# Final Model Water Conditions for Coal Mines in the Fitzroy Basin

**Note:**

**Explanatory notes are in green. DELETE prior to issue of EA.**

**Insertions required by applicants and or the administering authority are in blue. 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 except as permitted under the conditions of this environmental authority.

**W2** The release of contaminants 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.

**Table 1 (Contaminant Release Points, Sources and Receiving Waters)**

| Release Point (RP) | Latitude or northing (GDA94) | Longitude or easting (GDA94) | Contaminant 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 |

**W3** The release of contaminants to waters must not exceed the release limits stated in Table 2 when measured at the monitoring points specified in Table 1 for each quality characteristic.

**Table 2 (Contaminant Release Limits)**

**EXPLANATORY NOTES – Setting interim release limits for EC:**

Option (c) – To negotiate a higher value for end-of-pipe EC limits, it will be necessary to have sufficient background water quality data from historical flow events, ideally above each discharge point. This data should be used to demonstrate that there is sufficient "assimilative capacity" in receiving waters to receive mine discharges of the proposed higher EC levels and maximum flows specified in condition W9. In other words, the limits should be such that the predicted in-stream water quality downstream will always remain below 1000 µS/cm EC (for example, using all historical data and assumptions of complete dilution). Consideration should also be given to the potential impact on any drinking water reservoirs immediately downstream of the discharge and the need to keep in-stream water quality below 750 µS/cm.

Option (d) – To negotiate a stepped approach to achieve Option (b) or (c) it will be necessary to predict the likely downstream receiving water EC as a result of the proposed limits for each step proposed. It will be necessary to have sufficient background water quality data from historical flow events, ideally for each discharge point. The data should be used to demonstrate that there is sufficient assimilative capacity to receive mine discharges of the proposed higher EC levels and maximum flows specified in condition W9. The limits should be such that predicted the in-stream water quality downstream is not likely to result in environmental harm from high salinity impacts. Ideally, in-stream EC s should remain below 1000 µS/cm EC (for example, using all historical data and assumptions of complete dilution). Where in-stream EC is likely to be above 1000 µS/cm then a case should be put forward as to why this is required and comments about the likelihood and potential extent of impacts. Consideration should also be given to the potential impact on any drinking water reservoirs immediately downstream of the discharge and the need to keep in-stream water quality below 750 µS/cm.

| Quality Characteristic | Interim Release Limits for all mines<br>(limits to apply from the date of issue) | Future Release Limits from XX/XX/XXXX (negotiated date)<br>Note: These future limits will apply from a yet to be negotiated date using alternative numbers that will be derived from the information gathered by any combination of the following:<br>(1) the results of near field monitoring,<br>(2) any studies or investigations carried out in accordance with recommendations 2 & 3 of the Cumulative Impact Study on water quality in the Fitzroy River Basin.<br>(3) any review of the QLD Water Quality Guidelines.<br>(4) other relevant information<br>*Note: This information should be available by the end of 2011 if not before and when it becomes available limits will be determined for each mine site based on the environmental values to be protected and in accordance with criteria below* | Monitoring frequency | Comment |
|---|---|---|---|---|
| Electrical conductivity (uS/cm) | Hierarchy for determining limits in priority order starting with (a):<br>(a) for mines that do not release contaminants to waters - no conditions are required for release authorisation, then conditions W2, to W15 inclusive, W18, W19 and W43 can be deleted.<br>(b) Current limit for those mine sites not under a TEP or 1500 EC (Maximum)* which ever is lower or<br>(c) a negotiated higher limit value that does not result in the contaminant release exceeding a maximum 1000 EC in the receiving waters and where the mine site demonstrates to DERM that it is unreasonable and impractical to immediately comply with the 1500 EC limit in (b) above and supported by a business case and commitment to ongoing environmental improvement on the mine site and with nominated timeframes.<br>*Note: If the current limit is lower than a limit determined as above then the current limit would initially apply.*<br>(d) for those other mines which cannot immediately achieve (b) or (c) above a stepped approach within the interim period ending 2011 to achieve (b) or (c) will be | **Aquatic ecosystem protection (no drinking water value):**<br>An end-of-pipe limit to achieve in the range 0 to 1000 EC in the receiving waters. (Must have natural flow i.e. the 20th percentile flow trigger and achieve a 1:4 dilution<br>**OR**<br>for mines in the upper catchments must have natural flow i.e. the 20th percentile flow trigger.<br>**OR**<br>**Drinking water protection:**<br>An end-of-pipe limit to achieve 0 to 750 EC in the receiving waters. (Must have natural flow, either 1:4 dilution and only release where a 20th percentile flow trigger occurs; OR for mines in the upper catchment must have a natural flow i.e. 20th percentile trigger. | Daily during release (the first sample must be taken within 2 hours of commencement of release) | |

