Permit¹

Environmental Protection Act 1994

Environmental Authority EPPR00521513

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994

Environmental Authority number: EPPR00521513

Environmental authority takes effect on the day of approval.

The anniversary day of this environmental authority remains **11 April** each year. Payment of the annual fee will be due each year on this day.

Environmental authority holder

Name	Registered address
Central SEQ Distributor - Retailer Authority	Level 2 15, Green Square Close
T/A Queensland Urban Utilities	FORTITUDE VALLEY QLD 4006

Environmentally relevant activity and location details

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1.500EP— otherwise - no IT or IR	Esk Sewage Treatment Plant Brisbane Valley Highway, ESK, QLD 4312 Lot 1 RP156580.
	Fernvale Sewage Treatment Plant Banks Creek Road, FERNVALE QLD 4306 Lot 4 RP814367.
	Helidon Sewage Treatment Plant Back Flagstone Road, HELIDON QLD 4344 Lot 1 RP32742.
	Kooralbyn Sewage Treatment Plant 8-22 Etruscan Road, KOORALBYN QLD 4285 Lot 371 SP238312 and Lot 173 SP238312.
	Lowood Sewage Treatment Plant 3249 Fernvale Road LOWOOD QLD 4311 Lot 1 RP138867.

¹ Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation



Environmentally relevant activity	Locations
	Toogoolawah Sewage Treatment Plant Lot 1 RP135864.
	Kalbar Sewage Treatment Plant 29 Heit Road KALBAR QLD 4309 Lot 2 RP127542.
	Aratula Sewage Treatment Plant Cunningham Highway ARATULA QLD 4309 Lot 4 SP121584.
ERA 63 Sewage treatment (1)(b)(i) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but not more than 1,500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	Forest Hill Sewage Treatment Plant Dodt Road FOREST HILL QLD 4342 Lot 1 RP114066.
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Canungra Sewage Treatment Plant Finch Road, CANUNGRA QLD 4275 Lot 2 RP150199 and Lot 2 RP204982.
	Karana Downs Sewage Treatment Plant Nalya Crescent, KARANA DOWNS QLD 4306 Lot 2 RP180342.
	Kilcoy Sewage Treatment Plant William Street, KILCOY QLD 4515 Lot 3 RP118370.
	Rosewood Sewage Treatment Plant 55-69 Rosewood-Warrill View Road ROSEWOOD QLD 4340 Lot 1 RP12983.
	Boonah Sewage Treatment Plant, Gorkow Road BOONAH QLD 4310 Lot 10 SP237223, Lot 11 SP237223, Lot 12 SP237223, Lot 13 SP237223, Lot 1 RP113490, Lot 2 RP113490.
ERA Sewage treatment 63 (1)(d) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 4,000 but not more than 10,000EP	Beaudesert Sewage Treatment Plant Drumley Street, BEAUDESERT QLD 4285 Lot 4 RP111345 and Lot 7 RP904224.



Environmentally relevant activity	Locations
	Gatton Sewage Treatment Plant Treatment Plant Road GATTON QLD 4343 Lot 3 SP235464, and Lot 4 SP235464, and Lot 4 RP96384.
	Laidley Sewage Treatment Plant Cnr East and Braham Roads off Boundary Road LAIDLEY NORTH QLD 4341 Lot 2 RP107816.
	Lowood Sewage Treatment Plant Forest Hill - Fernvale Road LOWOOD QLD 4311 Lot 1 SP295901.
ERA 63 Sewage treatment (1)(e) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 10,000 but not more than 50,000EP.	Carole Park Sewage Treatment Plant Boundary Road, CAROLE PARK QLD 4300 Lot 119 CP907852.
	Fairfield Sewage Treatment Plant Brisbane Corso FAIRFIELD QLD 4103 Lot 3 RP806359.
	Wynnum Sewage Treatment Plant Tanker St, LYTTON QLD 4178 Lot 3 RP162446.
ERA 63 Sewage treatment (1)(f) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 50,000 but not more than 100,000EP	Goodna Sewage Treatment Plant Lower Cross Street, GOODNA QLD 4300 Lot 1 RP887551.
	Wacol Sewage Treatment Plant Grindle Road, WACOL QLD 4076 Lot 906 SP220999 and Lot 1 SP220999.
ERA 63 Sewage treatment (1)(g) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than	Bundamba Sewage Treatment Plant 5 Hanlon Street, BUNDAMBA QLD 4304 Lot 1 SP230116.
	Gibson Island Sewage Treatment Plant, Paringa Road, MURARRIE QLD 4172 Lot 41 SP227024 and Lot 43 SP227024.
	Luggage Point Sewage Treatment Plant 200 Main Beach Road, PINKENBA QLD, 4008 Lot 1 & 2 SP230688.



Environmentally relevant activity	Locations
	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.
	Bicentennial Road, BOONDALL QLD 4034 Lot 1 RP63707.
ERA 57 Regulated Waste Transport Transporting regulated waste other than end-of-life tyres (5).	Mobile and Temporary.
ERA 61 Thermal waste reprocessing and treatment (1)(a) thermally reprocessing or treating, in a year, the following quantity of general waste — 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.
ERA 61 Thermal waste reprocessing and treatment (2)(a) thermally reprocessing or treating, in a year, the following quantity of category 2 regulated waste— 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.
ERA 61 Thermal waste reprocessing and treatment (3)(a) thermally reprocessing or treating, in a year, the following quantity of category 1 regulated waste—(a) 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.



A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- (a) the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- (b) a change in the condition of the contaminated land (notice must be given within 24 hours); or
- (c) a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days);

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website <u>www.qld.gov.au</u>, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

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Liz Clarke Department of Environment and Science Delegate of the administering authority *Environmental Protection Act 1994*

Date issued: 2 March 2022

Enquiries:

Utilities and Government Assessment Department of Environment and Science Phone: 1300 130 372 Email: palm@des.qld.gov.au



Obligations under the Environmental Protection Act 1994

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site.

Development Approval

This permit is not a development approval under the *Planning Act 2016*. The conditions of this environmental authority are separate, and in addition to, any conditions that may be on the development approval. If a copy of this environmental authority is attached to a development approval, it is for information only, and may not be current. Please contact the Department of Environment and Science to ensure that you have the most current version of the environmental authority relating to this site.



Conditions of environmental authority

Part 1: Code Compliant Sites

The conditions for the environmentally relevant activity at the location as described below, are standard conditions contained within the *Environmentally relevant activity standard - Regulated waste transport (ERA 57)* – *Version 2.*

Environmentally relevant activity	Location
ERA 57 Regulated Waste Transport	Mobile and Temporary
Transporting regulated waste other than end-of-	
life tyres (5 vehicles only).	

The environmentally relevant activity conducted at the location as described above must be conducted in accordance with the eligibility criteria and following conditions of approval.



Part 2: General Conditions

Part 2(A): General Conditions - Beaudesert, Canungra and Kooralbyn STPs

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Kooralbyn Sewage Treatment Plant 8-22 Etruscan Road, KOORALBYN QLD 4285 Lot 371 SP238312 and Lot 173 SP238312.
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Canungra Sewage Treatment Plant Finch Road, CANUNGRA QLD 4275 Lot 2 RP150199 and Lot 2 RP204982.
ERA Sewage treatment 63 (1)(d) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 4,000 but not more than 10,000EP	Beaudesert Sewage Treatment Plant Drumley Street, BEAUDESERT QLD 4285 Lot 4 RP111345 and Lot 7 RP904224.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following general conditions of approval.

Agency interest: General		
Condition number	Condition	
GA1	All reasonable and practicable measures must be taken to prevent the likelihood of environmental harm being caused.	
GA2	Any breach of a condition of this environmental authority, with the exception of breaches described in Part 2(A) condition GA3, must be reported to the administering authority as soon as practicable, or at most, within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions undertaken.	
GA3	The holder of this environmental authority must notify the administering authority in writing of any monitoring result that indicates an exceedance of or non-compliance with any approval limit within 28 days of completion of analysis.	
GA4	 The activity must be undertaken in accordance with written procedures that: 1. identify potential risks to the environment from the activity during routine operations, closure and an emergency; and 2. establish and maintain control measures that minimise the potential for environmental harm; and 3. ensure plant, equipment and measures are maintained in a proper and effective 	



	 condition; and ensure plant, equipment and measures are operated in a proper and effective manner; and ensure that staff are trained in and aware of their obligations under the <i>Environmental Protection Act 1994</i> ensure that reviews of environmental performance are undertaken at least annually; and ensure that reviews of environmental performance are undertaken at least annually.
GA5	All information and records required by the conditions of this environmental authority must be kept for a minimum of five years with the exception of environmental monitoring results which must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request and in the format requested.
GA6	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
GA7	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is for <i>in situ</i> monitoring of pH, Dissolved Oxygen and Free Chlorine.
GA8	A receiving environment monitoring program must be designed and implemented by appropriately qualified persons to monitor the effects of the activity on waters .
GA9	 The receiving environment monitoring program required by Part 2(A) condition GA8, must include at least the following: (a) a description of potentially effected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality); and (b) description of applicable environmental values and water quality objectives to be achieved; and (c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the Receiving Environment Monitoring Program is proposed; and (d) water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the monitoring program⁴. ⁴ The monitoring program should be developed using the Department's Receiving Environment Monitoring Program Guideline (EM1260), 2014 or later version.
GA10	An annual monitoring report must be prepared and submitted to the administering authority by 30 November each year, for the preceding financial year.
GA11	 You must record the following details for all environmental complaints received: (a) date and time complaint was received; and (b) name and contact details of the complainant; and (c) nature of the complaint; and



	(d) investigations undertaken; and(e) conclusions formed; and(f) actions taken.	
GA12	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority , to investigate a complaint not considered by the administering authority to be frivolous or vexatious, of environmental nuisance arising from the activity . The monitoring results must be provided to the administering authority upon request.	
GA13	Chemicals and fuels in containers of greater than 15 litres must be stored within a secondary containment system .	
Agency inter	est: Air	
Condition number	Condition	
AA1	Odours or airborne contaminants must not cause environmental nuisance at a sensitive place or commercial place .	
Agency interest: Water		
Condition number	Condition	
WTA1	In addition to Part 3(D) – WT3D1 and Part 3(E) - WT3E1, the release to waters must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other visually objectionable matter excluding bypass releases covered by water conditions Part 2(A) WTA2 - Part 2(A) WTA4.	
WTA2	Bypass releases must be screened prior to being released.	
WTA3	The administering authority must be notified within 24 hours of any bypass release ceasing.	
WTA4	 The following details must be recorded in relation to each bypass release: (a) the start time, date and duration of the release; and (b) the estimated volume of the bypass release; and (c) the level of treatment at the sewage treatment plant prior to discharge; and (d) the cause of the release; and any monitoring of the water quality released. 	
WTA5	The holder of this environmental authority must take all reasonable and practicable measures to minimise the occurrence of bypass events.	
WTA6	The volume of effluent release to waters must be determined or estimated by an appropriate method with an accuracy of +/-5%, for example, a calibrated flow metre, and records kept of such determinations and estimates.	



Agency inter	est: Noise	
Condition number	Condition	
NA1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place.	
Agency inter	est: Land	
Condition number	Condition	
LA1	Other than as permitted within this environmental authority, contaminants must not be released to land .	
LA2	Other than permitted in condition Part 2(A) - LA5 the only places to which the irrigation of treated effluent is authorised are defined as: (a) land within the boundaries of the site for the following uses: i. service water; and ii. landscaped areas.	
LA3	 Treated effluent released to land must be done in accordance with documentation that ensures: drainage to groundwater and subsurface flows of contaminants to surface waters are prevented; and surface pondage and run-off of effluent is prevented; and degradation of soil structure is minimised; and soil sodicity and the build-up of nutrients and heavy metals in the soil and subsoil are minimised; and spray drift or overspray does not carry beyond effluent disposal areas; and effluent disposal areas are maintained with an appropriate crop in a viable state for transpiration and nutrient uptake; and sufficient buffer zones are maintained between irrigation sites and sensitive environmental receptors. 	
LA4	When weather conditions or soil conditions preclude the release of treated sewage effluent to land , effluent must not be irrigated to land .	
LA5	Treated sewage effluent may be removed from the site and used for an alternate purpose, with the written consent of any third party involved.	
Agency interest: Waste		
Condition number	Condition	
WA1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.	



Part 2 (B) General Conditions - Luggage Point, Fairfield, Gibson Island, Karana Downs, Oxley, Carole Park, Goodna, Bundamba, Wacol, Sandgate and Wynnum STPs

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Karana Downs Sewage Treatment Plant Nalya Crescent, KARANA DOWNS LD 4306 Lot 2 RP180342.
ERA 63 Sewage treatment (1)(e) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 10,000 but not more than 50,000EP	Carole Park Sewage Treatment Plant Boundary Road, CAROLE PARK QLD 4300 Lot 119 CP907852. Fairfield Sewage Treatment Plant Brisbane Corso, FAIRFIELD QLD, 4103 Lot 3 RP806359. Wynnum Sewage Treatment Plant Tanker St, LYTTON QLD 4178 Lot 3 RP162446.
ERA 63 Sewage treatment (1)(f) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 50,000 but not more than 100,000EP	Goodna Sewage Treatment Plant Lower Cross Street, GOODNA QLD 4300 Lot 1 RP887551. Wacol Sewage Treatment Plant Grindle Road, WACOL QLD 4076 Lot 906 SP220999 and Lot 1 SP220999.
ERA 63 Sewage treatment (1)(g) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100,000EP	Bundamba Sewage Treatment Plant 5 Hanlon Street, BUNDAMBA QLD 4304 Lot 1 SP230116. Gibson Island Sewage Treatment Plant (EP Limit – 365,000) Paringa Road, MURARRIE QLD 4172 Lot 41 SP227024, Lot 43 SP227024. Luggage Point Sewage Treatment Plant 200 Main Beach Road, PINKENBA QLD, 4008 Lot 1 & 2 SP230688. Oxley Sewage Treatment Plant (EP Limit – 975,000) 240 Donaldson Rd, ROCKLEA QLD 4106 Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 RP37416, Lot 2 RP99640, Lot 100 SP1622583.



Environmentally relevant activity	Locations
	Sandgate Sewage Treatment Plant Bicentennial Road, BOONDALL QLD 4034 Lot 1 RP63707.
ERA 61 Thermal waste reprocessing and treatment (1)(a) thermally reprocessing or treating, in a year, the following quantity of general waste — 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.
ERA 61 Thermal waste reprocessing and treatment (2)(a) thermally reprocessing or treating, in a year, the following quantity of category 2 regulated waste— 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.
ERA 61 Thermal waste reprocessing and treatment (3)(a) thermally reprocessing or treating, in a year, the following quantity of category 1 regulated waste— (a) 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following general conditions of approval.

Agency inte	Agency interest: General				
Condition number	Condition				
GB1	All reasonable and practicable measures must be taken to prevent the likelihood of environmental harm being caused.				
GB2	Any breach of a condition of this environmental authority, with the exception of breaches described in Part 2(B) condition GB3, must be reported to the administering authority as soon as practicable, or at most, within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions undertaken.				
GB3	You must notify the administering authority in writing of any monitoring result that indicates an exceedance of or non-compliance with any approval limit within 28 days of completion of analysis.				
GB4	Other than as permitted by this environmental authority, the release of a contaminant into the environment must not occur.				



GB5	All information and records required by the conditions of this environmental authority must be kept for a minimum of five years with the exception of environmental monitoring results which must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request and in the format requested.
GB6	An appropriately qualified person(s) must monitor record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
GB7	A receiving environment monitoring program (REMP) must be designed and implemented by appropriately qualified persons to monitor the effects of the activities on the aquatic values on waters .
GB8	 The receiving environment monitoring program required by Part 2(B) condition GB7, must include at least the following: (a) description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality); and (b) description of applicable environmental values and water quality objectives to be achieved; and (c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the receiving environment monitoring program is proposed; and (d) water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the monitoring program¹. Alternatively, receiving environment monitoring program compliance may be achieved by the holder of this environmental authority becoming and remaining a "contributing member" in regional studies of water quality and ecosystem health which are endorsed by the administering authority. ¹The monitoring program should be developed using the Departments' Receiving Environment Monitoring Program Guideline (EM1260) 2014 or later version.
GB9	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is for <i>in situ</i> monitoring of pH, dissolved oxygen, conductivity, temperature and free/total chlorine.
GB10	An annual monitoring report must be prepared and submitted to the administering authority by 30 November each year, for the preceding financial year.
GB11	 You must record the following details for all environmental complaints received: (a) date and time complaint was received; and (b) name and contact details of the complainant; and (c) nature of the complaint; and (d) investigations undertaken; and (e) conclusions formed; and



	(f) actions taken.						
GB12	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority , to investigate a complaint not considered by the administering authority to be frivolous or vexatious, of environmental nuisance arising from the activity . The monitoring results must be provided to the administering authority upon request.						
GB13	 The activity must be undertaken in accordance with written procedures that: (a) identify potential risks to the environment from the activity during routine operations, closure and an emergency; and (b) establish and maintain control measures that minimise the potential for environmental harm; and (c) ensure plant, equipment and measures are maintained in a proper and effective condition; and (d) ensure plant, equipment and measures are operated in a proper and effective manner; (e) ensure that staff are trained in and aware of their obligations under the <i>Environmental Protection Act 1994</i>; and (f) ensure that reviews of environmental performance are undertaken at least annually. 						
Agency inter	est: Air						
Condition number	Condition						
AB1	Subject to Part 2(B) condition AB2, odours or airborne contaminants must not cause environmental nuisance at a sensitive place or commercial place.						
AB2	Odours or airborne contaminants may cause environmental nuisance at the Brisbane International Cruise Terminal for such time as an Infrastructure Agreement between Queensland Urban Utilities and Port of Brisbane Pty Ltd or their successors at law is in place.						
Agency inter	est: Water						
Condition number	Condition						
WTB1	The only contaminants to be released to surface waters, excluding bypass releases, are treated effluent from the release points described in <i>Part 2(B) Table 1 – Sewage Treatment Plant Sampling and Release locations</i> . These releases are to be in accordance with the release limits and the associated requirements listed as applicable in <i>Part 2(B) Table 1 – Sewage Treatment Plant Sampling and Release Locations</i> . Part 2(B) Table 1 – Sewage Treatment Plant Sampling and Release Locations						
	ERA Location	Release Point	Release Point	Sampling	Applicable		
		Name	Location	Location	Effluent release limits – Effluent		
	Luggage Point	W1	W1 - To waters	Downstream of	Column 3,		
					,		



Sewage		described as	stage 1 and 2	Column 4,
Treatment Plant		Brisbane River	discharges	Column 6 and
		at 0.0km AMTD		Column 8
Wynnum	W1	W1 - To waters	Final effluent	Column 3,
Sewage		described as	channel,	Column 4,
Treatment Plant		Moreton Bay at	downstream of	Column 5,
		Wynnum WWTP	disinfection	Column 6,
				Column 7 and
				Column 8
Gibson Island	W1	W1 - To waters	Effluent well	Column 3,
Sewage		described as		Column 4,
Treatment Plant		Brisbane River		Column 6 and
		at 8.0km AMTD		Column 8
Sandgate	W1	W1 – To waters	Outlet from	Column 3,
Sewage		described as	disinfection	Column 4,
Treatment Plant		Cabbage Tree	process	Column 5,
		Creek at 1.22km		Column 6,
		AMTD		Column 7 and
				Column 8
	W2	W2 – To waters		
		described as		
		Cabbage Tree	-	-
		Creek at 1.20km		
		AMTD		
Fairfield	W1	W1 - To waters	Outlet of	Column 3,
Sewage		described as	Chlorine	Column 4,
Treatment Plant		Brisbane River	Contact Tank	Column 5,
		at 33.7km		Column 6,
		AMTD		Column 7 and
				Column 8
Oxley Sewage	W1	W1 - To waters	Outlet from	Column 3,
Treatment Plant		described as	disinfection	Column 4,
		Brisbane River	process	Column 6, and
		at 46.5km		Column 8
		AMTD	Maintenance	Column 5 and
			Hole, Teesdale	Column 7
			Street, Corinda.	
	W2 (only	W2 – To waters	Outlet from	Column 5,
	sample when	described as	disinfection	Column 7
	discharges	Oxley Creek at	process	
	occurring on	8.0km AMTD		
	date of routine			
	sample)			
Wacol Sewage	W1	W1 – To waters	Outlet from	Column 3,
Treatment Plant		described as	disinfection	Column 4,



		Brisbane River	process	Column 5,
		at 60.0km		Column 6,
		AMTD		Column 7 and
				Column 8
Carole Park	W1	W1 - To waters	Sampling pit at	Column 3,
Sewage		described as	the outlet of the	Column 4,
Treatment Plant		Brisbane River	chlorine contact	Column 5,
		at 63.7km	tanks	Column 6 and
		AMTD		Column 7
Goodna	W1	W1 – To waters	At the effluent	Column 3,
Sewage		described as	standpipe	Column 4,
Treatment Plant		Brisbane River	located on the	Column 5,
		at 66.2km	outfall pipeline	Column 6 and
		AMTD	treated	Column 8
			wastewater flow	
			to the permeate	
			flow splitter tank	
	W2	W2 – To waters		
		described as	_	_
		Goodna Creek	-	_
		at 0.6km AMTD		
Karana Downs	W1	W1 - To an	Outlet from	Column 3,
Sewage		unnamed gully	disinfection	Column 4,
Treatment Plant		that joins the	process	Column 5,
		Brisbane River		Column 6 and
		at approximately		Column 7
		81km AMTD		
Bundamba	W1	W1 – To waters	Open channel	Column 3,
Sewage		described as	post chlorination	Column 4,
Treatment Plant		Bremer River at		Column 5,
		5.7km AMTD		Column 6,
				Column 7 and
				Column 8

Part 2(B) Table 2 – Effluent Release Limits

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Quality Characteristic	Sampling	Minimum	Long Term 80th	Short term	Maximum	aximum Maximum	
(units)	frequency	requency median Percentile				Median	
BOD5 (mg/L)	Weekly	-	20	-	60	-	-
Suspended Solids (mg/L)	Weekly	-	30	-	90	-	-
pH (pH units)	Weekly	6.5	-	-	8.5	_	-



							- J	
	Dissolved Oxygen (mg/L)	Weekly	2.0	-	-	-	-	-
	Enterococci (cfu/100mL)	Weekly	-	-	260	-	-	-
	Free chlorine (mg/L)	Weekly	-	-	-	-	0.7	-
	Total Nitrogen (mg/L)	Weekly	-	-	-	-	-	-
	Total Phosphorus (mg/L)	Weekly	-	-	-	-	-	-
	Ammonia (mg/L)	Weekly	-	-	-	-	-	4
	(a) Sampli Manua a labor mainta (b) Releas <i>1-sewa</i> where limits d	ng must be ir I and any add atory NATA o ined. e points/sam age treatment there is no by etailed in <i>Pa</i> i	a accordance ditional releva certified for sa pling location sampling an pass facility rt 2(B) Table	with the adm ant guidelines ampling. All m as must be in ad release loc or the sample 2-Effluent rel	inistering aut if necessary nonitoring dev accordance v ations of this e location incl ease limits ap	thority's Wate or alternative vices must be with the descr approval. Se udes bypass oplies to a dry	er Quality San ely must be un effectively ca riptions in <i>Pa</i> wage Treatm flows, the eff v weather day	npling ndertaken by alibrated and <i>rt 2(B) Table</i> ent Plants luent release r only.
WTB2	In addition to Part 2(B) condition WTB1, the release to waters must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other visually objectionable matter excluding bypass releases.							
WTB3	Inflows that are treatment proc	Inflows that are in excess of the hydraulic capacity of the plant may bypass the standard treatment processes of the plant.						
WTB4	Bypass releas	es must be	screened p	rior to being	released.			
WTB5	 The following details must be recorded in relation to each bypass release: (a) the start time, date and duration of the release; and (b) the estimated volume of the bypass release; and (c) the level of treatment at the sewage treatment plant prior to discharge; and (d) the cause of the release; and (e) any monitoring of the water quality released. 							
WTB6	The administe	ering autho	rity must be	e notified wit	thin 24 hour	s of any by	bass release	e ceasing.
WTB7	Treated sewage the written con ² Any reuse prop health.	ge effluent m sent of any osed must co	nay be remo third party i omply with all	oved from th nvolved. I other legal re	e site and u equirements i	sed for an a	Ilternate pur	pose ² , with public



Agency interest: Noise				
Condition number	Condition			
NB1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place.			
Agency inter	rest: Land			
Condition number	Condition			
LB1	Other than as permitted within this environmental authority, contaminants must not be released to land.			
LB2	Treated sewage effluent may be released to land within the boundaries of the site for the use of any of the following: (a) service water; or (b) watering of landscaped areas; or (c) research and development projects relating to biomass production.			
LB3	 Treated effluent released to land must be done in accordance with documentation that ensures: (a) drainage to groundwater and subsurface flows of contaminants to surface waters are prevented. (b) surface pondage and run-off of effluent is prevented. (c) degradation of soil structure is minimised. (d) soil sodicity and the build-up of nutrients and heavy metals in the soil and subsoil are minimised. (e) spray drift or overspray does not carry beyond effluent disposal areas. (f) effluent disposal areas are maintained with an appropriate crop in a viable state for transpiration and nutrient uptake. (g) sufficient buffer zones are maintained between irrigation sites and sensitive environmental receptors. 			
LB4	When weather conditions or soil conditions preclude the release of treated sewage effluent to land, effluent must not be irrigated to land.			
Agency inter	rest: Waste			
Condition number	Condition			
W1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.			



Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Esk Sewage Treatment Plant Lot 1 RP156580. Fernvale Sewage Treatment Plant
	Banks Creek Road, FERNVALE QLD 4306 Lot 4 RP814367.
	Lowood Sewage Treatment Plant, Fernvale Road LOWOOD QLD 4311 Lot 1 RP138867.
	Toogoolawah Sewage Treatment Plant Lot 1 RPI35864.
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Kilcoy Sewage Treatment Plant William Street, KILCOY QLD 4515 Lot 3 RP118370

Part 2(C): General Conditions – Esk, Fernvale, Lowood, Toogoolawah and Kilcoy STPs

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following general conditions of approval.

Agency inte	Agency interest: General				
Condition number	Condition				
AC1	Display of environmental authority A copy of this environmental authority must be kept in a location readily accessible to the personnel that are carrying out the environmentally relevant activities.				
AC2	Records All records or documents that are required to be kept by a condition of this environmental authority must be kept at the premises approved for the activity for a period of at least five years and be available for examination by an authorised person. The record retention requirements of this condition will be satisfied if any daily and weekly records are kept for a period of at least three (3) years and these records are then kept in the form of annual summaries after that period.				
AC3	Alterations No change, replacement or operation of any plant or equipment is permitted if the change, replacement or operation of the plant or equipment increases, or is likely to substantially increase, the risk of environmental harm above that expressly provided by this environmental authority. An example of a substantial increase in the risk of environmental harm is an increase of 10% or more in the quantity of the contaminant to be released into the environment.				



AC4	Calibration All instruments and devices used for measuring or monitoring to determine compliance with a condition(s) of this environmental authority must be calibrated, and appropriately operated and maintained.
AC5	Site-Based Environmental Management Plan Implement a Site-Based Environmental Management Plan that address the management of the actual and potential environmental impacts resulting from the carrying out of the environmentally relevant activity/activities (ERAs) - (including issue-specific environmental management plans required to be developed and implemented under the conditions of this environmental authority).
AC6	An up to date copy of the Site-Based Environmental Management Plan (including issue- specific environmental management plans required to be developed and implemented under the conditions of this environmental authority) must be kept at a location readily accessible to the personnel that are carrying out the environmentally relevant activities and be available for examination by an authorised person on request.
AC7	 Maintenance of Plant and Equipment The holder of this environmental authority must: (a) install all plant and equipment necessary to ensure compliance with the conditions of this environmental authority; and (b) maintain all plant and equipment in a proper and efficient condition; and (c) operate all plant and equipment in a proper and efficient manner. In this condition, "plant and equipment" includes: (a) plant and equipment used to prevent and/or minimise the likelihood of environmental harm being caused; and (b) devices and structures to contain foreseeable escapes of contaminants and waste; and (c) vehicles used to transport waste; and (d) device or structure used to store, handle, treat or dispose of waste; monitoring equipment and associated alarms; and (e) backup systems that act in the event of failure of a primary system.
AC8	 Trained operators All persons engaged in the conduct of the activity, including but not limited to employees and contract staff, must be: (a) trained in the procedures and practices necessary to: i. comply with the conditions of this environmental authority, and ii. (prevent environmental harm during normal operation and emergencies; or (b) under the close supervision of such a trained person.
AC9	 If the holder of this environmental authority gives or transfers ownership of the treated sewage effluent to another person(s), the holder of this environmental authority must: (a) prior to giving such effluent or transferring ownership of such effluent to that person(s), obtain from that person details of how that person intends to comply with the general environmental duty in respect of the use and disposal of such effluent, particularly in relation to environmental sustainability of any effluent disposal, protection of public health and protection of environmental values of waters; and



	Environmental Authority EPPR00521513
	 (b) only give or transfer ownership of such effluent in accordance with a written agreement between the holder of this environmental authority and that person(s); and (c) upon becoming aware that the person is not or is not likely to comply with the general environmental duty, cease the giving and transferring ownership of such effluent, as the case may be.
Agency inter	rest: Air
Condition number	Condition
BC1	Noxious or Offensive Odour Notwithstanding any other condition of this environmental authority, no release of contaminants from the approved place is to cause a noxious or offensive odour beyond the boundaries of the approved place at any odour sensitive place.
Agency inter	rest: Water
Condition number	Condition
WTC1	 Release of contaminants to waters Contaminants must not be directly or indirectly released to any waters or the bed and banks of any waters unless: (a) the release complies with the limits and other requirements stated in Part 2(C) Agency interest: Water; and (b) the release occurs only from the designated discharge point for each approved place; and (c) the release complied with other requirements stated for the relevant approved place.
WTC2	 Release of contaminants to waters Notwithstanding the specified effluent quality characteristic limits for each approved place, the release of contaminants to waters must comply with the following qualitative characteristics: (a) the release must not have any properties nor contain any organisms or other contaminants which are capable of causing environmental harm; and (b) the release must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other objectionable matter.
WTC3	Quality Characteristics of Release to Waters The release of contaminants to waters must comply, at the sampling and in-situ measurement points specified for each approved place, with each of the limits specified in Part 2(C)Table 1 for each quality characteristic.



Permit

	Part 2(C)Table 1 - Release Qu	ality Characteristic Limits	
	QUALITY CHARACTERISTICS	RELEASE LIMIT	LIMIT TYPE
	5-day Biochemical Oxygen	20 mg/L	Short-term 80th percentile compliance
	Demand (uninnibited)	40 mg/L	maximum
	Suspended Solids	30 mg/L	Short-term 80th percentile compliance
		60mg/L	maximum
	рН	6.5 to 8.5	range
	Dissolved Oxygen	2.0 mg/L	minimum
	Free Chlorine Residual	0.7 mg/L	maximum
	Faecal Coliforms	1000 organisms per 100 mL as a m 5 samples taken at not less than ha one day, with 4 out of the 5 sample 4000 organisms per 100 mL).	nedian value (minimum of alf-hourly intervals in any s containing less than
WTC4	 All contaminated wastewater generated from washing or degreasing of all vehicles, plant and equipment must be collected and: (a) treated and disposed of to sewer with the approval of the relevant authority in accordance with a trade waste permit; or (b) transported for disposal, recycled, reprocessed or treated at a facility that can lawfully accept such waste. 		
WTC5	 Receiving Environment Monitoring Program The holder of this environmental authority must implement a Receiving Waters Monitoring Program to monitor the effects of the release of contaminants on the receiving waters, which provides for the following functions: (a) monitoring for appropriate contaminants which may be released to such waters; and (b) description of potentially affected environment including key communities and ambient water quality; and (c) description of water quality objectives and biological objectives to be achieved; and (d) description of selected physio-chemical and biological indicators and reasons for their inclusion; the locations of monitoring stations as well as any control locations; the proposed sampling depths; and (e) the water quality characteristics of receiving waters to be determined; and (f) the frequency of sampling and analysis; any historical data sets to be relied upon; and (g) description of the statistical basis on which conclusions are drawn. 		
WTC6	 The Receiving Waters Monitoring Program must also consider, but not be limited to, the following: (a) water quality criteria specified in the Australian & New Zealand Environment & Conservation Council's "Australian Water Quality Guidelines for Fresh and Marine Waters", 2000; and (b) relevant Environmental Protection Policies enacted under Queensland's <i>Environmenta Protection Act 1994</i> concerning water guality and ecosystems; and 		



	(c) relevant reports produced with respect to the administering authority's water quality monitoring programs if applicable.		
WTC7	The holder of this environmental authority must submit a report of the results of the Receiving Waters Monitoring Program including an assessment of the impact of the discharge upon the receiving environment with respect to water quality criteria and the areas of consideration in Part 2(C) condition WTC5 with each annual monitoring report, and the suitability of the existing discharge location with reference to the environmental values (e.g. maintenance of aquatic ecosystems) of the receiving water body.		
Agency inter	est: Stormwater Management		
Condition number	Condition		
SMC1	Contaminant Releases Caused by Rainfall Except as otherwise provided by the conditions of the stormwater management schedule and the water schedule of this environmental authority, the environmentally relevant activity must be carried out by such practicable means necessary to prevent and/or minimise the release or likelihood of release of contaminated runoff to any stormwater drain or waters or the bed or banks of any such waters. "Contaminated runoff' for the purposes of this condition means stormwater and/or stormwater runoff that contain contaminants that may cause environmental harm.		
SMC2	Cleaning and spillages The maintenance and cleaning of all vehicles, plant and equipment must be carried out in areas where contaminants cannot be released into any waters, roadside gutter or stormwater drain.		
SMC3	Spillage of waste, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must not be cleaned up by hosing, sweeping or otherwise releasing such waste, contaminants or material to any stormwater drainage system, roadside gutter or waters.		
SMC4	Pond conditions All ponds used for the storage or treatment of contaminants or wastes must be constructed and maintained to ensure the stability of the pond's construction.		
SMC5	Suitable banks and or diversion drains must be installed and maintained to exclude stormwater runoff from any ponds or other structures used for the storage or treatment of contaminants or wastes.		
SMC6	Bunding All liquid chemical tank storages must be bunded so as to effectively contain a volume equivalent to at least that of 100% of the largest storage tank plus 10% of the second largest tank within the bund.		
SMC7	All chemical drum storages, must be bunded so as to effectively contain a volume equivalent to at least 25% of the maximum design storage volume within the bund.		
SMC8	All bunded areas must be roofed where practicable.		



