ER Consultants Pty Ltd
The trustee for ERC Unit Trust • ABN 72 514 406 373

ENVIRONMENTAL RISK CONSULTANTS

www.erc.net.au
PO Box 235 North Beach WA 6920

21 May 2024

Darrell Monteiro
Manager Waste and Fleet
Shire of Serpentine Jarrahdale
6 Paterson Street
Mundijong WA 6123

Dear Darrell,

RE: DRAFT INDICATIVE COSTINGS (V3) | Re-opening vs Closure Comparison MUNDIJONG WASTE AND RECYCLING TRANSFER STATION 40 WATKINS ROAD, MUNDIJONG WA 6123

1. INTRODUCTION

Further to the recent completion of a detailed site investigation (DSI) at the Watkins Road Transfer Station (WTS), located at 40 Watkins Road, Mundijong, WA 6123, please find enclosed the development of a series of high level indicative costings to facilitate either of the following scenarios:

1) Continued operation of the site as a waste transfer station (WTS).
2) Continued operation of the site as a WTS with green waste processing/recycling.
3) Closure of the facility and rehabilitation of the former landfilled areas.

The site comprised two parcels of land identified as and depicted on Figure 1 & 2:

- LOT 512 ON PLAN 53922 as shown on certificate of title LR3141/929 known as Mundijong WA 6123 (40 Watkins Road – WTS).
- COCKBURN SOUND LOCATION 4396 as shown on certificate of title LR3111/72 known as Mundijong WA 6123 (DBCA land).

Prior to 2000, both the WTS and DBCA land to the north were used for extensive sand mining and subsequent landfilling activities by the Shire of Serpentine Jarrahdale (the Shire) (Class 1 and 2) under Department of Water and Environmental Regulation (DWER) licence L182/97. Both lots were classified by the DWER on 29 February 2008 as "Possibly Contaminated – Investigation Required" (PC-IR) under Section 59 of the Contaminated Sites Act 2003. Both sites were

reported to DWER due to the history of waste disposal activities since the early 1980s, with illegal dumping also suspected to have occurred on the southeastern portion of the DBCA land. Basic/shallow capping of the landfill area is thought to have occurred ~2000.

The Shire operates the WTS as per the conditions of DWER licence L9073/2017/1. However, the WTS has been closed to the public since October 2023 following the discovery of low density asbestos containing material (ACM) debris at the site surface across several sections of the operational portion of the site. Following closure, the Shire is reviewing its long-term occupational strategy for the WTS with a view to potential remediation and/or management and subsequent reopening of the facility (pending the outcome of the DSI and indicative costings developed as part of this document).

It is expected that the reader of this document already has a general understanding of the scope of work, outcome and recommendations of the DSI, and as such, no further detailed summary is provided here. For further reference, please see the document entitled; *ER Consultants Pty Ltd, Preliminary Site Investigation (PSI)/Detailed Site Investigation (DSI), Waste transfer and Recycling Facility, 40 Watkins Road, Mundijong, Western Australia 6123, EXECUTIVE SUMMARY | DRAFT, May 2024.*

2. INDICATIVE COSTS

OPTION 1 | Continued operation of the site as a waste transfer station (WTS)

This option considers the following indicative costs *(rounded to the nearest $5,000)* for works which are intended to render the site suitable for ongoing industrial use, specifically for operation as a WTS. The management concept is intended to mitigate potential risk to human health through direct contact with contaminated soil and/or groundwater identified as part of the DSI but does not include indicative costs for re-design of the WTS facility to accommodate the remediation requirements. Appendix A presents a general breakdown of how the costs were calculated and Figure 1 presents the locations of each of the described "zones" or areas:

Table A | Option 1

ITEM	DESCRIPTION	INDICATIVE COST (Excl. GST)
1	Install Soil Capping (Compacted Recycled Road base) above Zone D @ 150mm*	$405,000
2	Install Soil Capping (Compacted Recycled Road base) above Zone D @ 300mm** (alternative to Item 1)	$625,000
3	N/A	---
4	Asbestos Containing Material (ACM) Removal (Windrow 1 & Stockpile 3)	$87,000
5	Drain Waste Removal (Stockpile 1 & 2) from Zone B & C***	$2,425,000
6	Groundwater Monitoring**** at/surrounding the facility (per event)	$12,000

