



Economic Review Waste Facility Future Options

Shire of Donnybrook-Balingup



Project No. 1611
March 2017

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Acknowledgements

ASK Waste Management gratefully acknowledge the cooperation of the Shire of Donnybrook - Balingup staff that provided information and assistance in the development of this report.

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Document Control			
Version	Date	Description	Initials
0 <draft>	8 March 2017	Draft version for internal QA	
1 <draft>	15 March 2017	Draft version for review by Shire	
2B <draft>	28 March 2017	Draft version for review by Waste Committee	

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EXECUTIVE SUMMARY

The Shire of Donnybrook-Balingup (the Shire) engaged ASK Waste Management (ASK) to complete a comprehensive economic review of future options to manage waste received at the Donnybrook Waste Management Facility (DWMF).

These Options include:

- Option 1a: DWMF Extension – Phase 1
- Option 1b: DWMF Extension – Phase 1 & 2
- Option 2a: Construction of a transfer station and disposal at BHRC as customer
- Option 2b: Construction of a transfer station and disposal at BHRC as member Council
- Option 2c: Construction of a transfer station and disposal at Cleanaway as customer.

Estimated waste tonnage

The DWMF does not have a weighbridge, therefore the total waste disposed of has been estimated based on the average of three methods of data extrapolation, resulting in an estimated 5,300tpa \pm 20%. N.B. this total does not include the materials recycled via the organics and packaging recyclables MGB service.

Table 1: Estimated tonnage data used

Waste Quantity	Tpa (rounded)
BTS (Domestic drop-off only)	500
BTS (Commercial drop-off only)	0
DWMF Domestic - Drop Off	1,250
Domestic - MGBs	1,600
Commercial MGB	350
Commercial waste	600
C&D Waste	1,000
Asbestos	0
Total	5,300

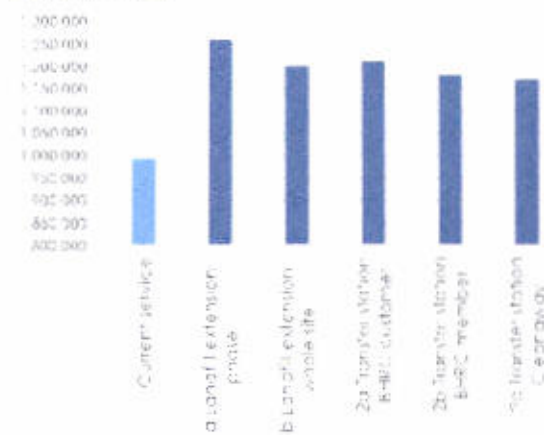
Findings

The financial model results are shown in Figure E.1 for each Option assessed and show that Option 2c (transfer station) is the most cost-effective option for the Shire, with the lowest cost alternative landfill at Cleanaway (Banksia Road, Dardanup). This option is approximately \$90,000pa lower than Option 1a (extension of landfill phase 1).

While the additional cost of Option 1a is less than expected, other negative factors associated with the landfill extension include:

- a significantly higher capital investment;
- an increase level of management and operational oversight;
- a greater environmental risk (e.g. puncture of the liner or leachate pollution); and
- due to the constraints of the site there is insufficient space for the lined leachate lagoon.

Figure E.1 Total annual cost of current services and potential options



Recommendations

Based on this assessment the Shire should consider the selection of option 2c, (transfer station and transport of waste to Cleanaway), as the preferred long term disposal option for the Shire.

Additional key recommendations relating to fees, charges and services, include:

- Tip passes; limit the tip passes to 52 x 240L tokens for residents with no kerbside collection and introduce two bulk waste passes.
- Increase gate fees by 40%, however, if tip pass changes impact on commercial waste revenue as expected only a 20% increase would be required.
- Increase the fee for the Shire's kerbside commercial waste service (240L MGB) by at least \$40 to achieve breakeven and complete a bin presentation audit to check all bins presented have been paid for.
- The current division of cost for domestic services between the Kerbside Charge and Waste Management Levy is unclear and should be resolved.
- Undertake a review of the operation of both the DWMF & BTS (contractor delivery versus in-house service), particularly in relation to the Balingup Transfer Station and future transfer station at DWMF, as these types of facility require less oversight than a landfill.
- Review the opening hours of the Balingup Transfer Station in view of providing a service which is more commensurate with its level of usage.
- Review the options of providing a kerbside collection for the whole Shire compared to the provision of the current drop-off facilities. As the cost per tonne for providing the current waste drop-off facilities is high, particularly for the BTS.



1 INTRODUCTION

The Shire of Donnybrook-Balingup (the Shire) engaged ASK Waste Management (ASK) to complete a comprehensive economic review of future options to manage waste received at the Donnybrook Waste Management Facility (DWMF).

With limited remaining landfill capacity, the Shire recently received Works Approval from the Department Environment Regulation for expansion of the landfill to a neighbouring lot. The Works Approval had numerous conditions on the expansion, and as such the decision on whether to proceed with expansion required a comprehensive economic review to cost this expansion against other disposal options available to the Shire.

In order to understand the financial implications of the future options to manage waste received at the DWMF, ASK developed a comprehensive model to estimate the economic impact of each future option for waste disposal in the Shire. Essentially all the capital and operational cost data for both options, together with the waste quantity data was used to provide an economic comparison of the two options. The key inputs such as tonnages, gate fee prices, distances to alternative facilities and available voidspace at DWMF was built into the model to ensure sensitivity analysis of these factors can be completed.

This report details:

- Current waste management practices
- Future disposal options available to the shire
- Conceptualised design criteria for landfill and transfer station options
- Model inputs
- Financial results
- Social, economic and political assessment
- Evaluation of outcomes
- Future funding options

The report concludes with a series of recommendations for consideration by the Shire to guide and inform a waste management solution that is aimed at maintaining a high level of service to the residents of the Shire in an efficient, equitable and cost effective manner.

1.1 REPORT OBJECTIVES

This report has been produced to meet the following objectives.

1. To provide the Shire with a detailed costing for:

- Option 1: Extending the existing landfill operations at the DWMF based on the works approval conditions and continuing with the Shire's current waste services; and
- Option 2: Establishing a resource recovery facility at the DWMF that would incorporate a transfer station for 'drop off' domestic waste, a tip shop, processing of green waste, collection of scrap metal and recyclables and the also a separate costing for the processing of concrete; and
- The capping and closure of the current waste disposal area.

2. Provide recommendations to fund the costs of the above.



2 CURRENT WASTE MANAGEMENT PRACTICES

The Shire of Donnybrook-Balingup currently provides numerous services to manage waste generated within the Shire. The Shire operates the Donnybrook Waste Management Facility (DWMF) as the central processing and disposal facility for the Shire, and the Balingup Transfer Station (BTS). In addition, both a three bin and two bin kerbside collection service operates within the Shire.

A Household rubbish, recycling and organics service (3 bin) operates in the Donnybrook, Kirup and Balingup town sites. Organics Bins are collected weekly, and rubbish & recycling Bins are collected fortnightly on an alternating basis. A two bin kerbside collection service operates in other town site area of the Shire (Argyle, Trishtown, Upper Copel and Brookhampton). Rubbish bins are collected weekly, and recycling bins collected fortnightly.

Approximately 50% of the Shire ratable properties are within kerbside collection areas, with another 50% of properties without access to kerbside collection services due to their distance from town areas. All services provided by the Shire (collection and processing contracts, operation of DWMF and BTS) operate under contract with 3rd party providers.

Waste Services provided by the Shire are not funded from general rates. Funds to provide the services are obtained from fee for services, gate fees from commercial disposal and a waste management levy applied to all ratable properties in the district.

All ratepayers are issued with a 'Waste Management Pass' with their annual rate notice. This pass allows disposal of domestic waste free of charge at any of the Shire facilities. There is a limit of 1m³ per day on all waste disposal under the pass system, but no limit on the number of days the DWMF can be visited.

2.1 KERBSIDE COLLECTED RECYCLABLES (240L YELLOW TOPPED MGB)

Recyclables including paper, cardboard, steel, plastic, aluminium cans and glass are collected fortnightly by Cleanaway and then transported to the Suez Recyclables Transfer Station in Ficton for consolidation with other recyclables collected throughout the south west. The consolidated material is then transferred to a Materials Recovery Facility (MRF) in Fibra Lake (20 km south of Perth). Recyclables are sorted by the MRF into material streams, then baled and sent for remanufacturing into new products.

The service is optional and there are approximately 2000 recycling collection services provided across the Shire on a fortnightly basis. The initial period of the current collection contract expires June 2018, with an option for extension of the contract available for another period of up to 5 years.

The collection and processing of recyclables will not be impacted by the outcomes of this options review as this waste does not require landfill disposal at the DWMF.

2.2 KERBSIDE COLLECTED ORGANICS (240L GREEN TOPPED MGB)

Weekly organics kerbside collection service operates in Donnybrook, Kirup and Balingup townsite areas. The service was introduced in December 2014 as part of the Better Bins funding program through the Waste Authority Western Australia and provides services to 1,250 households. The grant covered the purchase and delivery of 240 litre mobile garbage bins, compostable bags, kitchen bench top bins and the printing and distribution of information booklets and advertising.

All household organic material can be placed in the organics bin. This includes garden material, food scraps, food stained pizza boxes, shredded paper, paper towel and tissues, pet waste, charcoal and ash, human and pet hair. Organic waste is taken to the Bunbury Harvey Regional Council - Banksia Road Facility Dandarup where it is made into compost and soil-conditioning products.

The service is optional and there are approximately 1000 organic services provided across the Shire. The collection is undertaken under contract by Cleanaway. The initial period of the current collection contract expires June 2018, with an option for extension of the contract available for another period of up to 5 years.



The collection and processing of organics will be not be impacted by the outcomes of this options review as this waste does not require landfill disposal at the DWMF.

2.3 KERBSIDE COLLECTED RESIDUAL WASTE (240L 'RED TOPPED' MGB)

Kerbside collection of municipal solid waste is undertaken across the Shire with the collection frequency varying from weekly to fortnightly. For residents with organics collection, the residual waste bin is collected fortnightly, otherwise a standard weekly collection applies.

The service is mandatory in designated routes and there are approximately 700 weekly services and 1250 fortnightly services. Collection is undertaken under contract by Cleanaway with all waste taken to the Donnybrook Waste Management Facility for disposal. The initial period of the current collection contract expires June 2018, with an option for extension of the contract available for a further 5 years.

The outcomes of this report will impact on the disposal location for residual waste collected in the Shire at the expiry of the current landfill voidspace capacity. The existing kerbside collection contract allows the Principal to direct the contractor to deliver waste to other landfill facilities within the boundaries of the Wellington Group of Council at no extra charge to the Shire.

As such should Option 2 (Transfer Station with alternative landfill) be the preferred option, the Shire will not be required to pay mileage or transport fees for the extra distance to a new landfill for potentially a further 6 years. After this time, it would be expected that new collection contracts would incur additional transport costs.

2.4 BALINGUP TRANSFER STATION

The Shire operates the Balingup Waste Transfer Station at Lot 13799 South Western Highway Balingup. The facility is open 18 hours per week. The facility services residents outside of kerbside collection routes in the town of Balingup as well as locations of Mullalyup, Grimwade, Southampton and Kirup.

The facility accepts the following:

- Putrescible material
- Inert waste
- Dry recyclables (cardboard; plastic bottles and containers with symbol 1 to 6; glass bottles & jars; aluminium cans, foil and trays; steel tins and cans; paper, magazines and newspapers; paper and cardboard drink cartons)
- Greenwaste
- Used motor and cooking oils, hydrocarbon filters
- Empty chemical drums and containers (subject to DrumMuster requirements)
- Vehicle bodies and scrap metal
- Electronic waste
- Tyres
- Vehicle batteries
- Refrigerators, air conditioners and gas bottles

Acceptable waste is delivered to the Facility for storage and consolidation on-site prior to being transported to the DWMF. The facility is fully fenced with a main access gate. The site is laid out with various containers/bins, compounds and areas for the disposal of different waste types including but not limited to putrescible, inert, greenwaste, co-mingled dry recyclables, used oil, tyres, e-waste, DrumMuster containers and other recyclable materials.

The facility is operated by a third party (Hastie Waste) under contract. The contractor is responsible for management and operation of the facility and includes transport of waste to the Donnybrook Waste

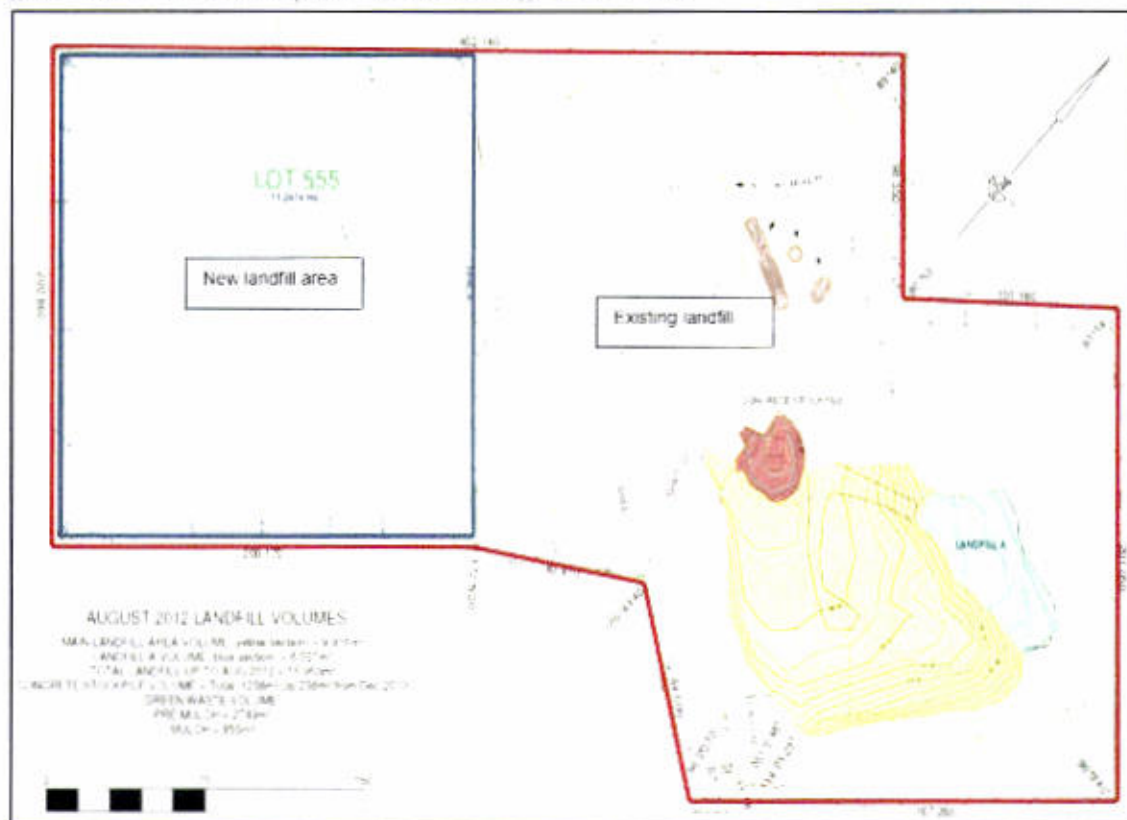
Management Facility for collection, processing or disposal. The contract expires 30 June 2017 with a 3yr option to extend.