| | | | | |
|---|---|---|---|---|
| | required.<br>*Note: some of these mines may already be under an approved TEP and EC limits and compliance timeframes in the TEP need to be taken into account with the stepped approach.*<br>To support a stepped approach DERM will require a business case and commitment to ongoing environmental improvement on the mine site to ensure that all reasonable and practicable measures are being/will be taken to prevent and/or minimise environmental harm. | | | |
| pH (pH Unit) | 6.5 (minimum)<br>9.0 (maximum) | 6.5 (minimum)<br>9.0 (maximum) | Daily during release (the first sample must be taken within 2 hours of commencement of release) | |
| Turbidity (NTU) | NA* | NA* | Daily during release* (first sample within 2 hours of commencement of release) | Turbidity is required to assess ecosystems impacts and can provide instantaneous results. |
| Suspended Solids (mg/L) | Current Limit | Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment | Daily during release* (first sample within 2 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) | Current limit or 1000 (maximum) which ever is the lower | 250 (Maximum) (Protection of drinking water Environmental Value)<br>OR<br>1000 (Maximum) (Protection of irrigation environmental value) | Daily during release* (first sample within 2 hours of commencement of release) | Drinking water environmental values from NHMRC 2006 guidelines OR ANZECC & ARMCANZ 2000 stock water quality guidelines. |

*Note: NA – not available, * local trigger values need to be developed*

**W4** The release of contaminants 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.

**Table 3 (Release Contaminant Trigger Investigation Levels)**

| Quality Characteristic | Trigger Levels (µg/L) | Comment on Trigger Level | Monitoring Frequency |
|---|---|---|---|
| Aluminium | 100 | *For aquatic ecosystem protection, based on LOR for ICPMS* | 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 | 10 | *For aquatic ecosystem protection, based on LOR for ICPMS* | |
| 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* | |
| Include additional contaminants as required | Include additional contaminants as required | | |

**EXPLANATORY NOTES – Table 3 Potential Contaminants:**

The quality characteristics listed below should be assessed on a site by site basis by each mine 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 likely to be discharged from contaminant release points in Table 1. Data may include historical results or sampling undertaken for this specific purpose. The intent here is that not all dams on site would need to be sampled but those that would 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 dam 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.

**Table 3 (Release Contaminant Trigger Investigation Levels) Potential Contaminants**

| Quality Characteristic | Trigger Levels (µg/L) | Comment on Trigger Level |
|---|---|---|
| Boron | 370 | *For aquatic ecosystem protection, based on SMD guideline* |
| Cobalt | 90 | *For aquatic ecosystem protection, based on low reliability 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* |

*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 list of quality characteristics required to be monitored as per Table 3 will be reviewed once the results of the monitoring data is gathered for the interim period until 31 December 2011 or an earlier date if the data is, or becomes, available and if its is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table 3.*

*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.*

**W5** 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 in accordance with the ANZECC & ARMCANZ 2000 methodology, 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 W5 2(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.*

**W6** If an exceedance in accordance with condition W5 2(b)(ii) is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.

**Contaminant Release Events**

**W7** The holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each Release Point as specified in Table 4 for any receiving water into which a release occurs.

**W8** Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 4 for the contaminant release point(s) specified in Table 1.

**Table 4 (Contaminant 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 that measures 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 by the time it reaches 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 replace of an upstream gauging station. The location should ideally not be affected by the discharge (e.g. be 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.

### Minimum Flow Trigger:

The intent for the minimum flow trigger is that the times of discharge are limited to times of natural flow events only (for ephemeral receiving waters). Ideally, the flow trigger should be chosen such that it represents, for example, a 20$^{th}$ percentile average daily flow (in m$^3$/s) of a minimum ten year period. This or a similar approach should aim to eliminate discharges during "low flow" periods. The maximum discharge volume can then be calculated by dividing the upstream flow trigger by 4. The intent here is that a minimum dilution 1:4 is always maintained (20% of downstream flow). In some situations, this will not allow the mine to release sufficient quantities of water. Therefore, it is possible to propose more than one flow trigger. For example, a 40$^{th}$ percentile average daily flow trigger may also be used in addition to the initial 20$^{th}$ percentile flow trigger such that above the 40$^{th}$ percentile average daily flow trigger a higher release volume will be allowed during periods of higher in-stream flow (while still maintaining a 1:4 dilution ratio).

The expectation is that 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.

Under certain circumstances, such as where a mine is in the upper part of the catchment, achieving a 1:4 dilution with receiving waters as described above may not allow the mine to discharge sufficient volumes. In such a case, a lower flow trigger must still be proposed but the discharge volume will also need to be linked to some downstream flow measure with sufficient dilution (ideally much greater than 1:4). The need for this must be demonstrated on a case by case basis and be supported by various flow calculations to demonstrate feasibility and show minimal environmental impacts.

