Guideline

Resource activity - mining

Model water conditions for coal mines in the Fitzroy basin

The purpose of this guideline is to provide a set of model conditions to form the basis of water related environmental protection commitments given in an environmental management plan for coal mining activities, and environmental authority conditions decided by the administering authority under the Environmental Protection Act 1994. *While these model conditions were developed in relation to coal mines located within the Fitzroy Basin - with an emphasis on improving management of cumulative effects from multiple mine releases - it is acknowledged they may contain principles and conditions that are applicable elsewhere. These model conditions do not preclude the proposing of alternative specific conditions through application documentation, or restrict the administering authority from using alternative specific conditions where the site or activity attributes warrant such a variation.*

Introduction

The *Environmental Protection Act 1994* (EP Act) provides for the granting of environmental authorities resource activity - mining.

In giving approval under the EP Act, the administering authority must address the regulatory requirements set out in the Environmental Protection Regulation 2019 and the standard criteria contained in the EP Act. The administering authority will give consideration to these regulatory requirements in the context of specific information about the environmental impacts of a particular project provided through an environmental impact statement or application documentations.

The following model conditions may be used as a basis for proposing specific water related environmental protection commitments in the application documentation. They may also be used to expedite the process of developing appropriate conditions for an environmental authority for a resource activity - mining in consultation with the administering authority.

The model conditions can be modified to suit the specific circumstances of a resource activity - mining to the assessment criteria outlined above. It is unlikely the administering authority will accept that less rigorous environmental protection commitments or environmental authority conditions are acceptable - without clear evidence that the risk of environmental harm is significantly reduced by:

- the specific environmental management practices to be implemented;
- technologies to be used; or
- the nature of the environmental values impacted by the project.

The following model conditions relate to the ' water' schedule of an environmental authority and are not intended to provide baseline condition standards for all interests of the administering authority likely to be conditioned within an environmental authority. This includes, but is not limited to air, noise, waste and rehabilitation.

Queensland Government

Further information

The latest version of this publication can be found at www.desi.qld.gov.au using the publication number ESR/2015/1561 as a search term.

Note:

Explanatory notes are in green. Please delete prior to issue of EA.

Insertions required by applicants and or the administering authority are in blue. Please delete prior to issue.

Contaminant release

W1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters as a result of the authorised mining activities, except as permitted under the conditions of this environmental authority.

W2 Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in Table 1 and depicted in Figure 1 <this would be a plan or plans locating all monitoring (water quality and flow) and release points> attached to this environmental authority.

W3 The release of mine affected water to internal water management infrastructure installed and operated in accordance with a water management plan that complies with conditions W32–W 37 inclusive is permitted.

Schedule W, Table 1—Mine affected water release points, sources and receiving waters

Explanatory notes—Determining mine affected water release points

Mine affected water release points should be specified in Table 1 where they represent a potential source of water contaminated by mining activity. Release points for runoff contaminated only by sediment do not need to be included in Table 1. That is release points associated with erosion and sediment control structures installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan. This applies where these structures manage run-off containing sediment only that is not likely to contain contaminants or have properties that would cause environmental harm.

Release point (RP)	Latitude (decimal degree, GDA2020)	Longitude (decimal degree, GDA2020)	Mine affected water source and location	Monitoring point	Receiving waters description
RP 1	XXXX	XXXX	e.g. Stormwater dam spillway overflow	Dam spillway	Wet Creek
RP 2	XXXX	XXXX	e.g. Dam overflow pipe	Sampling tap on pipe where the pipe enters Sandy Creek	Sandy Creek

W4 The release of mine affected water to waters in accordance with condition W2 must not exceed the release limits stated in Table 2 when measured at the monitoring points specified in Table 1 for each quality characteristic.

Schedule W, Table 2—Mine affected water release limits

Quality characteristic	Release limits	Monitoring frequency	Comment
Electrical conductivity (µS/cm)	Release limits specified in Table 4 for variable flow criteria.	Daily during release (the first sample must be taken within two hours of commencement of release)	
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within two hours of commencement of release)	
Turbidity (NTU)	Current limit or limit derived from suspended solids limit and demonstrated correlation between turbidity to suspended solids historical monitoring data for dam water*	Daily during release* (first sample within two hours of commencement of release)	Turbidity is required to assess ecosystems impacts and can provide instantaneous results.
Suspended solids (mg/L)	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment*	Daily during release* (first sample within two hours of commencement of release)	Suspended solids are required to measure the performance of sediment and erosion control measures.
Sulphate (SO_4^{2-}) (mg/L)	Release limits specified in Table 4 for variable flow criteria.	Daily during release* (first sample within two hours of commencement of release)	Drinking water environmental values from NHMRC 2006 guidelines OR ANZECC.