The outcomes of this report will impact on the disposal location for waste generated from the Balingup Transfer Station at the expiry of the current landfill voidspace capacity. If Option 2 (Transfer Station with alternative landfill) is selected the waste from Balingup Transfer Station will need to be taken to an alternative landfill. This waste will also attract gate fees at the determined landfill location.

2.5 DONNYBROOK WASTE MANAGEMENT FACILITY (DWMF)

The Donnybrook Waste Management Facility (DWMF) is located on Goodwood Road, Donnybrook. The land is leased from DPoW and comprises three lots covering a total of 11.13 hectares (**Figure 2-1**), with the third lot (lot 555) recently receiving Works Approval for construction of landfill cells. Lot 555 encompasses 4.65ha in area.

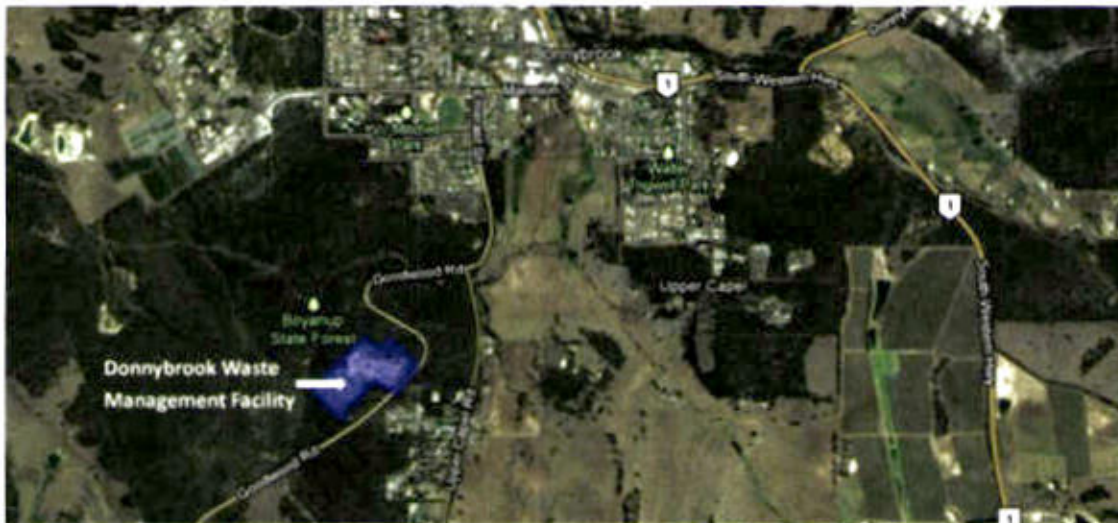
Figure 2-1. Plan of the Donnybrook Waste Management Facility



The facility was licensed by the DER in 1997 and accepts putrescible and inert solid waste. The current method of landfill is a combination of below ground trenches and above ground cells. The existing and historic cells are not lined to current best practice standards. The predominant soil type is clays with groundwater present within the clay matrix at approximately 60m below ground level (bgl).

Preferred groundwater flow direction is from west to east. Previous geotechnical investigations concluded that groundwater is not considered to pose a risk to down-gradient ecological receptors (Engtech 2012). The site is generally well placed in terms of sensitive receptors with the site bounded by State forest to the North, South and West. The site is bounded by Goodwood road to the East, with smaller residential and rural properties adjoining Goodwood Road. The landfill area is located within the Donnybrook Water Reserve (a Protected Drinking Water Source Area- PDWSA). It is classified as a P3 water reserve under the Department of Water Priority Source Classification System.

Figure 2-2: Location Plan of Donnybrook WWMF



The facility provides numerous services. These include the following:

- Landfill
- Domestic & commercial waste drop off,
- Greenwaste (to be mulched and recycled),
- Scrap metal (to be recycled)
- Dry recyclables (cardboard; plastic bottles and containers with symbol 1 to 6; glass bottles & jars; aluminium cans, foil and trays; steel tins and cans; paper, magazines and newspapers; paper and cardboard drink cartons)
- Used motor and cooking oils, hydrocarbon filters
- Empty chemical drums and containers (subject to DrumMuster requirements)
- Electronic waste
- Tyres
- Vehicle batteries
- Refrigerators, air conditioners and gas bottles.
- Items for the Reuse area (shop)
- Household hazardous waste
- Asbestos cement sheeting disposal

The Lions Club of Donnybrook also operates a materials recovery facility (MRF) on the site. The Lions Club have recycling rights to cardboard, newsprint, black and clear plastic sheet and plastic milk bottles deposited at the MRF. The MRF and surrounds (access and loading area) where the Lions operate is for the exclusive use of the Principia and the Lions.

Figure 2-3 shows an aerial photography of the site, in relation to operations the site can be broadly divided in four areas:

- Entrance and recycling area containing the gatehouse, (MRF) recycling shed, drop off area and equipment storage sheds (shaded blue);
- Main disposal area where the main above ground disposal activities are to be completed (shaded brown)
- Greenwaste storage and processing area (shaded green); and



- Scrap metal and C&D waste storage area (shaded yellow).

Figure 2.3 Aerial photograph of DWMF showing operational layout



The site is currently operated under contract by Hastie Waste. The Contractor is responsible for all operations, labour, plant, materials, supervision, and survey administration to manage the Facility and fulfil the requirements of the DER site licence. Tasks include daily waste compaction and cover, processing green waste, provision of DWMF attendants, DWMF maintenance and housekeeping, pest control and management of DWMF recycling facilities and activities. Supply of cover / fill material is the contractor's responsibility. The Facility is open 26 hours per week. The contractor has full salvage rights to recyclable material, other than that collected by the Lions Club. The current contract expires 30 June 2017 with a 2-year option to extend (30 June 2019).

2.5.1 DWMF - Landfill

The DWMF has received all the waste generated in the Shire since it closed its waste disposal sites at Lowden and Mumbalup and constructed a waste transfer station at Balingup in 2006. As the only landfill in the vicinity it receives a combination of Municipal Solid Waste (MSW) from domestic drop off and kerbside collection trucks, Commercial and Industrial waste (C & I) and Demolition Waste (C&D) via skip bins and front lift trucks operated by commercial contractors. The waste has been disposed of in a combination of below ground unlined trenches and above ground unlined cells.

Given the limited remaining landfill voidspace a works approval application was developed and submitted to the DER for expansion of the landfill on the neighbouring lot. The application was recently approved by the DER subject to numerous conditions as detailed in **Section 3**.

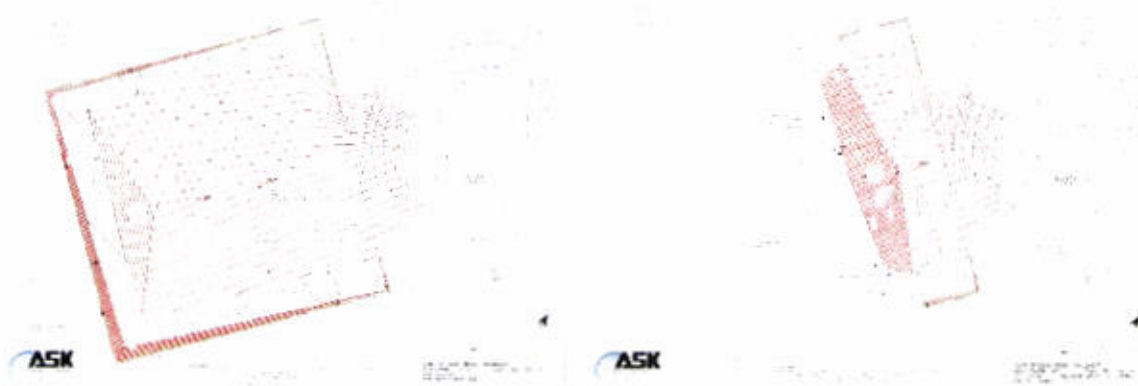
3 WASTE DISPOSAL OPTIONS

3.1 OPTION 1: EXPANSION OF LANDFILL INTO EXTENSION AREA

Environmental Protection Act 1986 Works Approval W5577/2013/1 was granted in June 2016 for the expansion of the Landfill by constructing additional Class II landfill cells on the adjoining cleared land (lot 555) to extend the operational life of the Landfill. The Shire has planned to develop the landfill in two phases. These phases include:

- Phase 1 - short to mid-term. Utilisation of approximately half of the new landfill (north east portion) for landfilling.
- Phase 2 – mid to long term. Utilisation of the whole of new landfill for landfill purposes.

Figure 3 Landfill extension area, whole area (left) and phase 1 cell (right)



Only phase 1 of the landfill area has been approved for construction under the Works Approval. The approximate dimensions of the phase 1 landfill area are 200 m in length to 80 metres wide. The landfill cells will be excavated to a depth of six metres below the re-profiled surface levels following gravel extraction which gives a maximum excavation depth of 7.5 m below natural ground level. The potential voidspace created by Phase 1 expansion is 72,500m³, which based on current waste volumes provides approximately seven years. Development of both phase 1 and phase 2 will provide a voidspace of approximately 224,000m³ or 24 years.

3.1.1 Work Approval requirements

The DER concluded based upon the information provided in the Works Approval application, the design of the new landfill area may present an unacceptable level of risk to groundwater unless regulatory controls are imposed to mitigate that risk.

The regulatory controls imposed in the Works Approval include:

- **Reducing the size of the landfill extension area by approximately 50%** to reduce the risk of the landfill extending into the contact point of the Leederville aquifer and the clayey regolith underlying the existing site. This restricts development to phase 1 only. It is noted that the works approval states that approval for the construction of Phase 1 does not guarantee approval for Phase 2.
- **Installing an additional two groundwater monitoring bores** to ensure any baseline groundwater quality and downstream impacts from the landfill can be identified if they occur. Given the significant distance to groundwater at the site these bores will likely need to be drilled in excess of 50m. Works Approval conditions for ambient groundwater monitoring and reporting requirements have also been included.



- **Requiring the base of each landfill cell to be graded to an impervious ($\leq 1 \times 10^{-9}$ metres per second) sump for the collection of leachates. The sump shall be designed with a capacity to store leachates generated during a one-off extreme rainfall event. Additionally, a leachate monitoring bore will be required to be installed allowing monitoring and extraction of leachate head.**

The implications of this condition mean the facility would need to contain the rainfall from a 1 in 10 year, 72hr rainfall event within an impermeable (lined) sump (lagoon). Given the application proposed no onsite leachate storage, should leachate accumulate in the cell at volumes that may present an unacceptable risk then a strategy for managing the leachate will need to be developed.

Therefore, this condition would require the construction of a lined leachate lagoon on site, including a leachate management system in the cell allowing leachate to drain or be pumped to the lagoon. The physical constraints of the site mean there is no available area to locate a leachate lagoon, this presents a significant problem.

- **Requiring the Works Approval Holder to appoint a suitably qualified Hydrogeologist to conduct an investigation and take representative soil samples from the base and inside walls of the excavation to determine the permeability of the in-situ soil.** The purpose of the investigation is to determine whether any shallow groundwater exists at the landfill that would increase leachate volumes and potentially provide a mechanism/pathway for leachate migration, and to verify whether the in-situ geology in the extension area is suitable to act as a landfill containment system as proposed in the works approval application.
- **The Works Approval Holder is also required to provide to DER a report on the findings from the investigation. If the report identifies a hydrogeological setting/in-situ geology that suggest the new landfill area would not be suitable for the disposal of waste due to the risk presented to the environment, then a licence will not be granted to allow the acceptance of waste in the extension area unless further engineered mechanisms such as a landfill liner implemented by the Shire to mitigate this risk to acceptable levels.** It should be noted that any change to the design of the landfill will need to sought through an amendment to the works approval.

These last two conditions infer that the DER are not satisfied that there is sufficient evidence to justify the installation of an unlined cell simply using the in-situ clayey soils, as proposed by the Shire in the application for approval.

Whilst no permeability specifications are given in the approval, results from the permeability tests will be used by the DER to determine whether the conceptual model put forward in the works approval application is accurate. Where the results identify anomalies, the results will be used to assess the risk to the environment from leachate and whether engineering measures (impermeable cell base to Best practice standards) are required to mitigate the level of risk.

Whilst this condition provides some flexibility for the Shire to prove the adequacy of the receiving environment, it is unlikely that the DER will accept hydraulic conductivity of the soil unless it meets the BPEM standards of 1×10^{-9} ms.

The only way these levels of impermeability can be met is with a compacted clay liner of suitable impermeability or with a geosynthetic liner. Given the challenges and cost of a compacted clay liner (construction requirements, testing regime and ensuring a supply of suitable and consistent clay) that will meet the specifications of BPEM, the installation a geosynthetic liner is the easier option with lower risk of further costs during construction.

Therefore, the cell extension has been costed based on a geosynthetic lined cell, leachate management system and leachate lagoon. It should be noted that if the Shire were to construct engineered landfill cells with leachate management, it would be likely that DER would allow the whole extension area to be developed over time, rather than just phase 1, however, there would not be sufficient space on site for the whole extension and the lined leachate lagoon.



3.1.2 DWM Landfill Extension Design concept

In order to provide relevant cost data for Option 1 a conceptualised landfill design was required incorporating the requirements of the works approval. The Phase 1 landfill area will be developed in two stages and progressively capped and rehabilitated. For the purposes of the model, this option has been broken into two scenarios: the development of the phase 1 cell (as detailed in the DER Works Approval) or the development of the whole area. The conceptual design detail is provided to follow.

3.1.2.1 Access

A new access road to the landfill area will be required. This will be constructed from in situ onsite material.

3.1.2.2 Infrastructure

- Fencing - the entire site is required to be fenced using a 1.8m chain link fence to prevent unauthorised entry to the site. This is a requirement under the Best Practice standards.
- Existing gatehouse & shed to remain.

