End of Waste Code

Biosolids (ENEW07359617)

Waste Reduction and Recycling Act 2011
## Version history

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description of changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>01 January 2019</td>
<td>EOW Code</td>
</tr>
<tr>
<td>1.01</td>
<td>08 October 2019</td>
<td>Environmental Protection Regulation 2019 update</td>
</tr>
<tr>
<td>2.00</td>
<td>01 January 2020</td>
<td>Amendment EOW Code – approval by gazette on 20 December 2019</td>
</tr>
</tbody>
</table>

Prepared by: Waste and Contaminated Land Assessment, Department of Environment and Science

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December 2019
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1. Explanatory Statement

This End of Waste (EOW) code for biosolids has been issued by the Queensland Government in accordance with section 159 of the Waste Reduction and Recycling Act 2011 (WRR Act).

This EOW code states when the biosolids becomes a resource and any relevant requirements and/or conditions for its use. If the resource is not being used in accordance with the relevant requirements and/or conditions of this EOW code, or another type of permit that allows for its use, it is considered a waste under section 13 of the Environmental Protection Act 1994 (EP Act) and must be disposed of appropriately at a facility that is lawfully able to receive the waste.

2. Guidance

2.1 Resource use versus activity

An EOW code states when a waste stops being a waste following any necessary processing or treatment. A waste becomes a resource when it has been determined to meet the requirements of an EOW code. It may be necessary to treat or process the waste prior to meeting those requirements. An Environmental Authority (EA) under the EP Act is required where an activity being undertaken triggers the threshold for any environmentally relevant activity (ERA).

This means that treating or processing the waste to meet the resource quality criteria under the EOW code may require an EA under the EP Act if the activity meets the threshold for an ERA with an exception of what is permitted under the requirements and conditions of this EOW code.

2.2 Resource versus waste

A waste that is a resource under an EOW code is considered a resource only for the use(s) approved in an EOW code. If a resource does not meet the requirements of the EOW code and/or is not used in accordance with the EOW code, it is not deemed a resource. It remains a waste and must be managed in accordance with waste management requirements under the EP Act and the WRR Act and their subordinate legislation.

A resource approved under an EOW code, is deemed to be a waste again, if it is disposed of at a waste disposal facility, or if it is deposited at a place in a way that would, apart from its use approved under an EOW code, constitute a contravention of the general littering provision or the illegal dumping of waste provision under the WRR Act.

2.3 Failure to comply

It is an offence under section 158(1) of the WRR Act for a registered resource producer to produce the resource, or use, sell or give away the resource if they do not comply with the requirements under an EOW code. Further, it is an offence under section 158(2) of the WRR Act for a person to use the resource in a way, or for a purpose, that does not comply with an EOW code. These offences carry a maximum penalty of 1,665 penalty units for an individual and 8,325 penalty units for a corporation.

Please refer to Appendix A of this EOW code for general obligations for all persons operating under this EOW code, which includes the resource users.

2.4 Lawfulness of the activity

The issuing of this EOW code for the use of the resource does not warrant or imply the lawfulness of the activity under all legislation, or that approvals necessary under other legislation have or will be approved. It is the responsibility of the registered resource producer and resource user to identify and obtain all other approvals necessary for the relevant activities.

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1 The value of a penalty unit is stated in the Penalties and Sentences Regulation 2015 (Qld).
3. Period of this EOW code

This amendment EOW code takes effect from 01 January 2020 and remains in force until it is cancelled, amended or suspended² by the chief executive.

4. Waste to which this EOW code applies

This EOW code is limited to biosolids that meet the criteria in Table 1 – Resource quality criteria of this EOW code. The waste becomes a resource when the requirements and conditions under this EOW code are met.

5. Person to whom this EOW code applies

5.1 Registered resource producers of the resource

5.1.1 Prior to operating under this EOW code, the producer of the resource must register with the chief executive by giving a notice in the approved form³ that the person intends to become a registered resource producer for this EOW code.

5.1.2 A registered resource producer for this EOW code must comply with the stated registered resource producer requirements in Section 6 – Registered Resource Producer Requirements.

5.2 Resource users

5.2.1 The resource user must only use the resource in a way, and for a purpose allowed under this EOW code.

5.2.2 The resource user must comply with the stated conditions of use in Section 7 – Conditions of Use.

5.2.3 Prior to operating under this EOW code, a person who intends to use the approved resource must notify the chief executive by giving a notice in the approved form⁴ that the person intends to become a resource user for this EOW code.

² If an EOW code is to be amended, cancelled or suspended, the chief executive will provide an opportunity to make written submissions by providing a proposed action notice to the registered resource producers; and publishing the proposed action notice on the chief executive’s website.

³ The approved form, Registered Resource Producer for an EOW code, is available on the Queensland Government website at www.qld.gov.au, using the publication number (ESR/2018/4082) as a search term.

⁴ The approved form, Notification of use of a resource is available on the Queensland Government website at www.qld.gov.au, using the publication number (ESR/2018/4552) as a search term.
6. Registered resource producer requirements

(6.1) The **registered resource producer** must not use, sell or give away the **resource** unless it meets the stated criteria in Table 1 – **Resource quality criteria** for the approved use in accordance with this EOW code.

