Build something great™

14 October 2020

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Mr Bradley James
Principal Case Manager
Office of the Independent Planning Commission NSW
Level 3, 201 Elizabeth Street
SYDNEY NSW 2000

Distributed to: [redacted]

Dear Bradley,

DUNMORE SAND AND SOIL MODIFICATION 2
RESPONSE TO QUERIES FROM PANEL 7 OCTOBER 2020

In response to your email dated 7 October 2020, seeking additional clarification on behalf of the Panel, I offer the following responses.

1. ***Applicant to provide further information in relation to water quality management arrangements and water quality testing between 12m – 27m at the 5B pond***

   We consider that water sampling at shallow depth in the pond will be sufficient to provide an assessment of water quality within the dredge pond. This is due to the fact that water extracted from depth, as part of the dredging process, returns to the same pond after processing, essentially to the surface of the pond; thereby water testing at the surface of the pond would provide an indication of the water quality for the entire water body.

   Provisions for the collection and assessment of water quality parameters at depth can be considered, if required, however we submit this would not be necessary for the reasons above. Notwithstanding, such a measure could readily be incorporated into the water management plan (WMP)/ groundwater management plan (GMP) that is to be updated once and if approval is granted.

2. ***What's the risk/likelihood of oxidation at depth?***

   It is important to note that the risk of oxidation of potential acid sulfate soil (PASS), subsequent acid generation, and release can only be realised if PASS materials are present and allowed to interact with air - oxidise.

   Concerning the proposed sand dredging operation at Stage 5, the risk of PASS oxidation can only apply if:

   - PASS materials are present (therefore there is a potential for disturbed materials to oxidise and generate acid leachate once exposed to air);
   - PASS materials are exposed at surface and allowed to oxidise (excavation from below water table and placement above); or
   - Existing Static water levels (SWLs) are lowered to such an extent that PASS at depth is exposed at surface and allowed to oxidise.

As the dredging process ensures materials at depth will not be allowed to be exposed to the surface, to allow oxidation to occur, these materials will remain saturated at all times, especially given the fact that no or negligible changes to the SWLs are anticipated.

The extraction techniques proposed effectively eliminate the risks and likelihood of oxidation of PASS materials at depth, and thereby is considered to be a low to negligible risk of occurring.

A more detailed analysis of the three scenarios contemplated is included in Appendix A of this letter.

Applicant to provide details regarding the 16mm increase of the five year ARI flood level at stage 5A (see pg16).

3. ***What is the current situation?***

Riverside Drive is currently located in a flood prone area. Modelling completed to determine the current flood impacts, confirms that in a 5 year ARI flood event, vehicles would not be able to traverse Riverside Drive.

Flood depths in such an event, at the lowest point, are expected to be 420mm deep; this is between the entrance to the recycling facility and the Fig Hill Lane/Riverside Drive intersection.

4. ***Is an additional 16mm a tipping point?***

As a result of Stage 5A removing some flood storage capacity in the immediate area, due to the establishment of bunds around our operations, the flood depth increases by about 16mm at the northern edge of the flood extents over Riverside Drive; this is not a discernible change of flood depths at the deepest point.

The additional 16mm in flooding height, is not considered to be significant given the anticipated maximum flood depth in a 5 year ARI flood event on Riverside Drive is 420mm deep.

5. ***How does this relate to the need for road closure and does this impact the recycling plant in any way?***

The temporary increase of 16mm to the flood height in our view is of no consequence, given the modelling demonstrates that the current landscape is likely to be inundated to such an extent, to render Riverside Drive closed.

The increase of flood height, and partial increase of flood area, would not result in any change to the accessibility of the Recycling Plant.

6. ***A setback diagram for Stage 5B pond showing the 3m standoff***

   See attached diagram included in Appendix B.

7. ***A cross-section of the Stage 5B pond illustrating the max depths (from pond edge to deepest point)***

   See attached cross sections included in Appendix C.

Should you have any queries or concerns, please don't hesitate to contact me.

Yours sincerely,

Adnan Voloder
Planning & Development Manager (NSW & ACT)
Boral Land & Property Group

[redacted]

APPENDIX A

Further explanation of Scenarios relating to Oxidisation of PASS.

SCENARIO 1: PASS MATERIALS MUST BE PRESENT

Stage 5A

PASS material was confirmed in the vicinity of two boreholes (MW5A2 and MW5A3) only, from a depth of 1.25-4 metres below the ground surface (m bgs).

Given the nature of the development is such that disturbance of the PASS in this area is unavoidable, despite the full lateral extent of PASS likely to be limited (identification in two bores only) – a conservative risk rating of "Moderate" was assigned in relation to the risk of in-situ oxidation, subsequent acidification and release.

