Biosolids
REGIONAL ENVIRONMENTAL IMPROVEMENT PLAN

Table of Contents

1. Introduction 4
1.1 Background 4
1.2 Operational Summaries 7
1.3 Boundary of the Regional REIP 10
1.4 Objectives of the Regional EIP 11
1.5 Scope of the EIP 11
1.6 Roles and Responsibilities 11
2. LEGISLATIVE REQUIREMENTS 12
2.1 EPA Licence and Land Use Guidelines 12
2.2 Planning Controls 12
2.3 Biosolids Agreements and Documentation 12
3. SITE SUITABILITY ASSESSMENT 13
3.1 System Introduction 13
3.2 Buffer Distances 14
3.3 Land Capability 14
3.3.1 Site Management Plan 15
3.3.2 Outcomes 15
3.3.3 Climate 16
3.3.4 Soils 16
3.3.5 Topography 16
3.3.6 Surface Water 16
3.3.7 Groundwater 16
3.4 Vegetation and Biodiversity 17
3.4.1 Flora 17
3.4.2 Fauna 17
3.4.3 Surrounding Area 17
4. BIOSOLIDS QUALITY 17
4.1 Verification Phase Testing for T1 and T2 Grade 17
4.2 Routine Monitoring 18
4.3 Sampling Program 19
4.4 Summary of Quality 19
4.5 Biosolids Application Rate 21
4.6 Nutrient Limiting Application Rate 21

4.7 Contaminant Limiting Application Rate 21
4.8 Actual Nutrients Applied 22
5. SITE MANAGEMENT 23
5.1 Transport 23
5.2 Storage 23
5.3 Roles and Responsibilities 23
5.4 Monitoring 24
5.5 Signage 24
5.6 Method of Application 24
5.7 Access Controls 24
5.8 Buffer Distances 24
5.9 Dust and Odour Control 24
5.10 Erosion Control Measures 24
5.11 Weather Conditions 25
5.12 Timing of Application 25
6. OCCUPATIONAL HEALTH AND SAFETY 25
6.1 Processing Site 25
6.2 Delivery and Reuse 25
7. RECORDING AND REPORTING 26
7.1 Reporting 26
7.1.1 EIP 26
7.1.2 Annual Reporting 26
7.2 REIP Review 26
7.3 Data Recording 26
7.4 Reporting Emergency of Non-Compliance 26
8. SOIL MONITORING 27
8.1 Overview 27
8.2 Detail of Measurements 28
9. RISK MANAGEMENT PRACTICES 29
9.1 Introduction 29
9.2 Hazard and Risk Assessment 30
..... 33
..... 34

1. Introduction

Biosolids are defined in the Victorian EPA Biosolids Land Application Guideline (Publication 943) as "treated or stabilised sewage produced during the biological treatment of sewage. Biosolids contain significant quantities of organic matter, moisture, nutrients and trace elements and as such are increasingly being viewed as a resource suitable for the agricultural and municipal sectors.

These attributes make biosolids an ideal input to agricultural systems or other plant based markets such as land rehabilitation for the purpose of plant growth and landscaping.

Biosolids is being successfully used in most of the states in Australia for a number of years. In excess of 170,000 tonnes are used in NSW. South Australia is using 34,000 tonnes on arable and mixed horticulture land. Western Australia and Queensland are using over 80% of the biosolids from their larger population centres.

Victoria has stockpiled in excess of 2 million tonnes of biosolids in the past of which 66,000 tonnes are being added annually. In 2002 a publication "Moving towards Sustainable Biosolids Management" was released to address the less than 5% reuse that was occurring in Victoria.

Western Water commenced beneficial use of biosolids in 2003/04 with 40% of total 2010 dry tonnes produced was beneficially reused. In 2004/05 and 2005/06 the percentage reuse increased to 52% of total of 2498 dry tonnes and 60% of total 2576 dry tonnes, respectively. The 2006/07 percentage reuse value of 143% included previously stockpiled biosolids at the Sunbury Recycled Water Plant.

Western Water wishes to expand its farm application practice of Biosolids to various areas and has recently received a number of expressions of interest from land holders located at Melton, Romsey and surrounding areas. Western Water has prepared this Regional Environmental Improvement Plans (EIP) as a general document that covers the Western Water Region (Appendix 1). The EIP will consist of a generic section which will include the treatment and chemical grade of the biosolids produced at Western Water recycled water plants and an addendum with site specific issues covered for the relevant farms. The site specific section will deal with soils types, contaminant levels, site constraints, and site suitability and application rates for specific sites. This will enable Western Water to achieve the necessary approvals in a timely and efficient manner.

1.1 Background

Western Water is a statutory corporation under the Water Act 1989 and is one of Victoria's thirteen regional urban water corporations. Western Water's service area incorporates parts of Hume, Melton, Moorabool and Macedon Ranges Councils. A combination of urban and rural living, our region includes a significant proportion of land devoted to agricultural uses, especially grazing and cropping.

Residential customers comprise 94% of our customer base. The Western Water region is one of the fastest growing areas in Victoria, with an annual growth rate exceeding 4% over the past five years. Growth forecasts range from 3.11% to 3.66% per annum over the future.
Western Water is fully owned by the Victorian Government and reports to the Minister for Water. A skills-based Board of Directors is appointed by the Minister to set Western Water's strategic direction and business policy, supported and advised by a senior management team. Western Water is responsible to the Minister through the Department of Sustainability and Environment (DSE). The Department of Human Services regulates Western Water's water quality standards while the Environment Protection Authority (EPA) controls environmental standards, particularly for wastewater discharge. The Essential Services Commission (ESC), the economic regulator for the Victorian water sector, regulates Western Water's prices, service standards and market conduct.

Western Water's water district has two main storages, Lake Merrimu and Rosslynne Reservoir, both of which are managed by Southern Rural Water. These reservoirs supply the Melton and Bacchus Marsh (Merrimu), and Macedon Ranges and Sunbury (Rosslynne) districts. Due to the impact of prolonged drought on local storages, Western Water has also gained access to a water allocation from Yarra systems storages, which draws on Melbourne water sources and is interlinked to supply all towns except Lancefield and Myrniong.

Western Water operates seven recycled water plants, where wastewater and trade waste collected from domestic, commercial and industrial customers, is treated. The seven recycled water plants are located in Sunbury, Melton, Gisborne, Romsey, Riddells Creek, Woodend and Bacchus March. The Sunbury, Gisborne and Melton recycled water plants produce biosolids on a continual basis, whilst the remaining recycled water plants are all lagoon based, and therefore desludging is only required every 5 to 10 years or on an 'as needs' basis. All seven recycled water plants are covered by an EPA issued corporate licence.

In total, over 6,700 megalitres of wastewater and sewerage is treated by Western Water at its seven recycled water plants, producing approximately 3500 dry tonnes of biosolids annually. The typical classification of biosolids produced at the each of the recycled water plants are provided in Table 1.

Table 1: Western Water's Recycled Water Plants

Location	Site Address	Area (ha)	Biosolids Annual Production (Dry tonnes)	Biosolids Classification Chemical Grade[1]	Biosolids Classification Treatment Grade[2]
Bacchus Marsh*	Parwan South Rd, Parwan South	267	75	C1	T3
Gisborne*	Crown Allotments 10,11,12 & 13, Parish of Gisborne	22	270	C2	T3
Melton	Butlers Rd, Melton South	692	1800	C2	T3
Riddells Creek*	Sutherlands Rd, Riddells Creek	20	15	C1	T3
Romsey*	Portingales Lne, Romsey	187	25	C1	T3
Sunbury	Harker St, Sunbury	52	1300	C2	T4
Woodend*	Montgomery's Lne, Woodend	27	50	C1	T3

* Lagoon based RWP

[1] *Biosolids are classified into Chemical Grade C1 and GradeC2, depending on metal concentrations. Metal limits are based on extensive research regarding the effects of biosolids on various pathways of exposure, including plant toxicities and adverse effects on animal and human health.*

[2] *Biosolids can be treated physically, biologically and chemically. Physical treatment involves heat, either through incineration or pyrolysis, chemical treatment generally involves lime addition, whilst biological treatment relies on micro-organisms to break down the organic matter in the sludge.*

The final quality of the biosolids produced depends on the quality of the sewerage entering the treatment plant and the treatment process. In terms of treatment, Sunbury RWP and Melton RWP employ aerobic and anaerobic digestion respectively, combined with subsequent dewatering, producing a biosolids product which is 'fit for use' for landfill, landscaping and on-farm application purposes. The remaining RWP's produce a biosolids product which is 'fit for use' for landfill and site rehabilitation purposes.