(6.2) **Table 1 – Resource quality criteria**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| Biosolids | 1. Generated from a **sewage treatment plant**.  
2. Meets the **biosolids** quality characteristic requirements for one or more of the classifications in **Table 2 – Biosolids classification requirements**.  
3. Despite criterion 2 above, biosolids which is being transferred from the **sewage treatment plant** to the **registered resource producer** or **resource user** is considered a **resource** if:  
   a) the stabilised biosolids being taken to the **site** of use is from a source that has met **Table 3 – Contaminant limits** in accordance with the continuous sampling procedure under the **NSW Biosolids Guidelines** for continuous operation in the last 17 samples and is awaiting contaminant analysis for compliance verification in the current monitoring event; or  
   b) ‘Stabilisation Grade B’ biosolids, that also meets **Table 3 – Maximum contaminant limits** in accordance with the continuous sampling procedure under the **NSW Biosolids Guidelines** for continuous operation or with the batch sampling procedure for batch operations, is being taken to the application **site** to meet the barrier option in accordance with **Table 4 – Biosolids Stabilisation Requirement**.  
4. Any **biosolids** which is determined to be non-compliant with **Requirements (6.2.2) or (6.2.3)**, other than biosolids awaiting reprocessing for reclassification, is considered to revert to classification as a **regulated waste** and must be taken by a **regulated waste transporter** to a facility that is lawfully permitted to accept **regulated waste**. |

(6.3) **Table 2 – Biosolids classification requirements**

<table>
<thead>
<tr>
<th>Biosolids classification</th>
<th>Biosolids quality characteristics</th>
</tr>
</thead>
</table>
| Unrestricted use         | 1. The quality of the **resource** meets the following requirements:  
   a) Contaminant limit in column ‘Grade A’ of **Table 3 – Contaminant limits**;  
   b) At least one pathogen reduction requirement and one vector reduction requirement for ‘Stabilisation Grade A’ of **Table 4 - Biosolids stabilisation requirements**;  
   c) Enteric viruses <1PFU per 4 grams (total dry weight);  
   d) Helminth ova <1 per 4 grams (total dry weight);  
   e) E-coli <100 MPN per grams (dry weight);  
   f) Faecal coliforms <1000 MPN per gram (dry weight); and  
   g) Salmonella species – Not detected. |
| Restricted use 1         | 2. The quality of the **resource** must meet the following requirements:  
   a) Contaminant limit in column ‘Grade B’ of **Table 3 – Contaminant limits**;  
   b) At least one pathogen reduction requirement and one vector reduction requirement |

5 Under this EOW code, it is the **registered resource producer’s** responsibility to ensure the quality of the **resource** has been determined before providing it to the **resource user**. It is the **resource user’s** responsibility to ensure that biosolids are of a quality that is suitable for the site location and land application use they will be undertaking.
for ‘Stabilisation Grade A’ of Table 4 - Biosolids stabilisation requirements;

c) Enteric viruses <1 PFU per 4 grams total dry weight;
d) Helminth ova <1 per 4 grams total dry weight;
e) E. coli <100 MPN per gram dry weight;
f) Faecal coliforms <1000 MPN per gram dry weight; and

g) Salmonella species – Not detected.

Restricted use 2

3. The quality of the resource must meet the following requirements:

a) Contaminant limits in column ‘Grade C’ of Table 3 – Contaminant limits; and

b) At least one pathogen reduction requirement and one vector reduction requirement for ‘Stabilisation Grade B’ of Table 4 - Biosolids stabilisation requirements.

PFU = Plaque-forming unit MPN = Most probable number

(6.4) Table 3 – Contaminant limits

<table>
<thead>
<tr>
<th>Quality characteristic</th>
<th>Contaminant limits (dry mass) in mg/kg*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade A</td>
</tr>
<tr>
<td>Arsenic</td>
<td>20</td>
</tr>
<tr>
<td>Cadmium</td>
<td>3</td>
</tr>
<tr>
<td>Chromium (total)</td>
<td>100</td>
</tr>
<tr>
<td>Copper</td>
<td>150</td>
</tr>
<tr>
<td>Lead</td>
<td>150</td>
</tr>
<tr>
<td>Mercury</td>
<td>1</td>
</tr>
<tr>
<td>Nickel</td>
<td>60</td>
</tr>
<tr>
<td>Selenium</td>
<td>5</td>
</tr>
<tr>
<td>Zinc</td>
<td>300</td>
</tr>
<tr>
<td>Per and poly-fluoroalkyl substances (PFAS)</td>
<td>Monitoring required</td>
</tr>
<tr>
<td>Total Organic Fluorine (extractable)</td>
<td>Monitoring required</td>
</tr>
<tr>
<td>DDT/DDD/DDE</td>
<td>0.5</td>
</tr>
<tr>
<td>Aldrin</td>
<td>0.02</td>
</tr>
<tr>
<td>Dieldrin</td>
<td>0.02</td>
</tr>
<tr>
<td>Chlordane</td>
<td>0.02</td>
</tr>
<tr>
<td>Heptachlor</td>
<td>0.02</td>
</tr>
<tr>
<td>HCB</td>
<td>0.02</td>
</tr>
<tr>
<td>Lindane</td>
<td>0.02</td>
</tr>
<tr>
<td>BHC</td>
<td>0.02</td>
</tr>
<tr>
<td>PCBs</td>
<td>Not detected**</td>
</tr>
</tbody>
</table>

Notes:
* Contaminant limits are NOT mean values. Refer to Schedule 2 of the NSW Biosolids Guidelines.
**Not detected at a limit of detection of 0.1 mg/kg.
Table 4 – Biosolids stabilisation requirements

