Site Selection Study

Freehold Land Assessment – Technical Report

Prepared for Shire of Esperance

May 2016

Project Number TW13002
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1 Introduction

The Shire of Esperance (the Shire) has commissioned Talis Consultants Pty Ltd (Talis) to undertake a Site Selection Study with the objective of selecting a suitable site for a modern Waste Management Facility. The Site Selection Process should be based on best practice principles. Initially, the new site will include a putrescible landfill, however it may potentially provide resource recovery and similar services in line with the Shire’s desire to divert waste from landfill. The delivery of a modern waste management facility can be a long and complex process involving multiple phases covering Site Selection and Site Investigations through to Approvals, Design, Construction and Operation. The entire process can take 4-5 years to complete.

The Shire initially prioritised the investigation of Crown and Shire land as part of the Site Selection Study. A Preferred Site located on Crown Land was identified that warranted further investigations. However, Native Title claims associated with the site have significantly delayed the advancement of the site. Therefore, the Shire has commissioned Talis to conduct an assessment of Freehold Land for the development of the waste management facility.

The process utilised for the Freehold Land Assessment was an adjusted method to that of the Crown Land Site Selection and included a Community and Stakeholder Engagement Program. The Community and Stakeholder Engagement Program aimed to inform, consult and involve various parties through a range of activities including the release of a Community Consultation Report and Feedback Forms and running a series of community workshops and stakeholder meetings.

This report outlines the works completed and key findings arising from the assessment of potential Freehold Land with the key objective of identifying Preferred Freehold sites that warrant further, more detailed consideration.

1.1 Background

The Shire’s current Wylie Bay Waste Management Facility (the Wylie Bay Facility) has been in operation since 1988 and now includes a Community Drop-off, Materials Recovery Facility (MRF) and Landfill (Class II). The Wylie Bay facility is licenced (Licence No. L6882/1997/13) in accordance with the Environmental Protection Act 1986 under the following Prescribed Premise categories:

- Category 13 – Crushing of building material;
- Category 57 – Used tyre storage (general);
- Category 62 – Solid waste depot; and
- Category 64 – Class II putrescible landfill site.

The current landfill cell at the site is approaching the end of its operational lifespan. At the Ordinary Council Meeting on the 29 November 2011, the following resolution was passed to provide a replacement facility:
A Waste Disposal Strategy (2012) was prepared for the Shire which examined the following three options for long-term waste disposal:

- Option 1 – Construct a new lined cell at the Wylie Bay site;
- Option 2 – Establish a modern waste management facility at a new site; or
- Option 3 – Disposal within a neighbouring Shire’s existing landfill.

The Waste Disposal Strategy assessed both the technical and financial perspectives of each option. Option 1 was discounted due to a number of technical factors and the Department of Environment Regulation (DER) preference to cease operations at the site. The Waste Disposal Strategy identified that the Wylie Bay Facility is anticipated to continue to play a role in the Shire’s waste management infrastructure network. Due to its proximity to the Esperance townsite, the Wylie Bay Facility may continue to provide Community Drop-off and recycling services including the continuation of the MRF. However, the role that Wylie Bay may play in the Shire’s waste management practice is likely to be determined by the location of the new site determined through the Site Selection Process.

The Waste Disposal Strategy discounted Option 3 due to excessive transportation costs. Therefore it was recommended that the Shire adopts Option 2 as their preferred waste disposal solution and further investigates the feasibility of siting and developing a new modern waste management facility based on best practice principles.

This recommendation was presented to Council at the Ordinary Council Meeting on 24 April 2012. Council’s final resolution on the matter is documented below:

**Council Resolution O0412-011**

That Council:

1. Requests that the CEO initiate discussions with the City of Kalgoorlie Boulder and the Goldfields Voluntary Regional Organisation of Councils on the basis of developing a regional waste facility.
   a. If no interest in developing a regional waste facility is forthcoming within 4 months then Council seeks officers act upon “Option 2 of the Waste Disposal Strategy being:
      i. Establish a modern waste management facility at a new site as the preferred solution for future waste disposal within the Shire of Esperance; and
      ii. Prepares an Implementation Plan for a new Landfill, outlining the works required and potential timelines, including (but not limited to) Site Selection Criteria Determination, Site Identification Study and Preliminary Site Investigations and Feasibility Assessment.

2. Further investigate resource recovery options as part of the forthcoming Phase 1 of the Regional Funding Program administered by the Department of Environment and Conservation (DEC) with a view to maximising the diversion of materials from landfill.

3. Advise the DEC of the decision to establish a new modern waste management facility based on best practice principals.
The Shire engaged with the City of Kalgoorlie-Boulder and the Goldfields Voluntary Regional Organisation of Councils on the concept of developing a regional waste management facility however, no significant progress or commitment was forthcoming. A key issue for all potential Local Governments that participate in a regional landfill facility would be the substantial distances that would be involved.

Therefore, in accordance with Council Resolution O0412-011, the Shire then commenced works on the implementation of Option 2 being the siting and development of a modern waste management facility at a new site within the Shire based on best practice principles.