1.2 Operational Summaries

Operational summaries for each of the recycled water plants, detailing the treatment process the sewage undergo are provided below:

Sunbury Recycled Water Plant

Sunbury Recycled Water Plant (RWP) is an activated sludge treatment plant, which collects and treats approximately 5 megalitres (ML) of sewage daily. The plant services both residential and commercial customers in both Sunbury and Diggers Rest. There are three streams of sludge produced at the Sunbury RWP: primary sludge, waste activated sludge and sludge produced by chemical precipitation of phosphorous using ferric salts.

Waste Activated Sludge (WAS) and sludge produced during the chemical precipitation of phosphorus are aerobically digested for approximately 20 days prior to dewatering via a centrifuge and will be through belt press from year 2011. Dewatering occurs mostly on weekdays and on an "as-needs basis" on weekends. Dewatering consistently achieves sludge with a solid content of 14 to 18 %.

All sludge that is currently produced is transported five days a week to the Pinegro facility in Deer Park, where it is composted with green municipal waste and sold as a domestic compost product. It is also utilised for the rehabilitation of a nearby landfill site.

The contract between Western Water and Pinegro was recently extended till June 2011. Prior to the composting arrangement, sludge produced at the plant was stockpiled on site in dedicated sludge bays. Western Water will continue to explore opportunities for farm application of Sunbury biosolids as the current cost for composting biosolids is costly. In order to achieve a suitable product for farm application, Western Water will use the Melton RWP biosolids storage facility for an interim storage of the product before farm application. Western water has recently completed a large clay lined biosolids storage facility at its Melton premises. There are also plans to construct a clay lined storage facility at Romsey RWP also for interim storage of Sunbury Biosolids. EPA approval will be sought prior to commencement of construction of the storage facility at Romsey.

Whilst the Contaminant Grade of Sunbury RWP Biosolids meet C1 grade, it does not achieve any of the stipulated Treatment Grades. Therefore Western Water will continue to manage the Sunbury RWP biosolids via the composting process. However, in the event of making any modification to the existing sludge treatment process which could result in an improvement to the Biosolids grade, Western water will review this regional EIP.

Melton Recycled Water Plant

Melton RWP collects and treats approximately 9 ML of sewage daily, servicing both residential and commercial customers in Melton. Sludge generated from primary and secondary

sedimentation is pumped to a Mesophilic anaerobic digester, and digested for approximately 15 days at 38 ^{0}C and therefore the Melton Biosolids are classified as T3. The digested sludge is then dewatered in a belt press. It is intended to re-use the dewatered biosolids products for farm application as per this regional EIP. The dewatering plant commenced operation in January 2008 and around 300 dry tonnes of biosolids are currently stockpiled on site.

As Melton recycled water plant receives larger proportion of Trade Waste in comparison to other Western water plants, concentration of copper and zinc are relatively elevated in the biosolids produced at Melton RWP.

Western water recently completed a clay lined biosolids storage area at Melton RWP as approved by EPA. The biosolids produced from the belt press is thinly placed on the clay lined area and a tractor driven windrow turner is used to enhance the drying of the biosolids. These processes assist in the reduction of moisture content in the biosolids and therefore reduce the transport cost and the subsequent greenhouse gas emission.

Western Water, in conjunction with RMIT University, is also conducting on-site field experiments into the use of biosolids as an effective fertiliser in canola cropping.

Gisborne Recycled Water Plant

Gisborne RWP collects and treats approximately 1 ML of sewage daily, servicing both residential and commercial customers in Gisborne. The treatment of sewage consists of a continuous activated sludge process consisting of aerobic and anaerobic system followed by chemically enhanced phosphorous removal and polishing in maturation lagoons. Sludge produced as wasted activated sludge from the oxidation ditch is discharged into a sludge lagoons which are periodically de-sludged. During the de-sludging process, the contents from sludge lagoon are emptied into a sludge drying bed. The sludge lagoon is fitted with a 22 KW aerator. The surface aerator operates on a continuous basis and provides an aerobic stabilization. The sludge lagoon is emptied every six months and the sludge is placed in drying bed for more than three months. The dried biosolids is then taken to Romsey Recycled Water Plant and stored for more than six months prior to application to the farms. Samples were collected over many years and the results indicate low E.coli well below the threshold of 2,000,000 E.coli MPN/g. Therefore the Biosolids from Gisborne RWP is classified as T3.

The sludge drying bed is clay lined and has the ability to separate the water from the sludge. While sludge production occurs on a continuous basis, sludge lagoon is only de-sludged on an "as needs" basis. Prior to de-sludging, dried biosolids from the sludge drying beds is collected and usually stored at Romsey RWP prior to the transport to a farm at Woodend. The farm application at Woodend is covered by a separate EIP

approved by EPA. This arrangement will continue until this REIP is approved by EPA. Western Water currently pays the costs for transport and application of biosolids to the land.

Woodend Recycled Water Plant

Woodend RWP consists of a mechanical treatment plant and maturation lagoons for disinfection. The sludge produced from the mechanical treatment plant is stored in earthen lagoons which get de-sludged on a yearly basis.

Bacchus Marsh Recycled Water Plants

Bacchus Marsh recycled water Plant consist of an aerated lagoon followed by several maturation lagoons. Prior to the construction of the aerated lagoon in 2012, three of the former primary lagoons were de-sludged. The sludge was dried on site and will be available for farm application in 2014.

Riddells Creek and Romsey Recycled Water Plants

In lagoon based treatment plants, the suspended solids from the raw sewage are allowed to settle in primary lagoons. The settled solids remain at the base of the lagoons and undergo a digestion process. The primary lagoons are generally dislodged every 10 years and therefore the sludge is technically stored for more than 3 years in the lagoon. The desludging process consists of removing the liquid and drying of the sludge in the lagoon for around 3 months. Once the sludge reaches around 10 % solid content, it is removed from the lagoon and placed outside the lagoon as windrows. The biosolids are then air dried by turning over every week. During the non-turning period, the temperature rises within the windrows due to bacterial activity experience indicate that temperature within the windrows could rise above 55 degrees. It is proposed that Western Water monitors the temperature in the stockpile during and after each turning process. The sampling results indicate that such an air drying process can significantly reduce the E.coli well below the threshold level for T3 grade.

In 2008, Western Water developed a Biosolids Re-Use Strategy. The key objective of the Biosolids Reuse Strategy is for Western Water to maintain its commitment to recycling 100% of its biosolids for the 2008-2013 regulatory periods.

Simplified flow diagrams describing the processes at the mechanical treatment plants are attached as Appendix 1.

Due to the fact that four out of the seven recycled water plants are lagoon based, the percentage beneficially used will vary per year. The potential biosolids reuse targets per site are:

RWP	**Biosolids Reuse Targets**				
	2013/2014	**2014/15**	**2015/16**	**2016/17**	**2017/2018**
Sunbury	100%	100%	100%	100%	100%

Gisborne	100%	100%	100%	100%	100%
Romsey*	0%	0%	0%	100%	0%
Riddells Creek*	0%	0%	0%	0%	100%
Woodend	100%	100%	100%	100%	100%
Melton	100%	100%	100%	100%	100%
Bacchus Marsh*	0%	100%	0%	0%	100%

* Lagoon based RWP

To achieve these targets, Western Water will manage the beneficial use of biosolids in an environmentally sound, sustainable, cost effective and safe manner. Continuing best practice for biosolids production, processing, transport, storage and application, along with keeping abreast of the latest technologies, will ensure Western Water is working towards 100% beneficial reuse of biosolids.

