Our reference: DOC15/294009

Mr David Mooney
A/Team Leader
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Dear Mr Mooney

Public Exhibition - Energy from Waste Proposal, Eastern Creek - SSD-6236

I refer to your email dated 25 May 2015 to the Environment Protection Authority (EPA) requesting comment on the Environmental Impact Statement ("EIS") submitted by Urbis Pty Ltd in relation to a proposed energy from waste facility at Eastern Creek (SSD-6236).

The EPA has reviewed the EIS and associated documents.

The EPA has significant concerns in relation to the following aspects of the proposal: human health risk assessment; ozone impact assessment; waste management report (including alignment with the EPA's Energy from Waste Policy); air quality and greenhouse gas assessment; and technological aspects.

A summary of the EPA's comments is provided in Attachment A, with detailed comments provided in Attachment B.

I have also included two independent reviews commissioned by the EPA to provide expert advice in relation to the Human Health Risk Assessment (EnRisks) and the technological assessment (Arup) of the proposal.

It is the EPA's recommendation that the Department of Planning & Environment reject the proposal in its current form.

Please see detailed comments attached and if you have any questions in relation to this matter, please contact Deanne Pitts on (02) 9995 5752.

Yours sincerely

4.8.2015

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ATTACHMENT A – SUMMARY COMMENTS

Background

An Environmental Impact Statement (**EIS**) has been prepared by Urbis Pty Ltd (**Urbis**) on behalf of The Next Generation NSW Pty Ltd in support of the State Significant Development Application for the construction and operation of the Energy from Waste Facility (proposed Facility) at Lots 1, 2, 3 and 4, in DP 1145808 (**the site**) within the Eastern Creek Industrial Estate.

The Next Generation NSW Pty Ltd (the Proponent) is proposing to construct and operate an electricity generation plant within the Eastern Creek Industrial Estate powered from unsalvageable and uneconomic residue waste that would otherwise be landfilled (the Project). The facility will have the capacity to process up to 1.35 million tonnes of residual waste fuel per year and generate up to 158 MW of electricity with a net thermal export to the grid of 140 MWe.

The development will be staged in two phases with each phase comprising two combustion grates and two 5 pass heat recovery boiler systems housed in one building with each boiler having its own independent flue gas treatment systems and connecting to one turbine enclosed in the adjacent turbine hall. Each boiler will also be connected to an air cooling system, one emissions stack and the other auxiliary elements connecting the process. Phase 2 will be built when it is demonstrated the required quantity of residual waste fuel is available to the facility.

The facility will operate 24 hours a day every day of the year apart from programmed offline periods for maintenance.

The proposed facility aims to receive and process up to 1.3 million tonnes of residual waste per annum (C&I and C&D & other waste) for energy recovery using "moving grate" incineration technology.

Prior to the EIS and associated assessments being publically exhibited the EPA completed a review of these documents and provided comments to the Department of Planning and Environment (DP&E).

On 22 May 2015, the EIS and associated assessments were placed on public exhibition by DP&E.

The EPA has reviewed these documents and provides its comments below. As well as general comments, there are specific comments in relation to air quality and greenhouse gas impact assessment; the ozone impact assessment; the human health risk assessment; and the waste management report. Many of these areas were identified previously prior to public exhibition of the EIS and still require attention by the Proponent.

Summary comments

A) General comments

- In general, the EIS and supporting documents still contain conflicting and inconsistent information, and lack of referencing, which makes it difficult to conduct a proper assessment. Further details are provided below, and in Attachment B. Separate assessments should be cross-referenced to ensure thorough assessments are completed, for example, although the Ozone Impact Assessment has predicted an impact, the effects of that impact on human health and human behaviour has not been mentioned at all in the Human Health Risk Assessment. Conflicting information about construction times, life of the operation, quantity of waste proposed to be received etc. makes it difficult to assess the proposal.

- In order to robustly assess potential impacts from the proposal, it is crucial to understand the waste feedstock proposed to be received at the facility, and understand how the proposed technology (HZI Moving Grate) will process that waste feedstock. During Adequacy Assessment, the EPA expressed

concern that it was not fully known how the proposed technology would handle the proposed feedstock and the EPA requested some real data (preferably from an operating EfW with similar operations) to support many of the assumptions made in the EIS and associated assessments. It is the EPA's view that this has not been addressed adequately in the publicly exhibited EIS. Although a few facilities have been listed, they are not appropriate to use as real data for this assessment (and it has not been justified why they were listed in any case). Further detail on this point is provided in the Technological Assessment in Attachment B.

- In addition to the point made above, most of the assessments (air, ozone, human health, waste) by necessity, rely heavily on knowing the waste feedstock proposed to be accepted at the facility and how the technology will process it. By not having a clear picture and real data, it has been difficult to properly and robustly assess what the real impacts or potential impacts will be. This concern is reflected throughout the EPA's submission.

B) Human Health Risk Assessment

Note: The EPA conducted a review of the Human Health Risk Assessment and also contracted a specialist expert consultancy, EnRisks, to conduct an independent review. Results of both reviews were consistent and complimentary. For completeness, both reviews are provided in Attachment B & Attachment C respectively.

The Human Health Risk Assessment (HHRA) included in the EIS on public exhibition is a relatively generic assessment that contains limited site specific information and is very similar to the one submitted at the adequacy review stage. The HHRA concludes emissions from the proposed energy from waste facility will not result in any adverse health impacts.

However, the HHRA does not include sufficient information and clarification in order to comprehensively justify the appropriateness of the assessment methodology and the assessment findings, or to demonstrate the assessment of Project health risks has been performed according to the requirements of the enHealth Guidelines, *Environmental Health Risk Assessment – Guidelines for assessing human health risk from environmental hazards (2012).*

It is the EPA's view that the HHRA has not been completed adequately, with the required Australian guidance, and as such it is not possible to determine the proposed Facility's potential or actual impact on human health. Therefore, the EPA cannot support the proposal in its current form.

C) Air Quality Impact Assessment

The EPA has reviewed the Air Quality and Greenhouse Gas Assessment for the EfW Facility. It has generally been conducted in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW. However, not all issues identified in the adequacy review have been satisfactorily resolved, as detailed in Attachment B, especially in relation to information about the diesel generators; operating temperature for the secondary combustion chamber; no assessment of ammonia emissions; and general inconsistencies in the assessment. Also, additional issues have been identified, and those are detailed in Attachment B.

It is the EPA's view that the Air Quality and Greenhouse Gas Assessment has not addressed all the issues as required by the EPA and therefore, the EPA cannot support the proposal in its current form.

D) Ozone Impact Assessment

The EPA has reviewed the Ozone Impact Assessment for the proposed facility. It has been generally conducted in accordance with EPA's published '*Tiered Procedure for Estimating Ground-Level Ozone Impacts from Stationary Sources*'. However, there are potential impacts that may occur. Therefore, the EPA requires further detail on possible approaches to reducing potential ozone impacts from the proposal as set out in Attachment B.

Until the Proponent provides the further detail as required, the EPA cannot support the proposal in its current form.

E) Odour Impact Assessment

The EPA has review the Odour Assessment and it has generally been conducted in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.

The odour impact assessment predicts operation of the proposed EfW facility and the adjacent Genesis recycling and landfill facility will comply with an odour assessment criterion of 2 odour units (OU) at the nearest existing and future sensitive receptors.

F) Alignment with the EPA's Energy from Waste Policy

It is the EPA's view that the proposal as presented does not provide enough information in order to demonstrate compliance with the requirements of the NSW Energy from Waste Policy Statement 2014 (the Energy from Waste Policy), in relation to the technical, thermal and resource recovery criteria outlined in Part 4 of the Policy.

The Environmental Impact Statement's Waste Management Report and supporting appendices contain limited, conflicting and sometimes inconsistent information about the source, supply, composition, recovery and management of the proposed waste fuel feedstock for the TNG facility. Without sufficient information, the EPA cannot complete an assessment of the feedstock proposed by TNG to determine their compliance with the Resource Recovery Criteria in the Energy from Waste Policy.

It is the EPA's view that the information provided does not show that proof of performance trials will be undertaken to demonstrate compliance with air emissions standards, that genuine dialogue with community has and will continue to be undertaken or that there is any commitment to the good neighbour principle within the Energy from Waste Policy.

Based on the points raised above, the EPA cannot support the proposal in its current form.

G) Technological Assessment

Note: The EPA contracted an external consultancy, Arup Pty Limited, to conduct a review of the technological aspects of the proposal, with reference to international best practice for energy from waste facilities. Arup also conducted a review of the proposal against the EPA's Energy from Waste Policy.

Comment provided by Arup Pty Ltd:

"The overall EIS and supporting documentation appear to lack a 'source of truth' and there are a large number of inconsistencies between the Main EIS and the appendices which have been authored by different specialists and within the EIS itself. There are a number of inaccuracies and inconsistences

between the main EIS document, the Environ Waste Management Report and the Concept Design Report produced by Fichtner, which has resulted in uncertainty in the information being provided and the authors of this review being unsure on which report is the 'source of truth'. The Fichtner report is titled the Concept Design Report and could be expected to provide the basis of design for the EIS. However, the preferred technology provider Hitachi Zosen Inova (HZI) have provided reference data for the Environ Waste Management Report which at times is inconsistent with the Fichtner report. It would be reasonable to expect that a concept design would have been developed for the proposal that comprehensively and accurately defined the Facility and provided a consistent basis of design for the EIS.

The proposed technology provider is Hitachi Zosen Inova (HZI). Arup Pty Ltd recognise that HZI is a leading company in grate incineration technology, with reference facilities around the world treating MSW and C&I waste. However, the EIS and supporting documentation only outlines a possible concept for a facility and does not define the facility in sufficient detail to allow for a full adjudication to be made on whether the proposal is compliant with international best practice.

It is considered that insufficient data has been provided within the EIS and supporting documentation to a sufficient level of detail to allow a full technical assessment of the technology to be undertaken.

A full as possible assessment has been made of the Proposal against the requirements of the NSW EPA Energy from Waste Policy Statement based on the information provided in the EIS, Environ Waste Management Report and the Fichtner Concept Design Report. Possible suggested conditions for approval have been included where appropriate. Comments have also been made on the responses provided by the Proponent to the Terms of Reference Adequacy comments

Based on the merit assessment undertaken by Arup of the technical aspects of the EIS referring to the proposed technology and its compliance with the NSW Energy from Waste Policy Statement (2015), Arup would propose that the NSW EPA recommend that this application is not approved in its current form."

Based on the comments provided by Arup Pty Ltd, it is the EPA's view that the Proponent has not provided sufficient information about the technology proposed to be used and the feedstock in order to conduct a thorough assessment.

Therefore, the EPA cannot support the proposal in its current form.

H) Contaminated Sites Assessment

The EPA required the Proponent to assess the current levels of soil, water and groundwater contamination at the site to obtain a baseline and also to assess the potential for contamination from the Proposal. The EPA has identified some gaps that need to be addressed prior to construction activities commencing at the site. Additional detail is provided in Attachment B.

I) Water-related assessments

The EPA required the Proponent to provide details regarding the management of surface water and waste water at the proposed site and its potential impacts. The EPA reviewed the various assessments that discussed water management at the proposed facility and has provided comments in Attachment B.

ATTACHMENT B – DETAILED COMMENTS

A) GENERAL COMMENTS – EPA

Are covered in Attachment A.

B) REVIEW OF HUMAN HEALTH IMPACT ASSESSMENT – EPA

Documents reviewed

- *The Next Generation NSW Pty Ltd, Energy from Waste Facility Eastern Creek, Human Health Risk Assessment* (Fichtner, Issue No. 6, 20 March 2015) (HHRA);
- *Energy from Waste Facility – Air Quality and Greenhouse Gas Assessment* (PEL, Revision 2, 26 March 2015) (AQA); and
- *Environmental Impact Statement – The Next Generation NSW Energy for Waste Facility, Eastern Creek* (Urbis, April 2015) (EIS).

1. Additional information and clarification are required to clearly demonstrate all chemicals of potential concern have been considered in the assessment of health risks.

Summary of issue: The HHRA considers chemicals of potential concern (COPC) identified under the Industrial Emissions Directive (2010/75/EU) (the IED), and which are included as "toxic air pollutants" in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (the Approved Methods), or are included in the US EPA Human Health Risk Assessment Protocol COPC database for the assessment of long term effects (Section 2.2).

However the COPC does not clearly demonstrate that all chemicals of potential concern have been considered in the assessment of health risks. In particular the HHRA does not:

- identify other potential pollutants that may potentially be emitted in significant quantities including metals such as beryllium and silver; or asbestos; or
- clearly prioritise and justify the chemicals that need to be considered in a quantitative risk assessment.

Proponent response: The Proponent notes:

- the COPC that are known to impact human health have been identified in Section 2.2; and
- asbestos containing waste will not be accepted and therefore no asbestos fibres will be released. Consequently asbestos emissions have not been considered in the HHRA.

EPA comment: The EPA notes:

a. the HHRA has not been revised to provide further clarification and information to clearly demonstrate all chemicals of potential concern have been considered, or why potential chemicals of concern have not been considered. Rather the Proponent reiterates in its response to this issue (#37 under the Air Quality and Human Health Section in the document titled "Consolidated Agency Feedback from Test of Adequacy December 2014") that the pollutants considered are those which have emission limits under the IED and which are "toxic air pollutants" in the Approved Methods and included in the USEPA HHRA protocol database;

b. Section 2 of the HHRA includes hydrogen chloride as a chemical of potential concern but does not include hydrogen fluoride. The HHRA does not provide clarification why this is the case. In addition a limit for hydrogen fluoride is not included in the National Environment Protection (Ambient Air Quality) Measure, however the HHRA does not justify the use of any limit value used to assess impacts associated with hydrogen fluoride;
c. copper, cobalt, manganese and vanadium have emission limits in the IED however are not considered for the purpose of the HHRA. The HHRA does not provide clarification why this is the case; and
d. despite the facility not accepting asbestos containing waste, it is possible that asbestos contamination (including friable asbestos) may exist in waste brought to the facility for processing. To ensure asbestos is not present in process feed material, a management framework that ensures the acceptability of materials at the facility must be developed and effectively implemented at the facility.

The EPA requires the Proponent include in the HHRA additional information and clarification so that it clearly demonstrates:

- ***all significant species that may be emitted from the facility have been identified and evaluated; and***
- ***all relevant COPC have been considered in the assessment of potential health risks.***

2. Additional information and clarification is required to clearly demonstrate the assessment identifies and includes all potential and significant exposure pathways.

Summary of issue: It is unclear if all potential exposure pathways have been identified and are considered. Justification is required to dismiss identified pathways that may be insignificant or unlikely.

Proponent response: The HHRA has been amended to:

- clarify the choice of a farmer receptor as conservative with respect to consumption of home-grown chickens and their eggs (Section 4.1);
- justify why exposure pathways via dermal absorption, groundwater exposure, surface water exposure and fish consumption, have been excluded for dioxin intake (Section 4.2);
- include information from the USEPA and HMIP regarding dermal absorption of dioxins from exposure to soil and groundwater which indicate these exposure pathway are only very minor and negligible risk contributors compared to other significant pathways. Consequently the dermal absorption and groundwater exposure pathways are considered to be an insignificant risk and therefore has been excluded from the assessment (Section 4.2.1);
- note that USEPA have concluded that dioxin build up in groundwater is insignificant over times relevant to human exposure is very small, and consequently the groundwater pathway has been excluded from the assessment (Section 4.2.2);
- note that exposure to surface water can occur via deposition of emissions directly onto surface water such as rainwater tanks and local drinking water supplies (Section 4.2.3);
- note that drinking water supplies are generally treated to remove contaminants, and that rainwater tanks have a small surface area and consequently a limited potential for deposition and build-up of COPC, and consequently this exposure pathway is excluded from the assessment (Section 4.2.3); and
- note that fish consumed would not be sourced from those caught in close proximity to the facility and consequently this exposure pathway is excluded from the assessment (Section 4.2.4).

EPA comment: The EPA notes:

a. the HHRA does not provide any detailed evaluation or justification of the USEPA and HMIP methodology and assumptions to demonstrate they are acceptable for use in assessing impacts from the Project. In addition the HHRA should assess impacts associated with any relevant

exposure pathway where it cannot be conclusively demonstrated that the pathway will not be a significant contributor to Project risk;

b. Section 4.2 of the HHRA appears to only refer to dioxins, however it is unclear if the HHRA has also considered or assessed all relevant exposure pathways for the other COPC. In addition, Section 2.1 of the HHRA refers to the need to include all relevant exposure routes for pollutants that accumulate in the environment and for which inhalation is only one of the potential exposure routes (relevant to dioxins, PCBs and heavy metals). However the HHRA does not further elaborate or justify if and what exposure pathways are assessed for heavy metals;
c. with respect to exposure from surface water collected in rainwater tanks, it is unclear if the HHRA considers the entire surface from which surface water is collected, which can be significant where large roofs are used as surface water catchment. This is important as a large surface area is likely to increase COPC levels entering the tank. In addition, rainwater tank water is likely to be ingested at least in some circumstances, and many rainwater tank systems are unlikely to have any associated treatment system. Consequently the HHRA should provide further site specific information and justification if this exposure pathway is to be excluded from the assessment; and
d. the HHRA references (Section 3.2) risk assessment methodologies and recommendations in the National Health and Medical Research Council document *Cancer Risk Assessment Methodology: A Review and Recommendations – Draft for public consultation* (2010). However it is unclear why the HHRA refers to this draft document when the relevant Australian guideline document for undertaking environmental health risk assessment is the enHealth document *Environmental Health Risk Assessment – Guidelines for assessing human health risks from environmental hazards* (2012).

The EPA requires the Proponent include in the HHRA additional information and clarification so that it clearly demonstrates:

- ***it has adequately considered and evaluated all relevant potential exposure pathways and COPC in the context of the Project, and relevant Project specific parameters and potential sensitive receptors; and***
- ***it justifies that the USEPA and HMIP methodology and assumptions used are applicable to assessing impacts from the Project.***

3. The HHRA should consider receptors located in the Eastern Creek Industrial Estate and any other potential future receptors that may be impacted by Project emissions.

Summary of issue: The HHRA does not include in the definition of sensitive receptors nearby locations such as the Eastern Creek Industrial Estate where people work.

Proponent response: The Proponent has amended the HHRA to include reference to receptors located in the Eastern Creek Industrial Estate. However the Estate is not assessed as a specific sensitive receptor as the ingestion pathways are not likely to be relevant for workers in the Estate, and in addition, the worst case scenario includes a receptor which is located at the point of maximum annual mean process emissions.

EPA comment: The EPA notes:

a. the HHRA does not include any detailed description or map of the sensitive receptors relevant to the Project, nor is any detailed description or map of other relevant features such as land uses or proposed/potential land uses provided;
b. the HHRA must provide information and clarification that all potential, including future likely receptors and exposure pathways have been considered and assessed where necessary; and
c. the worst case scenario includes exposure at the point of maximum impacts from annual mean process emissions. The HHRA does not include:
    - any information on, or discussion of, predicted ground level air impacts;
    - detailed information and discussion on how the annual mean process emissions were determined;

- justification why annual mean process emissions are appropriate to use in the assessment. ie. this parameter results in a conservative assessment and/or is consistent with potential worst case exposure; and
- also see Issue 4 below.

The EPA requires the Proponent include in the HHRA additional information and clarification so that it clearly demonstrates:

- ***all current and potential future sensitive receptors and relevant exposure pathways have been identified and considered; and***
- ***how exposure concentrations were calculated and what assumptions and uncertainty are associated with their estimation. ie. that exposure concentrations have been derived in a conservative manner with respect to estimating Project risks.***

4. The HHRA should provide sufficient detailed information on the IRAP model to demonstrate it is appropriate for use under Project conditions. In addition sufficient information should be provided to allow verification of the assessment.

Summary of issue: The HHRA does not include details of the IRAP model, or air quality model results and consequently it is not possible to verify model outputs such as the predicted impacts.

Proponent response: The Proponent has included IRAP model equations in Appendix E (as a copy of Chapter 5 of the manual of the *US EPA Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*) and IRAP inputs, results and outputs, in HHRA Appendix B, C and D respectively.

EPA comment: The EPA notes:

a. the HHRA does not include detailed discussion and justification of the IRAP model or the assumptions used, to demonstrate they are suitable and relevant for the Project. The HHRA also does not clearly reference literature used for the model inputs or literature used to demonstrate the input values used are appropriate for Project use; and
b. the HHRA lacks clarity on how COPC air concentrations have been calculated and used in the assessment of health risks.

The EPA requires the Proponent include in the HHRA additional information and clarification so that it clearly justifies the use of the IRAP model, and demonstrates how COPC air concentrations have been calculated and used in the HHRA.

5. Confirmation is required that the toxicity factors used in the HHRA are appropriate.

Summary of issue: The HHRA does not clarify that the chosen toxicity factors are consistent with Australian based toxicity factors and health criteria, as recommended in the enHealth Guidelines (2012).

Proponent response: The Proponent notes Australian based health criteria have been used where possible and USEPA toxicity factors can be applied where Australian specific sources are not available. The Proponent states this is consistent with NHMRC recommendations.

EPA comment: THE EPA note:

a. The HHRA uses USEPA toxicity factors (Section 3.2.1.3) and states these are a level 1 source and acceptable to use in lieu of any Australian specific sources. In contrast the enHealth Guidelines (2012) states (Section 5.12) that Australian guidance values should take precedence over other sources provided they are reasonably current, however other level 1 sources may be more useful where it can be established that they are based on more recent data or set using more contemporary risk assessment methodologies.

The EPA requires the Proponent provide clarification that the chosen toxicity factors are appropriate for use for the Project ie. have been sourced from Australian guidance where possible and as recommended by the enHealth Guidelines.

6. Summary and issues with estimated risk levels & 6a) Clarification regarding carcinogenic effects (Section 7.3).

Summary of issues: The HHRA incorrectly states the lifetime cancer risk for all sensitive receptors is less than 10^{-6}. Also, clarification is required to specify whether the Project has considered and meets the NSW HIPAP risk criteria.

Proponent response: The Proponent has updated the analysis of the cancer risks. The HHRA also references the HHRA references the NSW government document Risk Criteria for Land Use Safety Planning, and compares the calculated Project risk values with the risk values in the Risk Criteria for Land Use Safety Planning document.