3.1.2.3 Liner design

In the likely absence of suitable and consistent low permeability clay the design concept for the purposes of this report is based on a geosynthetic lining system to comply with the BEPM standards. The proposed base cell liner is as follows:

- Compacted proof rolled shaped subgrade (1.5% grade along drainage lines to sump)
- Low permeability Geosynthetic Clay Liner(GCL) with hydraulic conductivity less than 1×10^{-9} m/s as primary containment system
- leachate drainage system including:
 - leachate collection pipework
 - drainage aggregate
 - geotextile
 - sump consisting of double lined GCL, concrete slab and associated concrete riser
- Sand protection layer

3.1.2.4 Leachate Pond/ Lagoon

Within the leachate drainage system, an array of perforated pipework within the cell base will collect leachate and convey it to the sump where an extraction riser will be located. A pump will then be installed to remove the leachate via a pipe to a leachate evaporation pond. A water balance analysis will need to be undertaken to inform the dimensions and design of the pond to cater for leachate generation and rainfall events, including a 1 in 10 year, 72-hour rainfall event. A nominal amount has been placed in the model to cover design and construction of this pond.

The size of such a lagoon would be significant. All available space within the existing cleared site is currently utilised within the landfill cell extension design and as such there is no available area to locate the leachate lagoon without compromising landfill voidspace. This is a significant issue relating to Option 1.

3.1.2.5 Stormwater control

The area will have a raised bund constructed inside the fenced boundary to divert any off-site stormwater away from the facility. Cleanwater drains will be constructed around the perimeter of the new cells at the base of the re-profiled batter to direct stormwater falling on the re-profiled batters to the existing area's clean stormwater drains and ultimately diverted off-site.

3.1.2.6 Closure and Capping

The area will need to be progressively capped with a low permeability capping layer in line with BEPM criteria. Thus, an impermeable compacted clay or geosynthetic layer would need to be incorporated in the capping design. As each section of the cell is completed it will be covered with 300mm interim cap to provide a base on which to lay a 1mm Linear Low Density Polyethylene (LLDPE) geomembrane. A further 300mm of soil with sufficient high permeability to minimise infiltration of water into the waste mass.

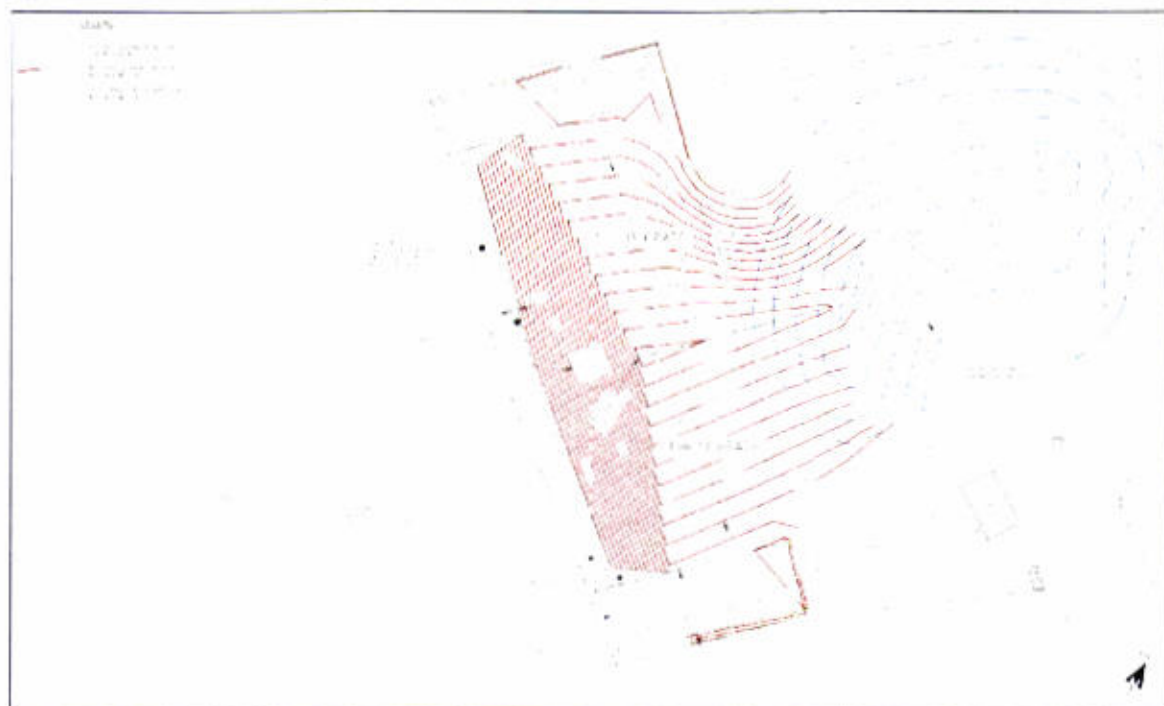
Figure 3-2: Indicative cap design required to meet BEPM specification.

Top soil	0.2 metres
sub soil / vegetation roofing zone (uncompacted local soils)	0.8 metres
Low permeability layer Clay from extension area	0.5 metres
Drainage layer and LDPE	0.25m
interim cover layer	0.3 metres
Waste	

3.1.2.7 Final Profiles

The final profile for phase 1 of the extension is shown in Figure 3-3, the design is to blend the final surface of the extension with the existing waste body in the current active area.

Figure 3-3: Final contours for phase 1 of the landfill extension.





3.1.3 DWMF landfill extension – Changes to services

With Option 1, whilst the extension of the landfill will require realignment of roads and access tracks, all the current services provided on site would not change. In addition, the majority of other infrastructure would also remain unchanged. This would include:

- Entrance and recycling area containing the gatehouse, recycling shed, drop off area and equipment storage sheds;
- Greenwaste storage and processing area; and
- Scrap metal and C&D waste storage area.

The expansion of the Facility would result in changes to existing DWMF management contract with the requirement for the management of the new on-site leachate lagoon and sump/ extraction system together with accountability and provisions for careful management of lining systems to prevent rupture or perforation during disposal operations.

3.2 OPTION 2: CONSTRUCTION OF TRANSFER STATION AND DISPOSAL OF WASTE AT AN ALTERNATIVE LANDFILL

The option is based on the Shire utilising the current landfilling area until it is full and then transferring waste to an alternative landfill via a transfer station at Donnybrook and the existing transfer station at Balingup. Given the Shire would no longer provide landfill services, waste requiring disposal will need to be transported to an alternative landfill.

This will have an impact on kerbside waste collection services, domestic waste drop off, commercial waste collections and waste from Balingup transfer station. The cost associated with Option 2 are the operations of the transfer stations, additional transport and the gate fees to be paid at an alternative landfill. In addition, the Shire would lose the revenue currently collected for commercial waste gate fees.

3.2.1 Transport of waste to an alternative landfill

In determining where to take Shire waste and the transportation method requires consideration of current kerbside collection contract requirements, alternative landfill locations, transport distances, potential gate fees and transport logistics all of which are interrelated and have a significant impact on the cost modelling of this option.

There are two commercial landfills within a 50km radius of the Shire of Donnybrook Balingup. These two options are discussed to follow. Both landfills cost options were considered in the modelling exercise.

3.2.1.1 Cleanaway Landfill (Banksia Road, Dardanup)

Cleanaway's Banksia Road Landfill Facility is located approximately 5km southeast of Dardanup in the Shire of Dardanup. It is a synthetically lined landfill established in 2000. The landfill is located on the western edge of the Whicher Scarp in a geological formation comprising clay-rich soils. The site currently operates to Best Practice landfill guidance standards, complies with best practice siting requirements in relation to separation distances to sensitive receptors and depth to groundwater is approximately 35 - 40m to a confined, permanent aquifer (Leederville Formation). The facility receives municipal and commercial waste from the local, regional and metropolitan area. The facility is approximately 30km from the Donnybrook Waste Management Facility (or 30-minute travel time).

3.2.1.2 Bunbury Harvey Regional Council (BHRC) Landfill (Stanley Road, Australind)

The Stanley Road landfill is a regional Class I landfill located on the Swan Coastal Plain, 14km northeast of Bunbury. The Bunbury Harvey Regional Council (BHRC) manages waste for the City of Bunbury and the Shire of Harvey in the south west region of Western Australia. BHRC owns and manages the Stanley Road Waste Management Facility, which encompasses a waste transfer station, greenwaste recycling and a Class I landfill site. The site operates as a commercial landfill and accepts domestic and commercial waste

from Bunbury, Australind and surrounds. The landfill commenced operation in 1990 and has operated as a licensed Class 2 Landfill since January 1997.

The landfill does not operate to Best Practice landfill guidance standards as it is currently unlined with no engineered leachate management system, minimal separation distances to groundwater and residential premises.

The facility is approx. 50km from Donybrook Waste Management Facility (or 45-minute travel time).

Figure 2: Location of DWMF and alternative landfill



3.2.2 Kerbside collection contracts

The outcomes of this report will impact on the disposal location for residual waste collected in the Shire at the expiry of the DWMF landfill voidspace. Currently the collection contract provides the Principal with the ability to direct the contractor to deliver waste to other landfill facilities within the boundaries of the Wellington Group of Councils at no extra charge to the Shire.

Therefore, should Option 2 (Transfer Station with alternative landfill) be the preferred option, the Shire will not need to pay for additional transport fees for the extra distance to an alternative landfill for potentially a further six years. After this time, it would be expected that new collection contracts would incur additional transport costs for the additional distances.

3.2.2.1 Commercial waste

The Shire would no longer be responsible for the disposal of commercial waste for Option 2. The transfer station would only accept domestic waste for landfill disposal based on the current domestic waste drop off and tip pass system. All additional commercial waste generated in the Shire would need to be transported directly to alternative landfills. The waste generator (or waste company they engage) would complete the transportation of this waste stream.

The model does not include the cost of commercial waste transport and disposal at an alternative landfill, as this will be the responsibility of the commercial waste generator.

3.2.2.2 Transportation Options

Different transportation methods are available for waste, the options include:

- Direct haulage: this is where waste is taken to the alternative landfill facility in the vehicle it was collected in. For example, the kerbside collected waste would be transported to a landfill using the kerbside collection truck.
- Waste consolidation and bulk haulage: this is where waste is consolidated to improve transport efficiency over long distances. For example, the kerbside collection trucks would tip the waste at Dunnybrook to be loaded into road trains for transport to landfill.
- Waste consolidation, compaction and bulk haulage: this involves a waste transfer station at the DWMF with inbuilt compaction system to consolidate all waste requiring landfilling. For example, kerbside collection trucks would tip at the DWMF and a compactor unit would consolidate the waste into sealed hooklift bins for transportation to an alternative landfill.

Option 2 has been modeled based on the following transportation systems for each waste stream:

- Kerbside collected waste: given the relatively short distance to the alternative landfills the cost of constructing a waste transfer facility and double handling of the kerbside waste is uneconomic when compared to the direct haulage of the kerbside waste in the collection trucks.
- Domestic drop-off waste at DWMF: this waste would be compacted into sealed hooklift bins (30m³ – 40m³) and then transported to an alternative landfill. By compacting the drop off waste the bulk density of waste can be approximately doubled and thus transport costs halved.
- Domestic drop-off waste at the BTS: this waste would be hauled to DWMF under the current contract, and waste would need be transferred to the compactor unit to be compacted into the hooklift bins. In the future it may be more cost effective to instal a compactor unit at the BTS.

Figure 3-5: Example of a compactor unit and sealed hook lift bin & Bin Tiler for compactor



3.2.3 Design concept waste transfer station

Under this scenario, landfilling on the site would cease, and the facility would operate as a transfer station for the holding of waste prior to final disposal and / or reprocessing. As such the transfer station at Donnybrook would receive:

- Waste from Balingup Transfer Station
- Domestic drop-off waste
- Greenwaste (to be mulched and recycled)
- Scrap metal (to be recycled)
- Packaging recyclables (via the Lions shed)
- Items for the reuse area (shop)
- Other domestic recycling: E-waste, tyre drop off, glass, mattresses, household hazardous waste, waste oil

In order to provide relevant cost data for Option 2 the waste transfer station design developed in the Site Layout Report (ASK, 2013) has been used (Figure 3-6).

Figure 3-6: Proposed layout of Donnybrook Transfer Station



3.2.3.1 Design

The transfer station costing is based on a basic design with only a compacted gravel hardstand and tracks for the public access. A small area of concrete has been included in the cost for the hooklift bin and compactor to be located on. No sealed (asphalt) roads or cover / roof for the transfer station has been included.

3.2.3.2 Access

Access to the facility will be via the current entrance which diverges at the gatehouse. Domestic traffic will be directed to the left of the gatehouse to a looped drop off area leading to common exit path on the right side of the gatehouse. Traffic disposing of larger volumes of greenwaste, scrap metal or C&D waste will be directed to the left to the hardstand reprocessing area.

3.2.3.3 Gatehouse

The Sites' gatehouse is owned by the contractor and currently located approximately 140 metres from the site entrance. The small gatehouse is manned by a Site Attendant and used for administrative functions such as directing site users, collecting fees and charges, and recording accepted wastes.

Ultimately the Shire should establish a new gatehouse to provide an appropriate and safe working environment for site staff. It should include a boom gate to control traffic. This has not been modelled in the scenario costing, as this action should be completed for any of the scenarios modelled.

Figure 3-7. Existing gatehouse at the DWMF



3.2.3.4 Domestic Drop-off and recycling area

Behind the gatehouse a drop off area will provide a single point for all domestic users of the transfer station to drop off recyclable materials to be processed and waste to be transferred to the alternative landfill.

3.2.3.5 Reprocessing area

A hardstand area has already been incorporated into the site layout (100m x 50m) to provide a permanent area for the storage and/or reprocessing of materials such as scrap metal, concrete and bricks (see **Section 5.4**) and greenwaste.

3.2.3.6 Reuse Area/Shop

The current reuse area is in the open on an unsealed strip next to the access track. This results in items becoming rapidly degraded by the weather and covered in dust from the movement of vehicles on the unsealed road.

There is an area to the East of the gatehouse that could be built up with cleanfill and used as the reuse area. Ultimately this area should be sealed and a building erected to hold 'household' items, while construction and outdoor items could remain on the uncovered hardstand.

