Narrandera
Shire Council

ATTACHMENTS

UNDER SEPARATE COVER

Ordinary Council Meeting

20 October 2020

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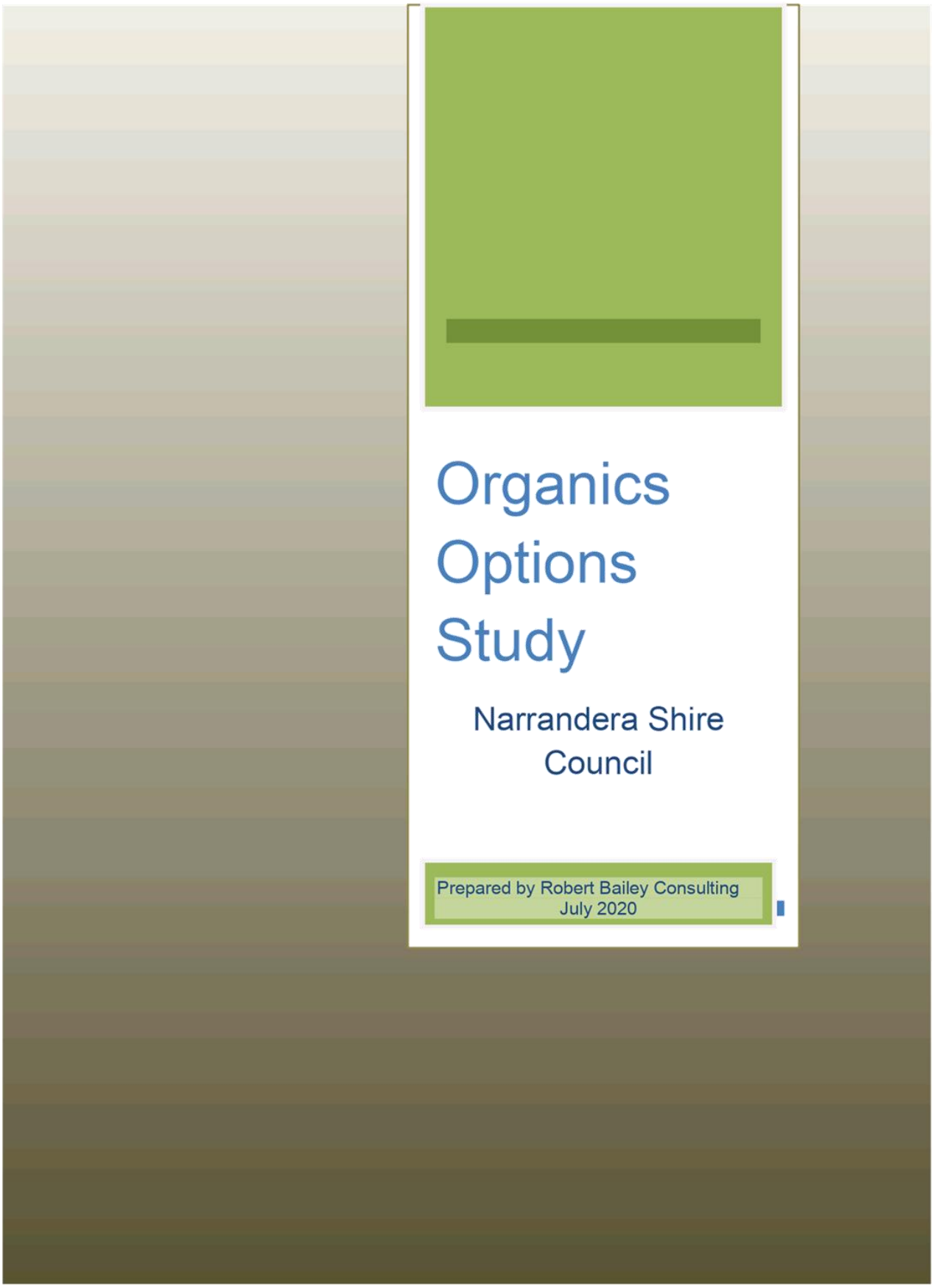
Organics
Options
Study
Narrandera Shire
Council
Prepared by Robert Bailey Consulting
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Executive Summary

This report has been prepared in four parts, with each part contributing to the knowledge base which will enable Narrandera Shire Council to make informed decisions on planning the pathway for effective and economical management of organic waste material generated within its local government area.

Part 1 provides the background information and defines the scope of the project, establishes the project aims and sets baseline information on the current infrastructure and services provided by Council. This baseline information identifies the quantities of organic waste material likely to be collected and potentially diverted from landfill. The cost of collection and processing is included, and together with quantities, provides a reference point upon which to measure the effects of the various options presented in this report.

Part 2 considers the technical and legislative elements of the project, including compliance with the Australian Standard for compost production, AS4454. Meeting this standard is more about risk management in confirming that the compost has been sanitised and all pathogens, weeds and seeds have been destroyed.

The process for obtaining and retaining a composting Environmental Protection Licence (EPL) together with the need for Development Approval is a most necessary consideration and is a prerequisite to any decision to embark on establishing and operating a composting facility. This aspect of composting is also considered in Part 2 along with the importance of marketing the finished product which will help shape thinking in the type of organics management systems Council may choose to pursue.

Part 3 examines seven composting systems that are applicable to Council, most of which are currently in use in Australia, these being Open Windrow, Tunnel, Fabric Cover (Gore), Mobile Aerated Floor (MAF), Inoculated (Groundswell), HotRot and Vertical Composting Unit (VCU). These seven composting systems range from the simple and cheap to the more expensive and complicated, yet with all offering particular applications to meet a variety of needs.

Part 4 considers options and charts the cost implications upon Council should any of these options be pursued. It is evident that the cost in dollars terms to divert organic waste from landfill is significant but this cost may be taken in context with the associated social and environmental benefits together with resident's expectations.

Transportation to a third party processing facility adds considerable cost to the process but eliminates a number of issues that would confront Council in establishing and operating its own facility, especially where relatively small volumes of inputs are involved. Local processing of organic inputs may offer better outcomes, but should food waste be included, then it will be important that Council chooses a system that can manage this material appropriately by applying it to a composting process on the day it is received or have

approved storage mechanisms. Plausible options in this regard are limited for a Council with a small population such as Narrandera Shire.

Any decision to include food waste as an extension to a kerbside garden organics collection service will have a corresponding escalation in costs, especially should kitchen tidies and compostable liners be supplied to residents. Studies into the quantum of food waste included in kerbside organics collection services indicate that generally around 5% but up to 10% of the total organics placed in the receptacle is food waste. Studies also show that the amount of material placed in kerbside organics receptacles where food waste is an input, the average annual quantity ranges between 400 kilograms per annum per premises to 700 kilograms per annum per premises. For Narrandera where there is the potential for about 2,000 services, allowing for the upper range of 600 kilograms per annum per premises, the total amount of food waste that could be collected would be between 60 to 120 tonnes per annum. This is an important factor when considering the cost/benefit of providing a kerbside organics collection service that includes food waste. Obtaining an environment protection licence from the Environment Protection Authority and undertaking the approvals processes and studies are other factors to consider where food waste is an input to a composting system

Making a determination on which pathway to pursue will be a value judgement for Council, however it is good policy when change is being considered to prepare and undertake commensurate consultation and engagement with those who will be affected by the change. Who are the stakeholders, how will they be impacted and what will be the intensity of that change? Within the options modelling, the cost of engagement and education has been included into the rolling out of new receptacles at the commencement of the next collection contract in January 2021 should an organics service be included. .

Part 1 - Background

Overview

For the uninitiated, there is a perception that transforming organic waste material into valuable compost is easy and that marketing the finished product is simple. The reality is much different, and this point is important to understand when first considering any decision to venture into organics processing. Making a product fit for purpose is a key undertaking and therefore the identification of markets and meeting customer's needs is paramount to conducting a successful composting operation. It is also important to understand one's limitations in the field of composting, and comprehensive staff training or partnering with contractors experienced in materials handling and composting will go a long way to ensuring a successful entry into this endeavour.

The economics of composting source separated food and garden waste is a significant barrier to overcome, as collection and processing costs materially affect the economic viability and there are many examples in Local Government where gate fees are paid to processing contractors to support composting operations. The marketable value of the compost products is often markedly less than the cost to collect and process the organic inputs.

It is therefore important to consider composting in the broader sustainability sense and place a value on the environmental benefits and social benefits of diverting organic material from being landfilled. Communities have an expectation of responsible environmental management from those who represent them and State and Federal Government are imposing fiscal measures through waste levies and other incentives to drive change.

One of the key features of the recent issues paper as part of the development of the NSW Government's 20 year waste strategy was the importance of education and engaging with communities to mobilize householders and business in waste minimisation and resource recovery. Improving the capture rates for source separated food and garden waste will be fundamental to success in any organics collection endeavour Council may pursue along the composting pathway. Effective community education and engagement will be an important contributor to this success.

So what is composting? Composting is the controlled aerobic degradation or decomposition of organic waste materials for the production of a commercially valuable end product. It is usually categorized as recycling and/or beneficial reuse of waste materials. The finished product is highly stable. Aerobic composting produces sufficient heat to pasteurise the organic materials, destroying weeds and seeds and killing plant and human pathogens that may be present in the raw materials.

Background

At its Ordinary Meeting conducted in July 2019, Narrandera Shire Council resolved to investigate the potential to undertake a food waste/organics collection service in the Narrandera Local Government Area. The investigation is to take the form of a feasibility study to determine if there is an adequate organics waste stream, to assess the cost of production, explore viable sales markets for the finished product and model the potential cost that would need to be passed onto the rate payer. In adopting that resolution, Narrandera Shire Council has recognised industry and government gravitation towards improving the recovery of organic material from the waste stream and is seeking to explore options in introducing an organics collection service and to the processing and marketing of recovered organic material.

The quantity of kerbside organics collected by Councils in NSW where the service is provided varies markedly from around 400 kilograms per annum (kpa) to 700 kilograms per annum. Narrandera Shire has the potential to generate a total of about 1,300 tonnes per annum of organic material sourced from kerbside collected organic waste based on 600 kpa together with around 500 tonnes of self haul garden waste that currently received at the Narrandera Waste Facility.

Council has now commissioned an options study and set a scope of works requiring the development of a business case study for the collection and processing options for garden and/or food organics. The scope includes –,

- Cost benefit analysis of implementing a compositing facility,
- Suitability of quality and quantity of current waste streams
- Regulatory suitability for the collection, storage, processing (including possible solutions to limit contamination),
- Viable retail market for finished product
- Potential costs for kerbside collection to be paid by users
- Indicative capital/setup/running costs
- Potential market price point for completed compost
- Estimated area required for the collection, storage and processing

Existing Services and Infrastructure

Narrandera Shire Council operates two landfills within its local government area. The principal landfill is located off Red Hill Road Narrandera and the secondary landfill is located off Barellan Tip Road, Barellan. Disposal fees are not applied for domestic sorted general waste and recyclables. Fees apply for commercial and industrial wastes and unsorted domestic general waste.

A range of activity areas are contained within the principal site at Narrandera, including-

- The operation of a Community Recycling Centre where household problem wastes are accepted and stored before transporting off site for re-processing
- A general waste disposal area for putrescible waste
- An inert waste disposal area
- A green waste stockpile area
- Gatehouse
- DrumMuster compound
- Drop off for household recyclables (front lift bins)
- Asbestos trench
- Wood waste stockpile area
- Waste oil station
- Scrap metal stockpile area
- Used tyre stockpile area
- Mattress drop off area
- Waste concrete and tile drop off area
- E-waste storage
- Street sweepings drop off area

The following plant and infrastructure are utilised within the waste facility-

- Cat 936E Front End Loader
- Komatsu Articulated Landfill compactor fitted with a trash rack
- Mobile litter fencing
- Machinery shed

Current Services

The current collection services conducted at Narrandera, Barellan, Grong Grong, Pinehill and Nallabooma are

- 1 x 240 litre red bin collected weekly for residual waste
- 1 x 240 litre yellow bin collected fortnightly for recycling

Residents are required to provide their own receptacles. The waste and recycling collection services are undertaken by contractor by Tomra Cleanaway. Collected household recyclables are transported to Wagga Wagga for processing by Kurrajong Recycling. The current contracts for the collection and processing services conclude 31st December 2021.

The DWMC for these services for 2020/21 has been set at $300 pa

Baseline Data

The annual quantity of self haul organic waste taken to the Narrandera Waste Facility for the 2019/20 financial year was in the order of: 500 tonnes

The potential annual quantity of kerbside garden organics and food organics that could be collected from the Narrandera, Barellan, Grong Grong, Pinehill and Nallabooma serviced areas, based on industry standards of around 600 kgs per household per annum, is-

2192 services @ 600 kgs which totals 1,315 tpa

The quantum of self haul green waste is around 500 tpa and Council has apportioned $17,900 in the 2020/21 budget for the mulching of green waste.

The likely cost to roll out new 240 litre receptacles for an organics collection, including kitchen caddies and information packs would be $51 per service

The likely cost to service the organics receptacles and take the collected materials to a composting centre at the Narrandera Waste Facility under a long term contract would be $2.15 per service

The likely cost to service the organics receptacles and take the collected materials to a third party composting centre at Carrathool (125 kilometres each way) would be $3.05 per service

The likely gate fee at a third party composting centre would be $55 per tonne. That would increase should contamination be greater than 1% of the total inputs

The “opt in” option for residents for a kerbside organics collection service would complicate the feasibility of the overall service and it is suggested this should not be considered

Project Aims

Although not defined in the RFQ, the scope infers the following are the project aims-

- To determine the most effective composting system(s) to manage a range of organic inputs.
- To examine the feasibility of collecting and processing garden organics and food organics
- To define potential markets for compost products
- To prepare business cases for the collection and processing options that will support decisions on future organics services and related composting infrastructure
- To consider the regulatory implications for establishing a composting facility

Part 2 - Understanding

Licensing and Exemptions

The Protection of the Environment Operations Act (1997) defines in Schedule 1 the types of activities and the thresholds for which an environment protection licence (EPL) is required, including composting. In addition, the *Food Waste Compost Exemption 2008* makes provision for compost derived from food waste to be applied to land and this application to land is exempted from requiring an EPL as defined in Schedule 1. What this means for Narrandera Shire Council is that the requirement to hold an EPL will be determined on the thresholds implied by Schedule 1.

It is also a requirement that any customer receiving compost produced in relation to the exemption must be advised of the exemption and that an EPL for land application is not needed.

The following extracts of the *POEO Act (1997)* highlight licensing and exemption provisions. These are simply extracts and the entire clauses of Schedule 1 should be read in total to understand the full relevance.

- Schedule 1 Part 1- Application of Part

"For the purpose of section 48, any activity that is declared by this Part to be a scheduled activity is taken to be an activity for which a licence is required for the premises at which it is carried out".

- Schedule 1 Clause 12 - Composting

"This clause applies to composting, meaning the aerobic or anaerobic biological conversion of organics into humus-like products. The activity to which this clause applies is declared to be a scheduled activity if, where it takes place is inside the regulated area and it has on site more than 200 tonnes of organics received from off site or it receives from offsite more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics".

For the purpose of this clause one tonne equals two cubic metres.

Schedule 1 Clause 39 – Waste Disposal (application to land)

- *"This clause applies to "waste disposal by application to land"*, meaning the application to land of waste received off site, including application by any of the following methods:

(a) spraying, spreading or depositing on the land

(b) ploughing, injecting or mixing into the land

(c) filling, raising, reclaiming or contouring the land

The activity to which this clause applies is declared to be a scheduled activity".

General Exemption Under Part 6 – the *Food Waste Compost Exemption (2008)*

- 5.1 "*The responsible person listed in Column 1 of Table 1 is exempt from the provision listed in Column 2 of that table but only in relation to activities involving the relevant waste*".

Column 1	Column 2
Processor	Section 48 of the Act in respect to clause39 of Schedule 1 to the Act

For its application to Narrandera Shire Council, composting is considered a scheduled activity if it takes place on a site outside a regulated area that receives more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics. Thus, such facilities must be licensed by way of amendment to an existing licence or by way of a new licence.

Environmental Planning and Assessment Act

Expansion of existing composting operations or creation of new composting operations are likely to come under the provisions of the Environmental Planning and Assessment Act and Regulation there under as "Designated Development" that will require an Environmental Impact Assessment and determination under Part IV or Part V of the Act

Schedule 3 under the Environmental Planning and Assessment Regulation 2000 states, inter alia, that composting operations that fall within the following definition are "Designated development":

Composting facilities or works (being works involving the controlled aerobic or anaerobic biological conversion of organic material into stable cured humus-like products, including bioconversion, biodigestion and vermiculture)

(a) that process more than 5,000 tonnes per year of organic materials, or

(b) that are located:

(i) in or within 100 metres of a natural waterbody, wetland, coastal dune field or environmentally sensitive area, or

(ii) in an area of high watertable, highly permeable soils, acid sulphate, sodic or saline soils, or

(iii) within a drinking water catchment, or

(iv) within a catchment of an estuary where the entrance to the sea is intermittently open, or

(v) on a floodplain, or

(vi) within 500 metres of a residential zone or 250 metres of a dwelling not associated with the development and, in the opinion of the consent authority, having regard to topography and local meteorological conditions, are likely to significantly affect the amenity of the neighbourhood by reason of noise, visual impacts, air pollution (including odour, smoke, fumes or dust), vermin or traffic.

Composting facilities that require determination under the provisions stated above must undergo rigorous assessment and consultation. Integrated Development concurrence of relevant authorities is required, in particular the EPA which is also the licensing authority under the POEO Act.

Environmental Guidelines

Composting and Related Organics Processing Facilities

The Office of Environment and Heritage has produced guidelines for composting and related organics processing facilities and has taken a performance based approach to composting by setting objectives rather than prescribing particular environmental techniques that must be used. The intention of this approach is to encourage facility operators to develop cost effective solutions to particular operations whilst meeting environmental objectives.

The information contained in the guidelines is beneficial to those who may need to plan for such facilities when applying for a composting Environmental Protection Licence (EPL) or as an extension to an existing EPL The guidelines encourage the preparation and implementation of Environmental Management Plans and Environmental Management Systems.

