewide).

Moran Corporation commissioned RMA to undertake an expert remediation contractor peer review on methodologies and work method statements prepared for the proposed remediation works to be conducted at 181 James Ruse Drive, Camellia, NSW (the site). The site has a total area of 6.97 hectares (Ha) (69,700 m<sup>2</sup>) and can be defined as the western portion of the former James Hardie Pty Ltd (JH) manufacturing property, to the west of the Clyde to Carlingford Railway.

It is understood that Statewide propose to redevelop the site for mixed land use comprising of commercial and residential apartments with basement car parking, subject to planning approval. The overall goal of remediation is to make the site suitable for the proposed land use, such that adverse health risks to future site users and the environment are mitigated and controlled in the long term.

Based on the Remedial Action Plan prepared by URS for the site, it is understood that the preferred remedial approaches are:

- Internment of fill that consists of asbestos, ash fill and clinker material within three, purpose-built, concrete containment cells that will be integrated with the proposed site redevelopment infrastructure; and
- Bioremediation of hydrocarbon-impacted soils utilising biopiling or landfarming technologies, after which the soils are to be beneficially reused onsite, or buried within the containment cells.

If space is available in the containment cells, then other fill materials may also be contained. The total estimated volume of fill materials onsite is 89,000 m<sup>3</sup> as defined in the URS RAP.

## 2. General Scope of Works

Moran Corporation engaged RMA to undertake the following scope of works as part of the contractor peer review process:

- Review existing site information comprising the following key documentation:
  - EPA Letter to Parramatta Council dated 09/07/14 (Doc Ref: 14/107383)
  - EPA Letter to Parramatta Council dated 25/08/14 (Doc Ref: 14/139332-05)
  - Environmental Strategies, Site Audit Report, 181 James Ruse Drive Camellia;
  - URS Remedial Action Plan (RAP), Main Site, 181 James Ruse Drive Camellia;
  - URS Remedial Action Plan (RAP), Foreshore Area, 181 James Ruse Drive Camellia;
  - URS Waste Management Plan, 181 James Ruse Drive Camellia;
  - URS Soil & Water Management Plan, 181 James Ruse Drive Camellia;
  - Cumberland Ecology, Riverbank Management Plan, 181 James Ruse Drive Camellia; and
  - Benbow Environmental, Asbestos Safe Work Method Statements, 181 James Ruse Drive Camellia dated Sept 2013;
- Review of the proposed project methodologies contained in the *Benbow Environmental, Asbestos Safe Work Method Statements, 181 James Ruse Drive Camellia Draft Revision A* dated Nov 2014; and
- Make recommendations / changes to the project methodologies and work method statements based on execution of the works by RMA in the role of principal remediation contractor.

### 3. Methodology Peer Review Summary

Based on RMA's extensive previous experience with management and removal of friable asbestos materials, the likelihood of failure of controls and release of fibres is considered low providing the generally accepted industry standard controls are implemented.

The generally accepted industry standard controls for large scale asbestos remediation are:

- Combined application of regular water mist sprays to keep remediation areas moist;
- Controlled staged excavation works;
- Establish appropriate decontamination process / facilities, including wet decontamination for friable asbestos removal work;
- Avoid cross contamination issues during remediation works;
- Establish exclusion zones around contaminated zone work areas;
- Use of appropriate PPE for personnel working within asbestos removal exclusion zones and in the general site work area;
- Undertake daily asbestos air monitoring by NSW licensed asbestos assessor;
- Use of an environmental enclosure under nominal negative air pressure (as a secondary safeguard measure);
- Transport & disposal of surplus contaminated materials to follow regulatory waste disposal legislation including use of EPA licensed transport vehicles and disposal of waste to landfill licensed to accept the specific waste type.

These controls should be considered key requirements in an effective asbestos management strategy for the Camellia Site.

RMA consider that overall the proposed asbestos management methodology requires simplification and general alignment with these accepted industry standards. The list below is not intended to be an exhaustive list, moreover, highlights key items which warrant further discussion and are the subject of this peer review letter.

- The wind mitigation device is untested and should be abandoned;
- The extent of water application proposed is considered generally excessive and contradicts general work practices. Surface saturation increase the likelihood of contaminated water movement across the site;
- If using an enclosure, automated misting nozzles could be set up on the roof of the enclosure and hand held mist sprays operated at ground level directly over the removal and encapsulation areas;
- Maintaining moist conditions during excavation, stockpiling, loading and placement process is the key to mitigating release of airborne dust / asbestos fibres;
- Foams are considered an unnecessary measure if an enclosure is adopted; and
- The level of environmental monitoring proposed (using TEM) is considered an unnecessary expensive measure.