In 2013, the Shire commissioned Talis to conduct a Site Selection Study that prioritised the investigation of Crown and Shire land for the location of the modern waste management facility. Arising from the Site Selection works, a Preferred Site was identified and a Due Diligence and Landfill Capability Assessment undertaken. To assist with investigations of the identified Preferred Site during this time, the following recommendation was presented to Council at the Ordinary Council Meeting on 17 December 2013:

**Council Resolution O1213-018**

That Council:

1. Provide delegated authority necessary to the CEO to enable further investigation of the possible new refuse site locations on state controlled reserve land including the ability to:
   a. Request the Minister of Lands to assign appropriate management orders to the Shire of Esperance; and
   b. Indemnify the Minister of Lands against any claims costs or liabilities due to relevant State or Federal Legislation.
2. Receive quarterly (3 months) progress reports on the investigations of possible refuse sites; and
3. Develop and implement a community engagement plan regarding progressing the design and development of a new refuse site.
4. Agree and confirm the preferred reserve for the new refuse site, once all necessary investigations are complete, prior to any development of the new refuse site occurring.

However investigations into the Preferred Site identified Native Title issues at the site. This constraint had the potential to cause significant time delays in obtaining access and securing the site.

As a result, the Site Selection Study was revisited to investigate Freehold Land while concurrently administering a Community and Stakeholder Engagement Plan. This was endorsed at the Ordinary Council Meeting on 24 February 2015:

**Council Resolution O0215-022**

That Council:

1. Accept the Talis Consultants Pty Ltd Report entitled “Waste Management Facility Site Selection Study”;
2. Adopt and enact the “Waste Management Facility Site Selection Study – Communication and Engagement Plan”; and
3. Continue to investigate waste minimisation and diversion options throughout the process of developing the new waste management facility.
2 Modern Waste Management Facility

In 2013, the Shire prepared a Strategic Waste Management Options Study with the key focus on the minimisation and diversion of waste from landfill. This report outlined a range of potential recycling and resource recovery initiatives that the Shire may consider and the potential land requirements for each of the elements within the Shire’s future waste management infrastructural network.

This Section provides an outline of a modern waste management facility and the phases and timeframe for the delivery of such a facility.

2.1 Waste Management Hierarchy

The Waste Management Hierarchy (Diagram 2-1) is an internationally adopted framework which lists waste management options in order of preference according to their sustainability and environmental impacts.

As shown in Diagram 2-1, options which achieve outcomes higher up the Waste Management Hierarchy are preferred over those located further down the Hierarchy.

While the details of the facilities that will be provided in the modern waste management facility have not yet been decided, it is anticipated that it will incorporate complimentary waste management facilities and initiatives that address the relevant levels of the Waste Management Hierarchy.

![Diagram 2-1: Waste Management Hierarchy](image-url)
Avoid and Reduce relate to waste minimisation and are normally implemented through waste education and government policies and programmes. Some modern waste management facilities have Education Centres to support these programmes and describe the activities at the site which include Reuse, Recycling and Recovery as a means to minimise the quantity of waste sent to the landfill for Disposal.

2.2 Modern Waste Management Facility Schematic Layout

Figure 1 shows a typical schematic layout of a modern waste management facility. The optimum size of the site for the facility is approximately 100 Ha. A typical modern waste management facility comprises the key elements outlined in the following Section.

2.2.1 Entry Point

Access to the site is controlled at a gatehouse and weighbridge with an adjoining administration building. It is important that modern waste management facilities are secure and that all waste that enters the site is inspected, weighed and recorded. The data collected is needed for management of the site, regulatory compliance reporting and for future waste management planning.

2.2.2 Reuse Shed

As Reuse and Recycling are near to top of the Waste Management Hierarchy, facilities promoting these activities are the first to be accessed by the public when entering the site. There is the potential for Reusable material including household goods and other second hand items to be dropped off or purchased at a Reuse Shed.

2.2.3 Community Recycling and Drop off Facilities

Recycling is the most common method of diverting waste from landfill in Western Australia (WA). To support this process, Community Recycling and Drop off Facilities are provided to accept and consolidate recyclable materials from the community for future recycling. The Community Recycling and Drop off Facilities accepts a range of materials including paper and packaging materials, scrap metal and greenwaste. In addition, the facility also accept household hazardous and problematic waste streams including paints, batteries, tyres and wastes that are destined to go to landfill cells. A typical layout of a Community Recycling and Drop off Facility is provided in Figure 2.

In accordance with best practice principles, a Community Recycling and Drop off Facility is located at the front of larger waste facilities such as landfills. This is to separate the public access from the other operational sections of the site. After all the recycling options, modern Community Recycling Centres provide disposal services to the community for refuse material which cannot be recycled. One key element of this approach is to control access to the landfill cells in the interests of public safety and minimise the size of the tipping face.

2.2.4 Materials Recovery Facility

The Shire currently operates a MRF at the Wylie Bay Facility which is the key recycling service within Esperance. The MRF processes and bales the recyclable materials (paper, plastics, metals) arising from the Shire’s kerbside recycling collections. Depending on the location of the new waste management facility, the MRF may remain at Wylie Bay.
2.2.5 Resource Recovery Facilities

Resource Recovery is an important component of the waste diversion activities at the waste management facility. Designated areas are required for stockpiling and processing of greenwaste and inert materials, including sand, concrete and metals. There may also be provision of areas for the development of a specialist facility for the recovery of energy or other valuable products (subject to their viability).

2.2.6 Engineered Landfill

Disposal of waste will occur in landfill cells that are designed, constructed and operated to best practice standards. The applicable standard in WA is the Victorian Environmental Protection Authority Best Practice Environmental Management publication, *Siting, Design, Operation and Rehabilitation of Landfills* (Best Practice Landfill Guidelines) published in 2014.

