Our reference : SF14/6336; DOC18/793784
Contact : Rebecca Scrivener – 02 6773 7000 – armidale@epa.nsw.gov.au
Date : 18 October 2018

Resource and Energy Assessments
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Email: Rose-Anne.Hawkeswood@planning.nsw.gov.au **BY EMAIL**

Dear Ms Hawkeswood,

RE: Notice of Exhibition – Vickery Extension (SSD 7480)

I refer to your email dated 11 September 2018 seeking comments on the proposed extension of the Vickery Coal Mine – SSD 7480. The EPA notes that should the proposed extension be approved, any project approval granted would replace the existing project approval (reference SSD-5000).

The EPA has reviewed the Environmental Impact Statement (EIS) titled, '*Environmental Impact Statement - Vickery Extension Project*', dated 2018 and has determined that it is unable to recommend project approval conditions for the proposal due to inadequate information provided in the EIS.

The EPA requires additional information on the following:

1. **Air Quality Impact Assessment** – additional information is required to support the emissions inventory including, but not limited to, emissions from onsite hauling from neighbouring mines and further explanation and/or reconsideration of the use of unverified emission factors.

2. **Noise Impact Assessment** – additional information relating the assessment of construction and operational noise is needed as well as clarification on the rail noise impact assessment.

3. **Surface Water Assessment** – further assessment of potential impacts from sediment basin discharges is needed as well as clarification of water balance modelling and commitment to a surface water monitoring plan.

4. **Groundwater Assessment** – provision of a detailed map identifying the location of all groundwater monitoring bores used for groundwater quality sampling and review of alternate options for final void design to minimise impacts on groundwater.

5. **Waste** – provision of an assessment of waste generation, management and disposal

Specific information requirements are provided at **Attachment A**.

Once the information identified in Attachment A is received, the EPA will review the additional information and provide recommended project approval conditions, if appropriate.

Email: armidale@epa.nsw.gov.au
PO Box 494 Armidale NSW 2350
85 Faulkner Street, Armidale NSW 2350
Tel: (02) 6773 7000 Fax: (02) 6772 2336
ABN 30 841 387 271
www.epa.nsw.gov.au

Please contact Rebecca Scrivener on (02) 6773 7000 or by email to armidale@epa.nsw.gov.au to discuss this matter further.

Yours sincerely,

LINDSAY FULLOON
Manager, Regional Operations – Armidale
Environment Protection Authority

ATTACHMENT A

Additional Information Required to Inform EPA Assessment of Vickery Extension Proposal

BACKGROUND

The Vickery Coal Project (operated by Whitehaven Coal Pty Limited) is an approved, but yet to be constructed open cut coal mine approximately 25 km north of Gunnedah, NSW. The mine is approved for open cut mining of 4.5 Mtpa ROM over 30 years.

Whitehaven is applying for an extension to the approved mine which includes:

- Physical extension of the mine to additional ROM reserves directly south of the approved mine;
- An increase in production from 4.5 Mtpa to 10 Mtpa;
- An increase in the waste rock emplacement footprint;
- Construction and operation of a coal handling and preparation plant (CHPP) on site. The CHPP will process approximately 13 Mtpa;
- Approval to accept and process coal from Rocglen and Tarrawonga at the CHPP;
- Construction of a train load-out facility onsite (for transport of up to 11.5 Mtpa coal); and
- Reduction of the mine life from 30 years to 25 years.

The project will involve:

- Open cut mining at the project site;
- Processing coal at the on-site coal handling preparation plant (CHPP). This includes processing coal from neighbouring mines;
- Transport of coal in on-road haul trucks from the neighbouring mines to the onsite CHPP;
- Stockpiling soil, overburden and coal; and
- Transfer of coal from the onsite CHPP to the train load-out facility.

AIR QUALITY IMPACT ASSESSMENT

The EPA has reviewed the Air Quality Impact Assessment (AQIA) provided in *Vickery Extension Project, Appendix E, Air Quality and Greenhouse Gas Assessment,* Ramboll June 2018.

The AQIA modelled emissions using AERMOD for three representative years of mining operations being Years 3, 7 and 21. These years were selected to assess the air quality impacts of worst case operations. Cumulative impacts were assessed by modelling emissions from neighbouring mines and included background data from a nearby air quality monitoring gauge (being a tapered element oscillating microbalance or 'TEOM') and dust deposition gauge.

