

PRESENTATION TO NSW INDEPENDENT PLANNING COMMISSION

Vickery Extension Project

6 December 2018



 **WHITEHAVEN COAL**



Our company

Whitehaven
is a proudly
Australian
company listed
on the ASX

We have a long
history in the
Gunnedah Basin
stretching back
two decades

We operate a total
of six mines around
the key centres of
Gunnedah, Boggabri
and Narrabri

We have a strong
track record of safe and
environmentally responsible
operation, including the
management of water resources

Our coal

- **Gunnedah Basin produces** the best quality, low ash, low sulphur, high-energy coal in the seaborne market
- **Our coal is powering** advanced and developing economies across Asia
- **Whitehaven produces** both thermal and metallurgical coal, with Vickery programmed as a predominantly metallurgical coal project
- **Many of our customers** in Asia recall the high-quality of coal from the Vickery deposit
- **According to the International Energy Agency**, coal demand in these markets is growing strongly and will increase by 491 million tonnes coal equivalent by 2040
- **24 countries** have included coal in their Nationally Determined Contributions
- **Our thermal coal** is exclusively used in the most efficient, lowest-emitting power stations in the world



Our community and social compact

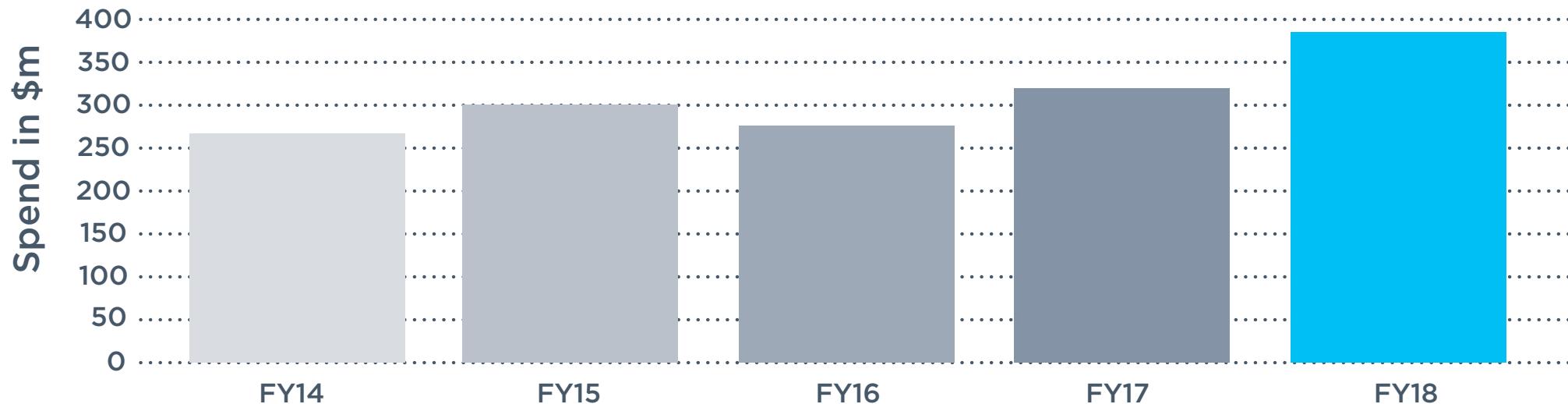
We are committed to establishing greater awareness, understanding, legitimacy and trust in the local community.



Our local focus

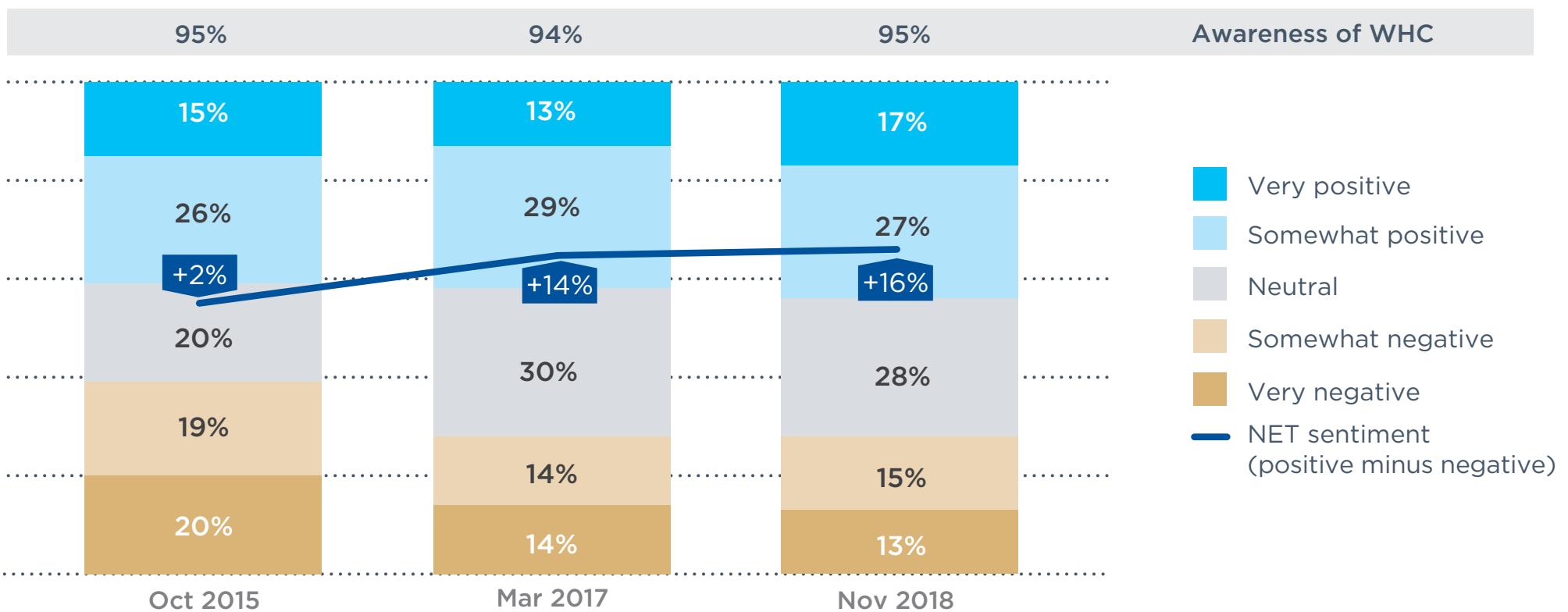
- We are the single largest private employer in the NSW North West Region
- More than 70% of our 1,500-strong workforce live in the local communities around our mine sites
- In Gunnedah, 1 in every 7 people works for Whitehaven Coal
- Over the last five years, we have invested over \$1.5 billion in the NSW North West
- \$41 million in payments to local councils since between FY12-19
- 11% Aboriginal employment across our local workforce

Region investment by year



Awareness and opinion of Whitehaven through time

Whitehaven's reputation in the Gunnedah, Narrabri, Tamworth and Liverpool Plains LGAs has improved over the last few years

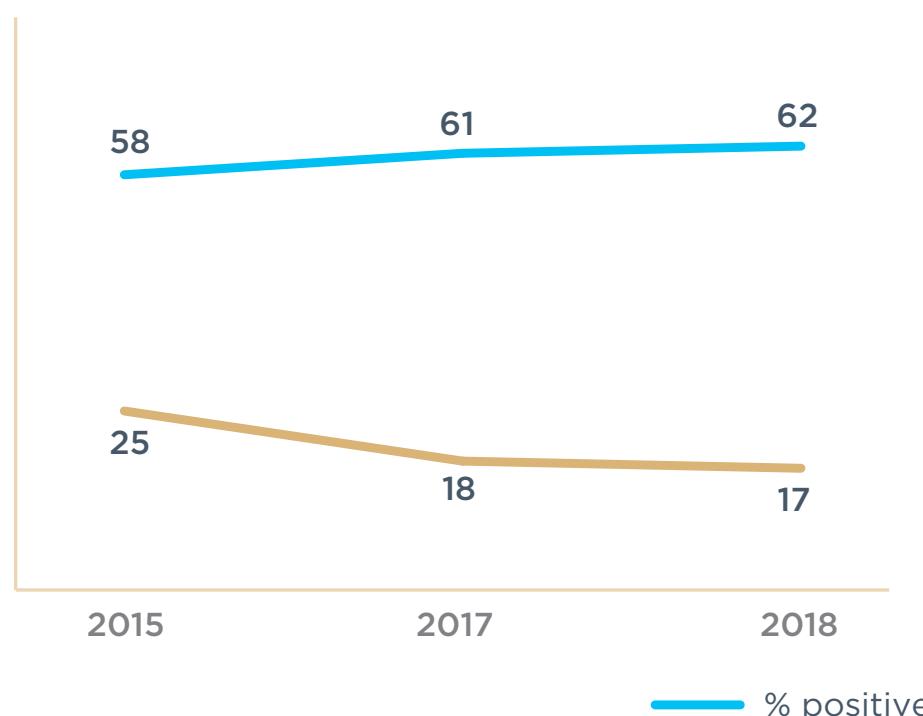


Source: Independent quantitative research conducted by Newgate Research.

