AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

22 July 2011

Felicity Greenway
Department of Planning and Infrastructure
23-33 Bridge Street
Sydney NSW 2001

Dear Felicity,

Response to Submissions: Orica Modification 1

This letter presents Orica's response to submissions received with respect to Orica Kooragang Island Ammonium Nitrate Facility 08_0129 MOD 1.

The application and supporting environmental review was submitted to Department of Planning and Infrastructure (DP&I) on 3 May 2011. The four submissions in relation to this modification listed below are in the order they were received via email from DP&I;

- The Office of Environment and Heritage (OEH) on 7th June 2011,
- WorkCover NSW – Major Hazard Facilities Team on 10th June 2011,
- Newcastle City Council – Development Assessment Team on 27th June 2011
- NSW Department Of Health – Health Protection Unit Hunter New England Health on 23rd June 2011,

This letter presents our response in the order in which the submissions were received.

1.0 Office of Environment and Heritage – Dept. of Premier & Cabinet

The OEH submission was in two parts, the first relating to the predicted exceedance of particulate matter at one of the 40 receptors listed and the second relating to ongoing investigation of emissions reduction in the existing No. 1 Ammonium Nitrate Plant (AN1) prill tower.

1.1 Particulate Matter Exceedance

OEH's submission stated that *"OEH notes that predicted air emissions from the proposed modification are likely to result in a 0.2µg/m^3 exceedance of the National Environmental Protection Measures (NEPM) assessment criteria for fine particulates (as PM_{10}) for a 24 hour averaging period in respect of Receptor 3."*

In relation to the source of the exceedance, it should be noted that there is no change to the proposed concentration or mass discharge from the existing and new plant. Rather the predicted exceedence has occurred as a result of the layout changes (specifically the location change of the No. 3 Ammonium Nitrate Plant).

The modelling and assessment undertaken to support the modification did identify a potential exceedance of 0.2µg/m^3 at one receptor out of the 40 receptors assessed. This meant that the 24 hour average resulted in a potential level of 50.2µg/m^3 against the criteria of 50µg/m^3. None of the other 39 receptors were subject to any potential exceedance according to the model.

The predicted exceedance at Receptor 3, however, represented only a 0.4µg/m^3 increase from the original modelling and assessment undertaken in the 2009 Environmental Assessment (EA). On this basis, the assessment in the modification noted that it was *"considered unlikely that this exceedence would be able to be distinguished from the concentration predicted in the 2009 EA."*

It is worth however, extending review of this issue back to the original EA and the source data that was used for the assessment, since the extent of the predicted levels (and therefore exceedance) is also a factor of the effect of the Project against the existing background levels for which the site is one of many local contributors.

Particulates are monitored at a licensed sampling site located within a substation site on Fullerton Road in Stockton. Receptor 3 is situated approximately 100m from the monitoring station, on the corner of Stone and Fullerton Streets. As outlined in the original EA, the 24 hour maximums for the last three available years were:

- 2006: 37µg/m^3 (against a criteria of 50);
- 2007: 18µg/m^3 (against a criteria of 50); and
- 2008: 16µg/m^3 (against a criteria of 50).

In general, the data collected from this monitoring station as 24 hour averages shows that the background PM_{10} results have been declining over recent years. Similarly, a second monitoring station at the corner of Stone and Dunbar Streets in Stockton (which is approximately 100m to the east of Receptor 3) shows one exceedance of the criteria for PM_{10} in 2005. Since that time, there have been no exceedances. Further, the PM_{10} ambient levels have been dropping, sometimes consistently into single figures.

As was noted in the original Air Quality Assessment in the EA when it presented this data *"The activities at the Orica site have remained constant through that time (as shown by consistent Nitrate concentrations which are an indicator of Orica activities) suggesting that other factors beside Orica's operation plays a controlling factor in air quality on Stockton."*

This also shows that the contribution of Orica to the background results could be lower than that assumed in the model and assessment.

