ThaQuarry Pty Ltd &
ACN 114 843 453 Pty Ltd

Light Horse Business Centre Environmental Assessment Report

August 2010

Reference: Application No: MP06_0239MOD

For and on behalf of ThaQuarry Pty Ltd & ACN 114 843 453 Pty Ltd, the undersigned certifies that the information contained within this report is neither false nor misleading

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LIST OF ABBREVIATIONS

Acronym	Meaning
AHD	Australian Height Datum
APZ	Asset Protection Zone
AQMP	Air Quality Management Plan
BCC	Blacktown City Council
BH	Bore hole
BTEX	Benzene, Toluene, Ethylene, Xylene
C&D	Construction and Demolition
C&I	Commercial and Industrial
CPW	Cumberland Plain Woodland
DADI	Dial-a-Dump Industries
DGRs	Director General's Requirements issued April 2010 (DoP)
DoP	NSW Department of Planning
DP	Deposited plan
DWE	Department of Water and Energy (formerly Department of Natural Resources
EA	Environmental Assessment
EAR	Environmental Assessment Report (this document)
EAR060239	Environmental Assessment Report dated December 2008 submitted for DoP Application No. 06_0239
ECRTN	Environmental Criteria for Road Traffic Noise
EEC	Endangered Ecological Community
ENCM	Environmental Noise Control Manual
EP&A Act	Environmental Planning and Assessment Act, 1979 (NSW)
EPA	NSW Environment Protection Authority (within the Department of Environment & Conservation)
ERM	Environmental Resources Management Australia Pty Ltd
GWh	Gigawatt hours
HIL	Health based Investigation Level
INP	Industrial Noise Policy
LHBC	Light Horse Business Centre
LALC	Local Aboriginal Land Council
LEMP	Landfill Environmental Management Plan
MPC	Materials Processing Centre
MPC	Materials Processing Centre
mtpa	million tonnes per annum
OSD	On Site Detention
PAH	Poly Aromatic Hydrocarbons
POEO Act	Protection of the Environment Operations Act, 1997 (NSW)
PCB	polychlorinated biphenyl
PFM	Planning Focus Meeting
PM_{10}	particulate matter less than 10 microns
RBL	Rating Background Level
RRF	Resource recovery facility
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy
SEMP	Site Environmental Management Plan
tpa	tonnes per annum
TPH	Total petroleum hydrocarbons
TSP	Total suspended particulates
VENM	Virgin Excavated Natural Material
VKT	Vehicle kilometres travelled
VPA	Voluntary Planning Agreement
WTS	Waste Transfer Station

EXECUTIVE SUMMARY

CONTEXT OF THIS REPORT

*This EAR has been prepared for submission to DoP as part of an application to modify the Consent No. 06-0239 granted 22 November 2009 (**Approval**). It is written in the context of:*

1. *EAR060239 (to which reference is made in this document); and*
2. *The conditions of the Approval (refer Appendix 1).*

PROJECT DESCRIPTION

ThaQuarry Pty Ltd and ACN 114 823 453 Pty Ltd (the proponent) sought and obtained project approval for the construction and operation of a resource recovery facility (RRF) and landfill facility at Eastern Creek (herein referred to as the Project), in the western suburbs of Sydney, New South Wales (NSW), under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). The Project was declared a 'major project' to which Part 3A of the EP&A Act applies. It was determined by the Minister for Planning on 22nd November 2009

The RRF will include a Material Processing Centre (MPC) and Waste Transfer Station (WTS) which will have the ability to accept up to two million tonnes of waste per annum, an estimated 65 to 80% (1.3 to 1.6 mtpa, based on maximum capacity intake) of which will be recycled. Waste loads received at the facility that are classified as containing material capable of being recovered or recycled will go through the recovery process, where an estimated 80% of material is expected to be recycled or recovered. After reprocessing and/or recovery, recycled goods will be stored on-site within material stockpile areas until sold.

The remaining 20% of the incoming waste stream is expected to constitute unsalvageable material and will be directed to the adjoining landfill facility or off-site as appropriate. In addition to the unsalvageable material left over from the sorting process, some material brought onto the site will be identified outright as unsuitable for recovery and will be directed to the WTS from where it will be transported to the adjoining landfill facility or off-site if required.

This will include asbestos waste, which may also bypass the MPC/WTS in instances where full asbestos (or asbestos contaminated) loads are received. These will be sent directly to the landfill facility. Dependent on the volume of material classified outright as unsuitable for recovery, an estimated 20 to 35% of total material received at the site will be sent to landfill.

Other site operations which will support the landfill facility and RRF will include an administration building, workshop building for maintenance, amenity berms, material stockpile areas, drop-off zones, internal road network, wheel wash stations to mitigate tracking of mud off site, On-site detention basins to manage stormwater flows, a leachate collection and treatment system to manage wastewater produced by the

landfill and weighbridges to record and manage waste loads entering and exiting the site in accordance with DECCWW Guidelines.

The Project has been designed to facilitate the economic re-use and rehabilitation of the Pioneer quarry void which was formerly quarried by Hanson Construction Materials Pty Ltd. Under the project, land immediately adjacent to the quarry that would have been unsuited for normal commercial development in accordance with SEPP 59 will be used as a resource recovery facility to provide Sydney with recycled landscaping, building and construction material.

Recycling of incoming waste materials into the site will, in turn, prolong the useful life of resources and assists in minimising quarrying for additional natural resources. The quarry will be used as a solid waste (non putrescible) landfill in conjunction with the resource recovery facility and will provide a consistent rehabilitation plan for the quarry in line with State Environmental Planning Policy No. 59 for future use of the site as a non-putrescible waste facility.

The Project will involve handling of up to two million tonnes of waste per annum at the site. Management procedures for waste to be processed through the RRF and landfill facility including the classification, unloading, sorting, processing, storage and disposal of waste loads are detailed in Chapter 3 of EAR060239.

These procedures have been developed in accordance with best practice to maximise resource recovery and minimise biodegradable material from being landfilled in accordance with relevant legislative requirements.

Waste stream which will be generated by staff, contractors, agents, invitees other than customers during the operational phases of this Project may include:

- *general waste produced by operational staff;*
- *recyclable waste including paper, cardboard and plastics; and*
- *wastewater and sewage.*

Putrescible wastes will not be accepted at the site and staff generated putrescible waste will be sent off site to an appropriate landfill facility. An overview of the safe handling of different types of waste during the stages of the project is outlined below.

This EAR sets out certain proposed modifications to the Consent and assesses the environmental impacts of the proposed modifications. It also addresses the matters raised in the DGRs (refer Annex A).

Consideration of relevant statutory provisions and a Statement of Commitments in relation to all of the proposed modifications are set out in Chapters 8 and 9 of this EAR.

Each of the proposed modifications is discussed in a separate chapter in this EAR (see Chapters 2, 3, 4, 5 and 6) and in Chapter 1 – Project Modification Overview. The remainder of the General Requirements and associated Key Issues (excluding the requirement for a signed statement by the author) set out in the DGRs are addressed for each proposed modification in Chapter 1 and its relevant chapter of this EAR.

CHAPTER 1 - PROJECT MODIFICATION OVERVIEW

1.1 WASTE MANAGEMENT STRATEGY

Light Horse Business Centre proposes a waste management strategy for the construction and operational phases of the Project which has been developed in accordance with the following waste policies and procedures:

- waste management hierarchy established under the Waste Avoidance and Resource Recovery Act 2001 i.e. avoidance – resource recovery - disposal;
- NSW Waste Avoidance and Resource Recovery Strategy 2007, which emphasizes a life cycle approach to waste and identifies the following key areas:
    - preventing and avoiding waste;
    - increasing recovery and use of secondary materials;
    - reducing toxicity in products and materials; and
    - reducing litter and illegal dumping;
- EPA Environmental Guidelines: Solid Waste Landfills;
- DECCW Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-Liquid Wastes; and
- POEO Act 1997.

The implementation of the proposed Site Environmental Management Plan will allow for greater opportunities for recycling through the Resource Recovery Facility. The specific waste management procedures to be implemented are summarised below.

1.2 PROJECT APPROVAL

Project Approval was granted by the Minister on 22nd November 2009

1.3 PROJECT CONDITIONS

Project Conditions are at Appendix 1

1.4 ARCHITECTURAL PLANS

Architectural Plans for the Development are in Annexure 3 in Volume 1 of EAR060239.

1.5 BACKGROUND TO THE PROJECT AND ITS MODIFICATION

The Project will include the development and operation of a RRF and a general solid waste (non putrescible) landfill. The RRF will include a Materials Processing Centre (MPC) and Waste Transfer Station (WTS). In summary, the following activities are proposed:

- capacity to receive up to two million tonnes (t) of waste per annum, including inert and solid wastes from construction and demolition (C&D), commercial and industrial (C&I) waste streams complying with acceptable waste for general solid waste (non putrescible) facilities and green waste clean ups;

- on-site waste processing including sorting, screening, sieving, crushing, grinding, shredding and/or chipping, and composting of green waste;

- recycling of an estimated 65-80% of incoming waste (1.3 to 1.6 million tonnes per annum (mtpa), based on maximum capacity intake) e.g. to produce road base, aggregate, landscaping soil, bedding sand, mulch, wood chip, green waste compost and asphalt derived products for land application;

- testing and on-site storage/stockpiling of finished products prior to resale from stockpiles, predominantly to the building, construction and landscaping sectors and potentially the domestic market;

- transport of an estimated 20-35% of incoming waste (0.4 to 0.7 mtpa, based on maximum capacity intake) to the landfill proposed within the quarry void, comprising incoming materials which are unsuitable or uneconomical for recovery and recycling (for example, contaminated soils, asbestos waste and loads that cannot physically be sorted);

- quarantine and transfer of unacceptable wastes to an appropriate off-site facility for disposal;

- construction and operation of associated infrastructure, plant and equipment, including upgrade of the internal road network and reshaping of earthen amenity berms;

- the use of the existing site access via Old Wallgrove Road; and

- retention and conservation of a significant area in the north-west corner of the site, incorporating a remnant endangered ecological community (EEC) of Cumberland Plain Woodland (CPW).

The Project was declared a project to which Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) applies and for which approval of the NSW Minister for Planning was required.

A Ministerial Consent Dated 22nd November 2009 has issued and the Proponent now seeks a variation of that Approval together with such Conditions as may be relevant or necessary to give effect to them.

This Environmental Assessment has been prepared in accordance with the requirements of the EP&A Act, the Environmental Planning and Assessment Regulation 2000 and the requirements of the Director-General of the Department of Planning (DoP) issued on the 29th April 2010 (refer Annex A).

This EA describes the Project Modification, environmental implications associated with key aspects of the Modifications and identifies mitigation and management measures to minimise potential impacts.

1.6 SITE FEATURES

The site including the surface area of the Quarry is 52.4Ha and comprises two land parcels, identified as Lots 1 and 4 in Deposited Plan 1145808.

References to the 'site' in EAR060239 refer to four parcels of land in their entirety and separated the 'proposed area of operations' which refers to a sub-set of the total site (of the 4 titles) that is to be developed for this Project and including the quarry pit and RRF areas.

Since the date of the Approval a boundary realignment and subdivision has been registered by the Land and Property Management Authority and the Lots 1 and 4 DP 1145808 now wholly represent the Project area.

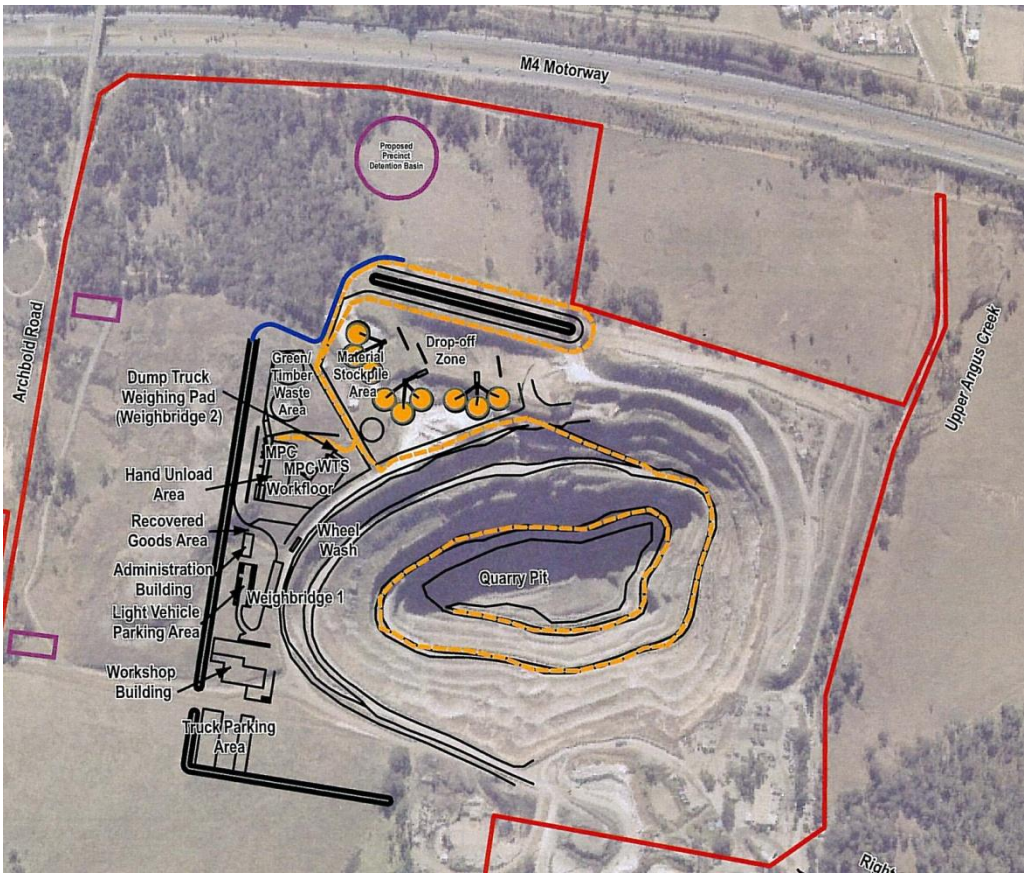
The quarry pit occupies the north-eastern portion of the site. It is an open cut elliptical void approximately 430 x 700 metres (m) and up to 150 m in depth, with stepped walls and an estimated volume of 11 million cubic metres.

The side slopes are steep at approximately 75 to 80° and are intersected by flat benches approximately seven to eight metres in width. There is a spiraling access road approximately 20 m in width around the pit edge which descends to the quarry floor. Steep banked stockpiles of excavated quarry overburden material up to 30 m in height are located to the north, east and west of the Quarry pit.

1.7 CONSTRUCTION OVERVIEW

The location of the site buildings and infrastructure to be constructed for the Project is show in Figure 1.1.

Figure 1.1 Site Layout



1.7.1 Construction Phases

The Project will require the construction of civil type infrastructure and will be conducted in the following stages:

- Stage 1 – Preconstruction;
- Stage 2 – Construction; and
- Stage 3 – Commissioning.

Stage 1 – Preconstruction- Active Now.

The preconstruction stage finalises engineering designs, establishes critical services and prepares the land site for construction purposes. This is more particularly described in the Site Environmental Management Plan – Stage 1 Construction phase which has been submitted to the Department of Planning. This involves:

- refinement of designs from pre-feasibility stage taking into account mitigation of core business risks such as environmental impacts and safety standards;

- establishment of essential services such as power (off-take from existing transmission lines), water (pipelines for "raw" and potable water), sewerage and telecommunications;

- construction of the OSD basins;

- pumping water out of the base of the pit; quarry pit maintenance works and wall stabilisation for safety;

- establishment and laying of site drainage works and piping;

- upgrade of internal roads, land re-profiling and bulk earthworks, including regrading of quarry floor and reshaping of the quarry face, with bulk earthworks to be performed over an estimated two month period.

- allocation of areas in the pit for gas chimneys.

Stage 2 – General Construction

The general construction stage involves the excavation of foundations and footings, placement of reinforced concrete and the erection of various structures. The key activities include:

- excavation of free digging waste rock materials for major footings, foundations and permanent service lines (e.g. trenches);

- placement of reinforced concrete;

- construction and furbishment of site buildings;

- construction of leachate treatment plant and water storage tanks;

- construction of drainage layers and herringbone pipe works in the base of the pit;

- construction of an in-pit leachate sump and riser; and

- further quarry wall stabilisation works if required.

Stage 3 – Commissioning

The commissioning stage involves testing and commissioning equipment and plant and training operations personnel. This will involve:

- erection of fencing;

- pre-commissioning, involving alignment and clearance checks on the mechanical equipment, electrical testing and instrumentation checks;

- service and process commissioning, involving ordering and testing of plant and equipment; and

- training of operations personnel involving site induction, occupational health and safety training and operational procedures training.

The site layout was planned to minimise potential environmental impacts during construction and operations whilst meeting the feasibility and practicality requirements of the operation.

Construction works for the Project will be in accordance with relevant industry standards and good practice.

Equipment used during construction will include 50 t truck mounted cranes, mobile cranes, light vehicles, delivery trucks (semis and rigid), concrete agitators (as required), elevating work platforms, earth moving equipment and a variety of smaller hand held tooling (e.g. welders, grinders, saws etc).

Construction of infrastructure will be short term in duration with an expected construction period of up to six months.

1.8 PROJECT MODIFICATIONS

The Proponent seeks the following Modifications to the Project.

PROPOSED MODIFICATION 1	
Timing of Construction	It is proposed that construction of those parts of buildings and building areas shown cross hatched on the Plan Ref A101-2/F (refer Annex B) be postponed until a date to be fixed after commencement of Operations.
Reason for Amendment	A reconfiguration of Proposed Operations within the MPC building and the proposed installation within the building of automated materials handling mean that certain areas of the building will not need to be commissioned immediately in order for Operations to commence.
Environmental Effects	No Environmental Effect is anticipated from this timing change.
Reference is made to the Plan Reference A101-1/E which forms an Annexure to the Project Conditions showing placement of certain buildings.	

PROPOSED MODIFICATION 2	
Construction of Conveyor	It is proposed that a Silo/Hopper, a downhill electrically powered conveyor and chute be constructed within the Quarry Void in the position shown on the Plan Ref A101-3/F (refer Annex B).
Reason for Amendment	Feasibility studies concluded after the date of the Project Approval concluded that it was economically feasible to construct an automated method of transporting shredded residual waste to the Quarry floor to enable landfilling to take place.
	The unrecyclable waste will be transported by enclosed conveyor direct from a loading hopper located within the MPC to the Quarry lip.
	The material will then enter one of the two silos located side by side and which are approximately 10 cubic metres each.
Proposed Operation of Conveyor	When one silo is filled with the shredded waste a weight sensor detects the trigger weight and the silo then opens gradually and the waste is fed onto the conveyor. The waste then proceeds via downhill conveyor to approximately the mid point of the Quarry where it meets end empties its load into the enclosed chute down which the waste travels to the Quarry floor as shown on the Plan Ref A101-4/F (ref Annex B).
Key Environmental Issues	The Environmental Effects are expected to be beneficial.
	The prospect of this method of waste transfer was canvassed in EAR060239 at Section 2.3.7.
	The more usual method of waste transfer is by Dump Truck traversing the 3.8Km journey via the haulroad on the inside perimeter of the Quarry.
	Dust Truck generated dust from the haul roads within the Quarry was a significant factor in the Air Quality Modelling undertaken by the Proponent. That factor is almost entirely removed by the use of the conveyor and chute.
	Fuel Usage There is also a significant reduction in diesel usage within the Project.
	Greenhouse Gases GHG emissions generated by the constant use of Dump Trucks are dramatically reduced by the almost complete removal of the need for Dump Trucks.
	Noise The electrically driven conveyor also removes the noise expected to be generated by the Dump Trucks.
	Air Quality At the egress point of the waste from the chute, the use of a sock, reduction in drop heights and targeted water mist sprays ensure that dust plumes often associated with tipping from open trucks will be almost wholly avoided.
Safety issues	**Occupational Health and Safety** for employees will be dramatically improved by implementation of the Conveyor and Chute avoiding the need for Dump Trucks to traverse the haul road within the quarry except for employees arriving or departing at the end of each daily shift.

PROPOSED MODIFICATION 3	
Two way traffic be permitted on road designated "Fourth Avenue"	Shown on the Plan Ref A101-7/F (ref Annex B).
Reason for Amendment	Fourth Avenue is a roadway 8 metres wide and able to cater for two way vehicle movements.
	Operational studies concluded after the date of the Project Approval concluded that improved traffic and checkpoint control would be able to be achieved by the use of one centralised checkpoint for vehicles entering and leaving the Segregated materials drop off area.
Key Environmental issues	The Environmental Effects are expected to be beneficial.
	There is no change to the number of vehicles entering and leaving this area of the site and so Dust, Fuel Usage, Greenhouse Gases and Noise expectations are unaffected.
	Closer control and inspection of vehicles, their loads and contents assists in excluding unacceptable wastes from being tipped and thereby contaminating recycling feedstocks.
	Unacceptable wastes which were not discovered at the first checkpoint inspection or the weighbridge may be better able to be discovered just prior to or when the vehicle is tipping. If unacceptable materials are discovered then they may more easily be excluded.
Safety Effects	Occupational Health and Safety for employees and members of the public are expected to be improved by the implementation of tighter traffic controls and by enhanced checking of waste materials.

PROPOSED MODIFICATION 4	
The construction of concrete bay walls within the area designated for receipt and processing of greenwaste	Shown on the Plan Ref A101-5/F (refer Annex B). The concrete walls will be 2.5 metres high and spaced at various widths ranging from 4.5 metres to 16 metres.
Reason for Amendment	Emplacement of shredded greenwaste within designated bays allows for the following,
	(a) Reduction in windrow height
	(b) Improved control of the material during maturation process
	(c) Covering of the material
	(d) Implementation of aerobic procedures to avoid odour.
Key Environmental Issues	The Environmental Effects are expected to be beneficial.
	Each bay in use at any given time will be capable of being individually covered by a roll out cover in order to reduce the potential for odour and also reduce the generation of leachate.
	Leachate during rain events can be more easily managed.
	Each bay will be able to be fitted with aerobic equipment allowing the introduction of air during the maturation process, thereby enhancing and expediting the process and reducing the risk of odour.
Safety Effects	Occupational Health and Safety for employees and members of the public are expected to be improved by the reduction in odour and leachate and also improved management prospects in the case of fire by being able to confine any outbreak within the bays in which they occur.

PROPOSED MODIFICATION 5	
Relocation of Drive through Wheelwash from the area Shown on Plan	Shown on the Plan Ref A101 -6/F (ref Annex B). It is proposed that the drive through wheel wash which was to be located immediately south of the MPC building be relocated to the location identified on Plan Ref A101-6/F.
Reason for Amendment	Vehicles entering and leaving the MPC building will do so via concreted ramps and roads and will not acquire on their wheels any debris or dirt requiring washing off. Vehicles collecting and being loaded with recycled hard fill materials; (soil, sand, brick and concrete) have an enhanced risk of accretion of material build up on tyres. The relocation of the wheel wash minimises the distance travelled with material build up on tyres. This in turn improves dust management and general cleanliness for the site
Key Environmental Issues	The Environmental Effects are expected to be beneficial resulting in less opportunity for dirt spill onto on site roadways.

1.9 KEY ENVIRONMENTAL CONSIDERATIONS RELATING TO THE PROJECT MODIFICATIONS

The Proponent has identified the following key Environmental considerations which may arise from implementation of the Modifications.

1.9.1 Waste Management

Waste generated by the Project will be dealt with by the management procedures for waste detailed within the Site Environmental Waste Management Plan (SEWMP).