*150mm is expected to compact down to ~125mm final thickness
**300mm is expected to compact down to ~250mm final thickness

***Assumed to be Class 3 as worst case. Preliminary testing (DSI, ERC 2024) indicates a lower waste classification; however, the volume of soil may prove to be unacceptable at smaller Class 1 or 2 licensed facilities. As such, assumption of Class 3 has been adopted for indicative costing.
****Expected at bi-annual intervals. At worst, this may last the life of the facility and beyond.

OPTION 2 | Continued operation of the site as a WTS with green waste processing/recycling

This option considers the following indicative costs *(rounded to the nearest $5,000)* for works which are intended to render the site suitable for ongoing industrial use, specifically for operation as a WTS with inclusion of concrete hardstand above the soil capped area (potential ongoing green waste processing). The management concept is intended to mitigate potential risk to human health through direct contact with contaminated soil and/or groundwater identified as part of the DSI but does not include indicative costs for re-design of the WTS facility to accommodate the remediation requirements.

The Shire acknowledges that further considerations are likely to be required with regard to this option, as it does not factor in an allowance for design requirements such as drainage and run-off/leachate collection (but may not be limited to from a licensing perspective). Appendix A presents a general breakdown of how the costs were calculated and Figure 1 presents the locations of each of the described "zones" or areas:

Table B | Option 2

ITEM	DESCRIPTION	INDICATIVE COST (Excl. GST)
1	Install Soil Capping (Compacted Recycled Road base) above Zone D @ 150mm*	$405,000
2	Install Soil Capping (Compacted Recycled Road base) above Zone D @ 300mm** (alternative to Item 1)	$625,000
3	Install Trafficable Concrete Pad above Zone D Soil Cap (150mm reinforced Concrete)	$1,895,000
4	Asbestos Containing Material (ACM) Removal (Windrow 1 & Stockpile 3)	$87,000
5	Drain Waste Removal (Stockpile 1 & 2) from Zone B & C***	$2,425,000
6	Groundwater Monitoring**** at/surrounding the facility (per event)	$12,000

*150mm is expected to compact down to ~125mm final thickness
**300mm is expected to compact down to ~250mm final thickness
***Assumed to be Class 3 as worst case. Preliminary testing (DSI, ERC 2024) indicates a lower waste classification; however, the volume of soil may prove to be unacceptable at smaller Class 1 or 2 licensed facilities. As such, assumption of Class 3 has been adopted for indicative costing.
****Expected at bi-annual intervals. At worst, this may last the life of the facility and beyond.

OPTION 3 | Closure of the facility and rehabilitation of the former landfilled areas

This option considers the following indicative costs *(rounded to the nearest $10,000)* for works which are intended to render the site suitable for closure and rehabilitation/revegetation with regards to the buried landfill material. The indicative costs consider two different types of landfill capping method for consideration.

ERC engaged ASK Waste Management Consultancy Services (ASK WM) to prepare indicative costings for the rehabilitation of the landfill. The estimates provided are high-level and based on typical unit costs, combined with the size of the site areas to be rehabilitated. *ASK WM's report is attached to the rear of this document as Appendix B, and contains further details on the unknowns, assumptions and limitations associated with the indicative costs.*

Table C | Option 3

ITEM	DESCRIPTION	INDICATIVE COST (Excl. GST)
1	ZONE A (DBCA Land) | Install Soil Capping System to support vegetation re-growth/seeding *(see Table 1 ASKWM Appendix B)*	$1,140,000
2	ZONE B, C & D (WTS) | Re-profile drain waste stockpiles (ZONE B & C) and install Soil Capping System to support vegetation re-growth/seeding (ZONE D) *(see Table 2 ASKWM Appendix B)*	$760,000
3	ZONE A, B, C & D (DBCA Land & WTS) | Install Soil Capping System to support vegetation re-growth/seeding *(see Table 3 ASKWM Appendix B)*	$1,900,000
4	ZONE A, B, C & D (DBCA Land & WTS) | Engineered Capping System with impermeable membrane *(see Table 4 ASKWM Appendix B)*	$3,160,000

