Vickery Coal Project

Environmental Impact Statement

ATTACHMENT 5

WATER LICENSING REQUIREMENTS

Resource Strategies

WHITEHAVEN COAL

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A5 WATER LICENSING REQUIREMENTS

This Attachment provides further discussion on the requirements and application of water licensing and associated approvals under the New South Wales (NSW) *Water Management Act, 2000* and NSW *Water Act, 1912* to the Vickery Coal Project (the Project).

References to Sections 1 to 7 in this Attachment are references to the Sections of the Main Report of the Environmental Impact Statement (EIS). Internal references within this Attachment are prefixed with an "A5". References to Appendices A to O in this Attachment are references to the Appendices of the EIS.

A5.1 WATER MANAGEMENT ACT, 2000

Consideration of the Project against the objects, water management principles and access licence dealing principles under the *Water Management Act, 2000* and a discussion of the licences and approvals required for the water sources associated with the Project is provided below.

A5.1.1 Objects of the Act

Section 3 of the *Water Management Act, 2000* outlines the objects of the Act:

> *The objects of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:*
>
> *(a) to apply the principles of ecologically sustainable development, and*
>
> *(b) to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality, and*
>
> *(c) to recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water, including:*
>
> *(i) benefits to the environment, and*
>
> *(ii) benefits to urban communities, agriculture, fisheries, industry and recreation, and*
>
> *(iii) benefits to culture and heritage, and*
>
> *(iv) benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water,*
>
> *(d) to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,*
>
> *(e) to provide for the orderly, efficient and equitable sharing of water from water sources,*
>
> *(f) to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,*
>
> *(g) to encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users,*
>
> *(h) to encourage best practice in the management and use of water.*

The Project would be consistent with the principles of ecologically sustainable development (Section 6.6.4).

A cumulative assessment of potential impacts of the Project on groundwater and surface water has been conducted as part of this EIS (Appendices A and B). Potential groundwater inflows and surface water containment requirements are described in Sections 2.9, 4.4 and 4.5. Groundwater and surface water licensing and approval requirements and the Project's proposed use of existing surface water/aquifer extraction entitlements under the *Water Management Act, 2000* and *Water Act, 1912* are summarised in Section 4, and described in the sub-sections below.

Mitigation measures, management and monitoring would be implemented to minimise potential impacts on downstream surface water flows, aquifers, water quality, soils, groundwater dependent ecosystems (GDEs) and biodiversity (Sections 2.9 and 4).

Sections 4.9.4, 4.10.4 and 7 summarise the Project biodiversity offset and compensatory measures that would assist in maintaining the biodiversity of the region. Project water management measures, including the implementation of best practice, is described in Appendices A and B and Sections 4.4 and 4.5.

The benefit cost analysis in the Socio-Economic Assessment for the Project (Appendix K) indicates a net production benefit of approximately $912 million (M), and a net benefit of between approximately $910M and $1,053M would be forgone if the Project's use of these water resources was not to occur. Comparative analysis of the economic benefits that alternative regional uses of this water may provide (i.e. for agriculture) has been undertaken (Appendix K). No material adverse impacts on urban communities, regional agriculture, fisheries, industry or recreation would arise due to the Project water use or water management.

A Water Management Plan would be developed for the Project (Sections 4.4.3 and 4.5.3) and would describe measures/procedures to respond to potential exceedances of water-related criteria and contingent mitigation/compensation/offset options that would be enacted in the event that downstream surface water users or groundwater users are adversely affected by the Project.

Community consultation regarding the Project is described in Section 3, and includes relevant feedback that has been received from the community regarding Project water use and water management.

A5.1.2 Water Management Principles

Section 5 of the *Water Management Act, 2000* outlines the principles of water management:

5 Water management principles

(1) The principles set out in this section are the water management principles of this Act.

(2) Generally:

(a) water sources, floodplains and dependent ecosystems (including groundwater and wetlands) should be protected and restored and, where possible, land should not be degraded, and

(b) habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored, and

(c) the water quality of all water sources should be protected and, wherever possible, enhanced, and

(d) the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems, should be considered and minimised, and

(e) geographical and other features of indigenous significance should be protected, and

(f) geographical and other features of major cultural, heritage or spiritual significance should be protected, and

(g) the social and economic benefits to the community should be maximised, and

(h) the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirements.

(3) In relation to water sharing:

(a) sharing of water from a water source must protect the water source and its dependent ecosystems, and

(b) sharing of water from a water source must protect basic landholder rights, and

(c) sharing or extraction of water under any other right must not prejudice the principles set out in paragraphs (a) and (b).

As described above, cumulative assessments for potential impacts on groundwater and surface water have been conducted (Appendices A and B) as part of this EIS. Mitigation measures, management and monitoring would be implemented to minimise potential impacts on water sources, floodplains and dependent ecosystems (Sections 2, 4.4, 4.5, 4.9 and 4.10). With the proposed management and monitoring measures in place, dealings associated with the Project are not expected to adversely affect the ability of a person to exercise their basic landholder rights.

Section 5 presents Whitehaven Coal Limited's (Whitehaven) rehabilitation strategy for the Project. The disturbance areas associated with the Project would be progressively rehabilitated and revegetated to include a combination of native woodland/forest and grazing land. Rehabilitation would include passive management of runoff (i.e. transferring it to the Project Water Management System for re-use in mine operations or discharged off-site after retention for sufficient time to allow settlement of sediment to achieve the required water quality) after rehabilitation areas have become stabilised by vegetation (Evans & Peck, 2013).

Sections 4.9.4, 4.10.4 and 7 summarise the Project biodiversity offset and compensatory measures that would assist in maintaining the biodiversity of the region, including consideration of native vegetation and fauna species.

The Groundwater Assessment for the Project (Appendix A) concludes that there is expected to be negligible change in groundwater quality within the groundwater systems as a result of mining in the short-term and in the long-term. In the long-term, the salinity in the final voids would increase through evaporative concentration, but as the final voids would remain groundwater sinks, there would be no deleterious effect on the beneficial uses of any groundwater sources (Appendix A).

Mitigation measures, management and monitoring to minimise potential impacts on water quality are described in Sections 4.4.3 and 4.5.3. The Project Water Management System has been designed to avoid, to the maximum extent practical, the contamination of water as a result of mining activities (Appendix B).

An Aboriginal Cultural Heritage Assessment has been conducted for the Project in consultation with the Aboriginal community (Section 4.13 and Appendix I). A Heritage Management Plan would be prepared in consultation with the Aboriginal community and the NSW Office of Environment and Heritage (OEH) to specify management and mitigation measures relevant to the management of Aboriginal heritage at the Project (Section 4.13).

