Environmental Impact Statement

The Next Generation NSW Energy from Waste Facility, Eastern Creek

THE NEXT GENERATION

Energise Your Future

April 2015

urbis

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	Stephen White
Consultant	Skye Playfair Redman
Job Code	SA5220
Report Number	EIS TNG EfW Post Test of Adequacy

© Urbis Pty Ltd ABN 50 105 256 228

All Rights Reserved. No material may be reproduced without prior permission.

You must read the important disclaimer appearing within the body of this report.

URBIS Australia Asia Middle East urbis.com.au

Glossary of Terms

ITEM	EXPLANATION
ACC	Air Cooled Condenser
ACHAR	Aboriginal Cultural Heritage Assessment Report
ANZECC/ARMCANZ	National Water Quality Management Strategy: Water Quality Management
APC	Air Pollution Control
APZ	Asset Protection Zones
ATR	Aboriginal Archaeological Technical Report
AWT	Alternative Waste Treatment
BAT	Best Available Technology
BLEP	Bankstown Local Environmental Plan 1988
C&D	Construction and Demolition
C&I	Commercial and Industrial
CASA	Civil Aviation Safety Authority
CEMP	Construction Environmental Management Plan
CEMS	Continuous Emission Measuring System
CIV	Capital Investment Value
COAG	Council of Australian Governments
COPC	Chemical of Potential Concern
CPTED	Crime Prevention Through Environmental Design
CPW	Cumberland Plain Woodlands
CRW	Chute Residual Waste
CV	Calorific Value
DACHA	Darug Aboriginal Cultural Heritage Assessments
DADI	Dial a Dump Industries
DALC	Darug Aboriginal Landcare
DCAC	Darug Custodian Aboriginal Corporation
DCP	Development Control Plan
DCS	Distributed Control System
DECC	Department of Environment and Climate Change
DGR	Director General Requirements
DICL	Ductile Iron Cement Lined
DIRG	Department of Infrastructure and Regional Development
DLALC	Deerubbin Local Aboriginal Land Council
DLO	Darug Land Observations
DSI	Detailed Site Investigation
DTAC	Darug Tribal Aboriginal Corporation
EfW/	Energy From Waste
EHRA	Environmental Health Risk Assessment
FIS	Environmental Impact Statement
	Environmental Health Risk Assessment: Guidelines For Assessing Human
enHealth Guildelines	Health Risks From Environmental Hazards. Department of Health and Ageing and Enhealth Council, Commonwealth Of Australia.
ENMM	Environmental Noise Management Manual, RMS, 2001.
EPA	NSW Environmental Protection Authority
EPBC Act 1999	Environment Protection and Biodiversity Conservation Act 1999
ERA	Extended Regulated Area
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
EU	European Union
FGR	Flue Gas Recirculation
FGT	Flue Gas Treatment
FRA	Fire Risk Assessment
GHG	Greenhouse Gas

GHG Protocol	Sustainable Development Greenhouse Gas Protocol
GLC	Ground Level Concentration
GO	Garden/Green Organics
HIL	Health Based Investigation Levels
HIS	Heritage Impact Statement
HV	High Voltage
HZI	Hitachu Zosen Inova
IBA	Incinerated Bottom Ash
ICNG	Interim Construction Noise Guideline, EPA, 2008.
IED	Industrial Emissions Directive
IN1	General Industrial Zone
INP	Industrial Noise Policy's
IRAP	Industrial Risk Assessment Program-Human Health
ISO	International Organization For Standardization
KNAC	Koomurri Ngunawal Aboriginal Corporation
KYWC	Kamilaroi-Yankuntjatjara Working Group
Genesis MPC	Genesis Xero Waste Facility Materials Processing Centre
MPA	Major Project Application
MRF waste	Material Recovery Facility waste
MSW	Municipal Solid Waste
MW	Mega Watts
MWe	Mega Watts of Electrical Energy
NIA	Noise Impact Assessment
NOW	NSW Office of Water
OFH	Office of Environment and Heritage
PAC	Powdered Activated Carbon
PAHs	Polycyclic -Aromatic Hydrocarbons
PCBs	Polychlorinated Binhenvis
РНА	Preliminary Hazard Assessment
PM	Particulate Matter
POEO Act	Protection Of The Environment Operations Act 1997
Proposed Facility	Proposed TNG Energy From Waste Facility
PSC	Pre-Sort Centre
Residual Waste Fuel	Feedstock (waste fuel) for the Facility
RMS	Roads And Maritime Services
SCC	Secondary Compustion Chamber
SEPP - ISEPP	State Environmental Planning Policy (Infrastructure) 2007
	State Environmental Planning Policy (State And Regional Development)
SEPP (State and Regional Development)	2011
SEPP (WSEA)	State Environmental Planning Policy (Western Sydney Employment Area) 2009
SMA	Segregated Material Stockpile Area
SNCR	Selective Non-Catalytic Reduction
SO2	Sulphur Dioxide
SRF	Solid Recovered Fuel Or Biomass
SSD	State Significant Development
SSDA	State Significant Development Application
SSI	State Significant Infrastructure
TER	Test Excavation Report
The broader site	Lots 1, 2, 3 and 4, In DP 1145808 containing both the proposed development Site and the Genesis Xero Waste Facility
The Precinct	Eastern Creek Precinct
The Proposed Development	Subdivision, construction works and operation of proposed Facility
The Site	The location of the proposed Development including the proposed Facility is referred to as the 'Site'.

ТМІ	Tolerable Monthly Intake
TNG	The Next Generation NSW Pty Ltd
TOC/s	Total Organic Compound/s
tpa	Tonnes Per Annum
Urbis	Urbis Pty Ltd
USEPA	United States Environment Protection Agency
VOCs	Volatile Organic Compounds
VPA	Voluntary Planning Agreement

TABLE OF CONTENTS

Glossary of Terms		
1	Introduction	1
1.1	Overview	1
1.2	Test of Adequacy and Peer review of EIS	2
1.3	Project Objectives	3
1.4	Value of Project	3
1.5	Director General Requirements	3
1.6	Supporting Technical Studies and Documentation	6
1.7	Report Structure	7
2	Site Context Analysis	8
2.1	Location	8
2.2	Background to Current Recycling Operations	13
3	The Proposed Development	19
3.1	Introduction	19
3.2	Subdivision	19
3.3	Proposed Development overview	22
3.4	Staging of the Development	28
3.5	Reference Facilities	28
3.6	Summary of the Proposed Energy From Waste Process	29
3.7	Electrical Efficiency	30
3.8	Weighing, Checking and Reception	31
3.9	Classess and Quantities of Waste to be Treated	32
3.10	Thermal Treatment Summary	33
3.11	Process Outputs/Residues and Disposal	39
3.12	Stacks	40
3.13	Maintenance, Start-up and Shutdown	41
3.14	Distributed Control System (DCS)	41
3.15	Diesel Generators	42
3.16	Water Demand	43
3.17	Supporting Facilities	44
3.18	Construction Management	47
4	Analysis of Feasible Alternatives	49
4.1	Analysis of Feasible Alternatives	49
4.2	Consideration of Alternative locations and Plant Layout	50
4.3	Consideration of Alternative Technologies	51
5	Environmental Risk Analysis	53
6	Consultation	59
6.1	Consultation to date	59
6.2	Summary of Consultation with agencies	59
6.3	Correspondance with The Federal Department of Infrastructure and Regional Development	62
6.4	Summary of comments and issues from community consultation	63

7	Strategic Planning Framework	68
7.1	NSW 2021 (State Plan)	68
7.2	A Plan for Growing Sydney	68
7.3	Broader Western Sydney Employment Area – Draft Structure Plan 2013	68
7.4	NSW Energy from Waste Policy Statement	79
8	Statutory Planning Framework	88
8.1	Overview – Planning Framework	88
8.2	Environmental Planning and Assessment ACT 1979 and Regulations	89
8.3	Environment Protection and Biodiversity Conservation Act 1999	89
8.4	Protection of the Environment Operations Act 1997	90
8.5	State Environmental Planning Policy (State and Regional Development) 2011	91
8.6	State Environmental Planning Policy (Western Sydney Employment Area) 2009	91
8.7	State Environmental Planning Policy (Infrastructure) 2007	95
8.8	State Environmental Planning Policy No. 55 – Remediation of Land	96
8.9	State Environmental Planning Policy No. 64 – Advertising and Signage	96
8.10	NSW State Rivers and Estuary Policy (1993)	100
8.11	NSW State Groundwater Policy Framework Document (1997)	101
8.12	NSW State Groundwater Quality Protection Policy (1998)	101
8.13	NSW State Groundwater Dependent Ecosystems Policy (2002)	102
8.14	Aquifer Interference Policy (2012)	102
8.15	Department of Primary Industries Risk Assessment Guidelines for Groundwater Dependent Ecosystems (2012)	102
8.16	Guidelines for Controlled Activities (2012)	103
8.17	Blacktown Local Environmental Plan 1988	103
8.18	Section 79C Assessment	103
8.19	Development Control Plans	105
9	Identification of Potential Impacts	109
9.1	Overview	109
9.2	Cumulative impacts of the Facility with current and proposed/future operations in the vacinity the site	of 110
9.3	Noise	111
9.4	Traffic	111
9.5	Air	111
10	Waste Management	113
10.1	Overview	113
10.2	Legislative Requirements	113
10.3	Assessment Methodology	114
10.4	Assessment of Key Issues	114
10.5	Waste outputs	119
10.6	Cumulative Impacts and Mitigations Measures	120
10.7	Summary and Conclusion	121
11	Air Quality and Ozone	123
11.1	Overview	123
11.2	Legislative Requirements	124
11.3	Assessment Methodology	124
11.4	Assessment of Key Issues	126
11.5	Cumulative Impacts and Mitigations Measures	132

11.6	Summary and Conclusion	
12	Human Health	137
12.1	Overview	
12.2	Legislative Requirements	
12.3	Assessment Methodology	
12.4	Assessment of Key Issues	140
12.5	Cumulative Impacts and Mitigations Measures	142
12.6	Summary and Conclusion	142
13	Odour	143
13.1	Overview	
13.2	Legislative Requirements	143
13.3	Assessment Methodology	143
13.4	Assessment of Key Issues	144
13.5	Cumulative Impacts and Mitigations Measures	146
13.6	Summary and Conclusion	
14	Noise Assessment	
14.1	Overview	148
14.2	Legislative Requirements	
14.3	Assessment Methodology	
14.4	Assessment of Key Issues	149
14.5	Cumulative Impacts and Mitigations Measures	
14.6	Summary and Conclusion	
15	Soils and Water	
15.1	Overview	
15.2	Legislative Requirements	
15.3	Assessment Methodology	
15.4	Assessment of Key Issues	
15.5	Cumulative Impacts and Mitigations Measures	
15.6	Summary and Conclusion	
16	Traffic and Transport	
16.1	Overview	
16.2	Legislative Requirements	
16.3	Assessment Methodology	
16.4	Assessment of Key Issues	
16.5	Cumulative Impacts and Mitigations Measures	
16.6	Summary and Conclusion	
17	Hazards and Risks	
17.1	Overview	
17.2	Legislative Requirements	
17.3	Assessment Methodology	
17.4	Assessment of Key Issues	
17.5	Cumulative Impacts and Mitigations Measures	
17.6	Summary and Conclusion	170
18	Flora and Fauna	

Discla	aimer	213
25	Summary and Concluding Comments	208
24.3	Demand for waste infrastructure	204
24.2	Employment Generation	203
24.1	Justification and Benefits of the Proposed Development	202
24	Justification	202
23	Mitigation Measures	196
22.6	Crime Prevention Through Environmental Design (CPTED)	193
22.5	Ecologically Sustainable Development (ESD)	191
22.4	Bushfire	190
22.3	Contamination	190
22.2	Landscaping	189
22.1	Overview	189
22	Assessment of Additional Issues	189
21.3	Aboriginal Cultural Heritage	186
21.2	Non-Aboriginal Cultural Heritage	184
21.1	Overview	184
21	Aboriginal and Non-Aboriginal Cultural Heritage	184
20.5	Summary and Conclusion	183
20.4	Assessment of Key Issues	182
20.3	Assessment Methodology	181
20.2	Legislative Requirements	181
20.1	Overview	181
20	Greenhouse Gas	181
19.6	Summary and Conclusion	180
19.5	Mitigation Measures	179
19.4	Assessment of Key Issues	177
19.3	Assessment Methodology	175
19.2	Legislative Requirements	175
19.1	Overview	175
19	Visual	175
18.6	Summary and Conclusion	174
18.5	Cumulative Impacts and Mitigations Measures	172
18.4	Assessment of Key Issues	172
18.3	Assessment Methodology	171
18.2	Legislative Requirements	171
18.1	Overview	171

TABLE OF CONTENTS

- Appendix A Peer Review letter of Confirmation, and Responses to Agency Test of Adequacy comments
- Appendix BSite SurveyAppendix CDirector General's Requirements
- Appendix D Architectural Drawings
- Appendix E Concept Landscape Plan
- Appendix F Civil Infrastructure Works
- Appendix G Concept Plan of Subdivision
- Appendix H Flora and Fauna Assessment
- Appendix I Visual Impact Assessment
- Appendix J Capital Investment Value Report
- Appendix K Waste Management Assessment
- Appendix L Local Air Quality and Greenhouse Gas Assessment
- Appendix M Odour Assessment
- Appendix N Ozone Assessment
- Appendix O Human Health Risk Assessment
- Appendix P Noise Impact Assessment
- Appendix Q Soil and Water Assessment
- Appendix R Traffic Impact Assessment
- Appendix S Aboriginal Archaeological Technical Report
- Appendix T Aboriginal Cultural Heritage Assessment Report and ACHAR Addendum
- Appendix U Aboriginal Heritage Test Excavation Report
- Appendix V Cultural Heritage Impact Statement
- Appendix W Phase 1 Preliminary Site Investigation and Phase 2 Detailed Site Investigation
- Appendix X Community Consultation Report
- Appendix Y Correspondence with the Department of Infrastructure and Regional Development and NSW Health
- Appendix Z Preliminary Hazard Analysis and Fire Risk Report
- Appendix AA Flood Report (Brown Consulting)
- Appendix BB Bushfire Assessment
- Appendix CC Construction Environmental Management Plan

Appendix DD Concept Design Report

Figures:	
Figure 1 – Regional Context Aerial	9
Figure 2 – Local Context Map	10
Figure 3 – Surrounding land ownership	11
Figure 4 – Existing Site Subdivision Layout	12
Figure 5 – Genesis Xero Waste MPC and Landfill	13
Figure 6 – Genesis MPC	14
Figure 7 – Inside the MPC from The Southern End	16
Figure 8 – Typical Loading Machinery Inside the MPC	17
Figure 9 – The Conveyor from the western side of the MPC building	18
Figure 10 – Genesis Xero Waste Chute System	18
Figure 11 – Extent of bushland in 1986 and extent of proposed Lot 10 (Aerial source: CH2MHILL Investigation Report dated 1 st October 2004)	Phase 1 20
Figure 12 – Current Extent of bushland and extent of proposed Lot 10 (Aerial source: NearMaps N 2014)	<i>lov</i> 21
Figure 13 – Proposed Plan of Subdivision (broader site outlined in red)	22
Figure 14 – 3D image of the Proposed Facility from the west	26
Figure 15 – 3D image of the proposed facility from the South West	26
Figure 16 – Site master plan	27
Figure 17 – Schematic Process Diagram for a Single Line of processing	30
Figure 18 – Incineration and Boiler	34
Figure 19 – Combustion Control System	35
Figure 20 – Computational Fluid Dynamics of Swirl Flow in Secondary Combustion Chamber	36
Figure 21 – Semi-Dry Flue Gas Treatment	38
Figure 22 – Steam Turbine Set Generating Electricity	39
Figure 23 – Proposed Signage on the Northern Elevation	46
Figure 24 – Western Sydney Employment Area Map (Source NSW DP&E)	92
Figure 25 – Framework Document and Component Policies	101
Figure 26 – Resource Recovery Verification Process Prior to Energy from Waste Processing	119
Figure 27 – Conceptual Site Model.	138
Figure 28 – Location of revegetation/regeneration areas	174
Figure 29 – Photomontages of the proposed Facility	177
Figure 30 – Overview of Scopes and Emissions across a Value Chain	182
Figure 31 – Location of reburial site within EFW South	188
Figure 32 – Illustrative Demonstration of benefits of EfW in reducing landfill volumes	206

TABLES:

Table 1 – Overview of Potential Impacts and mitigation	v
Table 2 – DGR Requirements	4
Table 3 – Indicative building dimensions of proposed Facility	
Table 4 – Details of reference facilities	
Table 5 – Preliminary Risk Analysis	53
Table 6 – Government and Local Stakeholders consulted	60
Table 7 – Key points of consideration under National Airports Safeguarding Framework	62
Table 8 – Eastern Creek Precinct Plan Assessment	71
Table 9 – EPA Energy from Waste Policy Technical Criteria (Source: Environ)	82
Table 10 – Overview of Planning Framework	88
Table 11 – Schedule 2 EIS Requirements	89

Table 12 – EPBC Matters of National Environmental Significance	90
Table 13 – SEPP 64 Objectives and Assessment Criteria	97
Table 14 – Section 79C Assessment	103
Table 15 – Blacktown DCP 2006 Assessment	105
Table 16 - Description of current and proposed/future operations surrounding the site	110
Table 17 – Design Fuel Mix FOR PHASE 1	115
Table 18 – Design fuel mix and composition by eligible EfW Policy Statement Categories	115
Table 19 – Summary of predicted ground level concentrations during normal operations	127
Table 20 – Emissions during upset conditions (worst case scenario)	129
Table 21 – Summary of predicted ground level concentrations during upset conditions	129
Table 22 – Predicted in-stack concentrations against applicable regulation limit	133
Table 23 – General good practice procedures / process control	133
Table 24 – Bat for Flue Gas Treatment	134
Table 25 – Odour Emission Rates	145
Table 26 – Summary of Predicted 99 th Percentile Ground Level Concentrations of Odour (OU)	146
Table 27 – Construction Stages and Noise Sources	150
Table 28 – Indicative Sound Power levels for Site Equipment	152
Table 29 – Input Material Source Summary (Planned)	163
Table 30 – Input Material Source summary - Modelled	164
Table 31 - Operational Traffic Generation on External Road Network	164
Table 32 – Endangered Ecological Communities and Threatened Fauna Species Recorded within th Survey Area	ne 172
Table 33 – Quantitative Visual Assessment	178
Table 34 – Estimated GHG Emissions from Waste Incineration	182
Table 35 – Estimation of Net GHG Emissions	183
Table 36 – Mitigation and environmental control Measures	196
Table 37 – Full load hours p/a and Cost comparision of energy technologies per MWh of energy pro	duced 207
Table 38 – Impacts and Mitigation/control Measures	208

Declaration

Submission of Environment Impact Statement:

Prepared in accordance with Schedule 6 of the Environmental Planning and Assessment Regulation 2000.

Environmental Impact Statement prepared by:

Names:	Stephen White (Director).
	Skye Playfair Redman (Consultant)
Address:	Urbis Pty Ltd
	Level 23, Tower 2 201 Sussex Street Sydney NSW 2000
In respect of:	Energy from Waste Facility, Eastern Creek (SSD 6236)

Applicant and Land Details

Applicant:	The Next Generation NSW Pty Ltd
Applicant Address:	32 Burrows Road, Alexandria NSW 2015
Land to be Redeveloped:	Honeycomb Drive, Eastern Creek
Lot and DP	Lots 1, 2, 3 and 4 in Deposited Plan 1145808
Project Name	Energy from Waste Facility, Eastern Creek
Project Description	The Construction and Operation of an Energy from Waste Facility, which includes:
	 Thermal treatment of up to 1.35 million tonnes of waste per year;
	 A boiler house, steam driven turbines and air emissions stacks;
	 An electrically powered feed-stock conveyor from the existing Genesis Xero Waste Management facility;
	 Provision of a direct underpass connection between the proposed Facility and the Genesis Xero Waste Facility; and
	 Associated internal road ways, staff facilities, car parking, water detention services and landscaping.

Declaration

I certify that the contents of the Environmental Impact Statement to the best of my knowledge, has been prepared as follows:

- In accordance with Schedule 2 of the Environmental Planning and Assessment Regulations 2000;
- In accordance with the requirements of the Environmental Planning and Assessment Regulations 2000; and State Environmental Planning Policy (State and Regional Development) 2011;
- The statement contains all available information that is relevant to the environmental assessment of the proposed development; and
- To the best of my knowledge the information contained in this report is neither false nor misleading.

Name:	Stephen White, Director Master of Urban Development and Design, University of New South Wales BSc (Hons) Economic Geography (University of New South Wales)	Skye Playfair Redman, Consultant Bachelor of Urban and Regional Planning/ Bachelor of Natural Resources (Hons), University of New England
Signature:	Stephn While	K.
Date:	28 April 2015	28 April 2015

Executive Summary

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

An existing waste recovery facility and material processing centre is currently in operation on site known as Genesis Xero Waste, adjoining a former quarry now utilised as a waste landfill for materials that cannot be reused or recycled. The proposed Facility is recognised to have direct synergies with the existing Genesis Xero Waste Facility and will adjoin the existing operations to allow for the transfer, via an underground culvert, of appropriate waste materials. Hence forth, the existing Genesis Xero Waste Facility will be referred to as the Genesis MPC (Materials Processing Centre).

The proposed Facility comprises a *Electricity Generating Works* with a capital investment value of some \$557,902,333 and is State Significant Development as defined by the State Environmental Planning Policy (State and Regional Development) 2011.

This EIS has been prepared to address the issues outlined in *Schedule 2, Part 3, Clause 6 and 7* of the *Environmental Planning and Assessment Regulations 2000* and the DGR's issued for the proposed development.

The DGRs were issued on December 2013 and a full copy is included at Appendix C.

The Applicant

The Next Generation NSW Pty Ltd, a stand-alone company, has been formed by Dial a Dump Industries and Genesis Xero Waste Facility to develop a low carbon electricity generating plant that will be fuelled by waste derived fuels.

The Proposed Development

The proposed Development involves the construction and operation of an Electricity Generation Plant (the proposed Facility). The proposed Facility will generate electrical power from unsalvageable and uneconomic residue waste which would otherwise be land filled. The proposed Development will be a 'green' electricity generation facility, and NSW's first (and Australia's largest) Energy from Waste Facility. The proposed Facility will have the capacity to process up to 1.35 million tonnes of Residual Waste Fuel per annum.

The Residual Waste Fuel will be sourced from the neighbouring Genesis MPC, which will enter the site via conveyor and the private under pass culvert, as well as from third parties via the public road system.

This application seeks approval for the entire facility, but construction will take place in two phases. Phase 1 will include Lines 1 and 2 and shared infrastructure, and Phase 2 will include Lines 3 and 4. Two independent combustion steam turbines and stacks will be provided per stage.

The following residual waste fuel types are considered as the main sources of fuel for the Facility;

- 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 proposed development also involves the subdivision of land and the following ancillary works:

- Earthworks associated with the balance of the site;
- Internal roadways;
- Provision of a direct underpass connection (Precast Arch and Conveyor Culvert) between the Genesis MPC and the proposed Facility;
- Staff amenities and ablutions block;
- Staff carparking;
- Water detention and treatment basins; and
- Services (Sewerage, Water Supply, Communications, Power Supply).

The Facility will generate three types of solid by-products:

- Bottom ash;
- Boiler ash; and
- Flue gas treatment residues.

The facility will produce no excess effluent during operation.

A detailed description of the proposed development is provided in Section 3.

The Benefits

The Energy from Waste Facility will result in significance benefits at a local, regional and State level, including:

- The production of a safe, clean and reliable form of energy for Metropolitan Sydney now and in the future, while providing an additional sustainable means of waste management through the operation of the Facility to manage or reduce demand for landfill in Metropolitan Sydney;
- Supporting the positive use of waste materials that would otherwise be disposed of to landfill, saving valuable landfill space and also reducing greenhouse gas emissions (including methane) that would otherwise have been generated from the breakdown of the waste material had it gone to landfill (discussed further in the Local Air Quality and Greenhouse Gas Assessment Report prepared by Pacific Environment at Appendix L)
- A net positive Greenhouse Gas effect, eliminating some 1.5 million tonnes of CO₂ per annum;
- Creation of 55 full-time employment positions and approximately 250 jobs during construction stage; and
- Upfront capital investment of \$557,902,333.

Broad Overview of Impacts

This Environmental Impact Statement includes a detailed assessment of the potential environmental and social impacts of the Energy from Waste Facility and identifies the management, mitigation and offset measures that will be implemented as part of the proposed development. It is noted that in many cases, the operational and environmental management controls inherent to operation of the Facility adequately manage the potential impacts. In these cases no additional mitigation measures are required to address the potential impacts.

A summary of the key findings of the assessment is provided in Table 1.

TABLE 1 -	OVERVIEW	OF POTENTIAL	IMPACTS	AND MITIC	GATION

ENVIRONMENTAL/SOCIAL	OVERVIEW OF POTENTIAL IMPACTS AND MITIGATION/ENVIRONMENTAL
ISSUE	CONTROL MEASURES
Waste	 The proposed Facility will generate the following solid, liquid and gaseous waste streams:
	 Ash Residue (bottom ash, boiler ash, Air Pollution Control [APC] ash)
	 Gaseous emissions (pyrolytic gas)
	The operational controls and procedures described below will adequately manage the
	potential impacts of residual wastes from the EfW process.
	 Bottom ash from the grate will be removed by quenching with water and moving it by conveyor to the enclosed ash storage bunker where it is stored prior to being transported off-site. The conveyor passes under a magnetic separator to remove ferrous materials, which will be recycled.
	 APC residue ash will be collected into sealed storage silos and transported via sealed tanker off-site for further treatment or disposal at landfill. In the event APC residue exceeds the criteria for Restricted Solid Waste, the residue will be taken off site to a Hazardous Waste Treatment facility, in line with relevant hazardous waste legislation.
	 Boiler ash will be conservatively disposed of with the APC residues, unless it can be proven to be reusable following rigorous testing procedures in compliance with EPA regulations.
	 In addition, further operational controls and procedures will be detailed and documented in an Environmental Management Plan before operation to further support the above controls.
Air Quality	 The primary emissions from the proposed Facility, as defined by emission limits for waste incineration set by the Industrial Emissions Directive (2010/75/EU), are:
	 Particulate matter (PM), assumed to be emitted as PM10 and PM2.5.
	– Hydrogen Chloride (HCI).
	 Hydrogen Fluoride (HF).
	– Carbon Monoxide (CO)
	– Sulphur Dioxide (SO2).
	 Oxides of nitrogen (NOx) .(expressed as Nitrogen Dioxide (NO2)).
	 Heavy metals (including Mercury (Hg), Cadmium (Cd), Arsenic (As), Chromium (Cr).

ENVIRONMENTAL/SOCIAL	OVERVIEW OF POTENTIAL IMPACTS AND MITIGATION/ENVIRONMENTAL	
ISSUE	CONTROL MEASURES	
	 Gaseous and vaporous organic substances (expressed as total organic carbon (TOC)). 	
	 Dioxins and furans. 	
	 Flue gas treatment is incorporated into the design of the Facility and is designed to meet the in-stack concentrations limits for waste incineration set by the Industrial Emissions Directive (IED) (2010/75/EU). The BAT includes Selective Non-Catalytic Reduction (SNCR) for reducing emissions of NOx. VOCs will be minimised through combustion control with additional controls afforded from activated carbon injection as part of the flue gas treatment. No mitigation required. 	
Human Health	 The proposed Facility may release substances to atmosphere which have the potential to harm human health. 	
	 The total intake for all receptors is well below the Tolerable Monthly Intake (TMI). 	
	 No mitigation required. 	
Odour	 Operation of the proposed Facility is not likely to result in an adverse impact on the local air environment in reference to odour. 	
	 All waste storage and unloading will take place within the tipping hall building, which is kept at negative pressure with air extracted from the building used as combustion air in the boiler. 	
	 No mitigation required. 	
Noise	 Predicted construction noise levels indicate that compliance would be achieved during standard hours at residential receiver locations. Exceedance of the noise management levels is expected at the closest industrial receiver for certain construction scenarios. 	
	 Operational noise emissions from the facility would comply with the most stringent criteria under both neutral and adverse meteorological conditions. In light of the predicted exceedances at the Hanson Facility and residential receivers in Erskine Park for selected scenarios a construction noise management plan will be developed to mitigate these exceedances. 	
Transport	 The increase in vehicle trips associated with the proposed Facility can be readily accommodated by the surrounding road network with no change to existing Level of Service and only minimal impact on average delays. 	
	 No mitigation required. 	
Biodiversity	 Approximately 0.27 ha Cumberland Plain Woodland and 2.89 ha Eucalypt River- flat forest will be cleared for the Development. Eight habitat trees within the proposal footprint will be cleared. 	
	 Offsetting will be achieved with approximately 0.54 ha of Cumberland Plain Woodland and 4.98 ha of River Flat Eucalypt Forest to be regenerated or replanted. 	
	 The loss of hollow-bearing trees will also be offset through the installation of twenty fauna roosting/nesting boxes. 	
	 Sediment fencing, weed removal, locally indigenous landscape planting, and 	

ENVIRONMENTAL/SOCIAL	OVERVIEW OF POTENTIAL IMPACTS AND MITIGATION/ENVIRONMENTAL CONTROL MEASURES	
	 stormwater quality discharge control will also be adopted as mitigation measures. A pre-clearance survey will be undertaken and any vertebrate fauna and Cumberland Plain Land Snails captured will be moved to the retained area of River Flat Eucalypt Forest to the south of the development footprint. 	
Aboriginal Cultural Heritage	 An Aboriginal heritage artefact assemblage is located within the development footprint. To mitigate against the Facility's development impacts, the found artefacts will be reburied within the riparian area within 'EFW South' as it will not be impacted by any future development works. This location was supported by the identified Aboriginal Stakeholders. No further impacts are anticipated. 	
Visual	 From most locations, the lower parts of the Facility will be totally obscured from view. Where views are possible, these will generally be of the upper parts of the buildings and the slender twin vent stacks protruding above the tree canopy or building line. Proposed landscaping will assist in softening the appearance of the Facility. All external lighting associated with the Facility will comply with Australian Standard AS 4282: 1997 – Control of the Obtrusive Effects of Outdoor Lighting. 	
Greenhouse Gas	 The operation of the proposed Facility would have a net positive GHG effect, potentially eliminating 1.5 million tonnes of CO₂-e per annum. The emission intensity for electricity generated from waste incineration is significantly lower than that derived from the current NSW electricity grid. No mitigation required. 	

This Environmental Impact Statement (EIS) includes commitments by The Next Generation NSW regarding the implementation of comprehensive management, mitigation and offset measures to minimise and counterbalance predicted impacts of the proposed development. These commitments are detailed in **Section 23**.

The proposed development has been assessed against the principles of Ecologically Sustainable Development as required by the *Environmental Planning and Assessment Act 1979* (the Act). This assessment concludes the proposed Development is consistent with the principles of Ecologically Sustainable Development providing inter-generational equity through a clean and reliable form of energy generation.

Project Objectives and Justification

The main objectives of the proposed Development are:

- To reduce the generation of greenhouse gases and help to solve the energy and waste needs of Sydney over the next 50 years;
- To manage or reduce the need for landfill in the Metropolitan Sydney;
- To provide New South Wales with the highest standard of technology in the Energy from Waste sector that is tried and proven successful, assists in delivering on the targets of the NSW Renewable Energy Action Plan, and aligns with the EPA NSW Energy from Waste Policy.
- To create a consistent source of green energy directly into the state's electricity grid;

- To deliver a net positive Greenhouse Gas effect, eliminating some 1.5 million tonnes of CO² per annum;
- To create a significant employment generating land use, consistent with the objectives and intentions
 of the Eastern Creek Precinct within the broader Western Sydney Employment Lands; and
- To retain high conservation value land.

The proposed Facility represents a positive development outcome for the site and surrounding area and is an appropriate and suitable land use. The proposed Facility is proven technology in the proposed configuration of the plant. This technology currently operates reliably in the United Kingdom and continental Europe and has a successful track record in treating the same Residual Waste Fuel streams that will be generated by the Facility.

The importance of the recovery of energy from waste as part of effective waste management is reflected in *NSW Energy from Waste Policy Statement 2014.*

The Environmental Protection Authority (EPA) recognises that the recovery of energy and resources from the thermal processing of waste has the potential, as part of an integrated waste management strategy, to deliver positive outcomes for the community and the environment. Energy from waste can be a valid pathway for residual waste where:

- Further material recovery through reuse, reprocessing or recycling is not financially sustainable or technically achievable;
- Community acceptance to operate such a process has been obtained.

The NSW Government recognises the diversion of waste from landfill, and consequent reduction in potential for methane emissions, and the provision of low carbon, renewable energy, as important contributions for dealing with NSW waste challenges.

It is considered the 'Do Nothing' scenario is not appropriate given the established need for new energy generation, including a need for low carbon generation. The alternative to the proposed Development proceeding would be continued operation of traditional landfill waste management operations which have been found to be inefficient and undesirable as a long term sustainable solutions to Sydney's expanding population and increasing waste generation.

The selection of the site for the proposed Development is directly related to its proximity to the M4 and M7 motorways, local electricity grid, and the direct synergies between the proposed Development and the adjoining Genesis MPC currently in operation which will provide a high percentage of the waste fuels.

The proposed Development represents a positive development outcome for the following reasons:

- The proposed Facility will provide the State of NSW with the world's leading technology to break reliance on landfilling in the future.
- The proposed Facility will provide a safe, clean and reliable form of energy generation for Metropolitan Sydney now and in the future, while providing a means of waste management resulting in improved management or reduction for the need for landfill in the Metropolitan Sydney;
- The proposed Facility provides a sustainable solution to Sydney's growing waste generation.
- The proposed Facility will result in a net positive Greenhouse Gas effect, eliminating the emission of some 1.5 million tonnes of CO² per annum from landfill.
- No adverse impacts will be experienced by residential properties as the development is well separated from residential uses.
- The proposed Facility has been designed to respond to the sites natural topography minimising the visual impact of the facility from the public domain and nearby sensitive land uses.

- The proposed Development is accompanied by a full suite of expert reports and drawings which address all the issues contemplated by the DGR's i.e. strategic planning, waste management, air quality and human health, noise, soils and water, traffic and transport, hazards and risks, flora and fauna, visual, greenhouse gas, and Aboriginal and non-Aboriginal Cultural heritage.
- The proposed Development is in the public interest in that it will generate in the order of 250 direct construction jobs and 55 new jobs during Facility operation, it contributes to energy security and diversity by providing additional low carbon, renewable electricity generating capacity, and supports the use of waste materials destined for landfill, thus saving landfill space and reducing greenhouse gas emissions from decomposing landfill matter.
- Given the benefits of the proposed Development, its importance for the management of waste and clean energy production to the local community and wider Metropolitan Sydney, and given that there are minimal environmental impacts on the locality, it is recommended this State Significant Development application be approved subject to the mitigation measures.

1 Introduction

1.1 OVERVIEW

This Environmental Impact Statement (EIS) has been prepared by Urbis Pty Ltd (Urbis) on behalf of The Next Generation NSW Pty Ltd (TNG) in support of the State Significant Development Application (SSDA) for the construction and operation of the Energy from Waste Facility (proposed Facility) at Lots 2 and 3 in DP 1145808 (the Site) within the Eastern Creek Industrial Estate. The Site forms part of a larger area of land which comprises the Genesis Xero Waste Facility and landfill ('broader site'). The broader site is described as lots 1, 2, 3 and 4 in DP 1145808.

While the Site is located within Blacktown Council Local Government Area, the Site is governed by the *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (SEPP (WSEA)). The proposed use is not identified as development permissible with consent under the provisions of the SEPP (WSEA) for the Site, notwithstanding this, '*electricity generating works*' is permissible on the Site under the provisions of the State Environmental Planning Policy (Infrastructure) 2007 (SEPP) under clause 34, to the extent the ISEPP provisions prevail.

The application is to be assessed as a State Significant Development in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979.*

Clause 20 of Schedule 1 of the *State Environmental Planning Policy (State and Regional Development)* 2011 (SEPP (State and Regional Development)) identifies development which is deemed to be potentially of State or regional significance, including 'electricity generating works and heat or co-generation':

Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that has a capital investment value of more than \$30 million.

The proposed development comprises the construction and operation of electricity generating works with a capital investment value (CIV) of \$557,902,333 and is therefore a State Significant Development. The provisions of the SEPP (State and Regional Development) are assessed in detail in **Section 8.5** of this EIS.

The main objective of the proposed Facility is to provide an alternative use for non-reusable or recyclable waste. The outcome being improved resource efficiency and increase in the sustainability of our communities, businesses and industries

The proposed Facility has been designed using established and proven technology. Energy from Waste is the generic term given to a process by which the energy stored in waste (chemical energy) is extracted in the form of electricity, heat and/or a fuel for use in a decentralised energy generation plant.

The Facility will be designed to meet the emission limits contained within the Chapter IV and Annex VI of the Industrial Emissions Directive (IED) (Directive 2010/75/EU)1 for waste incineration and co-incineration plants.

This EIS has been prepared in accordance with the following:

- Division 4.1 of the Environmental Planning and Assessment Act 1979 (the Act);
- Schedule 2 of the Environmental Planning and Assessment Regulation 2000; and
- The Director General Requirements (DGRs) issued under section 78A(8A) of the Act.

Under section 89D(1) of the Act, the SSDA is lodged with the Department of Planning and Environment and determined by the Minister.

1.2 TEST OF ADEQUACY AND PEER REVIEW OF EIS

The SSD application including this EIS and supporting technical documents were first lodged with the Department of Planning in June 2014. Following the Departments review the EIS was amended to provide more details and be read as a 'standalone' document. The application was re-lodged in October 2014 and was submitted for the test of adequacy. At his point, relevant government agencies reviewed the application and provided feedback on the adequacy of the information provided. Feedback was also received from independent consultants who reviewed the application on behalf of the agencies. All feedback from agencies and independent reviewers has been taken into account and addressed accordingly in both the technical reports and this EIS.. It is considered the detail of the application has increased considerably. The EIS has been scrutinised in detail and now acts as a stand-alone document

A table consolidating the comments provided by each agency and reviewer has been attached to the EIS at **Appendix A**. Each comment is included with a corresponding action and document reference from the applicant. This approach demonstrates how the applicant has addressed each comment made.

In response to feedback from Government agencies and feedback received in December 2014 Ramboll Group (including ENVIRON Australia Pty Ltd) and the CSIRO were engaged in January 2015 by the applicant to independently review the EIS, including the relevant technical reports prepared by the various consultants to confirm that the feedback has been addressed and that the amended EIS is adequate for review. The following documents were reviewed:

- EIS (this document) Ramboll (including ENVIRON Australia Pty Ltd)
- Civil Infrastructure Report Ramboll (including ENVIRON Australia Pty Ltd)
- Local Air Quality and Greenhouse Gas Emissions Assessment CSIRO and Ramboll (including ENVIRON Australia Pty Ltd)
- Odour Assessment CSIRO and Ramboll (including ENVIRON Australia Pty Ltd)
- Ozone Assessment CSIRO
- Human Hazards and Risk Assessment Ramboll (including ENVIRON Australia Pty Ltd)
- Noise Report Ramboll (including ENVIRON Australia Pty Ltd)
- Soil and Water Assessment Ramboll (including ENVIRON Australia Pty Ltd)
- Traffic Report Ramboll (including ENVIRON Australia Pty Ltd)
- Preliminary Hazard Analysis and Fire Risk Assessment Ramboll (including ENVIRON Australia Pty Ltd)

Concept Report – Ramboll Ramboll was commissioned to prepare a Waste Management Report to support the EIS, prepared in accordance with the Director-General's Requirements.

All documents were amended to incorporate the feedback received by Ramboll and CSIRO. The peer reviews involved the following:

- Ramboll undertook technical reviews of material contained in EIS and technical reports listed above;
- Ramboll undertook adequacy reviews of material contained in EIS and technical reports listed above;
- Ramboll undertook content review of EIS to ensure it operates as a 'standalone' document; and
- CSIRO undertook the independent review of the Greenhouse gas and Ozone Assessment;

Ramboll completed this review and it is now considered that the EIS addresses the comments from the agencies' reviews and is adequate for exhibition. Ramboll's letter of confirmation regarding the peer review is provided at **Appendix A**. CSIRO's letter forms Appendix F of the Ozone Report at **Appendix N**.

1.3 PROJECT OBJECTIVES

The application seeks approval for the construction and operation of the proposed Facility and associated internal road ways, car parking, bio-retention basin, weighbridges conveyor underpass, arch underpass, staff facilities, subdivision, services and landscaping.

The main objectives of the proposed development are:

- To reduce the generation of greenhouse gases and provide a cleaner source of Energy through electricity generation via the thermal treatment of Residual Waste as Fuel rather than fossil fuels.
- To reduce the need for landfill in the Metropolitan Sydney;
- To provide New South Wales with the highest standard of technology for Energy from Waste that compliments the EPA NSW Energy from Waste Policy utilising technology that is tried and proven and assists in the delivery of the targets of NSW Renewable Action Plan;
- To create a consistent source of green energy back into the grid;
- To deliver a net positive Greenhouse Gas effect, eliminating some 1.5 million tonnes of CO² per annum;
- To create a significant employment generating land use, consistent with the objectives and intentions
 of the Eastern Creek Precinct within the broader Western Sydney Employment Lands; and
- To retain land with high conservation value.

Additionally, the proposed development supports the objectives of the state significant employment land (as outlined within the (SEPP (WSEA)) in that it:

- Seeks to create additional employment within the Western Sydney Employment Area, directly employing 55 staff and hundreds during construction stage;
- It will result in a net positive Greenhouse Gas effect;
- It seeks to respond to the energy and waste disposal demands of Sydney over the next 50 years;
- It seeks to provide a safe, clean and reliable form of energy generation for Metropolitan Sydney;
- It seeks to manage or reduce the need for landfill in the Metropolitan Sydney; and
- It seeks to provide a consistent source of green energy back into the grid.

1.4 VALUE OF PROJECT

The CIV of the proposed development, as defined under clause 3 of the *Environmental Planning and Assessment Regulation 2000*, is \$557,902,333.

A Quantity Surveyors Certificate of Cost prepared by MMDC certifying the CIV of the proposed development is attached as **Appendix J**.

1.5 DIRECTOR GENERAL REQUIREMENTS

This EIS has been prepared to address the issues outlined in *Schedule 2, Part 3, Clause 6 and 7* of the *Environmental Planning and Assessment Regulations 2000* and the DGR's issued for the proposed development.

The DGRs were issued on December 2013 and a full copy is included at Appendix C.

Table 2 below summarises the requirements and identifies where responses to each of the DGRs are addressed in the EIS. Each technical/specialist report submitted with the EIS documents the response and assessment.

TABLE 2 – DGR REQUIREMENTS

DIRECTOR GENERAL REQUIREMENTS	EIS REFERENCE
EIS General requirements	
The EIS must include a:	
 detailed description of the site, and any existing or approved operations; 	Section 2
 detailed description of the development, including: 	
 likely interactions between the development and existing, approved and proposed operations in the vicinity of the site; 	Section 3, Section 9.2
 consideration of any relevant statutory provisions; 	Section 8
 risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment; 	Section 5 and Section 9
 detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment; 	Section 9– 22
 consolidated summary of all the proposed environmental management, mitigation and monitoring measures, highlighting all commitments included in the EIS. 	Section 23
 a detailed calculation of the capital investment value (CIV) of the development (as defined in clause 3 of the <i>Environmental Planning and</i> <i>Assessment Regulation 2000</i>), including details of all assumptions and components from which the CIV calculation is derived; 	Section 1.4 and Appendix J
 a close estimate of the jobs that will be created by the development during construction and operation; 	Section 24.2 and Appendix J
 verification that the CIV was accurate on the date that it was prepared. 	Appendix I
Key Issues	
Strategic Planning	Section 7
Waste Management	Section 10
	Appendix K
Air Quality and Human Health	Section 11 and 12
	Appendix L and Appendix O
Odour	Section 13
	Appendix M

DIRECTOR GENERAL REQUIREMENTS	EIS REFERENCE
Noise	Section 14 Appendix P
Soils and Water	Section 15 Appendix Q
Traffic and Transport	Section 16 Appendix R
Hazards and Risk	Section 17 Appendix Z
Flora and Fauna	Section 18 Appendix H
Visual, including Photomontages	Section 19 Appendix I
Greenhouse Gas	Section 20 Appendix L
Aboriginal and non-Aboriginal Cultural Heritage	Section 21 Appendix S, Appendix T, Appendix U, and Appendix V
Plans and Documents	
 The EIS must include the following: Architectural drawings; Site Survey Plan, showing existing levels, location and height of existing and adjacent structures/buildings and boundaries; 	Appendix D Appendix B
 Site Analysis Plan; Stormwater Concept Plan including easements and associated overland flow paths; Shadow Diagrams; 	Appendix F Appendix F
View Analysis/Photomontages;Landscape Plan;	3.2 and Appendix I Appendix E Appendix CC
Preliminary Construction Management PlanSchedule of materials and finishes.	Appendix CC

DIRECTOR GENERAL REQUIREMENTS	EIS REFERENCE
Consultation	
Details of consultation with relevant local, State and Commonwealth Government authorities, and community stakeholders.	Section 6 and Appendix X

1.6 SUPPORTING TECHNICAL STUDIES AND DOCUMENTATION

The SSDA is supported by specialist consultant reports provided in the appendices of this EIS as noted above. These technical studies were undertaken to inform the design of the proposed Facility and associated works in the context of future land uses, urban structure and built form and to assess potential social and environmental impacts.

The EIS was prepared by the project's consultant team:

- Proponent The Next Generation NSW
- Planning Urbis
- Technology Provider Hitachu Zosen Inova (HZI)
- Concept Design Fichtner
- Survey Land Partners
- Architecture Krikis Tayler Architects
- Landscaping Site Image
- Civil Engineering AT&L Associates
- Waste Management ENVIRON Australia Pty Ltd
- Access, Traffic and Parking Traffix
- Ecology Abel Ecology
- Bushfire Abel Ecology
- Community Consultation KJA
- Contamination AD Environmental Consulting Group
- Air Quality Assessment Pacific Environment
- Greenhouse Gas Pacific Environment
- Odour Pacific Environment
- Noise & Vibration Pacific Environment
- Groundwater and Surface Water Edison Environmental and Engineering Pty Ltd
- Hazards and Risks Raw Risk Engineering
- Heritage: Indigenous and Non-Indigenous GML Heritage and Artefact

- Quantity Surveyor MMDCC
- Stormwater AT&L Associates
- Flooding AT&L Associates
- Services AT&L Associates
- Construction Management Brookfield Multiplex
- Visual Analysis Urbis

1.7 REPORT STRUCTURE

The EIS for the proposed Development is structured as follows:

- Section 2 Site Context Analysis: Provides a description of Site and broader site, the regional and local context and an assessment of the opportunities and constraints presented by the Site.
- Section 3 The Proposed Development: Provides a description of the proposed Development and staging.
- Section 4 Analysis of Feasible Alternatives: Analysis of alternatives considered during the design process.
- Section 5 Risk Analysis Identification of key risks.
- Section 6 Consultation: Details the consultation process and outcomes from discussions with local, State and Federal agencies and the community.
- Section 7 Strategic Planning Context: Provides a review of the proposed Development in light of the applicable strategic policy documents.
- Section 8 Statutory Planning Framework: Provides a detailed review of the proposed Development against the Federal, State and local planning framework.
- Section 9 to 22 Assessment of Key Issues: Details an in-depth assessment of the existing environment, the potential impacts and mitigation measures for each of the key criteria in the SSDA DGRs.
- Section 23 Mitigation Measures: Description of the measures proposed to mitigate any adverse effects of the development on the environment.
- Section 24 Justification: Provides justification for the proposed Development.
- Section 25 Summary and Concluding Comments: Provides a detailed summary of the impact assessment with concluding comments.

2 Site Context Analysis

2.1 LOCATION

To avoid confusion, the area of land owned by the same corporate owner containing both the Genesis Xero Waste Facility and the proposed development site for the Facility is called the 'broader site'.

The location of the proposed Development including the proposed Facility is referred to as the 'Site'.

2.1.1 REGIONAL CONTEXT

The broader site is located within the Eastern Creek Precinct (the Precinct) which is strategically located in Central Western Sydney, approximately 36 kilometres from the Sydney CBD, 18 km west of Parramatta and 12 km east of Penrith. The Precinct is prominently located west of the corner of the M4 Motorway and Wallgrove Road, where the M4 Motorway intersects the M7 Motorway. The location of the broader site within the broader context is indicated in **Figure 1** (labelled in the Figure as 'Subject Site').

The M4 Motorway links the broader site east to Sydney CBD and west to the Blue Mountains. The M7 Motorway links the broader site into Sydney's orbital motorway network, north to the M2 and south to the M5 with links to Port Botany shipping terminal, Sydney's international and domestic airports, and Canberra.

Land use in the region includes residential, commercial and industrial development, small rural allotments with residences, tracts of undeveloped land which are clear or support remnant vegetation, waterways and associated riparian vegetation corridors, and transport and utilities infrastructure. The land north of the M4 Motorway comprises a disused animal quarantine station, lawn cemetery and crematorium, and the Minchinbury industrial and residential area. Land to the west forms part of the Ropes Creek regional open space corridor and the Local Government boundary with Penrith.

The broader site is located within the Blacktown Local Government Area. The Fairfield Local Government Area adjoins the Precinct immediately to the south. Land to the east of Wallgrove Road forms a north-south green belt, providing open space, a range of recreational opportunities and a visual and physical break between areas of urban development, including the Prospect Reservoir.

FIGURE 1 – REGIONAL CONTEXT AERIAL



2.1.2 LOCAL CONTEXT

The broader site is accessed via Honeycomb Drive at Eastern Creek. The M4 motorway runs adjacent to the northern boundary of the broader site. Archbold Road forms the western boundary with a buffer of unoccupied land further to the west and open grazing land to the south and along part of its eastern boundary. The remaining part of the eastern boundary of the broader site is occupied by the Hanson Asphalt Batching Plant and the Hanson yard ('Hanson site'). The context is shown in **Figure 2**.

FIGURE 2 – LOCAL CONTEXT MAP



Land surrounding the broader 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.

The above sites are identified for redeveloped for higher end industrial and employment uses over the next decade under the State Environmental Planning Policy (Western Sydney Employment Area) (SEPP (WSEA)). The location of these properties is indicated in **Figure 3**.

FIGURE 3 - SURROUNDING LAND OWNERSHIP



Details on how the proposed Facility may interact with these operations as they currently stand, as well as interactions with potential future operations, is provided in Section **9.2**

The closest residential areas to the Site are:

- Minchinbury, located approximately one kilometre from the northern boundary of the broader site;
- Residential dwellings approximately 1.2 kilometres from the northern boundary of the broader site; and
- Erskine Park, approximately 1km west of the broader site.

2.1.3 SITE DESCRIPTION

The broader site is legally described as Lots 1, 2, 3 and 4 in DP 1145808, as shown in **Figure 4** and detailed in **Appendix G**. It is located on Honeycomb Drive, Eastern Creek, and is situated in the area known as the M7 Business Hub, a major employment hub for Western Sydney. The proposed Development is intended for Lots 2 and 3.

FIGURE 4 – EXISTING SITE SUBDIVISION LAYOUT



The southern portion of Lot 2 and Lot 3 are currently undeveloped and classified as a "Greenfield" site. The broader site generally falls from the north east corner at RL78.99 down to the south west corner at RL 54.2 adjacent a Ropes Creek tributary to the south of the development. This tributary drains to the west of the broader site and connects into Ropes Creek. A 40m riparian zone is set by the *Water Management Act 2000* over this tributary (measured 20m either side from the top of bank).

The Alexandria Landfill Group currently operates a state of the art construction and demolition waste and commercial and industrial waste material processing centre and landfill known as Genesis Xero Waste Facility, within Lot 1, indicated in **Figure 4**, immediately adjacent to and north of the proposed Facility location. The landfill associated with this facility is located over lots 1 and 4.
2.2 BACKGROUND TO CURRENT RECYCLING OPERATIONS

In November 2009 a major project application (MPA-0139) was submitted by ThaQuarry P/L and ACN 114 843 453 Pty Ltd to construct and operate a resource recovery and non-putrescible landfill Facility at the former Pioneer Quarry site, Eastern Creek (Lots 1 and 4, DP 1145808).

Approval was granted to the project application for:

- A Waste Recovery Facility including materials processing centre (MPC) and green waste area;
- Rehabilitation of the quarry void via a Class 2 (non-putrescible) landfill;
- A total throughput of up to 2 million tonnes of material per calendar year;
- Landfilling of up to 700,000 tonnes of non-putrescible waste (including asbestos);
- Stockpiling of up to 50 tonnes of tyres at any one time; and
- Stockpiling of up to 20,000 tonnes of green waste at any one time.

The landfill and MPC are shown in Figure 5, Figure 6, and Figure 7.

Dial A Dump (EC) Pty Ltd, the license holder of EPL 20121 and 13426 operate the major recycling facility and general solid waste (non-putrescible) landfill facility known as the 'Genesis Recycling and Landfill Facility' at Honeycomb Drive, Eastern Creek. EPL 20121 specifically regulates the Genesis MPC operations and related materials. The Waste Recovery Facility developed under the approved project application is known as Genesis Xero Waste Facility which the largest integrated recycling/landfill facility in the Southern Hemisphere.

FIGURE 5 – GENESIS XERO WASTE MPC AND LANDFILL



FIGURE 6 - GENESIS MPC



2.2.1 CONSENT HISTORY

Set out below is a summary of the approvals issued for the development and operation of the Genesis Xero Waste Facility:

- Original Project Approval Minister's Approval (06_0139) for construction and operation of a resource recovery and non-putrescible landfill facility.
- Modification (Mod 1 granted by the Minister on 30 September 2010) for the following components:
 - electrically powered conveyor and chute;
 - postponed commencement of construction;
 - two way traffic on Fourth Avenue;
 - concrete bay walls within the greenwaste processing area; and
 - relocation of the wheel wash.
- Modification (Mod 2 granted by the Minister on 9 November 2010) for correction to the land description details of the Project Approval. The corrected reference to the land being Lots 1, 2, 3 and 4 in DP 1145808.
- Modification (Mod 3 granted by the Minister on 5 December 2011) for the following components:
 - revised final landform level of the fill pad at Area D;
 - operational landform levels and site stormwater design;
 - internal office and external amenities to the Weighbridge;
 - new amenities building;
 - new amenities building associated with the spotter stations;
 - new administrative/office building;
 - new amenities at the tarp stand area;

- approval for the use and relocation of the vehicle turning bay which works have already been carried out; and
- voluntary planning agreement.
- Modification (Mod 4 granted by the Acting Director on 14 December 2013) to amend the approved MPC operational hours to 6am to 10pm Monday to Friday, and 6am to 4pm Weekends and Public Holidays.

Another modification application (5) was submitted in December 2014, and is currently being. The modification seeks approval for the construction of a Pre-Sort Enclosure adjacent to the existing MPC which will provide additional space for sorting and improve the recycling ability of the facility.

The recycling / waste transfer facility opened 8 June 2012 and operates under EPL 20121. Mixed or comingled building and demolition waste is transported by truck to the facility where it is unloaded within the MPC. The MPC is a large building of cast concrete slab, steel and colour-bond construction typical of the surrounding industrial buildings within the Precinct.

In accordance with approved environmental management strategies for the Genesis Xero Waste Facility, preliminary sorting followed by the further processing of the mixed waste material takes place within the MPC.

