4.1 Introduction

This section provides an overview of each of the landfills currently in operation in the Council area based on the site visits carried out (7th and 8th April 2005) and the information provided by Council. The site visits were used to estimate the landfill life remaining in each of the landfills based on the number of properties within each landfill catchment and the remaining landfill volume. As no audit has been carried out of waste generation in the Council area, the waste generation was based on an annual generation of 1 tonne of waste to landfill per rateable property. This figure is based on previous studies carried out on waste generation in rural NSW such as the Eastern NetWaste Subregional Waste Management Plan, 2004. The actual amount of waste going to landfill may be below or above this amount, however for the purposes of the strategy it is considered a reasonable figure to adopt. Also, based on limited data provided by Council on the number of vehicles entering Macs Reef, Bungendore and Braidwood landfills, over the past year, confirmed the assumption of 1 tonne/per annum/property. The site visits were also used to identify key environmental and engineering issues associated with the operation of the landfills.

Also presented are future options for management of waste in the catchments based on the assessment carried out. These future options however only consider the individual landfill waste catchments and not the overall council wide waste management issues. Section 5 of the strategy draws upon the assessment carried out in this section to outline the best option for each catchment taking into consideration Council wide issues.

A comparison of each of the options taking into consideration capital and operating costs, environmental and social criteria is presented in this section. In carrying out the comparison a ranking method was used which consisted of scoring each option against the criteria on a scale of 1 to 10, with 1 being very low impact and 10 being a very high impact. The final score was obtained by adding the individual scores. All the criteria (cost, environmental and social) were given an equal weighting, however in keeping with Councils policy to provide reasonable services to the community, when two options had the same overall score, the option with the lower social impact was chosen as the preferred option. Further discussion on each of the criteria used is presented below.

Cost Impact

The Capital and Operating costs over a 20 year period were estimated for each of the options considered for each landfill catchment area. These costs were then used to calculate a Net Present Value (NPV) for each of the options to be used in the comparison. NPV is the most effective method to evaluate alternative options from a cost perspective as it takes into consideration the time value of money, and capital and operating expenses. A discount rate of 8% was used as recommended by the Australian Treasury department for this type of analysis. The option with the lowest NPV was subsequently given a high score out of 10 as having the highest cost impact, while the option with the highest NPV was given a low score out of 10 as it had a low cost impact.

Environmental and Social Impact

A qualitative impact assessment was carried out for comparing options against the environmental and social impact criteria. URS has carried out numerous environmental and social impact studies on similar projects and is aware of the impacts on flora/fauna, groundwater, surface water, air, noise and traffic. However, detailed environmental and social impact assessments may need to be carried out prior to any new works being undertaken in accordance with the regulatory guidelines outlined in Section 3.

In considering the social impact, the impacts on local communities of not having a suitable disposal system for residual waste and recyclables was taken into consideration in the qualitative analysis, as well as impacts on surrounding properties as a result of ongoing or new landfill/transfer station operations. A workshop was held with Councillors and key Council staff to assess the qualitative scores given by URS and these were modified taking into account their comments. The scoring will again be reviewed based on the comments received from the community during the exhibition period of the strategy.

Options Evaluated for Each Site

The options evaluated for each site were:

Option 1: Closure and Rehabilitation of the Landfill in the First Year of the Strategy.
The closure costs were determined based on rehabilitating the land filled areas of the site with a suitable cover soil and implementing limited surface water drainage and leachate controls works. Ongoing monitoring of the sites following closure was included in the operating cost estimates. The key social impact considered in assessing this option is the alternative waste disposal options available to residents in the catchment, in particular the distance to the nearest landfill. The key environmental issues to be considered include the likelihood of increased illegal dumping of waste if no alternative is available weighed against the improved environment due to closure and rehabilitation of the landfill.

