Submission opposing the Narrabri Lateral Gas Pipeline

Image: Yellow Springs Dam, Pilliga Forest, in the close vicinity downstream from proposed NLP.

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1. Introduction

We are a local conservation group based in the Narrabri region, whose objectives include the preservation and protection of the Pilliga Forest, and the natural environment of the Namoi Valley. **We object to the Narrabri Lateral Pipeline.** Santos proposes two linked projects, the Narrabri Gas Project (NGP) (approved but not commenced) in the Pilliga and the Narrabri Lateral Pipeline (NLP) to carry gas from Leewood and Bibblewindi to the Hunter Gas Pipeline. The contention that NLP is a standalone project is a plainly absurd. It has no purpose, and has not conceivable future purpose other than to connect the Narrabri Gas Project with the Hunter Gas Pipeline.

This submission addresses the inadequacy of the Narrabri Lateral Pipeline (NLP) Environmental Impact Statement (EIS) in relation to the following main subjects of concern:

- Cumulative Impacts with other major projects including the Narrabri Gas Project and the Narrabri Underground Stage 3 mine
- Blasting in the Pilliga Forest
- Traffic implications and Oversize Overmass vehicles
- Gomeroi cultural heritage impacts
- Groundwater Dependent Ecosystems (GDEs)

We address these subjects below.

2. Cumulative biodiversity impacts

Please refer to attached documents from the Conservation Programs, Heritage and Regulation Group (CPHR) of the Department of Climate Change, the Environment, Energy and Water which have been relied on in formulating this submission.

The Narrabri Lateral Pipeline (NLP) is proposed into a landscape that is already subject to intensive disturbance from the Narrabri Gas Project (NGP), Narrabri Underground Coal Mine Stage 3 Extension, and other coal and energy projects in the Pilliga Outwash and Liverpool Plains region. The Santos Biodiversity Development Assessment Report (BDAR) for the NLP relies on the NSW Biodiversity Offsets Scheme (BOS) and the Biodiversity Assessment Method (BAM) to demonstrate that residual impacts will be offset and that cumulative impacts are acceptable.

However, material provided by the NSW Department of Climate Change, Energy, the Environment and Water's Conservation Programs, Heritage and Regulation Group (CPHR) concerning the Narrabri Underground Mine Stage 3 Modification 1 (Mod 1) demonstrates that the Narrabri Underground coal project's own BDAR is flawed, its credit obligations have been repeatedly and erroneously recalculated, and its offset timing and staging proposals are inconsistent with the Biodiversity Conservation Act 2016 (BC Act).

Omission of Narrabri Underground Stage 3 from cumulative assessment

In this context, it is not credible for the NLP BDAR to treat surrounding projects, including Narrabri Underground Stage 3, as if their biodiversity impacts are fully and reliably offset. A robust cumulative assessment must be undertaken that explicitly:

- Confronts the instability and errors in Whitehaven's Stage 3 BDAR and Mod 1, and
- Assesses how these interact with Santos's proposed impacts and offset requirements for the NLP.

A key component of both strategic assessment and project-level EIA is the consideration of cumulative impacts. The NSW Cumulative Impact Assessment Guidelines for State Significant Projects requires that a combination of quantitative assessment (where there is sufficient information available) and qualitative assessment (where there is insufficient information available) are completed in relation to relevant projects. Santos has chosen to exclude the Narrabri Stage 3 Underground Mine project (State Significant Development SSD10269) as a cumulative impact on grounds of "project status" – Santos states that although the Underground Stage 3 mine has been approved but not commenced (and therefore should be considered according to the Guidelines), "there is insufficient publicly available information to support a cumulative impact analysis".

We contest that claim. Narrabri Coal Mine SSD-10269 is already do far advanced that a second modification is underway, which increases total ROM (run if mine) coal production of 8.9 MT

(260.9 MT total for Stage 3) from 2028 to 2044, increased from the previously proposed Total run-of-mine (ROM) coal production of approximately 6.8 million tonnes (MT) (258.8 MT total for Stage 3) from 2028 to 2035. According to the NSW Planning portal website, Modification 2 is underway and we expect the Modification Report to follow soon. Therefore, to assume no cumulative impacts from a nearby major extractive project such as the Narrabri Underground mine, is negligent.

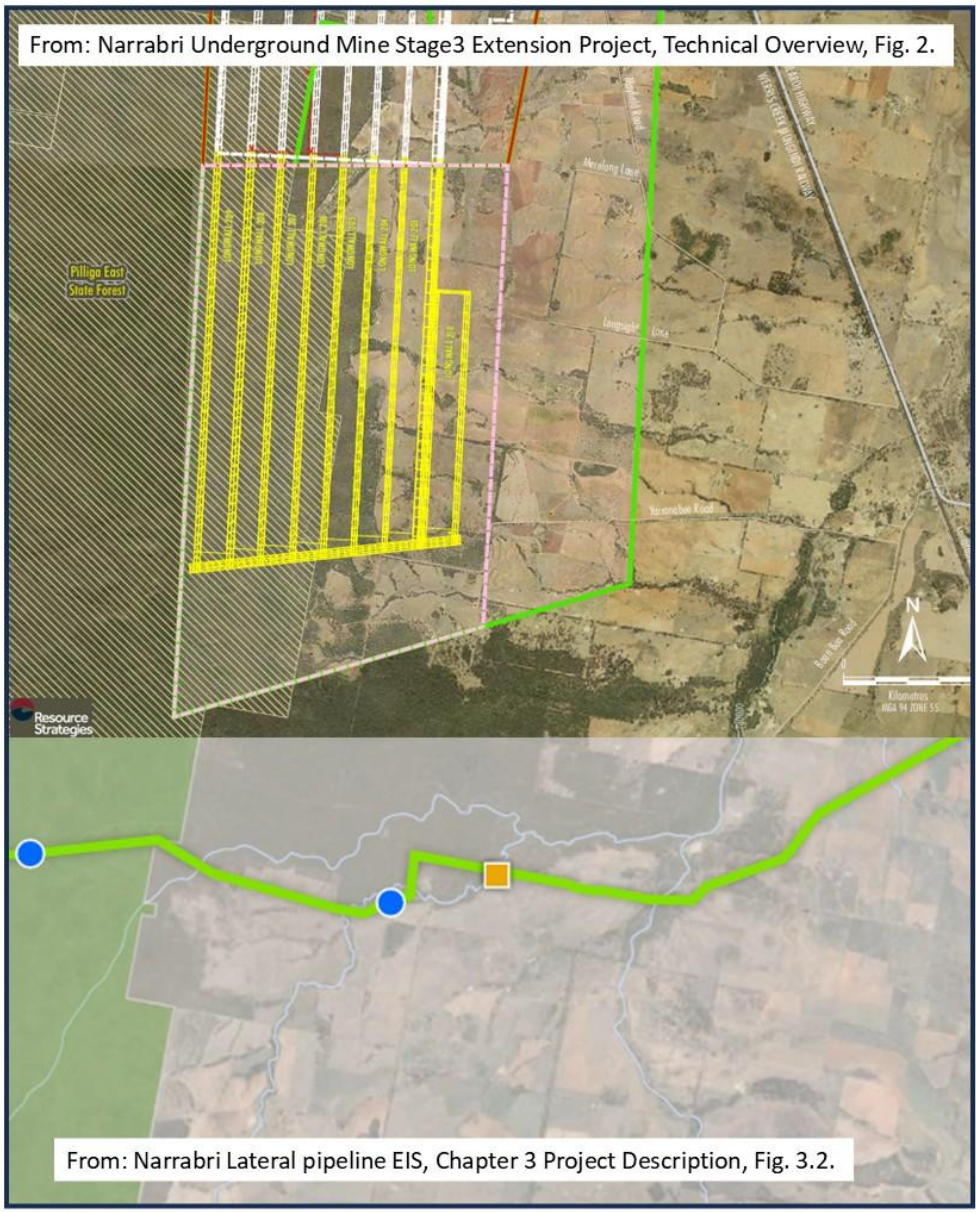

Figure 1. Infographic showing the location of the longwalls (in yellow) of the Narrabri Underground Stage 3 Extension and the Narrabri Lateral Pipeline (thick green line).

Regarding the likelihood that cumulative impacts of the project and other relevant future projects might result in significant impacts on a particular threatened species (for example, impact that are likely to result in serious and irreversible harm) and trigger the precautionary principle, then the cumulative impact assessment will need to be comprehensive. This is the case at hand, as the destruction of Pilliga Forest will have very long-term effects and the likelihood of manifestly impacting on the habitat of Swift Parrots and Glossy Black Cockatoos, both of which are recorded in this area of the Pilliga in recent times.

There are some clear mismatches between the Santos Narrabri Lateral Pipeline (NLP) BDAR and the Whitehaven Narrabri Underground Stage 3 Mod 1 material you've attached, particularly around:

- how cumulative impacts and offsets are framed, and
- the reliability of Whitehaven's credit calculations and staging.

1. Key discrepancies / contradictions between the NLP BDAR and the Narrabri Underground Stage 3 material
2. Whether Narrabri Mine has secured additional offsets beyond "Kenna"
3. A draft critique you could adapt for a submission, explicitly justifying the need for a cumulative assessment with the pipeline and highlighting Whitehaven's mistakes in Mod 1.

Discrepancies between the Narrabri Lateral Pipeline Biodiversity Development Assessment Report and Narrabri Underground Stage 3 (Mod 1 Biodiversity)

(a) Treatment of cumulative impacts and which projects "count"

The Narrabri Lateral Pipeline BDAR has a dedicated cumulative impacts section (Section 8.6). It defines cumulative impacts, cites the 2023 Cumulative Impact Guidelines, and identifies "relevant current and future projects" in the same sub-regions defined by the Interim Biogeographic Regionalisation of Australia (IBRA)which divides Australia into bioregions on the basis of their dominant landscape-scale attributes of native vegetation.

In its summary and early overview of cumulative impacts, the Narrabri Lateral Pipeline BDAR lists specific projects, including:

- Narrabri Gas Project
- Hunter Gas Pipeline
- Inland Rail Narromine–Narrabri
- Several solar farms (Narrabri, Whitehaven, Maules Creek, Narrabri South, Silverleaf)

- Maules Creek continuation project
- Boggabri Coal Mine MOD 10.

However, there is no explicit mention of the Narrabri Underground Stage 3 Extension as a cumulative project, even though:

- It sits in the same landscape between Narrabri and Pilliga, and
- It has major, ongoing biodiversity impacts, including extensive threatened species habitat clearance.

By contrast, the Department of Environment's correspondence about Narrabri Underground Stage 3 Mod 1 (available on NSW Planning Portal) repeatedly stresses that:

- Additional clearing of ~47 ha of native vegetation and threatened species habitat has already occurred under Stage 2 of the Narrabri Underground mine, directly adjacent to and overlapping the Stage 3 footprint; this area is recognised in the Stage 3 BDAR as native vegetation, with Threatened Ecological Communities and significant threatened habitat.
- The cumulative impacts of this extra clearing on the biodiversity values previously assessed in the Stage 3 BDAR must be thoroughly evaluated before any reduction in Stage 3 credit obligations is contemplated.

The Conservation Programs, Heritage and Regulation Group (CPHR) of the Department also warned, as recently as 25th September 2025, that: "Importantly, the revised ecosystem credit obligation [of Narrabri Underground Mine Stage 3] no longer aligns with the impact reduction calculations approved under condition B40 in March 2025.1 The RTS does not provide any explanation for the scale or rationale behind these major revisions. …CPHR remains seriously concerned about the land clearing undertaken within the Stage 3 extension area to date."