Other special cases include discharges to creeks below water reservoirs or dams and these should be dealt with on a case by case basis to address the intent described above.

| Receiving water description | Release Point | Gauging station description | Latitude or northing (GDA94) | Longitude or easting (GDA94) | Minimum Flow in Receiving Water Required for a Release Event | Flow recording Frequency |
|---|---|---|---|---|---|---|
| Wet Creek | | Gauging station 1 | XXXX | XXXX | Depending on individual catchment this minimum flow trigger will be either the release comprising less than 20% of the natural flow or any natural flow in the receiving environment.<br>The volume of flow can be determined by height of water or flow. The actual flow must be a quantifiable measure.<br>Example: > or = 5 m$^3$/sec | Continuous (minimum daily) |

**W9** Contaminant release flow rate must not exceed 20% of receiving water flow rate.

**W10** The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table 1.

**W11** 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**

**W12** The authority holder must notify the administering authority as soon as practicable (no later than 6 hours of having commenced releasing mine affected water to the receiving environment). Notification must include the submission of written verification 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.*

**W13** The authority holder must notify the administering authority as soon as practicable,(nominally within twenty-four (24) hours after of cessation of a release) of the cessation of a release notified under Condition W12 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.

**Notification of Release Event Exceedance**

**W14** If the release limits defined in Table 2 are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.

**W15** The authority holder must, within twenty-eight (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.

**Monitoring of Water Storage Quality**

**W16** 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.

**Table 5 (Water Storage Monitoring)**

| Water Storage Description | Latitude or northing (GDA94) | Longitude or easting (GDA94) | 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 |

**W17** 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.

**Table 6 (Onsite Water Storage Contaminant Limits)**

| Quality Characteristic | Test Value | Contaminant Limit |
|---|---|---|
| pH (pH unit) | Range | Greater than 4, less than 9[2] |
| EC (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**

**W18** 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.

**Table 7 (Receiving Waters Contaminant Trigger Levels)**

| Quality Characteristic | Trigger Level | Monitoring Frequency | Comments |
|---|---|---|---|
| pH | 6.5 – 8.0 | Daily during the release | **See Table 2 comments** |
| Electrical Conductivity (µS/cm) | 1000 | | |
| 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)<br>OR<br>1000 (Protection of irrigation environmental value) | | |

**Table 8 (Receiving Water Upstream Background Sites and Down Stream 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 or northing (GDA94) | Longitude or easting (GDA94) |
|---|---|---|---|
| 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 Xkm the release point.*

*b) the downstream point should not be greater than Xm from the release point.*

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

**W19** 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 in accordance with the ANZECC & ARMCANZ 2000 methodology, 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 W19 2(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.*

**Receiving Environment Monitoring Program (REMP)**

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**EXPLANATORY NOTES – Designing a REMP:**

The intent here is that the REMP will be designed for specific requirements of the mine's releases and the receiving environment. The monitoring within the REMP should not be the primary basis for compliance but will be essential for providing supporting information when incidents may occur or for deriving future license limits. The focus should also be on reporting against water quality objectives for relevant waterways affected by the discharge and be on a longer term basis compared to compliance reporting. The intent is that the REMP is to provide condition assessment of near-field areas, ie. local areas likely to be significantly affected by the mine's releases. To do this, it is necessary that monitoring data is collected during times of natural flow outside of times of release in addition to time of release. The REMP is likely to include monitoring sites and indicators in addition to what is presented in the tables of these conditions. The intent is that far-field areas and cumulative impacts will be monitored as part of regional monitoring described in Condition W43 and assist in providing regional condition assessment and regionally specific reference information.

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**W20** A REMP must be developed and implemented by XX/XX/XXXX (WITHIN 3 MONTHS OF THE DATE OF ISSUE) to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water. A copy of the REMP must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

For the purposes of the REMP, the receiving environment is the waters of the XX and connected waterways within XX (e.g. Xkm) downstream of the release.

**W21** The REMP must address (but not necessarily be limited to) 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 (i.e. as scheduled pursuant to the Environmental Protection (Water) Policy 1997); and

c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP 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 REMP.

e) Monitoring for any potential adverse environmental impacts caused by the release;

f) Monitoring of stream flow and hydrology;

g) Monitoring of toxicants should consider the indicators specified in Table 3 to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems;

h) Monitoring of physical chemical parameters as a minimum those specified in Table 2 (in addition to dissolved oxygen saturation and temperature);

i) Monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and 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*) for permanent, semi-permanent water holes and water storages;

j) The locations of monitoring points (including the locations specified in Table 8 which are background and downstream impacted sites for each release point);

k) The frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within 2 years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines* 2006. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;

l) Specify sampling and analysis methods and quality assurance and control;

m) Any historical datasets to be relied upon;

n) Description of the statistical basis on which conclusions are drawn, and

o) Any spatial and temporal controls to exclude potential confounding factors.