EPA comment: THE EPA note:

a. the HHRA still incorrectly states the lifetime cancer risks for all sensitive receptors is less than one in a million. The lifetime cancer risk values for adults and a child farmer (in Table 7.4) are above one in a million;
b. predicted annualised cancer risks have been derived, however the annualised risks derived are applicable to hazard analysis and fire risk assessment, rather than lifetime cancer or chronic risks. Consequently reference, discussion and calculations related to the Risk Criteria for Land Use Safety Planning may be better suited to the Hazard Analysis and Fire Risk Assessment (Appendix V in the EIS submitted for adequacy review);
c. the enHealth Guidelines (2012) (Section 5.10) refer to target risk levels and their acceptability; and
d. the NSW Approved Methods for the Modelling and Assessment of Air Pollutants (DEC, 2005) (the Approved Methods) also refers to the acceptance criteria for risk and hazard index with respect to complex mixtures of toxic air pollutants (Section 7.3). Reference to the requirement for best practice (for air toxics mitigation) is included in the acceptance criteria table in the Approved Methods (Table 7.3). Demonstration that current international best practice techniques will be used is required by the NSW Energy for Waste Policy Statement.
e. THE EPA notes the Project AQA (EIS Appendix L) contains a summary of best available techniques (BAT) (AQA Section 7.1) used to control emissions (by flue gas treatment) from waste incineration at existing energy from waste facilities. The proposed emission controls for the Project are designed to meet the in-stack concentration limits for waste incineration set in the IED. The summary of BAT for emission control (AQA Section 7.1.2) and review of emission performance (AQA Section 7.2) at existing facilities is used to demonstrate the proposed emission controls will satisfy the emission limit requirements of the IED. [*Note: THE EPA has not undertaken a review or comparison of the proposed emission controls for the proposed facility against international best practice, or a review of emissions data from existing facilities.*]

The EPA requires the HHRA to be amended to:

- ***correctly state that lifetime cancer risks above 10^{-6} were estimated for adults and the child farmer scenario;***
- ***reference appropriate target risk levels; and***
- ***reference Project documentation that demonstrates the Project will be using current international best practice techniques for process design and control, and, emission control equipment design and control (which is also required by the NSW Energy from Waste Policy Statement).***

6b. Requirement for the HHRA to include results of the calculated hazard quotients and hazard indexes (Section 7.2).

Summary of issue: The HHRA does not include results of the calculated hazard quotients or hazard indexes. Consequently it is not possible to verify the calculated hazard index values used to assess Project non-carcinogenic risks.

Proponent response: The HHRA has been updated to model (IRAP) inputs, outputs and results in HHRA Appendix B, C and D respectively.

EPA's recommendation: See Issue 4) above.

6c. Relates to issues with dioxins and furans which are dealt with elsewhere in this document.

6d. Requirement for the HHRA to include information to allow the assessment finding to be verified.

Summary of issue: The HHRA omits or generally presents minimal details of the HHRA methodology, calculations and input data used to estimate Project risks.

Proponent response: The HHRA has been updated to include some additional information.

EPA comment: THE EPA notes:

a. the HHRA still lacks detailed information and discussion required to ensure the assessment is comprehensive, site specific, and verifiable.

The EPA requires the HHRA to be revised to include additional information and details of the methodology, input data, and calculations used to estimate and assess Project risks so it is comprehensive and allows each of the assessment findings to be verified if required. The HHRA should follow the guidance outlined in the enHealth Environmental Health Risk Assessment (2012) document.

7. Clarification is required to demonstrate information used in modelling is site specific and appropriate.

Summary of issue: The HHRA omits or generally presents minimal details of the HHRA methodology, calculations and input data to estimate Project risks.

Proponent response: The HHRA has been updated to include additional information to address the issue.

EPA comment: The EPA notes:

a. some additional information has been added to the HHRA to demonstrate ground type dependent properties are suitable and representative at the Project site, however the HHRA does not discuss the sensitivity of the model to these or other parameters used;
b. the average wind speed was calculated from 2013 BoM weather data. However the HHRA has not been updated to present an analysis to demonstrate this data is representative of wind speeds over a longer averaging period;
c. the HHRA states a review of BoM data for Horsley Park Equestrian Centre has been undertaken, however any findings from the review cannot be verified as the review is not included with the HHRA; and
d. the HHRA does not provide any sensitivity analysis or justification that the values used for parameters such as wind speed result in a conservative assessment of Project impacts.

The EPA requires the Proponent provide additional discussion and justification of the data (e.g. wind data) and assumptions used in the estimation of COPC concentrations.

8. Clarification is required about how PAH IRAP model inputs were derived and which limit values were used to derived the assessed COPC emission rates.

Summary of issue: The AQA does not model PAH or benzo(a)pyrene emissions which is required to provide annual mean concentration data to generate inputs for the IRAP (risk) modelling. In addition the HHRA does not specify what limit values were used to derive the assessed emission rates for COPC that have both daily and half hourly limit values.

Proponent response: The HHRA has been updated to include additional emissions information in Table 6.4.

EPA comment: The EPA notes:

a. the HHRA still lacks clarity with respect to the estimated emission rates for COPC (Table 6.4);
b. the units have not been specified for the emission limit values in Table 6.4, except for dioxins and dioxin like PCBs; and
c. the volumetric flow rate for emissions is not provided and therefore the calculated emission rates provided in Table 6.4 cannot be verified.

The EPA requires the Proponent provide additional information to clarify how the emission rates were derived.

9. Potential health risks associated with process upset conditions should be considered.

Summary of issue: The HHRA does not consider or assess potential impacts during periods of process upset conditions and during start-up and shut-down periods.

Proponent response: Upset and shutdown/start-up conditions are short-term events which have little effect on the long term impact of the facility.

EPA comment: The EPA notes:

a. the HHRA has been amended to include some additional information and discussion on upset process conditions (Section 7.5). However additional detail is require to clearly demonstrate and justify the potential for risks during non-standard operating conditions, such as upset, shutdown, start-up and emergency conditions.

The EPA requires the Proponent provide additional information and discussion to assess the potential for risks during non-standard operating conditions, such as upset, shutdown, start-up and emergency conditions.

10. Health impacts associated with potential cumulative and background emissions should be considered.

Summary of issue: The HHRA to clarify if there are any nearby COPC sources or elevated background COPC levels that might warrant an assessment of health risks associated with cumulative exposure to these COPC.

Proponent response: The approach used to assess dioxins considers the mean dietary intake for Australians, however the recommended risk based approach for the other COPC does not consider existing levels as it considers increased risk associated with the facility only (Section 3.2.1.1) .

EPA comment: The EPA notes:

b. the HHRA notes that no significant sources of dioxins or furans or dioxin like PCBs have been identified in the area (Section 3.1) however no justification to this statement is provided; and
c. the HHRA (Section 3.3) has not considered existing background exposures for COPC (apart for some limited discussion regarding dioxins and furans), or potential nearby or relevant sources which may result in cumulative impacts. Consideration of background exposures and potential sources of COPC that may result in cumulative impacts, assists to demonstrate Project impacts have been robustly considered in the context of the location of the facility.

The EPA requires the Proponent revise the HHRA to include additional information and discussion to demonstrate background levels of COPC and potential cumulative impacts risks have been appropriately considered.

11. New issues.

11a) Clarification why values in Table 7.2 have been reversed is required.

Summary of issue: The values in Table 7.2 for the resident and farmer scenario at the point of maximum impact appear to be reversed compared to the same table in the HHRA submitted for adequacy review. However it is not clear why this is the case, and no explanation is provided.

The EPA requires the Proponent clarify and/or revise the HHRA to address this issue.

11b) Clarification why data in Tables 7.3 and 7.4 have changed is required.

Summary of issue: The values in Tables 7.3 and 7.4 have changed slightly compared to the same tables in the HHRA submitted for adequacy review, possibly due to changes to assumptions, input values or air emissions modelling.

The EPA requires the Proponent clarify and/or revise the HHRA to address this issue.

12. New minor issues.

12a) ELV is not defined as "emission limit value" eg footnote 4 in Section 2.2 and elsewhere. AQO is not defined in the HHRA (Section 2.2).

12b) The criteria pollutants in the *National Environment Protection (Ambient Air Quality) Measure* include nitrogen dioxide and sulfur dioxide - not "oxides of nitrogen" and "oxides of sulphur" (AQA Section 2.2).

13. (New issue) Additional detailed consideration of potential health impacts associated with exposure to ozone is required.

The EPA notes:

- the Project Ozone Impact Assessment (OIA) compares predicted ground level ozone concentrations with the 1-hour and 4-hour ambient air quality standards contained in the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM), and also against incremental criteria under the proposed ozone assessment framework (OIA Section 4);
- the OIA indicates the potential for the Project nitrogen oxide emissions to result in a significant increase in ambient ozone levels that are above the maximum allowable increase of 1 ppb (under the proposed ozone assessment framework) on specific occasions and at particular locations generally within the south and southwest of Sydney (OIA, Section 10.2);
- despite the demonstrated potential for a significant increase in ambient ozone levels, the HHRA does not consider or include a detailed assessment of potential health risks from ozone; and

- any detailed assessment of potential health impacts associated with exposure to ozone should consider health response information (i.e. exposure-response relationships from epidemiological studies) provided in recent discussion papers associated with review of the AAQ NEPM, and other jurisdictions where appropriate.

The EPA requires the Proponent revise the HHRA to include detailed consideration of potential health impacts associated with exposure to ozone.

B) REVIEW OF HEALTH IMPACT ASSESSMENT – ENRISKS

Please see Attachment C for the full Report.

C) REVIEW OF AIR QUALITY & GREENHOUSE GAS ASSESSMENT – EPA

Documents reviewed

- PEL (2014a) Energy from Waste Facility – Air Quality and Greenhouse Gas Assessment The Next Generation, 8 September 2014
- PEL (2014b) Energy from Waste Facility – Ozone Impact Assessment The Next Generation, 20 June 2014
- Urbis (2015) Environmental Impact Statement, The Next Generation NSW Energy from Waste Facility, Eastern Creek, April 2015
- PEL (2015a) Energy from Waste Facility – Air Quality and Greenhouse Gas Assessment. The Next Generation, 26 March 2015
- PEL (2015b) Energy from Waste Facility – Ozone Assessment. The Next Generation, 14 April 2015
- PEL (2015c) Energy from Waste – Odour Assessment The Next Generation 24 February 2015

ASSESSMENT OF EXHIBITED REPORT AGAINST ISSUES RAISED DURING ADEQUACY

1. Insufficient information regarding the diesel generators

This issue has not been satisfactorily resolved.

The proposed development includes two emergency 2.4MWe diesel generators. The diesel generators will provide sufficient power for the four incineration lines. Section 3.15 of Urbis (2015) states the emergency diesel generators will be used in the following situations:

- In case of a fire, the power for emergency lighting, firefighting pumps;
- During the simultaneous occurrence of the following when operating at full load (100%):
  - High voltage (HV) electric grid blackout in the Eastern Creek area or the whole of Sydney requiring island mode operation of the EfW plant; and
  - An extremely hot day with ambient temperatures above 37°C causing a turbine trip and necessitating a shutdown of the whole EfW plant.

In such a situation one emergency diesel generator would be required for the safe shutdown of the whole plant and the other for a black start of one line.

- Routine testing and maintenance (one hour per month).

The diesel emergency generators will not be used on a continuous basis. In an event requiring a safe shutdown and black start the diesel generators will be operating for a minimum of 2 hours with a maximum of 6 hours for a black start if the plant shutdown is over a longer period. The proposed engines are US EPA Tier 2 compliant.

PEL (2015a) provides the mass emission rates (g/s) for the emergency diesel generators and compares them to the EfW facility mass emission rates during normal operations. The emissions from the diesel generators account for up to 20% of the emissions released from the EfW facility during normal operation.

PEL (2015a) does not provide an estimate of the concentration of emissions from the diesel generators and their compliance with the relevant emission standards in the Protection of the Environment Operations (Clean Air) Regulation 2010 (Clean Air Regulation). PEL (2015a) incorrectly states that the generators are exempt from the in-stack concentration limits that would normally apply, as per clause 57A of the Clean Air Regulation as they will operate less than 200 hours per year. Clause 57A of the Clean Air Regulation exempts emergency generators operating less than 200 hours per year from the NO_X emission standards in Schedule 4. The emergency generators must comply with all other relevant Clean Air Regulation emission standards.

The potential air quality impact of the diesel generators has not been assessed quantitatively. PEL (2015a) considers the emergency diesel generators do not pose a significant potential for adverse impacts due to their infrequent use (one hour each month) and the relatively large distance between the EfW facility and nearest sensitive receptors.

The diesel generators are a source of air emissions, the emissions discharge at a significantly lower height than the EfW Facility and there is the potential for adverse air quality impacts when operated in conjunction with the EfW facility (such as during the monthly testing). The EPA therefore considers the air quality impact assessment should be revised to include the diesel generators as a source of air emissions.

PEL (2015a) includes additional information regarding the diesel generators *'....diesel generators are installed for start-up and to maintain the furnace temperature if required'.* The use of diesel generators to maintain the furnace temperature is not mentioned elsewhere in the documentation and should be confirmed and further details provided.

The EPA requires that the proponent provides the following additional information regarding the emergency diesel generators:

- ***Confirmation and further details regarding the use of diesel generators to maintain the furnace temperature;***
- ***Concentration of air emissions from the diesel generators and their compliance with the relevant Clean Air Regulation emission standards; and***
- ***Revised air quality impact assessment which includes the two diesel generators as a source of air emissions.***

2. No demonstration of suitability of secondary combustion chamber 850°C minimum operating temperature.

This issue has not been adequately addressed.

The NSW Energy from Waste Policy Statement specifies a number of technical criteria for energy recovery facilities, including the minimum temperature and residence time of the gas resulting from the process:

'The gas resulting from the process should be raised after the last injection of combustion air, in a controlled and homogenous fashion and even under the most unfavourable conditions to a minimum temperature of 850°C for at least 2 seconds....If a waste has a content of more than 1% of halogenated organic substances, expressed as chlorine, the temperature should be raised to 1,100°C for at least 2 second after the last injection of air.'

The design of the proposed Energy from Waste Facility includes a secondary combustion chamber to optimise flow conditions and temperature profile, reduce CO concentration and improved burnout of the flue gas. In the secondary combustion chamber a minimum flue gas temperature of 850°C is proposed together with a residence time of 2 seconds.

During the adequacy review, the EPA requested the final EIS includes data to demonstrate that the chlorine content of the waste will be 1% at all times to confirm the suitability of the proposed secondary chamber flue gas temperature of 850°C.

Urbis (2015) and PEL (2015a) state the annual average chlorine content of the waste will be less than 1%. An annual average chlorine content is not sufficient and the proponent must commit to maintaining the chlorine content of the waste less than 1% at all times.

Urbis (2015) discusses the differences between the NSW Energy from Waste Policy statement and the European Union (EU) Industrial Emissions Directions (IED) regarding the minimum temperature and the chlorine content of the waste. The NSW Energy from Waste Policy statement requires a minimum temperature of 1100°C for *'waste'* with halogenated organic substance content of more than 1%, expressed as chlorine, compared to the EU IED position that an 1100°C operating temperature is required for *'hazardous waste'* with halogenated organic substance content of more than 1%, expressed as chlorine'. The NSW Energy from Waste Policy statement was developed specifically for facilities in NSW proposing to thermally treat waste or waste-derived materials for the recovery of energy. A number of resources were referenced during the development of the policy statement, one of which was the EU IED.

The EPA acknowledges the differences in the wording between the EU IED and the NSW Energy from Waste Policy statement. However, the requirement for an operating temperature of 850°C in the EU IED is for municipal waste incinerators, which includes waste from households, as well as commercial, industrial and institutional waste where the chlorine content of the waste is managed to be less than 1% at all times. The fuel for the proposed EfW facility is not just municipal waste but also a range of other fuel types (e.g. paper pulp, auto shredder residue, etc). These other fuel types may be classified as hazardous in the EU. For example, the EPA notes that auto shredder residue has been classified as a hazardous waste in the EU (http://www.aidic.it/icheap9/webpapers/249Granata.pdf). Interestingly, BAT for hazardous waste incinerators feeding wastes of highly varying composition and sources[1] includes wet flue gas treatment to provide for improved control of short term air emissions.

Another issue raised in Urbis (2015) is that a plant operating at 1100°C prevents efficient energy recovery. The EPA considers further more detailed explanation of the issues with the current technology that prevents efficient energy recovery at the higher temperatures needs to be provided.

The EPA requires the proponent to identify the expected chlorine content of the waste for the proposed EfW plant. This is the chlorine content that will be maintained at all times and not an annual average. Further, more detailed information must be provided regarding the issues with the current technology such that efficient energy recovery is prevented when operating at a temperature of 1100°C.

[1] http://eippcb.jrc.ec.europa.eu/reference/BREF/wi_bref_0806.pdf

3. Inconsistencies in air quality impact assessment

This issue has not been satisfactorily resolved.

Section 1.1 of PEL (2014a) provides the background to the proposed Energy from Waste Facility including the source of the waste that will power the facility. This information has not been updated from the adequacy review. Section 1.1 states that the facility will have a total capacity of 1.35 million tonnes of waste per annum and up to 500,000 tonnes per annum will be obtained from external sources and 850,000 tonnes per annum will be sourced from the waste already received at the neighbouring Genesis Xero Waste Facility. This information is inconsistent with section 10.4.2 of Urbis (2015) which outlines the source and composition of the residual waste fuel. According to Urbis (2015) phase 1 of the project (lines 1 and 2) requires 552,000 tonnes per annum, 23% of which will be chute residual waste from the MPC and the remainder from third party authorised facilities. Construction of lines 3 and 4 will be delayed until eligible material inputs for these lines can be confirmed to the satisfaction of the Department of Planning and Environment and the EPA.

The EPA requires that the information in the EIS regarding the source of the fuel should be reviewed to ensure it is consistent throughout the document.

4. Meteorological data is not demonstrated to be site representative

This issue has not been satisfactorily addressed.

The air quality impact assessment uses year 2013 meteorological data sourced from the NSW Office of Environment and Heritage (OEH) monitoring site at St Mary's, approximately 5 kilometres (km) west of the site. Other options for meteorological data includes the Bureau of Meteorology (BoM) Horsley Park Equestrian Centre Automatic Weather Station, located approximately 6 km southeast of the site and the OEH Prospect monitoring station located approximately 6km east of the site.

PEL (2015a) states that the St Mary's monitoring station is closest to the site and considered to be the most representative in terms of land use and surface roughness. As in the adequacy review, no further information is provided to support this statement. A review of surrounding land uses by the EPA shows that either the St Mary's or Horsley Park Equestrian meteorological data could be appropriate for the project site. There are, however, differences in the wind roses for the two sites. St Mary's has lighter winds from discrete wind directions whereas Horsley Park Equestrian Centre generally has stronger winds from a greater number of wind directions. St Mary's has a higher percentage of calm conditions.

PEL (2015) considers the use of St Mary's meteorological data with a higher percentage of calms provides an additional level of conservatism in the predicted ground level concentrations. This is because calm conditions are often a function of temperature inversions and are associated with poor dispersion conditions. However, the EPA considers given the elevated discharge height of 100m (approximate height of an inversion during winter) and an exit temperature of 120°C the plume could penetrate the inversion, get trapped in the layer above and result in lower ground level concentrations. If such a situation occurs, the use of the St Mary's meteorological data will not result in a more conservative assessment of air quality impacts. ***Given the importance of the meteorological data in the assessment, the EPA considers the proponent be required to demonstrate the use of the St Mary's meteorological data (as opposed to the Horsley Park meteorological data) results in a more conservative assessment of air quality impacts.***

During the adequacy review it was raised that PEL (2014a) did not demonstrate the year 2013 meteorological data adequately describes the expected long term meteorological patterns at the site. The *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* requires site-representative meteorological data to be correlated against a longer duration site-representative meteorological database of at least five (preferably consecutive) years to be deemed acceptable. PEL (2015) has presented an

analysis of five years of meteorological data from Horsley Park and adequately demonstrated the meteorological conditions during 2013 are representative of the expected meteorological patterns at the site.

The EPA requires that further information should be provided to demonstrate that the St Mary's meteorological data results in a more conservative assessment of air quality impacts.

4. No assessment of ammonia emissions

This issue has been satisfactorily addressed.

During the adequacy review the EPA raised the issue that there was no discussion regarding the risk of ammonia slip from the flue gas treatment system or assessment of the impact of ammonia emissions from the facility.

PEL (2015a) includes an assessment of ammonia emissions from the facility. An ammonia slippage of 3 mg/Nm^3 has been assumed, which is low given the range of normal slippage is between 1 mg/Nm^3 and 10 mg/Nm^3. At an emission concentration of $3mg/Nm^3$, the maximum predicted ground level concentration of ammonia is 0.001 mg/m^3 which easily complies with the EPA's assessment criterion of 0.33 mg/m^3. A worst case ammonia slippage of $10mg/Nm^3$ was assessed as part of the upset conditions scenario and the maximum predicted ground level concentration of 0.0028 mg/m^3 also easily complies with the EPA's assessment criterion.

5. No presentation of $PM_{2.5}$ assessment results

This issue has been satisfactorily addressed.

The EPA identified during the adequacy that the results of the $PM_{2.5}$ impact assessment are not presented in the main body of the report. PEL (2015a) tabulates the results of the $PM_{2.5}$ impact assessment and has clarified the relevant size fraction of particulate.

ADDITIONAL AIR QUALITY ISSUES IDENTIFIED WITH THE PUBLICLY EXHIBITED ASSESSMENT

1. Cumulative impacts must be assessed at likely future sensitive receptors

The project site is located within the Eastern Creek Precinct, in Central Western Sydney, 18 kilometres west of Parramatta and 12 kilometres east of Penrith. Land surrounding the site is owned by:

- The Corporate Group Alexandria Landfill Pty Ltd;
- ThaQuarry Pty Ltd;
- Australand;
- Hanson;
- Jacfin;
- The Department of Planning and Environment; and
- Sargents.

Urbis (2015) states that the above sites are identified for redevelopment for higher end industrial and employment uses over the next decade under the State Environmental Planning Policy (Western Sydney Employment Area). The land surrounding the project site represents future sensitive receptors and the impact of the project on the surrounding land must be assessed in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.

PEL (2015a) presents the highest predicted ground level concentration at and beyond the site boundary and at sensitive receptors. Cumulative impacts are however presented only for identified sensitive receptors excluding those areas listed above. The proponent must also assess the cumulative impacts of the project at all likely future sensitive receptors.

The EPA requires that the Proponent assess the cumulative impacts of the project at existing and likely future sensitive receptors as outlined in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.

2. NSW Legislation does not provide for upset conditions

PEL (2015a) makes reference to the plant being designed to meet the following EU Industrial Emissions Directive (IED) requirement regarding duration of elevated emissions during upset conditions:

'such events shall under no circumstances occur for more than four hours uninterrupted where the emission values exceed the limits and no more than 60 hours per year.'

The proponent must note that there is no reference to allowable number of hours the emission limits can be exceeded during upset conditions or the maximum number of hours per year. The emission limits in the Clean Air Regulation and Environment Protection Licence are 100th percentile and must be complied with at all times.

The EPA requires that the Proponent is advised of the requirements to comply with the Clean Air Regulation and EPL limits at all times and that there are no requirements in NSW legislation or policy document regarding allowable number of hours emission limits can be exceeded.