Pollutant impacts were assessed at private and non-private (ie mine-owned) receptors in all cardinal directions surrounding the proposed site. Results suggest that the proposed mine expansion is unlikely to cause exceedances of the EPA ground level impact assessment criteria for total suspended particles (TSP), dust, particulate matter (PM) fractions PM_{10}, $PM_{2.5}$.

The AQIA purports to have assessed the following activities:

- Soil stripping in the open cut mine;
- Overburden removal and dumping from the open cut mine;
- Coal removal from the open cut mine;
- Coal processing, including crushing and screening, at the Vickery coal mine, including transfer to the coal handling and preparation plant (CHPP);

- Coal processing, including crushing and screening, at the Tarrawonga coal mine, including transfer to CHPP;
- Coal processing, including crushing and screening, at the Rocglen coal mine, including transfer to CHPP;
- Hauling and unloading of coarse rejects;
- Wind erosion; and
- Road grading.

Diesel emissions were not explicitly modelled but were assumed to be included in the total emissions for each source. Adjustments were made to ensure that controls due to watering do not apply to diesel emissions.

The emissions inventory indicates that the dominant source of annual PM_{10} emissions at the proposed mine is hauling, including diesel exhaust, (40%) followed by wind erosion (18%), overburden handling (14%) and coal stockpiles (13%). Hauling (including diesel exhaust) is the dominant source of annual $PM_{2.5}$ emissions followed by wind erosion (20%), overburden handling (17%) and coal stockpiles (14%).

The AQIA assumes the following emission controls will be employed:

- Watering of surfaces, with a 90% reduction in emissions;
- Surface stabilisation to reduce wind erosion;
- Minimising drop heights in coal handling operations;
- Enclosing the dump hopper;
- Watering coal stockpiles; and
- Windshielding and watering during coal processing operations.

The following issues were identified with the AQIA.

The emissions inventory is not transparent and there is not enough information provided for it to be reproduced and assessed.

It is unclear how emissions from processing at the CHPP were included in the assessment. The emissions inventory does not include emissions due to onsite hauling from the other mines to the CHPP. Since emissions from hauling are substantial, these should be included.

It also appears from the emissions inventory that crushing and screening are assessed at the Tarrawonga and Rocglen coal mines, and not at the Vickery CHPP. It is understood that crushing and screening of ROM from Tarrawonga and Rocglen coal mines will be undertaken at the Vickery CHPP, and therefore the source of all crushing and screening emissions should be from the Vickery CHPP. This needs to be clarified, and the model revised if necessary.

The AQIA references the use of particle emission control factors derived from ACARP Project C22027 and ACARP 20023 (ACARP factors). These ACARP factors are not routinely adopted in air quality impact assessments in NSW and are not endorsed by the EPA at this time.

The EPA understands that peer review of ACARP C22027, commissioned by the Commonwealth (under the NPI program) raised significant issues with the project and uncertainty with the derived factors. The EPA also understands that ACARP C20023 has not been peer reviewed.

Specific to the Vickery project, the 90% control factor used for watering of roads is considered high and not achievable. Katestone 2011[1] lists best practice control factors for haul roads, where the highest control

[1] *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*, June 2011, Katestone Environmental Pty Ltd.

achievable is 84% using suppressants. The control factor for level 2 watering of 75% is considered more realistic and achievable.

Additional Information Required – Air Quality Impact Assessment:

1) Emissions Inventory

Additional information in the emissions inventory is needed to enable emission estimates to be transparently assessed and replicated.

This includes:

i) Details of the intensity of operations including, but not limited to:
   - the number, weight and load of haul trucks;
   - the area of stockpiles, open pit and exposed ground surface area; and
   - the amount of coal transferred to the onsite CHPP.

ii) Confirmation of the modelling location of all crushing and screening emissions in the emissions inventory. If the modelling locations are not as described in the proposal, the AQIA should be revised using the correct locations for crushing and screening emissions.

Emissions due to onsite hauling from the other mines to the CHPP have not been included. The AQIA needs to be revised to include onsite hauling from other mines to the CHPP.

2) Emissions Factors

The proponent is to revise the AQIA to use established control factors (for example, as documented in Katestone 2011).

NOISE IMPACT ASSESSMENT

The EPA has reviewed the Noise and Blasting Assessment (NBA) provided in *Vickery Extension Project, Appendix D, Noise and Blasting Assessment,* Wilkinson Murray (Report 15260 Version A dated August 2018). The NBA has been carried out in accordance with the Noise Policy for Industry (2017).