However, the likelihood of this risk being realised is considered low, as appropriate management and mitigation measures are proposed to be deployed at the site during and after sand extraction. These management measures are to be expanded upon in more detail in the site Acid Sulfate Soil Management Plan (ASSMP) but include:

- Ensuring sediments with the potential to oxidise remain saturated thus ensuring that acid leachate is not produced. This will require that:
    - Excavation works commence by mining the shallow sand material (above the water table) and work to depth;
    - Once the excavation extends in depth greater than 1-2 m below the ground surface some groundwater ingress may commence; and
    - Ongoing management of excavation of sand materials (containing PASS) by sieving the fines out of the excavated material and returning fines to the excavation (under the water table) immediately.
- Undertaking all ongoing environmental monitoring with respect to surface waters and groundwater at the site (formalised in the GMMP and ASSMP) to encompass the proposed Staged 5 area to allow a proactive monitoring regime to be established. This will ensure in the event of unforeseen circumstances (i.e. early indications of acid generation) appropriate management actions may be triggered before environmental impacts are realised.

Stage 5B

The results of the assessment within the Stage 5B area did not identify PASS or AASS. Specifically, field assessment confirmed soils underlying the Stage 5B area could be designated:

- NASS: Not acid sulfate soils; or
- NRNR: No risk non-reactive (i.e. these soils are completely self buffering & do not require management through neutralisation if oxidised).

By way of further explanation:

- Soils designated "NASS": can be discounted from further consideration in relation to a PASS risk; and
- Soils designated "NRNR" retain a very low risk as, although acid could be generated following exposure and oxidation, these acids would be neutralised by the inherent

buffering capacity of the soil. In the case of soils in Stage 5B, this buffering capacity is attributable to shell grit ($CaCO_3$) which naturally occurs within the sand deposits.

Given the above, we consider the risks and likelihood of acidic leachate generation and release resulting in environmental impacts associated with soils classified NRNR on exposure to air, are low and acceptable for the proposal to proceed.

Furthermore, noting that acid generation and release can only occur should PASS material be exposed and allowed to oxidise, the risk of oxidation at depth is deemed low as:

- During sand extraction works, excavated sands (ex situ PASS) will be managed appropriately to minimise the likelihood of oxidation and acidification of disturbed materials with any fine fractions (*typically containing reactive sulfides) removed and returned to the base of the dredge pond (i.e. reburied) during the necessary processing of dredged materials for preparation of a commercially viable product.
- No dewatering activities are required during the extraction activities; the majority of water will drain back to the dredge pond preventing a lowering of the water table.

SCENARIO 2: PASS MATERIALS EXPOSED AT SURFACE/ALLOWED TO OXIDISE

(As above/ Refer also to Scenario 3)

During sand extraction works, excavated sands (ex situ PASS) will be managed appropriately to minimise the likelihood of oxidation and acidification of disturbed materials with any fine fractions (typically containing reactive sulphides) removed and returned to the base of the dredge pond (i.e. reburied) during the necessary processing of dredged materials for preparation of a commercially viable product.

This process will occur on an ongoing basis concurrent with the dredging activities proposed, therefore materials will be immediately returned below the water table in a saturated state and thus have a low likelihood (and therefore acceptable risk) of oxidation.

PASS materials at depth (e.g. below the depth of proposed dredging) will not be disturbed/exposed thus oxidation and subsequent acidification will not occur.

SCENARIO 3: LOWERING OF WATER TABLE

The water table will not be lowered during the proposed sand extraction activities such that PASS materials will be exposed and oxidised. Specifically:

- No dewatering is required during the proposed sand extraction activities. Sand will be extracted via suction dredge that will operate from a barge on the lake;
- The majority of water removed during dredging will drain back into the dredge pond thus preventing a lowering of the water table; and
- Recharge is rapid in this lithology (infiltration anticipated at around 70%) therefore rain will rapidly recharge the aquifer, further preventing impacts to the groundwater table across the site.