Note: *Limit for suspended solids can be omitted if turbidity limit is included. Limit for turbidity not required if suspended solids limit included. Both indicators should be measured in all cases.

W5 The release of mine affected water to waters from the release points must be monitored at the locations specified in Table 1 for each quality characteristics and at the frequency specified in Table 2 and Table 3.

Note: The administering authority will take into consideration any extenuating circumstances prior to determining an appropriate enforcement response, in the event condition W5 is contravened due to a temporary lack of safe or practical access. The administering authority expects the environmental authority holder to take all reasonable and practicable measures to maintain safe and practical access to designated monitoring locations.

Schedule W, Table 3—Release contaminant trigger investigation levels

Explanatory notes—Table 3. Potential contaminants

The quality characteristics listed below should be assessed by each mine, on a site-by-site basis, prior to finalisation of amendment applications. Based on this assessment, the quality characteristic should be either disregarded if below trigger levels, or included as priority contaminants in Table 3 if above trigger levels. Assessment should involve comparison of representative data from dams that have historically been discharged, or are likely to be discharged from contaminant release points in Table 1. Data may include historical results or sampling undertaken for this specific purpose. It is intended that not all dams onsite would need to be sampled, except those that make up the majority of water in dams with release points. It could also be demonstrated, based on existing water quality information, that the water source and relative water quality of some dams are the same, in which case such dams may not need to be sampled individually. For metals and metalloids, trigger levels apply if dissolved results exceed trigger levels. However, total (unfiltered) results for metals and metalloids can be used to disregard a characteristic for inclusion in Table 3. Terms include SMD—slightly moderately disturbed level of protection, guideline – refers ANZECC & ARMCANZ (2000), LOR—typical reporting for method stated. ICPMS/CV FIMS—analytical methods required to achieve LOR.

Quality characteristic	Trigger levels (µg/L)	Comment on trigger level	Monitoring frequency
Aluminium	55	For aquatic ecosystem protection, based on SMD guideline	Commencement of release and thereafter weekly during release
Arsenic	13	For aquatic ecosystem protection, based on SMD guideline	
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guideline	
Chromium	1	For aquatic ecosystem protection, based on SMD guideline	
Copper	2	For aquatic ecosystem protection, based on LOR for ICPMS	
Iron	300	For aquatic ecosystem protection, based on low reliability guideline	
Lead	4	For aquatic ecosystem protection, based on SMD guideline	
Mercury	0.2	For aquatic ecosystem protection, based on LOR for CV FIMS	
Nickel	11	For aquatic ecosystem protection, based on SMD guideline	
Zinc	8	For aquatic ecosystem protection, based on SMD guideline	
Boron	370	For aquatic ecosystem protection, based on SMD guideline	
Cobalt	90	For aquatic ecosystem protection, based on low reliability	

Quality characteristic	Trigger levels (g/L)	Comment on trigger level	Monitoring frequency
		guideline	
Manganese	1900	For aquatic ecosystem protection, based on SMD guideline	
Molybdenum	34	For aquatic ecosystem protection, based on low reliability guideline	
Selenium	10	For aquatic ecosystem protection, based on LOR for ICPMS	
Silver	1	For aquatic ecosystem protection, based on LOR for ICPMS	
Uranium	1	For aquatic ecosystem protection, based on LOR for ICPMS	
Vanadium	10	For aquatic ecosystem protection, based on LOR for ICPMS	
Ammonia	900	For aquatic ecosystem protection, based on SMD guideline	
Nitrate	1100	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	Protection of livestock and short term irrigation guideline	
Sodium	TBA		
Include additional contaminants as required	Include additional contaminants as required		

Note:

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The quality characteristics required to be monitored as per Table 3 can be reviewed once the results of two years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk. It may be determined that a reduced monitoring frequency is appropriate or certain quality characteristics can be removed from Table 3 by amendment.
3. SMD—slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
4. LOR—typical reporting for method stated. ICPMS/CV FIMS—analytical method required to achieve LOR.