The following issues have been identified during our review.

Sound Power Levels

The sound power levels (SWLs) used as a basis of predicted noise impact levels for the Project are lower than expected by the EPA (see Table 5-4 Indicative Equipment SWL). If approved, the project is likely to have consent and licence limits based on noise emissions at the closest noise sensitive receivers. Underestimation of plant SWLs may result in a risk of non-compliance.

The EPA recommends the proponent provide additional information to validate the indicative SWLs in Table 5-4 of the NBA.

Low Frequency Correction

The proponent states that the Project is similar to Bulga Coal Mine and that the Bulga Village Noise Audit low frequency measurements were conducted at distances of 3 to 4 km from the open cut mine with propagation paths comparable to those of the Vickery Extension proposal.

The EPA understands that a low frequency correction of +2 dB applies to Bulga Coal Mine at Bulga Village.

The EPA seeks an explanation as to why an equivalent low frequency correction would not apply to Vickery Coal Mine.

Cumulative Noise Impact Assessment

Cumulative noise impacts from surrounding coal mines are not clearly referenced and or correctly assessed.

The References in Section 10 of the NBA do not reference the document, *Noise and Vibration Impact Assessment – Rocglen Coal Mine Extension Project Gunnedah New South Wales - Spectrum Acoustics dated June 2010*. Rather, the proponent states that Rocglen noise levels are referenced for cumulative noise levels, and corrected to $LA_{eq,9hr}$ levels. The corrected noise levels for receivers 94 and 98 are not consistent with respect to the Spectrum Acoustics Report dated June 2010.

The proponent needs to review and confirm all the results of Table 5-11 of the NBA for noise emissions from the Vickery Extension proposal, Boggabri Coal Continuation Project, Tarrawonga Coal Project and Rocglen Coal Mine Extension Project.

Sleep Disturbance Assessment – Impact of Horns

Section 5.12 of the NBA indicates that noise events with the potential to result in sleep disturbance include dumping material in empty trucks, dozer track noise, impact noise in the infrastructure area, and haul truck passbys.

The proponent needs to clarify whether horn noise will also be a possible noise source and include this noise source in the sleep disturbance assessment if appropriate.

Proposed Construction Hours

Noise from construction activities associated with mines is typically similar in character to noise from mining operations and is thus assessed as operational noise.

The EPA notes that construction activities are proposed from Monday to Sunday during daytime hours, which is outside the Interim Construction Noise Guideline's (ICNGs) recommended standard hours of Monday to Friday 7am – 6pm and Saturday 8am – 1pm.

The EPA recommends that construction activities be carried out only during the ICNGs standard hours, unless adequate justification is provided in accordance with Section 2.3 of the ICNG. This is particularly important for the construction of the rail spur as the report acknowledges the character of these activities will differ significantly from operational noise.

Rail Noise Impact Assessment

The proponent assesses noise impacts from rail operations close to the project site under the Noise Policy for Industry (NPfI), and outside of this the Rail Infrastructure Noise Guideline (RING) is applied in Section 7 of the NBA.

The noise impacts at Rail Section 1 are stated as being low according to Table 7-4 of the NBA. The corresponding night time noise impacts in Rail Section 5 indicate that the impacts may be greater, increasing the compliance offset distance from 345m to 441m (a 27% increase). It is unclear how these differing impacts have been determined, and the proponent should review and clarify the rail noise impact assessment.

Cumulative Frequency of Occurrence Graphs

The graph in Appendix E of the NBA for Year 07-Winter Night- Receiver 131a states a P10 Noise Level of 35 dB(A), however Table 5-8 of the NBA states a corresponding value of 34 dB(A). The proponent should review and amend the information in Appendix E against Table 5-8 predictions where necessary.

Additional Information Required – Noise and Blasting Assessment:

a) Additional information to validate the sound power levels for plant and equipment to be used for the Vickery Extension proposal.

b) Additional information to justify why a low frequency correction should not be applied to noise emissions from the Vickery Extension proposal.

c) Review the cumulative noise impact assessment and amend where necessary.

d) Assessment of the potential for sleep disturbance from equipment horns if they are to be used on the Vickery Extension proposal.

e) Any construction activities should be restricted to the recommended standard hours in the Interim Construction Noise Guideline unless strong justification is provided.

f) Review and clarify the rail noise impact assessment.

g) Review the results of the cumulative frequency of occurrence graphs in Appendix E of the NBA.