The quality of biosolids produced at the seven recycled water plant will determine their beneficial end use. A high level market assessment conducted in 2003 identified the following options provided that the biosolids are treated to the appropriate treatment and contaminant grade:

- Farm application for use on food crops consumed raw, cooked or processed, prior to sale
- Fodder crops for sheep farmers
- Cattle fodder and pasture with appropriate with- holding period
- Landscaping with restricted public access
- Landfill cover material and other site rehabilitation

In addition, composting or pre-treating the biosolids produced from the recycled water plants would provide further unrestricted options for beneficial reuse.

Western Water has not considered options such as incineration and extraction of oil from sludge, as they are not considered to be feasible within the 2008-2013 regulatory periods.

This Regional Environmental Improvement Plan (REIP) describes the roles and responsibilities, monitoring and management practices that are necessary to ensure safe and sustainable use of biosolids in the rural and agricultural sectors in Victoria. The EIP includes aspects of human and livestock health, impact on neighbours and compliance with controlling regulations and legislation for the intended application.

1.3 Boundary of the Regional REIP

This regional EIP covers the Melton, Romsey, Woodend and surrounding areas and the boundary has been drawn in such a manner that the framework set within this REIP can be easily applied to all sites. Selection of farms will be based on a screening process with criteria consistent with to those specified in Table 8 and 9 of the EPA guidelines.

Via this regional EIP Western Water is seeking the flexibility to apply the biosolids from any of its recycled water plants within the areas defined within the regional EIP. Western Water is aiming to establish two biosolids storage and processing facilities at its Romsey Recycled Water Plant. The storage facility at Melton Recycled Water Plant was completed recently.

1.4 Objectives of the Regional EIP

The main objective of a regional REIP is to minimise the number of approvals required for the beneficial use of biosolids. Biosolids are the necessary by-products of wastewater treatment and production of biosolids from all of Western Water's recycled water plant and it would continue for many years. A regional EIP will provide an effective approval process to beneficially use biosolids when an opportunity arises. Farm application of biosolids depends on weather, soil temperature and availability of farms. As generally an approval process for an EIP can take a considerable effort and time a regional EIP gives the flexibility to obtain approvals quickly when an opportunity for farm application arises.

A regional EIP can also be used as a guidance document to the farmers in preparing a site specific management plan.

1.5 Scope of the EIP

This REIP covers the aspects of biosolids generation, quantity, pre-treatment, quality, storage, transport, farm storage, farm application, testing methods, monitoring, communication, cropping, documenting etc.

1.6 Roles and Responsibilities

Western Water as the supplier of biosolids is responsible for the following:

- Ensuring that EPA approval has been obtained for each reuse program;
- Ensuring that all activities are in accordance with this submission;
- Ensuring monitoring, testing and recording of data is undertaken in accordance with EPA guidelines; and
- Providing the EPA with a post application Site Plan which summarises the application.

The user or owners of the property to which biosolids are being applied are responsible for the following:

- signing the Reuse Agreement ensuring the information in the Site Plan is understood;
- undertaking of any necessary OH&S Training;
- providing access (when required) to the site for stockpiling and spreading;
- moving of livestock from paddocks that are to receive biosolids; and
- ensuring that any withholding periods are maintained.

2. LEGISLATIVE REQUIREMENTS

2.1 EPA Licence and Land Use Guidelines

The EPA's requirements for reuse of biosolids have been addressed in this REIP through use of the following documents;

- The Victorian EPA's April 2004 *Guidelines for Environmental Management Biosolids - Land Application,* has been used as the basis for development of this EIP and abridged to GEM in this document;
- Various SEPP publications on groundwater, ambient air quality and prevention and management of land contamination to ensure water and air quality;
- EPA Licence for the management of Biosolids which states that "Deposit of biosolids to land must not adversely affect the land";
- EPA Publication 441A (2000) *Guide to the Sampling of Water, Wastewater, Waste and Soils;*
- Regulation *Agricultural and Veterinary Chemical (Fertilizers) regulation 1995;* and
- Guidelines on the Investigation Levels for Soil and Groundwater of the National Environmental Protection (Assessment of Site Contamination) Measure 2013.

2.2 Planning Controls

A works approval is not required for the spreading of biosolids, the activity not being a waste disposal activity.

2.3 Biosolids Agreements and Documentation

User/Property Owner Documentation

- This REIP
- Biosolids Reuse Agreement
- Site Plan
- OH & S Training documentation
- Safe Work Method Statements
- Work Instructions

Other Documentation

- OH & S Procedures for Handling of Biosolids
- Test Results
- Post Application records

3. SITE SUITABILITY ASSESSMENT

3.1 System Introduction

The target area for the distribution of biosolids under this REIP submission is within 90km of the location of the biosolids stockpile.

Western water has secured a number of farms which are willing to accept biosolids via calling an expression of interest through newspaper advertisement and "word of mouth" and the details are provided in table 2. This list may expand as more farmers express interest for receiving biosolids.

Table 2: The farms which have expressed interest are:

Farm	Location	Area
Gary Don	Newham	100 acres
Laurie Hurley	Toolern Vale	360 ha
Murray Chessel	Toolern Vale	48 ha
Pat Toomey	Romsey	5 ha
Sharon Smith	Romsey	20 ha
Gavin Leister-Smith*	Woodend	100 ha
Mark Clement	Romsey	10 ha
Joe Failli	Parwan	223 ha
Tony McMahon	Staughton Vale	536 ha

* covered by a separate EIP as this Customer has been long term receiver of Western Water biosolids

Typically cereal and canola are the crops of choice with the preferred pasture being Lucerne, perennial grass and clover mix. To coincide with most farming programs, in relation to sowing, (typically determined by soil moisture) and grazing, biosolids distribution and spreading shall occur from March to July each year.

The biosolids application area is selected based on the criteria in this section. Paddocks are selected in consultation with properties owners. Maps and details of the individual

properties are included in the Site specific management plans which will be submitted as an addendum to this REIP. The area to receive biosolids shall be shown including the use of each paddock, whether used for grazing of cropping. The type of crop shall also be identified and shall be in accordance with the requirements of EPA Publication 943 *Guidelines for Environmental Management - Biosolids Land Application.*

When an expression of interest is received, Western Water screens the farms for the suitability of the site for biosolids application. The farms found to be not meeting the

requirements are advised that the sites are not suitable. A typical expression of interest form is attached as an Attachment 2. A fact sheet outlining the benefits and risks of biosolids application is also provided to the potential Customers. A copy of the fact sheet is attached as Attachment 3.

3.2 Buffer Distances

The proposed sites shall fully comply with EPA recommended minimum buffer distances. There are no specific restrictions for T_1 grade. Western Water has adopted a risk adverse approach and bases all biosolids on the use of T_3 grade guidelines specified in the GEM (Guidelines for Environmental Management).

TABLE 3. BUFFER DISTANCES TO SENSITIVE LAND USES FOR T_2 AND T_3 GRADE BIOSOLIDS

SENSITIVE LAND USES	DISTANCE TO SENSITIVE LAND USE (M) RECOMMENDED BUFFER DISTANCE (EPA ENVIRONMENTAL GUIDELINES FOR BIOSOLIDS MANAGEMENT, TREATMENT GRADE T_2 AND T_3	
	T_2	T_3
RESIDENTIAL ZONE, URBAN AREAS	50	250
OCCUPIED DWELLING	25	50
SURFACE WATER	50	50
DRINKING WATER BORES	100	250
OTHER BORES	25	50
FARM DAMS	25	25
ANIMAL ENCLOSURES	10	50
FARM DRIVEWAYS, ACCESS ROADS AND FENCE LINES	5	5
SIGNIFICANT NATIVE FLORA OR FAUNA	25	50
SENSITIVE AREAS*	50	100

* Includes National or State Parks, Crown nature reserves for flora and fauna, wetlands, karst areas, groundwater recharge areas, potable water supply catchments, world heritage areas, National Estate listed areas and aboriginal land of cultural importance.

3.3 Land Capability

Land Capability is assessed in the accordance of the requirements of EPA Publication 943 *Guidelines for Environmental Management - Biosolids Land Application.*

3.3.1 Site Management Plan

A Site Management Plan (referred to as an Addendum) is prepared for each application of biosolids. As previously stated, the Site Management Plan shall form part of the contract between Western Water and the property owner.