<table>
<thead>
<tr>
<th>Stabilisation Grade A</th>
<th>Pathogen Reduction Process</th>
<th>Vector Attraction Reduction Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biosolids</strong> have been treated using one of the following methods: <strong>1. Thermally treated biosolids</strong></td>
<td></td>
<td>1. Treatment in an engineered system, operating within its design envelope, able to achieve the relevant metrics through either validated mathematical simulation, or physical testing.</td>
</tr>
<tr>
<td><strong>a) Biosolids</strong> &gt; 7% solids with temperature at least 50°C</td>
<td></td>
<td>2. <strong>Anaerobically digested biosolids</strong> must have no more than 17% further volatile solids reduction when incubated under anaerobic conditions in a bench scale reactor for an additional 40 days at 35-37°C.</td>
</tr>
<tr>
<td>Celsius. The equation for the time-temperature requirement is:</td>
<td></td>
<td>3. Aerobically digested <strong>biosolids</strong> must have no more than 15% further volatile solids reduction when incubated under aerobic conditions in a bench scale reactor for an additional 30 days at 20°C.</td>
</tr>
<tr>
<td>(D = \frac{131,700,000}{10^{0.1400t}}), where (D) = time required in days, (t) = temperature in degrees Celsius.</td>
<td></td>
<td>4. As an alternative to requirement 3, specific oxygen uptake rate for <strong>biosolids</strong> treated by an aerobic process have been less than 1.5 mg O2/hour/g total solids at 20°C.</td>
</tr>
<tr>
<td>This option includes pasteurisation at 70°C for 30 mins;</td>
<td></td>
<td>5. The pH value of the <strong>biosolids</strong> have been raised to 12 and without the addition of further alkali shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours.</td>
</tr>
<tr>
<td><strong>b) Biosolids</strong> &gt; 7% solids. This option includes <strong>composting</strong> at 55°C for 3 consecutive days.</td>
<td></td>
<td>6. For <strong>biosolids</strong> which contain stabilised solids only, the proportion of dry solids must be at least 75%.</td>
</tr>
<tr>
<td><strong>c) Biosolids</strong> &gt; 7% solids that are small particles heated by contact with either warmed gases or an immiscible liquid. The temperature should be at least 50°C for at least 15 seconds using the equation above. This option includes <strong>biosolids</strong> in contact with a hot gas stream in a rotary drier or <strong>biosolids</strong> dried in a multiple-effect evaporator system.</td>
<td></td>
<td>7. For <strong>biosolids</strong> which contain unstabilised solids generated in a primary wastewater treatment process the proportion of dry solids have been at least 90%.</td>
</tr>
<tr>
<td><strong>d) Biosolids</strong> &lt; 7% solids and less than 30 minutes contact time. Use equation 1 for contact times &gt; 15 seconds and &lt; 30 minutes.</td>
<td></td>
<td>8. <strong>Biosolids</strong> have been treated in an aerobic process for at least 14 days. During that time, the temperature of the <strong>biosolids</strong> have been &gt;40°C and the average temperature &gt;45°C. This option relates primarily to composting as a stabilization process for biosolids with the feed being unstabilised solids.</td>
</tr>
<tr>
<td><strong>e) Biosolids</strong> &lt; 7% solids and &gt; 30 minutes contact time at 50°C or higher use equation (2) below: (D = \frac{50,070,000}{10^{0.1400}}) (D) This option includes thermophilic <strong>aerobic digestion</strong>.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. **Anaerobic digestion**
2. **Aerobic digestion**
3. Air drying
4. **Composting**\(^c\)
5. **Lime stabilisation**
6. **Extended aeration**\(^d\)

One of the vector attraction reduction requirements from Stabilisation A above or one of the following requirements:

**Process Option (for Stabilisation B only)**

1. At least 20 days continuous or intermittent extended aeration including **aerobic digestion** time, or
2. At least six (6) months lagoon-based treatment (i.e., storage) at ambient temperatures.

**Barrier Options (for Stabilisation B only)**

The barrier options are intended for biosolids generated from a stabilisation process (including extended aeration), which does not otherwise meet the performance metrics noted for Grade A, but does not represent an undue risk\(^e\).

3. The barrier option is not be applied to **biosolids** from unstabilised solids generated in a primary wastewater treatment process.
4. **Biosolids** will be injected below the surface of the land or:
5. **Biosolids** applied to the land surface must be incorporated within six hours of application on the land.

**Notes:**

\(^a\) Physical testing or validation by an appropriately qualified person may be used to verify that the process achieves metric 2 or metric 3 under anaerobic or aerobic digestion processes respectively. The additional volatile solids reduction (AVSR) test should be conducted with the previous month average Sludge Retention Time (SRT) or Hydraulic Retention Time (HRT) recorded. The HRT or SRT is to be chosen as the measure best representing the average time that the solids are retained under reactive conditions.

To determine the AVSR at a given HRT or SRT, the following equation may be used:

\[
AVSR_2 = AVSR_1 \frac{1 + k t_1 - k f d t_1}{1 + k t_2 - k f d t_2}
\]

Where AVSR\(_1\) is the predicted additional volatile solids reduction at desired retention time \(t_2\) (d), AVSR\(_1\) is the measured volatile solids reduction at retention time \(t_1\), \(k\) is the apparent sludge hydrolysis coefficient (d\(^{-1}\)).