SURFACE WATER ASSESSMENT

The EPA has reviewed the Surface Water Assessment provided in *Vickery Extension Project, Appendix B, Surface Water Assessment,* prepared by Advisian, dated August 2018.

The overall surface water management system proposed for the project site can be divided into two catchments, being a Dirty Water catchment and a Mine Water catchment.

In the Dirty Water catchment, sediment dams to manage runoff from the waste rock emplacement areas and any undisturbed areas that naturally drain to the site of each dam are proposed. Runoff collected in these dams would either be transferred to the mine water dams or, if the mine water dams were at capacity, discharged in a controlled manner once the water quality meets any discharge quality criteria specified in an approval document and/or an Environment Protection Licence. The sediment basin design is based on *Managing Urban Stormwater, Soils and Construction, Volume 2E Mines and Quarries* (Blue Book Volume 2E).

The Mine Water catchment consists of four groups of dams or voids as follows:

i) *Mine water dams* (MWD-1 and MWD-2) would be constructed and collect water from the following locations:
    a. MWD-1 would accept water pumped from the open cut pit, existing Blue Vale void, MWD-2, the Coal Contact Water Dams (CCWDs) and water transferred from the sediment dams;
    b. MWD-2 would accept water pumped from the open cut and transferred from sediment dams.

    Water in the mine water dams would be used as required for mine operations and reuse. No water held in the MWDs would be transferred to the sediment dams or discharged to the receiving environment.

ii) *Coal Contact Water Dams* (CCWDs)– will be constructed to collect runoff from the mine and secondary infrastructure areas. All runoff collected in these dams would be transferred to MWD-1. No water held in the CCWDs would be transferred to the sediment dams or discharged to the receiving environment.

iii) *Existing Storage Dams and voids* – will be used in Years 0-3 as a source of water for mine operations and for water management prior to the construction and commissioning of sediment dams.

iv) *Blue Vale Void* – will be used as a water supply dam in years 0-3. Once the mine water dams are established, the Blue Vale void will be used as a mine water surge storage to provide additional capacity for storage of water pumped from the open cut, in the event that the mine water dams are near capacity due to extended wet weather.

The Surface Water Assessment has referred to relevant guidelines including the *Australia and New Zealand Guidelines for Fresh and Marine Water Quality, 2000* ("ANZECC 2000 Guidelines") and *Managing Urban Stormwater, Soils and Construction, Volume 2E Mines and Quarries* ("Blue Book Volume 2E").

The following issues have been identified during our review.

Use of Trigger Values for Discharge and Regulatory Purposes

Section 3.3.1 of the Surface Water Assessment states that:

"A further aspect of the ANZECC 2000 Guidelines relates to the use of trigger values for regulatory purposes. Section 2.2.1.9 of the ANZECC 2000 Guidelines provides the following advice in relation to the use of the trigger values for regulatory purposes:

> *'The Guidelines have not been designed for direct application in activities such as discharge consents, recycled water quality or stormwater quality, nor should they be used in this way. (The exception to this may be water quality in stormwater systems that are regarded as having some conservation value.) They have been derived to apply to the ambient waters that receive effluent or stormwater discharges and protect the environmental values they support.'"*

It is recognised that the ANZECC guideline values apply to ambient waters (i.e. they apply outside a near-field mixing zone) and are only one consideration in licensing decisions under section 45 of the *Protection of the Environment Operations Act 1997* (POEO Act).

However, if discharges dominate flows in a waterway, where there is essentially limited or no mixing available, then they those discharges essentially represent ambient waters. In these instances, the guideline values can be considered at the point of discharge (among the other s45 considerations). This may be an important consideration for controlled discharges that are detained for settling, while receiving water flows may recede. The hydraulic assessment has not demonstrated that in-stream flows will remain high after sediment settling periods.