The benefit cost analysis in the Socio-Economic Assessment (Appendix K) indicates a net production benefit of approximately $912M, and a net benefit of between approximately $910M and $1,053M would be forgone if the Project is not implemented. Comparative analysis of the economic benefits that alternative uses of the Project lands and water usage may provide (i.e. agriculture) has also been undertaken (Appendix G).

Whitehaven would implement an adaptive management approach through the Water Management Plan (Sections 4.4 and 4.5), which would describe measures/procedures that would be implemented over the life of the Project to respond to potential exceedances of water-related criteria. It would also describe the contingent mitigation/ compensation/offset options that would be enacted in the event that downstream surface water users or groundwater users are adversely affected by the Project (Section 4.5).

A5.1.3 Access Licence Dealing Principles

The *Access Licence Dealing Principles Order 2004* outlines the access licence dealing principles which prevail over the access licence dealing rules to the extent of any inconsistency.

Clause 7 of the *Access Licence Dealing Principles Order 2004* relevantly states:

> ***7 Impacts on water sources***
>
> *(1) Dealings should not adversely affect environmental water and water dependent ecosystems as identified in any relevant management plan.*
>
> *(2) Dealings should be consistent with any strategies to maintain or enhance water quality identified in any relevant management plan.*
>
> *(3) In unregulated river water sources, dealings should not increase commitments to take water from water sources or parts of water sources identified in any relevant management plan as being of high conservation value.*
>
> *(4) In unregulated river water sources or a groundwater source, dealings should not increase commitments to take water from water sources above sustainable levels identified in any relevant management plan.*
>
> *...*
>
> *(6) In this clause, **commitments to take water** refers, in relation to all access licences with nominated works in that water source or part of the water source, to:*
>
> *(a) the total volume of water allocations in water allocation amounts, or*
>
> *(b) where relevant, the sum of limits on rates of extraction in extraction components.*

No high priority GDEs have been identified in the relevant water sharing plans (i.e. the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* and the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003*). As such, the Project would not impact on high priority GDEs.

Notwithstanding, consideration of potential impacts on other GDEs is provided in Appendices A, B, E and Section 4.9.

The Groundwater Assessment concludes that there is expected to be no long-term impacts to groundwater quality within the groundwater systems as a result of mining in the short-term and in the long-term (Appendix A). In the long-term, the salinity in the final voids would increase through evaporative concentration, but as the final voids would remain groundwater sinks, there would be no deleterious effect on the beneficial uses of any groundwater sources (Appendix A).

There are not expected to be any significant changes in the quality of the Upper Namoi Alluvium groundwater system as a consequence of the Project, and no significant impact to surface water quality in local rivers and creeks (i.e. Namoi River, Driggle Draggle Creek and Stratford Creek) (Appendices A and B).

In addition, with the implementation of management strategies and monitoring recommended in the Geochemistry Assessment (Appendix L) the risks of elevated dissolved solids and other contaminants impacting downstream waters is considered to be low (Appendix B).

Mitigation measures, management and monitoring to minimise potential impacts on water quality are described in Sections 4.4.3 and 4.5.3.

The Project would not involve extraction from water sources identified in any relevant management plan as being of high conservation value.

A cumulative assessment of potential impacts on groundwater and surface water has been conducted as part of this EIS (Appendices A and B). Access licences for the Project would be obtained in accordance with the applicable water sharing plans (Sections A5.1.4, A5.1.5, A5.1.6 and A5.1.7) and the *Water Management Act, 2000*, and therefore the Project is unlikely to increase commitments to take water from water sources above sustainable levels (i.e. the sustainable use of water is integrated in the objects of the *Water Management Act, 2000* and the visions and objectives of the relevant water sharing plan).

Clause 8 of the *Access Licence Dealing Principles Order 2004* states:

> ***8 Impacts on indigenous, cultural, heritage or spiritual matters***
>
> *(1) Dealings should not adversely affect geographical and other features of indigenous significance.*
>
> *(2) Dealings should not adversely affect geographical and other features of major cultural, heritage or spiritual significance.*

As discussed above, an Aboriginal Cultural Heritage Assessment (Appendix I) has been conducted for the Project in consultation with the Aboriginal community. An Aboriginal Heritage Management Plan would be developed in consultation with the Aboriginal community and the OEH to specify management and mitigation measures relevant to the Project area. Relevant consultation, management and mitigation measures are outlined in Section 4.13.

Clause 9 of the *Access Licence Dealing Principles Order 2004* states:

> ***9 Impacts on water users***
>
> *(1) Dealings should not adversely affect the ability of a person to exercise their basic landholder rights.*
>
> *(2) Dealings should have no more than minimal effect on the ability of a person to take water using an existing approved water supply work and any associated access licences. This should be addressed by constraints on dealings established in access licence dealing rules in relevant management plans.*

An assessment of potential impacts on groundwater and surface water users has been conducted as part of this EIS (Appendices A and B). With the proposed management and mitigation measures in place, dealings associated with the Project are not expected to adversely affect the ability of a person to exercise their basic landholder rights or have more than a minimal effect on the ability of a person to take water using an existing approved water supply work.

Notwithstanding, Whitehaven would implement a Water Management Plan (Sections 4.4 and 4.5) that would describe the contingent mitigation/ compensation/offset options that would be enacted in the event that private surface or groundwater users are adversely affected by the Project.

Clause 10 of the *Access Licence Dealing Principles Order 2004* states:

> ***10 Maximising social and economic benefits***
>
> *(1) The objective of access licence dealings is to help facilitate maximising social and economic benefits to the community of access licences as required under the objects of the Act. Dealings do this by:*
>
> *(a) allowing water to move between alternative uses, and*
>
> *(b) allowing the establishment of water markets that value the access licences, thereby encouraging investment in water efficient infrastructure, and*
>
> *(c) allowing greater flexibility to access licence holders.*
>
> *(2) Subject to other principles in this Order, access licence dealing rules should allow maximum flexibility in dealings to promote the objectives set out in subclause (1).*

The Project water management system has been designed to minimise reliance on external water sources (i.e. licensed extraction from groundwater or surface water resources) and to minimise changes to the flow regimes of downstream waters (Appendix B).

The Project would provide for operation of a new open cut coal mine for a period of approximately 30 years and direct employment of some 60 construction and 250 operational personnel. The Socio-Economic Assessment (Appendix K) indicates that operation of the Project is likely to result in an average annual stimulus of approximately 423 direct and indirect jobs in the local region and some 2,292 direct and indirect jobs in NSW.

A5.1.4 Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003

Under the Water Management Act, 2000, the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* commenced on 1 November 2006.