3. BAT for control of air emissions not demonstrated for proposed EfW plant.

Table 7-2 in PEL (2015a) provides an overview of Best Available Techniques (BAT) for EfW flue gas treatment and Table 7-3 provides the flue gas treatment at a selection of existing EfW facilities. This information is presented to demonstrate that existing technology can satisfy the emission limit requirements of the EU IED.

PEL (2015a) fails to consider the type of waste burnt at the existing facilities in Table 7-3. It is not highlighted whether or not these facilities are dedicated mixed municipal waste incineration facilities, hazardous waste incineration facilities or a combination. To demonstrate the proposed EfW facility will incorporate BAT for flue gas treatment, the proponent must make reference to an existing facility where the fuel mixture is identical to that for the proposed EfW facility.

The EPA requires that the Proponent update Table 7-3 in PEL (2015a) to include the fuel type for the existing facilities and include additional existing facilities where the fuel mixture is identical to that for the proposed EfW facility. Should no facility exist where the fuel mixture is identical to that for the proposed EfW facility, the proponent must provide additional robust justification for the proposed plant design and technology.

4. PEL (2015a) should consider impacts during process upset conditions.

Summary of issue: PEL has not considered or assessed potential impacts during periods of process upset conditions or during facility start-up and shut-down periods where the efficacy of emission controls may be reduced, and emissions may potentially exceed the IED short term limits.

Proponent response: PEL (2015a) has been amended to include consideration and assessment of start-up and shut-down periods, upset conditions, and emergency conditions. A summary of relevant information follows:

a) Start-up and shut-down conditions:

- Start-up and shut-down will occur infrequently and the facility is designed to operate continuously. Ideally the facility will only be shut down for its annual maintenance program.
- Start-up and shut-down conditions will include the use of clean support auxiliary fuel (low sulfur light fuel oil). During this time the flue gas treatment system is fully operational and emissions will be released from the 100 m stacks. The combustion of the low sulfur diesel fuel is expected to be significantly cleaner than the residual waste fuel.
- Due to the above, emissions during start-up and shut-down have not been assessed further.
- The standards of concentration prescribed by the Protection of the Environment Operations (Clear Air) Regulation 2010 (the CAR) for nitrogen dioxide and nitric oxide are exempted during start-up and shut-down scenarios (Clause 57A).

b) Upset conditions:

- Upset conditions can occur for a number of reasons and generally result in the operator reducing or shutting down operations as soon as practicable until normal operations can be restored. The design requirements for the facility are in accordance with the IED. Consequently upset events shall not occur for more than four hours uninterrupted where the emission value exceeds the limit, and for no more than 60 hours per year.
- PEL (2015a) notes that plausible in stack concentrations during upset conditions may exceed relevant CAR limits for particulate matter, cadmium and mercury. However the PEL (2015a) states these conditions are highly unlikely to persist or occur at a significant frequency.
- The highest predictions of ground level concentrations at and beyond the site boundary during upset conditions exceed the chosen assessment criteria for hydrogen chloride, cadmium, mercury, and dioxins and furans. However, due to the low probability of upset conditions resulting in actual ground level concentrations exceeding the assessment criteria, the predicted frequency of exceedance per year for each of the pollutants is very small (the maximum predicted frequency of exceedance is for cadmium and is predicted to be 0.077%).
- In the event of upset conditions, strict management measures must be designed and effectively implemented to ensure elevated emissions are minimised.

c) Emergency conditions:

- Two emergency diesel generators will be dedicated to ensure safe shutdown during emergency conditions. Each generator will have a capacity of 2.4 MW to provide sufficient power for the four incineration lines.
- PEL (2015a) states the emergency generators will not be used during normal operation of the facility and the probability of emergency occurrence is estimated to be once every ten years (PEL, 2015a, Section 2.5), in addition to a single hour each month (~12 hours per year) (PEL, 2015a, Section 7.6). In the event of an emergency shutdown the generators are anticipated to be required to run for between two and a maximum of six hours (PEL, 2015a, Section 2.5).
- The pollutant mass emission rates for the diesel generators are estimated to be up to 20% of normal emissions from the facility (for carbon monoxide, nitrogen oxides and particulate matter. See PEL, 2015a, Table 7-6). However, the discharge point from each generator is much lower than the 100 m stall stacks.
- Due to the infrequent use of this plant and the relatively large distance between the facility and the nearest sensitive receptor, air quality impacts due to emergency conditions have not been quantitatively assessed, with PEL (2015a) stating this aspect of the facility would not pose a significant potential for adverse impacts.
- Emissions of nitrogen dioxide and nitric oxide from the generators will be exempt from the in-stack concentration limits as the emergency generators will operate for less than 200 hours per year (see CAR clause 57A).

EPA comment: The EPA notes the following:

- consideration and assessment of start-up and shut-down periods, and upset and emergency conditions provides detailed information that allows a robust evaluation of impacts during these scenarios. This will help to ensure adequate planning and management is undertaken and implemented so that any potential impacts during these periods will be minimised.
- regarding the assessment of upset conditions:
    - Section 9.1.2 refers to the predicted frequency of exceedance per year for each pollutant, however this data has not been provided in PEL (2015a), so the resultant probabilities of exceedances (for hydrogen chloride, cadmium, mercury, and dioxins and furans) cannot be verified; and
    - due to the potential for Project assessment criteria to be exceeded, the Proponent will need to develop and implement efficient and appropriate management strategies that will ensure emissions will be minimised during these periods.
- regarding the assessment of emergency conditions:
    - the emission release height from the diesel generators should be stated, if they are known; and
    - PEL (2015a) should note that the exemption under CAR clause 57A only applies to emissions of nitrogen dioxide and nitric oxide.

The EPA requires the Proponent revise the assessment to:

- ***include additional information on the predicted frequency of exceedance per year for each pollutant under upset conditions;***
- ***clarify the release height (if known) for emissions from the diesel generators; and***
- ***clarify clause 57A of the CAR applies to nitrogen dioxide and nitric oxide only.***

5. Clarification is required regarding the assessment of chlorine emissions.

Summary of issue: PEL (2015a) (Section 7.3) refers to the Deacon equilibrium shifting to the left side when combustion occurs releasing water vapour. However combustion (the introduction of oxygen on the left side of the equation) shifts the equilibrium to the right side (resulting in the release of water vapour and chlorine). Additional water will shift the equilibrium to the left. The text appears to require amendment or clarification.

Despite the above and PEL (2015a) referencing chlorine as a potential emission in the IED (PEL, 2015a, Section 4.1), chlorine emissions do not appear to have been assessed.

Of note, PEL (2015a):

- includes predicted model results for chlorine in the Executive Summary; and
- elsewhere states that chlorine emissions have been considered as hydrogen chloride (Table 7-4).

The EPA requires the Proponent provide clarification on the assessment of chlorine emissions.

6. Clarification regarding stack exit parameters is required.

Summary of issue: The stack flow parameters (Table 7-8 in Section 7.8) have doubled from those presented in the assessment submitted for adequacy review. The resulting gas exit velocity is very large (35.8 m/s) and is likely to have implications regarding Aviation safety. Clarification should be provided to justify the change and to demonstrate appropriate potential impacts have been assessed.

The EPA requires the Proponent provide clarification on the stack flow parameters presented in Table 7-8, and potential impacts regarding aviation safety have been considered.

7. Minor issues (new).

7a) Impact assessment criteria for "air toxics" (PEL (2015a) Section 4.4) are applied "at and beyond the boundary of the facility".
7b) Section 4.5.1 (on hydrogen sulphide) is not a subsection of Section 4.5 (on load based licensing).
7c) The values specified in Table 4-7 for "Population of affected community" are the wrong way around. See Approved Methods Table 7.4b for correct values.
7d) Section 7.3 refers to the reference "Fichtner 2014" however the reference list does not contain this reference. The correct reference should be provided and if it is not readily available should be included as an additional Appendix.
7e) The criteria for TOC (as benzene) in Table 9-1 and Table 9-2 should be 0.029 mg/m^3, as per Table 4-4.
7f) The modelling predictions in Appendix F to inform the HHRA referred to in Section 9.1.1 are not daily averages which the HHRA appears to refer to.
7g) Section 9.1.1. The reference to Section 9.1.2 is incorrect and should be 9.2.
7h) TOC in Table 7-7 (PEL (2015a) Section 7.7) should not include "as benzene".

The EPA requires the Proponent revise the assessment to address the issues identified above.

EIS - MINOR COMMENTS

1) Fichtner - HHRA is not referred to in the EIS list of the Project's consultant team in Section 1.6 of the EIS.
2) Note that at a fuel input of 1,105,000 tpa, and capacity to process up to 1,350,000 tpa of waste, the Project is significantly larger than the reference facilities listed in Section 3.5 of the EIS. The EEW facility has the highest capacity of the reference facilities (at 300,000 tpa). It is unclear how applicable these facilities are to the proposed facility.
3) Note the EIS states support burners may be required if the temperature in the secondary combustion chamber drops below 850 °C, although this is likely to happen only very rarely (Section 3.10.4). The EIS does not clarify what if any impact this may have on stack emissions and their discharge parameters.
4) The chemical formula of calcium hydroxide is $Ca(OH)_2$ (EIS Section 3.10.9) (not OH_2 which is water).
5) Emissions from the diesel generators should also be stated as compliant with the requirements of the *NSW Protection of the Environment Operations (Clean Air) Regulation 2010* (EIS Section 3.15).
6) Note a small number of typos and spelling mistakes (can advise if required).
7) The *NSW Energy from Waste Policy Statement* (NSW EPA, Jan 2015) states (Section 4) "If a waste has a content of more than 1% of halogenated organic substances, expressed as chlorine, the temperature should be raised to 1100°C...". Sufficient residence time and temperature are critical to ensure near complete decomposition of halogenated and non-halogenated organic compounds. In addition to potentially being present in the waste (fuel), toxic and thermodynamically stable chlorinated organic compounds can be produced in the emission stream via a number of different mechanisms. Proof of Performance (POP) trials as required by the *Energy from Waste Policy Statement* should be designed to robustly demonstrate the efficacy of the implemented emission controls – ie. that they meet their design specification and Project criteria.
8) The footnotes for Table 19 (EIS Section 11.4.1) are missing.

D) REVIEW OF OZONE IMPACT ASSESSMENT – EPA

ADDITIONAL INFORMATION REQUIRED FOR OZONE ASSESSMENT

Impact greater than threshold requires best practice and discussion of emission offsets.

The ozone assessment showed maximum increase in ozone concentration greater than the threshold value - 1 ppb – set out in EPA's '*Tiered Procedure for Estimating Ground-Level Ozone Impacts from Stationary Sources*'[2] (Tiered Procedure). The procedure requires best practice and discussion of management measures (e.g offsets) when impacts are greater than the threshold.

Offsets

Offsets are noted in the report, but there is no discussion of possible offsets in the Sydney basin for this facility. The Tiered Procedure requires a discussion of offsets as an additional management option when assessment shows impacts greater than the threshold.

The EPA requires the Proponent to provide a discussion of the feasibility of using offsets within the Sydney basin as an option for reducing the contribution of the proposed facility to regional ozone.

Best Practice

Table 7-2 in PEL (2015a) provides an overview of Best Available Techniques (BAT) for EfW flue gas treatment. Best practice is required where impacts are assessed greater than the criterion. Where no offset is available as a means of reducing impact, there is greater emphasis on reducing NO_x emissions.

The EPA requires the Proponent to discuss NO_x emissions from the proposal and the best practice approaches chosen to minimise them in light of the results of the investigation into potential emission offsets.

E) REVIEW OF ODOUR IMPACT ASSESSMENT – EPA

Addressed in Attachment A.

F) ALIGNMENT WITH ENERGY FROM WASTE POLICY – EPA

The *Energy from Waste Policy* states that Energy Recovery Facilities must use international best practice techniques and proven technologies to ensure that air toxics and particulate emissions are below levels that pose a risk to the community or environment. Proposals for energy recovery facilities must reference fully operational plants using the same technology and feedstock in other jurisdictions, as well as demonstrating that proof of performance testing will be undertaken to demonstrate compliance with air emissions standards. The proposal does not provide detailed references with representative data to an operational facility with the same feedstock. It is not possible to validate assessments and conclusions in the EIS without this information. If appropriate data cannot be sourced from existing facilities the proponent

[2] Available from http://www.epa.nsw.gov.au/resources/air/estimating-ground-level-ozone-report.pdf .

may be required to conduct a trial using the proposed feedstock in the proposed technology to get the appropriate representative data. In addition, the proposal does not establish that proof of performance trials will be undertaken.

The Environmental Impact Statement's Waste Management Report and supporting appendices contain limited, conflicting and inconsistent information about the source, recovery and management of the proposed waste fuel supplies for the TNG facility. This includes the following:

- Limited information about the source, supply and control of waste fuel for the proposal;
- Conflicting information within and between the Waste Management report and EIS document;
- The report states that detailed information on the sources of the feedstock for the facility was supplied to the EPA in confidence. Formal submission of detailed information has not been received by the EPA;
- Descriptions of waste throughout the Report are unclear, inconsistent and do not align with the *Energy from Waste Policy*. e.g.
    - green waste from the back end of the materials processing facility is described as an eligible waste fuel (only source-separated green waste is a listed eligible waste fuel in the *Energy from Waste Policy*);
    - biosolids are listed within the Commercial and Industrial waste stream.
- Failure to demonstrate compliance with the resource recovery criteria set out in Table 1 of the *Energy from Waste Policy;*
- Unclear and limited justification for statements and information included in the report, such as the removal of the putrescible component of from commercial and industrial waste calculations;
- No supporting justification or evidence provided regarding the use of the "Green Star reporting criteria" and its application to the waste fuel supply chain;
- The Report relies on community drop off centres that operate for domestic waste only, to control hazardous waste contamination in the Commercial & Industrial and Construction & Demolition (C&D) waste streams for the facility;
- Information on the supply of waste fuel does not include details of the waste fuel for phase 2 (lines 3 & 4). The report outlines that Phase 2 of the proposal will be delayed until the Department of Planning and Environment is satisfied. But a determination of the proposal cannot be reached without this information;
- The report references outdated guidelines: The Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes (NSW EPA 1999) is not valid and has not been in force since 2008. This document has been replaced with Waste Classification Guidelines – Part 1: Classification of waste (EPA 2014).

The proposal includes detail on the process to identify and remove treated timber from the waste stream when fuel design thresholds are met. The EPA has concerns about the proposed method of identification and control. The proponent should demonstrate quality control and assurance actions to address treated timber levels.

The proposal outlines processes for the classification of ash and residues from the facility. This classification must be determined by sample analysis, including specific contaminant concentration (SCC) and toxicity characteristics leaching procedure (TCLP). If the material is classified as hazardous the material must be immobilised before transport to landfill for disposal. EPA policy is not to issue Resource Recovery Orders or Exemptions for restricted solid or hazardous wastes.

The EPA is concerned that the ferrous metal will be contaminated with residues and ash. The proponent should demonstrate how ferrous metal removed from potentially restricted solid waste or hazardous ash and residue will be treated before transport and recovery.

The *Protection of the Environment (Waste Regulation) 2014* and the *Waste Levy Guidelines* contain specific legal requirements which occupiers of 'scheduled waste facilities' must meet. Scheduled energy

from waste facilities will not be exempt from the new levy framework. The proponent must demonstrate how they will all relevant requirements in relation to the waste levy.

G) TECHNOLOGICAL ASSESSMENT – ARUP PTY LIMITED

For the full Report, please see Attachment D.

H) CONTAMINATED SITES ASSESSMENT – EPA

Documents reviewed

- 2015-04-28 Environmental Impact Statement.pdf
- 2015-04-17 APPENDIX Q_ Soil and Water Report
- 2015-04-17 APPENDIX W_ Phase 1 Preliminary Site Investigation_Part 1 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 1 Preliminary Site Investigation_Part 2 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 1 Preliminary Site Investigation_Part 3 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 2 Detailed Site Investigation_Part 1 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 2 Detailed Site Investigation_Part 2 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 2 Detailed Site Investigation_Part 3 of 3.pdf

The following data gaps have been identified:

1. Section 3.7 of the Assessment of Soil and Water Impacts report summarises the site investigations undertaken previously by ADI (1998) and further assessments undertaken by ADE (2014). The report states that four groundwater wells were monitored by ADI (1998) on or adjacent to the site and that no information on field and sampling methods were provided. The report concludes that on the basis of the provided information there is no evidence that groundwater at the site has been impacted.

2. No groundwater investigation was carried out during the Phase 2 investigation. On this basis there is limited information regarding the potential impact on groundwater at the site.

3. The soil investigation carried out during the Phase 2 investigation was limited to the top 0.5m of soil and within the two soil stockpiles. The sampling of the top soil could be due to the history of the site as grazing land, however, no reason is stated for the limited sampling depth.

4. Samples were field screened for BTEX using PID reader during the Phase 2 investigation. BTEX was not detected in any of the samples, however, no PID reading methods and results are provided in the report.

5. The EPA notes that the waste bunker will sit about 15 metres below ground, to a depth that may impact on groundwater. Therefore, should the proposal be approved, the EPA will require the Proponent to conduct a groundwater study as a baseline so that future contamination, if any, can be clearly attributed to recent site activities.

AQA

I) WATER ASSESSMENT – EPA

Documents Reviewed

- 2015-04-28 Environmental Impact Statement.pdf
- 2015-04-17 APPENDIX F_ Civil Infrastructure Report
- 2015-04-24 APPENDIX F_ Civil and Stormwater Plans_Part 1 of 3.pdf
- 2015-04-24 APPENDIX F_ Civil and Stormwater Plans_Part 2 of 3.pdf
- 2015-04-24 APPENDIX F_ Civil and Stormwater Plans_Part 3 of 3.pdf
- 2015-04-17 APPENDIX Q_ Soil and Water Report.pdf
- 2015-04-17 APPENDIX W_ Phase 1 Preliminary Site Investigation_Part 1 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 1 Preliminary Site Investigation_Part 2 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 1 Preliminary Site Investigation_Part 3 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 2 Detailed Site Investigation_Part 1 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 2 Detailed Site Investigation_Part 2 of 3.pdf
- 2015-04-17 APPENDIX W_ Phase 2 Detailed Site Investigation_Part 3 of 3.pdf
- 2015-04-17 APPENDIX AA_ Flood Report (Brown).pdf
- 2015-04-17 APPENDIX CC_ Construction Environmental Management Plan.pdf

Document: Environmental Impact Statement: The Next Generation NSW Energy from Waste Facility, Eastern Creek, April 2015.

1. On page 40 of this document it is stated that:

   "Liquid effluent will be collected in a storage tank to balance the amounts generated and disposed of to the ash quench. Any overflow from the storage tank could potentially be sent to a packaged effluent treatment system and onto a local foul drain.
   The discharge would be spot sampled for audit purposes and analysed for flow rate, pH, temperature, oxygen demand, toxic metals, grease/oil and suspended solids."

   It is advised that if the effluent and/or overflows become contacted with ash residues and/or other waste particles, then a range of organics should also be included in the suite of analysis. Organics with low water solubility would tend to adsorb to particles and if TSS levels are high, analysis of relevant organic compounds should also be considered.

2. In Table 5, page 55, it is stated under column "Control Measures" row "Soils and Water" that:

   "If high salinity soils are encountered, these soils will be removed for covered storage and blended with less saline soils prior to re-use as backfill."

   It should be ensured that during storage and/or during blending, saline runoffs are prevented from entering the local water course (Ropes Creek tributary) if high rainfall periods are encountered. It would be advised, that salinity (EC) levels in the Creek be measured when it is flowing, and any waters (such as runoffs or groundwater dewatering) with higher salinity be prevented from entering the creek. High salinity can be toxic to aquatic organisms and plants located onsite and/or downstream from the site of development, especially if discharges contain high bicarbonate together with other toxicants.

3. On page 158, section 15.4.2 "Ground Water" it is stated that:

   "It is expected that seepage water will be suitable for transfer to the construction-phase stormwater management systems. Poor quality groundwater may be encountered in some areas, such as elevated salinity associated with saline soils or highly alkaline water perhaps with elevated ammonia levels associated with the volcanic breccia present beneath the hill in the northern part of the site. On-site

treatment, blending with stormwater or transfer off-site to a suitable, licensed disposal site may be necessary as a last resort."

The comments in point 2 above is also relevant to this statement as any high salinity and nutrient rich water should be prevented from entering the creek. Further details are also probably required as to the method that will be employed to decide what treatment any groundwater encountered would require.

Document: Assessment of Soil and Water Impacts: Proposed Energy from Waste Facility, Eastern Creek, April 2015

4. Page 16, section 3.7.1. It is concluded from previous reports (ADI 1995 & ADI 1998) that groundwater at the site is not contaminated, although the writer questions the validity of the analytical results. It is also stated that: *"It is further noted that low-levels of both TPH and PAH can occur naturally in samples of bedrock in the Wianamatta Group rocks"* although a reference to this statement is not provided. Recent site contamination investigations by ADE (2014) have not analysed the ground water to verify this conclusion.

   It is advised that the ADI (1995 & 1998) reports or relevant extracts be provided for verifications along with a reference that substantiates the claim that natural TPH and PAH levels occur in the bedrock.

5. Page 25 mentions bio-retention basin, however this basin is now being used as a storage/treatment pond of runoff stormwater prior to discharge into a tributary of Ropes Creek.

   Clarification is required of any water treatment that will be carried out prior to discharge. For example flocculation etc. If any treatment will be carried out, additional details of the chemicals used (eg. flocculant etc.) is required together with an explanation of dosing systems (automatic or manual) to avoid residual chemicals migrating into the creek.

6. Page 26, section 5.2 refers Table 5.2 for monitoring details. Table 5.2 indicates relevant sampling locations 1 to 7, however the actual locations of these sampling points are not identified in a location plan.

   Provide diagrammatic locations of the proposed sampling points.

7. Page 26 refers to one of the Suite A analytes as "*total heavy metals*".

   Clarification is required as to what this "analyte" actual represents. It appears that this refers to total concentrations of individual heavy metals, however, the individual heavy metals are not specified.

8. Page 27: Consider adding turbidity field measurement to suite B and suite C analytes.

9. Additional information is required of the management options available if any of the Table 5.2 monitoring shows non-compliance.

10. Page 29, Section 6.3: MUSIC modelling of the stormwater is carried out. Please have this section reviewed by someone familiar with this model. The Water Wetlands and Coastal Science Group (Tim Pritchard) have relevant expertise for this.

Document: Construction Environmental Management Plan: Energy from Waste Facility, Eastern Creek. Brookfield Multiplex Construction. Revision 3.

11. On page 25, second row of the table, it is stated that water carts/sprays may be used in dust control.

    Consideration needs to be given to the source of water used in such spray dust control devices and any potential inhalation exposure pathway for onsite workers/visitors and any potential off-site receptors.