Australian Standard 4454 (2003)

AS 4454 is the standard for composts, soil conditioners and mulches. It is not a regulation but provides a form of quality management through a systematic approach to compost production. Meeting the requirements of AS 4454, will allow compost producers to consistently meet the needs of target markets, minimize commercial risk, consistently meet product quality standards and manufacture products efficiently and economically.

The Standard specifies physical, chemical, biological and labelling requirements for composts, soil conditioners and mulches which meet the minimum requirements set out in the Standard. It covers materials marketed or distributed in both bulk or in bags, but does not

apply to "garden wastes" that have not been subject to pasteurisation or to a composting process.

Regardless of the compost system adopted, it should be the objective of the compost manufacturer to achieve compliance with AS 4454 for the compost and mulches being produced.

Resource Recovery Order and the Resource Recovery Exemption for Mulch

The Resource Recovery Order (RRO) and the Resource Recovery Exemption (RRE) for Mulch were issued in 2016 under the Protection of the Environment Operations (Waste) Regulation and apply to the supply and land application of mulch. The EPA has published guidance notes on the resource recovery order and exemption for mulch that provides information on restrictions and exclusions on the land application of mulch, required competency/qualifications of those assessing organic inputs, definitions of organic materials and a flow chart showing the streams a processor should adopt in supplying mulch to consumers for land application. The following checklist provides some insight as to controls that need to be in place before moving mulch off site could be contemplated.

Checklist

Measure	Y	N
Staff competencies, qualifications and training are current and fit for purpose		
Organic inputs being inspected, assessed and segregated in accordance with standard operating procedures		
Incoming loads of organic materials being recorded		
The management protocol has been reviewed in the past 12 months and the version on site is the most recent version		
The information brochure is being provided to all customers taking mulch		
Mobile shredding plant and equipment has been checked for contamination prior to use on site		
Segregated material is being stockpiled in accordance with standard operating procedures		
Signage is in place clearly defining the segregated and the mixed stockpiles of organic materials		
The feral animal inspection record being completed quarterly and is up to date		

"Spread and sort" is being undertaken clear of the segregated stockpile to ensure cross contamination by weeds, pests and disease does not occur		

Unless all questions are answered in the affirmative, the processed organic material should not be sold or given away as being compliant with the Resource Recovery Order and the Resource Recovery Exemption for Mulch

Following meetings with the EPA, the regional waste group NetWaste developed a protocol for the management of green waste and its members waste management facilities that would permit mulching to be undertaken that would result in a product suitable for land application

Testing Procedure

The aim of any compost producers should be to produce mulch and compost based products of high quality and designed to meet local market requirements. For Narrandera Shire Council, green waste and some food waste would likely be the main feedstock materials, which would be pre and post treated to remove physical contaminants and provide consistency into the process. Increased quantities of food waste may be added into the process should the collection include commercial organics collection services.

Compost analysis results from similar operations provide an indication about the likely product quality derived from such an operation:

Organic matter	>50%
PH	6.5 – 7.5
Moisture	30-35%
Carbon/Nitrogen ratio	~15
N	0.5-1%
P	0.1-0.2%
K	0.2-0.5%
Heavy Metals	in compliance with AS 4454

A regular sampling and testing regime would need to be implemented in line with AS 4454-2003 and other relevant Standards.

Any product that does not meet the requirements for the market or Standards should be reprocessed until compliance is achieved.

With the first material produced, Australian Standard compliance certification procedures will commence. This involves on-going material sampling, quality testing, field tests and operation auditing. The process provides continuous monitoring and recording of the key parameters such as temperature, oxygen and moisture.

Those intending to embark on a composting pathway should be mindful that residues of dieldrin and chlordane can still be found in some soils and these compounds can compromise the value and usability of the processed compost.

Products, Markets and Marketing

A recent investigation undertaken by the NSW State Government has suggested composted garden organics have the potential to improve soil physical, chemical and biological characteristics however composted garden organics are unlikely to successfully compete directly with inorganic and organic fertilizers, such as poultry/ animal manures and biosolids as an economically viable source of nutrients for growing plants.

However, composted garden organics can offset decreased water availability and the value chain analysis concluded that purchase, transport and application costs for compost was the least negative for activities such as viticulture and perennial horticulture. However,the perceived value of compost by the market needs to increase and the cost of production and delivery needs to decrease in order to reduce the gap between market asking prices and a willingness to pay. Key to achieving this would require –

- Undertaking targeted research aimed at demonstrating how composted garden organics can help overcome specific crop problems, nutritional disorders and soil quality issues.
- Promoting these benefits to farmers and food consumers through education and campaigns to create market pull.
- Highlighting the value of composted garden organics more broadly to residents, farmers and stakeholders as a means of addressing soil and water quality issues in urban and agricultural catchments.

Such actions will improve the perceived value of composted garden organics and help manage the costs, which currently act as the main barrier to agricultural and horticultural markets.

It is also important to consider that any decision to pursue composting by Council would be its first entry into partnering, developing or operating a composting facility and history has shown that it will be critical for the quality, consistency and the characteristics of the compost to be firmly established before marketing of the product can commence.

It would require capable staff to be recruited and fully trained in the relevant composting system and that technical support and guidance would be needed.

There would be the need to consider the business case to confirm assumptions made on pricing the finished product and to address marketing risks. Setting the right gate fee and the annual Domestic Waste Management Charge for organic inputs and balancing this against the compost marketing price would be extremely important.

Competing compost producers have set prices of around $30 to $40 per tonne for 40 mm minus grade or $20 to $30 per tonne for 40 mm plus grade if sold directly into the core markets of Councils or other bulk users. For retailing to the general public, business and landscape gardeners the asking price would be 50% to 100% higher. Secondary markets of agriculture, horticulture and viticulture could be pursued once the initial markets have been established and secured where the $20 and $30 per tonne price would apply.

The option of selling all of the produced compost to a third party wholesaler would see the financial return reduced, but certainty of sales would be ensured. Maximising the return for compost should be the ultimate goal and direct marketing is the avenue to achieve this goal, whether this is a long term or short term goal.

Objective

The key objective should be to make and successfully market quality compost from a variety of organic inputs that complies with Australian Standard 4454, delivers measurable environmental outcomes and is based on sound financial principles. Associated goals include the diversion of waste to landfill, reducing greenhouse gas emissions, improving agricultural outputs, managing risk, complying with legislative obligations and contributing to sustainable waste management practices.

Analysis

Customers: These would be within the following five market segments.

1. **Landscape Suppliers**
   There are landscape suppliers operating within the local government area and a number in Wagga Wagga. This group undertakes work for home owners and businesses in the establishment and maintenance of gardens and would require a product complying with AS 4454 that is consistent in moisture content and carbon to nitrogen balance. This industry currently sources its compost from local landscape garden suppliers and although landscape garden suppliers are potential Council customers for compost, the margin would be considerably reduced. Direct marketing offers the best return.

2. **Residents**
   The local area has a residential population of about 5,000 citizens. In this sector customers would be purchasers of small quantities of compost collected in trailers or bags and although the price margin would be greater, so too would be the effort in marketing and sales

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3. **Council**
   Sections within Councils that are potential users of compost include Parks and Gardens and General Works and could use bulk quantities of compost on playing fields and regenerated nature strips/medium strips and swales. Product sizing (from variable screen sizes) will be an important factor in addressing the needs of this sector and will impact on pricing and value. Top dressing of playing fields for example, requires fine materials and certainly without small sticks that are prevalent in courser compost that may be suitable for agriculture.

4. **Agriculture and Horticulture**
   Application to agriculture/horticulture will be a frontier for marketing and will require a product with elevated nitrogen content and be spreadable. Orchards and the viticulture industries offer opportunities in the local area. Purpose designed compost spreaders are available to meet the needs of compost application for these industries. Promoting the benefits of compost to farmers through education and demonstration will be important actions if success in this segment of the market is to be realized.

5. **Nurseries**
   There are several nurseries in the Narrandera local government areas. Any opportunity to supply compost to nurseries will require blending with sands, grit or foam to align with the customer needs. This will require specialist product development in cooperation with individual customers.

Macro – Environmental

Political and Legal

Narrandera Shire Council is operating within a political environment subject to NSW Government legislative obligations and community expectations. The recent EPA 20 year Waste Strategy issues paper (Clean Up Our Act) sought input from stakeholders in the development of the Strategy. Resource recovery and waste minimisation remain a focus. Councils are generally supportive of initiatives that will minimize waste, address community expectations and achieve positive outcomes. Composting a variety of organic inputs diverted from landfill represents a sustainable pathway for Council in meeting these obligations.

Economic

The Narrandera Shire LGA covers an area of some 4,000 square kilometres and has a permanent population of about 5,000 residents. The area contains a diverse mix of urban centres, rural enterprise, commercial businesses, industrial complexes, tourist facilities and infrastructure utilities. Census figures and projections indicate the area has been growing

marginally over recent census periods. This slow growth and a small population may limit the potential for developing a local compost industry and to establish viable markets. .

Social and Environmental

Council currently does not provide a kerbside organics collection service for their residents and there is scope to introduce such a service. Should food waste be included into a kerbside organics collection service, the frequency should be weekly. For garden waste alone, the service could be fortnightly.

Composting offers a range of social and environmental benefits including;

- Delivering higher yields for crops.
- Offers an alternative to artificial fertilisers
- Employment opportunities in processing and marketing of compost products, especially for the less skilled or disadvantaged.
- Extending landfill residual life and delaying the replacement of a more expensive landfill or AWT.
- Is a source for a revegetation medium as part of landfill final cover, for soil amendments and conventional bio remediation.
- Provides a source of plant nutrients and improves soil fertility; results in significant cost savings by reducing the need for water, pesticides, fungicides, herbicides, and nematodes.
- Used as an alternative to natural topsoil in landscaping.
- Used as mulch for moisture retention and water saving in applications like orchards, vineyards, lawns and gardens.
- When placed over the roots of plants, compost mulch conserves water and stabilizes soil temperatures. In addition, it controls weeds, providing a slow release of nutrients, and preventing soil loss through erosion.
- Avoids the production of landfill gases that contribute to climate change
- Composting raises awareness about the amount of food waste produced from domestic and commercial areas.
- Can provide training opportunities in key skills and personal development
- Provides residents with a sense of making a positive contribution to environmental sustainability and resource conservation.
- Meets community expectations in the provision of sustainable waste management practices.

Technological

Although some of the composting systems discussed in this report are relatively new to Australia, most have been operating successfully in other countries for many years. Tunnel composting, Covered (Gore) and MAF apply the fundamentals for aerated static pile composting yet with sophisticated air delivery and monitoring controls within a managed

environment. This enables the process to be completed in shorter time frames and to achieve consistency in finished product quality.

HotRot and VCU operate on different technologies to aerated static pile and are examples of enclosed composting systems, whilst Inoculated (Groundswell) is simply windrow composting that is inoculated with a patented microbiological product and covered with a tarpaulin.

Opportunities

- Food waste as an input from commercial sources offers income streams from collection services, savings from tipping fees and improved nitrogen balance for compost.
- Combining grease trap waste treatment to composting as a source of process water and nutrient.
- Plasterboard as an input and a compost product variant for customers wanting gypsum blending.
- Processing green waste from adjoining councils who undertake kerb side organics collection services.

Price

Given the likely small quantities of organic waste inputs and potentially high cost of collection and processing, the cost of a composted product may be beyond customer's willingness to pay. Nonetheless, to establish and consolidate markets, competitive pricing will be paramount but the pricing will need to be reflective of the business case assumptions. Some broad discounting may be required initially and higher volume customers should receive permanent discounts to the standard price.

The general public, businesses such as landscape suppliers and Council should be targeted as the core customer base with agriculture, horticulture and viticulture as second line customers. It is these areas where the high volume sales should occur. Major competing compost producers sell into these types of markets for around $40 per tonne for 40 mm minus grade or $20 to $30 per tonne for 40 mm plus grade and offer discounts to high volume customers. However, the compost is produced using high nitrogen inputs and as a consequence is high in nutrient value. The start up price for entry into the market place for lower nutrient 40 mm plus grade compost would be in the order of $15 - $20 per tonne as direct marketing.

Supply and demand will also play a role in determining the price, as will product quality.

The anticipated return if the compost were to be sold to a wholesaler would be $15/tonne for the 40 mm plus grade compost.

Distribution

Compost sales could be from product stockpiles located on the processing site or from sites operated by contractor/alliance partners.

Direct marketing would include bulk delivery. This decision should be made before embarking on product marketing. Opportunities may arise for distant distribution outlets.

Points of contact for potential customers would be through contractor/alliance partners, with sales representatives providing direct customer contact and interaction.

Should the option of marketing to a wholesaler be pursued, then the wholesaler would collect the product directly from the composting facilities.

Promotion

- Promote the compost as compliant with AS 4454.
- Develop a marketing budget. This should be about 6-7% of the value of compost sales, including discounting.
- Prepare guidelines for various product uses, such as fact sheets.
- Develop product identity. This should be determined prior to implementing the marketing plan.
- Consider demonstration/testimonial sites or establishing a community garden.
- Attend conferences and seminars.
- Become a member of Compost Australia.
- Link the production of compost to Councils Waste Education Plan.

Short and Long Term Projections

There are some “rule of thumb” measures that should be understood when considering the quantity of compost that may be produced. It takes about 1 litre of water per kilogram of organics to complete the composting process. One tonne of inputs usually delivers less than half a tonne of compost If the total inputs are likely to be 1,565 tpa, perhaps just 750 tpa of compost would be produced. It is also important to know that establishing a composting facility that includes food waste needs to attain a higher standard of environmental controls that that simply composting garden waste.

- Start up inputs would likely be less than 1,815 tonnes per annum and this would be kerbside collected food and garden organics and self haul garden wastes. In the longer term other organic inputs could see the annual total climb if additional sources

of inputs could be sourced, either locally or from nearby LGAs.. There is also the likelihood of seasonal variations, with a reduction of inputs during the Winter months and an increase in Spring. This should equally apply for demand for compost.

- Outputs are generally about half the weight on the inputs, as moisture is lost during the composting process.
- Compost made entirely of garden waste and for direct retail for urban use should be cheaper to produce and could be sold in the order of $20 to $30 per tonne. If food waste became an input, the price could rise to $40 by year five as the nutrient value improves with the addition of larger quantities of food waste. Some composters add urea to boost the nitrogen content of the finished product

- Initial market focus would be Council, the general public, business and landscape suppliers and then the focus should shift to agriculture/horticulture/viticulture once the initial markets have been established and secured.

- The sustainability of this project will be reliant on gate fees and the Domestic Waste Management Charges to meet costs and to provide margin as well as the effective marketing of the finished product. The quantum of this gate fee will be determined as part of the business case and be reflective of the success of the composting process to deliver a quality product efficiently and to have effective marketing.

Part 3 - Evaluation of Common Composting Systems

1. **Open Windrow**
2. **MAF**
3. **Covered (eg Gore)**
4. **Tunnel**
5. **Inoculated Static Pile (eg Ground Swell)**
6. **Hotrot**
7. **Vertical Composting Unit (VCU)**

Whilst home worm farms have become somewhat popular in Australia, large scale vermin-composting is uncommon and has not been considered as an option, although Wormtech P/L have recently established large composting facilities at Yenda and Carrathool as part of their strategy to utilise agriculture waste and cotton waste from farming operations.

1. Open Windrow

This is the term given to static pile composting and is the forming of long, 1 – 2 metre high rows of organic material and then re-mixing daily to help aeration. Although oxygen is increased to 20% at the time of turning, the level drops to 0% within about two hours, therefore limiting the aerobic decomposition of the material. Temperature also drops during the turning process.

Turning of the windrows can be done with a front end loader or by specialist turning machines and can vary in capital cost from tens of thousands of dollars to up to a million dollars per unit. Some windrow turners can apply water during the turning process to ensure the moisture content remains at optimum levels.

Top over turner that applies water to the windrow during the turning process

Turning drum displayed

Pre treatment

- Depending on the sources of the organic inputs, contamination management is most important and should begin with the receival process, whether this is during the domestic kerbside collection service or at the waste management facility. Any material that contaminates the finished product will effectively devalue that product and may fail to achieve the required standard. It will therefore be essential to have procedures in place to effectively manage contamination in the early stages of compost production.

- A prerequisite to most composting processes is the shredding of the organic inputs. This is usually done by service contractors using mobile shredding machines, such as Doppstadt, but for smaller operations on site wood chippers can be used. Some composters use low speed in-line mulching machines as part of the pre treatment as evidenced with tunnel composting where the process in undertaken within a building.

Doppstadt Mobile Shredding Machine

Mobile wood chipper

In line shredding machine

Site area requirements

- Windrows require constant turning, therefore reasonable site area is needed between windrows for plant access and turning. If top over turners are not used and the windrows need to be rolled and turned by a front end loader or similar plant, then the site area requirements will be significantly larger.

Leachate management

- In the early stages of composting, the degradation process generates leachate, and this is especially evident should food waste be an organic input. For windrow composting, the entire site operational area requires some form of a suitable leachate management system, however this does not apply to areas dedicated to the storage of finished products.

Processing time

- 16 to 18 weeks

Plant and Equipment

- Shredder
- Loader or Top over turner
- Screen – ranges from a simple trommel to a Star screen

Star Screening Machine

Odour management

- Odours and other emissions are likely to be a major consideration when evaluating potential environmental impacts of a composting operation. Aerated composting offers the best method for controlling odour and for windrow composting the frequency and effectiveness of the windrow turning will determine the degree of odour emissions. The types of organic materials used will also have a bearing on how odour is generated and controlled. .

AS 4454 compliant

- Provided a systematic approach is undertaken, windrow composting can to meet the Standard

Direct Costs (does not include externalities)

- Establishment costs are generally limited to site preparation and the provision of leachate/surface water management systems. Site preparation would require the

development of suitable hardstand areas that are graded to allow for leachate and surface water management. The cost of establishing these hardstand areas will be influenced by the nature of the area to be developed, as in natural ground or land that had previously been landfilled. Equally, should there be existing leachate and surface water management systems in place that can be amplified, the costs will be less than building new management systems.

- The provision of suitable plant can take the form of a number of variables, including (i) outsourcing shredding, turning and screening, (ii) buying shredders, turners and screens, or (iii) a combination of outsourcing and buying.

- Operational costs include establishment and regular turning of windrows, quality control, shredding, screening and product testing.