Clause 4(3) of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* provides that the plan applies to the following waters:

> *(3) The Upper and Lower Namoi Groundwater Sources include all water contained in the unconsolidated alluvial sediment aquifers associated with the Namoi River and its tributaries.*
>
> ***Note.*** *Bores drilled through the unconsolidated alluvial sediments into the underlying Great Artesian Basin (GAB) are tapping a different groundwater source. On a map, they may appear to lie within the boundaries of the Lower Namoi, however they are within the deeper GAB groundwater source and are not included as a part of this Plan.*

The alluvial aquifers adjacent to the Project area fall within the Upper Namoi Zone 4, Namoi Valley (Keepit Dam to Gin's Leap) Groundwater Source (Zone 4) of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003.*

Appropriate aquifer access licences and share components for any take of water from alluvial aquifers would be sought and obtained under the *Water Management Act, 2000* in consultation with the NSW Office of Water (NOW). These aquifer access licences would be obtained with reference to the access licence dealing rules outlined in Part 11 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* and managed in accordance with the rules outlined in Part 10 of the plan.

Access Licences

Whitehaven currently holds volumetric licence allocation in Zone 4 under an aquifer licence. An allocation of 180 megalitres (ML) from Water Access Licence (WAL) 12714 (90CA80702) and WAL 12681 (90CA806925) is held by Whitehaven for the Project. Section A5.3.2 provides estimated groundwater licensing requirements for the Project and demonstrates that Whitehaven has sufficient allocation to meet these requirements.

Management of Access Licences

In accordance with Division 1 of Part 10 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003*, the total water in any aquifer access licence water allocation account cannot exceed 3 ML per share unit and the total water extracted under an aquifer access licence in a water year cannot exceed 2 ML per share unit (plus any allocation assignment to the account minus any allocation assignment from the account).

Whitehaven would manage its access licences to ensure that extraction does not exceed the water allocation account in any water year in accordance with rules outlined in Division 1 of Part 10 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003*.

Access Licence Dealing Rules

Part 11 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* outlines the access licence dealing rules that apply to dealings under the *Water Management Act, 2000*.

Clauses 46 to 50 of the plan are not applicable to any dealing for the Project as no conversion of access licence category or dealings between water sources or interstate are proposed.

Clause 45 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* relevantly provides:

> ***45 Rules relating to constraints within a groundwater sources***
>
> *(1) This clause applies to any relevant dealings under sections 71Q, 71S, and 71W of the Act, and section 71T of the Act with respect to allocation assignments within this groundwater source.*
>
> *(2) Dealings are prohibited under this clause if:*
>
> *(a) any of the access licences or water allocations involved are not within these groundwater sources,*
>
> *(b) the dealing results in the total access licence share components or credited water allocations authorised to be extracted through nominated works at a location exceeding 600 ML/yr per square kilometre,*
>
> *(c) the dealing would result in the total extraction under access licences through nominated works in the area, plus basic landholder rights extraction, causing an adverse local impact in accordance with Part 10 Division 2 of this Plan,*
>
> *(d) (Repealed)*
>
> *(e) the dealing involves a supplementary water access licence, or any water allocation credited to a supplementary water access licence.*

As described above, Whitehaven holds two aquifer licences in Zone 4, therefore clauses 45(2)(a) and 45(2)(e) are not applicable to any dealing for the Project.

As described in Section A5.3.2, the maximum predicted extraction from Zone 4 by the Project is up to 98 megalitres per annum (ML/annum). Given there is no other major extraction within one square kilometre, clause 45(2)(b) is not applicable to any dealing for the Project.

The applicability of clause 45(2)(c) (i.e. an adverse local impact under Part 10, Division 2) is described further below.

Management of Local Impact

Division 2, Part 10 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* provides provision for the management of local impact on the groundwater resource. Relevant provisions of Division 2, Part 10 are outlined below.

Clause 36 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* relevantly provides:

> ***36 Extraction interference between neighbouring bores***
>
> *(1) With the exception of a water supply work (bore) for the supply of basic landholder rights only, applications for a new water supply work (bore) within 100 metres of any bores for the supply of basic landholder rights, will require an investigation by the proponent of the potential impact on neighbouring bores.*
>
> *...*
>
> *(3) A minimum distance of 400 metres is to be maintained between all new water supply works (bores), except for a replacement water supply work (bore) and those for the supply of basic landholder rights only.*
>
> *(4) A new water supply work (bore) that is not a replacement water supply work (bore) shall be located no closer than 200 metres from a property boundary.*
>
> *(5) Notwithstanding the provisions of subclauses (3) and (4) the Minister may, upon application by an access licence holder, vary the distance restrictions specified in subclauses (3) and (4) if:*
>
> *(a) a hydrogeological study undertaken by the licence holder, assessed as adequate by the Minister, demonstrates minimal potential for adverse impact on existing licensed extraction, including consideration of cumulative impact,*
>
> *(b) written consent is obtained by the applicant from adjacent landowners, and*
>
> *(c) there is a process for remediation in the event that an adverse impact occurs in the future, specified as conditions on the licence.*
>
> *...*

(7) A new Water supply work (bore) with the exception of a replacement water supply work (bore) for the supply of basic landholder rights only, cannot be constructed within a minimum distance of:

(a) 500 metres of a bore nominated by a local water utility access licence,

(b) 400 metres of a Departmental monitoring bore,

(c) 400 metres of a bore extracting from the Great Artesian Basin,

(d) 500 metres of a wetland, or

(e) 200 metres of a river.

Section 89J(1) of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) provides that water use approvals under section 89, water management work approvals under section 90, or an activity approval (excluding an aquifer interference approval) under section 91 of the *Water Management Act, 2000* are not required for an approved State Significant Development Project (Section 6.2.3). Therefore, restrictions set out in clause 36 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* does not apply to a bore approved as part of the Project.

Notwithstanding, extraction from the alluvial aquifer would not occur within:

- 100 metres (m) of any bore for the supply of basic landholder rights;
- 400 m of a water supply work (bore) not owned by Whitehaven;
- 200 m of a property boundary with an adjoining property not owned by Whitehaven;
- 500 m of a bore nominated by a local water utility access licence;
- 400 m of a Departmental monitoring bore;
- 400 m of a bore extracting from the Great Artesian Basin;
- 500 m of a wetland; or
- 200 m of a river.

In addition to the above, Whitehaven would implement a process for remediation in the event that an adverse impact occurs on neighbouring bores as described in Section 4.4.3.

Clause 37 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* relevantly provides:

37 Water level management

(1) The Minister may declare that, in order to protect the project water levels within these groundwater sources, local access restrictions are to apply in a defined area known as a local impact area

...