RMA's comments and recommendations of the draft methodologies are detailed in subsequent sections below. It is noted that a final version of the proposed work method statement / methodologies will be appended to the EIS document for submission to relevant approval authorities.



## 4. Peer Review Issue Analysis

### Review of General Methods

RMA present below a summary of the general issues identified in the methodologies and work method statements presented in the AWMS. The identified issues, RMA comments and RMA recommendations are presented below.

**Issue:** *"Wind Mitigating Devices (WMD)"*

**Comments:** RMA have some reservations relating to the effectiveness and general suitability of the proposed WMD for an asbestos remediation project of this nature in an outdoor tidal / estuarine setting subject to frequent high wind episodes.

A more robust approach would involve the use of a mobile environmental enclosure fitted with dust and odour control extraction system.

RMA provide a general recommendations / comments summary below in relation to the proposed Benbow Environmental WMD:

- The proposed WMD structure has not been previously applied to an asbestos removal application of this scale;
- RMA have reservations on the practicality of moving the WMD structure (either one or two sides) around the site in a cost effective manner without causing significant disruption to overall progress of works on site. An alternative option involving the use of a mobile enclosure, although it would attract a higher setup cost, would be easier to move across the site between the various excavation cells / stages using conventional earthmoving equipment already on site (example 40 tonne excavator);
- The alternative mobile enclosure would be used for dust, asbestos and odour control via the integrated extraction system, this would also aid as an effective visual barrier to the general community (i.e. enhance public perception);
- The WMD structure proposed could potentially contribute to a wind tunnel effect, locally increasing wind velocities surrounding the removal area, this may have a negative effect on the efficacy of dust management controls;
- The height of the proposed WMD structure (approx. 8m) and structural support needs to be engineered (i.e. involve erection of bracing or propping supports on sides) to mitigate collapse during high wind periods. Internal support adjacent to open excavations will be difficult to achieve;
- The intensity of wetting / foaming agents / devices needs further consideration. RMA consider that there is currently excessive emphasis placed on saturation of the removal and containment cell areas. This is exemplified by the proposed multi-level water spray and foam system. It's considered that based on RMAs extensive asbestos removal / management experience, an overhead automated mist sprays system mounted on the enclosure roof (if an environmental enclosure is adopted) and direct hand held misting sprays from the ground surface over the removal area and containment cell area would be adequate in controlling the release of asbestos fibres / dust. The efficacy of the management controls would be verified by daily asbestos air monitoring;
- Saturation of material should be avoided at all times where possible to minimise the generation of contaminated runoff and subsequent treatment / management of contaminated water.

**Recommendation:** The use of a WMD should be abandoned.

**Issue:** ***"Saturation of the entire body of the friable asbestos using water injection"***

**Comments:** Saturation should be avoided where possible due to the potential to generate excess contaminated runoff / water which will require treatment / management on site.

**Recommendation:** Avoid water saturation. Mist spray devices are sufficient to keep the contaminated material moist.

**Issue:** ***"Possible use of an enclosure placed under negative pressure and exhausting the air through a HEPA filter"***

**Comments:** An enclosure should be used for excavation of the entire site in small work cells. Enclosures would be established over remediation and entombment / containment cell areas. The extraction system will be suitable for comingled contamination including asbestos and hydrocarbon impacted materials. HEPA filters will also make up the filter matrix.

The enclosure dimensions for full scale remediation works would be in the order of 30m L x 20m W x 10m H and be a mobile system to enable efficient relocation on site using conventional earthmoving equipment between remediation stages / excavation cells. The enclosure design is yet to be finalised and will be dependent on the outcome of the pilot trial investigation work.

**Recommendation:** RMA suggest establish & commission an environmental enclosure equipped with dust and odour extraction system operating under nominal negative air conditions.

**Issue:** ***"Saturation during excavation of disturbed surfaces"***

**Comments:** RMA suggest the preferred control to mitigate potential dust / fibre release should be the use of combination of automated overhead misting system and standard hand held ground operated water mist sprays which will be regularly applied to the removal area particularly during times of excavation or "breaking ground" and loading of trucks which have the highest potential for dust / fibre release. Emphasis will be on maintaining moisture in the material and avoiding where possible saturation of work area and contaminated materials.