Depending on the nature of the waste it will either be recycled or landfilled on-site or sent to an appropriate off-site facility for recycling or disposal. The SEWMP has been prepared in accordance with the principles of key waste policies and guidelines. Its implementation will ensure that the identified waste streams are appropriately managed, including reduction at source, reuse and recycling, where possible and practicable, and appropriate disposal. This will include procedures for safe handling and disposal of asbestos waste. Implementation of the SEWMP will enable compliance with relevant guidelines and regulatory requirements and minimise the potential for adverse impacts. The wastewater management system will be designed to maximise the recycling and beneficial use of site water.

Proposed Modification 2 replaces the transport of waste from the MPC to the pit by dump trucks, with a conveyor and chute system. All waste passing from the MPC into the pit is weighed as part of the conveyor and chute system.

The construction of concrete bay walls within the area designated for receipt and processing of green waste (Proposed Modification 4) will allow for the implementation of management strategies to minimise odour and leachate production from the green waste areas.

Otherwise the proposed modifications are not expected to affect the waste management of the Project.

1.9.2 Surface Water Management

Surface Water for the Project has been assessed by Storm Consulting (April, 2008) in accordance with the Landcom (2004) Managing Urban Stormwater-Soils and Construction (the 'Blue Book'); Blacktown City Council (BCC) (2005a) Eastern Creek Precinct Plan; and BCC (2005b) Stormwater Quality Control Policy.

Surface stormwater runoff generated on-site will be categorised as either 'clean' or 'dirty'. Clean stormwater runoff will be generated from building roofs (workshop, MPC/ WTS, administration building and weighbridge

shed), roads, car parks and other hardstand areas, pit walls, haul road and capped areas within the landfill.

Captured rainwater from building roofs will be used to help meet toilet flushing and wheel wash needs.

Recycled stormwater captured in the OSD basins will be used for dust suppression and irrigation i.e. sprinklers and water carts, and that captured in the stormwater pond (in pit and surface) will also be used in water carts.

Postponement of commencement of certain of the project buildings (Proposed Modification 1) could affect Stormwater collection volumes.

1.9.3 Ground Water Management

The ground water management considerations of the Project relate to groundwater systems in the pit to be landfilled and the effect of leachate produced in the pit on those systems.

None of the proposed modifications is expected to impact leachate production in the pit.

1.9.4 Leachate Management

Leachate management strategies discussed in EAR060239 related mainly to leachate produced in the landfill. Other than leachate produced in the landfill, a very small quantity of leachate is expected to be produced from the green waste areas from rainwater which has percolated through the waste.

The construction of concrete bay walls within the area designated for receipt and processing of green waste (Proposed Modification 4) would allow for the covering of the green waste reducing the amount of rainwater percolating through it and consequently the amount of leachate produced.

Otherwise it is expected that the proposed modifications would not affect the leachate production and management requirements associated with the Project.

1.9.5 Air Quality

An air quality assessment was undertaken for the Project. The key contaminants identified for consideration in this assessment were total suspended particulates (TSP); particulate matter less than 10 microns (PM_{10}); and odour.

Road haulage to landfill was identified in EAR060239 to be the most significant dust generating activity. Therefore, particulate matter emissions are highest during the initial stages of operations, when the haul, distance to the base of the pit is greatest.

The predicted ground level incremental and cumulative annual average TSP and PM_{10} concentrations and dust deposition were assessed at sensitive receivers to be well below the relevant DECCW criteria. Predicted maximum 24-hour average concentrations of PM_{10} from the Project at sensitive receptors we also identified to be below the relevant DECCW criteria.

An Air Quality Management Plan (AQMP) has been included in the Site Environmental Management Plan (SEMP) developed for the Project, with a focus on activities which generate the most significant emissions – in this instance those associated with haulage movements and transfer and loading activities. Alternative means of transporting waste to landfill could reduce particulate emissions and improve air quality.

The full assessment of the impacts on Air Quality from the proposed modifications is presented in the PAE Holmes Air Quality assessment in Appendix 2 of this EAR (**PAE Air Quality**).

The installation of a downhill conveyor and chute to directly transport waste into the landfill (Proposed Modification 2) would eliminate the need for dump trucks to transport the waste from the WTS to the landfill. It is expected that this would beneficially impact air quality.

The construction of concrete bay walls within the area designated for receipt and processing of green waste (Proposed Modification 4) would allow for better aeration of green waste resulting in reduced anaerobic, odour forming decomposition. It is expected that this would beneficially impact air quality.

1.9.6 Noise

The noise impact assessment was undertaken in accordance with the DECCW (2000) Industrial Noise Policy (INP), DECCW (1994) Environmental Noise Control Manual (ENCM) and DECCW (1999a) Environmental Criteria for Road Traffic Noise (ECRTN).

Noise Modelling was undertaken having regard to worst case of all vehicles and all items of Plant being operational on the site at the same time.

Noise levels for all stages of the Project operations are predicted to meet the relevant Project specific noise criteria at assessed sensitive receivers under all meteorological conditions during the evening, night-time and morning shoulder period.

The full assessment of the impacts on Noise from the proposed modifications is presented in the PAE Holmes Noise assessment in Appendix 3 of this EAR (**PAE Noise**).

Replacement of dump trucks as a means of transporting waste from the WTS to the landfill base by an electrically driven conveyor (Proposed Modification 2) could reduce noise impacts from the project.

1.9.7 Traffic and Transport

EAR060239 identified that the Project will generate light, medium and heavy vehicle traffic on the surrounding road network associated with deliveries of waste loads, dispatch of recycled products, service and maintenance activities, and some light vehicle traffic generated by staff, visitors and subcontractors.

Vehicle access for the Project is only permitted through the Old Wallgrove Road (i.e. Wallgrove Road and Quarry Road) intersections, the existing roadway constructed within the Registered ROW between Old Wallgrove Road and the site boundary and the existing haulage road which runs along the southern side of the quarry wall.

The main internal circulation roadways from the MPC will operate with a one-way traffic flow with two-way connectors to/from the drop-off zone and landfill etc. It will be appropriate for advisory (directional) signage as well as regulatory (one-way etc) signage to be provided including a 20kph speed restriction.

The design of the access roads, maneuvering and carpark areas will be suitable for the intended traffic movements and will comply with AS 2890.1 and 2, Austroads, and Council's Development Control Plans. These design requirements have been included within the draft Statement of Commitments.

Proposed Modification 3 seeks to alter the flow of traffic along one road designated "Fourth Avenue" so as to be two way. This would have no effect on the traffic network surrounding the project.

1.9.8 Visual Amenity

There are no receivers with elevated views of the site. The visual character of the locality is variable with the site surrounded by urban areas of Minchinbury to the north and Erskine Park to the south-west, industrial development including Hanson Asphalt Batching Works to the south-east, and transport and utilities infrastructure including the M4 Motorway and an associated landscaped buffer adjacent to the north.

The Hanson site to the south-east of the quarry pit is the only receiver which can experience uninterrupted views across the area where the majority of operations are to be focussed. The other receptors views of the site are shielded by existing Cumberland Plain Woodland along to northern boundary and 10 metre high earthen amenity berms designed along the north, south and western boundary of the operations area.

None of the proposed modifications is expected to impact visual amenity.

1.9.9 Flora and Fauna

The Project site is land immediately adjacent to and disturbed by 50 years of quarrying. Its predominant feature is the large earthen mounds of overburden material deposited during quarrying. There will be no natural vegetation

remaining within the Project area and no areas outside of the Project area will be affected by any of the modifications.

1.9.10 Aboriginal and Historical Heritage

The recommendations made by McDonald (2005) within the Heritage Conservation Strategy have been adopted. The Conservation Strategy did not identify any items of historical heritage significance at or adjacent to the site, on this basis no further archaeological investigations have been undertaken as part of this Project area and no areas outside of the Project area will be affected.

1.9.11 Hazards and Risk

No contaminated soils have previously been recorded at the proposed area of operations and soil contamination is not expected to pose a constraint to Project activities. This will be confirmed by additional testing to be undertaken as recommended. Stockpiled material surrounding the quarry pit can be re-used as VENM fill.

Fuel, chemical storage, handling procedures and spill response measures will be put in place and this will minimise the risk of soil contamination occurring during Project construction and operation phases.

Provided the recommendations in Section 15.4.3 of EAR060239 are implemented, Holmes Fire and Safety (2007) is of the opinion that, despite not being a legal requirement, the Project achieves the intent of the general requirements for Integrated Development as set out in RFS (2001) Planning for Bushfire Protection.

The steep pit walls are potentially unstable which poses a potential risk to any development near the quarry crest and for block fall out and rock falls in several areas of the quarry. This risk can be managed by measures outlined in Section 15.5.3 of EAR060239 including stabilising pit walls prior to commencement of in-pit activities. In the longer term, filling of the pit will eliminate this risk.

The operational activities of the RRF and landfill will be undertaken in accordance with the relevant and applicable occupational health and safety requirements to safeguard site staff, visitors, contractors and the public.

The installation of a downhill conveyor and chute to directly transport waste into the landfill (Proposed Modification 2) would eliminate the need for dump trucks to transport the waste from the WTS to the landfill and so reduce the number of workers exposed to any risks associated with the potentially unstable pit walls.

Jeffery and Katauskas Pty Ltd has provided an opinion in its 30 June 2010 letter which can be found in Appendix 4 of this EAR (**Jeffery and Katauskas**) that the geotechnical conditions at the Project site are suitable to support the

proposed downhill conveyor and chute (Proposed Modification 2), and so no hazards or risk arise in this regard.

Otherwise the proposed modifications are not expected to affect any potential risks associated with the Project.

1.9.12 Socioeconomic Impact

Community consultation undertaken for EAR060239 identified a general acceptance that Minchinbury is developing and changing and there are both positive and negative impacts associated with this. There is concern that this Project will not be adequately controlled and will come at the expense of Minchinbury residents.

Many potential issues identified in this socio-economic assessment result from a lack of knowledge about the Project and suspicion of regulatory bodies. There is a general feeling that the community are not a priority and their opinions do not hold as much sway as economic and political issues or interests. These concerns will be addressed through ongoing provision of clear transparent information about the Project to the community. Project issues identified by Minchinbury residents, including dust, noise, traffic, odour, hours of operation, and visual amenity are manageable and will be mitigated by measures included in the Project design and in the Statement of Commitments for the Project (refer to Chapter 19 of EAR060239 and Chapter 9 of this EAR).

The installation of a downhill conveyor and chute to directly transport waste into the landfill (Proposed Modification 2) would eliminate the need for dump trucks to transport the waste from the WTS to the landfill. The dump trucks driving in and out of the landfill were considered in EAR060239 to be one of the major generators of dust and noise. The elimination of this source of dust and noise by Proposed Modification 2 is expected to beneficially impact the residents of Minchinbury.

The construction of concrete bay walls within the area designated for receipt and processing of green waste (Proposed Modification 4) would allow for better aeration of green waste resulting in reduced anaerobic, odour forming decomposition. Reduced odour production is expected to beneficially impact the residents of Minchinbury.

1.9.13 Greenhouse Gas

The release of greenhouse gases from the Project will occur predominantly from carbon dioxide (CO_2) through the combustion of fossil fuels through energy consumption within the RRF and associated administration building and workshop and the transportation of waste loads in and around the site. Some methane production will also contribute to greenhouse gas production from composting and landfilling operations.

Greenhouse Gas emissions have been calculated for the Project in accordance with the Australian Greenhouse Office (AGO) Factors and Methods Workbook. Direct (diesel and electricity consumption and anaerobic and aerobic process within the landfill of degradable materials) and indirect (transportation of waste loads) greenhouse gas production has been assessed. Diesel consumption from the sorting process to be conducted at the material processing centre and waste transfer station is estimated to produce 1,404 tonnes CO_2 /annum.

The electricity consumption within the workshop, administration building, weighbridges and pumps is expected to create 207tCO_2 /annum.

Indirect diesel consumption from the transportation of waste loads to and from the site is anticipated to produce 3,806tCO_2/ annum.

EAR060239 noted that the Proponents would implement measures to mitigate greenhouse gas emissions include sourcing energy efficient mobile and fixed equipment, annual internal review of energy consumption to identify techniques to minimise energy use and assess if equipment is operating at optimum energy levels, equipment maintenance to reduce energy losses and inventory of emissions to be regularly updated and maintained.

The construction of a downhill conveyor and chute (Proposed Modification 2) is expected to reduce the total Greenhouse gases generated by the Project.

1.10 NEED FOR MODIFICATION TO THE PROJECT

In addressing the need for the modification of the project the following criteria were examined by the Proponents:

(a) Whether the modification sought had been earlier considered by the Proponents in the Environmental Assessment Report,

(b) Whether the modification produced any of the following,

i. identifiable operational efficiencies,

ii. cost savings or financial benefits,

iii. OH&S or public safety benefits

iv. Environmental benefits.

CHAPTER 2 - MODIFICATION 1

MODIFICATION 1 - DESIGN VARIATION REFLECTING STAGED DEVELOPMENT

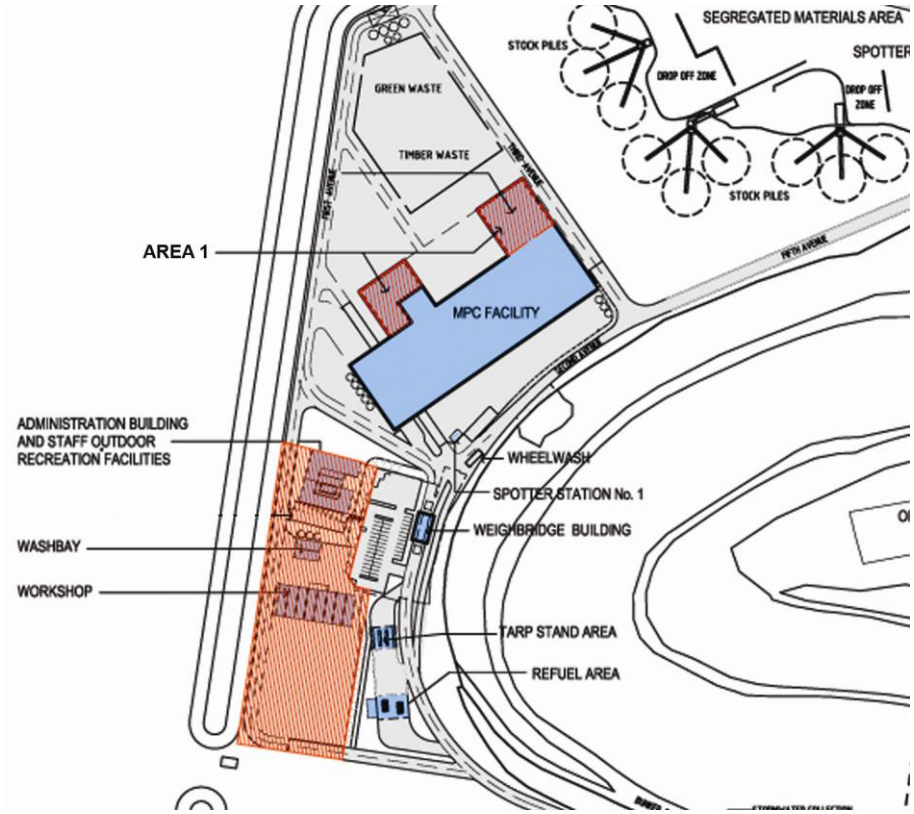
2.1 MODIFICATION DETAILS

2.1.1 AREA 1

It is proposed that construction of those parts of buildings and building areas shown cross hatched on the Plan Ref A101-2/F (refer Annex B) be postponed until a date to be fixed after commencement of Operations.

Area 1 shown marked in Figure 2.1 (below)

Figure 2.1



A reconfiguration of Proposed Waste handling Operations **within** the MPC building and the proposed installation within the building of automated materials handling mean that certain areas of the building will not need to be commissioned immediately in order for Operations to commence.

The modification sought had not been earlier considered by the Proponent in EAR060239 which was based upon the assumption that within the MPC/WTS building the sorting of waste materials would be a manual operation of the type which is typically currently used within the Industry. The design of the

proposed automated handling facility does not require the amount of covered floor space that would be required for manual sorting of waste materials.

The configuration of the automated process renders the area shown on the architectural drawing redundant in the first stage.

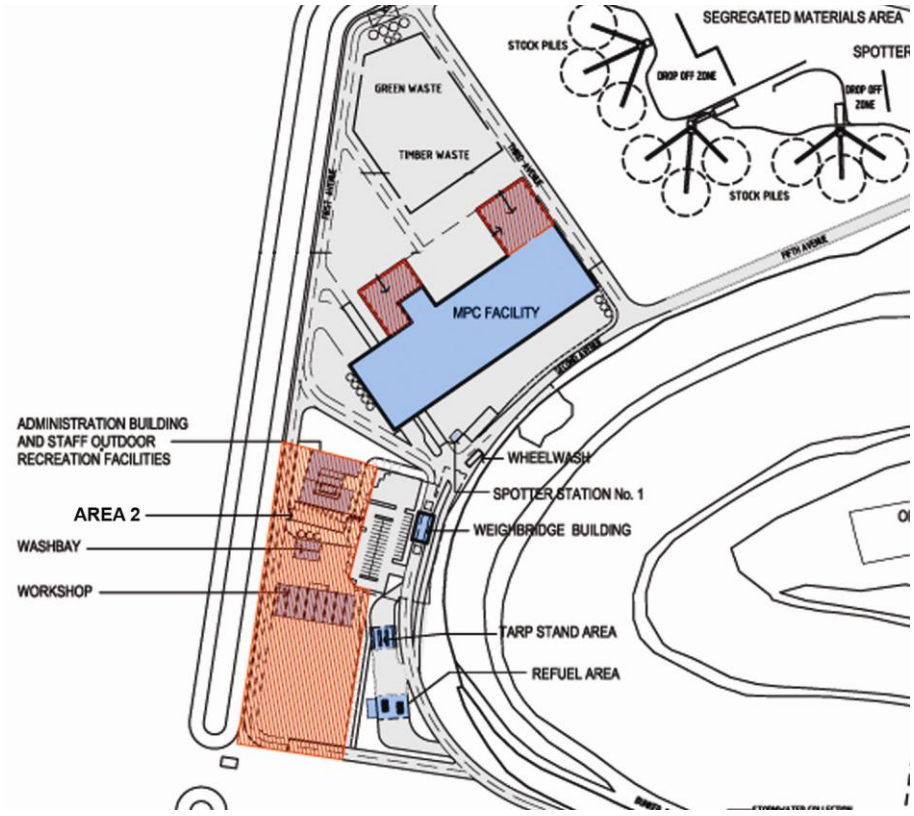
It may well be that at a later stage that area will be constructed for other processing purposes and so this application is only for postponement of commencement of the construction of the designated area.

2.1.2 AREA 2

It is proposed that construction of those parts of buildings and building areas shown cross hatched on the Plan Ref A101-2/F (attached to this letter) be postponed until a date to be fixed after commencement of Operations.

Area 2 shown marked on Figure 2.2 (below)

Figure 2.2



The area identified in the Plan is for workshop, truck wash and parking area.

The modification is to postpone construction of these ancillary facilities until after the Waste Facility becomes operational.

The workshop, truck wash and parking area are not required prior to the operation of the Waste Facility as any requirements of this nature can be

outsourced to other places such as the adjacent Hanson site. Further there are sufficient concreted areas around the MPC (notably the forecourt) where trucks can be parked overnight.

The modification sought had not been earlier considered by the Proponent in the Environmental Assessment Report

2.2 ALTERNATIVES CONSIDERED

The alternatives considered were to continue the Project in accordance with the Project Conditions or to lodge an application with DoP to modify the project in accordance with Proposed Modification 1 set out above.

The advantages and disadvantages of Proposed Modification 1 were considered by the Proponent and these are set out below.

2.2.1 Area 1

2.2.1.1 Advantages

The Proponent has determined since EAR060239 was prepared that the installation of an automated materials handling mechanism would produce identifiable operational efficiencies, cost savings financial benefits as follows:

(a) Operational Efficiencies and Advantages of the Automated System.

Maximise waste sorting opportunities, including opportunities for recovering items of smaller dimension which would not be otherwise recoverable by traditional methods and which would otherwise have to be disposed of to landfill This mechanism therefore maximises recycling and aims to ensure that a greater proportion of the waste stream is recoverable for conversion into products which may then be sold for financial return.

(b) OH&S or Public Safety Benefits

The use of an automated plant of the type shown reduces the need for human workers to physically handle waste and therefore reduces the opportunities for the happening of accidents and the incidence of needle stick injuries.

There is a reduced need for large machines excavators and loaders to operate within the confines of the MPC building reducing the opportunities for accident and injury to persons.

The process minimises noise, and particulate emissions even within the building.

Improved noise, air quality and visual impacts.

(c) Environmental Benefits.

The use of an automated materials handling facility maximises waste sorting opportunities, including opportunities for recovering items of smaller dimension which would not be otherwise recoverable by traditional methods and which would otherwise have to be disposed of to landfill. This mechanism therefore maximises recycling.

The use of an electrically driven plant ensures a reduction in use of Diesel fuels and in the generation of noxious gases within the building and then escaping to atmosphere.

The process minimises noise, and particulate emissions even within the building.

Improved noise, air quality and visual impacts.

2.2.1.2 Disadvantages

- Higher overall cost of design and construction of the automated process which offsets any savings by postponing the construction of that part of the building marked on the plan.
- Potentially there may be a reduction in employment opportunities

2.2.2 Area 2

2.2.2.1 Advantages

Reduced initial costs to the Proponent that would be incurred constructing Area 2.

2.2.2.2 Disadvantages

Reduced area for truck parking initially.

2.2.3 Preferred Alternative

The Proponent considers that the advantages of Proposed Modification 1 outweigh its disadvantages.

2.3 PROJECT BACKGROUND

Two alternatives for Waste processing and sorting were considered in EAR060239.

Option 1 was for an enclosed, raised MPC/ WTS structure, inclusive of a hand-unload area, with some open air processing and stockpiling behind amenity berms, subject to imposition of strict dust mitigation measures.

Option 2 was for completely open air sorting and stockpiling of waste materials and recycling and stockpiling of finished products.

Option 1 was preferred despite increased cost as it reduces potential noise, air quality, surface water and visual impacts.

2.4 KEY ENVIRONMENTAL ISSUES RELATING TO MODIFICATION 1

2.4.1 Waste Management

It is not expected that this modification will affect the waste management of the Project.

2.4.2 Surface Water Management

Surface stormwater runoff generated on-site will be categorised as either 'clean' or 'dirty'. Clean stormwater runoff will be generated from building roofs (workshop, MPC/ WTS, administration building and weighbridge shed), roads, car parks and other hardstand areas, pit walls, haul road and capped areas within the landfill.

Captured rainwater from building roofs will be used to help meet toilet flushing and wheel wash needs.

Postponement of commencement of certain of the project buildings could potentially affect the volume of Stormwater collection by reducing the roof area for collection

The elements of the surface water assessment conducted by Storm (2008) included:

- evaluation of the existing surface water conditions at the site including drainage networks, meteorology, hydrology and topography, based on previous site specific investigations, site visits and information available in the public domain;

- assessment of potential water demand impacts from Project operation, based on a site water balance model developed for wet, dry and average years;

- development of a concept stormwater drainage plan for the Project, including provision of water sensitive urban design (WSUD) elements where possible and detention calculations to determine appropriate sizing of basins and drainage works;

- assessment of the potential for Project discharges to impact receiving waters, inclusive of modeling of peak flows with the XP-RAFTS hydrology model and assessment of the performance of the proposed stormwater treatment system, using the MUSIC stormwater quality management model; and

- development of soil and water management, mitigation and monitoring measures to minimise the potential for adverse impacts on surface water resources.

The following key guidance documents were considered during preparation of the surface water assessment:

- Landcom (2004) Managing Urban Stormwater- Soils and Construction (the 'Blue Book');

- BCC (2005a) Eastern Creek Precinct Plan; and

- BCC (2005b) Stormwater Quality Control Policy.

