APPENDIX 3

Letter from JBS

Our Ref: JBS41181-16367 Rev 1

09 February 2011

TO: Fleur Mellor
Planning Manager
Barangaroo Delivery Authority
(via email: Fleur.Mellor@barangaroo.nsw.gov.au)

Barangaroo Headland Park and North Cove – Response to Submissions Regarding Contamination and Air Quality, Revision 1

Dear Fleur,

As requested by the Barangaroo Development Authority (BDA), JBS Environmental Pty Ltd (JBS) has reviewed submissions to the Barangaroo Headland Park and Northern Cove Main Works Project Application. This letter provides our responses to the issues raised in the submissions.

It is noted that the draft Human Health Risk Assessment (HHRA), draft Ecological Risk Assessment (ERA) and the draft Remedial Action Plan (RAP) have been completed, and submitted to the independently appointed NSW DECCW-accredited Site Auditor for review and comment. Site Auditor comments will be incorporated into the reports, after which, the reports will be finalised. A draft Remedial Works Plan (RWP) was prepared by JBS, which summarises the reports, and details succinctly the remedial works to be undertaken at Headland Park. The draft RWP was also submitted to the Site Auditor for review and comment. The RWP will be finalised following incorporation of Site Auditor comments. The remedial works will not commence at the site until the RWP is endorsed by the Site Auditor.

Submission by Beverley Bowden

Beverley Bowden's submission expressed concerns regarding the potential impacts on surrounding residential areas of vibration, noise, and air pollution generated during the works. Concerns relating to vibration and noise are dealt with in the 'Noise and Vibration Assessment' (Acoustic Logic Consultancy, 2010).

Air Pollution from Remedial Works

Impacts relating to air pollution created by the remediation of contaminated material are considered to be managed by the provisions outlined in Appendix 1 of the draft 'Air Quality Management Plan' (JBS 2010a), which include application of water sprays to disturbed areas; reduced material handling during poor meteorological conditions; minimisation of the quantities of exposed coal tar impacted materials and stockpiles; the installation of an odour suppression system; and ongoing air monitoring works. Where these measures are successfully carried out, it is considered that the works will not pose an unacceptable impact on air quality.

Submission by DECCW

The submission by DECCW includes a number of items in regards to contamination, waste management, noise and vibration, air and water. Concerns relating to contamination and air quality are responded to below.

Contamination

DECCW notes several points regarding the derivation of criteria used in the RAP and their intended use on site, and states that a decision on their acceptability cannot be made until a copy of the HHERA is made available. JBS has no objection to providing DECCW with a copy of the HHRA and ERA to ensure that the Headland Park risk assessments are consistent with that currently being prepared for the Barangaroo Central and South Sites by others.

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Odour Dispersion and Air Quality Modelling

DECCW notes numerous points in regards to modelling of air quality parameters, including peak to mean factors, odour exceedances, the particulate matter assessment, PM_{10} 24-hour and annual average, deposited dust, benzene assessment, and chromium criteria.

As noted within the DECCW comments, a more precise estimate of the potential odour and related speciated chemical generation of the works cannot be obtained in lieu of the environmental standards for the receipt of material onto the Headland Park site. Subsequent to derivation of environmental criteria and application of criteria to the proposed filling and associated earthworks on the Headland Park, as per the draft HHRA and ERA, a more precise estimate of odour, particulate and chemical constituent emission rates will be able to be completed in a revised air quality assessment.

JBS (November 2010) 'Air Quality Management Plan Barangaroo Headland Park and Northern Cove' has been prepared as a draft. The odour control provisions provided to this document will need to be confirmed through revised air dispersion modelling consistent with exposure scenarios documented in the final HHRA.

Odour Controls

JBS has no objection to including tarpaulins as an odour control measure to stockpiled soils / non active excavation faces.

Further Actions

To address all points raised by DECCW in relation to air quality and management of contamination, it is recommended that JBS Environmental (January 2011) 'Human Health Risk Assessment Barangaroo Headland Park' (JBS 2011a), JBS Environmental (January 2011) 'Ecological Risk Assessment Barangaroo Headland Park' (JBS 2011b) and JBS Environmental (January 2011) 'Remedial Action Plan Barangaroo Headland Park' (JBS 2011c) are finalised and issued to the DECCW following Site Auditor review. All documents require approval from both DECCW and the Site Auditor prior to revising the air quality modelling for the Headland Park works.

