Presented to:

Landfill Lifespan Assessment Report

Moree Waste Management Facility – Moree Plains Shire Council

MOREE PLAINS SHIRE COUNCIL | JANUARY 2019

VERSION NUMBER: V2

Presented by:

AMENDMENT, DISTRIBUTION and APPROVAL

ISSUE	DATE	DETAILS
1	31/01/2019	Issue of Report for MPSC Review
2	04/02/2019	Version 2 Issued to MPSC

TABLE OF CONTENTS

1 INTRODUCTION

The Moree Plains Shire Council (MPSC) has requested an assessment of the current landfill operation in order to establish the best and most cost-effective way to continue the operations at the landfill. This report aims to investigate and address the issues around the two main options as set out in the MPSC tender documents. (See section 1.1)

The outcome of this assessment is to make an independent recommendation to help inform the decision-making process in relation to the future operation of the Moree Waste Management Facility. The process of arriving at a recommendation was to initially assess the current situation and then to analyse, cost and compare both suggested options in enough detail to confidently conclude the investigation.

1.1 ASSUMPTIONS AND LIMITATIONS OF THIS ASSESSMENT REPORT

To complete this assessment in a timely manner, some assumptions were made, and several known limitations exist. The known assumptions and limitations are listed below. This list is not necessarily exhaustive.

- All information provided by MPSC is accurate;
- Survey Information done by SMK assumed as accurate and used in calculations;
- Landfill lifespan estimates were calculated using 2019 volumetric fill rates and may change due to recycling and/or other policy changes;
- No additional surveys were done;
- The cost estimates in this report are as a guideline for decision making only, a detailed design is needed for a detailed estimate;
- The rates used in the cost estimate are accurate market rates (2019), but may vary for this project;
- The effectiveness and operability of the current leachate system was not assessed;
- The volume calculations in this report were based on a Proterra designed model from the data available (Appendix A) – actual volumes may vary;
- Costs for option 1 were assumed to be half of that of option 2 where other information was not available;
- Only the landfill cell was considered in this report, other landfill activities such as recycling and resource recovery areas were not considered; and
- Any parameters or aspects not specifically mentioned in this report were not considered.

2 BACKGROUND

This section has been taken form the MPSC tender documents and has been left unaltered.

Moree Plains Shire Council commenced operations at their new landfill site in 2009 following extensive design and construction activities. Due to the costs of the project exceeding the allocated budget and the necessity to rein in expenditure, only half of the first landfill cell was constructed. It was proposed to excavate the remaining half of the cell once the current cell is half full, however due to limited funding, the cell design was changed at the time of construction but the methodology for the operation of the leachate system and the management of the bale placement operations provided in the EIS and development consent was not amended accordingly.

The issue of prediction of volumes to landfill is complex and made more difficult by recent uncertainties surrounding the recycling industry. At the present time Council directs significant resources to recycling through the existing "three bin" system. Contractor default in terms of recycling operations represents a significant risk in terms of potential impacts on landfill.

Waste is managed through pre-sorting into different categories which include wood, metal, builders waste, green waste, and general waste. In addition, specific wastes such as asbestos are separately dealt with. The landfill operation is predominantly utilised for general waste. This is pre-processed through a baling facility which bails and wire wraps waste for placement within the existing pit. Waste requires cover to manage issues such as vermin and wind-based dispersal. There is also a leachate management system installed as part of the cell operations. Firefighting facilities are also provided.

Planning and design for the next half of Cell 1 or the completion of Cell one and construction of the future new Cell number 2 including effective leachate design and bale management, needs to be undertaken. This will require a redesign of the cells and the creation of a new operations and management plan for the Waste Management Facility.

Of importance to Council is the current lifespan of the existing half-cell together with what may be the most cost-effective option in terms of providing additional cell capacity. The two main options include whilst maintaining operational usage, ease and safety during construction:

1. Completion of the existing half-cell noting the potential complexities associated with cell expansion at the same time as ongoing operations occur; and
2. Commencement of the second cell proposal while filling and capping off the existing half-cell

There are significant potential implications in terms of loss of overall landfill capacity through not completing the existing half-cell and these would need to be assessed and quantified as part of the overall proposal.

The two key areas are therefore a prediction of lifespan utilising statistical analysis to assess a range of probabilities and, secondly, a cost comparison of the two major expansion elements. Such costs comparison would be expected at a relatively high level and is not expected to include any detailed design or detailed review of current operations.

The key outcome sought from the study is a recommendation as to whether to finalise the current half-cell and commence a completely new cell or whether constructing the second stage of the current half-cell to its planned design capacity, including a redesign of the cell

and the creation of a new operations and management plan for the Waste Management Facility would be preferred. Justification for recommendations needs to be provided together with a clear indication of study limitations and uncertainties.