SMC9	Where it is impractical to completely roof a bunded area the holder of this environmental authority must ensure that stormwater captured within the bund is free from contaminants or wastes prior to being released.		
SMC10	Minimise infiltration The holder of this environmental authority must take all reasonable and practicable measures to minimise infiltration of stormwater to the sewerage system.		
Agency inter	est: Land Application		
Condition number	Condition		
LC1	Release of contaminants The only contaminants allowed to be released to land from the environmental relevant activity are treated effluents and sewage sludges.		
LC2	Contaminant release location Treated effluents and sewage sludges may only be released to the sludge drying beds or, for treated effluents, to designated irrigation areas within an approved place or to a third party.		
LC3	Contaminant release quality Treated sewage effluent used for irrigation purposes, or given to another party for irrigation purposes or other use, must comply with the quality characteristics specified in Part 2(C) Agency interest: Water.		
LC4	Contaminant release precautions The contaminant release areas within an approved place must not be used for grazing, recreational activities or as a traffic thoroughfare.		
LC5	The release of contaminants to land within an approved place must not be carried out within 50 metres of any watercourse.		
LC6	The release of contaminants to land within an approved place must not be carried out if soil moisture conditions are such that surface runoff or ponding is likely to occur.		
LC7	Spray from any release of contaminants to land must not drift beyond the boundaries of an approved place.		
LC8	Public access to any contaminant release area within an approved place must be denied during the release of contaminants to land and until the release area has dried.		
LC9	Pipelines and fittings for the release of contaminants to land must be clearly identified. Standard water taps, hoses and cocks must not be fitted to contaminants release pipelines, and the contaminant release system must not be connected to other service pipelines. Lockable valves or removable handles must be fitted to the contaminant release pipelines where there is public access to the contaminant release areas.		



Agency inter	est: Noise		
Condition number	Condition		
NC1	Emission of noise The environmentally relevant activity must be carried out by such reasonable and practicable means necessary to prevent the emission or likelihood of emission of noise that constitutes an unreasonable intrusive noise.		
NC2	In the event of a complaint about noise that constitutes an unreasonable intrusive noise being made to the administering authority, that the administering authority considers is not frivolous or vexatious, then the emission of noise must not result in levels greater than those specified in Part 2(C)Table 2 — Noise Emission Limits.		
	Part 2(C) Table 2 — Noise Emission Limits		
		DISE SENSITIVE PLACE	
	Period	Noise Level at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level Lamax. Adi. T	
	7 am - 6 pm	Background noise level plus 5 dB(A)	
	6 pm - 10 pm	Background noise level plus 5 dB(A)	
	10 pm - 7 am	Background noise level plus 3 dB(A)	
	NOISE LIMITS AT A C	COMMERCIAL PLACE	
	Period	Noise Level at a Commercial Place measured	
		as the Adjusted Maximum Sound Pressure	
		Level LAmax, adj T	
	7 am - 6 pm	Background noise level plus 10 dB(A)	
	6 pm - 10 pm	Background noise level plus 10 dB(A)	
	10 pm - 7 am Background noise level plus 8 dB(A)		
Agency inter	est: Waste Management		
Condition number	Condition		
GC1	 General Except as otherwise provided by the conditions of this environmental authority, the holder of this environmental authority must not: (a) allow waste to burn or be burned; nor (b) remove waste and burn such waste elsewhere. 		
GC2	Off-site movement Where regulated waste is removed from the premises (other than by a release as permitted under another schedule of this environmental authority), the holder of this environmental authority must monitor and keep records of the following: (a) the date, quantity and type of waste removed; and (b) name of the waste transporter and/or disposal operator that removed the waste; and (c) the intended treatment/disposal destination of the waste.		



	(NOTE: Records of documents maintained in compliance with a waste tracking system established under the <i>Environmental Protection Act 1994</i> or any other law for regulated waste will be deemed to satisfy this condition).		
GC3	The holder of this environmental authority must keep records required to be kept in relation to removal of regulated waste from the premises for a period of at least 5 years.		
GC4	Regulated waste must not be released to the environment, stored, transferred or disposed of contrary to any condition of this environmental authority.		
GC5	Notification of improper disposal of regulated waste If the holder of this environmental authority becomes aware that a person has removed regulated waste from the premises (or any approved vehicles) and disposed of the regulated waste in a manner that is not authorised by this environmental authority or is improper or unlawful, then the holder of this environmental authority must, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.		
GC6	Specific Waste Management Plan Associated With Site-Based Management Plans Incorporate a Waste Management Plan in the Site-Based Management Plans that addresses at least the following matters: (a) the quantity and nature of each waste produced; and (b) the current method of disposal of waste; and (c) proposed methods of pre-treatment or disposal; and (d) expected reduction in quantity of waste produced through waste minimisation and cleaner production; and (e) investigation and evaluation of alternative treatment options which shall include at least the following: i. cleaner production technologies including nutrient removal; ii. disposal or reuse of effluent and sludge; and iii. reporting the results of any investigation and evaluation to the administering authority.		
Agency inter	est: Monitoring and Reporting		
Condition number	Condition		
MPC1	 Complaint recording All complaints received by the holder of this environmental authority relating to releases of contaminants must be recorded and kept with the following details: (a) time, date and nature of complaint; and (b) type of communication (telephone, letter, personal etc.); and (c) name, contact address and contact telephone number of complainant (Note: if the complainant does not wish to be identified then "Not identified" is to be recorded); and (d) response and investigation undertaken as a result of the complaint; and (e) name of person responsible for investigating complaint; and (f) action taken as a result of the complaint investigation and signature of responsible 		



	person.
MPC2	Notification of emergencies and incidents As soon as practicable after becoming aware of any emergency or incident that results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority, the holder of this environmental authority must notify the administering authority of the release by telephone or email.
MPC3	The notification of emergencies or incidents as required by Part 2(C) condition MPC2 must include but not be limited to the following: (a) the name of the holder of the environmental authority; and (b) the location of the emergency or incident; and (c) the number of the environmental authority; and (d) the name and telephone number of the designated contact person; and (e) the time of the release; and (f) the time of the holder of the environmental authority become aware of the release; and (g) the suspected cause of the release; and (h) the environmental harm caused, threatened, or suspected to be cause by the release; and (i) actions taken to prevent any further release and mitigate any environmental harm caused by the release. (NOTE: Any relevant notification given under the duty to notify of environmental harm provisions of the <i>Environmental Protection Act 1994</i> that contains the information specified in Part 2(C) condition MPC3 is also notification under Part 2(C) condition MPC2.)
MPC4	Not more than 14 days following the initial notification of an emergency or incident, the holder of the environmental authority must provide written advice of the information supplied in accordance with Part 2(C) condition MPC3 in addition to. (a) proposed actions to prevent a recurrence of the emergency or incident; and (b) outcomes of actions taken at the time to prevent or minimise environmental harm.
MPC5	As soon as practicable, but not more than six weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident that results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority, the holder of the environmental authority must provide written advice of the results of any such monitoring performed to the administering authority.
MPC6	Exception Reporting The holder of this environmental authority must notify the administering authority in writing of any monitoring result that indicates an exceedance of or non-compliance with any approval limit within 28 days of completion of analysis.
MPC7	 The written notification required by condition number MPC6 above must include: (a) the full analysis results; and (b) details of investigation or corrective actions taken; and (c) details of any proposed subsequent analysis.



MPC8	Monitoring of Contaminant Releases to Waters The holder of this environmental authority must monitor the physio-chemical properties of treated effluent at the release point WI for each approved place at the frequency, and for the parameters, specified in Part 2(C) Table 3 — Monitoring Parameters and Frequency.		
	Part 2 (C) Table 3 — Monitoring Parameters and Frequency		
	Quality Characteristic	Units	Frequency
	5-day uninhibited Biochemical Oxygen Demand (BOD₅)	mg/L	Monthly
	Suspended Solids	mg/L	Monthly
	рН	pH scale	Monthly
	Dissolved Oxygen	mg/L	Monthly
	Free Chlorine Residual	mg/L	Monthly
	Faecal Coliforms	cfu/100 mL	Monthly
	Ammonia (as Nitrogen)	mg/L	Monthly
	Total Nitrogen (as Nitrogen)	mg/L	Monthly
	Total Phosphorus (as Phosphorus)	mg/L	Monthly
MPC10 MPC11	All monitoring of the physio-chemical properties of contaminants released to waters and the quality of surface waters and groundwater must be made in accordance with methods prescribed in the latest edition of the Administering Authority's Monitoring and Sampling Manual or supplements to that document as such become available. All determinations of the quality of contaminants released to waters and the quality of surface waters and groundwater must be performed by a person or body possessing appropriate experience and qualifications to perform the required measurements. The results of all monitoring and other determinations made under this environmental authority		
	must be kept for a period of not less than 5 years, and produced to an authorised person upon request.		
MPC12	 Noise monitoring For the purposes of checking compliance with Part 2(C) condition NC2, monitoring and recording of the noise levels from the activity/activities must be undertaken for the following descriptors, characteristics and conditions: (a) L_{Amax, Adj T}; (b) L_{A90, T}; (c) L_{AN, T} (where N equals statistical levels of 1, 10, 50, 90 and 99); (d) L_{pA T}; (e) L_{Aeq, T}; (f) the level and frequency of occurrence of impulsive or tonal noise; (g) atmospheric conditions including temperature, relative humidity and wind speed and direction; and (h) effects due to extraneous factors such as traffic noise. 		
MPC13	In conjunction with the measurement and sample and time of sampling must be reco	recording of noise, the orded.	e sampling location, date of



MPC14	In the event of a complaint about noise that constitutes an unreasonable intrusive noise being made to the administering authority that the administering authority considers is not frivolous or vexatious, the holder of this environmental authority must undertake monitoring to investigate such a complaint upon written request from the administering authority.		
MPC15	The method of measurement and reporting of noise levels must comply with the most recent edition of the Administering Authority's Noise Measurement Manual or supplements to that document as they become available.		
MPC16	The measurement and reporting of noise levels must be undertaken by a person or body possessing appropriate experience and qualifications to perform the required measurements.		
MPC17	 Incident recording A record must be maintained of at least the following events: (a) the time, date and duration of equipment malfunctions where the failure of the equipment resulted in the release of contaminants reasonably likely to cause environmental harm; and (b) any uncontrolled release of contaminants reasonably likely to cause environmental harm; and (c) any emergency involving the release of contaminants reasonably likely to cause material or serious environmental harm requiring the use of firefighting equipment. 		
MPC18	All bypasses of sewage shall be monitored and recorded in terms of event date, duration, cause of bypass, and actions taken in reporting and averting the bypass.		
MPC19	Monitoring Of Volume of Release The daily quantity of contaminants released must be determined or estimated by an appropriate method, for example, a flow meter.		
MPC20	Monitoring reporting The holder of this environmental authority must ensure that the results of all monitoring performed in accordance with this environmental authority for the period covered by each annual return period are submitted with the annual monitoring report.		
MPC21	Contaminant release quality pertaining to the yearly period, compiled, collected or recorded in accordance with Part 2(C) Agency interest: Water Table 1 conditions must be presented in a tabular format, showing: (a) date, times, and day of week sampled; i. all raw data; ii. any exceedance of levels of all parameters specified in the relevant Part 2(C) Agency interest: Water Table 1; and iii. maximum and minimum values for parameters specified in the relevant Part 2(C) Agency interest: Water Table 1; and (b) graphically showing data referred to in part (i) of this condition vs time. 		



Part 3: Site Specific Conditions

Part 3 (A): Bubble Licence: Lower Brisbane River Catchment Conditions

Part 3(A) Table 1 – Lower Brisbane River Catchment sewage treatment plants

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Karana Downs Sewage Treatment Plant Nalya Crescent, KARANA DOWNS QLD 4306 Lot 2 RP180342.
ERA 63 Sewage treatment (1)(e) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 10,000 but not more than 50,000EP	Carole Park Sewage Treatment Plant Boundary Road, CAROLE PARK QLD 4300 Lot 119 CP907852. Fairfield Sewage Treatment Plant Corner of Brisbane Corso and Cansdale Street Qld, 4103 Lot 3 RP806359.
ERA 63 Sewage treatment (1)(f) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 50,000 but not more than 100,000EP	Goodna Sewage Treatment Plant Lower Cross Street, GOODNA QLD 4300 Lot 1 RP887551. Wacol Sewage Treatment Plant Grindle Road, WACOL QLD 4076 Lot 906 SP220999 and Lot 1 SP220999.
ERA 63 Sewage treatment (1)(g) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100,000EP	Bundamba Sewage Treatment Plant 5 Hanlon Street, BUNDAMBA QLD 4304. Lot 1 on Plan SP230116. Gibson Island Sewage Treatment Plant (EP Limit – 365,000), PARINGA ROAD, MURARRIE QLD 4172 Lot 41 SP227024, Lot 43 SP227024. Luggage Point Sewage Treatment Plant 200 Main Beach Road, PINKENBA QLD, 4008 Lot 1 & 2 SP230688. Oxley Sewage Treatment Plant (EP Limit – 975,000) 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 RP37416, Lot 2 RP99640, Lot 100 SP1622583.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval.



Agency inter	est: General		
Condition number	Water		
WT3A1	For each annual monitoring report period, the total mass load of Total Nitrogen and Total Phosphorus released to waters must not exceed the limits specified in <i>Part 3(A)Table 2 –</i> <i>Annual bubble licence Load Limits for Total Nitrogen and Total Phosphorus</i> . Releases are to be calculated as a combined total from all environmentally relevant activities listed in <i>Part</i> <i>3(A)Table 1-Lower Brisbane River Catchment sewage treatment plants</i> of this environmental authority. <i>Part 3(A)</i> Table 2 – Annual bubble licence Load Limits for Total Nitrogen and Total Phosphorus		Total Nitrogen and Total cified in <i>Part 3(A)Table 2 –</i> <i>Phosphorus</i> . Releases are to ant activities listed in <i>Part</i> <i>t plants</i> of this environmental I Nitrogen and Total
	Effective up to and including	Total Nitrogen Mass Load	610 T/yr
	30 June 2022	Release Limit	
		Total Phosphorus Mass Load Release Limit	580 T/yr
	Effective from 1 July 2022	Total Nitrogen Mass Load Release Limit	605 T/yr
		Total Phosphorus Mass Load Release Limit	530 T/yr
	Associated requirements		
Total nitrogen and total phosphorus annual mass loads are to be calculated as follows:		ated as follows:	
	Catchment Annual TN Mas	ss Load (T) = Sum of all individual si	te TN mass Loads(kg)/1000
	 Individual Site An 	nual TN Mass Load (kg) = Yearly su	Im of Daily Release Volume (ML)
	for all dry weather	days/ the number of dry weather days	ays x 365 x Yearly Median dry
	weather TN Conc	entration (mg/L)	
	 Catchment Annual TP Mass Load (T) = Sum of all individual site TP mass Loads (kg)/1000 		
	 Individual Site Annual TP Mass Load (kg) = Yearly sum of Daily Release Volume (ML) 		
	for all dry weather weather TP Conc	r days/ the number of dry weather da entration (mg/L)	ays x 365 x Yearly Median dry
WT3A2	 By 30 November 2017, and every five (5) years thereafter, the holder of this environmental authority shall develop, with written agreement from the administering authority, the following: A pollutant release reduction target for Total Nitrogen and Total Phosphorus for the activities identified in <i>Part 3(A) Table 1-Lower Brisbane river catchment sewage treatment plants</i> of this environmental authority. A nutrient pollutant abatement program of works to achieve the target specified in <i>Part 3(A)</i> WT2 (1). 		
WT3A3	 By 30 November 2017, the hold 1. Conduct a mixing zone s catchment sewage treat impacts from releases a 2. With written agreement timeframe, implement re 	er of this environmental authority study for the activities in <i>Part 3(A</i> <i>ment plants</i> of this environmentand and submit the final written report from the administering authority, ecommendations (if any) from ab	w must A) Table 1- Lower Brisbane river al authority, to assess localised to the administering authority. and within a reasonable ove mentioned mixing zone



	study.
WT3A4	Within five (5) years from the take effect date of this environmental authority and every five (5) year period thereafter, the holder of this environmental authority shall provide the administering authority with a pollutant release reduction progress report stating:
	 The actual total load for each pollutant released during the preceding five (5) years; and The pollutant abatement actions undertaken during the preceding five (5) years, and The actual total pollutant load abated by the actions in paragraph 2.

Part 3(B): Aratula, Boonah and Kalbar STPs

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Boonah Sewage Treatment Plant, Gorkow Road BOONAH QLD 4310. Lot 10 SP237223, Lot 11 SP237223, Lot 12 SP237223, Lot 13 SP237223, Lot 1 RP113490, Lot 2 RP113490.
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Aratula Sewage Treatment Plant Cunningham Highway ARATULA QLD 4309 Lot 4 SP121584.
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Kalbar Sewage Treatment Plant 29 Heit Road KALBAR QLD 4309 Lot 2 RP127542.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval

Agency inter	rest: General
Condition number	Condition
G3B1	All reasonable and practicable measures must be taken to prevent the likelihood of environmental harm being caused.
G3B2	Any breach of a condition of this environmental authority, with the exception of breaches described in Part 3(B) condition G3B3, must be reported to the administering authority as soon as practicable, or at most, within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions undertaken.
G3B3	The holder of this environmental authority must notify the administering authority in writing of any monitoring result that indicates an exceedance of or a non-compliance with any condition



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	limit within 28 days of completion of analysis.
G3B4	All information and records required by the conditions of this environmental authority must be kept for a minimum of five years with the exception of environmental monitoring results which must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request and in the format requested.
G3B5	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
G3B6	A receiving environment monitoring program must be designed and implemented by appropriately qualified persons to monitor the effects of the activity on the aquatic values of waters.
G3B7	 The receiving environment monitoring program required by Part 3(B) condition G3B6, must include at least the following: (a) description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality); and (b) description of applicable environmental values and sediment and water quality objectives to be achieved; and (c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the Receiving Environment Monitoring Program is proposed; and (d) water and sediment quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the monitoring program. Alternatively, receiving environment monitoring compliance may be achieved by the holder of this environmental authority becoming and remaining a "contributing member" in regional studies of water quality and are endorsed by the administering ecosystem health which authority.
G3B8	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is for field sampling or online monitoring of pH, Dissolved Oxygen and Free Chlorine.
G3B9	An annual monitoring report must be prepared and submitted to the administering authority by 30 November each year, for the preceding financial year.
G3B10	You must record the following details for all environmental complaints received: (a) date and time complaint was received; and (b) name and contact details of the complainant; and (c) nature of the complaint; and (d) investigations undertaken; and (e) conclusions formed; and (f) actions taken.
G3B11	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority , to investigate a complaint not considered by the



	administering authority to be frivolous or vexatious, of environmental nuisance arising from the activity . The monitoring results must be provided to the administering authority upon request.
G3B12	 The activity must be undertaken in accordance with written procedures that: identify potential risks to the environment from the activity during routine operations, closure and an emergency; and establish and maintain control measures that minimise the potential for environmental harm; and ensure plant, equipment and measures are maintained in a proper and effective condition; and ensure plant, equipment and measures are operated in a proper and effective manner; and ensure that staff are trained in and aware of their obligations under the Environmental Protection Act 1994; and ensure that reviews of environmental performance are undertaken at least annually.
Agency inter	est: Air
Condition number	Condition
A3B1	Odours or airborne contaminants must not cause environmental nuisance at a sensitive place or commercial place .
Agency inter	est: Water
Condition number	Condition
WT3B1	The only contaminants to be released to surface waters are treated effluent from the release points described in <i>Part 3(B) Table 1 – Sewage Treatment Plant Sampling</i> and Release Locations. These releases are to be in accordance with the release strategy listed in <i>Part 3(B)</i>



ERA location	Release point name	Release Point location	Source of Effluent	Sampling location	Sampling frequency	Applicable Effluent rele limits - Table Effluent Release Lim
Aratula Sewage Treatment Plant	LW1	Washpool Gully into Warrill Creek at approximately 55 km AMTD	Wetlands	Final outlet of the treatment works	Monthly in the event of a release	Columns 1, 2 5 where 'Arat or 'All Sites' a listed in Colu 3
Boonah F Sewage Treatment Plant	RP1	At the end of the open drain on QUU land leading to Teviot Brook at 52km AMTD	Effluent Storage Lagoon	Effluent Storage Lagoon outlet	Monthly in the event of a release	Columns 1, 2 5 where 'Boo RP1' or 'All S are listed in Column 3
			MF Storage Tank	Final outlet of the treatment works	Monthly	Columns 1, 2 5 where 'Boo RP1' or 'All S are listed in Column 3
	RP2	Piped outlet to Teviot Brook at 52km AMTD	Effluent Storage Lagoon	Effluent Storage Lagoon outlet	Monthly in the event of a release	Columns 1, 2 5 where 'Boo RP2' or 'All S are listed in Column 3
Kalbar Sewage Treatment Plant	LW1	Via piped outlets to Kents Lagoon diversion channel	Wet weather storage lagoon or Chlorine contact tank	Final outlet of the treatment works	Monthly	Columns 1, 2 5 where 'Kalk or 'All Sites' a listed in Colum 3
Kalbar Sewage Treatment Plant Associated re 1. Samplin must be 2. The dail method, 3. A map o	LW1 Equirements g must be in effectively c y quantity of for example f release po	Via piped outlets to Kents Lagoon diversion channel accordance with the alibrated and maintai contaminants release a, a flow meter. ints at Aratula, Boona	Wet weather storage lagoon or Chlorine contact tank Monitoring and ned. ed must be det	Final outlet of the treatment works d Sampling M termined or es STPs is attack	Monthly anual and all n stimated by an hed in ATTAC	Columns 5 where 'H or 'All Site listed in C 3 nonitoring of appropriat
Part 3(B) T	able 2 – Se	ewage Treatment	Plant Effluen	it Release S	strategy	
Aratula Se Treatment	wage Plant	The total quantity of effluent released from release point Part 3(B) LW must not exceed 19.850 kilolitres per year.				
Boonah So Treatment	ewage Plant	Effluent release strategy applies from 1 July 2020 Treated effluent may be released from Boonah Sewage Treatment plant under the following conditions: 1. Treated effluent release is triggered only when the following				


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	conditions are met:	
	 a) i. When flow in Tometers/second Gauge 145031. ii. When flow in Tocubic meters/second cubic meters/second installed at a Bolocation. b) The combined maximum exceed 44 litres/second litres/second from the Elitres/second from the Elitres/second from the Elitres/second from the maximum exceed 44 litres/second litres/second from the maximum exceed 44 litres/second from the Elitres/second from the maximum exceed 44 litres/second litres/second from the maximum exceed 44	eviot Brook is greater than 2 cubic as measured at the Coulson A or; eviot Brook is greater than 1.78 econd as measured by a flow meter bonah STP release point or nearby m release flow rate must not d, consisting of maximums of 30 ffluent Storage Lagoon and 14 nembrane filtration Storage Tank ease when: goon has been drained down to the etres (or a level equivalent to 30% in Teviot Brook dropping below second as measured at the e 145031A or; res/second as measured by a flow at a Boonah STP release point or
	3. Treated effluent release must o	nly occur from RP2 and/or RP2
	For the annual reporting period, con release strategy must meet the requ <i>Maximum quantity of release</i> and as Part 3(B) Table 3 – Maximum qua	itaminants released under effluent uirements of <i>Part 3(B) Table 3</i> – ssociated requirements. ntity of release
	Parameter	Annual Mass Load limit (kg/year)
	Total Nitrogen (as N)	2,900
	Total Phosphorus (as P)	860
	Associated Requirements	
	1. The Annual Mass Load of Total Nitrogen in kgs/ Loads as calculated under associated requirement	vear must be calculated as the Sum of all TN Mass 2 for the annual reporting period.
	2. The TN Mass Load of each release event is calc total volume of effluent released to Teviot Brook fro	ulated as the most recent TN concentration x the om both RP1 and RP2.
	3. The Annual Mass Load of Total Phosphorus in k Mass Loads as calculated under associated require	gs/year must be calculated as the Sum of all TP ement 4 for the annual reporting period.
	4. The TP Mass Load of each release event is calc Total volume of effluent released to Teviot Brook fr	ulated as the most recent TP concentration x the om both RP1 and RP2.
	5. The Annual Mass Load Limits as detailed in Tab rainfall volume is greater than 1020 mm (equivalen	le 3 do not apply in any year where the annual t to greater than a 1 in 10 wet year).
	Effluent release strategy applies	from 1 July 2020
	Treated effluent may be released from plant under the following conditions	om Boonah Sewage Treatment
	 4. Treated effluent release is trigge conditions are met: a) When water level in the 	ered only when the following Effluent Storage Lagoon is above



	RL of la	of 81.1 metres (or a goon volume); and	level greater than or equal to 50%
	 b) c) At realitres 5. Treated effluation a) the limini of its b) where 6. Treated effluation 7. Treated effluation 8. Treated effluation <li< th=""><th> i. When flow in Termination of the second of the</th><th>eviot Brook is greater than 2 cubic as measured at the Coulson A or; eviot Brook is greater than 1.78 econd as measured by a flow meter bonah STP release point or nearby maximum release flow rate of 30 nerged outlet in Teviot Brook. ease when: goon has been drained down to the etres (or a level equivalent to 30% ok drops below second as measured at the e 145031A or; res/second as measured by a flow at a Boonah STP release point or nly occur from RP2. ntaminants released under effluent uirements of <i>Part 3(B) Table 4</i> – ssociated requirements.</th></li<>	 i. When flow in Termination of the second of the	eviot Brook is greater than 2 cubic as measured at the Coulson A or; eviot Brook is greater than 1.78 econd as measured by a flow meter bonah STP release point or nearby maximum release flow rate of 30 nerged outlet in Teviot Brook. ease when: goon has been drained down to the etres (or a level equivalent to 30% ok drops below second as measured at the e 145031A or; res/second as measured by a flow at a Boonah STP release point or nly occur from RP2. ntaminants released under effluent uirements of <i>Part 3(B) Table 4</i> – ssociated requirements.
	Parameter	•	Annual Mass Load limit (kg/year)
	Total Nitrogen (a	s N)	2,000
	Total Phosphoru	s (as P)	600
	Associated Require	ements	L
	 The Annual Ma of all TN Mass reporting period The TN Mass L concentration x The Annual Ma Sum of all TP N annual reporting The TP Mass L concentration x The Annual Ma the annual raim in 10 wet year). 	ss Load of Total Nitroge Loads as calculated und d. oad of each release even the Total volume of efflu ss Load of Total Phosph Mass Loads as calculated g period. oad of each release even the Total volume of efflu ss Load Limits as detaile fall volume is greater tha	n in kgs/year must be calculated as the Sum er associated requirement 2 for the annual ant is calculated as the most recent TN uent released to Teviot Brook from RP2. horus in kgs/year must be calculated as the d under associated requirement 2 for the ant is calculated as the most recent TP uent released to Teviot Brook from RP2. ed in Table 3 do not apply in any year where an 1020 mm (equivalent to greater than a 1
Kalbar Sewage Treatment Plant	The total quantit any dry weather must not exceed	y of effluent release day must not excee 1000 cubic metres	ed from release point LW1 during ed 250 cubic metres and in any day



Column 1	Column 2	Column 3	Column 4	Column
Quality Characteristic	Units	Site	Minimum	Maximu
BOD 5 day	mg/L	Aratula	NA	20
(inhibited)		Kalbar	NA	20
BOD 5 day	mg/L	Boonah RP1	NA	110
		Boonah RP2	NA	110
Suspended Solids	mg/L	Aratula	NA	30
		Kalbar	NA	30
		Boonah RP1	NA	220
		Boonah RP2	NA	220
рН	scale	All sites	6.5	9
Dissolved Oxygen	mg/L	All sites	2.0	NA
Faecal Coliforms	cfu/100mL	All sites	NA	1000
Free chlorine	mg/L	All sites	NA	0.7
Ammonia (as N)	mg/L	All sites (except Boonah)	NA	NA
		Boonah RP1 (before 1 Jul 2020)	NA	NA
		Boonah RP2 (before 1 Jul 2020)	NA	NA
		Boonah RP2 (from 1 July 2020)	NA	33
Total Nitrogen	mg/L	All sites	NA	NA
Total Phosphorus	mg/L	All sites	NA	NA
Associated requirem 1. Release limit 2. The most red against efflue 3. Effluent relea 4. Effluent relea	ents conly applies whe cent sample taken ent release limit. ase limits apply to ase limits apply to	en a release occurs. n from the sample location o Boonah for releases und o Aratula and Kalbar for al	n in Table 1 is use ler effluent release I releases.	ed to assess c e strategy.
In addition to Part 3 evidence of oil or gr objectionable matte	(B) WT3B1, the ease, nor conta r.	e release to waters mus ain visible floating oil, gr	st not produce a rease, scum, litt	ny slick or ot er or other vi



	holder of this environmental authority will manage the actual and potential environmental impacts resulting from any occurrence of blue-green algae outbreaks.
Agency inter	est: Noise
Condition number	Condition
N3B1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place.
Agency inter	est: Land
Condition number	Condition
L3B1	Other than as permitted within this environmental authority, contaminants must not be released to land.
L3B2	 Treated sewage effluent may be released to land within the boundaries of the site for the following uses: 1. service water; 2. watering of constructed wetland or landscaped areas; 3. research and development projects relating to biomass production.
L3B3	Treated sewage effluent may be removed from the site and used for alternate purpose, with the written consent of any third party involved.
Agency inter	est: Waste
Condition number	Condition
W3B1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.



Part 3(C): Laidley and Forest Hill STPs

Environmentally relevant activity	Locations
ERA Sewage treatment 63 (1)(d) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 4,000 but not more than 10,000EP	Laidley Sewage Treatment Plant Cnr East and Braham Roads off Boundary Road LAIDLEY NORTH QLD 4341, Lot 2 RP107816.
ERA 63 Sewage treatment (1)(b)(i) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme - IT or IR	Forest Hill Sewage Treatment Plant Dodt Road FOREST HILL QLD 4342. Lot 1 RP114066.

Agency interest: General		
Condition number	Condition	
G3C1	All reasonable and practicable measures must be taken to prevent the likelihood of environmental harm being caused.	
G3C2	Any breach of a condition of this environmental authority, with the exception of breaches described in Part 3(C) condition G3C3, must be reported to the administering authority as soon as practicable, or at most, within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions undertaken.	
G3C3	The holder of this environmental authority must notify the administering authority in writing of any monitoring result that indicates an exceedance of or non-compliance with any approval limit within 28 days of completion of analysis.	
G3C4	All information and records required by the conditions of this environmental authority must be kept for a minimum of five years with the exception of environmental monitoring results which must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request and in the format requested.	
G3C5	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.	
G3C6	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is for in situ monitoring of	



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	pH, Dissolved Oxygen and Free Chlorine.
G3C7	An annual monitoring report must be prepared and submitted to the administering authority by 30 November each year, for the preceding financial year.
G3C8	 You must record the following details for all environmental complaints received: a) date and time complaint was received (a) name and contact details of the complainant; and (b) nature of the complaint; and (c) investigations undertaken; and (d) conclusions formed; and (e) actions taken.
G3C9	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority , to investigate a complaint not considered by the administering authority to be frivolous or vexatious, of environmental nuisance arising from the activity . The monitoring results must be provided to the administering authority upon request.
G3C10	 The activity must be undertaken in accordance with written procedures that: 1. identify potential risks to the environment from the activity during routine operations, closure and an emergency; and 2. establish and maintain control measures that minimise the potential for environmental harm; and 3. ensure plant, equipment and measures are maintained in a proper and effective condition; and 4. ensure plant, equipment and measures are operated in a proper and effective manner 5. ensure that staff are trained in and aware of their obligations under the <i>Environmental Protection Act 1994; and</i> 6. ensure that reviews of environmental performance are undertaken at least annually.
Agency Inter Condition number	Condition
A3C1	Odours or airborne contaminants must not cause environmental nuisance at a sensitive place or commercial place .
Agency inter	est: Water
Condition number	Condition
WT3C1	The only contaminants to be released to surface waters from the release points described in <i>Part 3(C) Table 1 - Sewage Treatment Plant Sampling and Release Location</i> must be in accordance with <i>Part 3(C) Table 2 - Surface Water Release Limits</i> and the associated requirements.



ERA Locatio	on Relea Name	se Point	Release Point	Location	Sampling Location
Laidley STP	W1		Open channel a ATTACHMENT Laidley STP - V Point	as shown in ⁻ C: Figure 1 – V1 - Release	Final outlet of the treatment works
Forest Hill S	TP W1		Open channel a ATTACHMENT Forest Hill STP Point	as shown in D: Figure 2 – - W1 - Release	Final outlet of the treatment works
Part 3(C) Tab	le 2 - Surfa	ice Water Re	lease Limits		
Quality Cha (units)	racteristic	Minimum	80th percentile*	Maximum	Sampling
BOD5 (mg/L)		20	40	Fortnightly
pH (pH units)	6.5		9.0	Fortnightly
Dissolved Ox (mg/L)	kygen	2.0			Fortnightly
Total Susper Solids (mg/L	nded)		30	60	Fortnightly
Total Nitrog	en (mg/L)				Fortnightly
Total Phosp (mg/L)	horous				Fortnightly
Free Chlorin	e (mg/L)			0.7	Fortnightly
Faecal Colifo (cfu/100ml)	orms			1,000	Fortnightly
* These limits apprescribed sampler Associated mon 1. Sampli	bly only when o ing frequency itoring requir ng must be in a	dry weather efflu only when dry w ements accordance with	ent releases to surfac eather effluent release the current edition of	e waters occur. Sam es to surface water a the Department's Wa	pling to occur as per re occurring. ater Quality Sampling Man
and all 2. Monito	monitoring dev ring must be u	vices must be eff ndertaken during	fectively calibrated an a release and at the	d maintained. frequency stated.	
In addition to Part 3(C) condition WT3C1, the release to waters must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other visually objectionable matter.					
The daily quantity of contaminants released must be determined or estimated by an appropriate method, for example, a flow meter.					