A full description of methodology employed is presented in the Storm (2008) supporting technical report.

2.4.2.1 Impact Assessment

This section identifies the potential impacts of the Project Modification on surface water and operational areas, which is proposed to be collected within storage tanks and the OSD basins.

Clean stormwater runoff will be generated from:

- building roofs (workshop, MPC/ WTS, administration building and weighbridge shed);

- roads, car parks and other hardstand areas;

- materials stockpile area/ working floor/ drop off zone; and

- pit walls, haul road and capped areas within the landfill.

Dirty runoff will comprise stormwater that has come into contact with mixed wastes, green and timber wastes and uncovered landfill wastes. The dirty runoff will be collected separately from clean stormwater and will be treated as leachate.

2.4.2.2 Operational Area

Roof runoff will be collected in rainwater tanks for re-use for site toilet flushing and topping up the wheel wash. Flows in excess of tank capacity will discharge from tank overflows to the general site drainage network.

Stormwater runoff from the operational area will be directed to the Quarry North Catchment for treatment and retention in an On-Site Detention (OSD) basin, proposed to be located to the West of the Western berm (refer Figure 3.3 of EAR060239). The OSD basin 1 meets this requirement.

Runoff from the operational area will be conveyed via a combination of major and minor drainage systems refer Figure 6.1 in EAR060239, including:

- an underground piped system with stormwater pits located along roadways, designed to convey 1 in 20 year flows without surcharge, and with provision for overland flow along roads;
- stormwater detention and pollution control structures including the proposed OSD basins adjacent to Archbold Road.
- the natural drainage systems including creeks and overland flow paths.

2.4.2.3 Water Demand

Water uses for the Project will include:

- water spray and sprinkler systems located along berms, at materials stockpiles and unloading areas (estimated average application 30kL/ day), for dust suppression and irrigation of landscaped areas;
- dust suppression via water carts and site dump truck on-board reservoirs (estimated average application 80kL/ day);
- wheel wash top up - the wheel wash will be a fully bunded, closed system, with wash water passing through an oil water separator and sediment separator before being re-used in the wheel wash. There will be a net loss from this system and it will need to be topped up from time to time (estimated average use 1kL/ day);
- building internal uses e.g. toilet flushing (estimated average use 0.9kL/ day);
- potable uses (estimated average use 245 L/ day, based on 49 staff/ subcontractors on-site in any one day, each using 5 L of potable water); and
- fire fighting water (static on-site storage of 10 KL required).

On an annual basis, demand for potable water approximates 0.086 ML/ annum. Water demand for toilet flushing and wheel wash top up

approximates 0.7 ML/ annum. Using a water balance model demand for dust suppression was calculated to vary from 33 to 35.4 ML/ annum, dependent on prevailing weather conditions e.g. dust suppression not required when it is raining. An assessment of the ability of the proposed system of supply to meet site water demands was provided in EAR060239.

2.4.2.4 Water Supply

2.4.2.4.1 Overview

Stormwater runoff will be harvested from a 41.4 ha catchment area, comprising the areas identified in Table 6.2 of EAR060239. Calculated runoff volumes generated from each of the harvestable areas for a dry, median and wet year are presented in Table 2.1 below. It should be noted that the runoff volumes that can be harvested for re-use are smaller than total runoff volumes due to losses from the system from overflows, and are dependent on storage behaviour (i.e. if the storage reaches 100% capacity, overflows will occur rather than further collection).

Stormwater run off will continue to be the same as that modelled notwithstanding any delay in construction of any buildings or parts thereof.

Table 2.1 Potential Runoff Generated

Runoff Source	Area (ha)	Potential Runoff Generated (ML/yr)		
		Dry	Median	Wet
Building Roofs	0.6	3.0	4.7	6.2
Internal Roads and Hardstand areas	3.8	12.3	20.1	29.0
Quarry	26.5	39.1	71.2	124.9
MPC Stockpile	2.7	8.9	14.4	20.8
Remaining Site Operational Area	7.8	16.6	29.2	24.9
TOTAL	41.4	**79.9**	**139.6**	**345.4**

2.4.2.4.2 Re-Use of Captured Roof water

The performance of varying rainwater storage sizes in terms of meeting water demands for toilet flushing and topping up of the wheel wash (estimated demand of 0.7 ML/ annum), given changes to rainfall patterns is illustrated in Figure 2.3. It can be seen that a minimum tank storage volume of 40kL would meet over 75% of the site's toilet flushing and wheel wash demands. As such it was recommended that a 10kL rainwater tank (minimum) be installed for each of the four buildings on-site giving a total detention capacity of 40KL.

Figure 2.3 Roof water re-use for toilet flushing and wheel wash

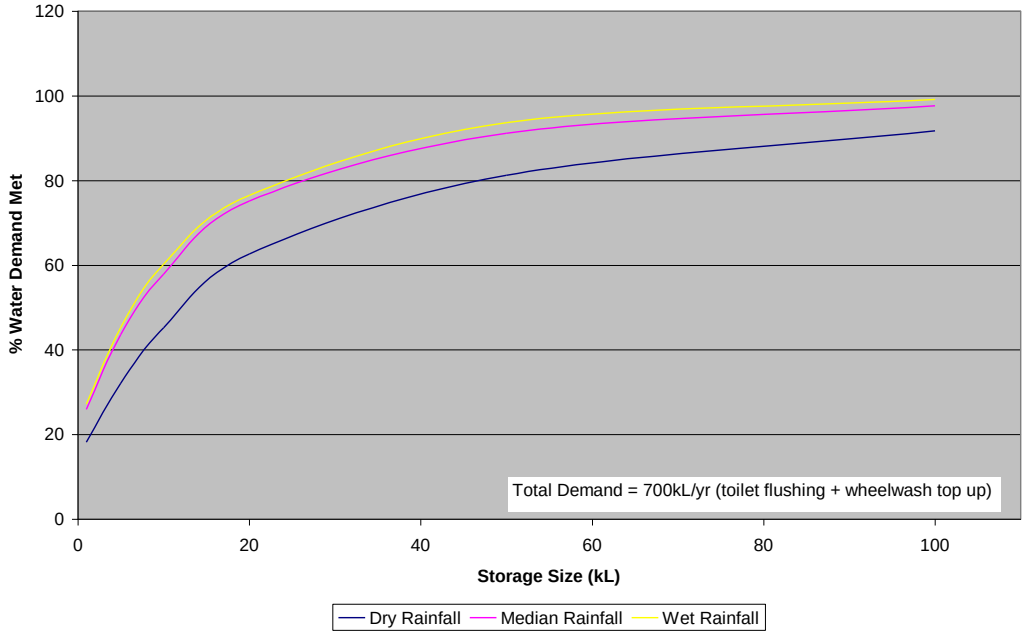


Table 2.2 Water Demand for Dust Suppression and Amount Supplied by Stormwater Captured On-site

Rainfall Year	Scenario 1			Scenario 2		
	Water Demand (ML/yr)*	Water Demand Met (ML/yr)	%	Water Demand (ML/yr)*	Water Demand Met (ML/yr)	%
			OSD basin			
Dry	22.5	15.5	69	9.7	9.2	95
Median	21.1	17.5	83	9.1	9.1	100
Wet	21.0	20.6	98	9.0	9.0	100
			Stormwater pond			
Dry	12.9	12.5	97	25.8	17.5	68
Median	12.1	12.1	100	24.1	21.4	89
Wet	12.0	12.0	100	24.0	22.2	92.4

1. Water demand is for water carts and sprinkler systems. It has been assumed that on days where daily rainfall exceeds 2mm, there is no demand for dust suppression.

The water balance results in Table 2.2 show that the proposed stormwater harvesting system will meet the majority of site water demands for dust suppression and irrigation. Overall, Scenario 1 will provide the greatest recycling efficiency, meeting 79.1% of water needs in a dry year and 98.8% in a wet year, by comparison to Scenario 2 which will supply 75.2% in a dry year and 94.8% in a wet year. Therefore allowing water carts to draw from both ponds will maximise re-use of recycled water and minimise demands on external water sources.

2.4.2.4.3 Summary of Water Demand

The water balance modelling undertaken indicates that overall water demands vary between 36.2ML/yr (dry year) to 33.7ML/yr (wet year). Water

may be supplied from the OSD basin (nom. 5362kL), sediment basin (within the quarry, nom. 9,773kL or a combination of stormwater basins in quarry and at the surface receiving pumped water from quarry stormwater basin, as required and from tanks (nom. 50kL) capturing roof water flows from buildings around the site.

Based on the above, potential water supplied from the aforementioned storages range between 28.6ML/yr (dry year - equivalent to 79% of overall demands) and 33.2ML/yr (wet year - equivalent to 99% of overall demands). Shortfall in supplies will need to be sourced from mains water supplies.

Key discharge points for site are to be maintained or will remain unaffected by site development. No stormwater will be directed to new discharge points, including bushland areas, and therefore it will not adversely affect these areas.

2.4.2.5 Water Supply Management/ Mitigation Measures

2.4.2.5.1 Maintenance and Monitoring

A maintenance plan has been developed to provide for:

- regular visual inspection of the stormwater treatment measures and site drainage system (including sumps, pipelines, pumps, bunds, tanks, oil/ water separators, sediment traps and storages), for example on a monthly basis and after rain events, with maintenance works triggered as required; and for

- water sampling at the OSD basins and in pit stormwater pond to ensure re-used/released water is of the appropriate quality for end-use (refer ANZECC guidelines and relevant NSW guidance), conducted quarterly for the first 12 months of operations and six-monthly for following years. The quality of any water releases should be in accordance with the site's EPL. Sampling requirements may include TSS, turbidity, ammonia, Biochemical Oxygen Demand, TN and TP.

2.4.2.5.2 Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) measures are incorporated into the stormwater system where practical. These include:

- grass swales around parts of the site near embankments and low-traffic areas; and

- wetland vegetation at the OSD basin, both of which once established are less susceptible to damage or unexpected sediment loads from site activities.

The SWMP includes details of drainage lines, sediment traps, check dams, erosions control, bunds infiltration areas, sediment fences, filters and all other erosion and sediment control devices.

2.4.2.6 Conclusion

There is no adverse effect demonstrated by this modification on,

a) water collection;

b) water quality.

2.4.3 Ground Water Management

It is not expected that this modification will affect the ground water management of the Project.

2.4.4 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

2.4.5 Air Quality

An air quality assessment was undertaken for the Project, addressing both construction and operational activities. The key contaminants identified for consideration in this assessment were total suspended particulates (TSP); particulate matter less than 10 microns (PM_{10}); and odour.

Postponement of the construction of some of the site buildings is not anticipated to significantly affect the conclusions of EAR060239 in regard to dust emissions and resultant concentrations predicted at residences. Compared with ongoing sources of dust from landfill operations, construction activities are of a short-term nature and are not considered to be a major source of dust emissions for this project. They do, however, as noted in EAR060239, have the potential to cause nuisance impacts if not properly managed.

The earthworks activities will be completed in accordance with the original timetable, with only the construction of the buildings postponed. Any areas exposed for prolonged periods of time will be either grassed or bitumen capped and as such will not be sources of dust due to wind erosion.

Removal of Diesel Plant from the mixed waste sorting process within the MPC is expected to reduce particulate emissions.

This modification is not relevant to odour and is therefore not anticipated to have any significant effect on odour emissions from the proposed operation

There are no adverse effects on air quality as a result of this modification.

2.4.6 Noise

The noise impact assessment was undertaken in accordance with the DECCW (2000) Industrial Noise Policy (INP), DECCW (1994) Environmental Noise Control Manual (ENCM) and DECCW (1999a) Environmental Criteria for Road Traffic Noise (ECRTN).

Noise Modelling was undertaken having regard to worst case of all vehicles and all items of Plant being operational on the site at the same time.

Noise levels for all stages of the Project operations are predicted to meet the relevant Project specific noise criteria at assessed sensitive receivers under all meteorological conditions during the evening, night-time and morning shoulder period.

This modification is simply a postponement of previously approved works and as such would be predicted to meet the same construction noise criteria assessed in the Noise Impact Assessment in EAR060239.

There are no adverse effects on noise levels as a result of this modification.

2.4.7 Traffic and Transport

Apart from a slightly reduced capacity for truck parking it is not expected that this modification will affect the traffic and transport management of the Project.

Despite a reduction in available truck parking proposed by this modification there would still be adequate parking available for operations after the commissioning.

2.4.8 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project.

2.4.9 Flora and Fauna

The Project site is land immediately adjacent to and disturbed by 50 years of quarrying. Its predominant feature is the large earthen mounds of overburden material deposited during quarrying. There will be no natural vegetation remaining within the Project area and no areas outside of the Project area will be affected by this modification.

2.4.10 Aboriginal and Historical Heritage

The recommendations made by McDonald (2005) within the Heritage Conservation Strategy have been adopted. The Conservation Strategy did not identify any items of historical heritage significance at or adjacent to the site,

on this basis no further archaeological investigations have been undertaken as part of this Project area and no areas outside of the Project area will be affected.

2.4.11 Hazards and Risk

The use of an automated plant reduces the need for human workers to physically handle waste and therefore reduces the opportunities for the happening of accidents and the incidence of needle stick injuries.

There is a reduced need for large machines excavators and loaders to operate within the confines of the MPC building reducing the opportunities for accident and injury to persons.

The process minimises noise, and particulate emissions even within the building thus reducing the exposure of workers to noise and particulate emissions.

2.4.12 Socioeconomic Impact

It is not expected that this modification will affect the socioeconomic impact of the Project.

2.4.13 Greenhouse Gas

The use of an electrically powered automated plant of the type shown reduces the need for large excavators and loaders in the MPC. The quantity of greenhouse gas emissions resulting from the use of the automated plant would be less than that from diesel powered equipment. This modification is expected to reduce the greenhouse gas emissions from the Project.

CHAPTER 3 - MODIFICATION 2

MODIFICATION 2 - TRANSPORT OF MATERIAL TO LANDFILL BY CONVEYOR

3.1 MODIFICATION DETAILS

It is proposed that a Silo/Hopper, a downhill electrically powered conveyor and chute be constructed within the Quarry Void in the position shown on the Plan Ref A101-3/F (ref Annex B).

Feasibility studies concluded after the date of the Project Approval concluded that it was economically feasible to construct an automated method of transporting shredded residual waste to the Quarry floor to enable landfilling to take place.

The unrecyclable waste will be transported by enclosed conveyor direct from a loading hopper located within the MPC to the Quarry lip.

The material will then enter one of the two silos located side by side and which are approximately 10 cubic metres each.

When one silo is filled with the shredded waste a weight sensor detects the trigger weight and the silo then opens gradually and the waste is fed onto the conveyor. The waste then proceeds via downhill conveyor to approximately the mid point of the Quarry where it meets end empties its load into the enclosed chute down which the waste travels to the Quarry floor as shown on the Plan Ref A101-4/F (ref Annex B).

The Environmental Effects are expected to be beneficial.

The prospect of this method of waste transfer was canvassed in EAR060239 at Section 2.3.7.

The more usual method of waste transfer is by Dump Truck traversing the 3.8Km journey via the haulroad on the inside perimeter of the Quarry.

3.2 ALTERNATIVES CONSIDERED

The alternatives considered were to continue the Project in accordance with the Project Conditions or to lodge an application with DoP to modify the project in accordance with Proposed Modification 2 set out above.

The advantages and disadvantages of Proposed Modification 2 were considered by the Proponent and these are set out below.

3.2.1 Advantages

- Increased operational efficiency and reduced running costs with conveyor and chute transport mechanism in place of dump trucks.

- Reduced risk of injury to workers by removing the need for dump trucks to traverse the haul road within the quarry except for workers arriving or departing at the end of each daily shift.

- Reduced dust and greenhouse gas emissions from the Project.

- Reduced dust, noise and air quality impacts from the Project.

3.2.2 Disadvantages

Higher capital cost for Proponent.

3.2.3 Preferred Alternative

The Proponent considers that the advantages of Proposed Modification 2 outweigh its disadvantages

3.3 PROJECT BACKGROUND

3.3.1 EAR060239

EAR060239 canvassed two alternatives regarding the transportation of Waste from the WTS to Landfill at Section 2.3.7.

Option 1

Option 1 involved using dump trucks to transport material to landfill, via the in-pit road.

Advantages

- More flexibility with regard to load-out and materials placement;

- Tried and tested at other landfill sites; and

- enables the proponent to make use of existing equipment (dump trucks) and avoid costly and complicated design, construction and maintenance of alternative transportation.

Disadvantages

- More extensive upgrade and maintenance requirement for in-pit road;

- more extensive dust mitigation required to address wheel generated dust; and

- costly to operate.

Option 2

The second option looked at for transport of waste to the landfill was to use a conveyor belt with waste load (whether as is coming from the conveyor or bagged) directed to a chute (or other similar transport mechanism) to send the waste material directly from the RRF to the landfill floor.

Advantages

- Reduction in wheel generated dust emissions;
- reduced labour requirement; and
- less extensive upgrade and maintenance requirement for in-pit road.

Disadvantages

- Anticipation of costly and complicated design required;
- Requirement for automation in the load-out stage; and
- Higher level maintenance and monitoring required.

3.3.2 Justification for Preferred Option in EAR060239

Option 1 was preferred in EAR060239 as it has been tested successfully at other sites and was thought likely to provide greater flexibility for operations. It was noted however:

> "Option 2 should not, however, be completely dismissed due to the benefits it may provide."

3.3.3 Understanding the Materials Receivable Process

Waste material will be delivered to the site by a combination of light, medium and heavy vehicles, with loads typically varying from approximately one to 40 tonnes (t) in weight.

The waste transporters will be required to ensure that incoming loads are covered prior to entering the facility.

All waste carrying vehicles entering the site will be weighed over Weighbridge. The loads will be classified at the weighbridge in accordance with DECCW's Material Composition Codes.

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

Non-complying loads identified e.g. putrescible, liquid and chemical waste, will be recorded as a rejected load and redirected off-site.

Depending on its constituent material, incoming vehicles will be directed to unload at the appropriate area as follows:

- segregated load: directly at the appropriate segregated stockpile either at the green/timber waste stockpiles or at the drop off zone (concrete, brick, ceramics, soils & sands);

- mixed load suitable to undergo the recovery process: the MPC. Small mixed loads which can be unloaded by hand will be directed to the hand unload area at the western end of the MPC. Larger mixed loads will be directed to tip at the MPC work floor; or

- material unable to be recycled at the site or separated i.e. waste with solid waste classification, asbestos waste, contaminated soils or loads that are so mixed they cannot be physically or economically separated: the WTS, or if it is a segregated load of asbestos or asbestos contaminated materials, potentially directly to landfill.

A spotter within the MPC will inspect all loads tipped to ascertain that the material conforms to the material classification and will identify any non-complying material missed at Check Point 1 Weighbridge. When the spotter identifies a non complying material during unloading, the vehicle will be reloaded with the non complying material, which will be recorded as a rejected load and will be directed off-site.

After unloading, vehicles will pass then be reweighed at Weighbridge 1 to calculate the net vehicle weight and thereby record the total weight of the load delivered, prior to exiting the site.

3.3.4 Sorting

Mixed loads delivered to the MPC/ WTS will be segregated where appropriate by material type and placed in adequate, appropriately labeled bays and bins for transport to appropriate areas for recycling, to landfill or off-site (as required).

The small loads unloaded at the hand unload area of the MPC will be sorted and placed into the segregated bays and bins by hand. Larger loads tipped at the work floor and which because of their size or the extent of the comingling are incapable of separation will be mechanically sorted by an automated screening and sorting mechanism.

Ferrous and non-ferrous metals recovered through the sorting process (generally by use of a magnet), as well as plastics and paper/ cardboard will be sorted, placed into bays and bins and stored until sold.

Recoverable goods capable of resale e.g. furniture items will be directed to the recoverable goods bay for resale or re-use.

Following sorting, other recoverable material will be retrieved from receptacles and placed within the appropriate stockpile to be processed.

The remaining 'unsalvageable' material will be loaded into a hopper then via conveyor for the sorting process. Any material remaining which is not segregatable or recoverable will be shredded.

The shredded residue will then be conveyed by covered conveyor from within the MPC building to the weighing silos at the head of the downhill conveyor.

3.3.5 Landfill Operation

All materials suitable for landfilling and incapable of being recovered, re-used or recycled will be directed to the landfill.

Dependent on the quantity of material received that is classified outright as unrecoverable, it is estimated that 20% to 35% of total material accepted onto the site will be sent to landfill i.e. 0.4 to 0.7 mtpa (based on maximum capacity intake).

In EAR060239 at Section 3.4.5 it was noted

> "All dump truck loads to the landfill will be recorded through Weighbridge 2. (Refer to Figure 3.3 of EAR 060239) The truck will travel down the haul road to the tipping area and return via the same route. Dust mitigation measures will be implemented along the haul road to the landfill, including watering of the haul road and use of onboard reservoirs on the site dump trucks to allow wetting whilst in motion. These measures are described in Section 9.5.2 of the EAR"

Under the Proposed Modification a covered conveyor would directly connect the MPC building with the Weighing Silos located at the position shown near the Quarry edge as seen in Plan Ref A101-4/F (refer Annex B).

Shredded residual waste and unsalvageable or un-recyclable material when shred will be transported via conveyor from the MPC building passing under the road via culvert and the material will then be emptied into the weighing silos.

The Silos or hoppers replace weighbridge 2 and themselves will be fitted with load scales and certified by the Department of Fair Trade.

When a hopper or silo reaches its established maximum weight the conveyor will be paused and weight will be automatically recorded for the purposes of DECCW records together with the time and date and classification and then the hopper will open, progressively feeding its contents onto the electrically powered downhill conveyor constructed at the position shown on the plan.

Each hopper will operate alternately so that when one is filling the other is emptying.

Material discharged from the hopper will be carried by the fully covered downhill conveyor and in turn empty into a covered chute down which the waste travels the remainder of the distance to floor of the quarry.

Then end of the chute will be fitted with a water spray and also a sock made of canvas or similar material in order to mitigate dust effects .

Waste will then be pushed around the landfill by bulldozer and compactor .

3.3.6 Asbestos Waste and Asbestos Contaminated Materials

Strict guidelines and procedures for the identification, storage, handling and disposal of asbestos waste and asbestos contaminated materials will be documented in the WMP for the site. Asbestos waste disposal will meet EPL conditions and Clause 42 of the Protection of the Environment Operations (Waste) Regulation 2005 NSW. During operation of the Project all staff will be trained in accordance with the Industry Asbestos Awareness Course and will receive regular retraining.

Asbestos waste will be identified by the classification and spotting process described in Section 3.4.1 of EAR060239. Complying waste containing asbestos removed from mixed loads will be quarantined and sent for disposal to landfill. Large waste loads containing only asbestos will be sent directly to landfill to minimise unnecessary handling of the waste.

Asbestos waste delivered to the site and bonded asbestos recovered from mixed waste will be wetted and sealed in heavy duty plastic bags, in accordance with licence requirements. Upon receipt (if asbestos is in small quantity (small sealed bags) capable of being handled), bagged asbestos waste will be placed in designated clearly labelled, leak proof, sealed containers at the WTF for disposal at the landfill, and in accordance with procedures to be included in the WMP. Where practicable, stabilised asbestos waste received at the site that is in bonded matrix form and soil contaminated waste will be kept covered at all times.

Asbestos waste sent to landfill will be placed to a depth of at least 0.5 m from the landfilled surface on the same day it is received. Loads which have some loose fibres or are friable will require separate burial and accordingly will be placed in pre-prepared trenches and immediately covered.

They will be unloaded in such a manner as to avoid creation of dust. All asbestos waste processed at the site will be in accordance with the DECCW asbestos waste requirements for a general solid waste (non putrescible) licensed landfill.