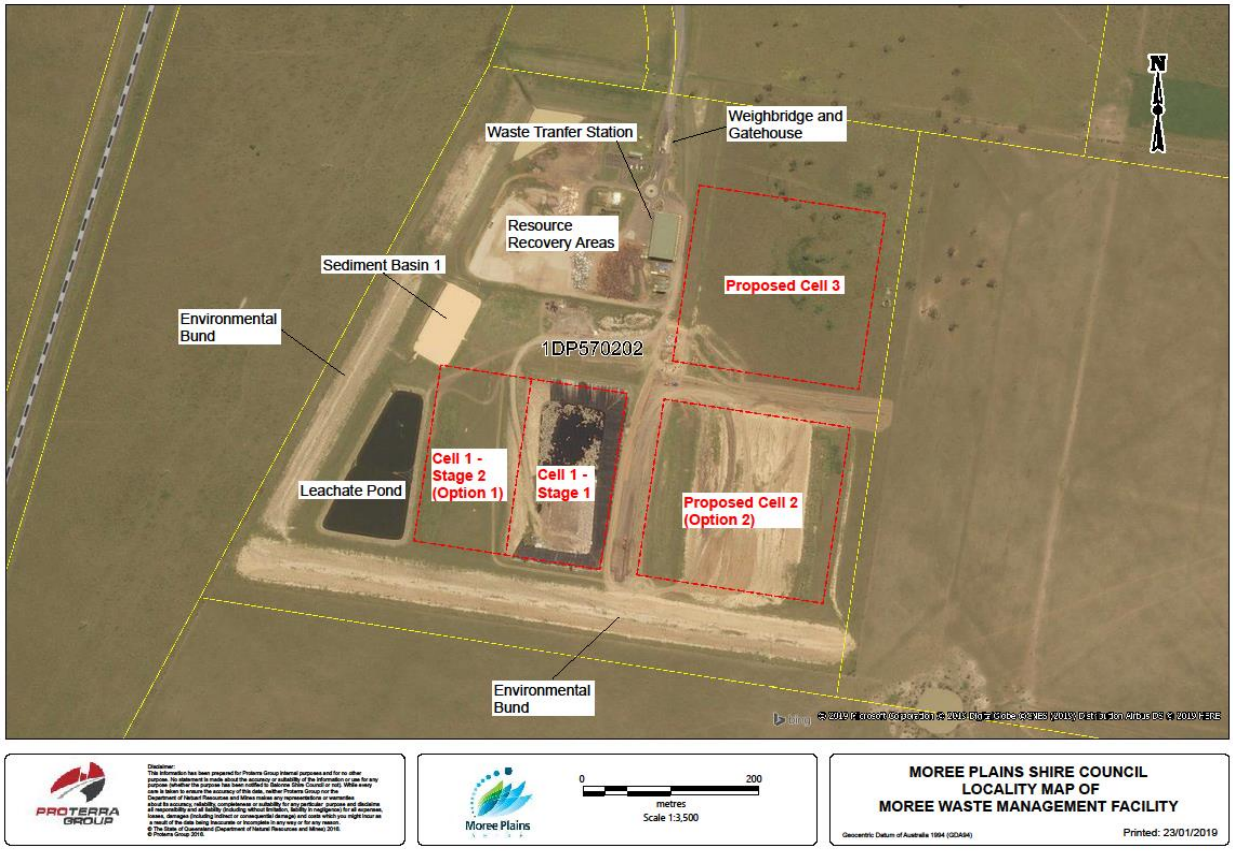
2.1 Site Location

The Moree Waste Management Facility is located approximately 10km south of the Moree Township adjacent to the Newell Highway off Tapscott Road at 57 Evergreen Road. The below locality map shows the location of the facility in relation to the Moree township.

Figure 2-1 Moree Waste Management Facility

The site was designed with space for three identical cells to be developed as the airspace is required. The three potential cells (including the current half-cell) are shown in the in the site layout below.

2.2 CURRENT SITE LAYOUT (APPENDIX B)



3 EXISTING WASTE MANAGEMENT OPERATIONS AND PROCESSES

The Moree waste management facility accepts a range of municipal solid waste (MSW) types. A minor amount of regulated waste may be deposited at the site. Wastes that are managed at the facility are either separated/sorted for reuse/recycling or disposed of in landfill via the on-site transfer and baling station. Wastes that are accepted and managed at the facility include:

- MSW from kerbside collection "wheelie" bins;
- General MSW delivered to the facility by local residents;
- Greenwaste – stockpiled on site and ground for re-use as landfill cover material;
- Construction and demolition waste;
- Waste concrete – stockpiled on site for crushing;
- Scrap steel – processed and stockpiled on-site for transport to a recycling facility;
- Waste motor vehicle and machinery lubrication oils – removed for reprocessing and recycling; and
- Asbestos – buried in a dedicated landfill cell on site.

MPSC places a high priority upon waste separation to ensure waste is only landfilled as a last resort. Moree Waste Management Facility has been specifically designed to accommodate all reasonable and practical waste diversion.

3.1 EXISTING WASTE FILLING PROCESS

Waste to be landfilled is loaded into the large on-site baling machine and compressed into large rectangular bales that is kept together with wire ties. The baler produces 1.5m^3 bales that range in weight from 1.0 to 1.2 Tonnes. The bales are transported by to the landfill cell where it is deposited in tightly packed rows and covered using an excavator.

Figure 3-1 Baling Machine

The bales are covered with a 50:50 mixture of chipped greenwaste and soil as an intermediate cover. The current filling methodology has some questions around the cost of operation and the reliability of the baling machine. Any expansion should consider an overall review of the current strategy compared to the more traditional method of waste

placement and compaction. The landfill also receives small quantities of waste that cannot be baled which is deposited directly into the landfill cell and compacted by using an excavator.

Figure 3-2 Stacked Bales with Intermediate cover

3.2 Leachate Collection and Disposal

The current half-cell has a 900mm deep compacted clay liner with a permeability less than 10^{-9}m/s and a 1.5mm HDPE liner with a permeability of less than 10^{-14} m/s, covered by a 300mm drainage layer of 20mm gravel, a layer of geofabric and a layer of wood chip/mulch 75mm thick.

Imbedded in the drainage layer is a number of subsoil drainage lines that is intended to transport leachate from the extremities of the cell to the leachate pump station just outside the north-eastern corner of the cell. The depth of the pump station sump is designed to allow for the free draining of the leachate pipes by managing the sump level via an automatic pump that transfers the leachate to the leachate ponds on the western side of the landfill property.

The leachate pond has a capacity of approximately 21,000m^3 and is located in the south western corner of the facility. The captured leachate is left to evaporate in the pond, with the aid of sprinklers if needed. In addition, the pond has a one-metre levee around it to stop the ingress of surface stormwater.

There has not been a lot of rain in the area recently, but there are questions about the effectiveness of the current leachate collection system. Any expansion work should include an investigation into the effectiveness and future viability of the system. Figure 3-3 below shows the condition of the leachate ponds (photo taken in January 2019). The pump station as it exists today is shown in fig 3-4.