We draw attention to these further comments from CPHR:

> "As of June 2025, approximately 47 hectares of vegetation has been cleared in the northern extent of the project area. This clearing activity is understood to have been carried out under the Narrabri Underground Stage 2 consent (approved on 26 July 2010). The Stage 2 consent permits vegetation removal based on broad vegetation categories and clearing limits, rather than according to biodiversity credit obligations (species and ecosystem credits) and contemporary ecological classifications (Plant Community Types [PCTs]) under the Biodiversity Conservation Act (2016). Under this consent, most of the vegetation which has been cleared to date is not identified as native vegetation in the Narrabri Stage 2 Environmental Impact Statement (EIS). As such, clearing undertaken within these areas has neither been offset nor counted toward the Stage 2 clearing limits. However, under the Stage 3 Biodiversity Development Assessment Report (BDAR) and

consent conditions (issued by the Independent Planning Commission in 2022), this same area is identified as containing native vegetation, threatened ecological communities (TECs), and significant habitat for multiple threatened flora and fauna species. The remainder of the northern extent also contains significant habitat for threatened species, including Serious and Irreversible Impact (SAII) entities, which are similarly not accounted for under the Stage 2 consent's clearing limits.

CPHR understands that as of 1 August 2025, the Stage 3 extension project has formally commenced, with a 12-month transitional period during which the Stage 2 consent also remains active."

1. Source: Letter from Sarah Carr, Director North West, Conservation Programs, Heritage and Regulation (CPHR) Group, Department of Climate Change, Energy, the Environment and Water to Brittany Golding, Senior Environmental Assessment Officer, Department of Planning, Housing and Infrastructure, 24th September 2025 Ref: DOC25/699192 SSD-10269-Mod-1

The Narrabri Lateral Pipeline BDAR proceeds as if the mine's offsets are stable and lawful or even ignores the project entirely in its cumulative list, whereas the CPHR material shows that the mine's BDAR and offset delivery are currently not reliable.

The NSW biodiversity regulator Biodiversity Conservation Division (BCD) advice on Modification also flagged that one of the key mines in the same landscape – Narrabri Underground Stage 3 – is already in serious trouble in terms of its offset accounting and credit staging and rejects Santos' BDAR treating cumulative impacts at a high level and assuming that each project will mitigate and offset its own impacts to "acceptable levels".

- It treats the BOS as a functioning, coherent framework and relies on the BAM-C credit reports for the NLP as if the surrounding credit environment is stable, which is clearly not the case.

The Department's advice on Narrabri Underground Stage 3 Mod 1 documents serious errors and process problems:

- **Numerical errors in PCT credit obligations**:
  CPHR states that changes to the total credit obligations for PCTs 88, 435, 404 and 244 in the Mod 1 and RTS documents "have been acknowledged by the proponent as errors" and that both the June 2025 Mod 1 report and the July 2025 RTS "should not be used as the basis for modifying the project's credit obligation".

2. **Manual recalculation rather than using BAM-C**:
   The Department notes that the project's biodiversity credit obligations "have already been significantly altered through a complex process of manual credit recalculations rather than using the Biodiversity Assessment Method Calculator (BAM-C)", and that previous post-consent credit amendment applications contained errors requiring substantial review and correction. As previously noted in the Department's response to MOD 1, Narrabri

Underground Stage 3 biodiversity credit obligations "have already been substantially altered through a complex process of manual credit recalculations. Past applications for post-consent credit amendments have also contained errors requiring extensive review and correction (see DOC25/337782, DOC25/111953 and DOC25/699192). These instances highlight the risks associated with manual credit recalculations and reinforce the need for a structured, auditable, and transparent process". Source: Letter from Sarah Carr, Director North West, Conservation Programs, Heritage and Regulation (CPHR) Group, Department of Climate Change, Energy, the Environment and Water to Brittany Golding, Senior Environmental Assessment Officer, Department of Planning, Housing and Infrastructure, 12th November 2025 Ref: DOC25/956585 SSD-10269-Mod-1

- **Redistribution of "tens of thousands" of credits without adequate explanation**:
  The RTS "includes significant changes to the total ecosystem credit obligation and redistributes tens of thousands of credits across project stages, with no explanation or supporting data".

- **Risky credit aggregation between stages**:
  Whitehaven proposed aggregating subsidence ponding credits from Stage 6c (east) into Stage 6b (west), shifting credits away from the impacted area on the assumption this is a conservative approach. CPHR explicitly warns that this:
  – Has no demonstrated operational need,
  – Introduces disproportionate complexity for 2.4 ha (<0.4 % of footprint), and
  – Will make tracking and auditing credit retirement more difficult, especially if further Stage 6 changes occur under B40.

- **Potential non-compliance with BC Act timing**:
  CPHR points out that separating subsidence ponding into its own offset "stage" risks ponding impacts occurring before offsets are retired, contrary to s7.14(4) BC Act and Table 7 of the consent, which requires retirement of credits *prior* to any impacts (clearance or longwall).

None of this instability in the Narrabri Underground Stage 3 offset regime is reflected in the Narrabri Lateral Pipeline BDAR. Instead, the BDAR assumes that surrounding projects have fixed, lawful credit obligations and that offsets can simply be delivered via the BOS without interacting risks.

Inconsistent treatment of indirect and connectivity impacts

In the pipeline BDAR, Santos argues that additional crediting for indirect "edge effects" is unnecessary. It notes that the BAM Stage 2 Operational Manual gives an example of using VI attribute reductions within 50 m of new edges for indirect impacts, but then asserts that in the case of narrow linear clearings with low vehicle traffic, vegetation integrity may actually *increase*

at edges (citing Krix et al. 2017). On that basis, it concludes that an additional biodiversity credit offset for indirect impacts is "unnecessary". The same BDAR also acknowledges that connectivity impacts on fauna (e.g. Squirrel Glider, Pilliga Mouse, Eastern Pygmy-possum, Corben's Long-eared Bat) will occur but proposes to deal with these via a future "connectivity strategy" and mitigation measures (e.g. glider poles), and explicitly states that "no offsets for prescribed impacts to connectivity or vehicle strike are proposed."

For the pipeline, linear clearing impacts on connectivity (including at Bohena Creek, which the Narrabri Gas Project assessment already identifies as a connectivity hotspot) are *not* generating offsets; they are left to mitigation and future "strategy", even though the same BDAR acknowledges that the pipeline will contribute to cumulative connectivity impacts with other projects.

Misalignment of spatial baseline and reality on the ground

CPHR identified that ~47 ha of native vegetation and threatened species habitat have already been cleared under the Stage 2 approval (MP08_0144), including areas not assessed as native vegetation in the Stage 2 EIS but recognised as native vegetation, Threatened Ecological Communities, and significant threatened habitat in the Narrabri Underground Stage 3 BDAR.

CPHR concludes that:

- "It is highly likely that the habitat suitability of the Stage 3 project area has been significantly compromised from these clearance operations" and
- The cumulative impacts from this additional clearing on the biodiversity values previously assessed in the Stage 3 BDAR should be thoroughly evaluated before any Stage 3 credit reductions.

Wando CCC can confirm the actual colocation of Santos contractors undertaking pipeline surveys, with road clearing and re-alignment works being undertaken by Whitehaven Coal at the same location Smithers Gate which is close to the entry of the proposed gas pipeline into the forest. This coincidence points clearly to the proximity and double-impact of the coal and gas companies operating in the same identical location.

Here is a link to video showing the scene of tree and understorey clearing witnessed in 19th September 2025 at Smithers Gate, Pilliga:

https://www.dropbox.com/scl/fi/5kvdv6xn06pqxms3yt9zq/IMG_0728.MP4?rlkey=ju900eweuho9aakxok0x52oxp&dl=0

Here are some stills from the video taken by a Wando CCC member whilst inspecting the Pilliga Forest on Friday, 19th September 2025, showing road widening and tree-clearing, road re-

alignment and purchase of Crown Roads (believed to be associated with Whitehaven Coal's Narrabri Underground Stage 2 mine biodiversity offsets).

At the same time, Santos's BDAR refers to cumulative projects at a coarse regional scale using IBRA subregions (e.g. Pilliga Outwash, Pilliga, Liverpool Plains) and assumes that each of them is operating on the basis of their approved BDAR and EIS footprints.

There is no recognition in the Narrabri Lateral Pipeline BDAR that:

- Narrabri Underground Stage 3's "mapped" habitat and credit obligations are already partly fictional, because the Stage 3 BDAR baseline has been eroded by the Stage 2 clearing, and
- The mine is actively seeking to redistribute and reduce credits via manual recalculations.

Whitehaven's Modification 1 BDAR – serious errors

Santos insists that Narrabri Underground Stage 3 should not be included in the cumulative assessment for the gas pipeline as insufficient is known about it. That is incorrect, plenty is known, particularly about the unreliability of Whitehaven's offset capability, even for the Stage 2 mine. In the Response to Submissions for the Narrabri Underground Stage 3 Modification 1, tens of thousands of credits are redistributed across project stages with (according to CHPR) "no explanation or supporting data". This is all discussed in the CPHR's Advice in Modification and includes such concerns as the following, which should all be taken into account by those assessing the Narrabri Lateral Pipeline.

1. **Compromised baseline due to NU Stage 2 clearing**
   Around 47 ha of native vegetation and threatened habitat have already been cleared under the Stage 2 approval, including areas not recognised as native vegetation in the Stage 2 EIS

but treated as native vegetation, Threatened Ecological Communities, and significant threatened habitat in the Stage 3 BDAR. CPHR considers it "highly likely that the habitat suitability of the Stage 3 project area has been significantly compromised" and therefore does **not** support further post-consent surveys and credit reductions for threatened species under the Stage 3 BDAR.

2. **Inappropriate weakening of NU consent conditions B39/B40**
   Whitehaven has also sought to amend core offset conditions so that the obligation to retire credits (B39) becomes subject to flexible modifying provisions in B40 and to introduce a new condition enabling future staging adjustments without formal modification. CPHR explicitly opposes making B39 contingent on B40 and notes that any proposed changes to credit numbers or classes inconsistent with the BDAR now require concurrence from the Environment Minister under the Biodiversity Offsets Scheme Amendment Act 2024.

Taken together, these issues show that the Narrabri Underground Stage 3 BDAR and its Mod 1 revisions are not a stable or reliable basis to proceed without cumulative assessment. They also indicate that the mine's actual biodiversity impacts and offset delivery are likely under-accounted relative to what the Stage 3 BDAR originally presented.

Competition for like-for-like credits

The Narrabri Gas Project and Narrabri Lateral Pipeline both require large numbers of ecosystem and species credits in the same sub-regions. The NGP, for example, requires 66,633 ecosystem credits and over 1.55 million species credits and is expected to affect up to 1,169.9 ha of habitat for threatened fauna with potential connectivity impacts at Bohena Creek. Narrabri Underground Stage 3 is simultaneously seeking to reduce and redistribute its credits, at the same time as it is clearing additional habitat outside the original Stage 3 BDAR assessment. The Narrabri Lateral Pipeline BDAR does not grapple with the real possibility that the same finite pool of appropriate PCT-matched credits and suitable stewardship land is being drawn upon by multiple large projects whose own credit baselines are unstable.

1. **Undervalued cumulative connectivity impacts**
   The pipeline BDAR recognises that there will be cumulative connectivity impacts where the pipeline runs adjacent to the NGP and Inland Rail, and it acknowledges effects on key species (e.g. Squirrel Glider, Pilliga Mouse). Yet it proposes no offsets for connectivity impacts, relying instead on a future connectivity strategy and mitigation structures.