The facility operates to strict waste classification management standards including the screening loads by weighbridge camera and then spotters at various positions throughout the facility. This will not change under this proposed Development.

2.2.2 WASTE PROCESSING

The Genesis MPC has the approval to accept and process up to two million tonnes of waste per annum.

CATEGORIES		
Segregated hard-fill materials	 This is material capable of being recovered or recycled by a series of processes. Carried on externally to the MPC. After reprocessing and/or recovery, recycled hard- fill materials [brick concrete, sand soil stone bitumen] are stored on-site within the segregated material stockpile area (SMA) until sold. 	
Segregated Timber Greenwaste Area	 This is material capable of being recovered or recycled by a series of processes. Carried on externally to the MPC but within its own self bunded area. After reprocessing woodchip and mulch are stored on-site within the bunded location (SMA) until sold 	
Co-mingled construction and demolition waste and commercial and industrial waste	 Consisting of metals, brick, concrete, plasterboard, soil, aggregates, plastics and a range of building and demolition wastes. These materials are delivered to the MPC for classification and processing. 	
Land-filling	The remainder of incoming waste materials is directed straight to landfill for disposal. This is either due to its chemical composition and waste classification which requires that it be disposed of by landfilling, or because it is a residual waste from another substantial recycling	

Waste loads received at the facility are classified into the following categories:

CATEGORIES	
	process and its destination has been determined prior to arrival at site.

2.2.3 THE GENESIS MPC

Waste which is received within the MPC is subject to processing by the Fixed Plant contained inside the MPC.

The Plant (as shown in the figures below) is a large and complex piece of fixed machinery involving up to 52 interconnected electrically driven conveyors and a range of magnets, graders, screens sieves and hand sorting stations.

FIGURE 7 – INSIDE THE MPC FROM THE SOUTHERN END



2.2.4 MATERIALS RECEIVABLE

Waste materials are currently delivered to the MPC by a combination of light, medium and heavy vehicles, with loads typically varying from approximately one to 40 tonnes (t) in weight (see **Figure 8**).

FIGURE 8 - TYPICAL LOADING MACHINERY INSIDE THE MPC



Preliminary classification of waste is based on advice from the carrier, inspection of the carrier's documentation prepared in accordance with the EPA (2008) Waste Classification Guidelines and verification of this information by visual inspection using the weighbridge camera ('Check Point 1').

Mixed loads are directed to tip at the MPC work floor after a physical visual inspection at the specially designed Spotter station (Check Point 2)

Loads are further inspected by trained staff working on the floor at the time of opening the tailgates and again when the load is tipped out on the floor. (Check Point 3)

2.2.5 SORTING

Mixed loads delivered to the MPC initially undertake a pre-sorting process to remove larger items that may impede the production of the plant. These wastes are segregated by material type and placed in designated bays and bins for transport to appropriate areas for recycling, landfilling or off-site (as required). This is when the majority of hard plastics and PVC are removed from the waste stream.

After pre-sorting the waste is introduced to the recycling plant extending the full length of the MPC, commencing with the primary shredder which reduces the mean size of the waste to ease separation throughout the rest of the plant. Waste is then transported through the Plant by a series of electrically driven conveyors, upon which the separation and sorting of various the waste types takes place automatically.

Ferrous and non-ferrous metals recovered through the sorting process (generally by use of a magnet and eddy current separators) as well as plastics and paper/ cardboard are sorted, placed into bays and bins and stored until sold or transported from site for recycling by others.

Timber wood waste is recovered from the mixed materials during the separation sorting process and is processed for resale as woodchip or for use as fuel by others.

Sand, soil, aggregates and rubble are sorted by the same processes and deposited outside of the western wall of the MPC. They are then further processed for resale.

The residual wastes from the recycling plant are transported by a continuous conveyor (**Figure 9**) that runs through the plant and exits at the rear of the MPC which is then weighed for EPA compliance and connects chute (**Figure 10**) which deposits the residual waste at in the base of the landfill.

FIGURE 9 - THE CONVEYOR FROM THE WESTERN SIDE OF THE MPC BUILDING



FIGURE 10 - GENESIS XERO WASTE CHUTE SYSTEM



The environmental management procedures have been developed in accordance with best practice to maximise resource recovery and minimise biodegradable material from being land-filled in accordance with relevant legislative requirements.

The Genesis MPC site also benefits from the construction of impervious barriers at various positions around the facility being a requirement under the Project Approval.

Management procedures for waste to be processed through the MPC (and landfill facility) including the classification, unloading, sorting, processing, storage and disposal of waste loads have been extensively detailed in the initial environmental assessment for the project (prepared by ERM dated December 2008; reference 0088621).

3 The Proposed Development

3.1 INTRODUCTION

The proposed Facility is a multi-fuel power station (Energy from Waste Facility) with a capacity to generate up to 158 Mega Watts of electrical energy (MWe). Of this, 140MWe will be available for export from the facility to the National Grid. The remainder is required for internal plant power usage.

The Facility will operate 24 hours a day, 7 days a week, with occasional offline periods for maintenance.

The proposed Facility will recover energy from the following Residual Waste Fuel types, which are considered the main sources of fuel for the Facility:

- Chute Residual Waste (CRW);
- Commercial and Industrial (C&I);
- Construction and Demolition(C&D);
- Flock waste from car and metal shredding;
- Paper pulp;
- Glass Recovery;
- Green Organics (GO);
- AWT; and
- MRF residual.

These Residual Waste Fuels will be sourced from the adjoining Genesis MPC and other Authorised Waste Facilities, which would otherwise be landfilled if not diverted to the proposed Facility.

The proposed Facility will complement existing recycling initiatives and support the waste hierarchy by accepting Residual Waste Fuel only after these recycling initiatives have been carried out.

Further information and analysis on the justification of the proposed Development and demand for the facility is provided in **Section 24**.

3.2 SUBDIVISION

In addition to the development of the Facility, this SSDA seeks approval for the consolidation and resubdivision Lots 1, 2 and 3 in DP 1145805 into 11 lots. No changes are proposed to the existing Lot 4 in DP1145805.

The proposed lots are as follows:

- Proposed Lot 1 5.901ha Energy from Waste Facility (lay-down pad 3).
- Proposed Lot 2 8.541ha Energy from Waste Facility (Facility).
- Proposed Lot 3 5.417ha Energy from Waste Facility (lay-down pads 2 and 4).
- Proposed Lot 4 5.227ha –Future Employment Lands/offset area.
- Proposed Lot 5 4.914ha Future Employment Lands
- Proposed Lot 6 26.36ha Genesis Xero Waste Facility and Quarry.

- Proposed Lot 7 0.4 ha Substation Lot.
- Proposed Lot 8 11.24ha Future Employment Lands.
- Proposed Lot 9 3.912ha Future employment lands.
- Proposed Lot 10 10.57ha Not proposed for future development. Remnant bushland.
- Proposed Lot 11 6.58ha Future Employment Lands

A draft plan of subdivision has been prepared by Land Partners is shown in **Figure 13** and has been submitted with this application at **Appendix G**.

The primary driver for the proposed subdivision layout is to dedicate a separate lot for use as a substation and create additional lots to allow future development of land not associated with the proposed Facility and the Genesis Xero Waste Facility. The exception to this is the proposed Lot 10 which is not proposed for development in the future. Lot 10 contains remnant bushland visible on current aerial mapping. It has been ensured all bushland in the North West corner of the Site has been incorporated into Lot 10.

To support determining the extent of Lot 10, an aerial photo from 1986 was geo-referenced to match the extent of the E2 zone (**Figure 11**). This overlay shows a road cutting into what is now E2 zoned land and general clearing beyond the extent of the bushland. It is clear the roads and disturbed areas were present within the E2 zone well before the current SEPP (Western Sydney Employment Area) 2009 (Published 31 August 2009) or earlier, in SEPP No. 59 – Central Western Sydney Regional Open Space and Residential (Gazetted 19 February 1999). It appears that when the E2 zone mapping was carried out in preparation for the SEPP (WSEA) the zone boundaries were established coarsely and consequently areas that are clearly not bushland have been captured.

As such, the proposed Lot 10 boundary reflects the actual extent of the bushland, and excludes the disturbed land. The extent of the proposed Lot 10 against the 1986 map is provided in **Figure 11**.

FIGURE 11 – EXTENT OF BUSHLAND IN 1986 AND EXTENT OF PROPOSED LOT 10 (AERIAL SOURCE: CH2MHILL PHASE 1 INVESTIGATION REPORT DATED 1ST OCTOBER 2004)



Figure 12 below demonstrates the proposed Lot 10 boundaries against 2014 aerial mapping. Again, it can be seen the proposed lot boundary is consistent with the existing extent of bushland, and intentionally does not capture the land and roads.

FIGURE 12 – CURRENT EXTENT OF BUSHLAND AND EXTENT OF PROPOSED LOT 10 (AERIAL SOURCE: NEARMAPS NOV 2014)



It is noted the proposed subdivision is consistent with the E2 zone objective '*To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values*' in that Lot 10 creates an individual lot containing high ecological value bushland which can be managed appropriately.

Any E2 zone that is present in the other lots, namely proposed lots 8, 6 and 11 can be assessed at a future date when a development application for these lots is lodged.

FIGURE 13 - PROPOSED PLAN OF SUBDIVISION (BROADER SITE OUTLINED IN RED)



3.3 PROPOSED DEVELOPMENT OVERVIEW

The SSDA seeks approval for the construction and operation of an Energy from Waste Facility with its associated buildings, infrastructure and plant.

The capacity of the Facility cannot be treated in a single stream combustion system as single stream facilities of the required size cannot be supplied. Rather, the Facility will be configured as a four stream system.

The Development will include the following elements:

- Four combustion lines and associated boilers;
- Cooling systems comprising air cooled condenser (ACC) units;
- Flue gas treatment systems, including residue and reagent storage silos and tanks;
- Emissions stacks and associated emissions monitoring systems;
- Steam turbines and generator housed within a turbine hall;
- Two auxiliary diesel generators each of up to 2.4MWe output (further details in Section 3.4).
- Buildings:
 - tipping hall and fuel storage;
 - o boiler hall;
 - o turbine hall;
 - o substation;
 - o ash collection bay;
 - workshop;
 - o stack; and
 - o control room, offices and amenities.
- Control room, offices and worker amenities;
- Hard-standing, internal vehicular access roads, vehicle turning and waiting areas;
- Fuel reception and storage facilities, consisting of a tipping hall and vehicle ramps, shredder, storage bunker and cranes;
- Consumable Materials Handling and Storage area for raw materials including hydrated lime, ammonium hydroxide, activated carbon, gas, oil, and water, bottom ash handling systems, compressed air systems;
- Process effluent storage tanks;
- Demineralised water treatment plants;
- Fire water and fire protection facilities;
- Pipe racks and pipe runs;
- Combined Heat and Power provisions;
- Administration and control buildings; and substation.

Associated and supporting components of the development will include:

- Subdivision of the land;
- Pedestrian footpaths and routes;

- Internal roadways and weighbridges (x 2);
- Direct underpass connection (Precast Arch and Conveyor Culvert) between the proposed Facility and the Genesis MPC;
- Staff carparking for 40 vehicles (including 3 visitor parking spaces and 2 disabled parking spaces);
- Water detention and treatment basin; and
- Services (Sewerage, Water Supply, Communications, Power Supply);
- Signage;
- CCTV and other security measures;
- External lighting; and
- Hard and soft landscaping and biodiversity measures.

The proposed buildings have varying footprints and heights, with the maximum height reaching 52 metres above ground level, and the stacks reaching 100m. The indicative dimensions of the buildings and various components of the facility are outlined within the table below.

TABLE 3 – INDICATIVE BUILDING DIMENSIONS OF PROPOSED FACILITY

ELEMENT	WIDTH	LENGTH	HEIGHT
Tipping Hall	108	51	19
Waste Bunker	127	40	44 (from ground)
Boiler House (per phase)	50	50	52
Flue Gas treatment (per phase)	45	47	35
Stack (per phase)	6.7	4.5	100
Turbine Hall (per phase)	34	46	26
ACC (per phase)	52	52	22
Ash collector (per phase)	21	17	19
Sub Station	63	63	8
Office Block	15	31	11
Workshop	33	41	17
Control Room	10	38	38
Weighbridge (in)	40	16	10
Weighbridge (out)	38	15	10
Sprinkler Tank	14.7	13.7	9
Pump Room	7.1	12.5	4.1

ELEMENT	WIDTH	LENGTH	HEIGHT
East Amenities	30.5	7	4.5
West Amenities	19	6	4.5

The above dimensions have been developed based in consultation with the technology provider (HZI) and the appointed construction company (Brookfield Multiplex) to ensure optimal functionality of the Proposed Development taking into consideration the unique site typography.

3D renderings of the Proposed Facility as viewed from entry road from the west, and from the south west are shown in **Figure 14** and **Figure 15** respectively.

FIGURE 14 – 3D IMAGE OF THE PROPOSED FACILITY FROM THE WEST



FIGURE 15 – 3D IMAGE OF THE PROPOSED FACILITY FROM THE SOUTH WEST



The layout of the proposed Facility is detailed within the architectural drawings prepared by Krikis Tayler Architects and submitted with this application at **Appendix D** and shown on Site Master Plan below in **Figure 16.**



3.4 STAGING OF THE DEVELOPMENT

It is noted that while the Facility layout has been designed for a four stream facility, the Facility will be built in two phases. Streams 1 & 2 being built in Phase 1 and Lines 3 & 4 being built in Phase 2 when the applicant can demonstrate the required quantity of Residual Waste Fuel is available to the Facility.

Each phase will comprise of two combustion grates two boiler systems housed in one building and each boiler has its own independent Flue Gas Treatment system and connecting to one turbine enclosed in the adjacent Turbine Hall and connecting to air cooling system and one emission Stack and the other auxiliary elements connecting the process.

In Phase 1 the entire Tipping Hall, Waste bunker Administration and workshop will be constructed as well as full sized underground infrastructure, substation, detention basins and back-up systems, to ensures no synergies or efficiencies of the facility are lost with the two phase approach and the external appearance is not altered between the construction of the two phases.

The main buildings of the Facility will comprise:

- tipping hall and fuel storage (common to both phases);
- boiler hall x2 ;
- turbine hall x2;
- substation;
- ash collection bay;
- workshop Common to both Phases;
- stacks ; and
- control room, offices and amenities (common to both phases).

3.5 REFERENCE FACILITIES

The following facilities utilise grate technology and treat similar feedstock and ratios of Residual Waste Fuels as is proposed in this application. These facilities utilise a grate system and use Residual Waste Fuel that contains only (or mostly) C&I waste, of pre-treated waste.

Details on the composition of waste feedstock received and the performance of these facilities is also detailed.

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

TABLE 4 – DETAILS OF REFERENCE FACILITIES

FACILITY NAME	LOCATION	CAPACITY	FUEL CONTENTS
			known)
EEW	Knapsack, Germany	300'000 t/a	100% pre-treated C&I waste

3.6 SUMMARY OF THE PROPOSED ENERGY FROM WASTE PROCESS

Key elements of the proposed Facility's energy from waste process are:

- All eligible Residual Waste Fuel required for Phase 1 of the development (552,500tpa) will be received from existing extensive waste and resource recovery infrastructure owned by Dial a Dump Industries (DADI). This material is either:
 - Residual waste fuel generated by the Genesis MPC (approximately 23% of the facility of input tonnes); and
 - Residual waste fuel received from third party authorised facilities that meet the eligibility criteria.
- Residual Waste Fuel from the Genesis MPC will be delivered to the proposed Facility by a conveyor enclosed in and underground culvert or by vehicle through the integrated underpass.
- The remainder of Residual Waste Fuel will be received from external transfer stations and recycling facilities via public road on trucks.
- All incoming fuel from the MPC entering via conveyor will be pre-weighed and its details recorded at the Genesis Xero Waste Facility before being transported to the TNG EfW Facility.
- External Residual Waste Fuel will enter the Site through the main entrance and will proceed to the weighbridge where the quantity of incoming fuel will be checked and recorded.
- The Residual Waste Fuel from both sources will be unloaded in the tipping hall and stored in the fuel bunker;
- There will be a single shared bunker serving each of the two combustion lines. The bunker has the capacity to store 5-7 days' worth of residual waste fuel;
- Waste in the bunker is first mixed before being loaded into a hopper using overhead cranes. The hopper then feeds the Residual Waste Fuel onto the continually moving grate furnace where it will be combusted. This continuous movement promotes mixing of the waste with the combustion air.
- The resulting hot gases will be passed through a heat recovery boiler to raise steam, which will then be passed to a shared steam turbine driven generator.
- The proposed Facility will generate three types of solid by-products:
 - Bottom ash, a non-hazardous waste. This will be ejected and cooled, and can be further processed off-site and potentially used as road aggregate (as done in Europe);
 - Flue gas treatment residues, also known as APC residue which is a hazardous waste, will require special handling and disposal arrangements; and
 - Boiler Ash, which is potentially hazardous and if so is treated the same as APC residue ash.
- The resulting flue gas will be cleaned in Flue Gas Treatment (FGT) plants to control emissions of nitrogen oxides, acid gases, particulates, dioxins and furans and heavy metals;

- The cleaned exhaust gases will be released to atmosphere via stacks 100 m high;
- In the first phase, the facility will be capable of generating approximately 79 Mega Watts (MW) of electricity, which, after supplying the sites electrical load, will be exported to the grid providing a net supply of approximately 70MW. In the second phase, this will increase to 158MW of electricity and a net supply of 140MW.
- The proposed concept is based on four lines of energy from waste processing, with each line consisting of a 5-pass heat recovery boiler with an SNCR process for Nitrogen Oxide (NOx) control, and the Semi-dry flue gas treatment system with all necessary waste and residue handling systems.
- For this four line concept, two turbine generator sets will be used with two lines supplying one turbine generator.
- The figure below depicts a basic schematic diagram of the operational process (single line) of the proposed EfW Facility
- Operation 24 hours per day, seven days per week with programmed offline periods for maintenance. Over the entire year it is assumed that the facility would be operational for approximately 8,000 hours.
- A fully automated Distributed Control System (DCS) manages the Facility. The DCS is used to operate the plant and ensures the safety of personnel and equipment.

Ammonia Feed Water Hydrated Lime Air & Activated Carbon Clean Waste Flue gas Grate Turbo Fabric Incineration Reactor Boiler filter Fly Ash Steam Condensate Electrical Heat Power Utilisation Bottom Ash Residue

FIGURE 17 – SCHEMATIC PROCESS DIAGRAM FOR A SINGLE LINE OF PROCESSING

The design of the proposed Facility has followed an iterative process based on preliminary environmental assessments, consultation with statutory and non-statutory parties and engagement with contractors and equipment providers.

In particular, the design for the proposed Facility has been shaped by lessons learned from the evolution and construction of existing facilities within the UK and continental Europe by technology provider Swiss Hitachi Zosen Inova (HZI). This proposed Facility is based on the most reliable and continuously improved technology HZI offer, which allows for an economically and ecologically optimised operation.

3.7 ELECTRICAL EFFICIENCY

The proposed Facility will have a net electrical efficiency of circa 30% (with a thermal input of 469.6 MW and a net thermal export to the grid of 140 MWe). High efficiency is assured by recovering the energy released by the combustion process in a 5-pass boiler, which then produces superheated steam. The chosen parameters of 73 bara/430°C for the superheated steam ensure high energy efficiency while still maintaining reliable boiler operation. The superheated steam is expanded in a condensation turbine.

About 90% of the gross electricity production is fed to the national grid. High plant availability is supported by an effective boiler cleaning system.

3.8 WEIGHING, CHECKING AND RECEPTION

The fuel reception and storage will comprise of two weighbridges and a fully enclosed fuel reception area, incorporating a tipping hall and enclosed fuel storage bunker. A maximum of 14 deliveries (approximately 22 tonne load per truck) will arrive per hour.

All incoming Residual Waste Fuel from the Genesis MPC will be pre-weighed and its details recorded on EPA approved weighing systems at Genesis Xero Waste Facility before being transported to the proposed Facility. Two underpasses are proposed to cross the estate road to provide connectivity between the proposed Facility and the existing Genesis MPC. These underpasses are described below:

- Humes Precast Arch will be constructed to allow for unimpeded vehicle access between the proposed Facility and Genesis MPC. The arch proposed will be approx. 18m wide with 6m overhead clearance. The arch will be precast in nature with precast wing walls to suit the estate road over.
- Conveyor Culvert will be constructed to allow for a conveyor to connect the Genesis MPC to the proposed Facility waste bunker. The culvert is proposed to be approx. 4.2m wide and 2.4m high and precast in nature. The final size, location and depth is subject to detailed design. Initial discussions have been had with Blacktown City Council regarding the ownership of the underpasses and the licenses and or deeds that will be required to operate the underpasses under a public roadway. TNG and BCC have agreed to prepare draft Voluntary Planning Agreement (VPA). A draft VPA will be prepared and issued to the Department of Planning and Environment during the assessment of this EIS.

Residual Waste Fuels from external transfer stations and recycling facilities will be delivered via road vehicle.

These vehicles will enter the Site through the main entrance off Precinct Road which is being constructed as part of this proposal in line with local area road network plans. Vehicles will proceed to the weighbridge where the quantity of incoming residual waste fuel will be checked and recorded.

A three point checking procedure will be in place to ensure only eligible waste is unloading in the waste bunker. Initial inspections of these vehicle loads are undertaken at the weighbridge to confirm the nature of incoming waste residual fuel and its source. Only approved residual waste fuel will proceed to the tipping hall. All loads are recorded and monitored with onsite CCTV, at an inspection when entering the Tipping Hall, and again when the loads are tipped off. Suspect loads are either rejected from the facility at the designated inspection area or on the tipping hall floor prior to being placed into the waste bunker. If loads are seen to contain unsuitable material for the EFW plant the waste is reloaded and sent offsite.

Following checking, vehicles will proceed to the tipping hall where they will be directed to a vacant tipping bay to discharge into the bunker.

The tipping hall will be fully enclosed and maintained under slight negative pressure to reduce the risk of odours and dust escaping. The storage bunker has a volume of 77,000m³ and will hold up to 7 days of fuel supply, to facilitate the proposed Development being able to operate 24 hours a day in the event of disruptions in fuel supply. Fill and removal of material will be via cranes.

On completion of the tipping operation, the vehicles will leave the tipping hall via a separate exit. The fuel reception area will incorporate a number of tipping bays to allow multiple vehicles to discharge at the same time. The entry and exit doors to the tipping hall will be equipped with vertical folding or roller doors, which will be kept closed when delivery of waste is not taking place.

Details on the sources of the residual Waste Fuel are provided in **Section 10** and further in **Appendix K**. DADI currently receives enough eligible material to operate lines 1 and 2 of the Facility, and the remaining Residual Waste Fuel will be sourced from other eligible sources other when it is at full capacity (4 lines).

It is noted the Genesis Xero Waste Facility has lodged a separate Section 75W application under the EP&A Act 1979 to seek approval for the construction of an undercover pre-sort centre (PSC) on its site to increase the amount of recycling achieved with particular focus on C&I waste streams. This is to ensure that residual waste fuels will meet the criteria and to ensure that recycling is not cannibalised by the introduction of the EFW.

It should also be noted that eligible material is currently being received at the MPC from third parties which is then sent directly to Landfill. Once the proposed Facility is operational these vehicles will enter directly via the EfW main entrance.

3.9 CLASSESS AND QUANTITIES OF WASTE TO BE TREATED

A description of each TNG waste composition category is provided below. The Design Fuel Mix for Phase 1 is provided in **Section 10.4.2**.

3.9.1 CHUTE RESIDUAL WASTE

Following pre-sorting, waste is shredded at the Genesis MPC and screened for further resource recovery. Residual waste is a typical mix of light wastes that are uneconomical to recycle further. This material is approximately 450mm or less in size and is currently transported to the landfill base via chute and is the residual of both C&D and C&I waste streams. CRW that are not processed via the Genesis MPC are typically the residual of other authorised facilities and are currently landfilled.

CRW from the MPC is expected to represent approximately 23% of the EfW Facility for Phase 1 feedstock.

3.9.2 CONSTRUCTION AND DEMOLITION

C&D waste is expected to represent almost 29% of Phase 1 feedstock, comprising C&D processing residual obtained from authorised C&D processing facilities.

3.9.3 COMMERCIAL AND INDUSTRIAL

C&I waste is expected to represent approximately 17% of Phase 1 feedstock, comprising C&I processing residual obtained from authorised C&I processing facilities.

3.9.4 FLOCK WASTE

Flock waste (shredder flock) is the residue resulting from shredding and crushing items such as motor vehicles and white goods. It is typically generated by metal recyclers and brought to the landfill for disposal, as limited further resource recovery is possible from this shredded material. The metal industry has successfully secured landfill levy exemptions to assist with the costs of disposing of this difficult waste stream.

Flock waste contains primarily plastics, seat foam, rubber, glass, and carpet and is therefore suitable for thermal recovery. Flock waste is expected to represent approximately 14% of the Phase 1 feedstock. This value can be increased to improve the NCV of the Facility feedstock as required.

3.9.5 PAPER PULP

Paper pulp is not identified as an independent waste stream in the NSW EfW Policy, but can be classified as a mix of C&I and MSW residual from paper recycling operations. The composition of paper pulp has been obtained from a post-consumer paper recycling operation in Sydney. Paper pulp is expected to represent approximately 5% of the Phase 1 feedstock.

3.9.6 GLASS RECOVERY

Glass residual is not identified as an independent waste stream in the NSW EfW Policy, but can be classified as municipal solid waste (MSW) residual from post-consumer glass recycling operations.

3.9.7 GARDEN ORGANICS

GO residual is classified as the residual from domestic source separated GO waste. The composition of this residual waste was obtained from council audit data for GO bins prior to processing.

3.9.8 ALTERNATIVE WASTE TREATMENT RESIDUALS

AWT residual is classified as the residual waste after processing domestic residual waste (red bin) from a two bin system. Processing thus removes dry recyclables, food, GO and other organic material via processing, leaving a high calorific residual waste stream. AWT residual is expected to represent approximately 7% of the Phase 1 feedstock.

3.9.9 MATERIAL RECOVERY FACILITY WASTE

Material recovery facility waste (MRF waste) residual is the residual from domestic dry recycling operations. The composition of this residual waste was obtained from a material recovery facility operator in Sydney. ENVIRON has sourced the composition of this residual fuel from a material recovery facility operator in Sydney.

3.10 THERMAL TREATMENT SUMMARY

3.10.1 OVERVIEW

After the Residual Waste Fuel has been thoroughly mixed, the two cranes feed the four independent lines, in semi-automatic or automatic operation mode. Once in the feed hopper, the Residual Waste Fuel is pushed onto the grate by a ram feeder. The grate itself has a water-cooled zone to protect the grate against excessive heat when using high caloric Residual Waste Fuels. When the Residual Waste Fuel is completely burnt, the remaining ash falls into the bottom ash extractor, where the bottom ash is quenched by water and then transported to its dedicated hall with a storage capacity of 5-7 days.

3.10.2 INCINERATION AND BOILER

The water cooled grate, combined with the 5-pass heat recovery boiler form the basis of this Facility. The features of the technology are provided in the figure below.



3.10.3 COMBUSTION CONTROL SYSTEM

Given the thermal output increases with greater waste throughout (**Figure 19**), a cooling system is used to condense the steam from the turbine exhaust for re-use. Large variations of the calorific value (CV) may require an adaptation of the parameters of the different control loops. The adaptation of all control parameters is executed manually by the adjustment of one single input value. This is the so called 'CV-correction'; a feature that is fully integrated in the control system. The CV-correction effects an automatic adjustment of up to ten parameters of the combustion control system.



3.10.4 INCINERATION DESIGN

The combustion grate is designed for municipal household waste, industrial waste as well as solid recovered fuel (SRF) or biomass. The specific thermal and static surface loads are important design parameters of a combustion unit, which is expected to demonstrate low wear and long life expectancy.

The furnace is designed for continuous waste combustion in the range between 60 and 100% of the thermal design load. Short-time peaks caused by the non-homogeneity of the waste are absorbed by the system up to 110% of the design load. In case of very low power and heat requirements even sub-load operation at 60% of the thermal load may be conducted. The area of operation is defined in the Combustion Diagram (see above typical).

Only in case the temperature in the secondary combustion chamber drops below minimum temperature of 850°C, oil or gas fired support burners automatically start operation. Experience shows that such activation occurs very rarely depending on the fuel. Predominantly the burners remain in a stand-by position.

Should support burners be required, gas is preferred. Discussions with private gas supplier Jemena Gas Networks and state owned electrical distribution network Endeavour Energy have indicated that sufficient gas supply will be available to the Site in time for operational commencement)

3.10.5 FLOW OPTIMISED SECONDARY COMBUSTION CHAMBER

The geometry of the secondary combustion chamber (SCC) is designed for optimal flow conditions. The arrangement of the secondary air nozzles creates a swirl in the SCC which homogenises the temperature, velocity and concentrations of the flow (See **Figure 20**). Peaks in temperature, velocity and concentrations are minimised in order to:

- Improve burning-out of the flue gas;
- Provide a uniform temperature profile across the SSC;
- Reduce CO-concentrations;
- Minimise risk of corrosion of unprotected heating surfaces;
- Improve burn-out of fly ash;
- Reduce the amount of fly ash; and
- Reduce the formation of dioxins.

FIGURE 20 – COMPUTATIONAL FLUID DYNAMICS OF SWIRL FLOW IN SECONDARY COMBUSTION CHAMBER



3.10.6 CORROSION PREVENTION

Corrosion minimised in the first boiler pass due to:

- Optimal temperature distribution, good burn-out and low Carbon Monoxide (CO) concentrations as a consequence of the swirl injection; and
- The combination of the Silicon Carbide protection tiles with high heat conductivity lining the refractory, and the Inconel cladding to the boiler section where the flue gas temperature is above 850°C.

3.10.7 TUBE PROTECTION TILES FOR SECONDARY COMBUSTION CHAMBER

The secondary combustion chamber (SCC) is lined with Silicon Carbide protection tiles of high heat conductivity. The small gap between the tiles and the heating surfaces is actively vented (rear-vented system) instead of filled with mortar as known from conventional refractory systems.

The design of the lining:

- High residence times of the flue gas at high temperature (> 2 sec. at 850°C at all conditions) and effective corrosion protection are guaranteed.
- Prevents a direct contact of the flue gas with steel surfaces (corrosion protection).
- Prevents large deposits on the surface due to relatively low surface temperatures and the avoidance of horizontal surfaces and steps in the lining (easier replacement).
- Remarkably increased life time of tiles.
- On-load shower cleaning can be applied.

3.10.8 BOILER DESIGN AND HEAT UTILISATION

The design affords spacious heat exchange surfaces allowing long-lasting service. The alleys between the convective bundles provide adequate space for maintenance work.

The boiler running at the steam conditions 430°C/73 bara is optimised for best thermal efficiency and minimum heat loss. The flue gas outlet temperature is controlled by regulating the feed water temperature of the economiser (ECO). The multi-stage superheater allows for optimum adjustment of the steam temperature within the operational range.

The primary and secondary combustion air are preheated using low pressure steam and, if necessary, saturated steam (only for primary air) taken directly from the boiler drum. The condensate of the primary and secondary air preheater will be returned into the condensate system.

Most waste incineration boilers worldwide have a vertical economiser section. The Vertical economiser pass chosen combines more economical fabrication and erection of bundles with tube coils resulting in a reduced building size compared to a horizontal economiser section.

3.10.9 FLUE GAS CLEANING

The semi-dry flue gas cleaning process is designed to remove acidic gaseous contaminants by chemical absorption with hydrated lime. Heavy metals and organic contaminant compounds are reduced by adsorption on activated carbon. Featured of this system are illustrated in **Figure 21**.

In this process the flue gas and solids move turbulently through the turbo reactor with partial inversion of the solid flow.

The pollutants react with the injected hydrated lime and the activated carbon at a temperature of approximately 145 °C.

The separation of solids from the flue gas takes place in the fabric filter downstream of the reactor.

Outdoor installation of the flue gas treatment technology is a proven design applied in several similar plants. Precautions are considered for water contacted parts, generally water-proof insulation is applied. All maintenance and inspection areas are encased in order to protect against rain during maintenance work.

The flue gas cleaning process is characterised by the following features:

- Flexible to load changes and changes in gas contaminant concentrations;
- Efficient use of adsorbent and minimised residue quantities;
- Designed for high Hydrogen Chloride (HCI) and Sulphur Dioxide(SO₂) inlet concentrations;
- Dry injection of Calcium Hydroxide (OH₂) and Powdered Activated Carbon (PAC);
- Separate injection of water for conditioning and reactivation of recycled lime particles;
- Compact design; and
- Low manpower requirement.



3.10.10 SNCR DENOX-PROCESS

In the first pass of the boiler, ammonia is injected into the flue gas stream. The ammonia reacts selectively with the NO_x. The results are well controlled emissions of NO_x below the levels given by the Industrial Emissions Directive (2010/75/EU (best practice)) and applied to the proposed Facility.

3.10.11 TURBINE AND WATER-STEAM CYCLE

For power production there will be one turbine set for two incineration lines. The produced steam is supplied to a multiple steam turbine turbo set. The turbo set will generate electrical energy for the needs of the complete plant as well as for the external electrical grid. The steam turbine set features are illustrated below.



FIGURE 22 – STEAM TURBINE SET GENERATING ELECTRICITY

By means of a pressure controlled steam extraction, low pressure steam is taken for internal consumers in the plant. The expanded steam is then led to an air-cooled condenser to completely condensate the steam. Also part of this cycle are general steam and condensate systems, water treatment and feed water preparation systems as well as a closed-loop cooling system for all general cooling purposes of the plant.

3.10.12 COOLING SYSTEM

The Proposed Development will require a cooling system to condense the steam from the turbine exhaust for re-use. A Best Available Technology (BAT) assessment has been undertaken by HZI, and has concluded that the use of ACC represents BAT for this installation based on its geographical location.

ACCs condense steam from the turbine exhaust by transferring heat to the air. The steam travels down the inside of finned metal tubes whilst air is blown by fans across the outside of the tubes. As the steam loses heat it cools and then condenses. The condensate is collected in a condensate tank below the ACC unit and then pumped to a feed water tank ready for recirculation back to the boilers.

3.11 PROCESS OUTPUTS/RESIDUES AND DISPOSAL

The facility will generate the following wastes:

- Ash residue (bottom ash, boiler ash, and APC ash);
- Ferrous material residue;
- Gaseous emissions (pyrolysis gas);
- Staff waste ; and
- Other waste.

Bottom ash

Bottom ash is the burnt-out residue from the combustion process. Bottom ash from the grate is quenched with water and moved by conveyor to the enclosed ash storage bunker where it is stored prior to being transported off-site. The conveyor passes under a magnetic separator to remove ferrous materials.

Boiler ash

The characterisation of boiler ash is dependent upon in which boiler pass it is accumulated in. Boiler ash will be conservatively disposed of with the APC residues, unless it can be proven to be reusable following rigorous testing procedures in compliance with EPA regulations.

Air pollution control (APC) ash

Flue Gas Treatment (FGT) residue, also known as APC residues, comprise fine particles of ash and residues from the FGT process. APC residue is collected in bag filters and will contain fly ash and reaction products from the hydrated lime scrubber and spent activated carbon. Due to the heavy metals involved in FGT, this material is classified as hazardous waste. FGT is required to be treated before disposal to landfill. It will be stored in dedicated enclosed silos located adjacent to the flue gas area before being transported via a sealed tanker to an appropriate offsite treatment facility, in line with relevant hazardous waste legislation.

Based on a fuel input of 1,105,000tpa at design waste composition with NCV of 12.34 MJ/kg the amount of ash (three types) generated at the nominal load (8,000 hours) would be 330,000tpa. Of this, 270,000tpa will be bottom ash (with 20% moisture content due to water absorbed from the quench bath), 5,000tpa will be boiler ash, and 55,000tpa will be APC ash.

Ferrous material residue

Ferrous metals will be removed from the bottom ash by means of magnetic separators and discharged to into bins which are then transported offsite to metal recycler.

Liquid effluent

Liquid effluents will be produced from the boiler water treatment system and from the boiler blow-down. All boiler blow-down and liquid effluent produced will be fed to the ash discharger via the process water system. Under normal operating conditions effluents are returned to the proposed Facility for re-use. As such, the majority of liquid effluent produced on site will either be evaporated or absorbed into the ash for transport off site.

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.

3.12 STACKS

Flue gases will be emitted to atmosphere via a stand-alone stack for each phase.

The final stack height was selected based on a combination of compliance of pollutant ground level concentrations and reference to the US EPA document "Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations)" (US EPA Good Engineering Guideline).

Treated flue gases will be emitted to the atmosphere via two separate twin-flue standalone stacks, located to the south of the Flue Gas Treatment Areas.

Each stack will be built to the minimum height necessary to ensure adequate dispersion of the emissions and excessive concentrations of any air pollutant in the immediate vicinity of the stack (as defined through air quality dispersion modelling and further described in **Section 11** of this EIS). The US EPA Good Engineering Guideline states the general rule of thumb for good engineering practice stack height is *'Height of building + 1.5 times the lesser of building height or projected width'*.

With height being the less of these two dimensions; a stack height of 125m is recommended. Dispersion modelling was then used to determine what height was actually needed, based on compliance with

ground level concentration. Dispersion modelling found that a stack height of between 80m and 100m would be required. Modelling results are presented in Table 7-5 of **Appendix L** for a final stack height of 100m, as this was closer to the good engineering practice guide.

3.13 MAINTENANCE, START-UP AND SHUTDOWN

The Proposed Facility will be operated and maintained by a dedicated Operations and Maintenance team. A maintenance plan will be established setting out-weekly, monthly, annual or longer interval inspections, tests and maintenance activities to be undertaken.

The Start-up and Shutdown process will start and stop automatically, under the supervision of trained operators. This means that the control system will start the process in a controlled and safe manner, but the operator will have various 'hold' points where checks are made before proceeding to the next stage. The process will be started using fuel oil or gas to reach safe combustion temperatures before any solid fuels are added. The flue gas cleaning system and emissions monitoring will be in operation before any solid fuel is added.

Process shut down will be carried out in a controlled manner by reversing the start-up process. Emergency controls will be in place for emergency shut downs.

The proposed Facility will be automatic and operator controlled from a stand-alone dedicated control room.

The proposed main control and supervision system will consist of a Distributed Control System (DCS) organised on several levels. The proposed Facility will be fully instrumented including alerts and controls to allow safe and efficient operation.

3.14 DISTRIBUTED CONTROL SYSTEM (DCS)

The DCS is an automated system used to operate the plant and ensure the safety of personnel and equipment. The DCS, provided by the technology provider HZI, operates the Facility processes, machinery, and drives. It also covers information management, quality control, and mechanical and field device condition monitoring.

The DCS replaces the following equipment:

- Operator Level
- Server stations
- Process stations
- System network (redundant Ethernet network)
- Bus systems to Remote I/O stations
- Communication to HV system
- Link to Turbine package unit

The DCS consists of the following levels:

- Plant level: Process equipment, sensors, actuators, probes and analysis devices
- Automation level: Process control, automated devices and autonomous systems, safety systems (SIL = Safety Integrated Level)
- Process control level: Monitoring and controlling of process, data acquisition, programming tools
- Plant control level: Management, maintenance and supervision

- Interface to management systems and the office network.
- Interface for remote access
 - CEMS (Continuous Emission Measuring System)
 - Remote maintenance
 - Data and trends

A more detailed description of the DCS is available at Appendix E of the Waste Management Report at **Appendix K**.

3.15 DIESEL GENERATORS

These emergency diesel generators (one for safe shutdown, one for black start) will have a capacity of 2.4MW respectively 3'000kVA for the four incineration lines. The diesel generators <u>will not be used</u> for shutting down and starting up the plant in the case of planned (scheduled) outages, or forced (unscheduled) outages.

In case of a fire, the emergency diesel generators will supply the power for emergency lighting, firefighting pumps, and similar.

The emergency diesel generators would also be used during the simultaneous occurrence of the following adverse conditions:

- 1. High voltage (HV) electric grid blackout in the Eastern Creek area of Sydney or in the whole of Sydney requiring island mode operation of the EfW plant; and
- 2. An extremely hot day with ambient air temperatures above 37°C causing an excessively high back pressure in the ACC, in turn initiating a turbine trip and necessitating a shutdown of the whole EfW plant.

The simultaneous occurrence of both these adverse conditions would require the emergency diesel generators for:

- a safe shut down of the whole plant
- a black start of one line enabling a turbine-powered black start of the other line (once the ambient air temperature cools down sufficiently to enable island mode operation again e.g. during the following night).

The probability of the first adverse scenario is low, as such the probability of the simultaneous occurrence of both conditions is very low. A grid blackout (= island mode operation of the turbine), extremely high temperatures and full load operation (100%) of the EfW plant would need to occur simultaneously to initiate a turbine trip and shutdown of the whole EfW plant.

Conversely, the potential of a turbine trip and grid blackout and very high ambient temperatures can be significantly decreased by a reduction of the waste load to approximately 80%

The diesel emergency generators will not be used on a continuous basis / during normal operation of the plant.

Durations:

Safe shutdown and black start each take 2 hours when the HV grid is straight away available again

Shutdown time and black start time are closely related, so if the shutdown time lasts longer, the plant will be cooled down further and the black start will take longer, in max. 6 hours.

Appearance:

The two diesel generators will each be located in a closed e-house with an exhaust pipe on the top.

Emissions:

The planned motor type QSK78 fulfils EPA Tier 2 (USA) and TA Luft 2 Gramm (EU / DE) emission requirements – attached are the respective emission certificates ("epa-1259", "epa-1260").

3.16 WATER DEMAND

For the construction phase, the average monthly water use is estimated to be 546 m³, with a maximum of 1836 m³ and minimum of 12 m³. Construction will take place over 43 months. The total water demand for the construction phase is 23,464 m³ or 23.4 ML. A construction water programme has been prepared by HZI and is appended to the Soil and Water Report.

Predicted water demand for the operation of the proposed Facility has two main components:

- EfW plant process water; and,
- General use for staff facilities, including potable supply.

3.16.1 EFW PLANT PROCESS WATER REQUIREMENTS

A detailed water balance for Facility processes was prepared by HZI and is appended to the Soil and Water Report. On the basis of 8000 hours of operation per annum and a water input of 20.10 m3 per hour of operation, the total water demand is estimated to be 160.8 megalitres per annum.

The EfW process includes three main stages as follows:

- Water/Steam Cycle;
- Flue Gas Treatment and Boiler Cleaning; and,
- Bottom Ash Handling.

Water/Steam Cycle

- A closed-loop boiler system is proposed. The combustion grate will use an air-cooled and partly water-cooled design. Total average water demand will be 20.1 m3/hr, which equates to 160.8 ML/yr based on 8000 hours of operation per annum.
- The cycle loss for the water/steam cycle is calculated to be 11.6 ML/yr.
- Air-cooled condenser. Steam from the turbines will be condensed using an air-cooled condenser which eliminates water consumption from this stage of the process. The condensed water is returned to the boilers.

HZI have advised only high-quality water is to be used in the Water/Steam Cycle. As such there is no potential for the use of stormwater runoff without treatment. No such treatment is contemplated in the current design. In summary, the total water supply requirements are as follows:

Flue Gas Treatment and Boiler Cleaning

- A semi-dry scrubbing flue gas treatment system is proposed. The average water consumption
 requirement with boiler cleaning and flue gas treatment is estimated to be 3.4 m3/hr for each of the
 four lines.
- A total of 117.2 ML/yr is expected to be lost from this stage with the flue gas.

Bottom Ash Handling

 Wet handling of combustion residue (bottom ash) will be employed with a total average gross water requirement of approximately 40.6 ML/yr which will be met by re-use of demineralisation plant effluent with the remainder of the water demand being met from re-use of process water effluent from the other stages.

Under average conditions 32.08 ML/yr is expected to be lost with the bottom ash.

3.16.2 USE FOR STAFF FACILITIES

Based on an average water use of 1.125 kL/m²/yr, and an office space allocation per person of 23 m², water use is estimated to be 1.43 ML/yr.

There is limited data available to divide the staff use between potable and non-potable sources. For the purpose of this report, a split of 70%/30% respectively has been adopted. On this basis the potable versus non-potable water use for staff facilities is estimated to be 1.00 ML/yr and 0.43 ML/yr respectively.

3.16.3 WATER RE-USE

The proposed EfW process is designed to allow the maximum practicable level of re-use of water within the systems of the Facility. This includes use of demineralisation plant effluent for bottom ash handling; return of boiler blow-down water for re-use in the Water/Steam Cycle and use for flue gas treatment; and re-use of water from the sampling stations.

Re-use from room run-off (non-potable) is proposed. The total available main roof area for rainwater collection is 17,570m2. An optimal storage tank size of 1,000kL has been determined, allowing 95% re-use of total inflow into the tank. Further, rain water holding tanks will be installed adjacent to the turbine halls and that water will be used on site as required.

Re-use of stormwater run-off collected in the bio-retention is not proposed as the quality of this water is unsuitable.

3.17 SUPPORTING FACILITIES

3.17.1 WEIGHBRIDGES

The proposed Facility will provide two new weighbridges to be constructed within the boundary of the Site on Precinct Road (one on entry and one on exit). These bridges can be seen on the Site Master plan in the architectural set submitted with this report (**Appendix D**).

Incoming bulk transport vehicles that are predetermined as carrying eligible residual waste fuel from external transfer and recycling facilities will enter the Site through the main entrance for the proposed Facility. They will proceed to the weighbridge where the quantity of incoming fuel is checked and electronically recorded. Vehicle loads will be inspected at the weighbridge to confirm the nature of incoming fuel and only authorised fuel will proceed to the fuel reception area.

Loads will be nominally 22 tonnes for all fuel types. Fuel can be sampled from the vehicle at the weighbridge. The weight of the outgoing vehicles will be recorded on a separate weighbridge as they leave the Site.

Residual Waste Fuel from the Genesis MPC will arrive at the proposed Facility in two ways as described below. The incoming fuel will be pre-weighed and its details are recorded at the Genesis Xero Waste Facility before transported to the proposed Facility:

- By a conveyor transport system which will carry the residual waste output of the Genesis MPC. It will
 travel via the culvert under the precinct road and will eject directly into the storage bunker.
- Some vehicle transport from Genesis MPC will be required and when this occurs it will be via the archway under the precinct road (yet to be constructed).
- By vehicle transport system via the culvert under the precinct road in the case that the conveyor is out
 of service or for unrecyclable wastes that are extracted from mixed waste stream at the pre-sort
 stage prior to be feed into the recycling plant

3.17.2 ROADS AND ACCESS

- Access to the Facility is via Honeycomb Drive. Honeycombe Drive is to be extended as part of this
 proposal and in line with areas precinct roads plans, this will provide direct access to the entrance of
 the TNG EFW facility.
- Internal traffic circulation is designed to separate staff and visitor car parking from the truck movements. Internal traffic management, line marking and signage generally promote a one way system around the Site circulating from the west to the east then to the south and to the north.

3.17.3 PARKING

The development accommodates 40 car spaces across two on grade car parks; one to the west of the office and one to the east of the workshop building, including 1 disabled space and 3 visitor spaces located in the western car park.

A traffic impact assessment has been prepared by Traffix and is provided at Appendix R.

3.17.4 LANDSCAPING, MATERIALS AND FINISHES

The landscape plan included at Appendix E aims to:

- Provide visual amenity generally against the built form;
- Provide shade;
- Create/ maintain passive surveillance of the Site; avoiding anti-social behaviour;
- Soften the ground plane;
- Provide vertical articulation via feature trees;
- Provide low water demanding plant species;
- Observe and maintain necessary safety and aesthetic sightlines; and
- Avenue tree planting to entries / formalised planting typologies.

The elevations in the architectural drawing set detail the proposed materials and finishes, including:

- Profiled colorbond metal sheet cladding laid vertically;
- Coloured steel twin wall stack with wind shield;
- Coloured steel louvre system;
- Aluminium framed window system with solar controlled glad;
- Insulated composite steel cladding laid horizontally;
- Translucent polycarbonate sheet; and
- Feature metal cladding.

A materials and finishes sample sheet is included at **Appendix D.**

3.17.5 COMMUNITY SAFETY AND FENCING

To ensure public safety, the following features and services are proposed:

Fencing is proposed around the perimeter of the facility to ensure the plant is secure. Fence heights
will not obstruct views to and from the Site from a public place. The existing post and rail fencing will

be maintained as part of the proposed works. New fencing and Armco barriers will be installed as required;

- 24 hour security personnel will be present on Site to respond to any safety concerns;
- CCTV will be onsite; and
- Signage for community safety communication will be erected as required. It is suggested a condition
 of consent be applied which requires the provision of the necessary safety and security measures
 consistent with Australian Standard AS 4282: 1997 Control of the Obtrusive Effects of Outdoor
 Lighting.

3.17.6 SIGNAGE

Three business identification signs are proposed on the north, east and west elevations of the tipping hall. Each sign will be painted on metal background, framed and mounted on building cladding, and illuminated via stalk lighting. The signs will measure 8m width x 2.84m height. The signage on the north and west elevations are proposed 6m above ground level. The signage on the east elevation is proposed 4m above ground level. Further details on this signage are provided in the Proposed Building Signage Plan at **Appendix D.**

Internal road and pedestrian signage is proposed to direct vehicle movements within the Site.



FIGURE 23 – PROPOSED SIGNAGE ON THE NORTHERN ELEVATION

3.17.7 CIVIL AND STORMWATER MANAGEMENT

AT&L have been engaged by TNG to undertake the Civil Design for the proposed Development. As part of these works a stormwater management plan has been prepared for the Site and is consistent with the stormwater strategy for the broader site.

The stormwater generated from Site will drain to the south into a bio retention basin to be detained and treated. A pit and pipe system will control the outflow to ensure post developed flows do not exceed pre developed flow for all storms up to the 100 year ARI events. An outlet from the basin will discharge into the existing Ropes Creek tributary to the south of the Site.

The AT&L Stormwater Management report has demonstrated that a storm water system consistent with good management practices can be provided for the proposed development.

A full set of civil and stormwater management drawings, along with supporting information have been prepared by AT&L and are submitted at **Appendix F**.

3.17.8 SERVICES

Services including sewer, water, power and telecommunication can be made available to the Site.

- Sewerage: There are no existing sewer mains within the area of the proposed development. Sewer is however available at the entrance to the Genesis Xero Waste Facility on Honeycomb Drive (as provided with the recently approved Australand latest development). Sydney Water are proposing to construct the Ophir sewer carrier main which will be installed east of Ropes Creek to the west of the Site. Discussions have been entered into with Sydney Water to construct the lead in sewer main from the Site to this carrier sewer.
- Water Supply: There is an existing 375mm Ductile Iron Cement Lined (DICL) water main within the access road off Honeycomb Drive. This water main runs across the northern boundary of the Site. Water for the Site can be accessed from this main. A detailed review of the water requirements of the proposed Facility is provided within the Soils and Water Report submitted at **Appendix Q**. TNG has consulted with the NSW Office of Water in relation to the water requirements to operate the proposed Facility who indicated that there is sufficient capacity to meet the water demands to run to proposed Facility.
- Communications: From Dial Before You Dig records there does not appear to be any telecommunications cables adjacent the Site. The closest telecommunications cables are within Honeycomb Drive to the east of the Site. In order to service the Site, extensions from this existing network will be required. Fibre optic supply can also be made available to the Site within the same system as the electrical cable supply from Transgrid
- Power Supply: Existing electricity cables and additional conduits are located within Honeycomb Drive to the north and continue down the Genesis Xero Waste Facility private road adjoining the Site. The offtake power from the EFW will be transferred via underground cable from the proposed electrical substation to the existing transgrid easement that runs on the western boundary of the Site. The 132kV underground cable will be housed in a 4m wide trench.
- Power Connection: The power generated from the EfW will be transmitted via underground 132 kV cables within a 4m wide trench from the proposed substation, westward into the existing Transgrid 132kV transmission line easement. The underground cable continues within the existing Transgrid easement heading south east into the Sydney West 330kV substation, which is located approximately 2km to the south-east of the site. The works will also include re-configuration of the equipment within Sydney West Substation to accommodate the connection.

3.18 CONSTRUCTION MANAGEMENT

A Construction Environmental Management Plan (CEMP) (**Appendix CC**) has been prepared by Brookfield Multiplex and outlines the approach and procedures for environmental management during the construction phase of the proposed Facility, Eastern Creek (SSD 6236).

The ground will be levelled to accommodate the structures, storage and access and parking requirements. Areas surrounding the buildings will be landscaped.

The proposed hours of construction are:

- Monday to Friday 7.00am to 6.00pm
- Saturday 8.00am to 1.00pm
- Sundays and Public Holidays No work permitted

In addition, the proposal seeks extended construction hours for 7:00am to 8:00am and 1:00pm to 6:00pm Saturdays in conjunction with specific periods of 24 hour operation.

The extension of standard construction hours is considered justified for the following reasons (further detailed in **Appendix CC**):

- Delivery of Large Plant and Equipment: With the large scale of the proposed Development, various construction and installation processes will require the delivery of oversized plant, equipment and structures (e.g. crawler cranes, earthmoving equipment, tanks and stacks). Due to their size these deliveries will need to travel on NSW roads at a time that is outside of the EPA recommended Construction Hours.
- Emergency works: Construction activities will be planned to be carried out within standard EPA working hours, however, activities may not be able to be completed for reasons beyond our control, that need to be completed to ensure the works remain safe and of an acceptable standard.
- Safety Works: To ensure that the Site is safe and the works unaffected, it is mandatory that
 inspections are carried out prior to operatives commencing works on a daily and ongoing basis.
 These inspections are proposed to be carried out prior to the operative's works commencement
 times. These inspections will also occur after the operatives have completed works each day.
- Maintenance and Utility Works: In order to sustain the operational integrity of public infrastructure some works will need to be done outside EPA working hours. The hours of works will be nominated by the Utility stakeholder.
- Construction Plant Maintenance: Due to the specialist nature of this plant and to achieve efficiency in its use, this plant is normally maintained during construction phase outside normal operating hours. It is unlikely that these works will cause excessive noise.
- Concrete Casting: There are structural elements in the Facility such as the Waste and Ash bunkers that will require the use of a "slip form" formwork system. Casting continuously over periods of 24 hour operation over several days at a time is required.
- Plant Installation: The majority of the components are "oversized" and will need to be transported to Site outside standard construction hours. The units need to be installed in a very specific order to complete the plant installation process. Given the size of these units, lifting, placing, securing, releasing the mobile or tower crane and ensuring the unit is safe to leave in a temporary state can take in excess of the available standard working hours. Breaking these activities up in to smaller elements will only compromise safety of the operatives and or quality of the completed unit.
4 Analysis of Feasible Alternatives

This section of the EIS outlines the alternatives considered in relation to the development of the site and design.

4.1 ANALYSIS OF FEASIBLE ALTERNATIVES

The importance of the recovery of energy from waste as part of effective waste management is reflected in The Environment Protection Authority's *NSW Energy from Waste Policy Statement 2014.* The Environmental Protection Authority (EPA):

'recognises that the recovery of energy and resources from the thermal processing of waste has the potential, as part of an integrated waste management strategy, to deliver positive outcomes for the community and the environment. Energy from waste can be a valid pathway for residual waste where:

• further material recovery through reuse, reprocessing or recycling is not financially sustainable or technically achievable

• community acceptance to operate such a process has been obtained'.

The diversion of waste from landfill, reducing the potential for methane emissions, while also providing a form of low carbon, renewable energy, is now recognised by Government as making an important contribution to the targets for dealing with waste.