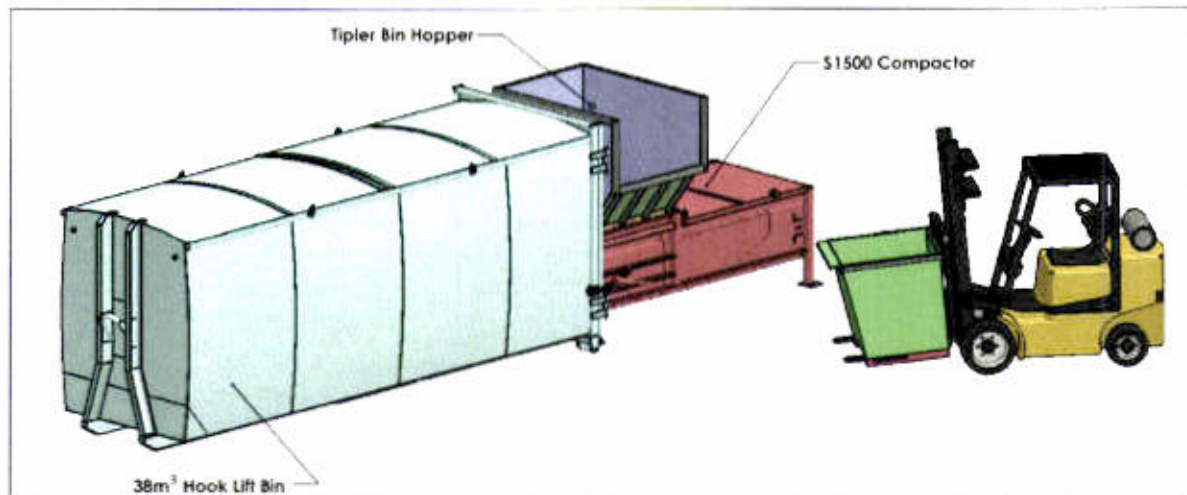
3.2.3.7 Compactor unit & hooklift

The efficiency of the transportation of waste to an alternative landfill would be significantly improved by using a compactor unit attached to sealed hooklift bins. The compactor can be fed:

- manually by each resident as they drop off their waste,
- with a lifting hopper,
- with a bin lift for 1100m³ bins or
- with a forklift as shown in **Figure 3-8**.

The use of a compactor roughly doubles the density of waste in the hooklift, thus halving the transport costs. In addition, because the waste is compacted into a sealed unit it reduces fly issues, odours, leachate generation and windblown litter.

Figure 3.8: A hook lift compactor unit with a hopper feed system





4 MODEL INPUTS

In order to understand the financial implications of the future options to manage waste received at the DWMF, ASK developed an MSExcel based model to estimate the economic impact of each future option for waste disposal in the Shire.

The key inputs such as tonnages, gate fee prices, distances to alternative facilities and available voidspace at DWMF was built into the model to ensure sensitivity analysis of these factors can be completed. The key inputs are described in the sections to follow:

4.1 WASTE QUANTITY DATA

The Shire provided waste quantity data from three sources: average weight per bin lift for the refuse MGB and organics MGB, the gatehouse records and site surveys. The results have also been checked against typical waste disposal per capita values. The sections below highlight the accuracy issues with each set of data and the estimated tonnage disposed per year based on these data sets.

4.1.1 Average bin weights

A single collection truck containing 606 lifts of the 'refuse' MGB was weighed and an average bin weight of 18kg per refuse MGB was determined. The process was repeated with a collection truck containing 500 lifts of the 'organics' MGB and an average bin weight of 17kg per organics MGB was determined.

Based on these average bin weights and the number of residential bin-lifts per year (allowing for presentation rates) the extrapolated tonnages for kerbside collected refuse is 1,680tpa before the organics MGB was provided and 1,250tpa since the organic MGB has been introduced.

4.1.2 Gatehouse records

The gate house records are based on volumetric estimates made by the site staff, the volumetric estimates are converted to tonnages based on industry standard bulk densities for each waste type. Due to the method used to collect and convert this data into tonnes, the values should only be considered to have an accuracy of $\pm 30\%$.

Based on this method the total waste disposed of at the DWMF landfill is estimated as 6,300tpa, of which the domestic kerbside collected waste would be 2,100tpa.

4.1.3 Site surveys

The waste disposal area of the DWMF is surveyed each year to determine the change in volume. This provides an accurate value for the change in volume, however it does not allow for long term waste settlement. Additional factors that are not quantified but effect the calculations include the amount of daily cover material used and the rate of waste compaction. Finally, the changes in fill based on the annual surveys are only accurate if the survey was completed when all below ground cells / trenches have been excavated and prior to any filling, as if cell / trenches start to be filled before the survey, the volume of waste already filled will not be recorded in the survey.

Therefore, the assumptions made for calculating the tonnage of waste disposed each year include:

- Use of daily cover is equivalent to 30% (by volume) of waste disposed
- Compaction of waste by tracked loader: 550kg/m³
- Compaction of waste by landfill compactor: 830kg/m³
- All cells / trenches are excavated and surveyed before any waste disposal occurs

Based on these assumptions the average tonnage of waste disposed of at DWMF based on site surveys is 3,500tpa.



4.1.4 Population extrapolation

The average amount of waste disposed of per capita for the southwest of Western Australia (City of Busselton and Greater Bunbury region) is 1.2 tonnes per capita. Therefore with a Shire population of 5100 this extrapolates to 6,100tpa.

4.1.5 Waste tonnage used for modelling

Given the considerable range of results from each set of data, ASK has used the following methodology to estimate the total waste disposed of at DWMF and the breakdown of the total into the main categories.

The total waste disposed of has been estimated based on the rounded average of the three sets of data above resulting in estimate of 5,300tpa \pm 20%. The gatehouse records provided a breakdown of the quantities received by the type / source of the waste, the percentage breakdown of these streams has been combined with the estimated total to calculate the likely tonnage of each waste stream disposed of per annum.

As the model only considers the waste managed at the DWMF and BTS, the wastes collected via the yellow topped recyclable packaging MGB and green topped organics MGB are not included in these waste totals.

Table 4.4.1: The estimated tonnes disposed by waste streams.

Waste Quantity	Percentage breakdown	Tpa (rounded)
BTS (Domestic drop-off only)	9%	500
BTS (commercial drop-off only)	0%	0
DWMF Domestic - Drop Off	24%	1,250
Domestic MGBs	31%	1,600
Commercial MGB	7%	350
Commercial waste	11%	600
C&D Waste	18%	1,000
Asbestos	0%	0
Total	100%	5,300

4.2 OPERATIONAL LIFE OF LANDFILLS

Landfill voidspace can be defined as the volume of space on a landfill site which is permitted for the disposal of municipal solid waste (MSW). This space is initially occupied by air which will eventually be displaced by the disposed waste. In the provision of solid waste disposal services, landfill voidspace is depleted by being filled up with waste.

The amount of available voidspace and annual waste tonnage of a site will affect what it costs to operate. Thus, the more tonnes a site receives, the lower the cost per tonne, due to the economy of scale. In general landfills with the greatest throughput are the most cost effective and can charge lower gate fees.

4.2.1 Current disposal area of existing landfill

The active area of the current landfill is nearing completion. Based on the final gradients as proposed in the Landfill Closure Management Plan for the site, there is approximately 1-2 years of voidspace available in the existing area for waste disposal.

4.2.2 Expansion of DWMF - Phase 1 voidspace

The potential voidspace created by Phase 1 expansion is 72,500m³, which based on current incoming waste volumes provides approximately 6-9 years of waste disposal (Figure 4-1).



4.2.1.3 Expansion of DWMF – Phase 1 & 2 voidspace

Development of both phase 1 and phase 2 will provide a voidspace of approximately 224,000m³ or 20 - 25 years of waste disposal (Figure 4-1).

Figure 4-1 Landfill extension area: whole area (left) and phase 1 cell (right)



4.3 EXISTING SERVICE COSTS

Existing service costs have been included in the model to provide a bottom line comparison for both options against current costs. These existing service costs are listed to follow:

Item	Cost (\$)	Comment
Kerbside Collection Contracts (three bins & Two bins)	338,000	Based on current collection costs. Contracts expire 2018 + 5 yr ext. period
Public Litter Bins+ rural recycling	116,500	
Contractor Balingup Transfer Station	138,120	Based on current costs. Contract Expire June 2017 + 3yr ext. period
Contractor Donnybrook Waste Management Facility	256,612	Based on current costs - includes compactor/loader use. Contract Expire June 2017 + 2 yr ext period
DWMF maintenance (incl. MRF, recycling, Drummuster)	56,796	Based on current services provided
Shire overheads + administration	179,733	Based on current budget
Total cost (rounded)	\$1,085,761	

4.4 COST TO OPERATE THE CURRENT LANDFILL FACILITY ONLY

The cost of operating the existing facility at Goodwood Road was included in the model to provide a base operating position in which to compare the financial implications of the alternative options.

Item	Cost (\$)	Comment
Contractor Donnybrook Waste Management Facility	256,612	Based on current costs - includes compactor/loader use. Contract Expire June 2017 + 2 yr. ext. Period
DWMF maintenance (incl. MRF, recycling, Drummuster)	56,796	Based on current services provided
Shire administration	60,000	Based on 30% of current budget, as includes BTS and collection contracts
Total cost (rounded) \$	373,408	



4.5 COST TO CLOSE THE CURRENT DWMF LANDFILL AREA

Given many of the impacts of landfilling occur long after a landfill has closed, landfills within Western Australia are required to have a plan for capping, closing and rehabilitating the facility at the end of its life. Guidance regarding closure and post-closure management of licensed landfills is provided by the Best Practice Environmental Management (BPEM) Standard – Siting, Design, Operation and Rehabilitation of Landfills (2015), produced by the Victorian EPA. A Landfill Closure Management Plan (LCMP) was prepared for the existing facility in 2013 in line with the guidance standards. The DWMF would be considered to meet BPEM criteria for a low risk rural landfill however, because it is located within a water protection zone, it would be considered as high risk under the BPEM guidelines.

The LCMP specifies the final cap design & slopes, methods of managing stormwater, post closure monitoring requirements including groundwater, surface water landfill gas monitoring. The LCMP has been approved by DER and proposes the following cap design for the existing portion of the DWMF:

Figure 4-2: Capping design for existing portion of the DWMF

Top soil	0.2 metres
sub soil / vegetation rooting zone (uncompacted local soils)	0.5 metres
Low permeability layer Clay from extension area	0.5 metres
interium' cover layer	0.3 metres
Waste	

A summary of costs for closure of the current DWMF landfill area is provided in **Table 4-2**, this shows that the existing portion of the landfill will cost approximately \$700,000 to cap and monitor after closure. As there is only a short period of operational life remaining in this area this cost cannot be annualised, but it is a cost the Shire will incur whichever long term option is selected.

Table 4-2: A Breakdown of the estimated cost to cap and monitor the existing portion of the DWMF

Description	Costs (\$)	Comment
Stormwater infrastructure	15,550	Stormwater drains, dirty water sums, sediment ponds, outlet spillway
Capping	460,500	Materials, labour, compaction
Landfill Gas Control	12,500	Landfill gas monitoring
Post Closure Monitoring	187,500	Revegetation, weed spraying, groundwater monitoring, cap monitoring and rehab
Contingency	34,000	
Estimated Total (rounded)	\$710,000	
Capping (only) cost per square meter	\$13.00	53,000 cubic meters

4.6 CAPITAL COST

Based on the conceptual designs for both the waste transfer station and works approval requirements for the landfill extension, capital cost estimates have been prepared for both options.

A breakdown of the various elements of the landfill extension and transfer station construction are presented in the tables to follow.



4.6.1 Option 1: Expansion of LWMF – Landfill Cells

The cost elements for the expansion of the landfill cells were modelled for Phase 1 expansion only, and both Phase 1 and Phase 2. The table to follow lists the approximate total cost for each parameter, followed by the annualised yearly cost which would be spread over the lifespan of each phase (9 years Phase 1, 24 years phase 1 & 2).

Table 4-3. Break-down of capital cost for Option 1: Landfill Expansion

Element	Phase 1&2		Phase 1	
	Total cost	Annualised cost	Total cost	Annualised cost
Site works, Incl. Perimeter Fence, Groundworks (excl.cell excavation), Perimeter Drain, Access Roads	\$128,654	\$5361	\$64,192	\$7552
Cell Establishment, Incl. Plans & Design, Cell excavation, Base Preparation, Geosynthetic Clay Liner, Leachate collection system, Sand protection layer	\$1,641,850	\$68,410	\$592,075	\$69,626
Leachate pond	\$425,000	\$17,708	\$425,000	\$50,000
Fire & safety Systems incl. Mobile fire safety unit Fire break construction	\$6,000	\$542	\$5,600	\$659
Management Systems	\$15,000	\$3,000	\$15,000	\$3,000
Total (rounded)	\$2,216,504	\$95,000	\$1,101,867	\$131,000

4.6.2 Option 2: Construction of a Transfer Station

The capital cost elements for the construction of a transfer station on were modelled based on the concept design as detailed in **Section 3.2.3**. The table to follow lists the approximate total cost for each parameter, followed by the annualised yearly cost spread over the 25-year lifespan of the facility.

Table 4-4. Breakdown of capital cost for Option 2: Transfer Station

Element	Total cost	Annualised cost
Establishment, Incl. Design & Approvals, groundworks, Hardstand area (unsealed), Access roads (compacted/unsealed), Concrete pad for compactor unit & hooklift	\$64,500	\$2,580
Equipment Incl. Transfer containers (sealed hooklift bins), Compactor for hooklift, Compactor reskin, Compactor servicing (3mthly), Compactor servicing (annual)	\$131,650	\$10,260
Total (rounded)	\$196,000	\$12,800

4.7 OPERATIONAL COST

A detailed breakdown of the operational cost for each option has been include in the financial model. A summary of the operational costs are provided in the following sections.

4.7.1 Option 1: Expansion of LWMF – Landfill Cells

The operational cost elements for the expansion of the landfill cells were modelled for Phase 1 expansion only, and both Phase 1 and Phase 2. The table to follow lists the approximate total operational cost for



each parameter, followed by the annualised yearly cost which would be spread over the lifespan of each phase. Only those costs expected to be incurred over and above current costs were modelled.

Table 4-1: Operational costs for expansion of the landfill (Option 1)

Element	Phase 1&2		Phase 1	
	Total cost	Annualised cost	Total cost	Annualised cost
Staff, incl. Contract Manager, additional contractor fee (management leachate ponds etc.)	\$25,000	\$25,000	\$25,000	\$25,000
Leachate system maintenance	\$5000	\$5000	\$5000	\$5000
Groundwater monitoring	\$2000	\$2000	\$2000	\$2000
Total Cost	\$32,000	\$32,000	\$32,000	\$32,000

4.7.2 Option 2: transfer Station

The operational cost elements for operation of the waste transfer station were modelled over the life of the facility. The table to follow lists the approximate total operational cost for each parameter, followed by the annualised yearly cost which would be spread over the lifespan of the facility. Only those costs expected to be incurred over and above current costs were modelled.