Asbestos waste will not be shredded and will not be handled in any way within the WTS except under the most stringent conditions applicable to bagged waste. Asbestos waste will still be trucked to the base of the Quarry

3.3.7 Air Quality

This section presents the outcomes of the air quality assessment undertaken for the Project, which assessed the potential for dust and odour emissions from the Project to impact air quality of the surrounding community. Measures are included to ensure identified potential impacts are appropriately managed.

An air quality assessment was undertaken for the Project, addressing both construction and operational activities. The key contaminants identified for consideration in this assessment were:

- total suspended particulates (TSP);
- particulate matter less than 10 microns (PM_{10}); and
- odour.

Background air quality is a measure of the existing air quality, prior to the commencement of Project activities. Existing air quality is an important consideration when determining cumulative impacts of the Project on sensitive receivers.

3.3.7.1 Impact Assessment

The main air quality issues identified in association with Project operations are related to particulate matter and odour emissions to the atmosphere.

In EAR060239 the expert report concluded from modelling that Particulate matter emissions will be generated from the following sources during operations:

- vehicles travelling to and from the site (along paved roads);
- dumping, loading, sorting, screening and crushing of materials;
- dump truck movements along the in pit haul road (unpaved); and
- wind erosion of the exposed landfill area and stockpiles.

To assess the potential range of air quality impacts throughout operations, three modelling scenarios were adopted, representative of Years 0, 13 and 20 of operations (refer to Table 3.1 below).

Annual dust emissions from each of these sources were estimated, taking into account air pollution controls proposed as part of the Project design, including

watering of stockpiles, load-out points and haul routes, with dust emissions reduced according to NPI control factor estimates.

The modelling of dust impacts was conducted on the 'worst case scenario' being landfilling of 1 mtpa of waste resulting in the highest predicted number of vehicles accessing the haulage road which is an unsealed road. The Consent granted 22 November 2009 ultimately provided for a maximum landfill of 0.7mtpa.

The traffic data spreadsheet adopted a convention that 296,800 movements referred to as 148,400 trips to the site plus 148,400 trips from the site would occur per annum. Based upon these traffic volumes dust dispersion modelling assumed that there were 148,400 vehicles coming to the site and then 148,400 vehicles leaving the site.

The maximum amount of waste to be transferred to the landfill being 1mtpa was selected over the 0.4mtpa as the best case scenario since the total dust emissions were determined to be higher for the 1 mtpa, providing for a more conservative assessment.

Dust emissions for the 1 mtpa to landfill scenario were approximately 195 t/y while the 0.4 mtpa to landfill estimate was estimated to be approximately 139 t/y. Therefore, the waste landfilled was more important for the dust emission estimates as this activity would be over unsealed haul roads.

It should be noted that the traffic report identifies a minimum and maximum range of traffic accessing the site of between 296,800 - 340,200 vehicle movements/annum. The traffic report assess the worst case scenario for traffic based on the maximum number of vehicles accessing the entire site, this includes vehicles accessing the sealed roads around the MPC, stockpile areas, administration building and the landfill.

It should be noted that only vehicles movements on the unsealed haulage road down into the pit represents the worst case for dust.

The worst case for vehicles movements accessing the haulage road is not based on the maximum number of vehicles accessing the site but on the worst case scenario for landfilling being 0.7 mtpa.

Therefore even if the number of vehicles accessing the site increases in the traffic report to present the worst case for impacts on the transport network these additional vehicles will be moving along the sealed roads and not down into the pit because movements into the pit will always be restricted to landfilling of 0.7 mtpa as the worst case scenario.

Table 3.1 Estimated Dust Emissions from proposed Operations

ACTIVITY	TSP emission rate (kg/y)		
	Year 0	Year 13	Year 20
Vehicles coming to site (paved)	20,776	20,776	20,776
Dumping material at MPC or segregated stockpile	3,757	3,757	3,757
Dumping material at WTS	2,254	2,254	2,254
Loading material by FEL for processing	3,757	3,757	3,757
Loading and sorting material by excavator	12,523	12,523	12,523
Screening material	3,938	3,938	3,938
Crushing material	270	270	270
Loading material to stockpiles	6,262	6,262	6,262
Loading material to trucks	10,019	10,019	10,019
Hauling material to landfill (unpaved, inc return)	92,312	27,694	23,078
Vehicles leaving site (paved)	20,776	20,776	20,776
Dumping material to landfill	10,019	10,019	10,019
Wind erosion from exposed landfill area	7,247	7,247	7,247
Wind erosion from soil stockpiles	412	412	412
Wind erosion from other stockpiles	329	329	329
Total dust (kg)	194,651	130,032	125,417

Road haulage to landfill was identified to be the most significant dust generating activity. Therefore, particulate matter emissions are highest during the initial stages of operations, when the haul, distance to the base of the pit is greatest. In practice, dust emissions will be controlled by measures outlined in Section 9.5.2 of EAR060239 to reduce this source of dust to the minimum practicable.

It was noted in Table 9.3 of EAR060239 that the ground level concentrations of particulate matter at receivers will decrease as landfilling progresses closer to the surface and in-pit haul distances decrease.

3.3.7.2 Particulate Matter

A number of management and mitigation measures are proposed to reduce particulate matter emissions generated by the Project:

- all operating internal roads outside of the pit, and operational areas at the RRF, will be sealed;
- water spray mists and/or sprinkler systems to be used for dust suppression as follows:
  - at crushing, grinding and chipping operations;
  - along perimeter berms
  - at all material stockpiles;

- along internal unsealed haul roads, applied by water cart at an application rate of at 1 - 2L/minute;

- use of onboard reservoirs on the site dump trucks to allow wetting whilst in motion;

- wetting of vehicles with potentially dusty loads, prior to unloading;

- construction of perimeter berms approximately 10m in height around the main area of operations to provide a barrier for dust emissions;

- planting of trees in berms, which when mature will serve as further mitigation of off-site dust emissions;

- cleaning spills of potentially dust materials immediately;

- regular cleaning of paved roads;

- consideration to application of binding agents to pit haul roads if required; and

- wheel wash for all vehicles travelling off-site.

In practice, the dust emissions are likely to be controlled beyond the level assumed in the modelling, however given that the air dispersion modelling has highlighted the potential for short-term air quality impacts to occur, the operations will need to adopt best practice mitigation measures.

The emissions due to haulage would be eliminated by the use of the covered conveyor, reducing the overall emissions from the site to approximately 103 t/y (53% of modelled emissions) in the initial year of operations, as opposed to 195 t/y with haulage. In Years 13 and 20, the dust emission due to haulage is around 20% of the anticipated total emissions reported in EAR060239.

The conveyor is covered and conveying is not therefore anticipated to be a significant source of dust emissions. The conveyer loading point is also enclosed within the MPC building, it is not considered to be a source of dust.

Prior to this proposed modification, it was anticipated that exceedance of the DECCW criteria for 24-hour average PM10 may occur on around 4 days per year (with background levels at 20 µg/m3). It is anticipated that the likelihood of exceedance of this criteria will be significantly reduced by this use of a conveyor to transport waste to the bottom of the landfill.

As noted in EAR060239, the predicted levels of annual average deposited dust, TSP and PM10 due to the proposed landfill, prior to this modification, were within the DECCW criteria. Therefore it can be concluded that the modified landfill, which is anticipated to create significantly less dust, would also meet these criteria.

This modification is not relevant to odour and is therefore not anticipated to have any significant affect on odour emissions from the proposed operation

3.3.8 GreenHouse Gas Emissions

Emissions of greenhouse gases will result primarily from activities associated with the Project that consume energy.

In the context of this assessment, greenhouse gas emissions refer to the six direct greenhouse gases regulated by the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol:

- carbon dioxide (CO_2);
- methane (CH_4);
- nitrous oxide (N_2O);
- hydrofluorocarbons (HFCs);
- perfluorocarbons (PFCs); and
- sulphur hexafluoride (SF_6).

The Project will consume energy and release greenhouse gases, predominantly carbon dioxide (CO_2) through the combustion of fossil fuels. In addition, some methane will be generated from composting and landfilling operations, however this is expected to be minimised through the RRF which will divert for reuse materials that might otherwise be landfilled and contribute unnecessarily to methane production.. Greenhouse Gas Legislation and Guidance

The two international frameworks addressing the issue of climate change are the UNFCCC and the Kyoto Protocol.

These frameworks guide the reporting of greenhouse gas emissions internationally, and form the basis of the approach to estimating greenhouse gas emissions. Other relevant legislation and standards include:

- World Resources Institute (WRI) The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, 2004;
- National Greenhouse Accounts (NGA) Factors (available at http://www.greenhouse.gov.au/workbook/);
- Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2005 series;
- AGO (2005) National Greenhouse Gas Inventory;

- State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007; and

- 2002 Draft NSW Energy and Greenhouse Guidelines in EIA (Department of Infrastructure Planning and Natural Resources, Department of Energy, Utilities and Sustainability).

These documents provide further guidance with respect to estimating and assessing impacts of greenhouse gases.

3.3.8.1 Global Warming Potential

The global warming potential of various gases has been defined as the warming effect relative to CO_2. The purpose of this is to enable comparison of the effects of individual substances on the climate. This enables the effect of the various greenhouse gases to be converted into the equivalent quantity of CO_2 required to give the same effect in absorbing solar radiation ($CO_{2\text{-}e}$).

The various greenhouse gases absorb radiation at different wavelengths and with different efficiency. Further, the lifetime of the gases in the atmosphere must be taken into account, as the longer they remain in the atmosphere, the greater their overall effects. The lifetime chosen to express global warming potential is typically 100 years.

The National Greenhouse Accounts (NGA) Factors, 2008 adopts the following Intergovernmental Panel of Climate Change (IPCC) 1996 global warming potential values for a 100-year time horizon:

- carbon dioxide: 1

- methane: 21

- nitrous oxide: 310

- hydrofluorocarbons: 140 – 11,700 (depending on the molecule)

- perfluorocarbons: 6,500 – 9,200 (depending on the molecule)

- sulphur hexafluoride: 23,900

Using these values, CH_4 therefore has a global warming potential 21 times greater than CO_2 and N_2O 310 times greater than CO_2.

3.3.8.2 Direct and Indirect Emissions

Emissions of greenhouse gases from the facility can be categorised as 'direct' and 'indirect' emissions.

The National Greenhouse Accounts (NGA) Factors, 2008 adopts the emissions categories of the international reporting framework of The Greenhouse Gas

Protocol: A Corporate Accounting and Reporting Standard (WRI/WBCSD). These emission categories are as follows:

- **Scope 1** covers direct emissions from sources within the boundary of an organisation such as fuel combustion, manufacturing and landfill processes.

- **Scope 2** covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation. Scope 2 emissions result from the combustion of fuel to generate the electricity, steam or heat and do not include emissions associated with the production of fuel. Scopes 1 and 2 are carefully defined to ensure that two or more organisations do not report the same emissions in the same scope.

- **Scope 3** includes all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned, or controlled, by the organisation.

Sources of greenhouse gases from the Project include:

- Scope 1 or direct emissions will result from the combustion of fossil fuels (e.g. diesel and fuel oil) in equipment used on site, and from decomposition of organic material as part of landfill and composting operations.

- Scope 2, indirect emissions, will result from electricity consumption from processing, administration infrastructure and other associated activities on-site.

- Scope 3 emissions considered as part of this assessment constitute indirect emissions from associated off-site contractor road transport movements and the extraction of raw fuels to supply liquid fuels and electricity for use on-site.

Consistent with the methodologies described in EAR060239, Scope 3 emissions which are not included in greenhouse gas calculations for this assessment are:

- employee business travel;

- employees commuting to and from work;

- extraction, production and transport of other purchased materials and goods; and

- out-sourced activities.

3.3.8.3 Methodology

Emission factors for calculating emissions of greenhouse gases are generally expressed in the form of a quantity of a given greenhouse gas emitted per unit of energy (kg CO_2-e /GJ), fuel (t CH_4/l diesel) or a similar measure.

Emission factors are used to calculate greenhouse gas emissions by multiplying the factor (e.g. kg CO_2/GJ energy in petrol) with activity data (e.g. kilolitres x energy density of petrol used).

Table 3.2 details the greenhouse gas emission sources included in this assessment.

Table 3.2 Greenhouse Gas Emission sources included in this Assessment

Scope 1 –direct emissions	Scope 2 –indirect emissions from purchased energy	Scope 3 – other indirect emissions
Diesel combustion on-site (equipment usage)	Electricity Usage	Emissions associated with diesel consumption from transport of product
Decomposition of organic material in composting and landfill operations		Indirect emissions from fuel extraction and transmission line loss associated with electricity supply
		Indirect emissions from fuel extraction associated with diesel fuel supply

Of the emissions sources identified in Table 3.2, it is important to note that Scope 1 and 2 sources are those under direct management control of the Project. That is, measures can be implemented as part of the Project which will directly effect emissions associated with these sources e.g. in the case of electricity usage, through reducing consumption.

Scope 3 sources are not under direct management control and therefore the opportunity to reduce emissions from these sources is less direct.

The inclusion of Scope 3 emissions results in inconsistencies in international greenhouse gas emission reporting, in that it can result in 'double counting' of emissions. This assessment therefore provides emission estimates of Scope 3 emissions to provide context regarding these emissions and an indication of emissions magnitude with respect to Scope 1 and 2.

Table 3.3 details the emission estimates for Scope 1 sources.

Table 3.3 Scope 1 (Diesel Consumption) Emission Estimate

Diesel Emissions	Activity Level (Litres/ annum)	Emission Factor [1] (t CO_{2-e}/kL[2])	Estimated Emissions (t CO_2/annum)
Vehicles working in the vicinity of the landfill	455,760	2.7	1,231
Loader and excavators handling waste at transfer station.	132,000	2.7	356
Material processing centre PC and Hand Unload Area	520,140	2.7	1,404
Segregated Material Processing	485,760	2.7	1,312
Major Plant	344,000	2.7	929
Total			**5,232**

1. All emission factors from. National Greenhouse Accounts (NGA) Factors, 2008

Table 3.4 Scope 1 (Landfill) Emission Estimate

Landfill Emissions	Maximum Possible Activity Level (Tonnes of Waste/annum)	Emission Factor[1] (t CO_{2-e}/t waste)	Estimated Emissions (t CO_2/annum)
Commercial and Industrial Waste	700,000	1.66	1,162,000
Total			**1,162,000**

1. All emissions factors from National Greenhouse Accounts (NGA) Factors, 2008.

Assuming all waste is classified as Commercial and Industrial (C&I) waste, not a mix of C&I and Construction and Demolition (C&D) waste.

Assuming maximum predicted waste to landfill scenario.

As highlighted by Tables 3.3 and 3.4 above, emissions associated with material to landfill represents the most significant Scope 1 source of greenhouse gas emissions.

Diesel consumption associated with 'major plant' activities largely represents the on-site consumption of diesel to generate electricity. In the future this equipment may be connected to the electricity grid.

Methane emissions in one year depend on the stock of organic material present in the landfill, which has been deposited over many preceding years.

As described earlier, one of the key objectives of the Project will be to maximise recycling of biodegradable material and minimise the proportion to landfill. If it is considered that the final composition of material sent to landfill will be similar in nature to construction and demolition waste, an approximation of biodegradable material to landfill can be obtained from Australian Methodology for Greenhouse Gas Emissions and Sinks 2006 (Waste).

This information indicates that biodegradable material comprises approximately 11% of construction and demolition waste, and that over half of that is wood. Recent research on the decay of wood products in Australian landfills demonstrated that wood products may decay much more slowly than previously thought.

The NGA Factors 2008 provide weighted averaged emission factors for MSW, C&I and C&D. These are simplified categories which provide a representation of emissions from these wastes. The facility is anticipated to landfill between 0.4 and 0.7 million tonnes of waste annually.

On-site waste to be landfilled comprises a mix of C&I waste (NGA emissions factor 1.66) and C&D waste (NGA emissions factor of 0.25). Given the difficulty in determining ratios of waste types and total annual volume to be landfilled, the maximum predicted waste to landfill scenario (700,000 T/annum) and the highest emission factor (C&I waste: 1.66 t $CO_{2\text{-}e}$/t waste) has been used for the purposes of this assessment. Based on this highest emission scenario, it is estimated that the site emits 1,162,000 tonnes $CO_{2\text{-}e}$/annum.

Table 3.5 details the emission estimates for Scope 2.

Table 3.5 Scope 2 Sources Emission Estimate

Source (Electricity Consumption)	Activity Level	Emission Factor (t CO_2/MWh)	Estimated Emissions (t CO_2/annum)
Workshop	96 MWh / annum	0.893	86
Office, Amenities	5 MWh / annum	0.893	5
Pumps, Weighbridge, Sprinklers and Treatment	130 MWh / annum	0.893	116
Total			**207**

1. Scope 2 NSW & ACT emission factor for consumption of purchased electricity National Greenhouse Accounts (NGA) Factors.

Table 3.6 details the emission estimates for Scope 3, including fuel combustion from off-site transportation and indirect emissions associated with the extraction (and transmission loss in the case of electricity supply) of fuels to supply diesel and electricity.

Table 3.6 Scope 3 Sources Emission Estimate

Source	Activity Level[1]	Emission Factor	Estimated Emissions (t CO_2/annum)
Emissions associated with diesel consumption from transport of product	1,268,820litres/annum[3]	3.0 $tCO_{2\text{-}e}$/kl[4]	3,806
Indirect emissions for fuel extraction associated with diesel fuel supply	1,937,660 litres/annum	0.2 $tCO_{2\text{-}e}$/kl[5]	387
Indirect emissions for fuel extraction and transmission line loss associated with electricity supply	231/MWh annum	0.17 $tCO_{2\text{-}e}$/MWh[2]	39
Total			**4,232**

1. Assuming 30km round trip and consumption of 0.285 l/km AGO Factors and Methods Workbook 2006
2. Scope 3 diesel fuel combustion emission National Greenhouse Accounts (NGA) Factors.
3. Scope 3 diesel fuel combustion emission factor National Greenhouse Accounts (NGA) Factors.

Table 3.7 summarises the estimated Scope 1, 2 and 3 emissions. Diesel consumption at the site represents, by far, the most significant source of greenhouse gas emissions.

Table 3.7 Summary Greenhouse Gas Emissions

Source	Estimated Emissions (t CO_2/annum)	
Scope 1 – diesel consumption in on-site equipment and processing	5,232	
Scope 1 – Emissions from landfilling construction and demolition waste	1,162,000	
Total Scope 1		**1,167,232**
Scope 2 – electricity consumption	207	
Total Scope 2		**207**
Total Scope 1+2		**1,167,439**
Emissions associated with diesel consumption from transport of product	3,806	
Indirect emissions for fuel extraction associated with diesel fuel supply	387	
Indirect emissions for fuel extraction and transmission line loss associated with electricity supply	39	
Total Scope 3		**4,232**

Annual emissions of greenhouse gases (Scope 1 and 2) are estimated to be 1,167,439 $tCO_{2\text{-}e}$ per annum. Given the difficulty in determining ratios of waste types and total annual volume to be landfilled, the maximum predicted

waste to landfill scenario (700,000 T/annum) and the highest emission factor (C&I waste: 1.66 t $CO_{2\text{-}e}$/t waste) has been used for the purposes of this assessment. Based on maximum capacity intake, the greenhouse intensity of the project therefore equates to approximately 0.833 $tCO_{2\text{-}e}$/t of material received. It is expected that this estimate is an overstatement due to a significant amount of material being recycled, and a significant component of landfilled material being closer in nature to construction and demolition waste rather than construction and industrial waste.

These scope 1 and 2 emissions represents a contribution of 0.07% to the State's reported greenhouse gas emissions in 2005[2] and less than 0.02% of Australia's reported greenhouse emissions in 2005[2].

Based on the magnitude of emissions estimated from the Project, there will be no direct measurable environmental effect due to the emissions of greenhouse gases from the project. The effects of the emissions from the Project would be unmeasurable.

The effects of global warming and associated climate change are the cumulative effect of many thousands of such sources and it is the cumulative effects that ultimately bring about climate change.

This highlights the problem of dealing with climate change on a project-by-project basis. With the exception of ensuring that developments employ methods and equipment that are as energy efficient as possible.

The Project has identified the most energy efficient methods and equipment that can be applied at this facility and efficiency of equipment will be a key consideration in procurement of additional equipment. Greenhouse gas emissions and intensity of production will be monitored, through on-site consumption of diesel and electricity on an annual basis.

In addition, the composting of green waste, rather than disposal in a landfill, reduces the generation of methane emissions and promotes the beneficial use of green waste.

3.3.8.4 Minimising Energy Consumption and Greenhouse Gas Emissions

To ensure that energy consumption and greenhouse gas emissions are minimised, the following management measures will be undertaken:

- efficiency of all new mobile and fixed equipment will be considered during procurement for both diesel and electric powered equipment;

[2] NSW reported emissions of 158,248,820 tCO_2 and Australia reported emissions of 559,074,490 tCO_2. Reporting year 2005, Kyoto framework, Australian Greenhouse Emissions Information System http://www.ageis.greenhouse.gov.au/

- an internal review will be conducted annually to identify techniques to minimise energy use and assess if equipment is operating at optimum energy levels;

- equipment will be maintained to retain high levels of energy efficiency; and

- the inventory of emissions developed for this assessment will be regularly updated and maintained.

These greenhouse mitigation and monitoring programs will be used throughout the life of the Project.

Energy use from the site is not expected to result in equivalent stationary energy consumption in excess of 10 GWh per year. Therefore, the development of a Energy Saving Action Plan is not required.

3.3.8.5 Conclusions

Greenhouse gas emissions will result primarily from activities associated with the Project that consume energy. When compared to the reported greenhouse gas emissions for 2005, the Project is predicted to contribute less than 0.003% of NSW annual emissions.

The proposed modification is expected to reduce greenhouse gas emissions from the Project by ,

(a) more efficiently being able to remove biodegradable material, woodwaste and paper in particular from the landfill waste stream,

(b) removing from GHG calculations those contributions attributed to the use of dump trucks to convey waste to landfill.

3.3.9 Geotechnical Considerations -Pit Wall Stability

The upper slopes of the quarry pit (four to five bench levels) comprise sediments (predominately shale, with a strong sandstone bed in the upper part of the east and west walls) (Pells Sullivan Meynink Pty Ltd, 2006). Slopes in the lower part of the pit are comprised of volcanic breccia.

Pells Sullivan Meynink Pty Ltd (2006) conducted an assessment of long term risks associated with the quarry. The predominant risk identified was potential instability of the near surface slopes. The shale slopes are prone to slow degradation, which results in loss of bench crest, subsequent narrowing of the overlying berm and shale rill accretion at the bench toe below. This can potentially create a rill slope and eventually result in outward lateral migration of the quarry crest location. The distance from the crest to where future cracking and/ or failure may extend to is shown in Figure 15.1 of EAR060239. Where the strong sandstone bed occurs (in the east and west walls), undercutting by the degrading shale could result in the potential for

sudden failure of the undercut sandstone and block fall out. In addition, there is a large block on the point of fall out in the upper north wall.

A moderate scale instability occurred in the upper north wall in 2001 (refer Photograph 15.1 in EAR060239), primarily triggered by surface water. The ground surface has been reshaped to direct water away from the back of the failure. However, it is anticipated that further break up of the large blocks and washing out of fines from the failure mass will result in the majority of the failed material moving to the catch bund, which was constructed directly below the failed mass. In the longer term there is potential for incipient structures nearby to open up and increase the extent of the instability.

With regard to the lower pit slopes, there is evidence of undercutting of the toe of the east wall, which could result in long term failure of the bench. The lower breccia walls have largely been developed by pre-splitting, are generally steep and show evidence of ongoing degradation. Therefore there is potential for rock falls, the majority of which are likely to be minor and caught by berms. However, as is typical of hard rock mining, there is a risk of some rocks not being caught on the berm. There is also some potential for block fall-out, particularly near the breccia/ sediment contact.

