Westernport Water Regional Environmental Improvement Plan for Biosolids management

Contents

Document control

Regional EIP for Biosolids management

Cowes Wastewater Treatment Plant

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Revision History

Revision	Revision Date	Details
0	1/5/2013	Draft for internal review
1	1/7/2013	Draft submitted to EPA for review
2	8/8/2013	Reviewed to address EPA comments
3	5/9/2013	EPA Comments
4	5/9/2013	Final EIP addressing EPA comments
5	14/10/2014	Revision to EIP in line with legal advice Russell Kennedy and Addendum framework

1. Introduction and background

The Cowes Wastewater Treatment Plant (CWWTP) is located at the south-eastern corner of Ventnor Beach Road and Pyramid Rock Road, Phillip Island; situated on 65.34 hectares of land described as Lots 1 & 2 PS113496 Parish of Phillip Island. The CWWTP operates under EPA Environmental Licence CL67896 issued 23 June 2010.

The CWWTP predominantly receives raw sewage from San Remo and from the developed areas on Phillip Island. The CWWTP uses Activated Sludge / Extended Aeration processes, which result in two final products - effluent and sludge. Currently the sludge is dewatered and dried using geobags prior to being transported; sun-dried and stockpiled on purpose built beds as biosolids. Further drying and conditioning occurs over a number of years.

The Corporations EPA licence (CL67896) also specifies the following;

> *"Discharge to Land requirements*
>
> *DL4 Deposit of biosolids to land must not adversely affect the land." (p4)*

2. Roles and responsibilities

Production, management and use of biosolids comprise the three main components of biosolids management.

The following parties for the Regional EIP for Biosolids Management undertake these key roles and responsibilities:

- The Supplier of biosolids is **Westernport Water**.
- The end users will be the **agricultural landowners** on Phillip Island.

Note that Westernport Water's agricultural land is not included in this EIP.

This Regional EIP details the roles and responsibilities of parties involved in the management of land based application of biosolids.

2.1 Westernport Water

Westernport Water is the bulk supplier of the treated biosolids. Westernport Water is responsible for:

- Ensuring the Regional EIP is endorsed by EPA complies with the EPA Publication, *GEM Biosolids Land Application*;
- Ensuring end users of biosolids comply with relevant requirements for the grade of biosolids supplied;
- Ensure biosolids meet the biosolids classification required for intended end use;
- Keep a register of biosolids scheme, including site location, quality, quantity and use of supplied biosolids; and
- Provide data and records of biosolids use to EPA annually.

2.2 Commercial Customers

- Ensure site and scheme is managed in accordance with the *GEM Biosolids Land Application*;
- Adhere to requirements within this Regional EIP and/or addendum as appropriate;
- Assess site suitability for biosolids application; and
- Keep records of application details.

2.3 EPA Victoria

The EPA is responsible for the approval of this Regional EIP. They provide formal agreement that the project is environmentally sustainable, provided all the documentation is complied with.

EPA is also responsible for:

- Administering the Guidelines and to ensure for scheme compliance.

- Audit and review the effectiveness of the Guidelines to ensure developments are in best practice for biosolids land application use in Australia and overseas are reflected in the Guidelines.

- Produce technical supplements for the Guidelines where additional guidance on interpretation of requirements is required.

3. Biosolids Description

Biosolids are classified based on two independent factors within the EPA Guidelines *GEM: Biosolids Land Application*, the contaminant concentrations in the biosolids and the microbiological quality post treatment. The classifications within these factors are:

1) **Contaminant Grade** (C1 or C2) based on biosolids contaminant concentrations

2) **Treatment Grade** (T1, T2 or T3) based on the treatment technology utilised, microbiological criteria and measures used to inhibit bacterial regrowth, vector attraction (such as insects or vermin) and odour.

Unrestricted biosolids achieve both C1 and T1 classifications, whereas restricted grade material (C2/T1, C1/T2-etc) requires land application management controls to ensure protection of the environment, public health and agriculture.

The **Contaminant Grade** of biosolids produced is classified as **C2** due to contaminants copper, selenium and zinc that exceeding the C1 classification limits. Further detail of the biosolids quality is provided in Section 3.3.

The Treatment Grade at the Cowes WWTP is classified as T3 due to the minimum 60 days detention in the digester. However, the stockpiled biosolids that is older than 3 years has undergone a validation testing and is classified as a T1 treatment grade (refer to supporting document for T1 validation testing process in Appendix 5). **Westernport Water will only supply biosolids that has been validated with the T1 classification for third party use.**

3.1 Treatment Process of Sludge at the Cowes WWTP

The sludge product from the treatment process is pumped to a 2 ML concrete tank (the digester) which can be operated under aerobic or anaerobic conditions. The sludge is settled and clear effluent (Return Activated Sludge or RAS) is decanted back to the aeration tanks. The thickened, digested, sludge (3 % solids) is then pumped to a series of geobags installed on drying beds with a sand and clay base. The geobags take approximately 3 months to fill. The drainage from the drying bags is collected and pumped back into the aeration tanks.