Agency inter	est: Noise
Condition number	Condition
N3C1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place.
Agency inter	est: Land
Condition number	Condition
L3C1	Treated sewage effluent may be removed from the site and used for an alternate purpose, with the written consent of any third party involved.
L3C2	Treated sewage effluent may be released to land within the boundaries of the site for the use of any of the following: (a) service water; or (b) watering of landscaped areas; or
	(c) research and development projects relating to biomass production.
L3C3	Treated effluent released to land within the boundaries of the site must be done in accordance with documentation that ensures:
	 (a) drainage to groundwater and subsurface flows of contaminants to surface waters are prevented; and
	(b) surface pondage and run-off of effluent is prevented; and
	(c) degradation of soil structure is minimised; and
	 (d) soil sodicity and the build-up of nutrients and heavy metals in the soil and subsoil are minimised; and
	(e) spray drift or overspray does not carry beyond effluent disposal areas; and
	 (f) effluent disposal areas are maintained with an appropriate crop in a viable state for transpiration and nutrient uptake; and
	 (g) sufficient buffer zones are maintained between irrigation sites and sensitive environmental receptors.
L3C4	When weather conditions or soil conditions preclude the release of treated sewage effluent to land, effluent must not be irrigated to land.
Agency inter	est: Waste
Condition number	Condition
W3C1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.



Offsite Nutrient Reduction Action Conditions				
Condition number	Condition			
O3C1	 The holder of this environmental authority must: 1. carry out an offsite nutrient reduction action via streambank stabilisation works within the catchment of Laidley Creek, in accordance with <i>Queensland Urban Utilities, Laidley Creek Sewage Treatment Plant Nutrient Offset Project Delivery Proposal</i>, dated 15th October 2016, included in Attachment L of this environmental authority, excluding sections 5.3.3, 5.3.4 and 6; and 2. before 1 July 2021, establish a sustainable irrigation scheme. 			
O3C2	The offsite nutrient reduction action referred to in Part 3(C) condition O3C1 must generate pollution credits for total nitrogen and total phosphorus specified in <i>Part 3(C) Table 5 - Pollution Credit Requirement.</i>			
	Pollutant Pollution Credit (Tonnes/Year)			
	Total Nitrogen	5.0		
	Total Phosphorus	10.0		
	 Associated Requirements 1. The Pollution Credits generated by the offsite nutrient reduction action referred to in Part 3(C) condition O1 commence 1 July 2021 and continue for a period of ten (10) years. 			
O3C3	For the annual reporting period, after 1 July 2021, the Net Combined Annual Mass Load released to waters under condition WT3C1 must not exceed limits for each parameter specified			



	Pollu	utant	
Net Combined Annual Mass Load (Toppes/Year)	Total Nitrogen	Total Phosphoru	
	7.5	0	
Associated Requirements			
 The Net Combined Annual Mass Log period of ten (10) years. 	ad Release Limits take effect on 1 July	2021 and continue to have effe	
 The Net Combined Annual Mass Log calculated under Associated Require 3(C) condition O3C2. 	ad of Total Nitrogen is the Combined A ement 4, less the Pollution Credit gene	nnual Mass Load of Total Nitro erated for Total Nitrogen unde	
3. The Net Combined Annual Mass Load of Total Phosphorus is the Combined Annual Mass Load of Total Phosphorus, as calculated under Associated Requirement 5, less the Pollution Credit generated for Total Phosphorus under Part 3(C) condition O3C2.			
. The Combined Annual Mass Load of Total Nitrogen is the sum of the Annual Mass Loads of Total Nitrogen , a calculated under Associated Requirement 6, released to water from Laidley and Forest Hill STPs under Part 3(i condition WT3C1.			
 The Combined Annual Mass Load of Total Phosphorous is the sum of the Annual Mass Loads of Total Phosphorus, as calculated under Associated Requirement 7, released to water from Laidley and Forest Hill ST under Part 3(C) condition WT3C1. 			
6. The Annual Mass Load of Total Nitrogen in tonnes/year for both Laidley and Forest Hill STPs must be calculate as the [(Yearly sum of Daily Release Volume (ML) for all dry weather days) x (Yearly Dry Weather Day Media Concentration (mg/L) of Total Nitrogen) divided by 1000] multiplied by [365/(number of dry weather days + number of wet weather days when Daily Release Volume < Average Daily Dry Weather Flow)].			
 The Annual Mass Load of Total Pho calculated as the [(Yearly sum of Da Median Concentration (mg/L) of Tota days+ number of wet weather days 	osphorus in tonnes/year for both Laidle aily Release Volume (ML) for all dry we al Phosphorus) divided by 1000] multi s when Daily Release Volume < Averag	y and Forest Hill STPs must be ather days) x (Yearly Dry Wea plied by [365/(number of dry w e Daily Dry Weather Flow)].	



Part 3(D): Beaudesert STP

Environmentally relevant activity	Locations
ERA Sewage treatment 63 (1)(d) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 4,000 but not more than 10,000EP	Beaudesert Sewage Treatment Plant Drumley Street, BEAUDESERT QLD 4285. Lot 4 RP111345 and Lot 7 RP904224.

Agency interest: General				
Condition number	Condition			
G3D1	The holder of this environmental authority must continue to implement the Beaudesert Offset Monitoring Program described in Attachment B, Beaudesert Sewage Treatment Plant Nutrient Offset Project Proposal Version 1 print date 13 December 2013 of this environmental authority.			
G3D2	G3D2 The offsite nutrient reduction action referred to in condition Part 3(D)G1 must pollution credits for total nitrogen specified in <i>Part 3(D)Table 1 — Pollution Credit Requirement.</i> Part 3(D)Table 1 — Pollution Credit Requirement			
	Pollutant	Pollution Credit (Tonnes/Year)	Offset expiry date	
	Total Nitrogen	5 (pro-rata for part years)	1 March 2024 (Date of practical completion of the project (1 March 2014) plus 10 years ¹)	
	¹ The maximum 10 year period will be split into two five year periods. A strategic review of the offset project ou will occur after the initial 5 year period by the project control group (PCG). The PCG will subsequently determin whether any additional offset works and/or amendments to offset conditions are needed prior to approving that can be applied for the second 5 year period (to make up to the maximum 10 year period).			
Agency inter	est: Water			
Condition number	Condition			
WT3D1	The only contaminants to be released to surface waters 'excluding bypass releases covered by water conditions Part 2(A) - WTA2 — Part 2(A) - WTA4 are from the sewage treatment plant to waters described in Part 3(D) <i>Table 2</i> — <i>Sewage Treatment Plant Sampling and Release locations</i> and in accordance with Part 3(D) <i>Table 3</i> — <i>Surface water release limits and the associated requirements (dry weather only)</i> .			



ERA Location	Release Point Name	Release Point Location	Release Sampling Frequency	Release Sampling Location	
Beaudesert Sewage Treatment Plant	W1 shown in attachment A	wn in Logan River at ent A approximately 105 kilometres		Final outlet the treatme works	
Part 3(D) Table 3 — weather only)	Surface water re	elease limits and th	ne associated	requirements (dr	
Quality Characteristics	Minimum	Median		Maximum	
BOD 5 day (mg/L)	-	-		30	
Suspended Solids (mg/L)	-	-		30	
Total Phosphorus (mg/L)	-	-	-		
pH (scale)	6.5	-		8.5	
Dissolved Oxygen (mg/L)	2	2 - - 150		-	
Faecal coliforms (cfu/100ml) Free Chlorine (mg/L as Cl ₂)	-			600	
	L -	-		0.7	
Associated requirement 1. Indicators for TN and 2. Sampling must be in	TP must be done as	24 hour composite sam	ples.	nitoring dovices must	
effectively calibrated	and maintained.	Water Quality Sampling	iviariuai ariu ali filoi	nitoning devices must i	
3. No release limits app	blicable on wet weathe	er days.			
The total quantity of stated in Part 3(D) T	contaminants rele able 4	eased via W1, must	not exceed the	e respective quant	



	Part 3(D) Ta	Part 3(D) Table 4 — Maximum quantity of release			
		Maximum perr	mitted quantity of r	elease	
	Release Point	Parameter	Maximum Annual release volume (ML) (dry weather)	Maximum release volume (ML) on any one day (other than during a bypass)	Net Mass Load release limit dry weather (tonnes/year)
	W1	Flow	162	5.450	-
	W1	Total Nitrogen	-	-	9
	W1	Total Phosphorus (as P)	-	-	3.5
	 Associated Ref. The Net A Associate condition The Annu Requirem The Annu Daily Rele Total Nitre The Net A Associate The Annu of Daily R 	equirements Annual Mass Load of ad Requirement 2, les G3D2. (al Mass Load of Tota ent 3, released to wa al Mass Load of Tota ease Volume (ML) for ogen) divided by 1000 Annual Mass Load of ad Requirement 5, rel al Mass Load of Tota celease Volume (ML) us and divide by 100	Total Nitrogen is the Anna s the Pollution Credit ger al Nitrogen is the Annual I ater from Beaudesert STF al Nitrogen in tonnes/year r all dry weather days) x (0]. Total Phosphorus is the A eased to water from Beau al Phosphorus in tonnes/y for all dry weather days >	anal Mass Load of Total Nitrogen nerated for Total Nitrogen under Mass load of Total Nitrogen as P under Part 3(D) condition WT for Beaudesert must be calcu Yearly Dry Weather Day Medi Annual Mass Load of Total Pho udesert STP under Part 3(D) c year for Beaudesert must be ca c Yearly Dry Weather Median (en, as calculated under er condition Part 3(D) calculated under Associated '3D1. lated as the [(Yearly sum of an Concentration (mg/L) of osphorus as calculated under ondition WT3D1. alculated as the [Yearly sum Concentration (mg/L) of Total
WT3D3	 The holder of this environmental authority must implement: 1. Actions to achieve 100% dry weather effluent reuse and zero (0) dry weather release into the Logan River by 31 December 2018 as discussed in the Queensland Urban Utilities Beaudesert STP Western reuse Scheme Management Plan prepared by Bligh Tanner in conjunction with Psi Delta dated 12 April 2013; or 2. Investigate additional cost effective effluent reuse measures and/or treatment technologies to further reduce the release of contaminants to waters. 				
WT3D4	The REMP include those	required by Part se shown in Attac	2(A) Conditions GA8 chment A	3 and GA9, must be con	ducted at locations that



Part 3 (E): Canungra STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Canungra Sewage Treatment Plant Finch Road, CANUNGRA QLD 4275 Lot 2 RP150199 and Lot 2 RP204982.

Agency inter	est: Water				
Condition number	Condition				
WT3E1	The only conta water condition waters describ locations and in associated req Part 3(E) Table	minants to b ns Part 2(A) bed in <i>Part 3</i> n accordanc uirements (c e 1 - Sewag	e released to surface - WTA2 — Part 2(A) - (E) Table 1 — Sewag e with Part 3(E) Table dry weather only). e Treatment Plant Sa	waters 'exclud WTA4' are fror Treatment Pla 2 —Surface w ampling and R	ing bypass releases covered by n the sewage treatment plant to ant Sampling and Release rater release limits and the elease locations
	ERA Location	Release Point Name	Release Point Location	Release Sampling Frequency	Release Sampling Location
	Canungra Sewage Treatment Plant	RP1	(-28.012594; 153.163957) Canungra Creek at approximately 23 kilometres AMTD	Fortnightly	Final outlet of the treatment works S1 - Maintenance manhole downstream of the permeate tank and upstream of the bypass interconnection point (see Attachment M: Canungra STP General (Process Flow Diagram) PF24).



Quality Characteristics	Minimum	50th %ile (long term)	50th %ile (short term)	80th %ile (long term)	80th %ile (short term)	Maxim
BOD 5 day (mg/L)	-	-	-	10	15	20
Suspended Solids (mg/L)	-	-	-	15	23	30
Dissolved Oxygen (mg/L)	2	-	-	-	-	-
Ammonia Nitrogen (mg/L as N)	-	-	-	1	2	4
Total Nitrogen (mg/L as N)	-	5	10	-	-	15
Total Phosphorus (mg/L as P)	-	1	2	-	-	3
pH (scale)	6.5	-	-	-	-	8.5
Faecal coliforms (cfu/100ml	-	-	150	-	600	-
Enterococci (cfu/100ml)	-	-	40	-	-	200
 Associated requirement Indicators for TN a Sampling must be effectively calibrat 	ents and TP must be in accordance w red and maintain	done as 24 hour with the Water Q ed	composite sam uality Sampling	ples. Manual and all i	nonitoring devic	es must b
The mass load of r RPI must not excer Part 3(E) Table 3 Phosphorus)	nutrients (Tot ed the specif — Release N	al Nitrogen ai ied limit in Pa /lass Load L i	nd Total Pho art 3(E) Table i mits for Nu	sphorus) rele 3. trients (Tota	eased from re	elease p
Contaminant	Relea	se Point	Releas	e Limit	Limit Ty	ре
Total Nitrogen (t/	yr) RP1		0.607	0.607		n
Total Phosphorus (t/yr)	s RP1		0.122		Maximur	n
The above release limit was determined based on design average dry weather flow multiplied by design long term median concentration multiplied by 110% to account for wet weather effects on annual mean daily flow. Annual Mass Load of Total Nitrogen in tonnes/year must be calculated as the Yearly sum of Daily Release Volume (I						



	Annual Mass Load of Total Phosphorus in tonnes/year must be calculated as the Yearly sum of Daily Release Volume (ML) for all dry weather days x Yearly Dry Weather Median Concentration (mg/L) of Total Phosphorus and divide by 1000.				
WT3E3	Disinfection shall occur by ultra violet radiation and or membrane technology for discharges to Canungra Creek.				
WT3E4	The total quantity of treated sewage wastes released to waters via the release point RPI defined in condition Part 3(E) WT3E1 must not exceed the quantities stated in Part 3(E) Table 4. Part 3(E) Table 4 — Permitted Quantities of Release				
	Release Point	Average Dry Weather Flow	Maximum Release on any Dry Weather Day	Maximum Release on any Day	
	RP1	0.3ML	0.48ML	1.5ML	
WT3E5	Bypass flow events must only occur for flows in excess of the hydraulic capacity of the plant which is 10.5 L/s.				
WT3E6	The bypass release must flow directly to Canungra Creek.				
Agency interest: Land					
Condition number	Condition				
L3E1	The only contaminants to Table 1 and Part 3(E) Ta	o be released to land ar able 2 of condition Part 3	e treated effluent in according (E) - WT3E1 and the as	ordance with Part 3(E) sociated requirements.	



Part 3(F): Esk STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Esk Sewage Treatment Plant Lot 1 RP156580.

Agency inter	rest: Water
Condition number	Condition
WT3F1	Only treated effluent to be released to waters The only contaminant permitted to be released from Lot 1 RP156580 to waters is treated effluent that has passed through the sewage treatment process.
WT3F2	Release point to waters The only location from which a contaminant may be released to waters from the Lot 1 RP156580 is from release point W1 located at Sandy Creek at approximately 1.5 km AMTD.
WT3F3	Maximum quantity of treated effluent released to waters The total quantity of contaminants released from release point W1 from Lot 1 RP156580 during any dry weather day must not exceed 600 cubic metres and in any day must not exceed 1500 cubic metres.
WT3F4	Sampling and In-situ Monitoring Point Details Determinations of the quality of contaminants released to waters to check conformity with the release quality characteristics specified in Part 2(C) Agency interest: Water of this environmental authority must be undertaken at the sampling and in-situ measurement point described as at the outlet of the chlorine contact tank.



Part 3(G): Fernvale STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Fernvale Sewage Treatment Plant Banks Creek Road, FERNVALE QLD 4306 Lot 4 RP814367.

Agency inte	rest: Water				
Condition number	Condition				
WT3G1	Only treated effluent to be released to waters The only contaminant permitted to be released to waters from Lot 4 RP814367 is treated effluent that has passed through the sewage treatment process.				
WT3G2	Release points to waters The only location from which a contaminant may be released to waters from Lot 4 RP814367 is release point W1 located at as the Brisbane River at approximately 131.0 km AMTD.				
WT3G3	Nutrient mass load limits for The annual load limits for Nitrog limits specified in Part 3(G) Tab Part 3(G) Table 1 — Annual N	Nitrogen and Phosphorous gen and Phosphorous release to le 1 — Annual Nitrogen and Ph itrogen and Phosphorous Lin	o waters must not exceed the osphorous Limits.		
	QUALITY CHARACTERISTIC	RELEASE LIMIT			
	Total Nitrogen	3,200 kilograms per year	Annual dry weather mass load until 30 June 2022*		
		2,137 kilograms per year	Annual dry weather mass load from 1 July 2022*		
	Total Phosphorous	340 kilograms per year	Annual dry weather mass load*		
	* where the annual dry weather mass load is calculated as the median annual concentration of parameter x Average Daily Dry Weather Flow x 365.				
WT3G4	Monitoring annual Nitrogen a The holder of this environmenta Phosphorous being released to calculations must be included w	nd Phosphorous Loads al authority must calculate the ar waters from Lot 4 RP814367, a vith the annual monitoring report	nnual mass load for Nitrogen and and the results of such		



WT3G5	Sampling and In-situ Monitoring Point Details
	Determinations of the quality of contaminants released to waters to check conformity with the release quality characteristics specified in Part 2(C) Agency interest: Water and Part 3(G) condition WT3G4 of this environmental authority must be undertaken at the sampling and in-situ measurement point described as the outlet of the chlorine contact tank.

Part 3(H): Gatton STP

Environmentally relevant activity	Locations
ERA 63 - Sewage Treatment 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of (d) more than 4000 but not more than 10,000EP	Gatton Sewage Treatment Plant Treatment Plant Road GATTON QLD 4343 Lot 3 SP235464, Lot 4 SP235464, and Lot 4 RP96384.

Agency interest: General		
Condition number	Condition	
G3H1	 Activities conducted under this environmental authority must not be conducted contrary to any of the following limitations: 1. Treated effluent must only be released to land inside the land application area identified in ATTACHMENT K Gatton Irrigation Area. 	
G3H2	All reasonable and practicable measures must be taken to prevent or minimise environmental harm caused by the activities .	
G3H3	Any breach of a condition of this environmental authority must be reported to the administering authority as soon as practicable within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions taken.	
G3H4	All information and records required by the conditions of this environmental authority must be kept for a minimum of five years with the exception of environmental monitoring results which must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request and in the format requested.	
G3H5	 You must record the following details for all environmental complaints received: 1. date and time complaint was received; and 2. name and contact details of the complainant; and 3. nature of the complaint; and 4. investigations undertaken; and 5. conclusions formed; and 	



	6. actions taken.				
G3H6	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority to investigate any alleged environmental harm arising from the activity .				
G3H7	The activity must be undertaken in accordance with written procedures that:				
	closure and an emergency; and				
	2. establish and maintain control measures that minimise the potential for environmental harm ; and				
	 ensure plant, equipment and measures are maintained in a proper and effective condition; and 				
	 ensure plant, equipment and measures are operated in a proper and effective manner; and 				
	5. ensure that staff are trained in and aware of their obligations under the <i>Environmental Protection Act 1994</i> ; and				
	6. ensure that reviews of environmental performance are undertaken at least annually.				
Agency interest: Air					
Condition number	Condition				
A3H1	Odours or airborne contaminants must not cause environmental nuisance at a sensitive place or commercial place .				
Agency inter	rest: Water				
Condition number	Condition				
WT3H1	Contaminants must not be released from the site to waters.				
WT3H2	Treated sewage effluent may be removed from the site and used for an alternate purpose, with the written consent of any third party involved.				
Agency inter	rest: Noise				
Condition number	Condition				
N3H1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place.				



Agency interest: Land					
Condition number	Condition				
L3H1	Other than as permitted within this environmental authority, contaminants must not be released to land.				
L3H2	The only contaminants allowed to be released to land are treated effluents to the designated irrigation areas at the site, depicted in ATTACHMENT K Gatton Irrigation Area .				
L3H3	When weather conditions or soil conditions preclude the release of treated sewage effluent to land, effluent must not be irrigated to land.				
L3H4	 Treated wastewater released to land must be done in accordance with documentation that ensures: 1. drainage to groundwater and subsurface flows of contaminants to surface waters are prevented; and 2. the treated wastewater must be distributed evenly within the land application area; and 3. surface pondage and run-off of wastewater is prevented; and 4. degradation of soil structure is minimised; and 5. effluent disposal areas are maintained with an appropriate crop in a viable state for transpiration and nutrient uptake; and 6. sufficient buffer zones are maintained between irrigation sites and sensitive environmental receptors; and 7. biomass removed from plants growing on irrigated land must be transported and disposed of other than the irrigated land. 				
Agency inte	rest: Waste				
Condition number	Condition				
W3H1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.				



Part 3 (I) Goodna STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(f) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 50,000 but not more than 100,000EP	Goodna Sewage Treatment Plant Lower Cross Street, GOODNA QLD 4300 Lot 1 RP887551.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval

Agency interest: Water		
Condition number	Condition	
WT3I1	Effluent must only be released from release point W2 (Part 2(B) Table 1) when the hydraulic capacity of W1 is exceeded or when effluent cannot otherwise be discharged through W1 (Part 2(B) Table 1).	

Part 3(J): Helidon STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Helidon Sewage Treatment Plant Back Flagstone Road, HELIDON QLD 4344 Lot 1 RP32742.

Agency interest: General		
Condition number	Condition	
A3J1	Contaminants must not be released to the environment other than in accordance with this environmental authority.	
A3J2	 The registered operator of this environmental authority must: (a) install and operate all works and control equipment, and take all measures, perform all acts and do all things, (b) necessary to ensure compliance with the conditions of this environmental authority. 	



A3J3	Display of Environmental Authority A copy of this environmental authority must be kept in a location readily accessible to personnel carrying out the activity.			
A3J4	A copy of this environmental authority shall be provided, on request, to any authorised person.			
A3J5	 Trained Operators All persons engaged in the conduct of the activity, including but not limited to employees and contract staff, must be: (a) trained in the procedures and practices necessary to: (i) comply with the conditions of this environmental authority, and (ii) prevent environmental harm and or environmental nuisance during normal operation and emergencies; or (b) under the close supervision of such a trained person. 			
A3J6	Inspections by Authorised Persons . At all reasonable times, and to the satisfaction of an authorised person, the following must be provided to enable an authorised person to check compliance with the conditions of this environmental authority: (i) monitoring facilities, and (ii) access to such facilities, and (iii) any reasonable assistance which the authorised person deems necessary.			
A3J7	Records Any record required to be kept by a condition of this environmental authority must be kept at the approved place and be available for examination by an authorised person.			
A3J8	Copies of any record required to be kept by a condition of this environmental authority must be . provided to any authorised person or the administering authority on request.			
A3J9	Alterations No change, replacement or operation of any plant or equipment is permitted if the change, alteration or operation of the plant or equipment increases, or is likely to substantially increase, the risk of environmental harm or environmental nuisance.			
A3J10	Calibration All instruments and measuring devices used for the measurement or monitoring of any parameter under any condition of this environmental authority must be calibrated, and appropriately operated and maintained. The calibration, operation and maintenance of such instruments and measurement devices in accordance with a protocol, which has been approved in writing by the administering authority, is deemed to demonstrate compliance with this condition.			
A3J11	Site-Based Management Plan By twelve months after completion of process testing the registered operator of this environmental authority must submit an Environmental Management and Operating Procedure (EMOP) which is acceptable to the administering authority.			
A3J12	The EMOP must contain detailed proposals for the management of environmental impacts resulting from the carrying out of the activities under this environmental authority including:			



	 (a) Operating procedures to prevent or minimise environmental harm and environmental nuisance, however occasioned or caused; and (b) Maintenance practices and procedures; and (c) Continency plans to deal with foreseeable risks and hazards including corrective responses to prevent and mitigate environmental harm (including site rehabilitation); and (d) Emergency procedures; and (e) Communication of procedures, plans, incidents, potential environmental problems and results; and (f) Handling of environmental complaints; and (g) Keeping and production of environmental records and reports; and (h) Monitoring of the release of contaminants into the environment including procedures, methods, record keeping änd notification of results; and (i) Assessment of the environmental impact of any releases of contaminants into the environment; and (j) Staff training and awareness of environmental issues related to the operation of the operation of the environmental issues related to the operation of the environmental problems and results; and
A3J13	The EMOP must be implemented by the registered operator of this environmental authority following its approval in writing by the administering authority.
A3J14	The registered operator of this environmental authority must submit details of any amendment to the approved EMOP to the administering authority with the Annual Return which immediately follows the enactment of any such amendment.
Agency inter	est: Air
Condition number	Condition
Condition number B3J1	Condition Release of Contaminants to the Atmosphere Except as otherwise provided by the conditions of Part 3(J) Agency interest: Air of this environmental authority the environmentally relevant activity must be carried out by such practicable means necessary to prevent or minimise the release or likelihood of release of contaminants to the atmosphere.
Condition number B3J1 B3J2	Condition Release of Contaminants to the Atmosphere Except as otherwise provided by the conditions of Part 3(J) Agency interest: Air of this environmental authority the environmentally relevant activity must be carried out by such practicable means necessary to prevent or minimise the release or likelihood of release of contaminants to the atmosphere. Noxious or Offensive Odour Notwithstanding any other condition of this environmental authority, no release of contaminants from the approved place is to cause a noxious or offensive odour beyond the boundaries of the approved place.
Condition number B3J1 B3J2 B3J3	Condition Release of Contaminants to the Atmosphere Except as otherwise provided by the conditions of Part 3(J) Agency interest: Air of this environmental authority the environmentally relevant activity must be carried out by such practicable means necessary to prevent or minimise the release or likelihood of release of contaminants to the atmosphere. Noxious or Offensive Odour Notwithstanding any other condition of this environmental authority, no release of contaminants from the approved place is to cause a noxious or offensive odour beyond the boundaries of the approved place. Nuisance No release of contaminants, including but not limited to odour, dust, smoke, fume, particulate and aerosols is to cause or be likely to cause an environmental nuisance beyond the boundaries of the approved place.
Condition number B3J1 B3J2 B3J3 B3J3	Condition Release of Contaminants to the Atmosphere Except as otherwise provided by the conditions of Part 3(J) Agency interest: Air of this environmental authority the environmentally relevant activity must be carried out by such practicable means necessary to prevent or minimise the release or likelihood of release of contaminants to the atmosphere. Noxious or Offensive Odour Notwithstanding any other condition of this environmental authority, no release of contaminants from the approved place is to cause a noxious or offensive odour beyond the boundaries of the approved place. Nuisance No release of contaminants, including but not limited to odour, dust, smoke, fume, particulate and aerosols is to cause or be likely to cause an environmental nuisance beyond the boundaries of the approved place. est: Water
Condition number B3J1 B3J2 B3J2 B3J3 Agency inter Condition number	Condition Release of Contaminants to the Atmosphere Except as otherwise provided by the conditions of Part 3(J) Agency interest: Air of this environmental authority the environmentally relevant activity must be carried out by such practicable means necessary to prevent or minimise the release or likelihood of release of contaminants to the atmosphere. Noxious or Offensive Odour Notwithstanding any other condition of this environmental authority, no release of contaminants from the approved place is to cause a noxious or offensive odour beyond the boundaries of the approved place. Nuisance No release of contaminants, including but not limited to odour, dust, smoke, fume, particulate and aerosols is to cause or be likely to cause an environmental nuisance beyond the boundaries of the approved place. est: Water Condition



	-				
	Except as otherwise provided by the conditions of Part 3(J) Agency interest: Water of this environmental authority the environmentally relevant activity must be carried out by such practicable means necessary to prevent or minimise the release or likelihood of release of contaminants to waters.				
C3J2	Contaminants must not be directly or indirectly released from the approved place to any waters or the bed and banks of any waters except as permitted under the water schedule or the stormwater management schedule.				
C3J3	Contaminants must not be directly or indirectly released from any source on the approved place to any waters at any location other than at the locations listed below:				
	Release Point W1 Sewage Treatment Plan of in waters described as "the farm dam".		nent Plan outfall pipe located ribed as "the adjacent 120 ML		
	Emergency Overflow from Sec Lagoon	ondary	See document	t No.13, in the table in T E .	
	Other Release Points		Sewage pump for in this envir	station overflows as provided onmental authority.	
C3J4	Description of Release The only contaminants permitted to be released from the approved place at the Release Point W1 are secondary treated sewage effluents.				
C3J5	Sampling Point Details The determinations of the quality of contaminants released to check conformity with Part 3(J) condition number C3J7 shall be undertaken prior to the outfall.				
C3J6	Quantity of Contaminants Released The total quantity of contaminants released from Release Point Number W1 must not exceed an annually calculated average of 161 kL/d. during dry weather days and in any day must not exceed 1 ,607 kL/d.				
C3J7	Quality Characteristics of Release to Waters The release of contaminants to waters must comply with each of the limits specified in Part 3(J) Table 1 for each quality characteristic. Part 3(J) TABLE 1 - RELEASE QUALITY CHARACTERISTIC LIMITS				
	QUALITY CHARACTERISTICS	RELEAS		LIMIT TYPE	
	5-day Biochemical Oxygen Demand	20 mg/L		80 th percentile	
	5-day Biochemical Oxygen Demand	60 mg/L		maximum	
	Suspended Solids	60 mg/L		80 th percentile	
	Suspended Solids	180 mg/L		maximum	
	pH Not less than 6.5 greater range				



 Notwithstanding the quality characteristic limits specified in Part 3(J) Table- 1, the release of contaminants to waters must comply with the following qualitative characteristics: (a) The release must not have any properties nor contain any organisms or other contaminants which, in the opinion of the administering authority, are capable of causing environmental harm or an environmental nuisance. (b) The release must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other objectionable matter. 			
e listed below			
tions			
No. 12, in the nent E			
Pump stations whose failure will result in a direct or indirect release of contaminants to waters must be fitted with stand-by pumps and pump-failure alarms. Pump failure alarms must be able to operate without mains power if such power failure occurs.			
e following for d with the			
esponse procedures to stop (whenever possible), control or reduce the overflow;			
s; and tion of the resources used in response to an overflow event; and			



	 (d) the training of staff that will be called upon to respond to an overflow; and (e) the availability of documented response procedures to staff attending an overflow event; and 	
	 (f) incident reporting to the administering authority; and (g) procedures to investigate the cause, and implement changes where necessary, to reduce the likelihood of a similar event recurring during dry and wet weather; and (h) catchment population serviced by the pump station to which the overflow is connected; and (i) the daily dry weather flow of the pump station; and (j) the need for screening to prevent the release of gross solids. 	
C3J12	The Emergency Response/Contingency Plan referred to in Part 3(J) condition number C3J11 shall be furnished to the administering authority within twelve (12) months of the date of issue of this environmental authority and shall be to the satisfaction of the administering authority.	
C3J13	No release of contaminants from any pump station shall occur except as a result of power failure, excessive rainfall, accidental damage or other emergency.	
C3J14	An updated list of connected pump stations shall be forwarded to the administering authority at the annual renewal date of this environmental authority.	
Agency inter	est: Stormwater Management	
Condition number	Condition	
D3J1	Contaminant Releases Caused by Rainfall Except as otherwise provided by the conditions of the stormwater management schedule and the water schedule of this environmental authority, the environmentally relevant activities must	
	be carried out by such practicable means necessary to prevent or minimise the contact of incident rainfall and stormwater runoff with wastes or other contaminants, and prevent or minimise the release or likelihood of release of any such contaminated runoff from the approved place.	
D3J2	be carried out by such practicable means necessary to prevent or minimise the contact of incident rainfall and stormwater runoff with wastes or other contaminants, and prevent or minimise the release or likelihood of release of any such contaminated runoff from the approved place. Stormwater Management Plan Part A - During Construction Within three months after acceptance of the tender for the construction of works at the approved place the registered operator of this environmental authority must prepare and submit a Stormwater Management Plan associated with the construction works which is acceptable to the administering authority.	
D3J2 D3J3	 be carried out by such practicable means necessary to prevent or minimise the contact of incident rainfall and stormwater runoff with wastes or other contaminants, and prevent or minimise the release or likelihood of release of any such contaminated runoff from the approved place. Stormwater Management Plan Part A - During Construction Within three months after acceptance of the tender for the construction of works at the approved place the registered operator of this environmental authority must prepare and submit a Stormwater Management Plan associated with the construction works which is acceptable to the administering authority. The Stormwater Management Plan referred to in Part 3(J) condition number D3J2 must provide detail on the works to be implemented and the timetable proposed to address at least the following issues: (a) minimisation of the amount of soil to be exposed or disturbed by staging works, and (b) revegetation of exposed or disturbed areas, and (c) installation of sediment control measures such as settling basins, and (d) diversion of upstream runoff from exposed or disturbed areas. 	



	this environmental authority must prepare and submit a Stormwater Management Plan associated with the operation of the approved place which is acceptable to the administering authority.
D3J5	 The Stormwater Management Plan referred to in Part 3(J) condition number D3J4 must provide detail on the works to be implemented and the timetable proposed to address at least the following issues: (a) prevention of incident stormwater and stormwater runoff from contacting wastes or contaminants, and (b) diversion of upstream runoff away from areas containing wastes or contaminants, and (c) minimisation of the size of contaminated areas, and (d) cleaning of contaminated areas without the use of water, and (e) installation of silt and rubbish traps, and (f) stormwater diversion systems, and (g) paving and roofing of contaminated areas.
D3J6	The Stormwater Management Plan must be implemented by the registered operator of this environmental authority following its approval in writing by the administering authority.
D3J7	The registered operator of this environmental authority must submit details of any amendment to the approved Stormwater Management Plan to the administering authority with the Annual Return which immediately follows the enactment of any such amendment.
D3J8	The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.
D3J9	Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must not be cleaned up by hosing, sweeping or otherwise releasing such wastes, contaminants or material to any stormwater drainage system, roadside gutter or waters.
Agency inter	rest: Noise
Condition number	Condition
E3J1	Except as otherwise provided by the conditions of the noise schedule of this environmental authority the environmentally relevant activities and the associated ancillary facilities must be carried out by such practicable means necessary to prevent or minimise the emission or likelihood of emission of noise.
E3J2	The emission of noise from the approved place must not result in levels greater than those specified in Part 3(J) Table 1 of Agency interest: Noise.