The landfill cells will be lined with a composite containment system including a leachate collection system which works to prevent contamination of the underlying soil and ground water. The collected leachate will be transferred to a lined leachate evaporation pond for treatment through evaporation. Leachate sprays will be used within the leachate evaporation pond and for recirculating into active landfill cells to promote evaporation of leachate.

Combustible landfill gas generated in the landfill cells will also be collected and discharged into the environment in a controlled manner. If sufficient quantities of landfill gas are generated, it could be captured and flared or even used to generate electricity.

Cells that have been filled with waste will be covered with a capping layer comprising an impervious liner to prevent water intrusion into the cell that would contribute to the generation of leachate. A restoration soil layer suitable for supporting vegetation growth will be then laid over the impervious layer to protect it. The surface of the capping layer will be constructed to a grade to drain stormwater and to support revegetation.

Some recent examples of engineered landfill cells being designed and constructed to Best Practice Landfill Guidelines include:

- Perthwaste North Bannister landfill – located at Lot 2 on Plan 2767 situated 500m north from North Bannister Wandering Rd and 5.5 km west of the Albany Highway, at the rear of the Culford Tree Farm.
- EMRC’s Red Hill waste management facility – located at 1094 Toodyay Rd, Red Hill WA 6056
- Millar Road Landfill Facility – Located at 204 Millar Rd West, Baldivis WA 6171

2.3 Development Timeframe

As stated in Section 1, the delivery of modern waste management facilities similar to that proposed by the Shire can be a long and complex process. The process is generally categorised into five key Phases which are detailed below in Table 3-1.
Table 2-1: Project Delivery Phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Key Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: Site Selection</td>
<td>Assessment of Sites of Interest identified through community and stakeholder engagement to determine Preferred Site(s) on which to commence Site Investigations.</td>
</tr>
<tr>
<td>Phase 2: Site Investigations</td>
<td>Undertaking detailed Site Investigations on Preferred Site(s) to gather site specific data, including but not limited to:</td>
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<tr>
<td></td>
<td>- Groundwater (hydrogeological);</td>
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<td></td>
<td>- Soil types (geotechnical); and</td>
</tr>
<tr>
<td></td>
<td>- Ecology (flora and fauna).</td>
</tr>
<tr>
<td></td>
<td>In addition, a full Due Diligence and Landfill Capability Assessment will be carried out to gather all available data on the sites. These works will assist in determining a Selected Site that will be carried through to the Approvals Phase and will also assist in gathering relevant design and approval data.</td>
</tr>
<tr>
<td>Phase 3: Approvals</td>
<td>The Shire will collect the relevant data and prepare the required documentation to support the relevant Environmental and Planning Approvals required for the Selected Site including:</td>
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<td>- Environmental Impact Assessment through Referral to the Environmental Protection Agency;</td>
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<td>- Planning Approval from the Shire’s Planning Department;</td>
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<td></td>
<td>- Works Approval from the DER for the construction of the facility;</td>
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<td></td>
<td>- Building Licence from the Shire; and</td>
</tr>
<tr>
<td></td>
<td>- Licence from the DER for the operation of the facility</td>
</tr>
<tr>
<td>Phase 4: Design and Construction</td>
<td>This Phase will commence with the design of the waste management facility and the associated site infrastructure. Design documentation including the technical specifications will be prepared to support the release of a construction tender for the project. Following the tender process, a preferred contractor will be appointed to complete the construction works. The design and construction will need to comply with conditions set through the Approvals Phase.</td>
</tr>
<tr>
<td>Phase 5: Operations</td>
<td>Once the waste management facility has been constructed in accordance with the relevant approvals, the Shire can commence the operations of the facility and the acceptance of waste.</td>
</tr>
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</table>

The typical project timeline for the delivery of a waste management facility is illustrated in Diagram 2-2. With the Wylie Bay Facility approaching the end of its operational life, the Shire is under significant pressures to progress this project. The current license for the Wylie Bay Facility expires in August 2019 and the DER are currently suggesting that the license will not be renewed.
Diagram 2-2: Project Timeline

- **SITING**
  - 6 months

- **SITE INVESTIGATIONS**
  - 12 months

- **APPROVALS**
  - 12 - 18 months

- **DESIGN & CONSTRUCTION**
  - 12-18 months

- **OPERATION**
  - YEAR 4-5
3 Site Selection Process

The following Section outlines the Site Selection Process that has been adopted for this study. Diagram 3-1 provides a schematic of the Site Selection Process developed in consultation with the Shire to identify a suitable site for the establishment of a waste management facility within the Shire and the current phase of the Freehold Land Assessment.

Diagram 3-1: Freehold Land Site Selection Process
3.1 Site Selection Criteria

As shown in Diagram 3-1, Site Selection Criteria were developed to govern the entire Site Selection Process. These criteria were defined at the start of the process to ensure they are considered throughout the project. The Site Selection Criteria consider a range of environmental, social and planning factors are listed in Table 3-1 below. They have been utilised in identifying areas and Sites of Interest for the Freehold Land Search. In addition, the Site Selection Criteria form the basis of the multi criteria analysis undertaken on the Sites of Interest.