The EIS also states that:

"The risk of contaminants in water released from Project sediment dams impacting downstream waters is considered to be very low given:

- *overflows from sediment dams would only occur following significant rainfall (i.e. concentrations of these metals would be heavily diluted by fresh rainwater);*

- *water released following heavy rainfall would represent a very small portion of the flow in receiving watercourses (e.g. Namoi River, Driggle Draggle Creek, North Drainage Line and Stratford Creek);*

While overflows are likely to be diluted, the overflow frequency from the Blue Book Volume 2E relates to 'clean' sediment and not elevated levels of other pollutants such as metals. It is noted that while a higher overflow frequency standard is being applied to the storages, suitable monitoring of all potential risk factors in controlled discharges and managed overflows should occur

For controlled water releases following heavy rainfall, collected wastewater is often held and settled to achieve discharge criteria. In this case, flow in receiving waters may have receded and may not provide adequate dilution in a near-field mixing zone. Project Approval and/or Environment Protection Licence monitoring and limits can be adjusted to consider available initial dilution if discharges occur during times of adequate flows and available dilution is demonstrated.

Controlled discharges from sediment basins

Section 4.11 "Water quality" of the Surface Water Assessment, related to solute concentrations in mine water, states that:

> "*Comparison to the aquatic ecosystem guideline values is not considered warranted given measured concentrations of key water quality indicators for the Namoi River are already elevated relative to these values*."

This is not an acceptable assessment for deriving site discharge criteria. Section 4.5.1 of the main body of the EIS states that:

> "*the majority of land within and adjacent to the Project has been cleared for agricultural purposes. The surface water quality and flow regimes in the Project area reflect the influences of the historical clearing*."

The EIS also states that:

> "*Schlumberger Water Services (2011): In summary the early studies, including Nancarrow (1998), concluded that prior to 2000, the chemical water quality of the Namoi River system was generally moderate to poor, with high levels of nutrients, areas contaminated by agricultural chemicals, and areas with on-going salinity problems."*

These statements highlight that the Namoi River near the mine is unlikely to provide a suitable reference condition to develop site specific trigger values for any controlled discharges from the site.

Water Quality Monitoring Program for Controlled Discharges from Sediment Basins

While it is noted that a higher sizing and overflow frequency standard is being applied to sediment basins, the Blue Book Volume 2E applies to 'clean' sediment management and does not provide guidance for potential pollution from toxicants that could be in overburden material. It is therefore supported that there is a more stringent requirement than the standard Blue Book Volume 2E criteria for managed overflows (as set out in the EIS) and a higher standard of runoff controls should apply.

The EIS indicates that pH, aluminium, arsenic, molybdenum and selenium would be included in the surface water monitoring program for the Project.

It is recommended that for site discharges, monitoring should occur initially for a full range of potential pollutants during controlled discharges and managed overflows to confirm the predictions in the EIS. The discharge monitoring program should include:

- A full suite of metals including but not limited to arsenic, boron, antimony, selenium, mercury, silver, molybdenum, aluminium;
- sulfate, total dissolved solids and electrical conductivity, major ions;
- total suspended solids and turbidity;
- any residual settling agent risks (flocculants or coagulants);
- volume and frequency of controlled discharges and frequency of managed overflows.

This monitoring program should occur until it is demonstrated that mitigation measures are effective (e.g. measures include placement of inert material on the outer surfaces of the waste rock emplacement.). Subject to initial results, a reduced suite of key indicators may be able to be developed, however, periodic monitoring of a wider suite of analytes may be required.

Frequency of controlled discharges and managed overflows

The EIS states that under median climatic conditions, controlled releases from sediment dams would only occur on an average two days/year; and under median climatic conditions, sediment dam overflows (i.e. when rainfall exceeds sediment dam design criteria) would only occur on an average of one day in every 3 years.

It is recommended that the worst case for climatic conditions also be considered in the discharge water quality assessment.

Additional Information Required for Assessment of Dirty Water Area:

1) Assessment of Surface Water Impacts from Project Site

To ensure appropriate assessment of surface water impacts from the proposed site, the EPA requires an assessment of potential impacts of discharges from sediment basins be provided, based on:

- comparison to either the relevant ANZECC trigger values for aquatic ecosystem protection or trigger values from suitable slightly modified ecosystem reference site which are selected and sampled in accordance with the Australian Water Quality Guidelines;
- all potential pollutants that could cause non-trivial harm in discharges, including metals, salinity and pH; and
- available dilution from receiving water flows that occur after sediment settling periods or when discharges will occur.

