PART D
The Overall Project

D.1 Socio-Economic and Financial Assessment

D.1.1 Socio-Economic Assessment

This subsection describes the key socio-economic indicators relating to population, labour force and employment for Orange LGA.

D.1.1.1 Population profile

Population in Orange LGA

According to the Australian Bureau of Statistics[6], the population of the Orange LGA was 37,009 in 2006. This is comparable to surrounding regional centres of Bathurst (population 37,542) and Dubbo (population 39,499). However both Bathurst and Dubbo have much larger jurisdictional boundaries.

Table D.1-1 Summary of population growth, 1996-2006

	Orange LGA	Bathurst LGA*	Dubbo LGA	Greater Orange	Central West	NSW
1996	34,828	33,989	36,533	41,493	172,501	6,204,728
2001	36,999	35,706	38,754	43,428	177,660	6,575,217
2006	37,009	37,542	39,499	44,898	178,501	6,817,182
% Growth (1996-2001)	6.23%	5.05%	6.08%	4.66%	2.99%	5.97%
% Growth (2001-2006)	0.03%	5.14%	1.92%	3.38%	0.47%	3.68%
% Growth (1996-2006)	6.26%	10.45%	8.12%	8.21%	3.48%	9.87%

Source: ABS Estimated Residential Population 2007
* Note: Bathurst City Council and Evans Shire Council amalgamated in May 2004 to create Bathurst Regional Council. The figures above show population for Bathurst Regional Council after the amalgamation.

Population in 'Greater Orange'

Orange plays an important role in the region, providing for employment opportunities and key regional services. In this context, the 'catchment' of Orange stretches beyond its jurisdictional boundary. Hence in reality, Orange provides for a catchment of around 45,000 people. This area can be considered the 'Greater Orange' area and includes parts of Cabonne and Blayney (see Figure D.1-1).

[6] Population statistics have been derived from Estimated Residential Population Data (2007). This is considered to be a more accurate representation of population than the 2006 Census of Population and Housing. It acknowledges and incorporates undercounting and residents temporarily overseas.

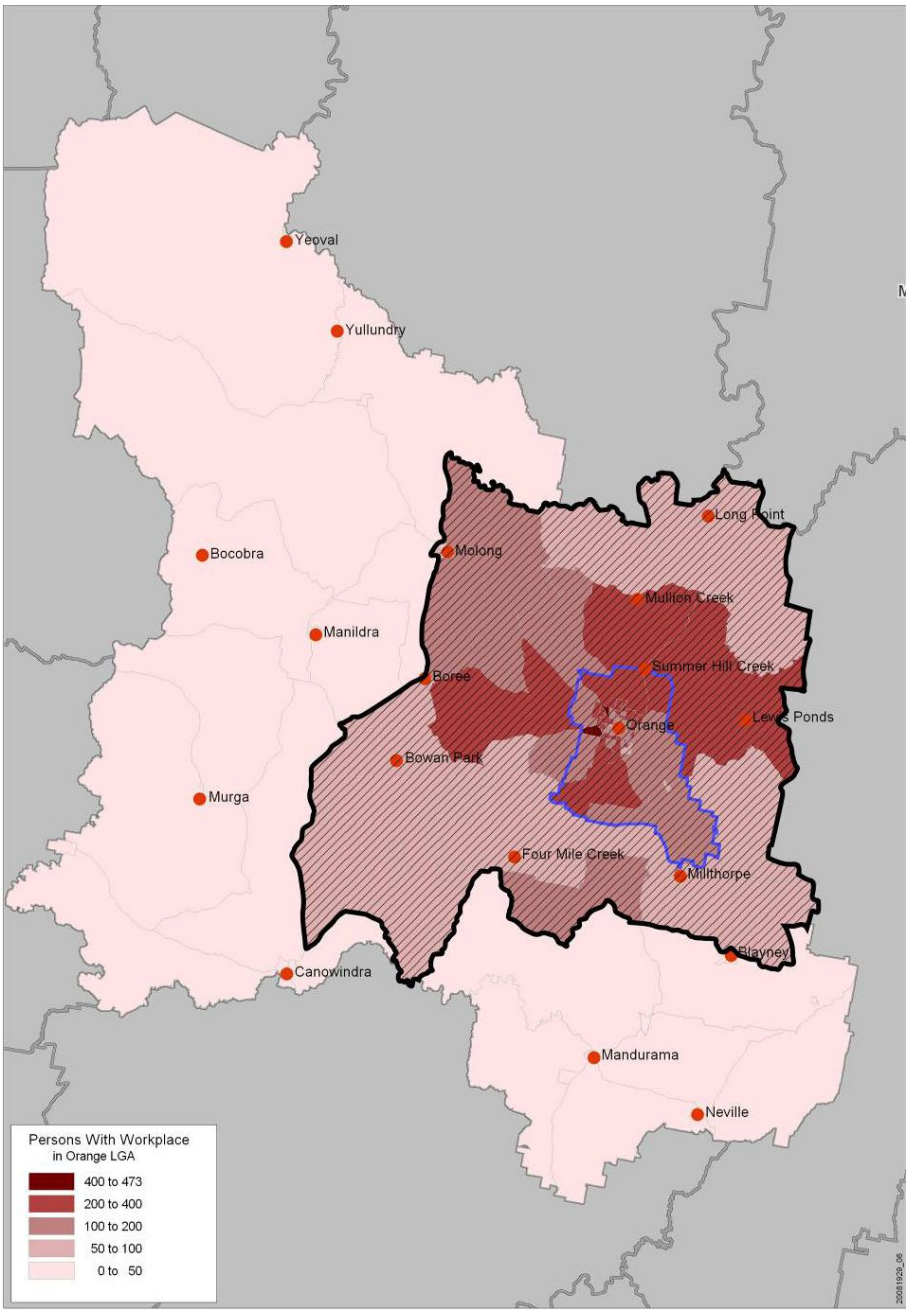

Figure D.1-1 Greater Orange catchment (SGS Economics and Planning 2008)

D.1.1.2 Economic and employment characteristics

Labour force participation

Table D.1-2 compares the labour force statistics of Orange LGA, Bathurst and Dubbo LGAs, the Central West Statistical Division (SD) and for NSW. This table shows that the labour force participation rate for Orange LGA was slightly less than its regional counterparts although higher than the Central West Region.

Table D.1-2 Labour force characteristics, 2006

	Orange LGA	Bathurst LGA	Dubbo LGA	Central West SD	NSW
Employed persons	15,366	16,268	16,982	72,885	2,901,478
Total labour force	16,322	17,368	17,937	77,806	3,084,380
Total population aged 15 yrs and Over	27,122	28,619	28,900	132,956	5,231,596
Labour Force participation rate	**60.2%**	**60.7%**	**62.1%**	**58.5%**	**59.0%**

Source: ABS Census of Population and Housing 2006

Unemployment

According to the Department of Education, Employment and Workplace Relations (2008) (cited in SGS Economics and Planning 2008) in 2008 the unemployment rate for Orange LGA was 4.5 percent. This is lower than the Central West SD (4.6%), the same as Bathurst LGA (also 4.5%), but higher than Dubbo (3.8%).

Employment self containment

Self containment is a measure by the share of jobs in a Statistical Local Area (SLA) occupied by residents of that SLA. As described by SGS Economics and Planning (2008), in 2006, Orange SLA had a rate of self sufficiency of 78.4%. This indicates that the remaining 21.6% of jobs in Orange and held by persons who travel from other SLAs. The most common origins for people who work in Orange are the nearby areas of:

- Cabonne (12.1%); and
- Blayney (4.4%).

According to this report, 34% of the total working population of Cabonne and Blayney work in Orange.

Occupations / industries

'Health Care and Social Assistance' and 'Retail Trade' are the top employment industries in Orange LGA, accounting for 16.6 per cent and 13.7 per cent (respectively) of total jobs. 'Manufacturing', 'Education and Training', 'Public Administration and Safety', and 'Accommodation and Food Services', also account for a significant proportion of employment in Orange LGA. Together these six categories account for over 60% of total employment.

When compared to Central West Region, 'Retail Trade' accounts for a significantly higher proportion of total jobs. This highlights Orange LGA's role as a major retail and service centre for the surrounding region. Orange LGA also displays a higher proportion of jobs in 'Health Care and Social Assistance', 'Manufacturing', and 'Accommodation and Food Services' compared to the Central West Region.

Compared to Bathurst and Dubbo LGAs, Orange LGA indicates higher employment in 'Health Care and Social Assistance' reflecting Orange LGA's medical infrastructure and assets. In addition, Orange LGA demonstrates a substantially higher proportion of persons employed in mining, reflecting the importance of the mining industry sector to Orange LGA.

Further consideration of the industries of employment of Orange and surrounding Cabonne and Blayney LGAs is provided in the assessment of agricultural capability of the Euchareena Road Site and region in Section D.1.3.1.

D.1.2 Financial Assessment of the Project and Alternatives

D.1.2.1 Methodology

A financial assessment (Appendix V) of the Project has been undertaken as part of preparation of this Environmental Assessment. This has focussed on comparison of the extra costs that would be incurred as a result of proceeding with the Project.

The assessment does not include the costing of practices that would continue whether the Project proceeded or not, such as collection of municipal wastes and recyclables from residents, sorting of recyclables, nor does it include any revenues associated with the project – annual resident waste charges, gate fees from commercial wastes or revenue from sale of compost or recovered recyclables. Instead, a zero value has been assumed for these items, on the basis that the purpose of this financial assessment is to compare the long-term costs incurred by the Project against these two possible alternatives, using a discounted cashflow approach.

In addition, the financial analysis has been done on the basis of wastes from Orange alone – that is, no regional waste has been included, other than residuals and glass fines from kerbside recyclables currently processed for other at the Proponent's MRF, at the Ophir Road RRC. The fixed costs associated with the Project infrastructure mean that any additional tonnes of waste composted or baled or landfilled at Euchareena Road RRC, as part of the Project for other regional councils would reduce the average costs of the system.

Each of the elements of the project has been identified, and their initial capital costs have been estimated. In addition, all capital costs plus operational costs during the 40 year life of the project have been converted into a single Net Present Value (NPV) using a discount rate of 7% on each item. An equivalent annual cost with the same net present value as the project has then been calculated. As well, the entire non-discounted cost of each service over a 40 year period has been calculated for comparison purposes. This has enabled the average cost of each service to be costed on a per tonne basis.

D.1.2.2 Financial analysis of the Project

Items included in the financial analysis are as follows:

- Capital costs associated with the baling plant, relocation of the existing MRF at Ophir Road RRC, construction of the composting plant and baling plant, and construction and operation of landfill and associated infrastructure at the Euchareena Road Site (fences, power supply, stormwater, internal roadworks);
- Costs of external road improvements such as upgrading of intersections in Molong and Euchareena Road;
- Operating costs of extra services provided, such as separate collection of garden and food wastes from residential and commercial premises, processing of food/garden organics and biosolids within the enclosed tunnel composting facility, and removal of easily recoverable recyclables at the baling plant at Ophir Road RRC;

- Purchase and operation of two prime movers, two bale carrying trailers and a skip carrying trailer;
- Biosolids to be composted at the enclosed tunnel composting plant (assumed transported to site within the cost of the project); and
- Potential landfill levy cost in 2013 (estimated to be $60/tonne) to be paid on all waste disposed of to landfill, including VENM.

A discount rate of 7% (as per NSW Treasury Guidelines) has been assumed, over a 40 year period.

The following waste flows have been assumed for the Project. These are the same as used for the environmental assessment of the project, other than for the traffic, noise and air studies, which have allowed for additional regional wastes to provide a conservative assessment of impacts.

Table D.1-3 Future waste flows (excluding regional council waste inputs)

Item	Quantity (t/yr)
Baled waste transfer to Euchareena Road RRC	18,459
Non-baled waste transfer to Euchareena Road RRC	6,788
VENM transfer to Euchareena Road RRC	4,000
Leachate disposal to Orange STP	8,500
Ophir Road MRF throughput[1]	12,568
Biosolids delivered to site	3,650
Food and garden organics collected	11,654
Total material composted	15,304
Compost rejects	493
Compost produced and delivered to market	10,315
Total baled waste landfilled	18,459
Total non baled waste landfilled	10,788
Total waste landfilled[2]	29,740

Notes: 1. Includes current regional kerbside recycling processed at Ophir Road MRF
2. Includes rejects and glass fines from the regional kerbside recyclables and VENM

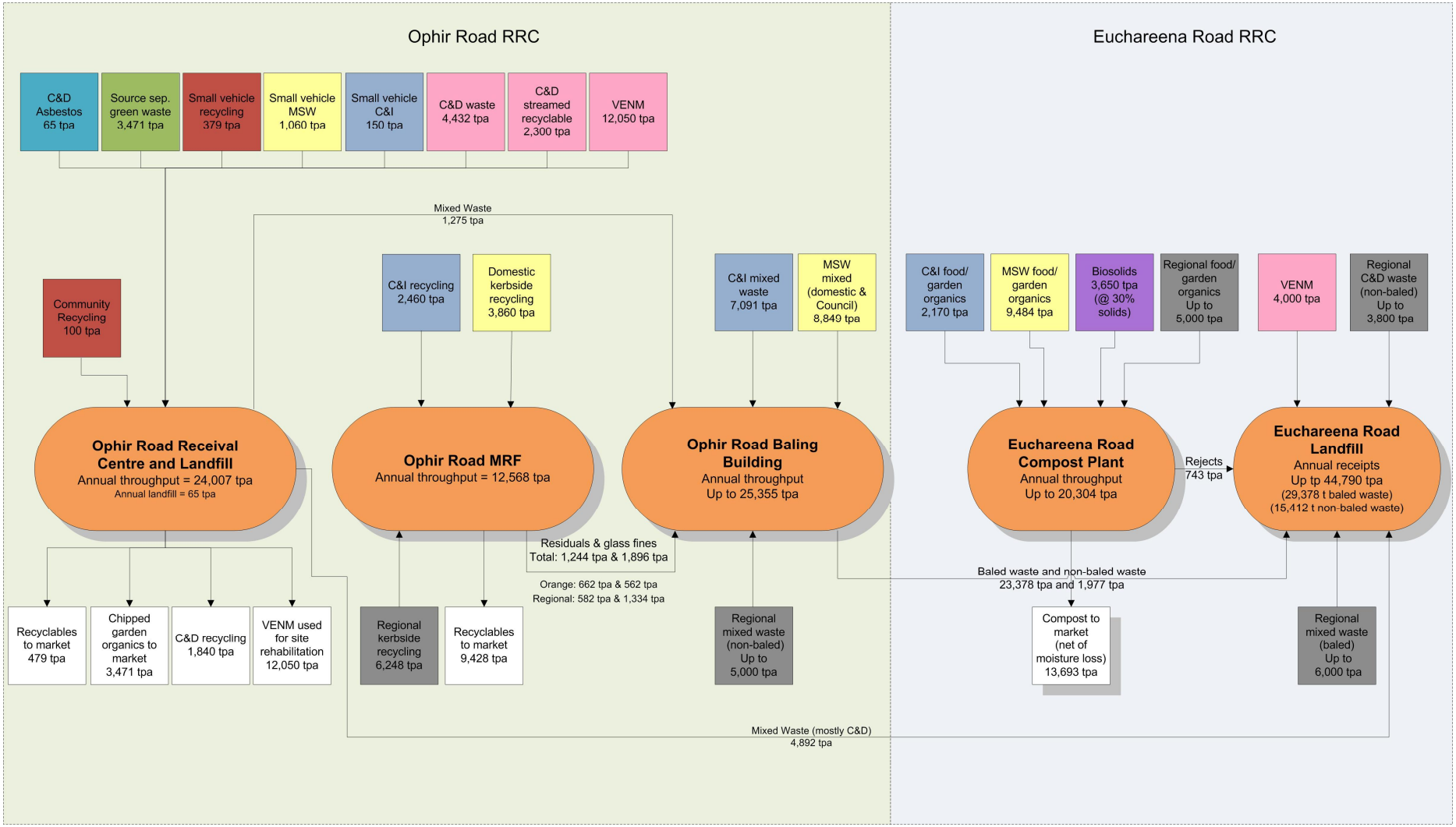

Figure D.1-2 Waste flows for the Project – Orange and current regional wastes only

The results of this analysis which are illustrated in Table D.1-6, show that the initial capital cost of the Project is approximately **$14.6 M**, and that the net present value of the costs of the Project over its 40 year life is approximately -**$89 M**. The total costs incurred over 40 years are of the order of **$213 M** over 40 years.