- Where larger volumes are being processed, basic windrow composting could be undertaken at a cost of around $20 per tonne for the simpler pasteurisation without screening.

Throughput

- Windrows can be almost any size and throughput would be dependent on site restrictions in combination with the desired length of processing time

Reliability

- Windrow composting is an established and proven method of organics management and delivers reliable outcomes whilst ever undertaken in accordance with sound practices.

Flexibility

- Flexibility is somewhat limited given the requirement for windrow establishment, maintenance and operations in a predetermined form. The windrows require regular turning and shape maintenance.

Restrictions

- Food waste is problematical to include as an input because of elevated environmental controls needed

Attributes and Detractions

Attribute	Detraction
Low capital cost	Relatively large site area requirement
Relative simple technology to operate and maintain	Lower compost pile heights and long lengths equate to expanded facility size
Suitable plant and equipment is readily obtainable	Outdoor activities are impacted by weather which can be difficult to control
Best suited for processing garden organics	Strong odours and dust can be emitted, especially when turning
Unlikely to require Development Application approval from the local authority	Process control is more difficult because aeration and temperature cannot be controlled continuously resulting in unreliable, non-uniform stabilisation and pasteurisation
	Not suited for processing food waste
	Leachate management increases in difficulty and cost the greater is the operational area

2 MAF

The Mobile Aerated Floor (MAF) system was developed in Germany and is in use in a number of countries and falls within the definition of aerated static pile composting. The technology was introduced into Australia in 2009 through the Adelaide based business, Peats Soils and Garden Supplies. Peats Soils has about 18 MAF modules in operation at its Adelaide facilities. The Western Australian based company E Wise (formally Custom Composts) has been appointed as the Australian agents for MAF and currently operates around 30 MAF units at their facility in Mandurah.

Modules can process up to 1,500 tonnes per annum of organic inputs and recent sales indicate each module costs about $A30,000 ex factory from the MAF agent in Western Australia. Additional costs need to be factored in, such as specific training, support services and materials delivery. The composting system works effectively in both wet and dry climates, according to the German owners of the technology, and cites examples in South East Asia where rainfall is high as well as in Adelaide where rainfall is low.

The system is aerobic static pile composting and incorporates an electrically driven air blower feeding a manifold, which connects four large air delivery pipes that sit under the mulched organic material to be composted. Air delivery in regulated by a programmed timer

and the composting process takes about six weeks to complete. The composting pile or block is turned every two weeks during the six week processing cycle.

MAF blower, manifold and air distribution pipes

MAF unit laid out and loading commenced

MAF "block" being loaded

MAF "block" loaded and being processed

Pre treatment

- contamination removal
- partial shredding depending on inputs
- some blending depending on inputs
- wetting to almost saturation before forming the block to be composted

Site area requirements

- Each MAF module requires approximately 15m x 16m (240m2) plus plant access and manoeuvring. This amount of site area will provide for the processing of around 500m3 of organic material. (a minimum of 2 blocks would be required ie 480 m2)

Leachate management

- Entire site operating area requires a leachate management system, including the storage of inputs and the maturation areas

Processing time

- 6 to 8 weeks, but this may be extended by maturing further in windrows depending on the target market requirements.

Plant and Equipment

- Shredder
- Loader
- Screen
- 3 phase power/generator

Odour management

- Odour is controlled by the process of continuous aeration, regardless of the organics inputs. This is a feature of the MAF, as air is delivered through continuous duty cycles as the oxygen is absorbed during composting. Duty cycles are typically 10 minutes with variable on/off air delivery. Greatest oxygen demand is at the commencement of the process when the first block is established.

AS 4454 compliant

- System ensures compliance with the Standard whilst ever the process follows established protocols for quality management.

Direct Costs (does not include externalities)

- Establishment costs include purchase of the MAF modules @ $30,000, site preparation and leachate/surface water management. Specific training and service support will contribute to the establishment costs.
- Operational costs include placement of aeration pipes, loading of organics, turning each two weeks, monitoring, wetting, screening and testing.
- There are examples of composting operations where gate fees are not charged or are minimal for higher quality inputs. However, for municipal applications a figure of $60 to $55 per tonne should be expected to be paid for medium term contracts and quantities greater than 5000 tpa and where the finished product is owned by the contractor.

Throughput

- Each module can process 500m2 per cycle of 6 weeks. Further maturing of 2-4 weeks depending on market demands.

Flexibility

- MAF provides flexibility in forming composting blocks on any level site where electrical power (3 phase) is available to run the units. Although generators can be used as a power source, the constant demand for three phase power can make this option expensive. However, the MAF management company is developing power packs based on liquid petroleum gas as a source of continuous fuel to run a three

phase generator that will be more efficient and cost effective compared to diesel run generators.

Restrictions

A Mid North Coast Council undertook trials and testing to receive EPA approval to include food waste as an input for the MAF. process. It failed to progress beyond the trial phase even though EPA approval was granted. The approval was site specific and was most expensive to achieve. It would be unreasonable to expect a small operation using the MAF technology would be able to include food waste as an input.

Attributes and Detractions

Attribute	Detraction
Low capital cost and low operational cost when compared to windrow composting that requires regular turning.	MAF equipment is not readily available so spare parts should be purchased and retained on site.
Small space requirement, which adds to material handling efficiency due to shorter travel time/distance.	Outdoor activities are impacted by weather which can be difficult to control
Overall more cost effective compared to windrow composting	Dust can be emitted, especially when turning
Suited for processing most forms of organic inputs and may include food waste, biosolids and grease trap wastes with EPA approval	Establishment is essential in ensuring the site is flat so that air delivery pipes are not distorted under load and that excessive water can drain off.
The creation of odours is controlled through air delivery and the fully aerobic composting process.	Although MAF is a relatively simple technology to operate and maintain, formal training in its operation is essential.
Relative simple technology to operate and maintain	Take up of the technology has been slow
Full support service is provided by the Australian agent, including comprehensive training in the MAF system operations.	May require the addition of urea or other nitrogen rich material to meet customer requirements
Few moving parts and minimal equipment is required, which reduces O&M costs and increases reliability.	Each MAF unit takes 6 weeks to process the organic materials and therefore annual processing is limited to about 1,500 tonnes
1.1 kW motors are small users of electricity	Leachate management increases in difficulty and cost
Unlikely to require Development Application approval from the local authority	

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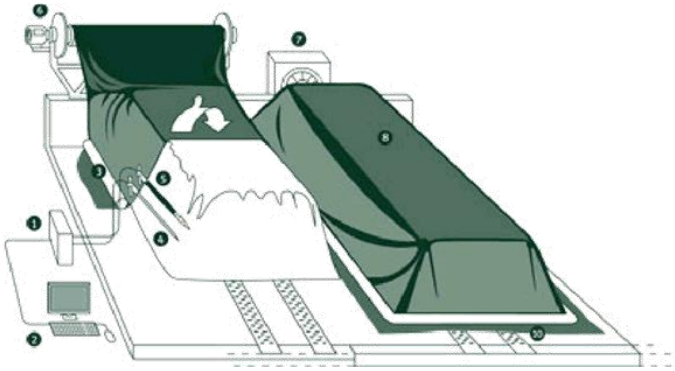
Food waste can be added progressively (daily) to form the composting block	

3 Covered (eg Gore)

Covered is another example of aerated static pile composting and Gore is the propriety name given to a composting system that provides a membrane cover to windrows of organic material whereby odour, oxygen, moisture and temperature are controlled during the composting process. It is an enclosed system and air is provided from channels created in the floor of the processing site and delivery is managed and monitored by remote control systems. The cover is a semi permeable micro porous membrane laminated between two ultraviolet resistant fibres. Being permeable to water vapour and air, it influences the extraction of moisture during the composting process. A fine film of condensate develops on the underside of the membrane in which odours and gases dissolve and drop back into the composting material. This, together with aeration, is key to the management of odours.

Large scale Gore Cover processing

1. Control unit
2. PC
3. Tarpaulin retainer
4. Temperature profile probe



5. Oxygen/Temperature probe
6. Winding gear
7. Ventilator station
8. GORE® Cover
9. Drainage system
10. In-floor aeration channels

Pre treatment

- contamination removal
- partial shredding depending on inputs
- blending and wetting

Site area requirements

- Pre sorting, holding and shredding areas.
- Similar to windrow composting in as much as lengths of Gore cover piles is dependent on the site, plus plant access and manoeuvring.

Leachate management

- Entire site operating area requires a leachate management system

Processing time

- 6 to 8 weeks

Plant and Equipment

- Shredder
- Loader
- Cover placement and retraction equipment
- Screen
- 3 phase power

Odour management

- Odour is controlled by the process of continuous aeration, regardless of the organics inputs. The Gore cover allows the passage of air but retains moisture within the organic material and prevents ingress of rainwater. A fine film of condensate develops on the underside of the membrane in which odours and gases dissolve and drop back into the composting material. This, together with aeration, is key to the management of odours

AS 4454 compliant

- The Gore system ensures compliance with the Standard whist ever quality management is maintained.

Direct Costs (does not include externalities)

- Establishment costs include fixed aeration channels, cover placement and retraction infrastructure, site preparation and leachate/surface water management
- Operational costs include loading of organics, placement of covers, monitoring, wetting, screening and testing.
- For processing contracts that are Build, Own, Operate and Transfer (BOOT) and are undertaken over ten years, have significant volumes, the gate fee would be in the order of $110 per tonne.

Throughput

- Each covered windrow can process a determinable quantity per cycle of 6 weeks. Further maturing of 2-4 weeks depending on customer requirements.

Flexibility

- Given that permanent infrastructure is part of the Gore process, there is little opportunity for the system to be flexible other than in the size of the covered windrow.

Attributes and Detractions

Attribute	Detraction
An enclosed system that is not materially impacted by weather	Specialist equipment with inherent requirements
No issues with dust emissions	High capital cost when compared to windrow and MAF
Low energy consumption	There is evidence that the cover may need to be replaced every five years, which is a significant operational cost
Good process control as compared to windrow composting	A number of moving parts and large covers to manipulate adds to O&M costs and increases wear.
Suited for processing most forms of organic inputs, including food waste, biosolids, grease trap wastes and garden organics.	Likely to require Development Application approval from the local authority
The creation of odours is controlled through air delivery, membrane cover and the fully aerobic composting process.	Is not a simple technology to operate and maintain, therefore essentially confined to operating by specialist contractors.
Highly mechanised and requires little manual effort	Not commonly used in Australia for organics management
Gore is a global enterprise and support services are readily available.	Requires multiple units to enable continuous treatment of inputs
Compost piles can be larger in cross sectional area than for windrow	Leachate management increases in difficulty and cost

management, therefore requiring slightly less site area.	
Delivers approved regulatory conformance.	

4. Tunnel

J R Richards & Sons MRF(foreground) and the Remondis ORRF (background

Tunnel composting is an example of enclosed composting and facilities comprise tunnels of varying dimensions but typically 25-30 metres long, 6 metres wide, 4.5 metres high. Each tunnel is independently operating and includes an air duct system, blowers, process water collection and water recycling systems together with a number of process control features such as temperature, humidity and air pressure. Trenches in the floor are covered with purpose designed timber boards to allow the inflow of leachate and outflow of air to the composting material. Access to the tunnels is by way of large doors that are opened by an electrical winch. During the process, the door is locked hermetically to contain any odour or leachate.

The unprocessed, mixed organic wastes are placed into each tunnel individually and removed by means of a front-end loader after the desired composting time, which can vary from 28 – 35 days for full processing, Each tunnel is equipped with a fan which blows a mixture of fresh air and recycled air through the floor trenches into the tunnel. At the same time surplus exhaust air is being discharged to the bio filter for deodorisation. The mixture of fresh and recycled air can be automatically controlled via the central control computer for each tunnel. Surplus air from the tunnel facility is discharged to the deodorisation bio filter.

The bio filter is usually under cover (roofed) and may be equipped with a sprinkler system depending on the local climate conditions.

Exhaust process air from the tunnel collection duct is drawn via the bio filter fan through the humidifier pit into the bio filter. A pump reticulates water inside the humidifier and establishes a water curtain at the humidifier outlet, which absorbs odorous organic compounds and absorbs dust particles from the exhaust air stream and also conditions air humidity and temperature.

The air distribution channel at the bio filter inlet side ensures consistent loading across the entire filter area. If required, the filter can be segmented to enable maintenance and material replacement works of one segment while bio filter operating continues at a reduced level. Depending on the type of bio filter material used, the material needs to be replaced every one to two years.

Boards shaped to fit air delivery channels

Bio filter before filter material is added

Pre treatment

- contamination removal
- partial shredding depending on inputs
- blending and mixing organic inputs, including wetting if bio solids are not included

Site area requirements

- Pre sorting, holding and shredding areas. Tunnels vary in dimensions but are about 6m x 4m x 25m. Each tunnel would process around 2500 tpa.

Leachate management

- Leachate is controlled within the tunnel and recirculated within the composting process from the leachate holding tank. The exterior site operating area containing raw product requires a leachate management system. When the total production areas are included, the process is leachate positive, that is, more leachate is produced than is consumed.

Processing time

- Generally 3 to 5 weeks, plus maturing in external windrows. Residency time within the tunnel can be reduced to 14 days with maturing being undertaken by external windrowing.

Plant and Equipment

- Shredder
- Loader
- Screen
- 3 phase power
- Biological filter

Odour management

- Odour is controlled by the process of continuous aeration within the enclosed tunnel, regardless of the types of organics inputs. Odour management is supplemented by scrubbing through the biological filter. For facilities including bio solids as an input, there is inevitably some odour issues when the bio solids are blended with green waste before being placed into the tunnels. Some facilities undertake the blending within buildings operating under negative pressure to control odours, with the return air passing through a biological filter.

AS 4454 compliant

- System ensures compliance with the Standard whilst ever quality control measures are maintained.

Direct Costs (does not include externalities)

- Establishment costs include construction of the concrete tunnels, fixed aeration channels, blowers site preparation and leachate/surface water management
- Operational costs include shredding, placement of organics into the tunnel, monitoring and screening.
- Contract rates for gate fees charged vary depending on the length of contract and whether the facility reverts to the principal at the conclusion of the contract. Current rates for Build, Own, Operate and Transfer (BOOT) contracts over ten years would see gate fees in the order of $110 to $130 per tonne.
- Capital cost would be multiples of millions of dollars, depending on the number of tunnels. For continuous processing of inputs, it is likely a minimum of 3 tunnels would be required

Throughput

- Each tunnel can process about 250 tonnes per cycle of 3-5 weeks on average. Maturing for an additional 2-4 weeks. This equates to around 2500 tpa for each tunnel.

Flexibility

- Given the tunnel composting system requires the construction of permanent structures and buildings, there is little flexibility in the process other than variations to the tunnel residency times.

Attributes and Detractions

Attribute	Detraction
An enclosed system that is not materially impacted by weather	Specialist equipment with inherent maintenance requirements
No issues with dust emissions	High capital and operational cost when compared to other systems
Medium energy consumption	Air delivery trenches need to be cleaned regularly
Good process control	Leachate can be corrosive to the tunnel construction. A leachate management system is requied for input stockpiles and the maturation areas
Suited for processing most forms of organic inputs, including food waste, bio solids, grease trap wastes and garden organics.	Safe working systems need to be developed for operating in "confined spaces".
The creation of odours is controlled through air delivery, biological filters, blending areas being enclosed and operated under negative pressure and the fully aerobic composting process.	Is not a simple technology to operate and maintain, therefore essentially confined to operating by specialist contractors.
Highly mechanised and requires little manual effort	Likely to require Development Application approval from the local authority
Tunnel composting has a history in Australia as a proven and effective technology.	Requires multiple units to enable continuous treatment of inputs – probably 3 units
Process manageability is high because the process is enclosed, making temperature, aeration and moisture control easier.	
Approved regulatory conformance.	

5. Inoculated Static Pile (eg Ground Swell)

"City to Soil" was a campaign developed by the Office of Environment and Heritage (OEH) with the aim of promoting the recovery of household organic waste in rural communities and processing this waste into quality compost for agricultural uses. It had mixed success but the program has been discontinued

"Groundswell" was a project born out of the City to Soil campaign and funded from the NSW Environment Trust Urban Sustainability Program. The project was conducted over three years and included participation by a number of Councils in the Central West of NSW.

The Groundswell model was designed to require minimal new machinery or infrastructure by utilising existing landfill or farm machinery, being able to operate with no electrical power and minimal make up water, by not requiring expert composting knowledge, being able to function effectively with variable inputs and to manage environmental factors such as odour, vermin, dust and leachate.

The process saw kerbside sourced food and garden waste collected (but not shredded prior to processing), contamination removed before wetting and then sprayed with a patented microbiological inoculating agent, forming into a windrow and covering with a tarpaulin.

At about 6 weeks, the material was uncovered, turned, re-mixed, re-wet and given another application of microbial inoculants. The pile was re-formed, covered and left for about 6 – 10 weeks. The total composting process took around 16 weeks before the material could be screened ready for marketing.

Pre treatment

- contamination removal
- inoculants applied
- wetting

Site area requirements

- Area requirements vary depending on the desired piles or windrows.

- Leachate management systems appear to be minimal given the piles or windrows remain covered during the composting process.

Processing time

- 16 to 18 weeks. As with most composting systems, the longer the maturing period, the better is the quality of the final product.

Plant and Equipment

- Loader
- Screen

Odour management

- Odour is controlled by the use of the patented microbiological inoculants in combination with covering and turning.

AS 4454 compliant

- Compliance with the Standard has been achieved during the project, as the material is turned and the entire pile reaches the required temperatures for more than three consecutive days.

Direct Costs (does not include externalities)

- Establishment costs, tarpaulins, inoculants and site preparation.
- Purchase and distribution of kitchen tidies and compostable liners (for the trial)
- Operational costs include administration, labour, fuels, plant hire, placement and loading of organics, monitoring, wetting, screening.
- Likely direct operational costs would be in the order of $30 - $40 per tonne, depending on throughput.

Throughput

- Each covered pile can process varying quantities per cycle of 16 - 18 weeks. Maturing is an additional 2-4 weeks. This process seemed best suited to smaller volumes of mostly food waste, though this was influenced by existing plant and infrastructure.