In terms of Orica's contribution, it is also worth noting the conservative approach adopted in the model. As noted in the original EA:

All modelling scenarios outlined above assumed the plants were operating at full capacity, running continuously (24 hours per day, 365 days per year). The facility is unlikely to operate at this level due to operational restrictions (such as breakdowns and routine maintenance) with the normal operation time for the Ammonia Plant, Nitric Acid Plants and Ammonium Nitrate Plants being approximately 95%, 92% and 85% respectively. The proposed ANP3 is estimated to operate approximately 85 to 90% of the time, whilst NAP4 is expected to operate approximately 92 – 95% of the time. Therefore, the scenarios represent worst-case conditions for the facility's operation, and are likely to overestimate the actual long term impacts experienced by receptors surrounding the facility.

Similarly, the modelling in the assessment for the modification used a worst case scenario as though the facility were running at maximum capacity 365 days per year. As noted above from the original EA, this is an over-statement and so both the 2009 and current results are believed to be conservative.

As such, the key issues in response to the predicted exceedance are:

- The exceedance represents only a 0.4ug/m^3 increase in predicted emissions from the original model;
- Background PM_{10} emissions have been falling over recent years, during which time Orica has been operating. This calls into question the level of Orica's contribution to the background levels;
- The model (for the 2009 EA as well as 2011 Modification) assumed Orica operates at maximum capacity and 365 per year which is an over-statement.

On this basis, the likelihood of the occurrence of the exceedance needs to be viewed within the context of the conservative approach adopted in the model.

1.1.1 Emission Reduction in the Prill Tower

OEH continued that "*OEH is aware from the original Environmental Assessment and recent discussions with the proponent that they are investigating options for reducing emissions from the Ammonium Nitrate Plant No.1 (ANP1) Prill Tower, which represents the largest particulate point source at the premises. A reduction in emissions from the Prill Tower is may result in the reduction in fine particulate emissions to levels below the assessment criteria.*

In addressing this issue OEH recommends that, should you intend on granting approval of the proposed modification to the project approval, a condition be included within the project approval that requires the proponent the [sic] investigate and implement options to reduce fine particulate emissions from the ANP1 Prill Tower within 2 years. Should you decide to grant approval, OEH advises you to consult NSW Health for advice on potential impacts from fine particles at the predicted levels on Receptor 3."

The original EA provided this commitment relating to the Prill Tower Emissions in the Statement of Commitments:

"As part of its improvement plans for its existing operations, Orica will also continue to investigate options to further reduce particulate and PM_{10} emissions from the existing AN Plant No.1 Prill Tower."

During the exhibition period for the original EA Newcastle Council raised a submission regarding the clarification of the timeframe of the implementation of PM_{10} abatement measures on the Prill Tower and that this be allowed for within the conditions of Project Approval. A submission was received from the Department of Environment and Climate Change (now OEH) but this issue was not included at that time.

Council's submission and Orica's own commitment was carried forward into the Project Approval in Condition 27 *The Proponent shall investigate and report on the progress to reduce PM_{10} emissions from the existing Prill Tower on the Ammonium Nitrate Plant No. 1. The report shall:*

a) Be provided annually, and can be reported through the Annual Environmental Management Report required by condition 50; and

b) Provide an update on the timeframe for the implementation of emission controls.

As noted in the submissions report, there are technological, economic, physical and structural constraints that require detailed investigation prior to conducting a feasibility study on a preferred option. This is an ongoing process being undertaken by Orica and is currently reported on in accordance with their conditions of Project Approval in the Annual Environmental Management Report.

This condition of Project Approval was deemed adequate for the levels of PM_{10} resulting from the 2009 model. The PM_{10} results for the proposed modification are broadly consistent with the 2009 results. As noted above, the exceedance has resulted from only a 0.4µg/m3 predicted increase in PM_{10} levels at one receptor. Given that the exceedance is based on a conservative modeling process (and therefore with a reduced likelihood of an exceedance actually occurring), it is believed that the existing condition of Project Approval remains adequate for the modified project.