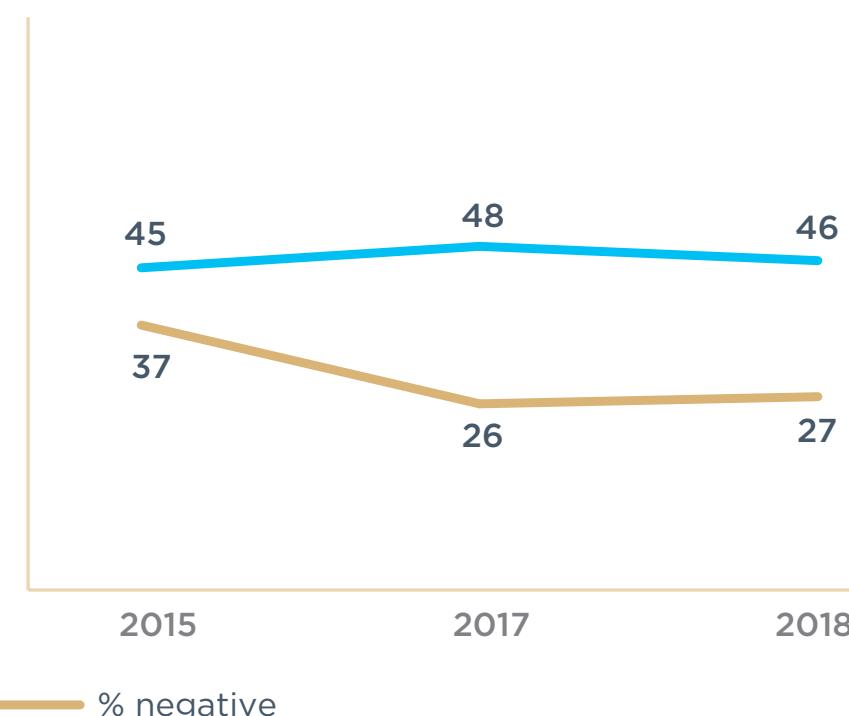
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Opinions of Whitehaven by community

Gunnedah



Narrabri



Source: Independent quantitative research conducted by Newgate Research.

Base: All 2018 participants (n=600), Tamworth (n=150), Gunnedah (n=150), Narrabri (n=150), Liverpool Plains (n=150). 2017 (n=600). 2015 (n=600).

Vickery Extension Project

Vickery is a predominantly metallurgical – or steel-making – coal project

Good for the local community: Forecast to create nearly 950 new jobs and contribute \$244 million in local wages

Good for the Indigenous community: Vickery will replicate our commitment at Maules Creek that 10% of the operational workforce will be Aboriginal

Good for the Government and people of NSW: Forecast to generate \$671 million royalty revenue for NSW in net present value terms – money for schools, hospitals, roads and other priorities against a backdrop of falling stamp duty and asset recycling receipts

Good for exports: Vickery will leverage Australia's competitive advantage as the major supplier to the best technology, lowest emitting power stations in the world

Good for local environment and amenity: Closure of Gunnedah CHPP, trucks off Kamilaroi Highway, reduced number of final voids from 5 to 2

Good for Whitehaven: Vickery ensures sustainability of our local presence over the long term