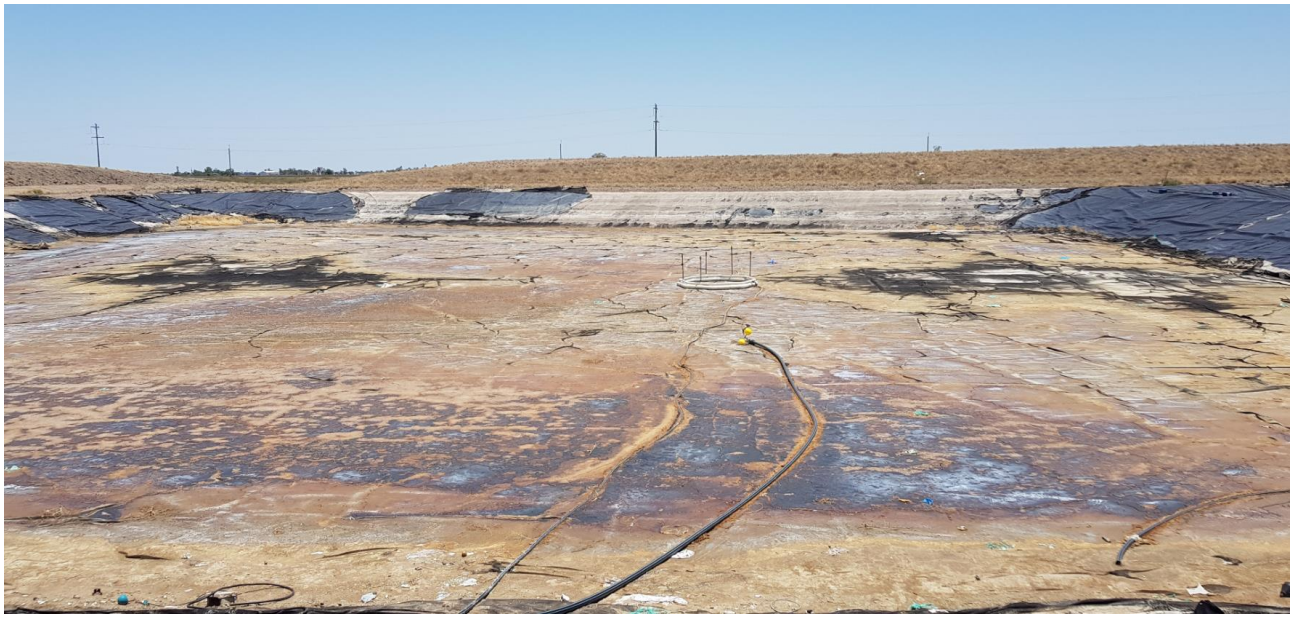


Figure 3-3 Leachate Pond

Figure 3-4 Leachate Pump Station

4 ASSESSMENT OF REMAINING AIRSPACE AND CELL LIFE

To be able to assess the two proposed options, the used capacity of the current half-cell needs to be established so that future capacity can be established for the two options and their variables.

4.1 AIRSPACE ASSESSMENT OF CURRENT HALF-CELL

The original design caters for approximately 641,794m^3 of waste filling capacity for each cell when the above ground height is assumed as 15m and the above ground batters are 1:5. The as-constructed half cell (stage 1 of cell 1) was completed in 2009 and has been used for landfilling since 2009. However, during construction due to budgetary constraints only half of the first cell was constructed and was labelled "Stage 1" of cell 1.

The original design allowed the airspace above the cell to be used effectively to increase the value from the expense of the cell liner, cell construction and the leachate system. Theoretically (to the layman), the half-cell should have half of the capacity of the full cell, but in reality, this is far from the case. Due to the above ground batter slope that is needed on all four sides to ensure that the final landform is safe and complies with all conditions from the EPA, the capacity of the half-cell is significantly reduced.

The current airspace remaining in the half-cell is around 47,829m^3 with the current western batter at a general slope of 3:1, and the above ground batter on the eastern side at 5:1. This equates to around 5 years in filling at current rates (SMK Consultants, 2019).

The current filling rate of the landfill is 26.21m^3/day compared to a previous fill rate of 31.73m^3/day (SMK Consultants, 2019). The highest recorded daily fill rate to date was 38.83m^3/day between January and March 2015, and the total average fill rate to date is 25.56m^3/day. The below table uses three different fill rates to assess and compare the current airspace available for filling.

Remaining Volume: Taken from the 2019 Moree Landfill Survey

Average Daily Fill Rate: Average since inception of the Landfill

Highest Daily Fill rate: Taken from 2019 Moree Landfill Survey (5/01/2015 – 30/03/2015)

Increased Daily Fill Rate: Rate halfway between the highest and average daily fill rate

Table 4-1 Half-Cell Fill Rate Comparison

Fill Rate Comparison				
Rate m^3/d		Remaining Volume	Remaining Fill Days	Years
Average	25.56	47,829	1,871	5.13
Highest	38.83	47,829	1,232	3.37
Increased	32.20	47,829	1,485	4.07

5 ASSESSMENT OF TWO OPTIONS

The two options as proposed by MPSC are analysed and compared in this section to establish the best solution. Various factors are assessed to arrive at two sets of numbers that are easy to compare and use for decision making.

5.1 OPTION 1 – COMPLETE CURRENT CELL

This option sees stage two of cell 1 being excavated and the rest of the cell used to its originally designed potential.

5.1.1 Process to Complete

Completing the cell to the original design makes sense as it would utilise a large amount of airspace that would otherwise be lost. The original design of the cell effectively uses the space above ground to maximise the filling volume available from the landfill footprint. The minor drawback is that because the cell was divided into two stages it will mean that there will be excavation work ongoing while the daily landfilling operations continue in the same cell. This option makes an allowance for the construction of a new leachate pump station within the cell 1 due to known issues with the current leachate collection and pumping system. The existing leachate system may be able to be repaired and/or upgraded. This should form part of a separate investigation.

The construction process can be split into the broad steps below:

1. Establish and set up work site,
2. Start bulk earthworks,
3. Form batters, place and compact clay liner (0.9m),
4. Install HDPE Liner and seal the seams,
5. Install Geotextile Fabric,
6. Install and connect leachate pipes to current system,
7. Place landfill base layers,
8. Construct haulage Routes,
9. Commission site and commence operation.

Special care will have to be taken to separate the current filling operations and the construction work while working in the same cell. The contractor will also have to be aware of the already completed work to minimise or eliminate damage to the existing liner and leachate system.

5.1.2 HDPE Liner

For the completion of the current half-cell into cell ,1 it is almost a certainty that the HDPE liner will have to be extended and sealed to the full extent of the whole cell if option 1 is executed. It seems that the EPA are unlikely to accept any other design, notwithstanding the natural clays in the areas exhibit very low permeability. It is also noted that tests have been required by the EPA to prove the integrity of the HDPE liner on a previous occasion. Ultimately consultation with the EPA will be required to determine whether removing the HDPE membrane from the lining system will be acceptable.

5.1.3 Volume Calculations

By modelling (Appendix A) the original design, the volume of the designed cell can be established. The parameters of the original design have been changed during construction and it is not clear from the provided construction drawings and documents what the exact original design was. The following parameters were used to model the cell.

Table 5-1 Parameters Used for Landfill Model

Landfill Cell Model Parameters	
Length	220 m
Width	210 m
Depth	12 m excavation at deepest point (bottom of clay liner)
Base Slope	3% west to east, 1.5% south to north
Clay Liner Thickness	0.9 m
Below Ground Batters	1:3
Fill batters Above Ground	1:5
Height Above Natural	15 m

5.1.3.1 Excavation Volume

Cell 1 has been divided into two stages, with the first stage excavated and constructed in 2009. Visual inspection and "as-constructed" plans reveal that just over half the full cell was excavated to enable to operation of the half-cell. For the purposes of this assessment the excavated volume will conservatively be assumed as half of the designed cell.