The Project is not located within a local impact area, therefore clause 37 is not applicable to any dealing for the Project.

Clause 38 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* relevantly provides:

38 Water quality management

(1) The beneficial uses of these groundwater sources are:

(a) raw water for drinking, and

(b) agriculture use,

based on beneficial use classes identified in the Australian and New Zealand Environment and Conservation Council Water Quality Guidelines 2001, and the National Health and Medical Research Council Raw Water for Drinking Purposes Guidelines 1996.

(2) Pursuant to subclause (1), water quality decline will be deemed unacceptable if extraction is likely to cause water quality to decline to a lower beneficial use class.

...

There are not expected to be any significant changes in the quality of the alluvial groundwater system as a consequence of the Project (Section 4.4.2 and Appendix A), therefore clause 38 is not applicable to any dealing for the Project.

Clause 39 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* relevantly provides:

39 Protection of groundwater dependent ecosystems

(1) Extraction of groundwater from a new or replacement water supply work (bore) is excluded within 100 metres of high priority groundwater dependent ecosystems, or any creek or river, or where impact may occur on Aboriginal cultural heritage values for those exercising basic landholder rights, and 200 metres for extraction authorised by all other access licences, unless the water supply work (bore):

(a) only draws water from an aquifer at depths as approved by the Minister, and

(b) has an impermeable seal, as specified by the Minister, constructed within the bore to isolate aquifers preventing water ingress from the restricted aquifer.

...

Extraction from the alluvial aquifer would not occur within 100 m of a high priority GDEs as none are listed under the relevant water sharing plans.

Clause 40 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* relevantly provides:

40 Protection of aquifer integrity

(1) The Minister may declare that, in order to protect the integrity of the aquifers within these groundwater sources, local access restrictions are to apply in a defined area known as a local impact area.

(2) The Minister may, on presentation of evidence of land subsidence or aquifer compaction, restrict extraction from all water supply works (bores) nominated by access licences within a local impact area declared under subclause (1), to such an extent for such time as to stabilise that subsidence or compaction.

The Project is not located within a local impact area and would not involve large-scale extraction or depressurisation of the alluvial aquifer. The Project open cut extent stands off the extent of the alluvium associated with the Namoi River floodplain.

Clause 40 is designed to prevent over extraction of the groundwater resource resulting in broad scale land subsidence or aquifer compaction. The Project is unlikely to result in land subsidence or aquifer compaction, therefore clause 40 is not applicable to any dealing for the Project.

A5.1.5 Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011

Under the *Water Management Act, 2000*, the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* commenced on 16 January 2012.

Clause 4(1) of the *Water Sharing Plan for the NSW Murray Darling Porous Rock Groundwater Sources 2011* provides that the plan applies to the following groundwater sources:

4 Application of this Plan

(1) This Plan applies to the NSW Murray Darling Basin Porous Rock Groundwater Sources (hereafter these groundwater sources) comprised of the following groundwater sources within the Border Rivers Water Management Area, the Central West Water Management Area, the Gwydir Water Management Area, the Lower Murray Darling Water Management Area, the Murray Water Management Area, the Murrumbidgee Water Management Area, the Namoi Water Management Area and the Western Water Management Area:

(a) Gunnedah–Oxley Basin MDB Groundwater Source,

…

(3) Subject to subclauses (7) and (8), the Gunnedah-Oxley Basin MDB Groundwater Source includes all water contained in:

(a) all rocks of Permian, Triassic, Jurassic, Cretaceous and Tertiary age within the outcropped and buried areas, and

(b) all alluvial sediments within the outcropped areas,

within the boundary of the Gunnedah-Oxley Basin MDB Groundwater Source as shown on the Registered Map.

…

The Project coal resource is wholly located within the Management Zone of the Gunnedah-Oxley Basin Murray Darling Basin Groundwater Source as defined by the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*.

Access Licences

Appropriate groundwater licences and share components for take of water from the porous rock aquifers would be sought and obtained under the *Water Management Act, 2000* in consultation with the NOW. These aquifer access licences would be obtained with reference to the access licence dealing rules outlined in Part 10 of the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*. Section A5.3.2 provides estimated groundwater licensing requirements for the Gunnedah-Oxley Basin Murray Darling Basin Groundwater Source Management Zone for the Project.

Management of Access Licences

In accordance with clause 34 of the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*, the share components of aquifer access licences authorised to take water from the groundwater source must not exceed a volume equal to the sum of water allocations accrued under the access licence from available water determinations in those years plus any water allocations carried over from the previous water year in accordance with subclause (2) (plus or minus any water allocations assigned or credited to or from the licence in accordance with sections 71T and 76 of the *Water Management Act, 2000*).

Whitehaven would effectively manage its access licences to ensure that extraction does not exceed the water allocation account in any water year.

Access Licence Dealing Rules

Part 10 of the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* outlines the access licence dealing rules that apply to dealings under the *Water Management Act, 2000*.

Clauses 43 to 49 of the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* are not applicable to any dealing for the Project as no conversion of access licence category, assignment of rights dealings, amendment of share component dealings, amendment of extraction component dealings, assignment of water allocations or nomination of water supply works dealings between Management Zones, water sources or interstate are proposed.

Management of Local Impact

Part 9 of the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* provides provision for the management of interference between water supply works. The relevant provision of Part 9 is outlined below.

37 Rules to minimise interference between water supply works

(1) A water supply work approval must not be granted or amended to authorise the construction of a water supply work which, in the Minister's opinion, is located within:

(a) 400 metres of a water supply work on another landholding that is authorised to take water from the same groundwater source pursuant to an access licence,

(b) 100 metres of a water supply work on another landholding that is authorised to take water from the same groundwater source pursuant to basic landholder rights,

(c) 200 metres from the boundary of the land, on which the water supply work is located, unless the owner of the land adjoining the boundary has provided consent in writing,

(d) 500 metres of a water supply work authorised to take water from the same groundwater source by a local water utility or a major utility, unless the local water utility or major utility has provided consent in writing, or

(e) 200 metres of a NSW Office of Water observation or monitoring bore, unless the Minister has provided consent in writing.

(2) The distance restrictions specified in subclause (1) do not apply to the grant or amendment of a water supply work approval if the Minister is satisfied that:

(a) the water supply work is solely for basic landholder rights,

(b) the water supply work is a replacement groundwater work,

(c) the water supply work is for the purpose of monitoring, environmental management or remedial works, or

(d) the location of the water supply work at a lesser distance would result in no more than minimal impact on existing extractions within these groundwater sources.