W6 If quality characteristics of the release exceed any of the trigger levels specified in Table 3 during a release event, the environmental authority holder must compare the down stream results in the receiving waters to the trigger values specified in Table 3 and:

1. where the trigger values are not exceeded then no action is to be taken; or
2. where the down stream results exceed the trigger values specified Table 3 for any quality characteristic, compare the results of the down stream site to the data from background monitoring sites and;
   a) if the result is less than the background monitoring site data, then no action is to be taken; or
   b) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
      i) details of the investigations carried out; and ii)
      actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W6 2(b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

W7 If an exceedance in accordance with condition W6 2(b) is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.

Mine affected water release events

W8 The holder must ensure a stream flow gauging station(s) is installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in Table 4.

W9 Notwithstanding any other condition of this environmental authority, the release of mine affected water to waters in accordance with condition W2 must only take place during periods of natural flow events in accordance with the receiving water flow criteria for discharge specified in Table 4 for the release point(s) specified in Table 1.

W10 The release of mine affected water to waters in accordance with condition W2 must not exceed the electrical conductivity and sulphate release limits or the maximum release rate (for all combined release point flows) for each receiving water flow criteria for discharge specified in Table 4 when measured at the monitoring points specified in Table 1.

Schedule W, Table 4—Mine affected water release during flow events

Explanatory notes—Table 4

Gauging station description

The intent here is that every release point in Table 1 is associated with a gauging station measuring flow upstream of the discharge point. More than one discharge point may be associated with the same gauging station. The gauging station should be at a minimum distance from the discharge point such that water flow under trigger flow events will not significantly diminish before reaching the discharge point. The location of the gauging station should ideally be such that it is not significantly affected by other upstream point source releases or times of discharge are limited to periods of ‘natural’ flow.

Under certain circumstances it may be appropriate to have a downstream gauging station in addition to or in place of an upstream gauging station. Ideally, the location should not be affected by the discharge (e.g. measured off the main waterway). The need for this must be demonstrated on a case-by-case basis to show why an upstream gauging station is insufficient. This may be the case when mines are located in the upper parts of catchments or near the downstream confluence or a major waterway. Similarly, the gauging station should be at a distance from the discharge point such that water flow during triggered flow events will not significantly diminish between the discharge point and the measuring point (or the confluence with the creek being measured). For downstream flow triggers, some changes to calculation for flow triggers and maximum release flows would typically be required based on the relative sizes of the waterways involved.

Flow triggers and electrical conductivity (EC) quality criteria

Flow triggers are to be used to limit any discharge to times of natural flow events only. Different flow regime methodologies are used to define mine affected water release opportunities, providing flexibility for site operators and protecting identified environmental values within receiving waters. The expectation is where flow gauging data is available, it is used to calculate flow triggers. Where gauging data is not available or is insufficient, flow triggers should be based on runoff/stream flow estimates using appropriate hydrological calculations or models and known catchment area, rainfall estimations etc.

Separate methodologies for discharges occurring to local waterways rather than regional waterways will be applied as part of this revised approach. Due to the increased flexibility of the revised approach and consideration of a wider range of local factors, the application of these model conditions to individual sites will require case-by-case assessment and sufficient background information to be provided. For example, it should be noted that discharges upstream of dams or lakes may require special considerations and generally stricter controls. Also, where multiple mines discharge to the same or closely connected waterways, consideration of cumulative impacts will be necessary as part of the assessment process.

Model conditions do not preclude applicants from proposing alternative or additional conditions, nor restrict the administering authority from using alternative conditions where the case warrants. However, applications proposing alternative approaches will need to be supported by sufficient environmental risk assessment and contingency planning information to allow the administering authority to adequately consider the proposal.

There may be instances where case-by-case proposals can be considered for conditions to address management of particularly heavy rainfall and flooding that is similar to previous events, where there is sufficient information available based on:

- previous transitional environmental programs;
- monitoring and analysis;
- the environmental values of the receiving environment together with the experience of impacts on those environmental values;
- rigorous contingency and disaster response planning with particular regard to actual and potential cumulative impacts.

For example, there may be potential to tailor a schedule of conditions to be triggered upon reaching nominated thresholds of rainfall, flow, flooding (or a combination) based on learning from an event that has occurred in the past. It may be possible to adopt a similar framework to previous discharge permissions granted in similar circumstances, provided the framework was demonstrated to adequately address environmental risk to the satisfaction of the delegate.