The geobags remain offline for a period of approximately 8 months, after which the biosolids have dewatered to 15 – 20 % solids.

The dewatered sludge (biosolids) from the geobags is then transported to a stockpile area, after which it is spread out on purpose built drying pans. After the biosolids have dried in the sun it is then stockpiled on site. The biosolids are stockpiled for at least 3 years (from the period of laying the (15 – 20 % solids) biosolids on the drying pans to the dried biosolids in stockpiles) before any reuse of the product will occur.

The Classifications that apply to the treatment process described above is detailed in Table 3-1 below which describes the associated grades and required controls based on the EPA Guideline *GEM; Biosolids Land Application.*

Table 3-1 Treatment Processes, the EPA Grade Classification and required controls

Treatment Process	Grade	Associated Controls
Long-term storage Sludge is digested, dewatered to > 10 % w/w solids and stored for > 3 years	T1*	Product must be stored in manner that ensures no recontamination and not generate offensive odours.
Anaerobic digestion >15 days at > 35 C or > 60 days at 15 C	T3	Relevant vector attraction reduction controls and product that, coupled with management controls, does not generate offensive odours. Weed seed controls may be needed in landscaping or agricultural applications.
Aerobic digestion > 40 days at > 20 C or > 60 days at 15	T3	

*The biosolids product available for third party use is only the biosolids that has been stockpiled for three years with a T1 classification.

3.2 Type of use

Based on the Classification of **T1 C2**, the biosolids can be used for the following purposes:

- Human food crops consumed raw in direct contact with biosolids; includes lettuces, strawberries and carrots
- Dairy and cattle grazing/fodder (also poultry)
- Processed food crops
- Sheep grazing and fodder (also horses and goats), on non-human food crops such as turf, woodlots, flowers and ornamental plants (not for human consumption)
- Landscaping with unrestricted public access, forestry and land rehabilitation

3.3 Biosolids Quality and Quantity

Quality

The contaminant concentration of the biosolids is presented in the Table 3-2. Fifteen samples were taken to test for metals and ten samples were taken to test for DDT & derivatives, organochlorine pesticides and PCBs. A BCC value was calculated for all contaminants to ensure that no more than 5 per cent of biosolids are incorrectly classified as belonging to a higher quality grade in accordance with the procedure outlined in the Publication 943 *GEM; Biosolids Land Application.*

Ongoing validation testing of biosolids stockpiles will be carried out and summarised in reports that are provided to Commercial Customers prior to application. This will include re-growth testing for E.coli and Salmonella that must meet requirements specified in the EPA Guidelines.

Table 3-2: Biosolids Quality- Contaminants Concentration *tested between October 2012 and February 2013*

	Contaminants	**BCC**	**Classification**
Metals	As Cd Cr Cu Pb Hg Ni Se Zn	7.0 1.0 57.5 278.9 25.5 0.5 26.2 3.5 577.0	C1 C1 C1 **C2** C1 C1 C1 **C2** **C2**
DDT & derivatives	DDT DDE DDD	0.07 ND 0.05	C1 C1 C1
Organochlorine pesticides	DIEL ALDR Chlordane HEPEP HCB LIND	ND ND 0.06 ND ND ND	C1 C1 **C2** C1 C1 C1
PCBs	Total Soil PCBs	ND	C1

ND= not detected

The microbiological quality of the three year stockpiled biosolids was tested to determine the treatment grade. During this validation sampling program, nineteen samples were tested for E. Coli, Salmonella and Helminth Ova. A further four samples were tested for enteric viruses. The results are shown in the table below. A more detailed description of the validation testing is provided in Appendix 5.

Table 3-3: Microbiological Quality- Treatment Classification

Microbiology	BCC Value	Treatment Grade
E. Coli (orgs/gm dry wt)	27.7	T1
Salmonella	ND	T1
Helminth Ova	ND	T1
Total Enteric Viruses (< 1 PFU/10 dw)	ND	T1

ND= Not Detected

Other physical and/or chemical properties of the stockpiled biosolids that are of use for land application is provided in the Table 3-4. Nine samples were tested for pH, EC, Total Nitrogen and four samples were tested for total organic carbon.

Table 3-4: Other Physical and Chemical Properties of Biosolids

Physical/ Chemical Properties	BCC Value	Minimum	Maximum
pH	5.14	5.0	5.2
EC	1207	900	1400
Total Nitrogen	25,262	15,000	28,000
Total Organic Carbon (%)	11.15	8	13

Quantity

The volume of dry C2 T1 classified biosolids currently stockpiled at the Cowes WWTP is approximately **1,330 dry tonnes**.