Attributes and Detractions

Attribute	Detraction
Low capital cost	Longer composting period compared to some other processes
Relative simple technology to operate and maintain	Low compost pile heights and long lengths equate to expanded facility size
Suitable plant and equipment is readily	Manual handling of tarpaulins and hold down

available	devices (tyres are typical)
Does not require inputs to be shredded	The finished product was not price competitive
Covered material limits the effect of weather	Was not a main stream activity at the trial sites and has not been taken up as an effective system
Leachate production is minimal	
Odours appear to be managed by the microbial inoculants	
Meets AS 4454 requirements	
Includes all food waste as an input	
Unlikely to require Development Application approval from the local authority	

6. HotRot

The HotRot has its origins in New Zealand and is a fully enclosed composting system, featuring a continuous operation in-vessel composting module unit with a tubular body section with sealed lids. A central shaft runs longitudinally through the vessel and rotates periodically and slowly, providing mixing and assisting with aeration. Fresh organic material can be added and the composted product removed progressively without interfering with the composting process.

Heat is generated during the process through aerobic microbial activity which results in pasteurization with temperatures exceeding 55 degrees centigrade. Both heat and CO2 are drawn off to control the decomposition process and regulate the pH and subsequently convert the organic waste to a composted material over a period of 15 to 20 days. This material is then cured in static piles for about 4 weeks, providing further breakdown by microbial action.

Units are manufactured in a range of four different sizes with processing capacities from around 800 tonnes per annum to 3000 tonnes per annum to meet individual market needs. Multiple units can be installed in parallel to provide increased capacity. The smaller units tend to process concentrations of food waste and sewer sludges. In New Zealand, disposable nappies are composted using the HotRot system.

Hotrot units have been installed in recent years at Lord Howe Island and Kangaroo Island

Pre treatment

- Source separation of organic inputs
- Contamination removal

Site area requirements

- This is a compact system and only requires a small area for the initial composting process. Additional area is needed for maturing in windrows.

Processing time

- 2 to 3 weeks, plus around 4 weeks maturing in open windrows

Plant and Equipment

- Ancillary equipment such as feed hoppers, bin-lifters, augers, conveyors, shredders and dewatering units can all be supplied as part of a turnkey installation offered by the manufacturer.

- Depending on the size of the operation, a loader may be required.
- Screening of the finished product, depending on the proposed use.

Odour management

- Odour is controlled by the enclosed vessel and an odour guarantee is provided by the manufacturer.

AS 4454 compliant

- Compliance with the Standard can be readily achieved.

Cost

- Delivery, establishment costs, including site preparation and power supply.
- Operational costs include loading of organics, power usage, monitoring, and screening and labour would be one full time equivalent person for the smaller operations.
- Capital cost for the 800 tpa (model 1811) is about $440,000, includes in-feed hopper, product discharge auger and package bio filter. Product screen and shredder would be an additional cost. For 2 x model 3518 with a combined capacity of 8,000 tpa, the turn key cost would be in the order of $3m.

Throughput

- Units vary in throughput from around 800 tpa (2.4 tonnes per day continuous) to over 3000 tpa. The manufacturer claims multiple units can be operated in parallel to increase throughput.

Attribute	Detraction
Short composting period	Relatively high capital cost of establishment
Relative simple technology to operate and maintain	More suited to smaller throughput of concentrated food wastes and sludges

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Suitable supplementary plant and equipment is readily available	Few examples of the system in use in Australia (but growing)
Does not require inputs to be shredded if made up predominantly of food waste	May require Development Application approval from the local authority
An enclosed process not affected by the weather	
Leachate production is contained within the system.	
No odour is generated throughout the process.	
Meets AS 4454 requirements	
Includes all food waste types as an input	
The manufacturer will provide a full back up service	
Requires few man hours per day to operate	

Hotrot model 1811 (above) and model 3518 (below)

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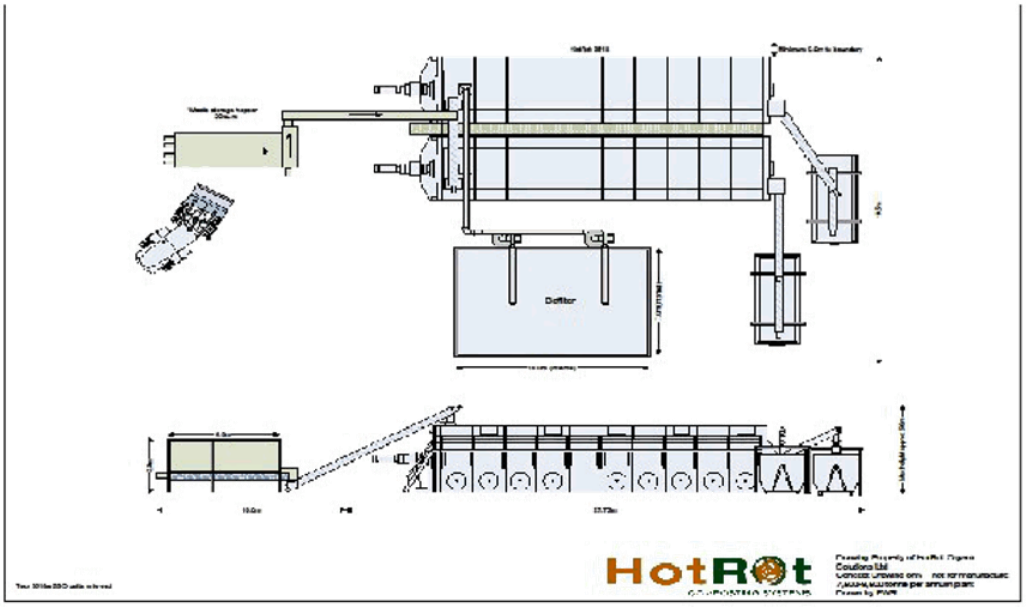
cfs
MTS

Central rotating shaft mixes and aerates



7. Vertical Composting Unit (VCU)

VCU is an in vessel, passively aerated composting system designed to process a wide range of organic residues, such as garden waste, food waste and offal. During the VCU operation, blended organic material is elevated and loaded into the top of the vertical insulated chamber where it progressively descends and composts at a controlled rate depending on the desired cycle rate, which can vary from 7 – 21 days. As the material passes down the system it is subjected to high temperatures arising from the microbiological activity. Stabilised compost is removed from the base of the unit and can then be matured in open windrows or blocks. The VCU plant at Moss Vale was used to treat food and grease trap sludges, mixed with shredded green waste. In 2011 the Council resolved to "mothball" the VCU because it was not considered economically viable. The VCU installed Lord Howe Island has recently been replaced with Hotrot.

Pre treatment

- Contamination removal
- Maceration of food inputs
- Chipping of garden wastes
- Blending to a defined recipe

Site area requirements

- Small area required and limited to the footprint of the VCU. Some area is required for ancillary activities such as chipping of garden waste and maturing of the composted product.
- Storage of makeup water.

Processing time

- 7 – 21 days, plus up to four weeks of maturing.

Plant and Equipment

- Macerator
- Loader
- Screen
- Three phase power

Odour management

- Odour is controlled by the aerobic processing, though the odour management appears not as effective as other aerobic systems.

AS 4454 compliant

- Compliance with the Standard should be readily achievable.

Cost

- Establishment costs, site preparation and leachate management
- Operational costs include chipping, blending, power, loading of organics, monitoring, wetting and screening. For small throughputs, the rate per tonne could exceed $150.
- Capital cost of 5m3 is about $170,000 and ranging to $350,000 for the 25m3 model. Small scale shredder suitable for the 5m3 model would be about $60,000 to $70,000.

Throughput

- The smallest model @ 5m3 would likely process just a few hundred tonnes per annum, yet multiples of the larger model could process thousands of tonnes per annum.

Attribute	Detraction
Short composting period	Relatively high capital cost of establishment and significant operating costs
Relatively simple technology to operate and maintain	More suited to smaller throughput of concentrated food wastes and sludges
Suitable supplementary plant and equipment is readily available	Generates leachate and requires specific leachate management system
Requires small site area	System support from the manufacturer is

	unknown
A largely enclosed process little affected by the weather	May require Development Application approval from the local authority
Meets AS 4454 requirements	Early examples of the VCU were subject to technical and mechanical failures.(failure of bottom rollers and systems blockages)
Includes all food waste types as an input	Does generate some odour
Many examples in operation in Australia (some more successful than others)	Does generate some leachate
	Inputs may need to be macerated and blended (correct recipe)
	More about managing problem wastes than manufacturing compost
	Sensitive to material inputs and requires a trained operator. Moisture balance is important.

Food Macerator

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Vertical Composting Unit

Part 4 - Options

Project Assessment Method

The method used in undertaking the business case assessments is based on measurable costs in dollar values and is not a Net Present Value (NPV), which places values against social and environmental impacts such as landfill gas, traffic, noise, taxes, levies, fuels etc.

The evaluation considers collection costs and the effect on the annual Domestic Waste Management Charge (DWMC) as applied by Council upon residential properties. It also considers the processing costs and how this will affect gate fees and contribute to the DWMC.

The assessments made in the tables represent costs additional to those costs currently being met by Council. Should any of the options be taken up, the annual domestic waste management charges will need to be increased by the corresponding amounts of the option

chosen and gate fees increased. Potential savings in diverting organics from landfill (true cost of landfilling) can be determined when a preferred option has been chosen, but these savings are largely theoretical.

The baseline financial model is structured using the Waste Section actual income and expenditure for 2019/20 together with the projected budgets for 2020/21. This is the "business as usual" view

Each of the 5 options (A-E) have had the cost/income view of introducing changes factored into the model and the cumulative effect demonstrated. For the financial models A, C, D and E, a second model has been prepared and called "Adjusted" where the domestic waste management charge (DWMC) was increased and the income from gate fees doubled to provide a surplus of $100,000. The surplus represents a transfer to reserves that would fund future capital works. Depending on Council's future works program, the surplus may need to be increased to align with the cost of construction, improvement or upgrading works.

Option B is already in surplus and did not required an adjusted model.

The current income from gate fees is modest and should be reviewed. This may include charging for self haul domestic and commercial green waste. Applying fees and charges to all sections of Council where waste is taken to the landfill should be discussed. Failing to apply fees to all sections of Council distorts the true cost of the works being undertaken and the income from the landfill operations

Council may have included the mulching of green waste into the overall site management budget and therefore the cost of mulching as an input into the financial models could be discounted by that allowance.

Kitchen Caddy and Kitchen Tidy with compostable liners

Assumptions (to be read in conjunction with the option modelling)

In endeavouring to make an assessment of the likely cost of providing a weekly organics collection service, only market testing through tendering of the service will provide the true answer. It should be noted that the current collection contract concludes on 30th December 2020 and any decision to embark on an organics collection and processing service with or without food waste as an input should be held back and options to provide these service included in the future collection tender specification

.Preliminary discussions were undertaken with representatives of three composting companies to gauge the likely costs in processing organic materials collected from Narrandera Shire.

Western Composting Technologies are located at Shepparton some 244 kilometres from Narrandera. Their standard gate fee is $120 per tonne and backloads of compost sold for $30 per tonne. The tunnel composting method is used for the processing of organic inputs.

Biomix is located 56k south of Moama and has a gate fee of $79.50 per tonne. Organics could be dropped off at Moama representing a travel distance from Narrandera of 269 kilometres. Biomix would sell compost to Council as a back load for $15 per tonne and Council could re-sell the compost for $30. This sales margin would partly offset some of the transportation costs.

Wormtech P/L is located at Carrathool about 125 kilometres from Narrandera where cotton residue is the major input to their composting operation. Open windrow and vermiculture (worms) are the methods used, where a gate fee of around $55 per tonne would apply (this would increase depending on the percentage of contamination). Perhaps as much as 200 tpa of compost could be given to Council as backloads to promote the use of the Wormtech P/L product and help offset some of the costs incurred by Council in providing an organics collection and processing service.

Should Council include the option of collecting and processing organic waste in the forthcoming waste and recycling collection tender specification, then potential tenderers will undertake their own investigations as to the best arrangement for providing the processing service. The costings provided by Western Composting Technologies, Biomax and Wormtech P/L for this organics options report were budget estimates only based on the assumptions provided. Council should require potential tenderers to indicate where processing would occur as part of the tender return schedules and ensure the processed material complies with Australian Standard 4454

- The cost of providing recycling and general waste kerbside collection services in a new contract starting on or around 1st January 2021 will be in keeping with the costs under the current contract

- Roll out new 240 litre mobile garbage bins for an organic collection service, including kitchen caddy, 2 x 75 bag rolls of compostable liners and supporting information packs $51
- Handling, storage, distribution of replacement compostable liners @ $20 for delivery upon request/replacement.
- Domestic organics collection vehicle travel costs from collection point to the Wormtech P/L composting facility in Carrathool $3.05 per service.
- Loading and transportation for self haul garden waste taken from the Barellan Waste Facility to the Narrandera Waste Facility @$30 per tonne, based on 20 tonne payloads.
- Collection service for kerbside organics taken to the Narrandera Waste Facility @ $2.15 per service
- Processing fee for food waste and garden waste, including contamination removal, at the Wormtech P/L composting facility @ $55/tonne where contamination is less than 1%. Compost to be retained in the ownership of the contractor. Backloads of compost could be free for the first 200 tonnes
- The gate fee for processing food waste and garden waste using Tunnel, Covered (eg Gore) or Hotrot composting based on a ten year Build, Own, Operate and Transfer (BOOT) would be @ $110/tonne. For the small quantities envisaged for Narrandera Shire, it is highly unlikely any of these technologies would be viable to establish.
- The gate fee, or processing fee, required by a contractor includes provision for power, fuels, testing, screening, plant/equipment, salaries, on costs and revenue from compost sales.
- On average, each household would produce 600 kgs of food and garden waste per annum from a weekly service. Of this, 5% or 30 kgs would be food waste.
- Organic waste will be mulched at a cost of $6.13 per cubic metre finished. Five cubic metres of shredded green waste to the tonne.
- The true cost of landfilling is $75 per tonne
- MAF unit $30,000 x 2, site establishment $25,000, leachate management system $100,000 (catch drains, de-leachating well, overflow dam, pumps/rising main, re-injection well with fall protection) 3 phase power extension (provisional sum $15,000) staff training $5,000 **$200,000**
- MAF operating costs, labour (0.5 x FTE), plant hire (10 hours per week @ $60/hr), power ($15,000 pa) testing $400 per test x20 tests pa) **$110,000 per annum**
- Income from sale of compost – 800 tonnes @ $30/tonne **$24,000**
- Interest on loans @ 5%
- Tunnel - $1,000,000 per tunnel with a minimum of 3 required, not including design, site works and approvals
- Weekly organics collection service with materials taken to Narrandera landfill - $2.15 per service

Note – the current transfer to reserves is around $170,000 pa. The adjusted financial models have been worked to produce $100,000 transfer to reserves, therefore current activities would support the adjusted options by $70,000 per annum

Option A – introduce a kerbside organics collection service and include food waste. Transport the collected material to a third party composting facility

Include food waste to the new kerbside organics collection service to be rolled out across the five council collection towns (Narrandera, Barellan, Grong Grong, Pinehill and Nallabooma. Provide kitchen caddies with compostable liners to residents and information packages as a universal roll out. Transport all kerbside collected organics to the Wormtech P/L composting facility at Carrathool for processing. Self haul garden organics for both Narrandera and Barellan to be retained at their waste facilities. This material is to be mulched and used for erosion control, dust management, internal berm construction and as a revegetation medium for intermediate cover and final capping.

Inputs-

- Cost to roll out new 240 litre receptacles, kitchen caddies and liners – 2192 services @ $51 **$111,792** (capital cost year 1)
- Cost to provide kerbside organics collection service and transport the collected materials to Carrathool– 2192 services @ $3.05 per service x 52.2 weeks **$348,988 pa**
- Wormtech P/L gate fee – 2192 services x 600 kgs per annum – 1,315 tonnes @ $55/tonne - **$72,325 pa**
- Shred 500 tonnes of self haul garden organic @ $6.13 per cubic metre finished, assuming 5 cubic metres of shredded material to the tonne - **$15,325 pa**.

Option B- undertake open windrow composting for self haul green waste only as an input

There are examples of successful open windrow composting that simply aim to pasteurise garden organics and sell or give away the mulch in the knowledge that all weeds and seeds have been destroyed and plant and human pathogens killed. A quality control system would need to be established that monitors and records temperatures and sees the windrow turned over at least three times. Testing needs to take place to confirm compliance with AS 4454. .

A front end loader (Council has one at Narrandera) or similar plant would be required to build and turn the windrows and a screen could be hired or purchased to prepare the finished product. Site preparation would be minimal, though leachate management would have to be considered in the site development works. Inputs would need to meet the RRO and RRE requirements. The produced compost would likely have a low nitrogen to carbon ratio and potentially limited market value

A cheaper option would be to shred the self haul green waste, establish small stockpiles of the shredded material, construct small perimeter berms to contain any leachate resulting from direct rainfall and allow the material to decompose. This material could be used on site

as cover material, re-vegetation medium, for erosion control and for dust control. The cost would be limited to shredding and some plant hire

Inputs

- Shred 500 tonnes of self haul garden organic @ $6.13 per cubic metre finished, assuming 5 cubic metres of shredded material to the tonne - **$15,325 pa**.
- Establish a leachate management system - shape working platform to drain to a leachate collection well (concrete or lined earth dam together with emergency overflow dam) install dual pumps and rising main to a dry well located on top of the landfill, or leachate evaporation dam or irrigation area or as make up water for composting, depending on the hydraulic calculations to manage capacity and EPA consents - **$50,000** (capital cost)
- Plant hire (spreading inflows to inspect and remove contamination, separating, stockpile management, turn windrows, feed screen, stockpile outflows, load vehicles) – FEL 5 hours per week x 52.2 weeks @ $90/hour **$23,490 pa**
- Water – 1,000 kilolitres (leachate as make up water) no direct additional cost
- Trommel screen **$15,000** (capital cost)
- Product testing 10 tests per annum @ $400 per test **$4,000 pa**
- Sales – 250 tonnes @ $20/tonne **$5,000 pa**

Option C – self haul green waste and kerbside collected garden organics mulched and used as part of final capping as the revegetation medium and over intermediate cover to achieve surface stabilisation.