Total volume proposed for excavation: 263,794m^3

Volume already excavated: 131,897m^3

Remaining volume to be excavated: **131,897m^3**

5.1.3.2 Airspace Volume

The total volume of remaining airspace available if option 1 was to go ahead is calculated below. The total remaining airspaces is calculated by subtracting the filled space (as of January 2019) from the total design airspace.

Total Design Airspace: 641,794m^3

Filled Airspace: 54,675m^3 (SMK Consultants, 2019).

Total Available Airspace: **587,119m^3**

5.1.4 Lifespan Prediction

The table below shows the lifespan comparison of cell one if it was excavated to design potential. The three fill rates as established in section 4.1 is used to provide a consistent set of numbers for comparison.

Table 5-2 Option 1 Lifespan Comparison

Fill Rate Comparison				
Rate m^3/d		Remaining Volume	Remaining Fill Days	Years
Average	25.56	587,119	22,970	62.93
Highest	38.83	587,119	15,120	41.43
Increased	32.20	587,119	18,234	49.95

5.1.5 Cost Estimate

The below Schedule estimates the cost of option 1. Note that the estimated rates were taken from various sources and while care has been taken to produce accurate costings it is not within the scope of this assessment to provide a detailed scope of works, and therefore the costings in this section are considered for comparison purposes only.

The main costs considered in this schedule are taken from the construction process as set out in 5.2.1.

Table 5-3 Cost Estimate for Option 1

DESCRIPTION	UNIT	QTY	RATE	AMOUNT
PRELIMINARIES				
Site Establishment (Site Preparation, Mobilisation of plant, Materials and equipment, Site office and amenities, security fencing, and regular site tidy up etc.)	Item	1.00	10,000.00	10,000.00
EARTHWORKS				
Clearing & Grubbing	Item	1.00	7,500.00	7,500.00
EARTHWORKS (CUT)				
Main Cell Excavation	m³	131,897.00	3.00	395,691.00
CLAY FILL AREA				
900mm Clay Layer	m³	15,466.00	5.50	85,063.00
DRAINAGE AGGREGATE - Supply & Install				
Base layer of 300mm	m³	3,634.00	53.28	193,619.52
LEACHATE COLLECTION SYSTEM				
Allowance for supply and installation of pump and system	Item	1.00	122,500.00	122,500.00
UV RESITANT GEOTEXTILE LAYER - Supply & Install				
Texcel R Range 400R (or similar) - Cell Lining	m²	12,115.00	5.00	60,575.00
HDPE CELL LINER - Supply & Install				
1.5mm HDPE Liner seam welded on site - Cell Lining	m²	18,902.00	10.00	189,020.00
			Construction Cost Total	**1,063,968.52**
PROJECT MANAGEMENT				
Tender Documentation, Contract and Construction Management	%	1.00	8.00	85,117.48
DETAILED DESIGN				
Allowance for a Detailed Design	%	1.00	5.00	53,198.43
CONTINGENCIES				
Contingencies - 10%	%	1.00	10.00	106,396.85
			Administration Cost	**$244,712.76**
			Total Cost of Project (Excl. GST)	**$1,308,681.28**

The above costs allow for the cell liner to be seam welded to the existing liner. The costs also include a new pump station and associated costs which may not be required if the current system can be used. The cost includes leachate drainage pipes for the remainder of the cell as per the original design.

5.2 Option 2 – Close Current Cell and Create New Cell

Option two sees the start of a completely new cell while allowing the current half-cell to operate as normal until capacity is reached.

5.2.1 Process to Complete

The proposal to start a completely new cell while operating the current half-cell until it reaches capacity has gained some traction because it moves heavy excavation work to another area of the facility to allow the undisturbed operation of the current cell.

There are a number of significant drawbacks to the decommissioning of the existing cell and construction of a new cell including but not necessarily limited to:

- The loss of a disproportionately large amount of potential airspace;
- The requirement to complete cell 1 lining layers on the western batter to natural surface level;
- Airspace west of the existing waste filling location will need to be filled to at least natural surface level before the cell can be closed;
- Capping and rehabilitation works for cell 1 will need to be completed soon after the cell is closed;
- The narrow strip of virgin ground left between a capped stage 1 of cell 1 and the leachate lagoon would be very difficult to develop for future landfilling activities.

The construction process is much the same as for option 1, but with fewer constraints around shared operational space. Similar to option 1, this option includes a new leachate pumping station due to know issues with the current system. The current pump station may be able to be used for this option but requires further analysis and should form part of a separate investigation. Both options have accounted for a new pump station, therefore this item will not have an impact on the overall viability of either alternative.

1. Establish and set up work site,
2. Start bulk earthworks,
3. Form batters, place and compact clay liner (0.9m),
4. Install HDPE Liner and seal the seams,
5. Install Geotextile Fabric,
6. Install new leachate pump and system,
7. Place landfill base layers,
8. Construct haulage Routes,
9. Commission site and commence operation.

5.2.2 HDPE Liner

For option 2 there is a chance that the HDPE liner could be left out of the construction if the EPA accepts a design without the liner. The EPA guidelines suggest that a 1000mm clay liner may be sufficient. Due to the first cell having been constructed with a liner, it is unlikely that another cell would be accepted without a HDPE liner on the same site, but a different design could be accepted if the justification was accepted by the EPA.

Further consultation with EPA will be required to determine the likelihood of a lower standard lining system being accepted.

5.2.3 Volume Calculations

The model parameters used for cell 1 were also used for option 2. While these parameters may vary slightly due to the level of the natural surface being different, the difference in volume can be seen as negligible considering the total volume of each cell. The following parameters were used to model the cell.

Table 5-4 Parameters used for Landfill Cell Model

Landfill Cell Model Parameters	
Length	220 m
Width	210 m
Depth	12 m excavation at deepest point (bottom of clay liner)
Base Slope	3% west to east, 1.5% south to north
Clay Liner Thickness	0.9 m
Below Ground Batters	1:3
Fill batters Above Ground	1:5
Height Above Natural	15 m

5.2.3.1 Excavation Volume

The total volume for excavation was determined from a landfill cell model (Appendix A).