Table 3-1: Site Selection Criteria

<table>
<thead>
<tr>
<th>ASPECT</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Minimum of 100 hectares.</td>
</tr>
<tr>
<td>Shape / Topography</td>
<td>Preferably an existing depression/undulation such as a dry valley and/or manmade void.</td>
</tr>
<tr>
<td>Distance from Esperance</td>
<td>As close as practically possible to the Esperance town site.</td>
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<td></td>
<td>Currently concentrating within 60 km.</td>
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<tr>
<td>Surrounding Land Uses</td>
<td>Preferably supportive or similar surrounding land uses such as:</td>
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<td></td>
<td>o Agricultural and forestry;</td>
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<tr>
<td></td>
<td>o Extractive Industry;</td>
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<td></td>
<td>o Unallocated Crown Land; and</td>
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<td></td>
<td>o Reserves.</td>
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<td></td>
<td>Ideally suitable for the establishment of a 500m buffer surrounding the site managed through the Town Planning Scheme.</td>
</tr>
<tr>
<td>Land Use Separation Distances</td>
<td>Preferably a separation distance of:</td>
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<td></td>
<td>o 1,000m to a Residential Area; and</td>
</tr>
<tr>
<td></td>
<td>o 500m to a Single Residential Dwelling.</td>
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<tr>
<td></td>
<td>Minimum separation distance of 9km to Aerodromes.</td>
</tr>
<tr>
<td>Environmental Separation</td>
<td>Preferably 10m - 20m separation distance to groundwater.</td>
</tr>
<tr>
<td>Distances</td>
<td>Minimum separation distance of 250m from surface water bodies.</td>
</tr>
<tr>
<td>Site Access and Road Network</td>
<td>Preferably direct access from a State Highway / Regional Distributor road.</td>
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<td></td>
<td>Located less than 1.5km from a sealed road catering for heavy vehicle movements.</td>
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<td></td>
<td>Preferably waste transport route not through residential/sensitive areas.</td>
</tr>
<tr>
<td>Land Ownership</td>
<td>Freehold Land.</td>
</tr>
<tr>
<td>Current Site Features</td>
<td>Preference given to those currently used for Forestry purposes</td>
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<td></td>
<td>Vegetation screening surrounding the boundary of the site.</td>
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<td>Large cleared areas; preferably including existing infrastructure such as:</td>
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<td></td>
<td>o Water Tank;</td>
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<td></td>
<td>o Shed/Building;</td>
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<tr>
<td></td>
<td>o Dam; and</td>
</tr>
<tr>
<td></td>
<td>o Sealed internal roads.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>ASPECT</th>
<th>CRITERIA</th>
</tr>
</thead>
</table>
| **Services** | Existing and/or available connections to:  
- Electricity grid;  
- Telecommunications; and  
- Water. |
| **Siting** | Site not located within the following:  
- 100m of a fault line;  
- Heritage Listed Area; and  
- Public Drinking Water Source Catchment Area.  
- Preferably site not located within the following:  
  - Groundwater Recharge Area;  
  - Conservation Significant / Environmentally Sensitive Areas which contain:  
    - Threatened Flora;  
    - Threatened Fauna;  
    - RAMSAR Wetland;  
    - Lake Warden catchment;  
    - Threatened ecological communities;  
    - Priority ecological communities.  
  - Proclaimed Water Management Area; and  
  - Area prone to flooding. |
| **Geology** | Preferably underlying geology of clay material.  
- Readily available construction and operational materials on or immediately surrounding the site. |

#### 3.2 Geospatial Mapping

Based on the Site Selection Criteria adopted, a geospatial mapping model was generated for the study area which contained a range of environmental, planning and social data layers. The various layers utilised in the Geospatial Model, along with the relevant sources of the data are listed below in Table 3-2.
It is important to note that some constraints would prohibit the development of a landfill facility, while others would represent a challenge. In consultation with the Shire, an approach has been adopted of following the path of least resistance through compliance with best practice siting principles.

### 3.3 Identification of Areas of Interest

The Site Selection Process commenced by conducting desktop analysis of the study area to identify areas within which Sites of Interest are likely to be found. This was done using the Geospatial Model and Site Selection Criteria. Details of the Areas of Interest identified are presented in Section 4.

### 3.4 Community and Stakeholder Engagement

Following the identification of the Areas of Interest, the Shire ran a Community and Stakeholder Engagement Program to provide members of the public and key stakeholders with an overview of the Site Selection Process and the identified Areas of Interest for their consideration. The Community and Stakeholder Engagement Program which aimed to
inform, consult and involve various parties through a range of activities including the release of a Community Consultation Report and Feedback Forms and running a series of community workshops and stakeholder meetings. Feedback was requested from the community and stakeholders on the overall Site Selection Process and also to identify Sites of Interest within the Areas of Interest that they wish to nominate for the Shire to consider as part of the selection process. Details of the Community and Stakeholder Engagement Program are presented in Section 5.

3.5 Sites of Interest

Following on from the Community and Stakeholder Engagement Program on the Areas of Interest, members of the public and stakeholders provided feedback on the process and nominated sites for consideration in the Assessment. These nominated sites then underwent a fatal flaw analysis to disregard sites that were incompatible with the Site Selection Criteria. Nominated sites that did not possess any fatal flaws were then identified as being Sites of Interest which were carried through for assessment. Details of the selected Sites of Interest are presented in Section 6.