12. Section 7.3, page 26, Table: Management Strategies. It is recommended that salinity (as electrical conductivity) be included in the list of water quality targets to be achieved prior to discharge into the creek. This is important as the groundwater is saline while the surface water creek may not be. The EC target can be established by undertaking background monitoring of EC in the creek when it is flowing and using ANZECC (2000) guidelines for establishing appropriate EC limit. Indicative limits for EC for different water systems are also provided in ANZECC (2000) guidelines.

Document: Targeted Phase II Detailed Site Investigation, 6th August, 2014.

13. The detailed site investigation only investigated levels in the soils, sediments and surface waters. While the groundwater level is generally deep at the site, there are areas with perched groundwater. Generally, groundwater analysis is a good indicator of any site contamination (that can be missed by targeted soil sampling) and mobilisation of such contamination.

    An explanation is required to detail the reasons for not testing any groundwater and verifying the conclusions in the Assessment of Soil and Water Impacts Report, as per point 4 above. In this respect, if any dewatering of groundwater is required during construction stage, is contaminant testing of such water warranted prior to discharge into the creek?

14. Page 46, section 8.7.1 Heavy Metals. It is stated that:

    "Four (4) surface water samples were analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). All of the samples returned values below the adjusted threshold criteria for 'Extremely Hard' water."
    Furthermore, it is noted on page 11 of the report that the creek was not flowing during investigations and *"the water depth was no greater than 0.2 m and dry in many sections."*

    It should be noted that the above scenario would have also concentrated the salts and the presence of "extremely hard water" may not be reflective of normal flow conditions during times when the creek is actually flowing. Therefore, the hardness corrected guideline values derived may not be applicable when the creek is actually flowing. For any future assessments it is recommended that the hardness of creek water be re-tested to verify hardness. Also, the hardness correction of copper is not recommended as it has been clearly shown that hardness corrected values of copper is not protective of all aquatic species and this may be removed in the reviewed ANZECC guidelines. See paper:

    Markich et al. (2005) Hardness corrections for copper are inappropriate for protecting sensitive freshwater biota. *Chemosphere* 60:1-8.

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6 July 2015

NSW EPA
PO Box A290
Sydney South NSW 1232

Attention: Deanne Pitts

Re: Review – Human Health Risk Assessment, Appendix O, Environmental Impact Statement, The Next Generation, Energy from Waste Facility, Honeycomb Drive, Eastern Creek

1.0 Introduction

Environmental Risk Sciences Pty Ltd (enRiskS) has been commissioned by the NSW EPA to review the Human Health Risk Assessment (HHRA) (provided as Appendix O of a revised EIS), for the proposed Energy from Waste Facility, Honeycomb Drive, Eastern Creek. The report was prepared by Fichtner Consulting Engineers Limited on behalf of The Next Generation NSW Pty Ltd.

A previous version of this risk assessment was reviewed for adequacy in November 2014. The review highlighted a large number of issues with the risk assessment that made it inadequate for the assessment of the facility. The previous risk assessment:

- did not use Australian guidance in relation to risk assessment
- used a proprietary black box model making it impossible to check the calculations
- used default assumptions in the model which were based on UK or US experience
- did not include in the report any description of the conceptual site model or the reasoning behind the choice of receptor types
- miscalculated the risk estimates in terms of Australian guidance.

A revised risk assessment has been prepared which was expected to be quite different to the original version given the comments provided. enRiskS was not asked to review the new version of the risk assessment for adequacy prior to it being placed on public exhibition. The revised EIS has now been put on public exhibition. The exhibition period runs from 27 May 2015 to 27 July 2015.

2.0 Acceptability of the Risk Assessment

The revised risk assessment is effectively the same as the original risk assessment. A few extra appendices have been added and some additional text in one or two places but otherwise the report and its conclusions are the same as they were in late 2014.

It was noted in 2014 that this assessment did not comply with Australian guidance and was, therefore, not acceptable. This remains the case.

An example of an appropriately undertaken risk assessment for a waste incineration facility in an urban area is available as Appendix H of the EIS for the Orica CarPark Waste Encapsulation Remediation Project available at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=18 . Such assessments will always have points of discussion but this example provides the type of approach that would have been expected for the human health risk assessment for this facility. An ecopy of this example HHRA will be provided along with this letter.

3.0 Detailed Assessment

3.1 Section 1

Section 1.1 is the same in both versions of the report.

Section 1.2 is the same in both versions of the report and says that it describes the approach taken for the assessment. The only addition in the 2015 version is a couple of references in footnotes.

This section discusses Australian guidance from enHealth and includes some general information about the framework for risk assessments. It then includes one paragraph noting that the assessment has used the USEPA IRAP package to estimate exposure and that modifications have been made to the default inputs to account for the differences between the Australian and US lifestyles. This section does not contain

- Any detail of the philosophy of the USEPA IRAP model
- The general outline of the modelling process adopted by this model
- How the model can be related to the enHealth guidance
- A list of the actual modifications that were made to the model inputs to make it more Australian.

As far as a description of the approach taken in a risk assessment this is quite inadequate. The rest of the report focuses solely on the USEPA model and does not return to any consideration of Australian guidance. As a result, this section does not provide an appropriate description of the approach taken in this assessment.

3.2 Section 2 – Issues Identification

Section 2 is the same in both versions of the report with the addition of a reference in a footnote in the most recent version.

Section 2 addresses the first step of a risk assessment – issue identification. This section is supposed to outline the issues related to the facility that may pose a human health risk and need to be assessed. It is usual to include:

- a description of the project including the technology involved (operational and pollution control) and how it will work at this facility
- identification of chemicals of potential concern and the sort of information available to use in estimating exposure to these chemicals
- a description of the location of the plant including land use at neighbouring properties, the locations of sensitive receptors, summary of meteorology that might affect dispersion of emissions from the plant (it is usual to include maps).

A risk assessment should be a standalone document to some extent so, while it is not expected that all the detailed information about the project description from the main report or the meteorology from the Air Quality Impact Assessment would be included in this report, it is usual to include a summary in a risk assessment so that the reader has sufficient information/understanding to assess the appropriateness of the assumptions used. This document fails in this regard.

This section includes discussion of the chemicals of concern but does not include any other information. The level of detail provided does not allow any assessment of whether the right chemicals of concern have been identified.

Section 2.1 flags a wider range of chemicals than is listed in Section 2.2. It flags that the air quality impact assessment covers the chemicals listed in the Ambient Air Quality NEPM which are listed incorrectly in this section as NOx, SOx, CO, particulates and hydrogen fluoride (HF). HF is not covered by the AAQ NEPM at all so it is not clear where any assessment of this chemical has been undertaken. Also the list in section 2.1

includes ammonia and there is no indication as to where it has been assessed in the EIS. Also not all the metals listed in Section 2.1 have been included in the list in Section 2.2 but there is no discussion about why they no longer need to be considered or where else they might have been assessed. It is not clear whether there has been sufficient consideration of NOx, SOx and particulates in line with the latest guidance from WHO and other guidance sources. NSW Health now require a much more detailed assessment of potential health risks from particulates than a comparison with the AAQ NEPM standards provides (see the HHRA for the NorthConnex tunnel available at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6136) where a proposal is a significant source of particulates to the Sydney air shed. Depending on the types of pollution control equipment included at this facility, this additional assessment may not be required for this proposal.

Section 2.1 also flags that dioxin-like substances (dioxins, furans and PCBs) and heavy metals can accumulate in the environment so need to be assessed using a multiple exposure pathway analysis. However, this report only appears to undertake such an analysis for dioxin-like substances (or at least the discussion section only refers to dioxin-like substances when discussing some of the pathways). PAHs should also have been included in the list for multiple exposure pathway analysis. Section 2.2 also appears to indicate that all of the listed chemicals have been assessed using a multiple exposure pathway analysis but if this has occurred it is not obvious at all in the report. If the same process has been applied for all the chemicals then tables similar to Table 7.1 and 7.2 should also have been included for all the substances.

3.3 Section 3 – Hazard Identification

Section 3.1

This section discusses Australian guidance in regard to dioxin-like substances. It is effectively the same in both versions of the report with the exception (in the more recent version) of a note that there are no other significant sources in the area and the addition of a reference for the information in Table 3.1 which is incorrect.

The NHMRC TMI for dioxin-like substances is the correct reference for the acceptable intake of this group of chemicals for the Australian population. A discussion of background intakes for these substances is also essential when assessing them. The actual reference for the mean monthly intakes quoted in Table 3.1 is Technical Report 12 from the National Dioxin Project (http://www.environment.gov.au/protection/publications/dioxins-technical-report-12) not the NHMRC report as cited (National Dioxins Program 2005).

The note about there being no other significant sources of these substances in the vicinity of the facility but provides no evidence/discussion of the basis for this conclusion. These chemicals are formed during all combustion processes including motor vehicle emissions, emissions from bushfires, other fires, cigarette smoking, wood heaters and other industrial facilities with thermal processes (e.g. cement furnaces). Also the movement of air (and the chemicals it contains) in the Sydney airshed means that such facilities do not necessarily need to be close to the existing facility. No evidence has been provided in this assessment to support the statement that there are no significant local sources nor is there any discussion of measured levels in the Sydney airshed (http://www.environment.nsw.gov.au/air/dopahhm/index.htm) nor the estimated levels in the more recent emissions inventory (http://www.epa.nsw.gov.au/air/airinventory.htm). However, while the assessment has not made a case as to the lack of significant sources of these chemicals in the vicinity of this facility, the assessment has considered the mean background exposure of people living in Australia to these chemicals. It should be noted that exposure from cigarette smoking is not included in the mean monthly intakes used in this assessment and such exposure can add significantly to background exposure (see discussion in NDP Technical Report 12).

Section 3.2

This section discusses the hazard posed by the rest of the chemicals identified as CoPCs for this facility.

Current Australian guidance about how to undertake risk assessment for chemicals is outlined in the latest version of the Environmental Health Risk Assessment Guidance from enHealth. Referencing a draft NHMRC document from 2010 is not considered relevant for this assessment. This document would have been a supporting document prepared as part of the process for updating the enHealth guidance document. The revised version of the enHealth document was published in 2012 and would have incorporated whatever was relevant from the draft supporting documents. The recommendation for target risk levels is provided in section 5.10 in the enHealth document and these should have been used in this assessment.

The quotes from the Risk Criteria for Land Use Safety Planning are not relevant for this risk assessment apart from in consideration of the potential risks posed for fires, explosions and other safety issues relevant for major hazardous facilities (if this facility falls into such a category). An assessment of acute safety risks has not been included at all in this risk assessment so these values cannot be used for comparison to any of the risk estimates calculated in this assessment. Long term chronic risks posed by normal operation of this facility (such as calculated in this assessment) need to be assessed in terms of the enHealth document only.

Section 3.2.1 is pretty much the same in both versions of this report and is not relevant in Australia. The exceptions are:

- Section 3.2.1.1 includes a note that only risks posed by the emissions from the facility need to be considered which implies no consideration has been given to background exposures or cumulative risk in this assessment. As noted above some consideration has been given to background exposure for dioxin-like substances but it would appear no other chemicals assessed have included consideration of background exposures (or at least whether or not a particular chemical has significant background exposure that should be considered in this assessment). It is a normal requirement of risk assessment to include such a discussion.
- Section 3.2.1.3 includes an additional paragraph justifying only using USEPA IRIS as a source of toxicity reference values for individual chemicals. This is not in line with Australian guidance and is frowned on by local health authorities. It is likely to have been the approach adopted due to the use of the USEPA model which may not allow any change in toxicity reference values by the user. **Table 1** shows the differences between the USEPA IRIS values and those recommended in Australian guidance.

Table 1 – Review of Table 3.2 from Assessment

Chemical	Oral Reference Dose (mg/kg/d)	Inhalation Reference Concentration (mg/m^3)	Oral Slope Factor (per mg/kg/d)	Inhalation Unit Risk (per µg/m^3)
Hydrogen chloride	0.00571	0.02	0	0
Benzene	0.004 ✓	0.03 ✓ (0.01 would also be relevant)	~~0.055~~ 0.035	~~7.8×10^{-6}~~ 6×10^{-6}
Benzo[a]pyrene	0	0	~~0.73~~ 0.233	~~0.0011~~ 0.087
Elemental mercury	8.57×10^{-5}	0.0003	0	0
Mercuric chloride	~~0.0003~~ 0.0006	~~0.0011~~ 0.0002	0	0
Methyl mercury	~~0.0001~~ 0.00023	~~0.00035~~ 0.0008	0	0
Cadmium	~~0.0004~~ 0.0008	~~0.0002~~ 0.000005	~~0.38~~	~~0.0018~~
Thallium	0.0046	0.0034	0.017	0.012
Antimony	0.0004	0.0014	0	0
Arsenic	~~0.0003~~ 0.002	~~3×10^{-5}~~ 0.001	~~1.5~~	~~0.0043~~
Chromium III	1.5	5.3	0	0
Chromium VI	~~0.003~~ 0.001	~~8×10^{-6}~~ 0.0001	0	~~0.012~~
Lead	~~0.000429~~	~~0.0015~~	~~0.0085~~	~~1.2x10-5~~
Nickel	~~0.02~~ 0.012	~~0.0002~~ 0.00002	0	~~0.00024~~

A quick review of readily available Australian (and Australian preferred) guidance shows the differences in preferred toxicity reference values listed above. Some of the highlighted values are higher than those provided in the model and some are lower. The guidance documents used included:

- Assessment of Site Contamination NEPM Schedule B7 Appendices A1 and A2 (NEPC 1999 amended 2013)
- CRC CARE Technical Report 10 Part 1 Appendix B (CRC CARE 2011)
- WHO Air Quality Guidelines for Europe (WHO 2000).

The USEPA develop cancer slope factors for chemicals that Australian health authorities do not consider to be genotoxic carcinogens. It is not appropriate to assess potential cancer risk using linear extrapolation for chemicals that are not genotoxic carcinogens. The USEPA continue to do this due to some historical anomalies in their technical policies and regulations.

The latest WHO and Australian guidance for lead have reported the withdrawal of reference doses and reference concentrations given the most recent health effects literature. Detailed assessment of lead is to be undertaken based on blood lead modelling approaches using a blood lead goal for Australians of 5 micrograms per decilitre (updated value released in May 2015). It is not appropriate to continue to use the old reference doses/concentrations for lead except in some limited circumstances.

Additional assessment of the chemicals listed that have not been checked has not been undertaken but can be if required.

Table 3.3 lists the toxicity reference values for the dioxin-like substances. These substances are not considered to be genotoxic carcinogens by Australian health authorities and should not be assessed using slope factors or unit risks. All assessment should be undertaken using the tolerable monthly intake only. The value listed in this Table does not correspond to the TMI recommended by NHMRC (i.e. $1x10^{-9}$ mg/kg/d USEPA compared to 2.3 $x10^{-9}$ mg/kg/d NHMRC TMI converted to TDI) even though the earlier sections of this assessment imply that the calculations use the NHMRC value.

3.4 Section 4 – Conceptual Site Model

A conceptual site model is supposed to be a representation of relevant site related information regarding chemical emissions that can arise from a facility. It should document sources of chemicals (e.g. description of facility and how these chemicals are present in any emissions to air, water or land from the site), the receptors that may be affected by the emissions (where people might be located in relation to the facility location), what environmental processes may affect the concentrations that people will be exposed to (dispersion due to wind etc) and the pathways by which people may be exposed.

Figure 1 shows, for the first time in this report, the philosophy behind the USEPA model. It illustrates the generalised approach the USEPA has developed applicable to all hazardous waste incinerators. It is a comprehensive approach that covers all aspects that should be thought through at a site. However, there is no site specific information included in this Figure or in this section about the relevance of each step in the process for this facility and how each step in the process will be assessed for this site.

Section 4.2 discusses the omission of exposure pathways including dermal contact, movement of the chemicals into groundwater or surface water. These pathways have been omitted on the basis that they are expected to contribute negligibly to the overall risk estimate. However, it depends on the assumptions made in the calculations and the toxicity of the chemical as to whether they contribute negligibly or not.

Figure 1 shows that it is more likely that dermal contact (and perhaps movement to groundwater) has been excluded from this assessment simply because the pathway is not included in the USEPA model so the calculations could not be simply undertaken in this package. In the example multi exposure pathway risk

assessment flagged in **Section 2.0** above the contribution of the dermal contact pathway was quite similar to the contribution via ingestion for at least some of the chemicals assessed as can be seen in **Table 2**.

Table 2

	Hexachloroethane			Pentachlorobenzene			Hexachlorobutadiene			Hexachlorobenzene			Octachlorostyrene			Dioxin-like substances		
	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib	Daily Intake	Risk	% Contrib
		0.001			0.01			0.0002			0.00016			0.00031			2.3E-09	
inhalation	1.70E-08	1.70E-05	19.27	2.00E-09	2.00E-07	94.22	5.60E-06	2.80E-02	90.84	5.30E-08	3.31E-04	94.02	7.00E-09	2.26E-05	1.87	4.10E-13	1.78E-04	96.55
ingestion	8.30E-10	8.30E-07	0.94	1.80E-12	1.80E-10	0.08	3.20E-09	1.60E-05	0.05	5.00E-11	3.13E-07	0.09	5.20E-09	1.68E-05	1.39	2.60E-16	1.13E-07	0.06
dermal	3.90E-10	3.90E-07	0.44	8.40E-13	8.40E-11	0.04	1.50E-09	7.50E-06	0.02	2.30E-11	1.44E-07	0.04	2.50E-09	8.06E-06	0.67	3.70E-16	1.61E-07	0.09
ingestion of plants	7.00E-08	7.00E-05	79.35	1.20E-10	1.20E-08	5.65	5.60E-07	2.80E-03	9.08	3.30E-09	2.06E-05	5.85	3.60E-07	1.16E-03	96.08	1.40E-14	6.09E-06	3.30
		8.82E-05			2.12E-07			3.08E-02			3.52E-04			1.21E-03			1.85E-04	

The percent contributions in **Table 2** also show that if the contribution from dermal contact is to be considered negligible the same could apply to the ingestion pathway. The enHealth guidance requires these pathways to be considered in order to provide a comprehensive picture of the relevance of different pathways and to check overall risk and help focus pollution control measures. The calculations in **Table 2** also show that the pathway that contributes most to the health risk can vary – in some cases it is the inhalation pathway and for others it is the pathway for ingestion of plants grown in the affected soil.

The popularity of the use of rainwater tanks in Sydney has increased significantly over the last decade and in many areas it is a Council requirement that they be installed when constructing new dwellings. While it is not intended that the water collected in the tanks be used as a potable water source, there is no mechanism by which this can be checked or controlled so it is possible that the water in these tanks is occasionally or even regularly consumed by some people. Such tanks definitely do not have treatment systems on them to remove contaminants prior to use. Whether such tanks could be a significant source of the chemicals in emissions from this facility to people consuming water depends on a number of things including:

- Toxicity of the chemical
- Whether the chemical is attached to particles or in vapour form
- Level of emissions of particles from the facility
- Solubility of the chemical in tank water
- Availability of the chemical from the particle
- Meteorology in the area (determining if and when particles from the emissions will deposit)

Consequently, this pathway should have been assessed to determine its relevance. Also it is noted that the Minchinbury Reservoir is quite close to the facility (neighbouring site). This reservoir consists of two large tanks which are used in many locations across Sydney to assist in managing line pressure in the distribution system. The potential for emissions to affect the water stored in this tank should have been assessed (a field observation may have been sufficient to determine if there was any chance particles falling onto the tank could get into the tank).

3.5 Section 5 – Sensitive Receptors

This section does not provide an adequate description of the sensitive receptors in the area. It does not provide a map showing land uses or sensitive receptors – a copy of the one from the air quality impact assessment would have been sufficient.

As noted in the air quality impact assessment, the NSW EPA defines sensitive receptors as any locations that may be affected by the facility where people are likely to work or reside (NSW DEC 2005). So it is not appropriate to leave out the industrial estate to the northwest of the facility when considering the risks posed by the facility.

This section flags that the risks posed by the facility have been assessed based on the predicted annual mean concentrations under normal operations. Risks have not been assessed for a worst case under normal operations nor have they been assessed under upset conditions. The approved methods manual for

modelling and assessment of air pollutants requires that peak concentrations for criteria pollutants and ground level concentrations for individual pollutants averaged over 1 hour be compared to impact assessment criteria in an air quality impact assessment (NSW DEC 2005). While it is not necessary to repeat this assessment in the human health risk assessment, such assessments give the opportunity to expand the understanding of the potential risks posed by such a facility and the underlying principles in the regulatory guidance should influence the choice of scenarios used in the risk assessment.

3.6 Section 6 – IRAP Model Assumptions and Inputs

Much of Section 6 is the same as it was in the original version of the risk assessment as it is a brief description of the assumptions used in the USEPA model to calculate environmental concentrations in various media.

A concern in regard to this model is the assumptions that need to be made for the values of the large number of parameters. While the overall approach of a multiple exposure pathway assessment is supported by the scientific understanding of how exposure to emissions from such facilities can occur, robust literature to support each of the values assumed for the many parameters used in this model is not so readily available. Also climate and other environmental conditions here in Australia can make a significant difference to how such understanding might be applied (e.g. having droughts that can run for a decade (limiting the potential for loss of deposited contaminants) or flooding rains that carry particulates (and attached chemicals) across great distances).

A full check through the extensive Appendix E (scanned copy of chapter 5 of the USEPA manual for this model) to determine whether appropriate choices have been made has not been undertaken but some examples of the issues arising with the use of this model are provided below. Also many of the values for chemical specific parameters are listed in parts of the USEPA manual not provided with this report so it is not possible to check them without obtaining the full manual which has not been undertaken given the overall issues with this assessment but can be undertaken if required.

Some examples of issues for consideration for each media include:

- Air

It is assumed that the air quality modelling undertaken in Appendix L of this EIS would be relevant for use in determining vapour phase and particle phase concentrations to feed into the IRAP model. The report does not definitively state that this is what was done nor does it include a table listing the values determined in Appendix L that were used in this assessment. The IRAP model appears to include the USEPA ISCST3 air dispersion model so it is also possible that it was used instead to determine concentrations in air. Given the output pages included in Appendix D of this risk assessment, it seems likely that this model (ISCST3) was used to estimate air concentrations. The ISCST3 model is a similar model to AERMOD/AUSPLUME but no information is provided about how it was set up (including things like met files). This would all need to be checked to be confident that the results are acceptable. It should be clarified which approach was adopted and it would be preferred that the modelling from Appendix L of the EIS was used if this has not occurred.

- Soil

In regard to soil, the model assumes the following values in its calculations:

  - Bulk density = 1.5 g/cm^3
  - Available water (precipitation + irrigation – runoff – evapotranspiration) – with US sources being recommended for use in determining appropriate values for runoff rate
  - Soil volumetric water content = 0.2 mL/cm^3
  - Soil mixing depth – 2 cm untilled land; 20 cm tilled areas

Comment by Julie Cattle might be useful in considering the appropriateness of these values for Australian conditions.