3.3.9.1 Impact Assessment

Potential instability of the steep pit walls poses a potential risk to development near the quarry crest and for rock falls in several areas of the quarry. Jeffery and Katauskas Pty Ltd (2008) (refer Appendix K of EAR060239) assessed the condition of the pit wall and summarised the risks in Table 3.8 below.

Table 3.8 Quarry Slope Types and Typical Instabilities

SLOPE TYPE	TYPICAL IDENTIFIED FORMS OF SLOPE INSTABILITY	COMMENTS
SHALE/SOIL	Weathering and erosion of slope face leading to formation of 'talus' slopes at the base of the face.	Benches and catch bunds satisfactorily collecting debris
SHALE/SOIL WITH LANDSLIP FEATURES	Near surface rotational failures within steep soil (including fill) and weathered shale slopes.	Smaller features contained on berm below. Larger features within the upper quarry slope have breached the catch bund.
SHALE WITH SANDSTONE 'CAP'	Preferential weathering and erosion of shale below sandstone cap leading to undercutting of sandstone and collapse of blocks of sandstone.	Blocks and material captured by catch bund at base of slope.

SLOPE TYPE	TYPICAL IDENTIFIED FORMS OF SLOPE INSTABILITY	COMMENTS
XW BRECCIA	Weathering and erosion of slope face leading to formation of 'talus' slopes at the base of the face. Occasional near surface slumping also evident.	Material collecting over about a 3m width extending out from the base of the face.
FRACTURED BRECCIA	Weathering and erosion of fractured faces leading to localised collapse of near surface of face.	Material collecting over about a 2m width extending out from the base of the face. Blocks less than 1m maximum dimension.
INTACT BRECCIA	Spalling of isolated blocks of rock (defect controlled). Localised sliding failure of distinct wedges formed by unfavourable orientated defects.	Site experiments indicate blocks come to rest within 2m of the base of the face below. Blocks less than 1m maximum dimension typically observed.
NORTH FACE LANDSLIP	Near surface slumping at the contact between the breccia and shale. Likely to have been controlled by increased rates of weathering concentrated along the contact defect leading to strength reduction together with increased pore water pressures within the slope. Landslip material continues to travel downslope and collect in the berm below (RL85m). Larger blocks within the landslip degrading. Backscar regressing – tension cracks have developed in the haul road since last PSM visit in December 2007.	PSM have been providing advice to Hanson over a number of years since the original slump occurred in 2001. Berm and catch bund below (RL85m) full of debris. Larger blocks (maximum dimension about 1.5m) roll downslope, 'overtop' the catch bund and impact haul road below.

- Table sourced: Jeffery and Katauskas Pty Ltd (2008) Geotechnical Quarry Slope Stability Assessment Existing Quarry, Archbold Road.

3.3.9.2 Management/ Mitigation Measures

Jeffery and Katauskas Pty Ltd (2008) identified mitigation measures for reducing risk impacts associated with the identified quarry slope types in Table 3.8. The key mitigation measures are discussed below and are summarised within Table C of the Jeffery and Katauskas Pty Ltd (2008) Geotechnical Quarry Slope Stability Assessment Existing Quarry, Archbold Road contained within Volume 2 of EAR060239. The mitigation measures include:

Catch Bunds:

- the existing catch bunds adjacent to the haul roads are to be cleared of debris;

- any new haul roads accessing the pit to have catch bunds provided; and
- benches above the haul road within the quarry should be provided with catch bunds to control debris that may otherwise impact on the haul road.

Safety Bunds and Haul Road Drainage:

- safety bunds along the haul roads to be maintain and repaired were required;
- any existing roads above the quarry (such as the access road that passes close to the southern crest of the quarry) should be provided with similar safety bunds;
- safety bunds to be provided along the downslope side of the proposed access road leading down into the pit from the access point at the north-western corner of the pit; and
- the haul road should be re-graded to direct surface run-off to the bases of the adjacent high side of the haul road face.

Slope Re-grading:

- over the western and south-eastern corners of the quarry crest, sandstone capping to shale slopes is likely to collapse over time. The impact on the crest areas may be controlled in one of two ways;
- lay back the sub-vertical sandstone face to an angle of 45^0. Provide a new safety bund set-back of 1 metre from the crest of the new slope;
- provide a new safety bund set-back of 1 metre from the trace of the zone of influence line project up from the base of the sandstone face at an angle of 45^0; and
- relocate existing power poles to align with the access point to site and weighbridges.

Landslip re-profiling along the northern quarry face:

- landslip was identified along the northern quarry face. The landslip debris would need to be cleared and the crest area of the landslip re-profiled. The re-profiling would impact on the existing fill slope to the north, the shale and soil slopes above and the proposed access road into the quarry leading down from the RRF;
- the expected on-going movement of the landslip will need to be monitored. It is recommended that two inclinometers are installed in boreholes and monitored on a monthly basis and after prolonged or heavy rainfall events; and

- the tension crack noted in the haul road should be backfilled to prevent ingress of water into the landslip.

Scaling off:

- the fractured breccia faces and intact breccia faces adjacent to the haul road should have all potentially loose blocks and fragments scaled off prior to commencement of landfilling; and

- a geotechnical inspection should be undertaken every 6 months to monitor the pit walls and any scaling off of loose material undertaken during 6 monthly inspections.

3.3.9.3 Conclusions

The steep pit walls are potentially unstable which poses a potential risk to any development near the quarry crest and for block fall out and rock falls in several areas of the quarry.

This risk can be managed by measures outlined in Section 15.5.3 of EAR060239 including stabilising pit walls prior to commencement of in-pit activities. In the longer term, filling of the pit will eliminate this risk.

The operational activities of the RRF and landfill will be undertaken in accordance with the relevant and applicable occupational health and safety requirements to safeguard site staff, visitors, contractors and the public.

It is proposed that any construction associated with the weighing silos downhill conveyor and chute be the subject of appropriate certification from Qualified Geotechnical and Civil Engineers and that all constructions be to appropriate Australian Standards.

3.4 KEY ENVIRONMENTAL ISSUES RELATING TO MODIFICATION 2

3.4.1 Waste Management

This modification replaces the transport of waste from the MPC to the pit by dump trucks, with a conveyor and chute system. All waste passing from the MPC into the pit is weighed as part of the conveyor and chute system.

This modification will result in greater efficiencies in the waste management process.

All waste being transferred into the pit via the conveyor and chute system will have proceeded through the same materials screening process as would otherwise occur if the waste were to be transported into the pit by dump truck. All waste being transferred into the pit by the conveyor and chute system will be weighed as part of the automated process described above.

This modification will not adversely impact the waste management for the Project.

3.4.2 Surface Water Management

It is not expected that this modification will affect the surface water management of the Project.

3.4.3 Ground Water Management

It is not expected that this modification will affect the ground water management of the Project.

3.4.4 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

3.4.5 Air Quality

3.4.5.1 Dust

Truck generated dust from the haul roads within the Quarry was a significant factor in the Air Quality Modelling undertaken by the Proponent (refer Section 3.3.7 of this EAR). That factor is almost entirely removed by the use of the conveyor and chute.

At the egress point of the waste from the chute, the use of a sock, reduction in drop heights and targeted water mist sprays ensure that dust plumes often associated with tipping from open trucks will be almost wholly avoided.

This modification is expected to greatly reduce the amount of airborne particulate matter generated by the Project.

3.4.5.2 Odour

It is not expected that this modification will affect the odour generated by the Project.

3.4.6 Noise

The electrically driven conveyor removes the noise expected to be generated by the Dump Trucks.

The MPC building will also provide a noise buffer for the power generation during the operation of the conveyor. Any noise generated from the conveyor activities will be less than those from the haul trucks.

3.4.7 Traffic and Transport

The conveyor and chute system will eliminate the need for dump trucks to drive in and out of the pit but otherwise is not expected to affect the traffic and transport management of the Project.

3.4.8 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project.

3.4.9 Flora and Fauna

The Project site is land immediately adjacent to and disturbed by 50 years of quarrying. Its predominant feature is the large earthen mounds of overburden material deposited during quarrying. There will be no natural vegetation remaining within the Project area and no areas outside of the Project area will be affected by this modification.

3.4.10 Aboriginal and Historical Heritage

The recommendations made by McDonald (2005) within the Heritage Conservation Strategy have been adopted. The Conservation Strategy did not identify any items of historical heritage significance at or adjacent to the site, on this basis no further archaeological investigations have been undertaken as part of this Project area and no areas outside of the Project area will be affected.

3.4.11 Hazards and Risk

Occupational Health and Safety for employees will be dramatically improved by implementation of the Conveyor and Chute avoiding the need for Dump Trucks to traverse the haul road within the quarry except for employees arriving or departing at the end of each daily shift.

Further in Jeffery and Katauskas it is opined that the geotechnical conditions at the Project site are suitable to support the proposed downhill conveyor and chute, and so no hazards or risk arise in this regard

3.4.12 Socioeconomic Impact

The conveyor and chute system will, as described above, reduce the generation of dust and noise by the Project. As discussed in Section 1.9.12 of this EAR, dust and noise issues are concerns which have been raised by the neighbouring residents of Minchinbury.

Eliminating the need for dump trucks will possibly result in fewer employment opportunities for local residents.

The Proponent considers that this modification will have a beneficial impact on the socioeconomic impact of the Project.

3.4.13 Greenhouse Gases

As discussed at Section 3.3.8.3 of this EAR, a significant proportion of greenhouse gas emissions for the Project results from the use of diesel dump trucks to transport waste into the pit. Greenhouse gas emissions generated by the Project are dramatically reduced by the almost complete removal of the need for dump trucks.

3.4.14 Fuel Usage

There is also a significant reduction in diesel usage within the Project as a result of this modification.

CHAPTER 4 - MODIFICATION 3

Modification - Two Way Traffic be Permitted on Road Designated "Fourth Avenue"

4.1 MODIFICATION DETAILS

Change traffic on Fourth Avenue from one-way to two-way as shown in Plan Ref A100-101-7/F (ref Annex B).

Fourth Avenue is a roadway 8 metres wide and able to cater for two way vehicle movements.

Operational studies concluded after the date of the Project Approval concluded that improved traffic and checkpoint control would be able to be achieved by the use of one centralised checkpoint for vehicles entering and leaving the Segregated materials drop off area.

The Environmental Effects are expected to be beneficial.

There is no change to the number of vehicles entering and leaving this area of the site and so Dust, Fuel Usage, Greenhouse Gases and Noise expectations are unaffected.

Closer control and inspection of vehicles their loads and contents assists in excluding unacceptable wastes from being tipped and thereby contaminating recycling feedstocks.

4.2 ALTERNATIVES CONSIDERED

The alternatives considered were to continue the Project in accordance with the Project Conditions or to lodge an application with DoP to modify the project in accordance with Proposed Modification 3 set out above.

The advantages and disadvantages of Proposed Modification 3 were considered by the Proponent and these are set out below.

4.2.1 Advantages

- Unacceptable wastes which were not discovered at the first checkpoint inspection or the weighbridge may be better able to be discovered just prior to or when the vehicle is tipping. If unacceptable materials are discovered then they may more easily be excluded.

- Occupational Health and Safety for employees and members of the public are expected to be improved by the implementation of tighter traffic controls and by enhanced checking of waste materials.

4.2.2 Disadvantages

In the opinion of the Proponent there are no disadvantages to this proposed modification.

4.2.3 Preferred Alternative

The Proponent considers that the advantages of Proposed Modification 3 outweigh its disadvantages

4.3 PROJECT BACKGROUND

The main internal circulation roadways from the MPC will operate with a one-way traffic flow with two-way connectors to/from the drop-off zone and landfill etc. It will be appropriate for advisory (directional) signage as well as regulatory (one-way etc) signage to be provided including a 20kph speed restriction.

The design of the access roads, maneuvering and carpark areas will be suitable for the intended traffic movements and will comply with AS 2890.1 and 2, Austroads, and Council's Development Control Plans. These design requirements have been included within the Statement of Commitments in EAR060239 and the Statement of Commitments in this EAR.

This Section provides an assessment of impacts of the Project upon traffic and transport, taking into consideration the existing traffic conditions and predicted traffic generation for construction and operation. Mitigation measures are included to ensure identified potential impacts are appropriately managed.

4.3.1 Internal Site Circulation

Subject to the proposed modifications set out in this EAR, the proposed internal road system is identified on the Site Layout Plan (refer Figure 1.1) and will involve a system of 8 metre wide roadways providing access to the various elements of the development including weighbridges, workshop, Materials Processing Centre, Waste Transfer Station, waste drop-off zone, landfill, administration building and parking areas.

The roadways have been designed to rationalise and facilitate the 'flow' of materials. The main circulation roadways from the MPC will operate with a one-way traffic flow with two-way connectors to/from the drop-off zone and landfill etc. The proposed arrangement represents a very 'logical', efficient and relatively conflict free system for vehicle activity.

To facilitate traffic management and to observe occupational health and safety requirements, it will be appropriate for advisory (directional) signage as well as regulatory (one-way etc) signage to be provided including a 20kph speed restriction.

The design of the access roads, maneuvering and carpark areas will be suitable for the intended traffic movements and will accord with the requirements of:

- AS 2890.1 and 2;
- Austroads;
- NSW WorkCover; and
- Council's Development Control Plans.

There is no cross over of traffic proposed between Hanson's facility and that of the proponent. Hanson accesses its asphalt area from within its own site and not via the proponent's road.

4.3.2 Mitigation Measures

Assessment in relation to the potential traffic implications of the proposed redevelopment has concluded that the internal access and external road systems will be suitable for the traffic needs and circumstances related to the Project. This outcome is largely due to:

- the existing provisions for the historical uses on the site involving heavy vehicle activity; and
- the traffic generation outcome with the proposed development being of a relatively low order and significantly less than that foreseen in the studies undertaken for the planning of the road system to serve development in the area.

Nonetheless, there are a number of amelioration measures relative to each element of access and circulation which will be necessary to ensure appropriate and safe traffic outcomes.

4.4 KEY ENVIRONMENTAL ISSUES RELATING TO MODIFICATION 3

4.4.1 Waste Management

This modification will allow for closer inspection and control of vehicles their loads and contents and will assist in excluding unacceptable wastes from being tipped and thereby contaminating recycling feedstocks. Otherwise it is not expected that this modification will affect the waste management of the Project.

4.4.2 Surface Water Management

It is not expected that this modification will affect the surface water management of the Project.

4.4.3 Ground Water Management

It is not expected that this modification will affect the ground water management of the Project.

4.4.4 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

4.4.5 Air Quality

As traffic volumes will not be affected by this modification, the movement of two-way traffic on Fourth Avenue is not expected to generate any more dust than the movement of one-way traffic. This road will have a sealed road surface, as indicated in EAR060239.

This modification is not relevant to odour and is therefore not anticipated to have any significant effect on odour emissions from the proposed operation.

4.4.6 Noise

As traffic volumes will not be affected by this modification, the movement of two-way traffic on Fourth Avenue is not expected to generate any more noise than the movement of one-way traffic. The dominant noise source in the area is through traffic on the M4 motorway and Great Western Highway and so it is unlikely that the vehicles travelling on this internal road will be discernible above the existing traffic noise.

4.4.7 Traffic and Transport

This modification changes the movement of traffic on Fourth Avenue from one-way to two-way improving traffic controls but without any change in traffic volumes. Otherwise this modification is not expected to affect the traffic management of the Project.

4.4.8 Visual Amenity

There are no receivers with elevated views of the site. The visual character of the locality is variable with the site surrounded by urban areas of Minchinbury to the north and Erskine Park to the south-west, industrial development including Hanson Asphalt Batching Works to the south-east, and transport and utilities infrastructure including the M4 Motorway and an associated landscaped buffer adjacent to the north.

The Hanson site to the south-east of the quarry pit is the only receiver which can experience uninterrupted views across the area where the majority of operations are to be focussed. The other receptors views of the site are shielded by existing Cumberland Plain Woodland along to northern boundary

and 10 metre high earthen amenity berms designed along the north, south and western boundary of the operations area.

There are no visual effects which this modification could have on the surrounding amenity.

4.4.9 Flora and Fauna

The Project site is land immediately adjacent to and disturbed by 50 years of quarrying. Its predominant feature is the large earthen mounds of overburden material deposited during quarrying. There will be no natural vegetation remaining within the Project area and no areas outside of the Project area will be affected by this modification.

4.4.10 Aboriginal and Historical Heritage

The recommendations made by McDonald (2005) within the Heritage Conservation Strategy have been adopted. The Conservation Strategy did not identify any items of historical heritage significance at or adjacent to the site, on this basis no further archaeological investigations have been undertaken as part of this Project area and no areas outside of the Project area will be affected.

4.4.11 Hazards and Risk

Occupational Health and Safety for employees and members of the public are expected to be improved by the implementation of tighter traffic controls and by enhanced checking of waste materials.

4.4.12 Socioeconomic Impact

It is not expected that this modification will affect the socioeconomic impact of the Project

4.4.13 Greenhouse Gas

It is not expected that this modification will affect the greenhouse gas emissions of the Project

CHAPTER 5 - MODIFICATION 4

MODIFICATION 4 - THE CONSTRUCTION OF CONCRETE BAY WALLS WITHIN THE AREA DESIGNATED FOR RECEIPT AND PROCESSING OF GREENWASTE

5.1 MODIFICATION DETAILS

Concrete walls 2.5 metres high and spaced at various widths ranging from 4.5 metres to 16 metres to be constructed within the area designated for receipt and processing of greenwaste as shown in Plan Ref A100-101-5/F (ref Annex B).

The Environmental Effects are expected to be beneficial.

Each bay in use at any given time will be capable of being individually covered by a roll out cover in order to reduce the potential for odour and also reduce the generation of leachate.

Leachate during rain events can be more easily managed.

Each bay will be able to be fitted with aerobic equipment allowing the introduction of air during the maturation process, thereby enhancing and expediting the process and reducing the risk of odour.

5.2 ALTERNATIVES CONSIDERED

The alternatives considered were to continue the Project in accordance with the Project Conditions or to lodge an application with DoP to modify the project in accordance with Proposed Modification 4 set out above.

The advantages and disadvantages of Proposed Modification 4 were considered by the Proponent and these are set out below.

5.2.1 Advantages

- Reduction in windrow height
- Improved control of the material during maturation process
- Covering of the material
- Implementation of aerobic procedures to avoid odour
- Occupational Health and Safety for employees and members of the public are expected to be improved by the reduction in odour and leachate and also improved management prospects in the case of fire by being able to confine any outbreak within the bays in which they occur

5.2.2 Disadvantages

There will be a higher cost of construction to the Proponent for the addition of concrete bay walls in the greenwaste stockpile area.

5.2.3 Preferred Alternative

The Proponent considers that the advantages of Proposed Modification 4 outweigh its disadvantages

5.3 PROJECT BACKGROUND

5.3.1 Decision to Recycle Green Waste

In EAR060239 the Proponent considered two alternatives in connection with the management of Greenwaste.

Option 1 involved acceptance and recycling of green waste at the RRF which offered the following advantages and disadvantages

Advantages

- More flexibility in that a wider range of materials are able to be accepted;
- in keeping with the proponent's core business and enables the proponent to take advantage of green waste processing and environmental management experience developed at the Alexandria facility;
- maximises resource recovery undertaken at the facility, in line with NSW waste avoidance and resource recovery goals;
- recycling of green waste reduces greenhouse gas emissions associated with landfilling of biodegradable waste, by maximising recycling and recovery of these materials; and
- facilitates production of a valuable recycled product and generates revenue from its sale.

Disadvantages

- Potential odour issues which require management (refer Section 9.5.2 EAR060239); and
- additional cost and labour requirement associated with management of green waste.

Option 1 was selected as it facilitates a higher level of resource recovery at the site and is in keeping with DECCW goals of maximum resource recovery.

5.3.2 Stockpiling and Processing

In EAR060239 it was stated:

- Timber waste material will be chipped and stockpiled in windrows for blending and/ or testing and resale as woodchip.
- Green waste material will be shredded on-site and stockpiled in windrows of approximately 5000m^2.
- The windrows will be turned every two weeks, or as required if the temperature in the pile gets over 70 Degrees Celsius.
- The water collected from a sump at the green/ timber waste stockpiles will be re-circulated by pumping from the sump and allowing it to gently seep out of perforated pipes at several locations across the windrow, to aid in the green waste composting process.
- Any excess water will be directed to the leachate treatment system.
- After a resting period of eight weeks the product will be tested and ready for sale as mulch or blended e.g. with tested recycled or VENM soil to produce an organic soil mix and be available for sale.
- The odour minimising oxidizing agent, Biomagic, which is discussed in Section 9.5.2 of EAR060239 will be used to mitigate odour impacts associated with composting materials.
- No accelerants, putrescibles, biological materials or animal products will be used for the composting of green waste.

5.3.3 Relevant Consent Conditions

Schedule 3
Landfill Construction and Operation

Windrow management

The Proponent shall manage windrow composting operations in accordance with:

a) AS 4454-2003: Composts, Soil Conditioners and Mulches, Appendix n;
b) Best practice guidelines for Composting Systems;
c) the most protective level of measures set out in the Environmental Guidelines for Composting & Related Organics Processing Facilities; or
d) other practices approved by the DECCW/EPA.

Schedule 3
Waste

Limits on Input

The Proponent shall not:

a) landfill more than 700,000 tonnes of non-putrescible waste per calendar year;
b) receive or landfill putrescible waste on site;
c) stockpile more than 50 tonnes of tyres on site at any one time;
d) stockpile more than 20,000 tonnes of green waste on site at any one time.

5.3.4 Surface Water Management

Surface stormwater runoff generated on-site will be categorised as either 'clean' or 'dirty'.

Water Collected on the concrete hardstand area will be directed to a sump from where it will be collected and pumped into storage tanks for re-use within the greenwaste area.

The addition of low concrete windrow walls will have no adverse effect on leachate collection or management.

Individual windrows may be covered by retractable roll top covers which can be used to contain the windrow and exclude rainwater thus reducing the volume of leachate formed.

5.3.5 Odour

An air quality assessment was undertaken for the Project, addressing both construction and operational activities. The key contaminants identified for consideration in this assessment were total suspended particulates (TSP); particulate matter less than 10 microns (PM_{10}); and odour.

EAR060239 noted the Project may potentially generate odour from:

- capped areas of the landfill (no putrescible waste is to be land filled, however a small volume of biodegradable materials may be land filled which could produce odours over time);
- active tip face in the landfill;
- leachate trench in the pit; and
- composting of green waste on-site.

Odour emissions from each of these sources were estimated based on data from previous studies of odour emissions from similar sources. The odour emission estimates used for the assessment are considered to represent the "upper limit" of Project emissions, given the tight controls on materials that will be accepted for landfill, the low proportion of biodegradable materials and assumed maximum extents of odour emitting surfaces in the modelling.

Holmes (2008) (refer Appendix E of EAR060239) used estimated odour emissions from each identified odour source, meteorological information and the CALPUFF (Version 6.113) dispersion model to predict off-site odour levels from the Project. 1-hour average odour levels (expressed in odour units) were predicted at the receptor locations used for the dust modelling. Model predictions were then compared with DECCW odour assessment criteria (Refer to Table 5.1 below).

Table 5.1 Odour sources and emissions used in dispersion modelling

Source	Area (m^2)	SOER ($ou.m^3/m^2/s$)	SOER with peak-to-mean ($ou.m^3/m^2/s$)		TOER with peak-to-mean ($ou.m^3/s$)	
			Neutral (2.5)	Stable (2.3)	Neutral (2.5)	Stable (2.3)
Capped areas	220,000	0.00051*	0.0013	0.0012	280	258
Covered tip face	450	3.83	9.58	8.81	4309	3964
Greenwaste windrows	5,000	0.105	0.263	0.242	1313	1208
Leachate pond/trench	30	0.069	0.173	0.159	5	5

Odour modelling results are shown in Figure 10 of the Air Quality Report (Air Holmes Sciences, April 2008 – refer Appendix E of EAR060239) in the form of contour plots and show the extent to which odours are predicted to occur for 99% of the time. The contours extend further to the north and south, consistent with the predominant wind patterns in the area. It can be seen that the most stringent DECCW odour criteria of 2 odour units, which is considered to be acceptable for the whole population does not extend into any residential areas.