Option 2: Closure and Rehabilitation of the Landfill upon Meeting its Estimated Capacity.
This option provides for the ongoing operation of the landfill with recommend environmental improvements, until closure and rehabilitation when it runs out of landfill space, with no transfer station or landfill extension. Again the key social impact considered in assessing this option is the alternative waste disposal options available to residents in the catchment, in particular the distance to the nearest landfill. The key environmental issues to be considered include the likelihood of increased illegal dumping of waste if no alternative is available weighed against the improved environment due to closure and rehabilitation of the landfill.

Option 3: Closure and Rehabilitation of the Landfill when it Reaches Capacity and Construction of a Small Transfer Station.
This option is the same as option 2, however allows for the construction and operation of a small transfer station following closure of the landfill. This will reduce the environmental and social impacts however increase the capital cost. The transfer station would consist of an elevated covered platform, from which residents could drop of their residual waste into a skip, which would be collected on weekly basis. The

transfer station would also consist of smaller skips for placement of recyclables including glass, plastics, metals and paper/cardboard.

Option 4: Closure and Rehabilitation of the Landfill when it Reaches Capacity and Construction of a New Landfill.
This option is the same as option 2, however allows for the construction and operation of a new landfill following closure of the landfill. Capital costs include development approval and constructions costs for a Class 1 Solid Waste licensed landfill. Key environmental issues associated with a new landfill include long term liabilities associated with operating the landfill, not meeting the principles of the WARR Strategy to reduce waste going to landfill, and the direct environmental impacts.

4.2 Macs Reef Landfill

4.2.1 General

The Mac's Reef landfill is located approximately 3 km along Macs Reef Road from Federal Highway as shown in Figure 1.1. The landfill is surrounded by rural residential forested areas on all sides. There are approximately 1,197 rateable properties within its landfill catchment. The landfill is open from 7.30am to 5.00pm Friday, Saturday, Sunday and Monday, during both daylight saving and non-daylight saving periods. There are currently no gate charges for disposal of waste. The landfill is supervised during the opening hours. A "Revolve" type recycling drop area is provided with collection areas for various recyclable and reusable materials. Clearly labelled containers are provided for the collection of glass, metals and plastics.

4.2.2 Estimated Landfill Life

Overtopping the existing waste mound is currently filling the landfill. Based on the estimates made by URS in our previous report (URS, 2003) and the site visit, we believe that although the northern part of the site is elevated above the surrounding land, there is approximately 2 to 3 years life remaining in the Macs Reef landfill, as the final landform will need to blend the northerly batter slope into the southern elevated embankment.

4.2.3 Key Environmental and Engineering Issues

From our site inspection the following key environmental issues were observed where improvements could be made in the operation of the landfill to meet environmental protection standards:

- Uncovered waste: Due to a shortage of cover material on the site, waste is kept uncovered for long periods (greater than 2 weeks). This results in several environmental issues including windblown litter, feral animals, odour and increased leachate production. Some complaints have been received from residents to the north (opposite side of Macs Reef road from Landfill) regarding windblown litter.

- Batter slopes are poorly covered and not rehabilitated resulting in high erosion of cover material and waste into drainage paths. Possibility of slippage due to steep (20 to 30 metres on northern face) unprotected batters.
- Unlined landfill overlying sandy soils, with no leachate collection system or monitoring system in place to identify groundwater or surface water contamination.

These issues are illustrated in the photos of Macs Reef landfill taken during the site inspection, given below.

Photo 1 Windblown litter on slopes of landfill

Photo 2 Uncovered Waste

4.2.4 Future Options Macs Reef

Presented in Table 4-1 is the comparison of options for the Macs Reef catchment

Table 4-1 Macs Reef Landfill Future Options

Option	*Net Present Value*	*Cost Impact*	*Social Impact*	*Environmental Impact*	*Total Score*
1. Immediate closure and rehabilitation of landfill	-$574,929	2	6	3	11
2. Closure in 2 years, no transfer station	-$669,106	3	4	4	11
Closure in 2 years and construction of small transfer station	-$1,090,194	6	3	3	12
Closure in 2 years and construction of new landfill	-$2,603,207	8	5	8	21