3.6 Evaluation of Sites of Interest

In order to further filter down and identify a Preferred Site(s), the Sites of Interest were evaluated to assess their strengths and weakness. The principle evaluation tool used was a multi criteria analysis (MCA). The multi criteria analysis process assessed the Sites of Interest by scoring each site against Aspects and Criterion. The Aspects and Criteria were assigned a specific weighting to reflect their relative importance in determining the Preferred Site(s). The outcome of the multi criteria analysis was a weighted score for each Site of Interest. The multi criteria analysis and its key findings are presented in Section 7.

3.7 Preferred Sites

Following the multi criteria analysis, the total weighted score for each nominated Site of Interest was used to rank the sites from most to least preferred. From this ranking, the Shire should select a number of Preferred Sites to be carried through to the Phase 2 Site Investigation works.

3.8 Future Tasks

The Site Selection Process which determined the Preferred Sites has used currently available high level data and information which cannot be solely relied upon to provide a detailed understanding of the conditions on and surrounding a nominated Site of Interest. Therefore the Preferred Sites selected by the Shire need detailed on-site investigations and testing to confirm their suitability. This is referred to as the Phase 2 Site Investigation works.

If the detailed investigations into the Preferred Sites identify one as having a fatal flaw, then it will no longer be considered a Preferred Site. The remaining Preferred Site(s) will continue to be examined to determine their suitability as the Selected Site. In addition, the next highest ranked Preferred Site could be brought forward for consideration into the Phase 2 project works.
4 Areas of Interest

To commence the Freehold Land search, Areas of Interest were identified which had the most opportunity and were free of any large constraints to the development of a best practice standards waste management facility. This is particularly relevant to the Freehold Land search due to the potential amount of such land within the Shire. The Areas of Interest were chosen due to their absence of the following key constraints:

- Public Drinking Water Source Areas – The Department of Water designates areas, as catchments for potable water sources. In accordance with the Department of Water stringent management requirements for such vital areas, waste management facilities are precluded from being developed within these designated area;
- Airport Buffers – Guidelines of the International Civil Aviation Organisation specify that a buffer distance of 9km from aerodromes is recommended. Two aerodromes service the town of Esperance and any areas within 9km buffers of these aerodromes were avoided;
- National Parks – There are a variety of National Parks within the Shire which are managed by the Department of Parks and Wildlife. Due to their significant ecological and recreational values, these have been excluded from the study. In addition, these are generally Crown Land;
- Special Control Areas – To the north of Esperance is a number of environmentally significant wetlands. The topography and watercourses north of these wetlands encourage surface water flow in a north to south direction. The Shire has assigned a Special Control Area within its Town Planning Scheme (No. 23) that covers a large expanse of land to the north of these significant wetlands and prohibits some development in these areas. This Special Control Area as problematic for the location of a waste management facility;
- Crown and Shire land – As part of the Freehold Land Site Selection Study, Talis has mapped all Crown and Shire Land as a constraint and preclude it from future evaluation.

In addition, other key factors which governed the selection of the Areas of Interest and warranted consideration included:

- Distance from Esperance – Due to the large number of Freehold Land sites surrounding the town of Esperance, Talis focused on investigating areas that were within approximately 60km from the town centre; and
- Road Network – Waste management facilities can incur capital costs from the construction and maintenance of road infrastructure as well as the logistical operations of waste transport. Therefore, Talis focused on areas that were readily accessible from a suitable road network.

The Road Network surrounding Esperance has main arteries to the east and west of the townsite, and a third to the north. Due to the presence of the Special Control Area and Airport Buffers, a large area to the north of the town was excluded. This then initially concentrated the focus of the study on key areas within 60km to the west and the east of the Esperance town centre.
4.1 Western Area of Interest

The Western Area of Interest selected by Talis is shown in Figure 3. The Western Area of Interest commences 15km from the town centre and extends westerly along South Coast Highway through to Sears Road. It includes land south of the South Coast Highway and northwards in a semi-circle shape until it meets the Esperance Coolgardie Road approximately 40km north of the airport.

4.2 Eastern Area of Interest

The Eastern Area of Interest is shown in Figure 4. It commences approximately 15km east of the town centre with its eastern extremity being Ridgelands Road. It is dissected by Fisheries Road with the southern extent of the Eastern Area of Interest generally abutting the Cape Le Grande National Park. It extends in a semi-circle shape just north of Lignite Road.
Community and Stakeholder Engagement

Throughout the Site Selection Process the Shire has sought to engage with the community, including key stakeholders that hold an interest in the project through a range of methods that seek to Inform, Consult and Involve the various parties. Following the selection of the Areas of Interest, the Shire ran a Community and Stakeholder Engagement Program which included a range of activities such as the release of a Community Consultation Report and Feedback Forms and running a series of community workshops and stakeholder meetings. The Engagement Methods used to date on the project are detailed with Table 5-1 and are discussed within this Section.