Upon Site Auditor and DECCW endorsement of JBS 2011a, 2011b and 2011c, it is recommended that an updated 'Air Quality Management Plan Barangaroo Headland Park Construction Works' (AQMP) is prepared. As a minimum it is recommended that the AQMP:

- Identify air quality goals for the range of potential emissions from the Headland Park site to be applied to receptors in proximity of the site;
- Contain detail of revised modelling of air emissions from construction works on the Headland Park site based on emissions presented in the Human Health and Ecological Risk Assessments and Remedial Action Plan;
- Contain detail of air quality controls to be applied to reduce air emissions at adjoining receptors / properties consistent with DECCW criteria and acceptable levels of hazard and risk; and
- Contain detail on an air quality monitoring program to assess / demonstrate compliance with air quality goals.

Submission by Dynamic Property Services

The Dynamic Property Services submissions raised concerns for the potential for works to result in airborne contamination that might impact on properties to the east.

Air Pollution from Remedial Works

Potential air pollution relating to remedial works, largely the generation of airborne particulate matter during excavation and transfer works, is considered to be managed by the provisions in Appendix 1 of the draft 'Air Quality Management Plan' (JBS 2010a), which are summarised above, and which will be revised, if required, following finalisation of JBS 2011a, 2011b and 2011c.

Where these provisions are successfully completed, it is considered that the works will not pose an unacceptable level of air quality.

Submission by Ingrid Webster

The submission by Ingrid Webster indicates concern regarding potential pollution and noise impacts to the Towns Place apartment block, and regarding contamination present on the Headland Park site.

Air Pollution from Remedial Works

Potential air pollution relating to remedial works, largely the generation of airborne particulate matter during excavation and transfer works, is considered to be managed by the provisions in Appendix 1 of the draft 'Air Quality Management Plan' (JBS 2010a), which are summarised above and which will be revised, if required, following finalisation of JBS 2011a, 2011b and 2011c.

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Greenhouse Emissions and Noise

Greenhouse emissions generated during works, and during the future operation of the site, are managed by the 'Ecologically Sustainable Development Report' (Built Ecology, 2010), while issues relating to noise are dealt with in the 'Noise and Vibration Assessment' (Acoustic Logic Consultancy, 2010).

Contaminated Fill on Headland Park

The submission does not make clear the specifics of concerns regarding contamination on the Headland Park site. However, extensive modelling was conducted during the completion of the draft 'Human Health and Ecological Risk Assessment' (JBS 2010b) to indicate the potential risk posed by contamination, and criteria provided to ensure that soils and groundwater present on, and imported to, the Headland Park site will not pose a risk to human health. These criteria are referenced by the Headland Park draft 'Remedial Action Plan' (JBS 2010c) and will determine the management options for soils on and imported to the site, where less impacted soils will be retained and managed safely, while materials deemed to pose a potential risk to human health will be disposed off-site to a landfill licensed to accept the class of waste.

The HHERA notes that the maximum level of contamination in groundwater on the site is considered to pose an unacceptable risk to human health in the event that it infiltrates into the car park basements. This is recommended to be monitored on an ongoing basis, and in the event that contamination in groundwater comes into the proximity of the carpark, further remedial works take place.

Where all remediation and monitoring works are completed in accordance with the requirements of the Headland Park RAP, the Overarching RAP (ERM 2008), and the HHERA, contamination is not considered to pose an ongoing risk to human health.

Submission by Jane Irwin Architects

The submission by Jane Irwin Architects indicates concerns relating to the western air plenum in the carpark, noting that neither the method of air exiting nor an emissions rate are indicated in the 'Air Quality and Health Assessment' (JBS 2010d).

The 'Air Quality and Health Assessment' (JBS 2010d) deals with air quality issues relating to the construction works and contamination present on site, and hence does not discuss the air quality issues relating to greenhouse emissions from the completed building.