Total volume proposed for excavation: 263,794m^3

Volume already excavated: 0m^3

Remaining volume to be excavated: **263,794m^3**

5.2.3.2 Airspace Volume

The total volume of airspace available is calculated below:

Total Design Airspace: 641,794m^3

Filled Airspace: 0m^3

Remaining Airspace from Cell 1: 233,949m^3

Total Available Airspace: **875,743m^3**

5.2.4 Lifespan Prediction

Table 5-5 Lifespan Comparison for Option 2

Fill Rate Comparison				
Rate m3/d		Remaining Volume	Remaining Fill Days	Years
Average	25.56	875,743	34,262	93.87
Highest	38.83	875,743	22,553	61.79
Increased	32.20	875,743	27,197	74.51

5.2.5 Cost Estimate

The below schedule estimates the cost of option 2. Note that the estimated rates were taken from various sources and while care has been taken to produce accurate costings it is not within the scope of this assessment to provide a detailed estimate.

The main costs considered in this schedule are taken from the construction process as set out in 5.2.1.

Table 5-6 Option 2 Cost Estimate

DESCRIPTION	UNIT	QTY	RATE	AMOUNT
PRELIMINARIES				
Site Establishment (Site Preparation, Mobilisation of plant, Materials and equipment, Site office and amenities, security fencing, and regular site tidy up etc.)	Item	1.00	10,000.00	10,000.00
EARTHWORKS				
Clearing & Grubbing	Item	1.00	7,500.00	7,500.00
EARTHWORKS (CUT)				
Main Cell Excavation	m³	263,794.00	3.00	791,382.00
CLAY FILL AREA				
900mm Clay Layer	m³	30,931.00	5.50	170,120.50
DRAINAGE AGGREGATE - Supply & Install				
Base layer of 300mm	m³	7,269.00	53.28	387,292.32
LEACHATE COLLECTION SYSTEM				
Allowance for supply and installation of pump and system	Item	1.00	152,500.00	152,500.00
UV RESITANT GEOTEXTILE LAYER - Supply & Install				
Texcel R Range 400R (or similar) - Cell Lining	m²	24,230.00	5.00	121,150.00
HDPE CELL LINER - Supply & Install				
1.5mm HDPE Liner seam welded on site - Cell Lining	m²	37,804.00	10.00	378,040.00
			Construction Cost Total	**2,017,984.82**
PROJECT MANAGEMENT				
Tender Documentation, Contract and Construction Management	%	1.00	8.00	161,438.79
DETAILED DESIGN				
Allowance for a Detailed Design	%	1.00	5.00	100,899.24
CONTINGENCIES				
Contingencies - 10%	%	1.00	10.00	201,798.48
			Administration Cost	**$464,136.51**
			Total Cost of Project (Excl. GST)	**$2,482,121.33**

The pricing also includes a new pump station and associated costs which may not be required if the current system can be used. Pipe work for the whole cell is included.

In addition to the above cost to construct a completely new cell, the cost of works to the current cell will also need to be considered. The half cell could be filled by continuing the 3:1 western batter as surveyed by SMK. If this option is taken, the cell will have to be capped and the void between the 1:3 waste batter and the western batter of the excavation filled by earth. While this can be done in theory it would likely be impractical and is considered a waste of both airspace and soil that could be used for daily cover.

If construction of a liner on the western batter of the current half-cell is completed, much more airspace becomes available without the need for more excavation. Once the design

levels are reached, cell 1 will need to be capped in accordance with EPA conditions shortly after cell 2 is commissioned.

The costs involved in achieving the above are approximated below:

Earthworks and Lining of current cell:	$15,000
Leachate pipes and connection:	$25,000
Engineered capping of cell:	$610,000
Total:	**$650,000**

5.2.6 Cell 1 Considerations

The current cell (stage 1 of cell 1) will need to be closed and capped if option 2 is adopted. The figures from SMK reflect the continuance of the current western batter at 3:1 until the western and eastern batters intersect.

However, if the half cell is completed on the westerns side, the airspace volume available can be significantly increased. The below diagram shows the various stages of completion for cell 1. Note that the volumes are total airspace remaining except for the "filled section". The "fully completed" volume is an estimate based on the other figures taken from the model.

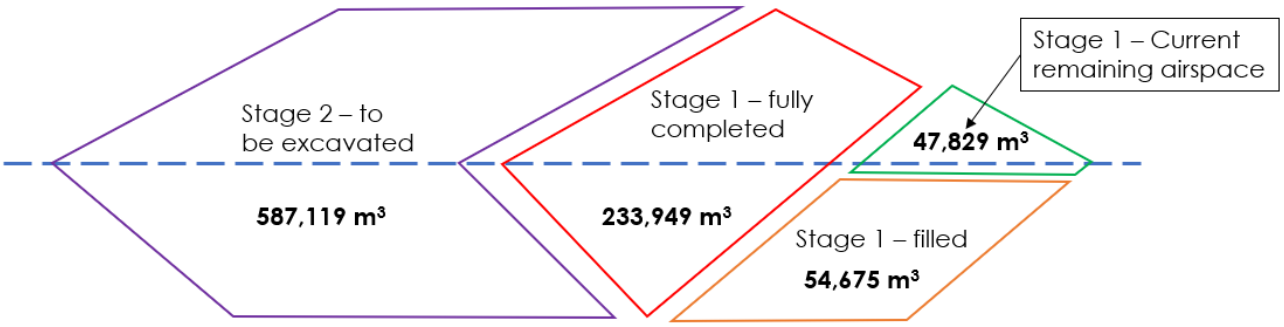


Figure 5-1 Typical Section of Landfill Cell 1 Showing Total airspace Remaining for Each Option (Not to Scale)

5.3 Option Comparison

From the option assessments above the following table shows the key differences between the two options:

PARAMETER	OPTION 1	OPTION 2
EXCAVATION VOLUME	**131,897m³**	**263,794m³**
AIRSPACE REMAINING	**587,119m3**	**875,743m³**
LIFESPAN 25.56 m³ (AVG FILL)	**62.93 Years**	**93.87 Years**
LIFESPAN 38.83 m³ (MAX FILL)	**41.43 Years**	**61.79 Years**
LIFESPAN 32.20 m³ (MED FILL)	**49.95 Years**	**74.51 Years**
TOTAL PROJECT COST ESTIMATE	**$1,308,681.28**	$2,482,121.33 plus $650,000 (REHAB CELL 1) **$3,132,121**
COST PER m³ OF AIRSPACE	**$2.23**	**$3.57**
ADVANTAGES	• **Better value for money** • **Quicker to construct** • **Better use of available land**	• **Work away from current cell**
DISADVANTAGES	• **Work in the same cell as daily operations**	• **More Expensive** • **Longer time to construct** • **Cost for capping and rehab of cell 1 brought forward** • **Future use loss of cell 1 stage 2**

From all of the parameters considered in this report, it is clear that option 1 is a far more appealing option from a financial point of view than option 2. The dollar per cubic meter of airspace cost of option 1 is significantly less than that of option 2.