Concentrations in soil are determined from vapour phase and particle phase deposition (wet and dry) of the various CoPCs to soil. Once these concentrations have been added to the soil the model then considers loss via leaching, erosion, runoff, degradation and volatilisation. The soil loss constant (ks) is calculated as:

$$ks = ksg + kse + ksr + ksl + ksv$$

Where

ksg = loss constant due to degradation (based on half-life for each chemical)

kse = loss constant due to soil erosion (set to zero as conservative assumption)

ksr = loss constant due to runoff (uses equation based on annual runoff (BOM data), volumetric water content of soil, mixing depth and soil bulk density (US assumptions) plus soil water partition coefficients for each chemical)

ksl = loss constant due to leaching (uses equation based on rainfall, irrigation, runoff and evaporation (BOM data), volumetric water content of soil, mixing depth and soil bulk density (US assumptions) plus soil water partition coefficients for each chemical)

ksv = loss constant due to volatilisation (uses equation to estimate volatilisation of chemicals from the soil surface – bulk density, particle density and volumetric water content use US based assumptions, the rest of the parameters in the equation are chemical-specific)

A significant number of assumptions about parameter values need to be made to undertake these calculations. While this approach is theoretically correct, the robustness and the applicability of the parameter values used in the model for Australian conditions have not been evaluated. For example, in Australia runoff and leaching can be negligible during droughts which can extend for many years. It would have been better (and conservative) to set the soil loss constant for all potential pathways of loss to zero for this assessment or to only use loss due to degradation of each of the chemicals (given that many of the CoPCs are metals which don't degrade even including this may not be appropriate).

- People

The soil ingestion rates used in this assessment are the assumptions used in the US even though the Australian values are lower (leads to lower risk estimate so is conservative). Body weight for children is higher than recommended by Australian authorities (correct value would result in higher risk estimates so it is not conservative). They should have been adjusted to those recommended in Australian guidance.

Intake of produce should have been adjusted for Australian recommendations. The total diet survey documents from Food Standards Australia and New Zealand as well as the enHealth Exposure Factor Guidance are sources of such information. A simple adjustment can be made to the recommended values which are listed in g fresh weight per day to convert them to the values required by IRAP (kg fresh weight/kg body weight per day). The values listed in Australian guidance can be converted from g fresh weight per day to kg fresh weight/kg body weight per day by dividing by 1000 (g to kg) and body weight (per day to per kg bw per day) (i.e. divide by 70000 for adults and 15000 for children (using 15 kg body weight for child – value recommended in Australia)) (enHealth 2012; FSANZ 2003, 2008, 2011, 2014).

Assumptions in regard to breast milk used in the assessment are listed in Section 6.4.2 as:

- Exposure duration of infant to breast milk = 1 year
- Proportion of ingested dioxin that is stored in fat = 0.9%
- Proportion of mother's weight that is stored in fat = 0.3%
- Fraction of fat in breast milk = 0.04%

- Fraction of ingested contaminant that is absorbed = 0.9%
- Half-life of dioxins in adults = 2,555 days
- Ingestion rate of breast milk = 0.688 kg/day

There has been an error in how these assumptions have been listed (or the values used are not correct). For example, the fraction of fat in breast milk is 4% (or a fraction of 0.04) not 0.04% and the fraction of ingested contaminant absorbed by the child from the milk is 90% (or 0.9 fraction) not 0.9%. Also, according to the National Dioxins Program risk assessment, the ingestion rate of breast milk assumed for Australia is 0.75 kg/day and the half-life of dioxins is assumed to be more than 4,000 days (National Dioxins Program 2005).

A complete assessment of the calculations undertaken in the model and the impact of the assumed values for each parameter compared to the values recommended in Australia has not been undertaken but could be if required.

Section 6.6 and Tables 6.4 and 6.5 outline how the emission rates for each chemical were determined. The emission rates are based on the emission limits in the stack, however, they are based on European requirements for stack limits not those listed in the POEO Clean Air Regulation which is what the facility must comply with here. A quick check of some of the Group 6 requirements for scheduled premises indicate that some of the levels assumed in this assessment may be too high for a facility in NSW. The assessment should be redone using the relevant NSW limits as the starting point for estimating emissions (NSW Government 2010).

3.7 Section 7 – Risk Characterisation

Section 7 discusses the results of the risk assessment and estimates risk. Given the many issues discussed above, a detailed assessment of this section has not been undertaken. Matters that have been identified in a short review include:

- Slight changes in estimated risks between the original version and this more recent version – presumably this is due to changes in the air quality modelling but it is not possible to determine why these changes have occurred. For dioxins in breast milk the risk estimates at the point of maximum impact for resident and farmer have been reversed – it is not clear which is correct.
- Annualised risk estimates for cancer – the only place annualised risk estimates are used in NSW is the land use safety planning guidance where it is used to establish limits on fatality and injury risk estimates for fire, explosion and other safety incidents. It is not appropriate nor is it compliant with any guidance about assessing risk for cancer in Australia. The lifetime risk estimate is the only relevant parameter to use in assessing whether cancer risk at the facility is acceptable. As a result, the cancer risk estimated for the farmer at the point of maximum impact is not acceptable for this facility and the cancer risks estimated for residents at the point of maximum impact and in the surrounding suburbs are within 2-10 fold of the acceptable value. Such a small margin of safety might require additional pollution control measures be considered.
- Upset conditions – as already discussed it is normal to consider, in some fashion, the potential for risks during upset conditions. In the example HHRA discussed above, a description of what could occur during upset conditions was included to provide some understanding of what impacts that may have on emissions from the facility. Also, an assessment of short term concentrations during upset conditions against emergency acute air guidelines (shown in Table 7-2) but no long term assessment was undertaken. Such an approach is likely to have been appropriate for this assessment.

3.8 Section 8 – Conclusions

Given the issues already outlined the conclusions cannot be accepted until the risk assessment is revised in accordance with Australian guidance.

4.0 References

CRC CARE 2011, *Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document*, CRC for Contamination Assessment and Remediation of the Environment, CRC CARE Technical Report no. 10, Adelaide. <http://www.crccare.com/products-and-services/health-screening-levels>.

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5.0 Limitations

Environmental Risk Sciences has prepared this report for the use of NSW EPA in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The methodology adopted and sources of information used are outlined in this letter report. Environmental Risk Sciences has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions.

This report was prepared in July 2015 and is based on the information provided and reviewed at that time. Environmental Risk Sciences disclaims responsibility for any changes that may have occurred after this time.

This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

If you require any additional information or if you wish to discuss any aspect of this letter please do not hesitate to contact Therese on (02) 9614 0297 or 0487 622 551.

Yours sincerely,

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NSW EPA

The Next Generation (NSW) Energy from Waste Facility, Eastern Creek EIS

Merit Review

Issue | 3 August 2015

Job number 239880-00

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Document Verification

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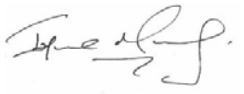
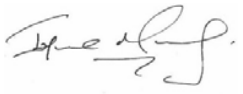
		Signature			
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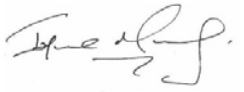
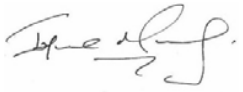
		Signature			
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Appendix A

NSW EPA Energy from Waste Policy Statement Review

Appendix B

Adequacy Comments Review

This report has been prepared by Arup for the NSW EPA and the Department of Planning and Environment, NSW in connection with The Next Generation (NSW) Pty Ltd application for an Energy from Waste Facility, at Eastern Creek, and takes into account their particular instructions and requirements. It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.

1 Scope of Work

Arup was appointed in November 2014 to undertake an adequacy review of the technical components of The Next Generation (NSW) Energy from Waste Facility, Eastern Creek EIS. This was undertaken by Arup in December 2014, and this information was used to inform the NSW EPA response on the adequacy of the EIS documentation.

In June 2015, Arup was appointed by the NSW EPA to:

- Conduct a merit assessment of the Concept Design Report (dated 11 March 2015 and prepared by Fichtner Consulting Engineers Limited) ("The Report") and relevant sections of the Environmental Impact Statement (dated April 2015 and prepared by Urbis Pty Ltd) ("the EIS").
  The merit assessment should focus on the technical content of the Report and EIS. Specifically determine whether the Report and EIS demonstrate that (including but not limited to):
  - The proposed facility will use current international best practice techniques with respect to process design and control; emission control equipment design and control; emission monitoring with real-time feedback; arrangements for the receipt of waste; management of residues from the energy recovery process;
  - The proposed technologies are proven, well understood and capable of handling the variability and type of waste feedstock; and
  - Whether the proposed facility delivers on all aspects of the NSW Energy from Waste Policy Statement (2015) (including meeting emission limits).
- Provide written comments to the EPA in relation to the above points; provide expert opinion as to whether the facility will perform as proposed; and provide expert advice for development of conditions of approval should the development be approved.

This report documents the findings of the merit assessment and provides advice for the development of conditions of approval should the development be approved.

A review of the Applicants responses to the comments made during the Adequacy review has been carried out and is included in Appendix B.

2 Summary of findings

2.1 Introduction

The Next Generation NSW Pty have made an application for the construction and operation of an Electricity Generation Plant which will be fuelled using waste materials sourced from commercial and industrial (C&I) stream, construction and demolition (C&D) stream and residual wastes from municipal solid waste (MSW) treatment facilities. The facility proposed will be developed in two phases, both with a design electricity generation of approximately 70MW. The proposed Facility will have the capacity to process up to 1.35 million tonnes of Residual Waste Fuel based on a calorific value of 10MJ/kg. The design capacity of the Facility is estimated at 552,000 tonnes per stage or 1,105,000 tonnes per year based on a calorific value of 12.34MJ/kg.

The facility will be located within the Eastern Creek Industrial Estate, Eastern Creek, NSW 2766.

The overall EIS and supporting documentation appear to lack a 'source of truth' and there is a large number of inconsistencies between the Main EIS and the appendices which have been authored by different specialists and within the EIS itself. There are a number of inaccuracies and inconsistence between the main EIS document, the Environ Waste Management Report and the Concept Design Report produced by Fichtner, that has resulted in uncertainty in the information being provided, as the authors are unsure on which report is the 'source of truth'. Where inconsistencies relate to technology, feedstock, ash residues or other aspects of the proposal which relate to its operation and functionality, Arup has sought to identify them within our commentary.

The Fichtner report is titled the Concept Design Report and could be expected to provide the basis of design for the EIS. However, the preferred technology provider Hitachi Zosen Inova (HZI) have provided reference data for the Environ Waste Management Report which at times is inconsistent with the Fichtner report. It would be reasonable to expect that a concept design would have been developed for the proposal that comprehensively and accurately defined the Facility and provided a consistent basis of design for the EIS.

The proposed technology provider is Hitachi Zosen Inova (HZI). Arup recognise that HZI is a leading company in grate incineration technology, with reference facilities around the world treating MSW and C&I waste. However, the EIS and supporting documentation only outlines a possible concept for a facility and does not define the facility in sufficient detail to allow for a full adjudication to be made on whether the proposal is compliant with International best practice.

A detailed assessment based on the information provided has been undertaken against the NSW Energy from Waste Policy Statement (2015) based on the information provided in the Main EIS, Environ Waste Management Report and the Fichtner Concept Design Report. It is considered that insufficient data has been provided within the EIS and supporting documentation to a sufficient level of detail to allow a full technical assessment of the technology to be undertaken

and determine whether the application and supporting documentation complies or meets the requirements of the NSW Energy from Waste Policy Statement (2015). Refer Appendix A.

2.2 Feedstocks and reference facilities.

It is proposed the facility will be fuelled on a number of residual waste fuel types. These are:

- Chute Residual Waste (CRW) from the Genesis MPC;
- Commercial and Industrial (C&I);
- Construction and Demolition(C&D);
- Flock waste from car and metal shredding;
- Paper pulp;
- Glass Recovery;
- Garden Organics (GO);
- Alternative Waste Treatment (AWT); and
- Material Recovery Facility waste (MRF waste) residual.

The breakdown of the waste feedstock can be visualised as following:

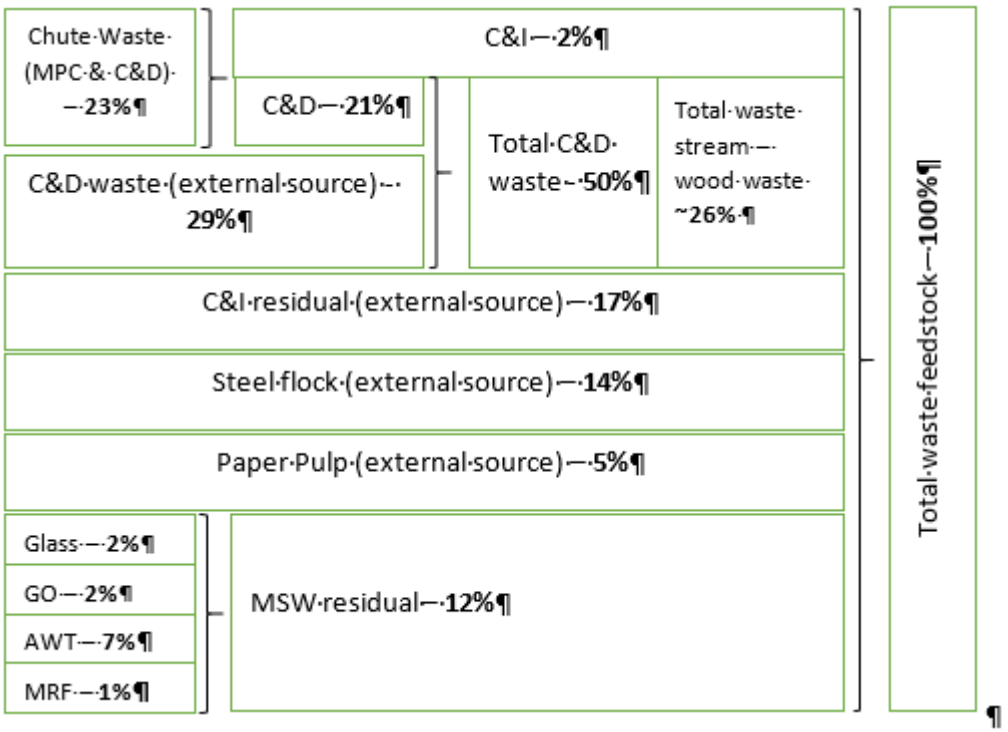

Figure 3.1: Breakdown of waste feedstock.

Arup consider that insufficient details have been provided in the EIS to allow a full comparison and assessment of the TNG proposed feedstock in the ratios suggested to the facilities listed in Table 4 – Section 3.5 of the EIS.

Facility Name	Location	Capacity	Fuel Contents
TREDI	Salaise, France	146,000 t/a	Grate furnace within a plant for treatment of industrial and hazardous waste
KEBAG	Zuchwil, Switzerland –	200,000 t/a	– – 50% C&I waste (no pre-treatment)
VFA	Buchs, Switzerland	180,000 t/a	65% C&I waste (no pre-treatment)
STADTWERKE ERFURT	Erfurt, Germany □	80,000 t/a □	100% pre-treated MSW and C&I waste (fraction not known)
EEW	Knapsack, Germany	300,000 t/a	100% pre-treated C&I waste

Table 1: Reference facilities provided in Section 3.5 of EIS.

For the five reference facilities provided in the EIS:

- There is no correlation in feedstock of the reference facilities to that of what the project is proposing
- None of the identified reference facilities demonstrate the treatment of C&D waste
- None of the reference facilities refer to the treatment of floc waste – however it is noted that this maybe include as part of C&I waste stream

It is important to consider the actual composition of Australian feedstock and consider whether it is comparable to the feedstock of that being treated by the reference facilities.

When considering whether a reference facility is comparable, consideration needs to be given not only to the types of waste that are accepted at a reference facility but also to the upstream processes a waste is subjected to before presentation at the facility and whether those upstream process facilities are comparable to upstream process facilities that will be used to source waste for TNG facility. For instance, C&I and C&D recycling facilities in Sydney, Australia are potentially different to that in the European Union (EU) which would result in a different residual waste being generated.

2.3 Wood waste

Based on the data provided in Table 7 of the Waste Management Report, approximately 26% of the total waste stream will be wood waste. Given the very high proportion of wood waste, more details need to be provided on the specific composition of the wood waste within the different waste types and how much of the wood waste could be treated with paints, solvents or other possible contaminants. Also consideration needs to be given the physical size of wood waste and how it will be handled to reduce its size to allow for full combustion on the grate.

2.4 Floc waste

It should be noted that floc waste is referred to as 'Flock waste' throughout the EIS and supporting documentation. The NSW EPA refer to this waste as floc waste and thus in this section the authors will refer to it as floc waste.

Floc waste composition in Table 1 of the Concept Design Report is inconsistent with floc waste composition in Table 7 of the Environ Waste Management Report. Therefore, there is uncertainty to the actual design composition of this waste input.

With regard to the generation of floc waste, consideration needs to be given as to whether the resource recovery facilities in Australia handling motor vehicles and white goods and generating floc waste are using the same processes and technology as those facilities operating in Europe. It is the authors understanding that Australian metal recyclers currently shred whole cars and white goods without prior breakdown or removal or many materials. This results in the contamination of floc waste with oils, lubricants, wire castings, soils and other materials. A detailed compositional comparison and analysis of floc waste generated from an Australian motor vehicle and white goods recovery facility to floc waste generated from an European facility should be undertaken to ensure it is comparable and producing a waste of a similar composition..

With regard to floc waste the EIS states in Section 3.9.4 that the percentage of floc waste in the feedstock could be increased to improve the Net Calorific Value (NCV) of the Facility feedstock as required. The Fichtner Report on Table 1 Page 8 states that the NCV of the floc waste is 8.46 MJ/kg which is the second lowest of all the proposed fuel feedstock. Therefore, the statement that more floc waste will be used to improve the NCV does not equate.

2.5 Ash

There is a number of inconsistencies between the Main EIS, the Fichtner Concept Design Report and the Environ Waste Management Report on the quantities of ash that will be generated. Therefore it is unclear what is the 'source of truth' for the ash production rates. This EIS and Waste Management Report state:

EIS/Waste Management Report			
Fuel Input	1,105,000.00 tonnes per annum (tpa)		
	Wet tpa	Dry tpa	Per cent of fuel input (%)
Bottom Ash	270000	225000	20.36
Boiler Ash	5,000	5,000	0.45
APC	55,000	55,000	4.98
	330,000	285,000	25.79

Table 2: Ash generation rates reported in EIS and Environ Waste Management Report.

The EIS states circa 30% total ash generation (20% moisture content in wet bottom ash) or 25.8% total ash generation (dry weight). The ash generation rates quoted in the EIS are very high and it is our understanding that typically total ash generation would be not greater than 20% with best practice seeking bottom ash generation rates of 10-12% of the total fuel input and APC residue of 3-4%.

The Fichtner report in Section 4.7 details ash generation. The Fichtner report states that:

Fichtner Concept Design Report			
Fuel Input	1,350,000.00 tonnes per annum (tpa)		
Ash Generation	20%		
	Wet tpa	Dry tpa	Per cent of fuel input (%)
Bottom Ash	320,625	256,500	19.00
Boiler Ash	13,500	13,500	1.00
APC	51,700	51,700	3.83
Total	377,325.00	321,700.00	23.83

Table 3: Ash generation rates reported in Fichtner Concept Design Report for 1,350,000 tpa fuel input.

For fuel input of 1,350,000 tpa (8,000hours @10MJ/Kg) there will be a total of 20% bottom and boiler ash of which 95% will be bottom ash. This equates to 321,000 tpa wet bottom ash (assumes 25% increase due to water). For this fuel input the APC residues are estimated at 51,700 tpa.

Fichtner Concept Design Report			
Fuel Input	1,105,000.00 tonnes per annum (tpa)		
Ash Generation	11.53%		
	Wet tpa	Dry tpa	Per cent of fuel input (%)%
Bottom Ash	151,295	121,036	10.95
Boiler Ash	5,000.	6,370	0.47
APC	43,800	43,800	3.24
Total	200,095	171,206	14.67

Table 3: Ash generation rates reported in Fichtner Concept Design Report for 1,105,000 tpa fuel input.

The Fichtner report states for a fuel input 1,105,000 tpa (8,000 hrs at 12.34MJ/kg) the ash content would be 11.53%. It then states that the amount of bottom ash generated would be 184,000 tpa. Based on the figures provided in the report, the authors are unable to substantiate these estimates as 1,105,000 x 11.53% x 1.25 = 151,295 tpa. The APC residues for a 1,105,000 tpa fuel input are estimated at 43,800 tpa.

Table 11 in the Fichtner report summarises the ash production but does not quantify the percentage of boiler ash separately and includes it in the bottom ash calculation. This is inconsistent with the rest of the report. It is therefore also unclear whether boiler ash is quoted in dry weight or wet weight. It is assumed to be wet weight as it is included in the bottom ash quantities.

5.7 Ash and Residue

The residue production from the Facility has been estimated and presented within Table 11:

Table 11: Ash Production			
		Design fuel	Worst case fuel
Fuel NCV	MJ/kg	12.34	10
Ash content	%	11.53	20
Fuel Flow	tpa	1,105,000	1,350,000
Bottom ash (dry)	tpa	127,400	257,000
Bottom ash (wet)	tpa	159,300	321,000
FGT/APC residue	tpa	43,800	51,700
Combined ash and residue	tpa	203,100	372,000

Figure 2: Extract from Fichtner Concept Design Report – Table 11: Ash Production.

2.6 Thermal Efficiency

The EIS assumes a net electrical production of 30% but does not demonstrate its assumptions through calculations. Given the seasonal ambient air conditions in Sydney the Applicant needs to demonstrate that the net electrical efficiency can be achieved through the whole year.

The Fichtner report refers to the R1 energy efficiency requirement from the EU Waste Framework Directive. This requirement has been removed from the NSW EPA Energy from Waste Policy therefore it is not appropriate to rely on this as proof of meeting the thermal efficiency requirements. Again no allowance was made in the calculations provided in the Fichtner report for the seasonal ambient air conditions in Sydney.

2.7 Chlorine

The EIS highlights the difference in the wording between the NSW policy and EU Industrial Emissions Directive (IED) and identifies that the NSW EPA policy applies to all waste not just Hazardous waste as in the IED.

Hazardous waste incinerators are designed for 1100°C, due to the nature and composition of the difficult waste generally processed through them thus ensuring their complete destruction. This practice is based on considerable practical experience.

Similar practical experience shows that 850°C is sufficiently high for the destruction of MSW and C&I wastes, where the chlorine concentration of the waste feed to the grate is normal up to 1%. Limiting the chlorine concentration in the feedstock to 1% prevents excessive corrosion of the boiler and shock loading of chlorine into the flue gas treatment plant. It is possible and acceptable for small quantities of waste with higher concentrations of chlorine to be accepted into the pit but they would need to be mixed and/or blended with other waste before feeding onto the grate.