3. ASSUMPTIONS & CONDITIONS

- This document presents high level indicative costings only, based on the current rates for time and materials generally associated with the earthworks and environmental consulting industries at the time it was prepared.
- The indicative costs are based on conceptual design only and may not consider all of the specific civil or structural engineering, regulatory, or ongoing waste management facility design requirements, which may become apparent during the project planning stages.
- The contents of this letter are based upon ERC's best estimates at the time it was prepared with the intent of guiding decision making by the Shire. ERC accepts no responsibility for additional costs over and above those indicated, in the event they may arise. It is recommended that detailed itemised quotes are obtained prior to proceeding with any of the potential options presented in this document.
- Indicative costings do not include an allowance for re-design/re-build of the WTS facility to accommodate the remediation requirements under any applicable option.
- Additional environmental consulting costs may be required with respect to addressing the associated contaminated site classifications under the Contaminated Sites Act (2003) and obtaining future site re-classification.

I trust this deliverable meets your requirements at this time, however if you have any questions or queries or wish to discuss any adjustments, please do not hesitate to contact the undersigned on 0404 342 098 or at brownj@erc.net.au.

Yours sincerely,
ER CONSULTANTS PTY LTD

Jonathan Brown
Principal | Director

Attachments

APPENDIX A | INDICATIVE ONGOING CONTAMINATED SITE MANAGEMENT COSTS

WASTE TRANSFER STATION | 40 WATKINS ROAD, MUNDIJONG WA

ITEM 1 | MANAGED CAP ABOVE ACM IMPACTED LANDFILL MATERIAL - ZONE D ONGOING MANAGEMENT (OPTION 1 - 150MM)

No.	Description	Item	Unit	Quantity	Rate	Cost (Excl. GST)
A	Prepare site	Loader & Operator	Day	3	$ 2,600.00	$ 7,800.00
B	Install Geofabric (ZONE D)	Supply & Install Geofabric	m^2	10500	$ 12.00	$ 126,000.00
C	Install Capping (ZONE D)	Supply & Install Road base	m^2	10500	$ 15.00	$ 157,500.00
					Sub-Total	$ 291,300.00
D	Consulting Fees	Project Management	1	10%		$ 29,130.00
E	Consulting Fees	Air Monitoring	1	Allowance	$ 25,000.00	$ 25,000.00
F	Other	Contingency	1	20%		$ 58,260.00
					Total (Excl. GST)	$ 403,690.00

ITEM 2 | MANAGED CAP ABOVE ACM IMPACTED LANDFILL MATERIAL - ZONE D ONGOING MANAGEMENT (OPTION 2 - 300MM)

No.	Description	Item	Unit	Quantity	Rate	Cost (Excl. GST)
A	Prepare site	Loader & Operator	Day	3	$ 2,600.00	$ 7,800.00
B	Install Geofabric (ZONE D)	Supply Geofabric	m^2	10500	$ 12.00	$ 126,000.00
C	Install Capping (ZONE D)	Supply & Install Road base	m^2	10500	$ 30.00	$ 315,000.00
					Sub-Total	$ 448,800.00
D	Consulting Fees	Project Management	1	10%		$ 44,880.00
E	Consulting Fees	Air Monitoring	1	Allowance	$ 40,000.00	$ 40,000.00
F	Other	Contingency	1	20%		$ 89,760.00
					Total (Excl. GST)	$ 623,440.00

ITEM 3 | TRAFFICABLE CONCRETE PAD ABOVE CAP - ZONE D ONGOING MANAGEMENT (150MM REINFORCED / 40 MPA)