Any water quality assessment must separate:

1. discharge trigger values or criteria (which should be based default trigger values in ANZECC 2000 for slightly to moderately disturbed aquatic ecosystems or site-specific trigger values from slightly modified reference sites selected and sampled in accordance with the Australian Water Quality Guidelines); and
2. trigger values or criteria that may be used to assess ambient water quality differences upstream and downstream of the development. In this case site-specific trigger values from upstream sites on the Namoi River (that are not based on ANZECC reference site requirements) can be used to compare upstream water quality to downstream water quality using appropriate statistical comparisons. These upstream waters, however, if degraded, do not provide a basis for deriving site-specific discharge criteria.

The worst case for climatic conditions must also be considered in the discharge water quality assessment.

2) Expanded Parameter Suite for Surface Water Monitoring Program

The proponent needs to commit to an expanded surface water monitoring program to validate/verify EIS predictions. This initial monitoring should occur until it is demonstrated that mitigation measures are effective (e.g. measures include placement of inert material on the outer surfaces of the waste rock emplacement.) Subject to initial results, a reduced suite of key indicators may be able to be developed, however, periodic monitoring of a wider suite of analytes may be required.

Mine Water Reuse in Dirty Water Catchment

The EIS states that all mine affected water would be re-used within the site, therefore a nil discharge site is proposed for mine water. One potential indirect discharge of pollutants in mine water could occur if collected mine water is re-used in areas other than those that drain to nil discharge catchments, e.g. mine water reuse in catchments that drain to the dirty water or rehabilitation area catchments could lead to runoff and discharges via the sediment basins in those areas.

It is unclear how potential risks of contamination between dirty water and mine water areas will be managed.

Wastewater Storage Liners in Mine Water Catchment

All practical measures to mitigate the risk of seepage of mine water from storages into the surrounding aquifers or watercourses needs to be provided. Consistent with other contaminated water storages the wastewater storage ponds should be lined to a permeability equivalent to a 900mm clay liner with permeability not less than 10^{-9} ms^{-1}. A more permeable liner may be acceptable if the proponent provided a detailed justification, including demonstration that the likely long-term fate of salt or other pollutants will not impact the beneficial use and environmental values of surrounding ground and surface waters.

It should be noted that salinity can affect clay and change soil dispersion characteristics which can then affect the permeability of any clay linings.

The EPA notes that:

- while the assessment in the EIS is based on salt losses, there is potential for a range of pollutants to be present in any groundwater discharges from the mine water storages;
- the assessment considers impacts on the Namoi River but the assessment does not appear to consider water quality impacts on all local waterways including Draggle-Draggle and Stratford Creeks;
- there remains potential for some additional loads of salts and other pollutants to migrate to the Namoi River (and other local watercourses) from voids. This can contribute to cumulative impacts in the river system.

Final void

The EIS states that "*ongoing evaporation of the lake water will lead to progressive increase in salinity. Modelling by Advisian (2018) indicates that in the long-term the lake will become increasingly saline. Because the hydraulic gradient remains towards the void, poorer quality water within the final void would not migrate outside the void; therefore, it would not adversely affect surrounding groundwater resources*."

An open water hyper-saline final void could potentially cause toxic and anoxic conditions resulting in longer term ecotoxicological and amenity impacts from the final void.

Alternate options for the long-term fate of the mine void should be identified and assessed.

Water Balance Modelling

The general assumptions used for the water balance model related to surface water storages appear appropriate. The main assessment is focussed on median conditions, however, includes consideration of a wet climate sequence.

The worst-case conditions have the potential to increase losses via groundwater from voids and this groundwater aspect should be assessed by relevant hydrogeology experts.

If mine water discharges are a contingency option, then potential discharge impacts should be fully assessed, and appropriate discharge parameters established prior to a decision is made about the project. The EIS modelling should have verification monitoring, and contingency options be developed, to mitigate any significant deviations from the modelled output.

Additional Information Required for Assessment of Mine Water Area:

1) Mine Water Reuse in Dirty Water Catchments

If reuse is proposed potential risks need to be identified and adequately assessed including:

- salinity of irrigation water and related erosion and soil structure degradation risk to soils;
- salinity and pollutants in mine water runoff to sediment basins that discharge to the environment and increased risk of a wide range of potential pollutants in discharges to the environment.

2) Permeability of Mine Water Storages

The proponent needs to commit to mine water storages being lined to a permeability equivalent to a 900mm clay liner with permeability not less than 10^{-9} ms^{-1}. A more permeable liner may be acceptable if a detailed justification is provided, including demonstration that the likely long-term fate of salt will not impact the beneficial use and environmental values of surrounding ground and surface waters.