Thank you

www.whitehavencoal.com.au

Level 28, 259 George Street,
Sydney NSW 2000





Whitehaven Coal Limited

VICKERY EXTENSION PROJECT | EIS
INDEPENDENT PLANNING COMMISSION BRIEFING

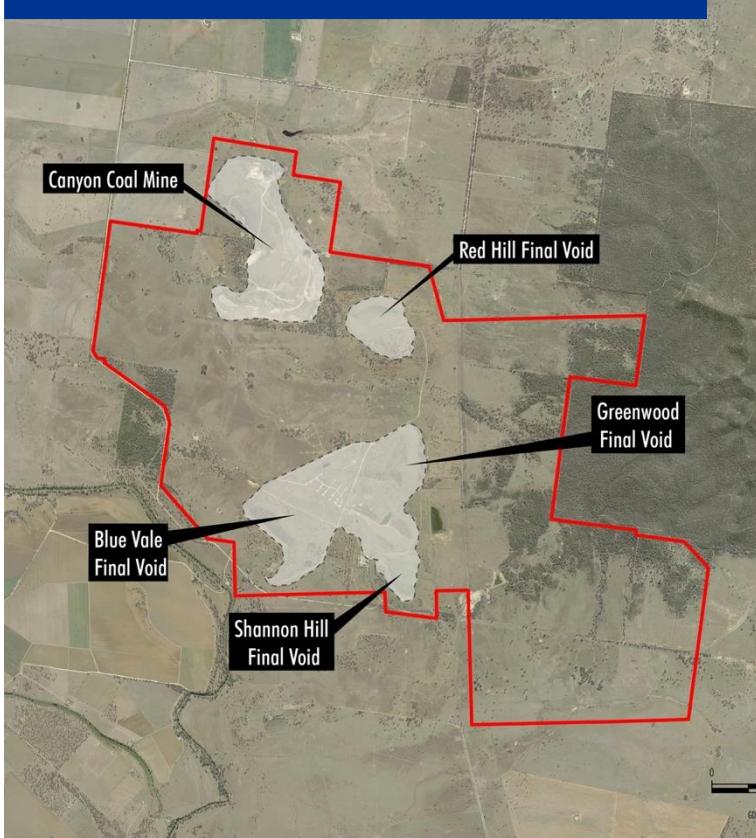
6 December 2018



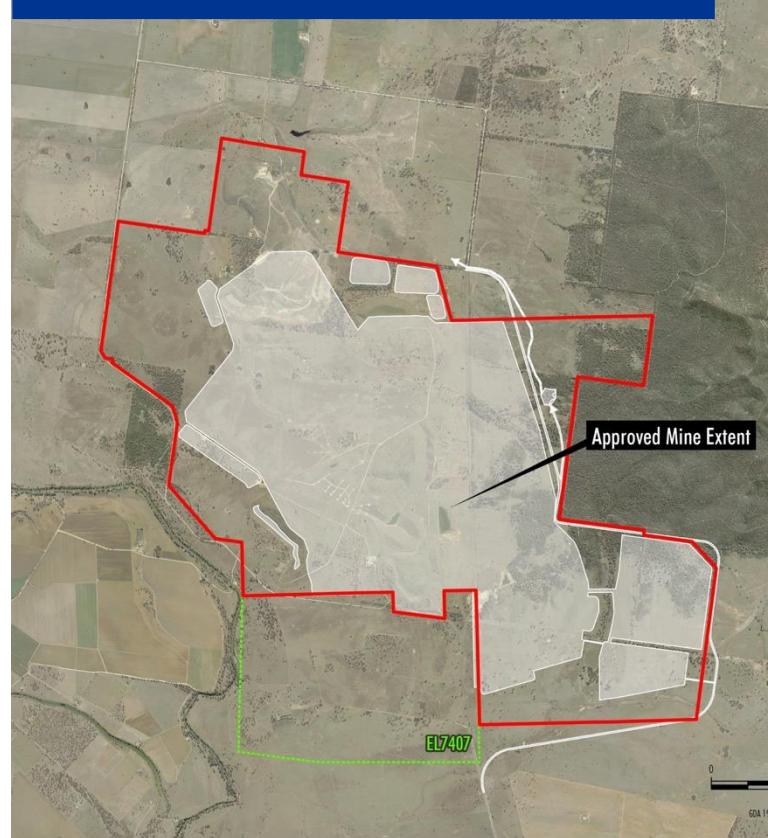
WHITEHAVEN COAL

Project Site – History of Mining

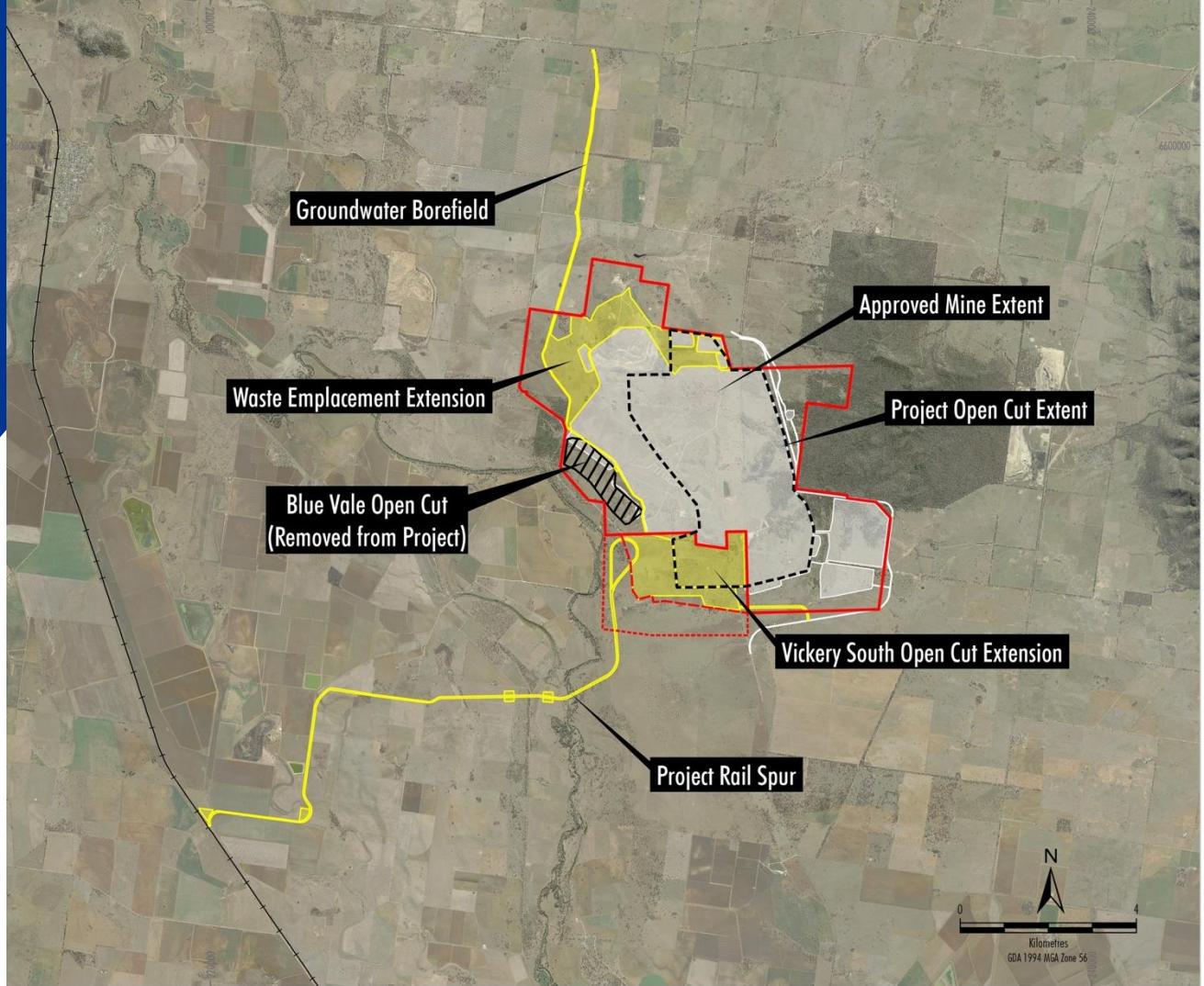
Historic Mining



Approved Mine



Project – Builds on Existing Approval



Extensive Community Consultation

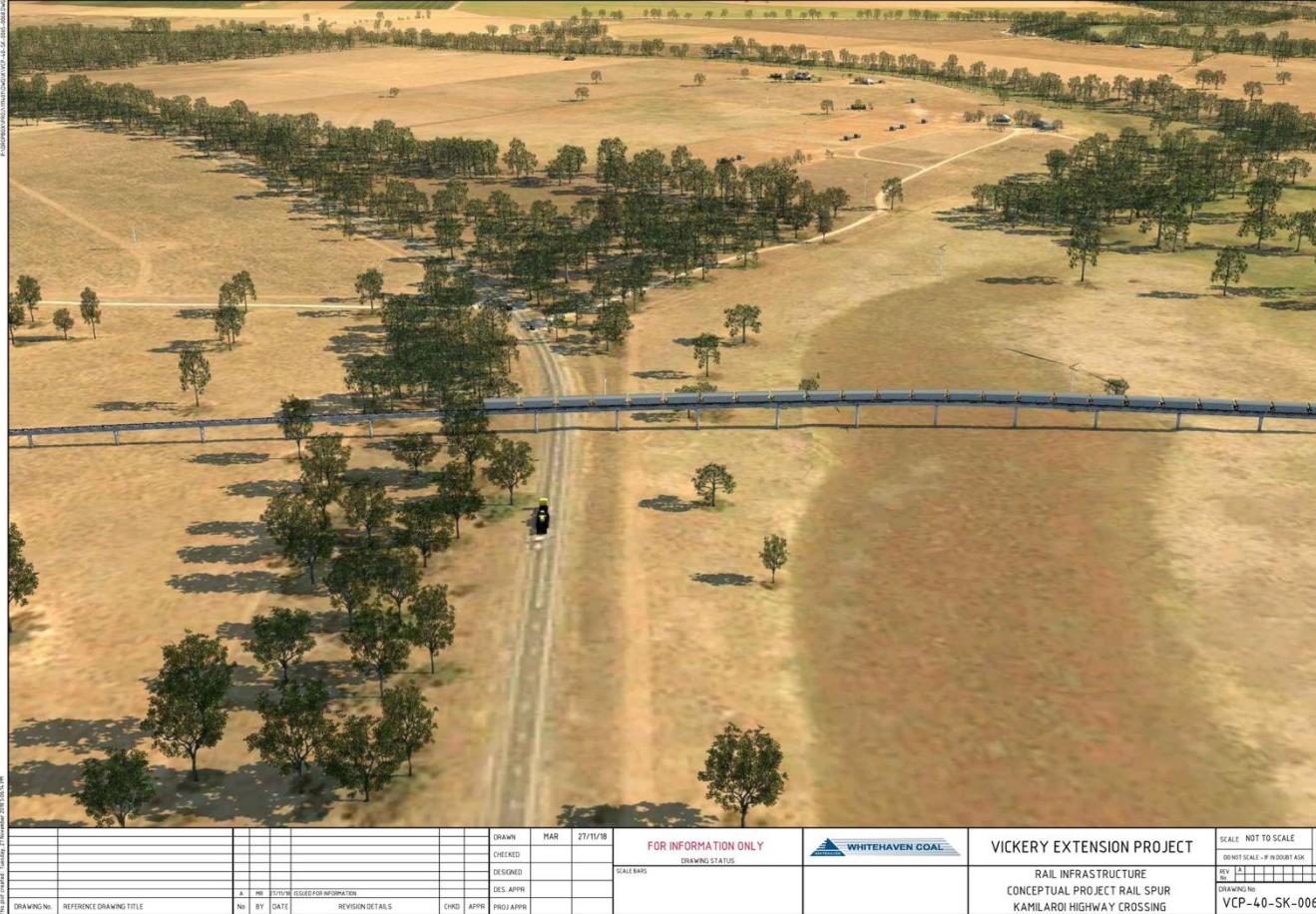
- Face-to-face meetings with locals and businesses
- Community information sessions
- Digital communications campaign
- Individual landholder packages
- Newsletters
- Site tours
- Social Impact Assessment
- 5 years of qualitative and quantitative baseline research on community views



Project Rail Spur



Rail Spur – Designed to Avoid Flood Impacts



Protection of Water Resources

- Negligible loss of flows from the Namoi River
- Negligible impact to Namoi River water quality
- Negligible change to flood characteristics
- Open cut mining does not intercept the Namoi River alluvium
- Negligible impact to Namoi River alluvial groundwater quality
- Negligible drawdown at privately owned groundwater bores
- Sufficient water licences currently held by Whitehaven
- Similar magnitude of impacts to the Approved Mine



Improved Final Landform

- Reduction in final voids (2→1)
- Reduction in final void catchment area (490ha→250ha)
- Final void to act as a groundwater sink with no risk of overtopping
- Small indirect groundwater inflows which would be licenced
- Backfill not considered reasonable or feasible
- Progressive rehabilitation to native vegetation and agricultural areas
- Macro-relief to integrate with Vickery State Forest landforms
- Micro-relief to stabilise landform
- 100m lower than Vickery State Forest
- Detailed design of final landform to be developed in Rehabilitation Strategy with DRG



