TAHMOOR COAL MINE
LONGWALLS W1-W2 EXTRACTION PLAN
Reasons for Approval

In granting a conditional approval of Tahmoor Coal's Extraction Plan application, I have carefully considered the following:

1. PROJECT APPROVAL STATUS

- The Tahmoor Coal Mine operates under several development consents, the earliest of which dates back to 1975. There are two key State consents for the mine, being:
  - DA 57/93: granted in September 1994 by the Land and Environmental Court of New South Wales, which permitted the extension of mining operations to the north of the then mined area; and
  - DA 67/98: granted in February 1999 by the then Minister for Urban Affairs and Planning, which permitted mining in areas of Tahmoor north that were excluded from DA 57/93. This approval has since been modified on four occasions.
- The approved project involves extraction of coal until 2022, at a rate of up to 3 million tonnes of run-of-mine coal a year (Mtpa). Coal is approved to be transported by rail to Port Kembla Coal Terminal, or occasionally Newcastle Port Waratah, for delivery to both Australian and International markets. Tahmoor Coal Mine also has approval to transport up to 50,000 tonnes per annum of coal by road within the Wollondilly Shire or in circumstances where rail transport is unavailable.
- To date, subsidence impacts have been managed in accordance with detailed Subsidence Management Plans (SMPs) and risk management frameworks regulated by the Department's Division of Resources and Geoscience (DRG) and Resources Regulator under the *Mining Act 1992* and Tahmoor's mining leases.
- As part of Modification 4 to DA 67/98, the Department's Planning and Assessment Division (the Department) recommended that the existing SMP process is replaced by a best-practice Extraction Plan process, managed under updated conditions of consent.
- The Independent Planning Commission of NSW concurred with the Department's approach and determined that the consent be updated to reflect current best practice for management of underground coal mines in NSW, including recommending performance measures and requiring that all longwalls from Longwall 33 onwards be managed under a contemporary Extraction Plan process.
- The project approval requires an Extraction Plan to be approved by the Secretary before mining in specific longwalls commences.

2. ASSESSMENT BACKGROUND

- On 23 December 2014, the previous owner of the mine (Glencore) submitted a SMP application to the now Resources Regulator for the extraction of coal for Longwalls 31-37 from the north-western extraction area. These longwalls were proposed to mine directly under Matthews, Cedar and Stonequarry Creeks. In December 2014, a decision was made to submit SMPs for Longwalls 31 and 32 individually. These two longwalls were subsequently approved.
- Since this time, the Western Domain mine plan (i.e. Longwalls W1-W4) has been reviewed and refined. This process resulted in the re-orientation of longwalls from a north-west to south-east orientation to a north to south orientation (see Figure 1).
- These design changes were implemented to avoid direct undermining of third order and above streams and to reduce subsidence-related impacts to Matthews, Cedar and Stonequarry Creeks, which are located along the western and northern areas of the Western Domain. The Department notes that the previous mine plan would have directly undermined these creeks.
- While the revised layout avoids directly undermining several high-order streams/creeks, including Cedar (5th order), Stonequarry (5th order) and Matthews Creeks (4th order), Longwalls W1 and W2 are still in close proximity to these creeks and some surface impacts are still expected.

- On 16 July 2019, the Department received an Extraction Plan for Longwalls West 1 (W1) and West 2 (W2) in the north-western extraction area of the Tahmoor Coal Mine.
- This Extraction Plan was submitted in accordance with the modified consent and refers to Longwalls 33 onwards as the Longwalls West series. For simplicity, the Department hereafter refers to the longwalls in the Extraction Plan as W1 and W2 (i.e. previously 33 and 34).
- The proposed layout for Longwalls W1 and W2 is within the footprint of the Limit of Subsidence as assessed for the 1999 development consent. The longwall panels would be 283 metres wide (including first workings) with a length of 1,875 km for W1 and 1,685 for W2. The mining height is predicted to be up to 2.1 metres, with the Bulli Coal Seam having an average thickness of 1.88 metres in this area.
- On 18 July 2019, the Department sought comments from relevant State agencies, including the Department's Biodiversity and Conservation Division (BCD), Water Group, Resources Regulator and Division of Resources and Geoscience. The Department also sought comments from Wollondilly Shire Council (Council) and Subsidence Advisory NSW (SA NSW).
- On 6 September 2019, Tahmoor Coal provided a response to agency submissions. These comments were provided to BCD and Council for any residual comment.