Preferred Option: Option (2) Closure in 2 years with residents using Bungendore landfill in future. This option has a lower social impact than the immediate closure option (1). Bungendore landfill is located approximately 8 kilometres to the west of Macs Reef landfill as shown in Figure 1.2

4.3 Bungendore Landfill

4.3.1 General

The Bungendore landfill is located on the Tarago Road approximately 2 km north of the Bungendore Village as shown in Figure 1.1. The site is surrounded by rural land, however there is a residential development approximately 0.5 kilometre to the south of the site. There are approximately 1,657 rateable properties within its landfill catchment. The landfill is open from 7.30am to 5.00pm Friday, Saturday, Sunday and Monday, during both daylight saving and non-daylight saving periods. There are currently no gate charges for disposal of waste. The landfill is supervised during the opening hours. A recycling drop area is provided with collection areas for various recyclable and reusable materials. Clearly labelled areas are provided for the collection of tyres, scrap metal and greenwaste.

4.3.2 Landfill Life

Based on the estimates made by URS in our previous report and our recent site visit, we believe that there is approximately 3 to 4 years life remaining in the Bungendore landfill. This can be achieved through land filling household waste in the existing trenches located to the south of the site and filling the site approximately 2 m above the existing capped level, in line with the current batter being built around the northern, western side of the site with commercial and household waste. It is noted that the site is already above the surrounding natural surface, by 4 to 6 metres however as the waste batter around the site is already being built it is necessary to fill to this level to achieve a suitable cap and natural slope for the site. The final lift should be placed to provide 3 to 5% slope from the centre to the edges to provide good rainwater runoff.

4.3.3 Key Environmental and Engineering Issues

From our site inspection the following key environmental issues were observed where improvements could be made in the operation of the landfill to meet environmental protection standards:

- Uncovered waste: As with Macs Reef Landfill, due to a shortage of cover material on the site, waste is kept uncovered for long periods (greater than 2 weeks). This result in several environmental issues including windblown litter, feral animals, odour and increased leachate production.
- Visual Impact from Tarago road due to uncapped western batter slopes.
- Slope stability of uncovered batters on the western side of the landfill.
- Stockpiling of tyres may pose a potential fire hazard.
- Future expansion of Elsmlea estate to the south of the site may result in complaints from residents regarding windblown litter and visual impact.

- Unlined landfill overlying silty-clay soils, with no leachate collection system or monitoring system in place to identify groundwater or surface water contamination.

These issues are illustrated in the photos of Bungendore landfill taken during the site inspection, given below.

Photo 3 Uncovered batter slope

Photo 4 Tyre Stock Pile

4.3.4 Future Options Bungendore

Presented in Table 4-2 is the comparison of options for the Bungendore Landfill

Table 4-2 Bungendore Landfill Future Options

Option	Net Present Value	Cost Impact	Social Impact	Environmental Impact	Total Score
1.Immediate closure, rehabilitation of landfill and no transfer station	-$1,241,596	2	6	3	11
2.Closure in 3 years when no remaining landfill life & no transfer station	-$1,344,936	3	5	4	12
3.Closure in 3 years and construction of waste transfer station	-$2,235,070	5	2	3	10
4.Closure in 3 years and construction of new landfill	-$3,121,728	8	3	8	19

Preferred Option: Option (3) Closure in 3 years with construction of a transfer station.

4.4 Collector Landfill

4.4.1 General

The collector landfill is located approximately 1 km to the east of the Federal Highway in the north of the Palerang Council area as shown in Figure 1.1. The site is surrounded by rural land. There are approximately 180 rateable properties within its landfill catchment located within Palerang Council. The landfill is open Sat and Sunday from 9am to 5pm, during both daylight saving and non-daylight saving periods. There are currently no gate charges for disposal of waste. The landfill is supervised by staff from Upper Lachlan Council during the opening hours. A recycling drop area is provided with collection areas for various recyclable and reusable materials. Areas are provided for the collection of tyres, scrap metal and greenwaste however these are not clearly identified.