(3) For the purpose of subclause (2) (d), the Minister may request the applicant to undertake a hydrogeological study, submitted by the applicant and assessed as adequate by the Minister, to demonstrate that the location of the water supply work at a lesser distance would result in no more than minimal impact on existing extractions within these water sources.

(4) If an approval is granted in circumstances where subclause (2) (d) applies, the approval must be subject to a requirement that, when directed by the Minister by notice in writing, the approval holder must carry out all actions required by the Minister and specified in the notice to minimise the impact of the water supply work on existing water levels or extraction, if the Minister is satisfied that the location of the water supply work is causing more than minimal impact on existing water levels or extraction.

> *(5) An approval that authorises the construction of a water supply work to take water under a supplementary water (subcategory "storage") access licence must be subject to a requirement that the water supply work is constructed to a depth determined by the Minister as necessary to protect existing extraction from the groundwater source.*

Section 89J(1) of the EP&A Act provides that water use approvals under section 89, water management work approvals under section 90, or an activity approval (excluding an aquifer interference approval) under section 91 of the *Water Management Act, 2000* are not required for an approved State Significant Development Project (Section 6.2.3).

Notwithstanding, extraction from the porous rock groundwater source would not occur within:

- 400 m of a water supply work (bore) not owned by Whitehaven;
- 100 m of any bore for the supply of basic landholder rights;200 m of a property boundary with an adjoining property not owned by Whitehaven;
- 500 m of a bore nominated by a local water utility access licence; or
- 200 m of a NOW observation or monitoring bore.

In addition to the above, Whitehaven would implement a process for remediation in the event that an adverse impact occurs on neighbouring bores as described in Section 4.4.3.

A5.1.6 Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003

Under the *Water Management Act, 2000*, the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003* commenced on 1 July 2004.

The Lower Namoi includes the regulated river sections downstream of Keepit Dam to the Barwon River. The surface waters and alluvial aquifers adjacent to the Project area therefore fall wholly within the Lower Namoi Regulated River Water Source of the Namoi Unregulated Rivers Extractive Management Unit.

Clause 4 of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003* provides that the plan applies to the following waters:

> ***4 Water sources and waters to which this Plan applies***
>
> *(1) The water sources in respect of which this Plan is made shall be known as the Upper Namoi Regulated River Water Source and the Lower Namoi Regulated River Water Source (hereafter these water sources).*
>
> *...*
>
> *(3) The Lower Namoi Regulate River Water Source is that between the banks of all rivers, from Keepit Dam downstream to the junction of the Namoi River with the Barwon River, which at the date of commencement of this Plan, have been declared by the Minister to be regulated rivers.*
>
> *...*
>
> *(6) This Plan applies to all waters contained within these water sources but does not apply to water contained within aquifer water sources underlying these water sources or to waters on land adjacent to these water sources...*

The Project would involve extraction between the banks of a regulated river (i.e. the Namoi River), therefore the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003* is applicable to the Project.

Access Licences

Whitehaven currently holds volumetric licence allocation under river general security and river supplementary licences for the Project. A total of 1,155.2 ML is specifically held for the Project from:

- WAL 2682 (90WA804771, 90CA802036) 486 ML (general security);
- WAL 21366[1] (90WA811536) 350 ML (general security);
- WAL 2577 (90CA801779) 144 ML (general security);
- WAL13051 (90CA802398) 96 ML (general security);
- WAL 2683 (90WA804771, 90CA802036) 53 ML (supplementary);
- WAL 2578 (90CA801779) 15.7 ML (supplementary); and
- WAL13052 (90CA802398) 10.5 ML (supplementary).

[1] 350 ML of allocation from WAL 21366 is in the process of being transferred to Whitehaven.

Section 2.9.3 of the Main Report of the EIS and Appendix B provides estimated surface water licensing requirements for the Project and demonstrates that Whitehaven has sufficient allocation to meet these requirements.

Management of Access Licences

In accordance with Part 8, Division 1, clause 33 of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003*, the maximum volume that may be taken under, or assigned from, a regulated river (general security) access licence from the Lower Namoi Water Source during any water year shall be equal to 1.25 ML per share unit (or lower amount to maintain compliance with the long-term average annual extraction limit). The maximum volume that may be taken during any three consecutive water years shall be equal to 3 ML per share unit, or such lower amount in accordance with the long-term extraction limit specified in clause 32.

In accordance with Part 9, Division 2, clause 45 of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003*, up to 0.5 ML per share unit remaining in a general security water allocation account may be carried over from one water year to the next, provided that the maximum volume that is held in the water allocation account at any time is equal to 1 ML per share unit (plus any allocation assignment to the account minus any allocation assignment from the account).

In accordance with Part 8, Division 2, clause 39, subclause (2) of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003*, the available water determination for supplementary water access licences may shall not exceed 1 ML per share unit, or such lower amount in accordance with subclause (1), or such lower amount in accordance with the long-term extraction limit specified in clause 32.

The taking of water under supplementary licences in the Lower Namoi Regulated River Water Source shall be in accordance with Part 9, Division 3, clause 49 of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003.*

Whitehaven would manage its general security and supplementary security access licences to ensure that extraction does not exceed the water allocation account in any water year in accordance with rules outlined in Part 8, Division 1, Division 2 and Division 3 of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003.*

Access Licence Dealing Rules

Part 10 of *the Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003* outlines the access licence dealing rules that apply to dealings under the *Water Management Act, 2000*.

Extraction components for Whitehaven access licences are not within the Gunidgera/Pian Creek system and are upstream of Mollee Wier and therefore clauses 51(2), 51(3), 51(4), 51(7) and 51(8) are not applicable to any dealing for the Project.

There would be no water allocations from or to a supplementary WAL water allocation account from an access licence of any other access licence category and as such clauses 51(5) and 51(6) are not applicable.

Clauses 52 to 56 of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003* are not applicable to any dealing for the Project as no change of water source, conversion of access licence category or dealings between water sources or interstate are proposed.

Management of Local Impact

Part 11, clause 58 of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2003* provides mandatory conditions on water supply works approvals.

Section 89J(1) of the EP&A Act provides that water use approvals under section 89, water management work approvals under section 90, or an activity approval (excluding an aquifer interference approval) under section 91 of the *Water Management Act, 2000* are not required for an approved State Significant Development Project (Section 6.2.3).

Notwithstanding, flow measurement devices shall be installed and maintained on all works used for the extraction of water under an access licence. Whitehaven would provide water extraction property management infrastructure details to the NSW Minister for Planning and Infrastructure (the Minister) upon request.

A5.1.7 Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012

Under the *Water Management Act, 2000* the *Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012* commenced on 4 October 2012.