This option provides a source of material to be used as the revegetation medium as part of the final capping and for placement over intermediate cover to provide stabilisation by limiting erosion and controlling dust. Inputs would be stockpiled and managed until shredding was undertaken. The shredded material would be kept in manageable stockpiles until used for on-site operational purposes. The stockpiles would have low bunds established around the perimeter to contain leachate generated from direct rainfall

Council should engage a consulting geo technical engineer to develop a long term plan of management for the Narrandera landfill that would include a final landform design, filling (staging) plans, volumetric calculations for landfill residual life, cover/capping quantities and an excavation plan to win cover/capping from a "borrow" area. This long term plan of management would identify areas where final capping and intermediate cover could be progressively applied.

Inputs

- Shred 500 tonnes of self haul garden organic and 1,215 tonnes of kerbside collected organics @ $6.13 per cubic metre finished, assuming 5 cubic metres of shredded material to the tonne - **$52,564 pa**.
- Plant hire (included into the normal daily operational activities) no direct additional cost

- Collection and transport of kerbside garden organics – 2192 services @ $2.15 x 52,2 **$246,000 pa**

Option D – set up MAF composting systems and manage Council's non food waste organic inputs (kerbside and self haul).

One of the major hurdles would be sourcing enough water to support the composting process. Should the MAF option be undertaken by Council staff, then training would be an essential part or NSC would need to align with a suitable contractor to operate the MAF system. Two MAF units should be sufficient to process the likely organic inputs. Council would likely meet all of the capital costs. The produced compost would have a low nitrogen to carbon ratio and potentially limited market value. A Mid North Council currently using MAF for the processing of garden waste simply gives the product away to local residents or uses it as a re-vegetation medium as part of the final capping of the landfill. Quality control is an issue.

Inputs

- Shred 500 tonnes of self haul garden organic and 1,215 tonnes of kerbside collected organics @ $6.13 per cubic metre finished, assuming 5 cubic metres of shredded material to the tonne - **$52,564 pa**.
- Collection and transport of kerbside garden organics – 2192 services @ $2.15 x 52,2 **$246,000 pa**
- Establish a leachate management system - shape working platform to drain to a leachate collection well (concrete or lined earth dam together with emergency overflow dam) install dual pumps and rising main to a dry well located on top of the landfill, or leachate evaporation dam or irrigation area or as make up water for composting, depending on the hydraulic calculations to manage capacity and EPA consents - **$50,000** (capital cost)
- Plant hire (spreading inflows to inspect and remove contamination, separating, stockpile management, turn blocks, feed screen, stockpile outflows, load vehicles) – FEL 5 hours per week x 52.2 weeks @ $90/hour **$23,490 pa**
- Water – 1,000 kilolitres (leachate as make up water) no direct additional cost
- Trommel screen **$15,000** (capital cost)
- Product testing 10 tests per annum @ $400 per test **$4,000 pa**
- Sales – 900 tonnes @ $30/tonne **$27,000 pa**
- MAF unit $30,000 x 2, **$60,000** (capital cost)
- Site establishment **$25,000** (capital cost)
- 3 phase power extension **$15,000** (capital cost)
- Staff training **$5,000** (capital cost
- Staff operations (0.3 FTE) **$27,400 pa**
- Marketing and promotion **$5,000 pa**

Option E – undertake the inoculated static pile system where food waste is an input

The Groundswell trial did not materialise into an uptake of the technology and questions are therefore raised about pursuing this system. If the system were to be taken up by NSC on any sizeable scale, then it is likely it would be subject to the approvals and licensing controls identified in Part 2 of this Options Study. It would therefore be most important to discuss any proposal firstly with the local office of the EPA as kerbside collected organics that contains food waste would be considered as food waste in its entirety thus exceeding the 200 tpa threshold where licensing is required.

Inputs

- Shred 500 tonnes of self haul garden organic and 1,315 tonnes of kerbside collected organics @ $6.13 per cubic metre finished, assuming 4 cubic metres of shredded material to the tonne - **$55,629 pa**.
- Collection and transport of kerbside garden organics – 2192 services @ $2.15 x 52,2 **$246,000 pa**
- Plant hire (spreading inflows to inspect and remove contamination, separating, stockpile management, turn blocks, feed screen, stockpile outflows, load vehicles) – FEL 5 hours per week x 52.2 weeks @ $90/hour **$23,490 pa**
- Trommel screen **$15,000** (capital cost)
- Product testing 10 tests per annum @ $400 per test **$4,000 pa**
- Sales –800 tonnes @ $30 /tonne **$24,000 pa**
- Marketing and promotion **$5,000**

Option F – establish a 3 tunnel composting facility at the Narrandera Waste Facility as the central composting centre for the region and process all kerbside collected organics (including food waste), self haul and commercial organics.

Building and operating a tunnel composting facility is a specialist activity and limited to only three of four companies in Australia. Licensing and development approvals (EPL and EIS) apply to any decision to pursue tunnel composting. The benefits and detractions of tunnel composting were discussed in Part 3 of this options report. There are examples of tunnel composting facilities that draw inputs from neighbouring LGAs, such as at Port Macquarie and Dubbo, but these are large regional centres in their own right and cannot be compared with Narrandera. It is highly improbable that Narrandera could draw sufficient organic inputs from neighbouring Councils to make tunnel composting viable. A recent report commissioned by the regional group NetWaste indicated the cost of a tunnel composting facility capable of processing 20,000 tpa of inputs would be about $8m with repayments taken over 15 years totalling $12m (capital and interest) if funded by Council (interest rate of 6%). Scaling down has been done successfully elsewhere, but 3 tunnels is the minimum size

that allows inputs to be managed progressively. The cost of the tunnels alone would exceed $3m. Design, studies, approvals, licensing, services and site works would add to the cost

The prohibitive capital and operational costs effectively render this option unviable. Similar impediments relate to the Covered (eg Gore), Hotrot and VCU technologies. Modelling of this option has not been undertaken

Financial Modelling for each option

1. **Baseline Model**

Nerrandera Financial Model - Base Model.p

What the Model Reveals

- There is an operating surplus of about $170,000 per annum
- There is no rolling works program for site development or future works
- There is only modest income from gate fees

2. **Option A – introduce a kerbside organics collection service and include food waste. Transport the collected material to a third party composting facility**

Nerrandera Financial Model - Option A.pdf

Nerrandera Financial Model - Option A Adj

What the Model Reveals

- There would be a net operating loss of $280k pa if increased fees and charges were not applied
- The DWMC would need to be increased by around $165 pa from the present $300
- Gate fees would need to be increased to generate double the current takings
- If broken down to its components, the processing cost per premises would be about $0.64 cents per week or $33 per year and the additional collection and transport cost per premises would be $1.00 per week or $52,20 per year.(cost to transport collected organics estimated at $2.15 if taken to the Naraandera Waste Facility and not to the Wormtech P/L facility at Carrathool)

Option B- undertake open windrow composting for self haul green waste only as an input

Nerrandera Financial Model - Option B.pdf

What the Model Reveals

- There is an operating surplus of about $150k (though this is largely because of the current operating factors)
- The cost to produce the compost would be about eight times the revenue from sales

3. **Option C - self haul green waste and kerbside collected garden organics mulched and used as part of final capping as the revegetation medium and over intermediate cover to achieve surface stabilisation**.

Nerrandera Financial Model - Option C.pdf

Nerrandera Financial Model - Option C - Ac

What the Model Reveals

- There would be a net operating loss of $115k pa
- The DWMC would need to be increased by around $97.10 pa from the present $300
- Gate fees would need to be increased to generate double the current takings

4. **Option D – set up MAF composting systems and manage Council's non food waste organic inputs (kerbside and self haul).**

Nerrandera Financial Model - Option D.pdf

Nerrandera Financial Model - Option D - Ac

What the Model Reveals

- Reserves would be consumed
- There would be a net operating loss of $150k pa
- The DWMC would need to be increased by around $98.60 pa from the present $300
- Gate fees would need to be applied to generate about double the current takings

5. **Option E – undertake the inoculated static pile system where food waste is an input**

Nerrandera Financial Model - Option E.pdf

Nerrandera Financial Model - Option E - Ad

What the Model Reveals

- Reserves would be consumed
- There would be a net operating loss of $140k pa
- The cost of studies, approvals and licensing would add to the deficit (these costs have not been factored in because of the uncertainty of the likely financial implications)

Cemetery Review 2020

July 2020

Narrandera Shire Council

Prepared by: Roger Evans

Narrandera Shire Council

1. EXECUTIVE SUMMARY

The Narrandera Shire Cemetery Review has been conducted to examine current service provisions and management procedures and consider options for the future provision of cemetery services. Narrandera Shire Council currently operates six cemeteries across the Shire, each presenting different management challenges. There are also a number of private cemeteries and graves within the Local Government Area (LGA) that Council does not control or manage.

Taking into consideration the evolution of the cemetery, funeral industry and local government's important role in the provision of services and facilities, the need to establish a long-term direction for the care, control and management of public cemeteries is recognised, as well as the ongoing expectations of procedural and operational improvements.

In line with the purpose of the cemetery review, a number of conclusions have been reached with recommendations made to provide a clear and consistent direction for the planning, management and operation of the cemeteries throughout the LGA. These operational improvements and strategic directions take into consideration several key drivers including:

- Public expectations
- Legislative and regulatory requirements
- Industry standards and trends
- Consistency with other LGAs
- Retainment of the key characteristics of the cemeteries within the Shire
- Future demands on the provision of cemeteries.

The following key recommendations have been identified for Council's consideration:

1. Establish a range of clear and concise policies and procedures for the management and operation of Narrandera Shire Council Cemeteries.
2. Improve efficiency of cemetery operations through the purchase of a cemetery management system, specifically developed for cemetery management. The system is to assist with the coordination of records, reservations, and historical data to enable accurate reports to be generated instantly without unnecessary resource strain. The system would include a mapping program capable of capturing and protecting all historical data, including available for public viewing.
3. Improve the efficiency and effectiveness in the planning, management and operation of Narrandera Shire Council cemeteries through the engagement of a specialised consultant to review historical records for accuracy and develop site specific masterplans, complete with future extensions to address requirements of Section 90 of the *Cemetery and Crematoria Act 2013*.
4. Explore the additional staff and resources needed to address the maintenance needs of expanding cemeteries identified in master plans.
5. Ensure future budget allocations are sufficient to meet maintenance works identified within the master plans.

6. Engage a certified consultant to undertake the monument testing as part of the masterplan and cemetery management system project.
7. Acknowledge that under section 90 of the *Cemeteries and Crematoria Act 2013*, Council is required to have a strategic plan (individual plan or overarching) for Council-managed Crown cemeteries.
8. Acknowledge the Voluntary Code of Practice for Cemetery Maintenance - Cemetery Maintenance Guide.
9. Council to explore options for the extensions of the Narrandera Cemetery and recommend that this should be explored through master planning with a specialised consultant.
10. Council to acknowledge the Barellan Lawn cemetery's forecasted capacity statement and support the concept of extending two lawn areas directly south of the existing lawn areas.

2. INTRODUCTION

2.1 Background

Narrandera Shire is centrally located in the Riverina Region of NSW, 554kms south west of Sydney, 339km west of Canberra, 437kms north of Melbourne and 824kms east of Adelaide. The Shire covers an area of 4,116 square kilometres. It sits mid-way between the main regional centres of Wagga Wagga (99km to the east) and Griffith (98km to the west), and marks the transition between the extensive broadacre agricultural areas of the western slopes and plains to the east and the highly productive Murrumbidgee Irrigation Area (MIA) to the west.

The township of Narrandera (population 4,375) is the commercial and administrative centre of the Shire. The town is a district centre servicing Narrandera Shire and the northern part of Federation Shire to the south. Located at the junction of the Sturt and Newell Highways and on the banks of the Murrumbidgee River, Narrandera is also a significant highway service centre as well as a popular location for travellers to stop.

Narrandera Shire Council includes the town of Narrandera and the villages of Grong Grong, Binya and Barellan.

According the 2016 Census undertaken by the Australian Bureau of Statistics, of the 5,853 residents of Narrandera Shire 50.4% of persons were female and 49.6% of persons were male. Approximately 10.1 % of the Shire population identify as being of Aboriginal or Torres Strait Islander descent. Of the entire Shire population 20.0% were aged 0-14 years, 10.5% were aged 15-24 years, 47.4% were aged 25-64 years and 22.1% of the population were aged 65+.

The 2018 estimated residential population for Narrandera (A) is 5,931 People. This represents a 1.5% increase from 2016 when the population on Census night was 5,842 people. In 2011, the population was 5,900. The annualised population growth rate for Narrandera (A) is -0.2%.

Age refers to a person's age at last birthday. The 'Age' profile of the resident population details the age distribution within the region. The 50-59 years cohort is the most common with 874 people.

Table 1: 2018 Age Profile

Cohorts	Narrandera (A)
0-4 years	396
5-9 years	480
10-19 years	667
20-29 years	526
30-39 years	607
40-49 years	675
50-59 years	874
60-69 years	788
70-79 years	480

80-89 years	286
90-99 years	52
100 and over	11
Total	5,842

2.2 Cemetery Service Review Background

In 2014 Narrandera Shire Council undertook an organisational review conducted by Blackadder Associates. The purpose of the review was to:

- Review the operations of the Council generally.
- Review the organisation structure down to manager level.
- Evaluate the culture of the organisation.
- Assess the efficiency of operations.
- Evaluate service delivery options.
- Undertake a high-level review of the 34 functional areas (later changed to groupings to reduce the number).

The review sought to identify opportunities for improving the organisation, particularly in the strategic context, the culture of the organisation, the leadership required for the future and the systems and processes that will assist in improving culture and delivering on the strategy.

The review focused on a number of recommendations and although the Cemetery Service Review was not listed in the Blackadder report, Council identified the need to conduct a cemetery service review given following issues, findings and recommendations had been documented in the organisational review as follows:

Issue 2.4	The cemetery is a Council business and should have a business plan. Many other Councils have a positive return on investment from their cemeteries.
Findings	As a Council business there should be a Business Plan for the future development of the Council cemetery.
Recommendations	That the General Manager arrange for a Business Plan to be developed for the Council cemeteries.

2.3 Purpose of This Review

The purpose of this Cemetery Review can be broken down into four key focus areas

1. Identify opportunities and changes to management practices to improve efficiencies and cost control.
2. To establish service levels related to industry standards and Council expectations.
3. To establish costs and budget where service levels differ from current service levels.
4. To document processes to enable more efficient delivery of the service.

This study is not a performance review of the Open Space and Recreation team members or contractors. The report addresses levels of service and how these will be retained and improved in the future.

2.4 Objectives of the review

There are three key components identified as the objectives of the review:

2.4.1 Productivity

a. Seek opportunities for cost savings of 2.5% for labour and materials to maximise operational efficiencies.

b. Investigate a staff structure that supports this service and recommendations for improvements to work process (specialised cemetery training).

c. Establish a base cost for maintenance services in Lawn areas and Monumental sections.

d. Establish a target (benchmark) for maintenance services for Lawn, Old Section and Outer areas at all cemeteries managed by Council.

2.4.2 Risk Management

a. Identify Council's obligation to contractors and volunteers working onsite and document a process to ensure procedures are adhered to.

b. Identify risks associated with monuments and document who is responsible for the repair or replacement, also detailing a considerable number of unapproved monuments.

2.4.3 Asset Management

a. **Review** the current cemetery policy and update to reflect current operational standards.

b. Explore the use of cemetery specific programs GIS mapping to locate plots for immediate customer feedback regarding ancestor searches and to assist with reservations of plot.

c. Investigate and Implement appropriate entrance signage to outline rules and regulations with monuments, ornaments, and vases.

d. Investigate documenting relevant historical information for public viewing to be signposted at the cemeteries.

e. Determine the useful cemetery life based on current operations and population forecasts and identify future strategies for capital upgrades and requirements for growth through a long-term capital works program.

2.5 Review Tasks

The key tasks involved in preparing this Review included:

1. Identifying all cemeteries currently under Council management.

2. Review Cemetery Policy and Procedures for burials including private land burials within the shire.
3. Identify Council obligations and liability in accordance with the *Cemeteries and Crematorium Act 2013*.
4. Identify monument and ornament management in line with current standards.
5. Assess plant productivity
6. Explore technology options to improve outcomes (specific management systems GIS).
7. Assess current operations ground maintenance and irrigation methods.
8. Review contractor and volunteer management.
9. Evaluate aesthetics and ensure a safe environment for residents and visitors while maintaining the aesthetics of the cemetery, including row numbering of old sections.
10. Evaluate the current maintenance schedule addressing optimal maintenance timing.
11. Review current booking and approval processes.
12. Review management of customer requests (GIS data and signage versus labour-intensive methods).
13. Identify the need for an NSC Cemeteries master plan/strategy.
14. Budget Control (10-year plan to address master plan).
15. Capacity statement of each cemeteries to ensure effective future planning.

3. COUNCIL OBJECTIVES AND PRIORITIES

3.1 Narrandera Shire Community Strategic Plan

Council's objectives and priorities are conveyed through the Narrandera Shire Community Strategic Plan 2012 – 2030.

Council's vision for Narrandera Shire is: we are a prosperous, diverse, and sustainable community, built on a deep sense of trust, care and commitment for each other and our environment.

Council's key strategic themes are:

1. A strong and resilient community and sustainable environment.
2. A growing economy.
3. Quality and sustainable infrastructure.
4. Efficient and responsive services.
5. Trusted and effective Government.

Council has developed a range of strategies and actions to deliver on these Strategic Directions, with responsibility for undertaking the actions allocated to Council departments.

Council's Open Space and Recreation section is solely responsible for all services in relation to the management of all six of the Cemeteries under Council's management.

The broad areas of control of the Open Space and Recreation section:

- Parks, including Memorial Parks – ensuring all green space is accessible and well maintained for the public.
- Gardens and Streetscapes - ensuring all gardens and streetscapes are ascetically pleasing.
- Reserves - by developing and overseeing plans of management which foster water sensitive urban designs, land conservation and high presentation standards of open space and recreation areas.
- Tree Management Strategy and Streetscape Planning - by coordinating and developing action plans that support the implementation of Council's tree management strategy and minimising public risk to Council.
- Management of Sporting Facilities - by developing and overseeing facility management policies, venue bookings, and facility utilisation and works programs, including events.
- Biosecurity - by ensuring Council's legislative requirements are met, weeds management priorities are in line with regional strategies and management plans, protecting the economy, environment, and community from the negative impacts of pests and diseases, weeds and contaminants.
- Capital project - development, funding applications and delivery.
- Cemeteries – Adhering to the requirements of the *Cemeteries and Crematoria Act 2013* and the Cemeteries and Crematoria Regulation 2014 and the relevant objectives including demonstrating satisfactory levels of accountability, transparency, and integrity.