Orica has discussed with OEH the inclusion of a Pollution Reduction Program on the site Environment Protection License to investigate emissions from the AN1 Prill Tower, review the feasibility of options to reduce particulate emissions and undertake a detailed evaluation of the identified feasible options. This program of works is expected to take longer than the OEH recommended two years to complete due to the inherent complexities of this project.

The program of works on this project that is being undertaken during 2010/2011 was detailed in the 2010 Annual Environmental Management Report, which was submitted to the Department of Planning and Infrastructure on 30 November 2010.

2.0 WorkCover NSW

WorkCover NSW – Major Hazards Facilities Team provided the following comments itemised below:

It is noted by Orica that the majority of these queries do not relate to this modification and are queries which pertain to the Orica Safety Report falling under MHF legislation. Never the less Orica has provided responses to the comments.

1. *In relation to the bulk ammonia storage tank (12,000 tonnes, -33oC):*
   a. *The basis of consequence (vapour evaporation) estimates for the catastrophic failure of the tank are not stated.*

   This is based on PHAST Risk estimates for LOC of entire contents as liquid. The basis of consequence estimates (vapour evaporation) are described in Appendix III in the original PHA (see attachment 1). The dispersion of the pool is calculated in Phast Risk, based on the factors as mentioned in the appendix.

   Heat conduction from the ground is modelled in Phast Risk assuming a uniform semi-infinite medium on which the pool spreads (Shaw and Briscoe. 1978). In our case the bund is concrete and hence the heat conduction from this surface is calculated using the default values in Phast Risk for a concrete surface (Roughness factor = 1, Thermal conductivity = 1.21 W m-1 K-1, Thermal Diffusivity = 5.72 x 10-7 m2 s-1).

   b. *Has Orica considered the issue of concrete bund overtopping in a potential catastrophic failure? If not, how will this affect its consequence estimates?*

   The issue of the concrete bund surrounding the bulk ammonia storage tank overtopping has not been considered in the PHA Modification as there are no changes to this storage tank or the inventory stored in the tank as part of the approved project.

   The "catastrophic failure" case in this PHA does not envisage a release which would be sufficiently severe to cause overtopping; that is, in the model of this case, the entire contents are lost but not so fast as to overtop the bund wall enough to noticeably affect the consequence modelling (there could be some splashing, but not a significant increase in vapour generation). Lees (3rd edn) section 22.21.6 points out that overtopping is more likely for low bund walls. V-101 has a high bund wall to minimise exposed surface area and investigations have

shown the concrete bund surrounding the tank is of sufficient capacity to hold the contents of the tank in the case of a tank failure.

c. *We understand that Orica is considering including a flare stack – has Orica include [sic] consideration of a flare stack in the Hazard and Risk Report?*

Orica is not considering including a flare stack.

2. *Has Orica assessed the integrity of the tank and concrete bund wall in the case of an earthquake?*

Orica has reviewed site drawings relating to the construction of the tank and the concrete bund wall to determine the integrity in the case of an earthquake. The Ammonia Tank was built in 1969 and was not designed or built to current earthquake standards. It is noted however that the existing tank has retained its structural integrity remaining structurally intact after the 1989 Newcastle earthquake.

Site drawings indicate that the concrete bund wall was designed to withstand an earthquake with clear design mitigation measures such as bearing pads and footings designed to allow for horizontal movement. However due to the age of the records exact design calculations to determine the extent of the protection are not available. A site wide engineering SHE project to review older structures in light of current engineering standards is currently underway.

3. *In relation to incidents, we note that some relevant incidents have not been included e.g. the rupture of a cryogenic ammonia tank (roll over due to warm ammonia) in Jonova, Lithuania, (USSR) on 20 March 1989 (see http://www.aria.development-durable.gouv.fr/resources/aria_717_eng.pdf)*

Orica notes that it is not essential that a PHA lists historical incidents, although as noted in the PHA, they have informed the hazard identification in Appendix II.

However Orica's Basis of Safety for ammonia includes information on incidents relevant to the manufacture, storage, handling and transport of ammonia. This includes incidents such as the 1989 Lithuania tank failure, the 1970 Nebraska tank overfilling incident, the 1978 Idaho tank collapse, the 1987 Silver Sands vessel stress corrosion cracking and the 1994 Port Neal tank damage following an external explosion. The incidents included in the Basis of Safety have been used to inform the hazard identification process which was undertaken for the PHA, and where relevant, they have been included in Appendix II of the PHA.