Table 4-6: Operational costs for the Transfer Station (Option 2)

Element	Annualised cost
Site Services/maintenance	\$4000
Administration (Shire staff)	\$10,000
Site staff (26hours/week allowing 1hr/d not open)	\$65,000
Total Cost	\$79,000

4.8 TRANSPORTATION AND DISPOSAL COST

Under Option 2 (Transfer station and alternative disposal site) the Shire would no longer provide landfill services and as such all waste requiring landfill disposal would be transported and disposed at an alternative landfill. To determine the economic impacts of this option disposal volumes, waste disposal gate fees at alternative landfills, transport logistics and costs along with transport distances has been considered. The assumptions and rationale for the transport logistics has been provided in **Section 3.2.1**, however a summary is provided in the following sub sections.

4.8.1 Transport of kerbside collected domestic waste

The residual waste collected in the "Red topped" MGB with kerbside collection trucks would be transported directly to an alternative landfill in the kerbside collection trucks.

4.8.2 Transport of domestic drop-off waste from BTS and DWMF

The model assumes the domestic drop-off waste from the BTS would be transported to the DWMF using the current method and then consolidated with the DWMF domestic drop-off waste. The consolidated waste would then be compacted into sealed hooklift bins for transport to an alternative landfill.

4.8.3 Waste disposal gate fees

Indicative gate fee prices for waste to be disposed at the two alternative landfill sites included in the modeling are shown in **Table 4-7**. The BHRC have provided two gate fee values, one rate of \$51/tonne as a customer and a lower rate of \$42/t if the Shire were to join the BHRC and become a member Council.



Whilst the member Council rates at BHRC are lower, the Shire should assess the pros and cons of this option before pursuing this opportunity, as this assessment is beyond the scope of this report. A member council in the BHRC becomes a joint owner of the landfill which has a considerable unquantified environmental liability from decades of waste disposal in unlined landfill cells. The groundwater plume generated by these historic cells may require remediation in the future and if this was to happen it could incur significant cost to the BHRC's member Councils.

Table 4.7: Gate fees for the alternative landfill sites

Landfill	Gate fee (Ex GST) \$ per tonne
BHRC Australind - Customer	\$51.00
BHRC Australind - Member Council	\$42.00
Cleanaway Dardanup - Customer	\$47.00

4.6.4 Transport Costs & Distances

The distance from the DWMF to the alternative Cleanaway (Dardanup) landfill is 30km and 50km to the BHRC (Australind) landfill. The cost for the transportation of kerbside collection trucks can be assumed at \$0.65 per tonne per km. N.B. The current collection contract allows the Shire to direct the kerbside collection truck to any landfill in the region with no additional transport cost, so while this contract is still valid the Shire would not incur additional transport costs for the kerbside collected waste.

The cost of transport for full hooklift bins is based on \$230 per hooklift bin to the Cleanaway landfill and \$300 per hooklift bin to the BHRC landfill. This cost is based on the truck exchanging bins at the DWMF, i.e. bringing and leaving an empty bin, to return with the full hooklift bin.



5 FINANCIAL RESULTS

Based on the modelling undertaken, ASK prepared total annual costs under each scenario for operating the existing services in combination with the alternative options to enable comprehensive comparisons to be undertaken. These include the following:

- Current Costs (Business as usual)
- Option 1a: DWMF Extension – Phase 1
- Option 1b: DWMF Extension – Phase 1 & 2
- Option 2a: Construction of a transfer station and disposal at BHRC as customer
- Option 2b: Construction of a transfer station and disposal at BHRC as member Council
- Option 2c: Construction of a transfer station and disposal at Cleanaway as customer.

The costs and commentary for each individual scenario is described in the following sections.

5.1 CURRENT COSTS

Table 5-1 demonstrates that the estimated annual cost to the Shire for operating current waste services it provides, including disposal within the current operating area of the DWMF is \$1,086,000 per year.

N.B. This cost excludes the one off expenditure of \$710,000 to cap and rehabilitate the existing landfill area.

Table 5-1 Current cost for the collection and management of waste services in the Shire

Description	Annual cost
Domestic kerbside collection (three bins & filter)	454,500
Waste disposal at DWMF	0
Contractor Balingup Transfer Station	138,120
Contractor DWMF	256,612
DWMF Maintenance (inc MRF & DrumMuster)	56,796
Shire administration ¹	179,733
Total cost (rounded)	1,086,000

5.2 EXPANSION OF DWMF LANDFILL

5.2.1 Option 1a DWMF Extension – Phase 1

If the Shire were to undertake Phase 1 of the landfill expansion only, it is estimated that it would cost the Shire approximately \$1,260,000 annually to operate the current waste services it provides and dispose of waste in the phase 1 landfill extension cells over the life of the asset.

A breakdown of these costs is provided in **Table 5-2**. This would provide the Shire with a disposal option for approximately 9 years based on current waste volumes. This option is estimated to increase the cost of the Shire's waste services by approximately \$175,000 annually.

There are differences in cost for some items in Table 5-2 and Table 5-3, such as landfill establishment and closure. This is due to the economies of scale for the development of the whole landfill extension (phase 1 & 2) when compared to only extending into phase 1. This results in a lower unit cost per cubic metre of voidspace created, thus lower annualised costs for Option 1b (Landfill extension phase 1 & 2).

¹ Shire administration cost includes the following items from the Shire budget: Regional Waste management, Admin salaries allocated, General Admin allocated, Salaries waste management, Superannuation, Vehicle expenses, Insurance and office expenses



Table 5-2: Estimated cost to establish and manage Phase 1 of the landfill expansion at DWMF

Description	Annual cost
Landfill establishment	131,000
Additional operations (Contractor & Shire)	32,000
Gate house receipts (commercial waste revenue)	-91,000
Existing services (that would continue unchanged)	1,086,000
Closure	104,000
Estimated total cost (rounded)	1,260,000

5.2.2 Option 1a: DWMF Extension – Phase 1 & Phase 2

if the Shire were to undertake Phase 1 and Phase 2 landfill expansion, it is estimated it would cost the Shire approximately \$1,200,000 annually to operate the current waste services it provides and dispose of waste in the landfill extension area over the life of the asset (Table 5-3).

This would provide the Shire with a disposal option for approx. 24 years based on current waste volumes. This option is estimated to increase the cost of the Shire's waste services by approximately \$115,000 annually.

Table 5-3: Estimated cost to establish and manage Phase 1 & Phase 2 of the landfill expansion at DWMF

Description	Annual cost
Landfill establishment	95,000
Additional operations (Contractor & Shire)	32,000
Gate house receipts (commercial waste revenue)	-91,000
Existing services (that would continue unchanged)	1,086,000
Closure	80,000
Estimated total cost (rounded)	1,200,000

5.3 OPTION 2: TRANSFER STATION AND DISPOSAL AT AN ALTERNATIVE LANDFILL

The following sections provide a breakdown of the cost for Option 2: Transfer station and the disposal of domestic waste at the alternative landfills.

5.3.1 Option 2a: BPRC (Stanley Road) as a customer

The breakdown of annual cost to have a transfer station at DWMF and transport and disposal of the domestic waste at the BPRC's Stanley Road landfill as a customer is provided in Table 5-4 below.

The estimated cost for this option and to continue providing the other unchanged waste services would be approximately \$1,210,000 per year, resulting in an increase of approximately \$125,000 annually.

Table 5-4: A Breakdown of costs for Option 2 with transport and disposal at the BPRC as a customer

Description	Annualised cost
Transfer station establishment	12,800
Operations (Contractor & Shire)	79,000
Existing services (that would continue unchanged)	829,100
Transfer of domestic drop-off waste (BTS)	18,800
Transfer of domestic drop-off waste (DWMF)	47,300
Transfer of domestic kerbside waste (A - Shire)	53,300
Disposal of transferred waste	173,500
Estimated total cost (rounded)	1,210,000



5.3.2 Option 1b) BHRC (Stanley Road) as a member Council

The breakdown of annual cost to have a transfer station at DWMF and transport and disposal of the domestic waste at the BHRC's Stanley Road landfill if the Shire was a member Council of the BHRC is provided in **Table 5-5** below.

The estimated cost for this option and to continue providing the other unchanged waste services would be approximately \$1,180,000 per year, resulting in an increase of approximately \$95,000 annually.

Table 5-5: A breakdown of costs for Option 1 with transport and disposal at the BHRC as a member Council.

Description	Annualised cost
Transfer station establishment	12,800
Operations (Contractor & Shire)	79,000
Existing services (that would continue unchanged)	829,100
Transfer of domestic drop-off waste (BTS)	18,800
Transfer of domestic drop-off waste (DWMF)	47,300
Transfer of domestic kerbside waste (All Shire)	53,300
Disposal of transferred waste	142,900
Estimated total cost (rounded)	1,180,000

5.3.2 Option 2c) Cleanaway (Bankia Road) as a customer

The breakdown of annual cost to have a transfer station at DWMF and transport and disposal of the domestic waste at Cleanaway's Banksia Road facility is provided in **Table 5-6** below.

The estimated cost for this option and to continue providing the other unchanged waste services would be approximately \$1,170,000 per year, resulting in an increase of approximately \$85,000 annually.

Table 5-6: A breakdown of costs for Option 2 with transport and disposal at Cleanaway's landfill

Description	Annualised cost
Transfer station establishment	12,800
Operations (Contractor & Shire)	79,000
Existing services (that would continue unchanged)	829,100
Transfer of domestic drop-off waste (BTS)	16,600
Transfer of domestic drop-off waste (DWMF)	41,600
Transfer of domestic kerbside waste (All Shire)	32,000
Disposal of transferred waste	159,890
Estimated total cost (rounded)	1,170,000

5.4 CONCRETE RECYCLING

The transfer station could offer the reprocessing of clean concrete and bricks. This would allow the facility to still receive a portion of the approximately 1,000 tonnes of construction and demolition (C&D) waste currently received.

The concrete and bricks could be stockpiled until sufficient volume had been accrued to justify the mobilisation cost of a crushing unit. Given that there is a local supplier of a concrete crushing unit located 50km from Dornybrook, the mobilisation costs would be low.

The processing cost for concrete and brick is between \$10 - \$20 per m³ of final product. The range of cost depends upon the size reduction required, if a basic 0-70mm aggregate is required the cost is at the lower



end of the range, while to produce two products of 0-25mm road base and a 25-40mm drainage product the cost is towards the upper range.

To process concrete the Shire would need to apply to the DER to add category 13 to its licence and develop an asbestos management plan. The final products also have to be tested to show they are asbestos free and this adds to the cost of processing.

Therefore, provided the Shire continued to charge a gate fee of at least \$35.00 per cubic metre for the delivery of separated clean concrete and bricks, and the Shire has a use of the final aggregate (thus offsetting the cost of purchasing or quarrying aggregate), the processing of C&D material at the transfer station would be cost effective.

5.5 COMPARISON OF OPTIONS

Table 5-7: A summary of the cost for each Option

Option Ref	Description	Annual cost	Change
BAU	Current waste management services	1,086,000	-
1a	Landfill extension - phase 1	1,260,000	174,000
1b	Landfill extension - phase 1 & 2	1,200,000	114,000
2a	BHRC Stanley Rd Landfill (customer)	1,210,000	124,000
2b	BHRC Stanley Rd Landfill (Member Council)	1,180,000	94,000
2c	Cleanaway (customer)	1,170,000	84,000

Based upon the results of the financial model, Option 2 (Transfer station and alternative landfill) is the most cost efficient option and transporting the waste to the Cleanaway landfill in Dardanup. The Cleanaway landfill is the lowest cost option as it's both the nearest landfill and has the lowest gate fee. However, the modelling indicates there is a relatively low variation in annual costs between both Options and all of the scenarios with only approximately a 1% difference between the lowest and highest options when compared with the total cost of waste services (Landfill extension in phase 1 is a 8.6% increase in cost and transferring waste to Cleanaway results in a 7.7% increase in cost).

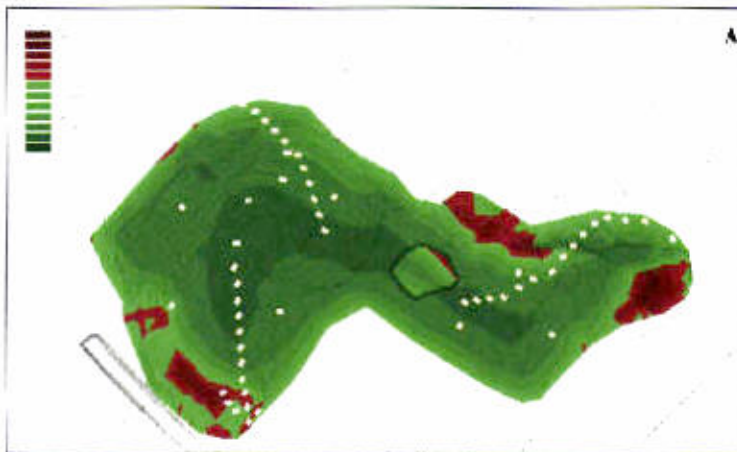
5.6 10 YEAR EXPENDITURE OF KEY COST

The key capital and operational expenditure has been included in a 10 year cashflow projection to assess the impacts on the timing of expenditure for each option and provide a 10 year total cost estimate.

5.6.1 Option 2d transfer station after maximum use of current landfill area

As the project has been delivered an additional Option (2d) has been developed. With this scenario, the Shire would use the whole of the current landfill area, including the current hardstand area for waste disposal and the transfer station and new hardstand area (for greenwaste, scrap metal, etc) would be constructed in the extension area (Figure 5-1). The transfer station would initially be used by the residents of the Shire, much as they use the current drop-off area at the DWMF.

Figure 5: Final contours of maximum waste disposal in the active area of the landfill



Based on the maximum slopes of 1(v): 5(h) from the perimeter of the landfilling area, by maximising the disposal area in the current landfill area a voidspace of approximately 70,000m³ can be achieved. Allowing for the current rate of annual voidspace utilisation this would provide 6–9 years of waste disposal at the DWMF before waste would need to be transferred to an alternative landfill.

5.6.2 – 10 year expenditure results

Table 5-8 on the next page provides a simple 10 year projection of the capital and operational expenditure. The income from commercial gate fees has been included as this revenue will be lost once DWMF ceases to landfill waste and becomes a dedicated transfer station, while the revenue from the Kerbside Charge and Waste Management Levy will remain.