No.	Description	Item	Unit	Quantity	Rate	Cost (Excl. GST)
A	Concrete Hardstand (ZONE D)	Supply and Install Concrete	m^2	10500	$ 150.00	$ 1,575,000.00
					Sub-Total	$ 1,575,000.00
B	Consulting Fees	Project Management	Item	1	$ 5,000.00	$ 5,000.00
C	Other	Contingency	1	20%		$ 315,000.00
					Total (Excl. GST)	$ 1,895,000.00

ITEM 4 | ASBESTOS REMOVAL (WINDROW 1 & STOCKPILE 3) - WTS ONGOING MANAGEMENT

No.	Description	Item	Unit	Quantity	Rate	Cost (Excl. GST)
A	Machinery	Excavate/Remove Material	Day	4	$ 2,600.00	$ 10,400.00
B	Trucks	Waste Cartage (2 x trucks)	Day	8	$ 2,600.00	$ 20,800.00
C	Waste Disposal (Est. 220m^3)	Disposal to Licensed Facility	m^3	220	$ 120.00	$ 26,400.00
					Sub-Total	$ 57,600.00
D	Consulting Fees	Project Management	Item	1	$ 3,000.00	$ 3,000.00
E	Consulting Fees	Waste Assessment	Item	1	$ 3,000.00	$ 3,000.00
F	Consulting Fees	Site Supervision/Air Monitoring	Item	4	$ 1,500.00	$ 6,000.00
G	Consulting Fees	Soil Validation & Report	Item	1	$ 6,000.00	$ 6,000.00
H	Other	Contingency	1	20%		$ 11,520.00
					Total (Excl. GST)	$ 87,120.00

ITEM 5 | DRAIN WASTE REMOVAL (STOCKIPLE 1 & STOCKPILE 2) - ZONE B & C ONGOING MANAGEMENT

No.	Description	Item	Unit	Quantity	Rate	Cost (Excl. GST)
A	Machinery	Loader & Operator	Day	12	$ 2,600.00	$ 31,200.00
B	Trucks	Waste Cartage (Multiple trucks)	No./Day	40	$ 1,500.00	$ 60,000.00
C	Waste Disposal (Est. 6250m^3)	Disposal to Licensed Facility*	Tonne**	10000	$ 190.00	$ 1,900,000.00
					Sub-Total	$ 1,991,200.00
D	Consulting Fees	Project Management	Item	1	$ 3,000.00	$ 3,000.00
E	Consulting Fees	Waste Assessment	Item	1	$ 5,000.00	$ 5,000.00
F	Consulting Fees	Site Supervision/Air Monitoring	Item	12	$ 1,500.00	$ 18,000.00
G	Consulting Fees	Soil Validation & Report	Item	1	$ 10,000.00	$ 10,000.00
H	Other	Contingency	1	20%		$ 398,240.00
					Total (Excl. GST)	$ 2,425,440.00

** Assumed Class disposal at Millar Road due to volume of soil (even though classification would likely be <Class 3)*

*** Tonne conversion = cubic m volume multiplied by 1.6kg/L for sand*

ITEM 6 | GROUNDWATER MONITORING (8 WELLS) - ONGOING MANAGEMENT

No.	Description	Item	Unit	Quantity	Rate	Cost (Excl. GST)
A	Consulting Fees	Groundwater Monitoring (8 wells)	Item	1	$ 7,500.00	$ 7,500.00
B	Consulting Fees	Letter Report (Per Event)	Item	1	$ 1,500.00	$ 1,500.00
					Sub-Total	$ 9,000.00
C	Consulting Fees	Project Management	1	10%		$ 900.00
D	Other	Contingency	1	20%		$ 1,800.00
					Total (Excl. GST)	$ 11,700.00

ZONE A | No management unless under closure
- 17,500m²

ZONE B | STOCKPILE 1
- Drain Waste
- 4,000m³

ZONE C | STOCKPILE 2
- Drain Waste
- 2,250m³

ZONE D | Area of site to cap
- 10,500m²
- 150mm thickness (min)
- 300mm thickness (max)