The land characteristics associated with biosolids application shall have been assessed in accordance with EPA guidelines and reported in the Site Plan. Final assessment of the land and suitability shall follow the review process documented in Table 3 for each of the risk parameters. An assessment on final suitability will be reported in the Site Plan.

3.3.2 Outcomes

The land capability assessment, review of the ratings and the criteria on which they are based shall reveal no significant limitation to the use of the land for biosolids reuse.

Table 4. Land Capability Assessment for Biosolids Application

Site Characteristic	Site Limitation (EPA, 2004)			
	Slight	Moderate	Severe	Unsuitable
Slope (%)	3 - 6	6 - 12	12 - 15	> 15
Permeability	Moderate	Low, high	Very high	Very low, extremely permeable
Depth to regional groundwater (m)	> 5	3 - 5	1.5 - 3	< 1.5
Depth to seasonal high water table (cm)	> 90	60 - 90	45 - 60	< 45
Depth to most restrictive layer (cm)	> 90	60 - 90	45 - 60	< 45
Salinity ECe (dS/m) (0-45 cm)	2	2 - 4	4 - 8	> 8
pH (0-10 cm) pH (10-45 cm)	≥6.5 ≥6.0	5.5 – <6.5 5.0 – <6.0	4.5 - < 5.5 4.0 - < 5.0	< 4.5 < 4

[a] Salinity converted from EC(1:5) using multiplier factor based on soil texture
[b] pH (H_20) converted from pH ($CaCl_2$), where pH (H_20) = pH ($CaCl_2$) + (0.5 – 1.0)

Generally Western Water calls for an expression of interest for farm application of biosolids. During the expression of interest period, the sites are assessed for the suitability for land application of biosolids. The sites which are found to be unsuitable under the criteria specified in Table 2 are rejected. The sites which are found to have severe site limitations will be selected only as a last option and the customer will be encouraged to carry out necessary works to minimise any potential risks.

3.3.3 Climate

The effect of climate has an impact on the conditions and timing of spreading biosolids than on the biosolids themselves. The conditions during storage are dictated by weather conditions and this shall be considered during site assessment. Regional weather patterns shall be reviewed to determine the best conditions to spread biosolids in the Region.

3.3.4 Soils

The soils of the region are determined using local knowledge and data from the property owner. Depending on the landform, the area will be divided into units and soil samples shall be collected from both the surface soil (minimum of 30 cores 0 - 10cm depth) per unit and the subsoil samples will be collected as per the crop selection. It is noted that for existing sites, based on the soil sampling history the number of cores will be less than 30 cores with minimum core of 8. The subsoil samples shall be collected with a hand auger as a composite sample from a minimum of 5 sites and from a composite depth of 10 - 45 cm. The soil samples shall be analysed for a range of chemical parameters. The results shall be documented in the Site Plan. The data collected shall form the basis for final suitability and the application rate for the biosolids. All results are recorded in the Site Plan.

3.3.5 Topography

The proposed site shall be assessed for the following:

- gradient of the land;
- drainage condition;
- rock outcrops; and
- degree of cleared land.

Details of the site assessment shall be reported in the Site Plan.

3.3.6 Surface Water

The proposed site should have no significant surface waters within the application area. An assessment shall be made based on rainfall events for the area. If it is foreseen that rainfall events could flow overland to local streams before the majority of the nutrients have been taken up by the plants, the site will be rejected. Details of the finding are recorded in the Site Plan. Application of biosolids will not be conducted in a flood plain.

3.3.7 Groundwater

The geology of the proposed reuse site shall be assessed using available mapping. The assessment shall include rock outcrops or other significant groundwater recharge areas. Minor infiltration to shallow groundwater from surplus rainfall during the winter and spring months is acceptable in a high rainfall area. The regional heavy clay B horizon of the soil is likely to have a low permeability and the ability to store nutrients.

3.4 Vegetation and Biodiversity

3.4.1 Flora

Biosolids application will pose little or no threat to native flora. All the areas that are suitable for biosolids application consist of existing agricultural land.

3.4.2 Fauna

Biosolids application will pose little or no threat to native flora. All the areas that are suitable for biosolids application consist of existing agricultural land.

3.4.3 Surrounding Area

Selected sites shall be in long established rural areas that will not be impacted by the use of biosolids. Any site that is close to a sensitive site defined in section 3.2 shall have the appropriate buffer distances enforced. Refer to Table 1.

4. BIOSOLIDS QUALITY

4.1 Verification Phase Testing for T1 and T2 Grade

Western Water plan to categorize all biosolids as either:

- Treatment Grad T1 for composted biosolids at a temperature above 55 deg centigrade
- Treatment Grade 2 or 3 (T2 or T3)) by adopting an alternative process.

The process for achieving T3 grade biosolids if for the stabilised biosolids to be air dried to greater than 75% DS and stockpiled. The air drying process is to be conducted over the summer months and to be turned (minimum of five times) using a windrow turner or excavator. The air drying process is in addition to long term storage of the biosolids in maturation or sludge storage lagoons. Table 5 outlines the minimum testing / verification requirements.

TABLE 5. VERIFICATION FOR TREATMENT GRADE T2. PRIOR TO THE SUPPLY OF T2 PRODUCT

PARAMETER	MINIMUM TEST	LIMIT	FREQUENCY

E.*COLI*	**6 SAMPLES**	**⟨1000 *E.COLI* MPN /G DRY WEIGHT**	**1 SAMPLE/500 TONNES. MIN OF 6 SAMPLES FOR ANY ONE STOCKPILE**
SALMONELLA	**6 SAMPLES**	**⟨10 SALMONELLA /50G DRY WEIGHT**	**1 SAMPLE/1000 TONNES. MIN OF 6 SAMPLES FOR ANY ONE STOCKPILE**
ADENOVIRUS	**6 SAMPLES**	**⟨2 PFU/10G DRY WEIGHT**	**1 SAMPLE/1000 TONNES. MIN OF 6 SAMPLES FOR ANY ONE STOCKPILE**
REOVIRUS	**6 SAMPLES**	**⟨2 PFU/10G DRY WEIGHT**	**1 SAMPLE/1000 TONNES. MIN OF 6 SAMPLES FOR ANY ONE STOCKPILE**
ENTEROVIRUS	**6 SAMPLES**	**⟨2 PFU/10G DRY WEIGHT**	**1 SAMPLE/1000 TONNES. MIN OF 6 SAMPLES FOR ANY ONE STOCKPILE**
HELMINTHES	**6 SAMPLES**	**<1 *TAENIA* OVA / 10G**	**1 SAMPLE/1000 TONNES. MIN OF 6 SAMPLES FOR ANY ONE STOCKPILE**

Generally Western Water has been adopting a conservative approach and classifies the biosolids produced from its recycled water plants as T3 despite of the monitoring results for its dried biosolids meet the criteria specified in Table 5.

4.2 Routine Monitoring

Final product testing is the only comprehensive testing completed prior to delivery. If there are major changes in the storage process that affect the integrity of the stockpile, testing shall be undertaken. The program for this testing is outlined below.

4.3 Sampling Program

Appendix B of the GEM states a minimum of five grab samples of biosolids be collected from evenly distributed locations within the biosolids stockpile at the processing facility and tested individually for the parameters specified in this document. In addition, one sample per 100 - 500 dry tonnes is required and these shall be individually tested to identify stockpile variability.

The use of a sample statistical determination of biosolids contaminant concentration (BCC) will enhance the reliability and will account for skewed data. BCC is based on statistical methods for ensuring 95% confidence that biosolids are not incorrectly allocated to a higher quality grade (Table 1. Appendix B in the GEM).

All samples are tested in a NATA registered laboratory.

4.4 Summary of Quality

The parameters of the biosolids testing program are summarised in the table 6 below. Results are recorded in the Site Plan.