**Recommendation:** Adopt a combination of automated overhead misting system and regular hand held ground operated water mist sprays.

**Issue:** ***"Initial stockpile of ACM during construction of Containment Cell 1"***

**Comments:** The excavation of the southern half of Containment Cell 1 would initially require the shallow ACM to be excavated to a depth of 0.7m, which would be stockpiled on the surface of the site of the Northern end of Cell 1.

RMA suggest that excavation of this material should be undertaken within an environmental enclosure fitted with dust extraction system as detailed above. Stockpiling of materials may require placement of material on hardstand area outside the environmental enclosure.

The stockpiled material will be kept moist with the aid of water sprays and be temporarily covered with weather proof tarpaulins. Following construction of the cell, it will be loaded and transported into the cell area for subsequent burial / encapsulation.

**Recommendation:** Initial excavation of the overlying ACM at the site of Containment Cell 1 should be undertaken within an enclosure. Initial stockpiling should be outside the enclosure covered with tarpaulins. An added measure of containment can be considered in the form of an additional enclosure to facilitate stockpiling of contaminated materials from excavation areas and stockpiling directly into another enclosure. Transported loads of contaminated materials would be covered during transit between enclosures.

**Issue:** **"Parramatta River Boundary"**

**Comments:** RMA note reference to the following *"a 600sqm tent over a tidal waterway has not been undertaken in Australia, and as far as our research has revealed, nor anywhere else in the world. As such, the technology for such an enclosure has not been created nor tested. Thus it would not be used along the foreshore"*.

RMA concur that the use of a mobile or fixed enclosure structure over the embankment area will not be practically feasible given the steep terrain / topography of the area. Therefore, the general asbestos management controls proposed for dust control during excavation works within the enclosure are also proposed to be applied to the embankment area.

The degree of water misting sprays may need to be upgraded incrementally given the work will be conducted in an open exposed outdoor area. Tools down periods may also be implemented during adverse weather conditions such as strong winds and periods of heavy rain.

**Recommendation:** The embankment earthworks should be completed in a controlled manner and be divided into a series of stages (nominally 30m sections). The length of each section is designed to limit the amount of removal work to a manageable size that can be practically completed in one day and placed into the containment cell area.

This strategy aims to minimise the surface area of potentially exposed cut ground surfaces of contaminated material. The exposed surfaces will be reinstated with imported clean material (such as rip rap rock or similar) to stabilize the remediated section of embankment before progressing to the next section. The process will be replicated several times until the entire length of the embankment has been remediated and reinstated.

Temporary exposed ground surfaces will be kept moist and covered with a physical barrier (geofabric material) overnight or while awaiting validation of areas prior to reinstatement.

**Issue:** **"Foam Investigation"**

**Comments:** RMA consider that the use of foaming agents for asbestos fibre dust control is an unprecedented additive for dust control. Based on the product overview and data presented below on the foaming agents, although considered a low likelihood, there is potential for environmental and human health degradation / harm resulting from the use of these foaming agents.

The use of conventional water misting sprays for dust control is considered by standard industry and regulatory bodies as acceptable asbestos fibre / dust control methods. These conventional methods are sound and effective in the control of asbestos fibres / dust and has been demonstrated on a number of similar scale asbestos projects in Australia and Internationally. Introduction of additional foaming agents is generally over complicating the asbestos fibre / dust control methodology.

There are also very few and limited similar project examples of where these foaming agents have been successfully applied in the Australian market for asbestos fibre dust control.

**Recommendation:** The use of foaming agents should be abandoned from the ASWMS and project methodology for asbestos fibre / dust control.

**Issue:** ***"Enclosure Investigation"***

**Comments:** RMA consider that the use of an environmental enclosure fitted with an odour and dust control extraction system under nominal negative pressure should not be flatly ruled out at this stage. As discussed previously, the EPA and general community will have difficulty accepting that the remedial works will be conducted using wet methods only and without an enclosure.

The nature and type of the asbestos waste (predominantly friable asbestos waste in the form of fibre cement sheeting, pipe and sludge residues) and large volume present on site is unprecedented and similar project examples in Australia are not known at this stage.

An enclosure occupying the entire site area is clearly not a practical asbestos dust control solution given the large site area in excess of 6 ha. However, a mobile enclosure and extraction system provides for a flexible and practical setup on site enabling completion of excavation and entombment of the waste in onsite containment cells using a staged remediation approach concurrent with the nominated mobile enclosure design dimensions

**Recommendation:** The use of two or more mobile enclosures fitted with an odour and dust control HEPA Filtration extraction system under nominal negative pressure should be incorporated in the remediation design.