3.0 Newcastle City Council – Development Assessment Team

Newcastle City Council Development Assessment Team provided comment on the modification request noting the expected exceedance at the modelling location identified as receptor three in the Air Quality report. Council recommended that further investigations be undertaken to reduce the emission to within the criteria. In addition it is noted by Council that the existing commitment by Orica to reduce emissions from the existing prill tower would be likely to reduce these emissions to below the criteria.

This reaffirms the approach and the existing commitment by Orica to investigate opportunities to reduce emissions from the No1 Ammonium Nitrate Prill Tower.

4.0 Department Of Health

A submission was received from NSW Health via the DP&I on 6 July 2011. The issues raised in this submission from the Department's Population Health, Planning, and Performance Division are summarised in the table below.

Table 1 NSW Health Issues and Responses

Issue	Response
Ensuring there is minimal impact from the proposed development on the water quality of the surrounding waterways, particularly from stormwater runoff	There would be no change to the stormwater runoff as assessed in the original EA and Submissions report.
The incorporation of best practice design principles in water saving strategies, such as rainwater tanks and rainwater reuse	This issue was discussed in the original EA, Submissions report and conditions of Project Approval. It is not an issue relevant to the specifics of the proposed Modification.
A mosquito risk assessment of the site to ensure any potential mosquito breeding sites. Furthermore, a mosquito management plan should also be developed	This issue was addressed in the Submissions report and was not carried forward by DP&I into the Project Approval. It is not an issue relevant separately to the

Issue	Response
which will reduce both nuisance biting and disease transmission mosquitoes and their subsequent effects on the occupants of the site and the local community	specifics of the proposed Modification.
The long history of industrial use of the site and surrounds may have lead to contamination of the soil. Soil contamination should be addressed before development occurs. A remediation plan for the site should require that all land will have all contaminated soil removed and the final remediation be validated as safe by a Site Auditor. We believe this should occur across the site to provide adequate assurance of health protection	This issue was discussed in the original EA. It is not an issue relevant to the specifics of the proposed Modification.
Any water cooling system and/or warm water systems must meet the NSW Code of Practice for Plumbing and Drainage, relevant Australian Standards and the NSW Code of Practice for the Control of Legionnaires Disease 2004. They must be installed and maintained to prevent the growth of Legionella	This is not an issue relevant to the specifics of the proposed Modification.
The storage and movement of Hazardous Materials on the site should be included in the sites Emergency Management Plan. The Plan should reflect the increase in quantity of Hazardous Materials attributed to the modification any the effect of that increase to employees, adjoining properties and the community	This is not an issue relevant to the specifics of the proposed Modification. The modified proposal would not result in an increase of Hazardous Materials.
The Emergency Plan for the site should incorporate procedures that outline a strategic Early Warning System (EWS) for any incident/emergency emanating from the development that may affect adjoining properties and the local population.	The Emergency Plan will be prepared in accordance with relevant guidelines and in consultation with appropriate authorities.

5.0 Department of Planning and Infrastructure

DP&I requested a plan of the proposed layout changes that was presented in a clearer manner, in order to help to distinguish those elements as approved in the 2009 EA from the elements now proposed to change. An amended figure has been provided with this letter.