The 10 year estimated cost expenditure for Option 1a (landfill extension phase 1) is approximately \$14.65M; Option 2c (transfer station and Cleanaway landfill) is approximately \$12.8M and Option 2d (maximise available landfill and transfer station) is \$11.9M.

If the transport of waste to an alternative landfill (Option 2c) was delayed by maximising the available voidspace in the current landfill area (Option 2a), there is an estimated saving of \$900,000 over 10 years.

The minimal saving is a reflection of the reduced staff and operational costs associated with operating a transfer station in comparison to a landfill. Thus the reduced staffing and operations nearly offset the additional transport and waste disposal costs.

Option 2d also has the advantage of deferring the capital expenditure for the capping of the landfill until year 8, however, given that the Shire has sufficient funds in the waste reserve, this is not a significant advantage.



Figure 5-2: Capital expenditure for each option over the next 10 years

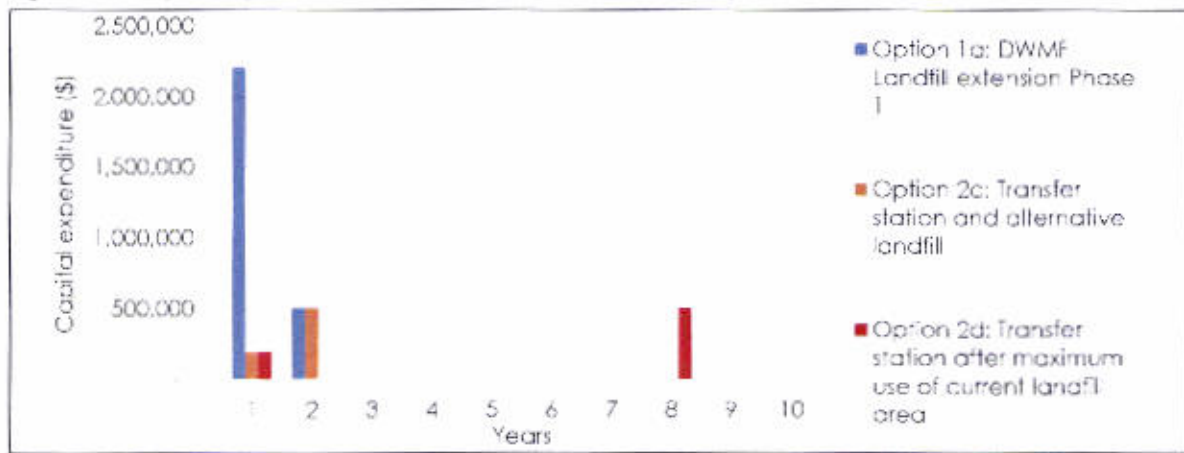




Table 3.6: 10-year projections for Centers 1a, b, and c

	Option 1a: DWMF Landfill extension Phase 1										
	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	Total
	1	2	3	4	5	6	7	8	9	10	
Capital costs											
Capping of old landfill site (inc post closure monitoring)		510,050	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	574,050
Landfill extension (Phase 1)	2,216,534										2,216,504
Capping and closure of extension										1,637,550	1,637,550
Operational costs											
Additional operations (Contractor & Shire)		32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	288,000
Existing services (that would continue unchanged)	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	10,860,000
Revenue											
Commercial waste gatefees	90,600	90,600	90,600	90,600	90,600	90,600	90,600	90,600	90,600	90,600	906,000
Profit/loss (exc rates and levy revenue)	3,210,000	1,540,300	340,000	640,000	640,000	640,000	1,040,000	1,040,000	340,000	2,670,000	14,670,300
	-3,210,000	-4,750,300	-5,790,300	-6,830,300	-7,870,000	-8,910,000	-9,950,000	-10,990,000	-12,030,000	-4,700,000	-4,700,000
	Option 2c: Transfer station and alternative landfill										
	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	Total
	1	2	3	4	5	6	7	8	9	10	
Capital costs											
Capping of old landfill site (inc post closure monitoring)		510,050	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	574,050
Transfer station construction	196,150										196,150
Operational costs											
Additional operations (Contractor & Shire)		79,000	79,000	79,000	79,000	79,000	79,000	79,000	79,000	79,000	711,000
Transport and disposal of domestic waste	250,090	250,090	250,090	250,090	250,090	250,090	250,090	250,090	250,090	250,090	2,250,810
Existing services & transfer station operation	908,100	908,100	908,100	908,100	908,100	908,100	908,100	908,100	908,100	908,100	9,081,000
Revenue											
Commercial waste gatefees											
Profit/loss (exc rates and levy revenue)	1,100,000	1,780,000	250,000	250,000	250,000	1,230,000	1,250,000	250,000	1,250,000	1,250,000	12,810,000
	-1,100,000	-2,950,000	-4,100,000	-5,350,000	-6,500,000	-7,850,000	-9,100,000	-10,350,000	-11,600,000	-12,850,000	-12,850,000
	Option 2d: Transfer station after maximum use of current landfill area										
	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	Total
	1	2	3	4	5	6	7	8	9	10	
Capital costs											
Capping of old landfill site (inc post closure monitoring)								510,050	8,000	8,000	526,050
Transfer station construction	196,150										196,150
Operational costs											
Additional operations (Contractor & Shire)									79,000	79,000	158,000
Transport and disposal of domestic waste									250,090	250,090	500,180
Existing services & transfer station operation	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	1,086,000	908,100	908,100	10,504,200
Revenue											
Commercial waste gatefees											
Profit/loss (exc rates and levy revenue)	1,280,000	1,090,000	1,090,000	1,090,000	1,090,000	1,090,000	1,090,000	1,600,000	1,250,000	250,000	1,880,000
	-1,280,000	-2,370,000	-3,460,000	-4,550,000	-5,640,000	-6,730,000	-7,820,000	-8,910,000	-10,000,000	-11,090,000	-11,090,000



6 ENVIRONMENTAL, SOCIAL, POLITICAL & TECHNICAL ASSESSMENT

Whilst the decision in determining a favoured long-term disposal option for the Shire is significantly influenced by the economics of the various options available, other environmental, social, political and technical factors need be considered as part of the decision-making process.

Table 6-1 provides a summary of the key issues that should be considered when selecting the preferred Option.

Table 6-1: Summary of environmental, social, political and technical factors

Criteria	Information	Strengths/Weaknesses of options
Environmental		
Greenhouse Gas Emissions	Transportation of waste to an alternative landfill will increase greenhouse gas emissions generated from transport. However, if the landfill selected has landfill gas (LFG) management systems the methane generated from the waste will be flared or used for energy generation, thus resulting in a net reduction in GHG emissions.	Use of both alternative landfills will increase transport emissions Both DWMF and BHRC landfills are currently uncapped with no LFG management. The Cleanaway landfill has LFG management.
Best Practice siting	The appropriate siting of a landfill is the primary environmental control in relation to limiting the potential impacts on the Environment. Distance to Groundwater, surface water, buffer distances, geology.	The BHRC and DWMF siting does not comply with best practice guidelines.
Operational Liability	Potential for operation liability arising from legacy environmental issues passed onto the Shire.	High BHRC (as member Council) Low BHRC (as customer) Low Cleanaway High DWMF
Distance from Dennybrook	Cleanaway ~ 30km BHRC ~ 50km DWMF ~ 2km	DWMF - nearest Cleanaway - mid BHRC - farthest
Social		
Community Acceptance	The local community may dislike the idea of no landfill in the Shire, although as the waste services for the residents will not change there is likely to be little resistance.	DWMF extension results in no change
Cost of services	Increases in waste services will result in increased rates.	Transfer station option is the lowest cost option.
Commercial waste generators	Option 2 (Transfer station) would result in the DWMF & BTS no longer accepting commercial waste and local commercial waste would have to be transported to other landfills. However, if the DWMF landfill was extended the commercial gate fee would need to be significantly increased to cover the increased cost.	All options will impact significantly on commercial waste generators.

Criteria	Information	Strengths/Weaknesses of options
Political / governance		
Long term security	Potential to provide secure long term waste disposal options to the Shire i.e. sufficient voidspace, long term contract options	The extension of the landfill could be impacted by changes in regulations. Transfer to alternative landfills should provide security with at least two close landfills able to receive waste.
Self Sufficiency	Does the Shire need to rely on other providers for disposal of waste, or are they self-sufficient? This impacts on potential ability to control or influence rising costs of transport or disposal.	Not self-sufficient as Shire will solely rely on a landfill not owned or operated by the Shire if Option 2 selected. However regulatory factors impacting on the DWMF are beyond the control of the Shire.
Regulatory compliance	With more complex waste disposal options comes greater regulatory compliance and oversight. Further the WA DER prefer smaller unlined landfills to close and transfer stations established.	Option 1 (landfill extension) will result in a higher level of regulatory burden and does not align with the DER's preferred strategy.
Technical		
Site constraints	The planned landfill cell in the extension area does not leave enough room for the leachate lagoon to be located.	There is no room for the leachate lagoon unless more trees were cleared and it is understood DER would be unlikely to approve a clearing permit.
Operational complexity	The operational management of a lined landfill is significantly more complex than the current DWMF landfill, as any damage to the liner would need to be repaired at significant costs. The management of leachate pumps and the lagoon will add another level of management to the site to prevent a significant pollution event from leachate spillage. However, the management of a transfer station is less complex than the current landfill.	Option 1 (landfill extension) will require a higher level of oversight from both the contractor and Shire. Option 2 (transfer station) requires less oversight and the Shire could consider bring the operations in-house.

6.1 EXPANSION OF CURRENT ACTIVE AREA DWMF

Strengths: zero greenhouse gas emissions increase, minimal capital investment, self-sufficiency in waste disposal for shire in short term. Community acceptance as no change from current practices for customers.

Challenges: regulatory risks, increases the potential for legacy liability issue as it would result in continued waste disposal in unlined cells.

6.2 EXPANSION OF LANDFILL PHASE 1 & 2

Strengths: Self-sufficiency for the Shire, long term security, best practice construction and operation (lined cell, leachate extraction and progressive capping), limited ongoing environmental liability as lined cell, community acceptance as no change from current practices for customer.

Challenges: Site limitations as insufficient space of the leachate lagoon, increased operational and management complexity, higher gate fees for commercial wastes, higher rates.

6.3 CONSTRUCT A TRANSFER STATION AND ALTERNATE LANDFILL

Strengths: Self-sufficiency for the Shire, mid-term security possible through long (5 – 10 year) disposal contracts, no ongoing environmental liability as no longer landfill ownership (unless the Shire became a member Council of a regional landfill).



Challenges: community acceptance of changes as commercial customers will be paying more in terms of disposal and transport charges for waste generated.

6.3.1 BMRG Customer

Strengths: potential for mid-term waste security - sufficient space to ensure long term security in terms of disposal option, low capital investment.

Challenges: unfavourable environmental aspects regarding no liner, no leachate management, no LFG capture and not sited in line with best practice. Located the greatest distance from Donnybrook. Shire will not be self-sufficient as it will solely rely on a landfill not owned or operated by the Shire which does present some low risks in terms of financial cost control.

6.3.2 BMRG Member Council

Strengths: potential for mid-term waste security - sufficient space to ensure long term security in terms of disposal option, low capital investment.

Challenges: member council could inherit legacy liability issues for previous waste disposal methods, unfavourable environmental aspects regarding no liner, no leachate management, no LFG capture and not sited in line with best practice. Located the greatest distance from Donnybrook. Shire will not be self-sufficient as it will solely rely on a landfill not owned or operated by the Shire which does present some low risks in terms of financial cost control.

6.3.3 Cleverway Customer

Strengths: potential for mid-term waste security, sufficient voidspace to ensure long term security in terms of disposal option, low capital investment, best practice operational landfill with good environmental management systems (i.e. leachate and LFG management).

Challenges: located 30km from Donnybrook which increases greenhouse gas emissions from transport, but as the landfill has LFG systems the net GHG emission will be lower than waste disposal at DWMF. Shire will not be self-sufficient as it will solely rely on a landfill not owned or operated by the Shire which does present minimal risks in terms of financial cost control.



7. FUNDING OF OPTIONS

The shire currently fund the majority of the waste services from commercial gate fee revenue, the waste levy and the kerbside collection charge. This section considers the increase in costs the Shire will face and provides options to fund the shortfall and optimise current service provision to minimise impacts on ratepayers.

7.1. OVERVIEW OF OPTIONS COSTS

7.1.1 Annualised cost

As indicated by the review, whichever option the Shire selects additional funding will be required to meet the increased cost. With current annual operational expenditure at \$1.1M and operating income of \$999,000, there is an operating deficit of \$100,000.

The most cost effective option modelled (Option 2: transfer station) shows that annual costs will be in the vicinity of \$1.17M (annual operational deficit of \$170,000), while the most expensive option (landfill extension) would result in annual costs of \$1.26M and an annual operational deficit of \$260,000.

7.1.2 Capital expenditure

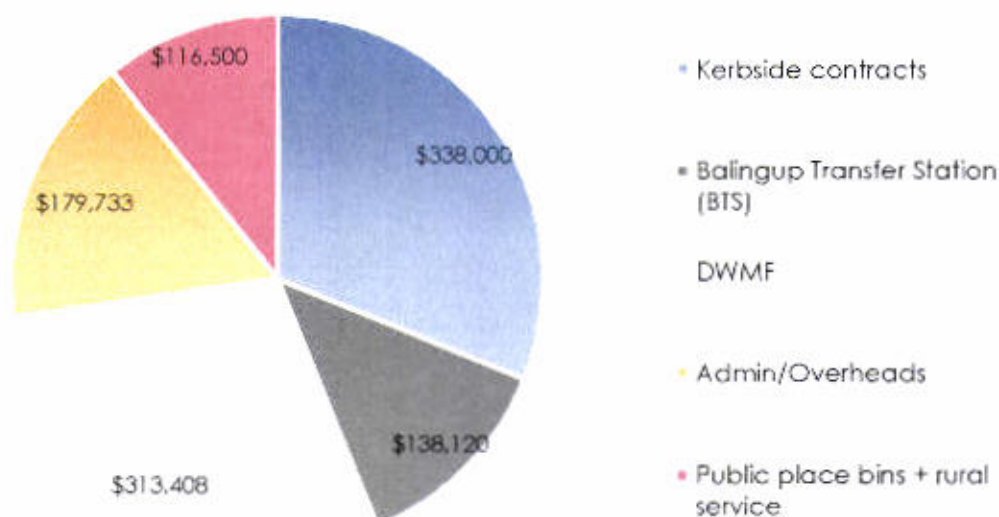
The closure and post-closure monitoring cost for the existing area of the Donnybrook Waste Management Facility (DWMF) are estimated at \$710,000, of which approximately \$500,000 is for capping and rehabilitation works, while the remainder is for the 25 years of monitoring post closure.