Submission by Kent Street Residents Group

The submission by the Kent Street Residents Group raises concerns over the use of contaminated fill from the Hickson Road area within the Headland Park, and questions who will undertake air quality monitoring. The contaminated fill is raised as an issue due to ongoing problems in the area with lead paint from the Harbour Bridge, and due to concerns over the methods of remediation.

Remediation of Hickson Road Declaration Area

JBS is not involved with the remediation of soils from the Hickson Road Declaration Area, and hence cannot comment on the remediation method.

Fill on Headland Park Site

The use of contaminated fill is considered not to pose a health risk to humans based on extensive modelling of contaminants during the completion of the draft HHRA and ERA (JBS 2011a and JBS2011b), using industry accepted modelling practices, on the Headland Park site. This modelling has helped to develop criteria to determine the acceptability of given concentrations of contaminants on the site. All material to be placed on the site will be subject to the Site Acceptance Criteria outlined in the final HHERA, while any materials not meeting the criteria will be disposed of to landfill. In addition, all materials placed on the site are expected to be covered by a layer of clean fill to between 0.5 and 1.5 m depth, acting as a growth medium for indigenous plants, and preventing direct access to soils. While these provisions for management are undertaken, the use of fill on the Headland Park site is considered not to pose a risk to human health.

Responsibility for Air Monitoring

Air quality monitoring is proposed to be undertaken by the nominated environmental consultant for the project.

Submission by Penelope Morris

Penelope Morris's submission expressed concerns regarding the potential impacts on surrounding residential areas of vibration, noise, and air pollution generated during the works.

Noise and Vibration

Concerns relating to vibration and noise are dealt with in the 'Noise and Vibration Assessment' (Acoustic Logic Consultancy, 2010).

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Air Pollution from Remedial Works

Potential air pollution relating to remedial works, largely the generation of airborne particulate matter during excavation and transfer works, is considered to be managed by the provisions in Appendix 1 of the draft 'Air Quality Management Plan' (JBS 2010a), which are summarised above and which will be revised, if required, following finalisation of JBS 2011a, 2011b and 2011c.

Where these measures are successfully carried out, it is considered that the works will not pose an unacceptable level of air quality.

Submission by Sydney Ports Corporation

The Sydney Ports Submission expressed concerns regarding the effect of airborne benzene on crew members of cruise ships docking for up to 72 hours at the CPT, management procedures for airborne benzene, and exceedances of odour and PM_{10} at the HCT, Moores Wharf and CPT sites.

In response to concerns about the exposure to airborne benzene, a risk assessment has been carried out to indicate the degree of risk posed to crew members and security on cruise ships. This is outlined following.

Airborne Benzene

A maximum benzene concentration of 3.61µg/m^3 has been predicted for the interim Sydney Ports Cruise Passenger Terminal. This would be anticipated to occur during working hours only, which is 7am to 6pm (11 hours per day). Substantially lower emissions would occur during non working hours. Assumption of maximum levels during working hours will be sufficient to account for the potential additional chronic dose of low emissions during non-operational hours.

The health risk assessment of vapour inhalation has been undertaken in JBS Environmental (January 2011) 'Human Health Risk Assessment Barangaroo Headland Park' by the method advised in US EPA (January 2009) 'Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)'. The following equation is provided in US EPA (2009) to determine exposure concentrations to airborne chemicals:

EC = (CA * ET * EF * ED)/AT (cancer risks)

EC = (CA * ET * EF * ED)/AT (hazard quotients)

Where: EC – exposure concentration (µg/m^3);

CA – contaminant concentration in air (µg/m^3);

ET – exposure time (hours/day)

EF – exposure frequency (days/year)

ED – exposure duration (years)

AT – averaging time, cancer risks (lifetime in years * 365 days/year * 24 hours/day)

AT – averaging time, hazard quotient (ED in years * 365 days/year * 24 hours/day)

Incremental risk and hazard are assessed by the following additional equations:

Risk = IUR * EC

HQ = EC / (Toxicity value * 1000 µg/mg)

Where: IUR – Inhalation unit risk (µg/m^3)$^{-1}$

Toxicity value – RfC appropriate to duration of exposure scenario, mg/m3

Values have been selected for these exposure parameters on the basis of exposure and toxicity values adopted in JBS (2011) and proposed exposure times nominated by Sydney Ports. An assessment has been undertaken on the basis of:

- A standard commercial / industrial receptor who works full time at the interim facility; and
- An intermittently exposed person who is present at the interim facility for a period of 72 hours (continuously) a total of 10 times per year.