STOCKPILE 3:
REMOVE DUE TO ASBESTOS (ACM) CONTAMINATION
- 100m³

WINDROW 1:
REMOVE DUE TO ASBESTOS (ACM) CONTAMINATION
- 120m³

Railway Line

BH01 BH02 BH03
TP01 TP02 TP03 TP04 TP05 TP06 TP07 TP08 TP09 TP10 TP11 TP12 TP13 TP14 TP15 TP16 TP17 TP18 TP19 TP20 TP21 TP22 TP23 TP24 TP25 TP26 TP27 TP28 TP29 TP30 TP31 TP32 TP33 TP34 TP35 TP36 TP37 TP38 TP39 TP40 TP41 TP42 TP43 TP44 TP45 TP46 TP47 TP48 TP49 TP50 TP51 TP52 TP53 TP54 TP55 TP56 TP57 TP58 TP59 TP60 TP61
SP1 SP2 SP3 SP4 SP5
SB1 SB2 SB3 SB4 SB5 SB6 SB7 SB8 SB9 SB10 SB11 SB12 SB13 SB14 SB15 SB16

0m 10m 30m 50m
APPROX. SCALE

LEGEND

- Lot 512 (40 Watkins Road) (PC-IR)
- Lot 4396 Cockburn Sound Location (DBCA site) (PC-IR)
- Lot 510 Watkins Road
- Site Fence Boundary
- Extent of Historical Landfill
- Test Pit Location
- Test Pit (PACM observed)
- Stockpile Sample
- Soil Bore Locations
- Soil Observation Bore Locations
- Borehole Locations

DRG. No.	1449-5-T7	
DRAWN:	VL	19/04/2024
REVIEWED:	JB	19/04/2024
SOURCE:	Landgate	
PAPER SIZE:	A4	

Shire of Serpentine Jarrahdale

PRELIMINARY AND DETAILED SITE INVESTIGATION

INFERRED CAPPING AREA

40 Watkins Rd, Mundijong WA 6123

FIGURE 7

ER Consultants Pty Ltd

8 May 2024

Jonathan Brown
Principal Environmental Geologist
Environmental Risk Consultants
Via email