TABLE 6: BIOSOLIDS QUALITY SUMMARY (DRY WEIGHT BASE)

PARAMETER	VALUE	BIOSOLIDS CONTAMINANT CONCENTRATION (BCC)[1]	CLASSIFICATION
TOTAL NITROGEN (MG/KG)			
NITRATE/NITRITE N (MG/KG)			
NH3 (MG/KG)			
KJELDAHL N (MG/KG)			
TOTAL P (MG/KG)			
POTASSIUM (MG/KG)			
SULPHUR AS S (MG/KG)			
SOLIDS CONTENT (%)			

VOLATILE SOLIDS CONTENT (%)			
ARSENIC (MG/KG)			**C***
CADMIUM (MG/KG)*			**C***
CHROMIUM (MG/KG)			**C***
COPPER (MG/KG)			**C***
LEAD (MG/KG)			**C***
MERCURY (MG/KG)			**C***
NICKEL (MG/KG)			**C***
SELENIUM (MG/KG)			**C***
ZINC (MG/KG)			**C***
DDT & DERIVATIVES (MG/KG)			**C***
ORGANOCHLORINE PESTICIDES (MG/KG)			**C***
PCB'S (MG/KG)			**C***
E.*COLI* (MPN/G DRY WEIGHT)			**T***
SALMONELLA (/50G OF FINAL PRODUCT DRY WT)			**T***

[1]BCC is based on statistical methods for ensuring 95% confidence that biosolids are not incorrectly allocated to a higher quality grade.

4.5 Biosolids Application Rate

The biosolids are to be applied at tonnes per hectare (Dry Weight) based on the limiting factor for the receiving soil. These are defined in the Biosolids Land Application GEM under section 6.3 and further defined in Appendix B.

The Biosolids shall be spread in an even manner over the area within the capacity of the machinery being used.

4.6 Nutrient Limiting Application Rate

The nutrients limiting application are most likely to be phosphorus. The selected application rate shall be calculated on a dry weight basis per hectare. The reporting shall be in the format shown below and shall be recorded in the Site Plan.

TABLE 7: NUTRIENT LIMITING APPLICATION RATE TABLE

EXAMPLE ONLY		NITROGEN	PHOSPHORUS
Crop nutrient requirements	Kg/ha	170	25
Estimated available soil nutrient	Kg/ha	10	5
Available biosolids nutrient	Kg/tonne	2.89	0.54
Nutrient limiting application rate	Tonnes/ha	54	37

4.7 Contaminant Limiting Application Rate

The EPA has identified acceptable chemical limits for heavy metals and other contaminants that are often present in biosolids. These acceptable limits may place a limiting application rate on the rate per hectare for biosolids application. The process for calculating whether these contaminants may place a limit on biosolids application is to consider each contaminant in turn and compare it to the acceptable limit. An example of these comparisons is provided in Table 8. It is standard practice to start with the NLAR application rate and see if the CLAR is an issue at that rate.

TABLE 8: CONTAMINANT LIMITING APPLICATION RATE

CONTAMINANT EXAMPLE ONLY	UNITS	COPPER	ZINC	SELENIUM	ARSENIC	MOLYBDENUM
Receiving soil chemical contamination limit	Mg/kg	100	200	3	20	400

CONTAMINANT EXAMPLE ONLY	UNITS	COPPER	ZINC	SELENIUM	ARSENIC	MOLYBDENUM
Biosolids contaminant concentration	Kg/tonne	0.023	0.103	0.001	0.039	0.003
Contaminant limiting application rate	Tonnes/ha	4000	2000	3000	540	140,000

4.8 Actual Nutrients Applied

The calculation of NLAR and CLAR establishes the proposed application of biosolids rate in dry tonnes per hectare. It is then determined what the actual nutrient inputs would be from the calculated application rates, and whether additional agricultural fertilizers will be required to compliment the nutrients derived from biosolids for satisfactory plant growth.

The inputs are calculated and compared with normal or typical pasture/crop fertilizer inputs shown in the example in Table 9. They indicate that the biosolids shall adequately supply pasture needs for potassium but shall be inadequate for optimum growth rates for both nitrogen and phosphorus. A light application rate (90 kg/ha) Diammonium Phosphate (DAP) would provide a suitable supplementary fertilizer to balance the perceived shortage in nitrogen and phosphorus in this example.

TABLE 9: BALANCE OF MACRO NUTRIENTS FOR SPECIFIC CROP

CONTAMINANT EXAMPLE ONLY	UNITS	NITROGEN	PHOSPHORUS
Available Biosolids Nutrient	Kg/tonne	2.89	0.54
Biosolids Application Rate Wet Weight at 78% DM	Tonnes/ha	26	26
Nominated Biosolids Application Rate Dry Weight	Tonnes/ha	20	20
Total Nutrient Input	Kg/ha	58	10
Normal Agricultural Input for Pasture	kg/ha	75	30
Deficit	Kg/ha	17	20

Each Site Plan shall have the specifics for each individual paddock.

5. SITE MANAGEMENT

5.1 Transport

Transport of biosolids is not subject to EPA prescribed waste regulations, however, the transport of biosolids shall be in accordance with the following:

1. spillage of biosolids shall be avoided;
2. suitable transport vehicles shell be used and in roadworthy condition;
3. contamination with other materials during loading shall be avoided; and
4. a spillage management plan shall be prepared for the transportation.

Transport vehicles used are designed to fully contain the biosolids during transit. Transport vehicles have sealed tailgates, and retractable tarps. Where required wash down facilities will be provided to ensure transport vehicles remain clean after tipping and before returning to public roads.

5.2 Storage

Biosolids shall be transported to the reuse site by truck and deposited in temporary on-farm stockpiles. This shall be undertaken immediately prior to spreading (where possible) to limit the time the biosolids are temporary stored on the site to less than 30 days. If the storage time is extended to beyond this time frame, earthen bunding shall be installed to prevent product loss in the event of heavy rain. Stockpiles will be located in the least sensitive areas with the application area. Stockpiles will be isolated from stock and appropriate signage will be erected.

5.3 Roles and Responsibilities

The Reuse Agreement and Site Plan shall outline individual contractual responsibilities of both the end user and Western Water.

The responsibilities of Western Water as the supplier of biosolids (and their contractor(s) for land application) are:

- Classification of biosolids suitable for intended end use;
- Ensuring that there are site specific measures for complying with the EIP;
- Supplying biosolids quantity and quality information to the end user;
- Providing details of end use location, quality, quantity, use, etc. and supply to EPA (submitted annually);
- Management of land application in accordance with the guidelines and EIP;
- Community liaison, such as notification and education of neighbours and end users and a complaint response system;
- Carrying out site suitability assessment; and
- Recording application information.

The responsibility of the farmer as the end user of the biosolids is to:

- Ensure site management (i.e. incorporation, crop/livestock withholding) in accordance with the guidelines and EIP;
- Monitoring the farm to ensure on-going compliance with the agreement;
- Notify likely affected neighbours.

A participation agreement will be used that sets out the responsibilities of the suppliers and users.

5.4 Monitoring

Soil monitoring shall be in accordance with the requirements detailed in Section 8.

5.5 Signage

Signage will be place on the boundary fences of the application area and adjacent to any stockpiles. Distance between signs will not exceed 500m.

5.6 Method of Application

The biosolids shall be applied evenly to the reuse site at the calculated rate per hectare as detailed in Section 4.5. Typically spreader trucks are used to apply the biosolids. These trucks are purpose built to manage the spreading of biosolids and animal manures. Application is managed using agricultural GPS for guidance, which ensures an consistent application. The Biosolids will be incorporated into the soil by the user and typically it with will be done within 48 hours.

5.7 Access Controls

T2 AND T3 PRODUCT

Signs will be placed in strategic location to warn public about the application of biosolids on land. The signs will be in place until the withholding periods have passed.

5.8 Buffer Distances

Biosolids shall only be spread in locations as identified on the Site Plan. Buffer distance requirements of the April 2004 *Guideline for Environmental Management, Sustainable Reuse of Biosolids - Land Application* shall be adhered to.

5.9 Dust and Odour Control

Biosolids shall not be transported or spread in windy conditions. All precautions are taken to minimise dust and odour emissions. Weather conditions are continually monitored to program for the transport and spreading of biosolids. 48 hours' notice is given to the end user when possible.

5.10 Erosion Control Measures

The reuse site has been selected on the basis that the surface slopes and soil permeability will minimise risk of erosion of surface-applied biosolids from the site. Soil types that are identified as highly dispersive will be avoided as much as possible, especially when slope is identified as being moderate.