D.1.2.3 Alternatives to the Project

Two alternatives to the Project have been analysed. Alternative 1 is for Orange Council to proceed with the separate organics collection system, and build and operate an enclosed composting plant at the Euchareena Road Site. It would also build a new waste transfer station at Ophir Road RRC, by relocating the current MRF. Residual wastes would be bulked up at the new transfer station and transported in B doubles to the Dubbo Council landfill some 150 km away.

Alternative 2, which is considered to be a "do nothing" or base case, is to for Orange Council to construct a waste transfer station at the Ophir Road RRC, to bulk up all wastes (including garden and food organics currently contained in the municipal and commercial waste streams). There would be no separate collection of this material as is currently proposed. All wastes would be compacted as much as possible at the new waste transfer station, and transported to Dubbo in B double trailers.

D.1.2.4 Financial analysis of Alternative 1 – residual wastes to Dubbo

Items included in the analysis for Alternative 1 are as follows:

- Capital costs associated with a new waste transfer station at the Ophir Road RRC, construction of the enclosed tunnel composting plant and associated infrastructure at the Euchareena Road Site (fences, power supply, stormwater, internal roadworks);
- Costs of external road improvements such as upgrading of intersections in Molong and Euchareena Road;
- Costs of extra services provided, such as separate collection of garden and food organics from residential and commercial premises, and processing of food/garden organics and biosolids within the enclosed tunnel composting facility;
- Potential landfill levy cost ($60/tonne) to be paid on all waste disposed of to Dubbo landfill;
- Gate fee of $45/tonne at Dubbo landfill;
- Purchase and operation of four prime movers, four B double trailers and a VENM disposal truck;
- Costs of disposing of 4,000 tonnes per annum of VENM at a suitable VENM only site for $30/tonne (excluding waste levy);
- Biosolids to be transported to Euchareena Road RRC for composting; and
- CPRS liabilities associated with municipal and some commercial wastes (priced at $15/tonne) of waste received at Dubbo.

A discount rate of 7% (as per NSW Treasury Guidelines) has been assumed, over a 40 year period.

The following waste flows have been assumed for Alternative 1.

Table D.1-4 Future waste flows (excluding regional council waste inputs)

Item	Quantity (t/yr)
Waste transfer station throughput	25,740
VENM transfer to VENM only site	4,000
Ophir Road MRF throughput[1]	12,568
Biosolids delivered to site	3,650
Food and garden organics collected	11,654
Total material composted	15,304
Compost rejects sent to transfer station	493
Compost produced and delivered to market	10,315
Total waste landfilled at Dubbo[2]	25,740

Notes: 1. Includes current regional kerbside recycling processed at Ophir Road MRF
2. Includes rejects and glass fines from the regional kerbside recyclables

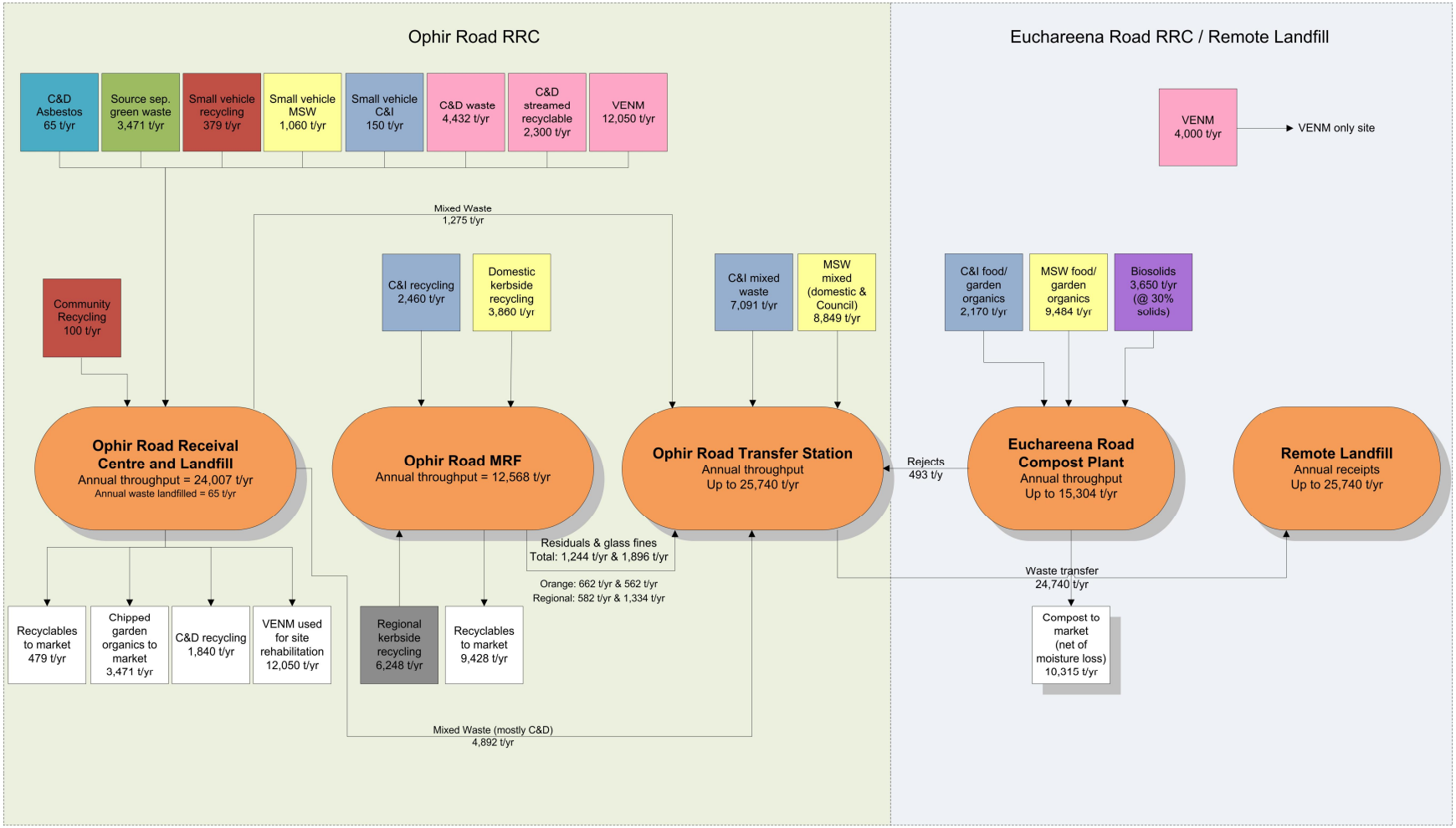

Figure D.1-3 Waste flows for Alternative 1 – Residual wastes to Dubbo Landfill

The results of the analysis, which are illustrated in Table D.1-6, show that the initial capital cost of Alternative 1 (sending residual waste to Dubbo, but still separately collecting food/garden organics, and processing them into compost at Euchareena Road, is approximately **$15.9 M**, and that the net present value of the costs of this alternative over its 40 year life would be approximately -**$125 M**. The total costs incurred over 40 years would be of the order of **$342 M** over 40 years.

D.1.2.5 Analysis of Alternative 2 – all wastes to Dubbo

Items included in the analysis for Alternative 2 are as follows:

- Capital costs associated with a new waste transfer station at Ophir Road RRC (larger capacity than required for alternative 1, due to higher tonnages);
- Potential landfill levy cost ($60/tonne) to be paid on all waste disposed of to Dubbo landfill;
- Gate fee of $45/tonne at Dubbo landfill;
- Purchase and operation of six prime movers, six B double trailers and a VENM disposal truck;
- Costs of disposing of 4,000 tonnes per annum of VENM at a suitable VENM only site for $30/tonne (excluding waste levy);
- Biosolids to be transported to and disposed of at Cadia Mine (as currently); and
- CPRS liabilities associated with municipal and some commercial wastes (priced at $15/tonne) of waste received at Dubbo.

A discount rate of 7% (as per NSW Treasury Guidelines) has been assumed, over a 40 year period.

The following waste flows have been assumed for Alternative 2.

Table D.1-5 Future waste flows (excluding regional council waste inputs)

Item	Quantity (t/yr)
Waste transfer to Dubbo	36,901
VENM transfer to VENM only site	4,000
Biosolids delivered to Cadia site	3,650
Total waste landfilled at Dubbo[2]	36,901

Notes: 1. Includes current regional kerbside recycling processed at Ophir Road MRF
2. Includes rejects and glass fines from the regional kerbside recyclables

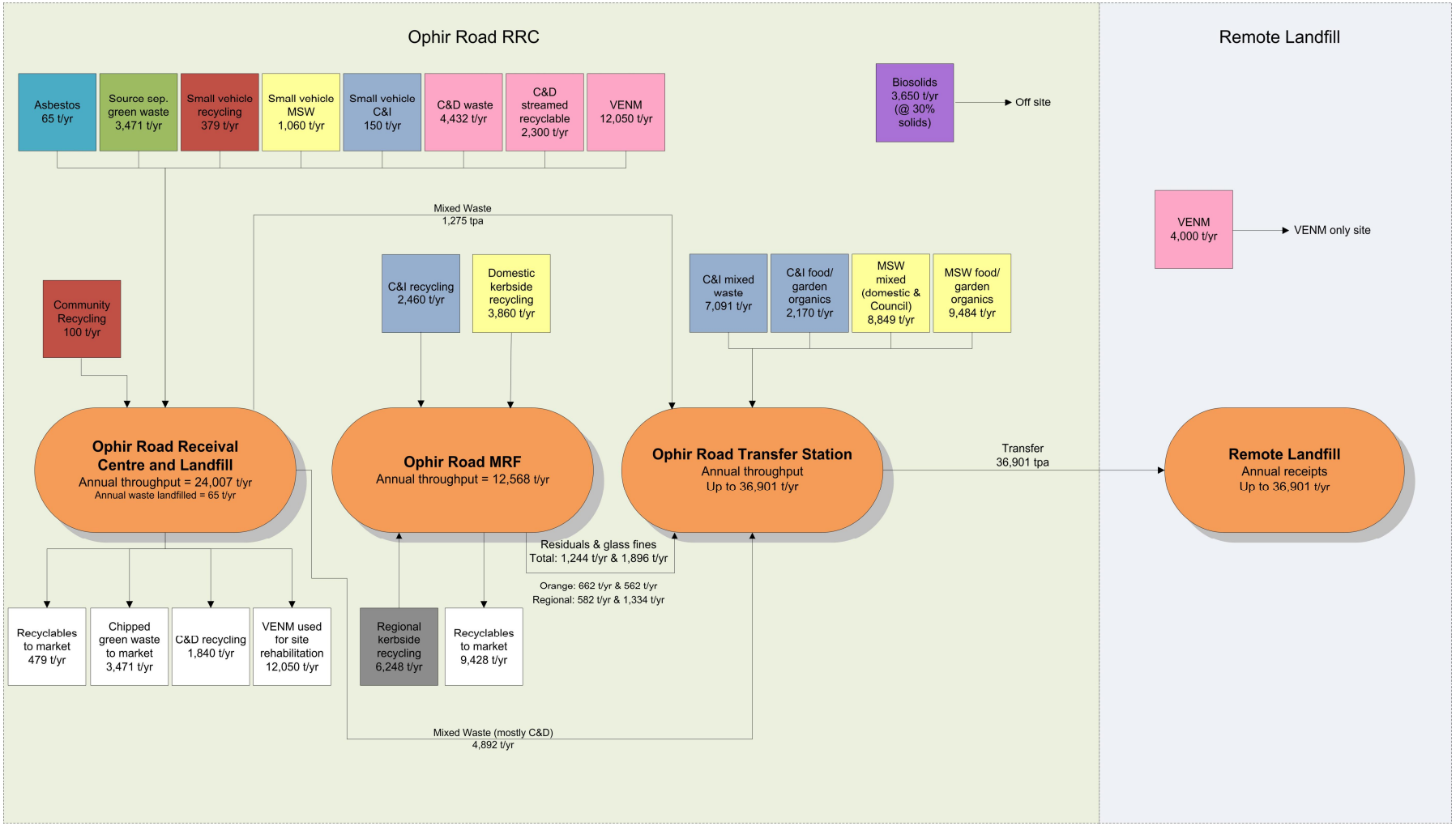

Figure D.1-4 Waste flows for Alternative 2 – all wastes to Dubbo landfill

The results of the analysis, which are illustrated in Table D.1-6, show that the initial capital cost of Alternative 2 (sending all waste to Dubbo) is approximately **$7.0 M**, and that the net present value of the costs of this alternative over its 40 year life would be approximately **$-125M**. The total costs incurred over 40 years are of the order of **$312 M** over 40 years.

The results of the assessment show that the Project would have a lower initial capital cost than Alternative 1 (landfilling only residuals at Dubbo) but higher than Alternative 2 (landfilling all wastes at Dubbo). However, when converted to an equivalent annual cost over 40 years, the Project would be cheaper than the two alternatives. There would also be lower annual costs per tonne of waste handled for the Project compared to the two alternatives.

Table D.1-6 Financial analysis of the Project vs alternatives (at 7% discount rate)

	Initial capital cost	Total annualised cost	Average cost per tonne handled	Waste landfilled per annum	Total cost over 40 yrs	Net Present Value (cost) [1]
	$M	$M/annum	$	t	$M	$M
The Project	14.6	6.7	52.08	29,740[2]	210	-89
Alternative 1 – Residual waste to Dubbo	15.9	9.6	75.28	25,740	342	-125
Alternative 2 – All waste to Dubbo	7.0	8.1	70.44	36,901	312	-125

Note:

[1] Does not include cost of garbage collection services, recycling collection services or MRF operations, nor continuing Ophir Road RRC recycling and special waste disposal operations.

[2] Includes 4,000 t/yr of VENM used for landfill completion works

D.1.2.6 CPRS and waste levy

The impacts of the waste levy (assumed at $60/t) and CPRS charges (assumed at $15/t) on the landfilling costs are shown in Table D.1-7 below.

Table D.1-7 Levy and CPRS costs for the Project and Alternatives

	Levy per annum at $60/t[1]	Total cost of Levy over 40 yrs	Net Present Value of Levy	CPRS per annum at $15/t[2]	Total cost of CPRS over 40 yrs	Net Present Value of CPRS
	$M/yr	$M	$M	$M/yr	$M	$M
The Project	1.78	71	-24	-	-	-
Alternative 1 – Residual waste to Dubbo	1.55	62	-21	0.39	15	-5.1
Alternative 2 – All waste to Dubbo	2.21	89	-30	0.46	18	-6.2

* Excluding VENM

** Excluding construction wastes and VENM

D.1.2.7 Sensitivity analysis

A sensitivity analysis of the financial assessment shown in Table D.1-8 indicates that the Project would be cheaper to operate over 40 years than the two alternatives, even if different discount rates (3% and 10%) are applied. The rankings of the Project versus the two alternatives in terms of total discounted cost over 40 years does not change with the application of the different discount rates, however the rankings of the two alternatives change slightly.

While they are of equal Net Present Value at a 7% discount rate, Alternative 1 is slightly cheaper than Alternative 2 at a 10% discount rate, and more expensive than Alternative 2 at a 3% discount rate.

Table D.1-8 Sensitivity analysis (NPV) – effect of varying discount rates

Discount rate	3%	7%	10%
The Project ($M)	-134	-89	-72
Alternative 1 - Residual waste to Dubbo ($M)	-193	-125	-99
Alternative 2 - All waste to Dubbo ($M)	-188	-125	-101

By varying the waste levy from the $60/tonne used for modelling (a conservative scenario) to $0/tonne (an optimistic scenario) and $30/tonne (a likely scenario), the effects on the rankings of the Project versus the alternatives can be seen. This is shown in Table D.1-9.

Table D.1-9 Sensitivity analysis (NPV) – effect of waste levy changes (at 7% discount rate)

Waste levy ($/t)	0	30	60
The Project ($M)	-66	-78	-89
Alternative 1 - Residual waste to Dubbo ($M)	-105	-116	-125
Alternative 2 - All waste to Dubbo ($M)	-96	-111	-125

It can be seen that as the waste levy increases from zero to $60/tonne, the financial differences between the Project and the alternatives (in terms of Net Present Value of the costs over a 40 year period) are reduced. However, the Project is still substantially cheaper than the two alternatives for all three scenarios modelled.

D.1.2.8 Comparison of the Project and alternatives

The results of the assessment show that the Project would have a lower initial capital cost than Alternative 1 (landfilling only residuals at Dubbo) but higher than Alternative 2 (landfilling all wastes at Dubbo). However, when converted to an equivalent annual cost over 40 years, the Project would be cheaper than the two alternatives. There would also be lower annual costs per tonne of waste handled for the Project, compared to the two alternatives.