4.4.2 Landfill Life

Household waste is currently being filled in a trench located at the eastern side of the landfill, while commercial waste is being placed on the western side towards the centre of the site. Based on the inspection carried out and the relatively small catchment the landfill serves, the landfill would have a life remaining of 12 to 14 years. This would be achieved by continuing with trenching followed by overtopping to produce a final landform, which matches in with the undulating surrounding land.

4.4.3 Key Environmental and Engineering Issues

From our site inspection the following key environmental issues were observed where improvements could be made in the operation of the landfill to meet environmental protection standards

- Windblown litter into adjoining rural land.
- Infrequent covering of household and commercial waste due to shortage of cover material leading to potential odour, windblown litter and increased leachate production.
- Unlined landfill overlying coarse sandy soils, with no environmental monitoring (groundwater, surface water) carried out to determine if water pollution is a problem.

These issues are illustrated in the photos of Collector landfill taken during the site inspection, given below.

Photo 5 Windblown Rubbish

Photo 6 Uncovered Waste Trench

4.4.4 Future Options Collector

Presented in Table 4-3 is the comparison of options for the Collector Landfill. In calculating the operation costs it was assumed Palerang Council would only pay for the annual monitoring costs of the existing landfill.

Table 4-3Collector Landfill Future Options

Option	Net Present Value	Cost Impact	Social Impact	Environmental Impact	Total Score
1.Immediate closure, rehabilitation of landfill and no transfer station	-$552,707	4	6	3	13
2.Closure in 8 years when no remaining landfill life & no transfer station	-$273,494	2	5	4	11
3.Closure in 8 years when no remaining landfill life & construct small transfer station	-$354,505	3	2	3	8
4.Closure in 8 years when no remaining landfill life & construct new landfill	-$666,637	8	3	8	19

Preferred Option: Option (3) Closure in 8 years with construction of a transfer station. It is understood that this landfill site may be transferred to Upper Lachlan Council ownership in the future.

4.5 Captains Flat Landfill

4.5.1 General

The Captains Flat landfill is located approximately 4 km along the Braidwood Road from the village of Captains Flat, as shown in Figure 1.1, and services a rural community and village of approximately 338 rateable properties. The site is surrounded by rural heavily vegetated land. The landfill is open from 8.00am to 5.00pm Friday, Saturday, Sunday and during non-daylight saving periods and 8.00am to 8.00pm on the same days during daylight saving periods. There are currently no gate charges for disposal of waste. The landfill is unmanned during the opening hours, with local residents opening and closing the gates on a voluntary basis. A recycling drop area is provided with collection areas for various recyclable and reusable materials. Clearly labelled areas are provided for the collection of tyres, scrap metal and greenwaste.

4.5.2 Landfill Life

Immediate closure and rehabilitation of landfill recommended due to the key engineering (eg. slope stability of existing batters) and environmental issues as described below.

4.5.3 Key Environmental and Engineering Issues

- *Slope Stability*: All batter slopes are only partially covered with suitable capping material and are built at steep gradient in particular on the South East face, which is approximately 40 to 60 metres in height and poses a significant slope stability risk. Significant erosion and litter observed on the batter slopes.
- *Uncovered waste:* As with the other landfills in the Council, due to a shortage of cover material on the site, waste is kept uncovered for long periods (greater than 2 weeks). This result in several environmental issues including windblown litter, feral animals, odour and increased leachate production.
- *Surrounding topography:* The landfill is currently being filled by overtopping the existing waste mound. This landfill is now elevated well above the surrounding topography
- *Contaminated surface water:* As shown in the photo below there was evidence of contaminated surface water discharge to the stormwater system flowing under the road to adjoining property to North of the site.
- *Potential groundwater contamination:* Unlined landfill overlying coarse sandy soils, with no environmental monitoring (groundwater, surface water) carried out to determine if water pollution is a problem.