It is therefore considered that the 'Do Nothing' scenario is not appropriate given the established need for new energy generation, including a need for low carbon generation. The alternative to the proposed Development proceeding would be continued operation of traditional landfill waste management operations which have been found to be inefficient as a long term sustainable solution to Sydney's expanding population and waste generation.

The selection of the Site for the Proposed Development is directly related to its proximity to the M4 and M7 motorways and the direct synergies between the proposed Development and the adjoining Genesis Xero Waste Facility currently in operation which will provide a percentage of the waste fuels.

The reasons for the selection of Site included:

- Its proximate location in relation to the residual waste fuel sources available in the Region and from the neighbouring site (with the same corporate owner);
- The topography of the land allows for the tipping hall to be considerably higher than the floor waste storage bunker without requiring volumes of fill material to achieve this.
- Availability of existing supporting infrastructure including.
 - o connection to the grid in close proximity less than 1.5kms
 - o availability of water and
 - o availability of natural gas supply directly to Site;
- Excellent road links and possible future availability of rail links;
- Access to a pool of skilled labour for operations and maintenance;
- Solid record of environmental compliance at Genesis Xero Waste Facility; and
- Separation from sensitive residential receivers.

The residual waste fuel availability and waste hierarchy analysis undertaken as part of the Waste Management Assessment (**Appendix K**) reviewed residual waste fuel availability in regard to eligible waste that can be used as a residual waste fuel in the Proposed Development.

Looking at both the volume of waste currently landfilled in New South Wales and forecasts regarding volume of landfilled waste in the near future, there is a clear demand and need for energy recovery facilities in the New South Wales by utilise waste that is currently going to landfill and causing diversion of the same.

Given the proximity, availability and capacity of road links associated with the Precinct, the location is ideally suited to utilise a range of potential waste sources across Western Sydney.

For these reasons, no alternative sites were considered for the Proposed Development.

4.2 CONSIDERATION OF ALTERNATIVE LOCATIONS AND PLANT LAYOUT

When considering possible locations for the Facility, it was clear a location within the broader site was most logical and would bring more benefits both to the local area and the operation than any alternatives. A location within the broader site has the following benefits:

- Proximity to Genesis MPC to maximise efficiencies with this facility
- Ideal location within Eastern Creek Industrial Precinct
- Opportunity for shared infrastructure with the Genesis Xero Waste Facility, including roads
- The broader site is an appropriate distance from sensitive receivers including residential areas
- The broader site is buffered by other industrial land uses and roads, and does not adjoin sensitive land uses
- Proximity to a major road network

The ability of the broader site to deliver the above benefits put this location above other potential options which may not have been able to deliver the same range of benefits. Specifically, another location would lack the opportunity for synergies with the Genesis MPC, and thus greater traffic impacts would result on public roads to deliver the Residual Waste Fuel to the Facility.

Whilst there were a range of options available for the specific location of the proposed Facility within the broader site, close consideration and evaluation during the feasibility and design development stage was given to the preferred location and adopted layout.

Consideration included:

- Known site constraints including the site topography, location of the landfill, E2 zoned land and riparian corridor;
- Environmental appraisal which informed the concept layout;
- Proximity to Genesis MPC (for the use of shared roads and proposed culvert between the two facilities);
- Maximum possible distance to residential properties; and
- Connection to the Grid.

The proposed location utilises the typography to reduce the visual impact of the proposed Facility by locating the stacks at the lowest point of the Site. The north western portion of the broader site was deemed inappropriate due to the prevalence of site vegetation required to be removed to facilitate construction.

Initial air quality, noise, transport, ecological and archaeological constraints appraisals were undertaken to inform the selection of the location of various plant items within the Site. This included identification of key receptors and key site constraints (both physical and environmental) and initial modelling to inform whether the specific location of the plant would affect the levels of noise or emissions that may be experienced by specific receptors.

The capacity of the location to share infrastructure with the Genesis Xero Waste Facility was an important consideration. The selected location allows use of the existing estate road from Honeycomb Drive and potentially other shared facilities and services over the lifetime of the two developments. The distance between the Genesis MPC and the proposed Facility was also an important consideration for the proposed underground conveyor culvert.

Close proximity and access to the Transgrid substation and use of the Transgrid easement for service lines makes the location chosen ideal for generating electricity. This proximity saves on cable distances and electricity loss from transporting to the grid.

4.3 CONSIDERATION OF ALTERNATIVE TECHNOLOGIES

There are a number of alternative technologies available for this type of proposed Facility (including external kilns, fluidised beds, gasification and pyrolysis, plasma gasification and moving grate technology).

Given the combined objective of the proposed Development primarily as an electricity generating station but also as a waste solution, moving grate technology is considered the most suitable for the proposed Development due to its reliability and performance in relation to energy generation and its robustness to manage a range of residual waste fuels with varying calorific value (CV) while experiencing minimal wear.

The appointed technology provider Hitachi Zosen Inova (HZI) has developed and operated numerous moving grate energy from waste plants around the world and is experienced in this technology. HZI is a leading global supplier for Energy-from-Waste plants with more than 500 reference projects worldwide and experience in different plant configurations, capacities, fuels, national standards, and high efficiency concepts.

Newly developed systems for improved combustion performance have been tested in reference plants prior to being offered to the market.

- The water cooled grate has been in operation on various plants since 1994.
- The flow optimised swirl injection of secondary air has been in operation since 1996. Today this system has become a standard in all new plants.
- Flue gas recirculation was introduced in 1985 and is now in use in more than 40 thermal waste treatment plants.
- The semi-dry flue gas treatment system was first installed in 1998. It has since been installed in various thermal waste treatment plants.
- The additive dosing (activated carbon, hydrated lime) was first applied in 1988 for adsorption of
 organic compounds and mercury in flue gas. This system has been continuously optimised and is
 now in operation in various thermal waste treatment plants throughout the world.

Whilst there are various forms of energy from waste, moving grate technology is a tried and tested. Alternative combustion techniques are available but do not have the same number of reference facilities and in some cases technology has been withdrawn from the commercial application market.

Other technologies that have achieved a degree of commercial development are gasification technologies, but these tend to rely on a modular form and so are not suited to large scale commercial facilities and are less efficient in converting the waste feedstock into electricity than moving grate technology over a range of different fuel types; an important consideration both in relation to achieving compliance with the waste hierarchy and commercially given the proposed Development is a commercial facility.

For the reasons set out above, and to ensure fuel mix has been carefully considered for the proposed Facility, the selected technology is a reciprocating grate system (a type of moving grate system).

Throughout the design process consideration has been given to a range of design options. These decisions have, where relevant and possible, been informed by environmental appraisal and assessment work and consultation with stakeholders, and the design has evolved through a continuous process of environmental assessment, consultation and development.

The proposed Facility, as presented in this EIS, is the result of a consideration of alternatives and design evolution process in accordance with the hierarchy avoid, reduce and, if possible, remediate. This has included identifying best available technology BAT and avoiding or reducing environmental impacts by design.

5 Environmental Risk Analysis

Whilst the Director-General's Environmental Assessment Requirements for this application do not include a requirement for an Environmental Risk Analysis, a summary of the anticipated risks for each of the environmental issues is provided on the following pages. Proposed control measures are also summarised.

It is noted that a Preliminary Hazard Assessment and Fire Risk Assessment has been prepared for the proposed Development (**Appendix Z**) and is detailed further in **Section 17**. Identified risks and issues are similarly explored in more detail in this report under the relevant DGR key issue (**Section 9 - Section 22.6**).

The identification of key environmental and community issues for the project was based on consideration of:

- The DGR's for the project
- The planning and environmental context of the Site
- Outcomes of the community and stakeholder engagement process
- Technical studies completed as part of the preparation of the EIS

The risk analysis was undertaken to identify the key issues that required further assessment as part of the EIS. This was carried out according to the principles outlined in the Australian Standard AS/NZ 4360:2004 Risk management. The basis for this encompassed the following steps:

- Establish the context for the risk analysis
- Identify potential risks to environment and community
- Analyse risks
- Evaluate risks to determine the key issues requiring further assessment

ISSUE	DGR KEY ISSUE?	POTENTIAL RISKS	CONTROL MEASURES
Waste Management	Yes	 Improper disposal of residual waste products from EfW process Non-compliance with the NSW Waste Avoidance and Resource Recovery Strategy 2007 	 Bottom ash from the grate will be removed by quenching with water and moving it by conveyor to the enclosed ash storage bunker where it is stored prior to being transported off-site. The conveyor passes under a magnetic separator to remove ferrous materials, which will be recycled. APC residue ash will be collected into sealed storage silos and transported via sealed tanker off-site for further treatment or disposal at landfill. In the event APC residue exceeds the criteria for Restricted Solid Waste, the residue will be taken off site to a Hazardous Waste Treatment facility, in line with relevant hazardous waste legislation. Boiler ash will be conservatively disposed of with the APC residues, unless it can be proven to be reusable following rigorous testing procedures in compliance with EPA regulations.

TABLE 5 – PRELIMINARY RISK ANALYSIS

ISSUE	DGR KEY ISSUE?	POTENTIAL RISKS	CONTROL MEASURES
			 Measures implemented at the Facility to ensure ongoing compliance with Strategy include exclusion of waste that has not undergone resource recovery, sourcing waste from resource recovery facilities; and inspections of all incoming vehicle loads to confirm that resource recovery has taken place and that load contains residual waste fuel.
Air Quality	Yes	 Degradation of air quality, including elevation of ozone levels 	 The proposed technology for the EfW facility is based on existing facilities in the UK and rest of Europe and will incorporate best available technology (BAT) for flue gas treatment, designed to meet the stringent in-stack concentrations limits for waste incineration set by the Industrial Emissions Directive (IED). The BAT includes Selective Non-Catalytic Reduction (SNCR) for reducing emissions of NOx. VOCs will be minimised through combustion control with additional controls afforded from activated carbon injection as part of the flue gas treatment.
Human Health	Yes	 Adverse health impacts from dioxins and furans, non-carcinogenic and carcinogenic effects. 	 The total intake for all receptors is well below the Tolerable Monthly Intake (TMI). No mitigation required.
Odour	Yes	 Release of odour emissions from: Active tip face Leachate tank Leachate riser 	 Fuel (waste) will arrive to the proposed Facility in covered trucks or via an enclosed conveyor from the Genesis Xero Waste Facility. The proposed Facility will employ high speed roller doors for truck access to ensure fugitive odour emissions are not expected. All waste storage and unloading will take place within the tipping hall building, which is kept at negative pressure with air extracted from the building being used as excess air in the boiler.
Noise	Yes	 Degradation of noise amenity (including cumulative). Construction noise Operational noise Road traffic noise 	 Noise mitigation and management measures for construction noise management will be implemented where reasonable and feasible. A construction noise management plan will be developed and implemented once further details and schedules are confirmed. It would include the following: Communication with the potentially affected receiver locations to inform of the proposed works, durations and potential for noise. Identification of key noise impacts

ISSUE	DGR KEY ISSUE?	POTENTIAL RISKS	CONTROL MEASURES
			 Noise management measures Noise monitoring on site and at sensitive receivers Training and awareness of on-site personnel. Incident and emergency response. Non-conformance, preventative and corrective action. Education and training of site staff will also be carried out to ensure satisfactory implementation of noise mitigation measures. An operational noise management plan will be developed for the site to assist in maintaining good practice in
Soils and Water	Yes	 Flooding Degradation of surface water Encounter of high salinity soils 	 ongoing noise management. The proposed flood levels of the creek do not adversely affect the proposed Site. Flood levels associated with the creek are at least 2m below the proposed finished levels of the site. Sediment control basins are proposed and an Erosion and Sediment Control Plan has been put in place to address risks to water and soil 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.
Traffic and Transport	Yes	 Altered traffic conditions during construction and increased travel times. Increased traffic on local road network. Decrease in quality of local road. 	 The increase in vehicle trips associated with the proposed Facility can be readily accommodated by the surrounding road network with no change to existing Level of Service and only minimal impact on average delays.
Hazards and Risks (Storing and Handling Dangerous Goods On Site)	Yes	 Hazards: Diesel tank leak, spill, immediate ignition and pool fire; PAC dust cloud, ignition and dust cloud explosion; Ignition of waste in 	 Development of a work permit system, including hot work permits; Development of hazardous area diagrams in accordance with AS60079.10; Ignition sources within the hazardous area should be controlled according to AS60079.14.1; Installation of monitor(s) in the waste bunker (further monitor recommendations below); and

ISSUE	DGR KEY ISSUE?	POTENTIAL RISKS	CONTROL MEASURES
		bunker and fullbunker fire; andTransformer OilSpill, Ignition andPool Fire.	 Feasibility of installation explosion venting or nitrogen blanketing in the PAC silos will be investigated.
		Fire Risks:	 36m hose reel located mid-way along the bund wall, set back 5m. 1 hose reel for each diesel bund.
		 Diesel bund fire Weste bunker fire 	 Installation of fire monitors
		 Waste burker fire PAC silo fire 	 Deluge system, hydrants, and oxygen exclusion (nitrogen blanketing) will be adopted.
		 Transformer bund fire 	 Powder-type extinguisher.
Flora and Fauna (Bio- Diversity)	Yes	 Loss of native flora and fauna 	 A pre-clearance survey will be undertaken and any vertebrate fauna and Cumberland Plain Land Snails captured will be moved to the retained area of River Flat Eucalypt Forest to the south of the development footprint. Locally indigenous flora in will be used in proposed landscape planting Weeds will be removed within the development proposal footprint to mitigate against further weed spread. Offsetting will be achieved with approximately 0.54 ha of Cumberland Plain Woodland to be regenerated or replanted for the 0.27 ha that will be removed, and approximately 4.98 ha of River Flat Eucalypt Forest to be regenerated or replanted for the planted for the 2.89 ha that will be removed. The loss of hollow-bearing trees will also be offset through the installation of twenty fauna boxes. Additionally, all vegetation clearing will be supervised by a project ecologist.
Visual	Yes	 Visual obtrusion of the proposed in the setting 	 From most locations, the lower parts of the Facility will be totally obscured from view. Where views are possible, these will generally be of the upper parts of the buildings and the slender twin vent stacks protruding above the tree canopy or building line. The resulting visual impact will be negligible for most locations and generally low to moderate where views

ISSUE	DGR KEY ISSUE?	POTENTIAL RISKS	CONTROL MEASURES
			 are possible from sensitive viewpoints. Proposed landscaping will assist in softening the appearance of the Facility. To minimise potential lighting impacts, all external lighting associated with the Facility will comply with Australian Standard AS 4282: 1997 – <i>Control of the Obtrusive Effects of Outdoor Lighting.</i> Night-lighting will be kept to the minimum required for operations and safety requirements.
Greenhouse Gas	Yes	 Emission of greenhouse gases. 	 The operation of the proposed Facility would have a net positive GHG effect, potentially eliminating 1.5 million tonnes of CO2-e per annum. The emission intensity for electricity generated from waste incineration is lower than that derived from the NSW electricity grid.
Aboriginal Heritage	Yes	 Disturbance of Cultural Heritage values, Aboriginal places or objects 	 To mitigate against the Facility's development impacts, the found artefacts will be reburied within the riparian area within 'EFW South' as it will not be impacted by any future development works. This location was supported by the identified Aboriginal Stakeholders. No further impacts are anticipated.
Non- Aboriginal Heritage	Yes	 Disturbance of sites of European heritage significance 	 Given the low potential for historical archaeological remains of low significance to be present within the study area, further works are not required.
Stormwater, On-Site Detention and Flooding	No	 Flooding 	 The proposed flood levels of the creek do not adversely affect the Site. Flood levels associated with the creek are at least 2m below the proposed finished levels of the Site.
Bushfire	No	 Potential fire hazard. 	 The Site is not sterilised by the bushfire threat. Building construction for all aspects of the buildings excluding windows will be minimum FRL 30/30/30 where separation of 27m from grassland and 55m from forest is not achieved; Openable portions of windows will be screened with metal mesh maximum 2mm aperture; Fire hose reels will be provided, which is capable of reaching all extremities of the proposed development. Grassland between the facility and unmanaged grassland will be mown as lawn.

ISSUE	DGR KEY ISSUE?	POTENTIAL RISKS	CONTROL MEASURES
Contaminati on	No	 Existing contamination of Site 	 No contamination of the Site has occurred. Based on the findings of the detailed site investigation, the Site is deemed suitable for commercial/industrial land use and the proposed development.
Community	No	 Disruption to the Community during construction Community concern over impacts on air quality. Community concern over human health risk. Community concern over visual impact 	 Risks have been assessed and impacts are considered absent, negligible or manageable. Ongoing community consultation will occur throughout the assessment and construction of the proposed Development to ensure key local stakeholders are kept informed of the progress of the proposed Facility and provided an opportunity to voice any concerns which will in turn be responded to accordingly.
NSW EfW Policy	No	 Risk of harm to human health and the environment 	 Consistency with the Policy is achieved. Where any inconsistencies arise, these are addressed. A summary of the technical criteria document in the EfW Policy Statement and TNG's proposed design is summarised in Table 9 at Section 7.4.

6 Consultation

The DGRs required consultation to be undertaken during the preparation of the EIS with a range of authorities and key stakeholders.

Each of the specified groups were consulted by The Next Generation NSW and its consultant team during the preparation of the EIS.

A Communication and Community Consultation Summary Report has been prepared by KJA which documents the consultation process to date (submitted at **Appendix X**).

6.1 CONSULTATION TO DATE

Since November 2013 a comprehensive and coordinated program of communication and engagement has been rolled out to support the application process. This involved providing a range of consultation opportunities to enable feedback and input into the different stakeholders, community groups and individuals.

The consultation has been designed to inform and build awareness of the proposed Facility, as well as identify key issues and opportunities and establish a framework for ongoing dialogue. Programs for communication have included:

- Project website- A dedicated website (www.tngnsw.com.au) has been created to offer general information on the proposal, together with a project flyer and video. In addition, frequently asked questions were uploaded to provide responses to general question.
- 1800 community line and project email- A dedicated, toll-free 1800 community information line (180 252 040) and email address (info@tngnsw.com.au) was established from the inception of the consultation to provide an immediately available and central point of contact for stakeholder and community enquiries.
- Key stakeholder correspondence- Correspondence has been sent via post and/or email to identified key stakeholders and community groups. The correspondence included a project overview and flyer with the offering of a personal briefing should they request it. This was also followed up by direct phone calls to some key stakeholders offering a personal briefing.
- Letter notification- Two letter box drops were undertaken to inform the nearby residential areas in the suburbs of Minchinbury and Erskine Park about the project. A total of 4,000 residences received the project flyers.
- Briefings- In addition to the statutory consultation with relevant agencies, personal briefings were
 offered to key stakeholders.
- Door knock- In an attempt to further connect with TNG NSW's industrial neighbours after a letter was sent to each business, a door knock was conducted to a number of businesses along the neighbouring street of Wonderland Drive, Eastern Creek.
- **Community information day and site tour-** On the 22nd of February 2014 a community information afternoon was hosted by TNG NSW. Approximately 32 people were in attendance.
- Media- The local newspapers of the Blacktown Advocate, Blacktown Sun and Mt Druitt St Mary's Standard were briefed on the proposed Development and given direct contact numbers for further questions. Various articles on the proposed Energy from Waste Facility were published including the front page of the Blacktown Sun on December 17, 2013.

6.2 SUMMARY OF CONSULTATION WITH AGENCIES

In preparing the EIS, TNG and their technical consultants have consulted with the following agencies and local stakeholders:

TABLE 6 – GOVERNMENT AND LOCAL STAKEHOLDERS CONSULTED

AUTHORITY	CONSULTATION FORMAT	ISSUES/KEY CONSIDERATIONS
Environmental Protection Authority	Meeting and Phone Discussions	 TNG consulted with the EPA in production of its Energy from Waste Policy Statement. The EPA were consulted during the design development stage to determine the relevant standards for measuring air quality, human health, greenhouse gas, ozone impacts and waste streams.
		 As a result, these relevant policies and standards have been addressed in the assessment of impacts of the proposed.
Blacktown City Council	A pre-lodgement meeting was held with Blacktown City Council in November 2013. TNG and the consultant team have subsequently met with Council on numerous occasions to discuss a range of technical issues.	 Council agreed that CIV of \$557 million will constitute a SSD. Overview of planning, key master plan issues, project aspirations. Discussion of proposed underpass. Council advised the VPA will need to be prepared in consultation with the Department of Planning and Environment. Application to demonstrate stormwater management meets Council's requirements. As a result, a VPA is being prepared in consultation with the Department of Planning and Environment, and the EIS and the Civil Infrastructure Report demonstrate compliance with Council's stormwater management requirements
Work Cover NSW	Phone Discussion	 Consultation with Work Cover will commence during construction management planning.
Department of Primary Industries including the NSW Office of Water;	Phone Discussion	 Site servicing requirements were discussed with Sydney Water. Servicing requirements have been incorporated into proposal. The NSW Office of Water was contacted via email and phone to address mapped but not physically evident watercourses and placement of a pump out pit. Informal approval for the removal of a 1st order watercourse has been granted.
NSW Roads and Maritime Service	Meeting and Phone Discussion	 TNG met with the RMS to discuss the proposed Development and the implication on the Archbold Road upgrade. No action required.

AUTHORITY	CONSULTATION FORMAT	ISSUES/KEY CONSIDERATIONS
Office of Environment and Heritage	Phone Discussion	 GML, in preparing a Heritage Impact Statement, have consulted with OEH and detailed their proposed methodology to address Aboriginal and Non-Aboriginal Cultural Heritage.
Heritage Branch	Phone Discussion	 GML, in preparing a Heritage Impact Statement, have consulted with OEH and detailed their proposed methodology to address Aboriginal and Non-Aboriginal Cultural Heritage.
NSW Fire Brigade	Phone Discussion	 Abel Ecology, in preparing a Bushfire Assessment, consulted with the NSW Fire Brigade and Rural Fire Service to determining if there was a need for Asset Protection Zones. No APZ is required.
Rural Fire Service	Phone Discussion	 Abel Ecology, in preparing a Bushfire Assessment, consulted with the NSW Fire Brigade and Rural Fire Service to determining if there was a need for Asset Protection Zones. No APZ is required.
Transgrid	Meeting and Correspondence	 Transgrid has provided a Letter of Feasibility relating to the connection of the proposed Facility to Transgrid's 132kV Sydney West Substation on the 7th April 2015. Transgrid has confirmed discussions TNG and have identified a target date for the connection in operation by June 2018. It has been acknowledged by transgrid that the delivery program is feasible
		however relies upon SSDA approval.
Civil Aviation Safety Authority	Phone Discussions, email correspondence	 TNG have contacted Sydney Airport Corporation Limited by phone in relation to the query and they stated it is outside their Kingsford Smith operations and so they are not concerned with the development. Telephone discussions and a formal comment on the final building design was sought from CASA.
		 CASA noted that they have not been able to get information from the Department of Infrastructure and Regional Development regarding the specific detail of the second Sydney Airport and thus could not provide a response about any potential impact of the facility in relation to the second airport.
		 The Federal Department of Infrastructure and Regional Development was contacted regarding timing around the release of this information. Details of this correspondence have been provided in Table 7 below.

AUTHORITY	CONSULTATION FORMAT	ISSUES/KEY CONSIDERATIONS
NSW Health	Email correspondence	 Helen Ptolemy at NSW Health was sent relevant reports and plans for comment. NSW Health has not made any specific comments however will take the opportunity to review the application in more detail during public exhibition. This correspondence is provided at Appendix Y.
Local Community	Refer to Community Consultation Summary Report (Appendix X).	

6.3 CORRESPONDANCE WITH THE FEDERAL DEPARTMENT OF INFRASTRUCTURE AND REGIONAL DEVELOPMENT

Over the months of February and March 2015 Urbis was in contact with the Department of Infrastructure and Regional Development (DIRG) regarding the proposed Development and any potential impacts this may have on the planned second airport in Badgery's Creek.

A copy of the email correspondence has been provided at **Appendix Y**. In Summary, the DIRG stated they are unable to provide specific advice on the project due to the early stage of the airport planning. However, DIRG requested the EIS have regard to the National Airports Safeguarding Framework. Specifically, take into account the points addressed in **Table 7**. It is considered this table adequately addresses these points until such time that further details are confirmed from DIRG.

KEY POINT	CONSIDERATION	RESPONSE
Obstacles to aircraft overhead	The height of buildings, structures and objects in the proposed development must not penetrate any prescribed airspace (which would include at the very least the Obstacle Limitation Surfaces) expected to be declared around the proposed airport site. Once declared, any construction or activity that impacts on the prescribed airspace will require approval.	Once the prescribed airspace has been declared, it will be possible to address this point. Until such time, it is not possible to determine whether the proposed Development extends into this space.
The attraction of certain wildlife, particularly birds	The proposed site activity may attract birds and other wildlife through the accumulation of waste. Mitigation strategies may be required as the development may result in increased hazards for aviation operations at a future airport development, especially in relation to bird strike during the take-off and landing phases of flights.	The waste on-site is non-putrescible waste, and as such will not attract birds like putrescible landfills might. Further, waste will be stored within the proposed tipping hall as opposed to in open-air spaces.
Other potential impacts	Any other potential impacts which may result in increased hazards for aircraft operations at a future airport such as particulate matter and hot air being released into the air, which may require a plume rise assessment.	With approximately 14km separation between the approximate second airport location and the broader site, it is unlikely the Facility will interfere with aircraft operations. Further consultation with CASA will take place when airport details are confirmed. At this

TABLE 7 – KEY POINTS OF CONSIDERATION UNDER NATIONAL AIRPORTS SAFEGUARDING FRAMEWORK

KEY POINT	CONSIDERATION	RESPONSE
		stage this point can be more closely addressed.
Cumulative impacts	The cumulative impacts associated with the proposed Energy from Waste Facility being located in the Western Sydney region which is already subject to significant residential, commercial and infrastructure development.	Cumulative impacts have been addressed in detail in this EIS, and further in individual technical reports.

6.4 SUMMARY OF COMMENTS AND ISSUES FROM COMMUNITY CONSULTATION

The following summary of key issues and comments are based on the Community Consultation Summary Report (**Appendix X**) and its appendices. These key comments and issues were noted at the Community Information day held 22/2/2014, meetings held with Blacktown City Council Mayor and Policy and Strategy team, Penrith Council, the MP of Mount Druitt, Total Environment Care, and from correspondence via the 1800 number and email register.

FOPIC: GENERAL			
Comment/issue	Response		
Some residents that would have liked to attend the information day could not make it.	The 1800 number, project email, project specific website, and brochures will provide adequate information on the project and provide a means for making enquiries if further information is sought.		
Will the electricity generated lower our power bills?	No, this is not under the control of TNG.		
What happens if the recycling market diminishes?	Recyclable items will continue to be used and recycled to a point where the next step is landfilling or energy from waste. This topic is addressed in further detail in Section 24 .		
Query on where the remaining tonnes will come from in only a portion of the Residual Waste Fuel comes from the Genesis Xero Waste Facility.	Details on the source and composition of the incoming waste streams are provided in Section 10 and Appendix K.		
Query on fire safeguards to be in place.	A Preliminary Hazard Analysis and Fire Risk Assessment Report has been prepared as part of the application. In addition to the preliminary hazard analysis a fire risk assessment was conducted to ensure adequate fire services would be available to combat the identified scenarios. Fire protection recommendations have been made and will be adopted in the facility including fixing of fire extinguishers, hose reels, hydrants, and installation of monitors. Ignition sources within the hazardous area will be controlled according to AS60079.14.		
Design excellence is important.	In response to feedback received by Blacktown City		

Council on the design of the proposed Facility, the
proposed built form, design and external treatments
have been developed further to present a high quality
modern industrial development. Additional landscaping
has also been proposed. Project architects Krikis Tayler
have prepared a Design Statement further detailing this
(Appendix D).

TOPIC: OPERATIONAL QUESTIONS		
Comment/issue	Response	
Concern whether 24 hour monitoring be adhered to.	This will be adhered to. HZI (the company who are providing this technology) have never had a closedown and constantly maintain the required levels. The technology and construction will be the best quality available. The EPA will be able to view the monitoring at any point.	
Issues with the concept of incineration	Mass burning without Flue Gas Treatment (FGT) is what people most commonly associate with 'incineration'. This kind of incineration does not involve emission control of dust filters, and is therefore not considered 'clean' or safe. Facilities that have operated using this technique have since been closed down. Burning with a Flue Gas cleaning system is cleaner,	
	safer and more technologically advanced. The proposed Facility will incorporate FGT.	
Concerns about radioactive issues in Penrith	There is no radioactive materials received or used at the EFW facility	
Penrith Council suggested ash should be put in sealed tankers for disposal.	APC residual ash will be stored in Silos and transported via sealed tankers.	

TOPIC: VISUAL			
Comment/issue	Response		
Query why the stacks are 100m.	The final stack height was selected based on a combination of compliance of pollutant ground level concentrations and reference to the US EPA document 'Guideline for Determination of Good Engineering Stack Height'.		
Comment on potential visual bulk and scale of the proposal, including 100m stacks	The stacks will be approximately the same visual height as the nearby electrical towers on the hill. An aesthetic redesign has been carried out since initial concepts were developed. Additional landscaping is proposed to help		

soften the appearance of the facility.

Visual impact assessments have been carried out and have deemed them as having negligible visual impact.

TOPIC: TRAFFIC	
Comment/issue	Response
General concerns around traffic impacts of proposed and increase in traffic movements.	The development will generate up to 454 traffic movements per day (in and out combined). These movements can be readily accommodated by the surrounding road network with no improvements considered necessary.
Comment that movement of Residual Waste Fuel from Genesis to the proposed EFW plant will be across a proposed future precinct plan road via an automated enclosed conveyor belt system.	Access between Genesis MPC and the Proposed Facility will be via an under road culvert for the conveyor. And via separate under road archway bridge for vehicles when required so there will be no traffic interference with the public road system.

TOPIC: AIR, DUST, EMISSIONS

Comment/issue	Response
General concerns about emissions	Several dozen of these generation plants are in operation across Europe and the United Kingdom and have been for a number of years. The technology is both advanced and well-studied. A number of these plants operate close to residential communities. European Union standards require close and constant monitoring to demonstrate safe outcomes for those communities. Similar standards will apply to this facility. The manufacturer of this particular type of plant has never had a forced shut down caused by a breach of its operating standards. Energy from Waste is a cleaner form of energy production than coal. Real time reporting on emissions will be taking place. EPA have direct access to view emissions 24 hours a day to ensure compliance with relevant standards.
With regards to the stack, when in use there will be a build-up of contaminates. What will happen when the stack is to be demolished (included reference to stack recently demolished in Wollongong)?	The emissions are filtered prior to entering the stack at the FGT so contaminants do reach the stack; ash from the facility is collected throughout the operational process and disposed of for recycling or to landfill as is appropriate. The stack is made of steel and can be dismantled as opposed to demolition (like the

	Wollongong stack).
Potential for hazardous and offensive odours and emissions	Under the NSW Environment Protection Authority's Energy from Waste Policy Statement, any facility proposing to recover energy from waste will need to meet current international best practice. The policy also requires that emissions from EfW facilities must satisfy, as a minimum, current emission limits prescribed by the POEO (Clean Air) Regulations. The Details on how the proposed Facility complies is provided in Section 11 and Appendix L .
Will there be plastics in the emissions?	There will plastics including some percentages of PVC in the residual waste fuel which is then eliminated and transformed into energy at the combustion stage, the gasses are cleaned at the FGT. Plastics do not come out the stack.
What reassurance is there that dioxins will not get through?	The technology is tried and proven in particular in the UK and Europe and the emissions meet all the necessary standards, including The NSW Energy from Waste Policy Guidelines. The flue Gas Treatment (FGT) is specifically designed to clean the emissions and it is has inbuilt redundancy to ensure its continued and safe operation.
	The DCS (Distributed Control) is also a very sophisticated control system to ensure the plant is always running at it optimum and is implemented to anticipate the needs of the plant ahead of them being required.
	There are also several safeguards in the operation of the plant and if an emissions breach was to occur and not be rectified the plant will automatically go into shut mode and safely shut down.
	All Waste Residual Fuel is fired at no less than 850°C for no less than two seconds.
	24hour real time monitoring is available to the EPA,

TOPIC: ODOUR

Comment/issue	Response		
General concerns around odour	Investigations into the odour impact of the proposed indicate when the Facility is considered both in isolation and combined with odour emissions from the MPC, the predicted 99th percentile odour concentrations would be below the 2 ou impact assessment criterion all of the sensitive receptors (including surrounding schools, and		

day cares). The odour concentrations are predicted to be below the impact assessment criterion of 2 ou throughout the suburb of Minchinbury.
It is anticipated the operation of the Facility would not result in an adverse impact on the local air environment in reference to odour.

TOPIC: NOISE

Comment/issue	Response
Concerns about noise generation from the facility, particularly trucks beeping.	A noise impact assessment for the proposed Facility was conducted for expected noise associated with operations, construction and road traffic in relation to the relevant guidelines, standards and policies. The assessment has concluded the anticipated noise impacts are acceptable, however management measures will also be put in place to further reduce risk of noise impacts.

7 Strategic Planning Framework

The proposed Facility has been considered against relevant policies and guidelines consistent with the SSDA DGRs. Relevant policies are addressed below.

7.1 NSW 2021 (STATE PLAN)

NSW 2021 is a 10 year strategic plan to guide policy and other decisions for the state. The Plan is based on five strategies to rebuild the economy, provide quality services, renovate infrastructure, strengthen local environments and communities, and restore government accountability.

The State Plan contains a number of the strategies and goals that are relevant to the Western Sydney Employment Lands. This includes goals to strengthen local environments and communities, protect the natural environment and enhance cultural, creative, sporting and recreation opportunities. The relevant goals are identified below.

P1 increased business investment

The proposed Development involves over \$557 million of investment to bring the site 'on-line' for employment land uses. The development increases the supply of land serviced and ready for development with the proposed subdivision, triggering market activity in the employment area.

P2 Maintain and invest in infrastructure

The development will contribute to regional roadworks through contributions, and will provide a vital piece of infrastructure for managing waste generation within Greater Metropolitan Sydney.

E2 A reliable electricity supply with increased use of renewable energy

The proposed Development directly aligns with this priority through the contribution of technology that produces renewable energy as detailed within **Section 22.5** of this EIS.

7.2 A PLAN FOR GROWING SYDNEY

In December 2014 'A Plan for Growing Sydney' replaced 'The Metropolitan Plan for Sydney 2036'. The Plan states the WSEA will be the single largest new employment space in the Sydney Metropolitan Area. Located on the intersection of the M7 and M4 Motorways near Eastern Creek, it will significantly expand the employment potential in this part of Sydney. The Plan identifies the Western Sydney Employment Lands as an area of strategic industrial importance due to its location close to Badgerys Creek Airport and proposed new transport infrastructure.

These industrially zoned lands are identified as vital in providing increased employment opportunities within Western Sydney and integrating new and existing employment precincts with transport infrastructure that will attract business investment and activity.

Given the proposed Facility is located within Eastern Creek and offers a new employment generating use on industrially zoned land, it is considered consistent with the vision of the Plan.

7.3 BROADER WESTERN SYDNEY EMPLOYMENT AREA – DRAFT STRUCTURE PLAN 2013

The Broader WSEA draft Structure Plan has been developed in line with the goals and priorities identified in NSW 2021 and the now superseded draft Metropolitan Strategy for Sydney to 2031.

The purpose of the draft Structure Plan is to provide a framework for land use, transport and infrastructure planning at a strategic level. It incorporates the findings of a series of technical studies into Transport, Economics, and Utilities and Services.

The draft Structure Plan will provide some 6,300 hectares of additional employment lands. About 57,000 new jobs are expected to be located at the employment area over the next 30 years, with a total of 212,000 new jobs when the area is fully developed beyond 2046, including both office based jobs and those in the industrial sector.

The proposed Facility has been reviewed in the context of aligning with the intent of the Broader WSEA draft Structure Plan.

Strategic and Statutory Planning Framework

The brief for the Broader WSEA Structure Plan indicated the State Government's vision was to provide an appropriate supply of well-located, serviced employment lands to secure the State's future productivity and economic growth.

When assessed in context of this key vision the proposed Facility is seen to directly align the draft Structure Plan through the provision of well located, serviced employment lands. Concurrent to this application is the application seeking amalgamation and strategic subdivision of the Site into 11 Lots. It is intended (subject to separate consent) that these lands will be developed as future employment lands for a range of users (with the exception of Lot 10 which contains remnant bushland). In particular, it is recognised that High Energy uses (such as data centres) would benefit from the close proximity to the energy generation plant available to these future employment lands.

Broader WSEA and Existing Context

The broader site is recognised as a significant land use within the Broader WSEA to be considered for earthworks or filling to *make these sites suitable for development*. The existing operation of the Genesis Xero Waste Facility has developed an employment generating use that takes advantage of the former quarry for landfill.

Use of land within the Site for the purpose of the proposed Facility provides an employment generating use that takes advantage of the unique nature of the site to benefit from the former quarry rather than view this component as a development constraint.

The draft Structure Plan recognises Gas, telecommunications, water and sewer services exist and supply the Existing WSEA. However, there is limited infrastructure available in the Broader WSEA that would be capable of supporting the planned level of development.

The proposed Facility, located adjacent to the Transgrid high voltage electricity transmission networks, will directly benefit the Broader WSEA employment lands through the provision of energy to meet future WSEA needs.

Vision, Themes and Principles

The core themes of the draft Structure Plan include:

Economy and employment

The proposed Development is considered to align with the principles of economy and employment within the Broader WSEA through the direct employment of 55 staff to operate the proposed Facility.

The Genesis Xero Waste facility currently employs 70 direct Staff. Several hundred staff are also indirectly employed through this operation (transport companies, subcontractors, trades). The proposed use is considered an appropriate land use for the area despite its lower density employment use. The Facility will provide a consistent source of green energy to the metropolitan area and presents significant employment benefits (additional 55 jobs, plus substantial indirect employment, and generation of over 250 direct jobs throughout the construction phase) compared to the current use of the Site.

Given the impacts of the proposal (discussed in **Section 9** and detailed in the chapters following) have been found to be acceptable, and adequate separation is achieved from surrounding land uses, the proposal will not have a negative impact on the capacity of surrounding land uses to operate and achieve high employment densities. The proposed Facility will directly provide infrastructure and services to the locality to accommodate a range of employment types and densities.

Land use and activities

The proposed land use has been designed to ensure the ecological and environmental constraints are appropriately managed.

The proposed Facility has been designed to utilise the former quarry use and the site typography by siting the larger mass components of the building at the lowest points of the Site and designing a system to convey waste fuels from the former quarry to be used in the proposed Facility. The bushland within the E2 zoned land at the north west corner of the Site is to be contained within Lot 10, distinguishing it from other lots which are to be developed for employment lands in the future. Lot 10 containing the bushland is not proposed for development.

Transport, movement and access

The draft Structure Plan recognises Archbold Road as a *Future Primary Road*. The proponent has been in discussion with the Department of Planning and Environment to ensure the proposed land use will not impact the future delivery of this key transport route. This component of the proposed Development will be detailed within the site specific Development Control Plan being prepared concurrently to this SSDA.

Further, internal road design has been designed to allow for a future connection to this road network.

The proponent is currently preparing a site specific Development Control Plan to ensure the provision for transport and arterial road infrastructure provides key linkages to the Precinct. We anticipate the draft DCP will be issued during the assessment of this application.

Draft Structure Plan

A robust road structure has been identified to address future land demand, in the form of an interconnected grid of east-west and north-south connections. The proposed Development recognises the delivery of this network and will not impact the future upgrade of Archbold Road.

Conclusion

The proposed Facility has been assessed against the relevant aspects of the Broader WSEA draft Structure Plan and found to align with the strategic intent of the plan is that it:

- Will directly employ 55 staff;
- Significant indirect employment;
- Approximately 250 jobs during the construction phase;
- Will generate significant employment during the construction phase;
- Proposes to strategically re-subdivide the site to create lots of future employment lands;
- Is located adjacent to the Transgrid high voltage electricity transmission networks, will directly benefit the Broader WSEA employment lands through the provision of essential infrastructure to meet future energy needs;
- Will not impact any future Archbold Road development works; and
- Does not propose development on the E2 zoned land.

7.3.1 EASTERN CREEK PRECINCT PLAN

The proposed development is located in land identified within the Eastern Creek Precinct Plan. The Precinct Plan came into force on 14 December 2005.

The *Eastern Creek Precinct Plan – Stage 3* outlined the provisions relating to development of the Stage 3 Release Area within the Eastern Creek Precinct under the now repealed *State Environmental Planning Policy No. 59 – Central Western Sydney Economic and Employment Area.*

Clause 19(2) of the principal statutory planning instrument SEPP (WSEA) requires that proposed development within the precinct be assessed against the existing precinct plan prepared under the *State Environmental Planning Policy No. 59 – Central Western Sydney Economic and Employment Area*

However, given the unique nature of the proposed works and the commitment by the proponent to prepare a site specific DCP in consultation with the Department of Planning and Environment (as per Clause 18 of the SEPP (WSEA), relevant aspects of the *Eastern Creek Precinct Plan* are limited.

The relevant provisions have been assessed in the table below.

		00000	DDEANIAT			
TABLE 8 –	EASTERN	CREEK	PRECINCT	PLAN	ASSESSME	ΝI

со	NTROL	COMMENT		
1.0	1.0 Introduction			
The (a) c) d) e) f) g) i) j)	bejectives of this Precinct Plan are to: promote economic growth and employment opportunities within Central Western Sydney; and ensure the orderly provision of infrastructure and services; and provide a safe and efficient stormwater management system that minimises stormwater impacts on the environment; and ensure ecologically sustainable development that takes an active approach to anticipating and preventing damage to the environment; and minimise the impact of development on areas of high biodiversity, archaeological significance, and heritage; and ensure the traffic and public transport needs for the Precinct are achieved; and ensure the best possible urban design outcomes are achieved; and ensure the community service needs of the working population are met; and allow for the provision of adequate open space for the use and enjoyment of the working population; and ensure the provision of high quality landscaping throughout the Precinct.	The proposed development has been designed to align with the relevant objectives of the Eastern Creek Precinct Plan and will result in a land use outcome the will directly promote economic growth and employment within Western Sydney. The provision of green technology as a long term sustainable option for waste management and production of clean energy is a vital piece of infrastructure within Metropolitan Sydney. A Stormwater Management Plan has been submitted in support of this application (Appendix E) prepared by AT&L that demonstrates a design outcome that will minimise stormwater impacts on the locality and ties into the existing systems within the precinct. A detailed within the Ecologically Sustainable Development Assessment within Section 22.5 of this EIS, this proven technology provides a clean source of renewable energy from waste fuels that cannot be reused or recycled. An Ecological Assessment has been prepared by Abel Ecology (Appendix H) outlining the potential impacts of the proposed Development in terms of high biodiversity and the proposed measures to mitigate any significant impacts. Both archaeological and heritage (indigenous and non- indigenous) cultural significance has been assessed by GML Heritage (Appendix S and Appendix T). The proposed Development has been designed and sited to minimise any potential impact on indigenous and non-indigenous heritage significance. A Traffic Impact Assessment has been prepared by Traffix (Appendix R) in support of this application and has found that the proposed development is supportable on traffic		

CON	TROL	COMMENT
		COMMENT planning grounds and will operate satisfactorily. The design of the proposed Facility has largely been driven by the technology demands however the proposed siting has given close consideration the relevant precinct urban design outcomes to minimise visual impact and ensure an outcome that does not conflict with adjoining land uses (both industrial and non-industrial). A Visual Assessment has been prepared by Urbis and is submitted at Appendix I . The proposed development is considered to result in a positive outcome for the community of Western Sydney through the provision of an ecologically sustainable waste recovery technology that will provide long term clean energy whilst minimising landfill. As detailed within the Waste Management Report prepared by MCA Consulting Appendix K) the identified waste fuel aligns with those identified within the <i>NSW EPA Energy from Waste Policy Statement</i> . The proposed development has been designed and sited to minimise development area and maintain open space and vegetation where possible as demonstrated within the Architectural Drawings (Appendix D) and the Ecology Assessment (Appendix H) submitted with this application. A Landscape Concept Plan has been prepared by Site Image and is submitted with this SSDA at Appendix E . The
		proposed landscape concept has been designed in keeping
		with the precinct to ensure a high quality landscape treatment.
3.0 E	conomic Development and Employment	
Object i. l i	tives Establish a high quality industrial Precinct that provides diversity in employment opportunities and economic development to benefit Blacktown	The proposed Development will help to achieve the Precinct Plan's objectives by preparing the land for its future development for employment generating activities. The Project will contribute to the economic development and
ii. l t t j	Provide a range of development consistent with the provisions of SEPP 59 and having regard to the location of the site in close proximity to the iunction of the M4 Motorway and the M7 Motorway.	employment opportunities within Western Sydney by providing diverse employment opportunities for roles including mechanics, weighbridge operators, plant operators, foremen, sales personnel, labourers and
iii. I S	Provide for a range of community services that service the daily convenience needs of the local workforce and visitors, and the needs of local businesses and activities	The Site's location close to the junction of the M4 and M7
iv. I	Enhance the skill of the local workforce through the provision of appropriate facilities for the training of apprentices, and oppoint training and	provides convenient access for business from the wider regional road network.
	development.	Community services including daily convenience needs are

not proposed.

- v. Contribute to the increased levels of skill matching with the local workforce.
 vi. Development should aim to achieve a minimum

The activities of the Facility will directly create jobs for 55

CONTROL	COMMENT
employment density target of 45 jobs per ha in order to achieve the overall projected on-site employment forecast of approximately 20,000 jobs for the whole Precinct.	 staff. While this quantum of jobs does not achieve the desired job per hectare rate for the precinct, the proposal is appropriate for the following reasons: It constitutes an intensification of employment on an underutilised part of the site A skilled workforce will be required for the Facility and staff can potentially be sourced from the local community. Staff employed at the proposed Facility will be skilled labour and ongoing training will be provided where appropriate. The presence of the proposed Facility represents ongoing economic benefits to the local and regional community via capital injection and value added spending. During Construction approximately 250 construction jobs will be created. Indirect employment will also be generated via support services such as maintenance workers and short term contractors. In contrast to the majority of Precinct lands, the nature of the area to be developed for this Facility i.e. the quary pit, is ideally suited to the operation of the proposed Facility adjoining the existing landfill and MPC. The Facility will not prevent adjacent lands within the Precinct from achieving the desirable employment densities.
 Objectives Develop a sewerage system that conforms to the requirements of Sydney Water and Blacktown City Council. 	As detailed within the Services Report prepared by AT&L and submitted with this application at Appendix E , the application has ensured that the development will ensure satisfactory arrangements for water, sewer, electricity and communications.
 Ensure the safe and reliable provision of electricity; and 	
 Ensure electricity supply meets the installation and operational requirements of 	
 the relevant service provider and the subsequent user demands. 	
 Ensure the supply of a telecommunications network that meets supplier and user demand. 	

	COMMENT
 Ensure a safe and reliable gas supply. 	
5.0 Stormwater Management	
 Development Applications must be accompanied by a site specific Stormwater Management Plan, designed to be consistent with the Precinct stormwater management system and with the latest stormwater quality control requirements of Blacktown City Council. Stormwater management and drainage works are to be constructed in accordance with Council's drainage standards and other relevant guidelines and standards. Applicants are required to demonstrate that water sensitive urban design principles have been considered development shall comply with Council's latest flood policy and building code requirements. Each development will be required to provide a water quality control mechanism to Council's satisfaction. Maintenance, monitoring and reporting of any stormwater infrastructure shall be undertaken and reported to Council. 	Surface water management including stormwater management has been addressed as part of this SSDA and is detailed within Section 15 of this EIS and within Stormwater Management Plan prepared by AT&:L Engineers (Appendix E). Confirmation was received from Blacktown City Council that the On Site Detention calculations for this area should confirm with the Blacktown City Council Stormwater Management SEPP 59- Eastern Creek Precinct Plan (Stage 3).
5.6.5 Detention Basins and Constructed Wetlands The area of the site falls within the Ropes Creek Tributa	ary Catchment.
Confirmation was received from Blacktown City Council that the On Site Detention calculations for this area should confirm with the Blacktown City Council Stormwater Management SEPP 59- Eastern Creek Precinct Plan (Stage 3).	The civil and stormwater design principles have been designed to comply with this.
A summary of Council requirements adopted for this catchment is as follows:	
"Detention Basins and wetlands:	
 Will need to include appropriate safety features, especially with regard to edge treatments 	
 Shall be designed to prevent induced salinity 	
 Shall be sized to attenuate peak flows to a maximum of rural flows over a range of storms from the critical 2 year ARI event up to and including the critical 100 year ARI event 	

CONTROL	COMMENT
 Shall be sized to limit pollutant export loads to the levels specified in the water quality section of this Precinct Plan 	
The detention basins shall be designed to attenuate flows to a maximum of the rural flowrates. This shall be addressed over a range of storms from the 2 year ARI to the 100 year ARI. The objective of this is to achieve a more natural flow regime in the creek systems as well as providing flood attenuation in major flood events (the attenuation of flows may be assisted with the incorporation of WSUD techniques).	
The affects of the PMF on the basin shall be assessed and measures prepared to avoid catastrophic failure. Where required the basins shall be referred to the Dam Safety Committee for assessment.	
WSUD to achieve target reductions:	
 85% Total Suspended Solids (TSS) 	
 65% Total Phosphorus (TP) 	
 45% Total Nitrogen (TN) 	
 90% Total Hydrocarbons 	
 90% Gross Pollutants (GP) 	
Finished Floor Levels (FFL) to have minimum 300mm freeboard to 100 year overland flows.	
In accordance with Blacktown City Council DCP Part R, rainwater tanks must be installed within the developed site with the aim to reduce the water demand for the development. Rainwater tanks are an effective system to provide non-potable water for reuse for irrigation, toilets and other nonpotable water uses. The rainwater tanks should be designed in accordance with Rainwater Tank Design and Installation Handbook, Australian Rainwater Industry Development Group, November 2008.	
6.0 Extraction and Rehabilitation	
Development relating to an area directly adjacent to the Pioneer Quarry pit shall be setback a minimum of 30m (when measured from the top of the bank of the pit). The 30m setback shall be provided as a landscaped buffer, with appropriate earth mounding	The former pioneer quarry is currently in use as the Genesis Xero Waste Facility. The proposed Facility has been appropriately sited to take advantages of the direct synergies between the operational resource and recovery

	CONTROL	COMMENT
	and fencing in order to screen the operation of the quarry. The landscaped buffer shall remain until such time as the quarry pit is rehabilitated to Council's satisfaction.	centre and the proposed development. The proposed Facility is predominantly set back 30 metres from the former quarry. A concept landscape plan has been prepared to appropriately screen the proposed development from the Genesis Xero Waste Facility.
	7.0 Environmental Management	
-	Ecologically Sustainable Development measures that will reduce waste and conserve	In response to Environmental Management, this SSDA is supported by the following technical studies:
-	water (by including water recycling); measures to minimise run-off and stormwater generation;	 ESD Assessment – Appendix H. ESD Assessment – Section 22.5 Air Quality Assessment – Appendix L.
•	implementing total water cycle management by measures that include reducing consumption of potable water for non-potable uses, treating and recycling wastewater for re-use, minimising site run- off and promoting stormwater re-use;	 Soils and Water Assessment – Appendix P. WSUD Report – Appendix E. Waste Management Report Appendix K.
•	utilising recycled materials and renewable building resources;	
-	promoting biological diversity by measures which include increasing habitat through appropriate retention, planting and maintenance of native flora considered representative of the area;	
-	implementing a waste management strategy and promoting the achievement of the 60 per cent waste reduction target for New South Wales by measures including, utilising recycled materials and renewable building resources, and recycling building and demolition materials for recycling and composting; and	
•	implementing energy conservation measures that include reducing energy consumption and increasing inherent energy efficiency through design and materials selection, and adopting energy management plans.	
-	complementing and reinforcing the development and use of the existing and planned integrated public transport, pedestrian and cycling networks servicing the site;	
•	encouraging increased reliance on public transport	

and reduced reliance on private vehicles for journeys to work and other trips, so as to reduce vehicle kilometres travelled;	
 providing levels of on-site parking aimed at reducing reliance on private vehicles for journey to work trips 	g
Water Conservation Controls	
 Development should incorporate water efficient fixtures such as taps, showerheads, and toilet suite (cisterns and urinals). The fixtures must be rated to at least AAA under the National Water Conservatio Rating and Labelling Scheme. 	s n
 Development Applications are required to submit a Site Water Management Plan that investigates, and where feasible, provides for the integrated management and use of water. The Site Water Management Plan should demonstrate that other water sources have been considered including: an integrated water collection and recycling system for capturing and recycling of roofwater; the re-use of greywater on-site; the capture and re-use of stormwater from the site; treating and re-using any process water generated by the development; and controlling the quality of waste water and stormwater to be disposed 	
Energy Efficiency:	
 Applicants are required to demonstrate appropriate use of energy efficient materials during construction 	
<u>Air Quality:</u>	
 Development Applications should provide an assessment, and identify necessary mitigation measures, to minimise the potential environmental impacts from air pollutants generated by the proposed development. 	
Waste:	
 Identify any licensing requirements under the Wast Avoidance and Resource Recovery Act 2001; 	

CONTROL	COMMENT
 document the type, classification and quantity of all waste that are likely to be generated during the development and post-development phases; identify initiatives for reusing and/or recycling of waste; 	
<u>Salinity:</u>	
 Applicants are required to provide a salinity model for the site, describing the distribution and concentration of salinity within the soil and groundwater profile in order to identify any potential different zones that may require different management strategies to be applied as a result of developing that site. A Salinity Management Plan must be submitted with all Development. Applications, outlining what actions are proposed to minimise the impact of development on the saline environment. 	
8.0 Biodiversity	
Applications for development of an allotment of land containing an identified conservation area or riparian corridor shall demonstrate that satisfactory arrangements have been made for the ongoing protection, enhancement, and management of biodiversity on that land.	As detailed within the Ecological Assessment (Appendix H) , satisfactory arrangements will be made to protect, enhance and manage biodiversity on site.
9.0 Heritage	
Non-indigenous heritage located at Southridge house and property. A Conservation Management Plan ('CMP') prepared by Eric Martin and Associates dated August 2003 relates to the management of this site. Applications for development of an allotment of land containing an identified conservation area shall	The proposed Development has been assessed in relation to indigenous and non-indigenous cultural heritage as detailed within the Heritage Impact Statement and Aboriginal Cultural Heritage Assessment submitted at Appendix S and Appendix T .
demonstrate that satisfactory arrangements have been made for the ongoing protection, enhancement, and management of indigenous heritage values on that land.	
10.0 Traffic and Transport	
Development should comply with the road design principles contained in the following documents:(Roads and Traffic Authority, <i>Road Design</i>)	A detailed Traffic Impact Statement has been prepared by Traffix (Appendix R) in support of this application to ensure the proposed Facility is supportable on traffic planning grounds and will operate satisfactorily.

CONTROL	COMMENT
Guidelines; and	
 Roads and Traffic Authority, Guide to Traffic Generating Development, (1993). 	
Local Road Network - Applicants will need to extinguish the existing right of way to the Pioneer Quarry in order to implement the local road network. The extinguishment of the right of way shall not detrimentally impact on the existing quarry operations.	
Public transport: Applicants will need to demonstrate that satisfactory arrangements have been entered into with the relevant State government authorities for the provision of public transport services to the Precinct. Public transport networks are not proposed.	
Parking: Off street parking should be designed to be consistent with the car parking standards of this Precinct Plan.	
14. Landscaping	
A landscape plan is to be prepared and submitted with development applications for each allotment.	A concept landscape plan has been prepared in support of the SSDA and is submitted at Appendix E .