PO Box 401
Brunswick Heads
New South Wales
Australia

admin@askwm.com
www.askwm.com
0447 393363

Dear Jonathan

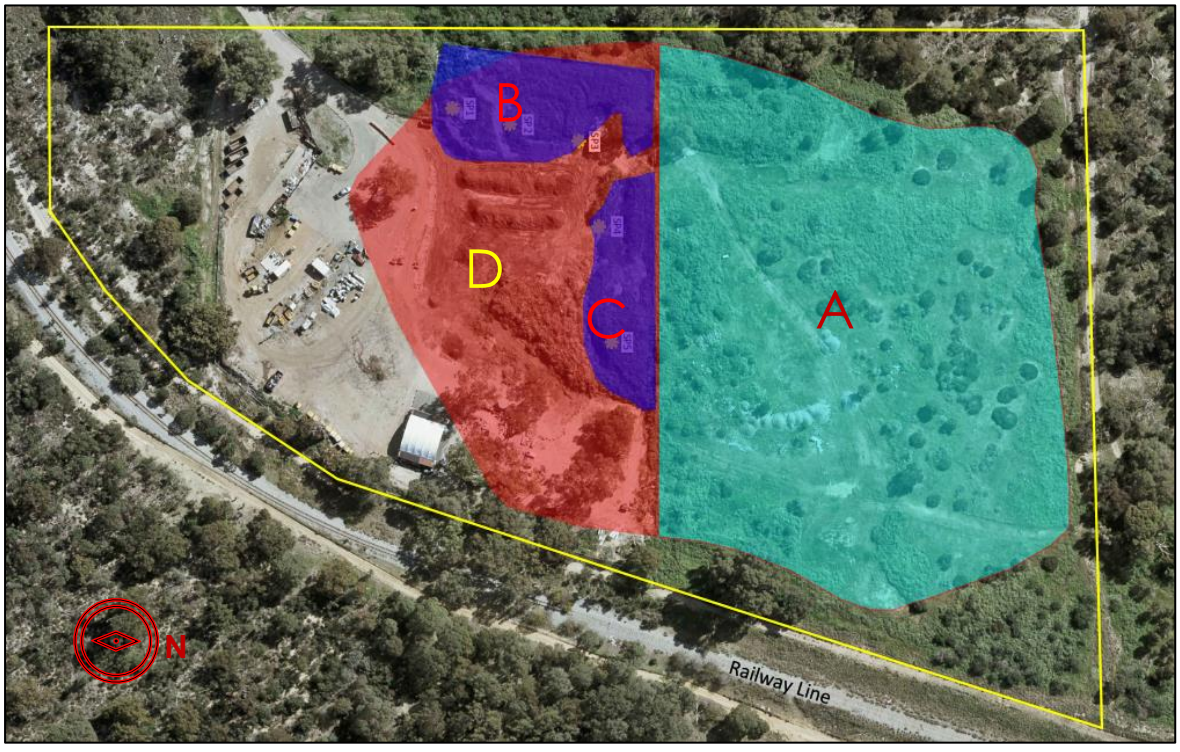
WATKINS ROAD WASTE TRANSFER STATION: LANDFILL CLOSURE COST ESTIMATE

I understand that the Shire needs to quantify the estimated costs to rehabilitate the landfill asset at the Watkins Road Waste Transfer Station (the Facility), to assist with determining the future strategy for the Facility. The estimates provided are high level and based on typical unit costs, combined with the size of the areas to be capped.

ASK has not visited the site, therefore these estimates and information provided are based on the documents that have been reviewed, specifically Drawing No 1449-T1 of the Facility (ECA, 2024) and a contour and feature survey of the southern portion of the Facility (McGregor Surveys, 2023).

Site Zones

Figure 1: Key zones at the Facility, used for the cost estimates



Zone A: This is the portion of the facility that was historically used as a landfill by the Shire of Serpentine Jarrahdale. It is understood to have been closed for at least 20 years and has a basic, shallow soil cap that has naturally revegetated. The contour survey did not extend to this northern portion of the site, so the topography could not be determined. However, the final landform should have a continuous gradient running from the peak or ridge to the toe of the landform to facilitate the surface runoff of stormwater away from the waste body. Any depressions or sumps would need to be filled, to avoid the ponding and resulting infiltration of any pooled water.

Zone B and Zone C: It is understood that these are two areas of stockpiled uncapped waste. Based on the contour survey, the batters of this above ground waste ate too steep and do not align with best practice guidance. Therefore, these areas will require reprofiling before they can be capped.

Zone D: This is the footprint of historic below ground waste. This area would require capping, however, if a portion of this area was to be used for on-going operations (e.g greenwaste storage, etc), this would require a low permeability hardstand to be deigned and constructed. The cost for an engineered hardstand has not been allowed for in the capping estimates provided below.

Watkins Road Waste Transfer Station

The Watkins Road Waste Transfer Station (the Facility) is approximately 6.3 hectares. It is understood that the Facility is currently closed, and the future strategy of the Facility is yet to be decided.

Whether the Facility is reopened as a Transfer Station or closed, the capping and closure costs for the landfilled Zones will be similar.

Zone A may be considered as capped and rehabilitated by the Regulator, as it appears to have met the excepted standards for a rural landfill at the time of closure. However, if the cap has less than 1 metre of soil, or a landform shape with slopes greater than 1(v):5(h) or less than 1(v):20(h) it does not meet current capping guidance for a rural landfill in Western Australia. If this is the case, the Shire may consider improving the capping over this portion of the site to reduce the long term environmental risk Zone A presents.

Zone D: The above ground waste in Zones B & C has not been capped, thus these stockpiles must be reprofiled to create an appropriate final landform that can be capped in line with current guidance for a WA rural landfill. It has been assumed that the reprofiling of the above ground waste would be within Zone D, thus over the existing below ground waste.