No/low flow stream conditions (best quality/low EC mine affected water)

Discharge water quality will need to meet or be better than water quality objectives (or long term background reference 75th/80th percentile) for EC and will only be permitted for temporary periods after periods of significant flow. The focus of this is to allow 'good' quality water to be released when collected rather than having it stored over long durations resulting in deteriorating water quality. Any discharges made under no/low flow stream conditions must not contribute to or cause erosion and due consideration should be given to road/rail access, stock crossings etc (particularly in relation to multiple mines discharging under no/low flow stream conditions on connected waterways). General principles include:

- release at times when flow is on tail end of flow event only i.e. following a flow above specified event flow trigger and when the flow reduces below the flow trigger again. This trigger will commence a discharge window of 4–6 weeks for good quality water only;
- end of pipe WQ ≤ WQO (or long term background reference 75th/80th percentile). May require assessment of downstream environmental values where WQO is more stringent (e.g. drinking water supply);
- duration of release is limited (dry ephemeral stream, 4 weeks after flow event ceases, use time after flow trigger for below—add additional time);
- volume/rate will be considered on a case by case basis.

Medium flow stream conditions (medium quality mine affected water)

A flow trigger for the stream is required and will be set to avoid discharge of medium quality water during periods of no or low flow. General principles include:

- requires the use of a stream flow trigger above which release can occur. The stream flow trigger must be representative of event flow and be above base/low flow (typically determined from hydrographs, historical flow/water quality data and/or modelling);
- end-of pipe EC <3500µS/cm. Options for either <1500µs/cm and <3500µS/cm as maximum limits can be considered which will result in different maximum discharge rates for different quality water. The better the quality of water to be released, the greater the volume that can be permitted;
- the design dilution/maximum discharge rate should be based on a site specific risk assessment. These should be designed to achieve an in-stream EC based on the location—upper (Zone 1), mid (Zone 2) or lower (Zone 3) catchment. The $EC_{WQO\ high\ flow}$ should be adopted as background EC for design calculations.
    - Zone 1, upper catchment mines, approximately <10km from top of waterway catchment.

      $EC_{in\ stream}$ = 1000µS/cm (toxicity guideline).
    - Zone 2, mid catchment mines, zones not within Zone 1 or Zone 3

      $EC_{in\ stream}$ = 700µS/cm
    - Zone 3, lower catchment mines (All regional waterways are considered Zone 3 from distance >50km from top of waterway catchment, refer to Zone 3 map) –

      $EC_{in\ stream} = EC_{high\ flow\ WQO}$ + multiplier x ($EC_{WQO\ low\ flow} – EC_{WQO\ high\ flow}$)

      e.g. multiplier = 0.2 for Isaac, Nogoa, Dawson

Note: $EC_{in\ stream}$ for calculations may vary according to other locally relevant environmental values that may need to be considered.

High flow stream conditions (poorer quality water)

This option might be used in some cases for mines that need to discharge higher EC wastewater than is allowable under medium flow stream conditions. Any discharge is required to have a higher level of dilution than with medium flow cases but still achieve a maximum incremental increase in the waterway. This option is most feasible for mines situated on regional waterways as the window for discharge is likely to be limited for local waterways. Some additional considerations on management of mixing zones and acute/chronic toxicity may be required in this case. General principles include:

- requires the use of a stream flow trigger above which release can occur. The stream flow trigger must be representative of high event flow and be above medium flow (typically determined from hydrographs, historical flow/water quality data and/or modelling)
- end-of pipe EC must be > 3500µS/cm (but <10,000µS/cm). The better the quality of water to be released, the greater the volume that can be permitted
- the design dilution/maximum discharge rate should be based on a site specific risk assessment. These should be designed to achieve an in-stream EC based on the location—upper (Zone 1), mid (Zone 2) or lower (Zone 3) catchment as described above
- may need some additional indicators/requirements and requires case by case assessment this option is likely to be less feasible for Zone 1 and 2 mines.