	Part 3(J) Agency interest: Noise TABLE 1		
	NOISE LIMITS AT A NOISE SENSITIVE PLACE		
	Period	Noise Level at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level L _{Amax, adj, T}	
	7 am - 6 pm	Background noise level plus 5 dB(A)	
	6 pm - 10 pm	Background noise level plus 5 dB(A)	
	10 pm - 7 am	Background noise level plus 3 dB(A)	
	NOISE LIMITS AT A COMMERCIAL PLACE		
	Period	Noise Level at a Commercial Place Measured as the Adjusted Maximum Sound Pressure Level $L_{\text{Amax, adj, T}}$	
	7 am - 6 pm	Background noise level plus 10 dB(A)	
	6 pm - 10 pm	Background noise level plus 10 dB(A)	
	10 pm - 7 am	Background noise level plus 8 dB(A)	
Agency inter	est: Waste Management		
Condition number	Condition		
F3J1	Waste must not be released to the environment, stored, transferred or disposed of contrary to any condition of this environmental authority.		
F3J2	Waste shall not be burnt, apart from off-gases from anaerobic digestors, or allowed to burn on the approved place or removed and burnt elsewhere unless specifically permitted by a environmental authority		
F3J3	Records of trade waste agreements must be made available for inspection on request.		
F3J4	Waste Management Plan (WMP) Upon completion of process testing the registered operator of this environmental authority must prepare and submit a Waste Management Plan which is acceptable to the administering authority.		
F3J5	The Waste Management Plan must be implemented by the registered operator of this environmental authority following its approval in writing.		
F3J6	The registered operator of this environmental authority must submit details of any amendment to the approved Waste Management Plan to the administering authority with the Annual Return which immediately follows the enactment of any such amendment.		
F3J7	Off Site Movement Regulated waste must not be sent for disposal at any facility without the written approval of the person operating that facility.		
F3J8	Records Records must be maintained for a period of five (5) years for all wastes mentioned in this		



	schedule	
F3J9	Notification of Improper Disposal of Regulated Waste If the registered operator of this environmental authority becomes aware that a person has removed waste from the approved place and disposed of the waste in a manner which is not authorised by this environmental authority or improper or unlawful, then the registered operator of this environmental authority must, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.	
F3J10	All regulated waste generated by the storage, treatment or reprocessing operations must only be treated or reprocessed at a facility approved by the administering authority to accept such waste.	
F3J11	Regulated waste must not be received from any person who requires a environmental authority but is not approved to transport such waste under the provisions of the <i>Environmental Protection</i> (Interim) Regulation 1995.	
F3J12	Record keeping: The registered operator of this environmental authority must keep and maintain permanent records for every load of waste transported off the premises, and must include the following information: (a) date of transport; and (b) description of waste; and (c) cross reference to relevant waste transport documentation; and (d) quantity of waste; and (e) destination of the waste; and (f) results of analysis (where applicable); and (g) method of waste treatment, reprocessing or disposal to be used (where applicable).	
F3J13	Records made in accordance with Part 3(J) condition number F3J12 must be kept for a period of five (5) years and must be made available to any authorised person of an administering authority on request.	
F3J14	Loading and unloading areas: All loading/unloading of regulated wastes must only take place in bunded areas or in specified areas.	
F3J15	The registered operator of this environmental authority must ensure that a facility or equipment is available for the containment and recovery of any spillages at the loading point.	
Agency interest: Self-Monitoring and Reporting		
Condition number	Condition	
G3J1	 All complaints received by the registered operator of this environmental authority relating to operations at the approved place must be recorded in a log book with the following details: (a) time and date of complaint; and (b) type of communication (telephone, letter, personal etc.); and (c) name, contact address and contact telephone number of complainant (Note: if the complainant does not wish to be identified then "Not identified" is to be recorded); and 	



	 (d) response and investigation undertaken as a result of the complaint; and (e) name of person responsible for investigating complaint; and (f) action taken as a result of the complaint investigation and signature of responsible person. 	
G3J2	The complaints record required by Part 3(J) condition number G3J1 must be maintained for a period of not less than five (5) years.	
G3J3	 Incident Recording A record must be maintained of events including but not limited to: (a) the time, date and duration of equipment malfunctions; and (b) any shut-downs of pollution control equipment associated with the pump stations and the sewage treatment plant; and (c) the hours of operation of the pump stations and plant. 	
G3J4	The record required by Part 3(J) condition number G3J3 must be maintained for a period of not less than five (5) years.	
G3J5	Details concerning any bypass of plant effluent shall be monitored and recorded in terms of event date, duration, cause of bypass, and actions taken in reporting and averting the bypass.	
G3J6	Notification of Emergencies and Incidents As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority, the registered operator of this environmental authority must notify the administering authority of the release by telephone or facsimile.	
G3J7	 The notification of emergencies or incidents as requited by Part 3(J) condition number G6 must include but not be limited to the following: (a) the registered operator of the environmental authority; and (b) the location of the emergency or incident; and (c) the number of the environmental authority; and (d) the name and telephone number of the designated contact person; the time of the release; and (e) the time the registered operator of the environmental authority became aware of the release; and (f) the suspected cause of the release; and (g) the environmental harm and or environmental nuisance caused, threatened, or suspected to be caused by the release; and (h) actions taken to prevent further any release and mitigate any environmental harm and or environmental nuisance caused by the release. 	
G3J8	 Monitoring of Contaminant Releases to Waters Not more than fourteen (14) days following the initial notification of an emergency or incident, the registered operator of the environmental authority must provide written advice of the information supplied in accordance with Part 3(J) condition number G3J7 in addition to: (a) proposed actions to prevent a recurrence of the emergency or incident; (b) outcomes of actions taken at the time to prevent or minimise environmental harm and or environmental nuisance; and (c) the results of any environmental monitoring performed. 	



G3J9	The registered operator of this environmental authority is responsible for the making of determinations of the quality of the contaminants released for the release points, quality characteristics, and at the frequency specified in Part 3(J) Agency interest: Self-Monitoring and Reporting Table 1:		
	Part 3(J) Agency interest: Self-Monitoring and Reporting - Table 1		
	Quality Characteristic Frequency		
	5-day Biochemical Oxygen Demand in mg/L	Monthly	
	Suspended Solids in mg/L	Monthly	
	рН	Monthly	
	Dissolved Oxygen mg/L	Monthly	
	Faecal Coliform in organisms/100mL	Monthly	
G3J10	All determinations of the quality of contaminants accordance with methods prescribed in the <i>Dep Quality Sampling Manual, 2nd Edition, February</i> to that document as such become available.	released to waters must be made in artment of Environment and Heritage Water 1995, or more recent additions or supplements	
G3J11	All determinations of the quality of contaminants body acceptable to the administering authority.	released must be performed by a person or	
G3J12	Records must be kept of the results of all determinations of the quality of contaminants released to waters for a period of at least five (5) years.		
G3J13	Monitoring of Volume of Release The daily quantity of contaminants released must be determined by a method acceptable to the administering authority.		
G3J14	Records must be kept of the results of all determinations of the daily quantity of contaminants released to waters for a period of at least five (5) years.		
G3J15	All instruments measuring and recording sewage waste flows must be accessible and capable of being read without opening the instrument cabinet.		
G3J16	The recordings of sewage waste flow must be marked to show the true calendar date and time of day.		
G3J17	Noise Monitoring Monitoring must be undertaken to investigate any complaint of noise nuisance upon receipt of a request from the administering authority to carry out such monitoring.		
G3J18	The method of measurement and reporting of noise levels must comply with the <i>Department of Environment and Heritage Noise Measurement Manual, second edition, March 1995</i> , or more recent additions or supplements to that document as become available.		
G3J19	The method of measurement and reporting of noise levels must be undertaken by a person or body acceptable to the administering authority.		
G3J20	Records must be kept of the results of all monitoring of noise levels and other information		



	required to be recorded in conjunction with such monitoring for a period of at least five (5) years.
G3J21	Exception Reporting The registered operator of this environmental authority must notify the administering authority in writing of any monitoring result which indicates an exceedance of any environmental authority limit within twenty-eight (28) days of completion of analysis.
G3J22	 The written notification required by Part 3(J) condition number G3J21 above must include: (a) The full analysis results; and (b) Details of investigation and corrective actions taken; and (c) Any subsequent analysis.
G3J23	 Monitoring Reporting Any data compiled, collected or recorded in compliance with Part 3(J) condition numbers G3J9 and G3J13 shall be supplied to the administering authority on a six (6) monthly basis. These reports shall cover the following periods during the year: (a) 1 January to 30 June; and (b) 1 July to 31 December. Each six (6) monthly Monitoring Report shall be presented as per Part 3(J) condition numbers G3J24, G3J25 and G3J26 and two (2) printed copies shall be delivered to the administering authority within four (4) weeks of the close of each six (6) monthly period.
G3J24	 Discharge quantity pertaining to the six-monthly period, compiled, collected or recorded in accordance with Part 3(J) condition number G3J13 (Discharge Quantity) shall be presented, including appropriate precipitation data from the sewer catchment: 1) in a tabular format, showing date of recording and raw data. The table shall be referred to as Table 1; and 2) Graphically showing raw data vs time
G3J25	 Discharge quality pertaining to the six monthly period, compiled, collected or recorded in accordance with Part 3(J) condition numbers C3J7 and G3J9 (Discharge Quality) shall be presented: in a tabular format, showing the date and day of fortnightly sampling; raw data; and calculated values for median faecal coliform levels. This table shall be referred to as Table 2; Graphically showing data referred to in Part 3(J) condition number G3J25, vs time in a tabular format, showing calculated 80th percentile values for biochemical oxygen demand and the number of exceedances for levels of biochemical oxygen demand specified in Part 3(J) condition number C3J7, using data collected for the respective period. Also required are the maximum and minimum results based upon data contained in Tables 1, and 2, including limits as specified in Part 3(J) condition number C3J7.This table shall be referred to as Table 3.
G3J26	Data pertaining to the six (6) monthly period, compiled, collected or recorded in accordance with Part 3(J) condition number G5 (bypass of plant effluent) for the six (6) monthly period, shall be presented in a tabular format showing: (a) date of commencement of bypass; and (b) duration of bypass (hours); cause of bypass; and (c) total bypass duration for the period (hours); and (d) actions taken in reporting and averting the bypass.



This table shall be referred to as Table 4.	
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Part 3(K): Kilcoy STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Kilcoy Sewage Treatment Plant William Street, KILCOY QLD 4515. Lot 3 RP118370.

Agency interest: Water		
Condition number	Condition	
К3К1	 Only treated effluent to be released to waters The only contaminants permitted to be released to waters from Lot 3 RP118370 are: (a) treated effluent that has passed through the sewage treatment process; and (b) sewage that has bypassed the sewage treatment process during period where hydraulic flow exceeds three times average dry weather flow (ADWF) if the sewage has been treated by fine screening prior to release. 	
K3K2	Release points to waters The only location from which a contaminant may be released to waters from Lot 3 RP118370 is through release point W1 to waters described as Sheep Station Creek located at approximately 13 km AMTD.	
КЗКЗ	Maximum Quantity of Contaminants Released The total quantity of contaminants released from release point W1 from Lot 3 RP118370 during any dry weather day must not exceed 600 cubic metres.	
КЗК4	Bypass Events The holder of this environmental authority must take all reasonable and practicable measures to minimise the occurrence of by-pass events.	
КЗК5	Sampling and In-situ Monitoring Point for Releases to Water Determinations of the quality of contaminants released to water to check conformity with the release quality characteristics specified in Part 2(C) Agency interest: Water of this environmental authority must be undertaken at the sampling and in-situ measurement point described as the outlet prior to discharge into Sheep Station Creek.	
K3K6	Sampling and In-situ Monitoring Points Details for Releases to Land	



	Determinations of the quality of contaminants released to land to check conformity with the release quality characteristics specified in condition Part 2(C) C3 of this environmental authority must be undertaken at the sampling an in-situ monitoring point described as from the effluent detention channel, prior to irrigation.
КЗК7	Notwithstanding any other conditions of this environmental authority, the holder of this environmental authority must undertake all reasonable measures to ensure that as large a proportion as is practicable of the treated sewage effluent is reused for worthwhile purposes instead of being released to waters, for example, for irrigation purposes.

Part 3(L): Kooralbyn STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Kooralbyn Sewage Treatment Plant 8-22 Etruscan Road, KOORALBYN QLD 4285. Lot 371 SP238312 and Lot 173 SP238312.

Agency interest: Water		
Condition number	Condition	
WT3L1	All ponds used for the storage or treatment of contaminants, sewage or wastes at or on the authorised place must be constructed, installed and maintained:	
	 (a) so as to minimise the likelihood of any release of effluent through the bed and banks of the pond to waters (including groundwater); and 	
	 (b) so that a freeboard of not less than 0.5 metres is maintained at all times except in emergencies; and 	
	(c) so as to ensure the stability of the ponds construction.	
WT3L2	The holder of this environmental authority must implement an effective and appropriate plan for the management of Blue-Green Algae in the effluent treatment and storage lagoon, which details how the holder of this environmental authority will manage the actual and potential environmental impacts resulting from any occurrence of blue-green algae outbreaks.	



Part 3 (M): Lowood STP

Environmentally relevant activity	Locations
ERA 63 Sewage Treatment 1(b) more than 100 but not more than 1,500EP— (ii) otherwise.	Lowood Sewage Treatment Plant Forest Hill - Fernvale Road LOWOOD QLD 4311. Lot 1 RP138867.

Agency interest: Water		
Condition number	Condition	
L3M1	Only treated effluent to be released to waters The only contaminant permitted to be released to waters from Lot 3 on RP138867 is treated effluent that has passed through the sewage treatment process.	
L3M2	Release points to waters The only location from which a contaminant may be released to waters from Lot 3 on RP138867 is through release point W1 to waters described as the Brisbane River at approximately 140.8 km AMTD.	
L3M3	Maximum Quantity of Contaminants Released The total quantity of contaminants released from release point W1 from Lot 3 on RP138867 during any dry weather day must not exceed 600 cubic metres and in any day must not exceed 1500 cubic metres.	
L3M4	Sampling and In-situ Monitoring Point for Releases to Water Determinations of the quality of contaminants released to waters to check conformity with the release quality characteristics specified in Part 2(C) Agency interest: Water of this environmental authority must be undertaken at the sampling and in-situ measurement point described as at the outlet of the chlorine contact tank.	


Part 3 (N): Oxley Creek STP

Environmentally relevant activity	Locations			
ERA 63 Sewage treatment (1)(g) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100,000EP	Oxley Sewage Treatment Plant (EP Limit – 975,000) 240 Donaldson Rd, ROCKLEA QLD 4106 Lot 818 Plan SL5746, Lot 957 Plan SL7763, Lot 1207 Plan M3117, Lot 1 Plan RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 RP37416, Lot 2 RP99640, Lot 100 SP1622583.			
ERA 61 Thermal waste reprocessing and treatment (1)(a) thermally reprocessing or treating, in a year, the following quantity of general waste — 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.			
ERA 61 Thermal waste reprocessing and treatment (2)(a) thermally reprocessing or treating, in a year, the following quantity of category 2 regulated waste— 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.			
ERA 61 Thermal waste reprocessing and treatment (3)(a) thermally reprocessing or treating, in a year, the following quantity of category 1 regulated waste— (a) 5,000t or less	Oxley Sewage Treatment Plant 240 Donaldson Rd, ROCKLEA QLD 4106. Lot 818 SL5746, Lot 957 SL7763, Lot 1207 M3117, Lot 1 RP99640, Lot 83 SP220962, Lot 82 SP220962, Lot 2 on Plan RP37416, Lot 2 RP99640, Lot 100 SP1622583.			

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval

Agency interest: Water				
Condition number	Condition			
WT3N1	Effluent must only be released from release point W2 (Part 2(B) Table 1) when the hydraulic capacity of W1 is exceeded or when effluent cannot otherwise be discharged through W1 (Part 2(B) Table 1).			



Agency inte	est: General
Condition number	ondition
G3N1	The Demonstration Pyrolysis Plant (DPP) trial must be conducted in accordance with the
	a) I he trial can run for a maximum period of 24 months from the commencement date of the trial;
	 b) Within 10 business days of the commencement of the trial, the holder of this environmental authority must notify the administering authority in writing that the trial has commenced; and
	c) A post-trial report must be submitted to the administering authority within 60 days of completion of the trial.
G3N2	Operation of the activity must cease if:
	a) the retort temperature drops below 400°C; or
	b) the afterburner temperature drops below 1100 °C; or
	c) the afterburner residence time is less than 2 seconds.
G3N3	A DPP post-trial report required by condition G3N1 must include at least the following:
	 A description of the trial process, including gasifier unit operating conditions during the trial;
	b) A description of the type and total quantity of wastes processed during the trial;
	c) A description of waste feed rate;
	 A description of test methods and the Quality Assurance and Quality Control procedures adopted during the monitoring program required by condition A3N4;
	 A summary of all results collected during the trial as part of the air emissions monitoring program required by condition A3N4. Contaminant concentrations must be presented at standard temperature and pressure and each contaminant result must include the relevant mass emission rate, exit velocity, volume flow rate and temperature at exit;
	 An interpretation of the results collected under condition A3N4 including a comparison with relevant trigger limits described in condition A3N4; and
	g) An assessment of the results of collected under condition A3N4 against the air emission limits described in the European Union's Directive (2010/75/EC) on industrial emissions.
G3N4	The post-trial report required by condition G3N1 must be completed by an appropriately qualifie d person.



Agency inte	erest: Waste
Condition number	Condition
W3N1	The activity must only accept the following wastes: a) tyres; b) green waste; c) municipal solid waste; d) sewage wastes; e) plastic polymer waste; and f) food and organic waste.
W3N2	No more than 20m ³ of waste is permitted be held on site in relation to the DPP trial activity at any time.
W3N3	All waste must be stored within a secondary containment system.
W3N4	Incompatible wastes must not be mixed in the same container or waste storage area.
Agency inte	erest: Air
Condition number	Condition
A3N1	RP1 and RP2 must be monitored independently (using isokinetic sampling) as required by condition A3N4 (Table 1).
A3N2	 Monitoring of the following must be undertaken at RP1 and RP2 as required by condition A3N4 (Table 1), when the DPP is operating: a) afterburner temperature and residence time; b) gasifier temperature; and c) stack flue gas concentration of oxygen, NO₂, SO₂ and CO.
A3N3	Monitoring must be conducted in accordance with the notes and associated requirements prescribed incondition A3N4.
A3N4	Contaminants must only be released to air from the point sources listed in <i>Table 1 – Point source air trigger limits</i> and in accordance with the notes and associated requirements.



Table 1 – Point source air trigger limits								
Release point	Minimum release height above ground (metres)	Minimum velocity (m/sec)	Contaminant released	Trigger limit (see Note 1)	Monitoring frequency			
Release point (RP) 1 - Stack serving LPG combustion gasses	8	15	Carbon Monoxide (CO) Oxides of Nitrogen (as	150 mg/ Nm ³ at 3% O ₂ 350 mg/ Nm ³ at 3% O ₂	Annually			
generated rom operating of the pyrolysis blant.			NO ₂)					
Release point (RP) 2 - Stack	8	15	Total Solid Particles	30 mg/ Nm ³	Continuous monitoring of			
process gasses			Carbon Monoxide	100 mg/ Nm ³	NO ₂ , SO ₂ and CO during every			
generated from pyrolysis in the retort.			Oxides of Nitrogen	400 mg/ Nm ³	feedstock trial.			
			(as NO ₂) Sulphur Dioxide (SO ₂)	200 mg/ Nm ³	One continuous			
			Hydrogen Chloride (HCl)	60 mg/ Nm ³	air sample per feedstock trial (see Note 1).			
			Hydrogen Fluoride (HF)	4 mg/ Nm ³				
			Total Volatile Organic Compounds (as n-propane equivalent)	20 mg/ Nm³				
			Cadmium and its compounds (as Cd)	0.05 mg/ Nm ³				
			Mercury and its compounds (as Hg)	0.05 mg/ Nm ³				
			Total Heavy Metals	0.5 mg/Nm ³ (sampling				
			.	period of 2 hours)				
			Dioxins and furans (I-TEQ for PCDDs and	0.1 mg/Nm ³ (sampling period of 4				



PCDFs, hours) including half LOD)
Polycyclic No limit
Aromatic nominated
Hydrocarbons
(PAH) (see
Note 2)
PFASNo limitextended suitenominatedcontaining 28(samplingcompoundsperiod 3 - 4(see Note 3)bours)

Note 1: All concentrations limits for the stack serving the treated process gases (100% compliance) refer to an 11% O_2 reference level, and must be averaged over the sample period of at least 30 minutes except for dioxins and furans, heavy metals, and PFAS, that refer to a specific sampling period.

Note 2: The Polycyclic Aromatic Hydrocarbons (PAH) limit refers to the total of the 16 priority pollutants listed by the United States EPA, namely, Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(α)anthracene, Chrysene, Benzo(β)fluoranthene, Benzo(k)fluoranthene, Benzo(α)pyrene, Indeno[123cd]pyrene, Dibenz[ah]anthracene and Benzo[ghi]perylene, expressed as Benzo(α)pyrene equivalents, using the potency equivalence factors specified by the World Health Organisation.

Note 3: PFAS must be quantified by applying the Total Oxidisable Precursor Analysis (TOPA), to provide analysis of PFAS extended suite of 28 compounds. In order to determine PFAS concentrations, you must analyse the PFAS extended suite containing 28 compounds from at least the following sources:

- a) Sewage sludge used in the trial, and
- b) Stack emissions during the selected trial where PFAS emissions are expected to be maximum.

Associated requirements

- 1) The release of contaminants from a point source must be directed vertically upwards without any impedance or hindrance;
- 2) Monitoring must be undertaken during a release and at the authorised release points, frequency and for the contaminants specified in the above table;
- 3) Monitoring must be undertaken when emissions are expected to be representative of actual operating conditions for the sample period;
- 4) All monitoring devices must be effectively calibrated and maintained in accordance with the manufacturer's instructions and Australian and international standards;
- 5) Air Monitoring must be in accordance with the current edition of the administering authority's Air Quality Sampling Manual and must also comply with the Australian Standard AS 4323.1 - 1995 "Stationary source emissions Method 1: Selection of sampling



	positions". If monitoring requirements are not described in the department's Air Quality Sampling Manual, monitoring protocols must be in accordance with a method as approved by New South Wales EPA, Victorian EPA or United States EPA;
	 All air emission stack monitoring must be conducted by an experienced person or body which holds current National Association of Testing Authorities (NATA); and
	7) During every sampling period the following additional information must be gathered:
	i) gas velocity and volume flow rate;
	ii) temperature and oxygen content;
	iii) water vapour concentration; and
	iv) DPP throughput rate at the time of sampling.
A3N5	If the trigger limits identified in the monitoring program required by condition A3N4 are exceeded the operator of the activity must:
	 a) notify the administering authority of the exceedance within 24 hours of becoming aware of the exceedance; and
	 b) within 24 hours of becoming aware of the exceedance, or within another timeframe as agreed to in writing by the administering authority, implement actions to:
	i. mitigate or manage any environmental harm caused, or likely to be caused, by the exceedance; and
	ii. reduce the concentration of the quality characteristic subject to the exceedance to a concentration in emissions that is at or below the trigger limit.
A3N6	Only liquified petroleum gas (LPG) is permitted to be used as a fuel for to operate the
	Demonstration Pyrolysis Plant (DPP).



Part 3(O): Rosewood STP

Environmentally relevant activity	Locations			
ERA 63 Sewage treatment (1)(c) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 1,500 but not more than 4,000EP	Rosewood Sewage Treatment Plant 55-69 Rosewood-Warrill View Road ROSEWOOD QLD 4340. Lot 1 RP129830.			

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval

Agency inter	est: General
Condition number	Condition
G3O1	 Activities conducted under this environmental authority must not be conducted contrary to any of the following limitations: (a) Inflows must not exceed the peak design capacity of three times the Design Average Dry Weather Flow (DADWF) of 800kL on any dry weather day; and (b) Inflows up to and including three times the DADWF must receive the standard treatment processes of the plant; and (c) Inflows greater than three times DADWF may bypass the standard treatment processes of the plant.
G3O2	All reasonable and practicable measures must be taken to prevent the likelihood of environmental harm being caused.
G3O3	Any breach of a condition of this environmental authority, with the exception of breaches described in Part 3(O) condition G3O4 must be reported to the administering authority as soon as practicable, or at most, within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions undertaken.
G3O4	The holder of this environmental authority must notify the administering authority in writing of any monitoring result that indicates an exceedance of or non-compliance with any approval limit within 28 days of completion of analysis.
G3O5	All information and records required by the conditions of this environmental authority must be kept for a minimum of five years with the exception of environmental monitoring results which must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request and in the format requested.
G3O6	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
G307	A receiving environment monitoring program (REMP) must be designed and implemented by appropriately qualified persons to monitor the effects of the activity on the aquatic values on



	waters.							
G3O8	The receiving environment monitoring program required by Part 3(O) condition G3O7, must include at least the following: (a) description of potentially affected receiving waters including key communities and							
	 background water quality characteristics based on accurate and reliable monitoring that takes into consideration any temporal variation (e.g. seasonality); and (b) description of applicable environmental values and water quality objectives to be achieved: and 							
	 (c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the receiving environment monitoring program is proposed; and (d) water guality targets within the receiving environment to be achieved, and clarification of 							
	contaminant concentrations or levels indicating adverse environmental impacts during the monitoring program ¹ .							
	Alternatively, receiving environment monitoring program compliance may be achieved by the holder of this environmental authority becoming and remaining a "contributing member" in regional studies of water quality and ecosystem health which are endorsed by the administering authority .							
	¹ The monitoring program should be developed using the Department's Receiving Environment Monitoring Program Guideline (EM1260) 2014 or later version.							
G3O9	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is for <i>in situ</i> monitoring of pH, dissolved oxygen and chlorine.							
G3O10	An annual monitoring report must be prepared and submitted to the administering authority by 30 November each year, for the preceding financial year.							
G3O11	You must record the following details for all environmental complaints received: (a) date and time complaint was received; and (b) name and contact details of the complainant; and (c) nature of the complaint; and (d) investigations undertaken; and							
	 (d) investigations undertaken, and (e) conclusions formed; and (f) actions taken. 							
G3O12	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority to investigate a complaint not considered by the administering authority to be frivolous or vexatious, of environmental nuisance arising from the activity . The monitoring results must be provided to the administering authority upon request.							
G3O13	The activity must be undertaken in accordance with written procedures that: 1. identify potential risks to the environment from the activity during routine operations.							
	 closure and an emergency; and establish and maintain control measures that minimise the potential for environmental harm; and 							
	 ensure plant, equipment and measures are maintained in a proper and effective condition; and ensure plant, equipment and measures are operated in a proper and effective manner; 							
	and							



	 ensure that staff are trained in and aware of their obligations under the <i>Environmental</i> <i>Protection Act 1994</i>; and ensure that reviews of environmental performance are undertaken at least annually 						
G3O14	Chemicals and fuels in containers of greater than 15 litres must be stored within a secondary containment system .						
G3O15	Other than as permitted by this environmental authority, the release of a contaminant into the environment must not occur.						
Agency inter	est: Air						
Condition number	Condition						
A3O1	Odours or airborne contaminants must not cause environmental nuisance at a sensitive place or commercial place .						
Agency inter	est: Water						
Condition number	Condition						
	 The only contaminants to be released to surface waters, excluding bypass releases covered by water Part 3(O) conditions WT3O4 and WT3O5 are: Treated effluent from the Rosewood Sewage Treatment Plant to waters described as Western Creek at W2 in the approved plans in ATTACHMENT G: Aerial Photo of Rosewood STP and Release Point W1 Outfall to Brisbane River at approximately 1.5 AMTD. These releases are to be in accordance with <i>Part 3(O) Table 1 — Surface water release limits</i>, and the associated requirements. 						
	Quality Indicator (units)	Monitoring frequency	Minimum	Maximum	Long term 80th percentile ⁵	Short term 80th percentile ⁵	Monitoring Location
	BOD5 (mg/L)	Monthly	-	40	20	30	6
	pH (pH unit)	Monthly	6.5	8.5	-	-	6
	Dissolved Oxygen (mg/L)	Monthly	2	-	-	-	7
	Escherichia coli (cfu/100mL)	Monthly	-	1,000	-	-	6
	Suspended solids (mg/L)	Monthly	-	60	30	40	6
	Free	Monthly	-	0.7	-	-	6



	1							
	Chlorine Residual (mg/L							
	Total Nitrogen (mg/L)	Annual Mass Load (dry weather (kg))	-	-	-	-	6	
	Total Phosphorus (mg/L)	Annual Mass Load (dry weather (kg))	-	-	-	-	6	
	Associated monitoring requirements							
	 COD may be monitored as an alternative to BOD5 once a reliable correlation has been determined through analysis of a minimum number of 24 wastewater samples over a minimum period of 12 months and with the agreement of the administering authority. Indicators for TN and TP may be done as 24 hour composite samples. Annual Mass Load/Volume must be calculated on a rolling weekly basis. Limits for free chlorine residual and total chlorine concentrations are set considering potential toxicity to the receiving waters. Sampling must be in accordance with the Water Quality Sampling Manual and all monitoring devices must be effectively calibrated and maintained. Rosewood STP Monitoring location is at the outlet from the chlorine detention tanks. Rosewood STP Monitoring location for dissolved oxygen is at the outlet from the energy dissipation flume. 							
WT3O2	Monitoring of contaminant releases to waters excluding bypass releases covered by Part 3(O) conditions WT3O4, WT3O5 and WT3O6 must be undertaken in accordance with <i>Part 3(O) Table 1 — Surface water release limits</i> and the associated monitoring requirements, and records of the results must be kept.							
WT3O3	In addition to Part 3(O) condition WT3O1, the release to waters must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other visually objectionable matter.							
WT3O4	Bypass relea	ses must be scre	eened prior	to being relea	ased.			
WT3O5	The administ	ering authority	must be no	tified within 24	4 hours of any	bypass relea	ase ceasing.	
WT3O6	The following	details must be	recorded in	relation to ea	ch bypass rel	ease:		
	(a) the st (b) the es	art time, date an stimated volume	d duration of the bypa	of the release; ass release: a	and nd			
	(c) the le (d) the ca (e) any m	vel of treatment ause of the releas nonitoring of the	at the sewa se; and water qualit	ge treatment y released.	plant prior to c	discharge; and	t	
WT3O7	Contaminants must not be released to groundwater or at a location where they are likely to release to groundwater .							



Agency inter	est: Noise						
Condition number	Condition						
N3O1	Noise generat place or com	ed by the acti mercial place	vity must not	cause enviro	nmental nuis	ance to any s	sensitive
Agency inter	est: Land						
Condition number	Condition						
L3O1	The only contaminants allowed to be release to land are treated effluent from the Rosewood Sewage Treatment Plant within the defined Landscaped Irrigation Area in the Approved Plan Attachment H Figure 2 and in accordance with <i>Part 3(O) Table 2 - Treated effluent release lin</i> to irrigation area. Part 3(O) Table 2 - Treated effluent release limits to irrigation area.			cosewood oved Plans in <i>release limit</i> s			
	Quality Indicator (units)	Monitoring frequency	Minimum	Maximum	Long term 80th percentile ⁵	Short term 80th percentile ⁵	Monitoring Location
	BOD5 (mg/L)	Monthly	-	40	20	30	6
	pH (pH unit)	Monthly	6.5	8.5	-	-	6
	Dissolved Oxygen (mg/L)	Monthly	2	-	-	-	7
	Escherichia coli (cfu/100mL)	Monthly	-	1,000	-	-	6
	Suspended solids (mg/L)	Monthly	-	60	30	40	6
	Total Nitrogen⁴	Monthly	-	-	-	-	6
	Total Phosphorus⁴	Monthly	-	-	-	-	6
	Associated requirements						
	1. Monitoring must be in accordance with the administering authority's Water Quality Sampling Manual and all						
	2. Monitor	monitoring devices must be effectively calibrated and maintained.Monitoring must be undertaken when treated sewage effluent is being irrigated, unless irrigation has ceased					
	for longer than the relevant parameters specified minimum frequency (e.g. if TSS was only required to be monitored once a week, then a TSS sample would not be required after the first week following cossistion of						
	the rele	ase).					.9 90000000000
	 BOD and Total Suspended Solids are about determining that the plant is achieving design outputs. Indicators for TN and TP are recommended to be done as grab samples. 						
	Enterod	cocci counts are th	ne recommended	i pathogen indica	tor for assessing	potential risks to i	recreational



	water, E. coli counts may be more relevant for land irrigation where recreation is unlikely.6. Rosewood STP Monitoring location is at the outlet from the chlorine detention tank.7. Rosewood STP Monitoring location for dissolved oxygen is at the outlet of the energy dissipation flume.
L3O2	 Treated effluent released to land must be done in accordance with documentation that ensures: (a) drainage to groundwater and subsurface flows of contaminants to surface waters are prevented; and (b) surface pondage and run-off of effluent is prevented; and (c) degradation of soil structure is minimised; and (d) soil sodicity and the build-up of nutrients and heavy metals in the soil and subsoil are minimised; and (e) spray drift or overspray does not carry beyond effluent disposal areas; and (f) effluent disposal areas are maintained with an appropriate crop in a viable state for transpiration and nutrient uptake; and (g) sufficient buffer zones are maintained between irrigation sites and sensitive environmental receptors.
L3O3	When weather conditions or soil conditions preclude the release of treated sewage effluent to land, effluent must not be irrigated to land.
L3O4	Treated sewage effluent may be removed from the site and used for an alternate purpose, with the written consent of any third party involved.
Agency inter	est: Waste
Condition number	Condition
W3O1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.



Part 3(P): Sandgate STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(f) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 50,000 but not more than 100,000EP.	Sandgate Sewage Treatment Plant Bicentennial Road, BOONDALL QLD 4034. Lot 1 RP63707.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval.

Agency interest: Water			
Condition number	Condition		
WT3P1	Effluent must only be released from release point W2 (Part 2(B) Table 1) when the hydraulic capacity of W1 is exceeded or when effluent cannot otherwise be discharged through W1 (Part 2(B) Table 1).		
WT3P2	For the annual reporting period the total mass load of total nitrogen and total phosphorus release must be less than the limits specified in Part 3(P) <i>Table 1 – Mass Load Limits for Total Nitrogen and Total Phosphorus</i> . Part 3(P) <i>Table 1 – Mass Load Limits for Total Nitrogen and Total Phosphorus</i>		
	Total Nitrogen Mass Load Release Limit 45,825 kg/year		
	Total Phosphorus Mass Load Release Limit 18,250 kg/year		
	Associated requirements		
Total nitrogen and total phosphorus annual mass loads are to be calculated as		s loads are to be calculated as follows:	
	 Annual TN Mass Load (kg) = Annual TN Mass Load (kg) = Yearly sum of Daily Release Volume (ML) for all dry weather days/ the number of dry weather days x 365 x Yearly Median dry weather TN Concentration (mg/L). Annual TP Mass Load (kg) = Yearly sum of Daily Release Volume (ML) for all dry weather days/ the number of dry weather days x 365 x Yearly Median dry weather TP Concentration (mg/L). 		