On a yearly basis, approximately 500 dry tonnes of biosolids are expected to be produced (this estimated is based on 2011/12 yearly production value of 479 dry tonnes)

4. Application Frequency and Scheduling

Based on the quality and quantity of biosolids stored at the Cowes WWTP the following application frequency and scheduling is proposed:

- Annual application of a **minimum** 500 dry tonnes of biosolids to the specified 3rd party application sites
- Based on current validated stockpile of T1 biosolids this will equate to a maximum period for 2 years of application. Biosolids currently aging will be classified and brought online for third party use after validated for a T1 C2 classification through Westernport Water's quality control sampling program. If this quality is not met, the biosolids will not be able to be used on these properties. Refer to 11.2 for further detail regarding Westernport Water's action if biosolids quality requirements are not met.

Specific Schedule for biosolids application across the individual sites is provided below:

Year	**Application Site***	**Land Area (Ha)**	**Application Rate****	**Calculated biosolids volume to be applied (dry tonnes)*****
2013/2014- spring/summer period	Bimberdeen Farm	6.6 Ha 3.4 Ha-R & D Salt affected land Total land area – 10 Ha	54-NLAR	540
2013/2014- autumn	Heath Hill	16.5	62-NLAR	1023
The schedule below is for biosolids that is still online and that will be validated to T1 C2 once the three year withholding period has been achieved at the WWTP.				
2014/ 2015- autumn	Gallaren Farm-	8	62-NLAR	496
2015/2016- autumn	Middle Farm	8	62-NLAR	496
	TOTAL LAND	**42.5 Ha**	**TOTAL VOLUME**	**2755**

*For more detail on the application sites, including specific location maps refer to Appendix 1- Site Assessments

** For site specific application rate calculations with consideration of limiting factors such as nitrogen, phosphorous and contaminant levels refer to the site specific assessments in Appendix 1.

*** Calculated volumes present the maximum volume of biosolids scheduled for application in the given year based on the allowable application rate, where volumes of biosolids available may fall short of this value from time to time.

5. Transport, storage and distribution system

5.1 Transport

Transport of biosolids is not subject to EPA Prescribed Waste Regulations. However biosolids are considered a controlled waste under national guidelines.

Transport of biosolids from Westernport Water wastewater treatment plants will follow best practice measures to ensure there is no spillage, odours, or contamination of the product.

Transport will have;

- Transport route with minimal interface with public and minimise impact of transport on public amenity (refer to transport maps for each site in Appendix 1- Sections 2.2, 3.2, 4.2, 5.2);
- Fully enclosed or sealed tankers or trailers with locks, water-tight seals, and water proof covers for loads;
- Assurance that the vehicle used for transport is not contaminated with wastes that will impact on the biosolids quality
- Cleaning of truck tailgates and tyres prior to leaving sites to avoid carryover or spills to roads; and
- The transport service must have a response plan to ensure rapid clean-up of transport spills. Dry clean-up methods are preferred and flushing of spilt biosolids down drains is prohibited.

5.2 Storage

Biosolids will be stockpiled and stored in a manner to avoid impacts on the beneficial uses of groundwater and surface waters, and avoid generation of offensive odours beyond the site boundary. Stockpiles for medium to long term storage will be stored at the Cowes WWTP, and in accordance with the following requirements:

- Stored within a bunded storage area with an impermeable to low permeable base and designed to capture the first flush of contaminated run-off;
- Water from bunded storage areas is returned to the treatment plant for treatment and disposal.
- Stockpile areas will be located on a slope less than 5 per cent;
- The Buffer distances (refer Section 8.2) will be adopted
- Stockpiles will not be turned or broken up on windy dry days, to minimise off-site odour and dust generation (light watering of stockpiles will be undertaken to control dust generation); and

- Where bunding and impermeable base is not practical at the application site, the stockpiles should be located on flat land, stockpiles should be sloped to reduce water penetration, stormwater flow into the storage site should be diverted, increased buffer distances to surface waters may be required and the duration of storage should be minimised

Only short term storage (< 60 days, preferably < 30 days) is permitted to occur at the end use sites. If biosolids are stored at the application site for longer than 30 days the same storage requirements specified for the stockpiled biosolids at the Cowes WWTP will apply. This will be ensured through the EIP auditing program (refer to Section 9) that will inspect application sites and ensure third party users have applied the biosolids according to the approved operating procedures.

6. Site locations

The sites for application of biosolids include:

6.1 Third Party Sites:

- Bimberdeen Farm-Ventnor
- Heath Hill Farm- Rhyll
- Middle Farm- Wimbledon Heights
- Gullaren Farm- Ventnor

The farms owned by a third party will only be supplied biosolids stockpiled for 3 years that has undergone the sampling validation to be classified as T1 C2 Quality. . Refer to the map below to see the broad locations of the application sites. Each individual site has a more detailed report including transport route, detailed site map with buffer distances, environmental risks and controls and calculated application rates details presented in Appendix 1.