5.11 Weather Conditions

Care is taken to minimise the risk of biosolids odour and dust generation and disturbance of soil and vegetation. Biosolids application is not permitted under the following weather conditions:

- dry and windy;
- during rainfall events;
- at times when heavy rainfall is forecast within the next 24 hours; and
- when soil is saturated.

5.12 Timing of Application

The proposed application of biosolids is during the months of April, May and June. This timing corresponds to the preparation of soils, in this region, prior to the sowing of cereal crops.

The sites selected are envisaged as long term beneficial users therefore repeat applications shall occur. The paddocks shall be rotated to spread the nutrient load and beneficial use on each receiving farm.

6. OCCUPATIONAL HEALTH AND SAFETY

6.1 Processing Site

The processing sites (for air-drying and stockpiling) will most commonly be:

- Romsey WWTP;
- Melton WWTP.

6.2 Delivery and Reuse

Employees of the reuse site shall be required to observe the following routine Occupational Health and Safety precautions:

- avoid inhalation or ingestion of biosolids dusts;
- no food or drink consumption while directly working with biosolids;
- wash hands before consuming food or drink and before smoking;
- when washing equipment, adopt techniques that minimise the generation of mists and airborne dust;
- work access shall be minimised during biosolids application; and
- wear protective equipment such as eye protection and masks if dusts or aerosols are generated.

This list is a guide for the reasonable requirements when handling biosolids.

7. RECORDING AND REPORTING

7.1 Reporting

Reporting is in accordance with EPA requirements.

7.1.1 EIP

This EIP shall be provided to:

- EPA;
- Processing Facility;
- Transport contractor; and
- End user.

7.1.2 Annual Reporting

Annual reporting includes tonnage, application rates, end users, test results and data from the region. Such information will be provided as a part of Annual Performance Report as required by EPA corporate licence.

7.2 REIP Review

The EIP is reviewed every two years and will be updated as necessary. The EPA should conduct a major review every six years. The review process includes the following:

- verify targets and objectives have been met;
- changes to legislation or regulations;
- review complaints and follow up corrective actions applied; and
- set new objectives and targets and how these are to be achieved.

7.3 Data Recording

Data relating to biosolids quality, application rates, procedures are recorded and are available for review.

Records maintained include:

- soil data;
- quality data;
- application calculations
- reporting incidents or non-conformance and corrective actions taken;
- register of non-compliance;
- inspection and maintenance;
- test results; and
- post application monitoring.

Records are maintained for a period of ten years.

7.4 Reporting Emergency of Non-Compliance

In the event of an emergency incidents following biosolids use, the farmer and or Western Water shall notify the regulatory authority. Notification shall be as soon as practical and shall include details of testing results, cause and effect and corrective and future preventative actions taken.

Emergency contacts are provided in the following table.

TABLE 10. EMERGENCY CONTACT DETAILS

NATURE OF EMERGENCY/INCIDENT	CONTACT
Incident or event that results in increased risk to the environment(This includes offensive odour emissions from the site and spills of biosolids onto roads, into or immediately adjacent to waterways or onto land not intended for biosolids use)	EPA
Incident or event resulting in significant increase in the risk to public health	Environmental Health Unit Department of Human Services
Incident or event that results in a risk to food safety, native flora or fauna, National Parks, conservation reserves or other sensitive land (Prohibitive areas)	DEPI
Other Contacts	Western Water
	Epsom Environmental Services Pty Ltd
	Biosolids End User

8. SOIL MONITORING

8.1 Overview

Monitoring of the soil shall occur at two specific times. The first is following the visual inspection of the paddock having found all other criteria satisfactory. The soil test results shall be used for the calculation of application rates and may be used by the farmer to

further fine tune additional nutrient applications. The second test and any subsequent tests shall be to monitor nutrient and physiological changes to the site. Duplicate samples shall be maintained for further analysis. All test are performed by NATA accredited testing laboratories.

8.2 Detail of Measurements

TABLE 8. THE QUALITY PARAMETERS REQUIRED FOR SOILS MONITORING

PARAMETER	SOIL CHEMICAL ANALYSIS
pH	_
Salinity (EC_{15})	_
Olsen P	_
Total P	_
Total K	_
Total S	
Arsenic	_
Cadmium	_
CHROMIUM	_
Copper	_
Lead	
Mercury	_
Nickel	_
Selenium	
Zinc	_
Total N	_
Kjeldahl N	
Nitrate N	_
Ammonia N	_
CEC (cation exchange capacity)	_
Total cation concentration	_
Exchangeable Na	_
Exchangeable Ca	_
Exchangeable Mg	_

PARAMETER	SOIL CHEMICAL ANALYSIS
Exchangeable K	_
Exchangeable Al	_
Sample Location	**Reuse Site**

9. RISK MANAGEMENT PRACTICES

9.1 Introduction

To assess the risk to the environment or to human or stock health, expected performance outcomes are identified and the potential risks which could compromise the expected performance outcomes are determined. Table 9.2 outlines the potential risks, performance outcomes and the mitigation measures to eliminate the risks.
Performance Outcomes - outcomes that need to be met to ensure the biosolids are utilised in a beneficial and ecologically sustainable manner.

- Risk Level - the risk of not achieving the desired performance outcome.
- Practices - a description of the relevant practices (investigation, design and operation) and the associated monitoring relevant to the element.
- Trigger Points and Responses - the limits, identified through monitoring, where actions need to be taken if changes to the system occur and what these actions are.
- Emergency Response - identifies potential emergencies and the necessary response to these emergencies.

9.2 Hazard and Risk Assessment

Risk	Performance Outcomes	Risk Level	Practices	Trigger Points	Response	Emergency Response
Biosolids Quality not suitable for proposed end use	The selected use is appropriate for the given quality The quality produced matches expected quality Contamination at processing site Windborne seed at processing site	Low - Treatment grade is T3 Low - contamination to stockpile on farm Low - risk of waterborne contamination from neighbouring properties Medium - weed infestation	Suitable for broad acre sheep and cropping. Low pathogen levels. Ongoing Monitoring Salinity and nutrients would not affect the environment or plant production Annual spraying as required	Tested to T_3 Tested to C_2 weed infestation	quality reduction continually monitored. Consideration to disposing of stockpile to less sensitive location. Investigation of occurrence Investigation of occurrence. Determination of pre cropping spray requirements	Disposal of stockpile in accordance with EPA guidance
High Nutrients	Low in nutrients Nutrient build up in soil	Low Low	Fertiliser applied to maximise plant growth Levels of nitrogen and phosphorus acts as a fertiliser substitute	Limit plant growth Nutrient balance by monitoring	Levels Total N 〉 0.20% Olsen P 〉 30ppm Levels Total N 〈 0.08% Olsen P 〈 15ppm	Review fertiliser application rates Plant tissue analysis for determination of additional fertiliser

Toxicants affecting plant growth	Impact on groundwater and surface water due to leaching and/or accumulation of toxicants	Low - Toxicant levels are measured	Additional testing if there is an alteration to water levels	Change occurs in treatment process or in trade waste customer process	test according to contents of chemicals used in treatment or processing. Review practices if necessary based on test results	Toxicant levels increased, cease contract and investigate source. Disposal of stockpile.
Poor Soil	Soil conditions optimised for plant growth. Erosion and runoff minimised	Low - establishment of groundcover	Biosolids will not adversely impact on the nutrient load in receiving soil.	Change in soil chemistry levels	Monitor. If chemistry levels change, identify the reason for the discrepancy	Change practices to eliminate erosion
Pollution of Surface Water	Water from surrounding land entering on farm stockpile	Low	Bunding prevents this occurrence	When wash is observed	Identify and rectify. Possible breach in bunding.	Identify and contact affected neighbours and EPA
Risk	**Performance Outcomes**	**Risk Level**	**Practices**	**Trigger Points**	**Response**	**Emergency Response**
Groundwater contamination	Contamination of groundwater	Low - biosolids salinity and nutrient levels lower than groundwater	The sites with shallow water table are avoided	When nutrients or salinity have risen significantly by 20%	Identify and rectify.	Not required

Risk	Performance Outcomes	Risk Level	Practices	Trigger Points	Response	Emergency Response
Human & Animal Health adversely impacted	Ingestion avoidance. Dust inhalation. Treatment grade achieved. Ongoing training	Low	Biosolids supplied contain low levels of pathogens to meet Grade T_1/ T_2	Contact between humans that could lead to health problems	Use appropriate PPE	Seek medical advice.
Public Amenity compromised	Dust and odour does not cross the end user's boundary. Biosolids not present on non-target areas. The public are informed of activities.	Low	Negative feedback	due to reuse or due to cartage	Identify and rectify in accordance with Management System non-conformance.	Not required
Viability	Paddocks selected do not achieve performance outcomes. Financial returns sufficient to encourage use of biosolids.	Low - selection based on criteria for land application	Refer to Reuse Agreement and Site Plan	Improvement of soil condition is less than expected	Investigate and rectify	Not required

Organisational Profile

Service Area

FACT SHEET: BIOSOLIDS

Western Water is investigating the opportunity to supply biosolids to suitable customers within the Western Water Region. If applied under approved conditions, Biosolids have the potential to provide users with a product that is recognised as a valuable alternative to often expensive inorganic fertilisers.