Key EIS Assessment Findings



Agriculture

- Project site disturbed by historic mining and agricultural activities
- Currently low intensity cattle grazing
- No cropping, and no BSAL in the Project footprint
- Project rehabilitation to woodland to contribute to offset liability



Biodiversity

- Approved Mine disturbance = 2,242 ha
- Project extension areas = 776 ha
- No terrestrial EECs or threatened flora species in Project extension area
- Offset Strategy developed in accordance with relevant State and Commonwealth guidelines

Key EIS Assessment Findings (presenters to follow)



Flooding

- Mine located beyond Namoi River floodplain
- Negligible change in flooding characteristics due to rail spur



Amenity (noise, blasting, air)

- No additional noise affected properties
- Compliance with blasting criteria
- Compliance with air quality criteria



Water

- Negligible impact to Namoi River
- Negligible impact to alluvial groundwater
- Adequate licensing



Economics

- Significant economic benefits to the State and region



Vickery Extension Project Flood Assessment

IPC Briefing - 6 December 2018



INTRODUCTION



- Greg Roads (B.Eng.), Director, WRM Water & Environment
 - 30 years experience as a Water Resources Engineer specialising in floodplain management
 - 10 years at NSW Dept. Water Resources and Dept. Land and Water Conservation in Rural Flood Group
 - Currently undertaking Flood Management Plans for Narrabri and Moree Plains council's
 - Currently undertake peer reviewer for NSW Office of Water and
- Peer review by Rohan Hudson (B.Eng., M.Eng.Sci.), Senior Water Resources Engineer, Royal HaskoningDHV
 - 18 years experience as a Water Resources Engineer
 - Experience in peer reviews for Government



INTRODUCTION



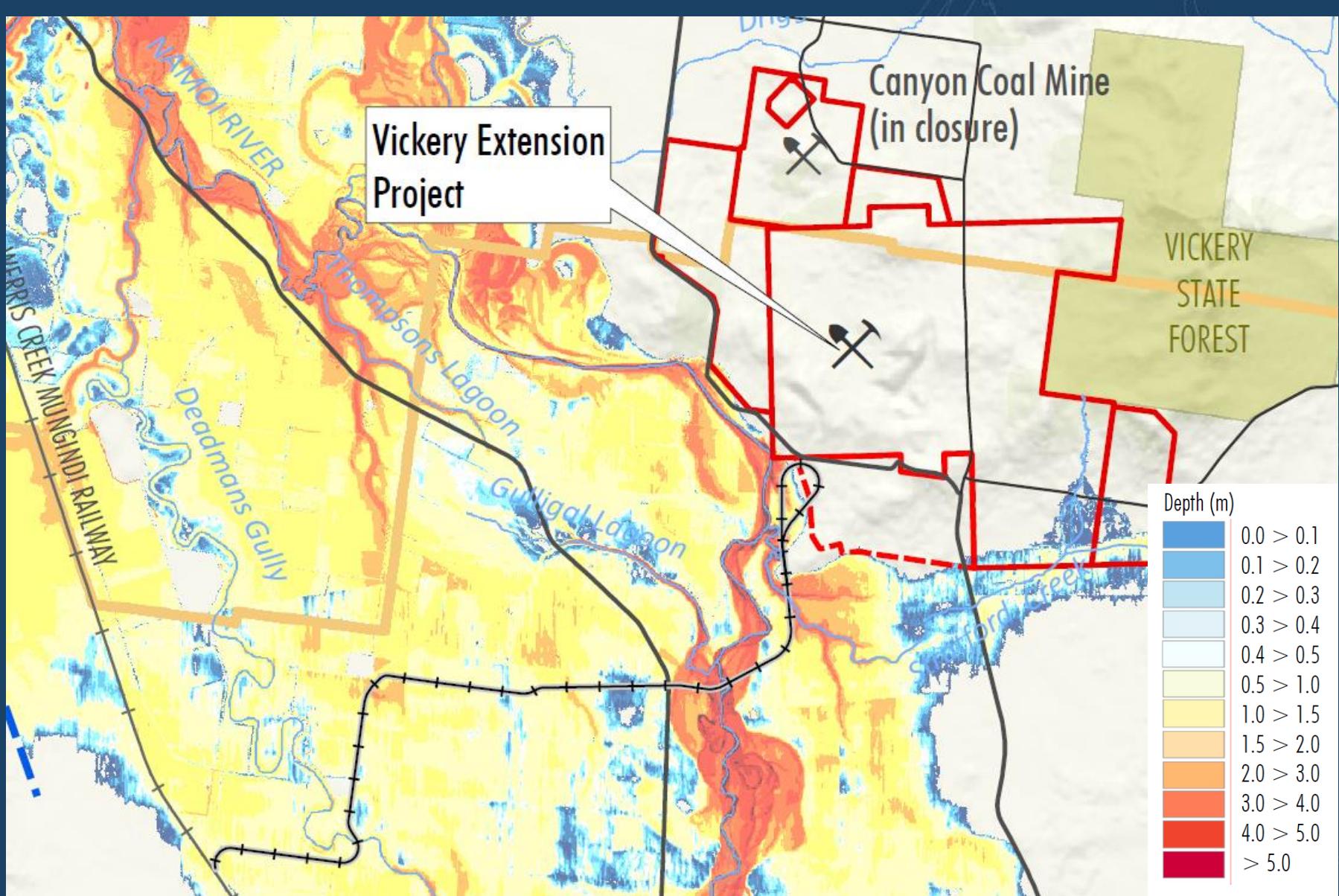
ASSESSMENT OBJECTIVES

- Assess potential impact of the Project on existing flooding characteristics of the Namoi River floodplain and adjacent tributaries
- Assist in developing a conceptual design of the Project rail spur that achieves compliance with Floodplain Management Plan criteria

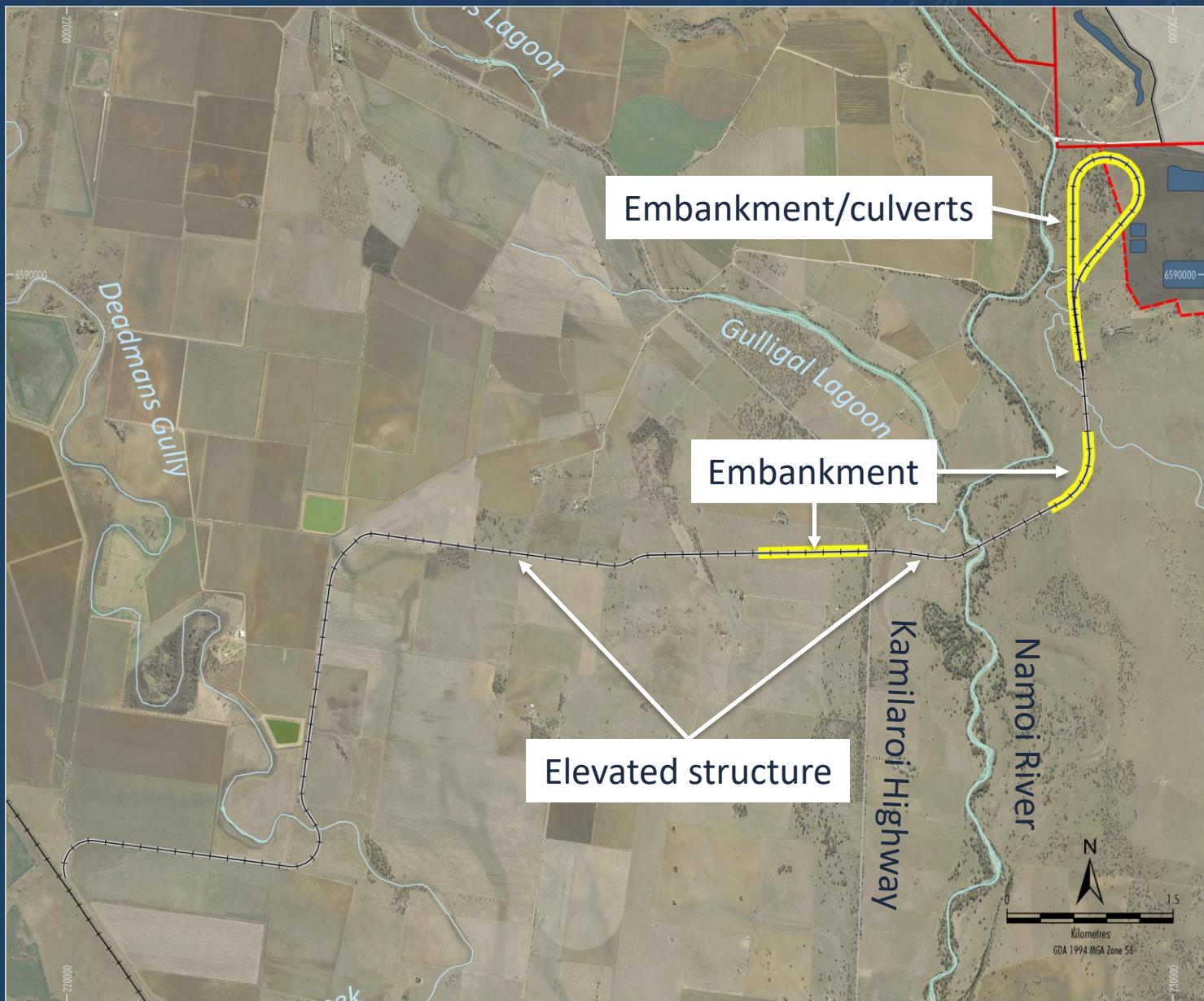
KEY CONCLUSIONS

- Project mining area located beyond Namoi River floodplain
- Project rail spur conceptual design complies with relevant FMP criteria:
 - Negligible afflux
 - Negligible change in velocity
 - Negligible change in distribution of flows