Table 4

Receiving waters/stream	Release point (RP)	Gauging station	Gauging station latitude decimal degree, GDA	Gauging station longitude decimal degree, GDA	Receiving water flow recording frequency	Receiving water flow criteria for discharge (m^3/s)	Maximum release rate (for all combined RP flows)	Electrical conductivity and sulphate release limits
e.g. Wet Creek	Insert all release points that will release based on this gauging station flow. e.g. RP1, RP2 & RP3	e.g. Gauging station 1	XXXX	XXXX	Continuous (minimum daily)	**Low flow** <XX m^3/s for a period of <insert number of days> after natural flow events that exceed XX m^3/s (where XX is a specified event flow trigger)	Insert < xx ML/day or < xx m^3/s Volume/rate to be determined on case by case basis	Electrical conductivity (µS/cm): <insert water quality objective or 75th percentile of long term background reference data> Sulphate (SO_4^{2-}): 250 mg/L
						Medium flow > XX m^3/s (where XX is specified event flow trigger)	< XX m^3/s (where XX is the maximum release rate determined on case by case basis)	Electrical conductivity (µS/cm) <insert value determined on case specific basis but typically <1500 Sulphate (SO_4^{2-}) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum)>

							< YY m^3/s (where YY is the maximum release rate determined on case by case basis)	Electrical conductivity (µS/cm) <insert value determined on case specific basis but typically <3500 Sulphate (SO_4^{2-}) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum)>
						High flow > ZZ m^3/s (where ZZ is a specified high flow event trigger)	< ZZ m^3/s (where ZZ is the maximum release rate determined on case by case basis)	Electrical conductivity (µS/cm) <insert value determined on case specific basis but typically within a range of <3500 to <10 000 Sulphate (SO_4^{2-}) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum)>

W11 The daily quantity of mine affected water released from each release point must be measured and recorded at the monitoring points in Table 1.

W12 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

Notification of release event

W13 The environmental authority holder must notify the administering authority as soon as practicable and no later than 24 hours after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information:

a) release commencement date/time;

b) expected release cessation date/time;

c) release point(s);

d) release volume (estimated);

e) receiving water(s) including the natural flow rate; and

f) any details (including available data) regarding likely impacts on the receiving water(s).

Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local administering authority via email or facsimile.

W14 The environmental authority holder must notify the administering authority as soon as practicable (nominally within 24 hours after cessation of a release event) of the cessation of a release notified under condition W13 and within 28 days provide the following information in writing:

a) release cessation date/time;

b) natural flow volume in receiving water;

c) volume of water released;

d) details regarding the compliance of the release with the conditions of agency interest—water of this environmental authority (i.e. contamination limits, natural flow, discharge volume);

e) all in-situ water quality monitoring results; and

f) any other matters pertinent to the water release event.

Note: Successive or intermittent releases occurring within 24 hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions W13 and W14, provided the relevant details of the release are included within the notification provided in accordance with conditions W13 and W14.

Notification of release event exceedance

W15 If the release limits defined in Table 2 are exceeded, the holder of the environmental authority must notify the administering authority within 24 hours of receiving the results.

W16 The authority holder must, within 28 days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:

a) the reason for the release;

b) the location of the release;

c) all water quality monitoring results;

d) any general observations;

e) all calculations; and

f) any other matters pertinent to the water release event.

Explanatory notes—Water storage monitoring conditions:

Conditions W17 and W18 can be removed if already conditioned in the authority or in the event that model conditions for regulated dams are finalised and they include relevant replacement conditions.

Monitoring of water storage quality

W17 Water storages stated in Table 5 which are associated with the release points must be monitored for the water quality characteristics specified in Table 6 at the monitoring locations and at the monitoring frequency specified in Table 5.

Schedule W, Table 5 – Water storage monitoring

Water storage description	Latitude (decimal degree, GDA2020)	Longitude (decimal degree, GDA2020)	Monitoring location	Frequency of monitoring
XXXX	XXXX	XXXX	To be negotiated- will depend on the individual storage structure volume. This will deal with stratification – depth profiles and be appropriate to in situ quality characteristics.	Quarterly

W18 In the event that waters storages defined in Table 5 exceed the contaminant limits defined in Table 6, the holder of the environmental authority must implement measures, where practicable, to prevent access to waters by all livestock.