For both Alternatives 1 and 2, there would need to be a new waste transfer station at Ophir Road RRC with a compactor, which would be more expensive than a baling plant located within the existing MRF building, and there would also be a need to purchase a number of dedicated prime movers and B double trailers for hauling waste to Dubbo. The initial capital costs of Alternative 2 are estimated to be the lowest of all the scenarios analysed, since this alternative would have limited infrastructure associated with it (only a new transfer station at Ophir Road RRC).

Alternative 2 would include a larger capacity waste transfer station than Alternative 1 and require more prime movers and B double trailers, due to greater quantities of waste being handled. There would be no separate collection and composting of organics with Alternative 2. All organics would be transported to Dubbo, mixed with other wastes.

In terms of operational costs, the costs associated with establishing and operating a separate food/garden waste collection system and enclosed composting plant (both the Project and Alternative 1) would be higher than transporting all wastes to Dubbo (Alternative 2). However the quantity of waste landfilled for the Project and Alternative 1 would be lower, hence landfill levies payable (on all waste), and CPRS liabilities (on waste likely to generate landfill gas) would also be lower.

Since the Proponent would have no control over landfill charges at Dubbo landfill or any other external landfill site, the long term costs associated with Alternatives 1 and 2 could be much higher than for the Project if gate fees rose due to: (1) increases in the waste levy, (2) operational cost increases, or if a significant allowance was made for CPRS charges by the host council or landfill owner.

D.1.3 Agricultural Capability of the Euchareena Road Site and Region

The proposed Euchareena Road RRC is located in the Cabonne LGA on land that is zoned General Rural 1 (a) under the Cabonne LEP 1991. The provisions of this LEP require that development consent is required for the construction of the Euchareena Road RRC, and that such consent needs to consider (among others) the following aspects in relation to agriculture:

- promote the proper management and utilisation of resources by: (a) protecting, enhancing and conserving agricultural land in a manner which sustains its efficient and effective agricultural production potential; and (b) preventing the unjustified development of prime crop and pasture land for purposes other than agriculture; and
- consent shall not be granted unless Council has made an assessment, where relevant, of the effect of the carrying out of that development on the present and potential use of the land for the purposes of agriculture; and the Council is satisfied that the development will not have an adverse effect on the long term use, for sustained agricultural production, of any prime crop and pasture land.

It is noted that with a Part 3A Application, where a development application is considered by the Minister for Planning, rather than Council, the Minister shall take account of Clause 10. The Director-Generals requirements for this project require a comprehensive assessment of the economic and social impacts of the Project, paying particular attention to the agricultural capability of the site and region.

D.1.3.1 Agriculture in the Region

Agriculture is a significant industry in Cabonne and surrounding LGAs (Blayney and Orange) and plays an important role in both the social and economic wellbeing of constituents. The importance of agriculture can be gauged by employment statistics which show that 23% of Cabonne LGA's workforce is

engaged in the agriculture, forestry and fishing industry (Table D.1-10). The agriculture sector is also the major employment industry in Blayney LGA while Orange LGA is less reliant on employment in the agriculture sector.

Table D.1-10 Industry of employment by LGA, 2006

Local Government Area	Blayney		Cabonne		Orange	
Industry	**Total**	**%**	**Total**	**%**	**Total**	**%**
Agriculture, forestry & fishing	448	16%	1,308	23%	388	3%
Health care & social assistance	303	11%	673	12%	2,249	15%
Manufacturing	276	10%	564	10%	1,554	10%
Retail trade	234	8%	485	8%	1,985	13%
Education & training	210	7%	449	8%	1,314	8%
Public administration & safety	186	6%	378	7%	1,193	8%
Construction	191	7%	328	6%	1,115	7%
Transport, postal & warehousing	136	5%	235	4%	620	4%
Professional, scientific & technical services	103	4%	198	3%	648	4%
Accommodation & food services	142	5%	197	3%	1,008	7%
Total employment in all industries	**2,864**		**5,727**		**15,480**	

Source: ABS 2006 Census of Population and Housing

The economic value of agriculture is indicated by the gross value of the major agricultural commodities for Cabonne and other LGAs (Table D.1-11). For Cabonne, crop production (mainly winter cereals and oilseeds) is valued at about $65 million per year, livestock slaughterings (mainly beef and lamb) at $44 million, livestock products (mainly wool) at $25 million, and horticulture (including viticulture and fruit production) at $27 million per year.

The value of crops and horticulture is significant for Orange LGA while beef and lamb production is the largest contributor to the value of agricultural production in Blayney Shire.

Table D.1-11 Gross value of major commodities 2005-06 ($ million)

Commodity	Blayney	Cabonne	Orange
Total crops	$8.47	$64.43	$22.27
Horticulture	$1.76	$26.55	$20.67
Livestock slaughterings	$19.55	$44.29	$3.08
Livestock products	$6.56	$25.09	$0.60
Total ($ million)	$36.35	$160.37	$46.62

Source: ABS Agricultural Commodities: Small Area Data, Australia, 2005-06

Land use for agriculture is the major form of land use in Cabonne and surrounding shires, with about 85% of Cabonne LGA's total land area being for agricultural use (Table D.1-12). The predominant use of agricultural land is for the grazing industries followed by crop land.

Table D.1-12 Agricultural land use 2005-06 (ha)

Commodity	Blayney	Cabonne	Orange
Total Shire land area	152,421	602,246	28,475
Agricultural land use area	140,770	511,436	18,442
Percent agricultural land use	92%	85%	65%
Agricultural land use by industry			
Land under crop or fallow	5,825	78,320	1,934
Grazing land (including pastures and rangelands)	122,635	397,586	15,156
Remnant vegetation and woodland not suitable for grazing	4,446	18,363	205
Land under commercial forestry plantations	334	3,875	13
Wetlands or swamps not suitable for grazing	182	209	30
Other environmentally sensitive areas fenced out of production	945	1329	115
Houses, sheds and other agriculturally unproductive land	1479	2660	284
Other (incl. not reported)	4,924	9,093	707

Source: ABS Agricultural Commodities: Small Area Data, Australia, 2005-06.

D.1.3.2 Agriculture impacts at the Euchareena Road Site

The Euchareena Road Site has a total land area of 192.6 ha. The land is classified as Class 3 on the map deposited in the Cabonne Council office. Under Cabonne Council's LEP, Class 3 land is considered

'prime crop and pasture land' and the unjustified development of prime crop and pasture land for purposes other than agriculture is prohibited.

The Class 3 land classification is based on the five class system used by Industry and Investment NSW (Agriculture) to classify the suitability of land for general agricultural use. Under this system Class 3 land is defined (in part) as '*grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with sown pasture. The overall production level is moderate because of edaphic factors (local soil conditions) or environmental constraints*.' (NSW Agriculture 2002, Agricultural Land Classification, Agfact AC.25). It should be noted that the publication discusses the limitations of mapping scale and states that any map unit will include areas whose characteristics differ from those of the dominant class.

Table D.1-13 shows the expected landuse for the proposed Euchareena Road Site.

Table D.1-13 Euchareena Road RRC expected land use

Land use	Hectares
Continued agricultural use	42.3
Northeastern woodland	51.1
Western woodland	31.9
Landfill footprint area	12
Rehabilitation area	13.6
Compost plant and roads	3.4
Compost maturation area	1
Dams and bunds	3.6
Other existing cleared land	33.7
Total site area	**192.6**

The area designated as continued agricultural use (Photo D.1-1) and the two woodlot areas (Photo D.1-2) would be largely unchanged by the Euchareena Road RRC development in respect of their landuse, although with improved biodiversity outcomes for the woodlands.

Photo D.1-1 Area for continued agricultural use

Photo D.1-2 Northeastern woodland

These areas would continue to provide similar socio-economic outcomes in terms of employment and value of agricultural production to Cabonne and surrounding shires during the operation and rehabilitation phases of the Euchareena Road RRC as they currently provide.

The land proposed for the landfill site, buildings associated with composting, screening bunds, vehicle access roads and other existing cleared land (67.3 ha) would obviously result in substantial changes to its current land use. This Class 3 land is currently used for livestock grazing and is suitable for cropping in rotation with improved pastures including lucerne (Photo D.1-3).

However, it is considered that during construction and operation of the Euchareena Road RRC, part of this 67.3 ha area could be grazed by livestock, as long as fencing was erected to contain stock in suitable locations.

If the whole of the 67.3 ha area was removed from agricultural production, this would represent a very small percentage of the total area for agricultural use in Cabonne LGA (67.3 ha out of 511,436 ha or about 0.01%) and a smaller percentage across the three shires. Within the Cabonne LGA, there is approximately 78,320 ha of crop and fallow land. Therefore as a percentage of crop and fallow land Cabonne LGA, this 67.3 ha represents about 0.1%.

However, as noted previously, the land would not be completely removed from production as limited grazing would be possible during operation of the Euchareena Road RRC. Also, during progressive rehabilitation of the landfill site and after closure of the Euchareena Road RRC when its useful life is completed, agricultural production could be resumed. It is likely that livestock grazing on improved pastures would be the best use of the land after site closure as the contours of the final landform would not be conducive to regular cropping.

Photo D.1-3 Landfill and rehabilitation area

D.1.3.3 Financial impact of agricultural land use change

Enterprise gross margins provide a useful comparison of the financial impact of a change in land use. Indicative enterprise types suited to the Euchareena Road Site on Class 3 land and their gross margins are shown in Table D.1-14.

Table D.1-14 Enterprise gross margins

Enterprise	Gross margin ($/ha)
Yearling beef cattle	$180
Canola	$605
Wheat	$403

Source: NSW DPI website http://www.dpi.nsw.gov.au/agriculture/farm-business/budgets

For cropping enterprises, rotations with pastures (and livestock grazing) are recommended for Class 3 land, and continuous cropping is not recommended. A suitable cropping rotation could be as follows:

Year 1 Canola

Year 2 Wheat

Year 3 Wheat (pasture undersown with wheat)

Years 4 – 7 Pasture (grazing with a yearling beef cattle enterprise)

Based on the enterprise gross margins in Table D.1-14, the average annual gross margin from a 7-year rotational cropping/pasture program would be $304/ha. This compares to a grazing enterprise gross margin of $180/ha (a difference of $124/ha/yr).

When the Euchareena Road RRC is decommissioned, the most profitable agricultural use of the land (cropping/pasture rotation) would not be possible, with livestock grazing as the only suitable alternative. This would result in a potential 'loss' of $124/ha/yr, or $8,300/yr for the 67.3 ha area.

For Cabonne LGA, the loss of $8,300/yr compares to the total value of agricultural production of about $160 million/yr (Table D.1-11), or about 0.005% per year. It is unlikely that such a loss would have any significant socio-economic impacts for agriculture in Cabonne and surrounding shires.

It should also be noted that the change in land use is not cumulative. The development of the Euchareena Road RRC will not encourage additional similar developments in the vicinity and add to the decline in prime crop and pasture land. The change in land use for the proposed Euchareena Road RRC is for a single, definable and necessary development that will not lead to a continuous decline in the area of prime agricultural land and subsequent decrease in the socio-economic outcomes for shire residents.

In addition, the Proponent is proposing to offer compost produced from the tunnel composting facility to local farmers free of charge for the first two years (based on assessed 'beneficial program' applications). This initiative would contribute to enhanced agricultural productivity in the surrounding areas.

D.1.3.4 Mitigation measures

The following mitigation measures are proposed to minimise the potential impact on agricultural land:

Minimising impact on agricultural land – the landfill footprint will be held to a maximum of approximately 12 ha. An additional 8 ha will be required for operating buildings, maturation area, roadways etc making total operating land requirement 20 ha. This will release nearly 90 ha of the 109.6 ha of cleared land for uses other than waste management. It is proposed that approximately 42.3 ha of the cleared land will be designated for ongoing agricultural use.

An important biodiversity offset – 13.6 ha of cleared land referred to above at the northern part of the property will be dedicated to improving biodiversity through development of a new stand of Grassy White Box Woodland to connect the existing two separate woodland stands. Further White Box planting would be undertaken to enhance the sparse woodland at the west and at the northeast of the property. The entire woodland precinct would be fenced to facilitate regrowth of understorey destroyed by grazing. In keeping with advice from Industry and Investment NSW (Agriculture), flowering trees and shrubs would be used to provide a diverse understorey to maximise bee nutrition.

Assistance for existing landholders – the proposed AWT facility will treat source-separated food/garden organics received from households and businesses with organic-rich wastes. The AWT output will be high quality compost suitable for application to farmlands in lieu of chemical fertilisers. Council proposes to make this compost available at no cost for two years to local farmers as a certified compost product. Preference will be given to applications where the objective is to upgrade the agricultural quality of farming land.

D.1.4 Apiary Industry

The economic impacts of potential infection of apiaries are not easy to quantify. If approximately 1,600 hives were at risk, a possible worse case scenario would be for up to 30% of hives could be infected at a value of $150 each (pers correspondence R Gulliford). The immediate cost would be about $72,000, to which would need to be added the loss of income from these hives as well as the heightened cost of eradication procedures and time to restore the apiary to full strength. This assumes that it can be established that the landfill is the cause, which would not be certain.

D.1.5 Sustainability Assessment

D.1.5.1 Introduction

The environmental sustainability of the Project has been assessed using a Life Cycle Assessment (LCA) methodology. This approach has enabled the Project to be assessed and benchmarked against a base case option. Environmental impact categories that are common to waste management systems analysis are reported against including:

- Global warming potential;
- Solid waste to landfill;
- Resource use benefits (soil structure and water use); and
- Air and water pollutant loads (considered for a limited range of transport air toxins and landfill).

The two options compared in terms of environmental sustainability include:

- Option 1. The Project – Organics composting and residual waste baling

This option is based on waste separation at source to maximise the value of recycling. It includes separate food and garden waste collection for Orange City Council, and enclosed composting of this material at Euchareena Road. It also includes resource recovery of recyclables and baling of residual waste at Ophir Road, for landfill disposal at Euchareena Road.

- Option 2. Base Case - Transport to remote landfill

  The second option involves the transfer of residual wastes to a remote landfill such as Dubbo, an assumed 150 km away from the current Ophir Road site. This option would involve bulk haulage of waste by semi trailers, B doubles or road trains. There is no additional resource recovery or composting of food and garden organics in this option.

D.1.5.2 Scope of assessment

The following parameters have been modelled for each of the two options:

- Global Warming Potential of landfilled wastes using the NGERS calculation procedures (tCO_2-e/yr);
- Landfill space – valued based on amenity losses ($/yr);
- Toxicity impacts of landfilled waste ($/yr);
- Soil Property Benefits of composting (water retention, soil structure, salinity, acidification);
- Landfill stabilisation benefits arising from toxicity reduction through organics removal;
- Benefits of compost avoided products (fertiliser, urea, KCl, pesticide);
- Greenhouse gas impacts of waste transfer (Ophir road to Euchareena Road vs Ophir road to Dubbo;
- Greenhouse gas impacts of extra food and garden waste collection services (preferred option only);
- Transport air toxins impacts of waste transfer (Ophir Road RRC to Euchareena Road RRC vs Ophir Road RRC to Dubbo; and
- Transport air toxins impacts of extra food and garden waste collection services (preferred option only).

D.1.5.3 Methodology

One underlying method for the environmental assessment of two waste management systems is LCA. LCA is internationally recognised (International Standard ISO 14040: 1997) as a technique for assessing the environmental aspects and potential impacts associated with a product or service, by:

- Compiling an inventory of relevant inputs and outputs of a product (or service) system;
- Evaluating the potential environmental impacts associated with those inputs and outputs; and
- Interpreting the results of the inventory analysis and impact assessment phases in relation to the objectives of the study.

This assessment has involved the application of publicly available LCA data within the context of an LCA assessment framework to determine the benefits of the preferred project over the business as usual option. This is achieved by using published data on the value of individual inventory loads extrapolated across the data using equivalence factors.

This is conducted in much the same way as a dollar value for carbon dioxide can be applied for other greenhouse gases such as methane using an equivalence factor. The financial valuation of environmental benefits is used to simplify the results and make the assessment more meaningful. It is a relative assessment between the two options and should not be used as an absolute value.

The steps involved in this environmental sustainability assessment are:

1. Detailed system characterisation and waste flow analysis;

2. Assessment of system components by LCA data acquisition and application to system boundary;

3. Gap analysis to define unquantified impacts and inventory data collection as appropriate; and

4. Impact assessment and financial valuation of inventory data.

D.1.5.4 Assumptions

Final approaches to modelling results are summarised in Table D.1-15 below.