FLOOD MODELLING - EXISTING



RAIL SPUR - CONCEPTUAL DESIGN





RAIL SPUR - CONCEPTUAL DESIGN



Concept Design

RAIL SPUR - PREDICTED FLOOD IMPACTS





RAIL SPUR - DETAILED DESIGN



- Detailed design of the rail spur will meet the requirements of the FMP criteria (both 2006 Carroll to Boggabri FMP and 2016 Draft Upper Namoi FMP)
- The final height and the size of the spans, piers and embankments will be determined during the detailed design stage
- Detailed design to be prepared in consultation with OEH



FLOOD MODELLING - REVIEW COMMENTS



Royal HaskoningDHV's peer review concluded:

“... the WRM (2018) assessment was undertaken using best-practice techniques...”

WMAWater's peer review confirmed the flood assessment was:

“... undertaken in accordance with industry best practice...”

Whitehaven's Response to Submissions will include detailed responses to each of the DPE's Peer Reviewer comments.



CONCLUSION



KEY CONCLUSIONS

- Project mining area located beyond Namoi River floodplain
- Project rail spur conceptual design complies with relevant FMP criteria:
 - Negligible afflux
 - Negligible change in velocity
 - Negligible change in distribution of flows



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Vickery Extension Project

Surface Water Assessment

Independent Planning Commission Briefing

Chris Thomas
Senior Principal
Practice Lead – Water Resources

6 December 2018



Advisian

WorleyParsons Group

www.advisian.com



Introduction

Chris Thomas (B.Eng., M.Eng.Sc.), Principal, Water Resources, Advisian

- 30 years experience as a Water Resources Engineer practicing in all facets including catchment and flood hydrology, surface water management, surface water-groundwater interaction, water balance, dam design and water quality analysis
- Principal Hydrologist responsible for Surface Water Assessments for a range of NSW coal mining projects (Ashton, Moolarben, Mt Arthur)
- Peer Review of Surface Water Assessments including Bylong Coal Project
- Immediate past chair and longstanding member of the Sydney Diversion Water Panel of Engineers Australia

Peer review by Emeritus Professor Thomas McMahon, University of Melbourne



Incremental Impacts due to Extension of Approved Mine

- Extension of the Approved Mine into the Vickery South area has minimal impact on the surface water management regime.
- Western Emplacement no closer to the Namoi River.
- Reduction from two final voids to one with associated reduction in final void catchment area.
- No additional impacts compared to the Approved Mine.



Introduction

ASSESSMENT OBJECTIVES

- Develop a water management system and water balance for the Project life which:
 - demonstrates there is sufficient water to meet mining needs
 - demonstrates water inflows can be effectively managed
- Assess the impacts of any changes to water flow and quality in the receiving environment

KEY CONCLUSIONS

- Water management system designed in accordance with relevant guidelines which prevents the release of 'mine water' off-site
- Water balance demonstrates Whitehaven holds sufficient licences for life of mine
- Potential downstream impacts on water flow and quality considered to be negligible



Advisian
WorleyParsons Group



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**Vickery Extension Project
Surface Water Assessment**

Existing Environment – Water Flow and Quality

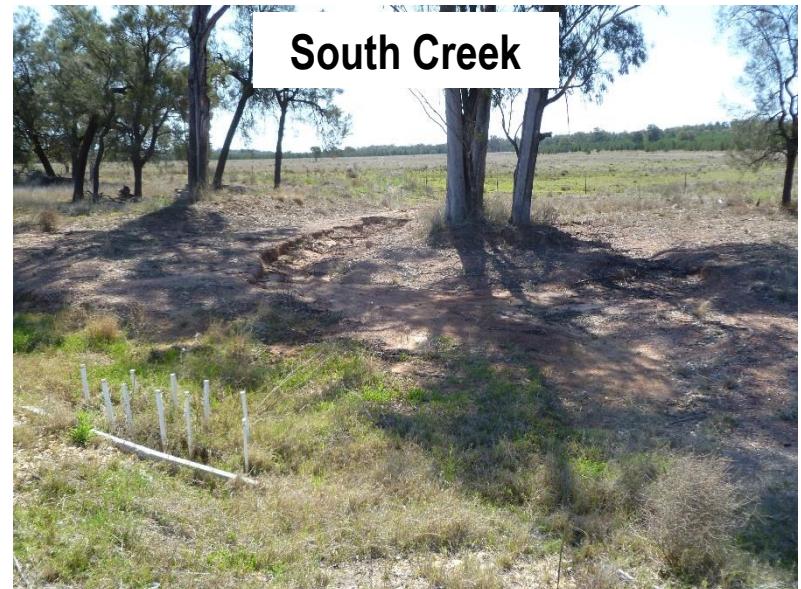
Namoi River



North-west Drainage Line



South Creek





Water Balance Model

1. Analysis undertaken to assess the performance of the water management system in terms of:
 - Security of water supply for operational purposes
 - Frequency and volume of discharge of water from the mine site
 - Water balance monitoring and management
2. Separate water balance analysis undertaken to assess the long-term water level and salinity in the final void following mine closure



Water Balance Modelling Results

- As per the Approved Mine water management system operates effectively and meets the water requirements for coal processing and dust suppression
- System is capable of operating with no discharge of water that has been in contact with coal
==> Nil Discharge Mine
- Sediment dam releases to restore dam capacity within five days of a rainfall event exceeding the design capacity would occur as controlled discharge, in accordance with Landcom (2004) and contemporary Environmental Protection Licence conditions
- No significant changes to the quantity or quality of surface water available to third party users or the environment
- No risk of overflow from the final void following mine closure
- Salinity in the final void is expected to increase progressively with the accumulation of salt



Summary of Assessment Findings

Namoi River

- Catchment reduction of up to 2.5 km² during mining and 2.4 km² following completion of mining → = 0.01% of total catchment
- Approximately 9 km² of rehabilitated waste rock emplacement area would drain towards the Namoi River
- No perceptible or measurable change in the flow regime expected
- Similar to the Approved Mine no change in the overall water quality of the Namoi River is expected due to the measures being taken to protect the quality of the water in the watercourses surrounding the site