## **Review of Proposed Work Methods for Camellia**

**Issue:** ***"Prior to excavation, holes would be drilled into the concrete using drill rigs filled with dust capture and HEPA air filtration. The holes would be flooded with water to saturate the subsoil"***

**Comments:** RMA consider this in an onerous and overly conservative approach to asbestos fibre / dust control below the subsurface. Currently, there are no other known examples involving asbestos waste removal below the subsurface where this approach has been undertaken. Saturation of the subsurface in this manner would introduce a contaminated water issue which would require subsequent treatment / management during the excavation process.

**Recommendation:** Abandon the saturation approach. Once again, emphasis should be on maintaining moist material conditions via use of water mist sprays and avoid saturation of materials where possible.

**Issue:** ***"Prior to excavation concrete slabs would be numbered, then cut into manoeuvrable pieces within the wind mitigating device, lifted and washed down."***

**Comments:** RMA suggest removal of concrete using conventional methods (combination of ripper, bucket and hammer attachment on excavator) plus use of wet mist spray methods, emphasis again on keeping concrete moist during removal process rather than excessive saturation.

Observation of presence of asbestos debris / fragments on underside of concrete pavement should be undertaken. If loose fragments are observed, concrete may be washed down and then validated for recycling purposes. If asbestos materials are embedded in concrete (i.e. used as formwork etc.) concrete will either require burial in containment cell or offsite disposal to landfill as asbestos waste.

**Recommendation:** Removal of concrete using conventional methods (combination of ripper, bucket and hammer attachment on excavator) plus use of wet mist spray methods.

**Issue:** *"The Occupational Hygienist would examine the surface of the slab and require more washing down until the surface is clean of any asbestos fibres."*

**Comments:** RMA suggest omission of the washing process as it's considered overly conservative and excessive and will result in generation of contaminated water requiring treatment / management. Verification that the concrete is free of asbestos fibres by swab sampling dust on surface is agreed to and recommended.

**Recommendation:** Concrete should be lifted under moist conditions and visually inspected.

**Issue:** *"The concrete slab would be removed once given the clearance. It would be removed to a designated clean area to await recycling on or off site."*

**Comments:** RMA agree with this comment.

**Recommendation:** Maintain this method.

**Issue:** *"Prior to the first removal of the sub surface, it would be saturated until a layer of water with wetting agent rests on the upper surface."*

**Comments:** RMA suggest that emphasis should be on maintaining the removal area moist with the aid of water sprays rather than saturation of subsurface and generation of contaminated water runoff requiring subsequent treatment / management.

**Recommendation:** Abandon saturation method.

**Issue:** *"As the bucket of the excavator breaks the surface of the ACM, a dust foam suppressant would be applied to envelope the disturbed surface in foam."*

**Comments:** RMA consider that the use of foaming agents is unprecedented in asbestos removal / management activities and is not warranted / required.

**Recommendation:** Abandon use of foams method.

**Issue:** *"The application of foam would continue under the surface of ACM that is exposed."*

**Comments:** RMA consider that the use of foaming agents is unprecedented in asbestos removal / management activities and is not warranted / required.

**Recommendation:** Abandon use of foams method.

**Issue:** *"The excavator once full would then be covered with the foam. The use of water sprays would be undertaken regularly through the excavation, stockpiling and loading operations."*

**Comments:** RMA consider that the primary objective is to maintain a moist surface within the excavation, during stockpiling and loading of asbestos waste.

**Recommendation:** Saturation of materials should be avoided where possible.

**Issue:** *"The bucket would then be emptied into the dump truck. Water fogging would occur over the body of the dump truck during this step. These steps would be completed until the dump truck is full."*

**Comments:** RMA are in general agreement with this statement.

**Recommendation:** Maintain this method.

**Issue:** *"The wheels of the dump truck and the sides of the body would be washed down before the truck leaves the end of the wind mitigating device..."*

**Comments:** RMA considers that the requirement to decontaminate equipment bodies during the excavation and entombment process is not justified and overly conservative. It may also imply that the equipment working in close proximity to the asbestos waste will be contaminated with asbestos fibres.

The objective of the water misting sprays is to keep the source removal area moist at all times and mitigate the potential for release of airborne asbestos fibres to a negligible level. The dust extraction system and nominal negative air setup will also maintain air quality within the enclosure. Water sprays will be applied during excavation and loading of asbestos waste into truck bodies. Trucks will be positioned on hardstand areas at all times.