The WPW site at the King Road WWTP was assessed, however due to environmental risks and limited volume that could be applied is not considered a feasible site for inclusion in this EIP.

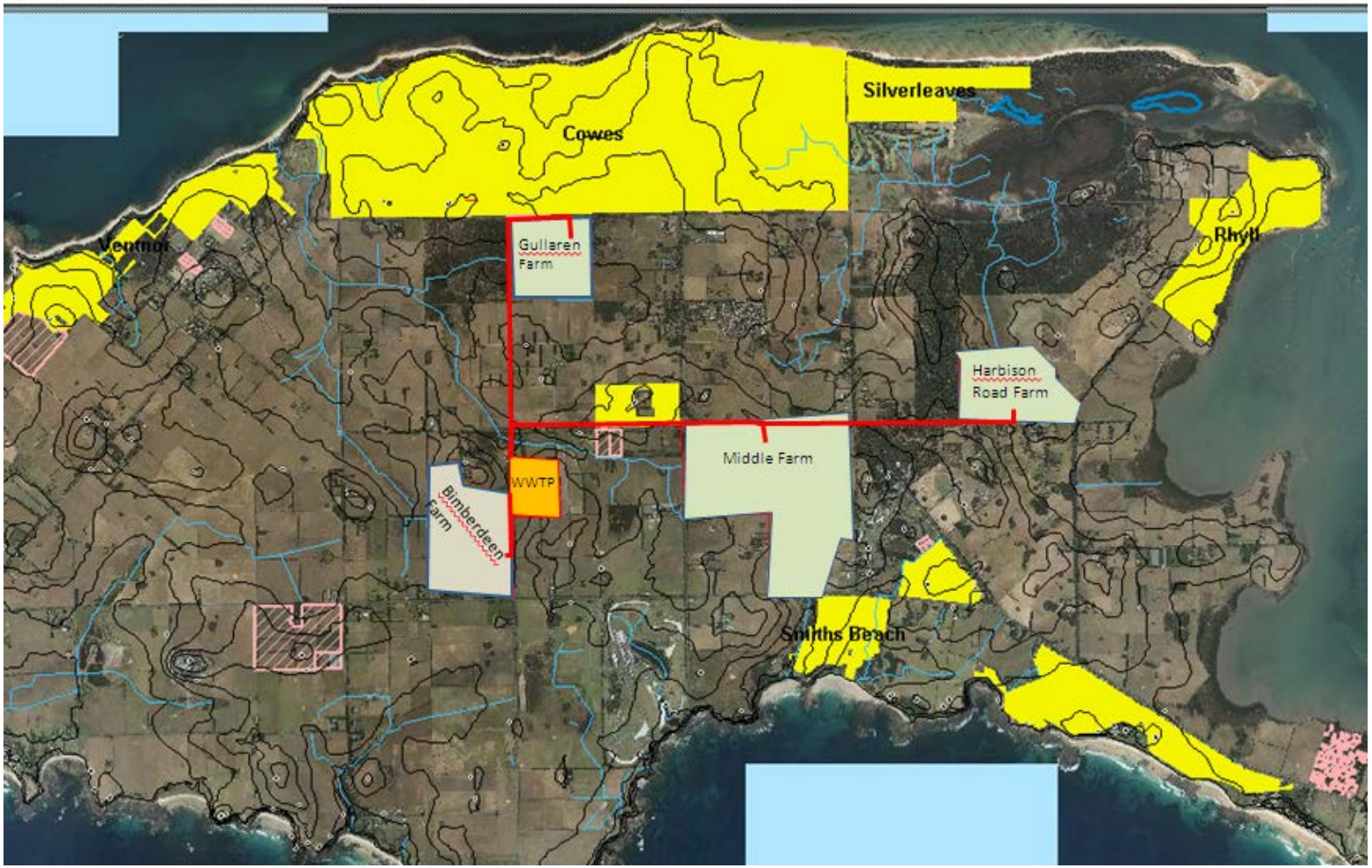

Figure 1: Third Party Site Location Map Location Map showing third party application sites: Bimberdeen Farm, Gullaren Farm, Middle Farm and Harbison Road Farm. The WWTP where the biosolids will be sourced from is shown in orange. Transport routes are shown in red and yellow areas indicate residential zones. For detailed site maps refer to Appendix 1.

7. Biosolids application rate and method

The rate at which biosolids can be applied to land is determined by three factors:

1) The Receiving Soil Contaminant Limits (RSCL)

2) The Contaminant Limiting Application Rate (CLAR) and

3) The Nutrient Loading Application Rate (NLAR)

Although it will vary from site to site, the most common limitation of RSCL is Cadmium, and the most common limitation in NLAR is the rate of nitrogen utilisation. The CLAR is determined from analysis of the receiving soil condition (RSCL) together with the concentration of contaminants in the biosolids. The most limiting factor will be adopted to determine the volume of biosolids that can be applied to land. Refer to the table below for the limiting factors for each of the identified sites.