Table 5-1: Community and Stakeholder Engagement Methods

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Engagement Methods</th>
</tr>
</thead>
</table>
| Land owners in the Areas of Interest             | • Individual letters sent to all land owners.  
• Meetings to be held in the local area.  
• Use print and digital media to promote the study and inform the community of the process being undertaken and the importance of locating a new site. |
| Broad Community                                  | • Use print and digital media to promote the study and inform the community of the process being undertaken and the importance of locating a new site. |
| Media                                            | • Engage with all local media bodies (print and radio) and inform them of the process and ensure all accurate information is provided  
• Media releases at project milestones.          |
| Real Estate Agents                               | • Meeting with all key local real estate agents to inform them of process being undertaken and enlist their assistance in locating a site, within the Areas of Interest.  
• Contact via phone and email with main representatives during the process. |
| Government Agencies                              | • Correspondence to keep them accurately informed of the process being undertaken.  
• Copies of all Media Releases published.       |
| Local environmental groups (LEAF, ERF, SCNRM)    | • Meet with local groups to ensure they are accurately informed of the process being undertaken and provide access to all relevant documents to encourage support for the new location and subsequent design. |

As part of the Community and Stakeholder Engagement Program, a Community Consultation Report was prepared which sought to Inform and Consult the community on the Site Selection Process. The main objective of the report was to:

- Provide the Community with a detailed summary of:
  - The methodology adopted for the study;
  - Areas of Interest Identified;
- Obtain feedback on:
  - Works completed and key findings to date; and
  - Nominate sites for the Shire to further consider for the development of a waste management facility.

The Community Consultation Report was made available to the public through printed and digital media. The Community Consultation Report provided the reader with a feedback...
form which could be submitted to the Shire prior to the closure of the submission period on the 17th of April 2015.

Following on from the distribution of the report, four community workshops were then held during the week beginning 22nd March 2015 at the following locations:

- Scaddan Country Club – 23rd March 2015 from 1:00pm to 3:00pm;
- Dalyup Recreation Hall – 23rd March 2015 from 5:30pm to 7:30pm;
- Condingup Recreation Centre – 25th March 2015 from 10:30am to 1:00pm; and
- Esperance Civic Centre – 25th March 2015 from 5:30pm to 7:30pm.

The community workshops were conducted to present the findings of the Community Consultation Report and give the public further opportunity to provide comment or query any aspect of the Site Selection Process.

In addition to community workshops, stakeholder meetings were conducted with parties who held an interest in the project. Stakeholders included the following:

- Department of Agriculture and Food;
- Department of Environment Regulation;
- Department of Water;
- Local environmental groups;
- Real estate agents; and
- Media representatives.

5.1 Summary of Feedback

One of the principle objectives of the Community and Stakeholder Engagement Program was to receive nominations of potential sites for further assessment. This objective was achieved with multiple sites being nominated. The nominated sites varied in size, location and existing land use which allowed for a robust multi criteria analysis process by defining differing strengths and weaknesses. Feedback provided through the engagement process, has provided a greater understanding of local conditions which assisted undertaking the multi criteria analysis process.

Another key objective of the Engagement Program was to inform stakeholders and the community on the Site Selection Process and the remaining phases required to establish a waste management facility. Feedback received has indicated recognition that the Shire is undertaking a robust approach to deliver the new facility. Feedback also indicated an understanding of the need for the new site and the critical nature of waste management services.
6 Sites of Interest

A total of 14 sites were nominated by the community and stakeholders during the engagement process. Geospatial analysis was undertaken on the nominated sites to determine which could be carried through as Sites of Interest. The analysis utilised the Geospatial Model and Site Selection Criteria to determine the presence of any fatal flaws in the sites that would warrant their exclusion from further consideration. A review of the Tenure for the sites identified one nominated site as Crown Land and as a result the site was removed from the process. No fatal flaws were identified as occurring on any of the remaining nominated sites. Therefore, a total of 13 Sites of Interest were carried into the multi criteria analysis process. The 13 Sites were placed into Western and Eastern areas of interest shown in Figure 3 & Figure 4).
7 Multi Criteria Analysis

A multi criteria analysis was undertaken on the 13 Sites to assist in identifying their strengths and weaknesses and to rank the Sites of Interest in priority order.

7.1 Multi Criteria Analysis (MCA)

The multi criteria analysis was based on the Site Selection Criteria which compromise a range of environmental, technical and financial aspects and associated criteria. The aspects adopted for the multi criteria analysis were:

- Distance;
- Road Access;
- Buffers;
- Area;
- Environmental;
- Vegetation Clearing;
- Topography;
- Infrastructure;
- Soil Characteristics;
- Screening; and
- Onsite Capital Costs.