For anaerobic processes, the default \(k\) value is 0.3 d\(^{-1}\), and \(f_d\) is the sludge degradability. An \(f_d\) of 0.4 may be used for activated sludge, 0.6 for a mix of activated and primary sludge (50/50) and 0.8 for primary sludge only.

For aerobic processes (extended aeration or aerobic digestion), a default \(k\) value of 0.3 d\(^{-1}\), and an \(f_d\) value of 0.6 may be used.

These parameters may be corrected where multiple tests (at different times) are taken. It should be noted that the correction equation is relatively insensitive to the \(f_d\) value.

The minimum monthly average SRT or HRT is that which achieves an AVSR according to the metric provided in the table.

\(^b\) The method above may not be used to correct SOUR, which is regarded as an on-going test method rather than a process validation technique.

\(^c\) The PFAS National Environmental Management Plan provides that that dilution of PFAS contaminated waste into compost is not permitted. If composting is used as a stabilisation process, the resulting material must be used under this code and any other extraneous material used to facilitate the composting process must not contain any material concentrations of PFAS.

\(^d\) Extended aeration is nominally defined as an activated sludge treatment process with an SRT of greater than 20d (monthly average). The barrier option should be applied to solids with a shorter SRT.

\(^e\) Undue-risk solids are those which may represent a high pathogen risk or excessive level of unstabilised solids. A process achieving the metrics outlined in the table will achieve a 1.5-2 log reduction on most indicator organisms compared with primary sewage solids. The prescribed level of undue risk is identified as those which are achieving less than 1-log reduction compared with primary sewage solids.
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solids. Examples include anaerobic digestion with a HRT of less than 7 days, or an activated sludge treatment system with an SRT of less than 12 days.

(6.6) The registered resource producer must ensure that the classification of the resource has been determined according to the biosolids quality characteristics stated in Table 2 - Biosolids classification requirements.

Resource monitoring

(6.7) The registered resource producer must ensure that monitoring of the quality of resource is conducted for per and poly-fluoroalkyl substances (PFAS), including as a minimum C4–C14 perfluoroalkyl carboxylic acids, C4–C10 perfluoroalkyl sulfonic acids, perfluoroalkyl sulphonamides and n:2 fluoroalkyl sulfonic acids and Total Organic Fluorine (extractable using the same or similar techniques for PFAS analysis).

(6.8) When undertaking monitoring of the quality of the resource for PFAS:
   a) quality assurance measures for Total Oxidisable Precursor (TOP) Assay in section 19.2 of the PFAS National Environmental Management Plan (prepared by the Heads of Environmental Protection Agencies) must be complied with, including checks against PFAS results for corresponding non-oxidised samples;
   b) analysis techniques must achieve lowest practicable limits of reporting and maximise extraction of PFAS from samples; and
   c) any advice from the chief executive officer concerning improvements in analysis techniques must be considered.

(6.9) Monitoring and analysis undertaken to determine the classification of the resource and quality of the resource, including that for PFAS, must be conducted with samples taken at least for every 120 dry tonnes of the resource to be used.

(6.10) Where the composition of the resource has changed or is likely to change, more frequent monitoring must be conducted to sufficiently detect the extent of any change.

(6.11) Monitoring to determine the quality of the resource must be carried out on samples that are representative of the resource to be used.

(6.12) Prior to the initial supply of the resource to a resource user and following any variation of the quality of the supply, the registered resource producer must make the resource user aware in writing of the classification of, and contaminant analysis results applicable to, the resource supplied.

(6.13) The registered resource producer must record details of the following:
   a) the determination of the classification of resource as required by Requirement (6.6) of this EOW code; and
   b) results of ongoing sampling and characterisation, including analysis results.

(6.14) All analyses undertaken as a part of this EOW code must be carried out by a laboratory that has NATA certification, or an equivalent certification, for such analyses.

(6.15) Sampling and analysis conducted as a requirement of this EOW code must be undertaken by an appropriately qualified person.

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6 Resource sampling and analysis should be conducted in accordance with the procedures detailed in Schedule 1— Biosolids sampling and analysis procedures and Schedule 2— Grading, sampling and compliance procedures of the NSW Biosolids Guidelines.
Transport

(6.16) The **resource** must be transported in a vehicle fit for purpose that ensures prevention of the release of the **resource** into the environment during transport.

Records

(6.17) The **registered resource producer** must keep the following **records** each time the **resource** is provided for use:

a) origin of the **resource** (e.g. address, lot on plan, or GPS coordinates);
b) date of dispatch of the **resource**;
c) destination of the **resource**;
d) classification of the resource and analysis results;
e) information provided to the **resource user** concerning classification and quality of the **resource**;
f) business name, ABN and address of the **person** receiving the **resource**; and
g) quantity of the **resource** supplied (in tonnes).

(6.18) The **registered resource producer** must keep **records** of all requirements, including monitoring requirements, under this EOW code for a period of at least five (5) years and provide the records to the **chief executive** upon request within 10 business days and in the format requested.

7. Conditions of use

Approved uses

(7.1) The approved **resource** is **biosolids** that comply with the quality criteria listed in Table 1 – Resource quality criteria and is used for the relevant uses stated in Table 5 – Approved uses and conditions for resource users.

(7.2) The **resource user** must ensure that the **resource** is only applied to land as a fertiliser or soil ameliorant for the allowable land application use according to its classification stated in Table 2 - Biosolids classification requirements.