What are biosolids?
Biosolids are mainly a mix of water and organic materials that have been generated from the wastewater treatment processes. Biosolids contain macro and micro nutrients such as nitrogen and phosphorous. They are produced in a state that can be managed to sustainably utilise their nutrient and soil conditioning value depending on their end use, which is regulated by the Environmental Protection Authority (EPA).

How can I receive biosolids?
Western Water recently installed a biosolids dewatering facility at its Melton Recycled Water Plant and therefore is looking for potential users of biosolids for approved activities. You may be able to receive biosolids by completing the relevant expression of interest form which can be accessed on our website or by contacting the Renewable Resources team on 03 9218 5505. Western Water will assess the information and determine the suitability of the property and the proposed use of biosolids.
Western water can discuss the specific needs of the user to arrange delivery and application arrangements.

What class are the biosolids that will be supplied?
Biosolids are generally classified based on a combination of the treatment provided to the biosolids and the contaminants present. To be classified, biosolids must satisfy EPA criteria. Biosolids produced at the Melton Recycled Water Plant are classified as Grade T3/C2. Approved uses for such grade of biosolids are provided in the table below. A full technical analysis of the biosolids can be obtained by contacting the Renewable Resources team on the details below.

What quantity of biosolids are available?
Approximately 10 tonnes of biosolids with a solid content of 15% is generated and stockpiled daily at the Melton Recycled Water Plant. It is possible that Western Water could deliver the product every six months in bulk quantities of up to 500 dry tonnes. The typical application rate for dry biosolids is approximately 30 tonnes/ha as once off application or long term frequency.

Can I enter into long term contracts for biosolids?
Long term supply contracts are available. Western Water is happy to discuss supply arrangements with customers.

How reliable will the supply of biosolids be?
Western Water would guarantee the supply of mutually agreed minimum quantities of biosolids subject to operational issues associated with biosolids treatment.

What kinds of regulations and approvals are associated with the use of biosolids?
Australia has one of the strictest regulatory regimes for biosolids application and use in the world. The use of biosolids has to comply with guidelines from the Environmental Protection Authority (EPA) to ensure safe and sustainable application. The Guidelines specify a number of obligations for Western Water and the end user. The approval process typically involves preliminary assessments and testing of soil at the properties, combined with the development of an Environmental Improvement Plan and a Site Specific Management Plan, generally the cost associated with the development of this plan is met by Western Water and any costs associated with the Site Specific Management Plan are met by the customer.
The regulation and approval process clearly defines the responsibility of various parties and ensures that biosolids are managed in both a sustainable and a safe manner.

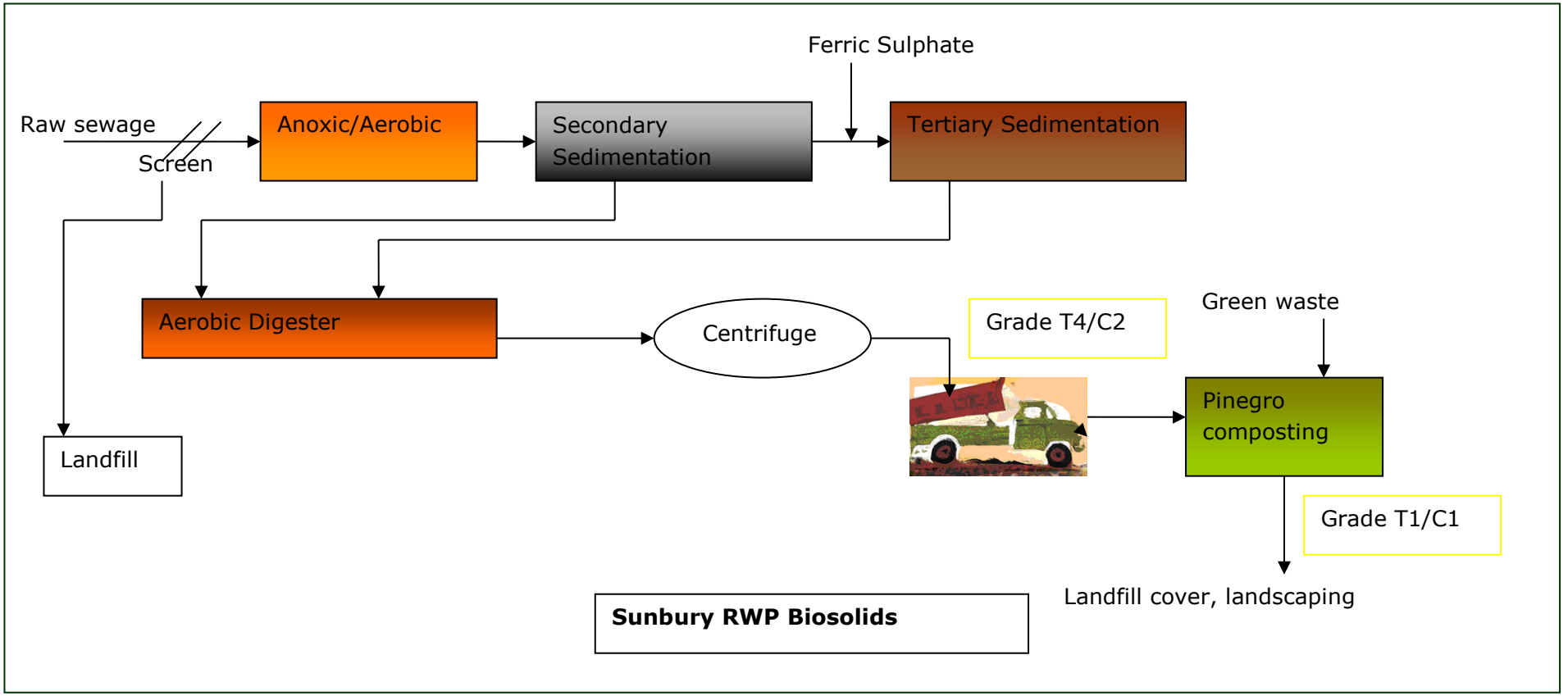
How much will it cost to use biosolids?
Western Water will cover the cost of the treatment and testing of the biosolid product to ensure it complies with regulatory requirements. We are also willing to cover transport costs up to a 5km radius from Melton Recycled Water Plant but expect customers to cover any additional transport costs outside the 5 km radius as well as the cost associated with the application of biosolids.

What can I use biosolids for?
Some of the permitted uses for the biosolids produced at the Melton Recycled Water Plant are outlined in the table below. Further information can be obtained by contacting the Renewable Resources team on the details below..