The design and construction of the future landfilling areas should commence as soon as practicable given;

- The amount of airspace remaining in cell 1 stage 2; and
- The potential for increased landfilling rates due to possible changes to recycling schemes, natural disasters, one-off projects (Inland Rail) etc.

6 RECOMMENDATION

Considering the results of the in-depth assessment undertaken to complete this project, Proterra Group makes the following recommendations:

1. Conduct a review of filling methodology to ensure that the current baling method remains the most efficient and cost-effective filling strategy for this site;
2. Investigate the effectiveness of the current leachate system and the viability of using it for any future expansion;
3. Investigate the possibility of a design without the HDPE liner for both options;
4. Adopt Option 1 (Extend cell 1 to original design specifications) as the preferred landfill cell development strategy for the Moree Waste Management Facility;
5. Commence detailed design and documentation in accordance with the stages of option 1 as soon as practicable;
6. Schedule construction of the extension of cell 1 in the 2019/2020.

7 REFERENCES

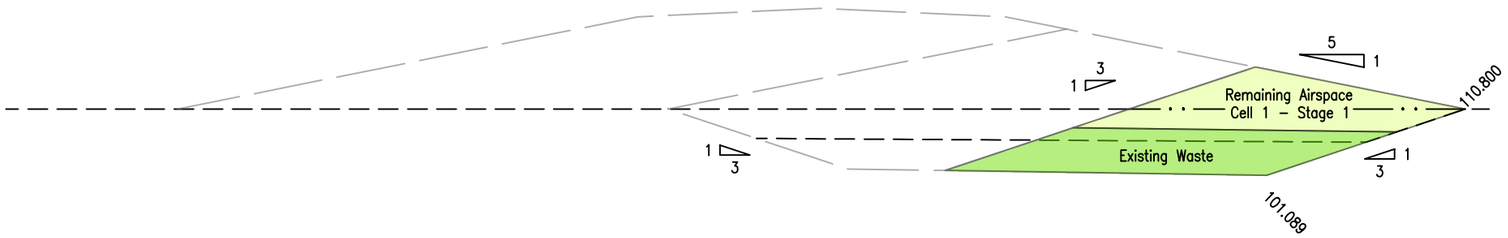
SMK Consultants, 2019. *Moree Waste Management Facility Landfil Survey for January 2018,* Moree: Moree Plains Shire Council.

APPENDIX A – LANDFILL CELL MODEL FOR MOREE WMF

MOREE WASTE MANAGEMENT FACILITY
57 EVERGREEN ROAD - MOREE
Moree Plains Shire Council

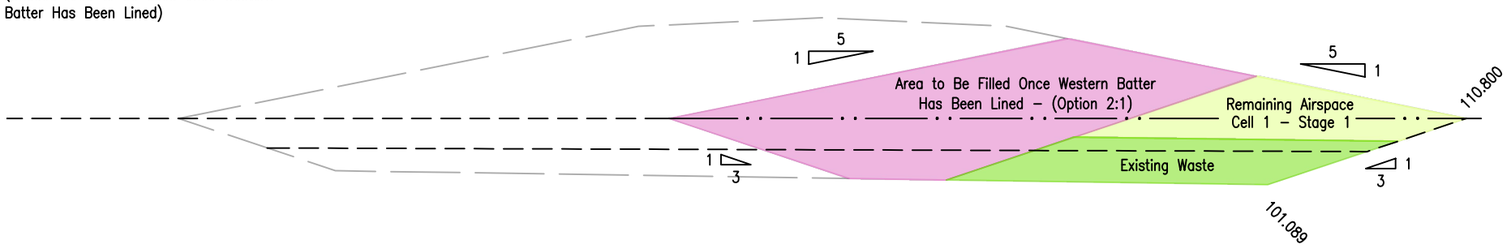
OPTION 1 : 1

Remaining Airspace
Cell 1 – Stage 1



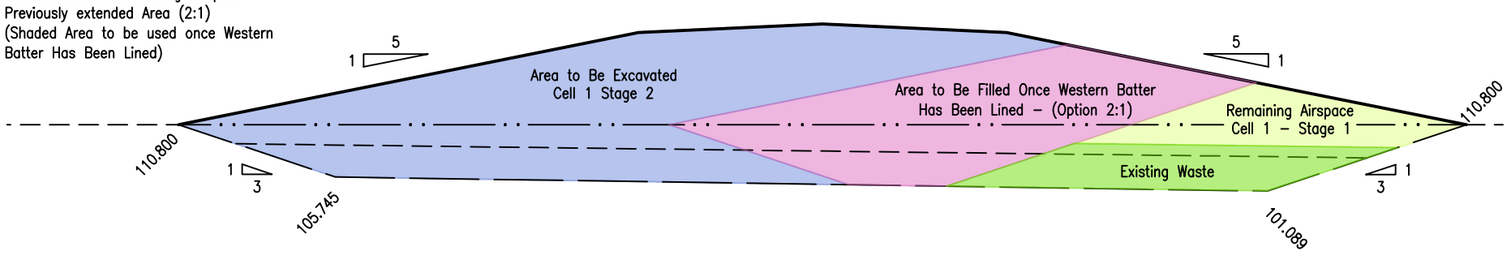
OPTION 2 : 1

Remaining Airspace + Shaded Area.
(Shaded Area to be used once Western
Batter Has Been Lined)