Part 3 (Q): Toogoolawah STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(b)(ii) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 100 but not more than 1,500EP— otherwise - no IT or IR	Toogoolawah Sewage Treatment Plant Lot 1 RP135864.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval

Agency interest			
Condition number	Condition		
M3Q1	Application of treated effluent All effluent from the maturation ponds must be applied to the vetiver plantation area.		
M3Q2	Effluent must not be applied to land at a rate, or in a manner, that will cause contamination of groundwater, or cause releases of effluent from the vetiver plantation area, in dry weather.		
M3Q3	Vetiver Plantation Area Monitoring Program The holder of this environmental authority must develop and implement a program to monitor soil and groundwater in the vetiver plantation area in accordance with Part 3(Q) condition M3Q6.		
M3Q4	The holder of this environmental authority must submit to the administering authority a report with every second annual monitoring report on the monitoring program, including an assessment of the impact and sustainability of the application of treated effluent to the vetiver plantation area. This report shall include an interpretation of the results and conclusions by an appropriately qualified person in the field of effluent land disposal.		
M3Q5	The vetiver grass plantation area must be bunded to exclude stormwater from entering the area and to minimise stormwater runoff being released from the area.		
M3Q6	Soil Monitoring At not greater than 2 yearly intervals, the holder of this environmental authority must take representative samples of the soil and subsoil from 2 sites within the vetiver grass plantation area and from 1 site outside of the plantation area, and analyse the sample for the quality characteristics specified in Part 3(Q) Table 1 — Soil Monitoring — Toogoolawah STP. Part 3(Q) Table 1 — Soil Monitoring — Toogoolawah STP		
	QUALITY CHARACTERISTIC UNITS		
	рН	pH scale	
	Exchangeable Sodium Percentage (ESP)	% Na	



	Exchangeable Cations	meq/100 g	
	Total Cations	meq/100 g	
	Specific Conductance or electrical conductivity	µS/cm	
	Total Nitrogen	mg/kg	
	Phosphorous (extractable)	mg/kg	
	Potassium (exchangeable)	meq/100 g	
	Total Calcium (exchangeable)	meq/100 g	
	Total Chloride	mg/kg	
	Total Magnesium (exchangeable)	meq/100 g	
	Total Sodium (exchangeable)	meq/100 g	
M3Q7	Only treated effluent to be released to waters The only contaminant permitted to be released to waters from Lot 1 RP135864 is treated effluent that has passed through the sewage treatment process.		
M3Q8	Release points to waters The only location from which a contaminant may be released to waters from Lot 1 on Plan RP135864 is to a table drain, downslope of the vetiver plantation, discharging into a tributary of Cressbrook Creek at release point W1.		
M3Q9	Maximum Quantity of Contaminants Released The total quantity of effluent released from release point W1 from Lot 1 on Plan RP135864 during any wet weather day must not exceed 1100 cubic metres, and must be monitored from the overflow location at the edge of the vetiver plantation area.		
M3Q10	There must be no release of contaminates to release point W1 on a dry weather day.		
M3Q11	Sampling and In-situ Monitoring Point for Releases to Water Determinations of the quality of contaminants released to water to check conformity with the release quality characteristics specified in Part 2(C) Agency interest: Water of this environmental authority must be undertaken at the sampling and in-situ measurement point described as outlets prior to discharge into a tributary of Cressbrook Creek.		
M3Q12	The holder of this environmental authority must monitor effluent quality during release events to waters. For release events that last longer than 3 days, such monitoring must occur at intervals of no greater than 3 days.		
M3Q13	The Site Based Management Plan for the approved place required under Part 2(C) condition AC5 should include: (a) effluent application rates and frequency of applications; (b) harvesting procedures and program; (c) soil and groundwater monitoring programs; (d) wet weather inspection procedures; (e) effluent release monitoring procedures; (f) pump maintenance programs; and		



	(g) a plan to manage Blue-Green algae.
M3Q14	Management of Blue-Green Algae The holder of this environmental authority must implement an effective and appropriate Plan for the Management of Blue-Green Algae for the effluent lagoons, which details how the holder of this environmental authority will manage the actual and potential environmental impacts resulting from any occurrence of blue-green algae outbreaks.
M3Q15	 The Management Plan for Blue-Green Algae must address at least the following matters: (a) weekly inspection to detect the presence of any bloom; (b) notification and reporting if blue-green algae blooms are confirmed; (c) the collection and analysis of samples if a bloom is suspected; and (d) remedial actions.
M3Q16	A copy of the Management Plan for Blue-Green Algae must be kept at a location readily accessible to the personnel that are carrying out the environmentally relevant activities.
M3Q17	The holder this environmental authority must not implement a Management Plan for Blue-Green Algae or amend a Management Plan for Blue-Green Algae where such implementation or amendment would result in a contravention of any conditions of this environmental authority.

Part 3(R): Wynnum STP

Environmentally relevant activity	Locations
ERA 63 Sewage treatment (1)(e) operating sewage treatment works, other than no-release works, with a total daily peak design capacity of— more than 10,000 but not more than 50,000EP	Wynnum Sewage Treatment Plant Tanker St, LYTTON QLD 4178 Lot 3 RP162446.

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site-specific conditions of approval

Agency interest: Water			
Condition number	Condition		
WT3R1	For the annual reporting period the total mass load of total nitrogen release must be less than the limit specified in Part 3(R) <i>Table 1 – Mass Load Limits for Total Nitrogen</i> . Part 3(R) <i>Table 1 –</i> Mass Load Limits for Total Nitrogen		
	Total Nitrogen Mass Load Release Limit 14,235 kg/year		
	 Associated requirements Total nitrogen and annual mass loads are to be of Annual TN Mass Load (kg) = Annual TN Volume (ML) for all dry weather days/ the Median dry weather TN Concentration (median dry weather TN Concentration dry weather TN Concentration (median dry weather TN Concentration dry weather TN Concentration dry weather TN Concentration (median dry weather TN Concentration dry weather TN Concentration dry weather TN Concentration (median dry weather TN Concentration dry weather TN Concentration dry weather TN Concentration dry weather TN Concentration (median dry weather TN Concentration dry weather TN Concent	calculated as follows: Mass Load (kg) = Yearly sum of Daily Release e number of dry weather days x 365 x Yearly ng/L)	



Part 3 (S): Lowood STP

Environmentally relevant activity	Locations
ERA 63 - Sewage Treatment 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of (d) more than 4000 but not more than 10,000EP	Lowood Sewage Treatment Plant Forest Hill - Fernvale Road LOWOOD QLD 4311 Lot 1 SP295901

The environmentally relevant activity conducted at the locations as described above must be conducted in accordance with the following site specific conditions of approval

Agency interest: General		
Condition number	Condition	
G3S1	All reasonable and practicable measures must be taken to prevent or minimise environmental harm caused by the activities.	
G3S2	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority to investigate a complaint of environmental nuisance arising from the activity . The monitoring results must be provided within 10 business days to the administering authority upon its request.	
G3S3	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is for in situ monitoring of pH and DO.	
G3S4	A receiving environment monitoring program must be designed and implemented by an appropriately qualified person(s) to monitor the effects of the activity on waters.	
G3S5	The receiving environment monitoring program required by condition G3S4 , must include at least the following:	
	(a) description of potentially affected receiving waters including key communities and background water and sediment quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality); and	
	(b) description of applicable environmental values and sediment and water quality objectives to be achieved; and	
	(c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the Receiving Environment Monitoring Program is proposed; and	
	(d) water and sediment quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the monitoring program. Alternatively, receiving environment monitoring program compliance may be achieved by the holder of this environmental authority becoming and	



	remaining a contributing member in regional studies of water quality and ecosystem health which are endorsed by the administering authority.								
G3S6	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.								
G3S7	The activity must be undertaken in accordance with written procedures that:								
	 identify potential risks to the environment from the activity during routine operations, closure and an emergency; and 								
	2. establish and maintain control measures that minimise the potential for environment harm; and								
	 ensure plant, equipment and measures are maintained in a proper and effective condition; and 								
	 ensure plant, equipment and measures are operated in a proper and effective manner; and 								
	5. ensure that staff are trained in and aware of their obligations under the <i>Environmental Protection Act 1994;</i> and								
	6. ensure that reviews of environmental performance are undertaken at least annually.								
G3S8	All information and records required by the conditions of this environmental authority must be kept for a minimum of five years with the exception of environmental monitoring results which must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request and in the format requested.								
G3S9	You must record the following details of all environmental complaints received: 1. date and time the complaint was received; and 2. name and contact details of the complainant when provided and authorised by the Complainant; and 3. nature of the complaint; and 4. investigation undertaken; and 5. conclusions formed; and 6. actions taken.								
G3S10	 Activities conducted under this environmental authority must not be conducted contrary to any of the following limitations: 1. Inflows must not exceed the peak design capacity of 5 times the Design Average Dry Weather Flow (DADWF) of 9.25 ML/day (DAFWF = 1.85 ML/day) on any day unless the standard treatment processes of the plant are bypassed. 								
G3S11	An annual monitoring report must be prepared and submitted to the administering authority by 30 November each year, for the preceding financial year.								
G3S12	All waste generated in carrying out the activity must be reused, recycled, or removed to a facility or designated onsite location(s) that can lawfully accept the waste.								
G3S13	The holder of this environmental authority must notify administering authority in writing of any monitoring result that indicates an exceedance of or non-compliance with any approval limit within 28 days of completion of analysis.								



Agency int	erest: Noise
Condition number	Condition
N3S1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place .
Agency int	erest: Air
Condition number	Condition
A3S1	Other than as permitted within this environmental authority, odours or airborne contaminants must not cause environmental nuisance at a sensitive place or commercial place .
Agency int	erest: Land
Condition number	Condition
L3S1	Treatment and management of acid sulfate soils must comply with the latest edition of the Queensland Acid Sulfate Soil Technical Manual.
Agency int	erest: Water
Condition number	Condition
WT3S1	All batteries, liquid chemicals, fuels, and other liquid substances with potential to cause environmental harm must be stored within a secondary containment system that is impervious to the materials stored within it and must be managed to prevent the release of contaminants to waters or land .
WT3S2	The only contaminants to be released to surface waters, excluding bypass releases covered by water conditions WT3S5 and WT3S6 , are from the Lowood Sewage Treatment Plant to waters described as Brisbane River from release point RP1 in accordance with Table 1—Surface water release limits and the associated requirements.



	Table	1—Surface wat	er release limits	5				
	Release Point (GDA 94 Zone 56J)			Quality Characteristics	Minimum	50th %ile (long term)	90th %ile (long term)	Maximum
	RP1		Northing 6961702.3135	BOD 5 day (mg/L)	-	10	-	15
		Easting 460437.1258		Total Suspended Solids (mg/L)	-	10	-	15
				Dissolved Oxygen (mg/L)	2	-	-	-
				Ammonia Nitrogen (mg/L as N)	-	1	-	2
				Total Nitrogen (mg/L as N)	-	5	-	7.5
				Total Phosphorus (mg/L as P)	-	2	-	3
				pH (scale)	6.5	-	-	8.5
				Enterococci (cfu/100ml)	-	100	400	-
WT3S3	Associ 1. 2. 3. Monito	ated monitoring Sampling must I must be effectiv Indicators for TN Samples must b	requirements be in accordance w ely calibrated and r N and TP must be c be representative of mant releases to w	vith the Water Quality maintained. done as 24 hour comp f the release. vaters, excluding by	ypass releas	nual and s. es covei	all monite	oring devices
	conditions WT3S5 and WT3S6, must be undertaken in accordance with Table 2—Monitoring frequency and the associated monitoring requirements and records of the results must be kept.							



	Table 2—Monitoring frequency								
		Monitoring locations (GDA 94 Zone 56J)		Quality Characteristics	Minimum Frequency				
		Easting	Northing						
				BOD5 (mg/L)	Weekly				
				Total Suspended Solids (mg/ L)	Weekly				
				Total Nitrogen (mg/L)	Weekly				
		460626.5950	6961589.6180	Ammonia(mg/L as N)	Weekly				
				Total Phosphorus (mg/L)	Weekly				
				pH (pH units)					
				(mg/L)	Weekly				
		400504 0400		Enterococci (cfu/100mL)					
		460/37 1258	6061702 3135	Volume (inflow) (ML)	Daily				
	Associate	d monitoring reg	uirements		Daily				
WT3S4	 Monitoring must be in accordance with the Water Quality Sampling Manual and all monitoring devices must be effectively calibrated and maintained. Monitoring must be undertaken when the activity is in operation and samples must be taken during a release. Total inflow before bypass release point. Total outflow is treated discharges and excludes flows those that are bypassed. In addition to WT3S2, the release to waters must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter, or other visually objectionable 								
WT3S5	Bypass releases must be screened prior to being released from release point RP1.								
WT3S6	The administering authority must be notified within 24 hours of any bypass release ceasing.								
WT3S7	The follov	ving details must	be recorded in re	lation to each bypass relea	se:				
	(a) the sta	art time, date and	d duration of the re	elease; and					
	(b) the es	timated volume of	of the bypass rele	ease; and					
	(c) the lev	el of treatment a	t the sewage trea	tment plant prior to discharg	je; and				
	(d) the ca	use of the releas	se; and						
	(e) any m	onitoring of the v	vater quality releas	sed.					
WT3S8	Treated sewage effluent may be removed from the site and used for an alternate purpose, with the written consent of any third party involved.								



Definitions:

Key terms and/or phrases used in this document are defined in this section and **bolded** throughout this document. Applicants should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

50th percentile means not more than three (3) of the measured values of the quality characteristic are to exceed the stated release limit for any (6) consecutive samples for a release/monitoring point at any time during the environmental activity(ies) works.

80th percentile means not more than one (1) of the measured values of the quality characteristic is to exceed the stated release limit for any five (5) consecutive samples for a sampling point at any time during the environmental activity(ies) works.

Long term 90th percentile means not more than one tenth of the measured values are to exceed the stated release limit for the limit period, e.g. not more than five (5) for any fifty (50) consecutive samples for the long term period.

Act means the Environmental Protection Act 1994.

Activity means the environmentally relevant activity to which the environmental authority relates.

Administering authority means the Department of Environment and Science or its successor.

Annual return means the return required by the annual notice (under section 308 of the Environmental Protection Act 1994) that applies to the environmental authority.

Australian Water Quality Guidelines means the Australian and New Zealand Guidelines for Fresh and Marine Water Quality as revised or amended from time-to-time.

Authorised person means a person holding office as an authorised person under an appointment under the *Environmental Protection Act 1994* by the chief executive or chief executive officer of a local government.

Annual Mass Load means the yearly sum of daily release volume (ML) for all dry weather days x the yearly dry weather median concentration of pollutant in treated effluent released from a specified wastewater treatment plant.

Appropriately qualified person(s) means a person or persons who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

Background, for noise, means noise measured in the absence of the noise under investigation, as $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90 percent of the time period of not less than 15 minutes, using Fast response.

BOD₅ means the 5 day biochemical oxygen demand determined using standard tests (e.g. those used by NATA laboratories). This test is not inhibited for nitrification, otherwise would be referred to as "carbonaceous" BOD.

Bypass means when the standard treatment processes of the plant do not occur as a result of wet weather and inflows that are in excess of the peak design capacity for inflow resulting in the release of untreated or partially treated effluent from the sewage treatment plant to the environment.



Bubble licence means a single licence and load limit that includes multiple operations

Commercial place means a place (other than a sensitive place) used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

Composite in respect of sampling means either time based taken at hourly intervals to cover the period in the twenty-four (24) hours of the sampling day during which a contaminant release occurs; or taken after set flow volumes to cover the period of the sampling day during which the contaminant release occurs.

The **date of practical completion** means the practical completion of the offsite nutrient reduction action agreed in writing by administering authority and the holder of the environmental authority.

Day means any 24 hour period.

Design Average Dry Weather Flow (DADWF) means the average dry weather flow of the treatment plant at the design horizon.

Demonstration Pyrolysis Plant (DPP) means the pyrolysis project being undertaken at the Oxley Creek STP (Lot 2/RP37416 and Lot 100/SP162583) that will involve the thermal decomposition of various wastes on a trial basis. The trial will process commercial and industrial waste streams, contaminated biosolids, and hazardous wastes, and is authorised to operate for a maximum period of 24 months from its commencement date.

Dry weather day means a day which less than 1 mm of rainfall is recorded at any rainfall measuring station recognised by the Commonwealth Bureau of Meteorology within the sewered area connected to the sewage treatment plant, or if no such measuring station exists, at the nearest such station to the sewage treatment plant. The term also excludes days during which recorded rainfall over the 4 preceding days exceeds a cumulative rainfall of 50 mm.

Dry weather flow means flow which occurs from the sewage treatment plant to the designated receiving water during a dry weather day.

Dwelling means any of the following structures or vehicles that is principally used as a residence

- (a) a house, unit, motel, nursing home or other building or part of a building;
- (b) a caravan, mobile home or other vehicle or structure on land;
- (c) a water craft in a marina.

Environmental harm as defined in Section 14 of the Environmental Protection Act 1994.

Environmental nuisance as defined under Chapter 1 of the Environmental Protection Act 1994.

Environmental value as defined under Chapter 1 of the *Environmental Protection Act 1994*. **Feedstock trial** is defined as any change in operation of the **Demonstration Pyrolysis Plant (DPP)** that is expected to substantially alter the emissions output, and which involves any of the following:

- (a) a change in the composition of the feedstock supplied to the retort of the DPP; or
- (b) a change in the internal operating conditions of the retort or thermal oxidiser.

Groundwater means water that occurs naturally in, or is introduced artificially into, an aquifer.

Incompatible waste means waste that may chemically react when:

- (a) placed in proximity to other wastes; and/or
- (b) mixed with other wastes

Land means land excluding waters and the atmosphere.



Long Term (limit) means a limit applied to consecutive samples taken over a one year or 52 week period (on a rolling basis for limit calculations) where consecutive samples are taken.

Long term 50th percentile means the median value of the measured values in ranked order or the quality characteristic is not to exceed the stated release limit for any twenty-six (26) consecutive samples where:

- (a) the consecutive samples are taking over a one year period;
- (b) the consecutive samples are taken at approximately equal periods; and
- (c) the time interval between the taking of each consecutive sample is not less than ten (10) days or greater than eighteen (18) days.

Long term 80th percentile means that not more than five (5) of the measured values of the quality characteristic are to exceed the stated release limit for any twenty-six (26) consecutive samples where:

- (a) the consecutive samples are taking over a one (1) year period;
- (b) the consecutive samples are taken at approximately equal periods; and
- (c) the time interval between the taking of each consecutive sample is not less than ten (10) days or greater than eighteen (18) days.

Long term 90th percentile means not more than one tenth of the measured values are to exceed the stated release limit for the limit period, e.g. not more than five (5) for any fifty (50) consecutive samples for the long term period.

L_{A 1, adj, 10 mins} means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10 minute measurement period, using Fast response.

L_{A 10, adj, 10 mins} means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for ten percent (10%) of any 10 minute measurement period, using Fast response.

L_{A max adj, T} means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

L_{Aeq adj,T} means the adjusted A weighted equivalent continuous sound pressure level measures on fast response, adjusted for tonality and impulsiveness, during the time period T, where T is measured for a period no less than 15 minutes when the activity is causing a steady state noise, and no shorter than one hour when the approved activity is causing an intermittent noise.

L_T means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over a time period of not less than 15 minutes, using Fast response.

Measures has the broadest interpretation and includes plant, equipment, physical objects, bunding, containment systems, monitoring, procedures, actions, directions and competency.

Median means the middle value, where half the data are smaller and half the data are larger. If the number of samples is even, the median is the arithmetic average of the two middle values.

Maximum means that the measured value of the quality characteristic or contaminant must not be greater than the release limit stated.

Minimum means that the measured value of the quality characteristic or contaminant must not be less than the release limit stated.

Noise affected premises means a noise sensitive place or a commercial place

Range means that the measured value of the quality characteristic or contaminant must not be less than the higher release limit stated nor lower than the lower release limit stated.



mg/L means milligrams per litre.

NATA means National Association of Testing Authorities.

Noxious means harmful or injurious to health or physical well-being.

NTU means nephelometric turbidity units

Offensive means causing offence or displeasure; is unreasonably disagreeable to the sense; disgusting, nauseous or repulsive

Offset means a unit of pollution reduction also known as a credit

Offset Credit means a unit of pollution reduction, expressed in tonnes per year, equivalent to the pollutant load avoided by an offset works under the QId Government's "Flexible options for managing point source water emissions: A voluntary market-based mechanism for nutrient management". Offset credits accrue following the date of practical completion of works designed to generate offset credits.

Offsite nutrient reduction action means an action taken to counter-balance a point source nutrient increase under the department's '*Flexible options for managing point source water emissions: A voluntary market-based mechanism for nutrient management*'.

Organic waste includes:

- (a) a substance used for manufacturing fertiliser for agricultural, horticultural or garden use;
- (b) animal manure;
- (c) cardboard and paper waste;
- (d) fish processing waste;
- (e) food and food processing waste;
- (f) grease trap waste;
- (g) green waste; and
- (h) waste generated from an abattoir.

Participating member means, for the purposes of an equivalent REMP, being an actively participating member in a study which is the equivalent of the REMP and any monitoring program resulting from such study.

Polycyclic Aromatic Hydrocarbons (PAH) means limit is for total of the 16 priority pollutants listed by the United States EPA, namely, Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(α) anthracene, Chrysene, Benzo(β)fluoranthene, Benzo(α)pyrene, Indeno[123cd] pyrene, Dibenz[ah]anthracene and Benzo[ghi] perylene, expressed as Benzo(α)pyrene equivalents using the potency equivalence factors specified by the World Health Organisation.

Prescribed contaminants means contaminants listed within Schedule 9 of the *Environmental Protection Regulation 2008*.

Receiving environment monitoring program means a monitoring program designed to monitor and assess the potential impacts of controlled and/or uncontrolled releases of contaminants to the environment from the activity.

Records include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a condition of this authority.

REMP means the Receiving Environmental Monitoring Program.

Release point (RP) 1 means the stack serving LPG combustion gasses generated from operating of the DPP.



Release point (RP) 2 means the stack serving treated process gasses generated from pyrolysis in the retort unit in the **DPP**.

Secondary containment system means a system designed, installed and operated to prevent any release of contaminants from the system, or containers within the system, to land, groundwater, or surface waters.

Site means the place to which the environmental authority relates or the premises to which this environmental authority relates.

Release of a contaminant into the environment means to:

- (a) deposit, discharge, emit or disturb the contaminant
- (b) cause or allow the contaminant to be deposited, discharged, emitted or disturbed
- (c) fail to prevent the contaminant from being deposited, discharged emitted or disturbed
- (d) allow the contaminant to escape
- (e) fail to prevent the contaminant from escaping.

Sensitive place includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:

- (i) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- (j) a motel, hotel or hostel; or
- (k) a kindergarten, school, university or other educational institution; or
- (I) a medical centre or hospital; or
- (m) a protected area under the Nature Conservation Act 1992, the Marine Parks Act 2004 or a World Heritage Area; or
- (n) a public thoroughfare, park or gardens; or
- (o) for noise, a place defined as a sensitive receptor for the purposes of the *Environmental Protection* (*Noise*) *Policy* 2019.

Short-term (limit) means a limit is applied to five consecutive samples (on a rolling basis for limit calculations) where consecutive samples are taken.

Short term 50th percentile means that the median value of the measured values in ranked order of the quality characteristic is not to exceed the stated release limit for any five (5) consecutive samples where:

- (a) the consecutive samples are taking over a ten (10) week period;
- (b) the consecutive samples are taken at approximately equal periods; and
- (c) the time interval between the taken of each consecutive sample is not less than ten (10) days or greater than eighteen (18) days.

Short term 80th percentile means that not more than one (1) of the measured values of the quality characteristics are to exceed the stated release limit for any five (5) consecutive samples where:

- (a) the consecutive samples are taken over a five (5) month period;
- (b) the consecutive samples are taken at approximately equal intervals; and
- (c) the time interval between the taking of each consecutive sample is not less than 25 days.

Sustainable irrigation scheme means an irrigated commercial farming arrangement, designed to generate income and operated in accordance with MEDLI modelling endorsed by the administering authority. MEDLI modelling is to be used to limit environmental harm, whereby a land and groundwater based REMP is not required.

Total heavy metals mean a cumulative total of Type 1 and Type 2 substances.

Total Nitrogen (TN) means the sum of Organic Nitrogen, Ammonia Nitrogen, Nitrite plus Nitrate Nitrogen, expressed as mg/L as Nitrogen. This includes both the inorganic and organic fraction of nitrogen.



Total Phosphorus (TP) means the sum of the reactive phosphorus, acid-hydrolysable phosphorus and organic phosphorus, as mg/L of Phosphorus. This includes both the inorganic and organic fraction of phosphorus.

Type 1 substances means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements.

Type 2 substance means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements.

Volatile organic compounds (VOC) means any chemical compound based on carbon chains or rings with a vapour pressure greater than 2mm of mercury (0.27 kPa) at 25°C), that participate in atmospheric photochemical reactions. The substances that are specifically excluded are: methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts. This is according to the definition of VOC outlined in the Australian Government National's Pollutant Inventory.

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.

Watercourse means a river, creek or stream in which water flows permanently or intermittentlyin a natural channel, whether artificially improved or not; or in an artificial channel that has changed the course of the watercourse.

Wet Weather Day means a day which is not a dry weather day.

Works or operation means the development approved under this authority.

You means the holder of the environmental authority.

Pollution Credit means a unit of pollution reduction, expressed in tonnes per year, equivalent to the pollutant load generated by an offsite nutrient reduction action under the department's '*Flexible options for managing point source water emissions: A voluntary market-based mechanism for nutrient management*'. Pollution Credits accrue from 1 July 2021. Pollution Credits accrue on the date of practical completion of the offsite nutrient reduction action credit.

Attachments:

- 1. ATTACHMENT A: REMP SAMPLING LOCATIONS Source: NearMap Pty Ltd, October 2012.
- 2. **ATTACHMENT B:** Beaudesert Sewage Treatment Plant Nutrient Offset Project *Proposal Version 1 Print date 13 December 2013.*
- 3. ATTACHMENT C: Laidley STP- Release Point.
- 4. ATTACHMENT D: Forest Hill STP-W1 Release Point
- 5. ATTACHMENT E: Helidon Sewage Treatment Plant Schedule of Approved Documents
- 6. ATTACHMENT F: Maps of Release Points
 - a. Attachment F.1 Boonah STP Release Point Location
 - b. Attachment F.2 Aratula STP Release Point Location
 - c. Attachment F.3 Kalbar STP Release Point Location
- 7. ATTACHMENT G: Aerial Photo of Rosewood STP and Release Point W1 Outfall to Brisbane River.
- 8. ATTACHMENT H: Rosewood STP Landscaped Irrigation Area. (Source: Google Maps)
- 9. ATTACHMENT I: Lower Brisbane River Catchment sewage treatment plants' locations.
- 10. ATTACHMENT J: Lower Brisbane River Catchment sewage treatment plants REMP sampling locations.
- 11. ATTACHMENT K: Gatton Irrigation area



- 12. **ATTACHMENT L:** Laidley Creek Sewage Treatment Plant Nutrient Offset Project Delivery Proposal, dated 15th October 2016, included in Attachment L of this environmental authority, excluding sections 5.3.3, 5.3.4 and 6.
- 13. ATTACHMENT M: Canungra STP General (Process Flow Diagram) PF24





Attachment A: BEAU- REMP SAMPLING LOCATIONS. Source: NearMap Pty Ltd, October 2012.





Attachment B: Beaudesert Sewage Treatment Plant Nutrient Offset Project Proposal Version 1 Print date 13 December 2013









BEAUDESERT STP NUTRIENT OFFSET PROPOSAL

1. INTRODUCTION

Elevated levels of nutrients and sediments in receiving waters have adverse ecological and economic implications. Nutrient pollution of receiving waters arises from both point source, such as end of pipe discharges from sewage treatment plants (STPs), and non-point sources. The Environmental Protection Act 1994 seeks to regulate the amount of nutrient discharges from point sources, including STPs.

Nutrient offsetting is an approach to improve water quality in creeks and rivers by reducing the amount of nutrients entering waterways through alternate, lower costs methods (e.g. stream-bank rehabilitation) than traditional projects [e.g. STP infrastructure upgrades). An offset is a reduction in pollutant load, measured in kilograms, which is created by an action, activity or technology; this may be used by the licensed person/entity to comply with relevant regulated conditions or to achieve nutrient abatement targets, such as zero net emissions. An offset may only be used by the licensed person/entity and the Department of Environment and Heritage Protection (EHP) governs, to which environmental relevant activity (ERA) licence the offset can be attached.

Water Utilities can apply to EHP to undertake nutrient obstement projects for offsetting an existing licenced activity where the project is undertaken in the same waterway catchment as the activity itself. If approved, nutrient offsetting delivers the opportunity for regulated point source dischargers to optimise receiving water quality outcomes, providing an overall net community benefit, whist achieving a more efficient capital outcome by offsetting investment in point source pollution abatement with investment in non-point source pollution abatement.

2. BACKGROUND

The EHP is currently developing a policy to allow water quality offsets as an alternative approach to effluent management in Queensland. To assist in better defining the elements of the policy, DEHP has approached the South East Queensland (SEQ) service providers to select pilot water quality offset schemes.

Queensland Urban Utilities had identified the following three high population growth plot project areas to trial the offset projects:

- Beaudesert/Bromelton
- Lockyer Valley
- Bremer River

This proposal details the implementation of a nutrient offsets scheme for the Environmentally Relevant Activity (ERA) undertaken at the Beaudesert Sewage Treatment Plant (BSTP). The key driver for the pilot project is to have

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banks and strengthening of the river banks over time using environmental plantings. The project areas have been identified by suitably qualified experts from SEQ Catchments - the local Natural Resource Management (NRM) provider.

The pilot scheme will quantify then monitor for 10 years the mass load of sediment and nutrient avoided by the BEC works.

Based on the outcomes of a preliminary investigation report undertaken by SEQC Services Pty Ltd, QUU subsequently engaged SEQC Services Pty Ltd to undertake detailed design of the BEC works and produce an available soil erosion quantification report incorporating.

- river bank erosian madeling (using the calibrated models on the AS IS and the various TO BE scenarios for the stabilised river bank);
- detailed design of the BEC works (structural engineering design and landscaping design) within the project area;
- soil sampling and analysis to more accurately predict the average annual erasion of the river bank with and without the BEC works:
- detailed methodology to quantify availed sediment and nutrient loss and the application of this methodology to the project area; and
- a statement of the sediment and nutrient loads avoided by the offset project.

Using this current 'best science' approach. SEQC Services Pty Ltd has quantified the mass of TN offset, as a result of the project, to be 5 tonnes/year (T/yr). (see Appendix 1 for the final draft report).

5 REGULATORY APPROVAL

QUU will make application to EHP to amend the Beaudesert STP EA (Ref. EPPR00515313) to-

- increase the TN mass load by 5 T/year on the signed date of practical completion of the Beaudesert STP nutrient offset project (as per the methodology in section 4);
- decrease the TN mass load by \$ T/year a maximum period 10 years after the signed date of practical completion of the Beaudesert STP nutrient offset project, or after the five year review of the project outcomes if applicable (see Section 4); and
- ensure QUU undertakes all activities identified in this proposal document.

6. PROJECT AREA

The project area is the area of land on which an offsets project is carried out and can cover multiple land areas or facilities. The proposed project area for this pliot scheme is located approximately 3km west of Beaudesert STP adjacent to the Ilbogan Park on Beaudesert Boonah Rd (Figure 1). The overall project area is divided into two sites. Site 1 extends 300m to 400m east of Ilbogan Park on the sauthern/eastern reach of the Logan River. Site 2 is

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located 400m downstream of Site 1 on the same side of the Logan River and extends 100m downstream.

The target Logan River reaches has highly eraded and degraded riparian areas. Historical studies and modelling undertaken by Healthy Waterways Limited and the latest preliminary report detailed in Attachment 1 indicates these river banks contribute significant sediment and nutrient pollution to the upper Logan River, which is the same receiving water for environmental discharges from the Beaudesert STP. The pilot nutrient offsets scheme will help reduce non-point sediment and nutrient (nitrogen and phosphorus) pollution from the target reaches of the Logan River through best practice riparian and tiver restoration investment (BEC techniques).

Queensland Urban Utilities will utilise existing Landowner Deeds each land owner within the project area has with SEQ Catchments as secured by QUU's contractual arrangements with SEQ Catchments and their subsidiary company SEQC Services Pty Ltd. The combination of these site access and security instruments will allow the offset project works and ongoing maintenance and monitoring program to proceed and also protect the project area from interference for the duration of the offset project. The project area is shown below, in light green shading.



Figure 1: Proposed project area on the Logan River shown in light green shading. The area is three kilometries west of Beaudesert STP

NITROGEN OFFSET ESTIMATION AREA (NOEA)

The surface area of river bank required for the nitrogen offset is dependent on the modelled amount of sediment transferred from the land to the waterway and the amount of nitrogen present in the sediment. Queensland Urban Utilities offset provider, SEQC Services Pty Ltd, has used a combination of the following technologies to determine the boundaries of the NOEA:

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erosion events caused by nature (e.g. rainfall events and floods). These events will be managed through the monitoring and reporting part of the project - see Section 8.0.

A NOEA may be remodeled and re-quantified for TSS and TN after the initial five year offset period if deemed necessary by the offset project control group (see Sections 4 and 8). The outcomes of this work may include QUU to undertake additional offset area remedial works prior to the offset being rolled over to the next five year period.

MONITORING, RECORD-KEEPING AND REPORTING REQUIREMENTS

A project control group (PCG) will be established to maintain regular liaison with EHP officers for the duration of the Beaudesert STP nitrogen offset project. Within 12 weeks of the date of practical completion of the project works, a final report will be provided to EHP including the process, outcomes and learning's.