Table D.1-15 System assumptions and assessment approaches by unit process

Unit Process	System assumptions	Approach
Waste collection	Option 1. Assume net collection for fortnightly garbage, weekly food and garden and fortnightly recycling is 500,000 km/yr. Option 2. Assume net collection of 375,000 km/yr for weekly garbage and fortnightly recycling.	Inventory data and NGA factors Valuation as per Appendix R
Waste transfer to landfill	Assume the assumptions are as follows: Option 1. Transfer distance of 40 km for a total of 98,000 km. Option 2. Transfer distance of 150 km for a total of 369,000 km. No backhaul assumed for either option – i.e. truck returns empty.	Inventory data and NGA factors Valuation as per Appendix R.
Kerbside recycling	Assume equivalent benefits across options	No difference assumed between systems
C&D Recycling	Assume equivalent benefits across options	No difference assumed between systems.
Organics Recycling	Assume compost benefits as per DECCW, 2005 update data for more recent sequestration and avoided product values. For toxicity reduction from carbon reduction to landfill use 90% (Stegmann, 1999).	Adapt and apply final LCA data and NGA factors See Appendix R for compost valuation

Unit Process	System assumptions	Approach
Waste to landfill	Assume landfill modelling as per NGERS 2008 with default NSW composition for MSW, C&I and C&D wastes. Assume no gas recovery with no legacy emissions. LCA data emissions attributable to each tonne of waste over the active life. For toxicity data, assume average between available published valuation data (NPCC, 2001; PC, 2007). Updated amenity valuation (NSW EPA, 1996) for current property price index.	Adapt and apply final LCA data NGERS modelling Valuation as per Appendix R
Waste compaction and baling	Assume compaction density of waste to be equivalent for bales and compacted landfill waste from 0.3 t/m^3 to 1 t/m^3. Assume plastic impact negligible and less than 5% significant to final results.	No difference assumed between systems

D.1.5.5 Comparative sustainability assessment

Based on the assumptions listed, the Project delivers a net environmental benefit, over the business-as-usual option, of $56/t. These benefits translate to a net annual benefit of $3.2 million per year.

As summarised in Table D.1-16, the greatest benefits arise from the stabilisation of landfill emissions to air and water as a result of carbon removal from waste. The next most significant benefits arise from compost application and these include soil property benefits such as improved water retention in soil, reduced salinity and soil structure decline, as well as the benefits from products avoided by the use of compost including fertiliser and pesticides. Based on the valuation offered by monetisation, climate change benefits from avoided landfill amount to less than 10% of the overall benefit.

Table D.1-16 Comparison of costs associated with each option

Net Impact ($/yr)	The Project - Organics composting and residual waste baling	Base Case - Transport all waste to Dubbo	Benefits of Project vs Base Case
GHG Assessment Waste - LCA emissions ($/yr). Assumes $30/t CO2-e	$1,019,591	$1,153,830	$134,238
Amenity loss from landfilled waste ($/yr)	$254,075	$367,668	$113,593
Toxicity impacts of landfill. Stabilisation assumed for carbon removal.	$130,917	$2,066,456	$1,935,539
Soil Property Benefits (water retention, structure, salinity, acidification)	-$458,967	-	$458,997
Compost avoided products (fertiliser, urea, KCl, pesticide)	-$506,409	-	$506,409
GHG Assessment Transfer impacts	$7,530	$32,129	$24,599
GHG Assessment Collection impacts	$49,249	$36,937	-$12,312
Transport air toxins - Transfer	$15,261	$60,626	$45,365

Net Impact ($/yr)	The Project - Organics composting and residual waste baling	Base Case - Transport all waste to Dubbo	Benefits of Project vs Base Case
Transport air toxins - Collection	$49,249	$36,937	-$12,312
Total (annual)	$535,547	$3,735,870	$3,200,324
Total stabilisation for organics removal LCA accounting			**$56/t**

Hence, the sustainability assessment shows that the Project is the superior option.

It is important to note that the financial valuation of environmental benefits is conducted only to simplify the results and make the assessment meaningful. It is a relative assessment between the two options and should not be used as an absolute valuation.

D.1.6 Mineral Resources

Golden Cross Resources Ltd (GCR), through a related Company Golden Cross Operations Pty Ltd holds Exploration Licence 6391 covering an area of approx 95 km^2 surrounding the former Copper Hill Mine located 2.8 km to the west of the Euchareena Road Site. GCR, in its comprehensive report dated January 2008, indicated that the Company has spent $5.5 million on the Copper Hill prospect throughout 2006 and 2007 and over $8 million since it acquired the project 10 years ago.

To date, the exploration around the Copper Hill Mine has defined a diffuse body of low grade mineralization extending NNW for almost 800 m, up to 500 m wide and to depths of over 400 m. The deposit is currently subject to resource estimation, pit optimization, mining and financial modelling studies.

Whilst GCR's exploration focus has been around the Copper Hill prospect and adjacent eastern zone, a range of geophysical techniques have been used to define exploration targets beyond the central area of defined mineralisation. One target identified to date is the 'Power Anomaly' located approximately 1 km southwest of the proposed landfill on the Euchareena Road Site. GCR has sought and received support from the Proponent to undertake both soil geochemical and air core sampling within the southwestern corner of the Euchareena Road Site within an agreed/preferred exploration area (see Figure C.2-3).

Figure D.1-5 displays the location of the Power Anomaly, the area of principal interest around the anomaly and the extent of soil geochemical and air core sampling.

The results of the exploration on the Euchareena Road Site to date may be summarised as follows:

- The soil survey indicates that there is a diffuse, weak gold-in-soil anomaly in the vicinity of the Power Anomaly; and
- The air core drilling in the vicinity of the Power Anomaly indicates that while there are scattered results returning values of up to 2.02 ppm gold, there is no co-incident copper anomalies, a feature associated with mineralisation elsewhere at Copper Hill.

These results suggest that the potential for the Power Anomaly to host a significant body of mineralisation is low. If, however, such a body of mineralisation is defined to be associated with the

Power Anomaly, comparisons with surface anomalies at Copper Hill suggest such mineralization would either be more deeply buried or significantly smaller than the principal mineralisation at Copper Hill.

Finally, should economically recoverable mineralization associated with the Power Anomaly be identified, it is likely that mining operations and the proposed Euchareena Road RRC could co-exist and that there may be a number of synergies between the operations.

In conclusion, the proposed Euchareena Road RRC would not adversely impact on any potential future development centred on the former Copper Hill Mine because of the distance between the Euchareena Road Site and the defined mineralisation. Further, in the event that mineralisation at the Power Anomaly can be economically mined, it is likely that the proposed Euchareena Road RRC and any proposed mining operation could co-exist. Such a coexistence would not impact negatively on the economic benefits arising from the venture on the Molong community.

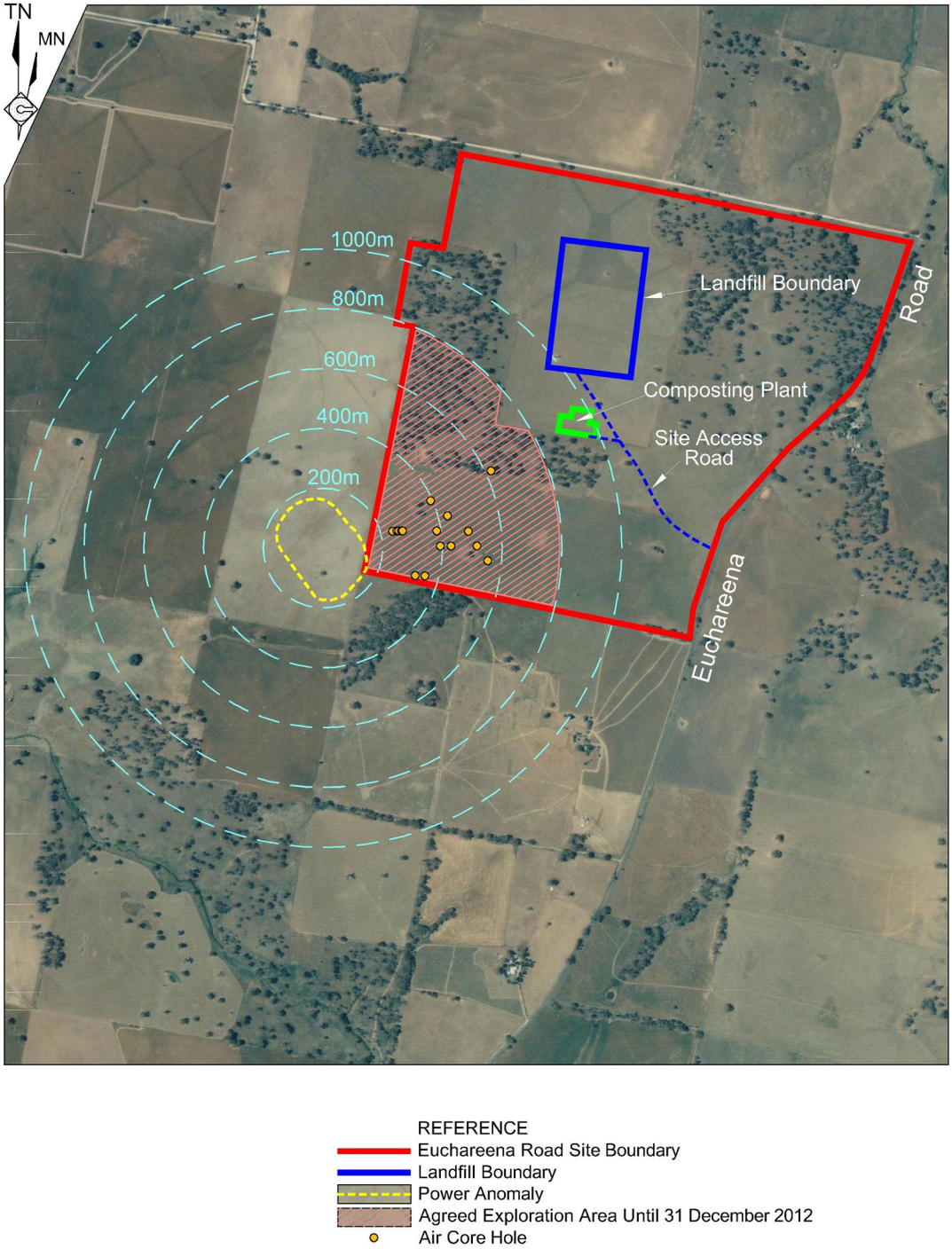

Figure D.1-5 Power Anomaly and the Euchareena Road Site

D.2 Greenhouse Gas Assessment

D.2.1 Introduction

This information presented in this section is based on the findings of the greenhouse gas assessment undertaken by GHD (2009d). The greenhouse gas assessment report is included in Appendix S of this Environmental Assessment.

The greenhouse gas assessment was conducted in accordance with the general principles of:

- The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard developed by the World Business Council for Sustainable Development; and
- The Commonwealth Department of Climate Change (DCC) National Greenhouse Accounts (NGA) Factors, 2008).

The scope and methodology for conducting the assessment was based on the Director-General's requirements for the Project. These included a requirement for assessment of scope 1 and 2 emissions. Assessment of scope 3 emissions was not required. As a result, the emissions sources considered included:

- Emissions from fuel use associated with site preparation and construction at both the Ophir Road Site and Euchareena Road Site;
- Diesel usage by mobile equipment during operation at the relocated materials recovery facility, baling plant and compost plant;
- Diesel usage for waste transport / transfer between the Ophir Road RRC and Euchareena Road RRC, delivery of biosolids sourced from the Orange Sewage Treatment Plant and offsite transport of finished compost products;
- Diesel usage for landfill operations and for transfer of compost residuals to the landfill;
- Electricity use during construction and operation;
- Emissions from fixed equipment;
- Emissions from the composting process; and
- Landfill gas emissions from the Euchareena Road landfill.

D.2.2 Assumptions

Assumptions used in estimating the energy use and greenhouse gas emissions for the construction of the Project are listed in Table D.2-1.

Table D.2-1 Construction energy use and greenhouse gas emissions assumptions

Parameter	Data Source and Assumptions
Diesel used in construction equipment	Construction equipment types and durations of use were estimated. Diesel consumption was estimated based on equipment type and assumed specifications from manufacturers' websites as 282 kL over the construction period. This includes construction of each cell of the landfill (8 cells in total).

Parameter	Data Source and Assumptions
	Diesel is assumed to have an energy density of 38.6 GJ/kL and emissions factor both from Table 4 of the DCC NGA Factors publication (2008) for fuel combustion emission factors – fuels used for transport energy purposes.
Electricity for site offices	Quantity estimated based on typical site shed use as 75.9 MWh over the construction period. Emission Factor from Table 5 of the DCC NGA Factors publication (2008) for NSW (Scope 2).

Assumptions used in estimating the energy use and greenhouse gas emissions during operation are listed in Table D.2-2.

Table D.2-2 Operation energy use and greenhouse gas emissions assumptions

Parameter	Data Source and Assumptions
Electricity use	Quantity of electricity consumed by the relocated MRF, baling plant, compost facility and amenities buildings during operation estimated based on the existing Ophir Road MRF electricity and similar baling and composting plants in NSW to be 1,590 MWh/year. Emission Factor from Table 5 of the DCC NGA Factors publication (2008) for NSW (Scope 2).
Diesel use in mobile equipment	Quantity of diesel consumption from mobile equipment in the relocated MRF, baling plant and compost facility estimated to be 27 kL/year, based on the existing Ophir Road MRF mobile plant fuel consumption and similar baling and composting plants in NSW. Diesel energy density is 38.6 GJ/kL (Table 4 NGA). Emissions factor from Table 4 NGA.
Diesel for transport / transfer of waste	Fuel use for transportation / transfer of baled and non-baled waste between Ophir Road RRC and Euchareena Road RRC, plus transport of biosolids and compost product to market is estimated to be 82 kL/year. Fuel consumption estimates for fully loaded and empty trips were taken from Volvo Truck Corporation (2008) *Emissions from Volvo's Trucks* to be 0.3 L/km and 0.4 L/km for leachate tanker, biosolids delivery truck and compost trucks (empty and fully loaded trips respectively). For transfer vehicles for mixed (mostly C&D) waste, baled and non-baled waste fuel consumption factors of 0.32 L/km and 0.53 L/km were used (for empty and fully loaded trips respectively). Diesel energy density is 38.6 GJ/kL (Table 4 NGA). Emissions factor from Table 4 NGA.
Landfill operation and transfer of compost residuals	Fuel use for landfill operation and transfer of compost residuals to landfill was estimated to be 29 kL/year. Diesel energy density is 38.6 GJ/kL (Table 4 NGA). Emissions factor from Table 4 NGA.
Landfill emissions	50% capture and treatment of landfill gas. Default DCC waste mix composition amended to reflect waste flows associated with the Project – as shown in Figure A.3-4. Refer section C.1.6.8 for detailed results on landfill gas modelling.
Compost emissions	Methane and nitrous oxide emissions factors from section 4.2 NGA.

D.2.3 Modelling and Results

The scope 1 and scope 2 emissions associated with the construction of the Project are listed in Table D.2-3.

Table D.2-3 Construction scope 1 & scope 2 emissions

Emissions Source	Quantity Consumed	Scope 1 Emissions (t CO_2-e)	Scope 2 Emissions (t CO_2-e)
Diesel use in construction vehicles	282 kL	761	-
Electricity for site sheds/amenities	75.9 MWh	-	68
Subtotal*		**761**	**68**
Total		**829**	

*Note: Figures in table may not sum exactly to total value due to rounding.

The scope 1 and scope 2 emissions associated with the operation of the Project are listed in Table D.2-4.

Table D.2-4 Operations scope 1 & scope 2 emissions

Emissions Source	Quantity Consumed Annually	Scope 1 Emissions (t CO2-e/year)	Scope 2 Emissions (t CO2-e/year)
Diesel use in mobile equipment	27 kL	72	-
Diesel for transport / transfer of waste	82 kL	222	-
Landfill operation and transfer of compost residuals	29 kL	77	-
Landfill emissions		14,250	-
Compost emissions		3,208	
Electricity for operations	1,590 MWh	-	1,415
Subtotal*		**17,829**	**1,415**
Total		**19,244**	

*Note: Figures in table may not sum exactly to total value due to rounding.

The results from the greenhouse assessment are summarised Table D.2-5.

The total Scope 1 and 2 emissions during construction amount to 829 t CO_2-e or 21 t CO_2-e/yr assuming a design life of 40 years. Total annual emissions during operation amounts to 19,244 t CO_2-e. The estimated annual emissions from the Project is 19,265 t CO_2-e (assuming a design life of 40 years).