ADDITIONAL INFORMATION (MANAGEMENT AND MITIGATION)

Any potential risks associated with PASS will be mitigated by adherence to a site acid sulfate soil management plan (ASSMP) which has been prepared primarily to mitigate any residual risks of acid generation from PASS located in Stage 5A and also for ongoing proactive and conservative management of NRNR soils in Stage 5B i.e.:

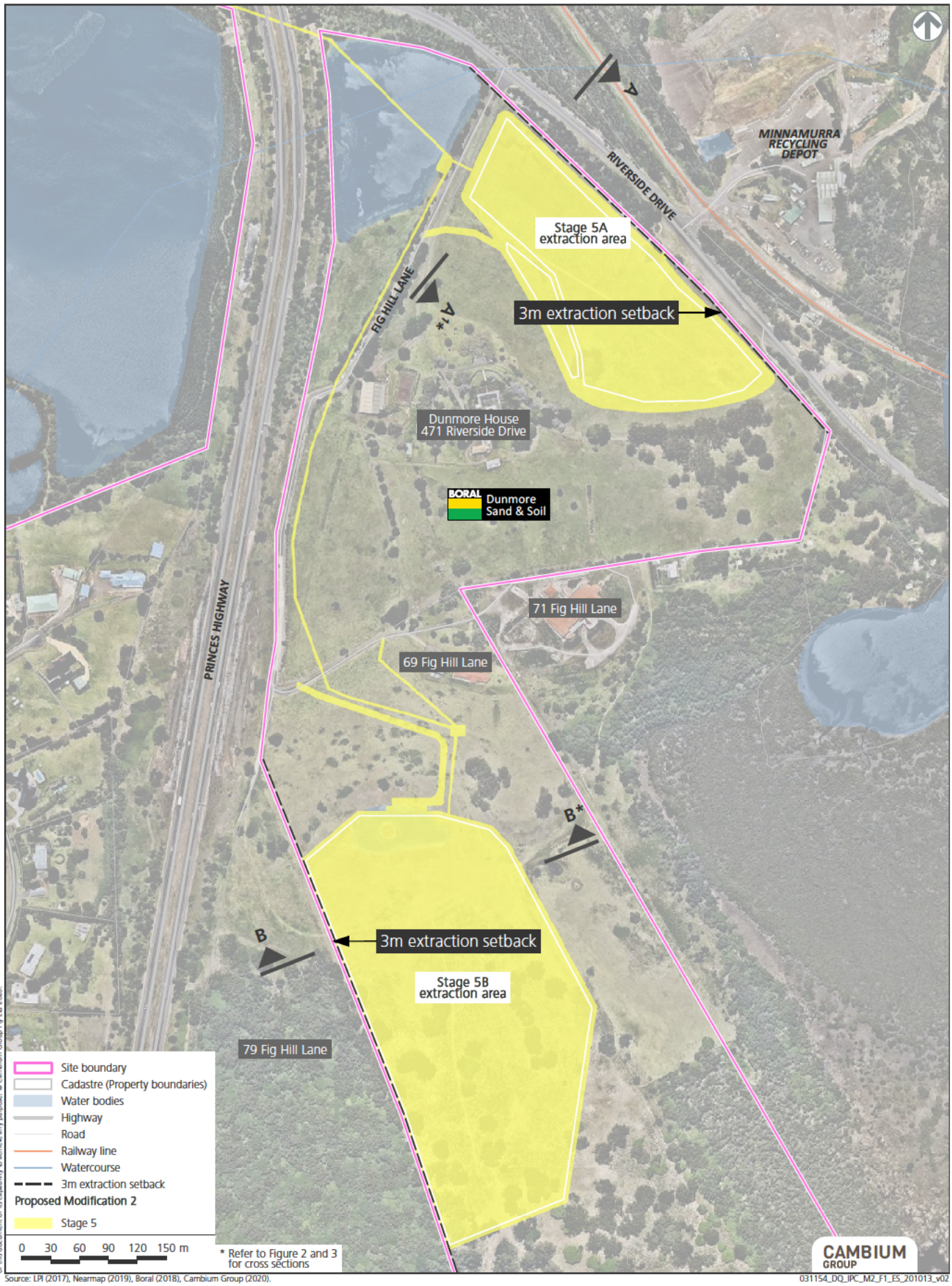
- During sand extraction, sands should be sieved, and fines reburied below the water-table to prevent oxidation;
- On completion of extraction activities in the Stage 5B area, the area should be converted to a wetland to further facilitate water-table recharge and a return to natural conditions; and
- All bores within both the Stage 5A and 5B areas should be monitored at regular intervals during sand extraction and post closure in accordance with the recommendations of the ASSMP to monitor changes in SWL and chemistry (field and laboratory analysis). This monitoring should continue until such time that it can be demonstrated that SWLs are at steady state, in equilibrium with the surrounding environment and not facilitating oxidation of in-situ PASS (where present) and/ or soils designated NRNR.
    - Should bores be destroyed during the extraction activities, replacement bores will be installed to facilitate ongoing monitoring, to a minimum depth of 6 m bgs.