3. NATURAL FEATURES

High-order streams:

- Tahmoor Coal is proposing that Longwall W1 has a minimum setback from Matthews Creek and Cedar Creek of approximately 120 metres and from Stonequarry Creek of 50 metres. Longwall W2 would also have a minimum setback from the Stonequarry Creek of 50 metres.
- Tahmoor Coal's subsidence consultant (MSEC) predicts a maximum total valley closure after extraction of both Longwalls W1 and W2 of 180 mm for Cedar Creek, 170 mm for Matthews Creek and 60 mm for Stonequarry Creek. The maximum predicted compressive strain is 6 mm/m.
- The Department notes that these impact levels could result in fracturing along Matthews, Cedar and Stonequarry Creeks.
- To address this, Tahmoor Coal undertook an assessment using the rockbar impact model for the Southern Coalfield which defines a Type 3 impact as "*fracturing in a rockbar or upstream pool resulting in reduction in standing water level based on current rainfall and surface water flow*".
- This assessment notes that the predicted rate of impact for the pools along these creeks is less than 10% based on the maximum predicted total closure of 180 mm at the completion of Longwall W2.
- The Department understands that water levels in a large pool (SR2) in Stonequarry Creek are controlled by a rockbar (SR17), which is located approximately 540 metres from Longwall W1 and 230 metres from Longwall W2. The Department notes that impacts to SR17 are considered unlikely, as less than 30 mm of closure is predicted at this location.
- In considering the predicted impacts, the Department notes that BCD has previously identified in its advice on other longwall applications at Tahmoor Coal Mine (i.e. SMPs) that it does not support proposals that would negatively impact environmental water resource values on high order streams.
- In regard to the current Extraction Plan, BCD recommended that:
  - the northern ends of W1 and W2 be reduced so as not to go within the angle of draw of Cedar and Stonequarry Creeks;
  - a *negligible impact* performance measure be set for Cedar and Stonequarry Creeks; and
  - any impacts to Matthews Creek be required to be remediated.
- In response, Tahmoor Coal noted that should a *negligible impact* criterion be adopted, or mining be restricted to within the angle of draw, this would have the direct effect of significantly reducing the lengths of Longwalls W1 and W2. Tahmoor Coal contends that the Western Domain would then be economically unviable which would have flow on effects for operational continuity at the mine while the proposed Tahmoor South Coal Project proceeds through the NSW assessment process.
- In recognition of comments made by both BCD and Tahmoor Coal, the Department sought additional information from Tahmoor Coal about how the expected impacts may change if the commencing end of the longwall were to be reduced by varying lengths.
- On 1 October 2019, MSEC provided a report detailing the predicted changes in subsidence effects and impacts should Longwall W1 be shortened by an additional 50 or 100 metres. This report did not provide an analysis of shortening Longwall W2, as Tahmoor Coal has committed to implement an adaptive management strategy to address potential impacts of this longwall.
- The MSEC report notes that the affected creeks are not expected to experience measurable conventional tilts, curvatures or strains, meaning that potential for impacts is primarily governed by valley related effects rather than the conventional subsidence effects.
- Under the base case (ie the proposed Extraction Plan), Matthews, Cedar and Stonequarry Creeks are predicted to experience vertical subsidence of up to 70 mm after completion of Longwall W1 and up to 90 mm after completion of Longwall W2.

- Overall, MSEC concluded that the maximum predicted vertical subsidence, upsidence and valley closure do not change significantly from the base case due to shortening of the commencing end of Longwall W1 and that expected changes would be similar to the accuracy for the prediction method.
- The assessed rate of Type 3 impacts on each of the creeks would be less than 5% at the completion of Longwall W1 for the base case, 50 metre and 100 metre setback. Similarly, the assessed rate of Type 3 impacts on each of the creeks would be less than 10% at the completion of Longwall W2 (noting these scenarios only change the setback distance for Longwall W1 and do not include scenarios for the adaptive management and further setbacks of Longwall W2).
- Tahmoor Coal noted that in addition to loss of revenue (i.e. coal sales) and reduced State royalties, the setbacks would also incur costs associated with relocating machinery, re-driving roadways and downtime of the workforce for approximately two months while new roadways are constructed.
- The Department has taken all of the above into consideration and is recommending Tahmoor Coal comply with the following performance measures for Stonequarry, Cedar and Matthews Creeks:
  - No subsidence impact or environmental consequence greater than minor; and
  - No connective cracking between the surface, or the base of the alluvium, and the underground workings.
- Minor is defined as: *not very large, important or serious.*
- While BCD and Council have raised concerns that minor is not quantitatively defined, the Department notes that these are standard and current best practice performance measures for 3rd, 4th and 5th order streams for current underground coal mines in NSW.
- Tahmoor Coal would be required to update its Water Management Plan and Trigger Action Response Plan (TARP) to reflect the performance measure and to ensure that there is appropriate management and monitoring in place to measure ongoing compliance with this performance measure. The TARP is expected to define when there is a breach of the performance measure. In this case, the Department is of the view that it would be when impacts to pools are greater than 10%. Council is broadly supportive of this condition.
- The Department notes that Tahmoor Coal has also committed to implementing an adaptive management strategy and proposes to undertake remediation of impacted creeks. These are discussed further below.