7.4 NSW ENERGY FROM WASTE POLICY STATEMENT

The Environment Protection Authority (EPA) recognises that the recovery of energy and resources from thermal processing of waste has the potential, as part of an integrated waste management strategy, to deliver positive outcomes for the community and the environment.

TNG recognises the EPA facilitates a risk-based approach to the recovery of energy from waste. The EPA has applied the following overarching principles to waste avoidance and recovery:

- Higher value resource recovery outcomes are maximised;
- Air quality and human health are protected;
- 'Mass burn' disposal outcomes are avoided; and
- Scope is provided for industry innovation.

The proposed Facility has been designed to recover energy from waste or waste-derived materials that are not listed as eligible waste fuels. Additional information regarding the use of eligible and non-eligible waste fuels is summarised in the following sections.

7.4.1 ELIGIBLE WASTE FUELS

Waste or waste-derived materials that pose minimal risk of harm to human health and the environment due to their origin, low levels of contaminants, and consistency over time, are categorised as eligible wastes. The following wastes are categorised by the EPA as eligible waste fuels:

Biomass from agriculture;

- Forestry and sawmilling residues;
- Uncontaminated wood waste;
- Recovered waste oil;
- Organic residues from virgin paper pulp activities;
- Landfill gas and biogas;
- Source-separated green waste (used only in processes to produce char); and
- Tyres (used only in approved cement kilns).

From the above list, the Genesis MPC generates uncontaminated wood waste and source-separated green waste. These eligible waste fuels that are recovered through Genesis MPC are saleable recycled products destined for market. Therefore, these potential waste fuels have a higher value resource recovery outcome than would be achieved if these materials were processed through the proposed EFW Facility and recovered for energy and therefore are not intended be used as fuel for the TNG EFW Facility.

7.4.2 NON-ELIGIBLE WASTE FUELS

TNG proposes to thermally treat waste or waste-derived materials that are not listed as eligible waste fuels and that meet the requirements of an energy recovery facility by using Residual Waste Fuel. TNG has performed detailed waste mapping to identify the sources and composition of allowable non-eligible waste fuels in the market. The analysis is conducted at a state level, considering waste generated in the Sydney Metropolitan Area, Extended Regulated Area (ERA), Regional Regulated Area (RRA) and the Rest of NSW to map allowable waste streams at a state level.

All calculations, assumptions regarding the Energy from Waste Policy interpretation, and data sources are detailed in the Waste Management Assessment at **Appendix K**.

7.4.3 PUBLIC CONSULTATION AND GOOD NEIGHBOUR TEST

TNG has committed to and is continuing an extensive community and stakeholder consultation process. This process will be ongoing to ensure the community understands the importance and impacts of the proposed Development. TNG understands its obligation to provide information and public consultation regarding the energy from waste proposal, from concept to detailed development assessment and commissioning. TNG engaged in genuine dialogue with the community in late October 2013, at the same time as the DGRs were requested from the Department. TNG has ensured that the planning consent and other approval authorities are provided with accurate and reliable information.

7.4.3.1 STAKEHOLDER CONSULTATION STRATEGY

TNG has developed a stakeholder consultation strategy to engage stakeholders over the life of the project in order to keep them informed and to respond to any concerns. TNG acknowledges that different aspects of the proposed project will concern different stakeholders. TNG is committed to:

- 1. Mitigating risks and stakeholder concerns during the planning stages of the project;
- 2. Providing information to all stakeholders and seeking feedback prior to implementation; and
- 3. Maintaining open and transparent communication channels with all stakeholders.

TNG has engaged KJA Pty Ltd to develop a Communications and Consultation Strategy to guide stakeholder and community engagement during the preparation and the public exhibition of the EIS. The Communication and Consultation Summary Report for the Energy from Waste Facility produced by KJA Pty Ltd for TNG is provided at **Appendix X**.

7.4.4 ENERGY RECOVERY FACILITIES

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 (according to International Organization for Standardization (ISO)), 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.

The above- listed considerations will ensure that air toxics and particulate emissions are below levels that may pose a risk of harm to the community or environment. As demonstrated within the supporting information lodged with this application (Air Quality Report prepared by Pacific Environment).

Technical Criteria

A summary of the technical criteria document in the EfW Policy Statement and TNG's proposed design is summarised in the table below (taken from Environ Waste Report).

TABLE 3 - LFA LINENGT		SOURCE. LINVIRON)

ENERGY FROM WASTE POLICY STATEMENT TECHNICAL CRITERIA	FACILITY CHARACTERISTICS	REFERENCE STANDARD
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).	The furnaces will be fitted with auxiliary burners, fired on low sulphur gas-oil or the preferred which is natural gas which will automatically, if required, maintain the combustion chamber temperature above 850°C for 2 seconds to ensure the destruction of dioxins, furans and other undesirable combustion products. Combustion chambers, casings, ducts, and ancillary equipment will be maintained under negative pressure to prevent the release of gases (Fichtner 2014a). The facility is designed to safely fulfil this requirement WITHOUT any auxiliary burners. Only at start-up and shut-down the auxiliary burners will automatically be used to further comply safely with this requirement, even under no further fuel supply or only up-starting fuel supply. Continuous temperature measurements will be recorded in the roof of the first boiler pass to provide data at a representative point in the combustion chamber. Additional temperature measurements can be installed as required.	IED Article 50 (2)
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 seconds after the last injection of air.	In the EU regulation the following is stated in the IED (Industrial Emissions Directive): If <u>hazardous waste with a content of more than 1% of halogenated organic substances</u> , expressed as chlorine, is incinerated, the temperature has to be raised to 1,100°C for at least two seconds. In the NSW EfW Policy the following is stated: If <u>a waste has a content of more than 1% of halogenated organic substances</u> , expressed as chlorine, the temperature should be raised to 1,100°C for at least 2 seconds after the last injection of air. There is a small, but significant difference between these two texts, with considerable implications for EfW in Australia ("hazardous waste" versus "waste"). PVC is not classified as a hazardous waste in both jurisdictions. Moreover, the IED regulation is not concerned about "chlorine", but about "hazardous waste with halogenated organic substances". 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	IED Article 50 (2)

	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%. The issue of chlorine is purely technical, e.g. the capability of the flue gas treatment to cope with short-term chlorine peaks as well as long-term chlorine concentrations – whatever level they are. The NSW EFA will consider this proposal of a change to the NSW EfW Policy Appendix G. Potentially the NSW EfW Policy Statement will be modified, as discussed with NSW EPA on 12 th February 2015.	
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.	The IED daily emission standards set out in Annex VI Part 3 exceed the requirements of group 6 emission standards set out in Schedule 2 of the Protection of the Environment Operations (Clean Air) Regulation 2010.The flue gas treatment system has been designed to meet the requirements of the European Commission Directive on Industrial Emissions (IED). The combustion control system will regulate the combustion conditions, and thereby minimise the levels of pollutants and particulates in the flue gas before the flue gas treatment. The proposed flue gas treatment system will consist of a Selective Non-Catalytic Reduction (SNCR) of NO _x , activated carbon injection, dry lime scrubbing and fabric bag filters.	POEO Act 2010
Continuous measurements of NO _x , CO, particles (total), total organic compounds, HCI, HF and SO ₂ .	 The following parameters will be monitored and recorded continuously at each stack using a Continuous Emissions Monitoring System (CEMS): (1) Oxygen; (2) Carbon monoxide; 	IED Annex VI Part 6 point 2.1 (a) and point 2.3
The continuous measurement of HF may be omitted if treatment stages for HCI are used which ensure that the emission limit value for HCI is not being exceeded.	 (3) Hydrogen chloride; (4) Sulphur dioxide; (5) Nitrogen oxides; (6) Ammonia; (7) VOCs (volatile organic compounds)[*]; and (8) Particulates. The following parameters will be monitored by means of spot sampling at frequencies agreed with the relevant regulator. (1) Nitrous oxide; (2) Heavy metals; and 	

	(3) Dioxins and furans.						
	Emission concentrations will be verified by an independent testing company at frequencies agreed upon with the relevant regulator (Fichtner 2014a).						
	[*] VOCs and total organic compounds (TOCs) in cleaned flue gas are used interchangeably in all technical reports prepared by HZI. Thus, TOCs and VOCs are continuously monitored. All particles and elementary, <i>un-burnt</i> carbon are completely removed from the flue gas by the installed bag filter.						
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.	Emissions from the stack will be monitored continuously by an automatic computerised system and reported to the NSW EPA as part of the anticipated Environmental Protection Licence for the Facility. Sampling and analysis of all pollutants will be carried out to European Committee for Standardization (CEN) or equivalent standards (e.g. International Organization for Standardization (ISO), national, or international standards). This ensures the provision of data of an equivalent scientific quality (Fichtner 2014a).	N/A					
	(1) to provide the information necessary for the facilities automatic						
	control system to ensure safe and efficient facility operation;						
	(2) to warn the operator if any emissions deviate from predefined ranges; and						
	(3) to provide records of emissions and events for the purposes of demonstrating regulatory compliance.						
	All continuous monitoring records will be made available to NSW EPA in real-time using the preferred data access platform and reporting frequency for publication.						
There must be continuous measurements of the following operational parameters: temperature at a representative point in the combustion chamber;	During operation, the temperature in the combustion chamber will be continuously monitored and recorded to demonstrate compliance with the requirements of the IED. The combustion control system will be an automated system, including monitoring of:	IED Annex VI Part 6 point 2.1 (b)					
concentration of oxygen; pressure and temperature	(1) Steam flow;						
in the stack; and water vapour content of the	(2) Oxygen content;(3) Tomporeture conditions of the crote;						
exhaust gas.	(4) Modification of the fuel feed rates; and						
	(5) Control of primary and secondary air.						
This must be conducted and held by the proponent for a period of three years.	Con the poi me In a em IEE (1) (2) the All ava	ntinuous tempe roof of the firs nt in the combu asurements ca addition, the fol ission concent b: Water vapour Temperature a stack). data will be ke ilable to the El	erature meas t boiler pass ustion chaml in be installe lowing para rations can b content of th and pressure pt for a minin PA at all time	surements will als to provide data a ber. Additional te ed as required. meters will be mo be reported in acc the flue gas; and e of the flue gases mum of five years es.	so be recorded in at a representativ mperature onitored so that cordance with the s (assumed to be s by TNG and wi	ו ve e in II be	
---	---	--	--	---	--	-----------------------------	--------------------
Proof of performance	ΤN	G will fully com	ply with all f	EPA requirement	s, allowing		IED Annex VI Part
(POP) trials to demonstrate	ind	ependent pers	onnel to con	duct proof of per	formance trials a	ıt	6 point 2.1 (c)
emissions standards.	any time.						
	The following parameters will be monitored by means of spot						
These must be at least two			enere agree				
measurements per year of	(1)	Nitrous oxide;					
heavy metals, polycyclic	(2) Hydrogen fluoride;						
aromatic hydrocarbons,	(3) Heavy metals: and						
furans. One measurement	(0)	nouvy motul	, and				
at least every three months	(4) Dioxins and furans.						
shall be carried out for the	Emission concentrations will be verified by an independent testing						
operation. If and when	cor	npany at frequ	encies agree	ed with the releva	int regulator		
appropriate measurement	(Fichtner 2014a).						
techniques are available, continuous monitoring of	Pol	ycyclic aromat	ic hydrocarb	ons are monitore	ed continuously in	n all	
these pollutants will be	VO hvc	C measureme Irocarbon anal	nts. TNG wil vses at least	l conduct specific t twice a vear in a	c polycyclic arom accordance with	atic	
required.	bes	st practice oper	ations interr	nationally.			
The total organic carbon	The	e assessment o	of Hazard Cl	assification of Uk	K IBA (Incinerate	d	IED Article 50 (1)
(TOC) or loss on ignition	Bot	tom Ash) 2011	states that	(WRc plc 2012):		1	
(LOI) content of the slag and bottom ashes must not		Parameter	Average	95 [™] Percentile	Maximum		
be greater than 3% or 5%,		LOI (%)	1.87	2.93	3.79		
respectively, of the dry		100 (%)	1.03	2	2.41		
weight of the material.	This analysis is consistent with IED Article 50 (1) and the EfW Policy Statement.						
	ΗZ	l technology sp	pecifically co	mplies with TOC	and LOI content	t	
	req	uirements in th	e bottom as	h in accordance	with the NSW Ef	W	
	Pol	icy Statement.					

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.	Control of emissions from the Facility is given highest priority. Carbon monoxide and oxygen levels are continuously monitored to ensure combustion is good and the Facility maintains a flue gas temperature of 850°C automatically. If this is not met, auxiliary burners will start up to raise temperatures and if problems continue, fuel feeding will be stopped automatically. The control process is fully automated with safety interlocks. If any parameter such as temperature, pressure or oxygen level reaches a set level, an alarm sounds and if the problem persists, the Facility will be stopped automatically. If any emergency condition is reached, or if a rapid facility shut down is required, the Facility will stop automatically in a rapid manner. Fuel flows and airflows are stopped instantly, which causes combustion to cease. The boiler can be depressurised via safety valves if required. This system is fully interlocked to prevent manual intervention unless it is safe to do so (Fichtner 2012a).	N/A
An air quality impact assessment must be undertaken in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.	TNG engaged Pacific Environment Limited to prepare the Air Quality and Greenhouse Gas Assessment in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (Pacific Environment 2014). The proposed technology for the EfW facility is based on existing facilities in the United Kingdom and mainland Europe and will incorporate best available technology for the flue gas treatment. The flue gas treatment is designed to meet the in-stack concentrations limits for waste incineration set by the IED, which are generally more stringent than the Clean Air Regulations. The flue gas treatment system includes:	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (Pacific Environment 2014)
	 (1) Selective Non-Catalytic Reduction (SNCR) for reducing emissions of oxides of nitrogen; (2) Lime scrubbing for reducing emissions of acid gases, including hydrogen chloride (HCl) and sulphur dioxide (SO₂); (3) Activated carbon injection for reducing emissions of dioxins and mercury; (4) Fabric bag filters for reducing emissions of particles and metals; and (5) Following the flue gas treatment, cleaned flue gas will be dispersed via a 100m stack. There are no exceedances of the EPA criteria when the Facility contribution is added to the maximum background, with the exception of PM, which results in a cumulative concentration marginally over the 24-hour PM10 criteria of 50 µg/m³. However, this occurs on a day when the background is already high (at 49.2) 	

μ g/m ³) and further analysis demonstrates that no additional exceedances would occur as a result of the facility.	
The operation of the facility would have a net positive greenhouse gas effect, potentially eliminating one million tonnes of CO_2 -e per annum. The emission intensity for electricity generated from the facility is lower than other generators in NSW.	

Thermal Efficiency Criteria

The Energy from Waste policy statement is restricted in its scope to facilities that are designed to thermally treat waste for the recovery of energy rather than as a means of disposal. The net energy produced from thermally treating waste, including the energy used in applying best practice techniques, must therefore be positive.

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).

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 Facility has been designed to have a thermal input of 469.6MWe (117.4MWe for each incineration line) at the design point. The Facility has an assumed net electrical efficiency of 30% which is above the 25% efficiency criteria rate. The Facility has been designed to export approximately 140MWe (30% X 469.6MW). High net electrical efficiency is a priority for TNG, and there are a number of options that could be incorporated into the design to increase the efficiency further including steam reheating and flue gas cooling.

Resource Recovery Criteria

The EPA considers energy recovery to be a complementary waste management option for the residual waste produced from material recovery processes or source-separated collection systems. The Energy from Waste 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; and
- ensure only the residual from bona-fide resource recovery operations are eligible for use as a feedstock for an energy recovery facility.

TNG will only receive feedstock from authorised waste facilities or collection systems that meet the criteria set out in Table 9 – EPA Energy from Waste Policy Technical Criteria (Source: Environ)**Table 9** and are compliant with the Facility's licenses to accept non-putrescible waste streams.

Potential tonnes

The potential feedstock in the market for the facility is mapped out in **Appendix K**. All assumptions regarding the interpretation of the Energy from Waste Policy Statement are summarised in this Appendix and have been interpreted with the assistance of NSW EPA during a meeting conducted between MRA Consulting Group and NSW EPA on 8th September 2014.

All separated waste streams (excluding biosolids and source-separated food and garden organics) referenced in the Energy from Waste Policy Statement (wood waste, tyres and textiles) are assumed to be included in the existing tonnes reported in the mixed waste streams.

8 Statutory Planning Framework

8.1 OVERVIEW – PLANNING FRAMEWORK

The proposed Development has been assessed against applicable environmental planning instruments consistent with the SSDA DGRs. These instruments are set out in the table below.

TABLE 10 – OVERVIEW OF PLANNING FRAMEWORK

FRAMEWORK LEVEL	PLANNING INSTRUMENT
Legislative Acts and Regulations	 Environmental Planning and Assessment Act 1979 Environmental Planning and Assessment Regulation 2000 Environment Protection and Biodiversity Conservation Act 1999 (COMMONWEALTH) Protection of the Environment Operations Act 1997
Environmental Planning Instruments – State	 State Environmental Planning Policy (State and Regional Development) 2011 State Environmental Planning Policy (Infrastructure) 2007 State Environmental Planning Policy (Western Sydney Employment Area) 2009 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development State Environmental Planning Policy No. 55 – Remediation of Land State Environmental Planning Policy No. 64 – Advertising & Signage. NSW State Rivers and Estuary Policy (1993); NSW State Groundwater Policy Framework Document (1997); NSW State Groundwater Quality Protection Policy (1998); NSW State Groundwater Dependent Ecosystems Policy (2002); Aquifer Interference Policy (2012); Department of Primary Industries Risk Assessment Guidelines for Groundwater Dependent Ecosystems (2012); and Guidelines for Controlled Activities (2012).
Environmental Planning Instruments – Local	 Blacktown LEP 1988
Local Planning Policies	 Blacktown DCP 2006

The tables below set out the requirements of these statutory planning instruments.

8.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 AND REGULATIONS

The *Environmental Planning and Assessment Act 1979 (*EPA Act) and accompanying Environmental Planning and Assessment Regulation 2000 (the Regulation) establish the legislative planning framework for NSW. The application is lodged under the State Significant Development provisions of the EPA Act.

This Statement is prepared in accordance with the relevant requirements of the EPA Act and the Regulation including Schedule 2 of the Regulation. The requirements of Schedule 2 and the section of report responding to this requirement are set out in **Table 11**.

REQUIREMENT	SECTION OF REPORT
Form of the EIS (clause 6)	Statement of Declaration
Name and details of the author, address of the land and description of the development	
Content of the EIS (Clause 7)	Executive Summary
Summary of the Environmental Impact Statement	
Statement of the development's objectives	Section 1
Analysis of feasible alternatives and consequences of not carrying out the development	Section 4
Full description of the development	Section 3
Description of the environment with details of those aspects likely to be significantly affected.	Section 9-22
The likely impact of the development	Section 5
Full description of the measures proposed to mitigate adverse effects of the development	Section 23
List of approvals that must be obtained under other Acts or law before the development may be lawfully carrying out	Section 7
A compilation of mitigation measures	Section 23
Principles of ecologically sustainable development	Section 22.5

TABLE 11 – SCHEDULE 2 EIS REQUIREMENTS

Under Schedule 3 of the Environmental Planning and Assessment Regulation 2000, 'Electricity generating stations' are listed as Designated Developments.

8.3 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Act 1999* (EP&BC Act) is the primary Commonwealth legislation directed to protecting the environment in relation to Commonwealth land and controlling significant impacts on matters of national environmental significance. The EP&BC Act requires assessment and approval of actions that either will significantly affect matters of national environmental significance, or are undertaken by a Commonwealth agency or involve Commonwealth land and will have a significant effect on the environment.

The EP&BC Act requires the approval of the Commonwealth Minister for the Environment for actions on Commonwealth land or those that may have a significant impact on matters of national environmental significance, which are: World heritage areas, national heritage places, wetlands of international importance, threatened species and ecological communities listed in the EP&BC Act, migratory species listed in the EP&BC Act, nuclear actions, and actions affecting the Commonwealth Marine Environment. The matters of national environmental significance are addressed in in table below.

TABLE 12 – EPBC MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE MATTERS OF NATIONAL COMMENT **ENVIRONMENAL SIGNIFICANCE** World Heritage Property No World Heritage Properties in the vicinity of the Site. National Heritage Places No National Heritage Places in the vicinity of the Site. Ramsar Wetlands of International No wetlands in the vicinity of the Site. Significance Listed Threatened species and ecological The proposed Facility will involve an action affecting a listed threatened Ecological Community, being the Cumberland Plain communities Woodlands (CPW). This is addressed further in Section 18. Listed Migratory species No migratory species have been found to use the Site.

The proposed development is not considered to be a 'controlled action' (i.e. likely to be significant) pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* as detailed within the Ecological Assessment at **Appendix H.**

No nuclear actions proposed.

No Commonwealth Marine Areas in the vicinity of the Site.

8.4 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) seeks to manage pollution impacts from various premises and non-premises based operations in NSW.

The objects of this Act are:

Commonwealth Marine Area

Nuclear actions

- to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development,
- to provide increased opportunities for public involvement and participation in environment protection,
- to ensure that the community has access to relevant and meaningful information about pollution,
- to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote the following:
 - pollution prevention and cleaner production,
 - the reduction to harmless levels of the discharge of substances likely to cause harm to the environment,
 - the elimination of harmful wastes,
 - the reduction in the use of materials and the re-use, recovery or recycling of materials,

- the making of progressive environmental improvements, including the reduction of pollution at source,
- the monitoring and reporting of environmental quality on a regular basis,
- to rationalise, simplify and strengthen the regulatory framework for environment protection,
- to improve the efficiency of administration of the environment protection legislation,
- to assist in the achievement of the objectives of the Waste Avoidance and Resource Recovery Act 2001.

As detailed throughout this SSDA, and in greater detail in the Ecologically Sustainable Development Assessment (**Section 22.5** of this EIS), the proposed Facility wholly satisfies the objectives of this Act through the provision of state of the art technology for resource recovery and electricity generation.

Clauses 48 and 49 of this Act require certain premises-based and non-premises-based activities to obtain licences for their operation. These activities and their licencing thresholds are listed in Schedule 1 of the Act.

- Clause 17 of Schedule 1 Electricity generation triggers the criteria for a scheduled activity under this Act for general electricity works with a capacity to generate more than 30 megawatts of electrical power.
- Clause 18 of Schedule 1 Energy recovery triggers the criteria for a scheduled activity under this Act for energy recovery from general wast involving processing more than 200 tonnes per year of waste (other than hazardous waste, restricted waste solid waste, liquid waste or special waste.

Given the above, an Environment Protection Licence is required for the operation of the Proposed Facility as a premises-based scheduled activity.

8.5 STATE ENVIRONMENTAL PLANNING POLICY (STATE AND REGIONAL DEVELOPMENT) 2011

State Environmental Planning Policy (State and Regional Development) 2011 identifies various types of development and particular sites upon which certain works are considered State Significant Development (SSD).

Schedule 1 of this SEPP identifies the proposed works as State Significant Development:

Clause 20 - Electricity generating works and heat or co-generation

Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:

(a) has a capital investment value of more than \$30 million, or

(b) has a capital investment value of more than \$10 million and is located in an environmentally sensitive area of State significance.

The subject development for a electricity generating works has a Capital Investment Value of more than \$557 million and therefore is classified as SSD.

8.6 STATE ENVIRONMENTAL PLANNING POLICY (WESTERN SYDNEY EMPLOYMENT AREA) 2009

The SEPP WSEA outlines the specific planning aims and objectives for urban development in Central Western Sydney, establishing the guiding principles to promote economic development and the creation of employment.

While the broader site is located within the Western Sydney Employment Area (shown in **Figure 24** below) and zoned IN1 – General Industrial and E2 – Environmental Conservation under the provisions of the SEPP WSEA, the proposed Facility is entirely sited on IN1 – General Industrial land.





The objectives of the IN1 zone include:

- To facilitate a wide range of employment-generating development including industrial, manufacturing, warehousing, storage and research uses and ancillary office space.
- To encourage employment opportunities along motorway corridors, including the M7 and M4.
- To minimise any adverse effect of industry on other land uses.
- To facilitate road network links to the M7 and M4 Motorways.
- To encourage a high standard of development that does not prejudice the sustainability of other enterprises or the environment.
- To provide for small-scale local services such as commercial, retail and community facilities (including child care facilities) that service or support the needs of employment-generating uses in the zone.

The proposed development is consistent with these objectives in that it:

- Will facilitate the development of employment generating uses on the Site;
- Will provide employment opportunities along the M4 and M7 corridors;

- Incorporates mitigation measures to minimise adverse environmental impacts on surrounding land;
- Includes key sections of the proposed Regional Road Network which facilitate links to the M4 and M7 motorways; and
- Includes development guidelines that encourage a high standard of development that does not impede the sustainability of other enterprises or the environment.

Whilst the proposed use is not identified as development permissible with consent under the provisions of the IN1 General Industrial Zone, the proposed Development is consistent with the zone objectives and is permissible under the provisions of the State Environmental Planning Policy (Infrastructure) 2007 as *electricity generating works* within an industrial zone to the extent the ISEPP provisions prevail.

The objectives of the E2 zone include:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

The proposed development is consistent with the objectives of the E2 zone in that:

- mitigation measures are proposed to mitigate adverse environmental impacts to the E2 zoned land;
- The Site is proposed to be subdivided in such a way that the high value ecological bushland within the E2 zoned land will be captured within a single lot (Lot 10). This lot is not proposed for future development; Relevant Provisions of SEPP (WSEA) 2009

Clause 14 – Subdivision Consent Requirement

A draft plan of subdivision of the broader site has been submitted with this application. Details of proposed subdivision of Lots 1, 2 and 3, DP 1145808 are provided in **Section 3.2** of this EIS.

Clause 18 – Requirements for development control plans

In consultation with the Department of Planning and Environment the proponent is preparing a site specific Development Control Plan in accordance with Clause 18 of the SEPP (WSEA). This DCP is being prepared concurrently with the assessment of the SSDA.

Clause 19 – Existing Precinct Plans under SEPP 59

An assessment of the proposed works against the provisions of the Eastern Creek Precinct Plan has been undertaken in **Section 7.3.1**.

Clause 20 – Ecologically Sustainable Development

As detailed with the Ecologically Sustainable Development assessment within **Section 22.5** of this report, the development contains measures to minimise:

- Use of potable water, and
- Emission of greenhouse gases.

Clause 21 – Height of buildings

The design and siting of the proposed Facility ensure *building heights will not adversely impact the amenity of adjacent residential areas* and *site topography has been taken into consideration.*

In order to comply with the combination of compliance of pollutant ground level concentrations and the US EPA document '*Guideline for Determination of Good Engineering Stack Height*', the proposed emission stacks are required to be 100 metres in height. However, as discussed in detail within the Visual

Assessment Report in **Section 19** of this EIS, given the height of the emissions stacks the final siting and general arrangement of the proposed Facility was designed to take advantage of the natural typography sloping south towards the riparian corridor. The final design strives to ensure the visual impact of the proposed Facility from nearby sensitive land uses is minimised.

Clause 22 - Rainwater harvesting

The consent authority must not grant consent to development unless it is satisfied adequate arrangements will be made to connect the roof areas of buildings to a rainwater harvesting scheme. Rain harvesting water sensitive design approaches have been incorporated into the bio-retention basin as detailed with the infrastructure report prepared by AT&L and submitted at **Appendix Q**.

Clause 27 – Exceptions to development standards

The proposed Development does not seek an exception to any development standards.

Clause 28 Relevant acquisition authority

The authority of the State is noted.

<u>Clause 29 Industrial Release Area – satisfactory arrangement for the provision of regional</u> <u>transport infrastructure and services</u>

A site specific Development Control Plan is currently being prepared in consultation with the Department of Planning and Environment and Blacktown City Council in accordance with Clause 18 of the SEPP (WSEA) to ensure satisfactory arrangements have been made for the provision of regional transport infrastructure and services.

Clause 31 – Design principles

In determining a development application that relates to land to which this Policy applies, the consent authority must take into consideration whether or not:

- the development is of a high quality design, and
- a variety of materials and external finishes for the external facades are incorporated, and
- high quality landscaping is provided, and
- the scale and character of the development is compatible with other employment-generating development in the precinct concerned.

The design, materials, architectural treatments, landscaping, scale and character are discussed in detailed within **Section 19** of this EIS which identifies the key considerations of the proposed Development.

Despite the scale and bulk of the proposed Facility, careful consideration to the design and choice of materials has been given to minimise its visual impact and ensure the scale and character are compatible with the precinct.

Clause 32 - Preservation of trees or vegetation

The key objective of Clause 32 is to preserve the amenity of the area through preservation of trees and other vegetation. Consent for the removal of the existing trees identified within the Flora and Fauna Report (prepared by Abel Ecology and submitted at **Appendix H**) is sought as part of this SSDA.

The proposed development area is largely clear of vegetation. The removal of existing vegetation within the proposed building footprint will result in the removal of weeds including noxious and environmental weeds, to the benefit to the surrounding locality. The preservation of trees is further detailed within **Section 18** of this EIS.

Conclusion

Based on the assessment above, the proposed Development is found to be generally consistent with the SEPP (WSEA) 2009.

8.7 STATE ENVIRONMENTAL PLANNING POLICY (INFRASTRUCTURE) 2007

The State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure projects across the state. Division 4 of the ISEPP outlines provision for electricity generating works being 'a building or place used for the purpose of making or generating electricity '.

If there is an inconsistency between the ISEPP and any other environmental planning instrument, the ISEPP prevails to the extent of the inconsistency.

8.7.1 LAND USE PERMISSIBILITY

Clause 34 facilitates development for the purpose of electricity generating works carried out by any person with consent on any land in a prescribed rural, industrial or special use zone.

The proposed Facility is located within a prescribed Industrial (IN1) zone and is therefore considered permissible with consent under the ISEPP.

8.7.2 TRAFFIC GENERATING DEVELOPMENT

Schedule 3 of the ISEPP details traffic generating development to be referred to the Roads and Maritime Services (RMS). Industrial premises with site access to any road greater than 20,000m² trigger referral to the RMS.

A Traffic Impact Assessment has been prepared by Traffix and is submitted with this application at **Appendix R**.

8.7.3 STATE ENVIRONMENTAL PLANNING POLICY NO. 33 – HAZARDOUS AND OFFENSIVE DEVELOPMENT

State Environmental Planning Policy No.33 – Hazardous and Offensive Development (SEPP 33) requires specific matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. The proposed development could be classified as 'potentially hazardous industry' which is defined as:

A development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

- (a) to human health, life or property, or
- (b) to the biophysical environment,

and includes a hazardous industry and a hazardous storage establishment.

The proposed Facility would be defined as *potentially hazardous industry* under the above definition if it operates without employing any measures to reduce or minimise its impact in the locality, and there is potential to for the operation to raise a risk in relation to the locality in terms of human health.

As detailed in **Section 23**, mitigation measures are proposed. The Human Health Risk Assessment prepared by Fichtner Consulting Engineers (**Appendix O**) states the necessary measures to ensure the proposed Facility will be free of significant health risks to all working or residing in the locality will be implemented.

Clause 12 of the SEPP requires a preliminary hazard analysis for a potentially hazardous industry. The analysis is to be prepared in accordance with the current circulars or guidelines published by the *Department of Planning and Infrastructure* and submitted with the development application.

In preparing this SSDA the applicant has engaged Pacific Environment to prepare an Air Quality and Greenhouse Gas Assessment to assess the potential for pollutants as a result of the proposed works (submitted at **Appendix L** and **Appendix N**).

A Human Health Risk Assessment has been undertaken by Fichtner Consulting Engineers (**Appendix O**) to assess the specific effects on Human Health through inhalation. The assessment considers the Proposed Facility to be free of negative health effects as further discussed in **Section 12** of this EIS.

In addition, a Hazards and Risks Report (**Appendix Z**) was undertaken by Raw Risk (further discussed within **Section 17** of this EIS).

8.8 STATE ENVIRONMENTAL PLANNING POLICY NO. 55 – REMEDIATION OF LAND

SEPP 55 provides State-wide planning controls for the remediation of contaminated land. The policy states land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed in accordance with applicable standards and requirements.

As detailed in **Section 22.3** of this report, a Phase 1 Environmental Site Assessment was prepared for the Site by AD Envirotech Australia P/L (**Appendix W**).

Despite the Site having been utilised as grazing land as far back as records indicate, given an asphalt plant and associated waste water overflow dam has been present on the adjoining site since at least 1978, the Phase 1 Preliminary Site Investigation recommends a Targeted Phase 2 Detailed Site Contamination Investigation. The investigation is recommended around the boundary of the asphalt plant to determine whether contamination is present within the soil, and or surface water and river sediment within the boundaries of the Site.

This Targeted Phase 2 Detailed Site Contamination Investigation has been commissioned by the proponent and will be submitted for assessment upon completion during the course of the assessment of this application.

8.9 STATE ENVIRONMENTAL PLANNING POLICY NO. 64 – ADVERTISING AND SIGNAGE

SEPP 64 applies to the proposed Development, as the business identification signage on the northern, western and eastern facades is visible from the surrounding road network. It is noted the SEPP will apply in the event of any inconsistency with another Environmental Planning Instrument.

Part 3 of SEPP 64 does not apply to this application, as the proposed sign are defined as 'business identification sign' and 'building identification sign'.

In accordance with Part 2 of the SEPP, the compliance of the proposed Development with the objectives of the policy and the assessment criteria in Schedule 1 needs to be assessed.

An assessment of the proposed business identification signage against the SEPP 64 objectives and assessment criteria has been undertaken below which demonstrates the proposed signage can be granted consent under Clause 8 of SEPP 64. Each of the assessment criteria in Schedule 1 of SEPP64 has been considered and is summarised below.

Character of the Area

The signs are of a simple and modern design and compatible with the proposed development and use of the Site.

The signs are consistent with the scale of development within Eastern Creek.

The signs will have a high quality appearance which will complement the overall physical appearance of the Site.

Special Areas

The proposed signage is not visible to or from any environmentally sensitive areas, natural or other conservation areas, open space areas, waterways or rural landscapes.

Views and Vistas

The proposed sign will not obstruct any significant views. The proposed sign is appropriately located to ensure that they do not obstruct sight lines for motorists. The proposed signage does not obscure existing signage on surrounding land and therefore respects the viewing rights of existing and future advertisers.

Streetscape, Setting and Landscape

The proposed sign is scaled appropriately within the Eastern Creek Industrial Precinct. The proposed signage will be visually appealing. Visual clutter is minimised. The sign does not dominate the visual appearance of the Site.

Site and Building

The dimensions of the proposed sign are appropriate given the size and overall scale of the existing buildings in the locality. The proposed signage has been appropriately positioned and proportioned to identify the Site itself.

Associated Devices and Logos with Advertisements and Advertising Structures

A consistent theme has been adopted for all signage throughout the Site to provide regularity in the signage imagery.

Illumination

The proposed business identification signage will be illuminated using mounted stalk lighting.

Safety

There is adequate separation between the proposed business identification sign and nearby roads to ensure it will not impact visibility for motorists or obstruct pedestrian views within the Site's parking areas. The sign will not include any flashing or moving parts and therefore will not pose any distraction to passing motorists.

A full assessment of the proposed signage against the SEPP 64 objectives and assessment criteria has been undertaken and is detailed in **Table 10** below.

				SMENT	CDITEDIA
TABLE 13 -	3EFF 04 00	DJECHVES	AND ASSES		

ASSESSMENT CRITERIA	ACCEPTABLE	COMMENT
Clause 3 – Aims and Objectives		
 (a) to ensure that signage (including advertising): is compatible with the desired amenity 	Yes	 The proposed signage is consistent with the Eastern Creek Industrial Precinct in relation to scale and design.
and visual character of an area, andprovides effective communication in		 The scale is compatible with the scale of development proposed and the surrounding land use context being similar to that approved for the adjoining Genesis Xero

ASSESSMENT CRITERIA	ACCEPTABLE	COMMENT
suitable locations, and		Waste Facility.
 is of high quality design and finish, and 		 The business identification signage is consistent with the bulk and size of the built form and the potential scale of development within the Eastern Creek Industrial Precinct. The proposed signage will be of a high design quality using appropriate corporate colours and a scale that does not exceed an appropriate level of the Facility.
(b) to regulate signage (but not content) under Part 4 of the Act, and	Yes	 Noted.
(c) to provide time-limited consents for the display of certain advertisements, and	Yes	 Noted.
(d) to regulate the display of advertisements in transport corridors, and	Yes	 The signage will be restricted to that indicated on the plans prepared by Krikis Tayler Architects attached in Appendix D.
(e) to ensure that public benefits may be derived from advertising in and adjacent to transport corridors.	Yes	 The proposed signage relates to business identification rather than advertising.
Schedule 1 Assessment Criteria		
 <u>Character of the Area</u> Is the proposal compatible with the existing or desired future character of the area or locality in which it is proposed to be located? Is the proposal consistent with a particular theme for outdoor advertising in the area or locality? 	Yes	 The proposed signage is compatible with the existing and future desired character of the area in that: The scale and location of signage is consistent with the scale of the proposed development and existing signage on surrounding business premises. The sign is a simple and modern design and compatible with the future development and use of the Site. The signs will have a high quality and consistent appearance which will complement the overall physical appearance of the Site. The signage is consistent in scale and appearance to other industrial signs nearby at the approved Genesis Xero Waste Facility.
Special Areas Does the proposal detract from the	Yes	 The Site is not located within a 'special precinct'. The proposed signage will not detract from

Γ			
	ASSESSMENT CRITERIA	ACCEPTABLE	COMMENT
	environmentally sensitive areas, heritage areas, natural or other conservation areas, open space areas, waterways, rural landscapes or residential areas?		any environmentally sensitive, natural or conservation areas, open space areas, waterways or rural landscapes given the significant separation between the proposed sign and natural areas.
-	Views and Vistas Does the proposal obscure or compromise important views? Does the proposal dominate the skyline and reduce the quality of vistas? Does the proposal respect the viewing rights of other advertisers?	Yes	 The proposed signs will not interrupt existing views or vistas of significant quality or importance. The signage is of a scale and height consistent with the proposed building form and does not adversely impact significant views or vistas from other properties, nor will it impede the visibility of other existing signage in the surrounding area.
	Streetscape, setting and landscape	Yes	The proposed signage will:
•	Is the scale, proportion and form of the proposal appropriate for the streetscape, setting or landscape? Does the proposal contribute to the visual interest of the streetscape, setting or landscape? Does the proposal reduce clutter by rationalising and simplifying existing advertising? Does the proposal screen unsightliness? Does the proposal protrude above buildings, structures or tree canopies in the area or locality?		 Incorporate quality materials and finishes. Present a coherent and integrated colour theme based on the corporate colours of the operator. The proposed signage will be visually appealing with a consistent theme throughout the Site. The proposed sign is an appropriate height given the relative scale of the proposed new buildings. Visual clutter is minimised. Sign is sited at a suitable distance apart to ensure they do not dominate the visual appearance of the Site.
-	Site and building Is the proposal compatible with the scale, proportion and other characteristics of the site or building, or both, on which the proposed signage is to be located? Does the proposal respect important features of the site or building, or both? Does the proposal show innovation and imagination in its relationship to the site or building, or both?	Yes	 The dimensions of the proposed sign are appropriate given the size and overall scale of the building.
	Associated devices and logos with	Yes	 Proposed sign is for business identification only, no associated devises and logos with

ASSESSMENT CRITERIA	ACCEPTABLE	COMMENT
advertisements and advertising structures Have any safety devices, platforms, lighting devices or logos been designed as an integral part of the signage or structure on which it is to be displayed?		 advertising or advertising structures proposed Safety devices, platforms, lighting devices or logos have not been designed as an integral part of the signage
 <u>Illumination</u> Would illumination result in unacceptable glare? Would illumination affect safety for pedestrians, vehicles or aircraft? Would illumination detract from the amenity of any residence or other form of accommodation? Can the intensity of the illumination be adjusted, if necessary? Is the illumination subject to a curfew? 	Yes	Illumination of the business identification signage is proposed. The lighting will comply with AS4282 'Control of the obtrusive effects of outdoor lighting' to minimising impact on surrounding land uses, roads, aircrafts, and pedestrians. Illumination is proposed via mounted stalk lighting. Given the 24 hour nature of the Facility, the illumination will not be subject to a curfew.
 Safety Would the proposal reduce the safety for any public road? Would the proposal reduce the safety for pedestrians or bicyclists? Would the proposal reduce the safety for pedestrians, particularly children, by obscuring sightlines from public areas? 	Yes	 The proposed sign will not encroach on the roadway or interfere with pedestrian or vehicular sight-lines. The signage will not distract motorists as it will not resemble a traffic sign.

8.10 NSW STATE RIVERS AND ESTUARY POLICY (1993)

The NSW Government has recognised the need for the improved management of rivers and estuaries and their floodplains. This Policy complements the State Soils, State Trees and State Groundwater Policies. The intent is to ensure that rivers and estuaries can continue to support responsible economic and social uses in the long term.

The objectives of this Policy are to manage the rivers and estuaries of NSW in ways which:

- Slow, halt or reverse the overall rate of degradation in the systems
- Ensure the long term sustainability of their essential biophysical functions; and
- Maintain the beneficial use of these resources

The proposed Development is consistent with these objectives in that it acknowledges the natural water systems on the Site and ensures potential impacts on the natural system are minimised through soil and water management infrastructure.

8.11 NSW STATE GROUNDWATER POLICY FRAMEWORK DOCUMENT (1997)

This Framework Document sets out the overall direction of groundwater management in NSW. It provides broad objectives and principles to guide the management of groundwater. Under this Framework are three component policies which build on this approach and provide more detail and guidance on how to manage and protect groundwater quality, groundwater quantity and groundwater dependent ecosystems respectively. The component policies (structure provided below) provide a basis for decision making to achieve sustainable natural resource management.





The framework states the Goal for groundwater management in New South Wales is 'to manage the State's groundwater resources so that they can sustain environmental, social and economic uses for the people of NSW'. It is the policy of the NSW Government to encourage the ecologically sustainable management of the State's groundwater resources, so as to:

- slow and halt, or reverse any degradation of groundwater resources;
- ensure long term sustainability of the systems ecological support characteristics;
- maintain the full range of beneficial uses of these resources;
- maximise economic benefit to the Region, State and Nation.

The Policy states these objectives will be achieved through application of resource management principles listed in the Policy. The principles most relevant to this application are:

- Non-sustainable resource uses should be phased out.
- Where appropriate, the management of surface and groundwater resources should be integrated.

The proposed Facility and associated works are consistent with these principles in that the Facility is introducing a sustainable energy generating facility which appropriately manages surface and groundwater in an integrated fashion.

While the development will result in a reduction in groundwater recharge, this will not affect the resource value of the local groundwater systems, and has potential benefits in terms of salinity as discussed in the Soil and Water Assessment at **Appendix Q**.

8.12 NSW STATE GROUNDWATER QUALITY PROTECTION POLICY (1998)

This Policy adopts the principles outlined in the NSW State Groundwater Policy Framework Document.

It is clearly understood that no-one has the right to contaminate groundwater in such a way as to create a significant risk to public health, critical ecosystems or other valued users of water. As such, mitigation measures will be put in place to ensure groundwater health will be maintained in such a way that it will not be a risk to public health, ecosystems, or other users of water.

Groundwater quality at the Site is generally poor, with high salinity levels from connate salts within the formation or alternatively from leaching of accumulated salt from the lower soil profile and the limited flushing due to low groundwater flow rates.

The proposed development does not include any activities that pose a particular risk to groundwater quality. The development will be sewered, and stormwater drainage will be directed to the local surface water system. The development therefore does not pose an unacceptable risk to groundwater quality, subject to standard pollution prevention measures for fuel storage etc.

8.13 NSW STATE GROUNDWATER DEPENDENT ECOSYSTEMS POLICY (2002)

This Policy is specifically designed to protect the state's valuable ecosystems which rely on groundwater for survival so that, wherever possible, the ecological processes and biodiversity of these dependant ecosystems are maintained or restored.

This policy provides guidance on how to manage groundwater dependant ecosystems in NSW.

The available groundwater storage in the shallow groundwater system on Site is low. This together with the low hydraulic conductivity of the lower soil profile and underlying strata greatly limit the potential for the shallow groundwater system to sustain terrestrial ecosystems or surface water baseflow during extended dry periods.

The Site and the tributary of Ropes Creek have been substantially altered from the original natural state by historical clearing of native vegetation to allow establishment of pasture and by maintenance of a highly artificial surface water flow regime over a prolonged period due to discharge of water pumped from the quarry and by leakage from the settlement dams located immediately adjacent to the south-eastern boundary on Hanson's site.

In view of these factors, no groundwater dependant ecosystems are considered to be present on the Site. As such, the management of groundwater dependant ecosystems is not relevant in this case.

8.14 AQUIFER INTERFERENCE POLICY (2012)

The NSW Aquifer Interference Policy was released in September 2012 and applies across the State. It explains the water licensing and impact assessment processes for aquifer interference activities under the *Water Management Act 2000* and other relevant legislation.

Activities such as construction dewatering currently continue to be regulated by NSW Office of Water through issuing of temporary licences under the Water Act 1912, where required.

NSW Office of Water generally applies an informal exemption to dewatering from a water table aquifer where the pump rate is less than 10 L/s and the total quantity of groundwater pumped is less than 25,000 kilolitres. Construction dewatering requirements for the proposed development are expected to meet these criteria and a licence is not expected to be required.

The permanent bypass drainage system around the waste bunker is not expected to result in any net removal of groundwater and a water access licence is not expected to be required. The system will ensure that the development will meet the "minimal impact considerations" define in the Aquifer Interference Policy and an Aquifer Interference Approval is not expected to be required after full implementation of the policy.

8.15 DEPARTMENT OF PRIMARY INDUSTRIES RISK ASSESSMENT GUIDELINES FOR GROUNDWATER DEPENDENT ECOSYSTEMS (2012)

These Guidelines present an approach to groundwater dependant ecosystem identification, classification, ecological valuation, and ecological risk assessment for a given activity or potential impact on a groundwater source. This has been done with a view to provide a framework and basis for sustainable

management of groundwater resources in light of aspirations for the development of NSW coastal groundwater resources whilst protecting the values associated with groundwater systems and groundwater dependant ecosystems.

No groundwater dependant ecosystems are considered to be present on the Site. As such, the management of groundwater dependant ecosystems is not relevant in this case.

8.16 GUIDELINES FOR CONTROLLED ACTIVITIES (2012)

The following guidelines for controlled activities were found on the NSW Office of Water website:

- In-stream works
- Laying pipes and cables in watercourses
- Outlet structures
- Riparian corridors
- Vegetation Management Plans
- Watercourse crossings

The most relevant of these to the proposed works are the following:

- Outlet structures This guideline is relevant to the outlets for the proposed bio-retention basins.
- Riparian corridors this guide states that 1st order watercourses require a 10 m vegetation corridor on both sides of the watercourse. Given the proposal involves the removal of part of a first order watercourse, informal approval via email correspondence has been obtained from the Office of Water prior to this submission.
- Vegetation Management Plans.
- Watercourse crossings

The applicant is aware of the requirements of the NSW Office of Water and the abovementioned guidelines should an application be required.

8.17 BLACKTOWN LOCAL ENVIRONMENTAL PLAN 1988

No planning controls in the *Bankstown Local Environmental Plan 1988* (BLEP) apply to the Site given the Site falls within the SEPP (WSEA).

SEPP (WSEA) applies therefore the BLEP is not relevant.

8.18 SECTION 79C ASSESSMENT

The proposed development has been assessed in accordance with the matters of consideration listed in Section 79C of the Act as outlined below:

TARI E 14 -	SECTION 79	
	SECTION 13	

CONSIDERATION	COMMENT
Environmental Planning Instruments	 State and Local Environmental Planning Instruments have been assessed in Section 8.
Draft Environmental Planning Instruments	 No draft Environmental Planning Instruments are applicable to the

CONSIDERATION	COMMENT
	Site.
Development Control Plans	 The proposed development has been assessed against the provisions of Blacktown DCP 2006 (see Section 8.19.1).
Any Matters Prescribed by the Regulations	 This SSDA has been prepared in accordance with Part 14, Clause 228 of the Regulations outlining the factors that must be taken into account concerning the impact of an activity on the environment. In addition, this EIS is prepared in accordance with the relevant requirements of Schedule 2 of the Regulation.
Likely Impacts of the Development	 An impact assessment has been provided in Sections 9-22 of this EIS.
Suitability of the Site	The location of the proposed Facility is:
	 Located in an industrial zone and under which the proposed use is permissible through the application is ISEPP.
	 Adjacent to an existing waste transfer landfill facility that will provide 9% of the fuel source for the energy generation.
	 Located in the Eastern Creek Industrial Area and is suitably sited among similar compatible land uses with a direct synergy to the proposed Development and the Genesis Xero Waste Facility.
	 Located proximate to the regional motorway network.
	Additionally:
	 The proposed use is consistent with the future strategic use of the land in providing a significant employment generating development.
	 Adequate car parking is provided to cater for staff and visitors to the Site.
	 The proposed development will provide a benefit to the local and regional economy through provision of a key infrastructure for the sustainable treatment of waste within Metropolitan Sydney.
Any submission made in accordance with this Act or the Regulations	 Submissions received from government agencies following the submission of the preliminary supporting documents (Preliminary EIS, Concept Plans, etc.) have been reviewed and where relevant, incorporated into the design development of the proposed works.
	 Any submissions received during the exhibition period are required to be considered under Section 79C of the Environmental Planning and Assessment Act 1979.
The Public Interest	 The proposed Development is in the public interest in that it will generate in the order of 250 direct construction jobs and 55 new jobs during Facility operation, it contributes to energy security and diversity by providing additional low carbon, renewable electricity

CONSIDERATION	COMMENT
	generating capacity, and supports the use of waste materials destined for landfill, thus saving landfill space and reducing greenhouse gas emissions from decomposing landfill matter.

8.19 DEVELOPMENT CONTROL PLANS

In accordance with Clause 18 (1) of the SEPP (WSEA): except in such cases as the Director-General may determine by notice in writing to the consent authority or as provided by clause 19, the consent authority must not grant consent to development on any land to which this Policy applies unless a development control plan has been prepared for that land.

In consultation with the Department of Planning and Environment a site specific Development Control Plan is being prepared by Urbis concurrently to the assessment of this SSDA.

In accordance with Clause 19(2) of the SEPP (WSEA), in determining a development application that relates to any land to which an existing precinct plan applies, the consent authority is to take the existing precinct plan into consideration.

The Eastern Creek Precinct Plan has been assessed in Section 7.3.1.

8.19.1 BLACKTOWN DEVELOPMENT CONTROL PLAN 2006

It is noted that is not a statutory requirement to give consideration to the Blacktown DCP 2006 however the proposed development has been assessed against the relevant general and industrial provisions of the DCP below.

CONTROL	COMMENT						
Part A – Introduction and General Guidelines.							
3.2 Areas Requiring Fill	The filling of land requires separate development consent, except where the proposed fill forms part of a Development Application for overall development of a site. The proposed fill associated with the development has been detailed within the Civil Engineering Plans prepared by AT&L and submitted at Appendix F .						
3.3 Tree Preservation	While much of the Site is clear of significant vegetation, Consent is sought for the removal of some vegetation as detailed with the Flora and Fauna Assessment prepared by Abel Ecology at Appendix H . Where possible existing vegetation has been retained by siting the development outside the 40 metre setback to the Riparian Corridor, the area of the Site that is currently the most vegetated.						
3.4 Cultural Heritage	Both Indigenous and Non-indigenous Cultural Heritage have been assessed by GML Heritage is preparation of the SSDA. The assessment has found that the area has a low potential for historical archaeological remains of low significance to be present within the development area.						

TABLE 15 - BLACKTOWN DCP 2006 ASSESSMENT

CONTROL	COMMENT
	The assessment of cultural significance is further detailed within Section 21 of this EIS.
3.5 Pollution Control	The proposed Development has been assessed in terms of the potential impacts relating to air, water and noise pollution as discussed in detail within Section 11, Section 14 and Section 15.
	Air quality and Noise assessments have been prepared by Pacific Environment Limited.
	Edison Environmental and Engineering Pty Ltd has provided an assessment of conditions on the Site relating to soils, contamination, groundwater, salinity and surface water; and of the potential impacts from the development and operation of the proposed Facility relating to groundwater and salinity, including suitability of the Site and mitigation measures required. This is provided at Appendix Q .
4.0 Roads	In preparing the application for the proposed Facility AT&L Civil Engineers designed an internal estate road to allow for access in keeping with the relevant Australian Standards and the general principles as detailed within the DCP.
5.0 Car Parking	A Traffic Impact Assessment has been prepared by Traffix and is submitted with this application at Appendix R
	The proposed Development relates to a relatively unique use that is not adequately covered by the generic land uses for which parking rates are provided within the RMS Guide to Traffic Generating Developments (RMS Guide), Blacktown City Council Development Control Plan (DCP) or the Western Sydney Employment Area – Eastern Creek Precinct Plan. As such a 'first- principles' assessment is has been undertaken.
	Having regard for the above, a total of 40 parking spaces are proposed within two separate car parking areas (20 spaces each) either side of the proposed Facility. Therefore, all future parking demands associated with the proposed development can be readily accommodated on-site.
6.0 Services	As detailed within the Services Report prepared by AT&L and submitted with this application at Appendix E , the application has ensured that the development will ensure satisfactory arrangements for water, sewer, electricity and communications.
7.4 Crime Prevention Through Environmental Design	A CPTED assessment has been undertaken within the EIS at Section 22.6 .
8.0 Development on Flood Prone Land	Flood modelling carried out by Brown Consulting in March 2010 (Appendix AA) for Blacktown City Council form the basis of the existing flood levels for the creek to the south of the Site. The 100

CONTROL	COMMENT
	 year ARI flood level determined in this Brown Report adjacent to the proposed basin has been adopted as the tail-water level for hydraulic modelling of the basin and stormwater network. This level has been assigned as 52.8m AHD as detailed within the Civil Infrastructure Report at Appendix F. Based on this modelling carried out by Browns, the proposed flood levels of the creek do not adversely affect the Site. Flood levels associated with the creek are at least 2m below the proposed finished levels of the Site.
8.5 Survey Plans	A Survey Plan has been prepared by Land Partners in accordance with the DCP requirements and is submitted with this EIS at Appendix B .
10.0 Contributions	A draft Voluntary Planning Agreement (VPA) is currently being prepared by the proponent in consultation with the Department of Planning and Environment and Blacktown City Council. A letter of offer has been provided to the Department of Planning and Environment and Blacktown City Council.
Part E – Development in the Industrial Zones	

3.0 Subdivision of Industrial Land	The proposed subdivision will not create any lots less than the minimum area of 1,500m ² .
4.1 Setback	The proposed Development is appropriate setback from the nearest street alignment. Great than the required 10 metres to an industrial collector road.
4.2 Landscaping	A Landscape Concept Plan has been prepared in support of this SSDA and is submitted at Appendix E . This item is further detailed in Section 22.2 of this EIS.
4.4 Building Design and Construction	A high standard of visual and environmental quality has been assured in the design of the proposed Facility. As detailed within the architectural drawings and the visual assessment prepared in support of this SSDA, the proposed Development has made careful materials selection and appropriate sited the development to minimise visual impact from the public domain and sensitive adjoining land uses. The Site typography assists in reducing the bulk and scale of the design with the proposed stacks located at the lower point of the Site to reduce the overall impact. These aspects of the development are discussed in greater detail in Section 18 of this EIS.
4.6 Vehicular Access and Circulation	A full set of architectural plans and civil design of the proposed access arrangement have been submitted with this application in accordance with the DCP.