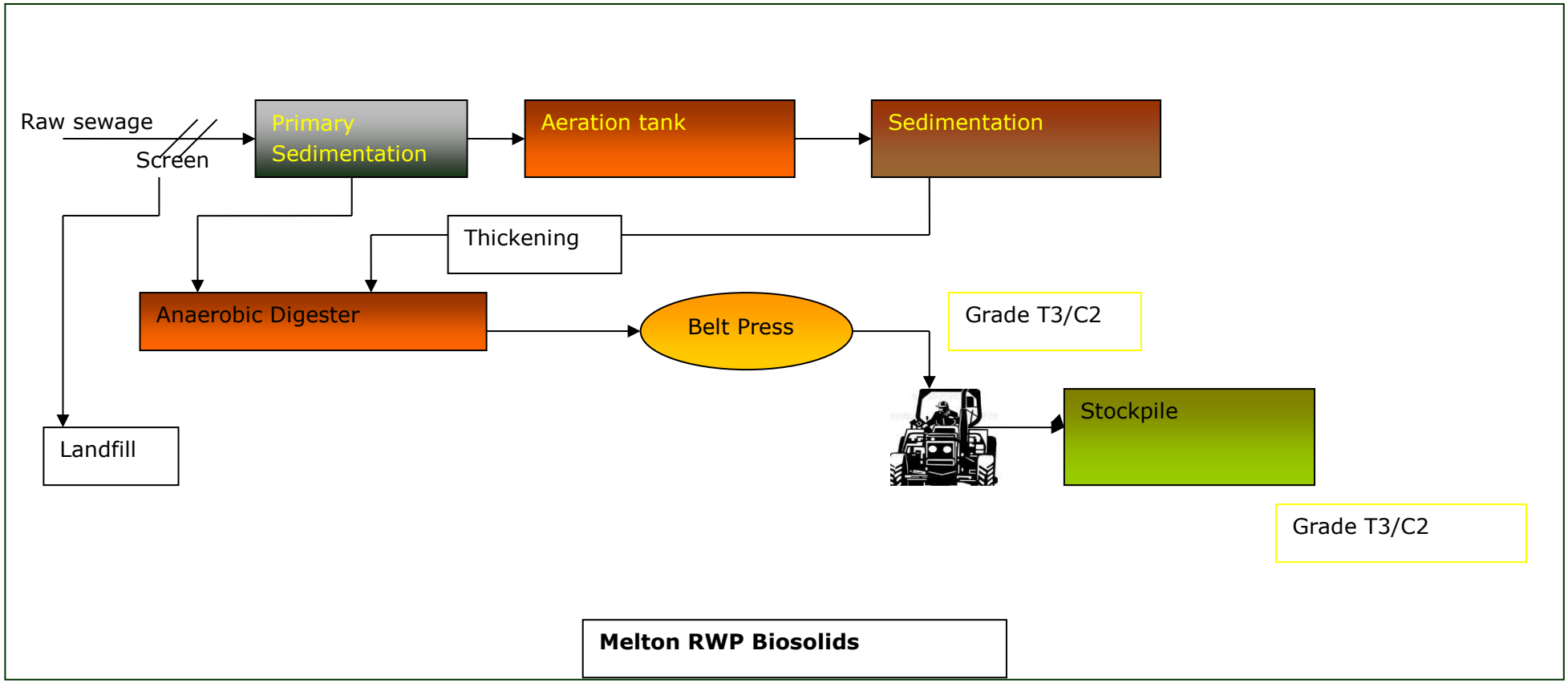
Typical T3/C2 Biosolid Use	Examples
Processed Food Crops.	Wheat, grapes for wine and olives.
Grazing and fodder.	Grazing land for sheep, horses and goats.
Landscaping with restricted public access.	Road development, non- recreational land or areas with controlled public access.
Non human food production.	Turf, woodlots, flowers and ornamental plants.
Land rehabilitation.	Filling in of quarries, mines and landfills.

For further information please contact the Renewable Resources team on 03 92185505, email: sarah.newell@westernwater.com.au or you can visit our website:

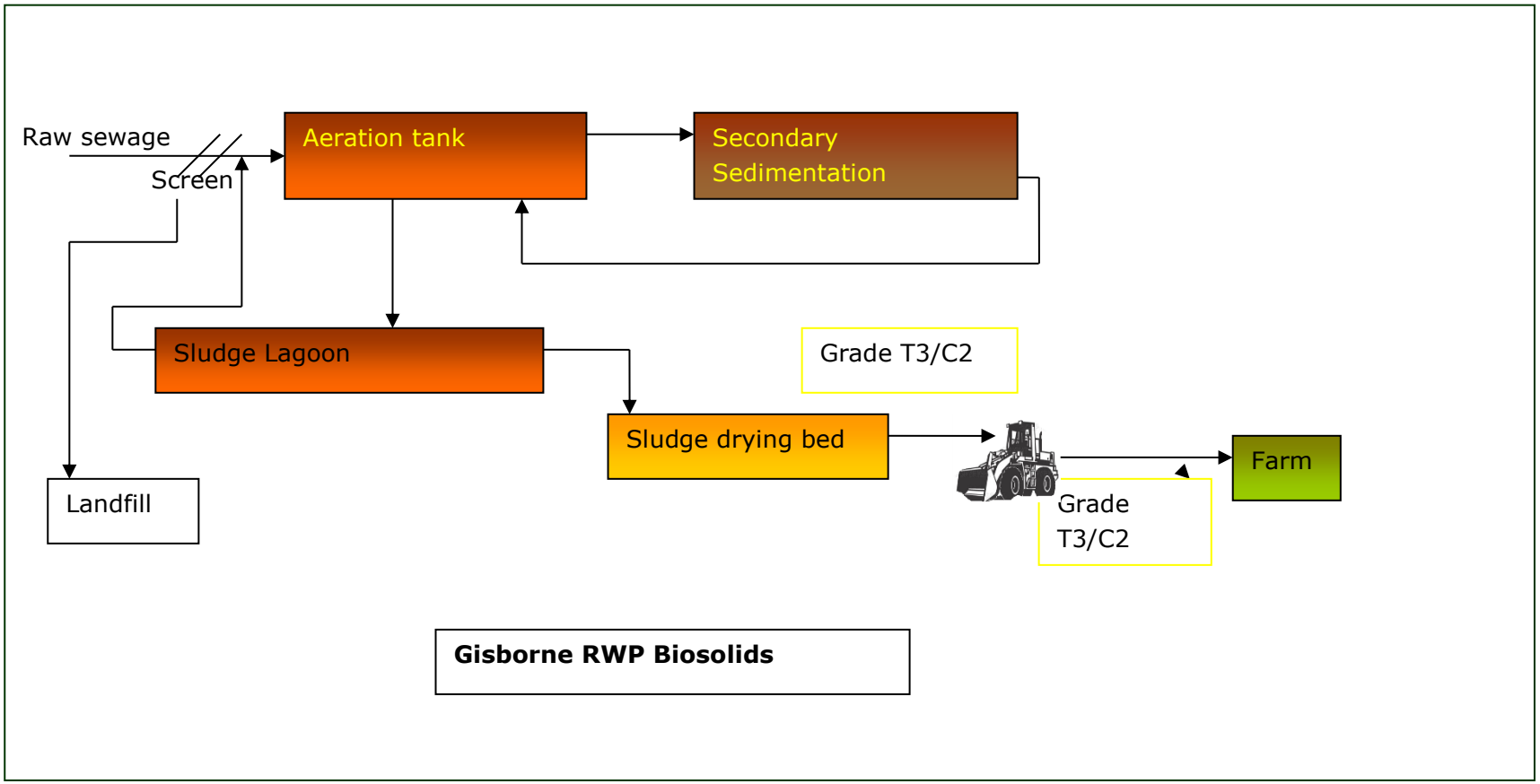
Appendix 1


Ferric Sulphate
Raw sewage
Screen
Anoxic/Aerobic
Secondary Sedimentation
Tertiary Sedimentation
Aerobic Digester
Centrifuge
Grade T4/C2
Green waste
Pinegro composting
Landfill
Grade T1/C1
Landfill cover, landscaping
Sunbury RWP Biosolids

Appendix 2


Raw sewage
Screen
Primary Sedimentation
Aeration tank
Sedimentation
Thickening
Anaerobic Digester
Belt Press
Grade T3/C2
Landfill
Stockpile
Grade T3/C2
Melton RWP Biosolids

Appendix 3


Raw sewage
Screen
Aeration tank
Secondary Sedimentation
Sludge Lagoon
Grade T3/C2
Sludge drying bed
Farm
Landfill
Grade T3/C2
Gisborne RWP Biosolids