Adaptive Management:

- Tahmoor Coal is proposing an adaptive management strategy to minimise impacts to Stonequarry Creek, which would involve further setbacks of the commencing position of Longwall W2 from Stonequarry Creek should unexpected impacts manifest.
- The adaptive management strategy would commence at the 1000 metre mark of Longwall W1 and would involve close review of observed subsidence impacts to compare against the predicted environmental impacts.
- The Department considers that a strategy of this nature, combined with the monitoring and management measures included in an updated TARP, should be adequate to actively monitor subsidence impacts on the creeks. This is evidenced by successful implementation of similar strategies elsewhere in the Southern Coalfield.
- However, the Department is of the view that this adaptive management strategy requires further work and has recommended conditions requiring the strategy be developed in consultation with Council and BCD, as part of an updated Water Management Plan and be submitted to the Department within 10 weeks of this Extraction Plan approval.
- The Department has also included a condition that allows for the establishment of first workings but prohibits secondary extraction of Longwall W2 until the Secretary is satisfied with the outcomes of the Applicant's adaptive management report.

Remediation Measures:

- The Department acknowledges that Redbank and Myrtle Creeks have been previously impacted as a result of mining directly beneath these creeks.
- The Department notes that the Resources Regulator has approved Corrective Action Management Plans for remediation in Redbank and Myrtle Creeks. Tahmoor Coal is currently completing creek remediation trials in Myrtle Creek.
- A key difference between impacts to these creeks and the creeks that would be potentially affected by Longwalls W1 and W2 is that Redbank and Myrtle Creeks were directly undermined, whereas Stonequarry, Cedar and Matthews Creeks would not be directly undermined.
- Nevertheless, Tahmoor Coal has committed to the remediation of creeks potentially impacted by Longwalls W1 and W2 in the TARP in the Water Management Plan. It is noted that this would require updating following this Extraction Plan approval.

- The Department has also included a best practice standard condition, that in the event remediation is not successful, offsets would be required. Council raised concern with this condition and noted its preference that streams are fully remediated to pre-mining condition. The Department considers that the conditions reflect the fact that remediation is the first and foremost course of action, offsets are a contingency in the effect remediation is unsuccessful.

4. BUILT FEATURES

- Longwalls W1 and W2 are located within the Wollondilly Shire Council Local Government Area. The predominant land uses in the area include rural residential, small scale cattle and horse grazing.
- Built features within the vicinity of the longwalls include the Main Southern Railway, the Picton Mittagong Loop Line, public roads, drainage culverts, bridges, potable water infrastructure, services infrastructure (sewer, gas, electrical and telecommunications), rural property and structures, groundwater bores and survey control marks.
- There are also several Aboriginal heritage sites and historical heritage sites
- Whilst it is acknowledged that there could be subsidence impacts on some of these built features, the Department notes that Tahmoor Coal has extensive experience of undermining built features and is proposing to continue to implement management measures that have been used successfully to date.
- The Department acknowledges that Tahmoor Coal have consulted with relevant stakeholders and have provided each with a subsidence monitoring program. The Department also notes that specific management plans would be prepared in consultation with each asset owner and would be provided to the Department prior to extraction.
- The Department is aware that there are ongoing negotiations between Bradcorp Holdings Pty Ltd (Bradcorp) and Tahmoor Coal over access arrangements and ongoing management of Bradcorp-owned land and in particular the Stonequarry Wastewater Treatment Plant.
- Tahmoor Coal is committed to preparing and implementing a Built Features Management Plan for the treatment plant. This would obviously be better informed and contain more accurate baseline data should Tahmoor Coal be granted access to undertake inspections of the site.
- In the event access is not granted, the Department considers that it would be possible to still prepare a Built Features Management Plan based on previous experience at Tahmoor Colliery and the information available on the treatment plant.
- The Department also notes the Resource Regulator's role as a stakeholder in the preparation of a Built Features Management Plan, Water Management Plan and Public Safety Management Plan and as the authority ensuring compliance with rehabilitation obligations under the *Mining Act 1992*.
- The Department understands Tahmoor Coal is actively engaging with the Resource Regulator on several Infrastructure Management Plans.
- Furthermore, the longwalls are located within the Bargo Mine Subsidence District which is administered by SA NSW under the *Coal Mine Subsidence Compensation Act 2017* to help protect homes and other structures from potential mine subsidence damage.
- The *Coal Mine Subsidence Compensation Act 2017* also provides for the assessment and management of risks associated with subsidence resulting from coal mining operations and includes provision for compensation or repairs required to mitigate the damage caused by mine subsidence.
- The owners of buildings or other surface improvements damaged by mine subsidence can lodge claims for compensation through SA NSW.
- SA NSW reviewed the Extraction Plan and noted that the management measures implemented for previous longwalls in the Tahmoor North domain would continue to be adopted to manage the potential for impact to surface features and as such had no further comments.