COMMENT
A traffic impact assessment has been prepared by Traffix and is submitted with this application at Appendix R . The proposed Development relates to a relatively unique use that is not adequately covered by the generic land uses for which parking rates are provided within the RMS Guide to Traffic Generating Developments (RMS Guide), Blacktown City Council Development Control Plan (DCP) or the Western Sydney Employment Area – Eastern Creek Precinct Plan. As such a 'first- principles' assessment is has been undertaken. Having regard for the above, a total of 40 parking spaces are proposed within two separate car parking areas (20 spaces each) either side of the proposed Facility. Therefore, all future parking demands associated with the proposed development can be readily accommodated on-site.
As detailed within the Services Report prepared by AT&L and submitted with this application at Appendix E , the application has ensured that the development will ensure satisfactory arrangements for water, sewer, electricity and communications.
The proposed Development has been assessed in terms of the potential impacts relating to air, water and noise pollution as discussed in detail within Section 11, Section 14 and Section 15. An air quality and noise assessment has been prepared by Pacific Environment. Edison Environmental and Engineering Pty Ltd has provided an assessment of conditions on the Site relating to soils, contamination, groundwater, salinity and surface water; and of the potential impacts from the development and operation of the proposed Facility relating to groundwater and salinity, including suitability of the Site and mitigation measures required (Appendix

9 Identification of Potential Impacts

9.1 OVERVIEW

The DGRs require the Environmental Assessment to address a number of key issues of perceived high environmental, social, and economic value, sensitivity or impact.

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
- A 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; and
- Consolidated summary of all the proposed environmental management, mitigation and monitoring measures, highlighting all commitments included in the EIS.

Assessment of the potential environmental impacts associated with the proposed Development including but not limited to those referenced in the DGRs, is provided in the following section. The key issues listed in the DGRs include:

- Waste Management;
- Air Quality;
- Human Health;
- Odour;
- Noise;
- Soils and Water;
- Transport and Traffic;
- Hazards and Risks;
- Flora and Fauna;
- Visual; and
- Aboriginal and Non Aboriginal Cultural Heritage.

In addition to the above, the following issues (not formally identified within the DGRs) are addressed:

- Stormwater, On-Site Detention and Flooding;
- Landscaping;
- Bushfire;
- Ecologically Sustainable Development;

- Contamination; and
- Crime Prevention Through Environmental Design.

The following sub-sections of the EIS provide an assessment of the key issues identified within the DGRs. Each of these issues have been assessed in accordance with the four criteria listed in the DGR above, as outlined within each of the following sub-sections and the specialist reports submitted with the application.

Each technical chapter follows the same structure for ease of reference, as follows:

- Overview;
- Legislative Requirements;
- Assessment Methodology;
- Assessment of Key Issues;
- Cumulative Impacts and Mitigations Measures; and
- Summary and Conclusion.

9.2 CUMULATIVE IMPACTS OF THE FACILITY WITH CURRENT AND PROPOSED/FUTURE OPERATIONS IN THE VACINITY OF THE SITE

The broader site and the land adjoining the site have been identified for redevelopment for higher end industrial and employment uses over the next decade under the SEPP (WSEA). As such, the cumulative impact and interaction of the proposed and current surrounding operations is expected to change over time with new developments and operations.

Details of the current and proposed/future operations surrounding the broader site have been collected using the Department of Planning and Environment and Blacktown City Council websites, and correspondence with the Department of Planning and Environment's Employment Land Release division.

LAND AND OWNER	CURRENT OPERATION	APPROVED/PROPOSED OPERATION
Sargents (west)	Vacant	Proposing a pie making facility. Application currently being assessed by Blacktown Council. VPA and works in kind proposed.
The Department of Planning and Environment (south west)	None.	Currently preparing a DCP for the site. Possible future market sale after finalisation of DCP. Timing unknown.
Hanson (east)	Fulton Hogan asphalt/emulsion plant (operation until June 2015)	Concrete plant, logistics centre, fuel depot, workshop, concrete recycling, office and lab, road infrastructure, continued asphalt/emulsion plant
Australand (north east)	Current distribution and warehouse tenants on land include - Kmart (distribution) - OfficeMax	Remaining land to be developed for same general industrial purposes.

TABLE 16 - DESCRIPTION OF CURRENT AND PROPOSED/FUTURE OPERATIONS SURROUNDING THE SITE

	Kuehne & Nagel (logistics)Kmart (warehouse)	
Jacfin (south)	None. Land subdivided. Jacfin seeking pre-commitments for development.	Likely to continue pursuing industrial/warehouse/logistics development in line with their approvals.

Cumulative impacts for noise, air quality, and traffic have been considered below.

9.3 NOISE

When assessing cumulative noise impacts, the combined impact of all industrial noise sources at a receiver point should be considered. Cumulative noise impacts affecting receivers from all industrial noise sources are assessed according to the Industrial Noise Policy's (INP) amenity criteria. The INP sets acceptable noise levels based on the time of day and the noise receiver type. The amenity criteria considers the cumulative impact of all industrial noise sources and applies penalties to the acceptable noise levels from any new development based on the existing level of industrial noise.

In addition, the Eastern Creek Precinct Plan contains cumulative noise goals for developments within different zones in the precinct. The proposed was assessed using this and the INP criteria, and considered the existing level of industrial noise, and also considered the cumulative impact of the future Hanson development which is approved but not operating. As a result, where predicted noise levels are compliant with these zone emission goals, adverse cumulative noise impacts would be not be expected.

Similarly, in the future the potential for cumulative noise impacts to occur as a result of future noise emitting developments in the vicinity of the Site together with the proposed facility can be considered by the amenity criteria within the INP. The amenity criteria considers the cumulative impact of all industrial noise sources and applies penalties to the acceptable noise levels from any new development based on the existing level of industrial noise.

Cumulative noise of future developments would be required to be assessed against the INP amenity criteria and precinct plan goals, which control the level of cumulative industrial noise from multiple developments in the vicinity.

9.4 TRAFFIC

The proposed will result in an increase of 53 vehicle trips per hour. This net traffic generation is a moderate increase above existing conditions and is unlikely to significantly impact the traffic capacity available to the wider area. This traffic impact is also conservatively calculated not taking into account synergies between EFW and Genesis Xero Waste Facility. The increase can be readily accommodated by the surrounding road network with no change to existing Level of Service and only minimal impact on average delays.

In terms of cumulative impacts of the proposed in future conditions, the traffic generated by the proposed development represents only a small proportion of traffic generated by the wider WSEA, and as such will not have a significant impact on the ability of the surrounding road network to operate at an acceptable level into the future. It is also emphasised that the critical intersection of Wallgrove Road and Wonderland Drive will operate with a Level of Service B/C (i.e. good to satisfactory for traffic signals and roundabouts, and acceptable to satisfactory for give way and stop signs) post development. As such, it is considered that there is additional spare capacity provided by the existing intersection to cater for further development within the area.

9.5 AIR

To assess the cumulative impact of the proposed with present conditions against the relevant air quality standards and goals, it is necessary consider the existing background concentrations of criteria pollutant. According to Pacific Environment, when the maximum predicted ground-level concentration for products of combustion from the EfW are combined with maximum background levels, there are no exceedances of the EPA criteria. The exception to this is particulate matter, which results in a cumulative concentration of 50.9 μ g/m³, which is marginally over the 24-hour PM₁₀ criteria of 50 μ g/m³.

However, this occurs on a day when the background is already high (at 49.2 µg/m3) and the probability of the facility resulting in additional exceedances of the impact assessment criteria is low. It is noted Pacific Environment's cumulative calculations are very conservative and the probability of a maximum observed value occurring at the time of a maximum predicted value is very small.

Future developments in the vicinity of the Facility will have the potential to impact local air quality, and therefore influence the cumulative impact of the area on air quality. There is a finite threshold of acceptable pollutant concentrations. This threshold is defined by the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" (EPA, 2005). Generally speaking the development of an asphalt plant in the local area will release gaseous pollutants, particulate matter, air toxics and odour. Gaseous pollutants, particulate matter, and air toxics are limited by the capacity of the air shed to diffuse these pollutants, and for concentrations to be at a safe level and below the NSW EPA limits.

As odour from the asphalt plant will be of different character than odours generated by the Facility or MPC, cumulative effects of odour should not be considered additive.

In terms of other future developments, the onus is on the proponent to demonstrate their proposed development can operate without adversely impacting upon an air shed which may already be constrained by local land uses. The total cumulative impact

At construction phase, particulate matter emissions are generated by onsite activities, such as earthworks and wheel generated dust on unpaved roads. Again, to maintain the integrity of the local air quality parameters the onus is on the construction operator for effective on site dust manage to mitigate particulate matter emissions.

10 Waste Management

10.1 OVERVIEW

The Director-General's Environmental Assessment Requirements for the Energy from Waste application include the following requirement for environmental assessment of waste management for the proposed Development:

Waste Management - including:

- a description of the classes and quantities of waste that would be thermally treated at the facility;
- 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;
- 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;
- details on the location and size of stockpiles of unprocessed and processed recycled waste at the site;
- 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;
- procedures for the management of other solid, liquid and gaseous waste streams;
- 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; and
- 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.

Environ Consultants were engaged to prepared a *Waste Management Assessment* (attached as **Appendix K**) to address the above requirements. The following sections of the EIS demonstrate the way in which each of the matters identified in the DGRs has been responded to within the detailed documentation that forms part of the application.

The proposed Facility will have a capacity to process up to 1,350,000 tonnes per annum (tpa) and will recover energy from waste that would otherwise be landfilled. The Facility is designed to operate efficiently between a net calorific value (NCV) of 10 and 16.5. At an NCV of 10, the plant will process a maximum of 1,350,000 tpa. At a NCV of 16.5, the Facility will require as low as 820,000 tpa. **Table 18** below presents approximate quantities and composition of waste expected to be processed under normal operating conditions, assuming a NCV of 12.34 and a fuel requirement of 1,105,000 for 4 lines. In Phase 1 this corresponds to 552,500tpa.

10.2 LEGISLATIVE REQUIREMENTS

- Waste Avoidance and Resource Recovery Strategy 2007 (Department of Environment and Climate Change (DECC))
- Waste Classification Guidelines (DECC)

- Environmental Guidelines: Assessment Classification and Management of Non-Liquid and Liquid Waste (NSW EPA)
- Environmental guidelines: Composting and Related Organics Processing Facilities (DEC)
- Environmental guidelines: Use and Disposal of Biosolid Products (NSW EPA)
- Composts, soil conditioners and mulches (Standards Australia, AS 4454)

10.3 ASSESSMENT METHODOLOGY

This Waste Assessment provides a comprehensive assessment of the potential waste management impacts of the proposed Facility and responds to the Director-General's environmental assessment requirements (DGRs) and NSW Environment Protection Authority (EPA) requirements in relation to waste management for the proposed Development, and State and Commonwealth legislative and policy requirements that would apply to the Facility, including the NSW Energy from Waste Policy Statement released in January 2015. In addition, the report demonstrates how the proposed Development is consistent with the waste management hierarchy and State and national waste policies and legislation, and prioritises resource recovery.

10.4 ASSESSMENT OF KEY ISSUES

10.4.1 RESOURCE RECOVERY PROCESS

The Residual Waste Fuel that enters the Facility is residual waste from resource recovery processed that maximise the recovery of material in accordance with EPA Guidelines.

As detailed further below in **Section 10.4.2** input fuel to the Facility originates in part from the Genesis MPC. The compliance of the Genesis MPC in terms of its processing is verified by independent environmental audits to the satisfaction of the NSW Government Departments. The MPC satisfies the criteria set out in the EfW Policy Guidelines, in that it achieves a diversion rate equal to or greater than 75% (the more conservative resource recovery criteria of mixed C&I and C&D).

Residual Waste Fuel from other resource recovery facilities are required require to participate in additional reporting under new POEO regulations. This data can be used by the EPA and/or TNG to ensure third party facilities achieve the diversion rates in the EfW Policy. TNG will also request receipt of reports from third party facilities to verify the reported resource recovery rates of each facility. Proposed auditing and management processes are detailed in **Appendix K**.

10.4.2 SOURCES AND COMPOSITION OF THE RESIDUAL WASTE FUEL

The eligible tonnes received currently across DADI's extensive waste asset portfolio exceed the tonnes required for lines 1 and 2 (552,000tpa).

TNG proposes to delay the construction of the lines 3 and 4 until eligible material inputs for these lines can be confirmed to the satisfaction of the Department of Planning and Environment and the EPA. As lines 1 and 2 operate independently from lines 3 and 4, they can be successfully operated as per the 'tried and tested' approach adopted and operating at similar facilities in the UK and Continental Europe.

TNG has identified and quantified the number of eligible tonnes that are received currently at DADI's facility at Eastern Creek from third party authorised facilities, in addition to the residual from the MPC. Detailed information on the customer, authorised facility location, resource recovery rate, and total tpa will be provided in confidence to the EPA and the Department of Planning and Environment. The design fuel mix has been determined using the waste sources that would be available to TNG today, however the technology employed allows for significant flexibility in composition and quantity of material. The design fuel mix is summarised below.

TABLE 17	- DESIGN FUE	L MIX FOR PHASE 1

DESIGN FUEL	DESCRIPTION	PHASE 1 COMPOSITION	TPA
Chute Residual Waste - Residual Fuel	Residual waste fuel from the MPC after initial sorting and separation process.	23%	129,105
C&D Waste -Residual Fuel	C&D residual waste from authorised facilities including source separation on construction sites	29%	158,533
C&I Waste - Residual Fuel	C&I residual waste from authorised facilities	17%	93,031
Steel Shredding Waste - Residual Fuel	C&I metal recycling residual also known as Flock	14%	79,741
Paper Pulp – Residual Fuel	Residual waste from paper pulp manufacturers processing post- consumer C&I and MSW paper	5%	26,580
Glass Recovery Waste Residual -Fuel Residual	MSW glass recycling facility residual	2%	9,493
GO Waste -Residual Fuel	MSW garden organics (GO) residual waste (domestic GO processing)	2%	11,392
AWT Waste -Residual Fuel	MSW alternative waste treatment facility residual (residual composting)	7%	37,972
MRF Waste -Residual Fuel	MSW material recovery facility residual (dry recyclables processing)	1%	6,645
Total		100%	552,500

The composition of each waste stream is provided in **Table 18** in accordance with the EfW Policy Statement.

TABLE 18 – DESIGN FUEL MIX AND COMPOSITION BY ELIGIBLE EFW POLICY STATEMENT CATEGORIES

PHASE 1	I MIXED C&D			MIXED C&I		SOURCE SEPARATED MSW				TOTAL		
	116,194	158,533	12,910	79,741	93,031	13,290	6,645	9,493	11,392	37,972	13,290	552,500
	21%	29%	2%	14%	17%	2.5%	1%	2%	2%	7%	2.5%	100%
Material Type	CRW	C&D	CRW	Flock Waste	C&I	Paper Pulp	MRF Residual	Glass Residual	GO Residual	AWT Residual	Paper Pulp	
Paper/card	4.3%	14.1%	4.3%	3.9%	22.4%	78.4%	38.5%	62.0%	30.0%	21.1%	78.4%	
Plastic film	10.2%	6.4%	10.2%	16.9%	10.9%	21.6%	26.9%	3.8%	2.5%	20.0%	21.6%	
Dense plastic	0.0%	6.4%	0.0%	1.1%	10.9%	0.0%	0.0%	34.2%	2.5%	21.1%	0.0%	
Textiles	5.3%	0.0%	5.3%	0.2%	12.9%	0.0%	0.0%	0.0%	0.0%	10.5%	0.0%	
Glass	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	8.5%	0.0%	4.0%	0.0%	0.0%	
Vegetation	8.3%	0.0%	8.3%	0.0%	1.7%	0.0%	0.0%	0.0%	35.0%	3.2%	0.0%	
Other	0.0%	0.0%	0.0%	67.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

PHASE 1	MIXED C&D		MIXED C&I				SOURCE SEPARATED MSW					TOTAL
combustible s												
Metal	1.8%	1.1%	1.8%	0.0%	0.4%	0.0%	7.6%	0.0%	5.0%	0.0%	0.0%	
Fines	0.0%	0.9%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	11.6%	0.0%	
Wood	58.2%	43.9%	58.2%	0.9%	21.5%	0.0%	0.0%	0.0%	0.0%	4.2%	0.0%	
Combustible s	0.0%	0.0%	0.0%	9.8%	2.8%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	
Non- combustible s	4.5%	0.0%	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%	21.0%	1.1%	0.0%	
Hazardous	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Gyprock	2.4%	6.5%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Other	5.0%	20.7%	5.0%	0.0%	14.4%	0.0%	18.4%	0.0%	0.0%	5.3%	0.0%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	

10.4.3 CHLORINE CONTENT OF RESIDUAL WASTE FUEL

The following is stated in the IED (Industrial Emissions Directive):

"If hazardous waste with a content of more than 1% of halogenated organic substances, expressed as chlorine, is incinerated, the temperature has to be raised to 1,100°C for at least two seconds"

In the NSW EfW Policy the following is stated:

"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 seconds after the last injection of air"

There is a small, but significant difference between these two texts, with considerable implications for EfW in Australia ("hazardous waste" versus "waste").

PVC is not classified as a hazardous waste in both jurisdictions. Moreover, the IED regulation is not concerned about "chlorine", but about "hazardous waste with halogenated organic substances".

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%. The issue of chlorine is purely technical, e.g. the capability of the flue gas treatment to cope with short-term chlorine peaks as well as long-term chlorine concentrations – whatever level they are. The NSW EPA will consider this proposal of a change to the NSW EfW Policy as discussed with NSW EPA on 12th February 2015.

10.4.4 FUEL ORIGINATING FROM GENESIS MPC

The best practice process at Genesis MPC from which input fuel is derived is described below.

Materials Receivable Delivery, Inspection and Classification

Waste materials are currently delivered to the Genesis Xero Waste Facility by a combination of light, medium and heavy vehicles, with loads typically varying from approximately one to 40 tonnes in weight. The waste received is co-mingled.

Classification of incoming waste is based on advice from the carrier, inspection of the carrier's documentation prepared in accordance with the EPA (2008) *Waste Classification Guidelines* and verification of this information by visual inspection using the weighbridge camera ('Check Point 1').

Small mixed loads that can be unloaded by hand are directed to the hand unload area at the western end of the Genesis Xero Waste Facility. Larger mixed loads are directed to be tipped at the Genesis Xero Waste Facility work floor. Co-mingled wastes, either C&D or C&I, are tipped onto the floor within the Genesis Xero Waste Facility, where a second visual inspection takes place of the contents. Unacceptable wastes which may have eluded identification at the weighbridge are identified at this point and rejected either for disposal by landfilling on site or elsewhere.

<u>Sorting</u>

Where practicable, mixed loads delivered to the Genesis MPC are first segregated by material type and placed in adequate, appropriately labelled bays and bins for transport to appropriate stockpiles for recycling, or to landfill or off-site (as required).

The larger loads tipped at the work floor after inspection and verification are mechanically pre-sorted and inspected by working from the western to the eastern end of the building.

This process ensures the early removal of items that are:

- Easy to remove; and/or
- Unnecessary or undesirable to shred and process through the plant.

Following this pre-sorting process, these metals and other recovered items or materials (gas cylinders, air conditioners, fire extinguishers, colorbond steel sheets, steel beams or girders, copper pipes or wiring etc.) are stored temporarily in large bins within the Genesis Xero Waste Facility from where they are later transported for processing by others.

The remaining co-mingled waste is then fed into the Genesis MPC plant for automatic separation.

Efficient Separation and Processing

Separation machinery used at the Genesis Xero Waste Facility is state-of-the-art and is very efficient at segregating wastes for further processing and recycling, ensuring that recycling is maximised, while residual waste is minimised.

Of the waste loads received at the Genesis Xero Waste Facility that are classified as containing material capable of being recovered or recycled, it is estimated that, on average, 80% of materials will be recovered by sorting, separating and processing, and made available for resale or reuse by other processors. This represents the better and higher re-use of the material indicated by the Waste Avoidance and Resource Recovery Act.

The following waste streams are recovered:

- Road base;
- Aggregates;
- Bitumen road base;
- Landscaping soil;
- Bedding sand;
- Dry shredded wood product (mulch and wood chip);
- Green waste compost;

- Paper;
- Cardboard;
- Fabrics;
- Carpet;
- Gyprock; and
- Polystyrene.

In accordance with the Resource Recovery Criteria of the Energy from Waste Policy, 25% of the total C&D waste processed by the Genesis MPC (the residual) will be used as fuel for the proposed Facility and 50% of the total C&I waste processed can be used as fuel for the proposed Facility. This allowable residual rate is higher than Genesis MPC's recovery rate of between 75% and 80%.

10.4.5 FUEL ORIGINATING FROM OTHER SOURCES

In addition to the 'best practice' process conducted at the MPC, TNG will conduct independent audits using the Green Star criteria for assessment to ensure that all waste streams sent to the Facility comply with the EfW Policy Statement resource recovery criteria.

The new POEO (Waste) Regulations 2014 will require additional reporting from resource recovery facilities. This data can be used by the EPA to assist in ensuring third party facilities achieve the diversion rates in the EfW Policy.

The resource recovery criteria verification process for all residual waste fuels received on site is summarised in the figure below.

FIGURE 26 – RESOURCE RECOVERY VERIFICATION PROCESS PRIOR TO ENERGY FROM WASTE PROCESSING



10.5 WASTE OUTPUTS

The facility will generate the following wastes:

- Ash residue (bottom ash, boiler ash, and APC ash);
- Ferrous material residue;
- Liquid effluent (although not during normal operation);
- Gaseous emissions (pyrolysis gas);

- Staff waste ; and
- Other waste.

Bottom ash

Bottom ash is the burnt-out residue from the combustion process. The specific contaminant concentration of lead and nickel in bottom ash it typically at hazardous levels. However, when applicable leachability is taken into account, the ash can be classified as general solid waste.

Boiler ash

The characterisation of boiler ash is dependent upon in which boiler pass it is accumulated in.

Air pollution control (APC) ash

Flue Gas Treatment (FGT) residue, also known as APC residues, comprise fine particles of ash and residues from the FGT process. APC residue is collected in bag filters and will contain fly ash and reaction products from the hydrated lime scrubber and spent activated carbon. Due to the heavy metals involved in FGT, there is the potential for this waste to be classified as hazardous waste.

Based on a maximum fuel input of approximately 1,350,000 tpa (8,000 hours operation at NCV of 10 MJ/kg and ash content 20%), it is estimated the proposed Facility will generate approximately 51,700 tpa of APC residue.

Based on a fuel input of 1,105,000tpa at design waste composition with NCV of 12.34 MJ/kg the amount of ash (three types) generated at the nominal load (8,000 hours) would be 330,000tpa. Of this, 270,000tpa will be bottom ash (with 20% moisture content due to water absorbed from the quench bath), 5,000tpa will be boiler ash, and 55,000tpa will be APC ash.

Ferrous material residue

Ferrous metals will be removed from the bottom ash by means of magnetic separators (or if adequate pre-treatment, magnet may not be required) and discharged to into bins which are then transported offsite to metal recycler.

Liquid effluent

Liquid effluents will be produced from the boiler water treatment system and from the boiler blow-down. All boiler blow-down and liquid effluent produced will be fed to the ash discharger via the process water system. Under normal operating conditions effluents are returned to the proposed Facility for re-use. As such, the majority of liquid effluent produced on site will either be evaporated or absorbed into the ash for transport off site.

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.

10.6 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

The proposed Facility generates three types of ash; bottom ash, APC ash, and boiler ash. The disposal of these wastes form mitigation measures for the risks of the Facility.

Bottom ash from the grate will be removed by quenching with water and moving it by conveyor to the enclosed ash storage bunker where it is stored prior to being transported off-site. The conveyor passes under a magnetic separator to remove ferrous materials.
APC residue ash will be collected into sealed storage silos and transported via sealed tanker off-site for further treatment or disposal at landfill. In the event APC residue exceeds the criteria for Restricted Solid Waste, the residue will be taken off site to a Hazardous Waste Treatment facility, in line with relevant hazardous waste legislation.

To minimise the concentration of metals, particularly lead and nickel, in the bottom ash and APC residue, residual waste of the Facility, the following measures will be taken:

- 1. Acceptance of C&I and C&D waste streams only from third party authorised facilities;
- 2. Preliminary inspection of waste, source verification and CCTV footage;
- 3. Visual inspection post tipping;
- 4. Contractual tools such as penalties or right of refusal for delivery of waste with high lead
- 5. or nickel concentrations;
- 6. Pre-screening, sorting and separation processes to remove hazardous materials at MPC,
- 7. PSC and/or other authorised facilities;
- Options to immobilise waste will be examined in the event that sorting does not reduce
 lead and nickel concentrations to be able to achieve a 'restricted solid waste'
- 10. classification: and
- 11. Periodic testing of bottom ash.

Boiler ash will be conservatively disposed of with the APC residues, unless it can be proven to be reusable following rigorous testing procedures in compliance with EPA regulations.

TNG will actively engage with the EPA and waste service providers to develop an appropriate means of recycling bottom ash. Options currently under consideration include use in road base and aggregate. The technique employed will be dependent on the ultimate composition of the bottom ash determined by chemical composition testing after commissioning of the Facility.

Objective 3 of the NSW Waste Avoidance and Resource Recovery Strategy 2007 is to 'Divert Waste from Landfill - By 2021/22 increase waste diverted from landfill from 63% to 75%'. The proposed Facility will itself contribute approximately 20% additional diversion from landfill in accordance with the Energy from Waste Policy Statement. Measures implemented at the Facility to ensure ongoing compliance with this objective are:

- Exclusion of waste that has not undergone resource recovery;
- Seek waste for fuel feedstock from resource recovery facilities;
- Inspections of all incoming vehicle loads at the weighbridge to confirm that resource recovery has taken place. Only loads confirmed to consist of residual waste will be allowed to proceed to the tipping hall; and
- Upon arrival at the Facility, all fuels will be weighed, visually checked with CCTV and if necessary sampled. Any deviation from the fuel specification will be noted, and if significant, fuel loads will be rejected.

10.7 SUMMARY AND CONCLUSION

The Facility will be capable of exporting approximately 140 MW of electricity to the grid, amounting to approximately 1,350,000 tonnes per annum (tpa) of waste at full capacity.

Details on the source and composition of residual Waste Fuel to be received at the Facility has been provided, and it has been demonstrated the facility can operate with this fuel profile given the alignment between the Proposed and existing EfW facilities in the UK and Europe which operate successfully with similar fuel and the same, or similar technology to that proposed.

It has also been demonstrated that adequate volumes of Residual Waste Fuel can be sourced for Lines 1 and 2 of the Facility.

The significant anticipated population growth in the Sydney Metropolitan Area, coupled with an increasing per capita consumption rate, is expected to contribute to the quantity of waste generated across all waste streams. It is expected by the time the Facility has been commissioned; sufficient allowable tonnes will exist in the regulated area and in NSW as a whole for the proposed Facility.

11 Air Quality and Ozone

11.1 OVERVIEW

The Director-General's Environmental Assessment Requirements for the Energy from Waste application include the following requirement for environmental assessment of air quality for the proposed Development:

Air Quality and Human Health - including:

- 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;
- a description of construction and operational impacts, including air emissions from the transport of materials;
- 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;
- details of any pollution control equipment and other impact mitigation measures for fugitive and point source emissions;
- 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;
- an examination of best practice management measures for the mitigation of toxic air emissions; and
- details of the proposed technology and a demonstration that it is technically fit for purpose.

Pacific Environment was engaged to prepare an *Air Quality Impact Assessment and Greenhouse Gas Assessment* (attached as **Appendix L**) to address the above requirements. The following sections of the EIS provide a summary of the report and demonstrate the way in which each of the matters identified in the DGRs has been responded to.

The NSW Environment Protection Authority (NSW EPA) has provided 'Agency Requirements' for the Environmental Assessment of the proposed The Next Generation (TNG) Energy from Waste facility (EfW) at Eastern Creek, including a photochemical smog assessment, as follows:

 Include a quantitative photochemical smog assessment in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005)

Accordingly, Pacific Environment was engaged to prepare an Ozone Impact Assessment (Appendix N)

In March 2014 the NSW Environment Protection Authority (EPA) published its Energy from Waste Policy Statement. The EfW Policy Statement requires that any facility proposing to recover energy from waste will need to meet current international best practice. The policy also requires that emissions from EfW facilities must satisfy, as a minimum, current emission limits prescribed by the POEO (Clean Air) Regulations.

The proposed technology for the Facility is based on existing facilities in the United Kingdom and Europe and will incorporate best available technology (BAT) for flue gas treatment. The flue gas treatment is

designed to meet the in-stack concentrations limits for waste incineration set by the EUIED, which are generally more stringent that the Clean Air Regulations. The flue gas treatment system includes:

- Selective Non-Catalytic Reduction (SNCR) for reducing emissions of oxides of nitrogen.
- Dry lime scrubbing for reducing emissions of acid gases, including HCl and SO₂.
- Activated carbon injection for reducing emissions of dioxins and Hg.
- Fabric filters for reducing emissions of particles and metals.
- Following flue gas treatment, emissions will be dispersed via a 100m stack.

A review of existing EfW facilities shows that the facility meets current international best practice and can satisfy the emission limit requirements of the IED.

Odour impacts are addressed in Section 13.

11.2 LEGISLATIVE REQUIREMENTS

- Protection of the Environment Operations (Clean Air) Regulation 2002
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC)
- Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC)

11.3 ASSESSMENT METHODOLOGY

As noted earlier, the EfW Policy Statement indicates that any facility proposing to recover energy from waste will need to meet current international best practice. The EfW Policy Statement also requires that emissions from EfW facilities must satisfy, as a minimum, emission limits prescribed by the Clean Air Regulations.

The proposed technology for the Facility is based on existing facilities in Europe and will incorporate best available technology (BAT) for flue gas treatment. The flue gas treatment is designed to meet the in-stack concentrations limits for waste incineration set by the EU IED. The IED emissions limits are generally more stringent that the Clean Air Regulation limits.

A summary of the technologies used to control emissions from waste incineration at existing EfW facilities is provided below and at **Appendix L.** This summary presents what constitutes current international best practice and demonstrates that existing technology can satisfy the emission limit requirements of the EU IED, and therefore is appropriate for the EfW facility.

The air quality impact assessment was undertaken having regard to the Site context, potential impacts of the proposed Development, consideration of statutory requirements and identification of appropriate mitigation measures. Air quality impacts were assessed at the closest sensitive receptors, including locations such as schools and hospitals, located within the closest residential suburbs of Minchinbury and Erskine Park.

The AERMOD atmospheric dispersion model was selected as a suitable dispersion model due to the source type, location of nearest receiver and nature of local topography. Preliminary iterative modelling was completed and determined that a stack height of 100m was required to demonstrate compliance with the NSW impact assessment criteria.

Modelling predictions for air toxics were assessed against the 99.9_{th} percentile prediction, at and beyond the Site boundary. The ambient concentration of H₂S was assessed against the 99_{th} percentile prediction.

The environmental assessment considered the following requirements with regards to air quality and greenhouse gas emissions:

- The NSW OEH prescribe ambient impact assessment criteria which as outlined in their 'Approved Methods for Modelling and Assessment of Air Pollutants in NSW' (NSW DEC, 2005);
- The Australian Government has committed to reduce its emissions by between 5 and 25 per cent below 2000 levels by 2020. It has also committed to a long term emissions reduction target of at least 60 per cent below 2000 levels by 2050;
- The National Greenhouse and Energy Reporting (NGER) Act requires corporations to register and report emissions, energy consumption or production that meets certain thresholds every year. For GHG emissions, thresholds are currently set at 25,000 tonnes carbon dioxide equivalent (tCO₂e) for a facility under a corporation and 50,000 tCO₂e for a corporation as a whole for 2010-2011 (DCC 2008);
- The NSW Department of Infrastructure, Planning and Natural Resources Department of Energy, Utilities and Sustainability Guidelines for Energy and Greenhouse in EIA provides guidance on the consideration of energy and greenhouse issues when developing projects and when undertaking environmental impact assessment;
- The Greenhouse Gas (GHG) emissions requirements have been considered in the context of the 'State and Territory Greenhouse Gas Inventories for 2008' which outlines targets for GHG emissions in based on the Kyoto accounting. The assessment of GHG emissions considers emissions generated from key components of developments including transport, waste and manufacturing and construction; and
- NSW Environment Protection Authority's Energy from Waste Policy Statement sets out the policy framework and overarching criteria that applies to facilities in NSW proposing to thermally treat waste or waste-derived materials for the recovery of energy. The policy also requires that emissions from EfW facilities must satisfy, as a minimum, current emission limits prescribed by the POEO (Clean Air) Regulations.

The Approved Methods for the Modelling and Assessment of Air Pollutants in NSW according to the NSW EPA 'Approved Methods for the Modelling and Assessment of Air Pollutants in NSW' 2005 state that advice should be sought from the EPA prior to undertaking a quantitative photochemical smog assessment. In accordance with the Approved Methods, Pacific Environment consulted with the EPA and NSW Office of Environment and Heritage (OEH).

At present there are no regulatory documents or policies in the public domain that prescribe the preferred methodology for ozone impact assessment in NSW. The assessment approach adopted by Pacific Environment has been discussed with the EPA. The framework is based on Pacific Environments' understanding of a proposed ozone assessment framework. This application is the first in NSW to be assessed under the ozone assessment framework.

- 1. Classification of region as ozone attainment or ozone non-attainment area. Ozone attainment and non-attainment areas are defined based on comparison with the ambient air quality (NEPMb) goals
- 2. **Emissions Threshold**. Evaluate the annual NOx and VOC emissions from the Facility and compare them with the emission thresholds. Scheduled activities that trigger the relevant emissions threshold are required to assess the significance of the incremental ozone contributions.

The annual NOx emissions for the TNG EfW facility have been estimated based on the facility meeting an in-stack concentration limit of 200 mg/Nm3, expressed as a daily average. Assuming the EfW facility emits NOx at this limit for 333 days a year (or 8,000 hours of the year), the annual NOx load to the Sydney airshed would be in the region of 800 tonnes/year. At this level, ozone assessment is triggered and the next step in the framework is a Level 1 screening assessment.

As agreed with the EPA and OEH, the photochemical grid model (PGM) used in the assessment is the CSIRO's The Air Pollution Model (TAPM), with chemical transport module (TAPM-CTM). A level 2 refined assessment methodology was used.

Two scenarios were examined, a Base Case and Test Case emissions scenario. The Base Case assesses model performance without the facility while the Test Case is used to assess the change in O_3 concentration with the addition of emissions from the facility.

11.4 ASSESSMENT OF KEY ISSUES

The primary emissions from the EfW facility, as defined by emission limits for waste incineration set by the European Union (EU) Industrial Emissions Directive (IED; Directive 2010/75/EU), are anticipated to be as follows:

- Particulate matter (PM), assumed to be emitted as PM₁₀ and PM_{2.5a}.
- Hydrogen Chloride (HCI).
- Hydrogen Fluoride (HF).
- Carbon Monoxide (CO).
- Sulfur Dioxide (SO₂)
- Oxides of nitrogen (NO_x) (expressed as Nitrogen Dioxide (NO₂)).
- Heavy metals (including Mercury (Hg), Cadmium (Cd), Arsenic (As) and Chromium (Cr).
- Gaseous and vaporous organic substances (expressed as total organic carbon (TOC)).
- Dioxins and furans.

In addition to the atmospheric emissions identified in the EU IED, other potential emissions that have been addressed include:

- Hydrogen sulfide (H₂S).
- Chlorine (Cl₂).
- Ammonia (NH₃).
- Polycyclic -aromatic hydrocarbons (PAHs).

A summary of the available air quality data is provided in the Air Quality Report. Generally, air quality for the local area can be described as good, with the exception of isolated high pollution days or extreme events such as dust storms and bushfires.

Photochemical smog, specifically ozone is also assessed at Section 11.4.8.

11.4.1 EMISSIONS DURING NORMAL OPERATIONS

Emission rates for modelling are estimated based on the EfW facility meeting the more stringent limits prescribed in the EU IED. The emission limits prescribed by the IED are expressed as both daily averages and half hourly maximums. Although the limits are based on the IED, the facility will be licenced under the NSW POEO Clean Air Regulation, which uses standards of concentration expressed as a 1-hour block (or the minimum sampling period in the relevant test methods).

Dispersion modelling is therefore based on the higher short term limits (where available), regardless of the averaging period for assessment of impact on ground level concentration (GLCs). In other words, even though the ambient assessment criteria for PM10 are expressed as 24-hour and annual averages, the half hourly IED limit is used for all modelling, not the daily average so as to provide worst case emissions scenario.

In the main, the emission rates (g/s) adopted for modelling of each stack presented in **Table 19**, are derived from the concentration limits (mg/Nm3) and flue gas flow rate per stack (Nm3/s) described in **Appendix L.**

Where emission limits are not available as part of the EU IED the emission limits from the Clean Air Regulation have been adopted, as in the case for H2S.

In the case of Cl2, the Clean Air Regulation limit (200 mg/m3) is considered inapplicable (overly high) to be used to estimate the mass emission rate of this compound. Rather, the EU IED limit for HCl (60 mg/m3) is considered a more appropriate in-stack concentration upper limit for Cl2.

A summary of the predicted ground level concentration (GLC) for each pollutant is presented in the **Table 19** below. GLCs are presented at and beyond the Site boundary, as well as the maximum prediction at sensitive receptors.

Pollutant	Averaging period	Units	Criteria	Highest prediction at and beyond site boundary	Highest prediction at sensitive receptor
	1 hour	µg/m³	246	159	96
NO2 ⁽⁴⁾	Annual	µg/ m³	62	5.1	4.1
	10-minute	µg/ m³	712	149	90
50	1 hour	µg/ m³	570	80	48
3U ₂	24 hours	µg/ m³	228	15	11
	Annual	µg/ m³	60	2.5	2.0
	15-minute	mg/ m³	100	0.06	0.04
со	1 hour	mg/ m³	30	0.04	0.02
	8 hours	mg/ m³	10	0.02	0.01
DM.	24 hours	µg/ m³	50	2.27	1.67
F 1VI 10	Annual	µg/ m³	30	0.38	0.31
DM.	24 hours	µg/ m³	25	2.27	1.67
F1V12.5	Annual	µg/ m³	8	0.38	0.31
HCI	1 hour	mg/ m³	0.14	0.017	0.014
	24 hours	µg/ m³	2.9	0.30	0.22
	7 days	µg/ m³	1.7	0.10	0.07
nr	30 days	µg/ m³	0.84	0.10	0.06
	90 days	µg/ m³	0.5	0.07	0.06
Cd (b)	1 hour	mg/ m³	0.000018	0.000014	0.000011
Hg (b)	1 hour	mg/ m³	0.00018	0.00001	0.00001
Dioxins and furans	1 hour	mg/ m³	2.00E-09	2.79×1011	2.27x10-11
TOC (as benzene) (b)	1 hour	mg/ m³	N/A	0.0056	0.0045
NH3 (b)	1 hour	mg/ m³	0.33	0.0010	0.0008
H ₂ S (c)	1 hour	µg/ m³	1.38	0.6775	0.0033
PAH (as benzo(a)pyrene) (b)	1 hour	mg/ m³	0.0004	2.79x10-7	2.27x107

TABLE 19 - SUMMARY OF PREDICTED GROUND LEVEL CONCENTRATIONS DURING NORMAL OPERATIONS

In summary, it was found that:

- The maximum predicted 1-hour NO2 is 39% of the impact assessment criterion, even assuming 100% conversion from NOx to NO2
- The maximum predicted annual NO2 is 7% of the impact assessment criterion.
- The maximum predicted 10-minute SO2 is 13% of the impact assessment criterion, for 1-hour 8%, for 24-hour SO2, 5% and for annual, 3%.
- The maximum predicted 24-hour PM is 3% of the impact assessment criterion for PM10 and 7% of the advisory reporting standard for PM2.5.
- The maximum predicted annual PM is less than 1% of the impact assessment criterion for PM10 and 3.8% of the advisory reporting standard for PM2.5.
- The maximum predicted CO 15-minute; 1-hour and 8-hour averaging periods are 0.1% or less than the relevant impact assessment criterion.
- The maximum predicted 24-hour HF is 8% of the impact assessment criterion, for 7-day 4%, for 30day SO2, 7% and for 90-day, 11%.

Modelling predictions for air toxics and individual odour compound H2S were assessed against the 99.9th percentile prediction, at and beyond the Site boundary. In summary, the modelling results showed:

- The 99.9th percentile predicted HCl is 12% of the impact assessment criterion.
- The 99.9th percentile predicted cadmium is 77% of the impact assessment criterion.
- The 99.9th percentile predicted mercury is 8% of the impact assessment criterion.
- The 99.9th percentile predicted dioxins and furans are 1% of the impact assessment criterion.
- The 99.9th percentile predicted TOC (as benzene) is 19% of the impact assessment criterion.
- The 99.9th percentile predicted NH₃ is 0.3% of the impact assessment criterion.
- The 99.9th percentile predicted PAH (as benzo(a)pyrene) is 0.1% of the impact assessment criterion.
- The 99th percentile predicted H₂S is 49% of the impact assessment criterion.

11.4.2 EMISSIONS DURING START-UP / SHUT-DOWN CONDITIONS

A clean auxiliary support fuel will be used in the incinerator to regulate the temperature. It is understood that the fuel would comprise diesel, with all emissions released from the 100m stack. The emissions from the combustion of diesel fuel would burn significantly cleaner than the residual waste fuel. Additionally, start-up and shut down occurrences will be infrequent. As such, impacts of emissions from start-up shut-down occurrences were not considered necessary for further assessment.

11.4.3 EMISSIONS DURING UPSET CONDITIONS

In the absence of monitoring data for upset conditions from existing facilities, worst-case assumptions have been made following consultation with the UK Environment Agency based on their knowledge of plausible upset emissions for key pollutants.

The plausible emissions during upset conditions developed in association with the UK Environment Agency are shown in **Table 20** below; along with the applicable Clean Air Regulation limit and the percentage such upset conditions would contribute to this limit. Also provided are the mass emission rates adopted in the dispersion modelling.

TABLE 20 – EN	MISSIONS DURIN	G UPSET CONDI	ITIONS (WORST	CASE SCENARIO)

Emission parameter	POEO Regulation limit (mg/m³) (a)	Plausible n-stack concentration during upset conditions (mg/m ³) ^(a)	Percentage above POEO Regulation limit	Mass emission rate used to model upset conditions (g/s)
Oxides of Nitrogen (NO _x expressed as NO ₂)	500	393	79%	76.2
SO2	n/a	321	n/a	62.7
со	125	71	57%	13.9
PM	50	107	214%	20.9
HCI	n/a	643	n/a	125.4
HF	n/a	64	n/a	12.5
Cd	0.20	0.5	268%	0.1
Hg	0.20	0.5	268%	0.1
TOC (as benzene)	40	14	36%	2.8
NH ₃ (b)	n/a	10	n/a	1.4

Very high emission rates due to upset conditions are unlikely, would occur rarely and only for a short time because plant shutdown would likely be an imminent consequence.

A summary of the predicted maximum ground level concentrations (GLCs) for each pollutant during upset conditions is presented in **Table 21**. GLCs are presented at and beyond the Site boundary, as well as the maximum prediction at sensitive receptors. Predictions above the relevant NSW impact assessment criterion are shown in bold.

Long term averaging periods (annual, 90 day, 30 day, 7 day and 1 day) have not been included. This is because the any upset emission scenario is anticipated to last a maximum of a matter of hours (likely less). Therefore prediction over longer averaging periods is not relevant for this scenario.

Pollutant	Averaging period	Units	Criterion	Highest prediction at and beyond site boundary	Highest prediction at sensitive receptor
NO ₂ (a)	1 hour	µg/m³	246	219	132
	10-minute	µg/ m³	712	336	202
502	1 hour	µg/ m³	570	179	108
	15-minute	mg/ m³	100	0.06	0.04
со	1 hour	mg/ m³	30	0.04	0.02
HCI	1 hour	mg/ m³	0.14	0.25	0.20
Cd (b)	1 hour	mg/ m³	0.000018	0.00021	0.00017
Hg (b)	1 hour	mg/ m³	0.00018	0.00021	0.00017
Dioxins and furans	1 hour	mg/ m³	2.00E-09	2.79E-09	2.27E-09
TOC (as benzene) (b)	1 hour	mg/ m³	N/A	0.0056	0.0045
NH3 (b)	1 hour	mg/ m ³	0.33	0.0028	0.0023

	CLINWARDA	OF DREDICTED		CONCENTRATIONS	DI IDINIC LIDGET	CONDITIONIC
TADLL ZT -		OFFREDICIED	GROUND LLVLL	CONCLINERATIONS	DURING UF SLT	CONDITIONS

Modelling results for criteria pollutants are assessed against the maximum prediction at sensitive receptors. In summary, the modelling results show that during upset conditions:

- The maximum predicted 1-hour NO₂ is 54% of the impact assessment criterion, even assuming 100% conversion from NO_x to NO₂
- The maximum predicted 10-minute SO₂ is 28% of the impact assessment criterion, and for 1-hour 19%.
- The maximum predicted CO 15-minute, and 1-hour averaging periods are 0.1% or less than the relevant impact assessment criterion.

Modelling predictions for air toxics are assessed against the 99.9th percentile prediction, at and beyond the Site boundary and indicate under upset conditions:

- ▶ The 99.9th percentile predicted HCl is 179% of the impact assessment criterion.
- > The 99.9th percentile predicted cadmium is approximately ten times the impact assessment criterion.
- > The 99.9th percentile predicted mercury is 116% of the impact assessment criterion.
- ▶ The 99.9th percentile predicted dioxins and furans are 139% of the impact assessment criterion.
- > The 99.9th percentile predicted TOC (as benzene) is 19% of the impact assessment criterion.
- > The 99.9th percentile predicted NH₃ is 0.8% of the impact assessment criterion.

The pollutants predicted to exceed the NSW impact assessment criteria include HCI, Cd, Hg and dioxins / furans.

Adopting a design to the requirements of the EU IED entails that such events shall under no circumstance occur for more than four hours uninterrupted where the emission values exceed the limits and no more than 60 hours per year. The probability that upset conditions will actually result in adverse air quality impacts at ground level is therefore a function of the maximum allowable hours of upset per year (60/8,760) multiplied by the predicted frequency of exceedances per annum for each pollutant. The resultant probabilities are therefore:

- HCI 0.001% probability
- Cd 0.077% probability
- Hg– 0.0004% probability.
- Dioxins and furans 0.001% probability.

Based on the above it can be inferred that in reality, the probability of the above pollutants resulting in adverse air quality impacts at ground level due to upset conditions would be extremely low.

11.4.4 EMISSION DURING EMERGENCY CONDITIONS

The primary emissions during emergency conditions will be released from the operation of the emergency diesel generators. During such times emissions would typically comprise NO_x, CO and PM (PM₁₀ and PM_{2.5}). Other pollutants, such as organic compounds, may also be released.

In view of the infrequent requirement for emergency generators (i.e. during emergency situations only) in addition to the anticipated single hour of operation each month (~12 hours per year) the potential air quality impacts of the emergency generators have not been addressed quantitatively. Rather, it is considered that the relatively large distance between the EfW facility and the nearest sensitive receptors, combined with the highly infrequent use of this equipment, would ensure this aspect of the EfW facility would not pose a significant potential for adverse impacts.

11.4.5 EMISSIONS OF OXIDES OF NITROGEN

Nitrogen oxides (NO_x) are emitted from combustion and are comprised mainly of nitric oxide (NO) and nitrogen dioxide (NO₂). Typically, at the point of emission, NO_x would consist of approximately 90-95% of NO and 5-10% of NO₂. The dominant mechanism for short-term conversion of NO to NO₂ is through oxidation with atmospheric ozone (O₃) as an exhaust plume travels from source. Therefore, to predict the ground-level concentration of NO₂ (regulated oxide of nitrogen) it is important to account for the transformation of NO_x to NO₂. Ultimately, all NO emitted into the atmosphere will be oxidised to NO₂ and to other higher oxides of nitrogen. The rate at which this oxidation takes place depends on prevailing atmospheric conditions including temperature, humidity and the presence of other substances in the atmosphere such as O₃. It can vary from a few minutes to many hours. If the dispersion is sufficient to have diluted the plume to the point where the concentration is very low, it is unimportant that the oxidation has taken place. However, if the oxidation is rapid then high concentrations of NO₂ can occur when inadequate dispersion / dilution conditions exist. For this report we have conservatively assumed 100% conversion of NO_x to NO₂.

11.4.6 FUGITIVE DUST EMISSIONS AND CONSTRUCTION

Residual waste fuel would be transported onsite via sealed roads. The use of sealed roads is considered an effective management strategy in the reduction of fugitive dust emissions, specifically those related to wheel generated dust emissions.

The tipping hall building will also operate under negative pressure whereby air within the building will be used as excess air for the boilers, limiting the release fugitive dust emissions generated within the shed to the ambient environment (as this will subsequently pass through the FGT's bag house).

The EfW facility is considered to have minimal potential for the generation of fugitive dust emissions provided good dust management practices are adhered to. Therefore this aspect has not been addressed further.

The main air pollution and amenity issues at construction sites are:

- Annoyance due to dust deposition (soiling of surfaces) and visible dust plumes.
- Elevated PM₁₀ concentrations due to dust-generating activities.
- Exhaust emissions from diesel-powered construction equipment.

Exhaust emissions from on-site plant and site traffic are unlikely to have a significant impact on local air quality. Very high levels of soiling can also damage plants and affect the health and diversity of ecosystems.

The risk of dust impacts from a demolition/construction site causing loss of amenity and/or health or ecological impacts is related to the nature and duration of the activities being undertaken, the size of the site, current meteorological conditions, proximity and sensitivity of receptors, and adequacy of the mitigation measures applied to reduce or eliminate dust.

Any effects of construction on airborne particle concentrations would also generally be temporary and relatively short-lived.

11.4.7 GREENHOUSE GAS ASSESSMENT

The emission intensity for electricity generated from waste incineration is lower than that derived from the NSW electricity grid and therefore a net reduction in GHG emissions is achieved when electricity from the proposed Facility is exported to the NSW grid.

Similarly, by diverting biodegradable wastes from landfill, significant emissions of methane from the decomposition of waste is avoided.

The operation of the Facility would have a net positive GHG impact, potentially avoiding 1.5 million tonnes of CO₂-e per annum.

11.4.8 PHOTOCHEMICAL SMOG

Ozone is the principal component of photochemical smog, which is typically formed several hours after the precursors (NO_x and VOCs) are emitted. The highest concentrations of ozone normally occur on summer afternoons in areas downwind of major sources of the precursors. The dominant ozone precursor released from the facility is NO_x .

Ground-level ozone continues to be a problem in Sydney during summer months. At ground level, elevated ozone concentrations can cause health and environmental problems. As well as affecting vegetation growth and damaging materials such as rubber, fabric, masonry, and paint, it can also reduce visibility.

Two scenarios were examined, a Base Case and Test Case emissions scenario.

Six days were selected for detailed analysis of impact based on high ozone concentrations when the model performs well. The analysis shows that the difference between the maximum 1-hour and 4-hour O3 for the Base Case and Test Case, across the region, may be above the maximum allowable increase of 1 ppb on specific occasions and at locations.

Further, while incremental O3 concentrations are predicted to be greater than 1 ppb on particular hours at particular locations, these do not relate to periods of time or locations where the maximum concentrations are occurring, nor at concentrations that are predicted to exceed the NEPM ambient O3 criteria. In other words, while the value of 1 ppb is predicted to occur on occasion under the Test Case scenario, this ozone formation is predicted to occur during periods when ambient ozone is low (and thus of lesser concern).

It is noted that a reasonable worst case Test Scenario assumes that both stacks are continuously operating at the EU IED daily emission limit. Typically during normal operations of the plant, the emission levels are anticipated to be lower, and well within the limit value.

11.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

11.5.1 CUMULATIVE IMPACTS

Under normal operating conditions, there are no exceedances of the EPA criteria when the EfW facility contribution is added to maximum background, with the exception of PM, which results in a cumulative concentration marginally above the 24-hour PM10 criterion of 50 μ g/m3. However, this occurs on a day when the background PM concentration is already high (at 49.2 μ g/m3) and the probability of the facility resulting in additional exceedances of the impact assessment criterion is considered to be low.

Under upset conditions, when the maximum predicted GLCs for products of combustion from the EfW facility are combined with maximum background levels, the cumulative concentrations of these GLCs is above the criteria for NO2, SO2, and CO. This provides a very conservative estimate of cumulative impact as the probability of a maximum observed value occurring at the time of a maximum predicted value is extremely small.

The NOx load based licensing threshold is 2.5 tonnes/year. Based on the anticipated NOx emissions of 800 tonnes/year the EfW exceeds this threshold and it is therefore anticipated that the EfW facility will be subject to a load based licence limit on total NOx emissions, as well as summertime NOx emissions, prescribed by EPA on issuance of the EfW facility's EPL.

11.5.2 MITIGATION MEASURES

All calculated predicted in-stack concentrations comply with the relevant Clean Air Regulation limits (demonstrated in **Table 22** below), and as such, mitigation measures are not required.

Emission parameter	POEO Regulation limit (mg/m³)	Modelled In-stack concentration (mg/m³)
Oxides of Nitrogen (NOx expressed as NO ₂)	500	286
SO ₂	n/a	143
CO	125	71
PM	50	22
HCI	n/a	43
HF	n/a	3
Cd	0.20	0.04
Hg	0.20	0.04
Dioxins and furans	1.0x10-7	1.0x10-7
TOC (as benzene)	40	14
NH3	n/a	3
H2S	5	4
PAH (as benzo(a)pyrene)	n/a	5.1x10-4

TABLE 22 – PREDICTED IN-STACK CONCENTRATIONS AGAINST APPLICABLE REGULATION LIMIT

The EfW Policy Statement indicates that any facility proposing to recover energy from waste will need to meet current international best practice. The EfW Policy Statement also requires that emissions from EfW facilities must satisfy, as a minimum, emission limits prescribed by the Clean Air Regulations.

The proposed technology for the Facility is based on existing facilities in Europe and will incorporate best available technology (BAT) for flue gas treatment. The flue gas treatment is designed to meet the in-stack concentrations limits for waste incineration set by the EU IED. The IED emissions limits are generally more stringent that the Clean Air Regulation limits.

A summary of the technologies used to control emissions from waste incineration at existing Energy from Waste facilities is provided in **Table 23** and presented in **Appendix L** to examine what constitutes current international best practice. This summary demonstrates that existing technology can satisfy the emission limit requirements of the IED, and therefore with adoption the proposed Facility will meet the limit requirements of the IED, and no mitigation methods are required.

TABLE 23 -	GENERAL	GOOD PRA	ACTICE PR	OCEDURES		CONTROL
TADLE 25 -	OLINEIKAL	0000110		OOLDOILD/	TROOLOO	CONTROL

Process	Details			
Types of waste received	The technology has been chosen having regard to the characteristics of waste received, which are well known from the operation of the existing Genesis facility., and based on a minimum calorific value of 12.34 MJ/kg.			
	A quality control process will be established for waste received at the facility.			
Maintenance	Regular maintenance will ensure equipment remains in good working order			
Combustion	The furnace and boiler technology is designed for optimal combustion performance			
	Proposed use of automated combustion control system, including control and optimisation of oxygen supply, temperature, residence time.			
	Air injection			
	Minimising uncontrolled ingress of air into combustion chamber during loading.			
	Minimise start up / shut downs			
	Preheating the combustion chamber for lower calorific wastes.			
Monitoring	The facility will employ a Continuous Emissions Monitoring System (CEMS).			

