Department of Planning and Environment

Our ref: OUT23/5371

James McDonough

Planning and Assessment Group
NSW Department of Planning and Environment

Email: james.mcdonough@dpie.nsw.gov.au

18 April 2023

Subject: **Holcim Salt Ash Sand Operations (SSD-9099356) Environmental Impact Statement (EIS)**

Dear James McDonough,

I refer to your request for advice sent on 3 February 2023 to the Department of Planning and Environment (DPE) Water about the above matter.

The above development seeks approval to extract and process up to 550,000 tonnes per annum of sand at the site using both dry extraction and dredging techniques to a depth of minus 30m AHD.

DPE Water has reviewed the Environmental Impact Statement (EIS) and has recommendations to address water take and entitlement, groundwater modelling, and groundwater impacts. In particular, we do not believe that the current groundwater model accurately predicts impacts and the project in its current form poses significant risks to groundwater levels and quality.

Please see Attachment A for more detail.

Should you have any further queries in relation to this submission please do not hesitate to contact DPE Water Assessments water.assessments@dpie.nsw.gov.au.

Yours sincerely

Mitchell Isaacs
Chief Knowledge Officer
Department of Planning and Environment: Water

Attachment A

Detailed advice to DPE Planning & Assessment regarding the Holcim Salt Ash Sand Operations (SSD-9099356) Environmental Impact Statement EIS

1.0 Water take and entitlement

1.1 Recommendation – Prior to Determination

That the proponent:

1. provide a consolidated site water balance both during operation and post-dredging for a range of climactic scenarios (e.g., flood and drought), and
2. compare the maximum take to entitlement held and demonstrate the ability to obtain sufficient entitlement prior to take.

1.2 Recommendation – Post Approval

That the proponent ensure sufficient water entitlement is held in a water access licence/s to account for the maximum predicted take for each water source prior to take occurring.

Explanation

Quantification of post-dredging inflows into the pond is requested. The EIS notes that the dredge pond may be backfilled but this is not confirmed or to the extent this will occur. Ongoing inflows into the dredge pond will be required to be accounted for under a water access licence.

Clarification is requested on total water take for the project as it is unclear if this has been considered. Water take that requires licensing includes water:

- removed with sand (i.e. retained in sand product)
- inflows into the extraction lake created by water pumped out of the pond
- inflows into the extraction lake created by sand removal and/or evaporation
- inflows into the extraction lake if the lake level is lower than groundwater level

Groundwater inflows into the dredge pond should be accounted for. Should the water re-enter the pond immediately from the dredge and not affect the water source gradient then this is not classified as take. The proponent will need to confirm that this information has been included in the site water balance.

As noted in Appendix E - Groundwater Impact Assessment Report, there is a predicted 246ML of baseflow losses. Baseflow losses should be included in the site water balance and take must be accounted for with sufficient entitlement.

2.0 Groundwater model

2.1Recommendation – Prior to Determination

That the proponent:

1. revise and recalibrate the groundwater model, incorporating the following actions:
    a. validate the boundary conditions (external and internal)
    b. clearly defined stresses and stress periods
    c. undertake model and parametric sensitivity (parameter identifiability) analysis
    d. recalibrate against groundwater level and flux targets

e. revised the model predictions including
    i. cumulative impacts of coinciding quarry groundwater take and pumping from the Hunter Water Cooperation (HWC) emergency drought relief groundwater bores
    ii. climate change scenarios
    iii. basic contaminant transport using particle tracking
f. ensure future modelling reports include legible figures and do not contain errors and inconsistencies.

2. provide the model independent review report.

2.2 Recommendation – Post Approval

That the proponent validate and update the model and Groundwater Impact Assessment every three years throughout the lifetime of the Project.

Explanation

The groundwater model that supports the development application is reported in the Groundwater Impact Assessment (GIA) and provided as Appendix E to the Project's Environmental Impact Statement (EIS). The reporting and the modelling are found deficient, containing inconsistencies, shortfalls, and errors. The rectangular model domain is not defined on the basis of well-defined hydrogeological boundaries, the sensitivity analysis is inadequate, and the uncertainty analysis is oversimplified. Hence, DPE Water has low confidence in the groundwater model ability to accurately predict potential impacts to both the ecological assets and HWC municipal water supply assets and as an extension to predict impacts to licencing needs.

The groundwater model would require significant revision prior to DPE Water concurrence that the model is 'fit for purpose'. Further prescriptive information can be provided if requested that elaborates on numerous modelling issues leading to DPE Water's conclusion.

Hunter Water Corporation's (HWC) assets include emergency municipal water bores to the south of the site. These bores are predicted to be impacted by water table drawdown from the quarry. There is legislative recognition of a 'Special Area' for the purpose of municipal water supply (see: https://www.hunterwater.com.au/documents/assets/src/uploads/documents/Building-and-development2/Drinking-water-catchment/Guideline-GuidelineForDevelopmentInDrinkingWaterCatchments.pdf).

The proponent's modelling did not incorporate any scenario that included pumping from HWC bores with potential for cumulative drawdown. The cumulative effects of one or more dredging operations causing long-term decline in the groundwater system combined with any future operational use of the HWC borefield pose risks to the Groundwater Dependent Ecosystems (GDE) within the National Park. These cumulative pressures were not explored in the EIS.

An independent assessment of the model against the Australian Groundwater Modelling Guidelines although stated was not presented.