- Site is unmanned when open and therefore users are able to place waste in any area and also dispose of potentially hazardous items.

Photo 7: Significant erosion of batter slopes

Photo 8: Steep Batter Slopes

Photo 9: Evidence contaminated surface water discharge to stormwater system flowing under road to adjoining property to North of the site.

Photo 10: Windblown litter into adjoining properties

Photo 11: Windblown litter against landfill fence and into adjoining properties

Photo 12: Waste kept uncovered for long periods (greater than 2 weeks) due to unavailability of cover material resulting in windblown litter, feral animals, odour and increased leachate.

4.5.4 Future Options Captains Flat

Presented in Table 4-4 is the comparison of options for the Captains Flat Landfill. For this landfill as the there is currently no remaining landfill capacity, keeping the landfill open is not a viable option to be further considered. The option of putting in a Bank of Bins service, consisting of a several bins placed together in the Captains Flat village area for disposal of waste, which would otherwise go the landfill, was also considered (Option 4 below).

Table 4-4 Captains Flat Landfill Future Options

Option	*Net Present Value*	*Cost Impact*	*Social Impact*	*Environmental Impact*	*Total Score*
1. Immediate closure, rehabilitation of landfill and no transfer station	-$619,374	3	6	3	12
2. Immediate closure, rehabilitation of landfill & small resource recovery transfer station to Bungendore	-$1,506,310	5	2	3	10
3. Immediate closure of existing landfill and construction of new landfill on adjoining site	-$2,508,762	8	3	8	19
4. Immediate closure of existing landfill and provision of Bank of Bins service	-$935,694	4	5	3	12

Preferred Option: Option (2) Immediate closure and rehabilitation with construction of a transfer station.

4.6 Braidwood Landfill

4.6.1 General

The Braidwood landfill is located approximately 5 km along the Bombay Road from the township of Braidwood, as shown in Figure 1.1, and in "theory" services a rural community and town of approximately 1,882 rateable properties. As shown in Figure 1, the Braidwood landfill catchment extends several kilometres to the south, in between the Captains Flat and Majors Creek landfill catchments. In practice most of the properties located in the south would not travel the 50 to 60 km distance to Braidwood to dispose of their waste, however for the purposes of this study they are included in the Braidwood catchment as they are more likely to travel to Braidwood rather than the alternative landfill sites due to the topography and condition of the roads in the area.

The site is surrounded by rural land, with no private residence located within 500 metre radius of the site. The landfill is open everyday of the week from 1 pm to 5.00pm on during both non-daylight saving periods and daylight saving periods. There are currently gate charges in place for disposal of waste at the landfill. The landfill is manned during the opening hours by Council staff. A recycling drop area is provided with collection areas for various recyclable and reusable materials. Clearly labelled areas are provided for the collection of tyres, scrap metal and greenwaste.

4.6.2 Landfill Life

Based on discussions with the landfill operator and the site inspection undertaken it appears that the majority of the site has been trenched in the past. Following completion of the current household waste trench, following further investigation it maybe possible to obtain 2 to 3 more similar trenches. The landfill has been overtopped in some areas up to a height of approximately 1 to 2 metres above natural ground level. Following completion of the trenched filling, it will be possible to overtop the remaining parts of the landfill up to 2 metres in height above the existing land level to obtain a uniform final landform, which will blend in with the surrounding topography. Therefore the total landfill life remaining is estimated at approximately 10 to 15 years based on the current filling rate.

4.6.3 Key Environmental and Engineering Issues

- *Leachate Management* Unlined landfill overlying silty sandy soils, with no environmental monitoring (groundwater, surface water) carried out to determine if water pollution is a problem. A creek is located approximately 500 mm down gradient of the site.
- *Covering of waste:* Waste covered infrequently due to shortage of cover material resulting in increased leachate production observed in trench, and feral animals (several cats observed during site visit).

- *Stormwater Management:* Stormwater runoff from catchment located up gradient of site, flows across site during heavy storm events and enters waste trenches. Attempts to divert around site have been carried out however permanent diversion drain may be required.

