

16 January 2019



Attention: Stephen O'Donoghue
Team Leader
Department of Planning and Environment
Level 22, 320 Pitt Street
Sydney NSW 2001

Dear Steve,

RE: Response to Report - "Geotechnical and Hydrogeological Review Eraring Ash Dam Expansion", WSP for the NSW Department of Planning & Environment

In response to the report prepared by WSP, for the NSW Department of Planning & Environment (DPE), in relation to the Eraring Ash Dam Modification application, Origin provides the following response to a number of matters and recommendations raised in the report.

Origin refutes the statement made by WSP regarding Stantec's subsidence mitigation capabilities. Origin has engaged Stantec as its 'Engineer of Record' (EoR) for the Eraring Ash Dam given their extensive experience in mining, tailings management and geotechnical engineering. Origin does not believe WSP are in a position to make such statements in the Executive Summary and Section 3 of the report, and attach further information on Stantec's capability to refute such claims (refer Attachment A).

1.0 Response to Report

A review of the Report and its recommendations has been undertaken by Origin and Stantec. The response has been structured in relation to the recommendations set out in the report.

Executive Summary Recommendations

Recommendation: A mine subsidence expert be retained by Origin, who is approved by DPE, to assess subsidence impacts to the site and mitigation, particularly as only conceptual information has been provided on mine subsidence impacts and mitigation.

Response: As discussed above, Stantec have been retained as Origins EoR given their expertise in mining, tailings management and geotechnical fields. A statement of capability and relevant curriculum vitae are attached for the DPE's review.

Recommendation: A qualified and experienced hydrogeologist be engaged by Origin, who is approved by DPE, to:

- Better conceptualize the groundwater system;
- Assess and refine the potential risks to groundwater;
- Inform the detailed design; and
- Design and implement a water monitoring program.

Response: As discussed above, Stantec have been retained as Origins EoR given their expertise. In particular, David Thomson (present at the site visit) is a Hydrogeologist with over 30 years' experience in the mining, exploration, construction and environmental industries. David's CV can be found in Attachment A.

With regard to the hydrogeological matters highlighted, as per Origin's correspondence dated 17 December 2018, Stantec are currently developing relevant studies to input into the Void Management Plan.

Recommendation: Investigation of the mine workings and subsurface conditions in the site area be undertaken, including:

- Desktop study of mining and geology;
- Site reconnaissance to look for and locate mining and subsidence features, springs, and other items of interest; and
- Subsurface investigation with boreholes, downhole investigation techniques and test pits.

Response: This work is currently being developed by Stantec, including the identification of known cases of subsidence. Furthermore, this will be undertaken in consultation with Centennial.

Recommendation: Mitigation of existing and potential mine subsidence impacts at the site be undertaken. Several options have been proposed, which need further assessment including:

- Type, extent, analyses, and effectiveness of proposed mitigation option;
- Stabilization material assessment including trial mixes to assess strength, conductivity, flowability, and leachability; and
- Impacts to groundwater flow from the stabilization/barrier material at the mine level and in the overburden.

Response: Stantec are currently undertaking a Mine Void Study and associated assessment which is focussed on a preferred alternative to grout the underground workings. Trial mixes would be determined once design parameters relating to the characteristics of grout material (leachability etc.) are determined through the Void Management Study, and an appropriate contractor is engaged.

Recommendation: The recommendations provided within this document be included in a Mine Void Rehabilitation Plan (MVRP), to be submitted to DPE for review and approval prior to implementation.

Response: Origin has engaged Stantec to develop the Mine Void Rehabilitation Plan, including associated studies on subsidence and hydrogeology. The MVRP will aim to identify: Void treatment methods, excavations, a material placement strategy and design criteria; Bulk material handling practices, water management procedures and safeguards to minimise risks to the environment.

Recommendation: Regularly consult DPE during the development of the MVRP, detailed design and implementation stages to allow opportunities for DPE review and advice during the process, including the establishment of performance measures for subsidence and hydraulic leakage into the underground workings.

Response: Origin is committed to engaging with DPE and the Mine Subsidence Advisory NSW at key stages in the development of the MVRP.

1.2 Review of site walkover and meeting - Section 3

WSP (2018) have provided a number of observations regarding operation of the site, the existing site environment, past and proposed facility design and mitigation options. The following clarifications are provided:

- Further liaison between Origin, Stantec and Centennial Coal would be undertaken to inform development of the MVRP.
- Initial consultation has been undertaken with DSC and Subsidence Advisory NSW during preparation of the EA. Subordinate approvals would be sought as necessary during or following determination of the Modification application of Project Approval (07_0084).

1.3 Review of Additional information – Section 4

WSP (2018) have provided additional information regarding subsidence mechanics, potential mitigation measures, hydrology and groundwater issues. The following clarifications are provided:

- Establishing fly ash characteristics would be informed by a sampling plan considering the potential variability of fly ash material.

1.4 Review of REVIEW - SECTION 5

WSP (2018) have provided additional information regarding potential subsidence and groundwater risks perceived by WSP and the potential investigations which may support future mine grouting design. The following clarifications are provided:

WSP (2018) identify the potential presence of terrestrial and aquatic groundwater dependent ecosystems (GDE's) within the broader study area and coinciding with coastal wetlands mapped to the south west of Origin EPS landholdings. Potential impacts to coastal wetlands are considered within the EA (AECOM, 2018). The MVRP forms an integral part of the proposed Project and includes construction quality control measures to be implemented describing monitoring and verification of works and quality control of grouting materials. The proposed strategy is intended to minimise potential groundwater interaction between the Eraring Ash Dam (EAD) and Centennial mine workings. Therefore no significant direct or indirect impacts to groundwater dependent ecosystems (GDE's) are anticipated as part of the Project.

Further it is noted that a Mine Void Rehabilitation Verification Report would be prepared to determine the effectiveness of the applied rehabilitation action works. The verification report would be informed by and contain:

- A summary of geotechnical and/or groundwater investigations undertaken to verify performance measures identified in the MVRP are met.
- If necessary, any further monitoring or geotechnical work required to manage residual risk associated with subsidence and surface water connectivity risks prior to CCP disposition above RL 130 within the western emplacement area.

It is considered that the above mitigation measures would effectively mitigate subsidence risks identified for the site.

If you would like to discuss this matter further, please do not hesitate to contact me on the details below.

Kind Regards,



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