Capping Options

The design of a landfill cap is dependent on a number of factors; including surrounding receptors, waste type and quantity, management of the site and climate (please see Appendix A for an overview). The Shire could consider a soil cap, which for a rural landfill typically comprises of an initial interim 300mm of soil cover over the waste, followed by a 500mm layer of lower permeability compacted soil, and at least 500mm of uncompacted soil that will support vegetation.

Alternatively, an 'engineered' cap design with an impermeable geomembrane, such as LLDPE, can be designed and installed. This would significantly reduce the infiltration of rain through the waste, thus minimising leachate generation. However, the complexity of installing and maintaining an engineered cap are far more significant that a soil cap, and with a higher cost.

The Shire should complete a risk assessment of the site, and this can assist in determining the cap design. However, as the site has not received any significant quantities of waste for decades, the majority of the waste's contamination may have already leached from the landfill. Therefore, to install an engineered cap may be 'shutting the door well after the horse has bolted'.

Assumptions and limitations

The cost estimates provided are high level budget values, produced for strategic decision making. A complete Landfill Closure Management Plan (LCMP) would need to be produced for the Facility, in

close liaison with the Shire, to determine; the standard of capping wanted, soil availability, reprofiling needs, etc. This would include a Bill of Quantities, which would detail each component and cost.

However, for the purposes of this cost estimate I have assumed:

- Zone A has appropriate slopes, with no sumps / depressions. So does not require reprofiling.
- All soil that is required for capping must be imported to the site at a cost of $15 per cubic meter (i.e. to purchase, load and transport soils to the site).
- There is no waste buried beyond the licenced area, nor any waste that would require moving to construct the cap and stormwater drainage (ex. Zones B & C).
- The soil cap is based on 300mm of intermediate cover, 500mm of compacted low permeability soil and 500m of local soils and all associated works, but no independent CQA cost has been included[1].
- The engineered cap is based on the inclusion of a Landfill Gas (LFG) collection layer with passive venting, 1.5mm LLDPE, Geonet drainage, 1000mm soil layer, 100mm topsoil, CQA and all associated works.
- Both cap types allow for revegetation and initial weed control during establishment.
- There is no allowance for post closure monitoring and on-going cap maintenance.
- Both cap types allow for a 10% local loading (based on Perth costs), 10% for professional fees (consultancy advice, surveying, project management, tendering, etc) and a further 15% as a contingency for unforeseen factors and events.

Note: The reprofiling of any waste must only be undertaken after a risk assessment has been completed, and appropriate protocols are established, in case high risk wastes are exposed (e.g. asbestos) or other dangerous events occur.

Estimated cost

The estimated cost (rounded to the nearest $10,000) are provided below and include; the reprofiling of the waste in Zones B & C, importing the quantities of soil required for capping works, capping the areas in Zone A and Zone D, and revegetating these areas.

- Soil capping system: $1,900,000 (exc. GST)
- Engineered capping system: $3,160,000 (exc. GST)

A breakdown of the estimated cost for each option is provided in Appendix B.

If you have any questions about the information provided, please do not hesitate to contact me.

Yours sincerely

Giles Perryman BSc DMS CIWM
Director

[1] The soil cap will have no LFG infrastructure, but as the cap will be permeable, the remaining LFG can pass through the soil layers and some oxidation of the methane will occur, reducing the GHG impact of the emissions. An engineered cap is impermeable, so requires LFG infrastructure to allow emissions to be released. The methane will be release directly to the atmosphere with no additional oxidisation, thus this capping system has a greater GHG impact.

APPENDIX A: An Introduction to Landfill Closure

To ensure an understanding of how a rural landfill is managed and closed, an outline of the progressive capping and closure of a landfill is provided.

The objective when a landfill is closed, is to ensure that the site is rehabilitated to provide a physical barrier over the waste, to minimise the seepage of water into the landfill (thus leachate generation) and to maximise the collection and oxidation of landfill gas from the landfill.