Direct contact of tyres with contaminated waste surfaces will be avoided at all times. Excavation of remediation areas will be undertaken in a systematic and staged approach from one end of the site to the other to avoid cross contamination of remediated areas. Emphasis will be on demonstrating that the control of asbestos fibre / dust will be a proactive rather than reactive approach. Asbestos air monitoring will confirm the removal methods / controls are acceptable and within threshold / trigger levels protective of human health. We are not advocating the need to decontaminate equipment / trucks upon each exit of the enclosure or remediation area. A wheel wash can be installed at the exit to the enclosure and truck tyres can be washed on exit as a precautionary dust control measure.

**Recommendation:** Consider adopting a wheel wash area setup at the enclosure exit point to wash down truck tyres prior to exiting the enclosure if ACM slurry is spilled onto the ground surface during loading.

**Issue:** *"While the travel of the dump truck is occurring or until a second truck is ready to enter through the same end of the wind mitigating device, the excavated surface would again be saturated"*

**Comments:** RMA suggest application of water misting sprays rather than saturation of surface is preferred dust control measure.

**Recommendation:** Avoid saturation method.

**Issue:** ***"The dump truck would follow a designated roadway to shift the material to either a stockpile in the first instance and once one of this Environmental Cells is formed directly into a Cell to avoid stockpiling"***

**Comments:** RMA have discussed the use of bogie trucks fitted with automated environmental tarpaulin covers is considered the preferred transport medium rather than the use of dump trucks. In addition, drivers will be instructed to remain in cabins at all times with windows wound up. HEPA filters will be installed on the air conditioning units of trucks.

**Recommendation:** Use bogie trucks with auto winding environmental tarpaulin systems. Trucks to be fitted with HEPA air condition units.

**Issue:** ***"Works program"***

**Comments:** RMA consider that the general order of remediation works should be in a north to south direction towards the exit of the site (i.e. away from the Parramatta River). The embankment works would be undertaken as a first stage of remediation and then progress works in a general southerly direction. This would reduce the risk of cross contamination of remediated areas due to the requirement to gain access through to the embankment area at a later stage utilising remediated surfaces of the site.

**Recommendation:** Reconsider the works program to start at the Parramatta River and work back to the entry gates.

**Issue:** ***"Pilot Trial"***

**Comments:** RMA consider that the "dry run" stage of the pilot trial is unnecessary and overly conservative.

**Recommendation:** RMA suggest simplification of the nominated approval / staging process to include four (4) key stages as follows:  
 Stage 1 – Excavation of ACM within Environmental Enclosure & Extraction System (Pilot Trial);  
 Stage 2 – Excavation of Hydrocarbon Material within Environmental Enclosure & Extraction System (Pilot Trial);  
 Stage 3 – Full Scale Works; and  
 Stage 4 – Decommissioning of Site.

RMA propose to use the same enclosure for the asbestos trial and the hydrocarbon impacted soil trial. It may be prudent to undertake the hydrocarbon soil trial first prior to asbestos trial only in the event that the hydrocarbon impacted soil trial area selected is not an area of comingled contamination (i.e. also contains asbestos contaminated materials). Decontamination of the structure and equipment (primarily for presence of potential asbestos fibres) can then be completed at the completion of the trial work (one event only).

Preference would be to carry out the excavation of hydrocarbon impacted soils in a location where asbestos and hydrocarbon soil contamination is not comingled.

## 5. Final Recommendation of "Enclosure Analysis"

RMA consider that Option 4 enclosure is the preferred enclosure strategy from an effective process and practical execution point of view.

The analysis of Option 4 should be re-presented as follows:

Summary of Option 4 – 600m <sup>2</sup> Excavation Enclosure + 600m <sup>2</sup> Containment Enclosure		
Method	Advantages	Disadvantages
20m x 30m = 600 sqm tent at excavation sites.  20m x 30m = 600 sqm tent at containment cell site.  No negative pressure.  Odour and dust control extraction system with HEPA filters.  Use of mist and fog (wet methods) over the excavation areas to contain all fibres at point of excavation.  Trucks enter and exit via an air lock door	Complete isolation of excavation site from the surrounding environment.  Control of wind affects.  Visually satisfying to the public.  Ample room for earthmoving machinery to operate.  Secondary (redundant) measure.  Foams not necessary (but could be utilised as a secondary measure for treating raw asbestos powder.	Cannot be used along Parramatta River.  Proof of performance of wet methods would render the tent redundant.