The *Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012* applies to the unregulated water sources in the Namoi basin which comprises of sources that are dependent on rainfall and natural river flows, rather than water released from dams, and associated alluvial groundwater systems.

Within the *Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012*, the Project is located within the Bluevale Water Source (Area 9).

Clause 12(1) of Part 1 of Schedule 5 of the *Water Management (General) Regulation, 2011* provides access licence exemptions under the *Water Management Act, 2000* for certain excluded works.

Schedule 1 (clause 4) of the *Water Management (General) Regulation, 2011* describes relevant excluded works as follows:

> *(4) Dams approved in writing by the Minister for specific environmental management purposes:*
>
> *(a) that are located on a minor stream, and*
>
> *(b) from which water is used solely for those environmental management purposes.*

In addition, the Dictionary of the *Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012* defines a runoff harvesting dam as a dam on a hillside or minor stream that captures surface or rainfall runoff.

The taking of water from a runoff harvesting dam requires an access licence and a water supply work approval, except to the extent that the runoff harvesting dam is within an owner or an occupier's harvestable rights entitlement under section 53 of the *Water Management Act, 2000* (in which case it would not require an access licence or water supply work approval).

Evans & Peck (Appendix B) has reviewed the above and concluded that no access licences would be required for Project surface water containments. This conclusion was made on the basis that Project water storages would be relevant excluded works under Schedule 1 (clause 4) of the *Water Management (General) Regulation, 2011* on the assumption the Ministers delegate ultimately approves them on that provision. Such approval should be granted on the grounds that:

- the sediment basins will prevent the contamination of downstream water sources; and
- provide water for dust suppression and irrigation for the rehabilitation of disturbed mining areas.

It is noted that the Maximum Harvestable Right Dam Capacity (MHRDC) attributed to the Project is 392 ML (Evans & Peck, 2013). Notwithstanding the above, at any one time during the Project the maximum capacity of the sediment basins would be approximately 385 ML (Evans & Peck, 2013), which is less than the MHRDC. As such, if the sediment basins were not considered to be excluded works under Schedule 1 of the *Water Management (General) Regulation, 2011*, there would be no requirement to licence the take of water captured by the sediment basins.

Notwithstanding, a detailed assessment of the potential impacts of the Project on surface water flows, including surface water catchment excisions is provided in Section 4.5 and Appendix B.

A5.1.8 Water Use and Water Management Works

Section 89J(1) of the EP&A Act provides that water use approvals under section 89, water management work approvals under section 90, or an activity approval (excluding an aquifer interference approval) under section 91 of the *Water Management Act, 2000* are not required for an approved State Significant Development Project (Section 6.2.3).

Therefore the approval requirements of the *Water Management Act, 2000* that would normally apply before the following Project activities occur do not apply to the Project:

- the construction and use of water management works and water supply works associated with water covered by a water sharing plan under the *Water Management Act, 2000*;
- establishment of a permanent watercourse diversion to the east of the open cut; and
- establishment of flood bunds.

Notwithstanding, detailed assessments of the potential impacts of the Project on alluvial and hard rock aquifer resources and surface water resources have been conducted for this EIS and are detailed in Appendices A and B and Sections 4.4 and 4.5 of the Main Report of the EIS.

A5.2 WATER ACT, 1912

Flood Control Works

Under Part 8 of the *Water Act, 1912* controlled works require approval, which includes:

- works that are situated or proposed to be constructed within a floodplain designated pursuant to section 166(1) the *Water Act, 1912*; and
- earthworks, embankments or levees that affect, or are reasonably likely to affect, the flow of water to or from a river or lake and are used or are to be used for, or has the effect or likely effect of, preventing land from being flooded by water.

The Project does involve construction of works within a floodplain designated by an order pursuant to section 166(1) of the *Water Act, 1912*. Some components of the Project may also affect the flow of water to or from a river or lake and prevent land from being flooded by water.

Relevant approvals under Part 8 of the *Water Act, 1912* would be obtained for relevant Project components prior to their construction.

A5.3 AQUIFER INTERFERENCE POLICY

A5.3.1 Policy Overview

The *NSW Aquifer Interference Policy* (NSW Department of Primary Industry [DPI], 2012) (the AIP) has been developed by the NSW Government as a component of the NSW Government's Strategic Regional Land Use Policy. The AIP applies State wide and details water licence and impact assessment requirements.

The AIP has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The AIP will also enhance existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

The *Water Management Act, 2000* defines an aquifer interference activity as that which involves any of the following:

(a) the penetration of an aquifer;

(b) the interference with water in an aquifer;

(c) the obstruction of the flow of water in an aquifer;

(d) the taking of water from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations; and

(e) the disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.

Examples of aquifer interference activities include mining, coal seam gas extraction, injection of water, and commercial, industrial, agricultural and residential activities that intercept the water table or interfere with aquifers (DPI, 2012).

The AIP applies to all aquifer interference activities but has been developed in particular to address the following activities (DPI, 2012):

- ***mining activities*** *such as open cut voids, underground mine workings and the disposal of water taken from an aquifer including water taken as part of coal seam gas extraction;*
- ***other extractive industries****, such as sand and gravel extraction...;*
- ***coal seam gas activities****, including those related to both exploration and production;*
- *other large projects which require* ***dewatering*** *such as for the construction and maintenance of associated works, such as buildings, roads and other civil works;*
- ***injection works*** *used to transmit water into an aquifer; and*

- *activities with the potential to contaminate groundwater or result in unacceptable loss of storage or structural damage to an aquifer.*

Licensing Requirements

The AIP requires all water taken by aquifer interference activities to be accounted for within the extraction limits set by the relevant water sharing plan. A water licence is required, whether water is taken either incidentally or for consumptive use, where any act by a person carrying out an aquifer interference activity causes (DPI, 2012):

- *the removal of water from a water source; or*
- *the movement of water from one part of an aquifer to another part of an aquifer; or*
- *the movement of water from one water source to another water source, such as:*
  - *from an aquifer to an adjacent aquifer; or*
  - *from an aquifer to a river/lake; or*
  - *from a river/lake to an aquifer.*

The AIP also requires consideration of the continued take of water from groundwater or connected surface waters following cessation of an aquifer interference activity. For example, the post-closure inflow that occurs until a groundwater system reaches equilibrium following cessation of open cut mining is required to be considered. Licences are required to be held to adequately account for the ongoing take of water until the system returns to equilibrium, or alternatively, sufficient licences are required to be surrendered to the Minister.