3.2 Open Space and Recreations Role within the Organisation

Public open space provides significant benefits to communities. These benefits include protecting biodiversity, improving psychological health and wellbeing, improving physical fitness, facilitating social interaction and cohesion, promoting community pride, and enhancing child development through play. Open space also provides a location for participating in civic life.

Open Space and Recreations core functions are:

- To ensure long-term planning, management and development of open space and recreation areas within Narrandera Shire Council, including parks, reserves, lake and beaches, and associated facilities such as sporting grounds and recreational areas, amenities facilities, walking tracks.
- To provide an opportunity for the community to connect and live healthy and active lifestyles.
- To ensure Council's most valued assets are well maintained and continue to meet the needs of the community.
- To improve the lives of existing and future Narrandera Shire residents and visitors, by delivering infrastructure that supports health and well-being outcomes and encompasses biodiversity values.

4. PRODUCTIVITY

4.1 Cemeteries Currently Under Council Management

Given the importance of cemeteries and that users will often be experiencing intense feelings, staff endeavour to ensure that cemeteries are welcoming and aesthetically pleasing.

Narrandera Shire Council manages three fully operational cemeteries. (Fully operational cemeteries provide for burial and memorialisation through reservations or at the time of need).

4.1.1 Narrandera Cemetery Including the Commonwealth War Graves

Narrandera Cemetery is located at the western end of Douglas Street, Narrandera, and was dedicated for this purpose in 1860. Research in the General Cemetery area indicates that the earliest memorialised interment dates from the year 1886. Narrandera Cemetery is one of the oldest in the area and as such forms an integral connection with the history of the entire region.

The Cemetery is controlled and managed by Council whose main objective is to provide and maintain an aesthetically pleasing environment that is sympathetic to its purpose. It has a monumental section, a lawn cemetery, a niche wall, Chinese Graves, and War Graves section. Due to soil type being primarily sand, only single depth graves are permitted in the Lawn areas.

4.1.2 Barellan Cemetery

The Barellan Cemetery is located east of Barellan with the access road being 1.5km east of the township along the Burley Griffin Way. It was dedicated in May 1909. The Barellan Cemetery has two lawn areas for interment, a monumental section, a niche wall for the interment of ashes and a rose garden for the interment of ashes.

4.1.3 Grong Grong Cemetery

The Grong Grong Cemetery is located on Lachlan Street East of the Newell Highway at the Northern end of the village. It was dedicated in November 1894. The Grong Grong Cemetery has a monumental section and a niche wall for the interment of ashes.

Each operational cemetery has both burial sites and ashes memorial options.

4.1.4 Other Cemeteries

Narrandera Shire Council also manages three non-operational cemeteries (closed or historical cemeteries that have either reached physical capacity or have been closed to burial and memorialisation for other reasons). Such cemeteries are typically older and have historic significance locally or at a broader level.:

- Colinroobie cemetery – Located on Bunganbil Road, Colinroobie Cemetery was vested to Council's management from Crown Land in 2019. The are several monuments located at the cemetery.
- Old Grong Grong cemetery – Located adjacent to the Grong Grong cemetery, the cemetery is bushland with no monuments located at this cemetery.
- Narrandera Pioneer Cemetery – Narrandera Shire Council agreed to take over the management of the Pioneer Cemetery in 2018 when the Cemetery Trust formally

dissolved. The cemetery contains very old graves of some of Narrandera's earliest inhabitants. It is now grassed over and only the headstones are evident. The inscriptions are still quite clear on most of the gravestones.

Maintenance activities for these sites involve vegetation and vermin control.

Details of Council's cemeteries, including their categorisation in terms of the above groups, are outlined in Table 2.

Cemetery	Address	Lot Description	Cemetery Type	Lot Size (approx.)
Narrandera	Douglas street Narrandera, 2700	Lot305 DP 751719 Lot 306 DP751719 Lot 7007 DP1024998 Lot 7033 DP1023995 Lot 1 DP1158505 Lot 1 DP 179974 Lot 7030 DP105003 Lot 7008 DP 1025002 Lot 1 DP 179974 Lot 7032 DP1023995 Lot 1 DP668097 Lot 7009 DP1024999	Fully Operational	9ha
Barellan	Barellan Cemetery Rd Barellan, 2665	Lot 7001 DP94878	Fully Operational	2.7ha
Grong Grong	Lachlan St Grong Grong,2652	Lot 7300 DP1136149	Fully Operational	4.5ha
Old Grong Grong	Windamere road Grong Grong,2652	Lot7301 DP 1135839	Closed or Historic Cemetery	
Colinroobie	Bunganbil road Colinroobie	Lot7002 DP94882 Lot 7300 DP1158264	Closed or Historic Cemetery	8ha
Pioneer	Lake Drive Narrandera, 2700	Lot 46 DP751719	Closed or Historic Cemetery	1.5ha

4.2 NSC Cemetery Service – Current Operations

In terms of cemetery management there are six key maintenance principles that apply with cemeteries, these are:

- Welcoming - providing a strong sense of place for visitors.
- Safe - enabling people to move around the cemetery in a safe manner.

- Efficient maintenance processes and cemetery design - to create ongoing efficiencies, in the short and the long-term.
- Serviceable - publicly accessible, as well as places that have discrete operational needs.
- Accessible - meeting appropriate inclusive access standards wherever possible.
- Sustainable including economic, social and ecological - choices made now will also affect perpetual maintenance.

Council provides for a substantial number of cemetery services - averaging around 66 interments per year. It has the care and maintenance of three operational cemeteries along with the general upkeep of three non-operational cemeteries that have been vested to Council in recent years.

In providing the above burial services, and in caring for the perpetual maintenance of the cemeteries, Council staff undertake the following activities:

- Management and maintenance of interment infrastructure to enable supply of burial plots and ash placements including:
  - Gardens and walls associated with ash placement opportunities.
  - Provision of concrete beams associated with burial plots.
- Liaison with the bereaved, funeral directors and the public:
  - To facilitate the sale of plots, issuing of burial permits etc.
  - Provision of information and discussion of options for interment.
  - To assist the public in the location of a grave site / other historical enquiries.
- General maintenance including:
  - Mowing, weeding, graffiti removal, etc.
  - Minor infrastructure maintenance and improvements to facilities such as seating, fencing and pathways.
- Management of contracts:
  - For infrastructure/major capital works such as concrete beams, ash niche walls, roads, and signage.
- Graveside assistance at burials and ash placements including:
  - Grave digging.
  - Provision of shelter.
  - Ensuring occupational health and safety around the grave site.

4.2.1 Current Service Level for Operational Cemeteries

- Lawn areas maximum 65mm height.
- Areas fully serviced prior to significant events (Easter, Christmas, ANZAC Day, long weekends, public holidays, etc)
- Trees assessed in accordance with Quantified Tree Risk Management principles and maintained in line with Narrandera Shire Councils Tree Maintenance and Replacement program identified in the NSC tree Audit
- Irrigation tests conducted weekly in warmer seasons

- Flowers left and ornaments left in place for one month after interment
- Narrandera Cemetery toilets cleaned weekly.
- Burials to approved and excavated as requested where practical, priority given to excavation and backfilling, in the event of multiple burials or forecasted weather extremes grave to be excavated and covered with appropriate signage where practical.
- All graves at Narrandera Lawn excavated to a depth of 1.5m minimum.
- Customer requests addressed within one working week dependent on the complexity of the request.
- Top dressing conducted four times per year.

4.3 Base Cost for Current Service Level

LAWN A1,A2,A3,A4	fregency	Growing season	non growing season	PLANT no	cost/hr/km		TIME/KMS		staff	cost		EACH TIME	YEARLY			
EDGING	4 HOURS	9 MONTHS OF YEAR	3 MONTHS OF YEAR	LABOURER	$ 37.59		4	hr	2	$ 300.72		$ 329.72	GROWING SEASON (fornightly)	$ 5,334.96	$ 6,924.12	Total cost Turf maintinance Lawn cemetery $37379.76
				UTE	$0.50	km	10	km	1	5			NON GROWING SEASON	$ 989.16	Total cost for edging per year	
				P4140	$3	hr	4	hr	1	12						
				P4141	$3	hr	4	hr	1	12						
BLOWING	2 HOURS	9 MONTHS OF YEAR	3 MONTHS OF YEAR	LABOURER	$ 37.59		2	hr	1	$ 75.18		$ 90.18	GROWING SEASON (fornightly)	$ 1,623.24	$ 1,893.78	
				UTE	$0.50	km	10	km	1	$ 5.00			NON GROWING SEASON	$270.54	Total cost for edging per year	
				P3308	$5	hr	2	km	1	$ 10.00						
WHIPPERSNIPPING	2 HOURS	9 MONTHS OF YEAR	3 MONTHS OF YEAR	LABOURER	$ 37.59		2	hr	2	$ 150.36		$ 176.36	GROWING SEASON (fornightly)	$ 3,174.48	$ 3,703.56	
				UTE	$0.50	km	10	km	1	$ 5.00			NON GROWING SEASON	$529.08	Total cost for edging per year	
				P3340	$4.50	hr	2	hr	1	$ 9.00						
				P4050	$6	hr	2	hr	1	$ 12.00						
moving ornament/flowers	2 HOURS	9 MONTHS OF YEAR	3 MONTHS OF YEAR	LABOURER	$ 34.29		2	hr	1	68.58		$73.58	GROWING SEASON (fornightly)	$1,324.44	$ 1,545.18	
				ute	$0.50	km	10	km	1	5			NON GROWING SEASON	$220.74	Total cost for edging per year	
Mowing	growing season 8.5hrs	9 MONTHS OF YEAR	3 MONTHS OF YEAR				Growing	Non Growing		Growing	Non Growing		$22,575.06		$25,227.42	
				LABOURER	$ 37.59		8.5	6	1	$ 319.52	$ 225.54	$ 1,254.17				
				PLANT OPERATOR	$ 40.43		8.5	6	1	$ 343.66	$ 242.58					
				P2763	$30	hr	8.5	6	1	$255	$180	GROWING SEASON	GROWING SEASON (fortnightly)			
				P2764	$31	hr	8.5	6	1	$263.50	$186					
	non growing season 6hrs			trailor P2620	$5	hr	8.5	6	1	$42.50	$30		$2,652.36			
				ute	$0.50	km	60	40	1	$30.00	$20.00	$ 884.12				
												NON GROWING	NON GROWING SEASON		Total cost for Moving per year	
OLD SECTION	fregency	growing season	non growing season	PLANT no	cost/hr/km		TIME/KMS		staff	cost		EACH TIME	YEARLY			
Moving in between graves	17 Hours	9 MONTHS OF YEAR	3 MONTHS OF YEAR	LABOURER	$ 37.59		17	hr	1	$ 639.03		$ 2,111.34	GROWING SEASON (5 times in growing season)	$ 10,556.70	$ 12,668.04	Total cost Maintaining grass old section $24712.56
				PLANT OPERATOR	$ 40.43		17	hr	1	$ 687.31						
				P2755,	$20	hr	17	hr	1	$ 340.00			NON GROWING SEASON (once per 3 mths)	$ 2,111.34	Total cost for Moving per year	
				P2761	$20	hr	17	hr	1	$ 340.00						
				ute	$0.50	km	40	km	1	$ 20.00						
				trailor P2620	$5	hr	17	hr	1	$ 85.00						
mowing-Large outer areas	6.5 Hours	9 MONTHS OF YEAR	3 MONTHS OF YEAR	PLANT OPERATOR	$ 40.43		6.5	hr	1	$ 262.80		$ 522.80	GROWING SEASON	$ 9,410.31	$ 10,978.70	
				P2757	$40	hr	6.5	hr	1	$ 260.00			NON GROWING SEASON	$ 1,568.39	Total cost for Moving per year	
whippersniping	8.5 Hours	3 TIMES A YEAR		LABOURER	$ 37.59		8.5	hr	2	639.03		$700.03	$ 2,100.09	yearly cost	$ 2,100.09	
				ute	$0.50	km	20	km	1	10					yearly cost for whippersnipping old section	
				P4050	$6	hr	8.5	hr	1	51						

Figure 1 Base Cost – Current Service Level

PEST AND WEEDS																	
spraying	3 TIMES A YEAR		RAZE	$150		3 TANKS			150		$ 1,018.08	$ 3,054.24			$ 4,094.24	
			SPRAY OPERATOR	$ 39.84		17	hr	1	$ 677.28							
			SPRAY UTE P2343	0.52	km	40	km		$21							
			SPRAY UTE PUMP	$10	hr	17	hr		170		per application	Yearly cost				
	2 TIMES YEAR		BROADLEAF	$250		3 TANKS			$ 250.00		$ 520.00	$ 1,040.00				
			SPRAY OPERATOR	$ 39.84		5	hr	1	$ 199.20							
			SPRAY UTE P2343	0.52	km	40	km		$ 20.80							
			SPRAY UTE PUMP	$10	hr	5	hr		$ 50.00		per application	Yearly cost				
FILLING IN BURROWS	8.5 hours	2 TIMES YEAR	LABOURER	$ 37.59	hr	$ 68.58		2	582.93		$ 617.93	$ 1,235.86			$ 1,235.86	
			UTE	$0.50	km	20	km	2	$ 10.00			Yearly cost			Yearly cost	
			SAND	$25	M^3	1		1	25							
Baiting			LABOUR	$ 9.00	hr											
			UTE	P2224												
			BAITS													
WEED CHIPPING			LABOURER	$ 37.59												
			UTE	P2243												
Garden																
MAINTENANCE	2 hours	a week	GARDENER	$ 47.53		2	hr	1	$ 95.06		$ 4,943.12					
			UTE	$0.50	km	10	km	1	$ 5.00		$ 260.00	$ 5,203.12			$ 5,203.12	
												Yearly cost			Yearly cost	
maintenance on graves	8.5 hours	4 times a year	LABOURER	$ 37.59		8.5	hr	2	$ 639.03		$ 649.03	$ 2,596.12			$ 2,596.12	
			ute	$0.50	km	20	km		$ 10.00			Yearly cost			Yearly cost	
			soil	$50	m^3											

Figure 2 Base Cost – Current Service Level

Observations and Assessment:

- Based on the information provided in figure 1, staff are continually seeking more efficient options to deliver the quality service that is expected by the community and Council. Staff have adjusted their maintenance activities over the last 5 years. Adjustments to activities include broadleaf spraying of the general section and trailing the use of growth retardants to limit the frequency of mowing in lawn areas.
- With the required expansion of the lawn areas, there is an increase in mowing and irrigation cost but will reduce the weed control actions along with increase the ascetics of the area.

4.4 Structure of OSR Section

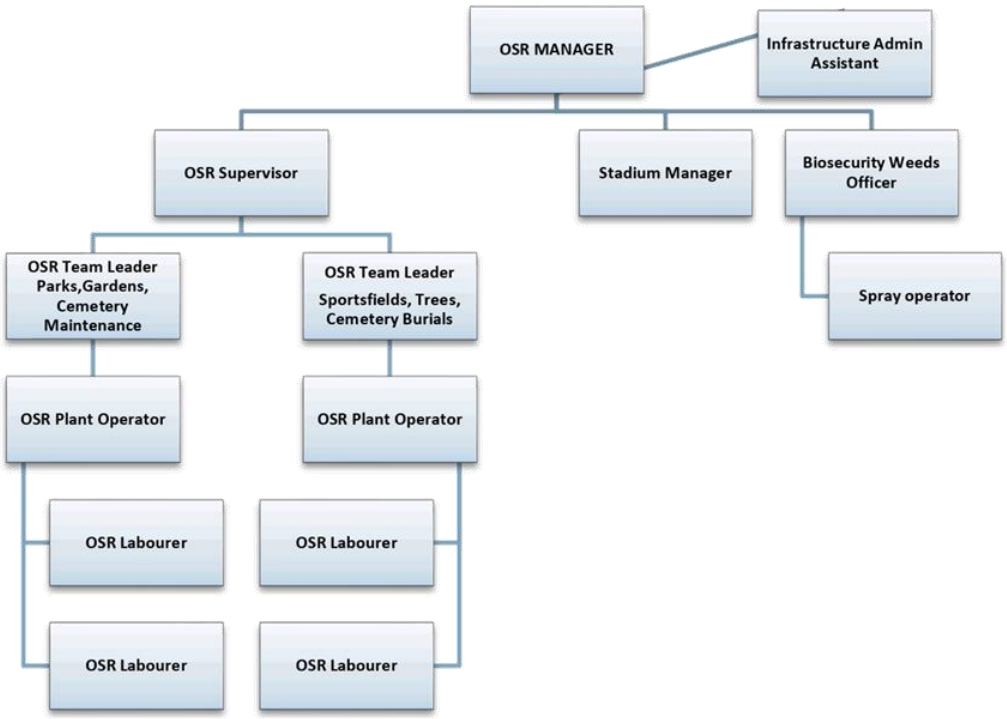

Figure 3 Current OSR Structure

The OSR section has introduced a two-tiered structure in 2019/20, the restructure was introduced to ensure priority works can be accomplished without influencing the general operations. Previously the structure only comprised of a supervisor and one team leader with no real succession planning in place. It was clear that the size diversity of the OSR core areas of management required a new structure to ensure all priority areas were addressed

without the unnecessary direction from management. Staff are still required to multi-task and reprioritise works schedules, but this is directly related to the size of the team.

The structure has been proven to be both more efficient and efficient compared to the previous structure.

Staff now have career pathways to progress into higher specialised positions and they have opportunity to undertake specific training in core areas without having an impact on the day to day operations of the unit.

Staff are responsible and accountable for designated sections and take pride in their work. This is evident with the weekly and monthly schedules as staff are proactively scheduling the priorities and amending the schedule to ensure other tasks get addressed according to priority. This scheduling also assists with forecasted leave as staff have demonstrated that some tasks, like planting or turf laying, have been bought forward if some members were planning on taking leave.