Schedule W, Table 6—Onsite water storage contaminant limits

Quality characteristic	Test value	Contaminant limit
pH (pH unit)	Range	Greater than 4, less than 9[2]
Electrical conductivity (µS/cm)	Maximum	5970[1]
Sulphate (mg/L)	Maximum	1000[1]
Fluoride (mg/L)	Maximum	2[1]
Aluminium (mg/L)	Maximum	5[1]
Arsenic (mg/L)	Maximum	0.5[1]
Cadmium (mg/L)	Maximum	0.01[1]
Cobalt (mg/L)	Maximum	1[1]
Copper (mg/L)	Maximum	1[1]
Lead (mg/L)	Maximum	0.1[1]
Nickel (mg/L)	Maximum	1[1]
Zinc (mg/L)	Maximum	20[1]

Note:

[1] Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.

[2] Page 4.2–15 of ANZECC & ARMCANZ (2000) 'Soil and animal health will not generally be affected by water with pH in the range of 4–9'.

Note: Total measurements (unfiltered) must be taken and analysed

Receiving environment monitoring and contaminant trigger levels

W19 The quality of the receiving waters must be monitored at the locations specified in Table 8 for each quality characteristic and at the monitoring frequency stated in Table 7.

Schedule W, Table 7—Receiving waters contaminant trigger levels

Quality characteristic	Trigger level	Monitoring frequency
pH	6.5–8.5	Daily during the release
Electrical conductivity (S/cm)	1000 Note: for protection against toxicity this may need to be reduced in some circumstances e.g. where in close proximity upstream of a drinking water dam or regional waterway	
Suspended solids (mg/L)	To be determined. Turbidity may be required to assess ecosystems impacts and can provide instantaneous results.	
Sulphate (SO_4^{2-}) (mg/L)	250 (Protection of drinking water environmental value)	
Sodium (mg/L)	TBA	

Schedule W, Table 8—Receiving water upstream background sites and downstream monitoring points

Explanatory notes—Selection of monitoring sites

The intent here is that that each discharge point has both an upstream and downstream monitoring point associated with it. These monitoring points should be located as close as practicable to the release point and the distances should be defined in the footnotes in Table 8. The location of flow monitoring points should also be considered in selecting upstream monitoring points. Other considerations include accessibility, particularly during wet weather conditions.

Monitoring points	Receiving waters location description	Latitude (decimal degree, GDA2020)	Longitude (decimal degree, GDA2020)
Upstream background monitoring points			
Monitoring point XX	XXXX Creek XX metres upstream of RP XX	XXXX	XXXX
Monitoring point XX	XXXX Creek XX metres upstream of RP XX	XXXX	XXXX
Downstream monitoring points			
Monitoring point XX	XXXX Creek XX metres downstream of RP XX	XXXX	XXXX
Monitoring point XX	XXXX Creek XX metres downstream of RP XX	XXXX	XXXX

Notes:

a) The upstream monitoring point should be within X km the release point.

b) The downstream point should not be greater than X m from the release point.

c) The data from background monitoring points must not be used where they are affected by releases from other mines.

W20 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table 7 during a release event the environmental authority holder must compare the down stream results to the upstream results in the receiving waters and:

1. where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or
2. where the down stream results exceed the upstream results complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

   i) details of the investigations carried out; and ii)

   actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W20(2) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

Receiving environment monitoring program (REMP)

Explanatory notes—Designing a REMP

Generally the REMP should be used to assess the local receiving waters for the specified discharge locations. The monitoring should not be specifically designed to assess compliance of the release—this is covered by other conditions. The key purpose of the REMP is to assess the overall condition of the local receiving waters. Assessment should be against water quality objectives and relevant guidelines. Note that in some cases where discharge occurs to ephemeral streams, there may be a need to include downstream sensitive receiving waters or environmental values outside of the specified REMP area. An example of this would be where there are no semi-permanent or permanent waterholes in the specific area but one is located further downstream prior to the confluence with the next major waterway. For further guidance on what to include in a REMP, please refer to the Draft DESI REMP document for Fitzroy Coal Mines and Additional Information.

There is a potential for beneficial linkages of REMP monitoring to regional waterway monitoring programs, such as the Fitzroy Partnership monitoring program. For example DESI intends to maintain monitoring information compiled through individual REMP programs through an internal database under development. Industry has indicated its willingness to see this data shared with the Fitzroy Partnership for the purpose of a regional water monitoring program. Likewise it is possible for environmental authority holders to utilise relevant and available water monitoring information collected by other parties—such as the Fitzroy Partnership—as reference data for the purposes of the REMP required by this section.