(7.3) The **resource** must only be used for a stated use in Table 5 – Approved uses and conditions for resource users where the **resource user** complies with all of the relevant conditions for that use.

(7.4) Where the **resource** is to be used for more than one approved use, the **resource user** must comply with all conditions for those uses in accordance with Table 5 – Approved uses and conditions for resource users.

Table 5 – Approved uses and conditions for resource users

<table>
<thead>
<tr>
<th>Biosolids classification</th>
<th>Allowable land application use</th>
<th>Biosolids quality characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted use</td>
<td>Home lawns and gardens</td>
<td>1. The quality of the resource meets the following requirements:</td>
</tr>
</tbody>
</table>
### Public contact sites
- **Urban Landscaping**
- **Agriculture**
- **Forestry**
- **Soil and site rehabilitation**

#### a) Contaminant limits in column ‘Grade A’ of Table 3 - Contaminant limits; and
#### b) At least one pathogen reduction requirement and one vector reduction requirement for ‘Stabilisation Grade A’ of Table 4 - Biosolids stabilisation requirements
#### c) Enteric viruses <1PFU per 4 grams (total dry weight)
#### d) Helminth ova <1 per 4 grams (total dry weight)
#### e) E-coli <100 MPN per grams (dry weight)
#### f) Faecal coliforms <1000 MPN per gram (dry weight)
#### g) Salmonella species – Not detected

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### Restricted use 1
- **Public contact sites**
- **Urban Landscaping**
- **Agriculture**
- **Forestry**
- **Soil and site rehabilitation**

#### 1. The quality of the resource must meet the following requirements:
#### a) Contaminant limits in column ‘Grade B’ of Table 3 - Contaminant limits; and
#### b) At least one pathogen reduction requirement and one vector reduction requirement for ‘Stabilisation Grade A’ of Table 4 - Biosolids stabilisation requirements
#### c) Enteric viruses <1PFU per 4 grams total dry weight
#### d) Helminth ova <1 per 4 grams total dry weight
#### e) E-coli <100 MPN per gram dry weight
#### f) Faecal coliforms <1000 MPN per gram dry weight
#### g) Salmonella species – Not detected

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### Restricted use 2
- **Agriculture**
- **Forestry**
- **Soil and site rehabilitation**

#### 1. The quality of the resource must meet the following requirements:
#### a) Contaminant limits in column ‘Grade C’ of Table 3 - Maximum contaminant limits; and
#### b) At least one pathogen reduction requirement and one vector reduction requirement for ‘Stabilisation Grade B’ of Table 4 - Biosolids stabilisation requirements

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**PFU** = Plaque-forming unit  **MPN** = Most probable number

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### Written Procedures

#### (7.6) The use of the resource must be undertaken in accordance with the written procedures that:

a) identify potential risks of environmental harm from using the resource during routine operations and emergencies; and

b) establish and maintain control measures that minimise the potential for environmental harm.

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### Transport

#### (7.7) The resource must be transported in a vehicle fit for purpose that ensures prevention of the release of the resource into the environment during transport.

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### Storage
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(7.8)</td>
<td>The resource must not be stored on the application area for a period exceeding 30 days unless the biosolids are stored within a site with a valid environmental authority for the purpose of site rehabilitation.</td>
</tr>
<tr>
<td>(7.9)</td>
<td>The resource must be stored in areas located outside the buffer distances stated in Table 7 – Minimum buffer zones to sensitive receptors.</td>
</tr>
<tr>
<td>(7.10)</td>
<td>All areas used to store the resource must be bunded so that overland flow of stormwater is excluded from either entering or leaving the bunded area.</td>
</tr>
<tr>
<td>(7.11)</td>
<td>Water that is collected within bunded storage areas must only be irrigated to the resource application area in a manner that prevents release to waters.</td>
</tr>
</tbody>
</table>

### Site suitability

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(7.12)</td>
<td>The suitability of each resource application area must be assessed by an appropriately qualified person before each application.</td>
</tr>
</tbody>
</table>
| (7.13) | The suitability assessment required by Condition (7.12) must include:  
  a) an assessment of the existing soil nutrient and contaminant levels and determination of the assimilative capacity of the soil in accordance with the NSW Biosolids Guidelines;  
  b) a determination of the soil pH level in accordance with the soil sampling procedure given in NSW Biosolids Guidelines;  
  c) a determination of the groundwater (standing water level) during both wet and dry seasons; and  
  d) an assessment of seasonal climate and flood risk. |
| (7.14) | The details of any assessment undertaken in accordance with Conditions (7.11) and (7.12) must be provided on request to the chief executive within 10 business days. |
| (7.15) | The resource must not be applied to land that:  
  a) has a soil pH of less than 3.5 (CaCl₂ method);  
  b) has groundwater (standing water level) located lesser than 3 metres below the surface (during either wet or dry seasons);  
  c) has a surface rock outcrop of greater than 10% of the area to which the resource is applied. |
| (7.16) | Prior to initial supply of the resource to the application area, consultation about the application of the resource must be conducted with any landholders or occupiers of the neighbouring land where the resource application is to occur. |
| (7.17) | For the consultation conducted in accordance with Condition (7.16), following records must be kept:  
  a) date of consultation undertaken; and  
  b) full name and address of the person consulted. |

---

7 The site suitability section covering Requirements (7.12) to (7.17) are not applicable when biosolids is being used on the capped area for rehabilitation in accordance with a valid environmental authority for the site.