The application method, specifically the soil incorporation depth will also determine the volume of biosolids that can be applied to land. For example, if biosolids is incorporated into the soil with 100 mm depth incorporation (through rotary hoe methods) more biosolids can be applied than if biosolids were incorporated to 10 mm depth in the soil or simply applied on the surface (refer to the table below). **All application sites require the biosolids to be incorporated to a 100 mm depth.** The specific method for applying biosolids is outlined in Appendix 3 in the Standard Operating Procedure for biosolids transport and application.

Although only the limiting contaminant is listed in the table 7-1 below, all potential limitations including the receiving soil contaminant limits (RSCL), the contaminant limiting application rate (CLAR) and the nutrient limiting application rate (NALR) have been considered at each site and the calculations are shown in Appendix 1 in Sections 2.6, 3.6, 4.6 and 5.6.

Table 7-1: Biosolids Sites and Land Application Volumes

Owner	Site	Site Area (Ha)	EPA NLAR/CLAR DRY Application Volume (tonnes/Ha)	Biosolids Dry tonnes
Bob Davie	Salt Contaminated land[3]- R&D- Bimberdeen Farm	3.4 Ha	54- NLAR	183.6
Bob Davie	Bimberdeen Farm	6.6	54-NLAR	356.4
David McGrath	Heath Hill Farm	16.5	62-NLAR	1023
David McGrath	Gallaren Farm-	8	62-NLAR	496
David McGrath	Middle Farm	8	62-NLAR	496
TOTAL LAND SUITABLE FOR BIOSOLIDS		**42.5**	**TOTAL VOLUME OF BIOSOLIDS FOR LAND APPLICATION**	**2555**

8. Controls

8.1 Biosolids Application Controls

Application Method

Application will include the following measures:

- Incorporation into soil to a 100 mm depth, achieved through surface application followed by soil incorporation;
- Very little if any biosolids should be visible on the surface after incorporation;
- The existing sites assessed for biosolids application do not employ no till farming methods. However, if in the future Westernport Water assesses an application for biosolids that has this requirements surface application of biosolids products may be acceptable but requires careful consideration and additional controls- in accordance with EPA Guidelines *GEM; Biosolids Land Application*
- Surface soils will not become compacted as a result of application operations; and
- The application method will ensure biosolids are evenly spread so that maximum agronomic benefit is obtained

  Refer to Appendix 3 for the standard operating procedure for biosolids transport and application.

Application Timing

- Winter application will be prohibited as the low crop nitrogen demand and high rainfall increases the risk of nitrate leaching, particularly on sandy soils. Refer to the planned timing of the biosolids application schedule in Section 4.
- Application will not occur during high rainfall events, or when application will coincide with forecasts for heavy rains; and
- To avoid nutrient losses, biosolids used in agriculture should be applied to fallow land as close as possible to the time of sowing, except where other restrictions apply.

8.2 Environment

8.2.1 Land Characteristics of Application Sites

Individual sites have been assessed based on site characteristics such as soil type, land slope, surrounding environment, land uses and risks to groundwater. The specific detail regarding these assessments is presented on each individual application site in Appendix 1 (refer to Sections 2 - 6). As all of the application sites are within 6 km of the Cowes WWTP, some generalised comments on the site characteristics are made here, for specific detail on each application site refer to Appendix 1.

The land in this region is typically undulating with slopes generally ranging from 4 % to 8 %. Soils are generally moderate to heavy clays that overlie basalts with some shallow alluvial/fluvial deposits overlying the weathered basalt. Regional groundwater levels vary and tend to range from near the surface to 10 m below ground level. Groundwater quality is generally poor in this area, with salinities that range from 2300 TDS to 10,000 TDS. Due to poor quality there is limited beneficial use of groundwater in the area. Some of the identified beneficial uses include provision of base flows to surface waterways and some limited irrigation/stock use.

8.2.2 Controls to Manage Risks at Application Sites

Stormwater

External surface water (from surrounding land) will be prevented as much as possible from flowing onto the application site. The application sites typically range from 4 – 8 % land slopes, which have a slight to moderate risk rating (refer to Appendix 1 Sections 2 – 6 for Site specific assessments). In order to manage risks of contaminating surface water runoff, biosolids will not be applied within 48 hours of heavy rains being forecast. Where light rain is forecast within 48 hours, application can proceed (as all sites do not have ratings above moderate for hydraulic capacity and slope - refer to Appendix 1 Sections 2.5, 3.5, 4.5 and 5.5).

Additional controls for surface water contamination include placing diversion banks and/or cut-off drains around the application site, where practical. These controls are not required for the application sites assessed.