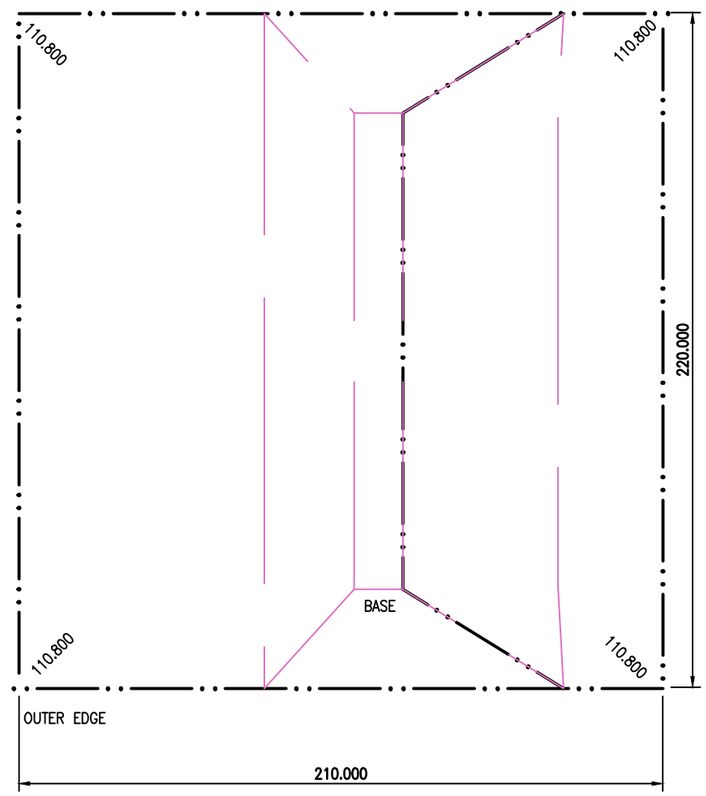


OPTION 2 : 2

Shaded Area + Remaining Airspace +
Previously extended Area (2:1)
(Shaded Area to be used once Western
Batter Has Been Lined)



SECTION A –
SCALE: A



A –

PLAN
Scale: B

CONCEPT

NOTE

LEVELS SHOWN ARE ASSUMED ONLY.
ASSUMPTION BASED ON LOWEST POINT AT RL100.00
AND THE EXISTING SURFACE BEING LEVEL AT RL 110.800

Rev	By	Description	Approved	Date
F				
E				
D				
C				
B				
A	jon.s	Concept Issue	EG	30–01–2019

PROTERRA GROUP
31 GLASSER STREET
GOONDIWINDI QLD 4390
ABN: 82 626 886 771
TEL: (07) 4671 5701
WWW.PROTERRAGROUP.COM.AU

DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS WHERE MARKED

REFER ANY DISCREPANCIES TO ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION

Scales:
A 0m 5 10 15 20 1:1000 AT A3
B 0m 10 20 30 40 1:2000 AT A3

Designed	jon.s		04–02–2019
Drafter	jon.s		04–02–2019
Check	EG		04–02–2019
Approved			

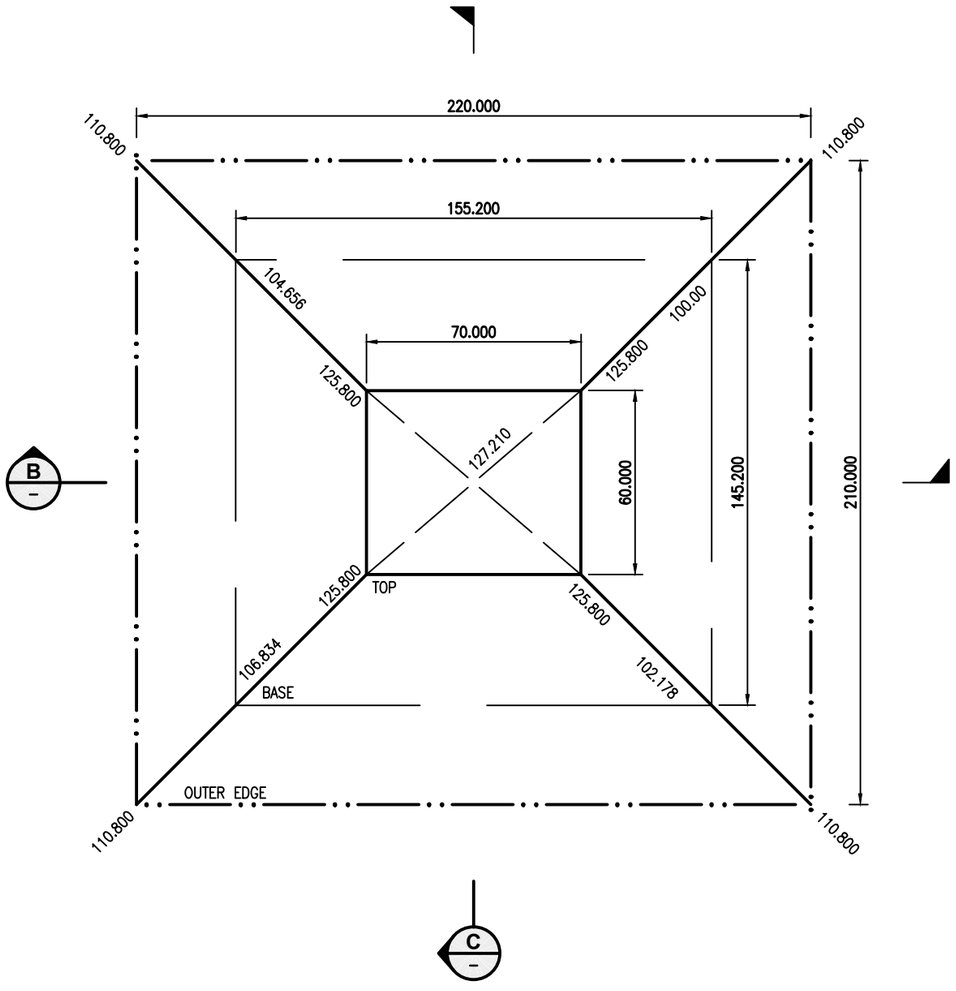
CELL CONCEPT 1
MOREE WASTE FACILITY
57 EVERGREEN ROAD
MOREE

Client: *Moree Plains Shire Council*

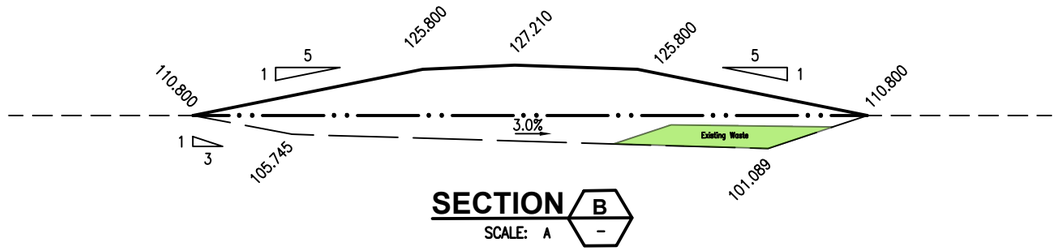
Drawing No. 18-737-Sk - 01
Sheet 01 of 02
Revision. A

z:\01 current projects\18_737 mpsc landfill cell\06_design\6.3 autocad\sketch\18-737-Sk01.dwg, 4/02/2019 2:22:29 PM