This indicates that adverse odour impacts from the Project would not occur.

Research indicates that during the composting/ biodegradation process most foul odours are generated when the material becomes anaerobic.

This can be mitigated by regular turning in order to make the material aerobic. The use of regulated windrows can facilitate the regular turning by mechanical means.

In this case however the Proponent intends using airblowers to ensure that biodegradation can occur more quickly and with much less odour than otherwise might be the case.

Each active windrow will have at its base a slotted pipe through which air will be pumped for not less than 4 hours per day during the initial composting period.

The windrow channel will be closed during this process to exclude unnecessary wetting, to contain odours and to accelerate the process.

The use of concrete windrow channels allows easier and more efficient management of the greenwaste process and is expected to reduce the incidence of the greenwaste becoming anaerobic.

The reduced incidence of anaerobic greenwaste anticipated by this modification will reduce the odour emissions from the Project.

5.4 KEY ENVIRONMENTAL ISSUES RELATING TO MODIFICATION 4

5.4.1 Waste Management

This modification improves the management of the green waste area as described in Section 5.2.1 of this EAR. Otherwise it is not expected that this modification will affect the waste management of the Project.

5.4.2 Surface Water Management

As this modification allows for the covering of the green waste materials slightly less of the rainfall received at the site will become leachate and will remain "clean" runoff. Otherwise it is not expected that this modification will affect the surface water management of the Project.

5.4.3 Ground Water Management

It is not expected that this modification will affect the ground water management of the Project.

5.4.4 Leachate Management

As described in Section 5.2.1 of this EAR, this modification will slightly reduce the amount of leachate produced in the green waste area. Otherwise it is not expected that this modification will affect the leachate management of the Project.

5.4.5 Air Quality

5.4.5.1 Dust

It is expected that this modification will either have no effect on the TSP and PM_{10} outputs from the Project as predicted in EAR060239 or else will reduce

the outputs slightly through reduced wind erosion of the greenwaste stockpiles when covered.

5.4.5.2 Odour

Odour from the green waste windrows was estimated in the Air Quality Impact Assessment in EAR060239 to be a significant proportion (22 percent) of the total odour emissions from the site; with green waste composting contributing approximately 1,200 ou.m3/s out of a total 5,907 ou.m3/s in neutral conditions and 1,300 ou.m3/s out of a total 5,435 ou.m3/s in stable conditions. Any improvement in odour emissions from green waste composting will therefore cause a further reduction in the likelihood of any unfavourable odour detections at residences, noting that predicted odour contours in the AQIA were already within DECCW criteria.

Without further modelling it is not possible to quantitatively predict the impact at residences from the construction of the concrete bay walls in the green waste area. A summary of available studies undertaken on the effectiveness of aeration and covering, however, has indicated that these controls, if employed, would have the potential to decrease odour emissions from the landfill. The practice of aeration and covering composting green waste is advocated in the relevant best practice standards and guidelines for composting (see Section 6.4.2 of PAE Air Quality).

Sustainability Victoria (2009) (see Section 8 of PAE Air Quality) recommends the use of aeration equipment in any composting situation, to prevent formation of anaerobic conditions.

The primary effect of aeration on the formation of odorous compounds is related to its impact on oxygen concentration. Oxygen concentration determines the biochemical process at work (anaerobic vs aerobic) and the compounds that form as a result. Odorous compounds that are a problem essentially only in anaerobic conditions include hydrogen sulfide and organic sulfides. Without oxygen, odorous compounds form and accumulate more readily and to a greater extent, increasing the intensity, unpleasantness and duration of the odours. Maintaining aerobic conditions can greatly reduce odour emissions (IWMB, 2007 (see Section 8 of PAE Air Quality)).

Several studies (within the mushroom industry, cited in Duns, 2004) have indicated that forced aeration may have varying degrees of effectiveness (ranging from 75-90%) in reducing odour emissions from composting materials. However, some studies (also cited in Duns, 2004 (see Section 8 of PAE Air Quality)) have shown that forced aeration can increase the levels of odorous compounds. It must be noted, however, that if compounds are continually or frequently dispersed at low concentrations, the dispersal may reduce their accumulation and lower the potential for problems when the composting mass is eventually disturbed (IWMB, 2007 (see Section 8 of PAE Air Quality)).

Sustainability Victoria (2009) (see Section 8 of PAE Air Quality) recommends covers on compost piles to minimise odour. According to the NSW DECCW Environmental Guidelines for Composting & Related Organics Processing Facilities (DEC, 2004 (see Section 8 of PAE Air Quality)), rapidly biodegradable organics (including grass clippings) should be covered, and the quantity of such material exposed to the atmosphere should be kept to a minimum. When rapidly biodegradable organics are in an active state during open-air handling and/or processing, they should be covered in order to reduce odour emissions. Material used for covering may be a gore-tex type fabric or simply the previous batch of compost or mulch prepared in the same area. The covering affords other benefits (summarised from DEC, 2004 (see Section 8 of PAE Air Quality)):

- Covering prevents the compost from getting too wet in the event of rainfall. When covered, the weather has less influence on the composting process, which means there will be better moisture control (Beyer, 2008 (see Section 8 of PAE Air Quality)). This ability to control the moisture content means an aerobic composting environment can be more easily maintained. As well as this, the covers limit run-on and infiltration of water, meaning there is less potential for odorous leachate to be formed as rainfall is kept out of the composting material. Whilst moisture is necessary for active decomposition, if too much moisture is present then water occupies the pore-spaces in the composting material, reducing the ability for oxygen to disperse throughout the compost (IWMB, 2007 (see Section 8 of PAE Air Quality)).

- Covering protects the composting organics from losing too much valuable heat and moisture.

- Covering makes it more difficult for vermin and vectors to get to the raw organics.

- Covering reduces fly propagation and rodent attraction.

- Covering controls and minimises the risk of fire.

- Covering minimises emission of biogas.

- Covering also decreases litter generation.

The main advantage of the concrete bay walls is therefore that it allows for the implementation of such measures as forced aeration and covers for the composting green-waste. Whilst some trial and error appears to be involved in perfecting the composting process with regard to odour, these measures allow more control over the process. It was not anticipated in EAR060239 that any adverse odour impacts due to the project would occur at nearby residences. Concrete bay walls themselves would do little to alter odour emissions from the landfill (which have already been predicted to lie within the DECCW criteria), however any subsequent composting controls employed, facilitated

by this modification to the proposed landfill, namely aeration and covering of the composting green-waste, would potentially reduce odour levels at residences.

5.4.6 Noise

It is not expected that the existence of this modification will affect the noise produced by the Project. The construction of the walls may involve some minor short term construction noise but would not be discernible above existing traffic noise and approved construction activities.

5.4.7 Traffic and Transport

It is not expected that this modification will affect the traffic and transport management of the Project.

5.4.8 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project.

5.4.9 Flora and Fauna

The Project site is land immediately adjacent to and disturbed by 50 years of quarrying. Its predominant feature is the large earthen mounds of overburden material deposited during quarrying. There will be no natural vegetation remaining within the Project area and no areas outside of the Project area will be affected by this modification.

5.4.10 Aboriginal and Historical Heritage

The recommendations made by McDonald (2005) within the Heritage Conservation Strategy have been adopted. The Conservation Strategy did not identify any items of historical heritage significance at or adjacent to the site, on this basis no further archaeological investigations have been undertaken as part of this Project area and no areas outside of the Project area will be affected.

5.4.11 Hazards and Risk

Occupational Health and Safety for employees and members of the public are expected to be improved by the reduction in odour and leachate and also improved management prospects in the case of fire by being able to confine any outbreak within the bays in which they occur.

5.4.12 Socioeconomic Impact

It is not expected that this modification will affect the socioeconomic impact of the Project.

5.4.13 Greenhouse Gas

It is not expected that this modification will affect the greenhouse gas emissions of the Project.

CHAPTER 6 - MODIFICATION 5

MODIFICATION 5 – RELOCATION OF DRIVE THROUGH WHEELWASH

6.1 MODIFICATION DETAILS

It is proposed that the drive through wheelwash which was to be located immediately south of the MPC building be relocated to the location shown on the Plan Ref A101-6/F (ref Annex B).

Vehicles entering and leaving the MPC building will do so only via concreted ramps and roads and will not acquire on their wheels any debris or dirt requiring washing off.

Vehicles collecting and being loaded with recycled hard fill materials; (soil, sand, brick and concrete) have an enhanced risk of accretion of material build up on tyres. The relocation of the wheelwash minimises the distance travelled with material build up on tyres. This in turn improves dust management and general cleanliness for the site.

6.2 ALTERNATIVES CONSIDERED

The alternatives considered were to continue the Project in accordance with the Project Conditions or to lodge an application with DoP to modify the project in accordance with Proposed Modification 5 set out above.

The advantages and disadvantages of Proposed Modification 5 were considered by the Proponent and these are set out below.

6.2.1 Advantages

- Reduced dirt on the sealed internal roads; and consequently
- Reduced generation of dust by vehicles travelling on the sealed internal roads.

6.2.2 Disadvantages

In the opinion of the Proponent there are no disadvantages to this proposed modification.

6.2.3 Preferred Alternative

The Proponent considers that the advantages of Proposed Modification 5 outweigh its disadvantages

6.3 PROJECT BACKGROUND

The Project originally included a wheelwash immediately south of the MPC to reduce the incidence of airborne particulate matter generated from dirt collected on the wheels of vehicles travelling onsite.

6.4 KEY ENVIRONMENTAL ISSUES RELATING TO MODIFICATION 5

6.4.1 Waste Management

It is not expected that this modification will affect the waste management of the Project.

6.4.2 Surface Water Management

It is not expected that this modification will affect the surface water management of the Project.

6.4.3 Ground Water Management

It is not expected that this modification will affect the ground water management of the Project.

6.4.4 Leachate Management

It is not expected that this modification will affect the leachate management of the Project.

6.4.5 Air Quality

It is expected that this modification is likely to result in a slight reduction in dust emissions from the site. The intention of this modification is to reduce the distance travelled by trucks on the sealed road after visiting the stockpile area before having their wheels washed. In the original design vehicles would need to travel approximately 200m along the internal site road before using the wheel-wash, bringing dust from the stockpile area onto the sealed road.

This modification is not relevant to odour and is therefore not anticipated to have any significant affect on odour emissions from the proposed operation.

6.4.6 Noise

It is not expected that this modification will affect the impact of noise emissions of the Project.

6.4.7 Traffic and Transport

It is not expected that this modification will affect the traffic and transport management of the Project.

6.4.8 Visual Amenity

It is not expected that this modification will affect the visual amenity of the Project.

6.4.9 Flora and Fauna

The Project site is land immediately adjacent to and disturbed by 50 years of quarrying. Its predominant feature is the large earthen mounds of overburden material deposited during quarrying. There will be no natural vegetation remaining within the Project area and no areas outside of the Project area will be affected by this modification.

6.4.10 Aboriginal and Historical Heritage

The recommendations made by McDonald (2005) within the Heritage Conservation Strategy have been adopted. The Conservation Strategy did not identify any items of historical heritage significance at or adjacent to the site, on this basis no further archaeological investigations have been undertaken as part of this Project area and no areas outside of the Project area will be affected.

6.4.11 Hazards and Risk

It is not expected that this modification will affect the hazards and risk of the Project.

6.4.12 Socioeconomic Impact

It is not expected that this modification will affect the socioeconomic impact of the Project.

6.4.13 Greenhouse Gas

It is not expected that this modification will affect the greenhouse gas emissions of the Project.

CHAPTER 7 - STAKEHOLDER CONSULTATION

The Proponent has not yet undertaken consultation with relevant government agencies and the local community in relation to the proposed modifications.

CHAPTER 8 - STATE LEGISLATION

8.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The EP&A Act provides the statutory framework for assessment of the Project.

The EP&A Act includes Part 3A, which provides a streamlined assessment and approval process for development that is defined as a Major Project. The Project is defined as a Major Project under Clause 75(b) of the EP&A Act. DoP confirmed on the 25 June, 2006 that the Project is to be classified as a 'Major Project' to which Part 3A of the EP&A Act applies.

The EAR considers the likely impact of the Project on the environment and has been prepared in accordance with environmental assessment requirements of Clause 75(F) and Clause 75(R) of the EP&A Act.

8.2 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The Protection of the Environment Operations Act 1997 (POEO Act) provides an integrated system of licensing for polluting industries. Schedule 1 of the POEO Act identifies types of development that require an Environment Protection Licence (EPL) for polluting industries and land uses.

Schedule 1 of the POEO Act identifies licensing requirements for the following activities:

Crushing, grinding or separating works that:

(1) process materials including sand, gravel, rock, minerals, slag, road base or demolition material (such as concrete, bricks, tiles, asphaltic material, metal or timber) by crushing, grinding or separating into different sizes, and

(2) have an intended processing capacity of more than 150 tonnes per day or 30,000 tonnes per year.

Waste facilities:

(1) A waste facility that is of any one or more of the following classes:

(a) hazardous, industrial, Group A or Group B waste processing facilities, being waste facilities that treat, process or reprocess hazardous waste, industrial waste, Group A waste or Group B waste (or any combination of those types of waste),

(h) solid waste landfill or application-sites, being landfill or application-sites that receive over 5,000 tonnes per year of solid waste or solid waste and inert waste,

(j) large-scale landfill or application-sites, being landfill or application-sites that receive over 20,000 tonnes per year of any waste.

Project activities will include crushing, grinding and separating of sand, gravel, rock, road base and demolition materials including bricks, concrete and tiles, with a processing capacity in excess of 150 tonnes per day. The Project includes a solid waste landfill which accepts up to two million tonnes of waste per annum, inclusive of solid waste. An EPL will be sought from the DECCW

8.3 CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICY NO. 59 – CENTRAL WESTERN SYDNEY ECONOMIC AND EMPLOYMENT AREA (SEPP 59)

Clause 10 of SEPP 59 includes a number of matters for consideration to be addressed by the consent authority. These matters are outlined in Table 8.1 below.

8.4 CONSIDERATION OF PRECINCT PLAN

Eastern Creek Precinct Plan (Stage 3)

Clause 12 of SEPP 59 requires the preparation of a Precinct Plan. The Eastern Creek Precinct Plan (Stage 3) prepared by Blacktown City Council applies to the Project site and came into force on the 14th December, 2005.

The Precinct Plan sets out guidelines for land use, built form controls, traffic and transport management, stormwater management, biodiversity conservation, heritage management and environmental management. Table 8.2 below provides an assessment of the Project against the provisions of the Precinct Plan.

Table 8.1 SEPP 59 Matters for Consideration

Matters for Consideration	Project
(a) the contribution the development makes to the economic development and the number and diversity of jobs in Central Western Sydney,	The project modifications have no application to this matter.
(b) the range of lot sizes and resulting ability to accommodate a wide range of employment-generating development including those uses which require large sites such as major distribution-sites,	The project modifications have no application to this matter
(c) the timing, location and design of the development having regard to the orderly provision of infrastructure and services,	The timing, location and design of appropriate servicing infrastructure including sewerage, gas, electricity and water shall be discussed with the relevant authorities.
(d) the remaining resources which are of a high quality, regionally significant and identified in Sydney Regional Environmental Plan No 9--Extractive Industry, should be extracted while economically viable,	Not applicable
(e) there should be an orderly and co-ordinated sequence of extraction and rehabilitation to achieve the progressive construction of landforms that are suitable for development as employment lands,	Not applicable
(f) housing choice will be achieved by a wide range of housing types and lot sizes, with an overall density within a Precinct of at least 15 dwellings per hectare to meet the principles of the compact city as described in Cities for the 21st Century, published by the Department of Planning in January 1995,	Not applicable
(g) development should be consistent with the principles of ecologically sustainable development which requires an active approach to anticipating and preventing damage to the environment, and where possible, ensuring that developments are planned in a way that enhances the environment.	The Project is consistent with ESD principles by proposing a suitable approach to rehabilitating the site in line with SEPP No.59. The Project will not adversely affect the surrounding natural environment nor will the Project adversely impact on the future development of the Eastern Creek Precinct as an employment hub for the future prosperity of the surrounding local communities. All environmental aspects of the Project including odour, surface water, groundwater, noise, etc have been assessed and management measures identified within the Statement of Commitment in order for the project to meet its environmental obligations in line with ESD.

Matters for Consideration	Project
(h) development should be consistent with Action for Air, the New South Wales Government's 25 year Air Quality Management Plan, published by the New South Wales Government in March 1998, including all aspects of air quality, from assessing emissions from a development to transport and land use considerations,	The Project has been assessed with respect to the relevant air quality requirements/ standards. (refer to Chapter 9 and Volume 2 of EAR060239 for the technical air quality report prepared by Air Holmes Sciences Pty Ltd dated April, 2008.)
(i) development should be consistent with the principles of total water cycle management, including minimising total water usage, minimising waste water requiring treatment and disposal, minimising stormwater impacts on the environment, and maximising water retention and re-use,	The Project is consistent with water use best practice and aims to provide the majority of its water needs by re-use of runoff captured on-site, and ensure any water to be disposed is treated to meet appropriate trade waste quality standards.
(j) development should be consistent with the principles of waste minimisation as set out in A Guide to the Waste Minimisation and Management Regulation, published by the Environment Protection Authority in 1996, and should ensure that waste is minimised through re-use, recycling and reprocessing, with disposal being the last resort option,	The Project involves recycling 65-80% of waste received, to ensure that the landfill is used as a last resort, after extensive sorting and processing within the RRF. This will ensure the longevity of the landfill and the appropriate management of received wastes from the building and construction industry, commercial and industrial sectors and private individuals.
(k) development should be planned to achieve maximum energy efficiency through such measures as building location, design and materials use, the selection of energy and water efficient building services, equipment and appliances,	The principles of energy efficiency are incorporated into the design of the buildings and facilities. The RRF is closely located to the existing quarry to ensure maximum energy efficiency in the handling and movement of material on-site. The buildings will be designed with pre-cast metal sheeting which is considered to be an appropriate building material for the proposed industrial use, to ensure the longevity of the buildings. Rainwater tanks are proposed for the collection and re-use of rainwater (refer to Chapter 6 of EAR060239).
(l) the conservation of items of heritage significance identified in this Policy or any other environmental planning instruments or subject to an order under the Heritage Act 1977,	Not applicable
(m) the conservation of significant bushland and other natural features,	Not applicable

Matters for Consideration	Project
(n) development should be planned to minimise impacts on areas of high biodiversity or Aboriginal heritage significance and should seek to enhance the values of these areas,	Not applicable
(o) the suitability of the site or part of the site for open space that will enhance and link the regional open space and special uses corridor and provide for the needs of the local community,	Not applicable
(p) the protection and improvement of the cultural landscape particularly that surrounding St Bartholomew's Church and Prospect Reservoir,	Not applicable.
(q) the range of permissible land uses, the design and layout of the site, and connections to existing transport networks should minimise vehicle kilometres travelled (VKT) while recognising the freight and transport requirements of the industry,	Not applicable
(r) development should provide for users of all modes of transport, including public transport, cycling and walking, with a recognition of the need to integrate the development into the surrounding network of each mode,	Not applicable
(s) the identification of freight links through the Greystanes Precinct from the land zoned "Employment" at Wetherill Park to the M4,	Not applicable
(t) the identification of links to the Transitway identified in Action for Transport 2010, an Integrated Transport Plan for Sydney published by the NSW Government in November 1998	Not applicable
(u) development should ensure that the environmental and social quality of existing and future residential areas are safeguarded and that, in particular, noise and vibration from quarry operations is minimised,	A noise impact assessment (Chapter 10), visual assessment (Chapter 12), assessment of hazards and risks (Chapter 15), air quality assessment (Chapter 9), traffic impact assessment (Chapter 11) and socio-economic impact assessment (Chapter 17) (being chapters in EAR060239) have been prepared to address environmental and social quality impacts of the Project.
(v) development should be designed and located to ensure the best possible urban design outcomes including landscape quality and visual character,	Not applicable .
(w) the scale and character of any development derived from an	Not applicable

Matters for Consideration	Project
analysis of the site, having particular regard for its character when viewed from the M4, or the environs of Prospect Reservoir,	
(x) development of the land will integrate community services with land use planning,	Not applicable.
(y) development of the land is to result in an attractive and safe built environment which satisfies a diverse range of community needs,	Not applicable
(z) the full range of human services and community facilities infrastructure appropriate to the changing needs of the community will be provided in a timely manner,	Not applicable .
(aa) the amenity of the region will be promoted through the provision of on-site services and facilities, and through complementing or augmenting existing service networks, (bb) equitable access to services and facilities will be promoted for all groups and individuals in the community, (cc) development will integrate the new community with existing adjoining communities, (dd) community participation will be encouraged in the identification of community services and facility needs.	Not applicable.

Table 8.2 Assessment of the Project against Requirements of the Eastern Creek Precinct Plan (Stage 3)

Precinct Plan	Project
Economic Development and Employment	
Objectives: (a) Establish a high quality industrial Precinct that provides diversity in employment opportunities and economic development to benefit Blacktown and Central Western Sydney.	The proposed works 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 employment opportunities within Western Sydney by providing diverse employment opportunities for roles including mechanics, weighbridge operators, plant operators, foremen, sales personnel, labourers and managers.
(b) 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 junction of the M4 Motorway and the M7 Motorway.	Not Applicable
(c) 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 presence of the RRF and landfill represents ongoing economic benefits to the local and regional community via capital injection and value added spending
(d) Enhance the skill of the local workforce through the provision of appropriate facilities for the training of apprentices, and ongoing training and development.	Staff employed at the RRF and landfill facility will be skilled labour and ongoing training will be provided where appropriate.
(e) Contribute to the increased levels of skill matching with the local workforce.	A skilled workforce will be required for the project and staff can potentially be sourced from the local community (refer Section 17.4.3 of EAR060239).
(f) Development should aim to achieve a minimum employment density target of 45	The recycling and landfilling activities of the Project will directly create jobs for 54 staff plus 10 contractors. 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,

Precinct Plan	Project
jobs per hectare in order to achieve the overall projected on-site employment forecast of approximately 20,000 jobs for the whole Precinct.	the nature of the area to be developed for this Project i.e. the quarry pit, is ideally suited to the operation of a landfill and RRF. Operation of these facilities require a specific skilled labour force, however do not require an employment density as high as 45 jobs/ha. The Project will not detract adjacent lands within the Precinct from achieving the desirable employment densities.
General Services	
Telecommunications, Gas, Water, Sewerage and Electricity will need to be provided to the specifications of the relevant authorities. There are no permanent water, sewerage or power supplies sufficient enough to cater for the future development of Stage 3.	No Effect
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 in EAR060239 and is detailed within Chapter 6 and Volume 2 Storm Consulting Assessment dated February 2008 of that document.
Extraction and Rehabilitation	
SEPP 59 (Amendment No 5) was gazetted on 7 May 2004 to insert clause 18(5) relating to the Pioneer quarry, stating that: "An extraction and rehabilitation plan referred to in Schedule 1 need not be prepared for land at Eastern Creek comprised of Lot 2 DP 262213, Lot 1 DP 400697, Lot W DP 419612 and Lot 11 DP 558723 before a Precinct plan is approved for that	Addressed in EAR060239

Precinct Plan	Project
land, but the consent authority is to have regard to such an extraction and rehabilitation plan before granting consent to any development on that land." 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 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.	Addressed in EAR060239
Environmental Management	
Ecologically Sustainable Development (ESD)Controls: (i) measures that will reduce waste and conserve water (by including water recycling);	Waste minimisation is discussed in EAR060239 in Chapters 3 for the management of the RRF and Landfill and in Chapter 16, for general waste management during construction and operational phases. Water conservation and waste water recycling for the Project is discussed in Chapter 6 of EAR060239.
(ii) measures to minimise run-off and stormwater generation;	Refer to Chapter 6 of EAR060239 which addresses surface water management.
(iii) 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;	Refer to Chapter 6 of EAR060239 which outlines total water cycle management.
(iv) utilising recycled materials and renewable building resources;	The Project includes a MPC and will recycle waste materials for redistribution, including the sale of recycled building materials.
(v) promoting biological diversity by measures which include increasing habitat through appropriate retention, planting and maintenance of native flora considered representative of the area;	Areas of native vegetation will be preserved on the site. Landscaping will include additional planting of native species. Refer to Chapter 12 of EAR060239 for further details.
(vi) implementing a waste management strategy and promoting the achievement of the 60 percent 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	An estimated 65 to 80% of waste materials received at the site will be recycled.