Minimal Impact Considerations

In addition to licensing requirements, the *Water Management Act, 2000* includes the concept of ensuring "no more than minimal harm". In this regard the AIP includes minimal impact considerations relating to water table and groundwater pressure drawdown and changes in groundwater and surface water quality.

The AIP provides that:

> *Aquifer interference approvals are not to be granted unless the Minister is satisfied that adequate arrangements are in force to ensure that no more than minimal harm will be done to any water source, or its dependent ecosystems, as a consequence of its being interfered with in the course of the activities to which the approval relates.*
>
> *While aquifer interference approvals are not required to be granted, the minimal harm test under the Water Management Act 2000 is not activated for the assessment of impacts. Therefore, this Policy establishes and objectively defines minimal impact considerations as they relate to water-dependent assets and these considerations will be used as the basis for providing advice to either the gateway process, the Planning Assessment Commission or the Minister for Planning.*

The AIP establishes minimal impact considerations for groundwater categories of both "highly productive" and "less productive" groundwater. Highly productive groundwater is defined by the AIP as groundwater which (DPI, 2012):

> *... is defined in this Policy as a groundwater source that is declared in the Regulations and will be based on the following criteria*
>
> *a) has total dissolved solids of less than 1,500 mg/L, and*
>
> *b) contains water supply works that can yield water at a rate greater than 5 L/sec.*

The AIP further groups highly productive groundwater into the following categories:

- Alluvial.
- Coastal sands.
- Porous rock, including:
  - Great Artesian Basin – Eastern Recharge and Southern Recharge; and
  - Great Artesian Basin – Surat, Warrego and Central.
- Other porous rock.
- Fractured rock.

The AIP similarly defines categories for less productive groundwater which include:

- Alluvial.
- Porous rock.
- Fractured rock.

The minimal impact considerations developed for highly productive alluvial water sources are summarised in Table A5-1.

Table A5-1
Minimal Impact Considerations for Aquifer Interference Activities

Water Source	Minimal Impact Consideration		
	Water Table	**Water Pressure**	**Water Quality**
Highly Productive Alluvial Water Sources	1. Less than or equal to a 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan; or A maximum of a 2m decline cumulatively at any water supply work. 2. If more than 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan then appropriate studies will need to demonstrate to the Minister's satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site. If more than 2m decline cumulatively at any water supply work then make good provisions should apply.	1. A cumulative pressure head decline of not more than 40% of the "post-water sharing plan" pressure head above the base of the water source to a maximum of a 2m decline, at any water supply work. 2. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.	1. (a) Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity; and (b) No increase of more than 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity. Redesign of a highly connected surface water source that is defined as a "reliable water supply" is not an appropriate mitigation measure to meet considerations 1.(a) and 1.(b) above. (c) No mining activity to be below the natural ground surface within 200m laterally from the top of high bank or 100m vertically beneath (or the three dimensional extent of the alluvial water source - whichever is the lesser distance) of a highly connected surface water source that is defined as a "reliable water supply". (d) Not more than 10% cumulatively of the three dimensional extent of the alluvial material in this water source to be excavated by mining activities beyond 200m laterally from the top of high bank and 100m vertically beneath a highly connected surface water source that is defined as a "reliable water supply". 2. If condition 1.(a) is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works. If condition 1.(b) or 1.(d) are not met then appropriate studies are required to demonstrate to the Minister's satisfaction that the River Condition Index category of the highly connected surface water source will not be reduced at the nearest point to the activity. If condition 1.(c) or (d) are not met, then appropriate studies are required to demonstrate to the Minister's satisfaction that: • there will be negligible river bank or high wall instability risks; • during the activity's operation and post-closure, levee banks and landform design should prevent the Probable Maximum Flood from entering the activity's site; and • low-permeability barriers between the site and the highly connected surface water source will be appropriately designed, installed and maintained to ensure their long-term effectiveness at minimising interaction between saline groundwater and the highly connected surface water supply.

Table A5-1 (Continued)
Minimal Impact Considerations for Aquifer Interference Activities

Water Source	Minimal Impact Consideration		
	Water Table	**Water Pressure**	**Water Quality**
Less Productive Porous and Fractured Rock Water Sources	1. Less than or equal to a 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan; or A maximum of a 2m decline cumulatively at any water supply work. 2. If more than 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan if appropriate studies demonstrate to the Minster's satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site. If more than 2m decline cumulatively at any water supply work then make good provisions should apply.	1. A cumulative pressure head decline of not more than a 2m decline, at any water supply work. 2. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.	1. Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity. 2. If condition 1 is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.

Source: Adapted from the AIP (DPI, 2012).

A5.3.2 Aquifer Interference Policy Requirements

An assessment of the Project against the licensing requirements and minimal impact considerations of the AIP is provided in the sub-sections below and Appendix A.

Licensing Requirements

As discussed above, the AIP requires all water taken by aquifer interference activities to be accounted for within the extraction limits set by the relevant water sharing plan. The water sharing plans relevant to the Project are the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* and the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*. Therefore, licensing under these plans is required to account for any loss of flow to the aquifers resulting from the Project. Details of the current groundwater licences held by Whitehaven for the Project are summarised in Table A5-2.

The predicted annual groundwater volumes required to be licensed for the Project are summarised in Table A5-3.

Table A5-2 indicates that Whitehaven currently hold licence entitlements of 180 ML/annum for the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003*. Whitehaven are yet to acquire licences for the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*.

Comparison of Whitehaven's licence entitlements against the predicted annual licensing requirements (Table A5-3) shows that adequate licences are available to account for the potential take of water associated with the Project from the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003*.

Whitehaven would acquire the necessary WALs for the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* prior to impacting on the relevant water source.

For comparison purposes, in addition to basic landholder rights and supplementary water access licences, the extraction limit stipulated in the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* is 199,893 ML/annum.

Table A5-2
Groundwater Licence Summary

Licence No.	WAL No.	Work Approval No.	Water Source	Amount (ML)	Lot/DP
90AL807001	WAL 12714	90CA807002	Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin's Leap) Groundwater Source	133	1/1034512, 21/754929
90AL806924	WAL 12681	90CA806925	Upper Namoi Zone 4 Namoi Valley (Keepit Dam To Gin's Leap) Groundwater Source	47	18/754929
			TOTAL:	**180**	

Source: After Appendix B.

Table A5-3
Groundwater Licensing Requirement Summary

Water Sharing Plan	Management Zone/ Groundwater Source	Predicted Groundwater Inflow Volume requiring Licensing (ML/annum)	
		During Project	Post-Mining
Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 4 - Namoi Valley (Keepit Dam to Gin's Leap) Groundwater Source	Average 44 Maximum 78	Average 88 Maximum 98
Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011	Gunnedah-Oxley Basin – Namoi Management Zone	Average 430 Maximum 700	Maximum 430

Source: After Appendix A.