Some aspects have a number of criteria assigned, due to multiple considerations needing to be addressed for that specific aspect. Each aspect, and by association each criterion, has an assigned weighting to indicate its importance when determining the preferred site. For example, based on the Site Selection Criteria all Sites of Interest were of a considerable size, and consequently the weighting for the Area aspect was not considered as important as the travel distance from Esperance townsite, which can result in significant operational costs over the life of the project. A simplistic three level scoring system was adopted for each of the criteria, with a score of three being the most preferred option and a score of one the least preferred option. Table 7-1 outlines the various aspects and criteria utilised for the multi criteria analysis and their respective weighting and scoring system.
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Weighting</th>
<th>Criteria</th>
<th>Percentage Allocation</th>
<th>Adjusted Weighting</th>
<th>Scoring</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
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<tr>
<td>Distance</td>
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<tr>
<td>Road Access</td>
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<td>Surrounding Existing Road Network</td>
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<td>4.05</td>
<td>Major Road</td>
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<td></td>
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<td>New Roadwork’s Required</td>
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<td>&lt;0.5 km</td>
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<tr>
<td></td>
<td></td>
<td>Road Maintenance Required</td>
<td>30%</td>
<td>4.05</td>
<td>Minimal</td>
</tr>
<tr>
<td>Buffers</td>
<td>11.00</td>
<td>Proximity to Sensitive Land Uses</td>
<td>70%</td>
<td>7.70</td>
<td>&gt;1000 m</td>
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<tr>
<td></td>
<td></td>
<td>Separation distance from Environmentally Sensitive Areas</td>
<td>30%</td>
<td>3.30</td>
<td>&gt;250 m</td>
</tr>
<tr>
<td>Area</td>
<td>6.00</td>
<td>Area</td>
<td>100%</td>
<td>6.00</td>
<td>&gt;100 ha</td>
</tr>
<tr>
<td>Environmental</td>
<td>10.00</td>
<td>Environmental Approvals</td>
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<td>7.00</td>
<td>Likely</td>
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<tr>
<td></td>
<td></td>
<td>Environmental Management</td>
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<tr>
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<tr>
<td>Topography</td>
<td>7.00</td>
<td>Site Contours</td>
<td>100%</td>
<td>7.00</td>
<td>Advantageous</td>
</tr>
<tr>
<td>Infrastructure</td>
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<td>Connection to Electricity Grid</td>
<td>100%</td>
<td>6.00</td>
<td>Readily Available</td>
</tr>
<tr>
<td>Soil Characteristics</td>
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<td>Suitability of in situ Soils</td>
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<td>8.00</td>
<td>Preferred</td>
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<tr>
<td>Screening</td>
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<td>Site Suitably Screened</td>
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<td>Extensive</td>
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<tr>
<td>Onsite Capital Costs</td>
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<td>Onsite Capital Costs</td>
<td>100%</td>
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<tr>
<td></td>
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</tbody>
</table>
The results of the MCA including the raw and weighted scores assigned to each of the Sites of Interest subjected to the multi criteria analysis are provided within Appendix A.

It is important to note that a key factor in the siting of landfill facilities is depth to groundwater. As shown in Section 3.1 the Site Selection Criteria lists ‘Preferably 10m - 20m separation distance to groundwater’ as one of the preferred requirements of a site for this Site Selection Study. A range of datasets related to depth to groundwater were gathered and analysed as part of this study, however the available datasets had limited coverage within the study area as well as differing degrees of accuracy which made uniform assessment and scoring of the Sites of Interest impractical against this criterion. Therefore, as the purpose of the multi criteria analysis is to assess all Sites of Interest against the Site Selection Criteria, it was determined that depth to groundwater should be removed as a criterion for the multi criteria analysis. Further detailed hydrogeological studies will be required as part of the Phase 2 Site Investigations which will be used to determine the Selected Site.

### 7.2 Sites of Interest Ranking

All of the Sites of Interest were then ranked based on their assigned weighted score, in order of highest to lowest, with highest being the most preferred Site of Interest. Table 7-2 shows the ranking of the Sites of Interest arising from the multi criteria analysis.

<table>
<thead>
<tr>
<th>RANKING</th>
<th>SITE ID</th>
<th>TOTAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>279</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>252</td>
</tr>
<tr>
<td>3</td>
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<tr>
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<td>200</td>
</tr>
<tr>
<td>13</td>
<td>10</td>
<td>192</td>
</tr>
</tbody>
</table>

As shown in Table 7-2, Site 11 ranked highest with a score of 279 based on the weightings applied to the aspects and criteria within the multi criteria analysis. The second highest ranked Site of Interest was Site 6 with a score of 252.
8 Discussion

Based on the aspects, criteria, weighting and scoring applied, the multi criteria analysis system allowed for the ranking of the Sites of Interest to prioritise those that warrant further consideration. However, the multi criteria analysis should not be regarded as a black box in which sites are assessed and a winner is determined based solely on the score. Rather, the multi criteria analysis should be regarded and utilised as an analytical tool that assists decision makers to better understand the strengths, weaknesses and points of difference between the various sites being evaluated.

8.1 Highest Ranked Sites of Interest Commentary

The maximum available score was 300 points. As shown in Table 7-2, Site 11 was the highest ranked site from the multi criteria analysis with a total score of 279 which indicates a high level of compliance with the Site Selection Criteria. The next highest score was 252 and was achieved by Site 6. While 252 is still considered a high score, it is significantly less than Site 11. Site 7 and Site 8 were ranked 3rd and 4th with scores of 246 and 245 respectively. Due to the high score of Site 11 and that sites ranked from second to fourth were only separated by 7 points, these were considered to be the highest ranked sites of interest warranting commentary.

The high score attributed to Site 11 is due to the multi criteria analysis identifying a number of significant strengths that the site possesses over all other Sites of Interest. The key strengths for Site 11 are related to the aspects of Distance and Road Access. Both of these aspects received high weightings in the multi criteria analysis due to their cost implications over the life of the facility. In addition to this, minimal new roadworks would be required to access the site. Site 11 was the only Site of Interest that achieved high scoring in both the aspects of Distance and Road Access which were the two highest weighted aspects in the multi criteria analysis.

In comparison to Site 11, sites ranked 2nd to 4th did not receive as high scores in the highly ranked aspects of Distance and Road Access. However outside of these aspects, the top four ranked Sites of Interest received comparable scores to that of Site 11 across the multi criteria analysis. As noted earlier, the sites ranked 2nd to 4th were separated by a small margin of 7 points in their multi criteria analysis scores. This minor variation in score was due to slight differences in site conditions which affected the scores associated with the Road Access and Environmental aspects.