5. SOCIO-ECONOMIC ISSUES

- The total recoverable reserve from Longwalls W1 and W2 is 3,853,247 tonnes of coal.
- The Department estimates that extraction of the coal reserves in Longwalls W1 and W2 would generate in excess of $30 million in State Government revenue through royalties over the next 2 years.
- Tahmoor Coal Mine produces metallurgical coking coal, which is transported by rail to Port Kembla Coal Terminal and Newcastle for shipping to domestic and overseas customers.
- The company provides in excess of 500 direct jobs (employees and contractors) at the mine and is a significant contributor to regional employment.

6. EVALUATION

- The Department notes that Longwalls W1 and W2 have been designed to minimise impacts on natural and built features, including the setbacks from Stonequarry, Cedar and Matthews Creeks.
- However, the Department acknowledges that there remains a residual risk of impacts to the creeks.

- As such, the Department is recommending a performance measure of *minor environmental impacts* for Stonequarry, Cedar and Matthews Creeks.
- In addition to requiring this specific performance measure, the Department also notes that Tahmoor Coal is required to implement an updated adaptive management strategy and undertake remediation of these creeks.
- The Department also has a role under the *Environmental Planning and Assessment Act 1979* to ensure compliance with the existing development consent and subsequent approvals under the consent.
- In undertaking this role, the Department has a range of enforcement powers available to it if it considers that there may have been or may potentially be a breach of the development consent or subsequent approvals under the consent, including but not limited to, requiring further setbacks from key features or the cessation of mining operations if considered necessary.

7. CONDITIONS ON LONGWALLS W1 AND W2

The Department has imposed the following conditions on the Extraction Plan approval for Longwalls W1 and W2:

Performance Measures

1) The Applicant must ensure that the development does not cause any exceedances of the performance measures in Table 1.

Table 1: *Subsidence impact performance measures – natural features*

Feature	***Performance measures***
Stonequarry Creek, Cedar Creek and Matthews Creek	No subsidence impact or environmental consequence greater than minor*. No connective cracking between the surface, or the base of the alluvium, and the underground workings.

*minor is defined as *not very large, important or serious*

2) These performance measures apply to all mining taking place after the date of this Extraction Plan approval.

3) The Applicant will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the Water Management Plan required under the Extraction Plan for Longwalls W1 and W2.

Additional Offsets

4) If the Applicant exceeds the performance measures in Table 1 and the Secretary determines that:
   (a) it is not reasonable or feasible to remediate the subsidence impact or environmental consequence; or
   (b) remediation measures implemented by the Applicant have failed to satisfactorily remediate the subsidence impact or environmental consequence,

   then the Applicant must provide a suitable offset to compensate for the subsidence impact or environmental consequence, to the satisfaction of the Secretary.

Water Management Plan

5) Within 10 weeks of this Extraction Plan approval, the Water Management Plan for the Longwalls W1 and W2 Extraction Plan must be updated to the satisfaction of the Secretary. This plan must be developed in consultation with Council and BCD and:
   (a) include performance indicators capable of managing and monitoring compliance with the performance measures in condition 1 of this Extraction Plan approval;
   (b) include suitable revisions to the Trigger Action Response Plan to include:
      - Level 1, 2 and 3, and exceeding prediction triggers to enable trends in data to be identified, actioned and reported as potential impacts escalate;
      - separation of actions and responses;
      - methodology and relevant monitoring stations;
      - higher frequency monitoring of pool water levels;
      - justification of the proposed flow triggers; and

- specific figures relevant to the baseline data;

(c) include a detailed adaptive management strategy that sets quantifiable assessment criteria and provides parameters for when additional setbacks from relevant watercourses should be implemented; and

(d) address the comments from the Department's Water Group dated 30 September 2019.