Table D.2-5 Greenhouse assessment summary

Greenhouse indicator	Note	Value	Units
Net annual emissions	1		
◗ Scope 1		17,848	t CO_2-e/yr
◗ Scope 2		1,417	t CO_2-e/yr
Total		**19,265**	**t CO_2-e/yr**
Greenhouse intensity of the Project (Scopes 1, 2)	2	0.29	t CO_2-e/t waste
Total annual NSW emissions	3	151.6	Mt CO_2-e/yr

Notes:

1. Refer to the greenhouse gas assessment report (Appendix S) for definitions of reporting scopes. A detailed emissions inventory can be found in the greenhouse gas assessment report (Appendix S)
2. Greenhouse intensity based on annual Scope 1 and 2 emissions (excluding annualised decommissioning emissions). 'waste' refers to C&I recycling, domestic kerbside recycling (both Orange and regional), C&I mixed waste, domestic mixed waste (Orange and regional), C&I food/garden organics, domestic food/garden organics (both Orange and regional), biosolids, VENM and C&D (both Orange and regional)
3. Total annual NSW emissions based on DCC (2009) 'State and Territory Greenhouse Gas Inventories 2007'

D.2.3.1 Greenhouse intensity

The emissions intensity for construction and operation of the Project is 0.29 t CO_2-e/ t waste processed, including scope 1 and scope 2 emissions considered in the assessment. Comparative figures for similar plants (with MRF, baling, composting and landfill) are not available.

D.2.3.2 Potential Impacts

Considering scope 1 and 2 emissions, the Project is expected to generate 19,265 t CO_2-e of greenhouse gas emissions. The total annual NSW emissions for 2007 was 151.6 Mt CO_2-e. Hence, the estimated annual Scope 1 and 2 emissions from the Project would equate to approximately 0.01% of the state's total emissions.

Implementation of the Project would result in diversion of a significant quantity of waste, including organic waste, from the landfill, which would otherwise have contributed to landfill gas generation.

D.2.4 Mitigation measures

The most significant contribution of greenhouse gas emissions from the Project would come from the degradation of waste in landfill (approximately 74% of operational emissions). Despite this, the level of landfill gas generation is judged to be relatively low and not sufficient for commercially viable recovery and energy (electricity) generation. However, it is proposed that an appropriate landfill gas management system would be developed during the detailed design phase of the Project, which would involve a passive landfill gas drainage and flaring system. This would help significantly reduce the emissions from the landfill and therefore the overall emissions from the Project.

During operation the Project would consume approximately 1.6 GWh of electricity annually (across both sites). During detailed design of the baling plant, new MRF building and compost facility, it may be

possible to integrate additional energy efficiency measures to reduce consumption of electricity. For example:

- Wide-panel skylights would be considered for installation on the roof of the baling building to maximise use of natural lighting;
- A variety of efficient lighting alternatives, including fluorescent lamp options would be considered;
- Where feasible and cost-effective, energy efficient lamp and lighting control technologies would be considered in amenities blocks;
- The gatehouse and amenities block would require air-conditioning / heating and components to be installed outside the building would be located in shady areas, or provided with artificial shading to improve efficiency with which heat is rejected from the building; and
- Passive cooling arrangements would be used for the baling building and compost facility in order reduce overall heat load rather than installation of an air conditioning system.

In addition, during the detailed design stage of the Project, where possible, energy efficiency would be considered in the selection of equipment.

PART E
Alternatives Considered

E.1 Alternative Landfill and Resource Recovery Sites

The Proponent purchased the Euchareena Road Site on 31 January 2002 following a lengthy process to select a suitable site. A brief chronology of the site selection process to early 2002 is set out as follows.

- September 1997 - Orange City and Cabonne Councils' Joint Waste Management Committee commissioned a Regional Landfill Investigation/Feasibility Study – essentially a desktop study based on information available from Cabonne Council and various State government agencies.
- December 1997 - The Regional Landfill Investigation/Feasibility Study identified a range of constraints that would influence the selection of a suitable site. Two potential areas near the centre (or hub) of the Cabonne LGA were identified.
- July 1998 - A draft Heads of Agreement was prepared between Orange City and Cabonne Councils for the establishment and operation of a regional reprocessing facility. At that time, both councils recognized there should be less emphasis placed on land filling and more emphasis placed upon considering wastes as a resource.
- June 2000 - Circulation of an information brochure to residents of Orange City and Cabonne LGA's outlining the Councils' intention to locate a site for 'a reprocessing hub' to be acquired with the community's consent. A total of 11 community discussion meetings were held throughout Orange City and Cabonne LGAs as a follow up from the circulated information brochure.
- February 2001 - A discussion paper entitled 'Site Selection Criteria for the Regional Resource Processing Facility' was completed for the Councils' Joint Waste Management Committee. The paper included 22 criteria relating to regional, local and site specific issues. This document was advertised in the Central Western Daily and the Molong Express together with a request for offers of suitable land for the Councils' consideration that satisfied the site selection criteria.
- June 2001 A final evaluation was undertaken of two sites offered following the February/March advertisement and two sites identified during the December 1997 feasibility study. The site now referred to as the Euchareena Road Site, was identified to be far superior than the other three sites assessed.

Throughout and following the preparation of the EIS for the Hub Regional Resource Recovery Facility, landowners around the Euchareena Road Site have regularly challenged the Proponent regarding the above process. There was an expectation of surrounding landowners, largely reflecting their rural/ agricultural pursuits, that a waste management facility should not be located on prime agricultural land (in their locality). These landholders did not place the same emphasis upon the critical issues relating to on-site water management and the protection of groundwater resources (via a thick clay resource). Both of these issues were in fact paramount in the selection of the Euchareena Road Site.

Site selection criteria

The Proponent considered it important to seek community input into the criteria that were to be used to select a site for the facility designed and operated to manage the wastes generated in both Orange City and Cabonne LGAs.

Review of alternative sites

Whilst re-considering its approach to the overall project following the decision of the NSW Land & Environment Court, the Proponent commissioned Wright Corporate Strategy Pty Ltd (WCS) to undertake a further review of alternative sites for a waste facility comprising of some form of Alternative Waste Technology and a landfill for residual wastes. WCS in turn contracted Mr. Robert H. Amaral, an experienced waste management / geotechnical engineer, to undertake the further review of alternative sites.

Mr. Amaral prepared four assessments covering a total of 63 alternative sites between June 2008 and May 2009. His report for each site is reproduced within Appendix D.

The four assessments covered the following.

Part 1: Fifty five (55) sites throughout Orange City, Cabonne, Blayney and Bathurst Local Government Areas. Each site was selected by Mr. Amaral initially as part of a desk-top study with the site evaluation of preferred sites involving a drive-by observation.

Part 2: Four (4) sites throughout Cabonne and Parkes Local Government Areas provided to Orange City Council in response to a request to the public for Expressions of Interests for sites satisfying criteria assembled by Mr. Amaral. The four (4) sites offered to the Proponent were submitted during the period between 11 December 2008 and 12 January 2009, referred to as the Expressions of Interest period.

Part 3: Three (3) additional sites within the Cabonne Local Government Area submitted confidentially following the closure of the Expressions of Interest period.

Part 4: One (1) further site, namely Phillip Street Quarry, was considered further by Mr. Amaral.

An overview of the approach to Mr. Amaral's site selection process and the results of the process are outlined as follows.

Part 1: 55 sites through Orange City, Cabonne, Blayney and Bathurst LGAs

At the outset, the site selection process focused on selecting a site that would enable 'an environmentally secure landfill capable of receiving any residential or 'end of pipe' waste not suitable for any other purpose'. Mr. Amaral's site selection methodology initially focused on identifying sites based upon topography as this feature is fundamental to ensure the 'shape' of the landform could contain wastes and avoid 'run-on of surface water during rainfall events'. Mr. Amaral focused on topography for the initial sites selected as those sites at the head or top of an isolated catchment area are capable of being progressively filled from upgradient to downgradient with no external run-on of surface water. Suitable topography also provides benefits for visually screening a site.

The above process, based solely on topography, yielded 55 potential sites throughout Orange City, Cabonne, Blayney and Bathurst Regional LGAs (see Figure E.1-1). Three (3) of the 55 sites had been previously considered by the Proponent as part of the previous site selection process.

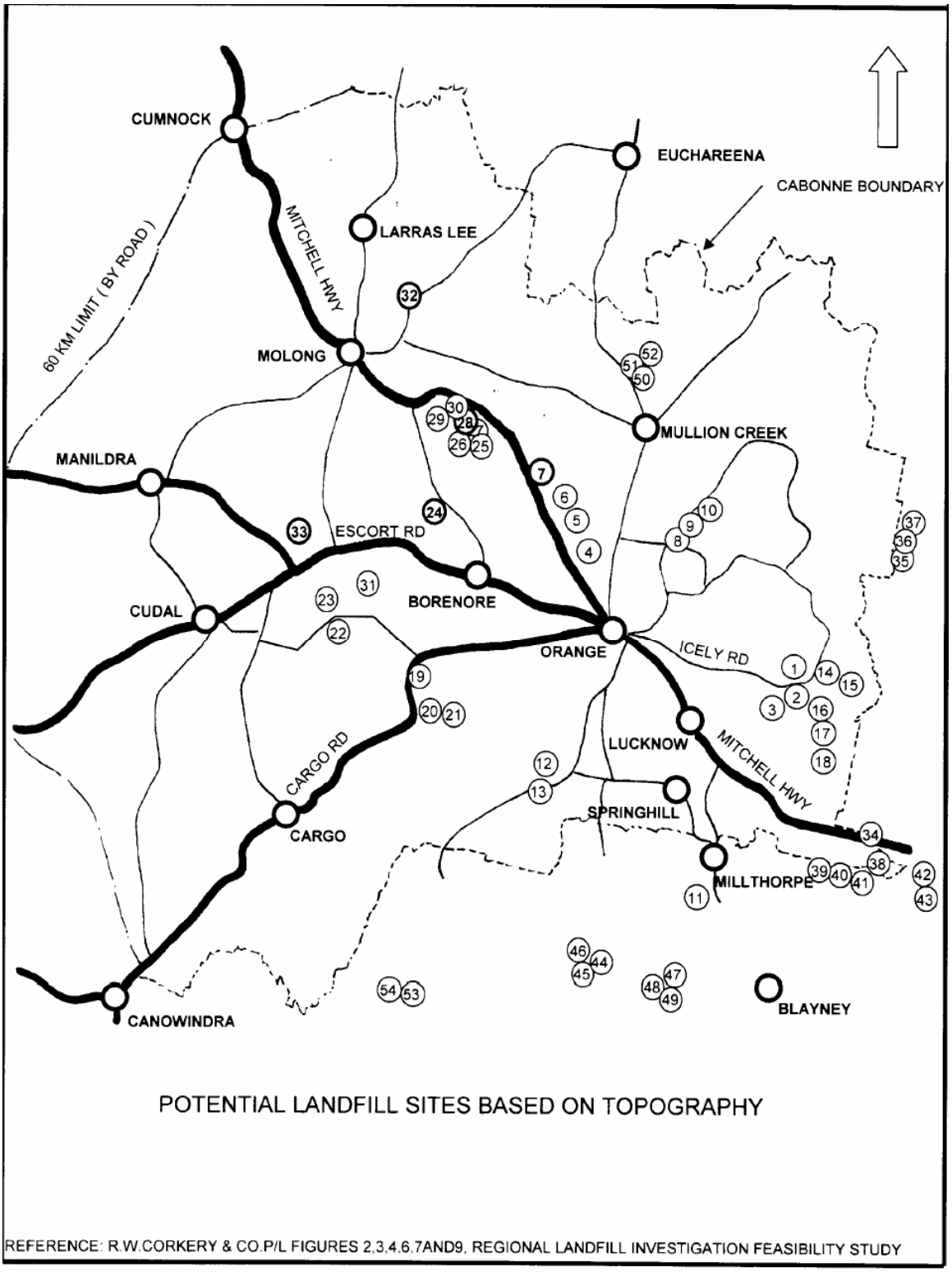

Figure E.1-1 Potential landfill sites based on topography

Mr. Amaral progressively reduced the number of sites through the consideration of a range of factors initially through a desk-top study and finally by undertaking a 'drive-by' view of the nine (9) preferred sites. The 'fatal flaws' factors should be evaluated by Mr. Amaral first including the following.

- Geology/soils/permeability
- Loss of amenity to existing or future residents
- Diverse or complex natural flora/fauna habitat
- Multiple titles to land
- Proximity to permanent water courses/water bodies
- Difficult/expensive access and/or development
- Landfill cover deficit

Table E.1-1 displays the sites discarded following the first stage of evaluation together with their reasons for being discarded. The Stage 1 process discarded 46 of the original 55 sites. Each of the remaining sites were viewed by Mr. Amaral from adjoining land or roadways. As a result of this process, four (4) further sites were discarded (see Table E.1-2).

Table E.1-1 Site selection summary (discarded sites – stage 1)

Site	Reason for discard	Site	Reason for discard
3	S, E(R), PW	30	EW
4	S, MT (buffer area)	31A/B	MT, LOA, E(R)
5	S, LOA, HP	24	LOA (Bathurst)
6	MT, HP, E(R), PW	35	D (Bathurst)
8	E(R), LOA, H	36	D (Bathurst)
9	LOA, S	37	D (Bathurst)
10	E(R), LOA, H, S	38	MT, EW, S
11	MT, S, D (Blayney)	39	D (Blayney), EW, LOA
14	H, LOA, E(R)	40	D (Blayney), MT, EW, LOA
15	E(R), H, LOA	41	D (Blayney), MT
16	E(R), H	42	D (Bathurst), E(R)
17	E(R),	43	D (Bathurst), E(R)
18	E(R), H	44	D (Blayney), LOA, PW
19	S, E(R), T, PW	45	D (Blayney), H
20	E(R), (LOA), PW	46	D (Blayney)
21	E(R), (LOA), PW	47	D (Blayney), MT, EW
22	E(R), MT	48	D (Blayney), EW, LOA
23A	E(R), MT	49	H, LOA, T

Site	Reason for discard	Site	Reason for discard
23B	E(R), MT	50	E(R), H
25	MT, PW	51	E(R), LOA
26	E(R), MT	52	E(R), LOA
27	MT, EW	53	D (Blayney)
29	EW, MT	54	D (Blayney), MT

LOA – Loss of Amenity
S – Special (Proximity to Orchards)
IB – Inadequate Buffer
HP – Historic Property
E(R) – Difficult/Expensive Roadworks
MT – Multiple Land Titles
EW – Exposure to Wind
T – Traffic Issue
H – Diverse Flor/Fauna Habtitat
PW – Proximity to Water Bodies
D – Distance from Orange

Table E.1-2 Site selection summary (discarded sites – stage 2)

Site	Reason for discard	Comments
1	E(R) Icley Road	Very favourable site within a pint plantation. Poor intersection off Icley Road
2	E(R) Icley Road, EW	Would need extensive planting to provide visual screen and wind protection
12	E(R) on site, T	Would also require Giles Road/Four Mile Creek Road upgrades. Snow would provide OH&S issues at times in winter and possible road closures
13	E(R) on site, T	Would also require Giles Road/Four Mile Creek Road upgrades. Snow would provide OH&S issues at times in winter and possible road closures. Poor intersection off Four mile Creek Road

LOA – Loss of Amenity
S – Special (Proximity to Orchards)
IB – Inadequate Buffer
HP – Historic Property
E(R) – Difficult/Expensive Roadworks
MT – Multiple Land Titles
EW – Exposure to Wind
T – Traffic Issue
H – Diverse Flor/Fauna Habtitat
PW – Proximity to Water Bodies
D – Distance from Orange

Table E.1-3 records a range of comments assembled by Mr. Amaral for the remaining five sites. Mr. Amaral favoured the discarding of one further site (No. 33) at that stage given the potential access difficulties and multiple owners.

Mr. Amaral's initial report concluded that four sites should be short-listed for further evaluation.

Mr. Amaral's review of the four sites established that the Euchareena Road Site was a suitable site for waste disposal and the three alternative sites, whilst not tested geologically had potential. Although issues relating to visibility and exposure to wind would need to be managed.

Given none of the final alternative three sites were considered superior to the Euchareena Road Site, and the environmental attributes of the site were known to be excellent, the Proponent acknowledged it was appropriate to focus the long term land filling component of the Project (with the enclosed composting plant) at the Euchareena Road Site.