3) Final Void Design

The proponent needs to investigate additional or alternate management solutions that demonstrate salinity impacts on the surrounding soil, ground and surface water environments are avoided or further minimised while there remains opportunity to amend the final landform.

4) Water Balance Modelling

Further clarification is to be provided regarding worst case conditions and the potential for no surface water discharge to occur under worst case rainfall conditions (which would require treatment and discharge limits to be developed).

A program of verification monitoring of the EIS modelling must be developed and contingency options must be included to mitigate any significant deviations from the modelled output.

WASTE

The EIS does not provide any information regarding waste management practices to be adopted at the site. Specific information regarding management of waste tyres, oils and mechanical waste as well as domestic, general, septage and grey water waste needs to be provided.

Land pollution is an offence under section 142A of the POEO Act and includes the placement of more than 5 tonnes of waste tyres or more than 500 waste tyres. This is a total, rather than annual, limit. Any coal mine operator that disposes of waste tyres on site over the prescribed thresholds (5 tonnes or 500 tyres)

would be polluting land for the purposes of the definition unless a defence, such as a condition of a Project Approval or Environment Protection Licence, applies.

The proponent needs to demonstrate that all feasible and reasonable options have been considered with regards to waste management. The waste hierarchy of reducing waste generation, reusing and recycling waste needs to be considered with disposal being a 'last resort'.

GROUNDWATER ASSESSMENT

The EPA has reviewed the Groundwater Assessment provided in *Vickery Extension Project, Appendix A (Part 1 and 2), Groundwater Assessment,* prepared by Hydro Simulations, dated August 2018.

The EPA refers to our previous comments regarding groundwater impacts provided in 2012 and 2013 for the Vickery Coal Project (SSD 5000) Environment Assessment (our reference DOC12/50726 and DOC13/11360; LIC12/4). Comments made above with regard to the Surface Water Assessment and the impacts of salts and metals on the surface and groundwater environments are also relevant.

Final Void

EPA recommendations for the proposed Vickery Mine EIS in 2013, established the view that final voids, in the form of unfilled open cut mining pits, were not practical for the re-establishment of the project area after the conclusion of extractive practices.

It is acknowledged that the current Vickery Extension proposal has reduced the number of final void pits from the currently approved project (being five voids) to two voids. However, alternative remediation designs, other than a reduced number of voids, have not been considered in the proposal.

Groundwater contributions from the project area in the form of baseflow, continue to be restricted post mining, as subsurface flows discharging to the riverbed and the local hydraulic gradient, are reversed towards the void. This is particularly concerning as the void areas will become sinks for the local groundwater systems.

Groundwater Monitoring Network

The groundwater monitoring network has expanded in the time between the approved mine proposal (2013) and the currently lodged application for the extension of the mine.

The Groundwater Assessment provides details and the spatial distribution of the monitoring bores used to sample groundwater quality. This information is presented as a table of 72 bores and several figures without adequate labelling.

Given the proximity of the Namoi River and the geological boundary between the hard rock and alluvial formations to the proposed extension area (less than 2km away), in conjunction with the westerly flowing hydraulic gradient, the coverage of groundwater quality sampling locations in this area is limited and currently unknown (see below image – area indicated by arrow, above MLA1 and the TEM survey extent).