8 Resource application must be avoided within the identified exclusion period for identified flood risk area in accordance with council approved flood plain mapping.
Land application of the resource

### (7.18) The application of the resource to land must be conducted at not more than an agronomic loading rate determined in accordance with the latest version of the NSW Biosolids Guidelines\(^9\), taking into consideration the limits for the parameters listed in Table 6 - Maximum allowable soil contaminant concentrations.

### (7.19) The application of the resource to land must not result in soil contaminant concentrations exceeding the limits for the parameters listed in Table 6 - Maximum allowable soil contaminant concentrations.

### (7.20) The resource must be spread on land at a uniform rate and incorporated into the soil within 36 hours of spreading unless it is used within a site with a valid environmental authority for the purpose of site rehabilitation.

### (7.21) Any excess biosolids (following application) are considered to be regulated waste, and must be taken to a location lawfully able to accept the material, and must not be stored or re-applied to the application areas of each site.

### (7.22) The following records must be kept by the resource user for each resource application:

- a) details of the land on which the application occurs (e.g. GPS locations of the farms and blocks);
- b) date and time of application;
- c) the calculated application rate at which the resource is applied;
- d) the actual application rate;
- e) land use of the application including crops grown and intended to be grown, including if any are intended for human consumption; and
- f) whether the land will be used for grazing stock or production of plant material to be used as food for stock.

### (7.23) Table 6 – Maximum allowable soil contaminant concentrations

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Maximum allowable soil contaminant concentration (mg/kg dry weight of soil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>20 or Background + 3(^*) (whichever is greater)</td>
</tr>
<tr>
<td>Cadmium</td>
<td>1</td>
</tr>
<tr>
<td>Chromium (total)</td>
<td>100 or Background + 10(^*) (whichever is greater)</td>
</tr>
<tr>
<td>Copper</td>
<td>100 or Background + 10(^*) (whichever is greater)</td>
</tr>
<tr>
<td>Lead</td>
<td>150</td>
</tr>
<tr>
<td>Mercury</td>
<td>1</td>
</tr>
<tr>
<td>Nickel</td>
<td>60 or Background + 10(^*) (whichever is greater)</td>
</tr>
<tr>
<td>Selenium</td>
<td>5</td>
</tr>
<tr>
<td>Zinc</td>
<td>200 or Background + 10(^*) (whichever is greater)</td>
</tr>
<tr>
<td>Per and poly-fluoroalkyl substances (PFAS)</td>
<td>Refer Condition (7.31)</td>
</tr>
</tbody>
</table>

---

\(^9\) The agronomic loading rate should be no greater than the lower of the nitrogen limited biosolids application (NLBAR) or the contaminant limited biosolids application rate (CLBAR) according to NSW Biosolids Guidelines as of 12 December 2018.
An appropriately qualified person must provide for and detail all of the following:

a) Sampling and analysis using standard and Total Oxidisable Precursor (TOP) Assay analysis to determine PFAS concentrations in soil prior to application of the resource.

b) The calculation of expected PFAS concentrations in soil after application of the resource considering:
   i. the resource’s PFAS concentrations;
   ii. existing PFAS concentrations measured in soil prior to application; and
   iii. the calculated application (agronomic loading) rate determined in accordance with Condition (7.18).

c) Sampling and analysis of PFAS concentrations in soil after application of the resource and within 3 months of the application occurring.

The chief executive must be notified within 24 hours in the event that PFAS concentrations are found to exceed any trigger values in Table 7 – PFAS trigger values after application of the resource to land.

Table 7 – PFAS trigger values

<table>
<thead>
<tr>
<th>Media</th>
<th>Contaminant</th>
<th>Trigger value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>PFOS</td>
<td>0.001 mg/kg</td>
</tr>
<tr>
<td></td>
<td>PFOS + PFHxS</td>
<td>0.002 mg/kg</td>
</tr>
<tr>
<td></td>
<td>PFHxS</td>
<td>0.003 mg/kg</td>
</tr>
<tr>
<td></td>
<td>PFOA</td>
<td>0.004 mg/kg</td>
</tr>
<tr>
<td></td>
<td>PFBA, PFPeA, PFHxA</td>
<td>0.001 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Sum C₉ -C₁₄ Perfluoroalkyl carboxylic acids</td>
<td>0.01 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Perfluoroalkyl sulfonamides</td>
<td>0.001 mg/kg</td>
</tr>
<tr>
<td></td>
<td>N₂ Fluorotelomer Sulfonic acids</td>
<td>0.004 mg/kg</td>
</tr>
</tbody>
</table>
Buffer distances

(7.27) The minimum buffer distances stated in Table 8 - Minimum buffer zones to sensitive receptors must be kept between all application areas and sensitive receptors.

(7.28) Table 8 – Minimum Buffer Zones to Sensitive Receptors

<table>
<thead>
<tr>
<th>Sensitive Receptor</th>
<th>Minimum buffer distance (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flat (&lt;3% or &lt;2°)</td>
</tr>
<tr>
<td>Surface waters</td>
<td>50</td>
</tr>
<tr>
<td>Farm dams</td>
<td>20</td>
</tr>
<tr>
<td>Drinking water bores</td>
<td>250</td>
</tr>
<tr>
<td>Other bores</td>
<td>50</td>
</tr>
<tr>
<td>Farm driveways, forest roads &amp; fence lines</td>
<td>5</td>
</tr>
<tr>
<td>Native forests &amp; other significant vegetation types</td>
<td>10</td>
</tr>
<tr>
<td><strong>Animal enclosures</strong>, property boundaries or land used for food production</td>
<td>25</td>
</tr>
<tr>
<td>Occupied dwelling</td>
<td>50</td>
</tr>
<tr>
<td>Residential zone</td>
<td>250</td>
</tr>
</tbody>
</table>

Application timeframes

(7.29) The resource must not be applied to land within the timeframes stated in Table 9 - Land use and harvesting timeframe restrictions.