2. The Narrabri Lateral Pipeline BDAR does not address the risk that BOS may not be able to deliver all required offsets if major projects such as Narrabri Underground Stage 3 continue to seek reductions and restaging of credits from a degraded habitat base.

Need for a genuine cumulative assessment including Narrabri Underground Stage 3

Given these issues, it is not sufficient for the NLP BDAR to rely on simplistic assurances that each project will manage its own impacts to "acceptable" levels and offset its footprint in isolation.

- Explicitly include Narrabri Underground Stage 3 Extension (including Mod 1 and the proposed Mod 2 bord-and-pillar extension) as a key cumulative project, not just in generic IBRA-level tables.
- Quantify, to the extent possible, overlapping and adjacent habitat losses from Stage 2 clearing, Stage 3 mining and subsidence ponding, the NGP, and the NLP in the Pilliga Outwash, Pilliga and Liverpool Plains IBRA sub-regions, particularly for koala, Pilliga Mouse, Corben's Long-eared Bat and other MNES.
- Analyse cumulative demand for the same PCT-specific and species credits across the NGP, NLP, Narrabri Underground Stage 3 and other Whitehaven projects (e.g. Maules Creek continuation, Boggabri MOD 10) and the realistic availability of like-for-like credit supply.
- Consider whether Narrabri Underground Stage 3's attempts to reduce and restage credits, coupled with unassessed Stage 2 clearing, effectively externalise biodiversity impacts onto the rest of the landscape, including areas traversed by the Narrabri Lateral Pipeline.

Until such a cumulative assessment is undertaken, it is premature to accept the Narrabri Lateral Pipeline BDAR's conclusion that the pipeline's residual impacts can be straightforwardly offset or that cumulative impacts, particularly on connectivity and threatened species habitat, will be acceptable.

There is a strong argument that Whitehaven's inability to secure more than one offset property (Kenna) after many years is evidence of a structural shortage of like-for-like biodiversity offsets in the Pilliga East.

Even without access to BOS register data, the regulatory context, ecological characteristics of the Pilliga, and Whitehaven's own behaviour provide strong circumstantial evidence of scarcity. The BOS requirements for Narrabri Stage 3 are unusually difficult to satisfy. Narrabri Underground Stage 3 requires very large numbers of ecosystem and species credits in the following Plant Community Types:

- PCT 435 – Pilliga Box / White Cypress Pine forest,
- PCT 244 – Pilliga Outwash vegetation,
- PCT 88 – Box–Gum open woodland variants,
- PCT 404 – Riparian types,

- plus high-numbers of threatened species credits (Koala, Corben's Long-eared Bat, Pilliga Mouse, Glossy Black-Cockatoo, etc.).

The Pilliga is dominated by public land, meaning very few private options exist for stewardship sites. The Biodiversity Offsets Scheme relies heavily on private land being placed under biodiversity stewardship agreements.

But the Pilliga is overwhelmingly:

- state forest
- national park
- cultural reserve
- broad conservation tenure
- strategic koala and mammal habitat
- critical groundwater-dependent woodland mosaics

Offset demand in the immediate vicinity, ie Pilliga East, dramatically exceeds supply

Three major projects all require the same or similar PCT and species credits:

- **Narrabri Gas Project (Santos)** – requires enormous species credit numbers (e.g., over 1.5 million fauna species credits) and large ecosystem obligations.
- **Narrabri Lateral Pipeline (Santos)** – additional clearing of Pilliga habitat and species credit demand.
- **Narrabri Underground Stage 3 (Whitehaven)** – large credit demands in already-depleted PCTs.

Additionally, Maules Creek, Boggabri Coal, and Tarrawonga have already consumed much of the available offset landscape for the region.

This means even if suitable private land exists, credit "competition" between projects has exhausted the pool.

This is a well-documented BOS failure mode in regions dominated by high-value habitat.

Whitehaven's behaviour confirms difficulty obtaining offsets, as it has:

- Not secured additional stewardship sites since Stage 3 assessment.
- Attempted to recalculate, reduce, or re-stage credits rather than retire them.

- Tried to aggregate credits between stages, and
- Sought regulatory concessions from DCCEEW to weaken Conditions B39/B40.

A proponent who could easily obtain required offsets generally does so, because offset acquisition is cheaper and easier than protracted amendment battles.

Whitehaven's push to:

- reduce koala credits,
- shift subsidence ponding credits,
- manually reassign credit subclasses,
- redefine PCT boundaries,

suggests it is struggling to meet BOS obligations with available supply.

This is indirect but powerful evidence of offset scarcity.

The fact the only registered offset is "Kenna" is itself evidence. "Kenna",a rural property in the hills above Maules Creek (which was severely affected by a major bushfire in 2023) is the only offset Whitehaven has secured for Narrabri Stage 3. This strongly indicates:

- There are no other willing landholders in the region, or
- The ecological attributes of available private lands do not match Stage 3 offset requirements, or
- The BOS market does not contain credits in the required PCTs.

If suitable sites existed:

- Whitehaven would have purchased them, or
- Brokers would have created them, or
- NSW would have approved a stewardship site in the last 8 years.

The absence of additional offsets over such a long time is a clear, structural indicator of market failure.

The Pilliga East forests contain unique assemblages poorly represented on private land

This is a known problem: Plant Community Types like those in the Pilliga Outwash often occur only on public tenure.

Thus, the like-for-like rule of the BOS becomes almost impossible to satisfy.

If Whitehaven cannot meet like-for-like requirements, its only remaining mechanism is:

- seek variation to credit class,
- request Ministerial concurrence for non-like-for-like offsets, or
- pay the Biodiversity Conservation Fund (which does not automatically generate credits and is currently unable to compensate for fundamental supply shortages).

Thus, the Pilliga's ecological uniqueness is itself evidence of offset scarcity.

As far as we can tell, which we request the decision makers to interrogate, the Biodiversity Conservation Trust has not registered a stewardship site in this region with relevant PCTs. We understand that there are:

- no significant stewardship sites in Pilliga-relevant Plant Community Types,
- extremely low registration rates for woodland PCTs in north-western NSW, and
- near-absence of offsets for Pilliga Mouse, Corben's Long-eared Bat, or koala in the Narrabri-Pilliga landscape.

Insufficient amount of relevant Plant Community Types to satisfy NLP offsets

This pattern supports the conclusion that the NSW Biodiversity Offset Scheme simply cannot supply what the project needs. The fact that Narrabri Underground Stage 3 has secured only the Kenna offset property after years of effort is strong evidence that the Biodiversity Offsets Scheme cannot supply suitable like-for-like offsets for the Pilliga East Forest. We believe that there is:

1. Severe regional shortage of private lands capable of generating Pilliga PCT credits
2. Over-allocation of credits to existing coal and gas projects
3. Inherent BOS market failure in landscapes dominated by public conservation land
4. Regulatory risk that Whitehaven cannot meet its offset obligations

This cumulative demand has exhausted available supply. The failure of the BOS market to generate Pilliga-relevant credits is not a short-term fluctuation but a systemic capacity issue.

The implications for BOS integrity and Ministerial concurrence requirements are that **o**ffsets that cannot be delivered for one project cannot be assumed to exist for others.

Under the *Biodiversity Offsets Scheme Amendment Act* (2024) (NSW), any deviation from required credit classes now requires Ministerial concurrence. The present shortage means that:

- Non-like-for-like offsetting may be unavoidable,
- Ecological equivalence cannot be demonstrated,
- The BOS may be asked to absorb environmental losses that the market cannot compensate.

This undermines Biodiversity Offsets Scheme credibility and contradicts the principle of "no net loss."

3. Blasting

We object to the EIS's failure to outline blasting activities that would be required to enable the pipeline to be laid in "hard rock terrain". Blasting ironstone outcrops with ANFO in the Pilliga is not a minor construction activity — it risks toxic fumes, flyrock, nitrate contamination and the permanent loss of rocky-outcrop habitat that many native species depend on. The EIS does not explain how these risks will be avoided. Before any blasting occurs, the public deserves a clear, detailed and independently verified plan that shows how the forest will be protected.

Wando CCC members have seen how inadequate conditioning, indeed inadequate assessment, of blasting the nearby Leard State Forest has resulted in egregious damage to the local environment which has embroiled the NSW EPA in prosecutions since 2020 and is continuing, in the long line of cases *NSW Environment Protection Authority v Maules Creek Coal Pty Ltd*, which we do not want to see repeated.

Santos' scoping report foreshadows:

- trenching to be done by trenching machines, rock saws or excavators, "and may involve rock hammers or blasting in hard rock"
- crossing of drainage lines "depending on … geotechnical conditions." majorprojects.planningportal.nsw.gov.au

The generic term "hard rock terrain" is used in the EIS, to describe the ironstone ridge which is known to run through the Pilliga East and is a geological feature that should have been described in some detail in the EIS due to the fact that it will almost certainly necessitate blasting by Santos and also because this kind of formation is known to have specific biodiversity features and are ecological refugia, which should be brought to the attention of decision-makers at State and Commonwealth levels.

Blasting with ANFO (ammonium nitrate fuel oil) is foreshadowed in the Project Description, however the likelihood of needing to blast is understated, leading to a skewed and unacceptable evaluation of risk. This is in part as it does not mention the ironstone ridge that almost certainly will have to be blasted to allow laying of pipeline:

> "In hard rock terrain where the use of wheel or chain trenchers, rock saws or excavators is not feasible, controlled blasting may be used. The need for blasting would be confirmed by geotechnical investigations undertaken to support detailed design. Should blasting be required, a blast management plan would be prepared prior to commencement. All blasting activities would be undertaken by appropriately qualified personnel in accordance with the

requirements of the relevant legislation and standards." (p. 3.15, Chapter 3 Project Description)

Santos states that "the need for blasting would be confirmed during detailed design" (EIS – section 3.4.2). However, this is too late. There needs to be sufficient detail in this very environmental impact assessment process to enable full evaluation through unacceptable risk assessment methodology. This is absent in the Narrabri Lateral Pipeline EIS. The same is true in relation to geology, where we are directed to Technical Report 4 (Water) (section 4.4.1), which also provides no indications of the scale, frequency, blast intensity or other potentially harmful aspects of blasting. For this project to be assessed and approved ahead of any material understanding of how much blasting could occur as a result of the terrain would be a severe dereliction of the precautionary principle and failure to consider the welfare of the local habitat.

Therefore, we are of the view that a preliminary understanding of how much blasting needs to be provided by Santos and where it would take place, as it is not credible to believe that Santos has not already costed this activity.

The value of ironstone outcrops to plant biodiversity is well-known in scholarly literature here and internationally, and it should be discussed in the EIS, but does not appear in the Biodiversity Development Application Report (BDAR) or the Preliminary Hazard Analysis contained in Technical Report 12. There, Santos says it will conduct "further surveys and studies" (p. 20) clearly signalling that any such investigations would occur AFTER approval, when assessment is minimal and would be treated as a mere modification.

Ironstone ridges should be considered areas of heightened conservation value during environmental impact assessment processes because:
- They support specialist and refuge-dependent species.
- They have limited capacity for ecological recovery if disturbed.
- Construction activities (e.g., pipelines, trenching, access track widening) in these areas often require blasting or mechanical rock cutting, resulting in disproportionate surface and subsurface disturbance.
- Even under controlled methods, blasting would be catastrophic to the delicate ecological balance of this fragile landscape where soil erosion can make the terrain impassable after heavy rains.