Post-closure annual licensing requirements are expected to be similar to the licensing requirements during operation. As Whitehaven would hold adequate licenses to account for the potential take of water associated with the operation of the Project it is expected Whitehaven would have adequate licences to account for the potential post-closure take of water.

Notwithstanding, the numerical groundwater model would be periodically reviewed and refined as necessary over the mine life in order to verify the post-closure licensing requirements associated with the Project.

Minimal Impact Considerations

As discussed above, the AIP establishes minimal impact considerations for highly productive and less productive groundwater. The impacts of the Project to the Upper Namoi Alluvium have been conservatively assessed against the minimal impact considerations relating to highly productive groundwater. The impacts of the Project to porous rock have been assessed against the criteria for less productive groundwater.

Upper Namoi Alluvium Water Table and Water Pressure Minimal Impact Considerations

The water table minimal impact considerations for aquifer interference activities within highly productive alluvial water sources are presented in Table A5-1 and include:

- impacts to high priority GDEs;
- impacts to high priority culturally significant sites; and
- water decline at any water supply work.

Water pressure minimal impact considerations for aquifer interference activities within highly productive alluvial water sources are also presented in Table A5-1 and include a maximum 2 m decline at any water supply work.

No high priority GDEs are identified in the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003*. Further to this, no high priority culturally significant sites are listed in the Schedule of plan.

In addition, the Groundwater Assessment for the Project (Appendix A) predicted that no privately owned registered bores within the Upper Namoi Alluvium would incur more than 1 m incremental drawdown due to the Project.

Given the above, it is assessed that the Project adequately satisfies the water table and water pressure minimal impact considerations relating to highly productive alluvial water sources defined in the AIP and outlined in Table A5-1.

Notwithstanding, an investigation would be undertaken in the event that any unforseen surface or groundwater impacts are detected or a complaint is received in relation to loss of groundwater supply. If the investigation identifies actual groundwater impacts attributable to Whitehaven activities, appropriate measures (e.g. provision of alternative water supply or bore reconditioning) would be developed and implemented in consultation with relevant authorities (e.g. the DP&I and the NOW) and the affected adjacent landowners.

Porous Rock Water Table and Water Pressure Minimal Impact Considerations

The water table minimal impact considerations for aquifer interference activities within less productive porous rock water sources are presented in Table A5-1 and include:

- impacts to high priority GDEs;
- impacts to high priority culturally significant sites; and
- water decline at any water supply work.

Water pressure minimal impact considerations for aquifer interference activities within less productive porous rock water sources are also presented in Table A5-1 and include a maximum of a 2 m decline at any water supply work.

No high priority GDEs are identified in the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* in the vicinity of the Project. Further to this, no high priority culturally significant sites are considered to be located in the vicinity of the Project.

Cumulative pressure head declines of greater than 2 m are predicted at two privately owned bores within the porous rock groundwater source relevant to the Project (Heritage Computing, 2013). Whitehaven would provide mitigation/compensation/ offset measures commensurate with the level of impact. These measures could include, but are not necessarily limited to lowering of pumps, deepening of bores, or provision of new bores/alternative water supplies.

Therefore the Project is considered to adequately satisfy the water table and water pressure minimal impact considerations relating to less productive porous rock groundwater sources defined in the AIP and outlined in Table A5-1.

Upper Namoi Alluvium Water Quality Minimal Impact Considerations

The water quality minimal impact considerations for aquifer interference activities within highly productive alluvial water sources are presented in Table A5-1 and include:

- impacts to groundwater quality in relation to the beneficial use category of the groundwater source;
- impacts to the long-term average salinity in highly connected surface water sources;
- consideration of the location of mining activities in relation to a highly connected surface water source defined as a "reliable water supply"; and
- limits to the extent of excavation of alluvial material.

The Project is not anticipated to result in a significant deterioration in groundwater quality of the Upper Namoi Alluvium (Heritage Computing, 2013). Therefore, the Project is not expected to lower the beneficial use class of alluvial groundwater within the vicinity of the Project.

The Groundwater Assessment for the Project (Appendix A) included an evaluation of the potential impacts of the Project on the 4 km long reach of the Namoi River adjacent to the western side of the Project mining area. The evaluation considered the potential increase in baseflow due to the proposed use of the Blue Vale void as mine water surge storage during the Project life.

The modelling considered a worst case scenario of the total salt load released from the mine water surge storage being captured by the Namoi River. Under this scenario the increase in salt load, and hence salinity, would be approximately 0.1% based on median flows. If average flow values for the Namoi River are used the increase in salinity would be even less (i.e. 0.02%) (Appendix A).

As the proposed open cut extent is located wholly within the Maules Creek Formation, no excavation of alluvial material would be conducted as part of the Project. The groundwater model does however predict some leakage from the Upper Namoi Alluvium to the immediate south of the open cut, as a result of depressurisation. Groundwater quality monitoring of the alluvial groundwater in this area indicates elevated salinity (>10,000 microSiemens per centimetre). This leakage would provide a beneficial effect as this area is a natural source of salinity for the Namoi River (Appendix A). Modelling predicts that approximately 500 tonnes per annum of salt would be removed from the alluvial/colluvial source and stored inside the less permeable porous rock aquifer.

On this basis, it is assessed that the Project adequately satisfies the water quality minimal impact considerations relating to highly productive alluvial water sources defined in the AIP and outlined in Table A5-1.

Porous Rock Water Quality Minimal Impact Considerations

The water quality minimal impact considerations for aquifer interference activities within less productive porous rock water sources are presented in Table A5-1 and relate to impacts to groundwater quality in relation to the beneficial use category of the groundwater source.

The Project would result in local depressurisation of the porous rock groundwater system during mining. Following completion of mining recovery of the groundwater level is predicted to reach an equilibrium level lower than the pre-mining level (Appendix A).

In consideration of this, there is not expected to be a migration of groundwater away from the Project mining area in the porous rock groundwater system either during mining or following completion of mining activities. On this basis, the Project would not lower the beneficial use category of the groundwater within the Permian system.

Therefore it is assessed that the Project adequately satisfies the water quality minimal impact considerations relating to less productive alluvial water sources defined in the AIP and outlined in Table A5-1.

A5.4 REFERENCES

Department of Primary Industries (2012) *NSW Aquifer Interference Policy: NSW Government policy for the licensing and assessment of aquifer interference activities*.

Evans & Peck (2013) *Vickery Coal Project Surface Water Assessment*.

Heritage Computing (2013) *Vickery Coal Project Groundwater Assessment*.