TABLE 24 – BAT FOR FLUE GAS TREATMENT

Substance	BAT	Comments
Particles	Fabric filters / bag filters Cyclones Electrostatic precipitators	Fabric filters are generally sufficient to meet the emissions limits than prescribed by the EU Waste Incineration Directive and typically employed at existing EfW facilities.
Hydrogen chloride (HCl) Hydrogen Fluoride (HF) Sulfur Dioxide (SO2)	Waste control Wet scrubbers Dry and semi dry scrubbers	Wet FGT results in lowest emissions; however Dry FGT has the co-benefit of removing PCDD/F and mercury (with addition of activated carbon injection). Dry/semi dry most commonly employed at existing EfW facilities.
Oxides of Nitrogen (NOx)	Reduction of thermal NOx through combustion control and Flue Gas Recirculation Selective Catalytic Reduction (SCR) Selective Non Catalytic Reduction (SNCR)	Waste and combustion control with SNCR/SCR can generally result in emissions within limits prescribed by the EU Waste Incineration Directive. SNCR typically employed at existing EfW facilities.
Carbon Monoxide Gaseous and various organic substance (TOC)	Combustion control	Activated carbon injection may provide additional benefit of VOC control.
Mercury	Wet scrubbing with injection Activated carbon injection Condensing scrubbers Resin filters	Adsorption using carbon based reagents generally needed to meet limits prescribed by the EU Waste Incineration Directive. Activated carbon injection typically employed at existing EfW facilities.
Metals	Activated carbon injection Fabric filters	Techniques that control dust will also control metal emissions and fabric filters commonly used. Activated carbon injection additionally controls volatile metals (Hg).
Dioxins and Furans (PCDD/F)	Primary (combustion control) techniques, flue gas recirculation Selective Catalytic Reduction (SCR) Catalytic filter bags Adsorption by activated carbon injection / static beds Wet scrubbing with carbon injection / carbon slurries	Secondary abatement generally needed in combination with primary (combustion control) to meet limits prescribed by the EU Waste Incineration Directive.

Ammonia slippage from a SNCR system (i.e. surplus NH3 going to atmosphere) normally constitutes instack concentrations of between 1 mg/Nm³ and 10 mg/Nm³, with an average of 4 mg of NH3/Nm³. It is noted that the 99.9th percentile predicted NH3 is 0.3% of the impact assessment criterion during upset conditions.

The emission performance of a number of case studies was examined by Pacific Environment, including a number of facilities which use HZI technology (technology proposed for the Facility). Most of the case studies apply the same flue gas treatment as the proposed Facility.

The data reviewed in the case studies demonstrate that emissions consistently meet the IED limits.

HZI has also provided a summary of heavy metals emissions from a number of reference plants in the UK which employ semi-dry FGT (as is proposed for the EfW facility). These results show that emissions of Hg and Cd are an order of magnitude below the EU IED limits.

A proportion of the residual waste fuel will be transported onsite via sealed roads. The use of sealed roads is considered an effective management strategy in the reduction of fugitive dust emissions, specifically those related to wheel generated dust emissions.

The tipping hall building will also operate under negative pressure whereby air within the building will be used as excess air for the boilers, limiting the release fugitive dust emissions generated within the shed to the ambient environment (as this will subsequently pass through the FGT's bag house).

The National Greenhouse and Energy Reporting Regulations 2008 (the NGER Regulations) describe the detailed requirements for reporting under the NGER Act 2007. The NGER Technical Guidelines outline calculation methods and criteria for determining GHG emissions, energy production, energy consumption and potential GHG emissions embodied in natural gas. Under the NGER Act, Scope 1 and 2 emissions will be accounted for by the DADI.

In terms of ozone impacts, during normal operation of the plant, the emission levels are generally expected to be well within the limit value. The facility will employ Best Available Technology (BAT) in the form of Selective Non-Catalytic Reduction (SNCR) for reducing emissions of NOx, the dominant ozone precursor released from the facility. VOCs will be minimised through combustion control with additional controls afforded from activated carbon injection as part of the flue gas treatment.

11.6 SUMMARY AND CONCLUSION

The proposed technology for the EfW facility is based on existing facilities in the UK and rest of Europe and will incorporate best available technology (BAT) for flue gas treatment, designed to meet the stringent in-stack concentrations limits for waste incineration set by the Industrial Emissions Directive (IED).

Dispersion modelling predictions are made based on the proposed Facility meeting the stringent limits prescribed in the IED and the results show:

Results for dispersion modelling predictions for normal operations show:

- The maximum predicted 1-hour NO2 is 39% of the impact assessment criterion, even assuming 100% conversion from NO_x to NO₂
- The maximum predicted annual NO₂ is 7% of the impact assessment criterion.
- The maximum predicted 10-minute SO₂ is 13% of the impact assessment criterion, for 1-hour 8%, for 24-hour SO₂, 5% and for annual, 3%.
- The maximum predicted 24-hour PM is 3% of the impact assessment criterion for PM₁₀ and 7% of the advisory reporting standard for PM_{2.5}.
- The maximum predicted annual PM is less than 1% of the impact assessment criterion for PM₁₀ and 3.8% of the advisory reporting standard for PM_{2.5}.
- The maximum predicted CO 15-minute, 1-hour and 8-hour averaging periods are 0.1% or less than the relevant impact assessment criterion.
- The maximum predicted 24-hour HF is 8% of the impact assessment criterion, for 7-day 4%, for 30-day SO₂, 7% and for 90-day, 11%.

Modelling predictions for air toxics are assessed against the 99.9th percentile prediction, at and beyond the Site boundary. The individual odour compound H₂S is assessed against the 99th percentile prediction.

In summary, the modelling results show:

- The 99.9th percentile predicted HCl is 12% of the impact assessment criterion.
- The 99.9th percentile predicted cadmium is 77% of the impact assessment criterion.
- The 99.9th percentile predicted mercury is 8% of the impact assessment criterion.
- The 99.9th percentile predicted dioxins and furans are 1% of the impact assessment criterion.
- The 99.9th percentile predicted TOC (as benzene) is 19% of the impact assessment criterion.

- The 99.9th percentile predicted NH3 is 0.3% of the impact assessment criterion.
- The 99.9th percentile predicted PAH (as benzo(a)pyrene) is 0.1% of the impact assessment criterion.
- The 99th percentile predicted H₂S is 49% of the impact assessment criterion.

Modelling is based on the proposed Facility emitting at the IED limits. Based on this, the prediction for cadmium is 79% of the impact assessment criteria. However, during normal operations emissions will be significantly lower than this limit, as demonstrated by monitoring data from existing facilities.

Cumulative predictions for normal operations show there will be no exceedances of the EPA criteria when the Facility contribution is added to maximum background, which the exception of PM, which results in a cumulative concentration marginally over the 24-hour PM₁₀ criteria of 50 μ g/m₃. However, this occurs on a day when the background is already high (at 49.2 μ g/m₃) and the probability of the proposed Facility resulting in additional exceedances of the impact assessment criteria is low.

The results of the modelling during upset conditions indicate that several pollutants are predicted to exceed the relevant short-term impact assessment criteria, including HCI, Cd, Hg and dioxins / furans. A probabilistic approach has been adopted to evaluate the probability of occurrence. Results indicate that the probability of the above pollutants resulting in adverse impacts at nearest sensitive receptors would be less than 0.1%.

A semi-quantitative screening assessment of construction phase impacts identified no human receptors within 350 m of the boundary of the Site. The screening assessment concluded no detailed assessment of construction phase impact is required and routinely employed 'good practice' mitigation measures for construction sites would be sufficient to control dust impacts to acceptable levels.

Consistent with the NSW EPA Energy from Waste Policy Statement, emission monitoring with real time feedback to will be carried out. The facility will employ a Continuous Emissions Monitoring System (CEMS).

The operation of the proposed Facility would have a net positive GHG effect, potentially eliminating 1.5 million tonnes of CO₂-e per annum. The emission intensity for electricity generated from waste incineration is significantly lower than that derived from the current NSW electricity grid.

In terms of ozone impacts, during normal operation of the plant, the emission levels are generally expected to be well within the limit value.

12 Human Health

12.1 OVERVIEW

The Director-General's Environmental Assessment Requirements for the Energy from Waste application include the following requirement for environmental assessment of air quality for the proposed Development:

Human Health - including:

 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.

The Facility will be designed to meet the emission limits contained within the Chapter IV and Annex VI of the Industrial Emissions Directive (IED) (Directive 2010/75/EU) for waste incineration and co-incineration plants.

Fichtner Consulting Engineers has been engaged by TNG to prepare a Human Health Risk Assessment Air (submitted at **Appendix O**) to meet the DGRs.

12.2 LEGISLATIVE REQUIREMENTS

The *Human Health Risk Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Facility:

- Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards. Department of Health and Ageing and enHealth Council, Commonwealth of Australia (enHealth Guidelines).
- Australian Exposure Factor Guidance: Guidelines for Assessing Human Health Risks from Environmental Hazards. Department of Health and Ageing and enHealth Council, Commonwealth of Australia.
- National Environment Protection (Assessment of Site Contamination) Measure 1999. National Environment Protection Council, as amended and in force on 16 May 2013.

12.3 ASSESSMENT METHODOLOGY

In 2012, the enHealth committee in Australia published the document "Environmental Health Risk Assessment – Guidelines for assessing human health risks from environmental hazards", referred to as the enHealth Guidelines. The enHealth Guidelines describe the five stages of Environmental Health Risk Assessment (EHRA):

- 1. Issue identification;
- 2. Hazard identification;
- 3. Dose-response assessment;
- 4. Exposure assessment for the relevant population; and
- 5. Risk characterisation.

The enHealth guidelines note that for planning purposes the amount of detail required when identifying the hazard will be limited to the identification of the relevant national or international guideline values for each substance identified as requiring assessment.

The enHealth guidelines state that the "dose-response assessment" should examine the qualitative relationships between exposure and the effects of concern. This assessment uses national and international guideline values when quantifying the long term impact of the proposed Facility on human

health. As these values are well established and based on dose-response research, it is not considered necessary to provide a review of underpinning research for the purposes of this assessment.

The "exposure assessment" can be split into a number of subsections namely:

- 1. A conceptual site model where source and pathways should be identified;
- 2. Identification of sensitive receptors; and
- 3. Quantification of exposure where the exposure via the different pathways identified should be quantified.

The conceptual site model is summarised below and outlined in more details within the HRRA (**Appendix** \mathbf{O}).

12.3.1 CONCEPTUAL SITE MODEL

A detailed Health Risk Assessment has been carried out using the Industrial Risk Assessment Program-Human Health (IRAP). The programme is based on the United States Environment Protection Agency (USEPA) Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities.

The exposure pathways included in the IRAP model are shown below.

FIGURE 27 - CONCEPTUAL SITE MODEL.



IRAP implements the exposure assessment calculations described in the enHealth guidelines. Exposure to gaseous contaminants has the potential to occur by direct inhalation or vapour phase transfer to plants. In addition, exposure to particulate phase contaminants may occur via indirect pathways following the deposition of particles to soil. These pathways include ingestion of soil and dust, uptake of contaminants from soil into the food-chain (through home-grown produce and crops), and direct deposition of particles onto above ground crops.

The pathways through which inhalation and ingestion occur and the receptors that have been considered to be impacted via each pathway are:

- Direct inhalation All receptors
- Ingestion of soil All receptors
- Ingestion of home-grown produce All receptors
- Ingestion of drinking water All receptors
- Ingestion of eggs from home-grown chickens Only farms
- Ingestion of home-grown chickens Only farms
- Ingestion of home-grown beef Only farms
- Ingestion of home-grown pork Only farms
- Ingestion of home-grown milk Only farms
- Ingestion of breast milk Infants only

The IRAP modelling assumptions and user defined inputs are outlined in the HHRA and include modifications to account for differences between the Australian and European/American lifestyle.

This assessment considers the possible effects on human health within the residential areas of Minchinbury to the north, Erskine Park to the west, and Horsley Park to the south. It is also noted that the adjacent Eastern Creek Industrial Estate will include workers. These receptors will be exposed to emissions via inhalation.

IRAP allows for sensitive areas to be defined. The maximum impact over the defined area is then used for the basis of the calculations. The point of maximum impact has been determined based on the maximum predicted annual mean process contribution. This point is not within the residential areas. For the purpose of this worst case assessment, two receptors have been considered - a farmer and a general resident.

The substances which have been considered within this assessment are those which are listed above and included in the NSW guidance document as "toxic air pollutants", or included in the USEPA HHRAP COPC database for the assessment of long term health effects. Although Emission Limit Values for PAHs are not currently set from installations, monitoring is required by legislation in the UK. Therefore, benzo(a)pyrene has been included in the assessment to represent PAH emissions. The following have been considered COPC for the purpose of this assessment:

- PCDD/Fs (individual congeners) and dioxin like PCBs;
- Hydrogen chloride
- Benzene
- Benzo(a)pyrene
- Mercury (Hg)

- Mercuric chloride
- Cadmium (Cd)
- Thallium (TI)
- Antimony (Sb)
- Arsenic (As)
- Chromium (Cr), trivalent and hexavalent
- Lead (Pb); and
- Nickel (Ni).

This risk assessment investigates the potential for long term health effect of these COPC through other routes than just inhalation.

12.4 ASSESSMENT OF KEY ISSUES

The key issue is the release of substances from the proposed Facility to atmosphere which have the potential to harm human health. The proposed Facility is to be located in Eastern Creek, approximately 36km west of the Sydney CBD and surrounded by the residential areas of Minchinbury, Mt Druitt and Rooty Hill to the northwest. The closest of these residential areas is approximately 1km to the north of the proposed Facility. Due to the proximity of the residential receptors there is the potential for emissions to impact upon human health.

The proposed Facility will be designed to meet the emission limits outlined in the Industrial Emissions Directive (2010/75/EU). Limits have been set for pollutants known to be produced during the combustion of waste which have the potential to impact upon the local environment either on human health or ecological receptors. These pollutants include:

- Nitrogen dioxide, sulphur dioxide, particulate matter, carbon monoxide, ammonia;
- Acid gases hydrogen chloride, and hydrogen fluoride;
- Total organic carbon;
- Metals mercury, cadmium, thallium, antimony, arsenic, lead, cobalt, copper, manganese, nickel and vanadium;
- Dioxin and furans;
- Dioxin like PCBs; and
- Polycyclic aromatic hydrocarbons (PAHs).

For most substances released from the proposed Facility, the most significant effects on human health will arise by inhalation. An Air Quality Assessment (**Appendix L**) has been undertaken to determine the impact of atmospheric concentrations of the pollutants listed above for which the Council of Australian Governments (COAG) have set limit levels within the National Environmental Protection Measure for Ambient Air Quality (Ambient Air-NEPM).

These levels have been set at a level which is considered to present minimum or zero risk to human health. It is widely accepted that, if the concentrations in the atmosphere are less than the criteria, then the pollutant is unlikely to have an adverse effect on human health. This is the case for most pollutants released by the proposed Facility, specifically oxides of nitrogen, oxides of sulphur, carbon monoxide, hydrogen fluoride, and particulates.

Details of the impacts of these pollutants on local air quality can be found in the Air Quality Assessment at **Appendix L**.

The assessment considers the possible effects on human health within the residential areas of Minchinbury to the north, Erskine Park to the west, and Horsley Park to the south. Reference should be made to the Air Quality Assessment which includes a map with these sensitive receptors highlighted.

A worst case scenario has also been considered, which is a receptor at the point of maximum impact from annual mean process emissions. This point is not within the residential areas. For the purpose of this worst case assessment two receptors have been considered - a farmer and a general resident.

The impact has been predicted for a residential receptor in the following areas:

- Minchinbury residential area to the north;
- Erskine Park residential area to the west; and
- Horsley Park residential area to the south.

The impacts are based on the maximum modelled predictions in each of these areas.

In addition a worst-case scenario has been considered in which a residential and farmer receptor are present at the point of maximum impact. This scenario has been considered to provide an upper maximum of the predicted impact of the proposed Facility.

Some pollutants, including dioxins, furans, dioxin-like polychlorinated biphenyls (PCBs) and heavy metals, accumulate in the environment, which means that inhalation is only one of the potential exposure routes. Therefore, impacts cannot be evaluated in terms of their effects on human health by simply reference to ambient air quality standards.

The following points summarise the results of the IRAP modelling against the relevant levels.

- Dioxins, furans and dioxin like PCBs: the total intake for all receptors is well below the Tolerable Monthly Intake (TMI). For the worst-case scenario (the point of maximum impact), the total intake remains well below the TMI.
- Non-carcinogenic effects: The Hazard Quotient for each COPC is well below the maximum score of '1' so no adverse non-carcinogenic health effects should result from a lifetime of exposure to any COPC.
- Carcinogenic effects: the Lifetime Cancer Risk for all sensitive receptors is less than one in a million. The carcinogenic effect of COPCs released from the facility is therefore considered negligible. The NSW Government document Risk Criteria for Land Use Safety Planning states that the risk rating is on a per year basis and that the most sensitive land-use types (hospitals etc.) should not be exposed to an individual risk level greater than half in one million per year. The maximum annualised cancer risk for a child famer receptor at the point of maximum impact, and for a child in the area to the North are all below this level. This shows that the carcinogenic effect of COPCs released from the facility is considered negligible even considering the worst-case scenario.

12.4.1 UPSET CONDITIONS

Article 46(6) of the IED (Directive 2010/75/EU) defines 'upset conditions' as short term events which can only occur for a maximum of 60 hours per year. Start-up and shut-down of the facility are upset conditions. Under the IED, during these times the Facility cannot continue to incinerate waste for a period of more than 4 hours uninterrupted where emission limit values are exceeded.

Start-up and shutdown are infrequent events. The facility is designed to operate continuously and ideally only shutdown for its annual maintenance programme.

12.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

Worst-case scenarios have been considered at the point of maximum impact. These scenarios have been considered to provide an upper maximum of the predicted impact of the proposed Facility. Even at the upper maximum, the impact of the Facility will not lead to adverse health impacts and as such, mitigation measures are not proposed.

The risk based approach is based on the additional risk of emissions from the Facility to cause harm to human health. As the additional annual risk is less than 1 in a million, the additional contribution from the Facility (cumulative impact) is considered acceptable. Should other sources in the area (existing background and future development) add additional risk of emissions, the overall impact would increase. However, this additional impact is out of the control of the proposed Facility.

The Tolerable Monthly Intake approach (method used to assess impact of dioxins and furans) takes into account the Mean Daily Intake (i.e. the background), and as such can better assess cumulative impacts. No significant sources of dioxins, furans or dioxin like PCBs have been identified in the area. Given the total intake for all receptors is well below the Tolerable Monthly Intake, the cumulative impact of the proposed together with the background conditions is considered acceptable.

12.5.1 MITIGATION OF UPSET CONDITIONS

Start-up of the facility from cold will be conducted with clean support fuel (low sulphur light fuel oil). During start-up waste will not be introduced onto the grate unless the temperature within the oxidation zone is above the 850°C as required by Article 50, paragraph 4(a) of the IED. During start-up, the flue gas treatment plant will be operational as will be the combustion control systems and emissions monitoring equipment.

The same goes to plant shutdown where waste will cease to be introduced to the grate. The waste remaining on the grate will be combusted, the temperature not being permitted to drop below 850°C through the combustion of clean support auxiliary fuel. During this period the flue gas treatment equipment is fully operational, as will be the control systems and monitoring equipment. After complete combustion of the waste, the auxiliary burners will be turned off and the plant will be allowed to cool.

Start-up and shutdown are infrequent events. The facility is designed to operate continuously and ideally only shutdown for its annual maintenance programme.

12.6 SUMMARY AND CONCLUSION

The *Human Health Risk Assessment* has demonstrated that with the implementation of mitigation measures, the proposed Facility will not exceed air quality criteria during construction or operation and will be free of human health effects.

13 Odour

13.1 OVERVIEW

Pacific Environmental Limited has been engaged to prepare an Odour Assessment in support of this application, submitted at **Appendix M**.

In accordance with the Director General's Requirements (DGR) (SSD 6236) detailed in **Section 11** the assessment has addressed the following key requirements for the assessment of odour:

 a quantitative assessment of the potential impacts for the development on surrounding landowners and sensitive receptors under the relevant Environment Protection Authority guidelines.

13.2 LEGISLATIVE REQUIREMENTS

The *Odour Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

- Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (DEC)
- Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC)

13.3 ASSESSMENT METHODOLOGY

The EPA has developed odour criteria and the way in which they should be applied with dispersion models to assess the likelihood of nuisance impact arising from the emission of odour.

There are two factors that need to be considered:

- What "level of exposure" to odour is considered acceptable to meet current community standards in NSW.
- How can dispersion models be used to determine if a source of odour meets the criteria which are based on this acceptable level of exposure.

The term "level of exposure" has been used to reflect the fact that odour impacts are determined by several factors the most important of which are (the so-called FIDOL factors):

- Frequency of the exposure.
- Intensity of the odour.
- Duration of the odour episodes.
- Offensiveness of the odour.
- Location of the source.

In determining the offensiveness of an odour it needs to be recognised that for most odours the context in which an odour is perceived is also relevant. Some odours, for example the smell of sewage, hydrogen sulfide, butyric acid, landfill gas etc., are likely to be judged offensive regardless of the context in which they occur. Other odours such as the smell of jet fuel may be acceptable at an airport, but not in a house, and diesel exhaust may be acceptable near a busy road, but not in a restaurant.

In summary, whether or not an individual considers an odour to be a nuisance will depend on the FIDOL factors outlined above and although it is possible to derive formulae for assessing odour annoyance in a

community, the response of any individual to an odour is still unpredictable. Odour criteria need to take account of these factors.

The "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" (EPA, 2005) (Approved Methods) include ground-level concentration (GLC) criterion for complex mixtures of odorous air pollutants. They have been refined by the EPA to take account of population density in the area. **Appendix M** lists the odour GLC criterion to be exceeded not more than 1% of the time for different population densities.

The difference between odour criteria is based on considerations of risk of odour impact rather than differences in odour acceptability between urban and rural areas. For a given odour level there will be a wide range of responses in the population exposed to the odour.

In a densely populated area there will therefore be a greater risk that some individuals within the community will find the odour unacceptable than in a sparsely populated area.

An odour criterion of 2 ou would apply to the built up areas around the Development Site in any further detailed assessment of proposed operations.

AERMOD was chosen as a suitable dispersion model due to the source type, location of nearest receiver and nature of local topography. AERMOD is the US EPA's recommended steady-state plume dispersion model for regulatory purposes. AERMOD replaced the Industrial Source Complex (ISC) model for regulatory purposes in the US in December 2006. Ausplume, a steady state Gaussian plume dispersion model developed by the Victorian EPA and frequently used in Australia for simple near-field applications is based on ISC, which has now been replaced by AERMOD.

1.1.1.1 PEAK-TO-MEAN RATIOS

It is common practice to use dispersion models to determine compliance with odour criteria. This introduces a complication because Gaussian dispersion models are only able to directly predict concentrations over an averaging period of 3-minutes or greater. The human nose, however, responds to odours over periods of the order of a second or so. During a 3-minute period, odour levels can fluctuate significantly above and below the mean depending on the nature of the source.

Peak-to-mean ratio refers to the ratio between the one-second peak concentrations and three-minute and longer period average concentrations. The ratio is also dependent on atmospheric stability and the distance from the source. For this assessment we have factored a peak-to-mean ratio of 2.5 and 2.3 for all stability classes for area sources and volume sources, respectively.

13.4 ASSESSMENT OF KEY ISSUES

13.4.1 EXISTING AIR QUALITY

The adjacently located Genesis Xero Waste Facility will give rise to odour of similar character to the Facility's. In January 2014, Pacific Environment completed an Odour Impact Assessment for the proposed Development (Pacific Environment, 2014b), under a requirement of the Site's EPL. The odour assessment reviewed potential odour sources and found the most significant odour sources to be the active tipping face within the landfill void, the leachate sump and riser and the leachate treatment and SBR tanks.

Odour monitoring on these sources found the leachate sump to be the most significant of these (50 times higher than the other sources). Dispersion modelling of the leachate sump found that the most stringent odour criterion of 2 ou is not exceeded beyond the Site boundary and does not encroach within 500 m of the nearest residences.

The character of the odour emissions are summarised below:

- Active tip face oily, dusty and garbage.
- Leachate tank garbage.

Leachate riser - oily, grease, onion, garbage and sulphide.

13.4.2 ODOUR EMISSIONS

The facility will employ high speed roller doors for truck access to ensure fugitive odour emissions from within the building are minimised. All waste storage and unloading will take place within the tipping hall building, which is kept under negative pressure. Air extracted from the building is to be used as excess air in the boiler (i.e. potentially odorous air will ultimately be thermally oxidised). The primary air will be drawn from the tipping hall using a fan beneath the individual grate zones. It is anticipated that the primary air flow will range between 77,560 Nm₃/hour and 129,180 Nm₃/hour. The primary air flow will also be used to cool the grate. The air will then be drawn into the primary combustion zone and will ultimately undergo combustion and released via the stack. As a result, the odorous compounds within the primary air will breakdown to simpler compounds that will pass through the various scrubbers and process to further remove contaminants from the air stream.

There is potential for the release of relatively small volumes of odorous air to escape during the opening and closing of the roller doors even though it will be under negative pressure. No odour emissions would be released from the stack and the odorous compounds would have undergone chemical decomposition.

As the waste for the proposed Facility will be supplied by the adjacent Genesis MPC and external sources delivered via vehicle, it can be assumed that the character of the odour from the active tip face and therefore applied to the proposed Development.

The odour concentrations and emission rates for the proposed Facility are presented in **Table 25.** The area of the roller door will be 25 m^2 . An exit velocity of 0.1 m/s was adopted to account for the small volumes of air that escape tipping hall when the doors are open and with the building operating under negative pressure.

The cumulative odour emissions from the Facility are based on the recent odour monitoring competed for the Genesis Xero Waste Facility (Pacific Environment, 2014b).

	Odour Concentration (OU)	Specific Odour Emission Rate (SOER) (OU.m ³ /m ² /s)	Source Area (m2)	Peak to Mean Ratio	Modelled Specific Odour Emission Rate (SOER) (OU.m3/m2/s)
Tipping hall	558	(odour emission rate for volume source) 1,395 OU.m ³ /s	-	- 2.3	(Modelled Odour Emission Rate for volume source) 3,209OU.m3/s
Active tip face	558	0.3	1,344	- 2.5	0.7
Leachate tank (x 4)	362	0.2	4 x 19.6		0.5
Leachate riser	19,500	10.3	177		25.8

TABLE 25 – ODOUR EMISSION RATES

There are no emission from the stack therefore building wake effects were not included in the modelling.

13.4.3 RESULTS

The dispersion modelling results for the 1 second (nose response) average 99th percentile odour ground level concentrations (GLCs) for the Facility in isolation and in combination with odour emissions from the Genesis Xero Waste Facility are presented **Table 26**.

The results indicate that when the Facility is considered in isolation and combined with odour emissions from the Genesis Xero Waste Facility that the predicted 99th percentile odour concentrations would be below the 2 ou impact assessment criterion all of the sensitive receptors.

Review of the contour plots shows that the spread of the odour plume is greatest to the north, and to a lesser extent the south, of the Facility. The odour concentrations are predicted to be highest in the residential suburb of Minchinbury, but are anticipated to be just above the detection threshold (1 ou) and below the impact assessment criterion of 2 ou throughout the suburb.

Comparison of the odour contours between the Facility in isolation (Table 26) and combined with the Genesis Xero Waste Facility show that there is little difference between the predicted odour impacts and can be inferred that the Facility would be the greatest contributor to offsite odour concentrations. This is largely because the most significant existing odour sources that comprise the Genesis Xero Waste Facility are located within the pit with little potential for the plume to disperse outside of the pit.

Receptor	Facility	Facility + MPC
James Erskine Primary School	- <1	- <1
Erskine Park High School	- <1	- <1
Clairgate Public School	- <1	- <1
Minchinbury Public School	- 1	- 1
Pinegrove Memorial Park Lawn Cemetery	- <1	- <1
Sunny Patch Preparation School & Long Day Care Centre	- <1	- <1
Eastern Creek Public School	- <1	- <1
St Agnes Catholic High School	- <1	- <1
All Areas Family Day Care Pty	- 1	- 1
Maria Hawey Child Care Centre	- 1	- 1
Jiminey Cricket Long Day Care	- 1	- 1
White Bunny Child Care Centre	- 1	- 1
LITTLESMARTIES	- <1	- <1
Kidz Fun Factory	- <1	- <1

TABLE 26 – SUMMARY OF PREDICTED 99TH PERCENTILE GROUND LEVEL CONCENTRATIONS OF ODOUR (OU)

13.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

Fuel (waste) will arrive to the proposed Facility in covered trucks or via an enclosed conveyor from the Genesis MPC. All waste storage and unloading is to take place within the tipping hall building, which is kept at negative pressure with air extracted from the building to be used as excess air in the boiler.

13.6 SUMMARY AND CONCLUSION

This odour assessment provides a quantitative assessment of potential odour impacts as a result of the proposed Facility. This report is an addendum to the air quality and greenhouse gas assessment completed by Pacific Environment in September 2014 (Pacific Environment, 2014a).

Modelling of odour emissions for the proposed Facility were based on recent odour monitoring that was completed for the Genesis Xero Waste Facility in January, 2014. Cumulative odour emissions from the Genesis Xero Waste Facility were also assessed.

The results indicate that when the Facility is considered in isolation and combined with odour emissions from the Genesis Xero Waste Facility that the predicted 99th percentile odour concentrations would be below the 2 ou impact assessment criterion all of the sensitive receptors.

The odour concentrations are predicted to be highest in the residential suburb of Minchinbury, but are anticipated to be just above the detection threshold (1 ou) and below the impact assessment criterion of 2 ou throughout the suburb.

In view of the dispersion modelling results it is anticipated that the operation of the Facility is not likely to result in an adverse impact on the local air environment in reference to odour.

14 Noise Assessment

14.1 OVERVIEW

Pacific Environmental Limited has been engaged to prepare a Noise Impact Assessment (NIA) in support of the proposed Development at **Appendix P**.

In accordance with the Director General's Requirements (DGR) (SSD 6236) the assessment has addressed the following key requirements for the assessment of noise:

- Description of all potential noise sources such as construction, operational, on and offsite traffic noise;
- Quantitative noise impact assessment including a cumulative noise impact assessment in accordance with relevant Environment Protection Authority guidelines; and
- Details of noise mitigation, management and monitoring measures.

14.2 LEGISLATIVE REQUIREMENTS

The assessment was performed with reference to the following guidelines, policies and standards:

- AS1055.1 Acoustics Description and measurement of environmental noise Part1: General procedures.
- AS 2436 Guide to noise and vibration control on construction, demolition and maintenance sites.
- Interim Construction Noise Guideline (ICNG), EPA, 2008.
- Industrial Noise Policy (INP), EPA, 2000.
- INP Application Notes, EPA 2006.
- Road Noise Policy (RNP), EPA, 2011.
- Assessing Vibration: A Technical Guideline, EPA, 2004.
- Environmental Noise Management Manual (ENMM), RMS, 2001.

14.3 ASSESSMENT METHODOLOGY

In preparing the NIA, Pacific Environmental identified the closest residential receivers in the vicinity of the Site. The closest areas of sensitive receivers are located to the north and west of the Site, approximately 1km away in Minchinbury and Erskine Park. As the two areas contain a number of residential receptors, representative locations were chosen to represent the potentially most affected receivers in these areas.

The assessment was conducted for operations, construction and road traffic in accordance with the relevant guidelines, standards and policies. The assessment was made using a number of conservative assumptions which are detailed in '**Appendix E**' of the NIA.

A modelling scenario was established to provide a conservative assessment for operations at the facility over a 15 minute period. The scenario considers the following assumptions, as agreed with the client:

 A peak number of fuel trucks entering the facility of 17 per hour. In order to be conservative, it has been assumed that 75% of the trucks enter the facility within 15 minutes. It is noted that this figure has been revised to 14 trucks per hour. As such, the calculation is taken to be even more conservative.

- The peak number of ash collection trucks is 5 per 15 minutes, APC trucks 1 per 15 minutes and consumable trucks is 1 per 15 minutes.
- Trucks travel around the Site at 30km/h.
- Access doors to the tipping hall are left open.
- Within the tipping hall, the activities that are assumed are trucks entering hall, dumping material, idling and then exiting the tipping hall.
- Building break out noise was calculated based on façade details provided in the concept drawings and transmission loss data was taken from manufacturer's data or products of equivalent performance. It is assumed that building facades are continuous and contain no gaps between panels and sections.
- Air cooled condensers are housed in an open top enclosure.
- The modelling considered significant noise sources based on information provided by the facility designers (HZI and Fichtner) and assessment of similar facilities (Ferrybridge, UK).
- Building walls and roofs are clad according to the specification supplied by the project architect. They
 include the following materials:
 - HiKlip 630 profiled steel sheeting,
 - o Alucobond 3mm panelling
 - Danapalon 16mm panelling
 - Low level concrete walling.
 - Steel sheeting roofing with one layer of insulation with an acoustic performance of Rw 25.
- All equipment is operating simultaneously.

Noise modelling was undertaken using the ISO9613 and CONCAWE algorithms, as implemented within the CadnaA acoustic modelling package. The noise modelling takes into consideration the sound power level of the proposed site operations, activities and equipment, and applies adjustments for attenuation from geometric spreading, acoustic shielding from intervening ground topography and barriers, ground effect and atmospheric absorption.

The noise assessment was undertaken having regard to the site context, potential impacts of the proposed Development, consideration of statutory requirements and identification of appropriate mitigation measures to be implemented to avoid any significant impacts.

A comprehensive assessment of the potential noise and vibration impacts of the proposed Development is detailed in the NIA. The operational noise criteria were established using the 'intrusiveness' and 'amenity' criteria in the *NSW Industrial Noise Policy*. The sleep disturbance criteria and road traffic noise criteria were established using the EPA's *Noise Guide for Local Government* and EPA's *NSW Road Noise Policy*. Construction noise criteria were established using the EPA's *Noise Guide for Local Government* and EPA's *NSW Road Noise Policy*. The construction noise criteria were established using the EPA's *Interim Construction Noise Guidelines*. The construction vibration criteria were established using the EPA's *Assessing Vibration: A Technical Guideline*.

14.4 ASSESSMENT OF KEY ISSUES

14.4.1 CONSTRUCTION NOISE

The construction of the facility is expected to last 36 months and be completed over stages. The construction works are expected to occur during standard hours 7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm Saturdays. Some construction activities would be required to work outside of standard

hours (7:00am to 8:00am and 1:00pm to 6:00pm Saturdays in conjunction with specific periods of 24 hour operation).

The following noise sources are anticipated for the various construction stages:

Stage	Plant	No. Off	Activity Use	Times of Use ¹	SWL per unit dB(A)
	4WD	4	Staff site vehicle movements	SH	97
	Dozer	1	Clearing and vegetation removal	SH	115
Site Clearing	Excavator	3	Clearing, stripping and stockpiling	SH	110
and Preparation	Water Cart	1	Dust suppression	SH	110
rioparation	Tipper	2	Relocation of spoil to stockpile	SH	116
	Mulcher	1	Vegetation Mulching	SH	116
	Generators	2	Site power	SH	106
Excavation/	Excavator	6	Preparation of grade materials	SH	110
	Roller	2	Compaction of grade materials	SH	108
Excavation/ Services	Water Cart	1	Dust suppression	SH	110
Lead In ²	Dozer	2	Stripping, stockpiling and relocating	SH	115
	Bobcats	2	Stockpiling	SH	104
	Rock Crusher	1	Crush rock for compaction	SH	112
	Trucks	6	Movement of spoil	SH	107
Structure	Concrete Pump (Mobile)	2	Pumping of Concrete	Concrete Pour Days (SH, OSH 1, 2, 3,4 & 5)	106
	Concrete Trucks	30	Supply of concrete	Concrete Pour Days (SH, OSH 1, 2, 3,4 & 5)	108
	Mobile Crane	2	Material handling for structural components.	SH, OSH 4	98
	Tower Crane	1	Material handling for structural components.	SH, OSH 4	104
	Generators	2	Site power	SH, OSH 4	106
	Vibrators	5	Placement of concrete	Concrete Pour Days (SH, OSH 1, 2, 3,4 & 5)	97
Technology	Mobile Crane	4	Material handling for structural components	SH, OSH 1, 2, 3,4 & 5	98
Provider	Tower Crane	2	Material handling for structural components	SH, OSH 1, 2, 3,4 & 5	104
Installation	Scissor Lifts	8	Access to various elements during steel erection	SH, OSH 1, 2, 3,4 & 5	106
Steel	Boom Lifts	8	Access to various elements during steel erection.	SH, OSH 1, 2, 3,4 & 5	105
	Generators	2	Site power	SH, OSH 1, 2, 3,4 & 5	106
	Franna	2	Material handling for structural components	SH, OSH 1, 2, 3,4 & 5	107
	Bobcat	2	Movement of spoil/soil	SH	104
	Excavator	1	Preparation of grade	SH	110
	Asphalt Layer	1	Installation of asphalt	SH	105
Landsocnic	Compactor	1	Preparation of grade	SH	106
g	Concrete Pump (Mobile)	2	Pumping of Concrete	Concrete Pour Days (SH, OSH, 4)	106
	Concrete Trucks	30	Supply of concrete	Concrete Pour Days (SH, OSH, 4)	108
	Vibrators	5	Placement of concrete	Concrete Pour Days (SH, OSH, 4)	97

TABLE 27 – CONSTRUCTION STAGES AND NOISE SOURCES

The construction noise assessment indicated the following:

- The predicted construction noise levels indicate compliance would be achieved at all sensitive receiver locations during Standard Hours and for all construction scenarios.
- Construction noise is predicted to be within the construction noise management goals outside of standard hours at residential and other sensitive land uses, with the exception of Erskine Park residential properties. The predicted exceedances of the construction noise management goals at the nearest Erskine Park residential properties.
- Compliance is expected at the commercial receivers Woolworths, Startrack and Aldi and the Genesis site for all construction scenarios.
- Exceedance of the criteria is predicted at the Hanson Facility for scenarios one, two, six and seven when works are at their closest to the Site boundary. It should be noted that when works are at the furthest from the Hanson Facility, compliance is predicted.
- The noise predictions take into account all plant working simultaneously at their closest point to the receiver, therefore where plant do not work simultaneously and are not at their closet point, lower noise levels would be expected.

The construction vibration assessment indicated that the most significant vibration generating activities would comply with the most stringent criteria at the closest receivers.

14.4.2 CONSTRUCTION VIBRATION

The most significant source of construction vibration has been identified as dozers. Pacific Environment found that vibration levels from construction will be well below the most stringent building damage criterion at 10m and the human comfort criterion at 40m. Therefore adverse impacts are not expected.

14.4.3 OPERATIONAL NOISE

Sound power levels during Facility Operation have been sourced from information provided by HZI and are based on noise levels measured at a similar plant in Ferrybridge, UK. Indicative noise levels are summarised below.

llem	Description	Number off	Height (m)	Descriptor	Noise Level, dB(A)
Tipping Hall ¹	Building	1	-	Internal Sound Pressure Level	85
Waste Bunker ¹	Building	1	-	Internal Sound Pressure Level	82
Boiler House ¹	Building	2	-	Internal Sound Pressure Level	85
Flue Gas Treatment ¹	Fixed Plant	4	-	Sound Power Level	98
Turbine Hall ¹	Building	2	-	Internal Sound Pressure Level	88
Ash Bunker Extraction fan ¹	Fixed Plant	2		Sound Power Level	93
ID Fans ¹	Fixed Plant	4	4	Sound Power Level	100
ID Fan duct ¹	Fixed Plant	4	9	Sound Power Level	79/m
Stack tip ¹	Fixed Plant	4	100	Sound Power Level	91
Lime Blowers ¹	Fixed Plant	2	1.5	Sound Power Level	92
Silo Air Compressors ¹	Fixed Plant	2	1.5	Sound Power Level	97
PAC Blowers ¹	Fixed Plant	2	1.5	Sound Power Level	92
Air Cooled Condensers ¹	Fixed Plant	24	11	Sound Power Level per section of 6 units	102
Transformer ¹	Fixed Plant	2	2	Sound Power Level	102
High Pressure Steam Line ¹	Fixed Plant	2	9	Sound Power Level	96
Heavy Vehicles ²	Vehicle at 30 km/h	13	1.5	Sound Power Level per vehicle	107

A review of the predicted noise levels indicates that compliance is achieved with the project specific noise level criteria during both neutral and adverse meteorological conditions.

The assessment indicated that adjustments for modifying factors is not required as the Facility is not expected to include tonal, intermittent, impulsive or low frequency noise characteristics.

14.4.4 ROAD TRAFFIC NOISE

The majority of heavy vehicle traffic into the Site is expected to come from the Genesis facility, approximately 63% via the connecting road between the sites. These traffic movements are incorporated into the existing Genesis generated traffic volumes. However approximately 37% of fuel deliveries are expected to come from sources other than Genesis and result in an additional 57 heavy vehicle movements a day.

Other traffic movements in and out of the Site is expected to include up to 4 movements a day for heavy vehicle traffic associated with consumable deliveries and removal of combustion by products and light vehicle traffic from staff movements.

There are expected to be 55 staff working on a three shift pattern. It is assumed that staff will use one car each to arrive and depart from the Site.

Existing roads related to the proposed Development already carry large volumes of traffic, including a large percentage of heavy vehicles on Wallgrove Road, M4 and M7 generated by existing industrial and commercial land uses. As a result of the Facility, the traffic volumes would be expected to increase on these road by less than 1% and therefore no significant noise increase is expected on these roads.

Typically an increase in traffic noise level above the 2 dB increase criteria is expected where traffic volumes increase by 20% or more. Since the Facility is expected to increase traffic by a much lower amount than this, it is considered to comply with the RNP relative increase criteria.

14.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

14.5.1 CUMULATIVE IMPACTS

When the adjacent Hanson development is operational, the presence of the existing industrial noise at $L_{Aeq,9hr}$ 34 dB(A) would require the night time amenity criteria at Erskine Park to be decreased by 1 dB to $L_{Aeq,9hr}$ 39 dB(A). This would mean the cumulative noise of the EFW facility and the Hanson development would exceed the amenity criteria by 1 dB and the Precinct Plan goal by 2 dB.

A 1-2 dB exceedance of the night time goals is considered marginal as typically a 3-5 dB increase in noise level represents a change in noise level noticeable by most people. Furthermore the exceedance is only predicted to apply during the night under temperature inversion conditions. As these conditions are not present all the time, it is expected to reduce the chance of adverse noise impacts occurring.

Therefore in consideration of conservative modelling, the marginal degree of exceedance and the conditions under which the exceedance is predicted to occur, additional mitigation is not considered reasonable.

14.5.2 CONSTRUCTION NOISE MANAGEMENT MEASURES

In light of the predicted exceedances at the Hanson Facility and residential receivers in Erskine Park for selected scenarios, noise mitigation and management measures will be considered for implementation where reasonable and feasible. A full construction noise management plan will also be developed once further details and schedules are confirmed. It will include the following:

- Communication with the potentially affected receiver locations to inform of the proposed works, durations and potential for noise.
- Identification of key noise impacts
- Noise management measures
- Noise monitoring on site and at sensitive receivers
- Training and awareness of on-site personnel.
- Incident and emergency response.
- Non-conformance, preventative and corrective action.

Noise monitoring will be conducted as part of the construction noise management plan. It will follow the principles for noise monitoring outlined in **Appendix D** and be made up of a combination of continuous long term unattended and short term attended noise monitoring. Attended monitoring will also be conducted at appropriate intervals during each major construction stage, and in response to complaints, where appropriate.

During out of hours work or work continuing for 24 hours a day, continuous unattended noise monitoring will be carried out supported by periodic attended noise monitoring. Education and training of site staff is

necessary for satisfactory implementation of noise mitigation measures. Education and training strategies should focus on:

Site awareness training / environmental is necessary for satisfactory implementation of noise mitigation measures. Education and training strategic would focus on:

- Site awareness training / environmental inductions that include a section on noise mitigation techniques / measures to be implemented throughout the project life.
- Ensuring work occurs within approved hours.
- Locating noisy equipment away from sensitive receivers.
- Using noise screens for mobile plant and equipment.
- Ensuring plant and equipment is well maintained and not making excessive noise.
- Turning off machinery when not in use.

Where appropriate, noise mitigation measures would include:

- Not operating equipment simultaneously, where possible. This has the potential to substantially reduce noise emissions.
- Mitigation of specific noise sources may be possible by using portable temporary screens or site structures.
- Maximising the offset distance between noisy plant items and receivers where possible, especially during more sensitive periods (evening and night).
- Orientating directional noise emitting equipment away from receivers.
- Operating excavators and other mobile plant in a manner that would reduce the likelihood of maximum noise level events occurring such as:
 - Sudden changes in vehicle direction/engine load.
 - Shaking excavator buckets.
 - Excavator buckets or similar contacting the ground or other solid structures.
- Carrying out loading and unloading away from sensitive receivers.
- Selecting plant and equipment based on noise emission levels.
- Use of residential class mufflers to reduce noise emission from mobile plant such as dozers, cranes, graders and excavators.
- Using alternative construction methods.
- Using spotters, closed circuit television monitors, "smart" reversing alarms, or "squawker" type reversing alarms in place of traditional reversing alarms.

14.5.3 OPERATIONAL NOISE MANAGEMENT MEASURES

This assessment has predicted compliance with the operational noise criteria. Nevertheless, in accordance with the DGRs, noise management principles have been included to assist the proposed Facility in maintaining good practice in noise management.

An operational noise management plan will be developed for the Site to assist in maintaining good practice in noise management.

The environmental noise goals of the project will be considered when selecting plant and equipment.

All building envelope materials will have the same or better performance than those used in this assessment.

Building facades will be constructed so they are continuous and contain no gaps between panels and sections.

Buildings will have openings orientated away from receivers, where possible. The opening will be designed so as to not compromise the acoustic performance of the building and remain closed where possible.

Where possible, broadband or smart reversing alarms will be fitted to all vehicles on site, in order to reduce the potential impacts caused by tonal style reversing alarms.

Noise monitoring will be carried out to establish the noise emission level of the facility at sensitive receptors and determine compliance. In the event of a noise complaint received from the community and during the initial stage of the development's operation, compliance noise monitoring will be conducted. Noise will be monitored at the most critical time of day near the complainant and near the identified source of the impact.

14.6 SUMMARY AND CONCLUSION

The assessment was conducted for operations, construction and road traffic in accordance with the relevant guidelines, standards and policies. Assessment was made using a number of conservative assumptions as outlined in the report.

The construction noise assessment indicated the following:

- Predicted noise levels indicate that compliance would be achieved during standard hours at residential receiver locations.
- Exceedance of the noise management levels is expected at the closest industrial receiver for certain construction scenarios.
- Where work occurs outside of standard hours, exceedances of the construction noise management goals were predicted for residential receivers in Erskine Park on weekends and during night works.
- Noise management measures are recommended to assist in the prevention of impacts.

The construction vibration assessment indicated that the most significant vibration generating activities would comply with the most stringent criteria at the closest receivers.

The operational noise assessment indicated that noise emissions from the operating proposed Facility would comply with the most stringent criteria under both neutral and adverse meteorological conditions.

The cumulative noise assessment for operational noise indicated that adverse cumulative noise impacts would not be expected.

Operational noise management principles are recommended to assist in the prevention of adverse impacts.

The road traffic noise assessment indicated that the predicted increase in road traffic noise from both construction and operational traffic would not be above the limiting criteria.

15 Soils and Water

15.1 OVERVIEW

The Director-General's Environmental Assessment Requirements for the Energy from Waste application include the following requirement for environmental assessment of Soils and Water for the proposed Development:

- Description of the water demands and a breakdown of water supplies;
- Description of the measures to minimise water use;
- A detailed water balance;
- Description of the construction erosion and sediment controls;
- A description of the surface and stormwater management system, including on site detention, and measures to treat or reuse water;
- An assessment of potential surface and groundwater impacts associated with the development including the details of impact mitigation, management and monitoring measures; and
- An assessment of any potential existing soil contamination.

Edison Environmental and Engineering Pty Ltd has been engaged to provide an assessment of conditions on the Site relating to soils, contamination, groundwater, salinity and surface water; and of the potential impacts from the development and operation of the proposed Facility relating to groundwater and salinity, including suitability of the Site and mitigation measures required (submitted at **Appendix Q**).

Soil contamination is dealt with in **Section 22.3**.

15.2 LEGISLATIVE REQUIREMENTS

The *Soil and Water Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

Surface Water

- National Water Quality Management Strategy: Water quality management an outline of the policies
- National Water Quality Management Strategy: Policies and principles a reference document
- National Water Quality Management Strategy: Implementation guidelines
- National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality
- National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting
- ANZECC Guideline and Water Quality Objectives in NSW (DEC)
- State Water Management Outcomes Plan
- NSW Government Water Quality and River Flow Environmental Objectives (DECC)
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DECC)
- Managing Urban Stormwater: Soils & Construction (Landcom)
- Managing Urban Stormwater: Treatment Techniques (DECC)
- Managing Urban Stormwater: Source Control (DECC)
- Technical Guidelines: Bunding & Spill Management (DECC)

Groundwater

- National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
- NSW State Groundwater Policy Framework Document (DLWC)
- NSW State Groundwater Quality Protection Policy (DLWC)
- NSW State Groundwater Quantity Management Policy (DLWC) Draft
- Guidelines for the Assessment and Management of Groundwater Contamination (DECC)
- NSW Water Extraction Monitoring Policy

15.3 ASSESSMENT METHODOLOGY

In order to complete the assessment, the following were undertaken:

- Existing published and site-specific documents were reviewed to establish predevelopment conditions with respect to:
 - Rainfall and climate;
 - Topography and geomorphology;
 - Soil types and properties including dispersivity, erodibility and actual or potential presence of acid sulphate soils;
 - Geology and hydrogeology;
 - Potential for existing contamination of soil and/or groundwater;
 - Salinity;
 - Surface water system including existing catchment conditions for the Site and the local catchment area including existing surface water run-off yields.
- A walkover site inspection was undertaken, and groundwater levels were measured in the existing shallow monitoring bores to provide updated information on shallow groundwater and salinity conditions.
- Investigation into rainfall, climate, topography, soil, geological, hydrological and hydrogeological conditions at the site;
- Assess any potential for changes to groundwater recharge conditions and identify implications for the local groundwater system.
- Assessment of potential impacts associated with changes to geomorphology; including changes to
 erosion and sedimentation patterns and implications due to acid sulphate soils and/or existing
 contamination.

15.4 ASSESSMENT OF KEY ISSUES

Construction of the proposed Facility and associated facilities (including lay-down pads and substation) will involve extensive excavation across approximately one third of the Site (maximum depths of up to 15m, typically 5 to 6 m) and filling over much of the remainder (maximum thickness c.7m, typically 3 to 4 metres. Calculated volumes indicate 323,000m³ of excavated material and 429,000 m³ of fill, with a net balance of 147,000m³ of additional fill material required. A site survey indicating levels has been provided in **Appendix A**.

15.4.1 CONSTRUCTION - EROSION AND SEDIMENT

The soils present on the site are expected to exhibit high erodibility. The presence of dispersive soils is also likely. As such, particular attention will be paid to erosion and sediment control during the construction phase and careful planning will be undertaken with regard to control and mitigation requirements, monitoring of run-off water quality and volume, and to phasing of the excavation, filling, construction and rehabilitation stages across the site.

15.4.2 GROUND WATER

The site setting is one of low sensitivity with respect to potential groundwater impacts. The underlying Bringelly Shale has a low resource potential, with water bores generally having low yields of high salinity groundwater. Groundwater usage in the area of the site is very low. The low permeability of the shale and the overlying residual clays greatly limits the potential for near-surface pollution to reach groundwater.

The proposed development does not include any activities that pose a particular risk to groundwater quality. The development will be sewered, and stormwater drainage will be directed to the local surface water system. The development therefore does not pose an unacceptable risk to groundwater quality, subject to standard pollution prevention measures for fuel storage etc.

Development will result in a reduction in groundwater recharge. Under existing conditions, the lost recharge to the fractured rock aquifer would be contributing to inflow to the former quarry, and the lost recharge to the shallow groundwater system would most likely be lost to evapo-transpiration, or emerge in areas subject to waterlogging or discharge. These changes will not affect the resource value of the local groundwater systems, and has potential benefits in terms of salinity.

The waste bunker, some 15 m deep, has the potential to intercept and possibly obstruct shallow groundwater flow. In terms of groundwater seepage into excavations, inflow rates are expected to be low and will, in all likelihood, reduce further within a few days of the water-bearing strata being exposed. The volume of water generated by groundwater inflow is expect to be considerably less than that due to rainfall and it is considered unlikely that a formal groundwater dewatering system will be required.

A licence for temporary construction dewatering issued by the NSW Office of Water (NOW) is unlikely to be required as the total groundwater inflow is expected to be less than 3 ML/yr.

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.

15.4.3 SALINITY

Salinity is known to occur in shallow soils and groundwater seepages in Western Sydney, with impacts including damage to buildings or roads, vegetation dieback, erosion and waterlogging. The Site area is classified as moderate salinity potential with high potential along the tributary of Ropes Creek.

Previous site investigation showed no evidence of serious salinity impacts or of conditions aggressive to foundations. It is concluded that soils on Site are moderately saline, but that with appropriate site drainage, redevelopment would probably improve the salinity situation. Existing salinity impacts are limited to waterlogging along minor drainage lines (some probably due to leakage from dams or poor

existing drainage), and increased salinity close to the tributary of Ropes Creek, probably reflecting discharge of deep groundwater from the Bringelly Shale.

Excavation of moderately saline soils could release additional salt into the environment. Construction in areas of high water tables and elevated salinity (i.e. close to drainage lines) could result in salinity damage to roads or buildings, although the potential for such impacts is limited.

15.4.4 SURFACE AND STORMWATER MANAGEMENT

Stormwater management, sedimentation and erosion control, flooding and Water Sensitive Urban Design are dealt with in further detail in the Civil Infrastructure Report at **Appendix F**.

The proposed Facility and road network has an area of 9 ha and excludes the riparian zone which extends 20 m each side of the creek. The proposed stormwater drainage system will include the lay-down pads and substation with a total catchment area of 21.4 ha.

Due to the increase in impervious surface from the proposed Development, the site will be divided into sub-catchments with all stormwater to be drained south into a bio-retention basin to be detained and treated. Stormwater quality treatment for the Site will ultimately be provided by the proposed WSUD biodiversity basin south of the site. A total surface area of 2,400m2 of the basin will be dedicated to bio-retention. A pit and pipe system will control the outflow to ensure post developed flows do not exceed pre developed flow for all storms up to the 100 year ARI events. An outlet from the basin will discharge into the existing Ropes Creek tributary to the south of the Site.

Overland flows within the Site have been designed to be safely conveyed within the roads, car parking and loading docks.

Erosion and Sedimentation controls will be installed and maintained in accordance with Department of Housing (1998), *Managing Urban Stormwater*, Soils and Construction, Fourth Edition. The following levels of control will be constructed:

- Silt fences will be installed along the base of excavated slopes and stockpiles to prevent runoff.
- Kerb inlet sediment traps will be installed at the completion of the drainage works. Whilst works are
 underway, geotextile filter fabric fences will be installed around open pits.