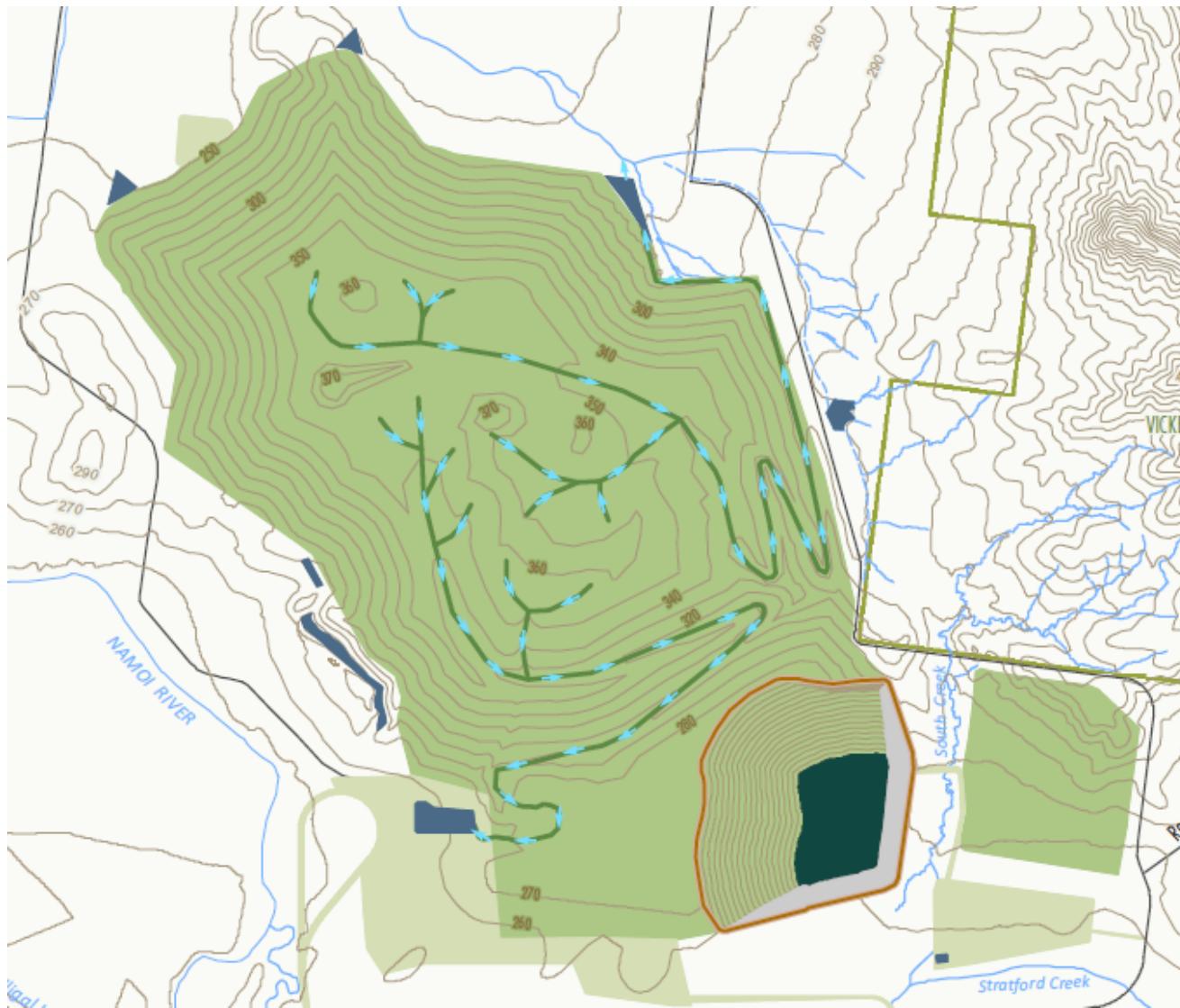
Summary of Assessment Findings

Water Quality in Off-Site Watercourses

- All water in contact with coal would be retained on site
- Sediment that may be carried by runoff would be controlled by:
 - Sediment dams
 - Prior to a controlled discharge of water from the dam, water would be allowed to settle (aided by a flocculent if necessary) to ensure SS concentration < 50 mg/L
 - Wet weather discharges and discharges to restore sediment dam capacity would be undertaken in accordance with an EPL which would specify water quality requirements and limits, including monitoring and discharge requirements
 - Treatment of areas of the final waste rock emplacement face that exhibit some erosion with gypsum
- Implementation of the sediment control measures would ensure that any controlled discharge would have minimal impact on the water quality of local creeks



Final Landform





Monitoring and Licensing

Water Management Plan (similar to the Approved Mine)

- Climate monitoring
- Site surface water monitoring and discharge
- Ambient surface water quality
- Water balance monitoring and management
- Environmental Protection Licence for conditions for water quality monitoring and sediment dam discharge



Review Comments

Emeritus Professor Thomas McMahon concluded:

“In summary, I conclude that, overall, the study detailed in the Vickery Extension Project Surface Water Assessment Report was completed in a professional and detailed manner, and the conclusions in the Report are appropriately supplemented by suitable modelling studies carried out by the consultant...”

BMT’s peer review (on behalf of DPE) concluded:

“The assessment results included the outcome of detailed water balance modelling completed with respect to mine operations. The review determined that the parameters and methodology adopted for the modelling of surface water are appropriate. The results obtained from the modelling can be used to consider the water balance of the mine and the likelihood of discharges occurring from the mine to receiving downstream watercourses...”

Whitehaven’s Response to Submissions will include detailed responses to each of the DPE’s Peer Review comments

Vickery Extension Project

Air Quality

6 December 2018



TODOROSKI
AIR SCIENCES

Introduction

Aleks Todoroski

- ◆ 28 years experience in air quality, including approvals for hundreds of new and modified mine projects
- ◆ Director – Todoroski Air Sciences (2011 to present)
- ◆ Principal Technical Policy Advisor (Air) – EPA (10 years)
- ◆ Conducted numerous peer reviews on behalf of the Department of Environment and Planning
- ◆ Peer review of Vickery Extension Project AQ Assessment (prepared by Ramboll)



Objectives and Conclusions

Objectives

- ✚ Identify appropriate mitigation measures
- ✚ Predict potential impacts and compare to recognised criteria

Conclusion

- ✚ Compliance with criteria predicted at all privately-owned dwellings



Modelled Air Quality Controls

- ✚ Haul road dust suppression – consistent with industry benchmarking
- ✚ Use of large vehicles to reduce the number of trips required
- ✚ Restricted speed limits on haul roads
- ✚ Progressive rehabilitation of disturbed areas
- ✚ Minimisation of pre-strip areas
- ✚ Sprinklers at CHPP



Predicted Results

- ✚ Compliance with criteria predicted at all privately-owned dwellings
 - Annual average TSP ✓
 - Annual average PM₁₀ ✓
 - Annual average PM_{2.5} ✓
 - 24-hour average PM₁₀ ✓
 - 24-hour average PM_{2.5} ✓
 - Dust deposition ✓
- ✚ No adverse air quality impacts are predicted due to coal train dust, diesel emissions, blast emissions
- ✚ Township of Boggabri is significantly further away from the Project (approx. 15 km) and dust from the Project would not be detectable



Operational Monitoring

- ✚ Real-time proactive air quality management system
- ✚ Meteorological forecasting and monitoring to identify adverse weather conditions
- ✚ Real-time dust monitoring
- ✚ Trigger levels set below criteria identify if additional at-source controls required to manage 24-hour average concentrations when daily background levels are elevated
- ✚ Management and documentation via Air Quality Management Plan
- ✚ With the above measures in place the risk of dust impacts from the Project is considered to be very low



VICKERY EXTENSION PROJECT NOISE & BLASTING ASSESSMENT

6 December 2018

Introduction

Noise and Blasting Assessment – Wilkinson Murray:

- John Wasserman – Director Wilkinson Murray
- Over 25 years experience in acoustics and vibration
- Formerly – Manager Noise Assessments for the NSW EPA
- Conducted numerous peer reviews on behalf of DPE

Peer Review – SLR Consulting:

- Glenn Thomas – Director SLR Consulting
- Over 25 years experience in mining noise impact assessment
- Numerous peer reviews on behalf of DPE

Objectives and Conclusions

Noise:

- Identify reasonable and feasible mitigation
- Predict noise levels at sensitive receivers and compare to criteria
- Conclusion: No additional noise affected properties compared to the Approved Mine

Blasting:

- Confirm compliance human comfort and building damage criteria
- Dwellings and heritage sites
- Conclusion: Compliance with criteria predicted

Reasonable and Feasible Mitigation

Iterative approach:

- Preliminary noise modelling
- Identify potential for noise exceedances
- Evaluation of combinations mitigation options to assess effectiveness
- Review of feasibility by Whitehaven
- Adoption of reasonable mitigation by Whitehaven for the Project

Reasonable and Feasible Mitigation

Key mitigation:

- Procurement of low noise fleet
 - Modelled sound power levels based on measurements
 - Significant recent improvements in noise performance technology
- Treatment of infrastructure items
- Refinements to waste rock emplacement and open cut progression to provide for shielding of operations

Operational Noise Assessment

- Noise criteria are lowest levels (most stringent) under the *NPfI*
- Methodology predicts conservative outcomes
- Compliance with criteria predicted all privately-owned receivers except three closest properties (IDs 131, 132, 127)
- Property IDs 131 and 132
 - “Negligible” exceedances (1-2 dB above criteria)
 - NSW noise policy describes 1-2 dB is imperceptible compared to compliance
- Property ID 127
 - “Marginal”/“Moderate” (3-5 dB) and “Significant” (>5 dB) exceedances
 - Owners have acquisition upon request rights for the Approved Mine