Threatened species habitats are no place for blasting to occur where shallow trench blasting,
Is proposed in hard ironstone, under or beside native vegetation.

ANFO (ammonium nitrate + fuel oil) is used in trench / pipeline blasting because:

- Is cheap, easy to pump in bulk, and widely used in open-cut and trench blasting.

- Performs well in hard, dry rock when it's well confined and correctly charged but very poorly where water is present.
- Has poor water resistance (ammonium nitrate is highly hygroscopic and soluble), so moisture in the hole or the surrounding rock degrades performance and increases misfires/fume. This is a problem that is causing intractible problems in the Narrabri region and which we are well aware of

Pipeline / trench blasting manuals routinely assume ANFO or ANFO–emulsion blends as the default explosive, with small diameter holes drilled along the trench line and lightly charged to avoid excessive overbreak.

So if the Narrabri Lateral Pipeline construction uses bulk AN-based explosives in rock, ANFO or ANFO-emulsion blends would be the "normal" choice, unless they go straight to fully water-resistant emulsions.

Implications of blasting ronstone outcrops

Blasting in ironstone is materially different from generic trenching

The Narrabri Lateral Pipeline will require excavation through ironstone outcrops and ferruginous ridges that support specialised vegetation and fauna refuges. Blasting these outcrops is not equivalent to trenching ordinary sandstone or soil. Ironstone is extremely dense and brittle, requiring higher explosive energy and more precise charge design. When ANFO is used in shallow holes, the risk of flyrock, cratering and excessive airblast increases significantly because the stemming depth is small and the rock mass is highly resistant. These factors increase the likelihood of vegetation damage and habitat loss outside the approved clearing footprint, which the EIS does not properly acknowledge or assess.

Loss of rocky-outcrop microhabitats and cumulative fragmentation

Rocky outcrops are well-documented biodiversity hotspots providing crevices, ledges and thermally stable refuges for reptiles, invertebrates, cryptogams and specialised plant assemblages. Blasting ironstone along a linear corridor will permanently remove these microhabitats, reducing connectivity across the forest. The EIS treats outcrops as interchangeable "rocky areas" but does not evaluate the ecological role of these structures or the cumulative effects of their sequential destruction along tens of kilometres of pipeline ROW. A cumulative-impact assessment is essential given that the pipeline intersects areas already affected by historical clearing, forestry tracks, and nearby mining and gas infrastructure.

"Ironstone" (not mentioned by name in the EIS) in the Pilliga context is typically:

- A very hard, dense ferruginous rock or duricrust (cemented by iron oxides) sitting in or on the Pilliga sandstones.
- Often occurring as boulders, ridges or caps with shallow soils and specialised vegetation growing between blocks or in fractures.

From a blasting point of view, ironstone behaves like other high-strength rocks (comparable to iron ore): high rock factor, high compressive strength, and quite brittle. Textbook surface-blasting design tables treat iron-rich hard rock as requiring relatively high powder factors and relatively tight burden/spacing to fragment properly.

Blasting ironstone outcrops with ANFO poses particular challenges:

(a) Shallow cover, flyrock and airblast

Pipeline trenches are shallow compared with benches in a mine. When you put ANFO in shallow holes in very hard rock:

- There is less stemming above the charge.
- The rock is very stiff, so energy can vent upwards, producing flyrock and strong airblast if design is marginal.
- Trench-blasting guidance stresses that in shallow holes, stemming depth should be at least equal to the burden, and blasting mats or other cover may be needed.

In a forest like the Pilliga, that means:

- Higher risk of rock fragments and woody debris hurled into surrounding vegetation, well outside the nominal right-of-way.
- Potential damage to tree trunks, hollows, logs and habitat structures that the EIS may have promised to retain.
- Higher risk of airblast impacts (overpressure) on hollow-bearing trees, nests and any nearby fauna refuges.

(b) Water & moisture in weathered ironstone and sandstones

Even if the surface looks dry, near-surface rocks and fractures often contain:

- Moisture in pores/fractures.
- Perched or episodic water after rain.

For ANFO this matters a lot:

- ANFO prill (polystyrene balls used to expand the explosive effect) wicks water; moisture desensitises the explosive, causing incomplete detonation, misfires and increased toxic fume (NOx, CO).
- Wet-hole conditions are now recognised as a major contributor to “post-blast fume events”.

In the Pilliga/native vegetation context, this translates to:

- Brown NOx clouds and other fumes hanging in or drifting through forest canopies if blasting is done in damp conditions.
- Additional oxidised nitrogen deposited on very nutrient-poor woodland soils and on foliage.

(c) Fragmentation control and overbreak

Ironstone outcrops are often very heterogeneous:

- Hard, massive ironstone blocks.
- Interbedded or underlying weaker sandstones / weathered zones.
- Complex jointing.

ANFO in hard rock, if not perfectly matched to rock conditions, can:

- Under-charge some areas, leaving large unfavourable boulders that then require secondary blasting or mechanical breaking.
- Over-charge or mis-position charges in weaker zones, causing overbreak, cratering and fracturing well outside the design trench envelope.

In a pipeline route through native forest, overbreak means:

- Wider physical disturbance than promised – more tree and shrub roots severed, more soil exposed.
- Destroying micro-habitats in the rocky outcrop (crevices, ledges) that support specialised reptiles, invertebrates, epiphytic plants etc. Rocky outcrops are known to be key refuges for such species.

(d) High abrasiveness and drill-hole quality

Ironstone is extremely abrasive:

- Drill bits wear quickly and are more likely to wander or deviate, reducing hole accuracy.

- Collars spall easily – giving shallow, unconfined charges near the surface if not controlled.

For ANFO this matters because energy distribution is based on nice clean rows of holes with controlled burden/spacing. Deviation and collar damage increase:

- Local over-concentration or under-charging.
- Unpredictable flyrock and breakout, especially close to vegetation.

(e) Misfires and safety

If moisture, reactive ground or poor confinement cause partial detonation, ANFO residues may remain in fractures or near the surface. Misfire-prevention guidelines for ANFO emphasise good hole protection, collar pipes, and avoiding loading into wet holes.

On a linear pipeline corridor through forest, misfires or undetonated ANFO present:

- Ongoing safety risks for workers and anyone entering the corridor later (including fire crews).
- Ongoing pollution sources as ammonium nitrate leaches into soils and shallow water.

Environmental & vegetation-specific issues in the Pilliga context

1. **Loss and fragmentation of rocky-outcrop habitat**
    - Rocky outcrops are recognised as important refuges for plants and animals, especially in otherwise cleared or fire-affected landscapes.
    - Blasting ironstone outcrops to form a trench is essentially permanent removal of those micro-habitats along the pipeline corridor.
2. **Blast-related mortality and habitat damage beyond the clearing line**
    - Flying rock, shattered fragments and high overpressure can damage or kill vegetation outside the approved clearing footprint.
    - This includes hollow-bearing trees and coarse woody debris that may not be physically cleared but are structurally weakened by shock and fragmentation.
3. **Nitrogen loading & contamination of surface water and GAB-related concerns**

- ANFO detonation products include NOx and nitrate; incomplete detonation leaves residual ammonium nitrate in rock and soil.
- In a nutrient-poor native woodland system, sudden, localised nitrate enrichment along a linear corridor would favour weeds over native flora.
- While the GAB issues around Narrabri are more about drilling/produced water, blasting in near-surface rocks with ANFO-based products can introduce nitrates to perched water tables, drainage lines and ephemeral creeks which would not be able to be feasibly controlled.
- Any claim that such blasting is "local" and "low risk" needs to grapple with the evidence that ANFO-based explosives are a recognised source of nitrate contamination in mine waters and runoff globally.

- Risk contamination of the Great Artesian Basin, as nitrate pollution has been found to contaminate groundwater in overseas studies like Doyle, J. D. (2024). Quarries as a source of nitrate pollution in Karst Aquifers: Case Study, the Edwards Aquifer, Texas [Case study]. Environmental & Engineering Geoscience, 30, 173-191. (**Attached)**

4. **Fire risk**
    - Blasting generates hot gases and ejecta; in very dry forest (as the Pilliga is for much of the year) there is a non-trivial ignition risk unless very strict controls (timing, fire crews on standby, weather windows) are in place.
    - Ironstone outcrops often support shrubby, low-fuel-moisture vegetation and litter trapped among rocks, which could ignite easily.

Information on blasting is required by decision-makers

A rigorous assessment should therefore require:

- A detailed geotechnical assessment specific to ironstone outcrops, not a generic rock-excavation paragraph.
- Explicit controls on:
    - Charge size, hole depth and spacing in shallow outcrops.
    - Use of water-resistant emulsions or liners, rather than bare ANFO, where moisture is present.
    - Fume management, weather windows and exclusion zones for fauna/people.

- Limits on overbreak and a method for independently verifying that the corridor disturbance stays within what was assessed.

Questions for Santos

1. Explosive Type, Water Resistance & Fume Generation

1. **Will ANFO be used for ironstone or hard-rock blasting along the Narrabri Lateral Pipeline (NLP) alignment?**
   If yes, why is ANFO considered appropriate given its known lack of water resistance and elevated risk of toxic post-blast fumes (NOx, CO) in damp or porous ground conditions?

2. **What geotechnical investigations have been undertaken** to confirm that ironstone outcrops and weathered Pilliga sandstones along the ROW are consistently dry enough for ANFO, rather than water-resistant emulsions?

3. **What fume-risk modelling has been completed**, and how will the proponent prevent brown NOx clouds from dispersing through surrounding native vegetation and fauna habitat?

2. Blast Design in Shallow Ironstone Outcrops

4. **What burden, spacing, and charge-weight limits per delay** will be applied when blasting shallow ironstone?
   Please provide evidence that these limits have been adapted from standard open-cut blasting to suit the elevated flyrock and airblast risks in near-surface environments.

5. How will the proponent **measure and control overbreak** in ironstone to ensure the disturbance footprint does not exceed the clearing envelope assessed in the EIS?

3. Protecting Vegetation and Rocky-Outcrop Habitat

6. What measures will be used to prevent **flyrock ejection** into retained vegetation, hollow-bearing trees, and coarse woody debris located outside the ROW?
   Will blasting mats or other confinement be mandated?

7. How will the proponent **identify, map and avoid** sensitive rocky-outcrop microhabitats (crevices, lichen assemblages, reptile refuges) prior to blasting?

8. Can the proponent confirm whether a **rock-outcrop-specific microhabitat assessment** has been conducted along the ROW, noting that rocky outcrops were largely not addressed at that level in the EIS?

4. Nitrate Contamination & Post-Blast Environmental Effects

9. What controls will be implemented to **prevent ammonium nitrate residues** (from undetonated ANFO) from leaching into soils, ephemeral drainage lines, and shallow water tables within the Pilliga?

10. Has the proponent assessed the **ecological consequences of nitrate enrichment** in a nutrient-poor woodland system, including weed establishment and altered fire regimes?

5. Misfires & Safety

11. What procedures will be used to detect and recover **misfired charges** given the linear, remote and vegetated nature of the pipeline corridor?

12. Will independent auditing be provided for misfire records, fume events, and exclusion-zone compliance?

6. Alternatives Assessment

13. Has the proponent evaluated **non-explosive methods** (mechanical trenching, ripping, rock-sawing) in each ironstone outcrop, and if so, what criteria were used to decide that blasting is environmentally preferable?

14. Has the proponent considered **water-resistant emulsions or charge-liners** as the default product rather than ANFO, given their lower fume and contamination risk?