In general site appears to be well managed with no evidence of wind blown litter, existing filled areas covered and vegetated and no significant odour issues.

A well-managed, covered recycling centre is provides on site, which collects clear plastic, aluminium, and glass containers, which are all collected by Smorgans for recycling. Paper and cardboard are collected by a contractor and taken to Visy in Canberra for recycling. Other resource recovery facilities provided on site include collection points for clean chemical drums (collected by Drummaster), cooking oil, white goods and scrap metal including old car bodies

Photo 13: Braid wood landfill Recycling Centre

4.6.4 Future Options Braidwood

Presented in Table 4-5 is the comparison of options for the Braidwood Landfill. As this is the only landfill which currently receives income form gate fees presented is the NPV taking into consideration an average annual income of $24,000 (obtained from Council estimates) until the landfill is closed.

Table 4-5 Braidwood Landfill Future Options

Option	Net Present Value (With gate fees)	Cost Impact	Social Impact	Environmental Impact	Total Score
1. Immediate closure, rehabilitation of landfill and no transfer station	-$1,352,707 (-$1,352,707)	3	6	3	12
2. Closure in 10 years when no remaining landfill life & no resource recovery and transfer station	-$1,215,326 (-$1,135,523)	2	5	4	11
3. Closure in 10 years when no remaining landfill life & small transfer station to Woodlawn	-$1,630,828 (-$1,480,903)	5	2	3	10
4. Closure in 10 years when no remaining landfill life & construct new landfill	-$2,279,056 (-$2,054,537)	8	3	8	19

Preferred Option: Option (3) Closure and rehabilitation in 10 years with construction of a transfer to take waste to Woodlawn landfill.

4.7 Araluen Landfill

4.7.1 General

The landfill is located within the Araluen village approximately 25 kilometres from Braidwood along the Braidwood – Moruya Road as shown in Figure 1.1, and services a rural community of approximately 182 rateable properties. The site is surrounded by common crown rural land to all sides except to the east (front of landfill) which is privately owned. The landfill is open from 8.00am to 5.00pm Sunday and Monday during both non-daylight saving and daylight saving periods. There are currently no gate charges for disposal of waste. The landfill is unmanned during the opening hours, with local residents opening and closing the gates on a voluntary basis.

Eighteen, 240L Municipal Garbage Bins (MGB) are provided at the landfill for residents to place recyclable glass, plastic and cardboard. At the time of the site inspection these bins were mostly empty. Most of the bins were open, and therefore likely to collect rainwater during a storm event. These bins are collected by Council (the bins are all emptied into one truck) and taken to Braidwood landfill, from where they are taken to Canberra for recycling.

4.7.2 Landfill life

Based on the site visit undertaken, following completion of the existing trench it may be possible to locate one or two more trenches further to the north west of the site. This would be followed by overtopping filling against the west batter slope toward the east to produce a final landform with a uniform slope from the west to the east similar to the adjoining land. Based on this filling plan and the current rate of filling there is approximately 8 to 12 years landfill life remaining in the current landfill.

4.7.3 Key Environmental and Engineering Issues

Stormwater management: As the land to the west of the site is steeply graded, there may be an issue with stormwater running onto the site, through the waste, and into the private property located in front of the landfill. Therefore further investigation should be carried out to improve the stormwater management o the site by diverting around the landfill.

Leachate Management and monitoring: The landfill is overlying sandy type soils, which are unlikely to provide a suitable barrier to leachate flow. No monitoring of surface water or groundwater is currently carried out. By diverting the stormwater around the landfill, the amount of water getting into the waste and subsequently the amount of leachate will be minimised.

Photo 14 View from the base of the landfill, looking towards the west.

Photo 15 Existing Resource Recovery Facilities

4.7.4 Future Options Araluen

Presented in Table 4-6 is the comparison of options for the Araluen Landfill.