Table E.1-3 Site selection summary (recommended site)

Site	Comments
7	◗ Excellent access of Mitchell Highway ◗ Located within 1 holding ◗ Although somewhat exposed (visual/wind) it could be readily buffered by extensive plantings (possibly pine forest) ◗ The likely good (low permeability) soil/rock sequence needs confirmation by test pitting/drilling ◗ Approximately 1 km to Historic Property buildings
24	◗ Access via Escort Road and Amaroo Road is paved ◗ Likely located within 1 holding ◗ Exposed to SW wind. Could be buffered by extensive plantings (possibly pine forest) ◗ The likely good (low permeability) soil/rock sequence needs confirmation by test pitting/drilling ◗ Exposed to distant views from 2 properties
28	◗ Excellent access off Mitchell Highway ◗ Located within 1 holding ◗ Exposed to SW wind. Could be buffered by extensive plantings (possibly pine forest) ◗ The likely good (low permeability) soil/rock sequence needs confirmation by test pitting/drilling
32	◗ 40 km from Orange (transport costs will remain a problem) ◗ Traffic through edge of Molong ◗ Rural residential lots to south (maximum 7 to be developed?) ◗ Site could be readily buffered by extensive plantings (possibly pine forest) ◗ Proven good (low permeability) soil/rock sequence ◗ Proven deep (40 m) non-saturated soil/rock attenuation zone beneath site ◗ Poor quality groundwater (TDS>1,000 mg/L) ◗ Land owned by Orange City Council ◗ Needs resolution of potential bee colony contamination with abutting Owner
33	◗ Possible multiple owners ◗ Access may need to be through adjoining properties ◗ Sandy Creek Road upgrade required (could be a total of 6-7 km depending upon access into site) ◗ The likely good (low permeability) soil/rock sequence needs confirmation by test pitting/drilling

Part 2: Four (4) sites throughout Cabonne and Parkes local government areas

A total of four sites were offered to the Proponent by two individual property owners, Cabonne Council and a company near Parkes that owns the former Parkes Gold Mine. Mr. Amaral assessed that each of the former sites would have been discarded in the first round of his initial assessment for reasons

comparable to many of the 44 sites included in Table E.1-1. The reasons for discarding the four sites are outlined below.

Site A1: Loss of amenity; distance from Orange; Limited size, Unlined and pervious soil.

Site A2: Proximity to water bodies, loss of amenity and limited size.

Site A3: Distance from Orange; loss of amenity (trucked traffic through Parkes); major development costs required; existing pit has OH & S issues; complex shared responsibilities associated with developing this site (ownership & environmental).

Site A4: Distance from Orange; difficult/expensive road works (creek crossing); proximity to water bodies; difficult development due to steep land; loss of amenity, extensive buffering from road required

Utilising the former gold mine at Parkes (Site A3) would require waste to be transported over 100 km each way. The site has no approval to operate as a landfill, and would likely remain in private ownership during and after use as a landfill.

Part 3: Three (3) additional sites within the Cabonne local government area

Three further sites were offered confidentially to the Proponent following the closure of the Expressions of Interest period. Mr. Amaral reviewed these sites and similarly established the sites were not suitable.

Part 4: Phillip Street Quarry

Mr. Amaral reviewed the suitability of the Phillip St Quarry near the Ophir Road RRC and considered the quarry as an opportunistic site with the following major drawbacks which would make it difficult to obtain approval to be developed as a landfill.

- Loss of amenity for many local residents into the future (likely in excess of 50 years).
- The site is relatively close to an existing watercourse (Blackman's Swamp Creek).
- Groundwater is being extracted within 1.3 km of the site.
- The upper filling levels will be exposed to views and wind.
- Current traffic (5 days per week) would be increased (7 days per week).
- Operating the quarry and landfill jointly could create long term OH & S issues relating to the high quarry walls.

It is further noted that the Phillip Street Quarry has in the order of 3 million tonnes of high quality hard rock suitable for the production of a range of aggregates suitable for use throughout Orange City for its long term development. Realistically, this quarry which has an approval to extract the subject rock at a rate of between 50,000 t/yr and 75,000 t/yr could have an operational life of between 35 and 50 years.

To forego the extraction of this resource would be short sighted on the Proponent's behalf as its close proximity to Orange City and future development areas around the city. Increased development costs, particularly for the Proponent if this resource is not fully exploited. Furthermore, the importation of aggregates from the quarries surrounding Orange i.e. at Shadforth and Larras Lee (average 80 km return trip to Orange). The Proponent recognises, given the success/need for the stormwater harvesting program near Blackman's Swamp Creek, there is likely to be considerable benefit for the void created within the quarry to be used for stormwater harvesting.

E.2 Consolidate all Waste Operations in Orange

The scope to conduct AWT operations and continue waste disposal at the Ophir Road RRC was raised as a possibility during the Land and Environment Court case. However, the landfill is approaching its ultimate capacity and with other resource recovery operations already taking up much of the above ground space at the site, insufficient space is available for an AWT facility. Further, the only vacant land located near the waste management site is being used by the Proponent for stormwater harvesting – a vital need, given the current drought position in Orange and the Central West generally.

Some stakeholders have raised the idea of siting an AWT facility at a nearby Phillip Street Quarry. This proposition ignores the fact that the quarry is in current use and is far from depleted with some 3 million t of rock remaining. To access a similar material for use in orange would require transport from some 20 km away, generating truck movements, fuel and greenhouse gas emissions similar to the transport of materials to Euchareena road of some 44 km to a total volume of 1.5 million t.

In any case, the Proponent recognises the land use conflict issue that would be presented by placing an AWT in this increasingly urban context. The actual operating experience in Australia with AWTs is that odour and noise impacts can extend beyond confined operating site boundaries – a challenge that is not present at the Euchareena Road Site.

A further issue for the Proponent would be the operating complexity and increased cost brought about by having waste management activities at three sites.

This broad option also misses the point that the landfill within the Ophir Road RRC is nearing completion and access to new landfill capacity will be required in as few as five years see section A.4 on Justifiable Demand.

E.3 Alternative Regional Landfill Possibilities

Possible alternatives to the Project include making use of existing landfills already in operation at other regional centres. To provide a viable alternative to the 40 year expected life of the Euchareena Road RRC landfill, a regional landfill would need to have a large capacity. This would rule out most of the landfills operated by other regional councils in the Central West, as they are of small capacity, and their current consents would not be likely to permit large quantities of extra wastes to be received from Orange.

However, there is a council operated landfill at Dubbo some 150 km distant which has sufficient capacity to accept waste from Orange for at least 40 years, even if no recovery of food/garden organics occurs. In this Environmental Assessment (Section D.1.1), financial modelling of two options involving long term use of the landfill at Dubbo has been undertaken. One involves sending only residuals to Dubbo (continuing to offer a separate food/garden waste collection and enclosed composting service to Orange residents), while the second involves sending all wastes to Dubbo.

This has demonstrated that although it is technically feasible to proceed this way, both would be more expensive than the Project, and sending all waste to Dubbo (the base case) would not provide any improvements in diversion. Both would leave the Proponent with little control over future CPRS liabilities and landfill levies. Transport costs would be significant in both cases. There is also a probable need for the landfill host to gain appropriate new statutory approvals.

A second possible landfill site with sufficient future capacity is the Woodlawn Bioreactor landfill, near Goulburn. This site is disadvantaged by the transport distances and freight rail logistics, which may result the journey taking 3-5 days to complete. To accommodate this, the Proponent would probably have to purchase two sets of dedicated rail wagons. Hence there would be valid concerns about the state of the putrescible waste when it arrived at the site, due to the time spent in sealed containers.

In this situation, there would also be a need for the landfill host to gain appropriate statutory approvals. The scheme would also leave the Proponent open to landfill practices and gate pricing over which it would have only limited control or recourse. This option would also not assist the Proponent in achieving the State waste avoidance and resource recovery targets.

Another alternative that has been raised by community groups is the use of the Cadia Mine site for landfilling. This would require an area to be allocated for a landfill within the existing buffer zone which has been acquired by Cadia. The area would need to be appropriately located (i.e. so as not to impact on Cadia's mining activities) and terms negotiated so as to give adequate long term control to the Proponent for waste disposal purposes, by entering into a long term lease/licence arrangement.

Advantages outlined by the community group were avoiding the need to upgrade Euchareena Road, and that the environmental and social issues facing the mine (although on a larger scale) are supposedly the same as those faced by the Proponent in operating its own waste facility. However, it is understood that Cadia did not respond to the Proponent's Expression of Interest for a new site, and that Cadia has not contacted the Proponent to express any interest in operating a waste facility on its land.

One site offered during the Expression of Interest process was the former gold mine site near Parkes (refer Photo E.3-1). This site did not meet the distance requirement for the site selection process, in that it was more than 100 km away from the Ophir Road RRC. It also has difficult slope stability issues that

would make landfilling potentially unsafe. Both of the above-mentioned options would leave the Proponent with little control over future CPRS liabilities and landfill levies. Transport costs would be significant in both cases. There is also a need in each case for the landfill host to gain appropriate new statutory approvals.

Another option raised in public forums has been the possible use of the old sale yards site siding for a waste facility, to transport waste from Orange on this rail link to an unspecified site near a rail line. Without knowing the distances involved, it is reasonable to say that the challenges and costs would be similar to the Woodlawn rail option discussed above.

Photo E.3-1 Former gold mine site near Parkes

E.4 Alternative Routes

A number of alternative routes between the previously proposed facility (The Hub) on the Euchareena Road Site and Mitchell Highway were investigated in the *Transport and Traffic Assessment Report* (Transport and Urban Planning 2005). The following is a summary of the conclusions of that investigation:

Euchareena Road

The longer-term use of Euchareena Road would require costly road pavement and sub-grade improvements together with intersection improvements with the Mitchell Highway. In the shorter term, road pavement/ shoulder maintenance including improvements to line marking and route delineation together with improvements to Back Creek Bridge may accommodate a low to moderate increase in daily truck traffic.

Shades Creek Road

The longer term use of Shades Creek Road would require costly road pavements and sub-grade improvements together with an improved intersection treatment at the Mitchell Highway. In the shorter term improvements to the road pavement would be required to accommodate truck traffic.

The adoption of this route would require all future truck traffic to travel through Molong to the north making this route the longest and most circuitous route to the facility for non-local traffic.

Belgravia Road

The longer term use of Belgravia Road would require costly road pavements and sub-grade improvements together with an improved intersection treatment at the Mitchell Highway. In the shorter term improvements to the road pavement would be required to accommodate truck traffic.

The adoption of this route would cater for trucks originating in Orange but may require all future truck traffic from Molong to travel south through Molong making this route the longest and most circuitous route to the proposed facility for local traffic.

Other Routes

Other routes considered were:

- Euchareena Road/ Back Saleyards Road/ Deight Road;
- Euchareena Road/ Back Saleyards Road/ Molong Street/ Marsden Street/ Wellington Street;
- Euchareena Road/ Belgravia Road/ Strathmore Lane;
- Euchareena Road/ Back Saleyards Road/ Molong Street/ Marsden Street/ Stuart Street; and
- Euchareena Road/ Copper Hill Road.

It was concluded in the Transport and Urban Planning (2005) report that these four route options were considered to be unlikely to be economically viable or adequately satisfy design constraints and road safety parameters in terms of intersection treatments with the Mitchell Highway, pavement suitability and the infrastructure improvements required to provide acceptable route performance levels.

PART F
Draft Statement of Commitments

F.1 Draft Statement of Commitments

Section 75F(6) of the NSW *Environmental Planning and Assessment Act 1979* states that the Director-General may require the Proponent to include in an environmental assessment a statement of the commitments the Proponent is prepared to make for environmental management and mitigation measures. The Director-General's requirements for the Project require that a draft statement of commitments be provided. In accordance with this requirement, this section provides the commitments for environmental mitigation, management and monitoring for the Project.

The Proponent commits to implement the measures outlined in Table F.1-1.

Table F.1-1 Draft Commitments

Issue	Commitments
Waste management strategy	The Proponent will implement its *Resource Recovery and Waste Management Strategy*, as described in Section A.3. This has the following key elements: ◗ Introduction of a third household mobile garbage bin for (weekly) collection of domestic garden waste together with kitchen-separated food waste; ◗ Differential landfill gate pricing at a level required to encourage source separation of business recyclable materials and food waste to provide clean streams for further processing; ◗ Increased landfill gate pricing for C&D waste to encourage source separation of recyclable materials and presentation of clean, unmixed streams; ◗ Further development of the current requirement for building applications to include waste management plans, with extension to include recycling plans that are subject to performance review; ◗ Working with NetWaste to continue improvement in event recycling opportunities; ◗ Action to improve the beneficial use of recycling yield from kerbside collected materials and C&I / C&D recyclables; ◗ Processing of food/garden organics at the Euchareena Road RRC using an enclosed tunnel composting technology; ◗ Continued recovery of dry recyclable materials at the Ophir Road RRC at a new MRF to be constructed; ◗ Baling of mixed residual waste at the Ophir Road RRC at a new baling facility to be installed; and ◗ Transport of baled mixed residual waste to the Euchareena Road RRC for disposal in a specially designed landfill.
Environmental management plans	Construction environmental management plans (CEMPs) would be prepared and implemented to guide environmental management and monitoring activities and compliant handling procedures during construction at both sites. The CEMPs would include the following sub-plans: ◗ Noise management plan – The plan would address how noise will be mitigated and managed during construction activities, in accordance with DECCW's Environmental Noise Control Manual; ◗ Flora and fauna management plan – The plan would address how impacts on flora and fauna would be mitigated and managed during the construction phase; ◗ Air and dust management plan – The plan will would mitigation measures to control

Issue	Commitments
	dust from exposed areas, stockpiles, plant equipment and unsealed roads; ◗ Waste management plan – The plan would include disposal requirements, measures to prevent the generation and measures to reduce, re-use or recycle wastes where possible; ◗ Soil and water management plan – The plan would address how potential construction impacts on soil and water quality will be mitigated and managed during construction works; ◗ Traffic management plan – The plan will include truck movements to and from the site, interactions with general public, parking and access requirements for construction personnel and safety signage and training of personnel in traffic management. Operational environmental management plans (OEMPs) would be prepared for both sites and implemented to guide environmental management and monitoring activities and complaints handling procedures during operation. The OEMPs would include the following sub-plans: ◗ Stormwater management plans – The plan would include the measures to retain and re-use the maximum amount of water on-site and ensure the surface run-off water is maintained at acceptable levels. The plan would also include erosion and sediment mitigation measures; ◗ Process water management plan (tunnel composting plant) – The plan would include measures to optimise reuse and ensure that wastewater generation and need for disposal is minimised; ◗ Air quality management plan – The plan would include mitigation measures for control of odours, dust and particles and monitoring undertaken. ◗ Noise management plan – The noise management plan will include noise control measures, monitoring. ◗ Pest, vermin and weed control – The plan will outline mitigation measures that will control pest and vermin that may be attracted to the waste facility and minimise the degradation of the local amenity caused by pest, vermin and noxious weeds. ◗ Traffic management plan – The plan will include parking and access requirements, safety signage and training of personnel in traffic management. ◗ Fire management plan – The plan would include details of sources of water for firefighting, the need for fire extinguishers on all mobile equipment and suitable training for site-based personnel.
Revegetation, rehabilitation and post closure management	The Proponent would undertake a program of progressive revegetation in those areas progressively disturbed by the operations and of the area designated for vegetation enhancement to the north of the landfill at the Euchareena Road Site. The Proponent would continue to manage the Euchareena Road Site following closure of the landfill and enclosed tunnel composting facility, in accordance with the documented set of procedures compiled in conjunction with the Site Closure plan. The Proponent would monitor the Euchareena Road Site in accordance with the site's EPL.
Soils and land capability	The Proponent would implement the following measures for the management of soil at the Euchareena Road Site: ◗ Double skin diesel storage tanks would be used to prevent fuel leakages; ◗ Topsoil would be stockpiled and used later for rehabilitation of the final landscape; ◗ Material at depths greater than 0.75 m would be stockpiled for use in bund wall construction, daily cover or landfill capping; ◗ Handling of topsoil would be minimised to reduce potential mechanical damage to soil structure;