**W22** A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions W20 must be prepared and submitted in writing to the administering authority by 1 October 2011. This should include an assessment of background water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values.

### Water Reuse

**W23** Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying stock water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with the quality release limits specified in Table 9.

**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 |

**W24** Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying irrigation water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with quality release limits in Table 10.

**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 |

**W25** Water contaminated by mining activity may be piped or trucked off the mining lease for the purpose of supplying water to a third party for purpose of construction and/or road maintenance in accordance with the conditions of this environmental authority.

**W26** Water contaminated by mining activity may be piped or trucked for the purpose of supplying water to <name adjoining mine> in accordance with the conditions of this environmental authority. The volume, pH and electrical conductivity of water transferred to {*name adjoining mine*} must be monitored and recorded.

**W27** If the responsibility of water contaminated by mining activities (the water) is given or transferred to another person in accordance with conditions **W23, W24, W25 or W26:**

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

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

**Water General**

**W28** All determinations of water quality 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 Environment Protection Agency Water Quality Sampling Manual;

*Note: Condition W28 requires the Water Quality 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; and

d) carried out on representative samples.

e) laboratory testing must be undertaken using a laboratory accredited (e.g. NATA) for the method of analysis being used.

**W29** The release of contaminants directly or indirectly to waters:

a) must not produce any visible discolouration of receiving waters; nor

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 the contaminants 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 exceedences with 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 Department of Natural Resources and Water *Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities.*

**Water Management Plan**

**W32** A Water Management Plan must be developed and implemented by XX/XX/XXXX (WITHIN 3 MONTHS OF THE DATE OF ISSUE) that provides for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority.

**W33** The Water Management Plan must be developed in accordance with DERM Guideline for Preparing a Water Management Plan 2009 (to be developed by 1 October) or any updates that become available from time to time and must include at least the following components:

a) Contaminant Source Study;
b) Site Water Balance and Model;
c) Water Management System;
d) Saline Drainage Prevention and Management Measures;
e) Acid Rock Drainage Prevention and Management Measures (if applicable);
f) Emergency and Contingency Planning;
g) Monitoring and Review.

**W34** Each year the holder of the environmental authority must undertake a review of the Water Management Plan prior to the wet season (i.e. by 1 November) and a further review following the wet season (i.e. by 1 May the following year) to ensure that proper and effective measures, practices or procedures are in place so that the mine is operated in accordance with the conditions of this environmental authority and that environmental harm is prevented or minimised.

**W35** A copy of the Water Management Plan and/or a review of the Water Management Plan must be provided to the administering authority on request.

**Saline Drainage**

**W36** 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**

**W37** 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**

**W38** 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 storm water.

**W39** 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.

**W40** 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 W41 and W42 to be removed if already conditioned in the authority.

**W41** The hazard category of each dam must be determined by a suitably qualified and experienced person at least once in each two year period.

**W42** Dams having a hazard category determined to be significant or high, must be specifically authorised by an environmental authority.

**Fitzroy River Basin Study**

**W43** The administering authority and the holder of this environmental authority both acknowledge that the conditions for release of contaminants to the XX River in this environmental authority have been calculated without the benefit of the findings of projects proposed to be undertaken as per recommendations 2 and 3 of the *Study of cumulative impacts on water quality of mining activities in the Fitzroy River Basin* (April 2009). The administering authority may, based on the information provided in the study report when it becomes available, all relevant information available at the time and the regulatory framework applicable at that time, consult with the holder of this environmental authority about the conditions in the environmental authority concerning the treatment and disposal of waste water.

The aim of the consultation shall be the meaningful review of the contaminant release limits imposed in this authority having regard to:

a) the study results;

b) near field monitoring results;

c) QLD Water Quality Guidelines; and

d) best practice environmental management.

If this review leads to a change in the requirements on this environmental authority holder, this shall be advanced by way of an authority amendment or a Transitional Environmental Program and as is necessary or desirable.

**Definitions:**

**"20th percentile flow"** means the 20th percentile of all daily flow measurements (or estimations) of daily flow over a 10 year period for a particular site. The 20th percentile calculation should only include days where flow has been measured (or estimated), i.e. not dry weather days.

**"acid rock drainage"** means 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"** means the Department of Environment and Resource Management or its successor.

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

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

**"environmental authority holder"** means the holder of this environmental authority.

**"flowable substance"** means 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"** means 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 the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 2.0, 2009) published by the Environmental Protection Agency on its website.

**"natural flow"** means the flow of water through waters caused by nature.

**"receiving environment"** means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

**"receiving waters"** means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

**"representative"** means 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 water 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.