The final report will also identify angoing maintenance, risk management issues and possible improvements that can be applied to future offset projects.

8.1 Geospatial information requirements

The boundary of the NOEA within the project area will be surveyed and Lot referenced and provided to EHP as required. Light detection and ranging (UDAR) and photo-point technology will be used to map the physical layout of terrain and landscape features.

8.2 Project monitoring and reporting

During Construction

Queensland Urban Utilities and the contractor will monitor the NOEA and adjust the NOEA boundary as required it part of the NOEA no longer meets the requirements of the project or based on further stratification of the project - see Section 7. Any project incidents or amendments to the project area or NOEA will be notified to EHP.

Post Practical Completion

Queensiand Urban Utilities will manitor and report on the Beaudesert STP nitrogen offset project in accordance with monitoring and reporting program detailed in Table 1.

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Monitoring Requirements by Year	Objective	Monitoring Mechanism	Reporting
Year 0 (Immediately after practical completion)	 Ensure that project works (earthworks & revegetation) are constructed in accordance with design plans. 	Pre and post works photo-point: – PhotoPoint Post works: – LIDAR	Practical Completion Report including 'as constructed' plans, photographs and digital terrain maps (LIDAR).
	 Select appropriate PhotoPoint site(s). 		(12 weeks after practical completion of project works)
Year 1	 Monitor and 	PhotoPoint (year 1)	Year 1 Annual report
Year 2	review growth of riparian vegetation	 PhotoPoint (year 2) LIDAR 	Year 2 Annual report
Year 3		PhotoPoint (year 3)	Year 3 Annual report
Year 4	 Confirm ongoing 	PhotoPoint (year 4)	Year 4 Annual report
Year 5	 Assess river bank erosion 	 PhotoPoint (year 5) LIDAR 	Year 5 Annual report including photographs and digital terrain maps (LIDAR).
Throughout Project Establishment Phase (Years 0-5)	Ensure EHP officers are notified of significant wet weather impacts on the project area. Ensure a coordinated and balanced response to significant wet weather impacts on the project area.	 Minor erosion event: damage is to a limited area of the NOEA and is within the erosion avoided estimate (see Appendix 1). Action: Photographic record Major erosion event as declared by PCG. Guidance: damage has resulted in the erosion avoided estimate (see Appendix 1) Action: 	 Minor erosion: No notification to EHP. Include detail in relevant annual report Major erosion: Notified to EHP within 1 month of becoming aware of damage. Event actions and response actions managed by the PCC

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8.3 Records

Queensland Urban Utilities will keep the following records in relation to the Beaudesert STP nitrogen offset project:

- design plans and 'as constructed' plans;
- monitoring data, site inspection observations/logs and annual reports;
- relevant invoices and receipts;
- contract documents and related records;
- detailed logbooks of activity where the activity has not been
- undertaken by a third party under a contract; and
 references to relevant published literature.

BROADER RECEIVING WATER QUALITY AND COMMUNITY BENEFITS

In addition to providing a neutral nitrogen offset, the project will repair eroded riparian corridors and provide the following overall net benefits:

- stabilised Logan River bed and banks to reduce erosion and protecting freehold land.
- reducing sediment mass load transfer and local turbidity levels in the Logan River;
- reducing sediment bound Total Phosphorus (TP) mass load transfer to the Logan River;
- better control the spread of environmental and declared weeds along the existing riparian corridor of the Logan River;
- 5. enhancement of biodiversity;
- 6. provision of shade and habitat for aquatic organisms;
- 7. establishment of permanent native vegetation; and
- 8. provide for future aquatic habitat protection in the Logan River.

10. POTENTIAL RISKS

The following risks are identified in undertaking the pilot offset scheme:

- 1. Project construction delays due to wet weather events;
- Total destruction of the offset works due to a natural disaster event such as a major flood in the first 5 years; and
- Technology risks with the river bank stabilisation and toe erosion model and proposed LiDAR monitoring system.







BEAUDESERT STP NUTRIENT OFFSET PROPOSAL

11. CONCLUSION

Successful implementation of the Beaudesert STP nitrogen offsets project will ensure Queensland Urban Utilities:

- contributes to the development of a state wide offset policy by EHP ٠ that will enable alternative effluent management options to be effectively implemented;
- · achieves its objective of providing affordable services to its customers by adopting prudent and sustainable sewage management measures at lowest long term costs to customers; and
- · achieves its future waterway nitrogen emission targets to assist in the protection of the environmental values of the Logan River system.

12. REFERENCES

- 1. Water Quality and Investigations, November 2012
- 2. Environmental Protection Agency, Development of a water quality metric, for nutrient offsets for Moreton bay, Queensland, November 2007.

13. TIMEFRAMES

An indicative timeframe is provided in Table 2 below.

Table 2 - J				9	1		
Tasks	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	Dec 2023
Information gathering	Oct'12- May'13						
Scheme partners identification	Dec'12- Feb'13						
Approvals (EHP & Queensland Urban Utilities' Board)		May'13- Sept'13					
Detailed design and soil erosion modelling. Quantify nitrogen mass Joad offset		July'13- Sep'13					
Commence project works		Oct'13					
Project area maintenance (riparian vegetation)		Nov'13-De	c'18			Full establish ment	
Project monitoring, evaluation and reporting		Oct'13-Dec'23 Nitrogen Offset terminales December 2023					

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Attachment C: Laidley STP - Release Point





Attachment D: Forest Hill STP-W1 Release Point





Attachment E: Helidon Sewage Treatment Plant: Schedule of Approved Documents

The environmentally relevant activity must be constructed, operated and maintained in accordance with all undertakings of the environmental authority application and any other documents approved by the administering authority as set out in the Approved Documents Schedule.

In the event of any inconsistency arising between the undertakings of the environmental authority application or other approved documents as set out in the Approved Documents Schedule and the conditions of this environmental authority, the conditions of this environmental authority must apply.

For the purposes of this environmental authority the following stated documents are approved documents:

1	Application for Environmental authority with accompanying report dated August 1995 by Gutteridge
	Haskins and Davey Pty. Ltd on behalf of Gatton Shire Council
2	Helidon Sewerage Scheme Locality Plan, (Figure 3.1 of the above mentioned report).
3	Treatment Plant Layout Plan, Figure 3.2 of the above mentioned report).
4	Process Flowsheet, (Figure 3.1 of the above mentioned report).
5	Topographical Map, (Figure 4.1 of the above mentioned report).
6	Report by Land Resource Assessment and Management Pty. Ltd titled "Assessment of land based disposal of effluent at Helidon" attached to Gutteridge Haskins and Davey Pty. Ltd's repot.
7	Map 1 of Land Resource Assessment and Management Pty. Ltd's report.
8	Letter dated 18 November 1995 from Gutteridge Haskins and Davey Pty. Ltd providing additional
	information as requested by the Department of Environment and Heritage under section 62 of the
	Environmental Protection Act 1994.
9	Fax dated 1-5 January 1996 from Mr. Steve Moller of Gatton Shire Council, containing pages relevant
	to zoning from the councils strategic plan.
10	Fax dated 19 January 1996 from Mr. Steve Moller of Gatton Shire Council informing of real property
	descriptions of the location of um stations number 2 and 3.
11	Fax dated 19 January 1996 from Mr. Steve Moller of Gatton Shire Council informing of real property
	descriptions of properties adjacent to the location of pump station number 1.
12	Fax dated 19 February 1996 from Jeanette Clewett (for Geoff Hacquoil) both of Gutheridge Haskins
	and Davey Pty. Ltd. containing further information including pages 3, 4 and 5 containing the location
	of the pump station overflow discharges and page 6 with a plan of pump station 1.
13	Fax dated 22 February 1996 from Mr. Nick Apostolidis of Gutteridge Haskins and Davey Pty. Ltd.
	outlining the path and, destination of the emergency overflow from the secondary treatment lagoon.



Attachment F: Map of Release Points Boonah STP Release Point Location

Attachment F.1 Boonah STP Release Point Location





Attachment F: Map of Release Points Aratula STP Release Point Location



Attachment F.2 Aratula STP Release Point Location



Attachment F: Map of Release Points Kalbur STP Release Point Location



Attachment F.3 Kalbur STP Release Point Location



Attachment G: Aerial Photo of Rosewood STP and Release Point W1 outfall to Brisbane River (Source; Google Maps 2015).





Attachment H: Rosewood STP Landscaped Irrigation Area. (Source: Google Maps)







Attachment I: Lower Brisbane River Catchment sewage treatment plants' locations.





Attachment J: Lower Brisbane River Catchment sewage treatment plants REMP sampling locations.



Attachment K: Gatton Irrigation area





Attachment L: Laidley Creek Sewage Treatment Plant Nutrient Offset Project Delivery Proposal, dated 15th October 2016, excluding sections 5.3.3, 5.3.4 and 6.



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Queensland Urban Utilities Laidley Creek Sewerage Treatment Plant Nutrient Offset Project Delivery Proposal

SubjectProject Delivery Proposal for the Laidley Creek STP Nutrient OffsetDistributionCameron Jackson, Queensland Urban UtilitiesDate15th October 2016ContactPaul McDonald and Paul Daly, SEQC Services Pty Ltd



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Executive Summary

Queensland Urban Utilities (QUU) commissioned SEQC Services to undertake a range of detailed investigations to further the planning required to invest in the rehabilitation of Laidley Creek under the State Government's 'Flexible options for managing point source water emissions: A voluntary market-based mechanism for nutrient management' document (known as the 'Nutrient Policy'). The proposed project requires the achievement of a 5 tonne/yr TN and 1 Tonne/yr TP offset in order to offset wet-weather related discharges from the Laidley STP into the Laidley Creek system. The information contained within this report achieves the required outcomes under the Nutrient Offset Policy using a similar strategy to that employed as part of the successful QUU Beaudesert Nutrient Offset Pilot Project.

Laidley Creek is in a highly degraded state which has been exacerbated by the 2011 and 2013 floods in the Lockyer Valley. A range of erosion mechanisms are present and the risk of future large scale erosion in the target investment area is significant. The proposed investment area is a 'regional hot-spot for restoration', which will have significant additional public good benefits in terms of improved water quality in the Brisbane River and Moreton Bay, improved water quality at the Mt Cosby Water Treatment Plant and enhanced biodiversity values in Laidley Creek. The proposed works are strongly supported by local landowners, the State Government and the Lockyer Valley Regional Council; and complement river restoration investments from other organisations.

The modelling and direct on-ground investigations undertaken have identified significant potential for future erosion in the target area, particularly resulting from the erosion of the inset channel features, creek bed deepening and associated failure of unstable shear creek banks. Based on a flow threshold of 90m³/s the modelling indicates long term annual sediment losses per length of waterway estimated at being 7.2 m³/m and 8.8 m³/m for Reach 1 and Reach 2 respectively. The estimates of sediment offset indicate the proposed works have the potential to result in a 90% sediment load reduction, which translates to a sediment offset of 6.5m³/m for Reach 0.5m³/m for Reach 0.2 annually. A detailed analysis of soil nutrient concentration through the target reach was conducted where 9 soil cores where taken and 85 samples extracted and analysed. The results of this analysis demonstrate a soil concentration of 0.063% TN and 0.125% TP.

Following the stream bank erosion nutrient offset decision support framework developed as part of the Beaudesert Pilot Project and the outcomes of the modelling and soil analysis *a total length of 2.05 kilometres of deliverable works* and associated structures is required to achieve the target nutrient offset. At the project area these works will achieve an estimated 12,000T of sediment erosion avoided per year, with an associated nutrient offset of 7.57 T TN and 14.96T TP. Using an attenuation factor of 1.5 given the downstream distance of the STP from the project area, *it is proposed that the project will achieve a nutrient offset at the Laidley STP point of discharge of 5.05T TN and 9.98T TP.*

The on-ground works are proposed to be delivered over a one year period, with 2050m of bank battering, revegetation and associated in-stream structures to be delivered. Engagement with all landholders that will be involved with the project has received their in-principal support for delivery on their properties. Further, relevant State Government Departments and the Lockyer Valley Regional Council have been engaged and are supportive of the proposed works.



To deliver the on-ground works required to achieve the identified nutrient offset outcome a total budget of \$1,598,000 (Ex GST) is required. This includes earthworks, materials, revegetation and site management for 5 years, project management and RPEQ certification of the in-stream structures constructed. It is important for QUU to recognise that SEQC Services has worked to keep the required budget as low as possible. This will mean that revegetation will occur at 900 stems/ha and that the budget is reliant on some support from landholders (in moving infrastructure and spreading spare soil). Whilst the works proposed are based on engineered designs and will build resilience in the site, river restoration faces inherent risks associated with climatic events. In the event that minor earthworks repairs are necessary over the licence period, SEQCS will discuss any suggested repairs with QUU and seek a variation to cover those costs.

This is an ambitious project and positive media opportunities would arise as a result of its delivery. SEQC Services thanks QUU for the opportunity to undertake this scoping project and is excited by the opportunity to work on such a significant regional project with QUU in the near future.

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Report Structure

The following report is presented in a number of sections that together provide the relevant investigations and an implementation strategy for QUU to progress toward the investment in the Laidley STP nutrient offset.

Section 1: Target Investment Area and Geomorphic Assessment

Section 2: The Modelling Methodology and Results

Section 3: Soil Assessment

Section 4: Engagement

Section 5: Proposed Nutrient Offset

Section 6: Project Budget

SEQC Services has engaged the services of geomorphic experts to assist with the geomorphic assessment and modelling, and engaged The Department of Science, Information Technology and Innovation to undertake all soil analyses.

Section 1: The Target Investment Area and Geomorphic Assessment

1.1: Investment Area Overview

The target investment area for the proposed nutrient offset is located in an area of Laidley Creek that SEQ Catchments has been delivering work in since 2013. Work delivered here to date has been funded by the State Government's Natural Disaster, Relief and Recovery Arrangements, The Department of Environment and Heritage Protection as part of their 'Health Country Support Program' and the Port of Brisbane as part of the Offsite Stormwater Treatment Pilot Project.

The target area for the nutrient offset to be delivered entails a section of Laidley Creek in the areas of Mulgowie and Thornton. As noted SEQ Catchments has been working in this area for some time and has developed an overarching rehabilitation implementation strategy for the area, this has included separating the target area of Laidley creek into 3 Reaches. The proposed delivery locations for QUU stretch along a 3.5km reach of the Creek in Reach 1 and 2 as shown in Figure 1.



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Figure 1: Map of Laidley Creek Strategic target area showing the 3 reaches and highlighting the proposed QUU works zones.



1.2: Understanding Laidley Creek

Laidley Creek is a significant source of sediment and nutrient loads into Lockyer Creek and subsequently the Brisbane River (Alluvium, 2016¹). This is particularly evident during major flood events. Recent channel adjustment after flooding in 2011 and 2013 resulted in substantial loss of land, damage to public and private infrastructure, and large volumes of sediment eroded and transported downstream to Lockyer Creek. As Lockyer Creek joins the Brisbane River downstream of Wivenhoe Dam, there are no major barriers to sediment transport between Laidley Creek and the Brisbane River.

Sediment generated from erosion in Laidley Creek therefore has potential to be transported to the Brisbane River potentially impacting on Brisbane's water supply and treatment process, Moreton Bay and the industries that rely on a healthy and functioning ecosystem in the Bay such as Fisheries and Tourism.

The system is significantly altered from its natural state and has a highly degraded riparian corridor. The Creek is not stable; it is continuing to deepen and widen and in some places is at risk of avulsion (finding a new course). These aspects of creek instability have implications for increased sediment supply to the downstream system as described above.

A review of historic channel change was undertaken to inform this investigation. Aerial imagery from various years between 1951 and 2013 was available to assess the historic rates of channel change (Figure 2). The analysis of historical aerial photos enabled changes in vegetation condition, channel width and planform to be assessed both historically and also more recently in the flood event of 2013. Limited change in the planform alignment of the macrochannel of Laidley Creek through the area of works was found, however there appears to have been widening of the inset channel throughout the area.



Figure 2: Laidley Creek bank alignment in Reach 1 from 1951 to 2013 – the red lines indicate top of macrochannel bank in 2013

Significant degradation of the inset features of the macrochannel has occurred between 1951 and 2013 (Figure 3). Mobilisation of sediment from these inset features has led to significant volumes of sediment transported downstream.



¹ Laidley Creek Management Options memo from Alluvium, 2016.



Figure 3: Degradation of inset bench within Reach 1 Laidley Creek demonstrated by change in aerial photography and change in elevation between 2011 and 2013 displayed on 2014 LiDAR (yellow and pink displays a drop in elevation indicating erosion has occurred)

1.3: Erosional processes within Laidley Creek

The erosion in Laidley Creek is the result of a range of complex and interrelated processes. Previous assessments have indicated that bed incision (i.e. channel deepening) processes may be occurring in the upper portion of Reach 1 and throughout Reach 2 (Alluvium, 2013), this was confirmed with a detailed field inspection undertaken and bed grade surveys undertaken for both reach 1 and 2 (Figure 4 shows the reach 1 survey). The incision processes may have been initiated by a combination of:

- Increased flows due to catchment clearing and burning of the steep hill slopes
- Reduction in coarse sediment supply due to ford and culvert crossings in upper reaches and tributaries
- Reduction in coarse sediment supply due to localised gravel extraction activities
- Loss of channel resistance through riparian clearing and desnagging

The bed incision has most likely resulted in increased rates of fluvial scour along the toe of the bank which has initiated mass failure of the upper bank. This process accounts for the active widening of the inset channel which has been observed in the aerial imagery analysis. Mass failure and/or scour of the bank has resulted in the collapse of constructed levees. In the 2013 flood event, such breaches in the constructed levees created concentrated floodplain flow paths and associated floodplain scour (e.g. Figure 5). The implementation strategy detailed in section 5.3 is designed to halt ongoing bed incision and reduce the potential for erosion on the creek banks through a combination of soft and hard engineering earthworks and associated revegetation.





Figure 4: Bed grade survey outcomes in reach one, a number of incisions were found toward the upstream area of reach one that required bed control structures to limit further deepening. Similar issues have been identified in Reach 2.



Figure 5: An area where the levee has been breached and the floodplain scoured, leading to a mass loss of soil. Also note the highly eroded creek banks following the 2013 flood.



Section 2: Modelling Methodology and Results

2.1: Modelling Methodology

The erosion avoided estimates identified in this report were generated using the methodology developed during the Beaudesert Pilot Project in 2013. The primary models used to generate these estimates include the Bank-Stability and Toe Erosion Model (BSTEM), developed by the National Sediment Laboratory of the USDA's Agricultural Research Station and HEC-RAS, a one dimensional flow model developed by the US Army Corps of Engineers.

The investigation phase of this project has been able to leverage off the considerable amount of work undertaken to date as part of prior investments in Laidley Creek. The following section includes a brief description of the key components of the modelling process undertaken to identify the expected erosion in the project area under both un-remediated and remediated conditions.

Key components of the modelling process have included:

2.1.1: Calibration of the model

Calibration of the model is important to ensure estimates of future erosion are accurate. The BSTEM package is used to assess erosion at the toe of stream banks and subsequent upper bank collapse. LiDAR captured in 2011 (pre 2013 flood) and 2013 (post flood) was used to calibrate BSTEM. The 2013 flood event resulted in overbank inundation, breaking through the levee at several locations along the target reach, causing significant floodplain scour (see Figure 5). However this study has concentrated on sediment loss from instream sources and not floodplain scour. As a consequence only in channel flows have been used for the assessment, which according to geomorphologists Alluvium Consulting is considered to provide a conservative estimate of future erosion.

The model was calibrated through an analysis of eight representative cross sections through reaches 1 and 2. These cross sections represented locations where bank erosion occurred in the 2013 flood event. The calibration process comprised adjustment of model parameters to establish a match between the 2013 surveyed cross-section topography at each cross section and the modelled cross-sections topography following the application of the 2013 flood event to the 2011 bank profile.

Adequate calibration was achieved for five of the eight BSTEM cross-sections, an example is shown in Figure 6. This example demonstrates vertical shear failure, which results in the angular failure plane shown (yellow line). Achieving an adequate calibration in five of the eight BSTEM cross-sections gives a level of confidence that the model is providing a reasonable representation of the bank erosion processes given the complexity of erosional processes. (Further calibration details see Appendix 1.1).





Figure 6: An example of the cross sectional model outcome compared to the pre and post flood LiDAR data. 2011 LiDAR in blue, 2013 LiDAR in orange and the calibrated model outcome shown in yellow. The modelled outcome shows the result of the 2013 event on the 2011 LiDAR data set, which then aligns with the actual erosion measured via the 2013 LiDAR.

2.1.2: Classification of geomorphic units

The classification of geomorphic units is important in understanding how different features of the waterway are affected by flow events. Cross sections used to assess the modelling outcomes were selected to represent the different geomorphic units found in the target section of Laidley Creek. Each geomorphic unit was classified into one of three categories:

- High bank High, shear banks, typically consisting of resistant clay which is less erodible than the inset features
- Inset floodplain depositional features located above the low water level, typically consisting
 of erodible sandy-loam soils. Major erosion of these features occurred during the January
 2013 flood event
- Bench distinctly-stepped depositional features located above the low water level, typically consisting of erodible sandy-loam soils. Major erosion of these features occurred during the January 2013 flood event

Each geomorphic unit along the target reach was assigned an individual identifier and the length for each was determined, this assisted in identifying the estimated expected erosion.

2.1.3: Design flood events

A range of design flood events were run in order to estimate sediment loss volumes for different magnitude flood events, these flood events are entered into the model to assess expected erosion. A partial Flood Frequency Analysis (FFA) was run using data from the Mulgowie Gauge to determine design events between 1 and 10 years. As previously discussed based on information from the DNRM gauge rating and previous studies, it is assumed that the gauge data represents only in channel flows. The results from the FFA are shown in Table 1.

Table 1: Design Peak flows for Laidley Creek at Mulgowie Weir				
Average Recurrence Interval (ARI)	1	2	5	10
Peak Discharge – Laidley Creek at Mulgowie Weir (m ³ /s)	71	187	277	309

The BSTEM analysis within Hec-RAS is sensitive to both peak flows and flow duration. As such, a key input into the hydraulic model is a flow hydrograph. The hydrographs for events matching the design peak flows in the 42 year flow record were analysed. The duration of flows was variable for each peak





flow event, as such both a short duration and long duration event was run for each ARI peak flow. An example for the short and long duration event for the 10 year ARI event is shown in Figure 7.



Section 2.2 Modelling Results

2.2.1: Event sediment loss

The modelled outcomes of expected erosion resulted in large variance between the short and long duration flows identified as part of the flood frequency analysis, with events skewed toward the longer duration flows (See Appendix 1.2 for further detail). Therefore an average flow duration was identified by Alluvium Consulting (geomorphologist experts) and is considered to be a conservative assumption. Table 2 shows the sediment loss expected in each reach under the short, average and long duration design events.

2.2.2: Annualised estimate

To determine an annual sediment loss the relationship between flood magnitude and sediment load was applied to the flow record at the Mulgowie Weir gauge. Each individual flow event above a threshold was extracted in order to determine the volume of erosion per event. Events had a seven day independence so events which have multiple peaks are only counted once (this is considered a conservative assumption).

A bank erosion threshold is required as there is currently significant weedy vegetation within the channel which provides some limited stabilisation to the underlying bank material. These weeds are typically shallow rooted and provide limited resistance to erosion. Based on Alluvium Consulting's experience in modelling waterway erosion they have assumed that once a threshold of 90 m³/s is reached under an 'average duration flow' this weedy vegetation is stripped and the banks which are composed predominately of sandy-loam material begin to erode (for further detail see Appendix 1.2).

Design	Peak flow	Short dura	itions	Average du	Average durations		tions	
event								
		Reach 1	Reach 2	Reach 1	Reach 2	Reach 1	Reach 2	
	(m3/s)	volume (m3)		volum	volume (m3)		ie (m3)	
1 year	72	4,436	10,421	7,287	16,116	10,138	21,811	
2 year	185	9,833	21,768	25,000	51,899	40,168	82,031	
5 year	284	11,417	24,509	35,793	75,046	60,169	125,583	
10 year	309	11,554	23,930	35,355	70,367	59,155	116,804	
2011 – 2013 (m3)*	380	66,000	192,000	66,000	192,000	66,000	192,000	
()					C .			

Table 2: Sediment loss estimate for each design event

* This is one event only and was calculated using a differential DEM analysis

Based on these assumptions, long term sediment losses per length of waterway are estimated to be 7.2 m³/m and 8.8 m³/m for Reach 1 and Reach 2 respectively. Table 3 shows the average sediment loss estimates broken down into estimates for the left and right bank at the 90m³/s flow threshold used.

Alluvium is confident that these rates are likely to occur over the next 10 years while the channel morphology remains similar to the current condition. After this period there is the potential for more resistant clay boundary layers to be reached which may reduce rates of erosion. However there is also the potential for bed incision to result in significant rates of bank erosion and mass failure of the steep banks which abut the floodplain which to date have been comparatively stable compared to the inset features. These estimates do not account for the additional erosion that would arise from such incision. Similarly the estimates do not include the loss of sediment associated with floodplain scour.

Flow threshold	2	Left bank (reach 1)	Right bank (reach 1)	Left bank (reach 2)	Right bank (reach 2)
	Total sediment loss (m3)	442,882	484,016	755,541	1,327,292
00 m3/c	Annual sediment loss per year (m3)	10,545	11,524	17,989	31,602
50 11 / 5	Annual sediment loss per length of waterway (m3/m/year)	3.6	3.6	3.2	5.6

Table 3: Average sediment loss results in each reach under different scenarios

2.2.3: Sediment avoided estimates

Alluvium estimates that the proposed works have the potential to result in a significant reduction in sediment loads from Reach 1 (\approx 90-95 % and Reach 2 (\approx 92-98 %). These estimates assume uniform vegetation establishment throughout the reach across the 10 year establishment period. In order to make a final calculation of erosion to be avoided, SEQCS has taken a conservative approach and used 90% avoided in both reaches, resulting in a sediment offset of 6.5m³/m for Reach one and 7.9m³/m



for Reach 2. Table 4 details estimates for erosion for each bank in reach 1 and 2. Reach 2 has higher expected erosion rates because of its more degraded state and the expectation of greater stream powers in that reach. For further detail on these estimates see Appendix 1.4.

Further, on-ground creek bed surveys and geomorphological assessments in the field were conducted to sense-check the validity of the LiDAR data and modelling outcomes. This has provided a significant degree of confidence in the results achieved as part of the modelling process.

Table 4: Annualised erosion avoided available by undertaking works along Laidley Creek in Reach one and two and annualised avoided erosion 'offset' m³/per metre of bank. For full modelled outcomes see Appendix 1.4, tables 9-12.

	Rea	ch 1	Reach 2		
Side of creek	Left bank	Right bank	Left bank	Right bank	
Average offset from years 1 to 10 on the left bank (m ³)	9,960 (total possible works extent 2950m)	6,034 (total possible works extent 1500m)	16,604 (total possible works extent approx 5678 m)	11,356 (total possible works extent approx 5678 m)	
Annualised offset m3/per metre of bank	3.4	4.0	2.9	5.5	

Section 3: Soil Assessment

3.1: Soil Nutrient Concentration Sampling Methodology

The methodology developed as part of the Beaudesert pilot project was employed to ascertain the nutrient concentration of the soil profile along the proposed project area. In brief, the nutrient concentration of the soil profile is identified through the direct measurement of Total Nitrogen (TN) and Total Phosphorus (TP) concentration in the soil at a range of locations along the target project area, at 50cm intervals to a depth of 4.5 metres, essentially the erodible bank profile of the area modelled.

Soil sampling from seven locations were conducted, including a triplicate at location 5 (see Figure 8 for map of locations). Samples were collected with a geoprobe industrial soil corer which in all but one location achieved a sample depth of 4.5m. 85 bulk samples were taken at 50cm intervals and sent for analysis at the laboratories of the Queensland Government Department of Science, Information Technology and Innovation (DSITI).

Analysis of the soil samples has included both the Dumas and Kjeldahl method of nutrient analysis (See appendix 2 for further detail). Whilst the Dumas method truly determines Total N, the Kheldahl method only converts protein N and some nitrate (NO³-N) into ammonium². Both methods have been undertaken as the Dumas method is only accurate at levels higher than 0.05%. Alternatively the Kjeldahl test provides readings down to 0.01%.

² Simonnea , E., & Mills, H (1998) Does the nitrate fraction account for differences between dumas-N and Kjeldahl-N values in vegetable leaves? Journal of Plant Nutrition 21 (12), 2527-2534.



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Figure 8: Soil sample locations



3.2: Soil Nutrient Concentration Analysis Results

Thirty-nine of the 85 soil samples returned TN estimates (Dumas technique) greater than the 0.05% detection limit and 76 of the 85 soil samples returned TKN results greater than the 0.01% detection limit. The 39 samples for which both TN and TKN estimates were greater than the respective detection limits was used to generate an understanding of the component of TN represented by TKN (percentage increase of TN over TKN). The approach used provides a median difference of 14.3% increase in TN over TKN.

As QUU's Environmental Authority regulates TN, Dumas is the appropriate measure to convert sediment erosion avoided to nutrient (TN) erosion avoided for the purposes of the Policy. The challenge in determining a soil profile TN level for the purposes of calculating nutrient erosion avoided is that for much of the lower soil profile, TN is below the Dumas test detection method (0.05%); though well above the TKN detection level (0.01%)

The approach employed by SEQC Services was to use TN values where TN >0.05% and use the conservative estimate of central tendency to convert TKN to TN for TN values <0.05% and TKN values >0.01%. Of the 85 samples analysed 13 returned a TKN of <0.01%, these samples have been calculated as having a value of 0.01% TN as the TKN analysis used provides the greatest possible accuracy of methodologies available at the selected laboratory. **On this basis (and assuming TN=0.01, when TKN<0.01), the total profile TN over the 9 profiles is 0.063%**.

For assessing Total Phosphorus (TP) the Total Kjeldahl Phosphorus (TKP) analysis was used as per the methodology employed under the Beaudesert Pilot Project and as TP is not the limiting nutrient identified in the system, the TKP analysis more than adequately provided the target TP offset QUU is seeking with **a TP concentration of 0.125%**. The averages for both analyses can be seen in Table 5, see Appendix 3 for full table of results.

Soil profile assessed	Average TN (%)	Average TKP (%)
1	0.066	0.146
2	0.056	0.126
3	0.078	0.142
4	0.074	0.118
5.1	0.052	0.108
5.2	0.047	0.094
5.3	0.042	0.137
6	0.069	0.146
7	0.083	0.104
Average nutrient concentration	0.063	0.0125

Table 5: Average nutrient concentration of the soil assessed from the project location. Note profile 5 is a triplicate sample.

3.3: Soil Bulk Density

Using Particle Size Analysis undertaken by DSITI 30 samples were assessed which resulted in an average PSA of 15.56% coarse sand, 43.98% fine sand, 20.17% silt and 20.29% clay.

To identify the bulk density of soil in the samples, the above noted average percentage soil composition was entered into two different soil texture triangles that are used to interpret percentage soil composition in to a known bulk density³. The percentage soil composition of the samples

server.carleton.ca/~msmith2/45211/Module5/soil_triangle.htm) and Geosciences Cooperation



³ From Carleton University, Ottawa Canada (http://http-

classified the soil type on average as a sandy clay loam with a bulk density average of 1.44 (see Appendix 5 for full results).

Section 4: Engagement

4.1: Landholder Engagement

SEQC Services has engaged over the past several years with the majority of landholders in the Mulgowie to Thornton area where the proposed project is to be delivered. Over this time we have established strong relationships with a number of landholders and through past projects demonstrated our ability to undertake waterway restorations projects, improving riparian condition and importantly increasing farm resilience when faced with future flooding events.

The proposed delivery area will work on 3 private landholders properties and across multiple properties owned by the Mulgowie Farming Company (MFC), the major horticulture enterprise operating in the Mulgowie area. The details of each landholding can be found in Section 5.3. SEQC Services has engaged with all of the identified landholders where works are proposed for delivery and received their in-principal support for work to take place.

Should the project be funded, SEQC Services will request that each landholder sign an individual agreement stating they agree to the work, will not undertake any actions that in some way will impact the delivered works and in the future will continue to manage the restored riparian area of their property.

4.2: Government Engagement

The primary point of contact has been the Department of Natural Resources and Mines. They have supported all works delivered by SEQC Services in Laidley creek previously and provided their inprincipal support for works to be delivered under this proposed plan. Once funded SEQC Services will act expeditiously to gain a Riverine Protection Permit (RPP) for the works detailed in Section 5.3.5 (detailed technical designs). We foresee no issues in gaining this permit.

The Department of Science, Information Technology and Innovation has supported the sampling regime undertaken to ascertain the nutrient concentration of the soil used to assess the required offset proposed in this report. Further, they have been engaged via work with the Offsite Stormwater Steering Committee (a Port of Brisbane project) to establish a water quality monitoring program that in time will complement the work proposed as part of this project.

SEQC Services is of the understanding that QUU has had a preliminary meeting with the Department of Environment and Heritage Protection (EHP) to assess their level of support for the proposed project. It is understood that this meeting went well and EHP have expressed support for the project. SEQC Services is available to assist QUU moving forward with any further engagement of EHP to discuss the contents of this report and any aspects of the proposed project to ensure the Government's acceptance of the project under the Nutrient Policy.

The Lockyer Valley Regional Council has been engaged regarding the proposed works. Personnel from Council have visited the area several times with SEQC Services personnel and are aware and supportive of the proposed works and other works undertaken to date in the creek by SEQC Services.



based on information from Washington State University (http://geocoop.stormloader.com/soil_h2o.htm?140,222)

Section 5: Proposed Offset

5.1: Offset Quantum

It is SEQC Services understanding that QUU has a target offset of 5 tonnes TN and 1 tonne TP per year. Following the stream bank erosion nutrient offset decision support framework developed as part of the Beaudesert pilot project, the primary data set used to calculate the required on-ground activities to achieve the target offset is the 'annual sediment offset' identified in the modelling process and the nutrient concentration identified as part of the soil nutrient assessment.

The framework depicted in Figure 9 uses the annualised erosion avoided estimates of $6.5m^3/m$ for Reach one and $7.9m^3/m$ for Reach 2 where works are planned for delivery and the nutrient concentration findings of 0.063% TN and 0.0125 TP.