Adaptive Management

6) At least 2 months prior to commencing extraction of Longwall W2, the Applicant must submit an Adaptive Management report for approval to the Secretary. The report must include a summary of the:
   (a) Applicant's performance under the Extraction Plan and this Extraction Plan approval;
   (b) implementation of the revised Water Management Plan Trigger Action Response Plan; and
   (c) outcomes of the adaptive management strategy, including any additional setbacks proposed to be implemented for Longwall W2. If no additional setbacks are proposed, detailed justification must be provided with reference to observed and predicted impacts.

7) The Applicant may not undertake any secondary extraction in Longwall W2 until the Secretary is satisfied that the Adaptive Management report includes appropriate adaptive management outcomes and selected setback distances from creek lines would achieve the requirements of condition 1.

Mike Young
A/Executive Director
Energy and Resources
as nominee of the Secretary

8/11/19.

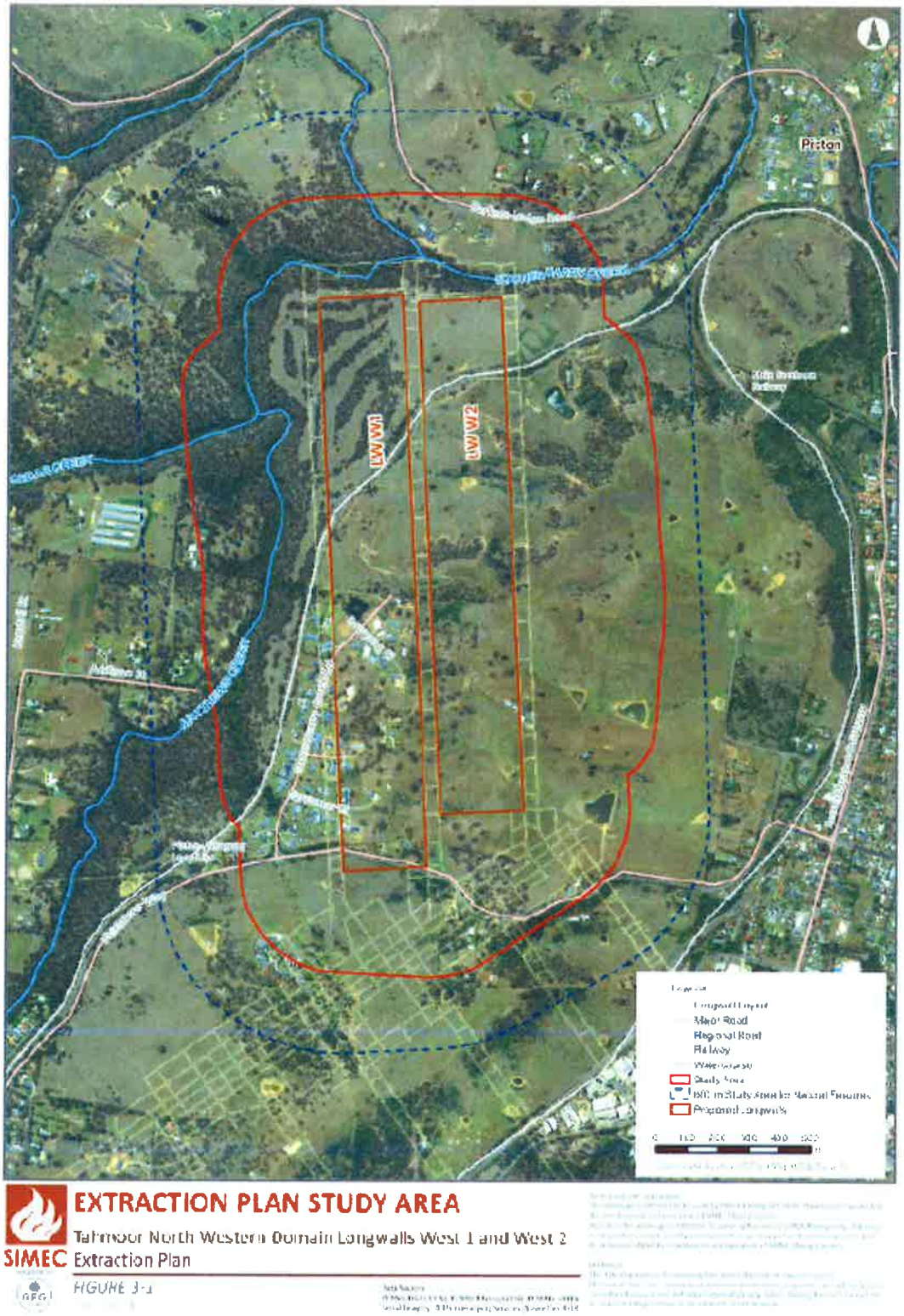

Figure 1: *Proposed longwall layout*