The Shire has accrued \$1M to date in the waste management reserve which will cover the immediate closure costs of this area. The remaining \$500,000 in the reserve would cover the capital costs associated with Option 2 (construction of a transfer station) but would not meet the \$2.2M capital cost for Option 1 (extension of the landfill).

7.2. EXPENDITURE

In terms of expenditure, the Shire's 2016/17 operating budget of \$1,000,000 is allocated as shown in Figure 7-1. Approximately 42% of the funds are allocated towards operation of the DWMF and the BTS, with the remainder allocated to kerbside contracts (31%), administration/overheads (17%) and public place bins (11%). There is a \$68,500 allocation of funds to the waste management reserve.

Figure 7-1. A breakdown of the Shire's 2016/17 budget allocation

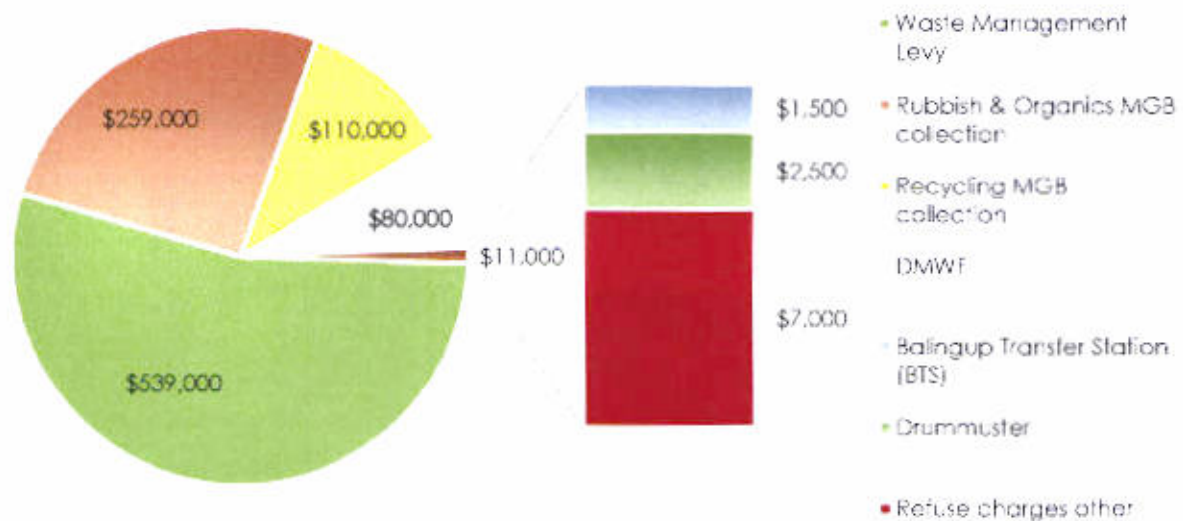




7.3 REVENUE SOURCES

The Shire's waste services receive an income of approximately \$1M per year. A breakdown of the revenue streams is shown in **Figure 7-2** and **Table 7-1**.

Figure 7-2: A breakdown of revenue by source (2015/16)



Over 54% of the revenue to fund waste services provided by the Shire is obtained from a waste management levy applied to all rateable properties in the Shire. Kerbside collection charges account for 31%, followed by income from gate fees/site charges at 8%.

Table 7-1: Shire revenue for waste service (2015/16)

Source	Amount	% of total revenue
Waste Management Levy	\$539,000	54%
Kerbside collection charges:		(37%)
Rubbish & Organics	\$259,000	26%
Recycling	\$110,000	11%
Facility charges:		(8.1%)
DMWF	\$80,000	8%
BTS	\$1,500	0.1%
Drummuster	\$2,500	0.2%
Refuse charges other	\$7,000	0.7%
Total (rounded)	\$999,000	100%

7.4 KERBSIDE COLLECTION CONTRACTS

Cost recovery is obtained by the Shire in relation to the fees charged for collection of the kerbside bins and processing of organics and recyclables. Of note however is that the domestic kerbside waste collection fee does not cover disposal costs at the DMWF incurred by the Shire for disposal (waste processing) and long term management of the facility, whereas recycling kerbside fees and organics kerbside fees cover waste processing (i.e. MRF operations and composting facility operations).

Therefore, the Kerbside Collection Charges (in the rates notice) cover the cost of all kerbside collection and processing, excluding the cost of waste disposal.



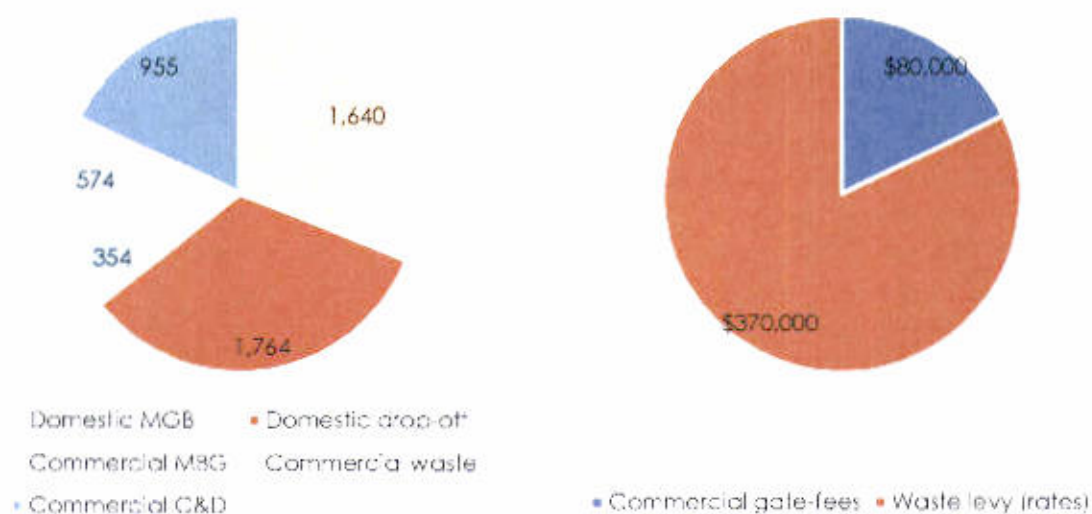
7.5 WASTE MANAGEMENT FACILITIES

As mentioned in **Section 7.4**, there is no cost recovery for the operation of the BTS and DWMF from the Kerbside Collection Charge. However, as shown in **Figure 7-1** 42% of expenditure (\$451,000) is allocated for the operation of these two facilities.

The Shire receives approximately \$80,000 of revenue from commercial gate fees to cover the cost of the BTS and DWMF, with funding from the Waste Management levy being used to cover the shortfall of approximately \$370,000 each year.

Figure 7-3 shows that while 35% of the waste received at the waste facilities is from commercial sources, only 18% of the revenue to cover the facilities costs is from commercial gate fees. Even when the DWMF is considered in isolation with an operational budget allocation of \$313,400, the commercial gate fee revenue only covers 25% of the costs, while it accounts for 35% of the waste. Therefore, the gate fees for commercial waste disposal are below breakeven and the disposal of commercial waste is being subsidised via the waste levy (in the rates notice).

Figure 7-3: A breakdown of the source of waste quantity and revenue for the BTS and DWMF



7.5.1 Domestic tip passes

The proportions of each waste stream received at the DWMF for disposal are not in line with the average proportions for rural Western Australia. Typically the breakdown for each waste stream is roughly 30% for domestic waste, 30% for C&I (commercial waste) and 40% for C&D (commercial waste), however, the DWMF has a breakdown of roughly 65% for domestic waste, 15% for C&I (commercial waste) and 20% for C&D (commercial waste).

The considerable variation of the waste stream proportions compared to typical values may be reflection of the unlimited 'tip passes' provided to the Shire's residents, as commercial waste may be brought to the DWMF by local businesses and declared as 'domestic waste' at the gate house to avoid the payment of gate fees.

ASK has experienced this situation with other rural local governments, and once the free disposal of domestic waste via 'tip passes' was restricted (in this case to two 6 x4' trailer loads per year, and/or 52 240L passes for residents without kerbside collection), the proportion of the waste streams received reflected the typical values and the 20% of the commercial waste previously received as free domestic waste attracted a gate fee and increased gatehouse revenue significantly.

The unlimited disposal of domestic waste via the current tip pass system is unequitable as a local home owner living on their own and producing little waste other than the kerbside MGB is paying the same cost



for waste disposal as a business owner in the Shire using their 'tip pass' for the free disposal of their commercial waste at the DWMF.

7.6 POTENTIAL FUNDING OPTIONS

There is a need to understand the real cost of providing current waste services, both now and into the future. Appropriately structured fees and charges are needed to cover whole of life waste facility costs and other waste services provided by the Shire. While the Shire continues to operate a landfill it must be decided how this expenditure will be equitably met by the ratepayers and commercial landfill users.

Currently the income generated from the waste management levy is being used to cover over 80% of the BIS and DWMF costs and with the free 'tip pass' system, all ratepayers are subsidising commercial waste disposal and are paying equally for the costs of their waste disposal regardless of how much waste they produce.

This report provides both current and future financial scenario modeling to provide the Shire with baseline information for which to consider sustainable future costing options. Along with any changes to fees and charges will be the need to actively engage the community on the need to realistically price waste services provided by the Shire.

The following sections consider a number of potential strategies to provide a more equitable fee and charge structure and to meet the increasing cost of providing the community with their waste services.

7.6.1 Changes to the tip pass system

Currently all rateable properties within kerbside collection areas and outside of kerbside collection area that pay the waste management levy receive a waste disposal pass which entitles the occupier to dispose of an unlimited quantity of domestic waste – this includes both household waste and bulky waste.

The Shire could modify the current tip pass system and only issue the pass to domestic residents outside of kerbside collection areas. Residents with no kerbside collection service could receive a pass with 52 vouchers, each to dispose of 240L of waste, this is the equivalent quantity collection with to a weekly kerbside MGB service. When all boxes on the pass are surrendered in the authorised twelve months normal gate fees are imposed. This ensures a more equitable service between those with kerbside and those without.

It is also recommended that a more stringent approach to 'domestic waste' eligible for free disposal be implemented by gate attendants. Given the proportion of waste received at BIS and DWMF through the pass system as 'domestic waste', it is likely that this pass is being used by commercial businesses to dispose of commercial waste that would normally attract gate fees and are able to dispose of commercial waste at nil cost. Further, if the Shire were to select Option 2 (Transfer station) any commercial waste received under the tip pass system will need to be transported to an alternative landfill and gate fees paid, resulting in even higher costs to the Shire to dispose of commercial waste.

Domestic waste should be waste typically food & household wastes suitable for disposal via a normal kerbside waste bin collection. This does not include bulky type wastes such as mattresses, settees, cupboards etc or commercial waste. These waste streams should be charged in accordance with current Shire disposal fees and charges. Alternatively, the Shire could provide a set number of bulky waste tip passes for disposal of a 6' x 4' (or equivalent) trailers of domestic (bulky household) waste each year and the unlimited drop-off of separated green waste. To ensure equity in service provision, bulky waste passes would also be provided to residents with kerbside services. Any residents generating more than this allocation would need to pay the standard gate fees to dispose of any additional waste. Similar approaches are common with many other local governments in the south west.

These passes should be not provided to commercial operators.

It is expected that implementing such changes to the pass would result in both an increase in gate fees at the DWMF and a more equitable system for the Shire's ratepayers.



As the Shire has provided the unlimited pass system for a considerable period of time, changing this service may present some challenges. As such it is recommended that the Shire engage with the community on the need to realistically price the waste services it provides to ensure equity for the users of the waste services in the Shire.

7.6.2 *Raising Landfill Gate Fees*

Gate fees are generally charged by waste facilities to cover costs of operation, overheads, mobile plant and equipment, labour, costs of roads, buildings and other assets (fencing, cover material etc.). Costs (and therefore gate fees) needs to include landfill closure costs, any post closure monitoring required of the site and asset depreciation of the landfill itself.

Occasionally, for social or political reasons a Council may decide to keep gate fees below breakeven rates. This is the Council's prerogative, but they should be aware that any shortfall will result in commercial businesses being subsidised and funding identified from other sources (e.g. general rates) and should be accrued annually, with a proportion allocated to a closure fund.

Given the current portion of waste received at the DWMF and the contribution to DWMF operational costs from commercial gate fees, the gate fees would need to increase by 40%. However, if the changes to the tip pass system suggested in Section 7.6.1 were introduced, gate fee revenue could be expected to increase by 15% - 20% due to the large quantity of waste attracting a gate fee. Therefore, if the change to the tip pass system was also introduced the gate fees would only need to increase by 20% to be equitable.

7.6.3 *Waste Management Levy*

The *Waste Avoidance and Resource Recovery Act 2007* provides local government with the ability to impose on rateable land within its district, an annual rate for the purpose of providing for the proper performance of all or any of the waste services it provides.

There are ceiling limits on the amount that can be charged depending on the system of valuation. The Shire's 2016/17 waste management levy is currently charged at \$168.00 per annum. There are approximately 3,300 rateable properties within the Shire, with the levy providing approximately \$539,000 per annum to cover waste service costs incurred by the Shire.

Whilst a levy provides an ability to ensure all ratepayers in the district contribute equally to the costs of providing services, a flat rate does not correlate to the amount of waste generated by the entity be it domestic or commercial. As such unless there are other mechanisms (such as accurate gate fees) to ensure users or waste producers contribute for the waste produced, small households end up subsidising costs of larger households and commercial operators.

There is an ability to increase this Levy to cover the increasing costs for the Shire for future waste services, whichever Option is selected.

7.6.4 *Kerbside Waste Collection Charge*

The *Waste Avoidance and Resource Recovery Act 2007* provides local government with the ability to impose a receptacle charge (Kerbside Charge) in respect of premises provided with a waste service by the local government.

7.6.4.1 *Domestic Properties*

The Kerbside Charge usually covers the collection costs and processing/disposal costs associated with the waste service provided (i.e. waste, recycling, organics). The Shire's current standard weekly waste collection charge is \$77.00 per residential service with \$62.40 going directly to the kerbside collection contractor.

The Kerbside Charge does not cover disposal costs for the waste collected, only the collection costs charged by the collection contractor, in comparison with four other local government areas (Augusta



Margaret River, Busselton, Manjimup, Nannup) the Shire charges one of the lowest Kerbside Charges, as the average for the four other rural local governments is \$230.00 per annum.