4.5 Key Responsibility Areas and Essential Tasks

In conducting the Cemetery review it is essential recognised the roles of OSR staff and the core areas of management in order to accurately establish a level of service that can be effectively sustained. The OSR structure has evolved over the last five years, with a team leader replacing the previous gardener positions allowing for a two-tiered structure to focus on key areas of management, this has also assisted with responsibility and accountability of tasks. The structure is also focused on succession planning, offering staff a pathway to progress into all areas of management. Although staff are still required to multitask, the current structure allows staff to undertake specialised training and will also incorporate apprenticeships as opportunity presents.

Below is a broad overview of the key areas of responsibility and the tasks being performed by the OSR and Biosecurity section:

- The Open Space and Recreation Manager (OSRM) is responsible for all aspects of the Open Space and Recreation including Council-managed Crown reserves, Lake Talbot and the Narrandera Wetlands, Cemeteries, sporting venues and user groups, parks, amenities, playgrounds, trees and biosecurity.
- In relation to cemeteries management, the role is responsible for the management and coordination of all cemetery operations including reporting, record keeping, customer service and the development long term plans and strategies to ensure Council-managed cemeteries are well maintained and managed in accordance with industry standards and current legislation.
- The Infrastructure Administration Assistant is responsible for all administration activities associated with the infrastructure section. In relation to cemeteries, the Infrastructure Administration Assistant is primarily responsible for record keeping, reservations, customer service and inquires, plot locations.
- The Open Space and Recreation Supervisor (OSRS) is primarily responsible for coordinating fortnightly works schedules for parks, tree maintenance, sports fields, playground maintenance, reserves. In relation to cemeteries the position is responsible for scheduling cemetery maintenance operations, plot locating and burials.

- The Open Space and Recreation Team Leader (OSRTL1) is responsible for conducting grave digging operations. The position is also responsible for conducting tree maintenance, Playing field maintenance, playground maintenance. This position has a crew of three staff.
- The Open Space and Recreation Team Leader (OSRTL2) is responsible for general ground and garden maintenance operations within the cemeteries. The position is also responsible for conducting garden maintenance in the CBD, small parks, entrances, reserves, memorial gardens, cleaning Toilets, BBQ areas, walking tracks and footpaths. The position has a crew of three staff.
- One-two casual staff have been employed where savings can be made within the operational budget to fund their employment.
- The Barellan grave digging contractor is employed directly by the funeral directors to carry out grave digging operations when available.

Given the resources available there is often a requirement for staff members to share roles and responsibilities to ensure priority tasks can be competed to a high standard and within an acceptable timeframe. **Cemetery burials take priority over all other tasks.**

Observations and Assessment:

The review discussed possible options for the employment of designated cemetery staff for the maintenance and operations of the cemeteries including grave digging. Work options discussed:

Week 1: 4 days located at Narrandera Cemetery and 1 day in Grong Grong conducting cemetery general maintenance on the cemetery and town

Week 2: 2-3 days at Narrandera Cemetery and 1-2 days at Barellan conducting cemetery and town maintenance

- Cost – employing a full-time staff member for the cemetery operations would cost $69,030.39 per year. Additional plant would also be needed. At times of burial, a second staff member would also need to assist.
- The position would assist with an increase in service level. The review group acknowledged that the current structure proactively maintains the current service level that appears to meet the community's expectations at this current period of time.
- The overall cost of the position could be offset by an increase in fees and charges, but the review group acknowledge this may not be received well by the wider community.

The review group concluded that although the additional position and plant will be of great assistance allowing staff to focus on other core areas, the inclusion of a designated cemetery position should be explored in future masterplans, as the cemeteries are continually expanding and a higher service level will be required.

RECOMMENDATION 1

1.1: The review Group recommend that additional staff should be explored within three (3) years, future masterplans should reflect staffing needs along with the maintenance needs as cemeteries continue to expand, theses masterplans should also take into consideration the expansion of areas that OSR service.

4.6 Essential Specialised Skills Associated with Cemetery Operations

- Staff have completed specialised grave digging training to ensure the organisation is operating in accordance with industry standards and also to minimise any risk to Council.
- Staff also have horticultural certification along with arboriculture training.
- Staff use Quantified Tree Risk Assessment (QTRA) principles when assessing and reprioritise tree works. Tree maintenance priorities are detailed in the Tree Audit and Tree Management Plan which is referred to by staff when planning tree works.

4.7 Historical and Cemetery Records

Figure 4 Council Cemetery Records

It is believed that Narrandera Shire Council was vested with the management and coordination of interments at cemeteries within the Shire in the 1960s. Churches were responsible for interments and interment records prior to 1960s.

It is evident that some records have either been misplaced, not been passed onto Council, were inaccurate, or interments not recorded or lost during fire events. Due to these reasons it has been difficult for staff to provide accurate information to relatives for information requests prior to Council's time of management.

Council staff utilise the following records, maps and journals to coordinate cemetery operations and address requests:

- Five (5) original cemetery maps for Grong Grong cemetery.
- One (1) original Map for Barellan Monumental sections 1955.
- Five (5) journals for Narrandera
  - General section 1900-1925
  - General section 1926-1942
  - General section 1958-1992,
  - General Church of England 1942-1958
  - Lawn area 1 1979 – present day
- One (1) Journal containing record for Barellan 1967-1994 and Grong Grong 1965-1993
- Eighteen (18) historical records that consist of permits and reserve certificates, staff uses these records to assists with historical information requests.
- Administration staff currently use a spreadsheet to document, record interments and reservations.

Figure 5 Barellan Cemetery map

Council staff undertook a site survey of all three operational cemeteries in 2007. The GPS coordinates were plotted and all interments along with reserve were recorded. This information is accurate with what is evident onsite but cannot be relied upon for all unmarked graves.

The image below is the mapping of Narrandera cemetery. The contracting plot colours indicate interments and reserved plots.

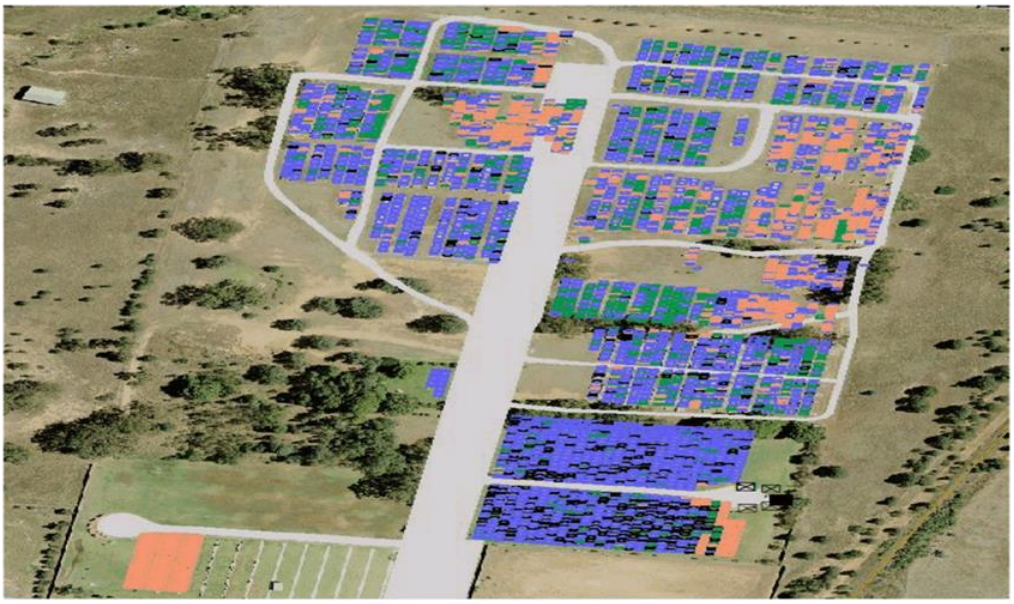

Figure 6 Narrandera Cemetery GIS plot locations 2007

There are unmarked graves at all cemeteries as this was not uncommon prior to 1960 - it is believed some graves were not recorded if the fees could not be finalised at the time of burial.

A common practice of past grave diggers was to use a system where a glass flower jar is placed at the head of each used plot. Councils current practice is to probe graves to find evidence that the plot has been used when request is received for a burial at an old grave site.

In 1988 the Griffith Genealogical and history society surveyed and documented monumental inscriptions and burial records of cemeteries located in the Narrandera District including Ardlethan, Barellan, Ariah Park and burials on private properties.

All attempts have been made to keep all Council-managed cemeteries coordinated, neat and symmetrical, but as is the case with all monumental sections there has been a period where the graves and monuments are out of line with other sections. Staff have been required to reline new graves at these sites.

Due to the increase in “find a grave” web services becoming readily available to the general public, Council has seen a sharp increase of the number of information requests to located ancestors. These requests occur in a frequently with up to two requests per week and can be n very time consuming, taking between thirty minutes to four hours to address. This is directly dependent upon how readily available and accurate the information as staff attempt to cross check the information to ensure it is accurate.

Observations and Assessment:

- The review group identified that a more efficient record system is needed. This would increase customer satisfaction and staff productivity.
- Council should acknowledge the services of the Infrastructure Administration Assistant who addresses the historic requests on a weekly basis with the current record system council has in place. The need to create and document a burial process had been identified during this review. The process has since been completed. The process ensures that other staff can utilise this document to ensure interments can take place in the absence of key cemetery management staff.
- Council should acknowledge the possible inaccuracy of some historical records give the transfer of records is not an issue with current or previous staffs skills or expertise but is directly related to the inconsistencies with record keeping during the period prior to 1960
- Council to investigate the purchase of a suitable cemetery records, booking, mapping system to ensure Council's record keeping and reporting requirement meet industry standards and increase customer satisfaction. Staff investigated two suitable cemetery management systems with the cost ranging from $100 to $2,000 per month and $10,000 to $45,000 for the program and install. All current records should be reviewed and cross check for accuracy before implementing a management system, this should be done by an external consultant that specialises in this area.
- Entrance signage, row numbering and mapping should be considered to assist with locating specific plots in all sections. Signage is currently in place at all operational cemeteries for sections but only lawn areas have visible row numbers.
- Historic signage may also be considered

RECOMMENDATION 2

2.1: Council to obtain quotes and purchase a suitable cemetery management system for records, booking and mapping system specifically for cemeteries.

2.2: Council to approve funds for the engagement of a specialised consultant to review all council records, cross check cemetery sites and create site specific masterplans for all cemeteries under council management.

4.8 Interments Past Five Years

The number of interments averages around 66 interments per annum.

Table 2: Interments 2015/16-2019/20

Narrandera General Cemetery (Double Depth)					
Burial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
1st Interment	2	5	2	2	3
2nd Interment	1	7	5	1	3
Total Burials	3	12	7	3	6

Narrandera Lawn Cemetery (Single depth only)					
Burial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
1st Interment	33	40	50	40	51
Total Burials	33	40	50	40	51

Narrandera Ashes					
Memorial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
Rose garden	1	3	3	3	3
Niche wall	3	11	4	1	0
Total Burials	4	14	7	4	3

Barellan General Cemetery (Double Depth)					
Burial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
1st Interment	2	0	1	2	0
2nd Interment	0	1	1	1	0
Total Burials	2	1	2	3	0

Barellan Lawn Cemetery (Double Depth)					
Burial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
1st Interment	5	3	2	3	8
2nd Interment	2	4	0	1	1
Total Burials	7	7	2	4	9

Barellan Ashes					
Memorial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
Rose garden	0	0	0	0	1
Niche wall	0	1	0	0	1
Total Burials	0	1	0	0	2

Grong Grong General Cemetery					
Burial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
1st Interment	1	1	1	1	3
2nd Interment	1	0	0	0	1
Total Burials	2	1	1	1	4

Grong Grong Ashes					
Memorial Type	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
Niche wall	2	0	1	0	2
Total Burials	2	0	1	0	2

Consolidated Summary	2015/16	2016/17	2017/18	2018/19	2019/20
Total	**51**	**76**	**69**	**55**	**76**

4.9 Current Utilisation and Capacity

In general terms the site is considered to be at capacity when no new reservations are possible.

The review group calculated that with every seven interments an average of one reserve will take place.

Table 3 Capacity and Available Plots

Cemetery	Plots Allocated	Reserved Plots	Plots available	Average interments per annum
Narrandera Lawn (A1, A2, A3, A4)	A1- 747 A2- 614 A3 - 357 A4 - 0	A1- 64 A2 - 149 A3 - 220 A4 - 0	A1- 0 - at capacity A2- 1 A3 - 216 A4 -	42.8
Narrandera General Section	Information not included			6.2
Narrandera Rose garden	38	30	38	2.6
Narrandera Niche wall	Niche Wall 1 – 73 Niche Wall Western - 28	Niche Wall 1 – 17 Niche Wall Western - 20	Niche Wall 1 – 2 Niche Wall Western - 57	3.8
Barellan General Section	Information not included			1.6
Barellan Lawn	Eastern Lawn – 93 Western Lawn - 15	Eastern Lawn – 27 Eastern Lawn - 12	Eastern Lawn – 0 - at capacity Western Lawn - 78	5.8
Barellan Rose Garden 1	2	1	39	0.2
Barellan Niche Wall	5	2	13	0.2
Grong Grong General Section	Information not included			1.8
Grong Grong Niche Wall	6	0	14	1

- An average of 66 interments take place per annum, averaging 1.3 interments per week.
- Narrandera Lawn area A1 is at capacity with one (1) plot being available in lawn area A2
- Barellan Eastern Lawn has reached capacity.
- Records from the General sections have not been included into this assessment. This is mainly due to the time take to cross check records for accuracy. The review group recommends that the capacity assessment should be conducted in more detail by a specialist to provide an accurate assessment of all available records and site information.

Observations and Assessment:

- Narrandera Lawn sections interments average 42.8 lawn area interments per year. This indicates that the lawn section will reach capacity within 23.5 years.
- The review group recognises the need to explore options for the extension of the Narrandera Cemetery and recommend that this should be explored through master planning.
- The western Barellan Lawn section will reach capacity at a minimum of 16.5 years with an average interment rate of 5.8 per year and a maximum of 20 years with an average of 1.6 second interments.
- The review group recommends that the capacity assessment should be conducted in more detail by a specialist to provide an accurate assessment of all available records and site information.

4.10 Financial Performance

Financial results of the cemetery services are directly aligned with number of deaths along with the number of reservations resulting burials or memorialisation's that occur over a given period. This is particularly true in terms of revenue, which can change significantly from year to year. Additional costs may also be borne by cemeteries from year to year in terms of pre-emptive capital works (eg: niche walls, landscape upgrades, lawn beams, road and carpark upgrades etc.).

A review of revenue, expenses, overall operating results are provided below over the past five years. For reference, it is noted that the number of burials, reservations and memorialisation's undertaken at the cemeteries is shown in Table 2 and Table 3

Narrandera Shire Council

Net Operating Results Summary

Column1	2015-16	2016-17	2017-18	2018-19	2019-20	5 year average
Revenue	86207.01	127,708.60	133,816.73	116,968.95	152,972.32	**123,534.72**
Expenses (including rates, insurances and depriciation)	117,418.67	107,835.02	142,546.72	137,705.62	149,580.68	**131,017.34**
Net Operating Result	-31,211.66	19,873.58	-8,729.99	-20,736.67	3,391.64	**-7,482.62**

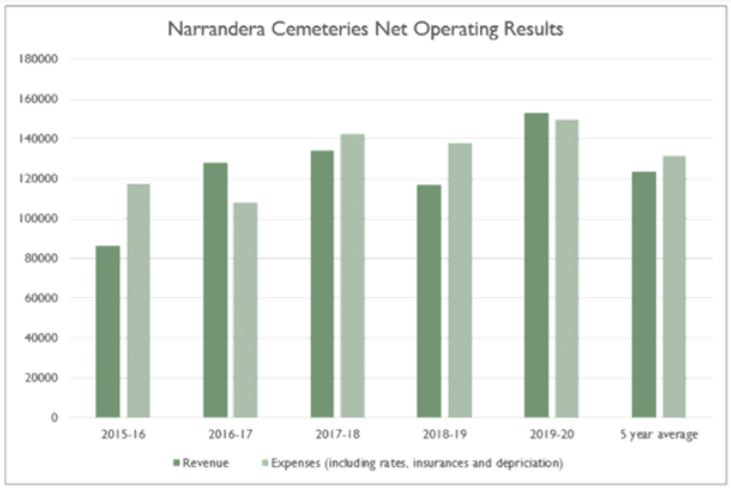

Figure 7 Operating Summary

OPERATING EXPENSES

EXPENSE	2015-16	2016-17	2017-18	2018-19	2019-20	Average
Maintenance expenses	96,986.84	97,635.02	102502.72	104,336.63	129,960.50	**106,284.34**
Engineers contribution	10,000.00	10,200.00	10,000.00	10,000.00	10,000.00	**10,040.00**
Rates	0.00	0.00	0.00	2,905.45	9,620.18	**2,505.13**
Insurances	0.00	0.00	0.00	20.90	0.00	**4.18**
Depriciation - Specialised	10,431.83	0.00	30,044.00	20,442.64	0.00	**12,183.69**
Total	117,418.67	107,835.02	142,546.72	137,705.62	149,580.68	**131,017.34**

Figure 8 Operating Expenses

4.10.1 Revenue

Revenue streams exist within cemetery operations, with the significant and recurring ones being:

- Interment permits: paid to Council on reservation/purchase of a burial plot (either at the time of need or in advance) and including any out of area payments as applicable.
- Burial fees: paid to Council on uptake of a burial permit via interment of the body; and
- Grave digging fees: also paid to Council to cover costs associated with Council's grave digging operations.

Other minor income streams include fees associated with ash interments within memorial walls, gardens and plots, and other minor fees and charges. In overall terms, (except for

2015-16) over the last 4 years total revenue has grown by $25,263.72 around 20% increase, though these results are variable from year to year, as shown in the graph at Figure 8.

4.10.2 Expenses

Like revenues, there are a number of expense streams that exist within the service, the significant and recurring ones being:

- Employment / staff costs – These costs are directly associated with the operational maintenance of the cemeteries with staff booking their time to each individual cemetery and the tasks that they are addressing.
- Materials and equipment costs - relating to the general maintenance and improvements within the cemeteries.
- Contracts - including contracted capital works, facility and infrastructure repairs and maintenance
- Utilities –cemeteries now have water charges at full rates. With the current climate, the continual extension of Lawn areas and the increase customer expectations these charges will continually increase substantially.