The rehabilitation measures are developed to meet the following outcomes:

- Development of a final landform, with slopes that align with industry guidance, that maximises the surface flow of rainwater away from the buried waste without causing erosion of the cap.
- Design and construction of the best cap practicable to prevent pollution of groundwater and degradation of air quality.
- Progressive capping and rehabilitation of the landfill in a staged approach.
- Development of a Landfill Closure Management Plan, which includes the monitoring requirements for at least 20 years after the site stopped receiving waste, or until the site no longer poses a risk to the environment.

Progressive rehabilitation of a landfill involves the closure of each cell or stage once filling has been completed throughout the operational life of the landfill. These works are effectively a staged closing of the landfill that occurs while the operational site is being filled. Landfill cell rehabilitation works include:

- Capping and revegetation in accordance with current regulatory requirements.
- Where required, installation and ongoing maintenance and replacement of stormwater, gas and leachate collection infrastructure; and
- Decommissioning of infrastructure no longer required.

Environmental and management benefits of progressive rehabilitation, include:

- Minimising the generation of leachate and offensive odours;
- Facilitating the budgeting of materials through the staged use of capping materials over the life of the landfill;
- Achieving cost recovery of capping and closure works during the operational life of the landfill;
- Completing rehab works while waste management personnel and plant are still based on-site;
- Refining the capping design and construction methods based on experience and cap performance; and
- Meeting financial assurance requirements.

Implementation of the progressive rehabilitation at a landfill should be consistent with the landfill closure plan. The Shire should, where operationally practicable, sequence operations to complete the filling of each cell or phase in turn, rather than leaving one or more partly filled cells inactive and not fully rehabilitated.

The cost associated with the capping, rehabilitation and closure of a landfill are broadly dependent on the regulatory requirements, size of the facility, cap design, leachate management and availability of suitable soils on site for capping works.

APPENDIX A: Estimated closure costs

Watkins Road Waste Facility: Closure Cost Estimate	
Contingency	15%
Regional factor	10%
Professional services	10%

Table 1: Estimated cost for a soil capping system

Category	Description	Unit	Qty	Basic rate	Regional rate	Cost ($)
Reprofiling slopes B	Correcting batter slopes	m^3	2,250	10.00	11.00	24,750
Reprofiling slopes C	Correcting batter slopes	m^3	3,983	10.00	11.00	43,813
Capping Zone A	Soil placement (1m)	m^2	17,500	24.00	26.00	455,000
Capping Zone C	Soil placement (1.3m)	m^2	10,500	28.00	31.00	325,500
Import of soil for capping	Purchase and transport of soil	m^3	28,000	15.00	17.00	476,000
Revegetation	Local species, weed control	m^2	28,000	5.00	6.00	168,000
	SUBTOTAL (Rounded)					1,500,000
	PROF SERVICES					150,000
	CONTINGENCY					250,000
	TOTAL (Exc. GST)					1,900,000
	GST					190,000
	TOTAL ESTIMATED SUM (inc GST) Rounded					2,100,000

Table 2: Estimated cost for an engineered capping system

Category	Description	Unit	Qty	Basic rate	Regional rate	Cost ($)
Reprofiling slopes B	Correcting batter slopes	m^3	2,250	10.00	11.00	24,750
Reprofiling slopes C	Correcting batter slopes	m^3	3,983	10.00	11.00	43,813
Capping Zone A & C	Engineered cap, with passive LFG system	m^2	28,000	55	61.00	1,708,000
Import of soil for capping	Purchase and transport of soil (1.1m soil)	m^3	30,800	15	17.00	523,600
Revegetation	Local species, weed control	m^2	28,000	5	6.00	168,000
	SUBTOTAL (Rounded)					2,500,000
	PROF SERVICES					250,000
	CONTINGENCY					410,000
	TOTAL (Exc. GST)					3,160,000
	GST					316,000
	TOTAL ESTIMATED SUM (inc GST) Rounded					3,500,000