Soils and Groundwater

Soils that have either very low or very high saturated hydraulic conductivity are generally not suitable for biosolids application. Where, low saturated hydraulic conductivity can lead to anaerobic conditions in the soil and increase the risk of run-off. Soils with highly permeable soils may allow rapid movement of nutrients or contaminants to groundwater. However, biosolids may improve soil structure- which should be assessed when looking at site with low permeability soils. Soils at each of the application sites have been assessed and all soils are considered suitable for biosolids application (refer to Appendix 1- Sections 2.4.1, 3.4.1, 4.4.1, 5.4.1 for detail)

The potential risk to groundwater has been assessed for each individual application site and is presented in Sections 2.4.2, 3.4.2, 4.4.2, 5.4.2 and 6.4.2 of Appendix 1. Regional groundwater was assessed as high risk if the sites meet one of the following conditions, while also considering the beneficial uses of groundwater in the area:

- Highly permeable soils or such as coastal dune sands, alluvial deposits or soils with hydraulic conductivity > 50 mm/h in the most restrictive layer;
- Shallow water table for example less than 1.5 – 3 m depth to groundwater;
- Less than 60 cm depth to bedrock or clay hard pan

All application sites included in this EIP were determined to pose a low – moderate risk to groundwater, refer to Appendix 1 - Sections 2.4.2, 3.4.2, 4.4.2 and 5.4.2 for detail.

Dust

Biosolids should minimise dust and aerosol generation and should only be applied in calm, light wind conditions (< 19 km /hr.) indicated by rustling leaves. This is in accordance with Appendix 3 – Standard Operating Procedure for Biosolids transport and Application.

Access controls (warning signs)

Access controls do not apply for the biosolids quality presented in this EIP (3 year stockpiled biosolids- validated to have a T1 C2 quality),therefore access of general public and stock to the site does not need to be restricted However, as an additional control on the first application site at Bimberdeen Farm (in accordance with the Farm sites own Environmental Management System) the site manager will fence off the area where biosolids has been applied for a 12 month period and a warning sign will be placed showing “biosolids in use” as shown in Section 2.3 of Appendix 1.

Use Restrictions

There are no withholding periods specified for a C2 T1 classification that is using soil incorporation methods as specified in this document.

Any surface application sites that do not use soil incorporation methods (there are none to date) require three month withholding periods for animals not consumed by humans (alpacas, horses), and animals consumed by humans are restricted from sites with surface application methods employed.

Buffer Distances

The required buffer Distances (shown in meters) highlighted in yellow are required to be met for each of the biosolids application sites. The application of the buffer distances is presented in each of the individual site assessments shown in the detailed maps in Appendix 1 (Sections 2.3, 3.3, 4.3 and 5.3) and also addressed further in the Controls sections of Appendix 1 (Section 2.5, 3.5, 4.5 and 5.5).

Land Uses	Treatment Grade	
	T2 or C2	T3
Residential Zone, urban areas	50	250
Occupied dwelling	25	50
Surface Waters	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 and fauna	25	50
Sensitive Areas- highly sensitive ecological, natural, conservation, cultural or heritage values worthy of highest levels of protection (gazetted National or State Parks, Crown nature reserves for flora and fauna, groundwater recharge areas, potable water supply catchments, or aboriginal land of cultural importance)	50	100

8.3 Food safety

Direct testing may need to be undertaken depending on the identified risks for food safety. These should be investigated by the applicant and WPW will assist with any direct enquiries. The DPI Agriculture Notes should be consulted for process testing, sampling and analysis. Biosolids applied to agricultural grazing land should consult the Livestock Diseases Control Act 1994.

9. Inspection and management programs

The end users of biosolids are to provide operation and maintenance procedures for biosolids application, storage and distribution. The WPW SOPs may be provided to third party landowners to use as a template if they do not have such documents developed. WPW will assess, approve and audit application sites to ensure that the procedures submitted for storage and application of biosolids are complied with.

The owner of each application site is required to sign onto a Customer Agreement to adhere to the controls specified in Appendix 1. This will ensure both parties understand their roles and responsibilities for the safe use of biosolids. Records of Customer Agreements for biosolids use and Site Management Controls will be kept by Westernport Water and the end use customers. Maintenance and inspection programs will be kept by the owners/operators of third party applicant sites for inspection as required by WPW or the EPA.

9.1 EIP Auditing Program

Westernport Water will audit biosolids to ensure that the standard operating procedures are followed and controls documented in this EIP are met. Westernport Water will maintain the audit and inspection records for assessment by the EPA if required. Onsite monitoring records will be kept for review by Westernport Water on an as needs basis- particularly to review the benefit provided to the soil from biosolids application.