W21 The environmental authority holder must develop and implement a REMP to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site.

For the purposes of the REMP, the receiving environment is the waters of the XX and connected or surrounding waterways within XX (e.g. X km) downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

W22 The REMP must:

a) assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality);

b) be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected;

c) include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release (as a minimum, the locations specified in Table 8);

d) specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines* 2006. This should include monitoring during periods of natural flow irrespective of mine or other discharges;

e) include monitoring and assessment of dissolved oxygen saturation, temperature and all water quality parameters listed in Table 2 and 3);

f) include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*);

g) include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology;

h) apply procedures and/or guidelines from ANZECC and ARMCANZ 2000 and other relevant guideline documents;

i) describe sampling and analysis methods and quality assurance and control; and

j) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

W23 A REMP Design Document that addresses each criterion presented in conditions W21 and W22 must be prepared and submitted to the administering authority no later than 3 months after the date of issue of this environmental authority [include for new sites or expansion projects, remove for existing mine sites which already have REMP Design Documents]. Due consideration must be given to any comments made by the administering authority on the REMP Design Document and subsequent implementation of the program.

W24 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions W21 and W22 must be prepared annually and made available on request to the administrating authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

Water reuse

Explanatory notes—Water reuse conditions

Mine affected water reuse conditions acknowledge that there is beneficial potential for using mine affected water. The conditions below provide examples of how such authorisation can be conditioned. The examples are not exhaustive and there may be valid proposals received to supply water to other industry types, or using different methods of transportation. In such cases it is important to consider any environmental risk associated with a proposal by considering what environmental values may be impacted by a given proposal, using an approach that accords with current criteria for environmental management decisions made by the administering authority, prior to presenting a recommendation to the relevant delegate for the decision.

W25 Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party for the purpose of:

i) supplying stock water subject to compliance with the quality release limits specified in Table 9; or

ii) supplying irrigation water subject to compliance with quality release limits in Table 10; or supplying water for construction and/or road maintenance in accordance with the conditions of this environmental authority.

Schedule W, Table 9—Stock water release limits

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical conductivity	µS/cm	N/A	5000

Schedule W, Table 10—Irrigation water release limits

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical conductivity	µS/cm	N/A	Site specific value to be determined in accordance with ANZECC & ARMCANZ (2000) Irrigation Guidelines

W26 Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as dams or tanks, for the purpose of supplying water to <name adjoining mine>. The volume, pH and electrical conductivity of water transferred to <name adjoining mine> must be monitored and recorded.

W27 If the responsibility for mine affected water is given or transferred to another person in accordance with conditions **W25 or W26:**

a) the responsibility for the mine affected water must only be given or transferred in accordance with a written agreement (the third party agreement); and

b) the third party agreement must include a commitment from the person utilising the mine affected water to use it in such a way as to prevent environmental harm or public health incidents and specifically make the persons aware of the General Environmental Duty (GED) under s. 319 of the *Environmental Protection Act 1994,* environmental sustainability of the water disposal and protection of environmental values of waters; and

c) the third party agreement must be signed by both parties to the agreement.

Water general

W28 All determinations of water quality and biological monitoring must be:

a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;

b) made in accordance with methods prescribed in the latest edition of the Department of Environment, Science and Innovation's Monitoring and Sampling Manual;

Note: Condition W28 requires the Monitoring and Sampling Manual to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

c) collected from the monitoring locations identified within this environmental authority, within XX hour of each other where possible;

d) carried out on representative samples; and

e) analysed at a laboratory accredited (e.g. NATA) for the method of analysis being used.

W29 The release of any contaminants as permitted by this environmental authority, directly or indirectly to waters, other than internal water management infrastructure that is installed and operated in accordance with a water management plan that complies with conditions W32 to W37 inclusive:

a) must not produce any visible discolouration of receiving waters; and

b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Annual Water Monitoring Reporting

W30 The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return:

a) the date on which the sample was taken;

b) the time at which the sample was taken;

c) the monitoring point at which the sample was taken;

d) the measured or estimated daily quantity of mine affected water released from all release points;

e) the release flow rate at the time of sampling for each release point;

f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority; and

g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

Temporary interference with waterways

W31 Temporarily destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with DESI's guideline Activities in a Watercourse, Lake or Spring Associated with Mining Activities.