(7.30) Table 9 – Land use and harvesting timeframe restrictions

<table>
<thead>
<tr>
<th>Land use</th>
<th>Timeframe in which the resource must not be applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human food crops</td>
<td>Harvested parts do not touch the resource 30 days prior to harvesting</td>
</tr>
<tr>
<td></td>
<td>Harvested parts touch the resource but are above the land surface (e.g. lettuce) 18 months prior to harvesting</td>
</tr>
<tr>
<td></td>
<td>Harvested parts are below the surface of the land (e.g. carrots) 5 years prior to harvesting</td>
</tr>
<tr>
<td>Animal feed &amp; fibre crops</td>
<td>30 days prior to harvesting</td>
</tr>
<tr>
<td></td>
<td>30 days prior to grazing by animals</td>
</tr>
<tr>
<td></td>
<td>Poultry and pigs must not be allowed to graze on biosolids application areas.</td>
</tr>
</tbody>
</table>

\(^{10}\) Downslope refers to the situation where the sensitive receptor is at a lower point on the slope than the biosolids application area.

\(^{11}\) Upslope refers to the situation where the sensitive receptor is at a higher point on the slope than the biosolids application area.
### Animal withholding

<table>
<thead>
<tr>
<th>Animal withholding</th>
<th>90 days prior to grazing by lactating (including milk for human consumption) and new born animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turf</td>
<td>1 year prior to harvesting</td>
</tr>
<tr>
<td>Public access</td>
<td>Where there is high potential for public exposure 1 year prior to access</td>
</tr>
<tr>
<td></td>
<td>Where there is low potential for public exposure 30 days prior to access</td>
</tr>
</tbody>
</table>

(7.31) The **resource** and any contaminants in the resource must not be **released** directly or indirectly to land, air, or **waters** in a way that is not in accordance with the conditions of this EOW code and causes or may cause actual or potential environmental **nuisance** or **environmental harm**.

(7.32) The **release** of noxious or offensive odours, or dust or any other airborne particulate matter must not cause a **nuisance at a sensitive place**.

(7.33) Noise generated from the use of the **resource** must not cause a **nuisance at a sensitive place**.

(7.34) All complaints received regarding the use and transport of the **resource** must be recorded including investigations undertaken, conclusions formed, and action taken. This information must be made available on request to the **chief executive** within 10 business days.

(7.35) The following **records** must be kept by the **resource user** for each **load** of the **resource** received:

- a) origin of the **resource**;
- b) quantity (in tonnes);
- c) date of collection;
- d) date of receipt; and
- e) destination (including the **site** address); and
- f) classification of the **resource** and the analysis results provided by the **registered resource producer**.

(7.36) All **records** required by this EOW code must be kept for a period of at least five years and provided upon request to the **chief executive** within 10 business days.

### Notification of emergencies, incidents and exceptions

(7.37) Any breach of a condition of this EOW code must be reported to the **chief executive** as soon as practicable and within 24 hours of becoming aware of the breach. **Records**, including full details of the breach and any subsequent actions taken, must be kept and provided to the chief executive upon request within 10 business days and in the format requested.
8. Definitions

Words and phrases used throughout this EOW code in bold are defined below. Where a definition for a term used in this EOW code is sought and the term is not defined within this EOW code, the definitions provided in the relevant legislation shall be used.

‘aerobic digestion’ means the biochemical decomposition of organic matter in sewage sludge into carbon dioxide and water by micro-organisms in the presence of oxygen.

‘agriculture’ means the current or future use of land for agriculture which includes horticulture, turf and any purpose of husbandry. This includes keeping or breeding livestock, and growing fruit, vegetables, field crops or pastures.

‘anaerobic digestion’ means the biochemical decomposition of the organic matter in sewage sludge into methane gas and carbon dioxide by micro-organisms in the absence of oxygen.

‘animal enclosure’ means an enclosure for intensive husbandry of livestock such as pigs, cattle and poultry; and does not include grazing purposes.

‘application area’ means relevant location(s) where the resource is applied in accordance with this EOW code.

‘appropriately qualified person’ means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

‘biosolids’ means treated tank sludges and residues from a sewage treatment plant including sedimentation tank and clarifier sludges, aerobically and anaerobically digested sludge and cake products from those sewage treatment plants.

‘chief executive’ means the Department of Environment and Science or its successor.

‘composting’ means the aerobic, biological decomposition of the organic constituents of biosolids and other organic products under controlled conditions. The rate of composting is dependent upon a number of factors, but key factors include: moisture content, carbon to nitrogen ratio, aeration, temperature and microbial population.

‘contaminant’ (as defined in Section 11 of the Environmental Protection Act 1994), unless authorised under this approval means —

(a) a gas, liquid or solid; or

(b) an odour; or

(c) an organism (whether alive or dead), including a virus; or

(d) energy, including noise, heat, radioactivity and electromagnetic radiation; or

(e) a combination of contaminants.