4. Need for a dedicated ironstone-outcrop blasting information

It is not reasonable or defensible to omit a geotechnical assessment when blasting may be required for pipeline trenching, especially in a forested environment containing ironstone outcrops, variable lithologies and shallow groundwater conditions such as the Pilliga.

Geotechnical assessment is fundamental before any blasting is proposed, to provide:

- Rock type, strength, weathering class and RQD (rock quality designation)
- Joint spacing, fracture patterns, bedding planes and faulting
- Moisture conditions / wet zones in near-surface rock
- Hardness and abrasiveness (affecting drilling method and deviation)
- Excavatability classification (rippable vs non-rippable rock)
- Whether blasting will be required, and under what constraints
- Safe charge sizes, maximum instantaneous charge, burden and spacing estimates

Without this information, it is not possible to:

- Predict whether blasting is required at individual locations.
- Design safe charges with predictable flyrock, airblast and overbreak behaviour.
- Identify where ANFO is *not* suitable due to moisture.
- Identify sensitive sites (fractured regolith, perched water, friable sandstone) where blasting must be avoided.
- Assess environmental impacts accurately (vegetation, soil stability, nitrate contamination, fauna habitat).

It is our understanding that all modern trench-blasting guidelines and pipeline design standards assume a geotechnical baseline exists before any blasting decision is made, including:

- **A geotechnical corridor investigation** at the planning/EIS phase;
- **Test pits and boreholes** to determine excavatability;
- **Specific identification of rock units** where trench blasting might be required;
- **Prediction of construction risks**, especially in hard, brittle or highly variable geology.

The Narrabri Lateral Pipeline EIS does none of this. Exclusion of geotechnical assessment is especially unreasonable in the Pilliga.

(a) The corridor contains ironstone outcrops

These are:

- **Very hard** and often require drilling and blasting for trenching;
- **Fragmentation-sensitive**, capable of producing significant flyrock;
- **Ecologically important microhabitats** for Pilliga species.

(b) The geology is heterogeneous

The Pilliga Sandstone varies widely in strength and fracturing; outcrops often overlie weaker material. Without geotechnical logs:

- Charge design cannot be tailored.
- Overbreak risk cannot be modelled.
- Moisture zones cannot be predicted (critical for ANFO).

(c) There are perched water tables and ephemeral drainage lines

Geotechnical investigation would normally identify where blasting is incompatible with:

- Shallow water
- Water-bearing fractures
- Reactive clay horizons
- Areas where nitrate contamination risk is high

Without this, ANFO use is extremely risky.

Blasting must be assessed, not deferred

Both NSW and Commonwealth assessment frameworks require that the construction method must be defined enough to assess impacts.

An EIS cannot state:

- "Blasting may occur,"
- without also providing:
    - Locations,
    - Geotechnical justification,
    - Charge design basis,
    - Expected impacts,
    - Mitigation measures.

If blasting is later introduced during construction without having been assessed at the EIS stage, this would constitute a modification.

Omission of geotechnical assessment is not a benign gap

It leads to:

(i) Underestimation of ecological impacts

Blasting expands disturbance beyond the trench line due to overbreak, flyrock and shattering. Without geotechnical data, the EIS cannot quantify this.

(ii) Underestimation of clearing footprint

Real disturbance is often wider than the nominal ROW when blasting occurs.
This undermines vegetation and habitat impact statements.

(iii) Underestimation of chemical contamination risk

ANFO misfires, nitrate leaching and NOx fume risk depend directly on geology and water conditions.

(iv) Safety risks for workers and fire crews

Misfires, blast fumes and flyrock are foreseeable without geotechnical design inputs.

(v) Lack of enforceability

Approval conditions cannot specify maximum charge weights, blast parameters or exclusion zones without underlying geological data.

The omission of a geotechnical assessment from the Narrabri Lateral Pipeline EIS is a serious deficiency. Blasting through ironstone outcrops or hard sandstone cannot be responsibly proposed without prior geological and geotechnical characterisation, including rock strength, fracturing patterns, excavatability and moisture conditions. These data are essential for determining whether blasting is required, for designing safe and environmentally acceptable blast parameters, and for assessing impacts on vegetation, rocky-outcrop habitats, soils and groundwater. Without such information, the EIS cannot demonstrate that construction impacts have been accurately predicted or that blasting impacts will remain within the assessed footprint. The geotechnical omission represents a material failure of impact assessment and should be rectified before approvals progress.

Why omission of geotechnical assessment may breach NSW Requirements for adequate EIS

1. Statutory Requirement: An EIS Must Include a Full and Reasoned Assessment of All Likely Impacts

Under **s 4.15(1)(b)** and **s 5.15** (formerly s 111) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), a consent authority must consider the likely environmental impacts of the development, including construction impacts, before granting approval.
An environmental impact statement must therefore provide sufficient material to enable proper consideration of those impacts.

The NSW Land and Environment Court has repeatedly held that an EIS must disclose enough information for decision-makers and the public to understand, test, and scrutinise the environmental consequences of the proposal (e.g., *Prineas v Forestry Commission of NSW* (1983) 49 LGRA 402; *Weal v Bathurst City Council* (2000) 111 LGERA 181).

Relevance to geotechnical assessment

Whether blasting is required, and what form of blasting will be used, depends entirely on **geological and geotechnical conditions**. These conditions directly influence:

- The **extent of vegetation and soil disturbance** (including overbreak and flyrock);
- **Safety impacts**;
- **Air quality impacts** (NOx fume);
- **Groundwater and soil contamination** (nitrates from ANFO);
- **Extent of clearing footprint**; and
- **Impacts on threatened species and rocky-outcrop habitats**.

Therefore, **without geotechnical characterisation**, the EIS necessarily fails to identify and assess the likely impacts of the construction method.

This is inconsistent with the statutory requirement for an EIS to provide a **comprehensive and transparent assessment of environmental consequences**.

Failure to Satisfy the Narrabri Lateral Pipeline SEARs

The Secretary's Environmental Assessment Requirements for State Significant Infrastructure (SSI) routinely require proponents to:

- Describe the construction methodology in sufficient detail to allow assessment of impacts;
- Conduct an analysis of site constraints, including physical and geotechnical constraints;
- Assess the impacts of earthworks, excavation, and blasting where relevant;
- Identify measures to avoid, minimise and mitigate those impacts.

If blasting is proposed—or even reasonably foreseeable—the SEARs' requirement for a detailed description of the construction methodology cannot be met without:

1. Geotechnical logs identifying rock types, strength, depth to refusal;
2. Excavatability classification;
3. Identification of locations where blasting is necessary;
4. Assessment of blast impacts, including overpressure, flyrock, fume, and overbreak; and
5. Justification for the chosen construction technique over feasible alternatives.

An EIS that does not supply this information does not comply with the SEARs, and a failure to comply with SEARs is a well-established ground for arguing an EIS is legally inadequate.

Where a proposal involves excavation in variable rock conditions, and blasting is a foreseeable construction method, geotechnical information is reasonably necessary to determine those impacts.

(b) *Gray v Minister for Planning* (2006)

The Court held that omissions which prevent meaningful public submissions amounts to a denial of procedural fairness.

Without geotechnical characterisation:

- The public cannot know where blasting will occur,
- what level of clearing is actually required,
- how rocky-outcrop habitats will be affected, or
- the extent of blast-related risks.

Accordingly, the omission undermines procedural fairness.

(c) *Prineas v Forestry Commission* (1983)

The Court made clear that deficiencies that impede the ability of a reader to understand environmental impacts render an EIS deficient in law.

A proposal that depends on excavation through ironstone and hard sandstone cannot be adequately understood without geotechnical data. The omission therefore constitutes a material defect.

4. Improper Deferral of Impact Assessment

NSW case law (e.g., *Hannam v Minister for Planning*, *Minister for Planning v Walker*) does not permit proponents to defer essential impact analysis to later stages of approval.

If the EIS states that blasting may occur, but provides no:

- Geological justification,
- Geotechnical data,
- Assessment of impacts, or
- Blast-design principles,

then the proponent has effectively deferred the environmental assessment of a known significant impact to a post-approval management plan.

This is contrary to the law, because:

- Environmental impacts must be assessed before approval,
- not managed after approval through plans whose environmental consequences cannot be publicly scrutinised.

Omission prevents proper assessment of alternatives

The EP&A Act and SEARs both require an examination of feasible alternatives and a demonstration of why the chosen construction method is environmentally acceptable.

Without geotechnical information, the EIS cannot:

- Compare ripping, sawing, mechanical trenching vs blasting;
- Identify where non-explosive options are feasible;
- Justify why blasting is "necessary";
- Demonstrate minimisation of impacts on rocky-outcrop habitat.

Thus the EIS fails a mandatory element of environmental reasoning: evaluation of alternatives.

6. Omission of geotechnical assessment undermines credibility of other Assessments

Every technical discipline, including biodiversity, noise, air quality, and groundwater assessment is affected when geotechnical data is missing:

Biodiversity

Extent of root damage, outcrop destruction, soil disturbance and overbreak cannot be predicted.

Noise and Vibration

Charge weights, hole depth, geology and stemming control vibration propagation; without geotechnical logs, vibration predictions are **speculative**.

Air Quality

NOx fume risk from ANFO correlates with **rock moisture and porosity** — geotechnical parameters that are completely unreported.

Groundwater

Near-surface fracture zones and perched aquifers, critical for nitrogen leaching risk, cannot be identified.

Heritage (Indigenous and non-Indigenous)

Rock shelters, artefacts in ferricrete or sandstone, and culturally significant stone features are vulnerable to blasting impacts that cannot be evaluated without geological characterisation.

The absence of geotechnical assessment therefore cascades into legal inadequacy across multiple impact domains.

Supplementary SEARs / EPBC bilateral Guidelines

Attachment 1 to the supplementary SEARs (EPBC bilateral guidelines for NLP) sets out **mandatory content** for the EIS: majorprojects.planningportal.nsw.gov.au+1

(a) Project description

The EIS must include:

- "The **location and description of all works** to be undertaken … that may have impacts on MNES"; and
- "**How the works are to be undertaken and design parameters** for those aspects of the structures or elements of the action that may have relevant impacts on MNES."

Blasting through ironstone outcrops, trench excavation methods, rock support and backfilling are exactly the kind of "how the works are to be undertaken" details that affect MNES via vegetation clearing, erosion, sediment and hydrological changes. You cannot provide a meaningful description of "how the works are to be undertaken" without a handle on ground conditions.

(b) Impact assessment

The same guidelines require that the EIS provide:

- "a **description and detailed assessment** of the nature and extent of the likely direct, indirect and consequential impacts"
- including impacts from "construction activities, including from noise, lighting, **vibration** impacts", and from "contamination, hydrological changes, **sedimentation and erosion** … weed incursion, feral pest activity and pathogens.

Vibration, sedimentation, erosion and hydrological change from blasting and trenching in hard rock are **geotechnical questions** – you need to know rock strength, fracture patterns, weathering, slope stability, etc., to quantify them.

The guidelines also say the EIS must include:

- "any technical data and other information used or needed to make a detailed assessment of the relevant impacts." majorprojects.planningportal.nsw.gov.au

Where blasting in hard rock is part of the project description, geotechnical data are part of the "technical data … needed" to assess stability, erosion and hydrological impacts, and therefore fall within this SEARs-derived requirement.

Blasting fire risk

The following reasons explain why blasting through ironstone carries elevated fire risk:

1. Ironstone is highly abrasive, dense, and brittle → produces high-energy fragmentation

Ironstone is:

- unusually hard,
- extremely dense,
- often fractured and brittle.