The EIS states in Table 9 that:

In the European EfW experience it has been found that EfW typically has to cope with concentrations of PVC of around 1% (MSW) with around 0.4% as background chlorine (not PVC related). Residual fractions from recycling, C&D and C&I can reach up to nearly 10% in the European experience. If TNG would find similar chlorine level of around 1% in MSW as per European experience, the current NSW EfW Policy would require burning at 1,100°C/2s instead of 850°C/2s. Current technology (from all EfW providers) doesn't allow efficient energy recovery at the higher temperature. In consequence, the energy efficiency requirement of R1>0.65 cannot be achieved. Hence, the NSW EfW Policy will contradict itself unless the wording is changed (back to the European IED).TNG believes that the text of the NSW EfW Policy needs to be amended to reflect the EU regulation and the European experience of safe EfW at chlorine concentrations of typically around 1% with some waste fractions up to 8%.

MSW and C&I incinerators are not designed to receive 8 or 10% chlorine and can only deal with higher levels of chlorine when the waste is mixed or blended with other feedstocks to ensure that the overall chlorine concentration is not greater than 1%. Therefore, if it is proposed by TNG to receive feedstocks with typically higher concentrations of chlorine it is important they are they accurately identify and quantify this waste and robust operational procedures are put in place to ensure that the overall concentration of input fuel into the incinerator is not greater than 1%.

The EIS suggests that in Table 9 the requirement to bring wastes with a higher concentration of chlorine to 1,100ºC will impact the energy efficiency of the facility. The energy efficiency of an energy from waste plant is more complex than implied in the EIS and the need to restrict the temperature is not just due to energy efficiency but due to possible high temperature chlorine corrosion of the boiler which limits the input temperature to the boiler.

Therefore, the design chlorine input level of the incinerator should be provided based on the specific waste streams and types that will be inputted into the TNG facility.

2.8 Current Genesis Xero Waste Facility Materials Processing Centre– Best Practice.

The EIS states that 23% of the phase 1 composition will be derived from chute residual waste from the current Genesis Xero Waste Facility Materials Processing Centre (MPC).

The EIS states that the Genesis MPC environmental management procedures have been developed in accordance with best practice to maximise resource recovery and minimise biodegradable material from being landfilled in accordance with relevant legislative requirements. Copies of the Environmental Management Procedures should be provided to demonstrate how best practice is being benchmarked against current international best practice and how this is being achieved.

2.9 Design Basis.

The Fichtner report states that sections of the plant will be designed to meet the UK's interpretation of the EU's Industrial Emissions Directive, however there is no clear design statement that the whole facility with be designed to meet the all the requirements of Best Available Techniques (BAT), as specified in the relevant BREF or 'BAT reference document[1]'. Instead reference is made to the design being based on the UK's interpretation of the EU's Industrial Emissions Directive.

Before the development commences the Applicant should submit for approval the fully defined standard to which the whole facility will be designed and operated to and an assessment should be made to ensure that this meets Australian design and operational standards. A comparison of the design to the EU BREF for energy from waste facilities should also be undertaken and any variances to the BREF should be described and validated. Given that the EU BAT and BREF are currently under review the Applicant should be made aware that the facility's design will be compared to the standard in force at the time the facility is approved to proceed.

2.10 Traffic

Chapter 16 Traffic and Transport and Appendix R detail the Traffic Impact Assessment (TIA) undertaken.

The proposed operational traffic generation on the external road network did not consider or assess the traffic volumes associated with the removal of ash residues from the facility. The EIS states that residual bottom, boiler and APC residues will be removed from site for recovery or disposal. The Fichtner report states in Section 5.8 that the average payload for bottom ash will be 18 tonnes and for APC residues will be 22 tonnes. Although the ash generation rates are unclear (refer Section 3.5) based on the figures quoted in the EIS and Waste Management Report there will be c15,000 one way vehicle movements a year associated with bottom ash removal, and 3,333 on way vehicle movements a year associated with boiler ash and APC residue removal.

[1] The BAT (Best Available Techniques) Reference Document (BREF) entitled Waste Incineration (WI) reflects an information exchange carried out under Article 16(2) of Council Directive 96/61/EC (IPPC Directive), dated August 2006.

TABLE 31 - OPERATIONAL TRAFFIC GENERATION ON EXTERNAL ROAD NETWORK

TYPE	MOVEMENTS	
	DAILY (VEH/DAY)	HOURLY (VEH/DAY)
Staff (Cars)	110	37
Input Waste / Fuel Deliveries	336	14
Miscellaneous Deliveries	8	2
Total	**454**	**53**

Figure 3: Extract from Chapter 16 of the EIS – Table 31 Operational traffic generation on external road network.

It is therefore recommended that the TIA is revised to consider the impact of vehicle movements carrying ash residues and the possible different scenarios for final ash treatment is considered in this assessment (on site recovery, off site recovery, onsite disposal, offsite disposal).

3 Summary

The overall EIS and supporting documentation appear to lack a 'source of truth' and there is a large number of inconsistencies between the Main EIS and the appendices which have been authored by different specialists and within the EIS itself. There are a number of inaccuracies and inconsistences between the main EIS document, the Environ Waste Management Report and the Concept Design Report produced by Fichtner, that has resulted in uncertainty in the information being provided and the authors of this review being unsure on which report is the 'source of truth'. The Fichtner report is titled the Concept Design Report and could be expected to provide the basis of design for the EIS. However, the preferred technology provider Hitachi Zosen Inova (HZI) have provided reference data for the Environ Waste Management Report which at times is inconsistent with the Fichtner report. It would be reasonable to expect that a concept design would have been developed for the proposal that comprehensively and accurately defined the Facility and provided a consistent basis of design for the EIS.

The proposed technology provider is Hitachi Zosen Inova (HZI). Arup recognise that HZI is a leading company in grate incineration technology, with reference facilities around the world treating MSW and C&I waste. However, the EIS and supporting documentation only outlines a possible concept for a facility and does not define the facility in sufficient detail to allow for a full adjudication to be made on whether the proposal is compliant with international best practice.

It is considered that insufficient data has been provided within the EIS and supporting documentation to a sufficient level of detail to allow a full technical assessment of the technology to be undertaken. A full as possible assessment has been made of the Proposal against the requirements of the NSW EPA Energy from Waste Policy Statement based on the information provided in the EIS, Environ Waste Management Report and the Fichtner Concept Design Report. Possible suggested conditions for approval have been included where appropriate. Refer to Appendix A.

Comments have also been made on the responses provided by the Applicant to the Terms of Reference Adequacy comments. Refer Appendix B.

Based on the merit assessment undertaken by Arup of the technical aspects of the EIS referring to the proposed technology and its compliance with the NSW Energy from Waste Policy Statement (2015), Arup would propose that the NSW EPA recommend that this application is not approved in its current form.

Appendix A

NSW EPA Energy from Waste Policy Statement Review

NSW Energy from Waste Policy Statement Review

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
1. Introduction	1	Facilities proposing to recover energy from waste will need to **meet current international best practice techniques**, particularly with respect to: • **process design and control** • **emission control equipment** design and control • **emission monitoring with real-time feedback** to the controls of the process	*The report defines a concept not the actual proposed development. It is very possible that the concept described may well lead to meeting this criteria, however based on the information provided within the EIS, it cannot be confirmed at present.* *For example the report states:* *4.3 A moving grate is likely to offer the most flexible technology. –However, it does not define the type of moving grate that will be utilised.* *4.4.1 Lists nine options to improve thermal efficiency, however the report does not define the selected option.* *4.5.1 States that Selective Non Catalytic Reduction (SNCR) is likely to be required however it is not definitive on this requirement.* *4.5.5 Does not specify the actual reaction to neutralise acid gases, it lists 2 options.*	*Section 3.10 through 3.17 provides a technical summary of a plant to be supplied by HZI.* *HZI are one of the leading international WtE technology providers. They have a proven track record in providing WtE that meet international best practice.* *In section 7.4.4 the report says this requirement is "according to ISO".* *The developer should explain why this has been added as it is not in the policy.*	*The Waste management report includes in Appendix F – the HZI Plant Operation Outline. This document clearly states that this document does not reflect the actual proposed plant configuration and is provided for demonstration purposes only.* *An operational facility will require a bespoke operational plan written specifically to meet the configuration of the actual facility designed and constructed.*	*The Proponent should submit for approval a concept design that comprehensively and accurately defines the facility. This should then flow down accurately through all documents and drawings*
2. Energy recovery framework and scope	4	As proposals progress from the concept to detailed development assessment stage, proponents should engage in a genuine dialogue with the community and ensure that planning consent and other approval authorities are provided with accurate and reliable information.	*Sections 3.4 and 4.5.7b refer to two stacks one for each phase but the layout diagram shows only one for the whole facility this is inconsistent.* *Section 4.3.5 States that Gasification is unproven at the scale required.* *Gasification is proven up to a scale of up to 90,000 tpa per line e.g Nippon in Japan operate 42 gasification plants. This may be costly but it is not unproven.*	*The EIS lacks in parts sufficient detail to allow a full and comprehensive examination of the proposal.* *There is no correlation in feedstock of the reference facilities listed in the EIS to what is being proposed.* *None of the reference identified reference facilities demonstrate the treatment of C&D waste which is proposed to be 50% of the total feedstock.* *None of the reference facilities refer to the treatment of floc waste – however it is noted this could be included in other jurisdictions as part of the C&I waste stream.* *The EIS provides inconsistent information with regard to the estimated development timeframe/schedule of the development. This therefore does not allow the public to*	*Comment as EIS*	*The Proponent should submit for approval the ongoing community engagement programme through the design, construction and commissioning stage.* *Information used to inform this engagement program should be consistent with the actual 'basis of design' of the facility.*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
				fully consider the potential impact associated with the construction program. *The traffic impact assessment does not assess the actual proposed full traffic movements associated with the proposed development as it does not consider the movements associated with ash residue removal (min 15,000 one way vehicle movements per year).* *As evidenced in Appendix X Community Communication and Consultation Report, the majority of the community consultation took place during the latter part of 2013 and the early part of 2014. Given that the EIS has been extensively revised since its original submission in 2014 and the proposal is now staged, it would have been reasonable to expect a further round of community consultation to update them of changes made to the proposal.* *There is a lack of a future plan to actively engage and communicate with the community through all stages of the proposal including operation.*		
		The operators of an energy from waste facility will need to be 'good neighbours' – particularly if near a residential setting but also where there are workers in other facilities. This would apply to waste deliveries and operating hours, but most importantly with respect to readily available information about emissions and resource recovery outcomes.	*Ongoing community engagement is not adequately described in the report.*	*Appendix X Community Communication and Consultation Report provides details of the community engagement to date.* *There is a lack of a future plan to actively engage and communicate with the community through all stages of the proposal including operation.*	*Ongoing community engagement is not adequately described in the report.*	*The Proponent should submit for approval a detailed community engagement plan for the life of the facility*
3. Eligible waste fuels	5	The following wastes are categorised by the EPA as *eligible waste fuels*: 1. biomass from agriculture 2. forestry and sawmilling residues 3. uncontaminated wood waste 4. recovered waste oil 5. organic residues from virgin paper pulp activities 6. landfill gas and biogas 7. source-separated green waste (used only in processes to produce char) 8. tyres (used only in approved cement kilns).	*Next Generation NSW Pty Ltd (TNG) proposed feedstock mix does not meet the 'eligible waste fuel' requirements.* *TNG therefore needs to meet the Policy requirements for an* ***energy recovery facility*** *– as detailed in Section 4 of the Policy.*	*Section 7.4 states that the proposed facility has been designed to recover energy from waste and waste-derived materials that are not listed as eligible waste fuels. It is stated that the Genesis MPC generates uncontaminated wood waste and source separated green waste but given their saleable value, and are not intended to be used as a fuel for the Facility.*	*Section 5.2 suggests that the Proponent may seek permission to process eligible wastes in the facility* *This is therefore contrary to the statement made in Section 7.4 of the EIS, which does not state that any changes will be made to treat eligible waste fuels through the Facility.*	*Permission should be obtained from the NSW EPA before processing Eligible Waste Fuels in the facility*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
					Descriptions of waste throughout the Report are unclear, inconsistent and do not align with the Energy from Waste Policy. e.g. *1. green waste from the back end of the materials processing facility is described as an eligible waste fuel (only source-separated green waste is a listed eligible waste fuel in the Energy from Waste Policy);* *2.biosolids are listed within the Commercial and Industrial waste stream*	
4. Energy recovery facilities	6	Any facility proposing to thermally treat a waste or waste-derived material that is **not a listed eligible waste fuel** (Section 3) must **meet the requirements to be an energy recovery facility**. Energy recovery facilities refer to facilities that **thermally treat waste-derived materials that fall outside of the low-risk '*eligible waste fuels*'**				
		These facilities must therefore **demonstrate** that they will be **using current international best practice techniques**, particularly with respect to: • **process design** and control • **emission control equipment** design and control • **emission monitoring with real-time feedback** to the controls of the process • **arrangements for the receipt of waste** • **management of residues** from the energy recovery process.	*In various sections, the report states that sections of the plant will be designed to meet the UK's interpretation of the EU's Industrial Emissions Directive.* *There is no clear design statement that the whole facility with be designed to meet the all the requirements of Best Available Techniques (BAT), as specified in the relevant BREF or 'BAT reference document'. Instead reference is made to the design being based on the UK's interpretation of the EU's Industrial Emissions Directive.* *It should also be noted that the EU BAT and BREF are currently being reviewed. This is expected to be completed in 2017.* *Consideration of how the design meets or compares to the EU BREF should be undertaken by the proponent.* *The report states in 4.5.10 that the flue gas treatment plant will be located outside. The*	*Refer to comments made under Fichtner Concept Study* *Table 3 indicates a flue gas treatment building size. The Proponent should*	*Refer to comments made under Fichtner Concept Study*	*Before the development commences the Proponent should submit for approval the fully defined standard to which the whole facility will be designed and operated. For example the EU IED as adopted in the UK.* *The Proponent should provide a comparison of the design to the EU BREF for energy from waste facilities.* *The Proponent should note that the facility's design will be compared to the standard in force at the time the facility is approved to proceed.* *Before the development commences the Proponent*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
			report often quotes UK standards. In the UK flue gas treatment plants are normally enclosed by buildings.	*confirm the extend the FGT plant is enclosed*		*should submit for approval the building enclosing FGT plant.*
			Arrangements for the management for the receipt of incoming waste is provided in Section 5.	*Arrangements for the management for the receipt of incoming waste is provided in Section 3.8 Weighing, Checking and Reception.*	*Arrangements for the management for the receipt of incoming waste is provided in Section 3.5.2*	*Before receipt of any waste at the facility the proponent should submit for approval a comprehensive suite of operational procedures for the weighing, checking and handling of incoming waste fuels.*
			There are a number of inconsistencies throughout the whole EIS on ash generation. *This report states for fuel input at 10MJ/kg that 20% ash will be generated.* *For design fuel input of 12.34MJ/kg that 11.53% ash will be generated. Figures provided though to not equate to these percentages.* *Table 5.7 Ash and residue – figures in this table are inconsistent with those quoted in Section 4.7.* *Section 2.10 states bottom ash of 23.8% and design of 11.8%. This range should be explained by the Proponent as it is not normal for this type of facility. Section 4.7 states that the maximum ash concentration is 20%, this is inconsistent.*	*Inconsistency with figures in Main EIS Section 3.11 quoted for ash quantities/* *Section 10.5 states a bottom ash of 24.4%*	*Appendix H provides a calculation of ash generation. States that c20% bottom ash (dry) will be generated based on design fuel CV. This appears very high and could be justified by the Proponent with reference to other facilities treating similar waste types.*	*The proponent to provide accurate consistent data on ash generation from the facility drawing reference to similar facilities using a similar feedstock of a similar composition, ratio and CV.*
			The report states in 4.7 that bottom ash will be landfilled or recycled as aggregate, but does not define the treatment process for the bottom ash is recycled, or define end markets. *The report does not define the further treatment of boiler and FGT residues.* *The treatment of residues is not adequately defined in the report.*	*The EIS states the Proponent will engage with the EPA to means of recycling the bottom ash.* *Section 10.6 states the APC residue will be treated offsite and landfilled. Also that the boiler ash will combined with the APC residue unless it can be proven to be reusable.*	*Table 8 lists possible disposal options for all ashes* *3.7.1 highlights that the APC may be classified as hazardous*	*All ashes from the facility will be directed to appropriate landfill until the NSW EPA approves otherwise.* *It should be noted that the EPA considers that:* *If the material is classified as hazardous the material must be immobilised before transport to landfill for disposal. EPA policy is not to issue Resource Recovery Orders or Exemptions for restricted solid or hazardous wastes.*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
			The report specifies the noise sources from a number of sources but does not define the noise expected outside the building or at the site boundary.	*Noise is addressed in the EIS – Ch 14 Noise Assessment*		*The Proponent to provide an assessment of the impact of traffic by traffic movements associated with ash removal from site.*
		Energy recovery facilities must **use technologies that are proven**, **well understood** and **capable of handling the expected variability and type of waste feedstock**. This must be **demonstrated through reference to fully operational plants** using the **same technologies** and **treating like waste streams** in other **similar jurisdictions**.	*In section 2.2 the report states that the range of acceptable fuels needs to be as wide as practical. In section 3.1 the report goes on to say the assumptions should be confirmed with the potential supplier. Section 4.2 also talks of maximum fuel flexibility.* *These comments are true but they does not assist in defining the limits and range of allowable wastes.* *The report does not attempt to demonstrate compliance with this section of the policy.* *Table 4 of this report lists the characteristics of suitable and unsuitable wastes for moving grate technologies. Listed in the criteria as unsuitable is waste with an NCV < 7MJ/kg.* *Table 4 also lists virgin wood and saw dust as being unsuitable.* *Table 1 provides a compositional breakdown of the proposed feedstocks. This includes Green organics (GO) residual. This has a CV listed as 6.31 MJ/kg. Therefore this would be deemed unsuitable as per Table 4.* *The composition of floc waste listed in Table 1 is different to the composition of floc waste listed in Table 7 of the waste management report.*	*Table 18 states that 50% of the design fuel mix is Mixed C&D waste and 14% is floc waste as C&I waste.* *Table 4 details the 5 reference plants. C&D and floc waste are not specified as a fuel in these reference facilities which equate to c64% of the waste input.* *Section 3.5 does not demonstrate that the jurisdictions of the reference facilities are similar to the proposed facility.* *For these reasons the EIS does not demonstrate compliance with the policy.* *The CRW waste passes through a shredder to give a material size of 450mm. Table 18 states that 25% of the whole waste stream is wood. The Proponent should confirm what further shredding of the wood is undertaken.*	*The composition of floc waste listed in Table 1 is different to the composition of floc waste listed in Table 7 of the waste management report.* *The report indicates certain contaminated woods will be removed from the waste streams. Explanation on how contaminated woods, virgin wood and sawdust will be removed from the waste stream given the high percentage of wood waste needs to be provided.* .	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met including referencing fully operational plants using the same technologies and treating like waste streams in other similar jurisdictions.*
Technical criteria	6	The **gas resulting from the process should be raised**, after the last injection of combustion air, in a **controlled and homogenous fashion** and even under the most unfavourable conditions to a **minimum temperature of 850°C for at least 2 seconds** (as measured near the inner wall or at another representative point of the combustion chamber).	*Refer to comments made under Section 4: Energy Recovery Facilities. The report states 850°C for at least 2 seconds*	*Subject to comment in item 6 above.* *The report indicates compliance with this standard*	*Comment as EIS*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*
		If a waste has a **content of more than 1% of halogenated organic substances**, expressed as chlorine, the **temperature should be raised to 1100°C for at least 2 seconds** after the last injection of air.	*In 4.2.2 the report states a maximum design Cl of 1%. The maximum allowable range of Cl should be confirmed by the Proponent.*	*The report highlights the difference in the wording between the NSW policy and IED. The NSW EPA policy applies to all*	*Comment as EIS*	*Before development commences the Proponent should submit for approval information that*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
				waste not just Hazardous waste as in the IED. *Hazardous Waste incinerators are designed for 1100°C, to ensure destruction of the difficult waste processed. This is based on considerable practical experience.* *Similar practical experience shows that 850°C is sufficiently high for the destruction of MSW and C&I wastes, where the chlorine concentration of the waste feed to the grate is normal up to 1%. This is done to prevent excessive corrosion of the boiler and shock loading of chlorine into the FGT plant.* *Small quantities of waste with higher concentrations of Chlorine can be accepted into the pit but they would need to be mixed with other waste before feeding onto the grate.* *MSW and C&I incinerators are not designed to receive 8 or 10% chlorine as suggested in the report.* *The report suggests that higher temperatures do not allow efficient energy recovery. In general coal or gas power stations work at higher temperatures and efficiencies.* *The energy efficiency of an energy from waste plant is more complex than implied in the report, for example, possible high temperature chlorine corrosion of the boiler limits the input temperature to the boiler.* *The Proponent should define the design chlorine input level of the incinerator.*		*demonstrates this clause of the policy has been met.*
		The process and air emissions from the facility must satisfy **at a minimum** the requirements of the **Group 6 emission standards** within the Protection of the Environment Operations (Clean Air) Regulation 2010	*Refer to comments made under Section 4: Energy Recovery Facilities. The IED requires tighter emissions controls and exceeds the Group 6 emissions.*	*Comment as Concept study*	*Comment as Concept study*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
	7	**There must be continuous measurements of NOx, CO, particles (total), total organic compounds, HCl, HF and SO2**. This data must be made available to the EPA in real-time graphical publication and a weekly summary of continuous monitoring data and compliance with emissions limits published on the internet. The continuous measurement of HF may be omitted if treatment stages for HCl are used which ensure that the emission limit value for HCl is not being exceeded.	*Refer to comments made under Section 4: Energy Recovery Facilities Assuming this is complied with, this requirement will be met.*	*Refer to comments made under Section 4: Energy Recovery Facilities* *The report indicates compliance with this standard*	*Comment as EIS*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*
		There must be **continuous measurements** of the following **operational parameters**: **temperature** at a representative point in the combustion chamber; **concentration of oxygen**; **pressure and temperature in the stack**; and **water vapour content** of the exhaust gas.	*Refer to comments made under Section 4: Energy Recovery Facilities Assuming this is complied with, this requirement will be met.*	*Refer to comments made under Section 4: Energy Recovery Facilities.* *The report indicates compliance with this standard*	*Comment as EIS*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*
		As part of the environment protection licence conditions of any energy recovery facilities, the EPA will require operators to undertake proof of performance (POP) trials to demonstrate compliance with air emissions standards. Following successful POP trials, there must be at least two measurements per year of heavy metals, polycyclic aromatic hydrocarbons, and chlorinated dioxins and furans. One measurement at least every three months shall be carried out for the first 12 months of operation. If and when appropriate measurement techniques are available, continuous monitoring of these pollutants will be required.	*Refer to comments made under Section 4: Energy Recovery Facilities.* *Assuming this is complied with, this requirement will be met.*	*Pag85 of the EIS states that:* *TNG will fully comply with all EPA requirements, allowing independent personnel to conduct proof of performance trials at any time.* *The EPA consider that the onus of proof is on the Proponent to provide proof of performance and it is the view of the EPA that the information provided does not show that proof of performance trials will be undertaken to demonstrate compliance with air emissions standards.*	*Comment as EIS*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*
		The **total organic carbon** (TOC) or **loss on ignition** (LOI) content of the **slag and bottom ashes must not be greater than 3% or 5%,** respectively, of the dry weight of the material.	*The report is silent on this requirement.*	*The EIS states that the HZI plant will comply with this requirement (Table 9)*	*Comment as EIS*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*
		Waste feed interlocks are required to prevent waste from being fed to the facility when the required temperature has not been reached either at start-up or during operation.	*See comment in item 6. Assuming this is complied with, this requirement will be met.*	*The report indicates compliance with this standard*	*Comment as EIS*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*
Thermal efficiency criteria	7	The **net energy produced** from thermally treating that waste, **including the energy used in applying best practice techniques**, **must therefore be positive**.	*This requirement should be met by the facility.*	*See comment in Concept study*		*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
		To meet the **thermal efficiency criteria**, facilities must **demonstrate that at least 25%** of the energy generated from the thermal treatment of the material **will be captured as electricity** (or an equivalent level of recovery for facilities generating heat alone).	*In 3.2 the report states a net electrical efficiency of approximately 30%. In section 9 the report states the EPA policy requires R1 to be met, this is incorrect. It then goes on to demonstrate the facility will meet the requirements of R1. This is not reliable and should be confirmed against the seasonal ambient air conditions in Sydney.*	*The EIS assumes a net electrical production of 30% but does not demonstrate through calculations. The Proponent should demonstrate the seasonal electrical efficiency based on Sydney climatic conditions.*	*The thermal efficiency criteria is addressed in Section 5.6*	*Before development commences the Proponent should submit for approval information that demonstrates this clause of the policy has been met.*
		Energy recovery facilities must also **demonstrate that any heat generated** by the thermal processing of waste is **recovered as far as practicable**, including **use of waste heat for steam or electricity generation** or for **process heating of combined heat and power schemes**.	*The reports states that heat will be recovered to make steam for electricity. The report states that the facility will be designed to be capable of being modified to provide CHP should a user of the heat be found.*		*The report states that provision will be made for CHP.*	*Before the development commences a market study of the possible heat and cooling market should be submitted for approval. This market study should be repeated every 3 years till a use for the heat is found. Demonstration of how the design can be modified to allow for heat recovery needs to provided, an assessment of construction impacts associated with this modification needs to be undertaken.*
Resource recovery criteria	7	The policy statement's objectives in setting resource recovery criteria are to: • **promote the source separation of waste** where **technically and economically achievable** • drive the use of **best practice material recovery processes** • ensure **only the residual from bona-fide resource recovery operations are eligible** for use as a feedstock for an energy recovery facility.	*The report does not adequately demonstrate this requirement will be met.*	*To compare the sorting line of the MPC with best practice materials recovery a full description of the sorting line is required. Section 2.2.5 states the waste is sorted automatically but does not describe how.* *Statement made that the Genesis MPC environmental management procedures has been developed in accordance with best practice to maximise resource recovery and minimise biodegradable material from being landfilled in accordance with relevant legislative requirements.*	*Similar to the EIS comment section 3.5.2 does not adequately describe the sorting process.*	*The proponent needs to provide evidence that any residual waste material accepted at the facility is eligible for use as a feedstock.* *Copies of the Environmental Management Procedures should be provided to demonstrate how best practice is being benchmarked and is being achieved.* *Approval must be sought in advance for the acceptance of feedstocks not listed in Schedule XX of the Approval or in quantities exceeding those listed in Schedule XX.*
	8	Energy recovery facilities **may only receive feedstock from "authorised" waste facilities or collection systems** that meet the criteria outlined in **Table 1**.	*The report does not define the sources of CRW waste or demonstrate compliance with this requirement.*	*The EIS states that details of source facilities of feedstock will be provided in confidence to the EPA and the Dept. of Planning and Environment. Arup or the EPA has not sighted this information so therefore cannot comment of the compliance with this requirement and in*	*The EIS states that details of source facilities of feedstock will be provided in confidence to the EPA and the Dept. of Planning and Environment. Arup or the EPA has not sighted this information so*	*The proponent should provide details of source facilities of feedstock prior to receiving them at the facility and approval should be sought for their acceptance.*