3.0 Groundwater impacts

3.1Recommendation – Prior to Determination

That the proponent:

1. limit the depth of sand mining to 1m above the groundwater table to mitigate the significant water level and water quality related risk(s), and
2. clarify what is proposed for the final landform.

Explanation

Due to the potential impacts to both water quality and water level, DPE Water recommends that the project be modified to limit the depth of sand mining to 1m above the groundwater table. The proposed dredging of sand below the water table will cause a predicted-peak incidental take of groundwater, of 402 ML/year, and groundwater drawdown which will extend over 2 km from the site boundary. The take of groundwater will likely cause water quality and water level impact impacts including:

- water table drawdown within the Worimi National Park, and at Hunter Water Corporation (HWC) water supply assets,
- disturbance of chemically reactive high risk acid sulfate material and
- sea-water intrusion.

The quarry is located adjacent to the North Stockton Catchment Area gazetted under the Hunter Water Regulation 2015. Whilst groundwater is not currently extracted from the North Stockton aquifer by HWC for potable water supply, HWC maintains an interest in protecting the water source and ensuring it is not adversely affected by development.

Groundwater drawdown

The quarry will excavate and dredge within 50 m of the boundary of the Worimi National Park. Sand will be removed on the outer edges of the steep sloping sand dunes that form part of the Worimi National Park. With the removal of sand and interception of the water table, groundwater will be drawn from the more elevated sand dunes that support GDEs within the Worimi National Park.

DPE Water also notes the intent of the Water Sharing Plan for the North Coast Coastal Sands Groundwater Sources 2016 (WSP) Clause 42 to limit water take close to a National Park. Clause 42 of the WSP states where take exceeds 100 ML in any water year, a water supply work must not be granted or amended to authorise the construction within 800 m of the boundary of lands reserved under the *National Parks and Wildlife Act 1974*. We note that while a water supply works approval will not be required, the quarry is proposed to be within 50 m of the National Park boundary with an estimated peak take of over 400 ML/yr.

The WSP allows distance restrictions to be relaxed provided studies show “no greater impact to any dependent ecosystems…”. To ensure “minimal impact”, DPE Water’s groundwater trade and dealing assessments procedure limits an acceptable level of drawdown impact to GDEs within a National Park to 0.1 metre. The EIS groundwater modelling reports a 1 m drawdown on the site boundary with the National Park and 0.2 m drawdown extending to 1100 m from the boundary. DPE Water believes groundwater drawdown impacts can be addressed by limiting the depth of sand mining to 1 metre above the groundwater table.

Water Quality impacts

Sand dredging below the water table poses water quality risks that would alter the beneficial use of the groundwater resource. DPE Water has previously provided similar advice for Boral’s proposed sand dredge operation also located on the Stockton Groundwater Source. DPE Water’s submission for the Boral project identified examples of recorded groundwater quality impact caused by deep dredging operations at the Hanson Tweed Sand Project (HTSP) located at Cudgen NSW, the Tomago RZM operations at Tomago, and a former short term dredge operation at Boral’s Stockton Sand Quarry.

The Project site is mapped as having low acid sulfate risk. However, lithology samples collected from all 7 investigation bores reported high risk acid sulfate material at various depth profiles. The proponent acknowledges that high risk acid sulfate material would require treatment should the project proceed. The sampling for the presence of acid-sulfate material is insufficient in spatial distribution and depth. Dredging is planned to 30 m depth while sampling was no deeper than 15 m which is insufficient.

Water quality testing identified iron concentrations in groundwater up to 6 mg/L. Further 10-day batch soil leachate testing of samples collected during drilling of the monitoring bores reported a significant reduction in pH (low of 2.5) and corresponding high increases in trace metals with the iron concentration peaking at 580 mg/L. DPE Water is of the views that there is a significant risk of a change in the aquifers beneficial use due to the release of trace metals.

Holcim's Salt Ash's mitigation strategy includes the development of an acid sulfate management plan with commitments to lime dose the process and dredge ponds in order to manage acidification. Similar mitigation strategies have been applied in other coastal sand dredge projects, however these have not prevented a change in beneficial use of the groundwater resource due to increase in trace metals concentrations; and the outcome is likely to be similar for this project.

Seawater intrusion

Sand dredging is modelled to result in a peak water table drawdown in the pit lake of 1.3 - 1.5 metres. The undisturbed (September 2020) water table ranges from 0 to < 2 m AHD, hence a drawdown of 1.3 - 1.5m would correspond to a pond water table of – 1.5 to 0.5 m AHD. DPE Water estimates that lake levels below 0.75 m AHD would pose a risk of direct saltwater ingress with a pond depth of 30 m.

The EIS position that a lowering of groundwater levels in the pit lake will not result in a shift in the saltwater interface has not been adequately demonstrated. With the subject site bounded by sensitive ecological assets within the National Parks estate and in proximity to Tilligery Creek, a precautionary position of limiting the depth of sand mining is warranted.

Final Landform

The sand quarry operation proposal is for a final landform that will consist of a 30-hectare groundwater lake. There is additional information that the site could be potentially backfilled with fill material which would prevent the creation of a permanent lake thereby avoiding ongoing evaporative losses. However, it is unclear what is actually proposed for the final landform. Limited information is provided on the potential impacts of the importation of VENM and/or ENM for site rehabilitation. The proponent states impact on groundwater dynamics and chemical stability in an acid environment would be negligible, however no evidence is provided to support the statements.

End Attachment A