Issue	Commitments
	◗ Care would be taken to ensure that topsoils and subsoils are not stripped when they are too moist; ◗ Driving of machinery on topsoil and subsoil stockpiles, other than scrapers during unloading, would be kept to a minimum; ◗ Topsoil stockpiles would be up to 1 m high and subsoil stockpiles would not exceed 3 m in height; ◗ Subsoil and topsoil stockpiles would be located within the footprint of the landfill or on the upper surface of completed landfill stages; and ◗ Stabilisation measures would be used until vegetation is established on the stockpiled soil.
Surface water	At the Ophir Road RRC, The Proponent would continue to comply with the existing LEMP. Sediment dams would be constructed prevent runoff from the Euchareena Road landfill from reaching water catchments.
Groundwater	The Proponent would ensure the proper compaction of the floor of each landfill cell and the maturation pad to achieve a uniform low permeability equivalent to less than 1 x 10^{-9} m/s for a depth of at least 0.9 m. The in situ permeability of compacted material would be tested by sampling and laboratory testing to ensure the required permeability level has been achieved. The Proponent would undertake a groundwater monitoring program at the Euchareena Road Site including groundwater level and quality monitoring as per the EPL for the Site.
Flora & fauna	The Proponent would further enhance the two woodland areas with plantings of all species. In addition, the Proponent would plant a rehabilitation corridor to ultimately join the two existing woodland areas and improve nature conservation across the site. The Proponent would encourage natural regeneration by installing tree guards and appropriate fencing of regeneration areas. Diverse native flowering flora would be planted in other regions to increase the biodiversity and availability of nectar for foraging bees. The Proponent would implement weed management measures including: ◗ Regular inspections of the Euchareena Road Site. ◗ Education of staff with respect to weed identification and control. ◗ Continual monitoring and control of identified noxious weeds. ◗ Investigation into the practicality of sowing crops or competitive improved pastures on sections of the Site not required for immediate disturbance as a means of weed control. The Proponent would also establish permanent quadrats / transects across the western and northeastern woodland areas to enable periodic monitoring to record the extent of flora regrowth within the protected woodland remnants. Where species diversity is found to be insufficient from monitoring, supplementary planting programs would be undertaken. Prior to the removal of any isolated paddock tree, a pre-start survey would be carried out to minimise the potential impact on spring nesting birds and over-wintering bats or any other species utilising the tree at the time. Timber from felled trees would be relocated to a position where it can form part of the ground cover habitat in the woodland habitat on site. The areas of Euchareena Road Site that are not directly affected by the proposed

Issue	Commitments
	activity would be destocked and remain free of grazing by domestic stock until such time when a long term vegetation rehabilitation management plan can be implemented to ensure the recovery of the woodland remnants on the site. The existing remnant woodland areas would be fenced-off, if necessary, in order to allow the woodland remnants on site to regenerate free from uncontrolled stock grazing pressure. Slashing would be used to minimise fire risk. Vegetation screens would be no less than 20 m wide to enhance wildlife habitat corridors around the perimeter of the Euchareena Road Site. A pest control plan would be formulated and adopted that includes, in particular, the control of foxes and feral cats and any other vertebrate pest that may be a problem to the surrounding properties. This pest control plan would form part of the overall Environmental Management Plan for the Euchareena Road RRC. Should a vermin-proof fence be constructed around the perimeter of the Euchareena Road Site, a plan to manage the kangaroos confined within this fence would be put in place in order to keep the natural ground cover at an appropriate level. It is noted that at this stage, the construction of this fence is not anticipated. Strict site hygiene controls and an effective control plan would be implemented to manage the potential impact of rodents, such as the Black Rat and House Mouse, exotic predators such as the European Red Fox and Feral Cat and introduced bird species. A Restrictive Covenant would be attached to the Land Title for the Euchareena Road site. This would protect the critically endangered ecological community and the corridor linking the two areas on which the critically endangered community is present. The only way that the Covenant could be removed is for the Consent to be amended. The Covenant would be administered by the NSW Land Titles Office.
Apiary industry	No apiary-related equipment or pesticide/chemical containers would be accepted at the Euchareena Road RRC or the Ophir Road RRC. Council officers supervising the delivery of wastes to the respective transfer stations would be trained to recognise apiary equipment and pesticide/chemical containers. The Proponent would work closely with the Department of Primary Industries (Agriculture) to inform all registered apiarists in the Orange City regional areas regarding the appropriate manner in which to dispose of apiary equipment and pesticide/chemical containers. The Proponent would continue to further promote recycling through education programs facilitated through NetWaste in order to continue to maximise the diversion of glass and plastic honey containers from the waste stream. All operators responsible for the receipt, compaction and covering of waste delivered to the Euchareena Road Site would be fully trained firstly to recognise any apiary equipment and pesticide/chemical containers and secondly to identify the presence of any bees on site. Similar training would also be provided for operational staff within each of the transfer stations operated by Orange City and where participating, the regional councils. Detailed operational procedures would be prepared and implemented at the Euchareena Road Site and transfer stations in the event that any apiary equipment or pesticide/chemical containers are delivered to the receival areas at either the Euchareena Road Site or transfer stations. Comprehensive training would also be undertaken for all personnel working on the Euchareena Road Site to ensure that the bale placement and covering of wastes within optimum periods is undertaken in accordance with the approved procedures. Delivery of bales would be between 9 am and 5 pm (excluding school bus times) and wrapped bales will be placed in the landfill and covered. Wrapping would not occur when bees are not active, however bales would be secured with straps all year round.

Issue	Commitments
	Bee-friendly native vegetation would be planted and maintained around the Euchareena Road Site within the various perimeter tree screens to provide a more appropriate alternative nectar source away from the landfilling operation. The species of trees and shrubs would be selected in consultation with the Department of Primary Industries (Agriculture) and local apiarists. A variety of flowering plants would also be planted to increase food source diversity. The Proponent would make arrangement for independent testing of nearby hives in the ownership of local apiarists. Failing that, the Proponent would establish a control, by placing hives at 500 m from the landfill and test for propolis and AFB during periods that the local hives are active.
Aboriginal heritage	At the Ophir Road Site if during construction, any Aboriginal objects are discovered, work would immediately cease in the area of the discovery and advice would be sought from the Aboriginal Heritage Unit of DECCW. For the Euchareena Road Site, The following management controls would be undertaken to minimise the impact on items of Aboriginal heritage significance: ◗ The woodland remnant containing the scarred tree (Molong ST1) would be retained and existing fencing retained and maintained to ensure no impact to the standing trees, including the scarred tree; ◗ The artefact scatter (Molong OS1) located within the southwestern corner of the Site would be left in its identified location and not salvaged. In order to ensure the continued conservation of both recorded sites, the Proponent would also adopt the following management controls: ◗ The location of site Molong ST1 and Molong OS1 would be recorded on a master plan in the Site Office, where the Site Manager has visual access to it. This plan would note that protected heritage items are present at these locations and that there are to be no impacts in the vicinity of these locations; ◗ The Proponent would appoint a Site Manager to take responsibility for the continued protection of these sites from future impacts as they arise and to ensure that fencing, if it is to be permanent, is appropriately maintained; and ◗ Part of the site induction for all staff and contractors would include a section on Aboriginal heritage. This induction would include brief reference to the legislative framework through which Indigenous heritage is protected, particular reference would be made to the location of the sites as well as providing a more general introduction to cultural heritage. Under the provisions of the National Parks and Wildlife Act 1974, all earthmoving contractors and operators would be instructed that in the event of any bone or stone artefacts, or discrete distributions of shell, being unearthed during earthmoving, work would cease immediately in the area of the discovery, and the Orange LALC and officers of the DECCW (NPWS), informed of the discovery.
European heritage	The Proponent would ensure trucks travelling to and from the Euchareena Road Site have covered or enclosed loads to ensure that windblown litter does not affect European heritage items adjacent to the proposed transport route.
Hazards	The Proponent would implement the following mitigation measures at the Ophir Road Site: ◗ Smoking would not be permitted within the new baling building; ◗ Any dangerous goods would be stored in accordance with normal dangerous goods storage procedures; ◗ Safety hazards would be managed through occupational health and safety procedures and through development and implementation of an operations plan for

Issue	Commitments
	the baling plant; ◗ Residents would not be permitted to deliver waste and recyclables to any area other than the existing waste transfer station, or to bulk drop-off areas (garden organics or separated concrete); ◗ Safety hazards from proposed construction works would be managed through occupational health and safety procedures and through development and implementation of an occupational health and safety plan for these works; ◗ Occupational health and safety procedures such as the use of personal protective equipment such as earmuffs, where noise exposure is unavoidable, would be followed during use of noisy equipment; The Proponent would implement the following mitigation measures at the Euchareena Road Site: ◗ There would be two separate facilities on the site – an enclosed tunnel composting plant, and a new landfill. Neither of these facilities would be considered as hazardous. Normal levels of hazard and risk associated with industrial sites and many construction sites would be managed through development and implementation of a site operations plan; ◗ Fires associated with composting would be avoided through plant operators monitor ongoing temperatures within compost that is undergoing maturation and ensuring that it is turned frequently; ◗ The Euchareena Road landfill would be lined, which would prevent off-site migration of this gas, and a gas management system would be designed in the detailed design phase to prevent methane from being discharged to the atmosphere from closed areas of the landfill; ◗ No dangerous goods would be stored on site, apart from small quantities of paints and solvents, used for equipment maintenance, and herbicides used for controlling weeds on site; ◗ All chemicals would be stored within a building in accordance with standard dangerous goods storage practices. Diesel fuel for on-site machinery would be stored in a double skin tank, located near the landfill site; ◗ Occupational health and safety procedures would be followed during use of composting and landfilling plant and equipment; and ◗ Occupational health and safety procedures such as the use of earmuffs would be followed during use of the complosting and landfilling equipment.
Air quality and odour	The Proponent would ensure the design and operation of the Project minimises the potential release of odour emissions. The specifications provided to prospective equipment suppliers would dictate the technical and environmental performance the equipment would be expected to meet, based on the Proponent's operational requirements and the conditions of project approval. The Proponent would implement the following mitigation measures for both sites: ◗ Exposed surfaces, including stockpiles unless revegetated or have a stable surface, would be watered. ◗ The area of exposed surfaces would be minimised. ◗ Available areas of disturbance would be rapidly and progressively rehabilitated. ◗ Visual amenity and perimeter bunds (and tree screens in the case of the Euchareena Road Site) would be established and maintained to limit emissions of particulate matter and odour beyond the site boundaries. ◗ The active landfill area would be convered following the completion of waste

Issue	Commitments
	placement at the end of each day with approximately 150 mm of daily cover material or a landfill tarpaulin. ◗ Odorous waste loads would be attended immediately to to limit transfer of odour off-site. ◗ Records of any complaints would be kept with respect to odour, and correlating with weather conditions and deliveries of particularly odorous wastes. ◗ Drop heights of waste placed into the landfill would be minimised. ◗ High dust-generating activities would be avoided during adverse wind conditions when blowing directly towards the nearest residences. ◗ An air quality (including dust and odour management) strategy would be incorporated into the Operational Environmental Management Plan as a sub-plan. In addition, at the Euchareena Road Site, there would be regular inspections and maintenance of the biofilter servicing the resource reprocessing facility buildings.
Traffic and transport	The Proponent would implement the following mitigation measures: ◗ Maintenance of the Ophir Road Site access intersection and provision of maintenance of Ophir Road for the duration of the Project operation. ◗ Preparation of construction traffic management plans (as part of the construction environmental management plans) to ensure safe movement of vehicles into and around each of the Sites. ◗ Trucks transferring baled waste or bulky / non-baleable waste from Ophir Road RRC to the Euchareena Road RRC would be scheduled to avoid the school bus pickup and drop-off times on Euchareena Road. That is, they would be scheduled so that they would arrive in Molong no earlier than 9 am and no later than 2.30 pm or after 4.30 pm, if necessary. There would be no deliveries of waste to the Euchareena Road RRC on weekends, except in emergencies. ◗ Minor safety improvements along Euchareena Road in accordance with the recommendations of an independent assessment of road safety requirements commissioned jointly by Cabonne Council and the Proponent. The safety improvements would be implemented prior to the first waste being received at the Euchareena Road RRC. ◗ New box culvert at Back Creek. ◗ Construction of a new Intersection at the site entrance to the Euchareena Road Site as per Figure C.4-23, which is designed in accordance with the NSW RTA AUR/AUL standards. This would be constructed prior to the first waste being received at the Euchareena Road RRC. ◗ Upgrade of the intersection of the Mitchell Highway (Watson Street) and Euchareena Road to meet RTA standards, as per Figure C.4-24. This would be upgraded prior to the first waste being received at the Euchareena Road RRC. ◗ Commitment of funds for the ongoing maintenance of the section of Euchareena Road used by trucks travelling to and from the Euchareena Road Site. ◗ Requirement that each driver would sign a Code of Conduct (during their first visit). ◗ Continued provision of a 15 m wide stock movement corridor along the western side of Euchareena Road along the Euchareena Road Site boundary.
Noise	The Project would be designed and operated to ensure that noise criteria are not exceeded. The noise management controls that would be implemented during the operation of the Euchareena Road RRC are detailed as follows. ◗ Construction of the perimeter amenity bunds would provide a noise barrier

Issue	Commitments
	between a number of surrounding residnces and the various operational components on site. ◗ All composting operations (other than maturation) would be undertaken within enclosed buildings. ◗ All construction and operational activities would be undertaken during daytime hours (7 am to 6 pm) with the exception of the composting operation, some components of which need to operate on a continuous basis, 24 hours per day, 7 days per week, albeit generating negligible noise levels. ◗ The Proponent would ensure all equipment, particularly waste delivery trucks, are maintained to a high standard to ensure there are no unnecessary noise emissions. Earthmoving equipment used on-site would be fitted with low impact broad band reversing alarms approved by WorkCover.
Visual	The Proponent would implement the following mitigation measures at the Euchareena Road Site: An earth mound, up to 2 m high, would be constructed adjacent to the northern boundary of the Euchareena Road Site for a distance of 600 m along the alignment of Shades Creek Road. The bund would be constructed with gentle external slopes and revegetated to limit the visibility of the bund itself. An eastern amenity bund, up to 4 m high, would be constructed immediately adjacent to the eastern limit of the landfill to provide a visual shield to the periodic construction activities and daily activities on sections of the landfill, particularly when viewed from 'The Shades'. An area of approximately 13.6 ha immediately south of the northern amenity bund would be planted during the first three years of operations. This corridor, as it grows and matures would provide a useful visual screen to shield the landfill from 'Maupas' and 'Meru'. The Proponent would plant some tree screens at strategic locations to limit visibility of the landfill, principally setback from Euchareena Road. The visual character of the other activities on site would also be considered through the following: ◗ All buildings / structures would be clad with materials either coated or painted with a light green hue; ◗ Selective landscaping would be positioned around the office, weighbridge and enclosed composting plant; and The site would be kept clean and tidy at all times.
Socio-economics	The Proponent would undertake consultation with relevant stakeholders including during the construction period. The Proponent would provide a stock movement corridor for north-south access across the Euchareena Road (eastern) side of the Euchareena Road Site to enable local landholders to safely move stock and farm equipment outside the Euchareena Road reserve. Areas not required for project-related activities or their ecological values would continue to be available for agricultural purposes. Approximately 42.3 ha of cleared land would be designated for ongoing agricultural use (Figure C.1-3). Compost from the enclosed tunnel composting facility would be made available at no cost for two years to local famers as a certified compost product. Preference would be given to applications where the objectives is to upgrade the agricultural quality of farming land.

Issue	Commitments
Greenhouse gas	Potential energy efficiency measures would be considered in the detailed design phase of the Project. An appropriate landfill gas management system would also be designed in the detailed design phase, which would be a passive landfill gas drainage and flaring system to help minimise potential greenhouse gas emissions from the landfill.

PART G
Project Justification and Conclusion

G.1 Ecological Sustainability

G.1.1 Introduction

The Proponent's management plan requires it to undertake council activities with regard for the principles of ecologically sustainable development. In general the ecologically sustainable development concept promotes reducing, re-using and recycling of wastes. The Project is consistent with the continued efforts of the Proponent to encourage community waste reduction, recycling and greater recognition of wastes as resources. This project is set in the context that the Ophir Road facility has only another four years of landfill life, from the date of this application.

This project is the only available opportunity to deliver food and garden waste diversion and provide recycling capacity regionally. The Central West regional councils need to take advantage of this.

An assessment of the Project with regard to the principles of ecologically sustainable development is presented in the following section.

G.1.2 Principles of Ecologically Sustainable Development

Clause 6 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* lists the principles of ecologically sustainable development as:

a) ***The precautionary principle****, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*

   (i) Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

   (ii) An assessment of the risk-weighted consequences of various options.

(b) ***Inter-generational equity****, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*

(c) ***Conservation of biological diversity and ecological integrity****, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.*

(d) ***Improved valuation, pricing and incentive mechanisms****, namely, that environmental factors should be included in the valuation of assets and services.*

An assessment of the Project against these principles is provided below.

G.1.2.1 Precautionary principle

A range of environmental investigations, as described in sections B.5 and C.4 of the Environmental Assessment, have been undertaken as part of the development of the Project and the environmental assessment process, to ensure that potential impacts are understood with a high degree of certainty. The assessment of the potential impacts of the Project is considered to be consistent with the precautionary principle. It is considered that the assessments that have been undertaken are consistent with accepted

scientific and assessment methodologies, and have taken into account relevant statutory and agency requirements.