Section	Page Ref	NSW EfW Policy Criteria	Arup Comments on Fichtner Concept Study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
				the absence of this information considers this as failure to demonstrate compliance with the resource recovery criteria set out in Table 1 of the Energy from Waste Policy.	*therefore cannot comment of the compliance with this requirement and in the absence of this information considers this as failure to demonstrate compliance with the resource recovery criteria set out in Table 1 of the Energy from Waste Policy.*	

Table 1 - Resource recovery criteria for energy recovery facilities (*adapted from NSW EfW Policy Statement*)

Waste stream	Authorised facility	% of residual waste allowed for energy recovery	Arup Comments on Fichtner Concept study	Arup Comments on EIS	Arup comments on Waste Management report	Suggested conditions
Mixed municipal waste (MSW)	Facility processing **mixed MSW** waste where a **council has separate collection systems** for dry recyclables and food and garden waste	**No limit** by weight of the waste stream received at an authorised facility	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*Provide a condition that Mixed MSW is not an acceptable waste input stream.*
	Facility processing **mixed MSW** waste where a council has **separate collection systems for dry recyclables and garden waste**	**Up to 40%** by weight of the waste stream received at an authorised facility	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*Provide a condition that Mixed MSW is not an acceptable waste input stream.*
	Facility processing **mixed MSW** waste where a council has a **separate collection system for dry recyclables**	**Up to 25%** by weight of the waste stream received at an authorised facility	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*N/A.* *Mixed MSW is not a proposed design fuel for the facility.*	*Provide a condition that Mixed MSW is not an acceptable waste input stream.*
Mixed commercial and industrial waste (C&I)	Facility processing **mixed C&I** waste where that waste is **sourced solely from an entity that has separate collection systems** for all relevant waste streams	**No limit** by weight of the waste stream received at an authorised facility		*The EIS states that details of source facilities of feedstock will be provided in confidence to the EPA and the Dept. of Planning and Environment. EPA/Arup has not sighted this information so therefore cannot comment of the compliance with this requirement.*		*The proponent should provide details of source facilities of feedstock prior to receiving them at the facility and approval should be sought for their acceptance.*
	Facility processing **mixed C&I waste**	**Up to 50%** by weight of the waste stream received at an authorised facility			*Assumption made in Table 13 Potential tonnes for energy from waste processing 2015 that 100% of landfilled C&I waste is mixed C&I waste.*	*The proponent to demonstrate prior to using any C&I waste that a minimum of 50% of the waste stream can be recovered.*
Mixed construction and demolition waste (C&D)	Facility processing **mixed C&D waste**	**Up to 25%** by weight of the waste stream received at an authorised facility			*Assumption made in Table 13 Potential tonnes for energy from waste processing 2015 that 100% of landfilled C&D can be processed through an authorised facility.*	*The proponent to demonstrate prior to using any C&D waste that a minimum of 75% of the waste stream can be recovered*
Source-separated recyclables	Facility processing **source-separated recyclables**	**Up to 10%** by weight of the waste stream received at an authorised facility				*The proponent to demonstrate prior to using any source segregated recyclables that no more than 10% of the input waste stream to the facility is being accepted by TNG.*
Source-separated garden waste	Facility processing **garden waste**	**Up to 5%** by weight of the waste stream received at an authorised facility				*The proponent to demonstrate prior to using any source separated garden waste (GO) that no more than 5% of the input waste stream to the facility is being accepted by TNG. Consideration needs to be made of the CV of GO and whether it is a*

						suitable waste fuel stream for a grate incinerator.
Source-separated food waste (or food and garden waste)	Facility processing **source-separated food or source-separated food and garden waste**	**Up to 10%** by weight of the waste stream received at an authorised facility				*The proponent to demonstrate prior to using any source separated food waste (or food and garden waste) that no more than 10% of the input waste stream to the facility is being accepted by TNG*
Note 1	1. The EPA may give consideration to increases to the maximum allowable percentage of residuals from facilities receiving mixed municipal and commercial and industrial waste where a facility intends to use the biomass component from that process for energy recovery, rather than land application and the facility can demonstrate they are using best available technologies for material recovery of that stream.		*None the report is silent on these requirements*	*None the report is silent on these requirements*	*None the report is silent on these requirements*	
Note 2	2. Waste streams proposed for energy recovery should not contain contaminants such as batteries, light bulbs or other electrical or hazardous wastes.		*None the report is silent on these requirements*	*None the report is silent on these requirements*	*The report requests that this be amended to include a test of economically and technically justifiable.* *The Report infers community drop off schemes for the removal of hazardous wastes – this is not applicable to C&I and C&D streams.* *Additionally, training documents included does not reference hazardous materials as per the policy.*	*The Proponent needs to provide details on how it will identify and manage contaminants listed under Note 2.*

Appendix B

Adequacy Comments Review

General Observation / DG Requirement	excel row no.	Environmental Assessment Requirements / General Requirements	EIS section/appendix Cross-Reference	Adequacy against TOR (Y/N/Partial)	Review Comments	Applicant Response	Applicant Reference	EIS (June 2015) Review Comments	Adequacy against TOR (Y/N/Partial)
	General Requirements								
Arup (gnl)	1	The Proponent must demonstrate that the technology will perform as stated in the EIS, with the composition of feedstock proposed.			While the technology proposed (HZI Moving Grate) is primarily designed and well established for the management of Municipal Solid Waste ("MSW"), it is not well established for the management of a composition of C&I and C&D feedstock. Demonstration of performance can be done by providing real data from named reference facilities that treat the same type and mix of wastes that are proposed for the Next Generation facility (C&I and C&D) for comparison. However, the EIS does not list any named reference facilities or 'real' representative data from those facilities to support the assertion made in the EIS about the performance of the proposed Next Generation facility with the proposed feedstock composition. Therefore, the Proponent must provide named reference facilities treating similar feedstock and ratios as is proposed for the Next Generation Facility. This includes specific data on the composition of waste feedstock received at those named reference facilities and the subsequent performance of those facilities, so it can be compared to the Next Generation's proposed facility.	The following is a list of EfW plants with moving grate technology whose fuel contains only or to an important fraction of C&I waste or pre-treated (often mostly commercial) waste. - 'TREDI' in Salaise, France. 146'000 t/a, Grate furnace within a plant for treatment of industrial and hazardous waste - 'KEBAG' in Zuchwil, Switzerland. 200'000 t/a, 50% C&I waste (no pretreatment) - 'VFA' in Buchs, Switzerland. 180'000 t/a, 65% C&I waste (no pretreatment) - 'STADTWERKE ERFURT' in Erfurt, Germany . 80'000 t/a 100% pretreated MS and C&I waste (RDF) (fraction not known) - 'EEW' in Knapsack, Germany. 300'000 t/a 100% pretreated C&I waste (RDF)	EIS Section 3.	The EIS lacks details on the ratio of feedstock material, only providing percentage of C&I waste, and also the performance of the named reference facilities. Noted that only one reference facility listed as having feedstock that is 100% pre-treated C&I waste - EEW. Recommend that further representative data is provided on the reference facilities; this should address the history of each facility (when constructed and modifications), ratio of feed stock of each facility, and the operating performance and outputs. Proponent to provide details on an existing reference facility that is processing similar (within a +/-5% variable range) feedstock to that is proposed.	N/A
Arup (gnl)	2				The EIS is not a stand-alone document and relies heavily on information contained within the appendices and even at that the information is spread across a number of the appendices. This makes the EIS difficult to read and review.	A peer review has been carried out by Ramboll and ENVIRON Australia. The quality and independence of the EIS is considered to have substantially improved since the previous submission. Ramboll and ENVIRON Australia consider the EIS addresses the comments from the agencies' reviews and is adequate for exhibition.		The EIS contains summary supporting information with reference to relevant appendices that information has been drawn from. However, in some cases where data has been sourced, the referenced document(s) have not been identified. Sourced data should be referenced, with details of published reports provided.	
Arup (gnl)	3				The EIS does not provide all the supporting information required and makes a large number of general statements without providing justification or supporting data.	See above.			
Arup (gnl)	4				The assessment of the need for the development is weak and does not provide robust analysis of current waste and infrastructure available in catchment area for this proposal. Furthermore, no assessment is made of other potential EfW projects that could be drawing on the same waste feedstock as this proposal. The EIS implies that the total available residual C&I and C&D waste streams in the catchment area are available to the facility. This assumption is not supported by any analysis of financial or demand modelling.	Additional information has been added on need for the development and detail on current waste infrastructure in the catchment area. A section on material input streams has been provided in the Waste Management Report and EIS. Although there is a lot of interest in EfW, particularly spurred on by the release of the EfW Policy Statement, TNG is by far the furthest advanced in terms of planning, licensing and procurement. No other large scale EfW facilities are currently in operation in NSW. As such, there are currently no other EfW facilities that would be drawing on the same waste feedstock as the proposal.	EIS Section 24 EIS Section 10.4, Waste Report Section 2. EIS Section 24.3	The EIS lacks details on the ratio of feedstock material, only providing percentage of C&I waste, and also the performance of the named reference facilities. Noted that only one reference facility listed as having feedstock that is 100% pre-treated C&I. There is a lack of assessment on future identified/planned waste infrastructure projects that may also draw on the identified input material, or that may have an impact on feedstock	
Arup (gnl)	5				The assessment of the potential sources of feedstock is confusing and it is not clear where feedstock will emanate from outside of the c10% residual waste by-product from the Genesis Xero Facility.	Clarification of sources has been provided in the Waste Management Report.	Waste Report Section 3.5	EIS states that proponent will provide in confidence to the EPA and the Dept. of Planning and Environment. Recommend that EPA and the Dept. of Planning and Environment to evaluate identified feedstock sources.	
Arup (gnl)	6	Further details on compositional data required			Very little compositional data is provided on the proposed feedstock. It categorises feedstock as general C&D and C&I and residual waste from Genesis Facility, "Flock waste" and other organic waste. Some compositional data is provided in the Fichtner Concept Design Report (Appendix Y) but it does not clarify if this data is based on Australian compositional analysis.	See above.	Waste Report Section 3.5	Provision of detailed data on sources	
Arup (gnl)	7				The composition of the bottom ash provided is based on the EfW facility burning Municipal Solid Waste. This facility will handle other feedstock and therefore the data provided is not representative of the waste that will be treated at the proposed facility.	This has been updated accordingly.	Waste Report Section 6.6.1	Note comments in Arup merit report on ash generation rates.	

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Arup (gnl)	8	The Concept Design Report suggests the facility will be phased but no details are provided on phasing in the Main EIS.			This needs to be clarified as it will impact construction activities etc.	Phasing details have been provided in the EIS	EIS Section 3.3	Staging of the development is detailed in Section 3.4. General overview of two phased development of the facility provided. No details provided on estimated development timeframe/schedule of the facility. Inconsistencies of construction period in EIS - Section 14.4.1 (Construction Noise) states construction period of 36 months. Section 3.16 (Water Demand) states that construction will take place over 43 months. Section 16.4.2 (EIS) and Section 7 (Traffic Impact Assessment), mentions total construction period of three (3) years.	
Arup (gnl)	9	No information is provided on the proposed facility's Distributed Control System (DCS).				Details of the DCS provided in EIS and Appendix E of the Waste Report.	EIS Section 3.13, Waste Report Appendix E.	Section 3.14 of EIS provides details of Distributed Control System (DCS).	
Arup (gnl)	10	There is no separate assessment of cumulative impacts with other existing or proposed projects, except for where a short commentary is provided at the end of individual chapter.				Section added in EIS.	EIS Section 9.2	Details on current and future interactions of the proposed facility with current neighbouring operations outlined in Section 9.2. Cumulative noise, traffic and air impacts detailed in following sections (9.3, 9.4, & 9.5).	
Arup (gnl)	11	The EIS has no referencing. There are numerous spelling, incomplete sentences and inconsistencies on information provided in the main document and appendices throughout				A peer review has been carried out by Ramboll and ENVIRON Australia. The quality and independence of the EIS is considered to have substantially improved since the previous submission. Ramboll and ENVIRON Australia consider the EIS addresses the comments from the agencies' reviews and is adequate for exhibition.		Minor grammar and spelling errors sighted throughout EIS. Lack of referencing through EIS especially relating the waste composition.	
Arup (DGR)		Detailed description of the site, and any existing or approved operations	Section 3.0	Y				Detailed site description and history provided, including history of development and operation approvals for the site.	Y
Arup (DGR)	12	Detailed description of the development, including need for the development; alternatives considered; engineering and/or architectural plans; justification for the development taking into consideration its location, any environmental impacts of the development, suitability of the site and whether the development is in the public interest	Executive Summary, section 3.0, 4.0 and 24.0.	P	The need and justification for the development is addressed in Section 4, 24 and the Executive Summary and the Waste Management Assessment Report. Further information and analysis on the justification for the project would be beneficial, particularly around the demand for waste infrastructure including EfW and the economic viability of the project in relation to a changing renewable energy and carbon market. No information on the staging of the development was located, although suggested in the Concept Design Report.	Additional information has been included around the demand for waste infrastructure and economic viability of the project. A summary on the phasing of construction has been provided.	EIS Section 24 EIS Section 3.2	WMP provides details on current waste infrastructure capacity based on two NSW Government commissioned studies and independent research. A brief summary of development staging is provided in EIS Section 2.4, but no details provided on preliminary development schedule/timeframe. In reviewing the CEMP, there is also no reference to scheduling.	P
Arup (DGR)	13	Likely interactions between the development and existing, approved and proposed operations in the vicinity of the site		N	No information on the interaction with existing, approved and proposed operations in the vicinity of the site could be located, with the exception of the provision of some information on the existing Genesis Xero Waste Facility. No discussion on any potential interactive or cumulative impacts was located in the main body of the EIS, although air, noise and traffic assessments in appendices had considered cumulative impacts. An additional section should be added to the EIS describing existing, approved and proposed operations and the interactive/cumulative impact of these in combination with the proposed project.	Additional section added to EIS addressing cumulative impacts.	EIS Section 9.2	Overview of local current and proposed future operating facilities identified. Lack of detail of current resource recovery operation on site - difficult to evaluate that current resource recovery practices are *employing best practice material recovery processes* (as per NSW EfW criteria).	
Arup (DGR)	14	Consideration of any relevant statutory provisions	Sections 7.0 and 8.0	Y				n/a	Y
Arup (DGR)	15	Risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment	Section 5.0	P	A summary of risk assessment has been provided in Section 5.0. Further information on the risk assessment methodology, criteria and scale/level of impact should be provided.	The Director-General's Environmental Assessment Requirements do not include an Environmental Risk Analysis. Further detail has been provided.	EIS Section 5.	AS/NZ 4360 Risk management methodology applied for risk analysis undertaken, however no details have been provided on the risk evaluation criteria. Details of the scale/level of impacts have still not been provided.	
Arup (DGR)	16	Detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: a description of the existing environment, using sufficient baseline data; an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage significant risks to the environment:	Various	P	A detailed assessment of key issues below is provided, as well as some additional issues (Section 22.0). There is limited assessment of staging options and cumulative impacts; descriptions of operational controls, contingency plans, monitoring and reporting could also be provided in more detail.	Staging details provided. Cumulative impacts detailed. Details of DCS provided.	EIS Section 3.3, 3.13, 9.2, 10-22.	Section 3.14 of EIS provides details of Distributed Control System (DCS). Note comments above re staging and construction timelines.	
Arup (DGR)	17	Consolidated summary of all the proposed environmental management, mitigation and monitoring measures, highlighting all commitments included in the EIS.	Sections 23.0 and 25.0	P	A summary of recommended mitigation measures is provided in Section 23.0. The proponent should confirm that all mitigation measures listed are to be applied (the use of 'if possible', 'should' etc. should be avoided). Section 25.0 provides a summary of residual impacts and commitments. Monitoring measures should also be included in these sections where relevant.	Mitigation/control measures have been confirmed. Monitoring measures included where relevant.	EIS Section 23, 25.		
Arup (DGR)	18	The EIS must also be accompanied by a report from a qualified quantity surveyor providing: a detailed calculation of the capital investment value (CIV) of the development (as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000), including details of all assumptions and components from which the CIV calculation is derived; a close estimate of the jobs that will be created by the development during construction and operation; and verification that the CIV was accurate on the date that it was prepared.	Appendix I, Section 3.0	P	Appendix I contains a report from a quantity surveyor providing calculations of the capital investment value, although information on assumptions is limited. A close estimate of operational jobs that will be created by the development is provided, however detailed information on construction employment is not provided. Information on how jobs figures were developed and relevant assumptions would be beneficial.	These details have been provided.	EIS Section 24.2, Appendix J.		
	Strategic Planning								