Toxicological values are summarised in Table 1.

Table 1: Summary of Adopted Toxicological Values for Benzene

Benzene	Value	Source / Comments
IUR	6.0 * 10^{-6} (µg/m^3)$^{-1}$	WHO unit risk
RfC	1 * 10^{-2} mg/m^3	ATSDR chronic duration inhalation exposure MRL

Exposure values adopted for each of the exposure scenarios are summarised in Tables 2 and 3.

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Table 2: Summary of Exposure Parameters for Commercial / Industrial Receptor

Property	Value	Source / Comments
ET	8 hours/day	enHealth (2004), NEPC (1999)
EF	240 days/year	enHealth (2004), NEPC (1999)
ED	0.5 years	Duration of works

Table 3: Summary of Exposure Parameters for Cruise Ship Receptor

Property	Value	Source / Comments
ET	11 hours/day	Duration of maximum emissions consistent with site work hours
EF	60 days/year	Based on equivalent of 10 x 72 hour exposure periods within 6 month period of works (and associated emissions)
ED	0.5 years	Duration of works

Risk and hazard results for each of the receptors assessed is provided in Table 4.

Table 4: Summary of Hazard and Risk Results

Receptor	Hazard Quotient	Incremental Risk
Commercial / Industrial Receptor	$7.9*10^{-2}$	$3.4*10^{-8}$
Cruise Ship Receptor	$2.7*10^{-2}$	$1.2*10^{-8}$

The hazard quotient is below the adopted acceptable level of hazard of 1.0 and the incremental risk is below the adopted acceptable level of incremental risk of $1 * 10^{-5}$. It is considered that the predicted levels of benzene will not pose an unacceptable level of risk or hazard to users of the Interim Port Facility.

Management of Airborne Benzene Exceedances

The air quality management plan contains provision for continuous monitoring of volatile compounds. Action levels are built within the AQMP to identify levels of total VOCs that are indicative of unacceptable levels of benzene. A range of control methods are provided in the AQMP to reduce/eliminate VOC emissions where these criteria are exceeded.

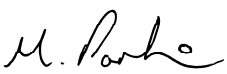
However, Sydney Ports should be aware that the assessment of the potential exposure to benzene is based on toxicological data and exposure parameters that are consistent with chronic timeframes. This causes the action levels as based on the toxicological values to be very low. With this, slight or momentary exceedances of these action criteria do not imply an acute risk. It should be considered that the use of chronic based toxicological values to derive these criteria has incorporated a substantial safety factor. If action criteria were based on acute exposure criteria, then they would be substantially higher than the values being adopted. As such, brief exceedances of the stated criteria are not deemed to pose an immediate risk; however, they should prompt the use of methods outlined in the AQMP to manage air quality and lower emissions.

PM_{10} Exceedances at HCT, Moores Wharf, and CPT

Sydney Ports has requested that continuous air quality monitoring for odour and PM_{10} be undertaken at the HCT, Moores Wharf and CPT sites, and that work shut down in the event of exceedances at these locations. It is recommended that monitoring be undertaken at these locations. Exceedances should be responded to by implementing the control measures outlined in the Air Quality and Health Plan. Where these fail to lower the concentration of PM_{10}, works should cease pending more favourable meteorological conditions.

Should you have any queries or require further clarification, please feel free to contact Andrew Lau on (02) 8338 1011.

Prepared by:



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Attachments: 1. Limitations

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Attachment 1 – Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS Environmental Pty Ltd accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS Environmental Pty Ltd, and should not be relied upon by other parties, who should make their own enquires.

Limited sampling and laboratory analyses were undertaken as part of the investigations reviewed, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS Environmental Pty Ltd reserves the right to review the report in the context of the additional information.