Other minor expense streams include internal plant costs, business overheads (rates, utilities etc.), and corporate overheads (HR, finance, management etc.).

It is noted that with future improvements and the continual expansion and growth of cemeteries depreciation will also increase.

Observations and Assessment:

- There has been a 20% increase in revenue over the last four years
- In general terms Councils' net operating result is in line with the current expenses. Years where a negative net operating result has been recorded is directly related to depreciation

4.11 Fees and Charges Cost Comparison

When reviewing cemetery-based fees and charges, a comparison was undertaken with Leeton Shire Council and Griffith City Council.

The fees and charges structure varied between councils, with Griffith and Leeton both having total burial fees compared to Narrandera having fees for each component of the interment.

Figure 9 provides fees and charges cost comparison between the three councils.

By assessing these fees and changes the review group can conclude that Narrandera Shire cemetery fees and charges are in line with the neighbouring councils.

Cemetery Fees & Charges COMPARISON

2019-20	Narrandera	Barellan	Grong Grong	Leeton	Griffith
Column1	Column22	Column2	Column222	Column3	Column4
General					
Average total per internment	**$2,709.00**	**$2,709.00**	**$2,887.00**	**$3,210.00**	**$2,014.00**
Land	$1,035.00	$1,035.00	$1,035.00		
Land - Perpetual maintenance	$451.00	$451.00	$451.00		
Internment Permit	$178.00	$178.00	$178.00		inc
Headstone Permit	$99.00	$99.00	$99.00		inc
General 1st Interment - Adult casket	$946.00	$946.00	$946.00	$3,210.00	$2,014.00
General 2nd Interment - Adult casket	$946.00	$946.00	$946.00	$1,085.00	$1,142.00
General 1st Interment - Infant casket	$473.00	$473.00	$473.00		$960.00
General 2nd Interment - Infant casket					$450.00
General Ashes Interment	$473.00	$473.00	$473.00		$314.00
Travel		$288.00	$178.00		
Lawn	**$2,709.00**	**$2,709.00**		**$3,945.00**	**$3,075.00**
Average total per internment					
Land	$1,035.00	$1,035.00			
Land - Perpetual maintenance	$451.00	$451.00			
Internment Permit	$178.00	$178.00			inc
Headstone Permit	$99.00	$99.00			inc
Lawn 1st Interment - Adult casket	$946.00	$946.00		$3,945.00	$3,075.00
Lawn 2nd Interment - Adult casket		$946.00		$1,295.00	$1,433.00
Lawn 1st Interment - Infant casket	$473.00	$473.00		$3,660.00	$1,614.00
Lawn 2nd Interment - Infant casket					$1,374.00
Ashes Interment	$473.00	$473.00			$777.00
Niche wall					
Average total per internment	**$1,082.00**	**$1,658.00**	**$1,548.00**		**$1,349.00**
Niche wall ashes allocation, internment and plaque	$805.00	$805.00	$805.00		$1,349.00
Supply and install vase	$99.00	$99.00	$99.00		inc
Internment permit	$178.00	$178.00	$178.00		inc
Reservation	$515.00	$515.00	$515.00		
Internment into reserve	$288.00	$288.00	$288.00		
		$288.00	$178.00		
Rose Garden	**$1,271.00**	**$1,559.00**		**$1,485.00**	**$1,155.00**
Average total per internment					
Rose Garden ashes allocation and intern	$805.00	$805.00		$1,485.00	$1,155.00
Internment permit	$178.00	$178.00			inc
Reservation	$515.00	$515.00		$575.00	
Internment into reserve	$288.00	$288.00			
Travel		$288.00			

Figure 9 Fees and Charges Comparison

5. RISK MANAGEMENT

5.1 Legislative requirements

Local Government controlled cemeteries were once subject to Ordinance 68 of the old *Local Government Act* (1919). The *Local Government Act* 1993 does not include any cemetery specific legislation. As such, the care, control, and management of cemeteries are covered by a range of legislations, charters, and Funeral Industry Guidelines. Following is a listing of the key relevant legislative provisions:

- Cemeteries and Crematoria Act 2013 (C&C Act).
- Anti-Discrimination Act 1991
- Birth Deaths and Marriages Registration Act 1995
- Conversion of Cemeteries Act 1974
- Coroners Act 1980
- Crown Lands Management Act 2016
- Crown Lands (General Reserves) Amendment (Sustainable Burials) By-laws 2011
- Environmental Planning & Assessment Act 1979 & Environmental Planning & Assessment Regulation 2000
- Fair Trading 1987 & Fair Trading General Regulations 2002
- Government Information (Public Access) Act 2009
- Health Records Information Privacy Act 2002
- AS-4204 (2019) Headstone and cemetery monuments
- Heritage Act 1977
- Human Tissues Act 1993
- Local Government Act 1993
- Privacy and Personal Information Protection Act 1998
- Public Health Act 2010
- Public Health Regulation 2012
- State Records Act 1998
- Threatened Species Conservation Act1995
- Threatened Species Conservation Amendment Act 2002
- Threatened Species Legislation Amendment Act 2004
- Work Health and Safety Act 2011 & Work Health and Safety Regulation 2017
- Workers Compensation Act 1987 & Workplace Injury Management & Workers Compensation Act 1998.

Observations and Assessment:

- The inter-relationship of both legislation and regulatory information required in cemetery operations is of a complex nature.

- All related policies and procedures will be required to be clear and concise to be compliant with legislation/regulations and transparent to staff, customers and all external agents.
- Staff are now able to refer to the Cemeteries & Crematoria NSW – Voluntary Code of Practice for Cemetery Maintenance to ensure Councils obligations are met and any risk to the organisations is minimised.
- Any future planning or master must be in accordance with the current industry standards and relevant legislation.
- Under section 90 of the *Cemeteries and Crematoria Act 2013*, Council is required to have a strategic plan for Council-managed Crown cemeteries. Council does not currently have a strategic plan in place.

RECOMMENDATION 3

3.1: Council acknowledge that Under section 90 of the *Cemeteries and Crematoria Act 2013*, Council is required to have a strategic plan (individual plan or overarching) for Council managed Crown cemeteries.

5.2 Contractors and Volunteers

Requirements for Works within Council Cemeteries by External Agents

Council has a responsibility to ensure that all activities conducted within its cemeteries comply with the requirements of the Work Health & Safety Act 2011 and the Work Health & Safety Regulation 2017 and associated legislation.

Some Councils have introduced a range of permits and guidelines for the operation of external agents in local government managed cemeteries.

External agents include but are not limited to funeral directors, monumental masons, grave diggers, their employees and any second parties that carry out services for them. The activities that they undertake include but are not limited to; excavation and site restoration; landscaping; funeral services; equipment maintenance; construction and maintenance of structures and monuments; lifting and transport and the disposal of surplus materials.

To date these identified works have been undertaken without any formal agreement between Council and the external agents. As with other areas of Council's operations, it is proposed that Council implement a specific agreement with external agents through the introduction of a permit and associated guidelines to operate within Council's cemeteries. The agreement and permit is aimed at clarifying responsibilities and accountability

Narrandera Shire Council currently has an approved contractor register in place to ensure all insurances and certificates are current.

Volunteer groups are required to be inducted under Councils volunteer induction register.

5.3 Monuments

Cemetery monuments often reflect the history, age and evolution of trends over time. These form a link to the past and reflect fluctuating prosperity, as well as changing traditions in stone masonry and religion. Monuments are a significant part of the make-up of the cemetery and are often seen to be an inherent part of council's maintenance responsibility. However, the **responsibility for maintenance of monuments lies with the interment right holder.**

There are two key considerations associated with monumentation:

- Ensuring that there is a clear understanding of responsibility between operator and rights holder
- Ensuring monuments remain safe, considering the general public's interaction with them.

Narrandera Shire Council does not currently conduct any structural assessment of monuments. This is mainly due both to recent changes in legislation and the skills and resources. The review identified that Council have a responsibility to ensure that monuments are designed and installed to meet appropriate standards and policies - most notably AS 4204:2019 Headstones and Cemetery Monuments and AS 4425:1996 Above Ground Burial Structures.

Ensuring appropriate standards are met will mean longer-term safety and a reduced need for interference with cemetery monuments in the future. The overarching principal identified in the Cemeteries & Crematoria NSW – Voluntary Code of Practice for Cemetery Maintenance is to 'do as much as necessary, but as little as possible' that may impact on the significance on existing monuments.

Creating clear and consistent monumental requirements is important and should be detailed in the policy.

Safety testing monuments should include extensive community engagement before, during and after implementation. Monuments should be visually inspected, hand tested, and where necessary machine topple testing (as per AS-4204:2019). Records should be kept and testing repeated at least every five years or as necessary. Where concerns exist, inform interment right holders and lay down monuments in accordance with National Trust Guidelines, but only if they pose an imminent risk.

Observations and Assessment:

- Although maintenance of monuments lies with the interment right holder, the review group noted that this may not always be possible give the age of the monument and the number of generations that have passed since the interment.
- AS 4204:2019 Headstones and cemetery monuments and AS 4425:1996 Above ground burial structures.
- The review group identified that testing of monuments structural integrity is needed at least every five years. Staff currently do not have the skills or the resources to conduct testing.
- The policy should include a monument testing program to be conducted every five years.
- Clear and consistent monumental requirements is important and should be detailed in the policy.

- Safety testing monuments should include extensive community engagement before, during and after implementation

RECOMMENDATION 4
4.1: That Council reviews the Cemetery Management policy and include clear and consistent monumental requirements and also include a monument testing program to be conducted every five (5) years. Safety testing monuments to include extensive community engagement before, during and after implementation.
4.2: Council note that resources and staff do not have the skills or specialised training to carry out the training. The review group recommend that a consultant be engaged to undertake the monument testing as part of the masterplan and cemetery management system project.

5.4 Signage

Access into a cemetery is important to ensure effective use of the site for a range of user types, from those grieving to interment services vehicles such as hearses. Site entry areas need to cater to other access requirements, such as those of pedestrians and cyclists.

By using visual features such as trees, fencing and other entry markers, as well as keeping signs and entranceways consistent with their surroundings, cemetery entry areas can be a defining 'welcome zone', helping to establish the tone of the space from the outset and elevating the cemetery's importance in line with community values. The area has the practical objective of being a clear marker for visitors to find the cemetery access point/s and to orientate themselves upon entry.

Council has section signage at all three of the operation cemeteries along with a cemetery entrance sign just stating the name of each cemetery. The review group found that more signage along with row numbering would assist visitors and contractors

Observations and Assessment:

- Council currently does not have any overview cemetery signage to assist visitors.
- There is a need for cemetery entrance signage at each cemetery, both operational and non-operational. These signs should include an aerial view of each cemetery identifying key sites, individual sections, amenities and roads.
- These signs may also have a brief outline of the history of each cemetery.
- Row numbering in the general section of operational cemeteries should also be considered to assist visitors and contractors. This may lead to a decrease in requests for information.

6. ASSET MANAGEMENT

6.1 Policy

The review group identified the need for council to implement a cemetery management plan to complement the Cemetery management policy. The purpose of the management plan is to provide staff guidance with planning and operations, the management plan will ensure council is both the capable and has capacity to meet all the relevant industry regulations and standards.

Policy review. Refer to:

- Attachment 2: Cemetery Management Policy
- Attachment 3: Voluntary Code of Practice for Cemetery Maintenance - Cemetery Maintenance Guide

The review group assessed the Voluntary Code of Practice for Cemetery Maintenance - Cemetery maintenance guide (attachment 3) that had been provided by Cemeteries & Crematoria New South Wales (CCNSW).

CCNSW is a statutory body established in 2014 under the *Cemeteries and Crematoria Act 2013*. CCNSW is led by an independent board (CCNSW Board) appointed by, and responsible to, the Minister for Water, Property and Housing.

The Voluntary Code of Practice for Cemetery Maintenance, otherwise referred to as the Cemetery Maintenance Guide, was been developed to help cemetery operators to implement the Cemetery and Crematorium Operator Code of Practice for Interment Rights and General Services.

The Operator Code of Practice is regulated by CCNSW.

The Review group found that the Cemetery Maintenance Guide gives practical advice to assist staff to ensure that they can address Part 8 of the Operator Code relating to maintenance of facilities, graves, vaults, cemeteries and crematoria.

The Cemetery Maintenance Guide is designed to highlight best-practice principles and directions that can help operators establish and improve on their cemeteries over time and in line with community expectations and available resources.

The Cemetery Maintenance Guide will help the Council meet the relevant objects of the *Cemetery and Crematoria Act 2013* including those to:

- (a) recognise the right of all individuals to a dignified interment and treatment of their remains with dignity and respect
- (b) provide for the operation of a consistent and coherent regime for the governance and regulation of cemeteries and crematoria
- (c) ensure that the operators of cemeteries and crematoria demonstrate satisfactory levels of accountability, transparency and integrity
- (d) promote environmental sustainability of the interment industry, including provision for natural and private burials.

It should be noted that this document is a guide and is not designed to give comprehensive details about all issues associated with cemetery maintenance.

RECOMMENDATION 5
5.1: Council adopts the Cemetery Management policy
5.2: Council acknowledges the Voluntary Code of Practice for Cemetery Maintenance - Cemetery Maintenance Guide

6.2 Cemetery Records Management Systems and Programs

The review group has identified the need to purchase a specialised cemetery management system to map all interments, coordinate bookings, register reservations and provided accurate data for reporting and public information requests.

Council's current system is labour intensive and often needs to be crosscheck multiple times to ensure accuracy.

The review group investigated a number of software managements systems that would be of great benefit to the cemetery operations. The review group focused on system that had the capacity to comprehensively manage the operational, financial, compliance and mapping needs of council managed cemeteries. The cost of the systems ranges from $10,000 - $45,000 installation and $100- $2,000 per month.

Although the upfront costs may appear to be substantial, the saving made through efficiencies with reporting and public requests for information would be of greater value.

The review group identified the need for a consultant to assess historic records and cross check them with site surveys. The review group recommend that the purchase of the cemetery management system, the development of site-specific master plans and the analysis of records should all be conducted during the same project.

Observations and Assessment:

- Councils current cemetery operation and reporting system is extremely labour intensive. The review group identified the need for a specialised cemetery management system to be implemented as a priority.
- The system must have the capacity to comprehensively manage the operational, financial, compliance and mapping needs of the cemetery. The review group believe the system will instantly improve productivity and customer service along with protecting the historical records of the cemeteries.

6.3 Current Capacity and Expected Operational Life of Cemeteries

Through calculating the average interments over the past five years (table 2) and comparing the figure against the available plots (table 3) staff can estimate that the Narrandera lawn areas will reach capacity within 23.5 years.

Through the same process the review group estimated that the Barellan western lawn section will reach capacity between 16.5 years and 20 years given that second interments take place at the site.

The review group found that with the current records available the capacity calculation for the general sections was not able to be carried out for this review. The review team recommend a specialised consultant given the time needed to cross check the records.

Masterplans will require careful consideration to the future needs of cemeteries and include infrastructure requirements along with addressing all current standards including accessibility

Observations and Assessment:

- Narrandera lawn areas will reach capacity within 23.5 years.
- Barellan western lawn section will reach capacity between 16.5 years and 20 years
- The review group have identified the need for site specific master plans to address future extensions along with specific requests from the public including the following:
  - Sheltered areas
  - Disabled access
  - Remembrance areas
  - Car park (potential hay shed suite)
  - Unique monuments
  - Seating
  - Bins
  - Toilets and fencing

Recommendation 5
5.1: Council to explore options for the extensions of the Narrandera Cemetery and recommend that this should be explored through master planning with a consultant.
5.2: Council acknowledge the Barellan Lawn cemeteries forecasted capacity statement and support the concept of extending two lawn areas directly south of the existing lawn areas.

6.4 Future Planning - Perpetual Care

From a maintenance perspective, perpetual care requires ongoing consideration of long-term community needs for cemetery planning, as well as through the lifecycle stages of the cemetery.

At the current rate of interment, it is estimated that within 23.5 years the Narrandera Cemetery lawn cemetery will be capacity.

In order to ensure the Narrandera Cemetery remains operational, Council needs to carefully consider extending the cemetery. The extension should be investigated and documented in a masterplan, consideration to the full extent of area that can be used for cemetery purposes, including the potential number of interments that can catered for needs of the cemetery should be included to provide an accurate estimate life of the cemetery extensions.

Perpetual funds raised may reasonably be used for cemetery expansion, provided that long-term plans and associated costs are being considered/allowed for at the point at which the cemetery reaches its perpetual or forever phase.

Barellan western lawn section will reach capacity between 16.5 years and 20 years. The review group found that the current cemetery has the space to create two more lawn areas directly south of the existing lawn areas. Master plans should be used to identify the extensions along with any infrastructure requirements needed.

7. Conclusion

Cemetery services need to be delivered with dignity and respect. As public services they need to be provided at a fair price to the public and there is a community expectation that cemetery grounds will be adequately maintained. In providing these services, cemeteries need to comply with legislative requirements to ensure the health and safety of cemetery employees and the broader community.

Taking into consideration the evolution of the cemetery, funeral industry and local government's important role in the provision of services and facilities, the need to establish a long-term direction for the care, control and management of public cemeteries is recognised, as well as the ongoing expectations of procedural and operational improvements.

During the review process it was clear that the staff vested with operating the cemeteries take great pride and ownership of the services they are proving, often going above and beyond their position description to assist families at their time of need.

All cemetery operators are required to comply with the same legislation and reporting requirements. In order for Narrandera Shire Council to meet these legislative requirements and more importantly the reporting requirements, it is essential for Council to consider the recommendations within this report.

The review group acknowledged the need for additional staff and resources, but also understand that this might not be achievable given the current economic climate. The review group have taken the conservative approach in recommending that the need additional staff should be reassessed in line with the implementation of future master plans and the additional maintenance requirements that they will be associated with them.

The review group found that the Narrandera Shire Cemeteries are being managed to a high standard. Given the resources available, other areas of management within the OSR section are seeing a reduction in service level when there is an influx of internments. The introduction of software systems will have an immediate effect, ensuring historic records are preserved, improving customer service, and having instantaneous access to internment searches and reporting.

In considering the recommendations for this review, the review group emphasize the importance of committing long term funding and resources to carry out the actions predicted within the future master plans. This is essential to ensure masterplans are of value and are a working asset to council.