‘emergency(ies)’ means a situation where either human health or safety is threatened, or serious or material environmental harm has been or is likely to be caused; and urgent action is necessary to protect the health or safety of persons, or prevent or minimise the harm, or rehabilitate or restore the environment because of the harm.

‘environmental harm’ means environmental harm as defined in Chapter 1 of the Environmental Protection Act 1994.

‘load’ means the volume of resource put in or on something for conveyance or transportation, carried at one time. A truck and trailer carrying the resource is considered as one load as well as multiple bins travelling by rail.
Where the resource is transported via conveyor systems, information should be recorded on a daily basis until the transfer ceases.


‘nuisance’ means environmental nuisance as defined in Section 15 of the Environmental Protection Act 1994 and means unreasonable interference or likely interference with an environmental value caused by—

(a) aerosols, fumes, light, noise, odour, particles or smoke; or
(b) an unhealthy, offensive or unsightly condition because of contamination; or
(c) another way prescribed by regulation.

‘occupied dwelling’ means a room or suite of rooms occupied on the property receiving biosolids or the adjoining property.

‘person(s)’ means an individual or a corporation.

‘public contact site(s)’ means land with a high potential for contact by the public, including public parks, fields, cemeteries, plant nurseries and golf courses.

‘registered resource producer(s)’ means a person who sells or gives away the resource to be used under this EOW code.

‘resource user(s)’ means a person who has entered into a written agreement with a registered resource producer, unless the registered resource producer and the resource user are the same entity, to use the resource in accordance with the conditions of this EOW code, and includes a registered resource producer who uses the resource.

‘regulated waste’ means regulated waste as defined in Section 65 of the Environmental Protection Regulation 2008.

‘regulated waste transporter’ means a waste transporter authorized for carrying out environmentally relevant activity 57 (Regulated waste transport) as authorised under the Environmental Protection Act 1994.

‘release(d)’ of a contaminant into the environment, includes —

(a) to deposit, discharge, emit or disturb the contaminant; and
(b) to cause or allow the contaminant to be deposited, discharged, emitted or disturbed; and
   (i) to allow the contaminant to escape; and
   (ii) to fail to prevent the contaminant from escaping.

‘residential zone’ means land identified in an environmental planning instrument as being predominantly for residential use, including urban, village or living area zones, but excluding rural residential zone.

‘sewage treatment plant’ also called ‘waste water treatment plant’ means a facility licenced for carrying out environmentally relevant activity 63 (Sewage treatment) as authorised under the Environmental Protection Act 1994 or an equivalent lawfully approved facility from another State or Territory jurisdiction that is located within 20 kilometres of the Queensland border.

‘sensitive place’ means –

a) a dwelling, mobile home or caravan park, residential marina or other residential place; or
b) a motel, hotel or hostel; or
c) a kindergarten, school, university or other educational institution; or
d) a medical centre or hospital; a protected area; a park or garden; or

e) a place used as an office or for business or commercial purposes and includes the curtilage of any such place; or

f) a public park or garden.

’site’ means the relevant location(s) in terms of lot and plan.

’stabilisation’ means the process of biosolids to reduce or eliminate the potential for putrefaction and which, as a result, reduces pathogens, vector attraction and offensive odours.

‘urban landscaping’ means landscaping undertaken for aesthetic or rehabilitation purposes within an urban environment, and includes all public landscaping but not residential areas.

‘waters’ includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

‘written procedures’ means a document prepared by an appropriately qualified person that meets the requirements of Condition (7.6) of this EOW code.

- END -
Appendix A — General obligation for all persons

This appendix is not intended to provide a comprehensive assessment of all obligations under Queensland law. It provides some general information and persons are encouraged to familiarise themselves with all requirements related to their specific operation.

Responsibilities under the Environmental Protection Act 1994

All persons within the State of Queensland must also meet their obligations under the Environmental Protection Act 1994, and the regulations made under that Act.

General environmental duty

Section 319 of the Environmental Protection Act 1994 states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to consider:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty. However, maintaining your general environmental duty is a defence against the following acts:

(a) an act that causes serious or material environmental harm or an environmental nuisance
(b) an act that contravenes a noise standard
(c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.


Some relevant offences under the Environmental Protection Act 1994

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is when the harm is not trivial or negligible in nature. Serious environmental harm is harm that is irreversible, of a high impact or widespread, or that is caused to an area of high conservation value or special significance. Damages, or costs required to rehabilitate the environment, of over $5000 constitutes material environmental harm and damages, or costs required to rehabilitate the environment, of over $50,000 constitutes serious environmental harm.

Serious or material environmental harm excludes environmental nuisance.

Causing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

Depositing a prescribed water contaminant in waters (section 440ZG)
Prescribed water contaminants include a wide variety of contaminants listed in Schedule 10 of the Environmental Protection Regulation 2019.

It is your responsibility to ensure that prescribed water contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the *Waste Reduction and Recycling Act 2011*

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200 litres or more) at a place. Illegal dumping can also include abandoned vehicles.

Failure to comply with EOW code (section 158)

A registered resource producer for an EOW code must not produce, use, sell or give away the resource unless the registered resource producer complies with the requirements of the EOW code relating to the resource.

A person, other than a registered resource producer, must not use a resource in a way, or for a purpose, that does not comply with an EOW code for the resource.

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**Approved:**

18 December 2019

**Enquiries:**

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