ASSESSMENT REPORT
Ginkgo Mineral Sands Mine
Waste Management Modification
(DA 251-09-01 MOD 11)

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1. BACKGROUND

Cristal Mining Australia Limited (Cristal) owns and operates the Gingko Mineral Sands Mine (Ginkgo Mine) located approximately 40 kilometres (km) west of Pooncarie and 170 km south of Broken Hill in far western New South Wales (see Figure 1).

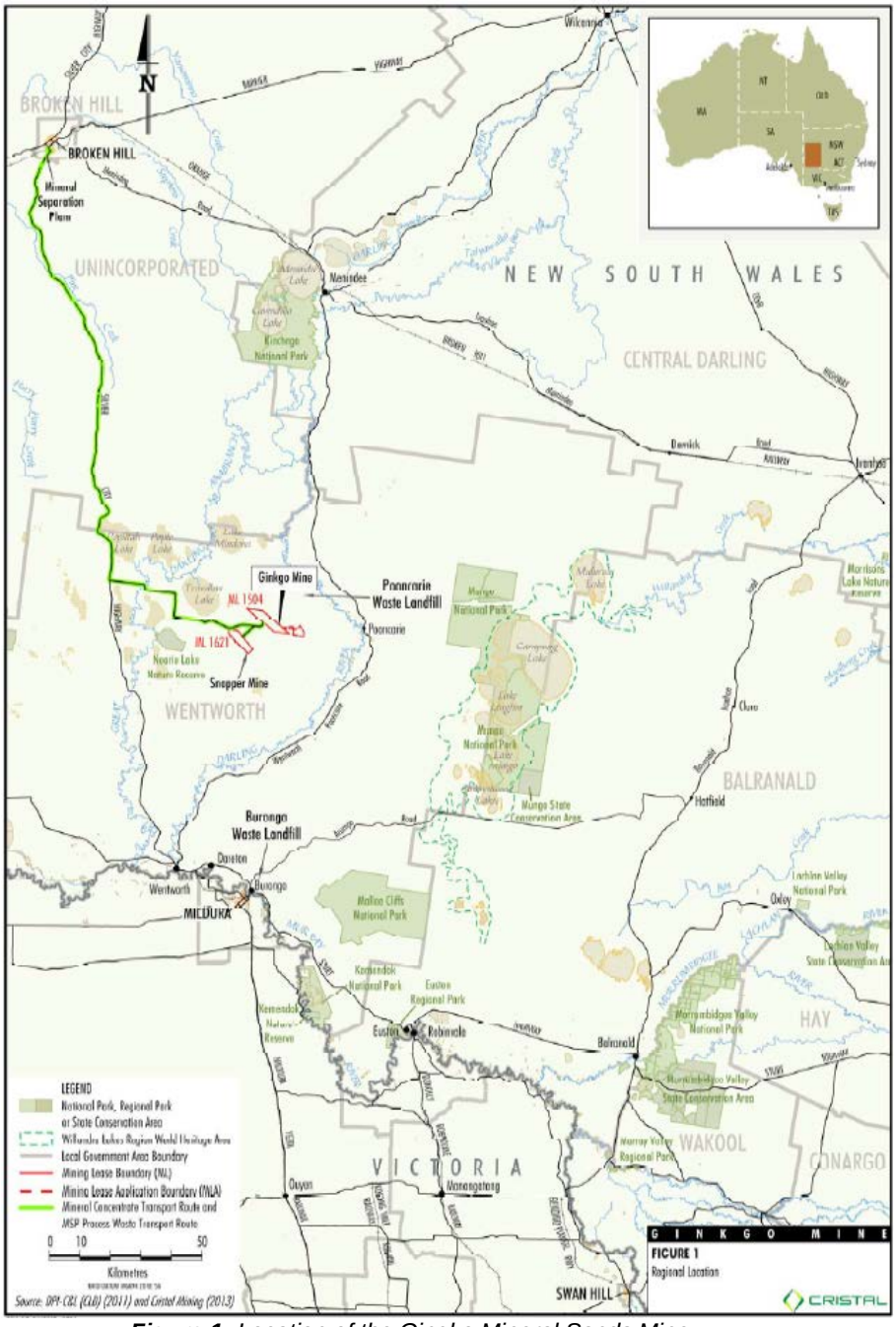

Figure 1: *Location of the Gingko Mineral Sands Mine*

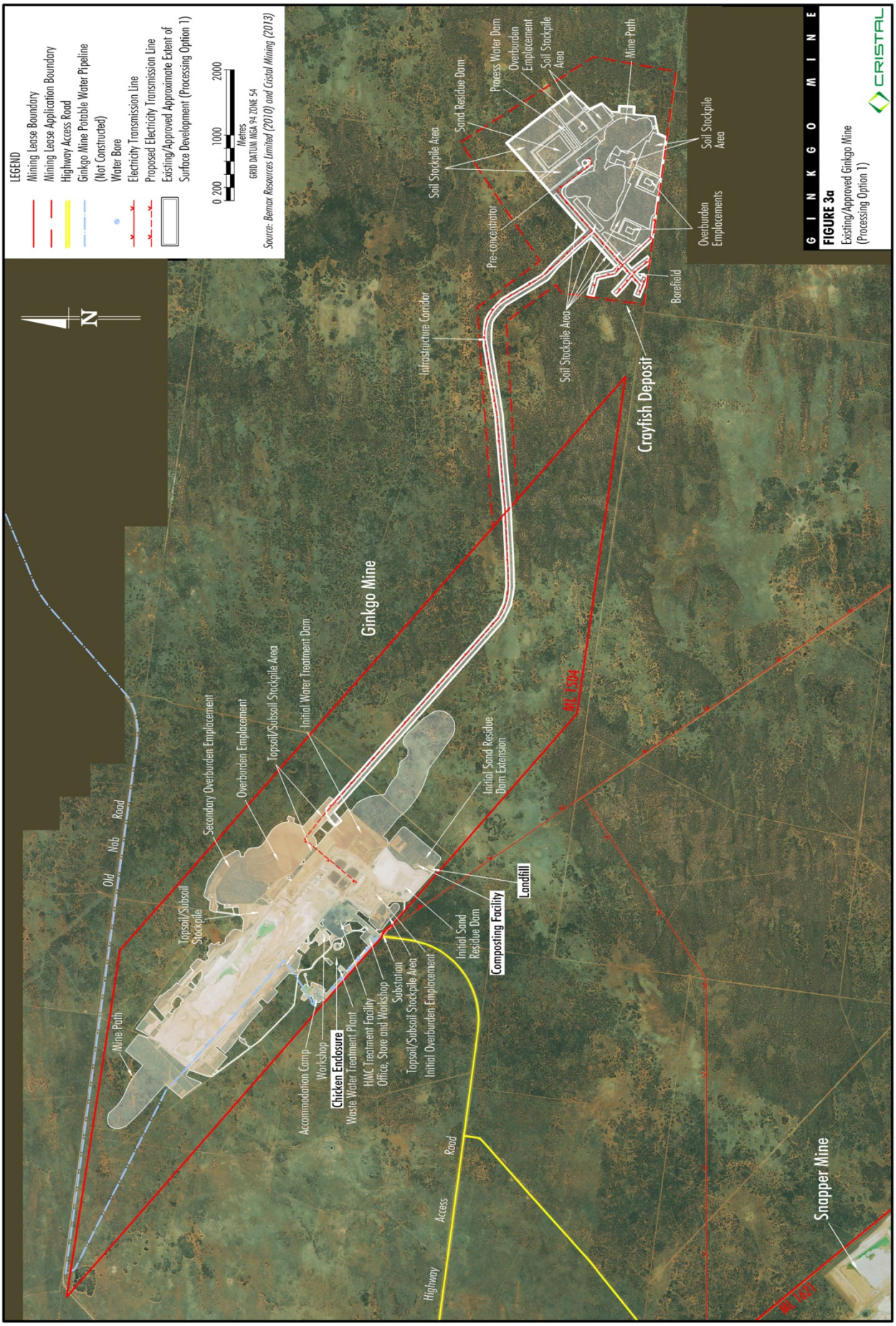

Figure 2: *Proposed Layout of Landfill, Compost Facility and Chicken Enclosure*

Cristal also owns and operates the nearby Snapper Mineral Sands Mine (approximately 10 km southwest of Ginkgo), the Atlas-Campaspe Mine located 80 km to the north of Balranald, and the Broken Hill Mineral Separation Plant (MSP) which processes the mineral sands concentrate from both the Ginkgo Mine and Snapper mines.

The Ginkgo Mine was approved by the Minister for Planning on 30 January 2002 under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (DA 251-09-01) and was commissioned in 2005. Since then the development consent has been modified on 10 occasions. Under its consent, until 6 March 2023, Cristal is allowed to:

- extract approximately 20 million tonnes per annum (Mtpa) of mineral sands ore;
- produce a maximum of 576,000 tonnes per annum (tpa) of mineral sands concentrate;
- transport mineral concentrate from the site (up to 975 000 tpa from Ginkgo Mine and Snapper Mine combined); and
- receive processed waste material from Broken Hill Mineral Separation Plant (up to 300 000 tpa to Ginkgo Mine and Snapper Mine).

General waste (general solid [putrescible] and general solid [non-putrescible]) waste generated at the Ginkgo Mine that cannot be recycled has historically been collected from the mine and disposed of at Wentworth Shire Council's (WSC) Pooncarie Waste Landfill. However, WSC recently requested that Cristal investigate alternatives for disposing of general waste generated at the mine, as the existing landfill at Pooncarie has very limited capacity remaining.