These management protocols would be implemented through a management plan to be endorsed by DPIE, in accordance with

APPENDIX B

Figure 1
Extraction setbacks

DUNMORE LAKES SAND EXTRACTION PROJECT | MODIFICATION 2
ENVIRONMENTAL ASSESSMENT



Source: LPI (2017), Nearmap (2019), Boral (2018), Cambium Group (2020).

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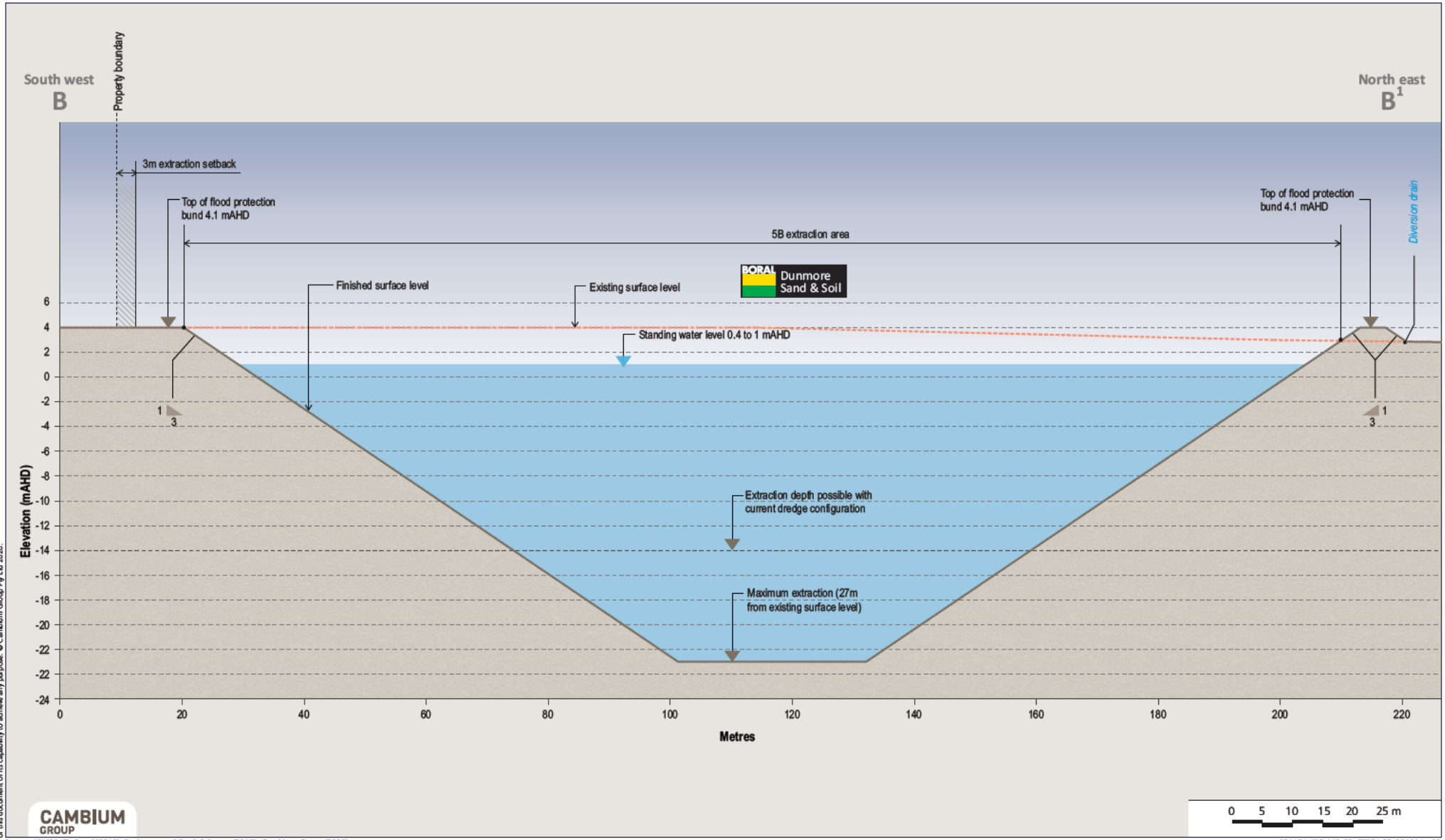
APPENDIX C

Figure 3
Stage 5B extraction area cross section

DUNMORE LAKES SAND EXTRACTION PROJECT | MODIFICATION 2
ENVIRONMENTAL ASSESSMENT



Source LPI (2017), Boral (2018), Environmental Earth Sciences (2019), Cambium Group (2020)

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