15.4.5 FLOODING

Based on previous flood modelling carried out and provided in the Brown Consulting Report appended at **Appendix AA**, the proposed flood levels of the creek do not adversely affect the Site. Flood levels associated with the creek are at least 2m below the proposed finished levels of the Site.

15.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

Visual observation will be maintained during excavation of the subsoil profile and soils showing clear evidence of high salinity (visible salt crystals etc.) should be removed and stored in covered stockpiles. Reuse of site as backfill material is considered acceptable although blending with less saline soils is recommended.

Dispersive soils are expected to occur on the site and will be encountered during the excavation and construction program. Sedimentation basins in the Erosion and Sediment Control Plan will be designed to account for the presence of dispersive soils and the ability to use of coagulants and/or flocculants.

The proposed Development, as demonstrated within the Civil Infrastructure Report and supporting plans, is found to meet the relevant standards and requirements in relation to stormwater management, on site detention, piped and overland flows, water sensitive urban design.

A detailed Erosion and Sediment Control Plan (ESCP) will be developed for the construction phase of the project. This will include a detailed description of the proposed overall approach and specific erosion and sediment control measures including the following:

- Proposed phasing of works (it is suggested that this be based upon the final stormwater catchments for the completed development; with excavation, filling and surfacing carried out area by area from north to south).
- Requirements for, and design sizing of sediment basins and associated catch drains;
- Detailed erosion control measures;
- Proposed systems for management of inflows and pumping of accumulated rainfall (and any minor groundwater seepage from excavations;
- Proposed monitoring of volumes of run-off, pumped water from excavations and discharge from the site during construction; and,
- Details of the approach and methods to be employed in post-construction rehabilitation of the site.

To demonstrate the effectiveness of erosion and sediment control, a surface-water monitoring programme is proposed. This will include background, routine, and event-based (wet weather) monitoring.

The site is in a low risk area with respect to potential groundwater impacts, and there are no constraints on development or mitigation requirements other than standard pollution prevention measures.

No significant groundwater is expected to be encountered at the proposed excavation depths, the potential impacts are considered to be negligible. As a precaution, it is understood that a groundwater drainage system around the entirety of the waste bunkers will be installed to assist groundwater reentering the strata. To monitor groundwater surrounding the waste bunkers, the aforementioned groundwater drainage system will also be connected to an inspection manhole which will enable periodic inspection of groundwater levels surrounding the waste bunkers. No disposal of intercepted groundwater is expected to be required under normal operating conditions for the lifetime of the facility.

The risk associated with salinity is also low, and the development is expected to reduce existing salinity impacts as a result of reduced recharge and improved drainage. Nonetheless the development should be planned to:

- Avoid/minimise exposure of saline subsoils, minimise cut and fill;
- Avoid disturbance in riparian zones and poorly drained areas;
- Establish vegetation is areas subject to erosion and disturbance;
- Consider salt-resistant construction materials in areas of shallow saline water tables;
- Monitor perched water tables.

Landscaped areas will be planned with salt-tolerant vegetation.

Detailed mitigation and monitoring requirements will be covered in a Salinity Management Plan for the site, which will be submitted to Council for approval prior to commencement of construction.

15.6 SUMMARY AND CONCLUSION

The above assessment has given due consideration to the potential impacts associated with soils and water during construction and operation of the proposed Facility.

This report presents the results of assessment of conditions on the site and of potential impacts from the development and operation of the proposed Facility relating to soils, groundwater, surface water and salinity, including suitability of the site and mitigation measures required, and found:

• No Groundwater Dependent Ecosystems are considered to be present on the site.

- Soils on site are moderately saline, but with appropriate site drainage, redevelopment would probably improve the salinity situation. No evidence of serious salinity impacts was observed during detailed site inspection although minor areas of waterlogging are present.
- The stormwater generated from site will drain to the south into a bioretention basin to be detained and treated. A pit and pipe system will control the outflow to ensure post developed flows do not exceed pre developed flow for all storms up to the 100 year ARI events. An outlet from the basin will discharge into the existing Ropes Creek tributary to the south of the site
- Potential soil and water impacts can be adequately managed during the construction and operational phase. It is critical that soil and water management infrastructure is carefully designed and operated.

16 Traffic and Transport

16.1 OVERVIEW

The DGRs for the Energy from Waste application pertaining to environmental assessment of Transport and Traffic for the proposed Development are:

- Details of traffic types and volumes likely to be generated during construction and operation;
- 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;
- Details of key transport routes, site access, internal roadways, infrastructure works and parking; and
- Detailed plans of the proposed layout of the internal road network and parking on site in accordance with the relevant Australian standards.

TNG engaged Traffix to prepare a Traffic Impact Assessment for the proposed SSDA. A copy of this report is submitted with this application at **Appendix R**.

16.2 LEGISLATIVE REQUIREMENTS

The *Traffic Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

- Guide to Traffic Generating Development (RTA).
- Road Design Guide (RTA).

16.3 ASSESSMENT METHODOLOGY

The transport and access assessment was undertaken having regard to the Site context, potential impacts of the proposed Development, consideration of statutory requirements and identification of appropriate mitigation measures to be implemented to avoid any significant impacts. Each of these matters is outlined in detail within the assessment report and is summarised below:

The traffic report provides an assessment of the existing conditions within the Precinct as well as an assessment of the potential traffic impact specifically related to the construction and operation of the proposed Facility.

The regional and local road network and the proposed capacity of the Precinct have been considered as part of this application. The Site is presently accessed via Honeycomb Drive (which runs in an east bound direction from Wonderland Drive. Positioned within the Eastern Creek Employment Precinct, the Site is well serviced by both the M4 and M7 motorways.

16.4 ASSESSMENT OF KEY ISSUES

16.4.1 CAR PARKING

The development proposes a total of 40 car parking spaces (including 3 visitor spaces and one disabled space) in accordance with the requirements of the RMS Guide to Traffic Generating Developments (RMS Guide) and The Disability (Access to Premises – Buildings) 2010 for generic industrial land uses and the Blacktown DCP 2006.

The proposed 40 car parking spaces will appropriately service the demands of the 55 staff who will be employed by the proposed Facility. Staff rosters will include 3 shifts per day and that staff numbers will be relatively evenly distributed across each shift.

Having regard for the above, there is potential for up to 37 persons to be on-site at shift changeover periods. Assuming each staff member drives to the Site separately, as a worst case scenario, then this results in a staff parking demand of 37 spaces. This demand would reduce to say 18 spaces outside of peak shift changeover periods.

The proposed development is nominally required under to provide one accessible parking space for the proposed development. This space shall be designed in accordance with AS2890.6.

The parking supply will enable the operational requirements to be accommodated on-site at all times with no reliance on on-street parking at any time including during critical periods such as shift change over where peak parking for staff may be required (including office staff, facility staff and truck drivers).

16.4.2 CONSTRUCTION TRAFFIC IMPACTS

A general maximum of up to 56 trucks per day is anticipated during construction and an average of approximately 37 trucks per day across the total construction period of 3 years. This general maximum of up to 56 trucks per day equates to 112 movements per day which is substantially less than the 344 truck movements per day associated with the Facility once operational.

16.4.3 OPERATIONAL TRAFFIC IMPACT

Staff Movements

The development will employ a total of up to 55 staff per day across 3 shifts. As such, the development will generate up to 110 staff trips per day (55 in, 55 out). A peak staff traffic generation of 37 vehicles per hour is expected to occur during shift changeover periods.

Waste/fuel deliveries

Trucks are anticipated to carry an average load of 22 tonnes. Given the maximum capacity of the proposed plant, a maximum of up to 168 trucks delivering input waste material per day is expected. However, the planned operational input of 1,105,000 tonnes per annum will result in only 138 trucks per day.

Of this input, it is expected that a significant proportion of input material will be sourced from the Genesis MPC per annum. This is summarised below.

SOURCE	ANNUAL INPUT MATERIAL
via Conveyor from Genesis MPC	136,000 tonnes
 Vehicles Re-routed (i.e. Reduced) From Genesis Xero Direct to EFW 	469,000 tonnes
 New Material from External Sources 	500,000 tonnes
 Combined Total 	1,105,000 tonnes

TABLE 29 – INPUT MATERIAL SOURCE SUMMARY (PLANNED)

As demonstrated above, on account of the efficient synergies between the proposed Facility and the Genesis Xer Waste Facility, the proposed Facility will only require an additional 500,000 tonnes per annum of input waste material from external sources (via vehicle).

Despite traffic volumes associated with the Genesis Xero Waste Facility, this will not be changed by the proposal which seeks only to divert some of this input material internally between facilities. Notwithstanding, an additional traffic generation of 168 truck deliveries (336 movements) has been

adopted for the purposes of this assessment to provide a worst case analysis and to acknowledge the potential variability in the location source for input material. As such, this assessment adopts the full input capacity of 1.35 million tonnes per annum as additional to that of the existing Genesis Xero Waste Facility, as follows:

TABLE 30 -		SOURCE	SUMMARY	
TADLE 30 -		SOUNCE	SOMMARY	

SOURCE	ANNUAL INPUT MATERIAL
Genesis Xero Waste Facility Only	2,000,000 tonnes
EFW Facility - New Material from External Sources	1,350,000 tonnes
Combined Total	3,350,000 tonnes

Miscellaneous truck deliveries have also been accounted for.

Assuming the 1.35 million tonne capacity of the facility and not taking into account the synergies between the proposed Facility and Genesis Xero Waste, the following traffic generation is expected during the operation of the Facility:

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		

TABLE 31 - OPERATIONAL TRAFFIC GENERATION ON EXTERNAL ROAD NETWORK

The Traffic Impact Assessment (**Appendix R**) details the peak hour intersection analysis carried out. The analysis found that that the critical intersection of Wallgrove Road and Wonderland Drive will continue to operate with acceptable Level of Service and moderate delays during both peak periods. As such, the traffic impacts of the development can be readily accommodated by the surrounding road network.

16.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

The net traffic generation is a moderate increase above existing conditions and is unlikely to significantly impact the traffic capacity available to the wider area. As such, no mitigation measures are proposed.

A Construction Traffic Management Plan is to be prepared prior to construction.

The traffic generated by the proposed development represents only a small proportion of traffic generated by the wider WSEA, and as such will not have a significant impact on the ability of the surrounding road network to operate at an acceptable level into the future. It is also emphasised that the critical intersection of Wallgrove Road and Wonderland Drive will operate with a Level of Service B/C (i.e. good to satisfactory for traffic signals and roundabouts, and acceptable to satisfactory for give way and stop signs) post development. As such, it is considered that there is additional spare capacity provided by the existing intersection to cater for further development within the area.

16.6 SUMMARY AND CONCLUSION

The net traffic generation is a moderate increase above existing conditions and is unlikely to significantly impact the traffic capacity available to the wider area. As such, no mitigation measures are proposed. The traffic impact has been also conservatively calculated not taking into account synergies between EFW and Genesis Xero. The increase can be readily accommodated by the surrounding road network with no change to existing Level of Service and only minimal impact on average delays.

The critical intersection of Wallgrove Road and Wonderland Drive will continue to operate with acceptable Level of Service and moderate delays during both peak periods. As such, the traffic impacts of the development can be readily accommodated by the surrounding road network.

Furthermore, the future peak hourly traffic volume of 262 vehicles per hour (209 veh/hr existing plus 53 veh/hr proposed) during the critical AM peak is only marginally higher than the 252 vehicles per hour previously adopted for the approved Genesis Xero Waste Facility.

The traffic impact statement concludes:

- The development is a highly specialised use and therefore requires a 'first principles' parking and traffic assessment, as included in this report.
- A car parking demand of up to 40 cars will occur at shift changeover periods, with a reduced demand for 21 spaces at other times. There is sufficient area to accommodate this parking.
- An increase of 53 vehicle trips per hour associated with the proposed Facility can be readily
 accommodated by the surrounding road network with no change to existing Level of Service and only
 minimal impact on average delays.
- The access and internal layout of the proposed Facility is generally acceptable, subject to identification of suitable on-site car parking area(s) and minor improvements to the future access from the Estate Road to accommodate B-Double access. Notwithstanding, it is noted that there is ample space available such that any minor changes to the plans, including a car park capable of accommodating all parking demands on-site can be readily provided.

17 Hazards and Risks

17.1 OVERVIEW

The Director-General's Environmental Assessment Requirements for the Energy from Waste application include the following requirement for environmental assessment of Hazards and Risks for the proposed Development:

- A 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; and
- Detail contingency plans for any potential incidents or equipment failure during the operation of the project.

RAWRiSK Engineering has completed the Preliminary Hazard Assessment (PHA) and Fire Risk Assessment (FRA) for the development, submitted at **Appendix BB**.

17.2 LEGISLATIVE REQUIREMENTS

The *Hazards and Risks Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

- AS/NZS 4360:2004 Risk Management (Standards Australia)
- HB 203: 203:2006 Environmental Risk Management Principles & Process (Standards Australia)
- Guideline for Application for Subsidence Management Approvals (Department of Primary Industries).

17.3 ASSESSMENT METHODOLOGY

The methodology used for the PHA and FRA study used a combined approach whereby all risks associated with the proposed Facility were assessed (e.g. environmental, fire, toxic gas, etc.) and the fire risks were reported in a separate chapter within the PHA study.

The following approach was used;

17.3.1 PHA STUDY

Hazard Analysis – A detailed hazard identification was conducted for the Site facilities and operations. Where an incident was identified to have potential off site impact, it was included in the recorded hazard identification word diagram.

Each postulated hazardous incident was assessed qualitatively in light of proposed safeguards (technical and management controls). Where a potential offsite impact was identified, the incident was carried into the main report for further analysis. Where the qualitative review in the main report determined that the safeguards were adequate to control the hazard, or that the consequence would obviously have no offsite impact, no further analysis was performed.

Consequence Analysis – For those incidents qualitatively identified in the hazard analysis to have a potential offsite impact, a detailed consequence analysis was conducted. The analysis modelled the various postulated hazardous incidents and determined impact distances from the incident source. Where an incident was identified to result in an offsite impact, it was carried forward for frequency analysis. Where an incident was identified to not have an offsite impact, and a simple solution was evident (i.e. move the proposed equipment further away from the boundary), the solution was recommended and no further analysis was performed.

Frequency Analysis – In the event a simple solution for managing consequence impacts was not evident, each incident identified to have potential offsite impact was subjected to a frequency analysis. The analysis considers the initiating event and probability of failure of the safeguards (both hardware and

software). The results of the frequency analysis were then carried forward to the risk assessment for combination with the consequence analysis results.

Risk Assessment and Reduction – The study was conducted using the Level 2 analysis detailed in the Multi-Level Risk Assessment approach, recommended by the (former) Department of Planning and Infrastructure. As the selected approach for this analysis was a level 2 assessment, where incidents were identified to impact offsite and where a consequence and frequency analysis was conducted, the consequence and frequency analysis for each incident were combined and compared to the risk criteria published in HIPAP No.4. Where the criteria were exceeded, a review of the major risk contributions was performed and the risks reassessed incorporating the recommended risk reduction measures. Recommendations were then made regarding risk reduction measures.

Reporting – on completion of the study a draft report was developed for review and comment by TNG. A final report was then developed incorporating the comments received TNG.

17.3.2 FRA STUDY

As part of the PHA study, it was necessary to assess fire risks, including fire scenarios, incident frequency, probability of failure of the safety systems at the site and risk of fire (as a result of the combination of the fire impacts and frequency).

The fire risks identified at the Site were used to determine the fire protection required at the Site. This was reported in a separate chapter within the PHA study.

The conclusions and recommendations for both the general and fire hazards and risks were reported within the same section of the document.

17.3.3 HAZARD IDENTIFICATION

A hazard identification table was developed for operations and storages at the Site. This table was used to develop scenarios which may occur and result in offsite impacts. The following scenarios were identified at the Site;

- Ammonium hydroxide tank leak, spill and release to environment;
- Diesel tank leak, spill and release to environment;
- Diesel tank leak, spill, immediate ignition and pool fire;
- Diesel tank leak, spill, unconfined, delayed ignition and flash fire;
- Diesel tank leak, spill, confined, delayed ignition and vapour cloud explosion;
- PAC dust cloud, ignition and dust cloud explosion;
- Ignition of waste in bunker and full bunker fire;
- Emission of combustion by-products;
- Transformer oil spill, ignition and pool fire;
- PAC dust cloud explosion within residue silo;
- Turbine fire;
- Release of calcium hydroxide; and
- Ignition of waste in truck and truck fire.

A detailed qualitative review of each scenario was performed to assess the potential for offsite impacts. Following the qualitative review, scenarios that still had potential to impact offsite were carried forwards for consequence analysis.

17.3.4 CONSEQUENCE ANLAYSIS

Scenarios carried forwards for consequence analysis were subject to a detailed assessment of the potential impacts. The following scenarios were carried forwards for consequence analysis;

- Diesel tank leak, spill, immediate ignition and pool fire;
- PAC dust cloud, ignition and dust cloud explosion;
- Ignition of waste in bunker and full bunker fire; and
- Transformer Oil Spill, Ignition and Pool Fire.

The impacts estimated for each of the scenarios were overlaid on the site layout diagram to assess offsite impacts. No scenarios were identified to impact over the Site boundary and so no further analysis was conducted.

17.3.5 FIRE RISK ASSESSMENT

The fire scenarios identified in the PHA (listed above) were used to assess the requirements for fire protection for each scenario location at the Site.

17.4 ASSESSMENT OF KEY ISSUES

A hazard identification table was developed for the proposed Facility to identify potential hazards that may be present at the Site as a result of operations or storage of materials.

17.4.1 HAZARD ASSESSMENT

A detailed qualitative review of each hazard scenario was performed to assess the potential for offsite impacts. Following the qualitative review, scenarios that still had potential to impact offsite were carried forwards for consequence analysis. These scenarios are listed below together with the summarised outcomes of estimated impacts:

Diesel tank leak, spill, immediate ignition and bund fire

There is potential for the diesel tanks to leak resulting in a flammable liquid spill within the bund. If the spill is ignited, a pool fire with the dimensions of the bund will occur. The radiant heat impacts at 4.7 kW/m2 do not extend over the Site boundary and, hence, it is unlikely that a fatality would occur at the Site boundary.

PAC dust cloud, ignition and dust cloud explosion within storage silo

A PAC dust explosion may occur within the storage silo provided the following are present: fuel, oxygen, confinement, dispersion, and ignition. It is noted that the analysis conducted for the silo explosion has been performed without the confinement of the silo enclosure. As a result, the results present a conservative outcome. The pressure impacts do not extend over the Site boundary and therefore it is unlikely that a fatality would occur at the Site boundary.

Ignition of waste in bunker and full bunker fire;

There is potential for a fire to develop within the waste bunker. All the materials within the bunker are combustible so there is potential for the fire to grow and consume the entire waste storage. The radiant heat impacts at do not extend over the Site boundary; therefore it is unlikely that a fatality would occur at the Site boundary.

Transformer internal arcing, oil spill, ignition and bund fire

There is potential for arcing to occur within the transformers which may lead to generation of gases and pressure above the structural integrity of the oil reservoir which may rupture leaking oil into the bund. As a result of the arcing and rupture, the oil may ignite leading to a fire within the bund. The radiant heat

impacts do not extend over the Site boundary; therefore it is unlikely that a fatality would occur at the Site boundary.

Ignition of waste in truck and truck fire

Products inside the truck trailers may catch on fire due to damaged packages which are exposed to an ignition source, and the stock loaded within the truck may be shielded from sprinkler discharge. The radiant heat impacts at do not extend over the Site boundary; therefore it is unlikely that a fatality would occur at the Site boundary.

The impacts estimated for each of the scenarios were overlaid on the Site layout diagram to assess offsite impacts. No scenarios were identified to impact over the Site boundary and so no further analysis was conducted.

17.4.2 FIRE RISK ASSESSMENT

The following fire scenarios may occur at the EfW Facility, and have the potential to impact over the Site boundary:

- Diesel bund fire;
- Waste bunker fire;
- PAC silo fire; and
- Transformer bund fire.

A follow-up consequence analysis on the above incidents showed that radiant heat at the Site boundary would be below 4.7 kW/m₂ and therefore it is unlikely a fatality would occur at the boundary. In addition, radiant heat from these scenarios would be contained within the Site and hence, fire propagation across the Site boundary would be unlikely to occur.

17.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

The following recommendations from the PHA have been made, and will be adopted at the proposed Facility;

- Development of a work permit system, including hot work permits;
- Development of hazardous area diagrams in accordance with AS60079.10.2 be conducted;
- Ignition sources within the hazardous area should be controlled according to AS60079.14;
- Installation of monitor(s) in the waste bunker (further monitor recommendations below); and
- Investigate the feasibility of installing explosion venting in the PAC silos.

The following recommendations from the FRA for fire protection have been made, and will be adopted regarding the proposed Facility;

Diesel Bund

- 1 powder type fire extinguisher per bunded area;
- 1 hose reel with foam making capabilities per bunded area; and
- 1 hydrant with foam making capabilities per bunded area.

Waste Bunker

- Two 1900 L/min monitors shall be installed to provide complete coverage within the fuel bunker;

- Monitors shall be installed such that access is provided externally from the fuel bunker; and
- Monitors shall be installed on raised platforms to prevent trucks from colliding with the monitors.

PAC Silo

 Potential of nitrogen blanketing for the purpose of fire protection (via oxygen exclusion) will be investigated.

Transformers

- 1 powder-type fire extinguisher per transformer.

Pumping and Water Availability

- A pump set shall be installed to provide adequate water pressure for the monitors; and
- At least 504,000 L of firewater shall be stored at the Site.

Given the various consequence analyses showed that none of the scenarios would impact over the Site boundary and therefore a fatality would not occur at the Site boundary, the cumulative risk at the Site boundary would be less than 50 per million per year, which is considered an acceptable risk level.

17.6 SUMMARY AND CONCLUSION

As detailed within the PHA and a FRA prepared in support of this application, with the implementation of the above recommendations for the proposed Facility the risks at the Site boundary will fall within accepted levels.

The consequence analysis showed that none of the scenarios would impact over the Site boundary and a fatality would not occur at the Site boundary. Therefore the cumulative risk at the Site boundary would be less than 50 chances per million per year, which is considered an acceptable risk level.

In addition to the preliminary hazard analysis (PHA) a fire risk assessment (FRA) was conducted to ensure adequate fire services would be available to combat the identified scenarios.

18 Flora and Fauna

18.1 OVERVIEW

The Director-General's Environmental Assessment Requirements for the Energy from Waste application include the following requirement for environmental assessment of Flora and Fauna for the proposed Development:

 Including an assessment of the potential impacts to threatened species, populations and communities, and their habitat(s), and if required describe how the principles of "avoid, mitigate, offset" have been used to minimise the impacts of the proposal on biodiversity

A flora and fauna survey was carried out by Abel Ecology within the proposal footprint and adjoining areas to assess the likely impacts of the proposal on species present on the Site, and whether there is likely to be any significant effect on any endangered ecological community, endangered population, threatened species or their habitats, as per the listings in the Threatened Species Conservation Act 1995 (TSC Act 1995) (state legislation), the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999) (Commonwealth legislation) and other applicable local or regional policies. The Flora and Fauna Assessment Report is provided at **Appendix H**.

18.2 LEGISLATIVE REQUIREMENTS

The *Flora and Fauna Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

- Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 Guide to implementation in NSW
- Environment Protection and Biodiversity Conservation Regulations 2000 (Schedule 4)
- State Environmental Planning Policy No 14 Coastal Wetlands
- NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects

18.3 ASSESSMENT METHODOLOGY

A flora and fauna survey was carried out within the proposed Development footprint and adjoining areas to assess the likely impacts of the proposed Development on species present on the Site, and whether there is likely to be any significant effect on any endangered ecological community, endangered population, threatened species or their habitats, as per the listings in the *Threatened Species Conservation Act 1995* (TSC Act 1995) (state legislation), the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) (Commonwealth legislation) and other applicable local or regional policies.

The assessment was based on the seven factors listed in Section 5A of the *Environmental Planning and Assessment Act 1979* (EPA Act),, which are detailed in **Appendix H.** The assessment addresses both 'endangered' and 'vulnerable', as required by the Threatened Species Conservation Act, 1995 (TSC Act 1995).

The flora survey involved random meanders through the survey area to compile vegetation descriptions and vascular flora species lists for the Site. Targeted surveys were made for threatened species on the basis of local species records and suitable habitat within the survey area. The fauna survey involved an aquatic biota survey, call playbacks, diurnal fauna searches, nocturnal fauna searches, stag watching, and microbat ultrasonic call recording.

18.4 ASSESSMENT OF KEY ISSUES

The survey area has had a long history of disturbance and is currently primarily used for grazing cattle. The proposal footprint is approximately 24.4 hectares in size. Approximately 22.5 ha of this area is grazing pasture which will be removed. Other areas of indigenous vegetation proposed for removal are:

- Approximately 0.27 hectares of the critically endangered ecological community Cumberland Plain Woodland;
- Approximately 2.89 hectares of River-flat Eucalypt Forest; and
- Approximately 970 m² of Cumbungi within a farm dam.

The proposed Development will also require the removal of eight potential habitat trees. The survey contains suitable habitat for a range of common indigenous species, feral species and some threatened indigenous species.

TABLE 32 – ENDANGERED ECOLOGICAL COMMUNITIES AND THREATENED FAUNA SPECIES RECORDED WITHIN THE SURVEY AREA

SPECIES/COMMUNITIES	C'WEALTH LISTING EPBC ACT'99	STATE LISTING TSC ACT '95	RESULT
Yellow-bellied Sheathtail- bat Saccolaimus flaviventris		Schedule 2, Vulnerable	No Significant Effect
Eastern Freetail-bat Mormopterus norfolkensis		Schedule 2, Vulnerable	No Significant Effect
Cumberland Plain Woodland	Critically Endangered	Critically Endangered	No Significant Effect
River-flat Eucalypt Forest		Endangered	No Significant Effect

Both of the threatened ecological communities were present as degraded remnants in Class 2/3 condition, with an understorey dominated by weeds (Class 2/3 condition indicated remnant or regenerating areas with weed invasion).

The provisions of the EPBC Act 1999 apply to the proposed development. The outcome is not significant, however, and does not require referral to the Commonwealth. There is not likely to be a significant effect on the Yellow-bellied Sheathtail-bat, Eastern Freetail-bat, Cumberland Plain Woodland or River-flat Eucalypt Forest. A Species Impact Statement is not required.

18.5 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

The survey area contains a patch approximately 2700 m² in size of the Critically Endangered Ecological Community Cumberland Plain Woodland comprising of trees, most commonly Grey Box *Eucalyptus moluccana* and Forest Red Gum *Eucalyptus tereticornis;* as well as scattered indigenous groundcovers. This ecological community is listed under both the NSW government TSC Act and the Commonwealth government EPBC Act.

The southern portion of the survey area contains the Endangered Ecological Community River-flat Eucalypt Forest. This endangered ecological community is listed under the NSW government TSC Act.

No threatened flora species were recorded in the survey area.

Two threatened insectivorous bat species, namely the Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* and Eastern Freetail-bat *Mormopterus norfolkensis* were recorded on the Site.

Short-term impacts of the proposal relate to the removal of all vegetation on the development footprint, including pasture. This is approximately 0.27 ha of Cumberland Plain Woodland and approximately 2.89 ha Eucalypt River-flat forest. The eight habitat trees and the farm dam, which are within the proposal footprint will be cleared.

The proposal will retain approximately 1.29 ha.

Removal of weeds including noxious and environmental weeds within the proposal footprint will be of benefit to the surrounding locality.

Long-term impacts will be similar to short-term impacts. However, appropriate landscaping plantings, the installation of bat roosting boxes and the offset planting of indigenous vegetation including areas of both Cumberland Plain Woodland and River Flat Eucalypt Forest around the bio-retention basin, along the southern boundary of the development footprint and other parts of the SEPP59 area will provide habitat for indigenous flora and fauna.

Emissions from the EFW plant are unlikely to significantly affect indigenous flora and fauna as they will be required to meet standards suitable for humans.

Stormwater falling within the development footprint will be directed to the two water storage dams proposed for construction along the southern boundary of the development footprint.

18.5.1 MITIGATION MEASURES

The Director General Requirements (DGRs) state that the proposal must 'describe how the principles of "avoid, mitigate, offset" have been used to minimise the impacts of the proposal on biodiversity'.

Areas of remnant indigenous vegetation will be retained as a result of avoidance of clearing. Approximately 1.29 ha of River-flat Eucalypt Forest will be retained south of the proposal footprint.

The approx. 0.27 ha of Cumberland Plain Woodland and 2.89 ha of River Flat Eucalypt Forest proposed to be cleared for the proposal will be offset.

Mitigation of some impacts will be achieved by the following actions:

- 1. Potential erosion will be mitigated through the use of sediment fencing adjacent to the downslope edge of the development footprint.
- 2. Stormwater quality discharged from the Site will meet or exceed the requirements of SEPP59 and thus this will mitigate against potential impact of poor water quality. The bio-retention basin will be planted with local indigenous wetland species to create wetland habitat.
- 3. A pre-clearance survey will be undertaken and any vertebrate fauna and Cumberland Plain Land Snails captured will be moved to the retained area of River Flat Eucalypt Forest to the south of the development footprint.
- 4. Use of locally indigenous flora in landscape planting
- 5. Weeds will be removed within the development proposal footprint. This will mitigate against further weed spread.

Offsetting will be achieved within the SEPP59 area along the Ropes Creek Tributary and also on the batters surrounding the Bio-retention basin and the batters to the south of the development footprint. Approximately 0.54 ha of Cumberland Plain Woodland will be regenerated or replanted for the 0.27 ha that will be removed and approximately 4.98 ha of River Flat Eucalypt Forest will be regenerated or replanted for the 2.89 ha that will be removed. The River Flat Eucalypt Forest will be regenerated and replanted within the SEPP59 Ropes Creek Tributary riparian corridor. **Figure 28** shows the location of revegetation/regeneration areas including the bio-retention basin bottom, River-flat Eucalypt Forest on the batters and along the Ropes Creek Tributary, and the area of offset revegetation Cumberland Plain Woodland to the south-west of the tributary.

FIGURE 28 – LOCATION OF REVEGETATION/REGENERATION AREAS



The loss of hollow-bearing trees will also be offset through the installation of fauna roosting/nesting boxes within the retained River Flat Eucalypt Forest along the Ropes Creek Tributary. For each of the hollow-bearing trees removed two nesting or roosting boxes will be installed within the Ropes Creek Tributary. Twenty fauna boxes will be installed.

18.6 SUMMARY AND CONCLUSION

The provisions of the EPBC Act 1999 apply to this proposal. The outcome is not significant, however, and does not require referral to the Commonwealth.

There is not likely to be a significant effect on the Yellow-bellied heathtailbat, Eastern Freetail-bat, Cumberland Plain Woodland or River-flat Eucalypt Forest.

There is overall very little remnant vegetation as the Site is mostly cleared. Remanent vegetation is primarily represented by scattered trees and scattered patches of herbaceous vegetation around the riparian corridor.

Both threatened ecological communities were present as degraded remnants in Class 2/3 condition, with an understorey dominated by weeds. While the provisions of the EPBC Act 1999 pertaining to Flora and

The flora and fauna survey did not reveal any impediments to the proposed development. There is not likely to be a significant effect on any endangered ecological community, threatened species or their habitats, therefore a Species Impact Statement is not required.

19 Visual

19.1 OVERVIEW

A Visual Impact Assessment has been prepared by Urbis in support of the proposed Development and is submitted at **Appendix I**. The Visual Assessment has been prepared to address the key considerations contained within the DGRs.

- 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;
- 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;
- Consideration of any impact on flight paths; and
- A detailed photo-montage based analysis of the visual impacts of development and emissions stacks.

19.2 LEGISLATIVE REQUIREMENTS

The *Visual Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

Control of Obtrusive Effects of Outdoor Lighting (Standards Australia, AS 4282).

19.3 ASSESSMENT METHODOLOGY

The study approach has been based on an analysis of the visual setting and an assessment of the potential impacts of the development of the Facility on its viewshed. The urban viewshed assessed is primarily the area where highest impacts are likely to occur, typically within 2.5 km of the Site area boundary. The methodology is comprised of a number of components. These are:

Qualitative Assessment

- Visual modification How does the proposed development contrast with the landscape character of the surrounding setting?
- What is the quality of the landscape setting?
- Sensitivity How sensitive will viewers be to the proposed development?
- Impacts of Night Lighting.

Quantitative Assessment

How much of the proposed development is visible from particular viewpoints?

The methodology employed by Urbis is based on the Landscape Aesthetics Handbook (United States Department of Agriculture [USDA] Forest Service, 1995) methodology. The basis of this Visual Management System methodology is that the visual impact of a proposed development is determined by evaluating the degree of visual modification/fit of the development in the context of the visual sensitivity of surrounding land use areas from which a proposed development may be visible.

The visual modification level of a proposed development can be best measured as an expression of the visual interaction, or the level of visual contrast between the development and the existing visual environment (Zube *et al.*, 1976). Throughout the visual catchment the level of visual modification generally decreases as the distance from the development to various viewpoint locations increases, and is categorised as follows:

- Negligible (or very low) level of visual modification where the development is distant and/or relates to a small proportion of the overall viewscape.
- Low level of visual modification where there is minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the development and the landscape.

In this situation the development may be noticeable, but does not markedly contrast with the existing modified landscape.

- Moderate level of visual modification where a component of the development is visible and contrasts with the landscape, while at the same time achieving a level of integration. This occurs where surrounding topography, vegetation or existing modified landscape provide some measure of visual integration or screening.
- High level of visual modification where the major components of the development contrast strongly with the existing landscape.

The quantitative assessment of visual prominence, as outlined in the section following, is considered in the assessment of visual modification in terms of the quantum of viewshed subjected to change. However, the assessment of visual modification also considers the level of visual compatibility of the Facility with the existing visual landscape.

Visual sensitivity is a measure of how critically a change to the existing landscape will be viewed from various use areas (Brush and Shafer, 1975). Different activities undertaken within the landscape setting have different sensitivity levels. For example, tourists who are using the surrounding landscape as a part of the holiday experience will generally view changes to the landscape more critically than agricultural or industrial workers in the same setting. Similarly, individuals will view changes to the visual setting of their residence more critically than changes to the visual setting of the broader setting in which they travel or work.

The visual sensitivity of the development depends on a range of viewer characteristics. The primary characteristics used in this study are:

- Land use and the expectation of the viewer of a particular visual experience.
- Distance of the development from viewers.

The visual sensitivity of land uses were assessed to assist in determining the visual impact of the development. As distance from the viewer to the proposed development increases, the level of sensitivity reduces.

Typical levels of viewer sensitivity for the assessed visual setting of the Facility are based on levels of visual significance as described in the Visual Management System within the assessment.

Photomontages of the proposed Facility are provided below.

FIGURE 29 – PHOTOMONTAGES OF THE PROPOSED FACILITY



PICTURE 1 – VIEW FROMENTRY ROAD FROM THE WEST



PICTURE 2 – VIEW FROM SOUTH WEST

19.4 ASSESSMENT OF KEY ISSUES

The critical issues to consider in the assessment of visual impact are:

- Degree to which the proposed works are visible from representative sensitive viewing locations; and
- The degree to which the Facility integrates within the character of the existing setting

The method assumes that if the Facility is not seen, then there is no resulting impact. Analysis was undertaken to identify sensitive viewpoints in the vicinity of the Facility. Viewpoints located within the local and near sub-regional settings of the Facility were chosen for detailed assessment based on their higher levels of viewer sensitivity:

- Residences and the local road network;
- Transport and Tourist Routes, e.g., motorway; and
- Open Space and recreation areas.

The quantitative assessment process has focussed on the visual modification that may result on views for the most sensitive visual settings/land uses, applying the visibility method.

Low sensitivity visual settings, such as existing landfill areas or industrial land uses have not been considered. The quantification of vertical angle is based on the height of the tallest elements of the Facility (e.g., the tallest building at 54 m and the vent stacks at 103.7 m). The quantification of vertical and horizontal prominence assists with the determination of visual modification.

However, it does not take into account aspects such as visual contrast or visual integration which are assessed as part of the qualitative assessment process. Distances expressed in the quantitative assessment are based on those from the viewpoint to the most visible components of the Facility, either the vent stacks or main building structure.

A quantitative assessment of these viewpoints is provided below and within the Visual Impact Assessment.

VIEWPOINT	VIEWSHED	HORIZONTAL DISTANCE FROM VIEWER (TO CLOSEST COMPONENT)	HORIZONTAL ANGLE	HORIZONTAL POTENTIAL VISUAL PROMINENCE	VERTICAL ANGLE	VERTICAL POTENTIAL VISUAL PROMINENCE	VISUAL MODIFICATION LEVEL
EASTERN AS	SPECT						
Viewpoint	Sub-	1.7 km (Tipping Hall)	5° Minimal	Insignificant	2° Minimal	Potentially Noticeable	Low to
1	Regional		Views –		Views –		Moderate
Roper			Mostly		Mostly		
Road			screened by		screened by		
Overpass			vegetation		vegetation		
Viewpoint	Sub-	1.9 km (Vent Stack)	No View –	No Impact	No View –	No Impact	No Impact
2	Regional		Screened by		Screened by		
Peppertree			built form and		built form and		
Drive (Near			vegetation		vegetation		
Phoenix							
Crescent)							
Viewpoint	Sub-	1.8 km (Vent Stack)	7°	Potentially Noticeable	3°	Potentially Dominant	Moderate to
3	Regional						High
Peppertree							
Park							
Viewpoint	Sub-	1.6 km (Tipping Hall)	No View –	No Impact	No View –	No Impact	No Impact
4	Regional		Screened by		Screened by		
Minchin	U		topography		topography		
Drive							
Viewpoint	Sub-	1.3 km (Tipping Hall)	No View –	No Impact	No View –	No Impact	No Impact
5	Regional		Screened by		Screened by		
McFarlane			topography		topography		
Drive							
Viewpoint	Sub	1.5 km (Vont Stack)	4º Minimal	Insignificant	2 ⁰	Potontially Noticeable	Low to
viewpoint	Sup-	1.5 km (Vent Stack)	4 Winimal	msignilicant	2	Folentially Noticeable	Low to
0	Regional		views -				woderate

TABLE 33 – QUANTITATIVE VISUAL ASSESSMENT

VIEWPOINT	VIEWSHED	HORIZONTAL DISTANCE FROM VIEWER (TO CLOSEST COMPONENT)	HORIZONTAL ANGLE	HORIZONTAL POTENTIAL VISUAL PROMINENCE	VERTICAL ANGLE	VERTICAL POTENTIAL VISUAL PROMINENCE	VISUAL MODIFICATION LEVEL
Indus			Mostly				
Street			screened by				
			vegetation				
Viewpoint	Sub-	1.6 km (Vent Stack)	8°	Potentially Noticeable	4°	Potentially Dominant	Moderate to
7	Regional						High
Old							
Wallgrove							
Road							
Viewpoint	Sub-	1.2 km (Vent Stack)	4° Minimal	Insignificant	3°	Potentially Dominant	Moderate
8	Regional		Views –				
Blackbird			Mostly				
Lane Path			screened by				
			vegetation				
Viewpoint	Sub-	1.3 km (Vent Stack)	4° Minimal	Insignificant	3°	Potentially Dominant	Moderate
9	Regional		Views –				
Sennar			Mostly				
Lane Path			screened by				
			vegetation				

19.4.1 NIGHT LIGHTING

The exact impact or acceptability of night-lighting is difficult to define as it is dependent on individual perceptions and sensitivities as well as the presence of existing light. From most locations in the sub–regional and regional setting, direct views to the lighting sources would be obscured from view by built form and vegetation within the landscape and around residences.

The local, sub regional and regional settings all contain lighting sources of a similar intensity emitted from both residences and other industrial uses and the nature of the night-lighting for the Facility would be similar to that of the existing night-time setting. Therefore any change in potential night lighting impacts would be relatively minor for most viewpoints.

19.4.2 FLIGHT PATHS

As detailed in **Section 6.3**, the Federal Department of Infrastructure and Regional Development has not progressed the planning of the proposed second Sydney airport to such a point that comment can be made by the Department or CASA about potential air traffic issues.

19.5 MITIGATION MEASURES

Concept Plan by Site Landscape has been prepared for the Facility. Key objectives of this concept plan were to soften the visual impact of the Facility. Primary ameliorative actions include canopy tree planting along the north interface with the future Estate Road.

Visual impact has been reduced through cladding of the buildings with non-reflective materials and use of subdued colours that mimic those found in the surrounding WSEA and landscape setting. For example greys, browns and olive greens. The design uses this range of complementary muted colours of slightly lighter and darker shades to provide a dappled effect to improve visual integration.

The visual impact of the stacks against the sky has been further reduced through selection of a light grey finish which aids visual integration in range of atmospheric conditions. Bright, un-natural colours have been avoided.

While not able to fully screen the proposed 50 m high buildings and 100 m vent stacks, the canopy tree planting proposed for the north eastern boundary of the Facility will soften the bulk of the buildings and assists in "settling" them within the landscape.

To minimise potential lighting impacts, all external lighting associated with the Facility will comply with Australian Standard AS 4282: 1997 – *Control of the Obtrusive Effects of Outdoor Lighting*. Night-lighting will be kept to the minimum required for operations and safety requirements.

19.6 SUMMARY AND CONCLUSION

A high degree of visual absorptive capability is afforded by the proposed Site landscaping and topography in the sub-regional and regional setting of the Facility which is generally flat to slightly undulating. Most sensitive viewpoints are located within this sub-regional setting.

Most views to the industrial landscape from Colyton, Minchinbury and Erskine Park are screened by existing vegetation and residential built form.

From most locations, the lower parts of the Facility will be totally obscured from view. Where views are possible, these will generally be of the upper parts of the buildings and the slender twin vent stacks protruding above the tree canopy or building line. The resulting visual impact will be negligible for most locations and generally low to moderate where views are possible from sensitive viewpoints.

The highest sensitivity viewpoints with higher visual impacts are generally located within the near sub regional setting. The highest impact locations are:

- M4 Western Motorway for a short section within close proximity to the Facility (local setting). However, given the modification to the landscape setting created by the M4 itself, and the heavily modified landscapes that it traverses, impacts to views from the M4 are not considered to be significant;
- Shared Path / Recreation Areas- Peppertree Park and Ropes Creek path; and
- Residences Erskine Park, Colyton and Minchinbury (sub regional setting);

Where open views are afforded to the Facility, they are from low sensitivity industrial areas in the vicinity of Wallgrove Road to the south east.

20 Greenhouse Gas

20.1 OVERVIEW

The Director-General's Environmental Assessment Requirements for the Energy from Waste application include the following requirement for environmental assessment of Greenhouse Gas for the proposed Development:

- 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; and
- A detailed description of the measure that would be implemented on site to ensure that the project is energy efficient.

Pacific Environment prepared a Greenhouse Gas Assessment (Appendix K).

20.2 LEGISLATIVE REQUIREMENTS

The *Greenhouse Gas Assessment* uses the following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development:

- AGO Factors and Methods Workbook (AGO)
- Guidelines for Energy Savings Action Plans (DEUS, 2005)

20.3 ASSESSMENT METHODOLOGY

The World Resources Institute / World Business Council for Sustainable Development Greenhouse Gas Protocol (the GHG Protocol) originally documented the different scopes for GHG emission inventories. The GHG Protocol is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions. This corporate accounting and reporting standard is endorsed by the Australian Department of Climate Change and Energy Efficiency.

The GHG Protocol defines three scopes for developing inventories leading to reporting of emissions. These scopes help to delineate direct and indirect emission sources, improve transparency, and provide a degree of flexibility for individual organisations to report based on their organisational structure, business activities and business goals.

Three scopes of emissions (also shown in Figure 30) are defined in the GHG Protocol:

- 'Scope 1' emissions: direct GHG emissions occurring from sources owned or controlled by the company – for example vehicle fleet and direct fuel combustion. Any negative emissions (sequestration), for example from a plantation owned by the entity, would also be included in Scope 1.
- 'Scope 2' emissions: indirect GHG emissions from purchasing electricity or heat from other parties; and
- 'Scope 3' emissions: indirect emissions which occur due to the company's business activities, but from sources not owned or controlled by the company - for example emissions from employee business-related air travel.

FIGURE 30 - OVERVIEW OF SCOPES AND EMISSIONS ACROSS A VALUE CHAIN



The GHG is guided by, and makes reference to the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (the "NGER Measurement Determination") incorporating the National Greenhouse and Energy Reporting (Measurement) Amendment Determination 2012 (No. 1).

The National Greenhouse and Energy Reporting Regulations 2008 (the NGER Regulations) describe the detailed requirements for reporting under the NGER Act 2007. The National Greenhouse and Energy Reporting (Measurement) Technical Guidelines (the NGER Technical Guidelines) have been intended to support reporting under the NGER Act 2007. They have been designed to assist corporations in understanding and applying the NGER Measurement Determination.

The NGER Technical Guidelines outline calculation methods and criteria for determining GHG emissions, energy production, energy consumption and potential GHG emissions embodied in natural gas. Under the NGER Act, Scope 1 and 2 emissions must be accounted for by the organisation. Reporting of Scope 3 is optional and not included in this assessment as the Scope 3 emissions would be minor. The proposed Facility will have no Scope 2 emissions (purchase of electricity is not required) and the focus of this assessment is therefore on Scope 1 emissions.

20.4 ASSESSMENT OF KEY ISSUES

The estimated GHG emissions from waste incineration are presented in Table 34.

WASTE (TPA)	CARBON CONTENT (5)	% CARBON THAT IS FOSSIL ORIGIN	OXIDATION FACTOR*	CO ² -E (TPA)
1,3500	32.48%	40%	1*	629,784

TABLE 34 – ESTIMATED GHG EMISSIONS FROM WASTE INCINERATION

Note: It is assumed that biomass based carbon is renewable or climate neutral.* Not known, default of 1 applied.

The emission intensity for electricity generated from waste incineration is lower than that derived from the NSW electricity grid and therefore a net reduction in GHG emission is achieved when electricity is diverted from the NSW grid. Similarly, by removing biomass waste from the landfill, significant emissions of methane from the decomposition of that waste are also eliminated.

20.5 SUMMARY AND CONCLUSION

A summary of the estimated net GHG emissions resulting from the proposed Facility are shown in **Table 35**.

CO ² -E TONNES PER ANNUM FROM WASTE INCINERATION	CO ² -E DIVERTED FROM GRID (TPA)	CO ² -E TONNES DIVERTED FROM LANDFILL	NET GHG EMISSIONS (CO ² -E TONNES PER ANNUM)
629,784	989,120	890,756	-1,250,092

TABLE 35 - ESTIMATION OF NET GHG EMISSIONS

The operation of the proposed Facility would have a net positive GHG effect, potentially eliminating 1.25 million tonnes of CO2-e per annum. The emission intensity for electricity generated from waste incineration is lower than that derived from the NSW electricity grid.

Additionally, by removing biomass waste from the landfill, significant emissions of methane from the decomposition of that waste are also eliminated.

Overall, the proposed development will result in a net benefit in terms of the reduction of Greenhouse Gas emissions.

21 Aboriginal and Non-Aboriginal Cultural Heritage

21.1 OVERVIEW

Referral of the Preliminary Environmental Impact Statement to Blacktown City Council led to the identification of the following matters which need to be addressed in this application:

- Address Aboriginal Heritage in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005 and Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.
- Any impacts to Aboriginal cultural heritage as a result of the proposal must be adequately mitigated.
- Address European Heritage through a European Heritage assessment with the primary purpose of recording and identifying any potential heritage issues on the site, archaeological protocols for ground works.

GML Heritage prepared the following documents in 2014 in support of the application in response to the DGRs:

- Aboriginal Archaeological Technical Report (ATR) (Appendix S);
- Aboriginal Cultural Heritage Assessment Report (ACHAR) (Appendix T); and
- Heritage Impact Statement (Appendix V).

Following preparation of these reports, Artefact consultants conducted an archaeological test excavation over a period of four days at the proposed Development Site. The appended Aboriginal Heritage Test Excavation Report (TER) (**Appendix U**) outlines the results of archaeological investigations. Artefact prepared an ACHAR addendum to incorporate the additional Aboriginal consultation and results of test excavation (**Appendix T**).

21.2 NON-ABORIGINAL CULTURAL HERITAGE

21.2.1 LEGISLATIVE REQUIREMENTS

The Heritage Impact Assessment uses the following Criteria and Standards for assessing the existing *conditions, and modelling the impacts of the proposed Development:*

- Heritage Act 1977 (NSW)
- NSW Heritage Manual (NSW Heritage Office & DUAP)
- The Burra Charter (The Australia ICOMOS charter for places of cultural significance)

21.2.2 METHODOLOGY

The Heritage Impact Statement assessed the potential for historical archaeological values and built heritage values to be present within the study area, in accordance with the principles of *the Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance 2013* (the Burra Charter) and the NSW Heritage Manual documents *Assessing heritage significance;* and *Statements of Heritage Impact*, issued by the NSW Heritage Office.

The assessment of significance of historical archaeological sites requires a specialised framework for consideration. The framework used in this assessment (and the most widely used) is the Bickford and Sullivan 1984, which comprises three key questions which can be used as a guide for assessing the significant of an archaeological site:

- 1. Can the site contribute knowledge that no other site can?
- 2. Can the site contribute knowledge that no other resource can?

3. Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history or does it contribute to other major research questions?

The assessment also follows the Heritage Branch of the OEH's 'Assessing Significance for Historical Archaeological Sites and Relics' (2009). These guidelines call for broader consideration of multiple values of archaeological sites beyond their research potential.

The study area was characterised by four main phases of historical development as follows:

- Phase 1 Early History (1819-1856).
- Phase 2 The Shepherds (1856-1909).
- Phase 3 Early Twentieth Century (1909-1954).
- Phase 4 Quarrying and Industrial Use (1955-Present).

21.2.3 IMPACT

GML's assessment concluded the following:

- Parts of the study area have been subject to major disturbances associated with quarrying activity to the east of the study area. Other parts of the study area have no known historical use and are largely undisturbed by any documented or visible development activities.
- The potential historical archaeological resource is expected to have low research potential and is not considered to meet the criteria for Local or State significant relics, as defined by the Heritage Act.
- The proposed redevelopment of the study area involves the construction of the Energy from Waste electricity generation plan and ancillary infrastructure. The excavation and ground works associated with the proposed development would remove any potential archaeological remains within the proposed impact area.
- These works are not considered likely to impact on relics, as the potential historical archaeological
 resource that is likely to existing on the study area does not meet the threshold for a relic due to lack
 of significance.

21.2.4 CUMULATIVE IMPACTS AND MITIGATION MEASURES

Given the low potential for historical archaeological remains of low significance to be present within the study area, cumulative impacts are not expected. In the event that unexpected archaeological remains not identified within the statement are discovered at the area, all works within the affected area should cease and the OEH should be notified, in accordance with Section 146 of the *Heritage Act 1977*.

To mitigate potential for adverse impacts on any historical archaeological remains, contractors involved in the development will receive a Heritage Induction outlining the protocol regarding the identification of unexpected archaeological remains, and their obligations under the Heritage Act and the National Parks and Wildlife Act (NSW).

21.2.5 SUMMARY AND CONCLUSIONS

The proposed excavation and construction works are not considered likely to impact relics, as the potential historical archaeological resource that is likely to existing on the study area does not meet the threshold for a relic due to lack of significance. Further studies are not required.

The statement provides the following recommendations:

In the event that unexpected archaeological remains not identified within the statement are discovered at the area, all works within the affected area should cease and the OEH should be notified, in accordance with Section 146 of the Heritage Act.

 All contractors involved in the development should receive a Heritage Induction outlining the protocol regarding the identification of unexpected archaeological remains, and their obligations under the Heritage Act and the National Parks and Wildlife Act (NSW).

21.3 ABORIGINAL CULTURAL HERITAGE

21.3.1 LEGISLATIVE REQUIREMENTS

The following Criteria and Standards for assessing the existing conditions, and modelling the impacts of the proposed Development have been used:

- National parks and Wildlife Act (1974)
- Environmental Planning and Assessment Act (1979)
- Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment
- Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (Department of Environment Climate Change and Water (now OEH))

21.3.2 METHODOLOGY

GML Heritage's ATR (**Appendix S**) identified one area which will be directly impacted by the proposed works. The area is known as EfW South, and is located on an elevated area at the confluence of three waterlines in the southeast corner of the Site. GML recommended an archaeological test excavation to assess the nature, extent, condition and integrity of the Site.

Artefact Heritage completed the archaeological test excavation of Aboriginal site EfW South. The ATR report completed by GML recommended the test excavation be completed according to the *OEH Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (Code of Practice). Given the project is a SSD, use of the Code of Practice is not required. However, the test excavation was completed in accordance with the Code of Practice as a large number of previous archaeological test excavations in the region were completed under this Code. Therefore it is considered an applicable framework to use for comparative analysis of archaeological findings.

It is noted that the TER was carried out based on a previous scheme that involved more expansive works (to the north west of the Site up to the junction of the electrical easement and proposed Archbold Road extension). The scheme proposed is more spatially constrained in comparison and will have less of an impact on the Site. As a result, the TER assessed a greater area than necessary.

In order to determine social values and community views and opinions with respect to Aboriginal heritage, the OEH has established a formal process involving identification, registration, engagement and consultation with Aboriginal peoples who may hold cultural knowledge relevant to determining the significance of an Aboriginal object and/or place.

Adherence with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 involves following a number of stages, which include:

- Informing Aboriginal people about the nature and scope of the proposal;
- Understanding what might be present in the landscape and its cultural significance;
- Determining the potential impacts and the proposed strategies to deal with them; and
- Reviewing the report.

Aboriginal community consultation in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 was initiated in March 2013 and is ongoing. Twelve Aboriginal stakeholders have registered for consultation throughout the project, including:

Darug Land Observations (DLO)

- Tocomwall
- Darug Aboriginal Cultural Heritage Assessments (DACHA)
- Koomurri Ngunawal Aboriginal Corporation (KNAC)
- HSB Heritage Consultants (HHC)
- Wurrumay Consultants
- Darug Aboriginal Landcare (DALC)
- Darug Tribal Aboriginal Corporation (DTAC)
- Deerubbin Local Aboriginal Land Council (DLALC)
- Kamilaroi-Yankuntjatjara Working Group (KYWC)
- Gunjeewong Cultural Heritage Aboriginal Corporation (GCHAC)
- Darug Custodian Aboriginal Corporation (DCAC)

The Test Excavation Methodology was sent by Artefact Heritage to all registered Aboriginal stakeholders for comment on 8 October 2014. No comments on the methodology were forthcoming from any of the registered stakeholders.

A consultation log has been kept detailing correspondence with the Aboriginal stakeholder groups. The full consultation log maintained by GML is provided in **Appendix T**.

21.3.3 IMPACTS

In consideration of the previous archaeological work within the study area and surrounding region and current consultation with the project Registered Aboriginal Party, the following points can be summarised:

- The study area and surrounds has been identified by the local Aboriginal community to be of high social significance.
- Two conservation zones were previously designated within the study area. Indicative plans for the development have not considered retaining these conservation zones.
- An archaeological field survey was completed by GML on 13 June 2014, accompanied by representatives from the project Registered Aboriginal Party.
- Previous work within the study area indicated areas with high and moderate archaeological potential exist across the development area.
- Previous archaeological excavations at sites directly surrounding the study area have confirmed the
 present of subsurface intact archaeological deposits. The majority of these sites that have been
 located on similar landforms as the study area have been consistent with low density background
 artefact scatters of moderate to low scientific significance.
- As this project is to be assessed in accordance with the EPA Act, it is not subject to the requirements for an Aboriginal Heritage Impact Permit (AHIP) in accordance with Section 90 of the NSW Park and Wildlife Act 1974 (NPW Act).