Water management plan

W32 A Water Management Plan must be developed by an appropriately qualified person and implemented by XX/XX/XXXX (WITHIN 3 MONTHS OF THE DATE OF ISSUE).

W33 The Water Management Plan must:

a) provide for effective management of actual and potential environmental impacts resulting from water management associated with the mining activity carried out under this environmental authority; and

b) be developed in accordance with the guideline Application requirements for activities with impacts to water (ESR/2015/1837)and include:

i) a study of the source of contaminants;

ii) a water balance model for the site;

iii) a water management system for the site;

iv) measures to manage and prevent saline drainage;

v) measures to manage and prevent acid rock drainage ;

vi) contingency procedures for emergencies; and

vii) a program for monitoring and review of the effectiveness of the water management plan.

W34 The water management plan must be reviewed each calendar year and a report prepared by an appropriately qualified person. The report must:

a) assess the plan against the requirements under condition W33;

b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and

c) identify any amendments made to the water management plan following the review.

W35 The holder of this environmental authority must attach to the review report required by condition W34, a written response to the report and recommended actions, detailing the actions taken or to be taken by the environmental authority holder on stated dates:

a) to ensure compliance with this environmental authority; and

b) to prevent a recurrence of any non-compliance issues identified.

W36 The review report required by condition W34 and the written response to the review report required by condition W35 must be submitted to the administering authority with the subsequent annual return under the signature of the appointed signatory for the annual return.

W37 A copy of the water management plan must be provided to the administering authority on request.

Saline drainage

W38 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.

Acid rock drainage

W39 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

Stormwater and water sediment controls

W40 An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

W41 Stormwater, other than mine affected water, is permitted to be released to waters from:

viii) erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition W40; and

ix) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with conditions W32 to W37 inclusive, for the purpose of ensuring water does not become mine affected water.

W42 The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters.

W43 Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters.

All dams

Explanatory notes—Dam conditions:

Note: Conditions W44 and W45 to be removed if already conditioned in the authority or in the event that model conditions for regulated dams are finalised and relevant replacement conditions are to be included into the EA.

W44 The hazard category of each dam must be determined by a suitably qualified and experienced person at least once in each two year period.

W45 Dams having a hazard category determined to be significant or high must be specifically authorised by an environmental authority.

Glossary

Acid rock drainage—any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining activity.

Administering authority—the Department of Environment, Science and Innovation or its successor.

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

Dam—a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. However; a dam does *not* mean a fabricated or manufactured tank or container designed to a recognised standard, *nor* does a dam mean a land-based structure where that structure is designed to an Australian Standard. In case there is any doubt, a levee (dyke or bund) is a dam, but (for example) a bund designed for spill containment to AS1940 is *not* a dam.

Environmental authority—an environmental authority granted in relation to an environmentally relevant activity under the *Environmental Protection Act 1994*.

Environmental authority holder—the holder of this environmental authority.

Flowable substance—matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

Hazard—in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

Hazard category—a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in 'Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (ESR/2016/1933)', prepared by the Department of Environment, Science and Innovation, as amended from time to time.

Mine affected water—the following types of water:

i) pit water, tailings dam water, processing plant water;

ii) water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2019 if it had not formed part of the mining activity;

iii) rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage runoff containing sediment only, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;

iv) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;

v) groundwater from the mine's dewatering activities; vi) a mix of mine affected water (under any of paragraphs i)-v)) and other water.

Natural flow—the flow of water through waters caused by nature.

Receiving environment—all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

Receiving waters—all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

Representative—a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

Saline drainage—the movement of waters, contaminated with salt(s), as a result of the mining activity.

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

Disclaimer:

While this document has been prepared with care it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the administering authority should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

Approved:

31 March 2013

Enquiries:

Permit and Licence Management

Ph. 1300 130 372 (select option 4)

Ph:13 QGOV (13 74 68)

Email: palm@des.qld.gov.au

Version	Effective date	Description of changes
3.00	31 March 2013	Minor updates to V2.00.
3.01	13 June 2018	The document template, header and footer have been updated to reflect current Queensland Government corporate identity requirements and comply with the Policy Register
3.02	28 June 2024	2023 MOG updates
3.03	03 October 2024	Minor update to replace reference to archived guideline – preparation of water management plan (ESR/2015/3111) with updated guideline Application requirements for activities with impacts to water (ESR/2015/1837).