10. Training programs

"Restricted Grade" biosolids may contain pathogens and chemical contaminants that require management, routine OH& S precautions, including:

- Education of on-site workers to risks associated with exposure to biosolids
- Worker immunisations where appropriate;
- Installation of wash basins and the provision of showering facilities;
- No food or drink consumption while directly working with biosolids and washing hands before meals or smoking;
- Adopting techniques that minimise the generation of mists and airborne dust, for example using wet sweeping (not flushing_ techniques rather than dry sweeping, avoiding high pressure equipment such as air pressure devices; and
- Minimising worker access to the site during biosolids application, keeping workers upwind during application and using protective equipment such as eye protection and masks if dusts/ aerosols are generated.

Employers should make themselves aware of their occupational health and safety responsibilities and duties under the *Occupational Health and Safety Act 1985*. An OH& S Plan should be prepared, staff trained and safe practices integrated into day to day work procedures.

Westernport Water will provide training to private landowners regarding the required application methods for biosolids application. These methods will be in accordance with the Standard Operating Procedure for Biosolids Transport and Application in Appendix 3.

11. Monitoring and Reporting

11.1 Monitoring

Nutrients, chemicals and Soil Structure

In addition to the soil monitoring required for determination of the biosolids application rate (refer to Section 7 and Appendix 1), subsequent soil sampling should be carried out when either:

- Mass balance calculations indicate that biosolids have contributed a load that exceeds 10 per cent of the RSCL since the previous sampling;
- Four biosolids applications have been undertaken since the previous sampling; or
- 20 years have passed since the previous sampling

For Agricultural land uses, on-going monitoring of parameters such as nutrients and acidity/alkalinity should be conducted as part of normal farm nutrient/ fertiliser planning and soil health management programs. These occur at each application site on a yearly basis, these records will be kept for inspection by Westernport Water when required.

Groundwater Monitoring

Groundwater monitoring is not required for the schemes complying with this Regional EIP. The local condition of these sites and the potential risk to groundwater has been assessed and is presented in Sections 2.4.2, 3.4.2, 4.4.2, 5.4.2 and 6.4.2 of Appendix 1.

Food Safety Monitoring

Direct testing may need to be undertaken, depending on the risks to food safety. Sampling and analysis should reflect the identified risks and should be conducted in accordance with Guidelines for sampling soils, fruits, vegetables and grains for chemical residue testing (NRE 1999#AG0889).

For biosolids applied to agricultural grazing land, a stock monitoring program may need to be implemented in accordance with the *Livestock Diseases Act 1994*. This is the responsibility of the owner and manager of the site, Westernport Water will provide assistance in providing any additional test results of biosolids quality if required.

11.2 Record Keeping

Supplier/Producer (Westernport Water) Records

Westernport Water must maintain the following records regardless of biosolids quality:

- Batch identification (or for a continuous operation, the biosolids produced between sampling periods)
- Production period;
- Contaminant concentrations and batch grade;
- Historic trends of contaminant levels;

- Treatment process, microbiological testing, stabilisation method and resultant treatment grade;
- Concentrations of nitrogen, phosphorus and other relevant nutrients in biosolids;
- Details of incidents and the corrective action taken;
- Inspection and maintenance reports;
- Quantity (dry tonnes) and solids content of the batch; and
- The type of produce produced.
- Address of the biosolids application sites, end use and any amendment to this document that may include additional application sites in the future

Records need to be maintained for at least 10 years in order to analyse trends and demonstrate on-going compliance with the objectives in this regional EIP and with the EPA Guidelines *GEM; Biosolids Land Application*

End Users

Restricted grade biosolids end users and Westernport Water need to maintain the following records:

- Source of biosolids, batch identification recorded by Westernport Water
- The date biosolids are received is to be recorded by both Westernport Water and the end user;
- The Biosolids to be applied is classified as T1 C2 provided and validated by Westernport Water;
- Details of application site including: location, name of occupier or owner, area involved, date of application in accordance with this Regional EIP- Refer Appendix 1 Site Assessments;
- The calculated NLAR;
- The concentrations of contaminants in soil prior to biosolids application;
- The calculated CLAR;
- The application rate and method of application;
- The soil pH and salinity;
- Monitoring data and analysis of trends in the parameters;

If the biosolids quality does not meet the T1 C2 quality as specified in this EIP, Westernport Water will not allow the biosolids to be used by third parties. Furthermore, Westernport Water will inform the EPA that the biosolids failed to meet these quality requirements and will investigate the cause of the issue (stockpile management/source issue/etc.).

- Cross reference to the relevant management controls (this document, individual site specific management controls in Appendix 1 and SOPs for transport and application of biosolids as required)

11.3 Reporting

Westernport Water will provide annual records at the request of the EPA of all monitoring programs in accordance with the *GEM; Biosolids Land Application.*

12 Emergency Plans

In the event on an emergency incident following biosolids use, the user and or/ Westernport Water must notify the regulatory body. This includes breaches such as:

- Breach of RSCLs; or
- Violations of food standards (i.e. MRLs or MLs).

Notification should be as soon as practical and include details of testing results, cause and effect and the corrective and future preventative action being taken.