### Option 4 Method Summary

- Excavation site tent dimensions = 20m wide x 30m long x 10m high (conceptual design stage);
- Containment site tent dimensions = 20m wide x 30m long x 10m high (conceptual design stage);
- Use of wet spray methods (combination of overhead misting spray foggers and direct sprays over the removal area) to contain fibres at point of excavation and containment;
- Emphasis will be on keeping removal area moist at all times during excavation and loading process, avoidance of saturation and creating excess contaminated water runoff;
- 40 ton excavator to operate inside the enclosure;
- Dump Trucks or Bogie trucks with auto-winding environmental tarps to be used for covering contaminated asbestos waste during transport from excavation area to containment cell area;
- Nominal negative air pressure;
- Odour and dust control extraction system with HEPA filters; and
- Foams could be applied when excavation reveals raw asbestos powder.



## 6. Final Recommendation of "Proposed Work Methods for Camellia"

The proposed work methods for asbestos dust controls for the Camellia project should be the following:

### A) Inside the Excavation Enclosure:

- Use of a 30m x 20m portable environmental enclosure for each excavation site;
- Nominally using the above enclosure dimensions, each work cell would be marked as 20m x 15m;
- Prior to excavation, concrete slabs would be numbered, then lifted using conventional methods (combination of ripper, bucket and hammer attachments on excavator) whilst water mist and fog is applied to envelope the concrete pieces and disturbed surface in moisture;
- The Occupational Hygienist would examine the surface of the concrete slab and may require washing down until the surface is clean of any asbestos fibres. Surface dust samples from each slab would be collected and analysed on site in a laboratory to be permanently manned on site;
- The concrete slab would be removed once given the clearance. It would be removed by truck to a designated clean concrete stockpile area for recycling;
- Prior to the first removal of the sub surface, water mist and fog would be applied to envelope the disturbed surface in moisture;
- As the bucket of the excavator breaks the surface of the ACM, water mist and fog would be applied to envelope the disturbed surface in moisture;
- As the excavator bucket is raised, water mist and fog would be applied to the exposed edges of the waste materials;
- As the excavator moves the bucket across to the dump truck and lowers the material into the bucket, it would place each bucket load slowly and would not drop the material from height;
- These steps would be completed until the dump truck is full;
- Trucks would be positioned on hardstand material at all times. Direct contact of truck tyres with contaminated waste will be avoided at all times;
- Excavation of remediation areas will be undertaken in a systematic and staged approach from one end of the enclosure to the other to avoid cross contamination of remediated areas;
- Asbestos air monitoring inside the enclosure will be used to verify the absence of any airborne fibres;
- If any ACM slurry spills onto the truck body, it would be washed down before the truck leaves the enclosure;
- The truck bed would be covered with an automatically retractable enviro tarp, which would remain in the full cover position until the load is released within the containment cell enclosure;
- The excavator would remain inside the enclosure;
- Drivers are to remain in cabins at all times with windows wound up; and
- The truck would pass through an air lock door to exit the excavation enclosure.

**B) En Route to the Containment Enclosure:**

- HEPA Filters would be installed on each truck;
- The dump truck would follow a designated roadway to either a stockpile in the first instance and once one of this Environmental Cells is formed directly into a Cell; and
- The truck would not travel on any remediated areas in order to eliminate any possibility of cross contamination of materials.

**C) At the Containment Enclosure:**

- Use of a 30m x 20m portable environmental enclosure for each containment cell;
- At the containment cell, a ramp would be made from recycled crushed concrete, which would lead to the point of placement;
- The truck would enter the containment enclosure via an air lock door;
- Water mist and fog would be applied to envelope the truck body as it is unloaded;
- As the bucket of the excavator relocates the ACM, water mist and fog would be applied to envelope the material in moisture;
- Trucks would be positioned on hardstand material at all times. Direct contact of truck tyres with contaminated waste will be avoided at all times;
- The placement of ACM into the containment cell will be undertaken in a systematic and staged approach from one end of the enclosure to the other to avoid cross contamination of remediated areas;
- Asbestos air monitoring inside the enclosure will be used to verify the absence of any airborne fibres;
- If any ACM slurry spills onto the truck body, it would be washed down before the truck leaves the enclosure;
- The excavator would remain inside the enclosure;
- Drivers are to remain in cabins at all times with windows wound up; and
- The truck would pass through an air lock door to exit the containment enclosure.