Table 4-6 Araluen Landfill Future Options

Option	*Net Present Value*	*Cost Impact*	*Social Impact*	*Environmental Impact*	*Total Score*
1.Immediate closure, rehabilitation of landfill and no transfer station	-$286,040	2	6	3	11
2.Closure in 8 years when no remaining landfill life & no resource recovery and transfer station	-$265,330	3	5	4	12
3.Closure and rehabilitation in 8 years when no remaining landfill life and construction of waste transfer station	-$460,295	5	2	3	10
4.Closure in 8 years when no remaining landfill life and construction of new landfill	-$1,261,539	8	3	8	19

Preferred Option: Option (3) Closure and rehabilitation in 8 years with construction of a transfer station to take waste to a major landfill outside Council area.

4.8 Majors Creek Landfill

4.8.1 General

The landfill is located along Seymour Road within Majors Creek approximately 20 kilometres from Braidwood, as shown in Figure 1, and services a rural community of approximately 174 rateable properties. The site is surrounded by rural forested land to all sides. The landfill is open from 8.00am to 5.00pm Saturday and Sunday during both non-daylight saving and daylight saving periods. There are currently no gate charges for disposal of waste. The landfill is unmanned during the opening hours, with local residents opening and closing the gates on a voluntary basis.

Twenty two, 240L MGB are provided at the landfill for residents to place recyclable glass, plastic and cardboard. At the time of the site inspection these bins were mostly empty. Most of the bins were open, and therefore likely to collect rainwater during a storm event. These bins are collected by Council on a fortnightly basis (the bins are all emptied into one truck) and taken to Braidwood landfill, from where they are taken to Canberra for recycling.

4.8.2 Landfill Life

The household waste is currently being placed in a trench located on the eastern side of the site. This trench has approximately 1-year life remaining. Based on more detailed in situ site investigation, it may be viable to establish further trenches, however from our initial site visit it appears that the majority of the area has already been trenched. By overtopping the site approximately 2 metres above the existing capped level, it will be possible to obtain a further 8 to 15 years of landfill space from the landfill site, without clearing any major vegetation, and blending the final landform into the surrounding landscape.

4.8.3 Key Environmental and Engineering Issues

- *Leachate Management and monitoring*: The landfill is overlying sandy type soils, which are unlikely to provide a suitable barrier to leachate flow. No monitoring of surface water or groundwater is currently carried out.
- Waste kept uncovered for long periods (greater than 2 weeks) due to unavailability of cover material resulting in windblown litter, feral animals and increased leachate production.
- Windblown litter into the surrounding forest land is a significant problem on the site.
- No signage on site identifying where to place particular wastes and recyclables leading to waste being mixed with recyclables
- Based on the sign at the entrance to the landfill the following items are prohibited: Chemical drums, car bodies, bulk scrap metal and white goods. However, there was a large scrap metal pile on site at

the time of the site visit which contained old white goods and chemical drums. Residents are meant to take these items to the Braidwood landfill.

Photo 16 Windblown Litter

Photo 17 Mixed Chemical Containers

Photo 18 Contamination of greenwaste stockpile with other materials such as painted timbers, metals and general waste

Photo 19 Scrap metal stockpile

4.8.4 Future Options Majors Creek

Presented in Table 4-7 is the comparison of options for the Majors Creek Landfill.

Table 4-7 Major Creek Landfill Future Options

Option	*Net Present Value*	*Cost Impact*	*Social Impact*	*Environmental Impact*	*Total Score*
1.Immediate closure, rehabilitation of landfill and no transfer station	-$197,151	2	6	3	11
2.Closure in 8 years when no remaining landfill life & no resource recovery and transfer station	-$213,465	3	5	4	12
3.Closure and rehabilitation in 8 years when no remaining landfill life and construction of small resource recovery and was transfer station	-$408,429	5	2	3	10
4. Closure in 8 years when no remaining landfill life and construction of new landfill	-$1,209,673	8	3	8	19

Preferred Option: Option (3) Closure and rehabilitation in 8 years with construction of a transfer station to take waste to a major landfill outside Council area.