When explosives are detonated in such a rock mass, the energy release produces:

- large volumes of hot ejecta,
- fast-moving rock fragments,
- sparking when iron-rich fragments collide with other rocks or metal equipment.

Because the rock is hard and resists deformation, more of the explosive energy is transferred into heat and kinetic energy, not absorption, increasing the risk of ignition.

2. Iron-rich fragments striking each other or equipment can create sparks

Ferricrete and iron-rich rocks are known to generate **frictional sparks** when:

- fractured violently (e.g., during blasting),
- scraped by excavator teeth,
- dropped or projected at high velocity against other rocks or metal.

These sparks can ignite:

- dry leaf litter,
- fine fuels caught in rock crevices,
- bark in the lower canopy.

In the Pilliga — a fire-prone, dry sclerophyll forest — **spark ignition is a recognised hazard** in industrial operations, including track-clearing, grading, and rock hammering.

Blasting amplifies this risk because:

- rock fragments travel further and faster,
- material is much hotter,
- vegetation is closer to the energy source.

3. Explosive detonation generates hot gases and flame fronts

All high explosives produce:

- **very high temperature gases** (2,000–3,000°C in the detonation zone),
- fine **hot particulate matter**,
- overpressure that can scatter these products into adjacent vegetation.

In open-air, shallow blasting — typical of pipeline trenching — the gases are **not contained**, meaning the flame front can extend horizontally into:

- dry grasses,
- leaf litter,
- mulched vegetation from clearing,
- logging debris (the Pilliga has substantial woody fuel loads).

If wind is present, the jetting of gases can push embers or hot particles into receptive fuels.

4. ANFO and AN-based explosives increase fire risk if combustion is incomplete

We note that Santos does not propose to use gel-based water-resistent explosives, preferring cheaper ANFO products.

If ANFO is used — as is common for hard-rock pipeline trenching — partial detonation or "low-order" detonation can produce:

- smouldering residues,
- hot ammonium nitrate/fuel oil droplets,
- persistent brown NOx fumes that can carry uncombusted hydrocarbons.

These can ignite:

- dry mulch,
- fallen leaves,
- woody debris created during right-of-way clearing.

Industry guidance classifies ANFO misfires and low-order detonations as fire hazards, particularly in bushland.

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5. Flyrock can ignite fuels on impact

Blasting in ironstone produces large, angular, high-velocity fragments.
When these strike:

- tree trunks,
- dead wood,
- hollow logs,
- forest litter,

they can:

- abrade (producing sparks),
- embed hot fragments in combustible material,
- generate frictional heat sufficient to start smouldering fires.

Even small embers or smouldering pockets can become fires hours later.

6. Pipeline right-of-way clearing creates a temporarily extreme fire-risk environment

Before blasting, contractors:

- clear vegetation,
- shred/stockpile woody debris,
- expose dry mineral soil,
- increase airflow across the ROW.

This means:

- fuel loads are redistributed,
- fuels become drier and more flammable,
- heat and sparks from blasting have direct access to fine fuels.

Blasting into freshly-cleared woody debris is substantially more hazardous than blasting in a quarry or mine bench.

7. Ironstone ridges tend to have shallow soils and fine fuels that ignite easily

Blasting through ironstone increases fire risk because:

1. **Iron-rich rock fragments can spark on impact**.
2. **Hard, dense ironstone produces hotter, more energetic ejecta**.
3. **Hot explosive gases and particles are vented into vegetation** during shallow trench blasting.
4. **ANFO and AN-based products leave smouldering residues when partially combusted**.
5. **Flyrock can ignite or embed heat into fuels**.
6. **Cleared pipeline corridors provide a continuous line of receptive, dry fuels**.
7. **Pilliga vegetation is extremely flammable**, with fine fuels that are easily ignited.

Thus fire risk is not hypothetical — it is a well-understood physical consequence of blasting hard, iron-rich outcrops in a fire-prone forest.

4. Traffic implications

The traffic implications of the NLP construction are vastly understated, both from road clearing and widening, and provision of access for pipeline trenching.

The Narrabri Lateral Pipeline route is not known with certainty, but judging from maps contained in the Environmental Impact Statement, road widening, road straightening and accompanying tree clearing will result in significant exceedances of the 30m width indicated. We can predict this because the size of vehicles needed to build such pipelines in already known, and it is important for decision makers to have a grasp of the scale of these Oversize Overmass (OSOM) vehicles. These OSOM vehicles pose risks which can never be mitigated or managed successfully.

There is a major gap in the description of Oversize Overmass vehicles in the EIS Technical Report 9 of the EIS, which states that "The construction contractor will confirm the dimensions and proposed routing of OSOM vehicles to be used and apply for the necessary permits prior to undertaking OSOM movements. The assessment will consider the shortest and least trafficked route for OSOM vehicles to minimise the risk to other motorists". This is vague, uncertain and left to a unnamed contractor to satisfy. Given the gravity of likely impacts of these OSOM's on the natural environment, both the description of the activity and the mitigation measures are sketchy to say the least, and completely unsatisfactory, making it impossible for the decision maker to properly consider or apply conditions.

5. Gomeroi cultural heritage

There is a great deal of uncertainty as to Gomeroi Traditional Owners approval of the Narrabri Gas Project and Narrabri Lateral Pipeline, both in respect of the Federal Court proceedings in which climate change grounds were used to oppose the gas projects, and the Indigenous Land Use Agreement (ILIA) purportedly agreed-to by meetings of Gomeroi apical family representatives recently.

Consideration of this EIS should not be advanced until a decision is made on the appeal brought by the Gomeroi people against the Native Title Tribunal's decision expected to be heard in March 2026. We also argue that the robustness, legitimacy, and what can and cannot be inferred from the two Gomeroi claimant votes, is not beyond challenge.

We believe there should be particular attention to abstentions and apical-family representation, as abstentions do not infer consent. The vote count was as follows:

Vote 1 (earlier)

- For: 65
- Against: 53
- Abstentions: 25
- Total present: 143
- Approval rate among votes cast (excluding abstentions):
  65 / (65 + 53) ≈ 55.1%
- Approval rate of those present:
  65 / 143 ≈ 45.5%

Vote 2 (later, deemed valid)

- For: 74
- Against: 9
- Abstentions: 13
- Total present: 96
- Approval rate among votes cast:
  74 / (74 + 9) ≈ 89.2%

- Approval rate of those present:
  74 / 96 ≈ 77.1%

The high rate of abstentions reduces confidence in the results of the vote as it may reflect uncertainty possible coercion, and other factors. A reallocation of abstentions could significantly change the outcome, and even vote too where there were less abstentions is not robust.

Furthermore there are concerns that the total number of participants in the vote dropped significantly from 143 to 96 at the second vote representing a 33% reduction in the voting population. As this process of public exhibition is supposed to consider social impacts it is essential that the traditional owners also be considered under criterion and this should include some analysis Why some apical families particularly those who previously dissented, did not attend the second meeting; Were there participation barriers such as timing, travel online access (problems with Internet access have been reported by some Gomeroi participants).

We contend that although the majority in vote two was numerically stronger, our overall assessment is that it is substantively weaker. Although there was greater decisiveness among participants with less abstentions, nevertheless the reduced participation undermines any claims of broad consent by the Gomeroi. Abstentions signal that there are unresolved apical family approval issues.

We observe that there remain deep and unresolved divisions between Gomeroi who approved of Santos to irreversibly contaminate and destroy the Pilliga Forest, and those who steadfastly refuse to approve of an ILIA. While Santos may claim that the vote satisfies the formal authorization requirements, the vote lacks social legitimacy and should not be relied on.

6. Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) hosting subterranean groundwater fauna (stygofauna) are Matters of National Environmental Significance. In our view, the Environmental Impact Assessments (EIA) for both the Narrabri Gas Project and the Narrabri Lateral Pipeline fail to provide the information needed to protect Commonwealth-listed groundwater-dependent ecological communities, especially subterranean groundwater ecosystems and stygofauna. Both the gas field and the pipeline are being assessed under the NSW Environmental Planning and Assessment Act 1979 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) as a controlled action. Matters of National Environmental Significance include threatened species and ecological communities such as GDEs.

Our concerns rely substantially on the independent expert report by Dr Peter Serov to the Independent Planning Commission on the Narrabri Gas Project EIS, and on Santos' own technical reports for the Narrabri Lateral Pipeline (BDAR, Aquatic Ecology and Chapter 6 – Biodiversity). Dr Serov is the leading expert on GDE's in north west NSW and the author of the *GDE Risk Assessment Guidelines for groundwater dependent ecosystems* which were written specifically so that impacts on each type can be properly assessed[1].

Although Dr Serov's expert report was prepared for the Narrabri Gas Project (NGP) and not for the Narrabri Lateral Pipeline NLP, it remains the most regionally relevant scientific analysis of groundwater ecology in the Pilliga region. For this reason, it represents the best available science under both NSW and Commonwealth assessment frameworks. Therefore, we suggest that this knowledge be given due consideration by the decision-maker. Dr Serov identified substantial evidence of stygofauna and multiple types of Groundwater Dependent Ecosystems (GDEs) in the Pilliga region. He found the NGP EIS did not follow NSW GDE Risk Assessment Guidelines, did not collect adequate stygofauna data, and overlooked key impact pathways. Dr Serov also points out that Pilliga streams such as Bohena Creek support higher macroinvertebrate diversity than the regulated Namoi River, functioning as important refuges in a highly modified catchment.

The Narrabri Lateral Pipeline EIS (including the BDAR, Aquatic Ecology report and Chapter 6 – Biodiversity) is supposed to address impacts along the new pipeline corridor, but it also leans heavily on the earlier NGP assessment. In our view, it continues many of the same errors. Dr Serov concluded that there is no doubt stygofauna are present in the NGP project area and recommends,

[1] Serov P, Kuginis L, Williams J.P., May 2012 , *GDE Risk Assessment Guidelines for groundwater dependent ecosystems* https://publications.water.nsw.gov.au/watergroupjspui/bitstream/100/1080/1/Gde_Risk_Assessment_Guidelines_Volume_1_Final_Accessible.pdf

on precautionary grounds, that we assume stygofauna are present in other aquifers and hyporheic zones of creeks in the area and include hyporheic sampling in all riverine risk assessments.

The Narrabri Lateral Pipeline EIS relies on the NGP baseline ecological science without addressing any of the deficiencies identified by Dr Serov. The EIS fails to assess essential impact pathways specific to pipeline construction such as trenching, dewatering and drilling mud losses.

- The EIS does not consider whether groundwater ecosystems may constitute Matters of National Environmental Significance (MNES).
- The precautionary principle requires further study; current information is inadequate for regulatory decision-making.

The Narrabri Lateral Pipeline EIS mischaracterises ephemeral creeks, including Bohena Creek, as Low-Value Systems. This follows a consistent pattern throughout the Narrabri Lateral Pipeline EIS is the treatment of ephemeral creeks—most notably Bohena Creek—as ecosystems with inherently limited ecological value. This interpretation is grounded almost exclusively in the flow regime of these creeks, with the EIS repeatedly asserting that their ephemeral nature "limits their capacity" to support aquatic communities. For example, Technical Report 2 states that "the ephemeral nature and generally low stream order of most watercourses in the study area limit their capacity to support [the Lowland Darling River EEC]" (p.i). This opening assertion frames the entire ecological assessment, positioning these creeks as minor or marginal systems. However, ephemerality alone is not a valid scientific reason to downgrade ecological significance. Many Australian inland aquatic ecosystems—especially those within the Pilliga—are naturally intermittent yet ecologically rich and tightly linked to groundwater.