As noted in Section 7.1, an analysis of available groundwater data failed to provide an accurate indication of depth to groundwater for comparison between sites. As depth to groundwater is considered a key factor in the siting of landfills, detailed hydrogeological studies are to be undertaken as part of the Phase 2 Site Investigations. If preliminary hydrogeological investigations were to be undertaken concurrently across more than one of the sites ranked 2nd to 4th, then there is potential for cost savings to the Shire due to the ability to negotiate with only one seller and the sites close proximity to one another.

An examination of aerial photography of Sites 6, 7 and 8 has shown indications of extensive surface water bodies occurring across Site 8, suggesting that depth to groundwater might be unacceptably small.
8.2 Preferred Sites

Based on the findings of the multi criteria analysis, it is recommended that the Shire recognises the top three ranked sites listed below in Table 8.1 as the Preferred Sites that warrant future consideration at this stage. Site 8 was not included due to the availability of other site options, the potential for groundwater issues, and its ranking in the multi criteria analysis.

Table 8.1: Preferred Sites warranting further investigation

<table>
<thead>
<tr>
<th>RANKING</th>
<th>SITE ID</th>
<th>TOTAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>279</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>252</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>246</td>
</tr>
</tbody>
</table>

8.3 Phase 2 Site Investigations

It is anticipated that the top three ranked sites as identified in Table 8.1 be carried through to Phase 2 of the project. It is acknowledged that the process used to date to determine the Preferred Sites has used currently available high level data and information which cannot be solely relied upon to provide a detailed understanding of the conditions on and surrounding a Site of Interest. Therefore the identified Preferred Sites need to be subjected to detailed on-site investigations and testing to confirm their suitability. These Phase 2 Site Investigations should include, but not be limited to, Hydrogeology and Geotechnical studies.

It is recommended that the Shire undertakes preliminary hydrogeological investigations across the top three ranked Preferred Sites in order to determine depth to groundwater and to guide the extent of the Phase 2 Site Investigations. These preliminary investigations will guide the scope of further groundwater hydrology and geological testing.

In addition to detailed site investigations, a full Due Diligence and Landfill Capability Assessment should be undertaken which will include the assessment of:

- The values on and surrounding the site including:
  - Certificate of Title;
  - Environmental Attributes:
    - Topography;
    - Geology;
    - Acid Sulphate Soils;
    - Threatened and Priority Fauna;
    - Threatened and Priority Flora;
    - Threatened and Priority Ecological Communities;
    - Environmentally Sensitive Areas;
    - Groundwater including Groundwater Proclaimed Areas;
    - Surface Water and wetlands including Surface Water Proclaimed Areas;
    - Public Drinking Water Source Areas;
    - Floodplains;
  - Social Attributes
    - Aboriginal Heritage;
    - Australian Heritage;
- Local Government Heritage;
  o Contaminated Sites Database and Register;
  o Freedom of Information request to the DER; and
  o Freedom of Information request to the Department of Mines and Petroleum.
- Comparison of these values to Best Practice Environmental Management for Siting, Design, Operation and Rehabilitation of Landfills.

While the on-site studies will commence concurrently on the top three ranked Preferred Sites, priority will be given to determining the suitability or otherwise of the highest ranked Preferred Site. If the detailed investigations into the Preferred Sites identify one as having a fatal flaw, then it will no longer be considered a Preferred Site. The remaining Preferred Sites will continue to be examined to determine their suitability as the Selected Site and the next highest ranked Site of Interest will be brought forward for consideration into the Phase 2 works.

8.4 Future Community and Stakeholder Engagement

As discussed in Section 5, a Community and Stakeholder Engagement Program has been implemented during the Freehold Land Assessment. This has been beneficial for the project, community members and stakeholders. It is important to the success of the project that the engagement processes continue. It is anticipated that the project will become more sensitive and complex as it moves towards the final selection of a site.

It is recommended that a Community and Stakeholder Consultation Strategy be prepared for the project moving forward that focuses on:

- Land owners;
- The community;
- Approval Authorities; and
- Stakeholders.
9 Recommendations

Based on the Freehold Land Assessment undertaken to date, it is recommended that:

1. The Shire adopts Site 11, Site 6 and Site 7 as the Preferred Sites.
2. The Shire engages with the Stakeholder to determine what opportunities or constraints may exist for Site 11.
3. The Shire undertakes preliminary hydrogeological investigations across the top three ranked Preferred Sites in order to determine the depth to groundwater and guide the extent of the Phase 2 Site Investigations.
4. The Shire commence planning works for Phase 2 Site Investigations including but not limited to:
   a. Hydrogeological and Geotechnical Investigations; and
   b. Due Diligence and Landfill Capability Assessment.
5. The Shire prepares a Community and Stakeholder Consultation Strategy for the project moving forward.
Figures

Figure 1: Typical Landfill Schematic Layout
Figure 2: Typical Community Recycling Centre Schematic Layout
Figure 3: Western Areas of Interest
Figure 4: Eastern Areas of Interest
Appendix A: Multi Criteria Analysis
### Site Selection Study: Private Land - Shire of Esperance MULTI CRITERIA ANALYSIS

<table>
<thead>
<tr>
<th>CRITERIA</th>
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#### Scoring

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#### Final Ranking

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<td>192</td>
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</tbody>
</table>

#### Categorization

- **Average**: 9.09
- **Total**: 99.09

**Note**: The table above represents the scoring of various criteria for site selection, with each site being evaluated on multiple dimensions such as distance, area, environmental conditions, vegetation cover, and infrastructure. The scoring is normalized to a 100% scale, with the highest score indicating the most advantageous site for development.