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	Waste Management								
Arup (DGR)	1	Details on Boiler ash			Boiler Ash can often be hazardous in composition and is managed either separately or with the APC residues as it may contain elevated heavy metals or dioxins. Therefore, data on this ash should be provided separately.	The quantity, composition and management of boiler ash has been estimated and is provided in Appendix H and Section 3.7.1 of the Waste Management Report. Ramboll and HZI have carried out an assessment of the ash fractions from the plant, based on the expected residual waste fuel composition (Appendix H). This now includes: 1. Bottom Ash 2. Boiler Ash 3. Air Pollution Ash	Waste Management Report Section 3.7.1 & 6.6.1 Appendix H of the Waste Management Report	Estimation of ash generation provided Table 8 of WMR. Composition (including TCLP & SCC values) of ash residues is provided in Appendix H of WMR. Would be beneficial to have overview of ash composition detailed in body of WMR. Inconsistencies in ash generation rates (refer Arup Merit Report Section 2.5).	
Arup (DGR)	2	a description of the classes and quantities of waste that would be thermally treated at the facility;	Section 10.3	P	A general list of waste streams and estimated quantities is included however full compositional breakdown is not provided for each waste stream. Compositional analysis is provided within the Concept Design Report Table 1, however it is not clear whether this compositional breakdown reflects the composition of these waste streams in Australia.	The Waste Management Report now provides the composition of all waste streams specific to Australia (Table 7). The data was sourced from publically available documents and confidential data sourced from operators of authorised waste facilities in NSW. The Company names will be provided in confidence to the Department but for commercial reasons the names will be omitted from the Waste Management Report. Other C&D and C&I residual characterisations have been determined using EPA data as a baseline. Recyclables have then been removed at appropriate recovery rates to determine a residual characterisation.	Waste Management Report Section 3.5 & Table 7 Section 6.1	Composition of waste streams provided in Table 7 of WMR. No reference to Australian reports in which data is sourced form. Useful to identify the publically available documents that data has been sourced from. There is no assurance to whether the compositional data will reflect the actual feedstock for the facility. Inconsistency in flock waste composition. Refer Arup Merit Report Section 2.4.J23	
Arup (DGR)	3	demonstrate that waste used as a feedstock in the waste to energy plant would be the residual from a resource recovery process that maximises the recovery of material in accordance with Environment Protection Authority Guidelines;	Section 10.3	P	The source of each potential waste stream is provided and states that all waste will come from authorised waste facilities. Details of the actual locations of these facilities with the exception of the Genesis Facility has not been provided. Therefore not able to validate if all feedstock be residual from a resource recovery process that maximises the recovery of material in accordance with Environment Protection Authority Guidelines; Furthermore, clarification required on sources of feedstock as Exec Summary states that 850,000 tonnes will be from waste received from Genesis Xero Waste facility and 500,000 from external sources. Section 10.3 Table 16 states that 100,000 tonnes will be from Genesis facility.	A summary of Resource Recovery Facilities is appended to the Waste Management Report and Section 2 summarises waste capacity in NSW. The details and contracts with 'other waste facilities is not possible to be finalised at this stage of the project, however, it is expected to be similar to MPC. The project will take a two phased approach after receiving feedback from the government agencies. Phase 2 will receive waste from external waste facilities. Phase 2 will only commence once the Department of Planning and Environment is satisfied that the required amount of eligible residual waste fuel is	Waste Management Report Appendix C. Waste Management Report Section 1.1 and 3.5	Details of source faculties of feedstock will be provided in confidence to the EPA and the Dept. of Planning and Environment.	
Arup (DGR)	4	procedures that would be implemented to control the inputs to the waste to energy plant, including contingency measures that would be implemented if inappropriate materials are identified;	App J Waste Management Assessment	P	Section 7.6.1 discusses how will minimise lead and nickel from feedstock. More description required on general management practises including SCADA/PLC systems that would be installed to monitor operations at the facility.	These inputs are minimised at the pre-sort stage. The DCS and Plant Operation Outline document appended to the WMR provide this information. Figure 3 presents the methods to be employed for controlling the inputs to the EfW Facility. A Waste Inspection Procedure has been included in Appendix B	Waste Management Report Appendix D, E and F. Waste Management Report Sections 3.3 & 6.3	No commentary provided on how would limit chlorine concentrations in fuel inputs. Refer Arup Merit Report Section 2.7 No commentary provided on detailed composition of wood waste and how this waste stream will be treated. Refer Arup Merit Report Section 2.3	
Arup (DGR)	5	details on the location and size of stockpiles of unprocessed and processed recycled waste at the site;	Section 3.4	Y	All feedstock will be stored in the receiving waste bunker. Ash will be stored in dedicated ash bunkers.	No comment to be made.		N/A	Y

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Arup (DGR)	6	demonstrate any waste material (e.g. biochar) produced from the waste to energy facility for land application is fit-for-purpose and poses minimal risk of harm to the environment in order to meet the requirements for consideration of a resource recovery exemption by the EPA under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005;	Section 3, 10.3, App J	N	Composition of Bottom ash is based on a Municipal Solid Waste Stream feedstock and not on the basis of the actual proposed feedstock. Commentary that bottom ash suitability to be recycled as aggregate or landfilled will be dependent on actual composition but no actual justification of this assumption provided.	An estimation of ash and residue composition has been appended to the Waste Management Report (Appendix H). It is TNG's intention to recycle bottom ash via a crushing and screening process to produce aggregate for road base. This will likely require a resource recovery order and resource recovery exemption to be issued by the EPA under Clause 92 of the PoEO Waste Reg	Waste Management Report Appendix H. Waste Management Report Section 6.5	Composition of bottom ash has been based on (UK) energy from waste data taken from facilities processing MSW. Ash generation rates are inconsistent. Recommend that bottom ash is landfill until provided otherwise suitable for recovery.	
Arup (DGR)	7	procedures for the management of other solid, liquid and gaseous waste streams;	App J Waste Management Assessment Section 7.6	P	Ash residues classified as either Bottom Ash or Air Pollution Control residue are described. Liquid effluent and Gaseous emissions also described. No details or estimate of quantity of boiler ash has been provided. Boiler ash composition is dependent on the feedstock can be classified as either hazardous no non hazardous and is either handled with the bottom ash or the Air Pollution Control residues dependent on its classification. No details provided on how other waste streams such as waste produced by staff or chemical waste will be managed.	Estimated residue ash quantities are now provided in Ramboll 'Estimation of ash and residue composition' assessment. Details on other waste streams are now provided in Section 6.6.	Waste Management Report Section 6.6.3, Waste Management Report Appendix H.	Control inputs detailed in Section 6.3 of WMR. Table 8 in Section 3.7 provides details of estimation of ash residue, based on volume of facility processing 1,105,000 tpa. Manage of bottom ash, APC and boiler ash procedures detailed in Section 6.6 of WMR. Initial identified licenced facilities open to accept APC have not been identified.	
Arup (DGR)	8	describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods;	App J Waste Management Assessment	P	Some general commentary is provided. No details are provided on a actual the sources of feedstock or possible suitable licenced landfills that could accept the ash residues.	Appendix H and Section 6.7 describe expected ash classification. Only APC reside is a potential the waste that may be classified as Hazardous Waste (although current analysis indicates APC reside will be classified as Restricted Solid Waste). In the event the waste exceeds the criteria for Restricted Solid Waste and is classified as 'hazardous' then the residue will be taken off site for treatment at a Hazardous Waste Treatment facility.	Waste Management Report Section 3.5	Details of information of the identification of authorised facilities for source of feedstock will be will be provided in confidence to the EPA and the Dept. of Planning and Environment. *EPA and the Dept. of Planning and Environment to evaluate identified feedstock sources.* The EIS, or WMR, does not provide any detail of the current resource recovery operation on site - difficult to evaluate that current resource recovery practices are employing best practice material recovery processes (as per NSW EfW criteria). Section 3.7.1 (WMR) details disposal options of APC ash and mentions Kemps Creek Landfill. No details of identified Hazardous Waste Treatment Facilities likely to accept APC ash provided. Section 3.7.1 references Appendix B for detailed procedures for each ash type - general procedures for hazardous waste are addressed, but no	P
Arup (DGR)	9	identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2007.	App J Waste Management Assessment	Y		No comment to be made.		N/A	Y
	Air Quality and Human Health								
Arup (DGR)	1	a quantitative assessment of the potential air quality and odour impacts for the development on surrounding landowners and sensitive receptors under the relevant Environment Protection Authority guidelines;	Section 11.0, Appendix K and L		Quantitative assessment of the potential assessment has been undertaken at the site boundary and sensitive receptors taking into account background pollutant levels, in accordance with EPA Guidelines. The assessment should also consider cumulative impacts of potential future developments, if relevant. Odour assessment not viewed.	n/a			
Arup (DGR)	2	a description of construction and operational impacts, including air emissions from the transport of materials	Section 11.0, Appendix K	P	A description of construction and operational air quality limit exceedances is provided. Emissions from the transport of materials is described qualitatively; Further information on the transportation of material to site (particularly for material that is not sourced from the Genesis facility) should be provided. No details provided of potential fugitive emissions.	Qualitative assessment completed.			
Arup (DGR)	3	a human health risk assessment covering the inhalation of criteria pollutants and exposure (from all pathways i.e., inhalation, ingestion and dermal) to specific air toxics	Section 12.0, Appendix N	Y		/		n/a	
Arup (DGR)	4	details of any pollution control equipment and other impact mitigation measures for fugitive and point source emissions	Section 11.4, Appendix K	P	The EIS describes in detail pollution control equipment for stack emissions; further information on construction and transportation emission controls are briefly described in Appendix K, but should be presented in the main body of the EIS also. A further description of ongoing management controls (particularly in adverse conditions) and monitoring should be provided.	/		n/a	
Arup (DGR)	5	a demonstration of how the waste to energy facility would be operated in accordance with best practice measures to manage toxic air emissions with consideration of the European Union's Waste Incineration Directive 2000 and the Environment Protection Authority's draft policy statement NSW Energy from Waste	Section 11.3 and 11,4, Appendix K	Y	A description of best practice measures to manage air emissions is provided and emissions modelled against criteria of the two described documents.	/		n/a	
Arup (DGR)	6	an examination of best practice management measures for the mitigation of toxic air emissions	Appendix K	Y	An analysis of best practice management measures applied at a number of similar overseas facilities is provided.	/		n/a	
Arup (DGR)	7	details of the proposed technology and a demonstration that it is technically fit for purpose	Section 11.3 and 11,4, Appendix K	Y	An analysis of best practice management measures applied at a number of similar overseas facilities is provided.	/		n/a	
	Noise								
Arup (DGR)	1	description of all potential noise sources such as construction, operational, on and off-site traffic noise;	Section 14,0 and Appendix O	Y	potential sources of construction, operational and traffic noise are described in detail.	/		n/a	

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Arup (DGR)	2	a quantitative noise impact assessment including a cumulative noise impact assessment in accordance with relevant Environment Protection Authority guidelines	Section 14,0 and Appendix O	Y	a quantitative noise impacts assessment, including cumulative noise has been undertaken.	/		n/a	
Arup (DGR)	3	`	Section 14,0 and Appendix O	Y	detailed noise mitigation, managing and monitoring measures are recommended in Appendix O. The main body of the EIS should confirm which of these measures will be implemented. In particular, it is not clear whether there is a commitment to undertaking noise monitoring.	This has been clarified in the EIS.	Section 14, 23		
	Soils and Water								
Arup (DGR)	1	description of the water demands and a breakdown of water supplies	Section 15.3.6	P	Operational water demand and supply breakdown is provided. Construction requirements should also be detailed.	A construction programme has been prepared by HZI. It is estimated that construction will be completed within 43 months, with civil works being undertaken between months five and thirteen. The plan includes an estimate of town water use by month during the construction period. The average monthly water use is estimated to be 546 m3, with a maximum of 1836 m3 and minimum of 12 m3 . The total water demand for the construction phase is 23,464 m3 or 23.4 ML. There is no estimate in the programme of the quantity of water to be retained for reuse on site during the construction phase. It is likely that the reuse of retained stormwater will be concentrated during the civil works for uses such as dust suppression.		Inconsistent construction program timelines referred to in the EIS.	
Arup (DGR)	2	description of the measures to minimise water use	Appendix P	y	Measures to minimise potable water are proposed (i.e. use of rainwater and reuse of water from bio-retention basin); further information on water efficiency could be provided.	No response required. No reuse of water from bio-retention basin in EfW process currently foreseen by HZI due to water quality requirements.			
Arup (DGR)	3	a detailed water balance	Appendix P	Y	Details on water demand and discharges are provided in Appendix P.	/			
Arup (DGR)	4	description of the construction erosion and sediment controls	Section 15.4.2	Y	A high level description is provided (including provision of a temporary bioretention basin), and a commitment to providing a more detailed ESCP is made.	/			
Arup (DGR)	5	a description of the surface and stormwater management system, including on site detention, and measures to treat or reuse water	Section 15.3.4, Appendix P	Y	A description of the existing and proposed surface and stormwater management system is provided in detail in Appendix P.	/			
Arup (DGR)	6	an assessment of potential surface and groundwater impacts associated with the development including the details of impact mitigation, management and monitoring measures	Section 15.4, 22.0. Appendix P	P	Potential impacts to surface and groundwater are assessed in Appendix P and described briefly in Section 15.4. Although significant impacts are not identified, the ecological implications of potential changes to groundwater should be considered, particularly in relation to the Threatened Ecological Community on site and the riparian corridor. Appendix P indicates that further investigations into groundwater contamination is occurring, although significant problems are not anticipated. If available, this work should be included in the EIS for completeness. Reference is made to a Stormwater Management Plan that has been prepared by AT& L in 2014. This Plan should be appended to the EIS (not available in the copy provided for review - this may be a reference to the Civil Infrastructure Report in Appendix E, but it is not clear). Section 22.0 references a flood report, however it does not appear to appended; this should be included if available. The design measures to control surface water runoff and potential contamination are well described. Further Information on management controls and monitoring should be provided.	Stormwater management has been assessed within the AT&L Civil infrastructure Report and Plan. Monitoring measures are summarised in the EIS Section 15. A water-quality monitoring programme has been detailed within the Soil and Water Report. The Brown Floor Report has been appended to the EIS.	Civil and stormwater Report and Plans EIS Section 15 Soil and Water Report Section 5.2, Table 5.1 EIS Appendix AA		
Arup (DGR)	7	an assessment of any potential existing soil contamination	Section 15.3.3, Appendix P	P	Appendix P provides an overview of historical soil contamination investigations undertaken in relation to minor levels of contamination associated with the nearby Asphalt Plant. These investigations should be attached if available. Further assessment is recommended in Appendix P; the main body of the EIS should describe the extent of this further work and provide a description of treatment measures proposed during construction.	The most recent soil contamination investigation conducted by ADE (2014) concluded “no contamination of the site from potential contaminating practices undertaken both on and off site, had occurred prior to the time the investigation took place”. ADE further concluded that the site is deemed suitable for commercial/industrial land use and the proposed development. This assessment included an evaluation of potential impacts from the adjacent asphalt plant. The Brookfield Multiplex Construction Environmental Management Plan contains an ‘unexpected finds protocol’ that will be implemented as required.	Construction Environmental Management Plan		
	Traffic and Transport								

General Observation / DG Requirement	excel row no.	Environmental Assessment Requirements / General Requirements	EIS section/appendix Cross-Reference	Adequacy against TOR (Y/N/Partial)	Review Comments	Applicant Response	Applicant Reference	EIS (June 2015) Review Comments	Adequacy against TOR (Y/N/Partial)
Arup (DGR)	1	details of traffic types and volumes likely to be generated during construction and operation	Section 16.3.2	P	Details of traffic types and volumes is provided for operations only. Details of construction is not provided. As details of the sources of feedstock other than from the Genesis facility is not provided, there is no assessment of potential routes	Section 6.2 provides some detail regarding the distribution of traffic onto the surrounding road network, in the absence of detailed information regarding specific feedstock locations. The feedstock locations would be expected to change over time and, given the inimal number of hourly truck movements, is not considered critical to the assessment of the application from a traffic perspective. Indeed, RMS has raised no objection to the application.	Traffic Report Section 6.2	The TIA did not consider any vehicle movements associated with ash residues.	
Arup (DGR)	2	an assessment of the predicted impacts of this traffic on the safety and capacity of the surrounding road network and a description of the measures that would be implemented to upgrade and/or maintain this network over time	Section 16.3 and Appendix Q	P	An assessment of the predicted impacts of traffic on the surrounding road network once the project for operations is provided. Information on construction traffic volumes and management should also be included.	Refer to the amended report (Section 7) which provides information with respect to construction traffic impacts. Notwithstanding, it is expected that preparation of a Construction Traffic Management Plan (CTMP) would be included as a standard condition of consent, as is standard practice	Traffic report Section 7	Construction Mgmt. section provides estimation of truck movements. There is no assessment on the impacts that these increased movements will have on the surrounding road network. Although the management measures construction traffic will be detailed in the CTMP, management measures and commitments could be outlined in the EIS.	
Arup (DGR)	3	details of key transport routes, site access, internal roadways, infrastructure works and parking	Section 16.3 and Appendix Q	Y		/			
Arup (DGR)	4	detailed plans of the proposed layout of the internal road network and parking on site in accordance with the relevant Australian standards	Appendix Q	Y		/			
	Hazards and Risk								
	1	Preliminary Hazard Analysis (PHA) in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* and *Multi-Level Risk Assessment* and details of fire/emergency measures and procedures	Section 17.0 and Appendix V	Y					
	2	detail contingency plans for any potential incidents or equipment failure during the operation of the project	Section 17.0 and Appendix V	N	Design measures are recommended; there is limited information on operational contingency plans in the event of incidents or equipment failure. A full review of drawings has not been undertaken, but it would be useful to provide text on whether the measures recommended in Appendix V have been included in the design.	A Preliminary Hazard Analysis (PHA) assesses the potential impacts (radiant heat, over pressure, toxicity, etc.) of an industrial facility on the surrounding land uses to determine whether the fatality risk of the facility exceeds the acceptable criteria published in the Hazardous Industry Planning Advisory Paper (HIPAP) No. 4 – Risk Criteria for Land Use Planning. The PHA does not take into account emergency response planning or management of equipment failures/systems. These contingency plans are assessed in other risk studies such as a Safety Management System (SMS) or an Emergency Response Plan (ERP). The preparation of these studies is dictated by the Secretary of the Department of Planning and Environment (DPE) following review of the EIS, the Work Health and Safety Regulations or both. In addition, contingency plans in the ERP and SMS are reviewed during a Hazard Audit (this requirement is also dictated by the Secretary) which is generally conducted after the first year of operation and every three years thereafter (although a different frequency maybe requested by the			
	Flora and Fauna								

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Arup (DGR)	1	including an assessment of the potential impacts to threatened species, populations and communities, and their habitat(s)	Section 18.0, Appendix G	P	An assessment of the direct impacts of the project on threatened species, populations and communities and their habitat has been made. There has been no assessment of any indirect impacts however, including noise, water quality, changes to hydrology, introduction of weeds or light impacts. In particular, further assessment of indirect impacts on the ecology of the flora and fauna of the Roper Creek tributary corridor and the 9ha of the critically endangered Cumberland Plain Woodland within the study area is warranted. Should indirect impacts be identified, the project may require referral under the Environmental Protection and Biodiversity Conservation Act 1999. It is acknowledged that the 0.2ha patch of Cumberland Plain Woodland to be removed does not meet Conservation Advice published by the Commonwealth Government, however there is no discussion on whether any offsets are still warranted at a state level. Despite this patch not meeting the significance criteria, further discussion on protection and ongoing management of this area in accordance with the conservation advice should be provided. Further information on the long-term monitoring and management of revegetated areas and fauna protection measures e.g. bat boxes, would be beneficial.	Indirect impacts are detailed in Flora and Fauna Report.	Flora and Fauna Report Section 8.3	Long-term monitoring and management of revegetated areas and fauna would be addressed in a VMP, but only if required. Flora and Fauna Report 'anticipates' that there will be no impacts on the 9 ha of Cumberland Plain Woodland, and thus it is 'not necessary' to referee to EPBC Act. No mention of need for referral to TSC Act (NSW).	
Arup (DGR)	2	if required describe how the principles of "avoid, mitigate, offset" have been used to minimise the impacts of the proposal on biodiversity	Section 18.0, Appendix G	P	The EIS does provide measures to mitigate, and to some extent, offset potential impacts where they have been identified. Further discussion on whether these impacts could have been avoided should be included. For example, could removal of the critically endangered ecological community be avoided?	Some areas of remnant indigenous vegetation have been retained and thus clearing has been avoided. Approximately 1.29 ha of River-flat Eucalypt Forest will be retained south of the proposal footprint. However an area of approx. 0.27 ha of Cumberland Plain Woodland and 2.89 ha of River Flat Eucalypt Forest will be cleared for the proposal. Clearing on these areas has not been avoided, but will be offset.	Flora and Fauna Report Section 8.1, 9.3	Avoid, mitigate, offset principles outlined in Section 9.3. Lack of commentary of alternative options to prevent the removal of critically endangered ecological community.	
	Visual								
Arup (DGR)	1	an assessment of the proposed building height, scale, signage and lighting, particularly from nearby public receivers and significant vantage points of the broader public domain	Section 19.0, Appendix H	Y	Provided in Appendix H. Some photo montages within the main body of the EIS would be beneficial.	Montages are provided within EIS.	EIS Section 3, 19	Two photo montages of the proposed facility provided of west and south-west directions.	Y
Arup (DGR)	2	details of design measures to ensure the project has a high design quality and is well presented, particularly in the context of the broader Western Sydney Employment Area	Section 3.6.4, Section 19.0 and Appendix H	N	No mitigation measures detailed in Section 19.0, although options are presented in Appendix H. The main body of the EIS should confirm if these recommended mitigation measures will be implemented. A description of the design is provided in Section 3.6.4; a description of the design objectives, process and quality would be beneficial in this location, particularly in relation to the broader Western Sydney Employment Area.	EIS has been updated.	EIS Section 19.	Details of mitigation measures provided in Section 19.5.	
Arup (DGR)	3	consideration of any impact on flight paths		N	No information on potential impacts to flight paths was located within either the main body of the EIS or Appendix H.	Visual Impact Assessment includes summary of design intents.	Visual Impact Assessment Section 5.	No details of considerations of potential impacts on flight paths in Appendix I Visual Impact Assessment. Section 6.3 (EIS) details consultation with Dept. of Infrastructure & Regional development regarding second airport at Badgerys Creek. Commitment should be made by proponent in EIS that evaluation of potential impacts on flight paths will be undertaken as details on second airport are released.	
Arup (DGR)	4	a detailed photo-montage based analysis of the visual impacts of development and emissions stacks	Appendix H	Y	Detailed photo-montages provided, including emissions stacks.	This matter has been addressed separately. Refer to Consultation section within EIS.	EIS Section 6.		
	Greenhouse Gas								
Arup (gnl)		The abatement equipment proposed is well established and emission modelling indicates emissions will be in line with the European Incineration Directive. No details are provided on fugitive emissions. No assessment is made of emissions during equipment failure or abnormal conditions.				This has been addressed in the Air Quality Report.	Air Quality Report Sections 7.4, 7.5, 7.6		
Arup (DGR)	1	a full greenhouse gas assessment (including an assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the project, and an assessment of the potential impacts of these emissions on the environment		P	An assessment of Potential Scope 1 and 2 emissions only has been made; an assessment of Scope 3 emissions should be provided.	This has been addressed in the Air Quality Report.	Air Quality Report Section 10.3	Section 10.3 provides GHG emission estimates for Scope 1 but no consideration of Scope 2 emissions have been made or acknowledged. Scope 2 emissions should be identified and quantified for completeness. Report acknowledges that Scope 3 emissions will be 'minor' but no estimations have been provided. Details on how this assumption has been should be provided, considering that Scope 3 emissions from the transportation of >1 million tpa waste feedstock (especially considering that external feedstock supplies have not been identified).	P
Arup (DGR)	2	a detailed description of the measure that would be implemented on site to ensure that the project is energy efficient		N	No specific information on energy efficiency of the project is provided, although some potential measures are described generally in Section 3.0. It is acknowledged that the purpose of the project overall is reduce the energy intensity of energy supply in NSW.	This has been addressed in the Air Quality Report.	Air Quality Report Section 10.3.2	Estimation of net GHG emissions has been made and benchmarking against major NSW generators.	Y

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	Aboriginal and non-Aboriginal Cultural Heritage								
		No specific requirements requested.	Section 21.0	Y					