This downplaying of ecological importance continues through the EIS, which frequently labels these creeks as providing only "temporary aquatic habitat" following rainfall events. In several places, the EIS emphasises that watercourses are "unlikely to retain water for long periods" and concludes on that basis that they have limited ecological value. Even higher-order systems such as Bohena Creek are diminished in this way. Chapter 6 of the EIS describes Bohena Creek as having only "limited" potential to support the Lowland Darling River EEC because of its predominantly ephemeral regime. These are not isolated phrases: the EIS repeatedly equates lack of permanent surface water with lack of ecological importance, effectively treating ephemerality as a synonym for insignificance.

This characterisation is scientifically incomplete and inconsistent with the best available regional evidence. Dr Serov's review of the Narrabri Gas Project which as we say is the closest high-quality aquatic ecological study relevant to the same landscape—demonstrates that Bohena Creek is far from low-value. He reports that Bohena Creek actually possessed higher biodiversity than both the Namoi River and Narrabri Creek, containing eleven macroinvertebrate taxa not found in either regulated system. This directly contradicts the implication in the NLP EIS that ephemeral systems lack ecological richness. Dr Serov also documented long-lived organisms such as freshwater

mussels that persist only in stable, groundwater-supported pool environments and are vulnerable to small hydrological changes. These species require reliable refugial conditions—precisely the type of habitat that hyporheic and groundwater-dependent systems in the Pilliga provide, regardless of surface ephemerality.

The EIS fails to recognise the established ecological principle that ephemeral creeks in semi-arid landscapes often function as groundwater-dependent refugia, even when surface water is absent. Dr Serov's findings indicate that macroinvertebrate composition—including taxa associated with groundwater influence (e.g., Hydraenidae, Elmidae, Atyidae)—reflects subsurface water permanence and connectivity. This aligns with broader scientific literature, which shows that intermittent streams often host specialised assemblages adapted to fluctuating hydrology and that their ecological value cannot be assessed solely based on visible water. By contrast, the NLP EIS provides no analysis of hyporheic or groundwater-connected fauna and dismisses the potential presence of such communities solely because water was not present during surveys.

What is striking is that the EIS uses the absence of permanent surface water to justify the absence of detailed aquatic assessment—yet Dr Serov shows that this is precisely where important data lie. He found that the NGP surveys (conducted by the same consultant) missed key taxa because they treated ephemeral systems as low priority, overlooking important indicators of ecosystem condition and groundwater dependence. The NLP EIS repeats the same methodological limitation: ephemeral creeks were surveyed only when dry, and findings were generalised across the entire system, leading to conclusions such as "works within watercourses are unlikely to impact key fish habitat". These conclusions are premature and unsupported because they assume low baseline ecological value rather than demonstrating it.

In framing ephemeral creeks as ecologically limited, the EIS downplays their well-documented role as refugia, biodiversity hotspots, and indicators of subsurface ecological function. This interpretation also masks key risks associated with pipeline construction, such as disruption to hyporheic flow, sedimentation of refuge pools, and indirect impacts on groundwater-dependent biota. A scientifically defensible assessment would treat ephemerality as a functional characteristic—not a justification to minimise survey effort or significance. These issues demonstrate that the NLP EIS mischaracterises ephemeral creeks—particularly Bohena Creek but also Yellow Springs Creek and Yellow Springs Dam—not because the documents explicitly state they are "low value," but because they repeatedly equate ephemeral surface flow with low ecological significance, in contrast with robust scientific evidence to the contrary. The result is an underestimation of environmental risk, inadequate assessment effort, and a failure to apply the precautionary principle.

Dr Serov's expert review of the NGP EIS to the Independent Planning Commission notes that:

- A "significant stygofauna community exists within the shallow alluvial aquifers and the deeper sandstone aquifers across the Pilliga and adjacent aquifers", with multiple surveys confirming presence in 2007, 2011, 2012, 2013, 2015, 2017 and 2020.

- Positive stygofauna records come from the Pilliga Sandstone aquifer at around 70 m depth and from the hyporheic zone of Bohena Creek Alluvium and Maules Creek alluvium.
- Subterranean fauna are typically under-surveyed (as here) and the absence of listed threatened species simply reflects a lack of sampling, not low conservation value.

NSW guidance and the work of Serov et al. (2012) recognise that groundwater dependent ecosystems include several types, of which there is evidence of rich stygofauna communities in the Pilliga.

Dr Serov's review of the Narrabri Gas Project EIS found that the consent authority "cannot make an appropriate assessment of the impact… on the Groundwater Dependent Ecosystems (GDEs), including the subterranean Stygofauna community based solely on the data and interpretation of the data provided by Santos". He recommends that, given these deficiencies, the proposal should have been rejected or subjected to substantial further work under the precautionary principle. However, it did not happen. Narrabri Gas Project, stalled and unable to proceed to approved production levels, has never undergone the needed investigations into GDEs in The Pilliga.

The main problems Dr Serov identified included:

1. **Over-simplified GDE classification** – The Narrabri Gas Project EIS relied on a basic vegetation-only classification (Eamus & Froend 2006) instead of the more detailed NSW GDE framework developed by Serov et al. (2012), meaning many types and sub-types of GDE were not properly recognised or assessed.
2. **Misinterpretation of groundwater cues in the landscape** – Important sand-based ecosystems and groundwater habitats were downplayed or ignored, including recharge zones and hyporheic zones in creeks.
3. **Inappropriate use of satellite imagery to determine groundwater dependency** – Remote sensing was used in place of field-based hydrological and ecological evidence, which Serov says is "not an effective or appropriate method for assessing groundwater dependency".
4. **Lack of time-series data on groundwater–surface water connectivity** – There was no adequate monitoring of groundwater levels, chemistry or temperature over time to confirm whether wetlands and creeks are fed by groundwater. Without this data, Serov states, "it is not possible to rule out any particular wetland as being a GDE" and the EIS conclusions "cannot be substantiated".
5. **Inadequate and poorly targeted stygofauna sampling** – The NGP study collected only 19 samples, many from unsuitable locations (clayey colluvium and salty coal seams).

Important locations like Maules Creek were omitted or not properly referenced, and there was almost no sampling of the Bohena Creek hyporheic zone.

6. **Failure to identify key impact pathways on GDEs** – Serov listed unassessed risks including:

    - contamination of aquifers and streams from spills and leaks of produced water;
    - creation of new connections between previously isolated aquifers via drilling and aging wells;
    - introduction of foreign bacteria and invertebrates into aquifers;
    - impacts of **drawdown rate and frequency** on GDE vegetation, baseflow pools and stygofauna; and
    - downstream propagation of instream disturbances beyond the gas field.

7. **Down-playing of GDEs as Matters of National Environmental Significance (MNES)** – The NGP EIS asserted that none of the springs or GDE sites "represent a threatened ecological community under the EPBC Act" because they are not Great Artesian Basin mound springs. Serov describes this as nonsensical: these springs are recognised as high-priority GDEs under NSW water sharing plans and should not be dismissed simply because they are not mound springs.

Taken together, these findings show that the original Narrabri Gas Project EIS did not provide a robust basis for concluding that GDEs and stygofauna are protected.

The BDAR acknowledged standard definitions and even cites Serov et al. 2012 on GDEs.

However in practice it was a narrow, desktop-only identification of GDEs:

- relied primarily on the Bureau of Meteorology Groundwater Dependent Ecosystem Atlas and Water Sharing Plan mapping to identify GDEs within 2 km of the pipeline;
- maps "low, moderate and high potential terrestrial GDEs" only as strips of riparian vegetation along third–sixth order streams such as Bohena, Yellow Spring, Sandy and Tullamullen creeks; and
- assumed that smaller watercourses, where groundwater depth exceeds 10 m, are unlikely to be groundwater dependent.

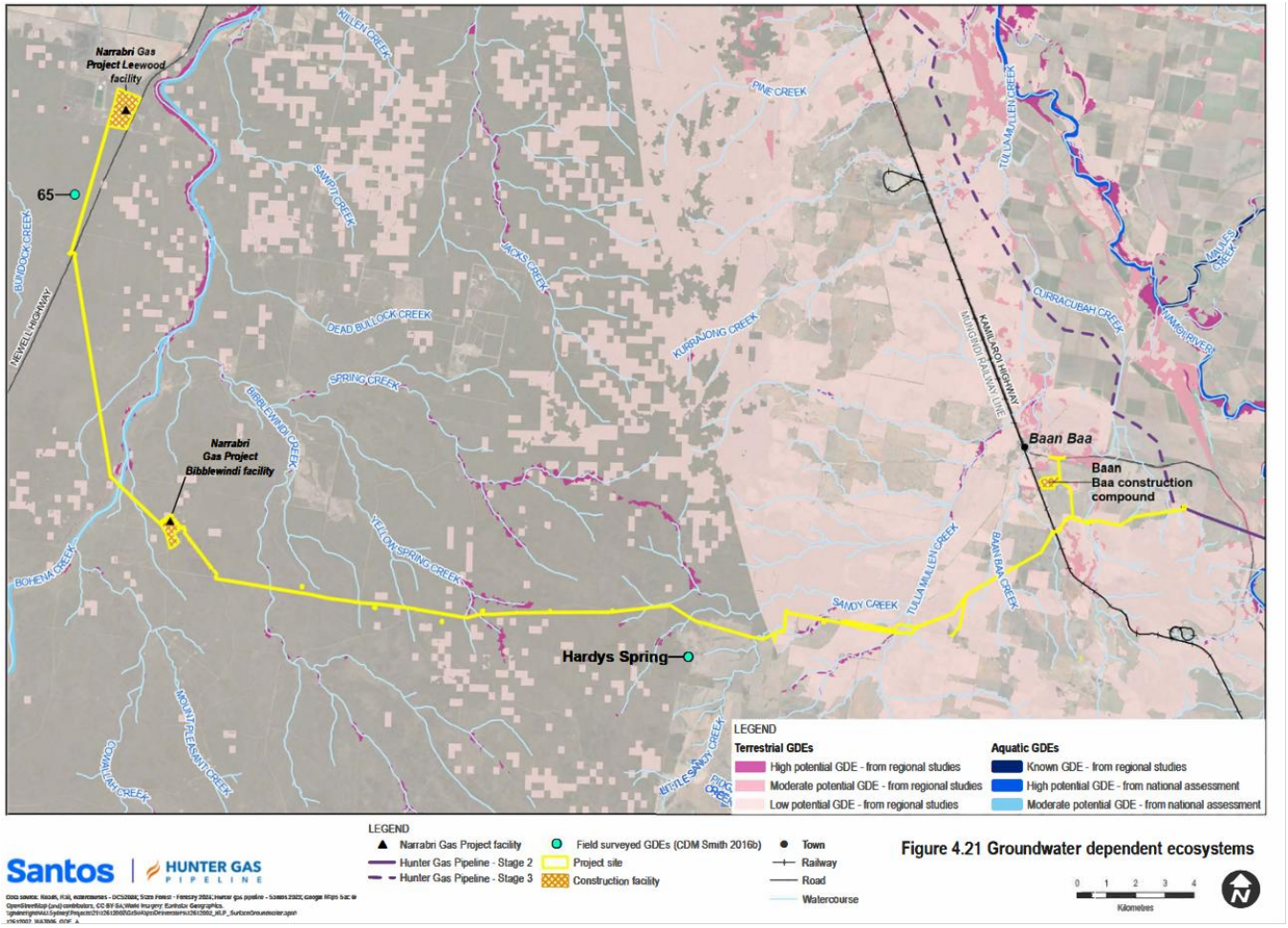
Yellow Spring Creek contradiction re GDEs within EIS chapters

Aquatic Ecology Technical Report 2 goes further, stating that "there are no known or high potential aquatic GDEs mapped in the study area", with only Bohena Creek mapped as a "moderate

potential" aquatic GDE. Other intersecting streams are simply left "unclassified". Strangely, the Figure 2.2 Aquatic habitat survey locations in Technical Report 2 Aquatic Habitat does not even show Yellow Springs Dam, a permanent partly spring-fed and partly surface water-fed reservoir shortly downstream of the proposed gas pipeline. This curious decision to omit a significant water resource smacks of either scientific negligence or alternatively, scientific misconduct, and has severe negative consequences for both baseline assessment and impact assessment.