The subsequent TER carried out by Artefact found that EfW South is a low density artefact scatter, a site type that is common within a local and regional context on the Cumberland Plain is of low archaeological significance. The proposed EfW Facility will have a direct impact on site EFW South.

Test excavation of PAD site EFW South retrieved an assemblage of fourteen artefacts from nine of the thirty-seven 500x500 mm excavation units. The total area excavated 18.5m₂; with an artefact density of

0.76 artefacts/m₂. The artefact assemblage was made up of stone artefacts composed entirely of silcrete. No tools, retouched artefacts or cores were noted in the assemblage. The assemblage is indicative of general stone reduction and casual discard. The artefacts identified during test excavation offer low research or educational value. All material recovered the same quality silcrete raw material and artefacts were waste flakes, with very little technical diversity.

As these objects will be impacted by the proposal, comprehensive Aboriginal consultation in accordance with the DEC Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation 2005 has been undertaken. The results of the community consultation and test excavations have been included in the Aboriginal Cultural Heritage Assessment Addendum.

21.3.4 CUMULATIVE IMPACTS AND MITIGATIONS MEASURES

Given the proposed works are defined in extent, cumulative impacts from the Proposed are not anticipated. Site EFW South has been assessed to be of low archaeological significance. No further archaeological investigation of that area is required prior to impacts taking place.

The retrieved artefact assemblage will be reburied in the portion of EFW South within the riparian setback (south of the development footprint). The riparian setback is indicated in blue in the **Figure 31** below, and EFW is indicated in green hatch. The location of the reburial is indicated where these two zones overlap (south west corner of the Site). This location will not be impacted by any future development works.

Consultation regarding this was conducted as part of the Aboriginal stakeholder review of the ACHAR, and a preference for reburial has been indicated A site update card should be forwarded to the OEH AHIMS Registrar with information on the location and depth of reburial.

FIGURE 31 – LOCATION OF REBURIAL SITE WITHIN EFW SOUTH



21.3.5 SUMMARY AND CONCLUSION

GML undertook an Archaeological Field Survey which recommended test excavation of the Site subject to development. Test excavation of PAD site EFW South carried out by Artefact found the site to be of low archaeological significant. The excavation retrieved an assemblage of fourteen artefacts. The artefact assemblage was made up of stone artefacts composed entirely of silcrete, and offer low research or educational value. The retrieved artefact assemblage will be reburied in the portion of EFW South within the riparian setback. This location will not be impacted by any future development works.

No further archaeological investigation of PAD site EfW South is required prior to impacts taking place.

The ACHAR prepared by GML has been updated by the means of an addendum prepared by Artefact. This addendum outlines the results of the additional Aboriginal consultation, test excavations and proposed impacts to the significance of Aboriginal heritage values of all identified Aboriginal sites within the study area.

22 Assessment of Additional Issues

22.1 OVERVIEW

In addition to the above issues listed within the DGRs, a number of additional issues were identified during the preparation of the Environmental Assessment that also warranted detailed consideration to determine their potential environmental impact. These issues include:

- Stormwater, On-Site Detention and Flooding;
- Landscaping;
- Bushfire;
- Ecologically Sustainable Development;
- Contamination;
- Crime Prevention Through Environmental Design; and
- Interaction with existing, approved and proposed operations in the vicinity of the Site.

Each of the above matters is addressed within the following sub-sections of the Environmental Assessment and within the specialist reports that are submitted with the SSDA.

22.2 LANDSCAPING

Landscaping proposed on site is consistent with the uniform landscape theme across the Eastern Creek Industrial Precinct as detailed within the Eastern Creek Precinct Plan. The design objectives are to:

- Provide visual amenity generally against the built form;
- Provide screen amenity for the proposed industrial development;
- Create/ maintain passive surveillance of the Site; avoiding anti-social behaviour;
- Soften the ground plane;
- Provide vertical articulation via feature trees;
- Provide low-water-demanding plant species;
- Observe and maintain necessary safety and aesthetic sightlines; and
- Avenue tree planting to entries / formalised planting typologies.

Landscape treatment of the Site will be provided along the Precinct Road frontage as well as to the west of the tipping hall building. Batters are proposed around the perimeter of the subject Site which will be treated with mass planting and groundcovers to soften the appearance of the Site from surrounding locations.

The species of trees and shrubs have been carefully selected to compliment and provide a visual extension to existing streetscape.

The landscape plan prepared by Site Image (submitted at **Appendix E**) is considered suitable for the proposed development for the following reasons:

Incorporates intensified landscaping along the Site's principle focal point closest to the public domain.

- Use locally indigenous species.
- Incorporates all planting species specified to meet Blacktown City Council species requirements.
- Incorporates drought tolerant and low-water demand planting, responding to the natural climate.
- Incorporates a range of low-maintenance native plants which will assist in maintaining an orderly site presentation for the development in perpetuity.
- Includes landscaping and planting which will provide relief to the hardstand area.

The ground plane and landscape treatments are in proportion to the buildings and site, thus reducing the apparent scale of the built forms. The office area is provided with a simple outdoor terrace area.

The landscaping will be in accordance with the landscape plan prepared by Site Image and is attached with the SSD submission.

22.3 CONTAMINATION

A Phase 1 Environmental Site Assessment was prepared for the site by AD Envirotech Australia P/L (ADE) and is submitted with this application at **Appendix W**.

A review of the Acid Sulphate Soil Risk Maps showed that the Site is within an area of 'extremely low probability of occurrence' for acid sulphate soils.

Despite the Site having been utilised as grazing land as far back as records indicate, given an asphalt plant and associated waste water overflow dam has been present on the adjoining site since at least 1978, the Phase 1 Preliminary Site Investigation recommended a Targeted Phase 2 Detailed Site Contamination Investigation around the boundary of the asphalt plant be undertaken to determine whether contamination is present within the soil, and or surface water and river sediment within the boundaries of the Site.

Following the recommendation of the Phase 1 Assessment, ADE was engaged to undertake a Targeted Phase II Detailed Site Contamination Investigation (DSI) (**Appendix W**) to assess the current level of contamination of the Site.

This investigation 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. Based on the findings of the detailed site investigation, the Site is deemed suitable for commercial/industrial land use and the proposed Facility.

The concentrations of the potential contaminants within the soil, sediment and surface water samples collected were below the NEPM Schedule B (1) Health Based Investigation Levels (HIL) D, Ecological Screening Levels (commercial/industrial) and ANZECC Guidelines for Fresh and Marine Water Quality assessment criteria's.

Based on the findings of the detailed site investigation, the Site is deemed suitable for commercial/industrial land use and the proposed development.

22.4 BUSHFIRE

A Bushfire Assessment of the proposed Development has been prepared by Abel Ecology (**Appendix BB**) giving regard to *Planning for Bushfire Protection 2006*.

The aim of the assessment was to ascertain the potential fire hazard and establish the Site capability for an Asset Protection Zone to protect staff and facilities.

The access road to the building footprint from Honeycomb Road is adequate for fire fighting access and emergency staff egress.

In the opinion of Abel Ecology the proposed development should proceed to construction with the following measures included:

- Building construction for all aspects of the buildings excluding windows will need to be minimum FRL 30/30/30 where separation of 27m from grassland and 55m from forest is not achieved;
- Openable portions of windows are to be screened with metal mesh maximum 2mm aperture;
- Water requirements. Fire hose reels must be provided, which is capable of reaching all extremities of the proposed development.
- Grassland between the facility and unmanaged grassland is to be mown as lawn.

22.5 ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

The primary objective of the construction and operation of the proposed Facility is the provision of sustainable infrastructure within Metropolitan Sydney for the processing of waste and the generation of clean energy.

The *Environmental Planning and Assessment Regulation 2000* requires than an Environmental Impact Statement include:

'The reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development.'

The principles of Ecologically Sustainable Development, as listed in the Regulations, are as follows:

- The precautionary principle, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
 - Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - An assessment of the risk-weighted consequences of various options,
- Inter-generational equity, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
- Conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
- Improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:
 - Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

22.5.1 PRINCIPLE 1: THE PRECAUTIONARY PRINCIPLE

The proponent's precautionary approach is demonstrated by the design and management controls to be implemented as part of the proposed development. The controls proposed specifically address the threat of serious or irreversible damage from:

- Greenhouse gas emissions;
- Air emissions;
- Noise emissions;
- Surface water discharges;
- Soil and groundwater contamination;
- Impacts of biodiversity;
- Visual impacts;
- Damage to cultural artefacts;
- Wastewater disposal;
- Potential hazards; and
- Land use change.

Monitoring of these aspects would be carried out in accordance with regulatory and licence requirements. Where deviations for expected conditions are recorded, the matter would be investigated immediately and appropriate action taken as necessary, to prevent any adverse environmental impact as required by the Environmental Management Plans (construction and operations) for the proposed Facility. The proposed Development does not contemplate works that would result in serious or irreversible environmental damage.

22.5.2 PRINCIPLE 2: INTER-GENERATIONAL EQUITY

The proposed Facility will ensure a safe, clean and reliable form of energy generation for Metropolitan Sydney now and in the future, while providing a means of waste management through the operation of the proposed Facility in concurrence with the Genesis MPC to reduce or even eradicate the need for landfill in the future. As demonstrated within the Greenhouse Gas Assessment prepared by Pacific Environment (**Appendix L**), the operation of the proposed Facility would have a net positive GHG effect, potentially eliminating approximately 1.5 million tonnes of CO₂-e per annum. The emission intensity for electricity generated from waste incineration is lower than that derived from the NSW electricity grid.

The Proposed Development ensures that the environment will be protected for its enjoyment by future generations. The Site is located within an established industrial precinct and has been designed to complement the interface with the adjoining land uses. All environmental management measures have been assessed as appropriate for the Site and include best practice management.

22.5.3 PRINCIPLE 3: CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

The Site is currently largely cleared of vegetation; however the Proposed Development has been designed to protect habitats and biological diversity where possible. This is further detailed within Flora and Fauna Report prepared by Abel Ecology submitted with this EIS at **Appendix H**

Measures to avoid impacts on biodiversity have been developed, mainly through locating the proposed Facility and associated infrastructure as far away as possible from endangered ecological communities or threatened species habitats, siting the proposed Facility within cleared grazing lands, allowing for a suitable setback from the Ropes Creek tributary. Mitigation measures to reduce or minimise biodiversity impact are included within the Construction Environmental Management Plan (**Appendix CC**).
22.5.4 PRINCIPLE 4: IMPROVED VALUATION, PRICING AND INCENTIVE MECHANISMS

Given the proposed development is positioned for the clean treatment of identified waste fuels (that cannot be recovered or reused by Genesis) and will result in a net benefit for the locality in terms of Greenhouse Gas reduction and reduced landfill, the proposed Facility is a unique development in terms of the generation pollution or waste. However, the proposed Development is subject to the regulatory requirements of the NSW and Australian Governments, and the open market, when it comes to the valuation, pricing and incentive mechanisms influencing the costs associated with the operation of the project including those relating to waste management and operational systems.

The primary objective of the construction and operation of the proposed Facility is the provision of sustainable infrastructure within Metropolitan Sydney for the processing of waste and the generation of clean energy.

The will in addition to the above, incorporate the following ecologically sustainable design features:

- Installation of energy efficient fixtures and fittings;
- Installation of bio-retention basins which will treat stormwater run-off from the site;
- Balancing cut and fill requirements so as to minimise truck movements during construction and also the amount of materials to be transported to and from the site;
- Use of recycled or sustainable materials where possible;
- Encouragement of design which maximises natural light and ventilation; and
- Planting of vegetation that has low water requirements.

In addition the above it is noted that the proposed development will result in the improvement of the biodiversity values of the site through:

- Protection of the E2 zoned land;
- Planting of new native trees and shrubs on the site; and
- Creation of new potential habitat through the construction of bio-retention basins within the precinct.

The Proposed Development accords within the principles of Ecologically Sustainable Development outlined within Schedule 2 of the Environmental Planning & Assessment Regulation 2000.

22.6 CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED)

The crime risk assessment has been undertaken in accordance with the Department's guideline - *Crime prevention and the assessment of development applications.* The design and operational measures that will be implemented for the Site are outlined below. These measures will ensure that the buildings and satisfies the CPTED principles.

22.6.1 LIGHTING

- Building entries will have appropriate levels of lighting to avoid poorly-lit dark spaces to create a sense of safety and security.
- Lighting will be 'vandal resistant' to limit breakage and maintenance issues.
- Lighting will take into account all vegetation and landscaping in the car park, pedestrian pathways and street frontages that may act as an entrapment areas.
- Lighting will be designed in accordance with standards that consider the control of obtrusive effects of outdoor lighting.

- Lighting will be maintained and cleaned regularly.
- Paths from the car parking areas to building entrances will be well lit and not obscured by vegetation.
- External lighting will be activated 24/7. External lighting will be compliant with AS4282 'Control of the
 obtrusive effects of outdoor lighting to provide adequate safety for people on site, while minimising
 impact on surrounding land uses, roads and aircrafts:

22.6.2 DESIGNING FOR CASUAL SURVEILLANCE

 The surrounding roadways do not have a significant amount of pedestrian flows and accordingly it is not imperative that a high level of casual surveillance occur over such roadways.

22.6.3 LANDSCAPING

- The landscaping of the Site has been specifically designed to minimise opportunities for both the entrapment or concealment of intruders in the public domain, with all plantings being either low in height or having clear trunks to facilitate clear view lines across the Site.
- Landscaping will not conceal the entry and exit points to the car park.
- Planting of medium height or dense foliage will be avoided, which would obscure a person hiding behind them.
- Regular gardening and maintenance of the landscape areas will be undertaken to ensure that foliage does not obscure sight lines and complies with CPTED requirements.

22.6.4 FENCING

Fencing will not be of a height to obstruct views to and from the Site from a public place. The existing
post and rail fencing will be maintained as part of the proposed works.

22.6.5 CCTV AND OTHER SECURITY MEASURES

The following features and services are proposed:

- Fencing is proposed around the perimeter of the facility to ensure the plant is secure. Fence heights
 will not obstruct views to and from the Site from a public place. The existing post and rail fencing will
 be maintained as part of the proposed works. New fencing and Armco barriers will be installed as
 required;
- 24 hour security personnel will be present on Site to respond to any safety concerns;
- CCTV will be onsite; and
- Signage for community safety communication will be erected as required. It is suggested a condition
 of consent be applied which requires the provision of the necessary safety and security measures
 consistent with Australian Standard AS 4282: 1997 Control of the Obtrusive Effects of Outdoor
 Lighting.

22.6.6 ACCESS

- Clear signage will be erected which indicates traffic direction and pedestrian access in all car parking areas. Signage will be strategically positioned within car parking areas, to facilitate ease of viewing for drivers in all parking bays.
- The design has incorporated a clear vehicle entry/exit points for the Site.
- Access into the Site will be controlled and restricted to those vehicles permitted to enter.

- Pedestrian access to the building will have a clearly-defined direct pathway from the car park or hardstand areas.
- The entry points and circulation area car park are clearly identified and provide for passive surveillance of the entries and street.

22.6.7 DELINEATION OF PUBLIC AND PRIVATE SPACE

• Landscape treatments, signage and fencing will create a clear sense of ownership and territorial reinforcement between public and private space

22.6.8 MATERIALS AND MAINTENANCE

- Regular maintenance of the buildings will promote an image of a well-cared-for development which in itself discourages vandalism.
- Appropriate materials will be utilised, where appropriate in the building, to minimise opportunities for vandalism.

23 Mitigation Measures

The following measures have been compiled based on the Environmental Impact Assessment undertaken in the preparation of this EIS and following review and consideration of the issues raised in consultation with government agencies.

They provide a commitment by The Next Generation NSW and indicate the responsibilities required to implement measures to prevent potential environmental impacts that have been identified through the assessment.

This will ensure that the proposed Development is environmentally, socially and economically sustainable.

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 requires a full description of the measures proposed to mitigate any adverse effects of the development on the environment.

The collective measures required to mitigate the impacts associated with the proposed works are detailed within **Table 36**. These measures have been derived from the assessments in previous Sections and those detailed within the appended consultant reports.

In many cases, the operational and environmental management controls inherent to operation of the Facility adequately manage the potential impacts. In these cases no additional mitigation measures are required to address the potential impacts.

For this reason, the below summarises both mitigation (where relevant) and environmental control measures.

KEY ISSUE	MITIGATION AND ENVIRONMENTAL CONTROL MEASURES
Waste	 The operational controls and procedures described below will adequately manage the potential impacts of residual wastes from the EfW process. Bottom ash from the grate will be removed by quenching with water and moving it by conveyor to the enclosed ash storage bunker where it is stored prior to being transported off-site. The conveyor passes under a magnetic separator to remove ferrous materials, which will be recycled. APC residue ash will be collected into sealed storage silos and transported via sealed tanker off-site for further treatment or disposal at landfill. In the event APC residue exceeds the criteria for Restricted Solid Waste, the residue will be taken off site to a Hazardous Waste Treatment facility, in line with relevant hazardous waste legislation.
	 Boiler ash will be conservatively disposed of with the APC residues, unless it can be proven to be reusable following rigorous testing procedures in compliance with EPA regulations. In addition, further operational controls and procedures will be detailed and documented in an Environmental Management Plan before operation to further support the above controls.
Air Quality	The existing best available technology that will be utilised by the Facility to ensure flue gas treatment meets the in stack concentration limits for waste incineration limits set by the IED.

TABLE 36 - MITIGATION AND ENVIRONMENTAL CONTROL MEASURES

KEY ISSUE	MITIGATION AND ENVIRONMENTAL CONTROL MEASURES
	 Fabric filters (bag houses)
	 Scrubbing systems
	 Good practice combustion and flue gas recirculation (FGR) for Thermal NOx control
	 Selective Non-Catalytic Reduction (SNCR) for NOx control.
	 Ammonia slippage from a SNCR system (i.e. surplus NH3 going to atmosphere)
	Consistent with the NSW EPA Energy from Waste Policy Statement, emission monitoring with real time feedback to will be carried out. The facility will employ a Continuous Emissions Monitoring System (CEMS).
	No mitigation required.
Ozone	In terms of ozone impacts, during normal operation of the plant, the emission levels are generally expected to be well within the limit value.
	The Facility has been demonstrated to employ Best Available Technology (BAT) in the form of Selective Non-Catalytic Reduction (SNCR) for reducing emissions of NOx, the dominant ozone precursor released from the facility. VOCs will be minimised through combustion control with additional controls afforded from activated carbon injection as part of the flue gas treatment.
Human Health	Even at the upper maximum, the impact of the Facility will not lead to adverse health impacts and as such, mitigation measures are not proposed. Nonetheless, the following operational controls will ensure risk of potential impact is minimised:
	 The flue gas treatment process is continuously monitored to avoid operating at levels above the set limits.
	 The flue gas treatment system will be designed to achieve the emission limits as required by the Industrial Emissions Directive. The proposed flue gas treatment system will consist of Selective Non- Catalytic Reduction (SNCR) of NOx, activated carbon injection, dry lime scrubbing and fabric filters.
	 Each unit would be fitted with conventional flue gas treatment equipment, consisting of Selective Non-Catalytic Reduction (SNCR) of NOx, lime abatement of acid gases, the addition of activated carbon to minimise the emissions of dioxins, mercury and other heavy metals and a bag filter to remove particulates, including the lime and activated carbon particles. The proposed Facility would meet the requirements of the EU Industrial Emissions Directive (IED).
Odour	 Fuel (waste) will arrive at the proposed Facility in covered trucks or via an enclosed conveyor from the Genesis MPC. The proposed Facility will employ high speed roller doors for truck access to ensure fugitive odour emissions are minimal. All waste storage and unloading will take place within the tipping hall building, which is kept at negative pressure with air extracted from the

KEY ISSUE	MITIGATION AND ENVIRONMENTAL CONTROL MEASURES
	building will be used as excess air in the boiler.
Noise	Construction
	In light of the predicted exceedances at the Hanson Facility and residential receivers in Erskine Park for selected scenarios, noise mitigation and management measures will be considered for implementation where reasonable and feasible. A full construction noise management plan will also be developed once further details and schedules are confirmed. It will include the following:
	 Communication with the potentially affected receiver locations to inform of the proposed works, durations and potential for noise.
	 Identification of key noise impacts
	 Noise management measures
	 Noise monitoring on site and at sensitive receivers
	 Training and awareness of on-site personnel.
	 Incident and emergency response.
	 Non-conformance, preventative and corrective action.
	Noise monitoring will be conducted as part of the construction noise management plan. Site awareness training will also be carried out for satisfactory implementation of noise mitigation measures.
	Operational
	Exceedance of the criteria is not predicted. Nonetheless, an operational noise management plan will be developed prior to operation. In addition:
	 The environmental noise goals of the Facility will be considered when selecting plant and equipment.
	 All building envelope materials will have the same or better performance than those used in this assessment.
	 Building facades will be constructed so they are continuous and contain no gaps between panels and sections.
	 Buildings will have openings orientated away from receivers, where possible. The opening will be designed so as to not compromise the acoustic performance of the building and remain closed where possible.
	 Where possible, broadband or smart reversing alarms will be fitted to all vehicles on site, in order to reduce the potential impacts caused by tonal style reversing alarms.
	 Noise monitoring will be carried out to establish the noise emission level of the facility at sensitive receptors and determine compliance. In the event of a

KEY ISSUE	MITIGATION AND ENVIRONMENTAL CONTROL MEASURES
	noise complaint received from the community and during the initial stage of the development's operation, compliance noise monitoring will be conducted. Noise will be monitored at the most critical time of day near the complainant and near the identified source of the impact.
Soils and Water	 The bio-retention basin and outlet structure will provide mitigation of peak flows for up to 100-year ARI events and with target annual pollutant load reductions to meet Council requirements. Sediment basins and an Erosion and Sediment Control Plan will adequately address risks to water and soil. Should high salinity soils be encountered during excavation, these soils will be removed for covered storage and blended with less saline soils prior to re- use as backfill.
Traffic and Transport	 The increase in vehicle trips associated with the proposed Facility can be readily accommodated by the surrounding road network with no change to existing Level of Service and only minimal impact on average delays.
	 Development of a work permit system, including hot work permits; Development of hazardous area diagrams in accordance with AS60079.10; Ignition sources within the hazardous area should be controlled according to AS60079.14.1; Installation of monitor(s) in the waste bunker (further monitor recommendations below); and Investigate the feasibility of installation explosion venting or nitrogen blanketing in the PAC silos. In relation to fire risk, the following will be provided: Diesel Bund: 1 powder type fire extinguisher per bunded area, 1 hose reel with foam making capabilities per bunded area. Waste Bunker: Two 1900 L/min monitors will be installed to provide complete coverage within the fuel bunker; .they will be installed such that access is provided externally from the fuel bunker. Monitors will be installed on raised platforms to prevent trucks from colliding with the monitors. PAC Silo: The potential of nitrogen blanketing for the purpose of fire
	 Transformers: 1 powder-type fire extinguisher per transformer. Pumping and Water Availability: A pump set shall be installed to provide adaguate water pressure for the menitory and at least 504,000 hord.

KEY ISSUE	MITIGATION AND ENVIRONMENTAL CONTROL MEASURES
	firewater shall be stored at the Site.
Flora and Fauna	 Potential erosion will be mitigated through the use of sediment fencing adjacent to the downslope edge of the development footprint. Stormwater quality discharged from the Site will meet or exceed the requirements of SEPP59 and thus this will mitigate against potential impact of poor water quality. The bio-retention basin be planted with local indigenous wetland species to create wetland habitat. A pre-clearance survey will be undertaken and any vertebrate fauna and Cumberland Plain Land Snails captured will be moved to the retained area of River Flat Eucalypt Forest to the south of the development footprint. Use of locally indigenous flora in landscape planting Weeds will be removed within the development proposal footprint. This will mitigate against further weed spread. Offsetting will be achieved with approximately 0.54 ha of Cumberland Plain Woodland to be regenerated or replanted for the 0.27 ha that will be removed, and approximately 4.98 ha of River Flat Eucalypt Forest to be regenerated or replanted for the 2.89 ha that will be removed. The loss of hollow-bearing trees will also be offset through the installation of twenty fauna boxes.
Visual	 Proposed landscaping will assist in softening the appearance of the Facility. Where views are possible, these will generally be of the upper parts of the buildings and the slender twin vent stacks protruding above the tree canopy or building line. To minimise potential lighting impacts, all external lighting associated with the Facility will comply with Australian Standard AS 4282: 1997 – Control of the <i>Obtrusive Effects of Outdoor Lighting. Night-lighting</i> will be kept to the minimum required for operations and safety requirements.
Greenhouse Gas	 The operation of the proposed Facility would have a net positive GHG effect, potentially eliminating 1.5 million tonnes of CO₂-e per annum. The emission intensity for electricity generated from waste incineration is significantly lower than that derived from the current NSW electricity grid. No mitigation required.
Non-Aboriginal Cultural Heritage	 In the event that unexpected archaeological remains not identified within the statement are discovered at the area, all works within the affected area should cease and the OEH should be notified, in accordance with Section 146 of the Heritage Act. All contractors involved in the development should receive a Heritage Induction outlining the protocol regarding the identification of unexpected archaeological remains, and their obligations under the Heritage Act and the

KEY ISSUE	MITIGATION AND ENVIRONMENTAL CONTROL MEASURES
	National Parks and Wildlife Act (NSW).
Aboriginal Cultural Heritage	 The retrieved Aboriginal heritage artefact assemblage will be reburied within the riparian are within 'EFW South' as it will not be impacted by any future development works. An Aboriginal Site Impact Recording Form will be completed and submitted to the OEH AHIMS Registrar within four months of completion of the authorised development works.
Stormwater, On-Site Detention and Flooding	 The stormwater generated from Site will drain to the south into a bio retention basin to be detained and treated. A pit and pipe system will control the outflow to ensure post developed flows do not exceed pre developed flow for all storms up to the 100 year ARI events. An outlet from the basin will discharge into the existing Ropes Creek tributary to the south of the Site. Storm water system consistent with good management practices will be provided for the proposed development.
Bushfire	 The Site is not sterilised by the bushfire threat.
	 Building construction for all aspects of the buildings excluding windows will be minimum FRL 30/30/30 where separation of 27m from grassland and 55m from forest is not achieved;
	 Openable portions of windows will be screened with metal mesh maximum 2mm aperture;
	 Fire hose reels will be provided, which is capable of reaching all extremities of the proposed development.
	 Grassland between the facility and unmanaged grassland will be mown as lawn.
Contamination	 No contamination of the Site has occurred. Based on the findings of the detailed site investigation, the Site is deemed suitable for commercial/industrial land use and the proposed development

24 Justification

24.1 JUSTIFICATION AND BENEFITS OF THE PROPOSED DEVELOPMENT

The proposed SSDA represents a positive development outcome for the Site and surrounding area and is an appropriate and suitable land use for the Site. The SSDA is considered justified in that:

- The Proposed Facility will use safe, reliable, tried and proven technology to create green energy from Residual Waste Fuel that would otherwise go straight to landfill.
- The Proposed Facility is proven technology in the proposed configuration of the plant. This
 technology currently operates reliably in the United Kingdom and continental Europe and has a
 successful track record in treating the same waste streams proposed as fuel as part of this
 application.
- The Proposed Facility will complement the existing waste disposal and recycling facility adjacent to the proposed Facility.
- The Proposed Development is permissible within the zone and complies with the development standards and objectives of state and local policies.
- The Proposed Facility represents best practice to minimise the discharge of emissions. Best practice accountable, real time emissions monitoring technology is proposed to be installed to constantly demonstrate that there are no harmful emissions to the environment, air, soil or water.
- The waste sourced as input is genuine Residual Waste Fuel that cannot feasibly be reused or recycled. The proposed fuel will not be putrescible waste. The proposed fuel directly meets the eligible fuels criteria of the NSW Energy from Waste Policy Statement 2014 (as detailed within the Waste Management Assessment at Appendix K).
- The specific effects on human health of the Proposed Facility have been considered (further detailed in Section 12 of this EIS) and it was found that the proposed Facility will not lead to any adverse health effects from dioxins and furans, and will not have any non-carcinogenic or carcinogenic effects.

The SSDA will also result in the following net benefits by contributing towards:

- Energy security and diversity by providing additional low carbon, renewable electricity generating capacity.
- Maximising energy recovery from waste in accordance with the NSW Energy from Waste Policy Statement 2014.
- Making use of Residual Waste Fuel obtained from the processing of various sources of municipal solid waste (MSW), commercial and industrial (C&I), construction and demolition waste (C&D).
- Complementing recycling initiatives by accepting waste after these processes have been carried out, thereby forming part of an integrated waste management system.
- Supporting the positive use of waste materials that would otherwise be disposed of to landfill, saving valuable landfill space and also reducing greenhouse gas emissions (including methane) that would otherwise have been generated from the breakdown of the waste material had it gone to landfill (discussed further in the Local Air Quality and Greenhouse Gas Assessment Report prepared by Pacific Environment at Appendix L)
- Providing the State of NSW with the world's leading technology to break reliance on landfilling in the future.

- Providing the technology and infrastructure to Sydney and the State of NSW to explore the possibility
 of prohibiting combustible wastes from Landfills completely at an appropriate time in the future.
- The preservation of Landfill space for more contaminated wastes that cannot be thermally treated such as contaminated soils and asbestos.
- Providing electricity generating capacity at an existing related waste infrastructure site located in close proximity to the National Electricity Grid for connection and export of the electricity produced.
- The Proposed Development will create in the order of 250 direct on site construction jobs during the construction and commissioning phase. 55 new jobs will be created when the Facility is operational, plus several hundred indirect jobs. Further detail on employment generation is provided in the section below.
- Overall, the works subject to the SSDA are considered to represent orderly and economic development of the precinct in line with established project objectives.

24.2 EMPLOYMENT GENERATION

In addition to 55 operational jobs, it is expected the proposed Development will generate up to 250 jobs during the construction phase. This figure is based on the published information for the following three Major Projects from Wellington Council, NSW:

- ERM Power (construction of a gas fired power station in Wellington)
- Infigen Energy Development Pty Ltd (construction of a 33 tower wind farm at Bodangora)
- Wind Prospect (construction of a 330 tower wind farm east of Wellington)

The labour demand for the proposed Development includes, but is not limited to, the following categories:

- Architects
- Bricklayers
- Building envelope/façade specialists
- Civil engineers
- Civil engineers operatives not elsewhere classified
- Construction managers
- Electrical trades and installation
- Floorers
- Glaziers
- Labourers
- Logistics
- Non construction professional, technical, IT, and other office based staff (excl. managers)
- Other Construction professional and technical staff
- Painters and decorators
- Plant mechanics/fitters

- Plant operatives
- Plasterers
- Plumbing and heating, ventilation and air conditioning trades
- Roofer
- Scaffolders
- Senior, executive and business process managers
- Specialist building operatives not elsewhere classified
- Steel erectors
- Surveyors
- Wood trades and interior fit-out

Further details on construction related jobs are provided in the Capital Investment Value Report at **Appendix J.**

24.3 DEMAND FOR WASTE INFRASTRUCTURE

Currently, there is a large infrastructure gap in resource recovery infrastructure and waste generation rates (for both material recovery facilities and EfW facilities). There are currently approximately 9 NSW EPA approved facilities in the Western Sydney region that can accept non-putrescible (Class 2) General Solid Waste, the waste type to be accepted at the proposed Facility. These are as follows:

- Kimbriki Resource Recovery Centre, Terrey Hills
- DADI, Eastern Creek
- Kurnell Landfill, Kurnell
- Blacktown Waste Services, Marsden Park
- NSW Investments (Previously called 'Wanless landfill'), Kemps Creek
- Erskine Park Landfill, Enviroguard,
- SITA Elizabeth Drive Landfill, Kemps Creek
- SITA Spring Farm Landfill, Spring Farm
- Veolia Horsley Park Landfill, Horsley Park

Some other Class 2 facilities are nearing closure, have recently closed or accept negligible quantities of waste and only from specific sources (e.g. council operations). These include:

- 1. Huntley Heritage Landfill, West Dapto (close to closure)
- 2. Brandown Landfill, Kemps Creek
- 3. Penrith Waste Services
- 4. Belrose Landfill (closed November 2014)
- 5. Bankstown City Council Kelso Landfill (closed mid 2014)
- 6. Glenfield Landfill, Glenfield
- 7. DADI Alexandria

The Waste management Report (**Appendix K**) states the NSW EPA has recently committed to conducting an infrastructure needs assessment, which builds upon the work conducted in 2011 by NSW EPA and will include landfills and C&D processing facilities in addition to the original analysis of MSW and C&I facilities. In the meantime, the most recent studies examining Class 2 capacity are:

- The 2009 Hyder Australian landfill capacities into the future report commissioned by the Department of the Environment, Heritage, Water and the Arts;
- The Wright Corporate Strategy report Strategic Review Putrescible Landfill Demand and Capacity for the Sydney Region which was prepared by and released by the NSW Government in 2010; and
- A 2010 independent assessment by MRA.

The Hyder report assumed 3.38 million tonnes of C&I and C&D waste deposited in Class 2 landfills for 2006-07. At less than 19 million tonnes capacity Sydney's contingency landfill space would suffice for just over 5.5 years. This calculation incorporates the Light Horse facility (or MPC) which was granted project approval by the NSW Planning Assessment Commission in 2009 and since it commenced operation, it has partly alleviated the sharp decline in landfill availability in the Sydney Metropolitan area.

The Wright Corporate Strategy assumed landfilling of 2.5 million tonnes annually, however the source of this estimate was not referenced. Nonetheless, at less than 46.5 million tonnes of landfill space (including the Light Horse facility), Sydney was calculated to have 18.5 years of contingency landfill space remaining in 2009.

MRA 2010 independent assessment evaluated whether a capacity of 34.3 to 36.3 million tonnes of landfill void space for Sydney Metropolitan Area was justified, information on Sydney C&I and C&D waste was extracted from the NSW DECCW Waste Avoidance and Resource Recovery Progress Report 2010. This information suggested Sydney's 2010 remaining capacity was calculated to be between 10.1 and 10.7 years. To verify this estimate, the 2009 Hyder report on *Waste and Recycling in Australia*ⁱ, and the *National Waste Report 2010*ⁱⁱ based on Hyder data additional data sources were used and 4.98 million tonnes of NSW annual landfill waste was agreed. With Sydney's population comprising 65% of the state total, it was assumed Sydney contributes 65% of the state landfilled waste. At this rate of disposal the 34.3 to 36.3 million tonnes of remaining capacity would last for between 10.6 and 11.2 years.

The Waste Management Report prepared by ENVIRON Australia Pty Ltd (**Appendix K**) has summarised that the combination of the most optimistic remaining capacity data with the most realistic waste disposal data yields a remaining Class 2 landfill capacity for Sydney in 2010 of under 14 years. This is considered as the most accurate estimate that can be obtained with the available literature.

Given landfill capacity has been significantly depleted since 2010, the proposed facility is well placed to provide the required Class 2 General Solid Waste management capacity. The proposed Facility will help take the strain off Sydney's Class 2 landfills, as any waste processed through it will also be diverted, to large extent, from landfill further preserving valuable landfill void.

Figure 32 diagrammatically illustrates how the energy from waste process will ease the pressure on landfills by diverting waste and utilising it to produce electricity. As such, the facility reduces the need for primary resources and consumption of fossil fuels. The energy from waste process is overall a cleaner form of energy production compared to burning coal.

It is noted that in terms of the final products of EfW with landfill being the final destination, there are three residue wastes. Bottom ash is a non-hazardous waste and will be sent to the adjoining MPC for disposal or to other licensed facilities for aggregate and road-base production. APC residue ash will be collected into sealed storage tanks and transported off-site for further treatment or disposal via sealed tanker vehicle. Boiler ash is either mixed with the bottom ash and forms a non-toxic mix or disposed with the APC residues.

FIGURE 32 – ILLUSTRATIVE DEMONSTRATION OF BENEFITS OF EFW IN REDUCING LANDFILL VOLUMES



24.3.1 ECONOMIC VIABILITY OF THE PROJECT

While renewable energy projects and carbon markets are positive steps towards creating a cleaner energy market, the economic reality of the matter is that landfill void space and landfill levies make EfW viable in Sydney and other areas of Australia.

Other renewable energy systems, such as wind, solar and hydro, do not provide continuous and steady supplies of energy as they are vulnerable to environmental conditions. As such, these systems are not as suitable for assisting with peak load time requirements at the grid compared the energy from waste facilities. Hydropower resources are geographically limited, and have substantial environmental costs. Ecological impacts down and upstream include creation of migration barriers and sediment flow disruption. Biomass that decomposes in reservoirs releases methane and carbon dioxide. Additionally, the expected increase in unpredictability of rainfall and run-off may limit the capacity of this technology. Given the maturity of this technology, there is little room for improvement in its efficiency.

While the cost of setting up and maintaining wind power infrastructure has reduced significantly in the last 30 years, the main disadvantage of this power is its intermittency. The proportion of electricity wind can contribute electricity to the grid is limited because of this. Further, the windiest places are rarely the most populous. As such, infrastructure development and transport of the energy is necessary. In terms of density, wind power is low density, and generates few watts per square metre. According to research by David Keith, head of the Energy and Environmental Systems Group at the University of Calgary in Canada, a truly large-scale deployment of wind power schemes could affect local, and potentially global, climate by altering wind patterns (Keith et al., 2004).

Solar cells do not generate electricity at night, and in places with frequent cloud cover, and at times of prolonged overcast conditions, generation fluctuates unpredictably during the day. Large installations will usually be far from populous areas, therefore distribution of the electricity generated will pose problems. Some advanced photovoltaic cells use rare elements that may be subject to cost and supply constraints.

In terms of cost comparison and efficiency of energy production between energy from waste facilities and other renewable energy systems, energy from waste is the more cost effective source based on 1 MWh of energy produced. According to 'Energie aus Abfall' (Band 6) written by Karl J. Thomé-Kozmiensky and Michael Beckmann (2009), it was found that while the initial investment cost (in Euros at the time of publication) of energy from waste is higher than wind and comparable to solar, the cost per MWh is much lower. Further, this publication also provided a comparison of number of hours per annum which the energy from waste ('full load hours'), wind and photovoltaic technology are able to operate and produce energy. It was concluded that EfW technology can produce energy for 470%-1,000% more hours in a year than the alternative technologies. This publication was used to create the below summary table, which demonstrates that

TABLE 37 - FULL LOAD HOURS P/A AND	COST COMPARISION OF ENERGY	TECHNOLOGIES PER MWH OF ENERGY
PRODUCED		

ENERGY TECHNOLOGY	FULL LOAD HOURS P/A	INVESTMENT COST (EUROS)/MWH
Energy from waste	8,000	~30
Wind	1,700	~40
Photovoltaic	800	~300

While landfilling and renewable energy markets are influenced and supported by government incentives and benefits such as carbon credits, the facility will operate independent of these and as such will not be vulnerable to legislative changes to these benefits.

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.

TNG is also uniquely placed in the market as a parent company. DADI owns multiple waste assets including collections, landfillings and state-of-the-art material processing facilities.

25 Summary and Concluding Comments

This EIS has been prepared to consider the potential environmental impacts in relation to the construction and operation of an Energy from Waste Facility and associated works.

In making this assessment, the EIS addresses the issues listed in the Director General's Requirements (**Appendix C**) and accords with Part 4.1 of the *Environmental Planning and Assessment Act 1979*, Schedule 2 of the *Environmental Planning and Assessment Regulations 2000* and *SEPP (State and Regional Development) 2011*.

The key issues for all components of the project identified in the DGRs have been assessed in detail, with specialist reports underpinning the key findings and recommendations outlined in the Environmental Assessment. It has been demonstrated that each of the impacts identified in the assessment of the key issues will either be positive or can be appropriately mitigated. In many cases, the operational and environmental management controls inherent to operation of the Facility adequately manage the potential impacts, and mitigation measures are not required.

Table 38 below summarises the key issues and relevant impacts, and how they are managed or mitigated.

TABLE 38 -	IMPACTS	ΑΝΟ ΜΙ	TIGATIC	N/CONT	ROI	MEASURES
TADLE 50 -	INIT ACTO		HOAIR		NOL	MEROOREO

ENVIRONMENTAL/SOCIAL ISSUE	OVERVIEW OF POTENTIAL IMPACTS AND MANAGEMENT/MITIGATION MEASURES
Waste	The facility will generate the following residual wastes:
	 Ash residue (bottom ash, boiler ash, and APC ash);
	 Ferrous material residue;
	 Gaseous emissions (pyrolysis gas).
	The operational controls and procedures described below will adequately manage the potential impacts of residual wastes from the EfW process.
	 Bottom ash from the grate will be removed by quenching with water and moving it by conveyor to the enclosed ash storage bunker where it is stored prior to being transported off-site. The conveyor passes under a magnetic separator to remove ferrous materials, which will be recycled.
	 APC residue ash will be collected into sealed storage silos and transported via sealed tanker off-site for further treatment or disposal at landfill. In the event APC residue exceeds the criteria for Restricted Solid Waste, the residue will be taken off site to a Hazardous Waste Treatment facility, in line with relevant hazardous waste legislation.
	 Boiler ash will be conservatively disposed of with the APC residues, unless it can be proven to be reusable following rigorous testing procedures in compliance with EPA regulations.
Air Quality	 The proposed technology for the Facility is based on existing facilities in Europe and will incorporate best available technology (BAT) for flue gas treatment. The flue gas treatment is designed to meet the in-stack concentrations limits for waste incineration set by the EU IED. The BAT includes Selective Non-Catalytic Reduction (SNCR) for reducing emissions of NOx. VOCs will be minimised through combustion control with additional controls afforded from activated carbon injection as part of the

ENVIRONMENTAL/SOCIAL ISSUE	OVERVIEW OF POTENTIAL IMPACTS AND MANAGEMENT/MITIGATION MEASURES
	flue gas treatment.
	 Consistent with the NSW EPA Energy from Waste Policy Statement, emission monitoring with real time feedback to will be carried out. The facility will employ a Continuous Emissions Monitoring System (CEMS).
Human Health	 The total intake for all receptors during normal conditions is well below the Tolerable Monthly Intake (TMI).
	 The proposed Facility will not lead to any adverse health effects from dioxins and furans, and will not have any non-carcinogenic or carcinogenic effects.
Odour	 In view of the dispersion modelling results it is anticipated that the operation of the proposed Facility is not likely to result in an adverse impact on the local air environment in reference to odour.
	 All waste storage and unloading will take place within the tipping hall building, which is kept at negative pressure with air extracted from the building will be used as excess air in the boiler.
Noise	 Noise impacts will arise from construction noise, operational noise, and road traffic noise.
	 A construction noise management plan will be developed and implemented once further details and schedules are confirmed. It would include the following:
	 Communication with the potentially affected receiver locations to inform of the proposed works, durations and potential for noise.
	 Identification of key noise impacts
	 Noise management measures
	• Noise monitoring on site and at sensitive receivers
	• Training and awareness of on-site personnel.
	 Incident and emergency response.
	• Non-conformance, preventative and corrective action.
	 Education and training of site staff will also be carried out to ensure satisfactory implementation of noise mitigation measures.
	 An operational noise management plan will be developed for the Site to assist in maintaining good practice in ongoing noise management.
	 Road traffic volumes will not significantly increase as a result of the Facility.
	 Noise monitoring will be carried out to establish the noise emission level of the facility at sensitive receptors and determine compliance. In the event of a noise complaint received from the community and during the initial stage of the development's operation, compliance noise monitoring will be conducted. Noise will be monitored at the most critical time of day near the complainant and near the

ENVIRONMENTAL/SOCIAL ISSUE	VERVIEW OF POTENTIAL IMPACTS AND MANAGEMENT/MITIGATION	
	identified source of the impact.	
Transport	The impact of the traffic generated by the proposed Development on the operation the surrounding road network is comparatively minor no mitigation is proposed.	of
Biodiversity	The proposal footprint is approximately 24.4 hectares in size. Approximately 22.5 h of this area is grazing pasture which will be removed.	na
	Potential erosion will be mitigated through the use of sediment fencing adjacent to the downslope edge of the development footprint.	
	Stormwater quality discharged from the Site will meet or exceed the requirements of SEPP59 and thus this will mitigate against potential impact of poor water quality. The bio-retention basin be planted with local indigenous wetland species to create wetland habitat.	of
	A pre-clearance survey will be undertaken and any vertebrate fauna and Cumberland Plain Land Snails captured will be moved to the retained area of River Flat Eucalypt Forest to the south of the development footprint.	r
	Use of locally indigenous flora in landscape planting	
	Weeds will be removed within the development proposal footprint. This will mitigate against further weed spread.	Э
	Offsetting will be achieved with approximately 0.54 ha of Cumberland Plain Woodland proposed for regeneration or replanting for the 0.27 ha that will be removed and approximately 4.98 ha of River Flat Eucalypt Forest for regeneration replanting for the 2.89 ha that will be removed.	or
	The loss of hollow-bearing trees will also be offset through the installation of fauna roosting/nesting boxes	
Visual	From most locations, the lower parts of the Facility will be totally obscured from vie Where views are possible, these will generally be of the upper parts of the building and the slender twin vent stacks protruding above the tree canopy or building line. The resulting visual impact will be negligible for most locations and generally low to moderate where views are possible from sensitive viewpoints.	W. S
	To minimise potential lighting impacts, all external lighting associated with the Facility will comply with Australian Standard AS 4282: 1997 – Control of the Obtrusive Effects of Outdoor Lighting. Night-lighting will be kept to the minimum required for operations and safety requirements.	
Greenhouse Gas	The operation of the proposed Facility would have a net positive GHG effect, potentially eliminating 1.5 million tonnes of CO2-e per annum. The emission intens for electricity generated from waste incineration is lower than that derived from the NSW electricity grid.	ity
Aboriginal Cultural Heritage	No further archaeological investigation of site EFW South is necessary as it is of lo archaeological significance.	W

ENVIRONMENTAL/SOCIAL	OVERVIEW OF POTENTIAL IMPACTS AND MANAGEMENT/MITIGATION
ISSUE	MEASURES
	 The retrieved artefact assemblage will be reburied in the portion of EFW South within the riparian setback (south of the development footprint). This location will not be impacted by any future development works.

The importance of the recovery of energy from waste as part of effective waste management is reflected in NSW Energy from Waste Policy Statement 2014.

The Environmental Protection Authority (EPA) recognises that the recovery of energy and resources from the thermal processing of waste has the potential, as part of an integrated waste management strategy, to deliver positive outcomes for the community and the environment. Energy from waste can be a valid pathway for residual waste where:

- Further material recovery through reuse, reprocessing or recycling is not financially sustainable or technically achievable;
- Community acceptance to operate such a process has been obtained.

The diversion of waste from landfill, reducing the potential for methane emissions, while also providing a form of low carbon, renewable energy, is now recognised by Government as making an important contribution to the targets for dealing with waste.

It is therefore considered that the 'Do Nothing' scenario is not appropriate given the established need for new energy generation, including a need for low carbon generation. The alternative to the Facility proceeding would be continued operation of traditional landfill waste management operations which have been found to be inefficient and undesirable as a long term sustainable solutions to Sydney's expanding population and waste generation.

There are a number of alternative technologies available for the type of proposed Facility (including external kilns, fluidised beds, gasification and pyrolysis, plasma gasification and moving grate technology).

Given the combined objective of the proposed Development primarily as an electricity generating station but also as a waste solution, moving grate technology was the only technology considered due to its reliability and performance in relation to energy generation.

The selection of the Site for the proposed Development is directly related to its proximity to the M4 and M7 motorways, local electricity grid, and the direct synergies between the proposed Development and the adjoining MPC currently in operation which will provide a percentage of the waste fuels.

Whilst there are various forms of energy from waste, the only one that is tried and tested in thousands of applications worldwide is moving grate technology. Alternative combustion techniques are available but do not have the same number of reference facilities and in some cases technology has been withdrawn from the commercial application market. The only other technologies that have achieved a degree of commercial development are gasification technologies, but these tend to rely on a modular form and so are not suited to large scale commercial facilities. They tend to be less efficient in converting the waste feedstock into electricity than moving grate technology over a range of different fuel types. This is an important consideration for achieving compliance with the waste hierarchy, and also commercially given the proposed Development is a commercial facility.

For the reasons set out above, the selected technology is a reciprocating grate system (a type of moving grate system).

The proposed Development represents a positive development outcome for the Site and surrounding area for the following reasons:

• The proposed Facility will ensure a safe, clean and reliable form of energy generation for Metropolitan Sydney now and in the future, while providing a means of waste management resulting in improved management or reduction for the need for landfill in the Metropolitan Sydney;

- The proposed Facility provides a sustainable solution to Sydney's growing waste generation.
- The proposed Facility will result in a net positive Greenhouse Gas effect, eliminating the emission of some 1.5 million tonnes of CO² per annum from landfill.
- No adverse impacts will be experienced by residential properties as the development is well separated from residential uses.
- The proposed Facility has been designed to respond to the Sites natural topography minimising the visual impact of the facility from the public domain and nearby sensitive land uses.
- The proposed Development is accompanied by a full suite of expert reports and drawings which address all the issues contemplated by the DGR's i.e. strategic planning, waste management, air quality and human health, noise, soils and water, traffic and transport, hazards and risks, flora and fauna, visual, greenhouse gas, and Aboriginal and non-Aboriginal Cultural heritage.
- The proposed Development is in the public interest in that it will generate in the order of 250 direct construction jobs and 55 new jobs during Facility operation, it contributes to energy security and diversity by providing additional low carbon, renewable electricity generating capacity, and supports the use of waste materials destined for landfill, thus saving landfill space and reducing greenhouse gas emissions from decomposing landfill matter.

Given the benefits of the proposed Development, its importance for the management of waste and clean energy production to the local community and wider Metropolitan Sydney, and given that there are minimal environmental impacts on the locality, it is recommended by this EIS that the State Significant Development application be approved subject to the mitigation measures.

Disclaimer

This EIS is dated October 2014 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd's (**Urbis**) opinion in this EIS. Urbis prepared this EIS on the instructions, and for the benefit only, of The Next Generation NSW P/L (**Instructing Party**) for the purpose of Environmental Impact Statement (**Purpose**) and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this EIS for any purpose whatsoever (including the Purpose).

In preparing this EIS, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this EIS are made in good faith and on the basis of information supplied to Urbis at the date of this EIS, and upon which Urbis relied. Achievement of the projections and budgets set out in this EIS will depend, among other things, on the actions of others over which Urbis has no control.

In preparing this EIS, Urbis may rely on or refer to documents in a language other than English, which Urbis may arrange to be translated. Urbis is not responsible for the accuracy or completeness of such translations and disclaims any liability for any statement or opinion made in this EIS being inaccurate or incomplete arising from such translations.

Whilst Urbis has made all reasonable inquiries it believes necessary in preparing this EIS, it is not responsible for determining the completeness or accuracy of information provided to it. Urbis (including its officers and personnel) is not liable for any errors or omissions, including in information provided by the Instructing Party or another person or upon which Urbis relies, provided that such errors or omissions are not made by Urbis recklessly or in bad faith.

This EIS has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this EIS are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

Appendix A

Peer Review letter of Confirmation, and Responses to Agency Test of Adequacy comments

Appendix B

Site Survey

Appendix C

Director General's Requirements

Appendix D

Architectural Drawings

Appendix E

Concept Landscape Plan

Appendix F

Civil Infrastructure Works

Appendix G

Concept Plan of Subdivision

Appendix H Flora and Fauna Assessment

Appendix I

Visual Impact Assessment

Appendix J

Capital Investment Value Report

Appendix K

Waste Management Assessment

Appendix L

Local Air Quality and Greenhouse Gas Assessment Appendix M

Odour Assessment

Appendix N Ozone Assessment
Appendix O

Human Health Risk Assessment

Appendix P

Noise Impact Assessment

Appendix Q

Soil and Water Assessment

Appendix R

Traffic Impact Assessment

Appendix S

Aboriginal Archaeological Technical Report Appendix T

Aboriginal Cultural Heritage Assessment Report and ACHAR Addendum

Appendix U

Aboriginal Heritage Test Excavation Report Appendix V

Cultural Heritage Impact Statement

Appendix W

Phase 1 Preliminary Site Investigation and Phase 2 Detailed Site Investigation Appendix X

Community Consultation Report

Appendix Y

Correspondence with the Department of Infrastructure and Regional Development and NSW Health Appendix Z

Preliminary Hazard Analysis and Fire Risk Report Appendix AA

Flood Report (Brown Consulting)

Appendix BB Bushfire Assessment

Appendix CC

Construction Environmental Management Plan Appendix DD

Concept Design Report

Department of Environment and Conservation (NSW), 1999, Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes.

Department of Environment and Climate Change NSW, 2007, *Report into the Construction and Demolition Waste Stream Audit 2000-2005.*

Douglas Partners, 2006, Report on Preliminary Contamination Assessment on Stockpiled Material and General Land Quality, April 2006.

'Electricity without carbon', Nature, Vol 454/14. August 2008.

EPHC, 2010, *National Waste Report 2010*, Environment Protection and Heritage Council, Department of the Environment, Water, Heritage and the Arts, Australian Government.

Karl J. Thomé-Kozmiensky, Michael Beckmann, 2009, 'Energy aus Abfall, Band 6' (Energy from Waste, Volume 6), 2009.

Fichtner Consulting Engineers, 2014a, *Energy from Waste Facility, Eastern Creek*, Concept Design Report, June 2014.

Fichtner Consulting Engineers, 2014b, Human Health Risk Assessment, August 2014.

Hyder, 2009a, *Australian Landfill Capacities into the Future, Final report amended and revised*, Prepared for the Department of the Environment, Water, Heritage and The Arts, Australian Government.

Hyder, 2009b, *Waste and Recycling in Australia*, Amended report, November 2009. A report prepared for the Department of the Environment, Water, Heritage and the Arts,

www.environment.gov.au/settlements/waste/publications/landfill-capacities.html.

KJA Pty Ltd, 2014, *Communication and Consultation Summary Report for the Energy from Waste Facility*, Eastern Creek, June 2014.

New South Wales Environmental Protection Authority, 1999, Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes.

New South Wales Environmental Protection Authority, 2008, Waste Classification Guidelines.

New South Wales State Government, 2005, *Protection of Environment Operations (Waste) Regulation 2005.*

New South Wales State Government, 2009, *State Environmental Planning Policy (Western Sydney Employment Area) 2009*, Department of Planning and Environment.

New South Wales State Government, 2010, *Protection of the Environment Operations (Clean Air) Regulation 2010.*

NSW Department of Planning, 2009. *Major Project Assessment: Eastern Creek Waste Project. Director General's Environmental Assessment Report.*

The influence of large scale wind power on global climate', Keith. D., DeCarolis. J., Denkenberger. D., Lenschow. D., Malyshev. S., Pacala. S., and Rasch. P. , PNAS vo. 101/46, November 2004.¶

The Next Generation Pty Ltd, 2014, *Director-General's Environmental Assessment Requirements*, June 2014.

WRc plc, 2012, Assessment of Hazard Classification of UK IBA 2011, July 2012.

Sydney Tower 2, Level 23,Darling Park 201 Sussex Street Sydney, NSW 2000 t +02 8233 9900 f +02 8233 9966

Melbourne

Level 12, 120 Collins Street Melbourne, VIC 3000 t +03 8663 4888 f +03 8663 4999

Brisbane Level 7, 123 Albert Street Brisbane, QLD 4000 t +07 3007 3800 f +07 3007 3811

Perth

Level 1, 55 St Georges Terrace Perth, WA 6000 t +08 9346 0500 f +08 9221 1779

Australia • Asia • Middle East w urbis.com.au e info@urbis.com.au