EPA should be notified of any event or emergency that poses risk to the environment including: biosolids spill to roads or immediately into adjacent waterways.

Department of Health are to be notified in case of emergency or incident that significantly increases the risk to public health and food safety.

DEPI should be notified in event of an emergency or event that presents a risk to native flora or fauna, National Parks, conservation reserves or other sensitive land.

13 EIP review

A review of this regional EIP will be undertaken after a three year period with analysis of crop yields to determine the effectiveness of biosolids application to land. There will also be review and assessment of the benefits of biosolids as a soil conditioner to enable the product to begin to achieve a market value through these land application sites.

13.1 EIP Auditing Program

Westernport Water will audit biosolids application sites during application to ensure that the standard operating procedures are followed and controls documented in this EIP are met. Westernport Water will maintain the audit/inspection records for assessment by the EPA if required. Westernport Water will also conduct site inspections to ensure records are kept by the site managers in accordance with this EIP.

14 EIP Checklist

Checklist	Westernport EIP reference
Type of use and the details of biosolids quantity and quality to be used	Section 3, p. 9 - 12
Biosolids Transport, storage and distribution systems	Section 5, p. 14, also Appendix 3
Roles and responsibilities for day to day management and compliance issues	Section 2, p. 6 -7
Biosolids application and soil incorporation method, operation and maintenance procedures	Appendix 3- SOP for Biosolids Transport and Application (Section 15.1 of EIP)
A scaled locality plan of the end use site showing all important features, sensitive land uses within 200 metres of the site boundaries	Appendix 1 Site Assessments – refer to Sections 2.3,3.3,4.3 & 5.3 (Section 15.1 of EIP)
Above plan as showing locations of prominent warning signs in accordance with the principles of AS 1319-*Safety Signs for the Occupational Environment*	Warning signs not required- refer Section 8.2; for Bimberdeen Farm refer Section 2.3 of Appendix 1 (Section 15.1 of EIP)
Contaminant and nutrient application rate calculation methods and resultant application rates, frequency/scheduling based on nutrient/contaminant restraints	Summary in Section 7, detail of calculations in Appendix 1 Site Assessments- refer Sections 2.6, 3.6, 4.6 & 5.6 (Section 15.1 of EIP) and Addendums submitted to EPA prior to application
For agricultural uses, the crop management practices, including crop nutrient utilisation practices, soil salinity, soil structure and productivity controls	Appendix 1 Site Assessments- refer Sections 2.5, 3.5, 4.5 and 5.5 (Section 15.1 of EIP)
Access controls-public and/or stock, including withholding periods	No access controls required – Refer Section 8.2.2
Site selection and management controls including buffer distances and land capability	Appendix 1 Site Assessments- refer Section 2.5, 3.5, 4.5 & 5.5 (Section 15.1 of EIP) or Addendum submitted to EPA prior to land application
Control for drainage, stormwater run-on and run-off, and for groundwater protection	Appendix 1 Site Assessments- Section 2.5, 3.5, 4.5 & 5.5 and Appendix 3 – SOP for Biosolids transport and Application (Section 15.1 of EIP)
Biosolids dusts and controls	Section 8.2.2 and Appendix 3 – SOP For Biosolids Transport and Application (Section 15.1 of EIP)
Occupational health and safety controls	Section 8.2.2 and Appendix 3 – SOP for Biosolids Transport and Application(Section 15.1 of EIP)
Training programs for workers	Section 10

Inspection and maintenance programs	Section 9
Monitoring programs biosolids and receiving soils and if relevant, agricultural produce and groundwater	Appendix 1 Site Assessments- Section 2.5, 3.5, 4.5, 5.5 (Section 15.1 of EIP)
Food safety quality assurance programmes- such as HACCP	Section 8.3- site specific detail kept by site manager
Recording and reporting programs	Section 11
Emergency/contingency implementation plans and procedures	Section 12
Auditing programs	Section 13.1
EIP review process	Section 13

15 Appendices and References

15.1 Appendices

- Appendix 1: Site Assessments of Westernport Water Regional Environmental Improvement Plan for Biosolids
- Appendix 2: Westernport Water Treatment Process Validation Report for Stockpiled Biosolids from the Cowes Wastewater Treatment Plant, February 2013
- Appendix 3- Standard Operating Procedure for the transport and application of biosolids

15.2 References:

- Soil Suitability Assessment for Third Party Land Application of Biosolids from the Cowes WWTP at McGrath & Davies Properties, Ag-Challenge Consulting, February 2013
- Cowes Wastewater Treatment Plant- Condition Report on Soils and Development Options for *The Farm,* Ag-Challenge Consulting, August 2012
- King Road Wastewater Treatment Plant- Condition and Baseline Report on Soils, Ag-Challenge Consulting November 2012
- Internal Report- Receiving Soil Condition at the Cowes WWTP and Implications for Farm Management, Westernport Water 2012