Precinct Plan	Project
(vii) implementing energy conservation measures that include reducing energy consumption and increasing inherent energy efficiency through design and materials selection, and adopting energy management plans.	The proposed site buildings including the administration building, workshop and MPC/ WTS have been designed to provide energy efficiency. Energy conservation is discussed further in Chapter 16 of EAR060239.
(i) complementing and reinforcing the development and use of the existing and planned integrated public transport, pedestrian and cycling networks servicing the site;	Public transport, pedestrian or cycling networks would not be appropriate transport networks to access or transfer waste to or from the site.
(ii) encouraging increased reliance on public transport and reduced reliance on private vehicles for journeys to work and other trips, so as to reduce vehicle kilometers travelled; (iii) providing levels of on-site parking aimed at reducing reliance on private vehicles for journey to work trips.	Not applicable, as public transport would be an inappropriate form of vehicular access to the RRF and landfill. Parking has been provided on-site to meet the needs of site staff and visitors and is discussed in Chapter 11 of EAR0239.
Water Conservation Controls: (a) Development should incorporate water efficient fixtures such as taps, showerheads, and toilet suites (cisterns and urinals). The fixtures must be rated to at least AAA under the National Water Conservation Rating and Labelling Scheme.	Water efficient fixtures and fittings will be installed during the construction phase of the Project.
(b) 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: (i) an integrated water collection and recycling system for capturing and recycling of roofwater; (ii) the re-use of greywater on-site; (iii) the capture and re-use of stormwater from the site; (iv) treating and re-using any process water generated by the development; and (v) controlling the quality of waste water and stormwater to be disposed.	The Site Water Management Plan is addressed in Chapter 6 and Volume 2 of EAR060239 which includes strategies for capturing and recycling of water on-site and water quality controls.

Precinct Plan	Project
Energy Efficiency:	
(a) Applicants are required to demonstrate appropriate use of energy efficient materials during construction.	Detail of the type of building materials to be used on-site will accompany the construction certificate stage of the development process.
(b) Development should be planned to achieve maximum energy efficiency in building design through measures including building location, internal layout, design and materials use, and the selection of energy and water efficient building services, equipment and appliances, and the use of landscape elements for microclimate control. These measures should aim to achieve: (i) optimal solar access and natural lighting; and (ii) optimal natural heating, cooling and ventilation.	Energy efficient appliances will be installed. Energy efficiency has been incorporated into the design of the buildings through the use of cross ventilation for heating and cooling. Location of the RRF close to the landfill will promote energy efficient by minimising the distance vehicles have to travel to and from the landfill.
(c) Development should incorporate energy efficient hot water systems, air-conditioning, and lighting and lighting control systems. (d) An Energy Performance Statement ('EPS') is to be prepared and lodged with all Development Applications, if not participating in SEDA's Greenhouse Rating Scheme. The EPS shall provide justification for the proposed energy efficiency measures by addressing: (i) solar access; (ii) building form and construction; (iii) heating/cooling and ventilation; and (iv) lighting, water usage and appliances.	The incorporation of energy efficient systems shall be addressed as part of the detailed design phase of the Project. Chapter 17 of EAR060239 addresses greenhouse gas production and identifies commitments to manage greenhouse gas emissions and produce energy efficiency with respect to functioning of the ancillary buildings including the administration and workshop buildings.
(e) Consideration should be given to the feasibility of any measures to substitute gridsource power with environmentally sustainable alternatives such as co-generation (i.e. recovery of waste energy) or photovoltaics.	Discussions with Integral Energy as the relevant authority will be undertaken to ensure suitable power is provided to the site.

Precinct Plan	Project
Air Quality:	
(a) 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.	Air quality has been addressed within Chapter 9 of EAR060239.
(b) Development Applications must comply with relevant Council, and government authority guidelines, to ensure no adverse environmental impacts occur both during and after development of the Precinct.	Air quality has been addressed within Chapter 9 of EAR060239.
Waste:	
(a) identify any licensing requirements under the Waste Avoidance and Resource Recovery Act 2001;	Licensing requirements will be provided by DECCW under the Waste Avoidance and Resource Recovery Act 2001 linked to the waste management requirements under the Protection of the Environment Operations (Waste) Regulations 2005.
(b) document the type, classification and quantity of all waste that are likely to be generated during the development and post-development phases; (c) identify initiatives for reusing and/or recycling of waste; and	Waste streams are identified in Chapters 3 of EAR060239. Chapter 16 of EAR060239 identifies general site waste management during construction and operational phases of the Project. As set out in Chapter 3 of EAR060239, the Project incorporates initiatives to re-use and recover 1.3 to 1.6 mtpa of waste, based on maximum capacity intake. Refer to Chapter 3 of EAR060239 for further detail.
(d) identify waste management protocols during the development and post development phases including: (i) storage and handling of waste on-site; (ii) transportation of waste; (iii) record keeping and target setting; (iv) compliance with obligations for notifying the relevant government authority; and (v) training and education of workers.	Waste management is addressed within Chapter 3 of EAR060239. The protocols have been set out in a LEMP (for the landfill) and a EWMP (for the RRF), which have been prepared prior to commencement of operations and implemented throughout operations.
Contamination:	
(a) Applicants are required to submit a site specific contamination report and/or remedial action plan prepared by a suitably qualified person to confirm that the site does not pose a risk to human health or the environment.	A site contamination report is included in Volume 2 of EAR060239 prepared by Douglas Partners dated April 2006, with key outcomes presented in Chapter 15 of EAR060239.

Precinct Plan	Project
(b) Development should be designed and managed to minimise the potential for polluting discharges, fugitive emissions and controlled spillages by appropriate site management techniques.	Measures will be in place to minimise potential for polluting discharges, fumes, emission and spills, and these are outlined in Chapters 6, 7, 8 and 9 of EAR060239.
(c) All development must comply with the requirements of Council's Site Contamination Policy, and relevant government guidelines.	A site contamination report is included in Volume 2 of EAR060239, with key outcomes presented in Chapter 15 of EAR060239.
Salinity: 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.	Issues with respect to groundwater and its management have been addressed within Chapter 7 and Section 6.4.5 Salinity of EAR060239.
Noise and Vibration: Development Applications should provide an assessment, and identify necessary mitigation measures, to minimise the potential environmental impacts from noise and vibration generated by the proposed development. Development Applications must comply with relevant Council, and government authority guidelines, to ensure no adverse environmental impacts occur both during and after development of the Precinct. Where appropriate, development may need to be treated to minimise the impact from noise generated both on and off-site with respect to surrounding sensitive land uses.	Noise and vibration have been addressed within Chapter 10 and Volume 2 Noise Impact Assessment (ERM) of EAR060239.
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.	Proposed management strategies to be implemented for the conservation area in the north-west of the site are identified in Section 13.5 of EAR060239. A plan of management for this area will be prepared and implemented.

Precinct Plan	Project
Biodiversity Conservation Areas: 8.3.5 When measured from the top of the bank on either side of the creek, development consent shall not be granted, except for development associated with the protection, enhancement and management of the riparian corridor, on land within the precinct that is within: **40** m of Ropes Creek Tributary or **10** m of Upper Angus Creek.	The operational land subject to this proposal is located more than 40 metres from Ropes Creek Tributary. Works associated with the enhancement, protection and management of Upper Angus Creek shall be undertaken within the riparian corridor where it bisects the subject site. The existing bunded wall of the pit which is located within the 10 metre buffer shall be maintained and landscaped as part of the proposal.
Feral and Domestic Animal Management: (a) Covered bulk rubbish bins are to be used during construction to ensure that there are not uncovered stock or rubbish piles. (b) Development must incorporate refuse storage areas that are designed to prevent feral animals entering. (c) Landscaping of all development sites, particularly those located adjacent to biodiversity conservation areas is to include native shrubs and trees.	Access to the site shall be controlled via security fencing to be constructed around the perimeter of the site. Waste shall also be managed on-site to limit access and mitigate any associated impacts. Landscaping will include planting of native species.
Bushfire Management: Development Applications relating to an area directly adjacent to land identified on Council's Bushfire Prone Land Map are to be accompanied by a bushfire hazard assessment	A bushfire hazard assessment has been undertaken for the site and is included in Volume 2 of EAR060239 prepared by Holmes Fire and Safety dated May 2007) with key outcomes presented in Chapter 15 of EAR060239.
8.4.3 (d) APZ's are to be located wholly within the development site, outside of any conservation area or riparian corridor.	Project modifications do not affect the location of the APZs as set out in the Holmes Fire and Safety report dated May 2007 included in EAR060239

Precinct Plan	Project
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.	Not applicable as the site does not contain any items of non-indigenous heritage.
Applications for development of an allotment of land containing an identified conservation area shall demonstrate that satisfactory arrangements have been made for the ongoing protection, enhancement, and management of indigenous heritage values on that land.	Proposed management of indigenous heritage values within the conservation area in the north-west of the site including the preparation of a plan of management for this area are discussed in Section 14.5 of EAR060239.
Traffic and Transport	
Development should comply with the road design principles contained in the following documents: (i) Roads and Traffic Authority, Road Design Guidelines; and (ii) Roads and Traffic Authority, Guide to Traffic Generating Development, (1993).	Site access is a right-of-carriageway via Old Wallgrove Road.
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 as part of this Project.
Parking: Off street parking should be designed to be consistent with the car parking standards of this Precinct Plan.	Parking will be provided on-site to service customers, visitors and staff. Parking is discussed further in Chapter 11 of EAR060239.
Urban Design	
A site analysis based on a survey drawing produced by a suitably qualified person must be submitted with all Development Applications.	Site constraints to development were considered during Project planning and these include ecological and heritage constraints which are reflected in Figures 13.1 and 14.1 of EAR060239

Precinct Plan	Project
	respectively.
Siting and Setbacks: No building or hardstand area (concrete or bitumen pavement) shall be erected on any land within 10m of the boundary (excluding public roads) of a: • conservation area; • riparian corridor • open space area; or • trunk drainage area. All setback areas should be landscaped in accordance with the Landscape Controls outlined in this Plan, and maintained as open space. The site coverage of the footprint of all buildings and canopy areas (excluding hardstand areas) to the area of the allotment on which it is to be situated shall not exceed 65% of the site area.	Project modifications not applicable to these matters.
Building Heights and Design: Applicants must give consideration to the following: (i) integration of building design with landscape elements; (ii) the impact of building heights on district views; (iii) building orientation and siting to optimise the use of natural elements, including topography, wind and sunlight, and maximise aspect and views; (iv) the articulation of building facades to provide visual relief from the public domain by using architectural elements such as: • external structures, finishes, etchings and recessed patterns; • decorative features, textures and colours; or • locating offices and highlighting entries within front facades to reduce the apparent bulk and scale of the structure; and • prevention of blank building facades. Details (including elevations) of all water tanks must be submitted with the Development Application.	Project modifications not applicable to these matters.

Precinct Plan	Project
External Building Materials and Colours: Applicants are required to submit a panel of external finishes and detail of colored elevations when lodging a Development Application. A condition of development consent will refer to the approved schedule of finishes.	Chapter 12 of EAR060239 identifies the commitment for the external finishes which will complement the surrounding natural environment so as to mitigate any visual impact on the precinct and immediate local setting.
Ancillary Buildings, Storage and Service Areas: Council will not accept open storage areas that are visible from the public domain. Where any materials are to be stored outside the primary industrial building, the storage areas are to be fully enclosed with solid fencing, surrounded by mature vegetation, and sited as part of the primary industrial building. Details of any proposed ancillary buildings, open storage and services areas must be submitted with all Development Applications.	Open stockpile areas will be shielded from the public domain by vegetated amenity berms as shown in Figure 3.3 of EAR060239. The ancillary open storage areas and buildings are detailed within Figure 3.3 of EAR060239.
Cut and Fill: A Development Application that includes cut and fill on a site adjoining a conservation area, open space area, or trunk drainage area is to address the potential environmental impacts of the proposed works on those areas.	n/a

Precinct Plan	Project
Signage and Lighting: Signage within the Precinct should be kept to a minimum, relate only to the use occurring on the respective property, and should identify the relevant business name. Directional signs for car parking areas, loading docks, delivery areas and the like should be designed in an attractive manner and should be located at a convenient point close to the main access to a development site. No form of moving or flashing signage or lighting is permitted within the Precinct. Details of all signage must accompany Development Applications for a proposed building, including both free standing, fascia, and wall signs.	n/a
Creating a sense of place: To contribute to the character of the area and the sense of place the development should inter alia aim to retain significant natural areas and tree canopy surrounding buildings; create buildings nestled into the landscape; keep high points within the Precinct vegetated; include water courses that run though the Precinct as an important element in the existing and future character of the site.	n/a
Private open Space: Each development shall be provided with at least 1 private open space area for the use and enjoyment of all employees of that development. The private open space area shall be suitably landscaped and directly accessible from the main office component of the development. The private open space area shall be provided at a rate of 5% of the total gross floor area of the office component of the development or a minimum of 50 square metres, whichever is the greater, to a maximum area of 100 square metres.	The Project is for a RRF and landfill. The areas of operations have been located so as to mitigate impacts on the surrounding precinct. The provision of private open space adjoining an open landfill within high traffic operational areas is not recommended. The Administration buildings will therefore provide internal lunch room and kitchens for use by staff.
Community Safety: Development should comply with the NSW Government, Crime Prevention and the Assessment of Development Applications (April 2001). Buildings should be designed to overlook public domain areas and provide casual surveillance. Building entrances should be orientated towards the street to ensure visibility between entrances, foyers, car parking areas and the street.	The RRF and landfill are to be surrounded by security fencing which will discourage unauthorised entrance. Security patrols after hours will increase the surveillance around the site. The site is accessed via a right-of-carriageway which will be under passive surveillance from surrounding land uses. The administration building and workshop are orientated to the entrance and will have sightlines to traffic entering and exiting the site.

Precinct Plan	Project
Community Services	
In order for Council to consider community services within the Precinct, applicants will need to justify that the size, function and proposed use serves the daily convenience needs of the workforce in the Precinct, or is for the benefit of the local workforce.	Community services are not proposed as part of this Project.
Open Space	
Development Applications that propose open spaces are to clearly identify the intended use and management of the open space, having regard to the potential multi-purpose use of these areas.	Community open spaces and neighbourhood open spaces are not proposed as part of this Project. However, rehabilitation of the former quarry site, by infilling, to facilitate its future reuse for uses consistent with the surrounding precinct and the associated preservation of an area of Cumberland Plains Woodland enhances the ecological, heritage and community amenity.
Landscaping	
A landscape plan is to be prepared and submitted with development applications for each allotment.	The project includes amenity berms which will be landscaped to provide a visual barrier to the surrounding locality and provide landscaping on site. The landscaping of the amenity berms is discussed within the Air Quality – Odour and Dust, by Holmes Air Sciences, in Vol 2 of EAR060239.

8.5 REGIONAL ENVIRONMENTAL PLANS

Sydney Regional Environmental Plan No. 9 – Extractive Industry

Sydney REP No.9 - Extractive Industry (No.2-1995) was gazetted on 15 September, 1995. The aims and objectives of the SREP are inter alia:

" (a) to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area by identifying land which contains extractive material of regional significance, and

(b) to permit, with the consent of the council, development for the purpose of extractive industries on land described in Schedule 1 or 2, and

(c) to ensure consideration is given to the impact of encroaching development on the ability of extractive industries to realise their full potential, and

(d) to promote the carrying out of development for the purpose of extractive industries in an environmentally acceptable manner, and

(e) to prohibit development for the purpose of extractive industry on the land described in Schedule 3 in the Macdonald, Colo, Hawkesbury and Nepean Rivers, being land which is environmentally sensitive."

SREP 9 applies to the local government area of Blacktown, and therefore applies to the proposed development. The main implication of the SREP arises from clause 8 which requires consultation with the Department of Mineral Resources in respect of the subject development application.

As indicated, the existing quarry has reached the end of its economic viability but notwithstanding this, until a new consent is issued for alternative uses such as proposed by the proponent, responsibility for the quarry continues to be held by Hanson pursuant to the Mines Inspections Act.

The proponent has agreed with Hanson to fulfill their continuing maintenance obligations until a new consent is obtained at which time the parties, in consultation with the Department of Primary Industry will arrange a transition where Hanson would be relieved of its future obligations and the proponent would then undertake all obligations for the future.

8.6 PLANNING FOR BUSHFIRE PROTECTION 2006

The NSW Rural Fire Surface (2006) Planning for Bushfire Protection includes performance based outcomes as well as prescriptive requirements and established bushfire planning objectives for development.

Planning for Bushfire Protection applies to all applications for development on land classified as bushfire prone. The site does not include any bushfire

prone land, however is adjacent to an area of bushfire prone land, as mapped by Council. Therefore to meet requirements of the Precinct Plan, a preliminary bushfire hazard assessment was undertaken for the Project by Holmes Fire and Safety (2007). This assessment is provided as a supporting technical document and key outcomes are presented in Chapter 15.

CHAPTER 9 - DRAFT STATEMENT OF COMMITMENTS

This chapter provides a summary of the major commitments of the proponent for the Project.

9.1 INTRODUCTION

The commitments detailed in this section have been compiled based on the environmental assessments undertaken during the preparation of the EAR. They constitute a commitment from the proponent, inclusive of the allocation of responsibilities and timing, to implement measures to minimise all potential environmental impacts that have been identified through the EAR and ensure that the project is environmentally, socially and economically sustainable.

The Statement of Commitments is detailed within Table 9.1 below.

Table 9.1 Draft Statement of Commitments

Item	Commitment	Responsibility	Timing
1. Scope of Development			
	The proponent will carry out the approved aspects of the development in accordance with the EA lodged with the DoP prepared by ERM February 2008.	LHBC	At all times
2. Statutory Requirements			
	The proponent will obtain and maintain all licences, permits and approvals as required.	LHBC	At all times
3. Construction and Operation EMP			
	A Construction Environmental Management Plan (CEMP) and an Operational Environmental Management Plan (OEMP) will be developed and approved by the Director- General and will respectively: • describe all activities to be undertaken on the site during construction and operation; • describe the work program outlining relevant timeframes that must be met during construction and operation; • detail statutory and other obligations that must be met during construction and operation, including all approval and agreements required from authorities and other stakeholders; • describe the roles and responsibilities for all relevant personnel involved in construction and operation; • detail the environmental management procedures, monitoring and reporting to be implemented during the construction and operation phases and timing and triggers for their implementation; • detail what incident management procedures will be in place during construction and operation; • detail procedures for community consultation and complaints handling during construction and operation; and • be made available for public viewing after approval from the Director-General.	LHBC / Director-General	CEMP – prepared prior to commencement of any site activity and implemented for the duration of construction. OEMP – prepared prior to commencement of operations and implemented for the duration of operations.
4. Construction Environmental Performance			
4.1 Surface Water			
4.1.1	Preparation of an Erosion and Sediment Control plan and a Stormwater Management Plan prepared in accordance with DECCW (2006) Managing Urban Stormwater: Harvesting for Reuse guidelines and will be adhered to and include: • Installation of temporary erosion and sediment control structures and sediment fences to prevent the movement of sediment from construction areas; • Minimisation of time excavated surfaces are left exposed; • Restriction of traffic to defined internal roads; • Ensuring any chemical (diesel for operating machinery) are stored on site and appropriately bunded in sealed containers;	LHBC/Construction Contractors	Detailed design phase and during construction

Item	Commitment	Responsibility	Timing
	• Regular inspection and maintenance of erosion / siltation control devices to ensure effectiveness for the entire construction period; • regular inspection of the stormwater treatment measures and site drainage system (including sumps, pipelines, pumps, bunds, tanks, oil/ water separators, sediment traps and storages), during the construction period with maintenance works triggered as required; • Installation of an on-site detention (OSD) basin with a volume of 5362m^3 on the northern portion of the site next to the M4 to allow for the retention and storage of surface water flows from the pit and operational areas to contain runoff for the 1 in 100 year rainfall event; • If required a surface stormwater pond will be placed adjacent to OSD basin to receive water pumped from the in pit clean operational stormwater pond. Mixing with the OSD basin will be prevented with the use of appropriate surface grading and bunding; • Development of a settling basin at the detailed design phase for pre-treatment before entry to the OSD basin to provide further attenuation and capture of sediment that may reach the OSD detention basin.		
4.2 Groundwater			
4.2.1	The existing nine (9) bore wells are to be prepared for monitoring by a suitably qualified expert. This will require BH01 deep well to either be unblocked or another BH01 deep well constructed for monitoring.	LHBC/Construction Contractors	During Construction
4.3 Leachate			
4.3.1	A detailed design specification for the leachate collection system shall be prepared to the satisfaction of NSW Benchmark Techniques and DECCW.	LHBC	Prior to construction
4.3.2	A detailed design specification for the leachate treatment system shall be prepared to the satisfaction of Sydney Water and DECCW.	LHBC	Prior to construction
4.3.3	A S.73 Trade Waste Certificate shall be gained from Sydney Water Corporation to determine disposal quantity and quality of leachate to Sydney Water Corporation sewage system.	LHBC	Prior to construction
4.3.4	The leachate collection and treatment system shall be constructed in accordance with the detailed design specifications, EPL and Trade Waste Agreement with Sydney Water Corporation.	LBHC	During construction
4.4 Air Quality			
4.4.1	A gas management system shall be developed at the detailed design stage and implemented at the relevant stages and then maintained as filling of the pit occurs over the life of the landfill and beyond as required.	LHBC	Prior to commencement of landfilling

Item	Commitment	Responsibility	Timing
4.4.2	The Construction Environmental Management Plan to be developed for the Project and will include the following dust mitigation and monitoring measures to minimise particulate matter emissions during the construction phase: • use of water carts and watering of exposed surfaces when necessary. This could include spray mists and sprinkler systems for crushing, grinding and chipping operations and on all material stockpiles; • minimising dust generating activities on days of extreme unfavourable weather conditions when there is a high risk of dust generation e.g. dry, windy conditions; • defining of trafficked areas; • imposition of site vehicle speed limits; • stabilising exposed areas as quickly as possible; • construction of perimeter berms around the main area of operations to provide a barrier for dust emissions; • cleaning spills of potentially dust materials immediately; • wheel wash for all vehicles travelling off-site; and • sealing of operational surfaces at the RRF.	LHBC/Construction Contractor	Throughout construction
4.5 Noise			
4.5.1	To reduce construction noise experienced at the nearby residences, the following DECCW Environmental Noise Control Manual (ENCM) time limits for construction activities where construction noise is audible at residential premises will be adhered to: • Monday to Friday, 7am to 6pm; • Saturday, 8am to 1pm (or 7am to 1pm if inaudible at residential premises); and	LHBC/Construction Contractor	During construction