Comparison to Approved Mine

- Improvement in noise mitigation technology since assessment for the Approved Mine
- Increased number of fleet items for the Project (reflects increased production rate)
- Decrease in overall site sound power level
- Noise benefits compared to the Approved Mine:
 - Cessation of road traffic noise along the Approved Road Transport Route
 - Cessation of noise from the Whitehaven CHPP in Gunnedah
 - Removal of Approved Mine Eastern Emplacement

Rail Noise

- Compliance with criteria predicted at all existing private receivers for trains travelling on the Project rail spur
- Locomotives idling on the rail loop included in operational noise modelling
- Recent noise measurements of locomotive noise taken
- Trains on the main line assessed cumulatively with existing/approved train movements

Blasting Assessment

- Blasting required for the removal of competent overburden
- Assessment methodology considers distance to receiver and maximum instantaneous charge
- Blasts are designed to achieve human amenity criteria
- Compliance with human comfort criteria (vibration and overpressure) predicted at all privately-owned receivers
- Compliance with building damage criteria at Kurrumbete homestead

Operational Noise Management

Noise

- Proactive and real-time noise monitoring and management:
 - Meteorological forecasting and monitoring
 - Real-time noise monitoring
 - Trigger levels set below noise criteria
 - Alarms sent to mine personnel to manage activities as required
 - Management measures documented in a Noise Management Plan

Blasting

- Monitoring of all blasts

AnalytEcon

Vickery economic assessment

December 2018

Introduction

Economic Assessment

- Dr Stephen Beare – Director – AnalytEcon
 - Former chief economist at the Australian Bureau of Agricultural and Resource Economics (ABARE) in Canberra
- Sabine Schnittger – Director Principal Economics (assessment team)

Peer Review

- Dr Brian Fisher AO – Managing Director – BA Economics
- Expert for UN and IPCC

Objectives and Conclusions

Objectives

- Estimate net benefits of the Project to NSW and regional economies [net benefits = benefits less opportunity costs]

Conclusions

- *“...Project will make a large net contribution to the economy of New South Wales should it be approved...”*

- Dr Brian Fisher, Peer Review Report (1 August 2018)

General Approach

- Identify and estimate the benefits and costs that accrue directly or indirectly to the State of NSW and local region from the Project under two alternative scenarios:
 - 'No mining operations'
 - 'Operate the Approved Mine'
- Using a framework that is consistent with NSW:
 - *Guidelines for the economic assessment of mining and coal seam gas proposals*
 - Gross state product accounting
- Figures reported here are for 'No Mining Operations'
 - Net benefits under the 'Operate Approved Mine' are generally about 60 per cent lower

Net Benefits – NSW

- Direct benefits:
 - **\$1,208M** (NPV) including:
 - \$671M in royalties [DRG calculated \$695M in its submission due to higher assumed coal price]
 - \$271M in employment benefits (disposable income)
 - Others (e.g. taxes, profit to NSW shareholders)
- Flow on benefits:
 - Employment and disposable income increase of:
 - **316 FTE** and **\$146M** (NPV) [DRG estimated higher indirect employment as a result of the Project in its submission]
 - Estimated increase in value added to NSW Gross State Product of:
 - **\$322M** (NPV)

Net Benefits – Local economy

- Direct benefits – employment and disposable income:
 - **255 FTE** and **\$224M** (NPV)
- Flow on employment and disposable income benefits:
 - **181 FTE** and **\$92M** (NPV)

DPE Peer Review (Marsden-Jacobs)

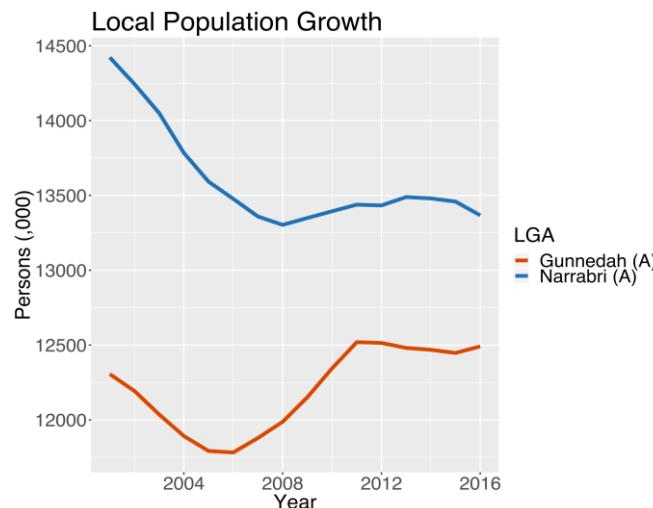
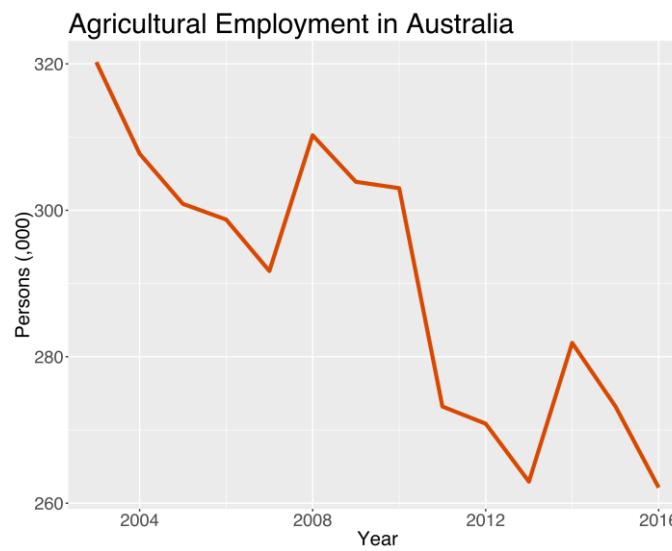
- Overarching comments:
 - "...Overall the AnalytEcon report robustly applies the guidelines for the assessment of economic costs and benefits..."
 - "...benefits and costs identified on the whole appear identified and categorised appropriately..."
 - "...indicative estimates broadly align with our expectations..."
- Specific comments and queries:
 - Whitehaven's Responses to Submissions will include detailed responses to Mardsen-Jacobs' peer review letter

A Conservative View

- Assumptions and methods used are not prone to overstating either benefits or costs of the Project including:
 - Only 20 per cent of employment considered as new jobs
 - Market based assessments of externalities where possible qualitative assessment otherwise
 - The use of first round as opposed to cumulative input-output multipliers
 - Attributing only unambiguous benefits to the local economy
- As noted in previous slides, this view is indirectly supported by the DRG Submission

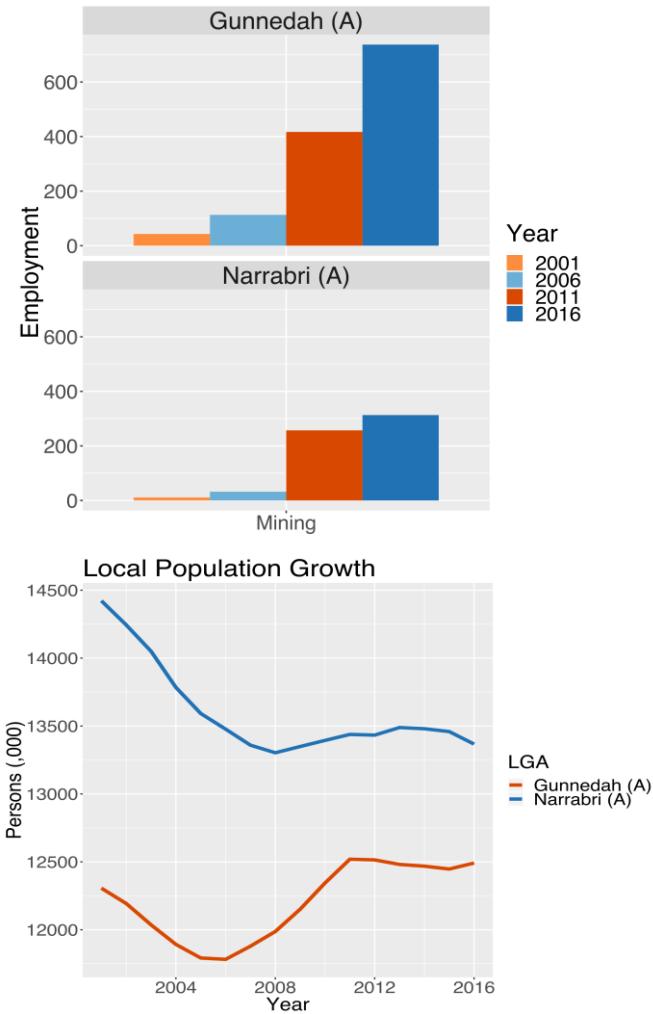
Competition for Labour - Agriculture

- Agriculture is generally the primary source of rural employment
- Declining use of labour is characteristic of agriculture in developed economies:
 - Over the last twelve years agricultural employment in Australia has fallen by almost 19%
- Regional Australia is not immune from other structural employment trends
- This puts downward pressure on rural populations