The Project has evolved to avoid impacts where possible and to reflect the findings of the studies undertaken. A number of safeguards have been proposed to minimise potential impacts. These safeguards would be implemented during construction and operation of the Project. No safeguards have been postponed as a result of lack of scientific certainty. The selected construction contractor(s) would be required to prepare a construction environment management plan prior to commencing construction. This requirement would ensure that the Project achieves a high-level environmental performance.

G.1.2.2 Principle of inter-generational equity

It is recognised that the construction of the Project has the potential to lead to some environmental and social disturbance. This includes some disturbance during road upgrades and construction activities at each site. However, the potential for environmental and social disturbance as a result of construction has to be balanced against the long-term benefits of providing essential waste management infrastructure for the region and improving resource recovery.

The Project would redirect approximately 58% (from 18%-20% currently) of waste from landfill into a potential use with a higher resource value through a combination of improved recycling and processing of food/garden organics. Recovering recyclable materials from a waste stream, that would otherwise have gone to landfill conserves raw material resource such as iron ore, bauxite and fossil fuels (used for production of steel, aluminium and plastics), and saves trees due to recovery of paper and cardboard. This is a direct benefit to future generations.

Recycling also captures the embodied energy contained within the recyclates – significantly reducing the energy demand that would be required to manufacture using virgin materials.

The Project would also deliver improved diversion of paper, cardboard and timber from the C&I waste stream and timber from the C&D stream through differential landfill gate pricing to encourage source separation of C&I wastes and increased landfill gate pricing for C&D waste to encourage source separation of recyclable materials.

Diversion of food/garden organics as well as paper, cardboard and timber from landfill saves methane emissions that would otherwise have been generated from their anaerobic decomposition in landfill. Methane is a potent greenhouse gas with a global warming potential 21 times greater than carbon dioxide. Implementation of the Project would reduce the greenhouse gas emissions from the food and garden organics waste stream. This is also a direct benefit to future generations.

Production of marketable compost by the food and garden organics enclosed tunnel composting plant at the Euchareena Road Site reduces the need for chemical fertilisers, which improves water quality in rivers and streams. Its use may also improve the water retention ability of soils which reduces the need to water plants / crops. This preserves water resources for future generations.

The Project incorporates increased resource recovery measures over the 2005 proposal and the landfill footprint has been minimised. In addition a significant portion (42.3 ha) of the remaining cleared land will be designated for ongoing agricultural use and that a 13.6 ha area of cleared land at the northern part of the property would be dedicated to improving biodiversity and designated as a rehabilitation corridor. The final landform also allows some agricultural production at the site after closure of the landfill. Furthermore, the high quality compost output from the enclosed tunnel composting facility would be

suitable for application to farmlands in lieu of chemical fertilisers. The Proponent proposes to make this compost available at no cost for two years to local farmers and contribute to enhanced agricultural productivity in surrounding areas. This has a benefit to future generations.

In addition, the Project would improve local employment potential and contribute to economic growth in the region and provide an important facility with minimal impact on the local visual environment.

G.1.2.3 Conservation of biological diversity and ecological integrity

Ecological studies have been undertaken to identify potential adverse impacts on flora and fauna. These specialist studies have found that in both the short and long term, the biodiversity of the Ophir Road and Euchareena Road Sites would be conserved and maintained. Furthermore, in the case of the Euchareena Road Site, the biodiversity and ecological integrity of the site would be improved as a greater diversity of vegetation would be established through the proposed remnant woodland enhancement, planting of the rehabilitation corridor and planting of native flowering flora in other areas.

At the Euchareena Road Site, it is proposed that the landfill footprint would be in the order of 12 ha and a further 8 ha would be required for operating buildings, the compost maturation area, roadways etc. However 89.6 ha of the 109.6 ha of cleared land would be used for purposes other than waste management. Approximately 42.3 ha would be designated for ongoing agricultural use and 13.6 ha of cleared land would be dedicated to improving ecological diversity. In addition, further plantings would be undertaken to enhance the existing sparse western and northeastern woodlands which would improve ecological integrity.

G.1.2.4 Improved valuation and pricing of environmental resources

The assessment has identified the environmental and other consequences of the Project and identified mitigation measures where appropriate to manage adverse impacts. The construction and operation of the Project would be in accordance with relevant legislation and the construction and operation environmental management plans. Requirements imposed in terms of implementation of these measures would result in an economic cost to the Proponent. The implementation of mitigation measures would increase both the capital and operating costs of the Project. This signifies that environmental resources have been given appropriate valuation.

The design for the Project has been developed with an objective of minimising potential impacts on the surrounding environment. This indicates that the design for the Project has been developed with an environmental objective in mind.

The economic costs of the Project, including environmental works and management, will be reflected in rates, gate fees and pricing of products (such as compost and recyclables).

G.2 Justification of the Project

G.2.1 Overview

The justification for the Project is based on a number of factors:

- The Project is consistent with the strategic direction for waste management in NSW and the Proponent's corporate objectives and strategic drivers;
- The Project provides a unique opportunity to implement alternative waste technologies in the Central West Region;
- The Project would assist in satisfying regional demand for landfills for residuals that exceed accepted standards set by the NSW EPA (DECCW) for regional facilities;
- The Project would enable other regional councils to reduce waste management costs and access alternative waste technologies at reasonable cost;
- The sites are environmentally suitable for the proposed use;
- The Project uses proven and affordable technologies that best matches the Orange situation; and
- Provides opportunities for regional cooperation.

These factors are summarised below.

G.2.2 The Strategic Direction for Waste Management in NSW

The Project would deliver outcomes consistent with state legislation and strategies for sustainable waste management. These include the *Waste Avoidance and Resource Recovery Act 2001*, the Waste Avoidance and Resource Recovery Strategy 2007, and the Sydney Metropolitan Strategy.

The Project aligns with the philosophy of viewing waste as a resource – and recovering resources in their highest net resource value state. The recovery of resources in this manner creates value from the waste stream.

It is estimated that up to 58% of waste that the Project would process each year, would be diverted from landfill. Optimised operations and differential charging for mixed and segregated wastes would improve this diversion rate in future years.

G.2.3 The Proponent's Corporate Objectives and Strategic Drivers

The Proponent is committed to the principles of waste avoidance and resource recovery through its own *Environmental Sustainability Action and Management Plan 2009-12* and through NetWaste. The Proponent is committed to providing environmentally sound and sustainable waste management solutions that improve resource recovery, and reduce the quantities of waste being disposed to landfill.

The Project as outlined in this Environmental Assessment implements the Proponent's *Resource Recovery and Waste Management Strategy* with an integrated plan for improved resource recovery and residual management with proposed new operations at the Ophir Road RRC and proposed Euchareena Road RRC. Section A.3.8.2 describes the five core activities that form the Strategy implementation:

- New residential food/garden organics collection service;

- Processing of food/garden organics at the Euchareena Road RRC;
- Recovery of dry recyclable materials at the Ophir Road RRC;
- Baling of mixed residual waste at the Ophir Road RRC; and
- Disposal of mixed residual waste at Euchareena Road RRC.

The Project would meet the objectives and Strategy of the Proponent.

G.2.4 Need for Alternative Waste Technologies

The NSW Government has set targets for waste diversion by 2014. Recycling of municipal waste is to be increased from a baseline of 26% of waste to be diverted from landfill, to 66% to be diverted by 2014. However, the total amount of diversion by recovering paper and recyclable containers alone has leveled out. The only way councils will achieve the 66% diversion target is to recover organic components of the waste stream (e.g. food) through an alternative waste management system. This project includes an alternative waste technology (enclosed tunnel composting) to recover food and garden organics from the waste stream.

G.2.5 Suitable Sites

Both sites are zoned for the proposed use. A comprehensive alternative site study was undertaken (as discussed in section E.1) which confirmed the suitability and merit of the Euchareena Road Site for waste processing and disposal.

G.2.6 Proven Technologies

The technologies proposed for the Project are already operating successfully. Baling operations and 'balefills' are currently underway at a number of locations (e.g. South Australia, Ballina). Fully functioning enclosed tunnel composting technologies have been operating in Australia (e.g. Port Macquarie) for a number of years.

G.2.7 Regional Options

The Project components and facility locations have been designed to facilitate access to the AWT to encourage positive regional environmental outcomes. The Project delivers the only regional option for the Central West. No one else has done this or is likely to.

G.3 Conclusions

This Environmental Assessment has considered the potential impacts of the Project. It has been prepared in accordance with the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* and the requirements of the Director-General of the NSW Department of Planning. The Environmental Assessment has documented the potential environmental impacts associated with the Project, considering both potential positive and negative impacts of the Project, and recommending management and mitigation measures to protect the environment where required.

Environmental investigations were undertaken during the preparation of the Environmental Assessment to assess the potential environmental impacts. These included specialist assessment on issues involving air quality and odour, traffic, noise, greenhouse gas emissions, biodiversity, and heritage.

Overall the Project would:

- Divert valuable resources from landfill and permit recovery and recycling of resources from the waste stream;
- Significantly reduce greenhouse gas emissions through:
  - Recovering (for recycling) homogenous streams of plastic, metal and glass; and
  - Avoiding emissions from material that would otherwise be landfilled (from both Orange City and regional LGAs).
- Reduce disposal to landfill of potential resources and assist the Proponent and potentially other regional councils in achieving their targets for diversion of waste from landfill; and
- Minimise odour, litter, noise and traffic impacts on the local community.

The Project would also provide benefits through development of a new industry and new employment opportunities in the region.

The Environmental Assessment has examined a number of key issues surrounding the Project, including identification of potential negative impacts. There are no major environmental issues with this project. The main potential impacts requiring normal levels of environmental management are:

- Air quality and odour;
- Noise;
- Traffic and transport; and
- Surface water.

The Environmental Assessment concludes that many of the potential issues identified would be effectively managed through project design features. To manage other issues, and in some cases eliminate them completely, a number of mitigation and management measures (commitments) that would be undertaken are outlined in section PART F.

Commitments made by the Proponent include the preparation of a construction environmental management and operational environmental management plan to ensure that the mitigation and management measures are developed, implemented and monitored. These plans would also ensure compliance with relevant legislation and any conditions of approval.

PART H
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PART I
Glossary of Technical Terms, Acronyms and Symbols

I.1 Glossary of Terms

Term	Definition
Alternative waste technology	Technology that diverts waste away from landfill, recovers more resources from the waste stream and minimises the impact on the environment. Provides a more sustainable solutions and can include mechanical separation, biological processes, thermal technologies and mechanical biological treatment.
Aquifer	Rock or soil formation containing groundwater
Aquitard	A layer of material that confines the aquifer.
Biogas	A clean gas and source of renewable energy that is produced by the biological breakdown of organic matter in the absence of oxygen.
Biological treatment	Covers a range of technologies to deal with residual municipal waste.
Catchment	The area drained by a stream, lake or other body of water.
Cumulative impact	A significant impact created by accumulation or successive additions of individual impacts, which may not in themselves be significant.
Ecologically sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Effluent	Liquid industrial waste or wastewater, which may or may not have been passed through a type of purification process.
Emission	The release of material into the atmosphere (e.g. gas, noise).
Environmental management plan	A document setting out the management, control and monitoring measures to be implemented during construction (a construction environmental management plan) and /or operation (operational environmental management plan) of a development, to avoid or minimise the potential environmental impacts identified during an environmental assessment process.
Flora and fauna	Plants and animals.
Greenhouse gases	Gases that accumulate within the earth's atmosphere (primarily water vapour, carbon dioxide and methane) and contribute to global climatic change/global warming (the 'greenhouse effect').
Greenhouse gases (scope 1 and 2)	Scope 1: Direct greenhouse gas emissions from sources falling within the operational boundary of the assessment, from sources that are owned and/or operated by the organisation in question. Scope 1 emissions include direct carbon dioxide emissions from the combustion of stationary or transportation fuels (natural gas, coal, petrol and diesel) in boilers, furnaces, vehicles etc, and fugitive emissions of greenhouse gases from chemical processes, such as wastewater treatment and some product manufacturing. Scope 2: Indirect greenhouse gas emissions associated with purchased electricity, heat or steam. These emissions physically occur at the facility where the electricity, heat or steam is generated.
Hydrology	The science dealing with water on the land or under the surface, its properties and distribution.
Material recycling facility	A place where kerbside recyclables are sorted into paper, metals and plastics.
Material separation	Separation of a combined waste stream into different materials.

Particulate	Small particles, usually occurring in suspension.
pH	Measure of acidity (or alkalinity).
Project approval	A approval granted under Section 75J of the NSW *Environmental Planning and Assessment Act 1979*.
Putrescible	Capable of biological decomposition.
Sewer	A conduit for carrying of wastewater (sewage).
The Project	Orange Resource Recovery and Waste Management Project
The Proponent	Orange City Council
Threatened species	Species of animals or plants that are at risk of extinction (also known as 'endangered species') or becoming endangered within the next 25 years ('vulnerable species'), defined by the *Threatened Species Conservation Act 1995.*
Water balance	Modelling the use of water in a development.

I.2 List of Abbreviations

Abbreviation	Name
AFB	American Foul Brood
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AWS	Automatic Weather Station
AWT	Alternative Waste Technology
BOD	Bathurst, Orange, Dubbo
CEMP	Construction Environmental Management Plan
C&I	Commercial and Industrial
C&D	Construction and Demolition
CPRS	Carbon Pollution Reduction Scheme
DA	Development Application
DECC	NSW Department of Environment and Climate Change (now DECCW)
DECCW	NSW Department of Environment and Climate Change and Water (incorporating the former NSW Environment Protection Authority/EPA)
DG	Director-General
DOP	Department of Planning
DPI	Department of Primary Industries (now Industry and Investment NSW)
DWE	Department of Water and Energy (now DECCW)
EA	Environmental Assessment
EAT	Emerson Aggregate Test
EC	Electrical Conductivity
ECRTN	Environmental Criteria for Road Traffic Noise
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
GCO	Golden Cross Operations Pty Ltd
GHD	GHD Pty Ltd
GPT	Gross Pollutant Trap
HDPE	High Density Polyethylene
INP	Independent Noise Policy
LALC	Local Aboriginal Land Council

LCA	Life Cycle Assessment
LEMP	Landfill Environmental Management Plan
LEP	Local Environmental Plan
LGA	Local Government Area
LLDPE	Low Linear Density Polyethylene
LOS	Level of Service
LP1	Leachate Pond 1
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
NEPC	National Environmental Protection Council
NEPM	National Environment Protection Measure
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service
NSW	New South Wales
OEMP	Operational Environmental Management Plan
OH&S	Occupational Health and Safety
POEO Act	*Protection of the Environment Operations Act 1997*
PPE	Personal Protective Equipment
PSA	Particle Size Analysis
PSNL	Project Specific Noise Levels
RBL	Rating Background Levels
RL	Reduced Level
RRC	Resource Recovery Centre
RRMP	NetWaste Regional Resource Management Plan
RWC	R W Corkery & Co Pty Ltd
SEPP	State Environmental Planning Policy
SF	Service Flow
SMU	Soil Mapping Unit
SWAP	Surface Water Assessment Plan
TDS	Total Dissolved Solids
TPHs	Total Petroleum Hydrocarbons
TSC Act	*Threatened Species Conservation Act 1995*
TSP	Total Suspended Particulates
TEOM	Tapered Element Oscillating Microbalance
VENM	Virgin Excavated Natural Materials
WARR Act	*Waste Avoidance and Resource Recovery Act* 2001
WARRS	Waste Avoidance and Resource Recovery Strategy
WCS	Wright Corporate Strategy Pty Ltd

I.3 Units of Measure

Length	mm	Millimetres
	m	Metres
	km	Kilometres
	RL	Reduced Level
Area	m^2	Square metres
	ha	Hectares
Volume	L	Litres
	kL	Kilolitres
	v/v	Volume for volume
	m^3	Cubic metres
Mass	µg	Micrograms
	mg	Milligrams
	g	Grams
	kg	Kilogram
Noise	dB	Decibel – unit of sound measurement
	dB(A)	Unit used to measure 'A-weighted' sound pressure levels
	Hz	Hertz – unit used to measure frequency
	L_N	Noise exceedance level (N = percentage of sampling period)
Time	s	Seconds
Odour	OU	Odour Units
Miscellaneous	%	Percentage
	$	Australian dollars
	@	At
	ºC	Degrees Celsius
	º	Degree (angle between slope and horizontal)
	pH	Measure of acidity or alkalinity

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