Figure 9: Stream bank erosion nutrient offsets decision support framework

Using the decision support framework and SEQC Services understanding of the project area, a total length of 2.05 kilometres of deliverable works and associated structures is required to achieve the target nutrient offset. At the project area these works will achieve an estimated 12,000T of sediment erosion avoided per year, with an associated nutrient offset of 7.57 T TN and 14.96T TP. Using an attenuation factor of 1.5 given the downstream distance of the STP from the project area, *it is proposed that the project will achieve a nutrient offset at the Laidley STP point of discharge of 5.05T TN and 9.98T TP.*

5.2: The Project Site

The proposed works are to be delivered in the upper section of Reach 1 and lower section of Reach 2. Within this area, the works to be delivered will occur at strategic locations on either side of the creek, in total rehabilitating 2.05km of creek bank (Figure 10).

The proposed works align with SEQC Services rehabilitation strategy for the area, progressively working upstream building natural resilience within the creek over time. These works will build upon efforts to date funded by a range of other organisations. The program of works considers these other organisations commitment to further funding the improvement of Laidley creek along the target area.

As noted in the geomorphic assessment, Laidley Creek is experiencing instabilities in both the creek bed and banks. Therefore investment must target the stabilisation of these two erosion threats, as targeting a single threat alone will not achieve the desired outcome. Under the Mechanism only restoration of the creek banks will contribute toward the offset quantum, however investment in controlling bed erosion is required to protect the investment in the bank stabilisation works (Alluvium, 2016⁴).



⁴ Laidley Creek Management Options memo from Alluvium, 2016.



Figure 10: Shows an overview of the proposed locations where works will be delivered (in green) and broken down in to locations to be delivered in downstream (red) and upstream (purple). The yellow outlines show the delineation of reach 1 and 2.


5.3: Implementation Strategy

The following delivery plan details the specifics of the on-ground deliverables, the investment locations, technical plans and proposed timeline for delivery (noting that delivery timings are linked to climate and seasonal conditions).

The proposed works will include the delivery of 850m of bank battering and associated revegetation (see Figure 11 for example). It is proposed a further 1.2km of bank battering and revegetation be undertaken, the installation of rock beaching at several locations and the construction of one grade control structure in Reach 2. After planting, vegetation on the sites will be managed intensively for 2 years and less intensively for another 3 years so as to give it the best chance of survival.

Section 5.3.5 details the technical plans that are identified for delivery over the implementation process.



Figure 11: An example of a battered bank on Laidley Creek

5.3.1: Proposed Delivery Plan

The proposed works are to be delivered from the most upstream extent of restoration work currently delivered, shown in Figure 12. There are three particular locations where work will be delivered in year 1, across 3 different landholders' properties, including:

Landholder one: Mulgowie Farming Company

Lot/Plan and property details: 17 Mulgowie School Road, Mulgowie, 4341; Lot 49 CH3149 & Lot 2 RP28308; Primary land use is small crops and fodder – irrigated; 55.2Ha in size and free hold tenure.

Proposed works: 300m of bank battering, levee adjustment and revegetation. Figure 13 shows a typical eroded section along where the works are proposed. SEQC Services has worked with MFC over the past several years undertaking bask stabilisation works. Due to the large size of the organisation they are able to offer significant in-kind contributions to any projects delivered on their land. In the form of machinery to spread excavated soil on their cultivation and personnel to assist with some watering of the remediated creek bank to establish grass cover.



Landholder two: Michael Lerch

Lot/Plan details: 126 Mulgowie Road, Mulgowie, 4341; L1 RP215312; Primary land use is small crops and fodder – irrigated; 18.27Ha in size and free hold tenure.

Proposed works: 350m of bank battering, levee adjustment and revegetation. Figure 12 shows a map where these works are proposed for.

Landholder three: Maree & Lindsay Smith

Lot/Plan details: 130 Mulgowie School Road, Thornton, 4341; Lot 2 & 3 RP807883; Primary land use is for a dwelling; 2.79 Ha in size and free hold tenure.

Proposed works: 200m of bank battering, revegetation and fencing. Figure 12 shows a map where the works are proposed for delivery.



Figure 12: Delivery locations with relevant landholder details next to the works zone proposed to be delivered on their property





Figure 13: Typical eroded bank with only grass growing on it and no trees. This type of bank is highly prone to erosion in future flow events.

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Figure 14: Upstream delivery locations with relevant landholder details next to the works zone proposed to be delivered on their property

The works to be delivered will work cooperatively with other organisations investing in the area. One landholder is located in Reach 1 of the project area and the other two locations for delivery are in Reach 2, above the Laidley Creek Weir (See Figure 14). In addition to the bank battering works delivered this year will include the construction of a grade control structure and rock beaching to increase the resilience of a particularly vulnerable sub reach. The 3 landholders where works are proposed include the following properties:

Landholder Four: Robert Elliot

Lot/Plan and property details: 137 Mulgowie Road, Mulgowie, 4341; Lot 2-3 CC1420, Lot 4 RP32848 & Lot 4 RP836235; Primary land use is small crops and fodder – irrigated; 155.1Ha in size and free hold tenure.



Proposed works: 300m of bank battering, levee adjustment and revegetation. Figure 14 shows a map where the proposed works are to be located.

Landholder one (different property to year 1 delivery): Mulgowie Farming Company

Lot/Plan and property details: 152 Mulgowie Road, Mulgowie, 4341; Lot 49 CH3149 & Lot 2 RP28308; Primary land use is small crops and fodder – irrigated; 55.2Ha in size and free hold tenure.

Proposed works: 600m of bank battering, levee adjustment and revegetation. An area of rock beaching will also be installed along this site where there is a particular risk of erosion along the toe of the bank identified in the modelling process and ground-truthed with an on-site inspection. This stretch of the project is also where a grade control structure will be installed as it was a section of the creek that was noted as having significant deepening potential. Rock chute style grade control structures are one of the most effective methods to halt incision. The structures limit deepening by providing a fixed hardened point within the channel bed. Cut-off walls at the crest and toe provide further security against this process. The structures can also lower the hydraulic gradient upstream of the crest which can reduce stream power and increase the likelihood of vegetation establishment. Figure 15 shows an example of a grade control structure installed further upstream in Laidley creek.

Figure 14 shows where the proposed works are to be located.

Landholder five: Paul Emmerson

Lot/Plan and property details: 153 Mulgowie Road, Mulgowie, L80 CH311035 & L136 CH311847 & L141 RP215334 & L2 RP32854 & L11 SP145223; Primary land use is small crops and fodder – irrigated; 108.29 Ha in size and free hold tenure.

Proposed works: 300m of bank battering, levee adjustment and revegetation. Figure 14 shows the actual area of delivery.

In addition to the in-kind contributions mentioned it should be noted the considerable productive land 'given up' by the landholder to undertake the project. This however provides a win-win outcome for QUU in the form of a location for project delivery, the landholder through improved farm resilience when faced with floods and the greater society and environment through the avoidance of sediment delivered downstream resulting from an on-going erosion problem.

The above noted locations are the result of our geomorphic assessment and negotiations with landholder to approve the delivery of work on their land. Given the 2 year delivery timeframe, should any issues arise that greatly change the developed technical plans or landholders change position on investment on their property, SEQC Services will be able to identify other areas for investment close to those proposed above and still achieve the required offset outcomes.

5.3.3: Ongoing maintenance and monitoring

As per the methodology used at the Beaudesert project, SEQC Services will continue to maintain the site for a period of five years post construction. This will include periodic weed management, inspections of the constructed structures and ongoing engagement with the landholders involved in the project.

SEQC Services will monitor the site as per the agreement between QUU and EHP as regulated by the amendments made to the Laidley STP. SEQC Services has budgeted for biennial LiDAR monitoring. QUU will need to confirm with EHP if this is a suitable monitoring regime. If annual LiDAR is required the proposed budget will need to be updated to account for this.



5.3.4: Proposed Delivery Timeframe

All efforts will be made to achieve the outcomes identified in the timeline, however unforeseen circumstances such as landholder related issues and delays related to the weather may impact on delivery. Should this occur the delivery schedule will be reviewed in discussion with QUU.

Table 6: Proposed delivery timeline





Figure 15: An example of a grade control structure constructed upstream in Laidley creek in 2013



5.3.5: Technical Plans

Note that the below technical plans go beyond the scope of works proposed under section 5.3.

Reach 1







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Queensland Government





Reach 2

























Permit Environmental Authority EPPR00521513





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Section 6: Budget

Activity	Key tasks	Cost (\$) exc GST
Earthworks	1 Grade control Structure, weed biomass removal, 2050m bank battering and 50m rock beaching	\$702,000
Risk contingency	Manage risk profile at 8%	\$56,160
Revegetation & site preparation	Site revegetation at 900 stems/ ha.	\$168,000
Commissioning period FY 17/18	Site maintenance	\$47,200
Project management	Landholder and contractor management, reporting, project coordination	\$315,000
Revegetation maintenance yr1 18/19	5 passes	\$59,640
Revegetation maintenance yr2 19/20	4 passes	\$45,000
Revegetation maintenance yr3 21/22	4 passes	\$45,000
Revegetation maintenance yr4 22/23	4 passes	\$45,000
Revegetation maintenance yr5 23/24	3 passes	\$30,000
Monitoring	Biennial LiDAR, Engineer signoff	\$85,000
Total		\$1,598,000

Notes

- Establishment phase (earthworks and revegetation) will occur over 2 years
- Vegetation will be monitored and managed for 5 years from planting to ensure successful establishment
- LiDAR costs have been calculated based on biennial flight runs. In the event that the licence condition requires yearly LiDAR, a variation will be submitted.
- The budget has been developed as leanly as possible, as such there is limited contingency available. Whilst the works proposed are based on engineered designs and will build resilience in the site, river restoration faces inherent risks associated with climatic events. In the event that minor earthworks repairs are necessary over the licence period, SEQCS will discuss any suggested repairs with QUU and seek a variation to cover those costs.



Appendix

Appendix 1:

Appendix 1.1: Calibration of BSTEM model

The BSTEM package is used to assess erosion at the toe of stream banks and subsequent upper bank collapse. LiDAR captured in 2011 (pre 2013 flood) and 2013 (post flood) was used to calibrate the BSTEM model. For modelling purposes it has been assumed that changes in bank morphology between the two LiDAR data sets resulted from the January 2013 flood event. The 2013 event was therefore used for model calibration.

The 2013 flood event resulted in overbank inundation, breaking through the levee at several locations along the target reach, causing significant floodplain scour. However this study has concentrated on sediment loss from instream sources and not floodplain scour. As a consequence only in channel flows have been used for the assessment, thus our estimates of future erosion avoided are conservative. Previous investigations (Alluvium, 2013) have found that the rating table at the Mulgowie gauge is representative of in-channel flows only. Data from the Mulgowie Gauge was used to generate a hydrograph for the 2013 flood event for calibration purposes.

The model was calibrated through an analysis of eight representative cross sections through reaches 1 and 2 (Figure 16 & 17). These cross sections represented locations where bank erosion occurred in the 2013 flood event. The calibration process comprised adjustment of model parameters to establish a match between the 2013 surveyed cross-section topography at each cross section and the modelled cross-sections topography following the application of the 2013 flood event to the 2011 bank profile

The method for calibrating the model was as follows:

- Step 1 Field testing of the soil profile of the inset features was undertaken to determine the soil property inputs to the model. Four soil samples (cores) were taken from inset features through reaches 1 and 2. Each of the soil samples revealed the inset features to be largely comprised of sandy-loam with some clay loams present.
- Step 2 Set up Hec-RAS model with 2011 geometry, including 8 BSTEM cross sections
- Step 3 Input typical properties for sandy-loam soil type
- Step 4 run model with 2013 flood event hydrology and compare the modelled bank failure in the 8 BSTEM cross sections with the 2013 cross-section geometry
 - Step 5 modify the cohesion, critical shear stress and erodibility parameters and rerun model. Repeat process with modified parameters until an adequate match is found.

Adequate calibration was achieved for five of the eight BSTEM cross-sections, two examples are shown in Figure 18. These examples demonstrate vertical shear failure, which results in the angular failure plane shown. It should be noted that BSTEM only models bank erosion and cannot simulate sediment accretion such as in Figure 18 or stream bed incision processes.







Figure 17: Reach two BSTEM cross sections used for modelling





Figure 18: 2011 and 2013 surface elevation at 2 BSTEM cross-sections (blue – 2011 and 0range – 2013), with the modelled surface elevation shown by the yellow line.

Bank erosion processes are complex and can be impacted by variations in the spatial and temporal variations in a range of complex and interrelated factors including soil parameters, vegetation, sediment supply and transport and within channel velocity distribution. To date it has not been possible to incorporate all the variables into an erosion model. However achieving an adequate calibration in five of the eight BSTEM cross-sections gives a level of confidence that the model is providing a reasonable representation of the bank erosion processes given the complexity of erosional processes.

The calibrated soil parameters for the sandy to clay loam soils which comprise the inset features are shown in Table 7.

Parameter	Value	
Saturated bulk density (kg/m ³)	1836	
Friction angle (degrees)	30	
Cohesion (kPa)	4	
Phi b (degrees)	15	
Critical shear stress (Pa)	4	
Erodibility (m ³ /N-s)	4.5 x 10 ⁻⁸	

Table 7: Soil parameters used for modelling



BSTEM cross-section selection

BSTEM cross-section locations were chosen strategically to represent the specific geomorphic units found in the reaches (as described above). Each geomorphic unit identified was represented by one representative cross-section. A difference in cross sectional area between the current cross-sections and modelled eroded cross section was calculated using the results from BSTEM. The difference in cross sectional area was multiplied by the length of the corresponding geomorphic unit to identify the expected sediment loss from each geomorphic unit making up the 2 reaches. The representative cross-sections adopted for Reach 1 and Reach 2 are shown in Figure 18.

Appendix 1.2: Modelling Results

Event sediment loss

The sediment loss estimates for each duration event for each reach are shown in Table 8. The sediment loss calculated for the 2013 flood event is also shown. The relationship between flood magnitude and sediment load for Reach 1 and Reach 2 is shown in Figure 19 and Figure 20 respectively. Due to the large variance in the sediment loss estimates between the short and long duration events average sediment loss estimates were generated for each design event, based on an 'average' flow event. Comparisons of average duration events with the long and short duration events indicates that events are skewed to the longer distribution. Therefore using the average sediment loss estimates is considered to be a conservative assumption.

Several geomorphic units were not used for the sediment loss estimates. These include areas of high banks which abut the floodplain terrace. The soil within these areas was found to be more resistant clays which have a greater resistance to erosion and are not represented by the soil properties used in the model calibration.

Short		Short dura	tions	Average du	rations	Long durat	ions
durations			10				
Total	Peak flow	Reach 1	Reach 2	Reach 1	Reach 2	Reach 1	Reach 2
	(m3/s)	volume (m	3)	volume (m	3)	volume (m	3)
1 year	72	4,436	10,421	7,287	16,116	10,138	21,811
2 year	185	9,833	21,768	25,000	51,899	40,168	82,031
5 year	284	11,417	24,509	35,793	75,046	60,169	125,583
10 year	309	11,554	23,930	35,355	70,367	59,155	116,804
2011 – 2013 (m3)*	380	66,000	192,000	66,000	192,000	66,000	192,000

Table 8: Sediment loss estimate for each design event

* This is one event only and was calculated using a differential DEM analysis





Figure 19: Relationship between flood magnitude and sediment load for Reach 1



Figure 20: Relationship between flood magnitude and sediment load for Reach 2 This assumption is supported by findings from the temporal LiDAR analysis, which indicated that limited erosion occurred on these banks during the January 2013 flood event. However if incision is left unmanaged these steep banks are likely to eventually erode due to mass failure which will result in significant sediment loads which are not currently accounted for in the modelling. The incision process cannot easily be incorporated into the modelling as the rate of bed erosion is unknown. Additionally, geomorphic units abutting the road on the right bank were omitted from the investigation as erosion is likely to be restricted by the road infrastructure and associated protection works.

Appendix 1.3: Annualised estimates

To determine an annual sediment loss the relationship between flood magnitude and sediment load was applied to the flow record at the Mulgowie Weir gauge. Each individual flow event above a threshold was extracted in order to determine the volume of erosion per event. Events had a seven day independence so events which have multiple peaks are only counted once (this is considered a conservative assumption).



A bank erosion threshold is required as there is currently significant weedy vegetation within the channel which provides some limited stabilisation to the underlying bank material. These weeds are typically shallow rooted and provide limited resistance to erosion. It is assumed this weedy vegetation is stripped once the threshold is exceeded and the banks are then predominately exposed sandy-loam material.

The actual critical threshold of the weedy vegetation is unknown and likely to be variable along the reach due to factors like varying types of vegetation, density, age etc. The hydraulic model was run with a range of flows to determine the average shear stresses through each reach in order to compare these with typical critical shear stress values in the range of the weedy vegetation. The critical shear stress for each reach for the flow thresholds of 50 m³/s, 70 m³/s and 90 m³/s is shown in Table 9.

	Reach		Reach 2	
Peak flow	Mean shear	Median shear	Mean shear	Median shear
	stress (N/m2)	stress (N/m2)	stress (N/m2)	stress (N/m2)
50 m³/s	28.6	25.5	32.5	29.8
70 m³/s	33.9	31.2	38.9	36.7
90 m³/s	38.4	36.2	44.2	42.5

Table 9: Critical shear stress values for varying steady state peak flow events

The relationship developed using short duration and long duration hydrographs was also applied to each reach and threshold scenario. The results are shown in Table 10. The sediment loss results were annualised over the 42 year period of the flow record and a sediment loss per metre of channel was determined. These are also shown in Table 10. Given that the duration of median flow events were skewed to the long duration hydrograph it is recommended that the average of the short and long duration results is used for the reach based estimates. It is also recommended that a flow threshold of 90 m³/s is adopted for the initiation of scour. Based on these assumptions, long term sediment losses per length of waterway are estimated to be 7.2 m³/m and 8.7 m³/m for Reach 1 and Reach 2 respectively. Table 11 shows the average sediment loss estimates broken down into estimates for the left and right bank.

These rates are likely to occur over the next 10 years while the channel morphology remains similar to the current condition. After this period there is the potential for more resistant clay boundary layers to be reached which may reduce rates of erosion. However there is also the potential for bed incision to result in significant rates of bank erosion and mass failure of the steep banks which abut the floodplain which to date have been comparatively stable compared to the inset features. These estimates do not account for the additional erosion that would arise from such incision. Similarly the estimates do not include the loss of sediment associated with floodplain scour.



Flow		Short	Average	Long	Short	Average	Long
threshold		durations	durations	Durations	durations	durations	Durations
	Total sediment	(reach 1)	(reach 1)	(reach 1)	(reach 2)	(reach 2)	(reach Z)
	loss (m3)	525,044	1,000,000	1,012,100	1,172,504	2,557,674	5,021,045
50 1/-	Annual sediment loss per year (m3)	12,472	25,429	38,385	27,912	57,073	86,234
50 m²/s	Annual sediment loss per length of waterway (m3/m/year)	4.1	8.3	12.5	4.9	10.1	15.2
	Total sediment loss (m3)	472,604	991,448	1,510,292	1,062,011	2,226,506	3,391,002
70 3/-	Annual sediment loss per year (m ₃)	11,252	23,606	35,959	25,286	53,012	80,738
70 m-7s	Annual sediment loss per length of waterway (m3/m/year)	3.7	7.7	11.7	4.5	9.3	14.2
	Total sediment loss (m3)	431,538	926,491	1,421,444	973,879	2,082,189	3,190,500
00 m³/c	Annual sediment loss per year (m3)	10,275	22,059	33,844	23,188	49,576	75,964
50 m-ys	Annual sediment loss per length of waterway (m3/m/year)	3.4	7.2	11.0	4.1	8.7	13.4

Table 10: Sediment loss results in each reach under different scenarios

Table 11: Average sediment loss results in each reach under different scenarios divided into left and right bank expected erosion

Flow threshold	2.	Left bank (reach 1)	Right bank (reach 1)	Left bank (reach 2)	Right bank (reach 2)
	Total sediment loss (m3)	513,803	554,608	892,782	1,504,935
50 m ³ /c	Annual sediment loss per year (m3)	12,233	13,205	21,257	35,832
50 1175	Annual sediment loss per length of waterway (m3/m/year)	4.1	4.2	3.7	6.3
	Total sediment loss (m ₃)	475,403	516,451	817,652	1,409,497
70 m³/c	Annual sediment loss per year (m3)	11,319	12,296	19,468	33,559
70 m-ys	Annual sediment loss per length of waterway (m3/m/year)	3.8	3.9	3.4	5.9



Flow threshold		Left bank (reach 1)	Right bank (reach 1)	Left bank (reach 2)	Right bank (reach 2)
	Total sediment loss (m3)	442,882	484,016	755,541	1,327,292
90 m³/s	Annual sediment loss per year (m3)	10,545	11,524	17,989	31,602
90 m-/s	Annual sediment loss per length of waterway (m3/m/year)	3.6	3.6	3.2	5.6

Appendix 1.4: Sediment avoided estimates

Based on the principal that rehabilitation works have been delivered which mitigate ongoing severe erosion likely to occur if the target area is left in its current degraded state, the following estimates of sediment loss avoided have been identified.

The method involves:

- Developing a new geometry file in the HEC-RAS model where banks were battered to a gradient of 1V:3H as shown in Figure 21.
- Re-runing all BSTEM scenarios outlined previously (i.e. short and long duration events for each ARI peak flow and the 2013 event) to determine the relationship between flow and average sediment loss under two scenarios:
- Scenario A -One year after construction which assumes vegetation coverage on the bank consists of 50% coverage with perennial ryegrass, 25% with shrubs, 15% with small trees and 10% with larger trees. Based on a diverse suite of riparian vegetation after a single year of establishment and growth a shear stress threshold of 40 Pa was adopted (Fischenich, 2001).
- Scenario B -Ten year after construction which assumes vegetation coverage on the bank consists of 50% coverage with perennial ryegrass, 25% with shrubs, 15% with small trees and 10% with larger trees. Based on a diverse suite of riparian vegetation after ten years of establishment and growth a shear stress threshold of 120 Pa was adopted (Alluvium, 2013).
- 3. Using the flow and average sediment loss relationship for Scenario A and Scenario B and the 90 m³/s flow threshold adopted for existing sediment loss estimates the annual sediment loss over the 42 year flow record for Scenario A and Scenario B was estimated. These results represent the annual sediment loss one (Scenario A) and ten (Scenario B) years after construction.
- For years 2 to 9 annual sediment loss is linearly interpolated between the Scenario A and Scenario B results.
- 5. The sediment offset in each of the ten years is the difference between the sediment load under current conditions and under design conditions. Given that the sediment load under design conditions changes over time (as vegetation matures and provides increased resistance to erosion) then the offset is different in each year.





Figure 21: Conceptual diagram of bank battering works to achieve a gradient of 1V:3H, also used as the geometric input for modelling.

At this stage the incision process and grade control structure(s) have not been included in the analysis of sediment loss avoided. However it is assumed that to achieve the outlined vegetation establishment rates a grade control program will be required to address the observed knickpoints.

The sediment offset for each year following construction of the stabilisation works on the left and right bank of Reach 1 is shown in Table 12 and Table 13 respectively. The sediment offset for each year following construction of the stabilisation works on the left and right bank of Reach 2 is shown in Table 14 and Table 15 respectively. The right bank estimates are based on works in the upper 1500 m of the reach as shown in Figure 22, whilst the indicative extent of proposed works in Reach 2 is shown in Figure 23. To achieve the desired offset both banks need to be managed along with the grade control program to stabilise the streambed. As a result, the offset values for each reach should be averaged between both banks.

As discussed earlier, long term sediment losses per length of waterway are estimated to be 7.2 m³/m and 8.7 m³/m for Reach 1 and Reach 2 respectively. The estimates of sediment offset indicate the proposed works have the potential to result in significant reduction in sediment loads from Reach 1 (\approx 90-95 %) and Reach 2 (\approx 92-98 %). These estimates assume uniform vegetation establishment throughout the reach across the 10 year establishment period.

There is the potential for erosional damage (i.e. localised toe scour or loss of vegetation) in the initial years following construction during high flow events. If suitable maintenance works are not undertaken to repair any localised damage to the bank, or poorly establishing vegetation, the erosional damage could be exacerbated in subsequent flow events. If this was to occur the predicted sediment offset estimates are unlikely to be achieved. As a result, it is recommended that the lower end of the modelled range be adopted as sediment avoided estimates for both Reach 1 and Reach 2. It is recommended that a 90 % reduction be adopted as a sediment avoided estimates for the proposed works in both Reach 1 and Reach 2. As a result, the adopted sediment avoided estimates for the proposed works should be 6.5 m³/m/year and 7.9 m³/m/year for Reach 1 and Reach 2 respectively.

A monitoring and maintenance program will be an important component of implementing the proposed works. Monitoring the condition of works will be important for identifying any new issues and determining appropriate repairs and maintenance to ensure the works are on trajectory to maximise the sediment offsets.



	Annual predicted sediment load (m ^a /year)	Sediment offset by works in specific year (m ³)	Offset per m of bank (m ³ /m)
Existing conditions (left bank)	10545		-
1 year after construction	1157	9388	3.2
2	1030	9515	3.2
3	903	9642	3.3
4	776	9769	3.3
5	649	9896	3.4
6	521	10024	3.4
7	394	10151	3.4
8	267	10278	35
9	140	10405	3.5
10 year after construction	12	10522	3.5
Average offset from voors 1 to	10 on the left back (total works	0060	3.0
extent 2950m)	-fft f	ssoo	5.4
Table 13: Annual sediment	offset for works in Reach 1 c	on the right bank where wor	ks are proposed
	Annual predicted sediment load (m ³ /year)	Sediment offset by works in specific year (m ³)	Offset per m of bank (m ³ /m)
Existing conditions (left bank)	6375		\sim
1 year after construction	681	5694	3.8
2	605	5770	3.8
3	530	5845	3.9
4	454	5921	3.9
5	378	5997	40
5	303	6072	4.0
7	303	6149	4.0
/	227	6148	4.1
8	151	6224	4.1
9	76	6299	4.2
10 year after construction	0	6375	4.3
extent 1500m)	offset for works in Reach 2 c	on the left hank where works	are proposed
Tuble 14. Annual Scament	onsector works in Reden 2 d	an the fert built where work.	s are proposed
	Annual manipant continues	Fading at affect by marks in	Offerst new of heads (m3/m)
	Annual predicted sediment	Sediment offset by works in	Offset per m of bank (m ³ /m)
Evicting conditions (left hould)	Annual predicted sediment load (m³/year)	Sediment offset by works in specific year (m ³)	Offset per m of bank (m ³ /m)
Existing conditions (left bank)	Annual predicted sediment load (m ³ /year) 17898	Sediment offset by works in specific year (m ³)	Offset per m of bank (m ³ /m)
Existing conditions (left bank) 1 year after construction	Annual predicted sediment load (m³/year) 17898 1376	Sediment offset by works in specific year (m ³) 16522	Offset per m of bank (m³/m) - 2.9
Existing conditions (left bank) 1 year after construction 2	Annual predicted sediment load (m³/year) 17898 1376 1358	Sediment offset by works in specific year (m ³) 16522 16540	Offset per m of bank (m³/m) - 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340	Sediment offset by works in specific year (m³) 16522 16540 16558	Offset per m of bank (m ³ /m) - 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321	Sediment offset by works in specific year (m³) 16522 16540 16558 16577	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5 6	Annual predicted sediment load (m³/year) 17898 1376 1358 1340 1321 1321 1303 1285	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631 16650	Offset per m of bank (m³/m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631 16651 16650 16668	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631 16650 16660 16668 16686	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0 3.0 3.0
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m)	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1257 1248 1250 1212 20 on the left bank (works extent	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631 16650 16668 16668 16668	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m) Table 15: Annual sediment	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1257 1248 1250 1212 20 on the left bank (works extent offset for works in Reach 2 c	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631 16650 16668 16666 16668 16604 wo the right bank where works	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m) Table 15: Annual sediment	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 00 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631 16650 16668 16686 16686 16604 won the right bank where works in	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0 3.0 3.0 2.9 Ks are proposed Offset per m of bank (m³/m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m) Table 15: Annual sediment	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year)	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16631 16668 16668 16668 16604 on the right bank where works in specific year (m ³)	Offset per m of bank (m ³ /m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0 3.0 3.0 2.9 ks are proposed Offset per m of bank (m ³ /m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m.) Table 15: Annual sediment Existing conditions (left bank)	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1225 1267 1248 1230 1212 <i>Uo on the left bank (works extent</i> offset for works in Reach 2 of Annual predicted sediment load (m ³ /year)	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16631 16650 16668 16668 16668 16664 works in specific year (m ³) -	Offset per m of bank (m ³ /m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to a approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 c Annual predicted sediment load (m ³ /year) 11524 336	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16650 16668 16668 16664 16664 on the right bank where works in specific year (m ³) - - 11188	Offset per m of bank (m ³ /m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 c Annual predicted sediment load (m ³ /year) 11524 336	Sediment offset by works in specific year (m³) 16522 16540 16558 16577 16595 16613 16631 16630 16668 16686 16686 16604 n the right bank where works in specific year (m³) - 11188	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16631 16668 16668 16668 16664 16664 16664 16664 16604 on the right bank where works in specific year (m ³) - 11188 11225 11363	Offset per m of bank (m ³ /m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0 3.0 3.0 3.0 2.9 ks are proposed Offset per m of bank (m ³ /m) - 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m.) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1225 1267 1248 1230 1212 <i>Uo on the left bank (works extent</i> offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261 224	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16631 16668 16668 16668 16664 works in specific year (m ³) - 11188 11225 11263	Offset per m of bank (m ³ /m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 c Annual predicted sediment load (m ³ /year) 11524 336 299 261 224	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16660 16668 16666 16666 16664 on the right bank where works in specific year (m ³) - 11188 11225 11263 11300 11307	Offset per m of bank (m³/m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4 5 5	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261 224 187	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16613 16631 16631 16663 16668 16668 16668 16664 on the right bank where works sediment offset by works in specific year (m ³) - 11188 11225 11300 11337 14325	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0 3.0 3.0 2.9 Ks are proposed Offset per m of bank (m³/m) - 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4 5 6 -	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 0 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261 224 187 149	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16630 16668 16686 16686 16686 16604 N the right bank where works in separific year (m ³) - 11188 11225 11263 11370 11377	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0 3.0 3.0 2.9 ks are proposed Offset per m of bank (m³/m) - 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 7	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1225 1267 1248 1230 1212 00 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261 224 187 149 112	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16631 16660 16668 16666 16664 works in specific year (m ³) - 11188 11225 11263 11300 11337 11375 11412	Offset per m of bank (m³/m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 c Annual predicted sediment load (m ³ /year) 11524 336 299 261 224 187 149 112 75	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16660 16668 16666 16666 16664 on the right bank where works in specific year (m ³) - 11188 11225 11263 11300 11337 11375 11412 11449	Offset per m of bank (m³/m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 9	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1285 1267 1248 1230 1212 10 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261 224 187 149 112 75 37	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16613 16631 16631 16663 16668 16668 16664 16604 on the right bank where works in specific year (m ³) - 11188 11225 11263 11300 11337 11375 11412 11449 11487	Offset per m of bank (m³/m)
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to . approx 5678 m.) Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 9 10 10 10 10 10 10 10 10 10 10	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1225 1267 1248 1230 1212 0 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261 224 187 149 112 75 37 0	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16631 16668 16668 16668 16668 16668 16664 16604 m the right bank where works in specific year (m ³) - 11188 11225 11263 11300 11337 11375 11412 11449 11449 11524	Offset per m of bank (m³/m) 2.9 2.9 2.9 2.9 2.9 2.9 2.9 2.9 3.0 3.0 3.0 2.9 Ks are proposed Offset per m of bank (m³/m) - 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5
Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 year after construction Average offset from years 1 to approx 5678 m Table 15: Annual sediment Existing conditions (left bank) 1 year after construction 2 3 4 5 6 7 8 9 10 Average offset from years 1 to 1	Annual predicted sediment load (m ³ /year) 17898 1376 1358 1340 1321 1303 1225 1267 1248 1230 1212 100 on the left bank (works extent offset for works in Reach 2 of Annual predicted sediment load (m ³ /year) 11524 336 299 261 224 11524 336 299 261 275 37 0 0 0 on the right bank (works extent	Sediment offset by works in specific year (m ³) 16522 16540 16558 16577 16595 16613 16631 16631 16668 16668 16666 16664 works in specific year (m ³) - 11188 11225 11263 11300 11337 11375 11412 11449 11487 11524 11356	Offset per m of bank (m³/m)

Table 12: Annual sediment offset for works in Reach 1 on the left bank where works are proposed







Figure 22: Total extent of possible works in Reach one





Figure 23: Total extent of possible works in Reach 2





Appendix 2: Total Nitrogen Calculations

Mechanism.

SEQC Services undertakes soil sampling in order to ascertain the Total Nitrogen (TN) content of soil which is to be protected through river restoration works. The nitrogen content of the soils in an important component of the calculation of a potential nutrient offset under the *Nutrient*

In recent sampling of soils at Laidley Creek, SEQC Services has undertaken both the Dumas and Kjeldahl method. Whilst the Dumas method truly determines Total N, whereas the Kheldahl method only converts protein N and some nitrate (NO3-N) into ammonium (Eric Simonnea, 1998), both methods have been undertaken as the Dumas method is only accurate at levels higher than 0.05%. Alternatively the Kjeldahl test provides readings down to 0.01%.

Nine soil cores were taken at the Laidley project site to measure the bank profile depths from topof-bank to approximately stream base. Around nine samples were taken at 50cm intervals from the nine cores (vis profile depth around 4.5m); providing 85 soil samples which were measured for TN (Dumas – detection limit 0.05%), TKN (detection limit 0.01%) and TKN. Thirty-nine of the 85 soil samples returned TN estimates (Dumus technique) greater than the 0.05% detection limit and 76 of the 85 soil samples returned TKN results greater than the 0.01% detection limit.

The 39 samples for which both TN and TKN estimates were > the respective detection limits were used to generate an understanding of the component of TN represented by TKN (percentage increase of TN over TKN).

Figure 24 below highlights the frequency distribution for percentage increase of TN over TKN.