4.9 Nerriga Landfill

4.9.1 General

The landfill is located on the corner of Regional Road 92 and Shire Road 35 (Enrick River Road) within Nerriga which is approximately 50 kilometres from Braidwood on the regional road 92 (un sealed) between Braidwood and Nowra, as shown in Figure 1.1, and services a rural community of approximately 309 rateable properties. The site is surrounded by rural forested land to all sides. The landfill is open from Sunday 9.00am through to 5.00pmMonday during both non-daylight saving and daylight saving periods. There are currently no gate charges for disposal of waste. The landfill is unmanned during the opening hours, with local residents opening and closing the gates on a voluntary basis.

Thirteen, 240L MGB are provided on a concrete pad at the landfill for residents to place recyclable glass, plastic and cardboard. At the time of the site inspection these bins were mostly empty. These bins are collected by Council usually on a fortnightly basis (the bins are all emptied into one truck) and taken to Braidwood landfill, from where they are taken to Canberra for recycling.

4.9.2 Landfill Life

Following completion of the existing trench there is room for one or two further trenches to east. Also the western section of the landfill site is completely unfilled, and based on the current filling rate there is over 20 to 30 years life remaining in the landfill site.

Photo 20 Site for future expansion on western side of site

4.9.3 Key Engineering and Environmental Issues

- No signage at site indicating what items can be disposed and/or what is restricted.
- Improved surface water diversion around landfill trench.
- Waste kept uncovered for long periods (greater than 2 weeks) due to unavailability of cover material resulting in windblown litter, feral animals and increased leachate production.

Photo 21 Uncovered Waste in Trench

Photo 22 Windblown litter on site (It is noted that no off site wind blow litter observed surrounding site)

Photo 23 Existing recycling MGBs

4.9.4 Future options Nerriga

Presented in Table 4-8 is the comparison of options for the Nerriga Landfill.

Table 4-8 Nerriga Landfill Future Options

Option	Capital Cost	Cost Impact	Social Impact	Environmental Impact	Total Score
1.Immediate closure, rehabilitation of landfill and no transfer station	-$130,485	1	6	3	10
2.Closure in 20 years when no remaining landfill life & no resource recovery and transfer station	-$211,795	3	5	4	12
3.Closure and rehabilitation in 20 years when no remaining landfill life and construction of small resource recovery and waste transfer station	-$255,563	5	2	3	10
4.Closure in 20 years when no remaining landfill life and construction of new landfill	-$424,198	8	3	8	19

Preferred Option Nerriga: Option (3) Closure and rehabilitation in 20 years with construction of a transfer station to take waste to a major landfill outside Council area. This option has the same overall score as Option 1, however has a significantly lower social impact.

4.10 Summary of Options

A summary of the preferred options for each of the landfill catchments is provide in Table 4-9.

Table 4-9 Summary of Options for Individual landfills

Landfill Catchment	*Preferred option from an individual catchment basis*
Macs Reef	Option (2) Closure in 2 years with residents using Bungendore landfill.
Bungendore	Option (3) Closure in 3 years with construction of a transfer station
Collector	Option (3) Closure in 12 years with construction of a transfer station
Captains Flat	Option (2) Immediate closure and rehabilitation with construction of a transfer station.
Braidwood	Option (3) Closure and rehabilitation in 10 years with construction of a transfer station to take waste to a major landfill outside Council area, Woodlawn.
Araluen	Option (3) Closure and rehabilitation in 8 years with construction of a transfer station to take waste to a major landfill outside Council area.
Majors Creek	Option (3) Closure and rehabilitation in 8 years with construction of a transfer station to take waste to a major landfill outside Council area.
Nerriga	Option (3) Closure and rehabilitation in 20 years with construction of a transfer station to take waste to a major landfill outside Council area. This option has the same overall score as option 1 (Immediate closure), however has a significantly lower social impact.