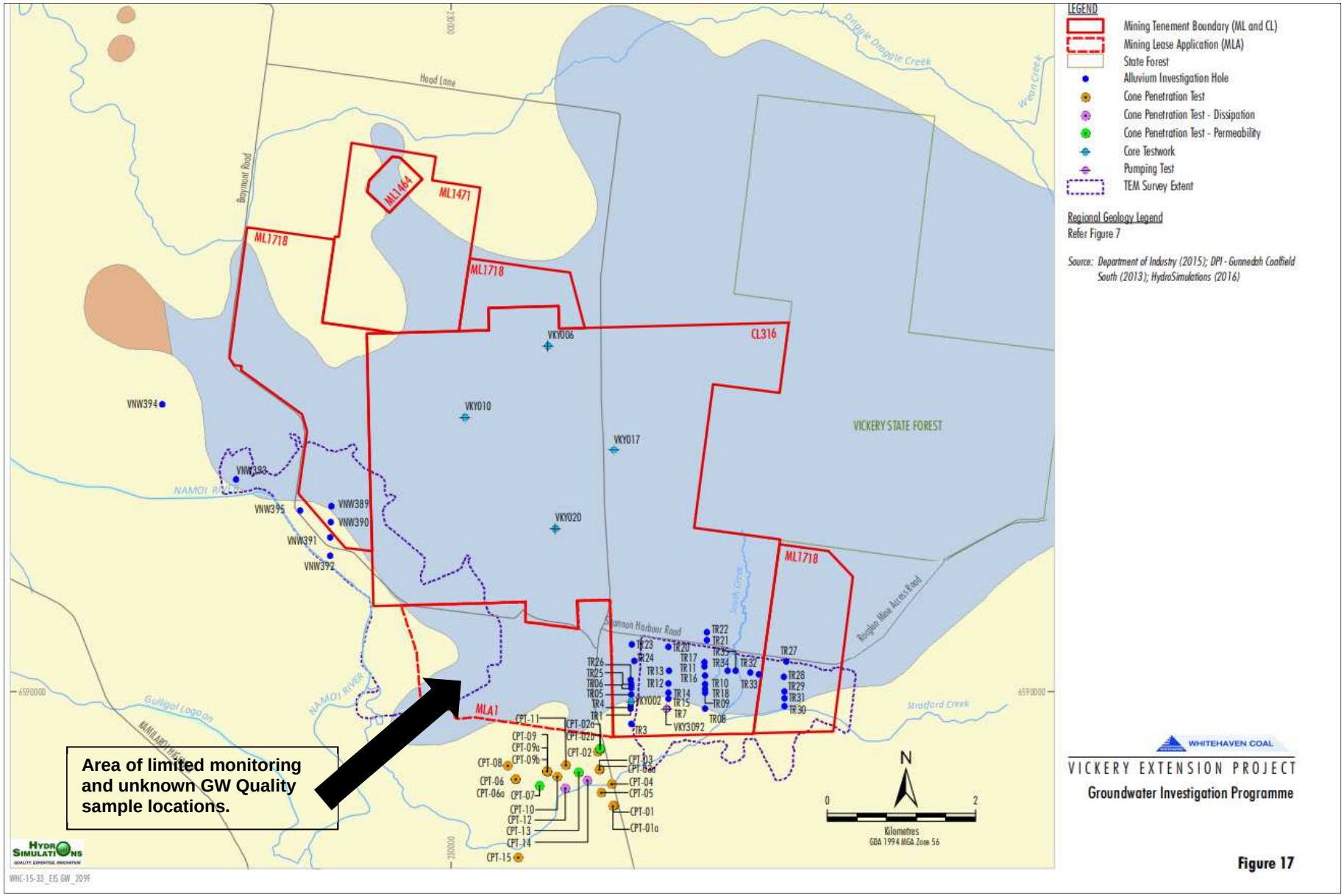
Additional Information Required – Groundwater Assessment

1) Final Void Design

The proponent is to provide further discussion on alternate final mine landform and further justification for final voids if this remains the preferred option. Justification must include demonstration of how long-term impacts on ground and surface water quality (from salts and metals ingress) and existing groundwater flow paths will be maintained.

2) Groundwater Quality Sampling Locations

The proponent is to provide a detailed map clarifying the locations of all groundwater monitoring bores used for groundwater quality sampling.


LEGEND
Mining Tenement Boundary (ML and CL)
Mining Lease Application (MLA)
State Forest
Alluvium Investigation Hole
Cone Penetration Test
Cone Penetration Test - Dissipation
Cone Penetration Test - Permeability
Core Testwork
Pumping Test
TEM Survey Extent
Regional Geology Legend
Refer Figure 7
Source: Department of Industry (2015); DPI - Gunnedah Coalfield South (2013); HydroSimulations (2016)
Area of limited monitoring and unknown GW Quality sample locations.
ML1464
ML1471
ML1718
CL316
MLA1
VICKERY STATE FOREST
Head Lane
Baymont Road
Drayton Haulage Road
Rogan Mine Access Road
Stratford Creek
NAMOI RIVER
Gulligal Lagoon
VKY006
VKY010
VKY017
VKY020
VKY002
VKY3092
VNW394
VNW393
VNW395
VNW389
VNW390
VNW391
VNW392
N
0
2
Kilometres
GDA 1994 MGA Zone 56
WHITEHAVEN COAL
VICKERY EXTENSION PROJECT
Groundwater Investigation Programme
Figure 17