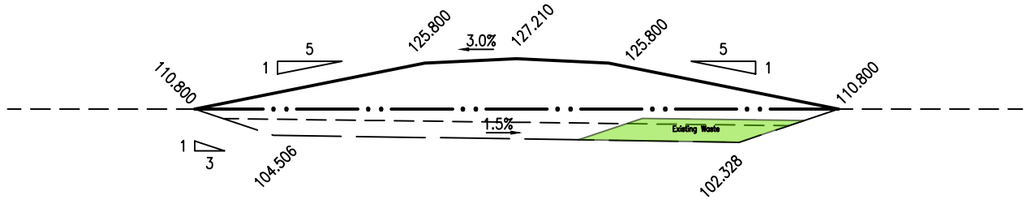
MOREE WASTE MANAGEMENT FACILITY
57 EVERGREEN ROAD - MOREE
Moree Plains Shire Council



PLAN
Scale: A



SECTION B
SCALE: A



SECTION C
SCALE: A

VOLUMES

FILL
PROPOSED FILL VOLUME
378000m³

CUT
PROPOSED CUT VOLUME
263794m³

TOTAL
PROPOSED TOTAL VOLUME
641794m³

CONCEPT

Rev	By	Description	Approved	Date
F				
E				
D				
C				
B				
A	jon.s	Concept Issue	E.G	30-01-2019

PROTERRA GROUP
31 GLASSER STREET
GOONDIWINDI QLD 4390
ABN: 82 626 886 771
TEL: (07) 4671 5701
WWW.PROTERRAGROUP.COM.AU

DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS WHERE MARKED

REFER ANY DISCREPANCIES TO ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION

Scales: A 0m 10 20 30 40 1:2000 AT A3

Designed	jon.s		04-02-2019
Drafter	jon.s		04-02-2019
Check	EG		04-02-2019
Approved			

CELL CONCEPT 2
MOREE WASTE FACILITY
57 EVERGREEN ROAD
MOREE

Client: *Moree Plains Shire Council*

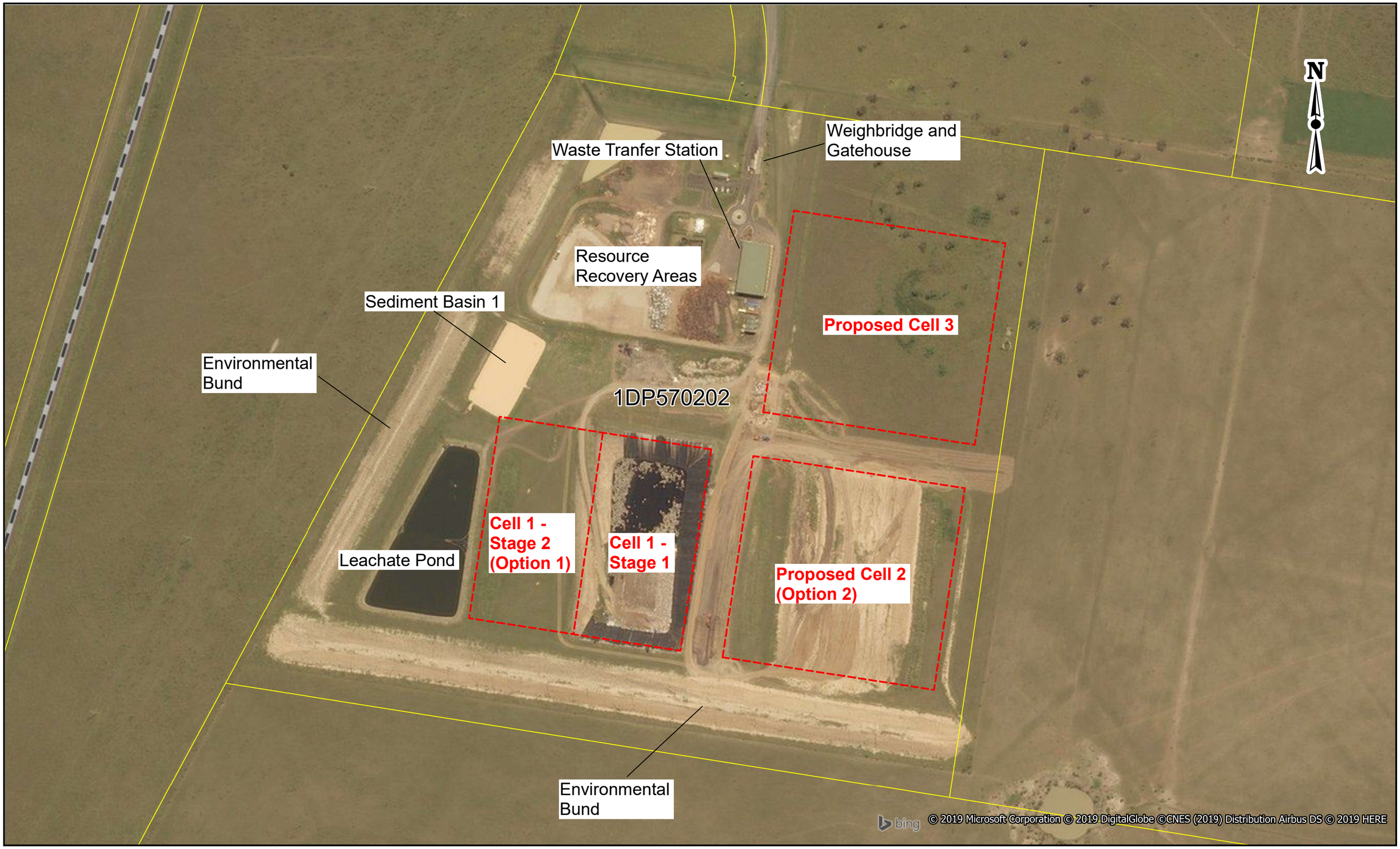
Drawing No. 18-737-Sk - 02

Sheet 02 of 02

Revision. A

z:\01_current projects\18_737 mpsc landfill cell\06_design\6.3_autocad\sketch\18-737-Sk02.dwg, 4/02/2019 2:22:38 PM

APPENDIX B – SITE LAYOUT MAP OF MOREE WMF



PROTERRA GROUP

Moree Plains SHIRE

0 200
metres
Scale 1:3,500

MOREE PLAINS SHIRE COUNCIL
LOCALITY MAP OF
MOREE WASTE MANAGEMENT FACILITY

Geocentric Datum of Australia 1994 (GDA94)

Printed: 23/01/2019