Figure 24: Difference in TN between Dumas and Kjeldahl methods over 39 samples at Laidley Creek.
The data for the 39 samples are highly skewed, with seven of the 39 samples showing no difference. Two measures of central tendency have been assessed:

1. [Sum of TN for the 39 samples] – [Sum of TKN for the 39 samples] %

2. Median $\left[\frac{(TN-TKN)}{TKN}\right]$ %

The first approach provides a mean of 14.9%; whereas the second provides a median of 14.3%. The two results are similar: The more conservative estimate of percentage increase in TN over TKN (14.3%) is used here.

As QUU's Environmental Authority regulates TN, Dumas is the appropriate measure to convert sediment erosion avoided to nutrient (TN) erosion avoided for the purposes of the Policy. The challenge in determining a soil profile TN level for the purposes of calculating nutrient erosion avoided is that for much of the lower soil profile, TN is below the Dumus test detection method (0.05%); though well above the TKN detection level (0.01%)

The approach recommended by SEQC Services is to use TN values where TN >0.05% and use the conservative estimate of central tendency to convert TKN to TN for TN values <0.05% and TKN values >0.01%.

On these bases (and assuming TN=0.01, when TKN<0.01), the total profile TN over the 9 profiles is 0.063%



	Queens	land Goverr	iment				
Kas.							
DSITI - Ch	emistry						
Centre	1						
Soil Analy	sis Report					-	2
Job No:	16-0386					-	
Report	16-0386-				50	\sim	
10.	F-V1				$\cdot \lambda$	\mathbf{O}	
			Method	S_DUM_	S_DUM_	*	*
				CN	CN	S_KJNP_	S_KJNP_
			Compon	TC	TN		
			ent				LIKE
			Units	%	%	%	%
Sample No	Custome r's ID	Description	Depth (m)				
16-0386-	10-Jan	Sample 1	0.10-	3.16	0.23	0.22	0.17
16-0386-	Jan-60	Sample 2	0.10	1 25	0.08	0.07	0.15
0002	Jan-00	Sample 2	0.60	1.25	0.08	0.07	0.15
16-0386-	1-110	Sample 3	1.10-	0.98	0.06	0.05	0.16
0003			1.10				
16-0386-	1-160	Sample 4	1.60- 1.60	1.42	0.08	0.07	0.16
16-0386-	1-210	Sample 5	2.10-	1.11	0.07	0.06	0.16
0005			2.10				
16-0386-	1-260	Sample 6	2.60-	0.63	<0.05	0.04	0.16
0006	1.210	Comple 7	2.60	0.27	<0.05	0.02	0.14
0007	1-510	Sample 7	3.10	0.57	<0.05	0.02	0.14
16-0386-	1-360	Sample 8	3.60-	0.26	<0.05	0.02	0.13
0008	· · · · ·		3.60				
16-0386-	1-410	Sample 9	4.10-	0.37	<0.05	0.02	0.12
16-0386-	1-460	Sample 10	4.10	0.39	<0.05	0.02	0.11
0010	1 100	comple 10	4.60	5.55	.0.05	5.02	5.11
16-0386-	10-Feb	Sample 11	0.10-	0.84	0.06	0.05	0.14
16-0296	Eab-60	Sample 12	0.10	1 30	0.10	0.1	0.15
0012	ren-00	Sample 12	0.60	1.50	0.10	0.1	0.15

Appendix 3: Soil Nutrient Analysis Raw Data



16-0386-	2-110	Sample 13	1 10	1 25	0.09	0.08	0.14
0012	2-110	Sample 15	1.10	1.25	0.09	0.08	0.14
16 0206	2.100	Comple 14	1.10	1.22	0.00	0.07	0.14
16-0386-	2-160	Sample 14	1.60-	1.22	0.08	0.07	0.14
0014			1.60				
16-0386-	2-210	Sample 15	2.10-	1.28	0.09	0.08	0.13
0015			2.10				
16-0386-	2-260	Sample 16	2.60-	0.74	0.05	0.05	0.12
0016			2.60				
16-0386-	2-310	Sample 17	3.10-	0.36	<0.05	0.02	0.12
0017			3.10				
16-0386-	2-360	Sample 18	3.60-	0.25	<0.05	0.02	0.10
0018			3.60				
16-0386-	2-410	Sample 19	4.10-	0.25	<0.05	0.02	0.11
0019			4.10			0	
16-0386-	2-460	Sample 20	4.60-	0.30	<0.05	0.02	0.11
0020			4.60				
0020							
16-0386-	10-Mar	Sample 21	0.10	2.36	0.17	0.16	0.15
0021	10-10101	Sample 21	0.10	2.50	0.17	0.10	0.15
16.0296	Mar CO	Comple 22	0.10	2.12	0.14	0.12	0.15
16-0386-	Mar-60	Sample 22	0.60-	2.12	0.14	0.13	0.15
0022	2.110	a 1.00	0.60			0.46	0.4.0
16-0386-	3-110	Sample 23	1.10-	2.24	0.16	0.16	0.16
0023			1.10				
16-0386-	3-160	Sample 24	1.60-	0.92	0.06	0.05	0.16
0024			1.60				
16-0386-	3-210	Sample 25	2.10-	0.93	0.06	0.05	0.16
0025			2.10				
16-0386-	3-260	Sample 26	2.60-	0.81	0.05	0.04	0.14
0026			2.60				
16-0386-	3-310	Sample 27	3.10-	0.30	<0.05	0.02	0.14
0027			3.10				
16-0386-	3-360	Sample 28	3.60-	0.36	<0.05	0.02	0.11
0028			3.60				
16-0386-	3-410	Sample 29	4.10-	0.43	<0.05	0.03	0.11
0029			4.10				
16-0386-	3-460	Sample 30	4.60-	0.93	0.06	0.05	0.14
0030		outlipie oo	4.60	0100	0.00		0.12.1
0050			4.00				
16-0386-	10-Apr	Sample 31	0.10-	3.40	0.32	0.30	0.21
0021	To-Api	Sample ST	0.10	5.40	0.52	0.50	0.21
16 0296	A == CO	Comula 22	0.10	1 10	0.00	0.07	0.16
10-0380-	Apr-60	Sample 32	0.60-	1.18	0.08	0.07	0.10
0032	4.440	C	0.60	1.00	0.07	0.07	0.15
10-0386-	4-110	sample 33	1.10-	1.25	0.07	0.07	0.15
0033		A 1.61	1.10				
16-0386-	4-160	Sample 34	1.60-	1.22	0.08	0.04	0.11
0034			1.60				
16-0386-	4-210	Sample 35	2.10-	0.66	0.05	0.04	0.13
0035			2.10				
16-0386-	4-260	Sample 36	2.60-	0.53	<0.05	<0.01	0.02
0036			2.60				



16.0396	4 210	Comple 27	2.10	0.00	0.07	0.04	0.11
16-0386-	4-310	Sample 37	3.10-	0.98	0.07	0.04	0.11
0037			3.10				
16-0386-	4-360	Sample 38	3.60-	0.29	<0.05	0.03	0.14
0038			3.60				
16-0386-	4-410	Sample 39	4.10-	0.24	< 0.05	<0.01	0.03
0039			4.10				
16-0386-	4-460	Sample 40	4.60-	0.15	< 0.05	<0.01	0.12
0040			4.60				
16-0386-	5 1-10	Sample 41	0.10-	1.68	0.14	0.13	0.15
0041	5.1-10	Jampie 41	0.10	1.00	0.14	0.15	0.15
16.0286	E 1.60	Comple 42	0.10	1 7 2	0.15	0.14	0.16
10-0380-	5.1-60	Sample 42	0.60-	1.72	0.15	0.14	0.10
0042			0.60				
16-0386-	5.1-110	Sample 43	1.10-	0.78	0.06	0.05	0.15
0043			1.10				
16-0386-	5.1-160	Sample 44	1.60-	0.63	<0.05	0.03	0.13
0044			1.60				
16-0386-	5.1-210	Sample 45	2.10-	0.42	<0.05	0.03	0.14
0045			2.10		\times / \sim		
16-0386-	5.1-260	Sample 46	2.60-	0.57	<0.05	0.04	0.14
0046	012 200	campie ie	2.60				
16-0386-	5 1-310	Sample 47	3.10	0.46	<0.05	<0.01	0.02
0047	5.1-510	Sample 47	3.10	0.40	~0.05	~0.01	0.02
16.0286	F 1 200	Commis 40	3.10	0.00	-0.05	0.02	0.14
16-0386-	5.1-360	Sample 48	3.60-	0.33	<0.05	0.02	0.14
0048			3.60				
16-0386-	5.1-410	Sample 49	4.10-	0.28	<0.05	<0.01	0.02
0049			4.10				
16-0386-	5.1-460	Sample 50	4.60-	0.15	< 0.05	<0.01	0.03
0050			4.60				
16-0386-	5.2-10	Sample 51	0.10-	1.89	0.12	0.11	0.15
0051		0	0.10				
16-0386-	5.2-60	Sample 52	0.60-	1.65	0.14	0.13	0.16
0052	5.2 00	somple se	0.60	1.00	0.1	0.10	0.10
16-0386-	5 2-110	Sample 53	1.10-	0.72	0.05	0.05	0.14
10-0380-	5.2-110	Sample 55	1.10	0.72	0.05	0.05	0.14
16.0206	5.0.100	Comple E4	1.10	0.65	-0.05	0.04	0.15
16-0386-	5.2-160	Sample 54	1.60-	0.65	<0.05	0.04	0.15
0054			1.60	0.10			
16-0386-	5.2-210	Sample 55	2.10-	0.18	<0.05	<0.01	0.02
0055			2.10				
16-0386-	5.2-260	Sample 56	2.60-	0.60	<0.05	0.04	0.14
0056			2.60				
16-0386-	5.2-310	Sample 57	3.10-	0.53	<0.05	<0.01	0.02
0057			3.10				
16-0386-	5.2-360	Sample 58	3.60-	0.21	< 0.05	0.02	0.14
0058			3.60				
16-0386-	5.2-410	Sample 59	4.10-	0.24	< 0.05	< 0.01	<0.01
0059	3.2 410	sumple ss	4 10	0.2-1	-0.05	-0.01	.0.01
16.0296	5 2 460	Sample 60	4.60	0.16	<0.0E	<0.01	0.01
10-0380-	5.2-400	Sample 60	4.00-	0.10	<0.05	<0.01	0.01
0060			4.60				

40.0000			0.40	4.07	0.00		
16-0386-	5.3-10	Sample 61	0.10-	1.07	0.08	0.07	0.14
0061			0.10				
16-0386-	5.3-60	Sample 62	0.60-	1.68	0.14	0.14	0.16
0062			0.60				
16-0386-	5.3-110	Sample 63	1.10-	0.64	<0.05	<0.01	0.06
0063			1.10				
16-0386-	5.3-160	Sample 64	1.60-	0.68	0.05	0.04	0.16
0064			1.60				
16-0386-	5.3-210	Sample 65	2.10-	0.54	<0.05	0.03	0.15
0065			2.10		0.05		
16-0386-	5.3-260	Sample 66	2.60-	0.22	<0.05	0.02	0.15
0066			2.60				
16-0386-	5.3-310	Sample 67	3.10-	0.62	<0.05	0.03	0.13
0067	5 3 3 6 9		3.10	0.00		0.00	0.40
16-0386-	5.3-360	Sample 68	3.60-	0.32	<0.05	0.02	0.13
0068	5 2 440	C	3.60	0.00	-0.05	-0.01	0.14
16-0386-	5.3-410	Sample 69	4.10-	0.22	<0.05	<0.01	0.14
0069	5.2.460	C	4.10	0.16	-0.05	-0.01	0.15
16-0386-	5.3-460	Sample 70	4.60-	0.16	<0.05	<0.01	0.15
0070			4.60				
16.0206	10.1	C	0.10	2.50	0.00	0.00	0.17
16-0386-	10-Jun	Sample /1	0.10-	2.59	0.20	0.20	0.17
00/1		C 1 70	0.10	4.76	0.44	0.40	0.45
16-0386-	Jun-60	Sample 72	0.60-	1.76	0.11	0.10	0.15
0072	C 110	Comple 72	0.60	4.55	0.1	0.00	0.45
16-0386-	6-110	Sample 73	1.10-	1.55	0.1	0.09	0.15
16.0206	C 100	Comple 74	1.10	1.01	0.07	0.00	0.17
16-0386-	6-160	Sample 74	1.60-	1.01	0.07	0.06	0.17
16.0206	6.210	Courselle 70	1.60	0.72	-0.05	0.04	0.15
16-0386-	6-210	Sample 75	2.10-	0.72	<0.05	0.04	0.15
16.0396	6.260	Comple 70	2.10	0.67	10.05	0.04	0.12
10-0380-	6-260	Sample 76	2.60-	0.67	<0.05	0.04	0.13
16.0396	6 210	Sample 77	2.00	0.64	<0.0E	0.02	0.12
10-0380-	0-310	Sample //	2.10	0.64	<0.05	0.05	0.15
16 0296	6 260	Sample 79	3.10	0.52	<0.05	0.02	0.14
10-0380-	0-300	Sample 78	3.60-	0.55	<0.05	0.03	0.14
16 0296	6.410	Sample 70	3.00	0.40	<0.0E	0.02	0.12
10-0380-	0-410	Sample 79	4.10-	0.40	<0.05	0.02	0.15
16.0296	6.460	Sample 80	4.10	0.20	<0.05	0.02	0.14
10-0380-	0-400	Sample ou	4.60	0.50	<0.05	0.02	0.14
0000			4.00				
16-0296	10-101	Sample 91	0.10	1.04	0.17	0.08	0.16
0081	10-301	Sample of	0.10	1.04	0.17	0.00	0.10
16-0386	Jul-60	Sample 82	0.60-	1 17	0.1	0.08	0.15
0082	Jui-00	Jampie 02	0.60	1.17	0.1	0.00	0.10
16-0386-	7-110	Sample 83	1 10-	0.58	0.11	0.04	0.14
0083	, 110	Sample 05	1.10	0.50	0.11	0.04	0.14
0000			1.10				



16-0386-	7-160	Sample 84	1.60-	0.22	<0.05	0.02	0.06
0084			1.60				
16-0386-	7-210	Sample 85	2.10-	<0.05	<0.05	<0.01	<0.01
0085			2.10				
16-0386-	7-260	Sample 86	2.60-	NR	NR	NR	NR
0086			2.60				
16-0386-	6-510	Sample 87	-	0.36	<0.05	0.02	0.13
0087							

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Sample Mat	trix : Soil							
					S PSA	S PSA	S PSA	S PSA
					Coarse	Fine	Silt	Clav
					sand	sand	Sile	ciay
Sample	Customer	Site	Obs	Depth	%	%	%	%
No	Sample ID	- Site	0.05	(m)	~~	~~	~~	
16-0298-	2-Oct		0	0.10-	27.4	56.6	9.2	10.1
0001			-	0.20				
16-0298-	Feb-60		0	0.60-	11.4	60.9	21.4	17.1
0002				0.70				
16-0298-	2-110		0	1.10-	9.3	58.4	22.7	19.1
0003				1.20				
16-0298-	2-160		0	1.60-	11	53.2	24.6	19
0004				1.70		X		
16-0298-	2-210		0	2.10-	3	48.3	29.6	28.2
0005				2.20				
16-0298-	2-260		0	2.60-	TF	TF	TF	TF
0006				2.70				
16-0298-	2-310		0	3.10-	14.7	51.9	17.3	21.1
0007				3.20				
16-0298-	2-360		0	3.60-	20.7	46	17.1	21.1
0008				3.70				
16-0298-	2-410		0	4.10-	23.7	44.2	17.3	19.5
0009				4.20				
16-0298-	2-460		0	4.60-	17.1	49.5	17.2	21.3
0010			\mathbf{O}	4.70				
16-0298-	3-Oct		0	0.10-	1.4	38.9	38.3	31
0011		\sim	-	0.20	1.0	10.0		10.0
16-0298-	Mar-60		0	0.60-	1.9	18.8	35.5	48.6
16.0200	2 110	<u> </u>	0	0.70	1.1	20.2	25.2	41.2
16-0298-	3-110		0	1.10-	1.1	29.2	35.3	41.2
16 0208	2.160		0	1.20	7 5	10 7	22.0	26.7
16-0298-	3-100		0	1.60-	7.5	48.7	22.8	20.7
16.0209	2 710		0	2.10	10	12 5	26	20.2
0015	5-210		0	2.10-	4.9	45.5	20	50.2
16-0298-	3-260		0	2.20	3.0	40.1	26.3	33.8
0016	5-200		0	2.00-	5.5	40.1	20.5	55.0
16-0298-	3-310		0	3 10-	9.8	53.9	18.9	23
0017	5 510		Ŭ	3.20	5.0	55.5	10.5	23
16-0298-	3-410		0	4.10-	20.6	35.4	18.7	28.2
0019			-	4.20		3317	10.7	2012
16-0298-	3-460		0	4.60-	<1.0	28	31.9	44.1
0020			-	4.70				
16-0298-	5.1-10		0	0.10-	20	57.2	13.6	12.4
0021			-	0.20				
16-0298-	5.1-60		0	0.60-	11.7	47.5	24.1	22.8
0022				0.70				

Appendix 4: Particle Size Analysis Results Raw Data





16-0298-	5.1-110	0	1.10-	24.8	46.9	15.3	15.9
0023			1.20				
16-0298-	5.1-160	0	1.60-	14.2	61.7	13.6	14.2
0024			1.70				
16-0298-	5.1-210	0	2.10-	37.4	41.5	9.9	12.4
0025			2.20				
16-0298-	5.1-260	0	2.60-	14.7	51	20.4	17.8
0026			2.70				
16-0298-	5.1-310	0	3.10-	23.7	45	18.5	17.8
0027			3.20				
16-0298-	5.1-360	0	3.60-	24.2	43.1	18.6	17.8
0028			3.70				
16-0298-	5.1-410	0	4.10-	37.8	40.6	11.1	12.9
0029			4.20				
16-0298-	5.1-460	0	4.60-	58	27.3	9.3	7.7
0030			4.70		$\mathbf{\nabla}$		

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Permit Environmental Authority EPPR00521513



Environmentally relevant activity standard Regulated waste transport (ERA 57) – Version 2

This document provides eligibility criteria and standard conditions for environmentally relevant activity (ERA) 57 – regulated waste transport in a vehicle if the relevant activity is:

- transporting end-of-life tyres; or
- transporting regulated waste, other than end-of-life tyres.

Eligibility criteria

Eligibility criteria are constraints set to ensure environmental risks associated with the operation of the ERA are able to be managed by the standard conditions. Eligibility criteria set out the circumstances in which a standard or variation application for an environmental authority can be made.

Standard conditions

Standard conditions are the minimum operating requirements an environmental authority holder must comply with.

Standard applications

If an applicant can meet all of the eligibility criteria and standard conditions, then they can make a standard application.

Variation applications

If an applicant can meet all of the eligibility criteria but needs to vary one or more of the standard conditions to suit their operational needs, then they can make a variation application.

Site specific applications

Applicants who cannot meet the eligibility criteria must make a site specific application.

Amendment applications

If the holder of an environmental authority needs to amend or add a condition in the issued environmental authority, then the holder must make an amendment application.

How to apply

The Queensland Government's Business Queensland website at www.business.qld.gov.au/ea has information on the standard, variation, site-specific and amendment application processes.

You can apply online through Connect at www.qld.gov.au/environmentconnect.

Alternatively email palm@des.qld.gov.au or phone 1300 130 372 (and select option 4) to obtain an application form to complete and submit.

Definitions

Some terms used in this document are defined in Appendix 1.

ABN 46 640 294 485



Version history

Version	Date	Description of changes
1	29 June 2018	Eligibility criteria and standard conditions take effect
2	01 July 2019	Minor updates including details of how to apply and the availability of forms, departmental name, legislative title (<i>Planning Act 2016</i>), description of ERA thresholds, definition of regulated waste and adding a version history.

Eligibility criteria

Eligibility criteria category	Eligibility criteria
Activity general	Regulated waste is transported by vehicles

Standard conditions

Conditions

General

G1: All reasonable steps must be taken to ensure the **activity** complies with the eligibility criteria.

G2: The **activity** must be undertaken by **vehicles** whose registration details must be provided to the administering authority before commencing the activity. The administering authority must be notified within 10 business days of any change to the **vehicle** registration details.

G3: The activity is undertaken by **vehicles** which are covered by a policy of insurance or other form of indemnity, for a sum that is not less than \$100,000, in respect of:

a) personal injury, death, property damage and other damage (except consequential economic loss) arising out of fire, explosion, leakage or spillage of dangerous goods in, on or from the **vehicle** or a container on the **vehicle**; and

b) costs incurred by or on behalf of a Commonwealth, State or Territory government authority in a clean-up resulting from any event of the kind referred to in subparagraph a) of this condition.

G4: Any breach of a condition of this environmental authority must be reported to the **administering authority** as soon as practicable within 24 hours of becoming aware of the breach. **Records** must be kept including full details of the breach and any subsequent actions taken.

G5: The **activity** must be undertaken in accordance with written procedures that:

- a) identify potential risks to the environment from the activity during routine operations and emergencies; and
- b) establish and maintain control measures that minimise the potential for environmental harm; and
- c) ensure plant, equipment and measures are maintained in a proper and effective condition; and
- d) ensure plant, equipment and measures are operated in a proper and effective manner; and
- e) ensure that staff are trained and aware of their obligations under the Environmental Protection Act 1994; and
- f) ensure that reviews of environmental performance are undertaken and recorded at least annually.

G6: The activity must not cause environmental nuisance at a sensitive place.

G7: All **records** required by conditions of this authority must be kept for at least five years and provided to the **administering authority** within 10 business days upon its request.

G8: When required by the **administering authority**, monitoring must be undertaken in the manner prescribed by the **administering authority** to investigate a complaint of **environmental nuisance** arising from the **activity**. The monitoring results must be provided within 10 business days to the **administering authority** upon its request.

G9: All vehicles, including tanks, containers and secondary containers used to transport regulated waste must be:

- a) maintained at all times to prevent any spillage or leakage of regulated waste or other contaminants; and
- b) kept free of regulated waste residues at all times when not in use; and
- c) must be effectively cleaned and, where used for transporting clinical waste, must be disinfected before reuse.

Conditions

G10: At all times, a copy of:

- a) this environmental authority issued by the administering authority for regulated waste transport activities; and
- b) the appropriate emergency guides in relation to the waste transported

must be carried in the cabin of each **vehicle** used to transport **regulated waste** and when requested, be presented to an authorised officer of the **administering authority** or relevant **regulatory agency** of the State or Territory in which the **vehicle** is travelling.

Note: Standards Australia publish numerous guides including HB 76-2004 Dangerous Goods – Initial emergency response guide, and emergency procedure guides (AS1678 Series) which are available from SAI Global Business Publishing. Further, when developing emergency guides in relation to PCB's, reference should be made to the United States Environmental Protection Agency 40CFP Part 761: Polychlorinated biphenyls: notification and manifesting for PCB waste activities: clause number 761.125

G11: When transporting regulated waste:

- a) any **regulated waste** not contained within weatherproof packages must be covered during transport to contain the load and protect it from wind and rain; and
- b) all regulated waste containers must be mounted securely to the vehicle and contained within the tray of the vehicle.

G12: When transporting **packaged regulated waste**, the top of any container must not protrude above the sides or gates of the vehicle by more than 30% of the height of the container.

G13: Road tank vehicles must:

- a) be constructed to minimise instability and risk of rollover; and
- b) be provided with roll-over protection to protect all tanks, components and fittings on the upper and side surfaces of the tank in the event of the vehicle rolling over or becoming inverted; and
- c) be provided with an effective bumper and/or barrier system to protect the tank and fittings from rear impact.

Waste

W1: Waste transported under the **activity** must be contained within a suitably designed waste containment structure that is constructed, operated and maintained in accordance with accepted engineering standards currently appropriate for the purpose for which the structure is intended to be used.

W2: Regulated waste must not be removed or released from the vehicle other than:

- a) for the purpose of consolidating grease trap and/or other oily wastes; or
- b) at a facility that can lawfully accept the waste.

W3: Incompatible wastes must not be placed in the same container or transported in such a way that mixing may occur.

W4: A record of all **regulated waste** (excluding trackable waste) must be kept detailing the following information for every load of waste transported:

- a) date of pickup of waste, including where loads are consolidated;
- b) description of waste;
- c) quantity of waste;
- d) origin of the waste; and
- e) destination of the waste.

Note: Additional waste tracking requirements apply to the transportation of trackable waste in accordance with the Environmental Protection Regulation 2008.

Conditions

W5: All asbestos waste transported must be:

- a) double bagged and **sealed** in heavy duty polythene bags (minimum 200 µm thickness); or
- b) sealed in drums or bins that are lined with heavy-duty plastic (minimum 200 µm thickness); or
- c) where the volume or size of **asbestos waste** (e.g. large asbestos cement sheets) is greater than the volume or size of a bag, drum or bin:
 - i. for **friable asbestos waste**, **sealed** in double lined heavy-duty plastic sheeting (minimum 200 µm thickness) prior to being placed into a waste skip, **vehicle** tray or similar container; or
 - ii. for **non-friable asbestos waste**, placed in a waste skip, **vehicle** tray or similar container that has been double lined with heavy duty plastic sheeting (minimum 200 µm thickness) and kept damp, and then **sealed** within the plastic sheeting.

W6: All **asbestos waste** transported must be labelled with a warning statement to indicate the presence of asbestos and that dust creation and inhalation needs to be avoided.

W7: All particulate lead waste must be:

- a) double bagged and sealed in heavy duty polythene bags (minimum 200 µm thickness), and placed in containers on the **vehicle**; and
- b) labelled to indicate the presence of lead and with appropriate lead risk phrase and safety phrase.

W8: All clinical and related waste must be provided with a rigid secondary containment system during transport.

W9: Vehicles and load compartments must be locked when unattended.

Term	Definition
Activity	means the environmentally relevant activity to which this environmental authority relates. An activity may be undertaken on the whole or a part of a site.
ADG Code	means the Australian code for the transport of dangerous goods by road and rail, 7th edition, or more recent versions as they become available.
Administering authority	means the Department of Environment and Science or its successor.
Asbestos-containing material	means any material, object, product or debris that contains asbestos.
Asbestos waste	means all removed asbestos-containing materials and disposable items used during the asbestos removal work, such as plastic sheeting used for an enclosure or to cover surfaces in the asbestos work area, disposable coveralls, disposable respirators and rags used for cleaning etc.
Clinical waste	means waste that has the potential to cause disease including, for example, the following:
	a) animal waste;
	b) discarded sharps;
	c) human tissue waste; and
	d) laboratory waste.
Combination vehicle	means a road vehicle that includes one or more trailers.
Commercial place	means a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.
Contaminant(s)	as defined in Section 11 of the Environmental Protection Act 1994.
Environmental harm	as defined in Section 14 of the Environmental Protection Act 1994.
Environmental nuisance	as defined in Section 15 of the Environmental Protection Act 1994.
Friable asbestos waste	means asbestos-containing material that is in powder form or which, when dry, is or may become crumbled, pulverised or reduced to powder by hand pressure.
Incompatible waste	means waste that may chemically react when:
	a) placed in proximity to other wastes; and/or
	b) mixed with other wastes.
Land	means land excluding waters and the atmosphere.
Measures	has the broadest interpretation and includes plant, equipment, physical objects, monitoring, procedures, actions, directions and competencies.

Appendix 1: Terms and definitions

Term	Definition
Minimise	means minimise by taking all reasonable and practical measures to minimise the adverse effect having regard to the following matters:
	a) the nature of the harm or potential harm
	b) the sensitivity of the receiving environment
	c) the current state of technical knowledge for the activity
	 the likelihood of successful application of different measures that might be taken to minimise the adverse effects
	 e) the financial implications of the different measures as they would relate to the type of activity
	 f) if the adverse effect is caused by the location of the activity being carried out, whether it is feasible to carry out the activity at another location.
Non-friable asbestos waste	means asbestos-containing material that is not friable asbestos waste , including material containing asbestos fibres reinforced with a bonding compound.
Sealed	means fully contained within. Where polythene sheeting has been used, adhesive tape should be applied to the entire length of every overlap.
Sensitive place	includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:
	 a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
	b) a motel, hotel or hostel; or
	c) a kindergarten, school, university or other educational institution; or
	d) a medical centre or hospital; or
	e) a protected area under the <i>Nature Conservation Act 1992</i> , the <i>Marine Parks Act 2004</i> or a World Heritage Area; or
	f) a public park or garden; or
	 g) for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.
Packaged regulated waste	means regulated waste in a container with:
	a) a capacity of not more than 450 litres; and
	b) a net mass of not more than 400 kilograms.
Particulate lead waste	means lead waste that is capable of becoming airborne or unable to be easily recovered if a spill occurs during transport. Examples include waste from foundry filters and lead based paint residues.
Records	includes breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a condition of this environmental authority.
Regulated waste	As defined in Section 64 of the Environmental Protection Regulation 2008.
Regulatory agency	means the agency of a State or Territory that has responsibility for regulating the transport of regulated wastes in that State or Territory.
Related waste	means waste that constitutes, or is contaminated with, chemicals, cytotoxic drugs, human body parts, pharmaceutical products or radioactive substances.

Term	Definition
Risk phrase	means a phrase stated in the National Occupational Health and Safety Commission's document entitled <i>National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]</i> , or more recent versions, that gives information about the substance's hazards.
Road tank vehicle	means a truck, trailer or semi-trailer or unit in a road train, incorporating a tank, or having a tank or tanks mounted thereon, either permanently or temporarily (as defined in AS 2809.1–2008 — road tank vehicles for dangerous goods).
Safety phrase	 means a phrase stated in National Occupational Health and Safety Commission's document entitled National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)], or more recent versions, that gives information about: a) the safe use of the substance; or b) the personal protective equipment for the substance.
Secondary containment system	means a system designed, installed and operated to prevent any release of contaminants from the system, or containers within the system, to land, groundwater, or surface waters.
Vehicle	Means a road vehicle including an articulated or combination vehicle, and does not include a train, boat or aircraft.
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.

Appendix 2: General obligations for environmental authority holders

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

Responsibilities under the Environmental Protection Act 1994

Separate to the requirements of the eligibility criteria and standard conditions, the holder of the environmental authority must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act. For example, the holder must be aware of the following provisions of the *Environmental Protection Act 1994* which may apply unless the environmental harm is authorised by the conditions of the environmental authority.

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.

More information is available on the Department of Environment and Science website www.des.qld.gov.au.

Duty to notify

Section 320A of the *Environmental Protection Act 1994* explains the duty to notify. The duty to notify applies to all persons and requires a person or company to give notice where serious or material environmental harm is caused or threatened. Notice must be given of the event, its nature and the circumstances in which the event happened. Notification can be verbal, written or by public notice depending on who is notifying and being notified.

The duty to notify arises where:

- a person carries out activities or becomes aware of an act of another person arising from, or connected to, those activities that causes or threatens serious or material environmental harm
- while carrying out a resource activity, other than a mining activity, a person becomes aware of the happening of one or both of the following events:
 - o the activity negatively affects (or is reasonably likely to negatively affect) the water quality of an aquifer
 - \circ $\,$ the activity has caused the unauthorised connection of two or more aquifers.
- the owner or occupier of contaminated land or an auditor performing an auditor's function (as defined in section 568(b) of the *Environmental Protection Act 1994*) becomes aware of:
 - o the happening of an event involving a hazardous contaminant on the contaminated land; or

- o a change in the condition of the contaminated land; or
- o a notifiable activity having been carried out, or being carried out, on the contaminated land;
- that is causing, or is reasonably likely to cause, serious or material environmental harm.

For more information on the duty to notify requirements refer to the guideline 'Duty to notify of environmental harm' (ESR/2016/2271).

Some relevant offences under the Environmental Protection Act 1994

Non-compliance with a condition of an environmental authority (section 430)

Section 430 of the *Environmental Protection Act 1994* requires that a person who is the holder of, or is acting under, an environmental authority must not wilfully contravene, or contravene a condition of the authority.

Environmental authority holder responsible for ensuring conditions complied with (section 431)

Section 431 of the *Environmental Protection Act 1994* requires that the holder of an environmental authority must ensure everyone acting under the authority complies with the conditions of the authority. If another person acting under the authority commits an offence against section 430, the holder also commits an offence, namely, the offence of failing to ensure the other person complies with the conditions.

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.

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 9 of the Environmental Protection Regulation 2008.

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.

Relevant offences under the Environment Protection Regulation 2008

Trackable waste to be given only to licensed transporter (section 81ZA)

A generator of trackable waste must not give the waste to another person to transport it for a fee or reward, or in a load of more than 250 kilograms, in a vehicle unless the other person holds, or is acting under, an environmental authority for transporting the waste in the vehicle.

Waste tracking (Chapter 5, Part 9)

Waste handlers must submit waste tracking information to the Department of Environment and Science as part of the process for tracking waste types as listed in Schedule 2E of the Environmental Protection Regulation 2008. The waste tracking enables the department to track waste from its source to the place of storage, recycling, treatment or disposal.

Responsibilities under other legislation

An environmental authority pursuant to the *Environmental Protection Act 1994* does not remove the need to obtain any additional approvals for the activity that might be required by other state and/or Commonwealth legislation. Other legislation for which a permit may be required includes, but is not limited to, the:

- Aboriginal Cultural Heritage Act 2003
- Australian Dangerous Goods Code
- Australian and New Zealand Environment and Conservation Council (ANZECC) Polychlorinated Biphenyls Management Plan Revised Edition – April 2003
- Contaminated land provisions of the Environmental Protection Act 1994
- Fisheries Act 1994
- Forestry Act 1959
- Nature Conservation Act 1992
- Petroleum and Gas (Production and Safety) Act 2004 / Petroleum Act 1923
- Planning Act 2016
- Queensland Heritage Act 1992
- Safe Work Australia Code of Practice on How to Safely Remove Asbestos 2011 or the Safe Work Australia Code of Practice on How to Manage and Control Asbestos in the Workplace 2011 or any subsequent versions
- Waste Reduction and Recycling Regulation 2011
- Water Supply (Safety and Reliability) Act 2008
- Water Act 2000
- Work Health and Safety Act 2011, Work Health and Safety Regulation 2011 and Work Health and Safety (Codes of Practice) Notice 2011

Applicants are advised to check with all relevant statutory authorities and comply with all relevant legislation.