Regarding Yellow Spring Creek, p. (i) of Technical Report 2 states that, "Bohena Creek is one of four watercourses in the study area mapped as a moderate potential aquatic groundwater dependent ecosystem (GDE) and is the only one intersected by the project site". This contradicts Figure 4.21 of Technical Report 4 – Water (p. 54) which clearly identifies High Potential GDEs spanning both sides of the proposed pipeline route down the length of Yellow Spring Creek downstream from Hardy's Creek. According to the EIS itself, this map was based on regional studies and data provided by Ecological (2016) and the Bureau of Meterology.

Screenshot of Fig 4.21 Groundwater Dependent Ecosystems, p. 54 Technical Report 2.



The approach in Technical Report 2 approach repeats the over-simplification criticised by Serov for the Narrabri Gas Project EIS. Despite the strong evidence of stygofauna in the NGP area, the Narrabri Lateral Pipeline EIS does not include any stygofauna surveys. The term "stygofauna" does not appear in the Aquatic Ecology report, the BDAR or Chapter 6.

Instead, assessment of GDEs is confined to:

- vegetation mapping and terrestrial GDE polygons; and
- desktop review of aquatic GDE Atlas mapping and fish-based habitat assessments.

This is directly inconsistent with Serov's evidence that:

- stygofauna are already known from the Pilliga Sandstone and Bohena Creek alluvium;
- these communities are likely to be highly endemic and sensitive to water chemistry and pressure changes; and
- on the precautionary principle, their presence should be assumed across similar aquifers and hyporheic zones in the project area.

The BDAR concludes that "no significant impacts on terrestrial GDEs" are anticipated, largely because:

- trenchless construction will be used at Bohena, Little Sandy (one crossing) and Tullamullen creeks;
- trenching elsewhere is said to affect only low- or moderate-potential GDEs; and
- any groundwater intercepted in trenches will be pumped back into the same watercourse, so net groundwater loss is "negligible".

Aquatic Ecology Technical Report 2 similarly concludes that, with mitigation, impacts on aquatic ecology and aquatic GDEs will be "minor, localised and temporary" and that "no significant residual impacts" are expected.

These confident statements do **not** address the key impact pathways identified by Serov for the NGP, including:

- contamination of aquifers and hyporheic zones from spills, leaks or drilling mud losses;
- creation of new flow paths between aquifers through construction activities, which can introduce saline water, oxygen, bacteria and surface invertebrates into previously isolated groundwater ecosystems;

- impacts of localised drawdown (even if short-term) on thin water-bearing zones that support stygofauna and baseflow pools; and
- cumulative hydrological changes from the combination of gas field extraction and pipeline construction.

Without addressing these mechanisms, the claim that GDE impacts will be "negligible" is unsupported.

Failing to treat GDEs as potential MNES

The Lateral Pipeline documents list EPBC-listed threatened ecological communities and species (e.g. Poplar Box Grassy Woodland, White Box–Yellow Box–Blakely's Red Gum Grassy Woodland, Koala) but do not explore whether groundwater-dependent communities or subterranean fauna may themselves be MNES.

This repeats the approach criticised by Serov in the NGP EIS, where springs and GDEs recognised as high-priority under NSW Water Sharing Plans and the NSW GDE Register were dismissed as not being EPBC-listed simply because they were not mound springs.

Given the documented presence of stygofauna communities in the Pilliga,the high likelihood that many of these species are new to science and highly range-restricted; and the EPBC Act's requirement to consider the precautionary principle when information is limited,the failure to even canvass the possibility that these groundwater communities may qualify (now or in the future) as threatened ecological communities or threatened species is a serious omission.

Cumulative impacts not genuinely assessed

The BDAR's cumulative impacts table notes that:

- the Narrabri Gas Project involves removal of almost 1,000 ha of native vegetation, with substantial impacts on threatened flora, fauna and connectivity at Bohena Creek; and
- the original Hunter Gas Pipeline approval did not assess impacts on terrestrial GDEs or quantify habitat connectivity impacts.

Yet the Lateral Pipeline assessment simply assumes that its own additional impact on GDEs is minimal, without adding in the unassessed impacts of the gas field and the main Hunter Gas Pipeline. This is contrary to Serov's warning that the underlying NGP EIS is already too deficient for a reliable GDE assessment.

EIA does not adequately protect Commonwealth-listed GDE communities

On the evidence available, we submit that the EIAs for the Narrabri Gas Project and Narrabri Lateral Pipeline do not adequately protect groundwater dependent ecosystems, including

subterranean and hyporheic communities, which fall within the broader class of Commonwealth-listed groundwater-dependent ecological communities and water resources.

Key reasons are:

1. **Information gaps** – There is **no dedicated stygofauna or hyporheic fauna survey** for the pipeline corridor, and the earlier NGP stygofauna sampling has been shown by Dr Serov to be inadequate and poorly designed.

2. **Misapplied GDE framework** – While the BDAR cites Serov's GDE classification and risk guidelines, it does not actually apply them. Instead, it limits GDE identification to mapped polygons and coarse assumptions about groundwater depth, contrary to the conceptual framework that emphasises field-based hydrology, ecology and type-specific sensitivity.

3. **Systematic down-grading of ephemeral and sand-bed streams** – The EIS discounts creeks like Bohena and Tulla Mullen as having "limited capacity" to support aquatic EECs or threatened species because they are ephemeral, despite strong scientific evidence that these creeks, and especially their hyporheic zones, are key GDEs and biodiversity refuges.

4. **Unassessed impact pathways** – Critical risks identified by Serov—contamination, inter-aquifer connectivity changes, drawdown rates, and downstream propagation—are not addressed for the pipeline, even though pipeline construction, operation and potential failure can trigger exactly these mechanisms.

5. **Failure to recognise potential MNES** – The EIAs continue to treat GDEs as a local or state-level issue, rather than considering that these groundwater ecosystems themselves, or the species they contain, may be (or become) Matters of National Environmental Significance, particularly in light of the EPBC water-resources provisions and the recognised national importance of GDEs.

6. **Non-compliance with the precautionary principle** – Given the **high uncertainty** and **clear evidence of sensitive, poorly known biota**, the EIAs should err on the side of protection. Instead, they assume that, because mapped GDE polygons are limited and surface water is often absent, impacts will be negligible. This reverses the burden of proof demanded by both NSW GDE policy and the EPBC Act.

6. What should be required

On the basis of the above, we respectfully call for the following steps before any approval is considered:

1. **Full application of the NSW GDE Risk Assessment Guidelines** (Serov et al. 2012) to both the gas field and the pipeline corridor, including proper classification of all GDE types and sub-types and assessment of risk pathways.

2. **Comprehensive stygofauna and hyporheic surveys** along the pipeline route and in adjacent aquifers (Pilliga Sandstone, Maules Creek and Namoi alluvium), covering multiple seasons and depths, with transparent reporting of methods and results.

3. **Integrated groundwater–surface water monitoring** (levels, temperature and chemistry) in key creeks and wetlands (Bohena, Tulla Mullen, Little Sandy, Yellow Spring and Sandy Creeks) to establish connectivity and to define natural ranges of water quality against which any construction or operational impacts can be assessed.

4. **A re-assessment of ecological value and MNES status** for groundwater communities in the project area, recognising the likelihood of highly endemic and potentially threatened stygofauna species.

5. **Robust cumulative impact assessment**, combining Narrabri Gas Project extraction, Narrabri Lateral Pipeline disturbance and the Hunter Gas Pipeline, rather than treating each in isolation.

6. If, after proper assessment, significant uncertainty or risk remains for GDEs and stygofauna, the **precautionary principle** should be applied and the project **refused, or re-designed to avoid high-value GDEs entirely.**

GDE Conclusion

Our communities live with the consequences of decisions made about water. The Pilliga forests, the Bohena and Maules Creek systems and the underlying aquifers support unique groundwater-dependent ecosystems that cannot be replaced once damaged.

Given the serious shortcomings identified by Dr Serov in the Narrabri Gas Project EIS, and the way the Narrabri Lateral Pipeline EIS repeats and amplifies these problems, we submit that the current environmental assessments do not provide an adequate basis to conclude that Commonwealth-listed groundwater dependent ecosystems and associated stygofauna will be protected.

Until the information gaps are closed and the precautionary principle properly applied, approval of the Narrabri Gas Project and Narrabri Lateral Pipeline would be inconsistent with both the EPBC Act and responsible stewardship of our region's groundwater.

Dr Serov's findings demonstrate that the Pilliga landscape supports a diverse and sensitive network of groundwater-dependent habitats. These include subterranean aquifer ecosystems, hyporheic zones beneath creek beds, vegetation communities with partial groundwater reliance, and aquatic ecosystems supported by baseflows. His investigations reveal that stygofauna are widespread, often highly endemic, and vulnerable to changes in aquifer connectivity, water

chemistry and pressure. They cannot be assumed absent merely because sampling has been limited.

Serov concluded that the NGP EIS failed to provide the information necessary for the NSW Independent Planning Commission to make a lawful and informed assessment. Key issues included inadequate stygofauna sampling, failure to apply NSW Groundwater Dependent Ecosystem Risk Assessment Guidelines, incorrect ecosystem classification, and omission of several important impact pathways. These
problems are directly relevant to the NLP because the pipeline EIS relies on the same flawed baseline ecological information and does not rectify it through new surveys or investigations.

The NLP EIS contains no stygofauna studies but acknowledges the existence of subterranean fauna. It further mischaracterises ephemeral creeks, including Bohena Creek, as having low ecological value. Serov's research shows the opposite: these ephemeral sand-bed creeks contain high macroinvertebrate diversity and play a critical refuge role in the landscape.

The NLP EIS also omits assessment of important impact pathways associated with pipeline construction. These include trenching through saturated layers, dewatering, sediment plumes, drilling mud losses, and risks of inter-aquifer connectivity changes. Such mechanisms
directly threaten hyporheic fauna and aquifer ecosystems, yet are largely unexamined in the EIS.

Furthermore, the EIS does not consider whether these groundwater ecosystems or their endemic fauna may qualify as Matters of National Environmental Significance under the EPBC Act. This is a significant omission given the recognised national importance of groundwater ecology and the EPBC Act's requirement for precaution where uncertainty is substantial.

For these reasons, we submit that the NLP EIS does not meet the scientific or legal standards required for approval. Comprehensive stygofauna surveys, groundwater–surface water connectivity investigations, application of the NSW GDE risk guidelines, and a proper cumulative impact assessment are essential before the proposal can be properly considered. If uncertainty remains after undertaking these studies, refusal of the project should be considered in accordance with the precautionary principle.