The Shire has an opportunity to increase the costs of the Kerbside Charge to adequately cover the cost of collection and disposal at the landfill.

If the Shire were to consider increasing this charge for residential properties it needs to be mindful of creating a potential inequity between those with access to a kerbside collection and those without. The current structure used by the Shire recoups disposal costs via the Waste Management Levy, which all ratepayers equally contribute to.

To ensure equity of the domestic charges, this would need to be accompanied with the introduction of quantity limits for the tip pass system (see **Section 7.6.1**).

7.6.4.2 Commercial properties

Kerbside services are also provided to commercial properties. Whilst commercial properties pay more for this service (currently \$108.00 per service), only approximately \$45.00 per year per bin is available to cover the costs of waste disposal (given the cost of the collection contract). Given an audit of the weekly MGB collection showed an average bin weight of 18kgs, a weekly service would collect 936kgs per year. Based on typical densities of collection truck waste this equates to 2.2m³ of waste, which should cost over \$75.00 for disposal at the current gate fee of \$35.00 per m³, rather than the \$45.00 recovered from the Shire charge.

Therefore, as each commercial MGB service is gaining a \$40.00 subsidy each year, with the 286 commercial kerbside services the Shire provides, the commercial businesses are gaining a \$11,000 subsidy for their waste each year.

The shire should review current protocols for commercial waste kerbside services with a view increasing costs to cover actual cost of disposal of the waste (approximately \$140.00 per MGB service) and completing an audit of the number of MGB presentations by each organization against the number of services (bins) paid for, as each commercial MGB should cover its whole of life costs of disposal.

7.6.5 Reducing operating costs

Increases in charges to Shire ratepayers could be minimised by reviewing the current service levels and operating costs of the waste services provided. During this financial review a number of areas of expenditure have been highlighted that could achieve potential savings, as follows:

7.6.5.1 Review operation of Balingup Transfer Station

This is currently costing the Shire approx. \$140,000 per year to operate and transport waste to DWMF, with minimal income received. This facility is open 18 hours a week (2.5 days) and receives only 500 tonnes per year, or nine tonnes per week on average.

Given the town of Balingup receives a kerbside collection, this facility is servicing only a relatively small population. There is an opportunity to potentially close the facility or reduce opening hours on this facility to be more commensurate with the level of usage.

7.6.5.2 Investigating the extension of kerbside collection services

Currently approximately 50% of the Shire's population receives a domestic kerbside collection. The routes and settlements receiving a collection are largely reliant on the density of population it serves. Properties receiving a collection pay for this weekly service. However, the operating cost for the Shire's drop off facilities at Balingup and Donnybrook are significant.

The Shire should complete a review of the costs of extending services to outer rural areas and reduce the level of service at the drop-off facilities, to ascertain impacts on costs to services and feasibility of doing so.



This option would have the advantage of providing a user pays waste collection service, thus ensuring a fair and equitable service was being provided across the Shire and reduce the need and cost associated with the BTS and the current waste disposal pass. Any extension to the designated collection routes by the Shire would require a mandatory payment of the kerbside collection service fees as occurs in town areas of the Shire for these properties.

7.6.5.3 Public Bin Servicing

The collection of public litter bins is completed by the Shire. This allows a flexible service as the frequency of bin pickups varies between the season, as some bins may require emptying daily during peak times.

However, this service is costing the Shire over \$110,000 per year to service 83 bins, or \$1,300 per year per bin. Given the current kerbside collection bin lift cost is \$1.32 for a domestic MGB, a significant variation in costs exist. Whilst bin sizes and access may present challenges for incorporating servicing of such bins into kerbside collection contracts, the Shire should review the operations and economics of this service with a view to reducing the cost implications with this service.

7.6.5.4 Service delivery model for the transfer station

If the Shire select Option 2 (transfer station) it should consider bringing the facilities operations back in-house. A transfer station is less complex than a landfill, thus the management oversight and operational processes are more process driven.

If a waste contractor was collecting the waste from the transfer stations for disposal at an alternative landfill the actual operations at the transfer station would be to provide instructions for the domestic users and to maintain the site.

The Shire should accurately estimate the cost to provide the operations from Shire staff and plant, to compare this with the current contractor fee.



8 CONCLUSIONS

Based on the financial modelling, economic review and assessment of environmental, social, political and technical factors, the following conclusions can be drawn.

8.1 SUMMARY OF FINDINGS FOR EACH OPTION

The following sections summarise the key results and considerations for each scenario considered.

8.1.1 *Option 1a: Expansion of DWM Phase 1*

- Would be built in general accordance with Best Practice Environmental Management (BEPM) guidelines (Cell lined, leachate management & progressive capping)
- Provides the Shire with only midterm (9-year) waste disposal option.
- Community acceptance as no change from current practices for customer.
- Most expensive option modelled due to minimal period to amortise costs.

8.1.2 *Option 1b: Expansion of DWM Phase 1 & 2*

- Would be built in general accordance with Best Practice Environmental Management (BEPM) guidelines (Cell lined, leachate management & progressive capping)
- Provides the Shire with long term (24-year) waste disposal option.
- Self sufficiency
- Community acceptance as no change from current practices for customer.
- Second most expensive option modelled

8.1.3 *Option 2a: transfer station and transport waste to alternative landfill as customer (Banbury Harvey Regional Council)*

- Limited ongoing environmental liability as no longer landfill ownership.
- Provides the Shire with long term waste disposal option & flexibility.
- Unfavourable environmental aspects in terms of surrounding land uses and best practice siting.
- Located greater distance from Donnybrook which in turn impacts on increased greenhouse gas emissions
- Community acceptance may pose a challenge from commercial sector of community as Shire will no longer accept commercial waste
- Shire will not be self-sufficient as it will solely rely on a landfill not owned or operated by the Shire.
- Most expensive landfill site for Option 2 (transfer station), however more economical than landfill expansion options.

8.1.4 *Option 2b: transfer station and transport waste to alternative landfill as owner (Banbury Harvey Regional Council)*

Points to note regarding this option as follows:

- Limited ongoing environmental liability as no longer landfill ownership.
- Provides the Shire with long term waste disposal option & flexibility.
- Risk on inheriting legacy liability issues for previous waste disposal methods on site if member Council
- Community acceptance may pose a challenge from commercial sector of community as Shire will no longer accept commercial waste.
- Unfavourable environmental aspects in terms of surrounding land uses and best practice siting.



- Increased distance from DWMF which impacts on increased greenhouse gas emissions.
- Shire will not be self-sufficient as it will solely rely on a landfill not owned or operated by the Shire.
- Second most expensive landfill site for Option 2 (transfer station), however more economical than landfill expansion options.

8.1.5 Capital 2c: transfer station and transport waste to alternative landfill at Clearaway (Clearaway)

- Limited ongoing environmental liability as no longer landfill ownership.
- Provides the Shire with long term waste disposal option & flexibility.
- Landfill site has been built and operates to Best Practice guidelines.
- Shire will not be self-sufficient as it will solely rely on a landfill not owned or operated by the Shire.
- Financially attractive as lowest cost of the modeled options.
- Community acceptance may pose a challenge from commercial sector of community as Shire will no longer accept commercial waste.

8.1.6 Alternative Capital 2c: transfer station after decommissioning of current landfill area (pre-Section 5.5.7)

- Provides the Shire with approximately seven years of waste disposal option whilst longer term options being finalised.
- Initial community acceptance as no change from current practices for seven years.
- Spreads capital costs, as transfer station would be built within 18 months, but landfill capping cost would be deferred for six years.
- Regulator unlikely to support this Option, but also unlikely to stop it given its previous approach this type of scenario.

8.2 PREFERRED OPTION

The economic modelling results shown that Option 2c (transfer station) is the most cost-effective option for the Shire, with the lowest cost landfill for waste disposal is at Clearaway (Banksia Road, Doragonup). This option is approximately \$90,000pa lower than Option 1a (extension of landfill phase 1).

While the additional cost of Option 1a (landfill extension) is less than expected, other negative factors associated with the landfill extension include:

- a significantly higher capital investment;
- an increase level of management and operational oversight;
- a greater environmental risk (e.g. puncture of the liner or leachate pollution); and
- due to the constraints of the site there is insufficient space for the lined leachate lagoon.

8.3 ADDITIONAL CONCLUSIONS

Whilst completing the project several aspects of the financial costs and structure of the waste services have been highlighted, the associated conclusions are provided in the following subsections.

8.3.1 Proportion of costs attributable (equity of cost)

The current structure of fees and charges does not reflect the producer pays principle, as commercial businesses are:

- paying below breakeven for a kerbside collection services
- paying below breakeven for self hauled waste due to low gate fees



- can dispose of unlimited quantities of commercial waste under the 'tip pass' system for domestic waste

8.3.2 *Equity in domestic charges*

The waste charges for residents (Kerbside Charge and Waste Management Levy) do reflect some of the costs but currently result in a shortfall over approximately \$100,000 per year. The allocation of cost with these two charges is not very clear.

The unlimited domestic tip pass system invites companies to dispose of commercial waste as domestic waste and also penalises households that produce small quantities of waste, while subsidising households that generate large quantities of waste that are drop-off at the BTS or DWMF.



9 RECOMMENDATIONS

Based on the outcomes and findings of this project, the following recommendations are provided:

9.1 SELECTION OF OPTION 2C AS FUTURE WASTE DISPOSAL OPTION

Based on this assessment the Shire should consider selection of option 2c, (transfer station and transport of waste to Cleanaway), as the preferred long term disposal option for the Shire.

This provides the most cost effective outcome for the Shire, provides a long-term disposal solution, ensures best practice waste disposal and reduces the Shire's potential ongoing environmental liability associated with landfill ownership. The modeling indicates this to be \$1.17M annually – approximately \$85,000k more expensive than current waste management expenditure by the Shire.

The immediate actions for this option would include the:

- Withdraw the current works approval for the landfill extension.
- Design and approvals for new transfer station. While the transfer station design used for this project has been based on the current layout, it would be a worthwhile investment for the Shire to establish a modern gatehouse and transfer station, with a sealed hardstand, landscaping and possibly covered to provide shelter from the rain and sun for the residential users.

Should the Shire wish to spread the capital cost and provide additional time to develop and decide on the new services, Option 2d (transfer station and maximum utilisation of current landfill) could be considered as an additional option.

9.2 SHIRE FEES AND CHARGES

The cost of the waste services is likely to increase with the recommended changes; however, a number of areas have been identified to increase revenues and potentially reduce costs. These should be reviewed and approved in a defined order as changes are introduced.

9.2.1 Tip passes

It is recommended the Shire limit the tip passes and introduce bulk waste passes by considering changes to the current pass system as follows:

Limiting eligibility: The pass should only be provided to domestic residents without kerbside collection. Commercial properties outside collection routes should not be provided with a pass.

Limiting volume of free disposal: End the use of unlimited disposal with domestic tip passes and restrict the quantities to the equivalent amount of waste able to be disposed through a kerbside collection service. This would see the pass restricted to 52 x 240L passes for residents without kerbside collection. Any residents generating more than this allocation would need to pay the standard gate fees to dispose of any additional waste.

Stringent application of 'domestic waste' eligibility: Domestic waste should be waste typically food & household wastes suitable for disposal via a normal kerbside waste bin collection. This does not include bulky type wastes such as mattresses, settees, cupboards etc. or commercial waste. These waste streams should be charged in accordance with current Shire disposal fees and charges.

Introducing bulk waste passes: To control volumes of bulky waste disposed in the Shire, all residents be issued with two bulk waste tip passes, each allowing the disposal of a 6' x 4' (or equivalent) trailers of domestic (bulky household) waste each year and the unlimited drop-off of separated green waste. Any residents generating more than this allocation would need to pay the standard gate fees to dispose of any additional waste.



Community Engagement on changes: As the Shire has provided the unlimited pass system for a considerable period of time, changing this service may present some challenges. As such it is recommended that the Shire engage with the community on the need to realistically price the waste services it provides to ensure equity for the users of the waste services in the Shire.

It is predicted that by introducing changes to the pass revenue from domestic and commercial waste at the DWMF will increase, and the quantity of domestic waste that would need to be transferred to an alternative landfill could potentially decrease.

9.2.2 Commercial gate fees

The commercial gate fees are currently below breakeven, as a result commercial business and any waste imported to the Shire for disposal is being subsidised by the domestic ratepayers. Based on the current breakdown of waste quantities the gate fees should be increased by approximately 40%.

However, if the Tip Passes were restricted in line with the suggestion above, the likely quantity of commercial waste currently declared as domestic waste, that would then attract a gate fee would result in increased commercial waste revenue. In this case, the gate fees would only need to increase by approximately 20%.

9.2.3 Commercial kerbside collection

The cost for the collection and disposal of kerbside waste is below breakeven, the cost of this service needs to be increased to by at least \$40.00 per bin service, plus the increase in commercial waste gate fee.

The Shire should audit the number of MBG's presented compared with the number of MGB services paid for, so ensure organisations aren't placing additional bins at the kerbside without paying for the extra service with the Shire.

9.2.4 Domestic charges

The current division of cost between the Kerbside Charge and Waste Management Levy is unclear and should be resolved. The development of these charges should consider each cost element of:

- Kerbside collection charges
- Disposal / processing (Facility costs)
- Waste Management Reserve fund contributions
- Administration and overheads

These costs will vary for properties with kerbside collection services and those without, but the breakdown should be clear and defensible.

9.3 WASTE INFRASTRUCTURE & SERVICES

The review has highlighted a range of areas that relate to the economics and operation of the BTS and DWMF, the key recommendations include the following.

9.3.1 Service delivery model

The Shire should undertake a review of the operation of both the DWMF & BTS in terms of determining the costs of contractor delivery verses in-house service delivery. Particularly in relation to the Balingup Transfer Station and future transfer station at DWMF, as these types of facility require less oversight than a landfill.

9.3.2 Opening hours

The Shire should review the opening hours of the Balingup Transfer Station in view of providing a service which is more commensurate with its level of usage, whilst providing operational cost savings for the Shire.

9.3.3 Kerbside collection V drop-off

The Shire should review the options of providing a kerbside collection for the whole Shire compared to the provision of drop-off services by estimating the cost of providing kerbside collection services throughout



The Shire, with a very reduced service for waste drop-off in comparison to the current high level of services offered for waste drop off.

The variation may be a marginal, however, the cost per tonne for providing the current waste drop-off facilities is high, particularly for the BTS.



REFERENCES

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APPENDIX A – MODEL CALCULATION SHEETS

<to be inserted after feedback of draft report>