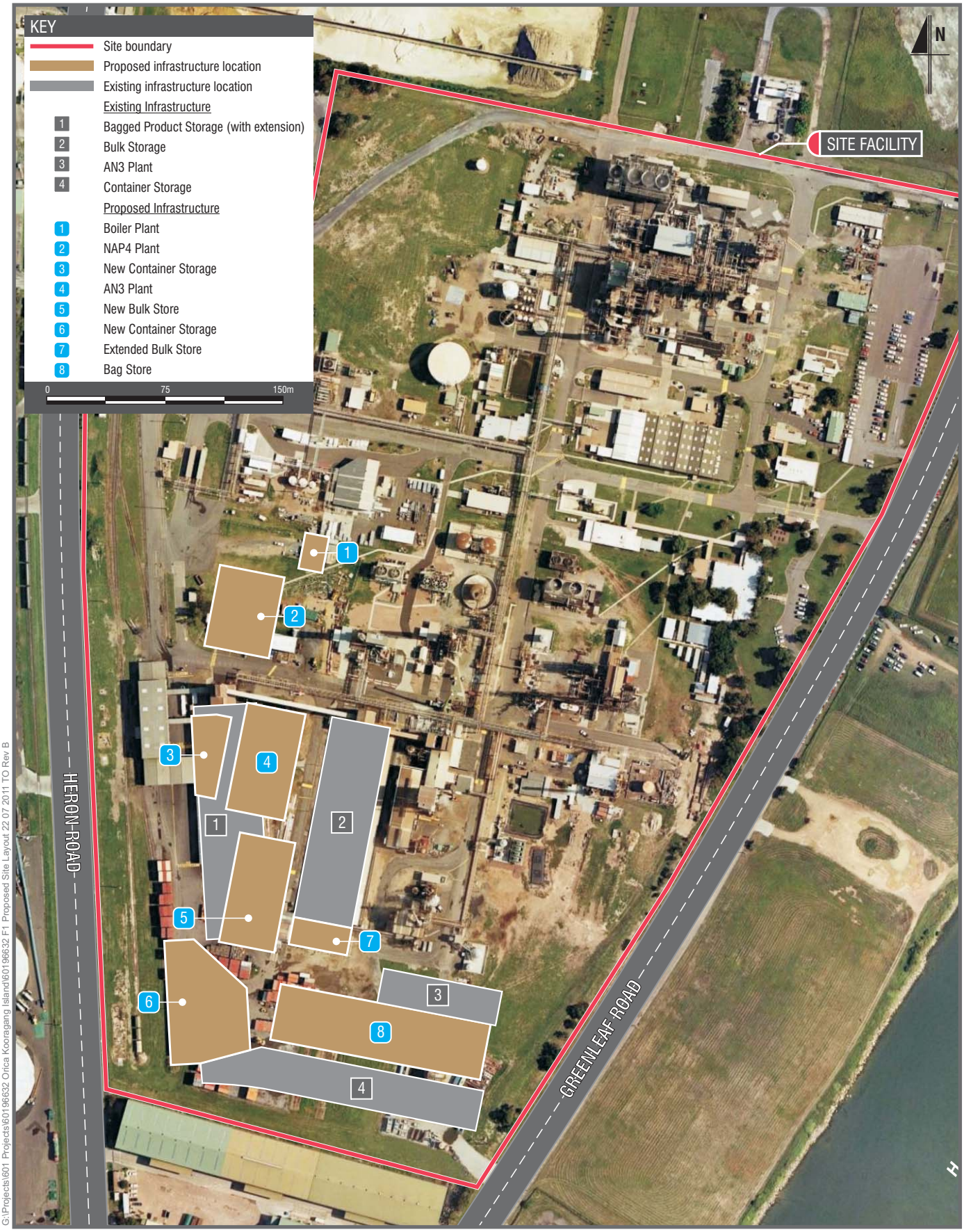
Should you have any further queries, please do not hesitate to contact me.

Yours faithfully

Ruth Baker
Associate Director
ruth.baker@aecom.com

Mobile: +61 407 930 997
Direct Dial: +61 2 8934 0052
Direct Fax: +61 2 8934 0001

cc: Richard Sheehan
Carey Gent



G:\Projects\601 Projects\60196632 Orica Kooragang Island\60196632 F1 Proposed Site Layout 22 07 2011 TO Rev B

AECOM

PROPOSED SITE LAYOUT

Environmental Assessment
Proposed Ammonium Nitrate Facility Expansion, Greenleaf Road, Kooragang Island

Note:
Information derived from Hatch EMA plan HEN2561-0000-00-014-0012 (**05/04/2011**)

FIGURE 1