Mining

- In Gunnedah and Narrabri coincident increases in mining employment appear to have curtailed population decline (or increased population)
- Sustained / sustainable increases in LGA population can have associated economic and socio-economic benefits
 - Gunnedah has strong employment growth in the service sector
 - Narrabri has seen a recovery in its service sector
- Mining appears to have reattained displaced agricultural labour, not the other way around



Project Summary

- Negligible change to flood characteristics
- Negligible impact to Namoi River flows and water quality
- Negligible drawdown at private groundwater bores
- Cessation of road transport of coal to, and operations at the Whitehaven CHPP
- Improved final landform
- No additional ‘noise affected’ properties
- Compliance with air quality criteria predicted
- Significant employment opportunities
- Significant economic benefits



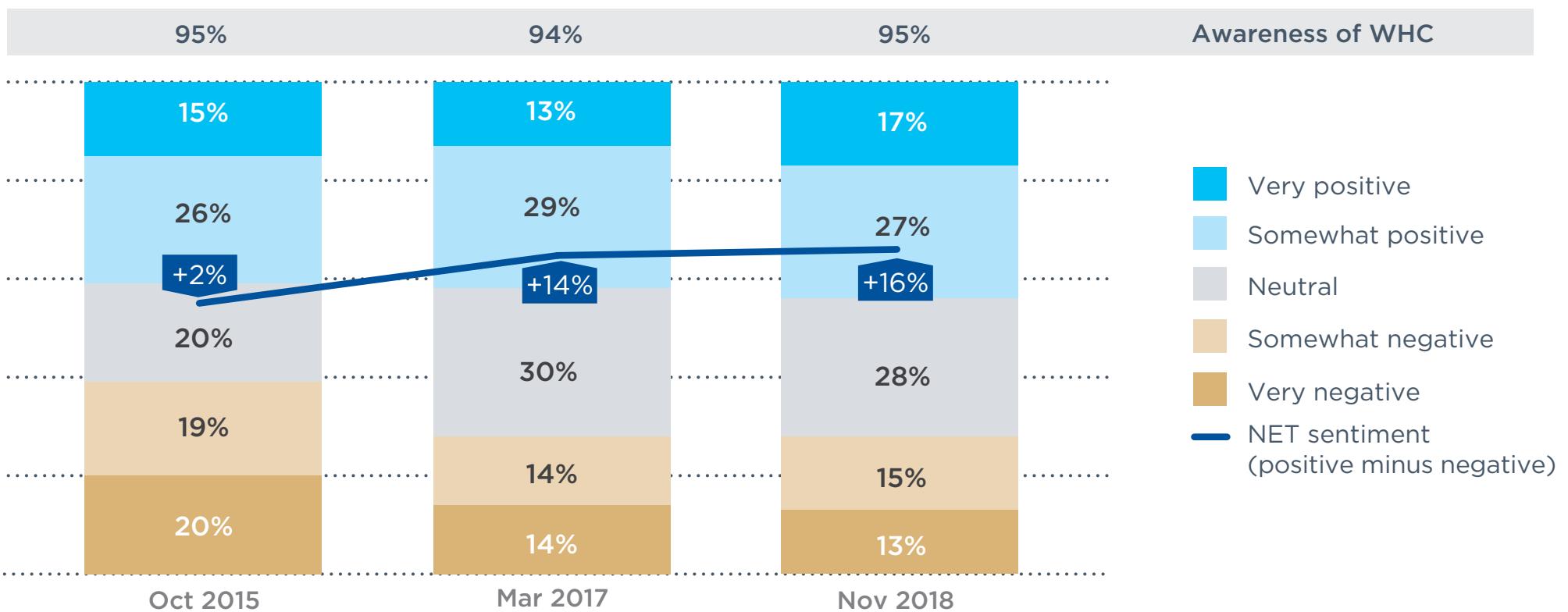
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WHITEHAVEN COAL

Awareness and opinion of Whitehaven through time

Whitehaven's reputation in the Gunnedah, Narrabri, Tamworth and Liverpool Plains LGAs has improved over the last few years

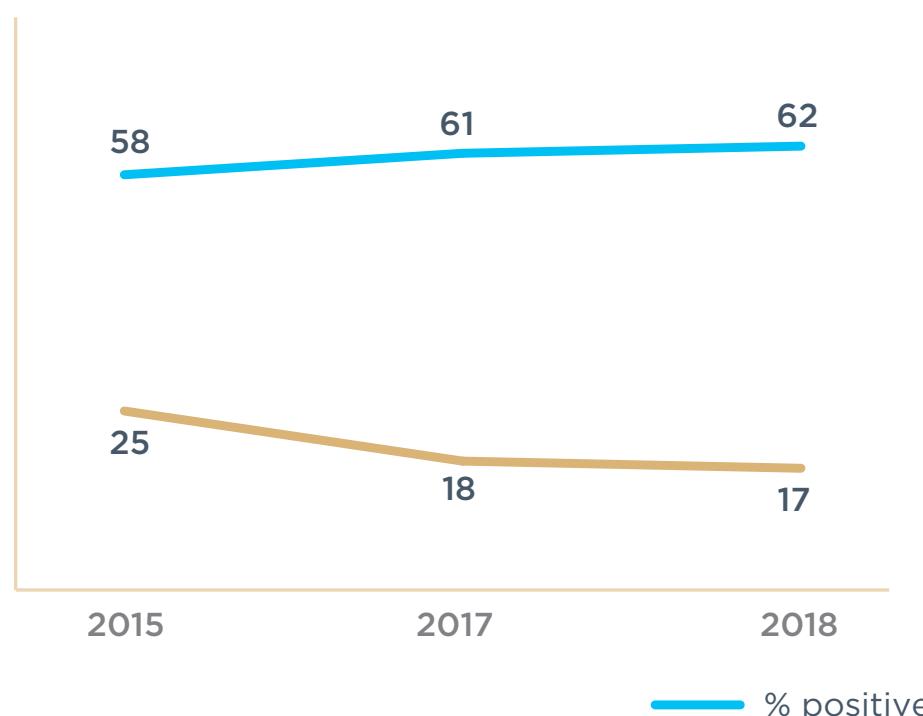


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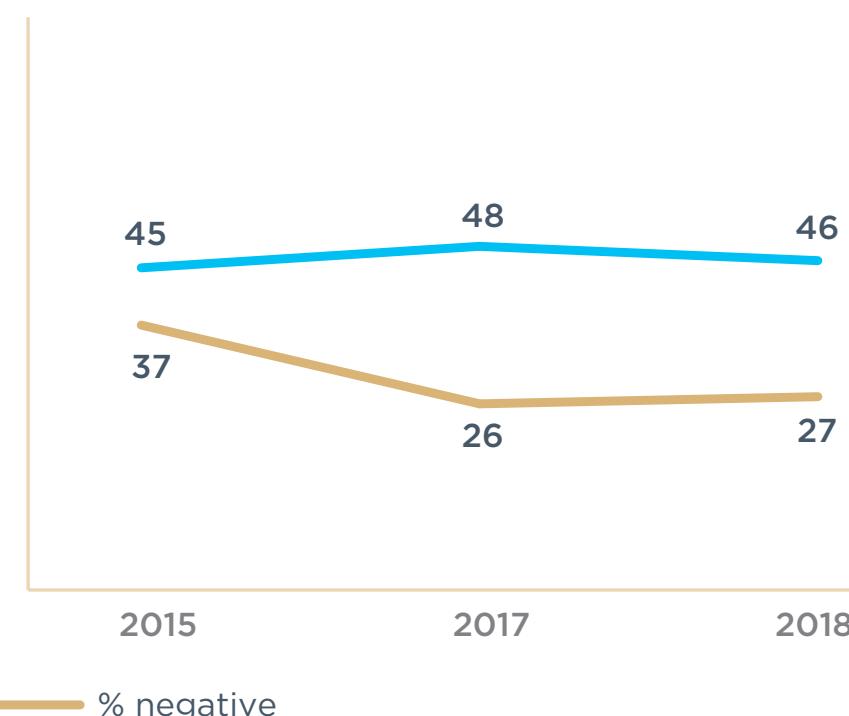
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Opinions of Whitehaven by community

Gunnedah



Narrabri



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