Item	Commitment	Responsibility	Timing
	• No construction on Sundays or public holidays.		
4.5.2	Construction of impervious noise barriers at various positions around the facility, including 10 m high barriers to the north, north-west, west and south of the main area of operations and retention of the existing earth mound to the north-east of the quarry pit.	LHBC/Construction Contractor	During construction
4.5.3	The following measures will be implemented as part of the CEMP: • Informing potentially affected residents in advance as to the extent and timing of potentially nosier construction activities and responsibly advising when noise levels during such works may be relatively high.; • Where known to be readily available, deploying equipment having lower noise emission levels; • Maintain construction equipment to ensure rated noise emission levels are not exceeded; • Provide a contact telephone number via which the public may seek information of make a compliant. A log of complaints should be maintained and actioned by the site supervisor in a responsive and timely manner; and • Undertake construction activities in accordance with DECCW (2000) Industrial Noise Policy (INP).	LHBC/Construction Contractor	During construction
4.6 Traffic			
4.6.1	An operational traffic assessment for access way onto the Precinct Plan Stage 3 road system will be submitted.	LHBC	• When an application is made to construct the stage 3 road system by the then owner of the non operational land, and • when the Precinct road through the adjacent Australand site is constructed and its egress point from the Precinct is

Item	Commitment	Responsibility	Timing
			known.
4.6.2	The following construction to be undertaken to the existing contractual ROW and completed prior to operations: • construct a sealed industrial standard road pavement generally 7.0 metres wide along the existing section of 'haulage road' (AS 2890.2 for design and Council standards for construction); • install guard rail along the northern side of the road along the edge of the quarry road to RTA standard for design; • install 'barrier' centreline along the roadway with 40 kph speed restriction and appropriate lighting.	LHBC/Construction Contractor	During construction
4.6.3	The following construction to be undertaken for the internal site road network and completed prior to operations; • construct a sealed industrial standard road pavement (Council design standard); • provide appropriate directional and regulatory signposting; • provide appropriate lighting along the internal road network; • provide appropriate fencing and barriers to avoid any safety issues in relation to the quarry wall (vehicular and pedestrian); • provide paved parking areas and line marked areas (AS 2890.1 design standard); and • ensure that the design provides for the access and maneuvering for all vehicles accessing the site (AS2890.2 design standard).	LHBC/Construction Contractor	During construction
4. 7 Visual Amenity			
4.7.1	The site will be maintained in an orderly manner and the material stockpiles, waste, plant, equipment and vehicle parking will be kept to designated areas.	LHBC/Construction Contractor	Throughout construction

Item	Commitment	Responsibility	Timing
4.7.2	LHBC will install outdoor lighting in accordance with Australian Standards, AS4282-1977 'Control of Obtrusive Effects of Outdoor Lighting' and AS1158 'Lighting for Roads and Public Places'. The lighting will be kept to the minimum necessary to safety and efficiency purposes and will be directed away from residences and roads through the use of directional lighting equipment and shielding.	LHBC/Construction Contractor	During Construction
4.7.3	LHBC will construct building elements using muted colour tones which blend into the surrounding natural environment	LHBC/Construction Contractor	During Construction
4.7.4	LHBC shall undertake landscaping works prior to operation of the RRF facility. Landscaping shall be undertaken along internal roadways, on berms and around the administration building.	LHBC/Construction Contractor	During Construction
4.7.5	The north-western visual barrier wall shall be coloured using green tones which compliment the surrounding vegetation.	LHBC/Construction Contractor	During Construction
4.8 Ecology			
4.8.1	Fencing is to be constructed around the identified Endangered Ecological Communities on site to restrict vehicular and pedestrian access.	LHBC/Construction Contractor	Prior to construction
4.8.2	As part of the ECMP all stockpiled materials are not to be located in close proximity to the EECs or any individual native trees on site.	LHBC/Construction Contractor	Throughout construction
4.9 Aboriginal Heritage			
4.9.1	Two weeks notice will be given to the Deerubbin Local Aboriginal Land Council (DLALC), Darug Custodian Aboriginal Corporation (DCAC), Darug Tribal Aboriginal Corporation (DTAC) and Darug Aboriginal Cultural Heritage Assessments (DACHA) prior to construction to allow organisation of Aboriginal site monitors to inspect horizon top soil stripping and collect any surface artefacts within the operational areas of the site.	LHBC, DLALC, DCAC, DTAC and DACHA	Two weeks prior to horizon topsoil stripping within the operational areas of the site
4.9.2	Should LHBC uncover previously unrecorded relics (non-Indigenous heritage items) during construction, works will cease immediately at that location and the NSW Heritage Office will be notified and advice sought as to the appropriate course of action.	LHBC	During construction
4.9.3	Areas to be disturbed within the moderate and high sensitivity zones, subsurface investigation within the impact zone, by way of archaeological salvage excavation including test pits, will be undertaken prior to commencement of groundbreaking works, to properly assess the scientific significance of these areas.	LHBC	Prior to construction works
4.10 Hazards and Risk			

Item	Commitment	Responsibility	Timing
4.10.1	Relevant standards and requirements relating to fire/ emergency measures and procedures will be adhered.	LHBC/Construction Contractor	During Construction
4.10.2	Additional soil testing of stockpile materials will be initiated to ascertain the presence of any contaminants prior to its use for capping; as amenity berms or transportation off site.	LHBC	During construction
4.10.3	Prior to removal of stockpiles from the site additional samples are collected and analysed on a regular basis.	LHBC	Prior to removal of stockpile materials
4.10.4	Following the removal of the stockpiled material additional field work and laboratory analysis and reporting are to be undertaken to a level commensurate with the site area intended for redevelopment and according to relevant published guidelines.	LHBC	Once stockpiles have been removed, prior to construction of the RRF
4.10.5	The risk of soil contamination by spills will be minimised throughout the Project by implementation of appropriate procedures for safe handling and storage of fuel and chemicals and spill response procedures.	LHBC/Construction Contractor	During Construction
4.10.6	Electricity transmissions lines should be installed underground (where possible)	LHBC/Construction Contractor	During Construction
4.10.7	Reticulated or bottled gas shall be installed and maintained in accordance with AS/NZS 1596-2002: Storage and Handling of LP Gas and the requirements of the relevant authorities.	LHBC/Construction Contractor	During Construction
4.10.8	A reticulated hydrant supply should be installed in accordance with the requirements of AS 2419.1 (1994). Hydrants should be installed at regular intervals throughout the internal road network and should be readily accessible without having to leave the sealed internal road network.	LHBC/Construction Contractor	During Construction
4.10.9	A dedicated static water supply of at least 10,000 litres should be provided for fire fighting activities. If the storage is also required for alternate uses, the draw off for these uses will need to be above the 10,000 litres.	LHBC/Construction Contractor	During Construction
4.10.10	The landslip along the northern face of the pit shall be stabilised and monitored as specified within the Jeffery and Katauskas Pty Ltd (2008) Geotechnical Stability Assessment.	LHBC	During Construction
4.11 Waste management			
4.11.1	A Construction Waste Management Plan (CWMP) shall be prepared to ensure that all general wastes produced during the construction phase are disposed of off-site to appropriate waste facilities. The CWMP shall be made	LHBC	During construction

Item	Commitment	Responsibility	Timing
	available to all construction staff to ensure waste is managed appropriately during construction.		
4.12 Socio-economic			
4.12.1	Where possible, LHBC will locally source jobs created for construction.	LBHC/Construction Contractor	On hiring of construction staff
4.12.2	Preparation of Local Communication Strategy for the dissemination of information regarding the Project to the local community.	LBHC	To be prepared prior to construction and implemented during construction
5. Operational Environmental Performance			
5.1 Surface Water			
5.1.1	A detailed stormwater management plan shall be developed and include the requirements set out in the Surface Water Report prepared by Storm Consulting dated April 2008, which will include management for spills from drainage lines, sediment traps, check dams, erosions control, bunds infiltration areas, sediment fences, filters and all other erosion and sediment control devices.	LHBC	Prior to commencement of operations
5.1.2	Water sampling at the OSD basin and in pit stormwater pond to be conducted quarterly for the first 12 months of operations and six-monthly for following years to ensure re-used/released water is of the appropriate quality for end-use in accordance with ANZECC guidelines and relevant NSW guidance and the sites Environmental Protection Licence. Water sampling shall test for compliance with specified water quality standards for discharge. Sampling requirements will include TSS, turbidity, ammonia, Biochemical Oxygen Demand, TN and TP.	LHBC	Monitoring to occur on a quarterly basis for the first 12 months and then six-monthly for all following years of operation.
5.1.3	An OSD basin and Gross Pollutant Trap Cleaning Program to be implemented to provide more frequent monitoring as site settles from development. The Cleaning Program will include: • sediment and weed removal from the OSD basin and its associated sediment control/stilling basin; and • checking integrity of in-pit stormwater basin, plus sediment removal. A maintenance and monitoring check-sheet shall be developed that allows for the data entry, location of stormwater management devices on-site (e.g. based on a map with numbered locations), type of monitoring (visual, water	LHBC	Cleaning Program to be implanted on a quarterly basis and monitoring and recording to be undertaken in compliance with the Environmental Protection Licence issued for the Project.

Item	Commitment	Responsibility	Timing
	sampling, etc), outcome (e.g. all clear, device needs cleaning), actions taken, and any follow up required.		
5.1.4	Periodic removal of sediment and other materials from site storages and sediment traps and waste oil and sludge from the oil / water separators and wheel wash sediment separator, immediate stabilisation and disposal at an appropriate off-site facility. Storage dams will have markers that indicate when sediment is to be removed so that minimum storage requirements can be maintained.	LHBC	As required during operations
5.1.5	Diesel fuel will be stored in bunded above ground double skin diesel fuel tanks located near the workshop. The tanks will be designed and manufactured in accordance with AS1940 and AS1692.	LHBC	Tanks to be installed prior to operations.
	Any refuelling facilities or fuel/ chemical (including oil and lubricant) storages, are to be located in covered, bunded areas or self bunded storage containers, designed to prevent the entry of stormwater and capable of containing the full storage volume of the container plus an additional 10%.		Management of tanks to occur throughout operations
5.1.6	Potential spills will be contained, in the first instance, by bunding and grading to sumps with backup containment created by the main storage basins. Spill kits will be available on-site and staff will be trained in their use to contain spills and prevent them from entering the stormwater drainage system. Runoff from areas where spills can occur will not be discharged off-site.	LHBC	Training of staff to occur within the first 6 months of operation. Spill maintenance to occur throughout operations
5.2 Groundwater			
5.2.1	A groundwater monitoring program is to be prepared to the satisfaction of DECC and the Environmental Protection Licence (EPL) issued for the Project to satisfy reporting requirements.	LHBC	Prior to operation
5.2.2	Water quality samples shall be taken from all nine (9) bore wells to establish the base water quality standard for groundwater quality monitoring. The base water quality samples are to be provided to DECC satisfaction.	LHBC	Prior to operation
5.3 Leachate			
5.3.1	The LEMP will set out leachate management to maintain the collection and treatment system. Visual inspections of the leachate collection system (sump and riser) shall be undertaken quarterly for the first 18 months of initial operations and if no adverse impacts of operations is observed, will be reduce to every 6 months throughout the life of the Landfill and RRF. Visual inspection shall also occur proceeding significant rainfall events. Submission of water	LHBC	Preparation of the management plan prior to operations.

Item	Commitment	Responsibility	Timing
	quality monitoring results shall be submitted to the relevant authority as required by the EPL.		Monitoring to be conducted throughout the life of the Project.
5.3.2	The leachate collection system shall be monitored for clogging every year throughout the life of the landfill and RRF. The system shall be unclogged as required to maintain the level of leachate within the pit below the regional groundwater table.	LHBC	During operations
5.4 Air Quality			
5.4.1	A real-time dust monitoring and reactive control system will be implemented to identify activities that may lead to off-site air quality impacts. The dust monitoring can be used to assess compliance with DECCW ambient air quality criteria. A minimum of one real time monitor (e.g. DustTrak, TEOM, E-Bam, E-Sampler) will be used to identify real-time impacts and delineate short term particulate matter concentrations and thus trigger required maintenance/ repairs or development of engineering solutions.	LHBC	Throughout operations
5.4.2	Monitoring will be undertaken as per DECC (1996) *Environment Guidelines: Solid Waste Landfills* for the gas management system. Unless otherwise approved by DECC, monitoring will be conducted monthly for initial operations, and if no adverse impacts are observed, will be reduced to quarterly after six months of operations and to annually after 18 months of operation. Monitoring would include a walkover along chimneys with monitoring of landfill gas (methane and hydrogen sulfide) undertaken using a suitable LFG monitor e.g. GA 2000, capable of reading % gas and % LEL. Monitoring shall also include recording of odour observations including the monitoring of BioMagic key odour sources to minimise emissions.	LHBC	Initial monitoring to be conducted monthly and reduce to monitoring annually after 18 months where no adverse impacts are observed. Monitoring to be conducted throughout operations
5.4.3	An Air Quality Management Plan (AQMP) shall be prepared which will be included in the LEMP and EWMP to be developed for the Project, with a focus on activities which generate the most significant emissions – in this instance those associated with haulage movements and transfer and loading activities.	LHBC	Prepared prior to commencement of operations and implemented for Throughout operations
5.5 Noise			
5.5.1	On-site plant and equipment are to be properly maintained to ensure rated noise emission levels are not exceeded.	LHBC	Throughout operations

Item	Commitment	Responsibility	Timing
5.5.2	With the application of reasonable and feasible mitigation, operational noise levels at residences will not exceed 55bB(A)$L_{eq,15min}$.	LHBC	Throughout operations
5.5.3	A contact telephone number will be provided on a sign on the site fence for the public to seek information or make a noise complaint.	LHBC	Throughout operations
5.5.4	A log of noise complaints will be maintained and actioned in a responsive manner.	LHBC	Throughout operations
5.5.5	Normal hours of operation between 6am to 10pm, with landfilling operations further restricted to the hours between 6am and 6pm (receivable material would only occur after 10pm on occasion). A public notice shall be posted on the site fence informing the public when waste will be received after normal hours of operation.	LHBC	Throughout operations
5.6 Traffic			
5.6.1	• The existing contractual ROW and internal site road network to be maintain at all times to the Australian Standards for roadway design AS 2890.1 and AS2890.2.	LHBC	Throughout operations
	• Regular monitoring of the road network is to be undertaken throughout the life of the landfill and the ongoing operation of the RRF. Any reported damage to the road network is to be recorded and repaired within a timely manner.	LHBC	Throughout operations
5.7 Visual Management			
5.7.1	Where possible, use of highly reflective external materials/ colours on the site will be avoided unless necessary for safety reasons.	LHBC	Throughout operations
5.7.2	LHBC will operate outdoor lighting in accordance with Australian Standards AS4282-1977 '*Control of Obtrusive Effects of Outdoor Lighting*' and AS1158 '*Lighting for Roads and Public Places*'. The lighting will be kept to the minimum necessary to safety and efficiency purposes and will be directed away from residences and roads through the use of directional lighting equipment and shielding.	LHBC	Throughout operations
5.7.3	LHBC will maintain building elements using muted colours which blend into the surrounding natural environment.	LHBC	Throughout operations
5.7.4	The site is will be maintained in an orderly manner and the material stockpiles, waste, plant, equipment and vehicle	LHBC	Throughout operations

<table>
<tr><th>Item</th><th>Commitment</th><th>Responsibility</th><th>Timing</th></tr>
<tr><td></td><td>parking will be kept to designated areas.</td><td></td><td></td></tr>
<tr><td>5.7.5</td><td>LHBC shall maintain landscaped areas on site throughout operations.</td><td>LHBC</td><td>Throughout operations</td></tr>
<tr><td colspan="4">5.8 Hazards and Risks</td></tr>
<tr><td>5.8.1</td><td>The risk of soil contamination by spills will be minimised throughout the Project by implementation of appropriate procedures for safe handling and storage of fuel and chemicals and spill response procedures.</td><td>LHBC</td><td>Throughout operations</td></tr>
<tr><td>5.8.2</td><td>Provide and maintain Asset Protection Zones (APZs) as follows:
<table>
<tr><th>Potential Bushfire Hazard</th><th>Recommended APZ</th><th>Justification of Recommended APZ</th></tr>
<tr><td>Grassland vegetation adjoining site to east, south and west</td><td>10m IPA + 1.8m non-combustible radiant heat fence or earthern embankment (rock and soil) with a minimal basal width of 10m. If over 20m separation, the latter is not required.</td><td>Non-residential nature of Project. NB the Project design provides over 20 m of separation so a radiant heat fence or earthern embankment is not required.</td></tr>
<tr><td>Woodland in the north-west corner of site</td><td>20m IPA + appropriate construction standards and berms.</td><td>The small size and isolated nature of this remnant vegetation pocket, along with the non- residential nature of the Project.</td></tr>
<tr><td>Riparian vegetation of Ropes Creek tributary in the southern portion of the site</td><td>20m</td><td>Non-residential nature of the Project and the narrow width of these vegetation fingers.</td></tr>
</table></td><td>LHBC</td><td>Establish APZs prior to operation.

Maintain APZs throughout operations</td></tr>
<tr><td>5.8.3</td><td>Emergency Response Procedures including evacuation procedures shall be developed for the occurrence of a fire.</td><td>LHBC</td><td>Prior to operation</td></tr>
<tr><td>5.8.4</td><td>Geotechnical inspections of the pit shall be undertaken every 6 months and any identified stability issues rectified as required. All geotechnical inspections shall be documented and reported as part of a management plan of the pit</td><td>LHBC</td><td>Throughout landfilling</td></tr>
</table>

Item	Commitment	Responsibility	Timing
	integrity.		
5.9 Waste Management			
5.9.1	A Site Environmental Waste Management Plan (SEWMP) shall be produced to manage general waste streams produced during operations. The SEWMP shall be made available to all operational staff upon commencement of employment. The SEWMP shall ensure putrescible waste and recycling waste receptacles are provided within the RRF and associated buildings. The SEWMP will ensure that all putrescible waste shall be collected and disposed of off-site.	LHBC	Throughout operations.
5. 10 Greenhouse Gas			
5.10.1	Inventory of emissions will be prepared and maintained to monitor greenhouse gas throughout the life of the Project.	LHBC	Throughout operations
5.10.2	Undertake an internal review annually to identify techniques to minimise energy use and assess if equipment is operating at optimum energy efficiency. Internal review to address inventory of emissions levels.	LHBC	Annually, throughout the life of the Project
5.10.3	Energy efficiency to be a priority for of all new mobile and fixed equipment during procurement for both diesel and electric powered equipment.	LHBC	Procurement of mobile and fixed equipment
5.10.4	All greenhouse gas producing equipment will be maintained to retain high levels of energy efficiency.	LHBC	Throughout operations
5.11 Health and Safety			
5.11.1	LHBC will implement health, safety and risk management plans for the Project.	LHBC	Throughout operations
5.12 Socio- economic			
5.12.1	Where possible LHBC will locally source staff.	LHBC	On hiring of operational staff
5.12.2	Preparation of Local Communication Strategy for the dissemination of information regarding the Project to the local community.	LBHC	Throughout operations

CHAPTER 10 - CONCLUSION

As discussed in section 1.10 above, this EAR has examined the following criteria to address the need for and benefits of the proposed modifications to the Consent:

(a) Whether the modification sought had been earlier considered by the Proponents in the Environmental Assessment Report,

(b) Whether the modification produced any of the following,

i. identifiable operational efficiencies,

ii. cost savings or financial benefits,

iii. OH&S or public safety benefits

iv. Environmental benefits.

The justification for each of the proposed modifications based on the benefits it provides (by reference to the criteria above) is described in the sub-sections below.

10.1 MODIFICATION 1 – POSTPONEMENT OF CONSTRUCTION

10.1.1 Area 1

10.1.1.1 Increased Operational Efficiency

The automated materials handling mechanism (requiring less covered floor space) maximises waste sorting opportunities, including opportunities for recovering items of smaller dimension which would not be otherwise recoverable by traditional methods and which would otherwise have to be disposed of to landfill. This mechanism therefore maximises recycling and aims to ensure that a greater proportion of the waste stream is recoverable for conversion into products which may then be sold for financial return.

10.1.1.2 OH&S and Public Safety Benefits

The automated materials handling mechanism reduces the need for workers to physically handle waste and therefore reduces the opportunities for the happening of accidents and incidence of needle stick injuries.

This also results in:

1. a reduced need for large machines, excavators and loaders to operate within the confines of the MPC building reducing opportunities for accident and injury to persons;

2. the minimisation of noise and particulate emissions within the building; and

3. an improvement in noise, air quality and visual impacts.

10.1.1.3 Environmental Benefits

The automated materials handling mechanism (requiring less covered floor space) maximises waste sorting opportunities, including opportunities for recovering items of smaller dimension which would not be otherwise recoverable by traditional methods and which would otherwise have to be disposed of to landfill. This mechanism therefore maximises recycling.

This also results in:

1. a reduction in the use of diesel fuels and in the generation of noxious gases within the building and then escaping to the atmosphere;

2. the minimisation of noise and particulate emissions within the building; and

3. an improvement in noise, air quality and visual impacts.

10.1.2 Area *2*

10.1.2.1 Cost Savings

The postponement of construction in Area 2 reduces the initial costs that would be incurred by the Proponent.

10.2 *MODIFICATION 2* – CONSTRUCTION *OF CONVEYOR AND CHUTE*

10.2.1 Earlier Consideration

The possibility of using a conveyor system rather than dump trucks to transport waste into the pit was canvassed in EAR060239

10.2.2 Increased Operational Efficiency

The conveyor and chute mechanism will provide a more efficient mechanism for transferring waste into the pit.

10.2.3 Cost Savings

The use of the electrically powered conveyor and chute mechanism will result in significant operational cost savings to the Proponent as compared with the running costs in utilising dump trucks.

10.2.4 OH & S and Public Safety Benefits

This modification reduces the risk of injury to workers by removing the need for dump trucks to traverse the haul road within the quarry except for workers arriving or departing at the end of each daily shift.

This modification will also reduce dust, noise and air quality impacts on workers and visitors.

10.2.5 Environmental Benefits

This modification will provide environmental benefits as follows:

1. Reduced emission of greenhouse gases;

2. Reduced dust generation;

3. Reduced risk of noise and dust impacts on surrounding areas.

10.3 *MODIFICATION 3* – TWO-WAY TRAFFIC ON FOURTH AVENUE

10.3.1 Operational Efficiencies

This modification allows for improved inspection processes of arriving waste to more efficiently exclude undesirable waste.

10.3.2 OH&S and Public Safety Benefits

Tighter traffic controls and enhanced inspection of waste materials are expected to improve occupational health and safety and the safety of the public.

10.4 *MODIFICATION 4* – GREENWASTE AREA WALLS

10.4.1 Operational Efficiencies

The inclusion of concrete bay walls in the greenwaste area will facilitate the aeration and control of the greenwaste stockpiles.

10.4.2 OH & S and Public Safety Benefits

Increased aeration of the greenwaste stockpiles (facilitated by the use of concrete bay walls) will improve occupational health and safety and public safety by reducing odour and leachate produced by the stockpiles and also by allowing for greater ease in confining the outbreak of any fire in the bays.

10.4.3 Environmental Benefits

The use of concrete bays to contain the greenwaste stockpiles will provide the following environmental benefits:

1. Reduced creation of airborne particulate matter with the reduction in windrow height and the use of covers;

2. Reduced production of offensive odours due to less anaerobic decomposition of the greenwaste (facilitated by better aeration mechanisms);

3. Reduced production of leachate as a result of reduced percolation of rainwater into the covered greenwaste.

10.5 *MODIFICATION 5* – RELOCATION OF WHEEL WASH

10.5.1 Operational Efficiencies

Reduced requirement to clean up dirt carried onto the internal roads by truck.

10.5.2 OH & S and Public Safety Benefits

Reduced dust impact on workers and public.

10.5.3 Environmental Benefits

Reduced dust generation by dirt carried onto the internal roads by trucks.