An alternative WSC waste landfill site is located approximately 175 km from the Gingko mine in Buronga. However, using this facility would significantly increase waste disposal costs. After reviewing options to minimise general waste generation and management costs, Cristal's preferred option is to construct an on-site landfill for general solid (putrescible and non-putrescible) waste.

2. PROPOSED MODIFICATION

Cristal is proposing to further modify the development consent for the Ginkgo Mine (DA 251-09-01 MOD 11). The proposed modification mainly involves constructing an on-site general solid (putrescible and non-putrescible) waste landfill. The proposed modification is described in Cristal's Environmental Assessment (EA) (see Appendix C).

The landfill would consist of a pit approximately 100 metres (m) in length, 4 m deep and 6 m wide at the base, with a total volume of approximately 3,000 m^3. Approximately 350 tpa of waste generated at the mine would be disposed of in the landfill. The landfill would be lined with a leachate barrier system and the base would be angled to direct captured rainfall and leachate towards a sump at one end. Leachate would drain from the collection sump into a holding dam that would also be lined with a leachate barrier system. The rehabilitated landfill would include a final capping layer comprising a 0.3 m thick seal bearing surface and a composite sealing layer (see Figures 3 and 4).

Cristal would continue to use the Pooncarie Landfill prior to commissioning the on-site landfill, and at other times as necessary.

To minimise the quantity of general sold [putrescible] waste required to be disposed of within the on-site landfill, Cristal also proposes to construct:

- an on-site compost system to be located within the existing/approved mine surface development area to be used for paper, cardboard and green waste; and
- a chicken enclosure housing approximately 100 chickens for disposal of food waste.

The general layout of the mine including the proposed modification is depicted in Figure 2.

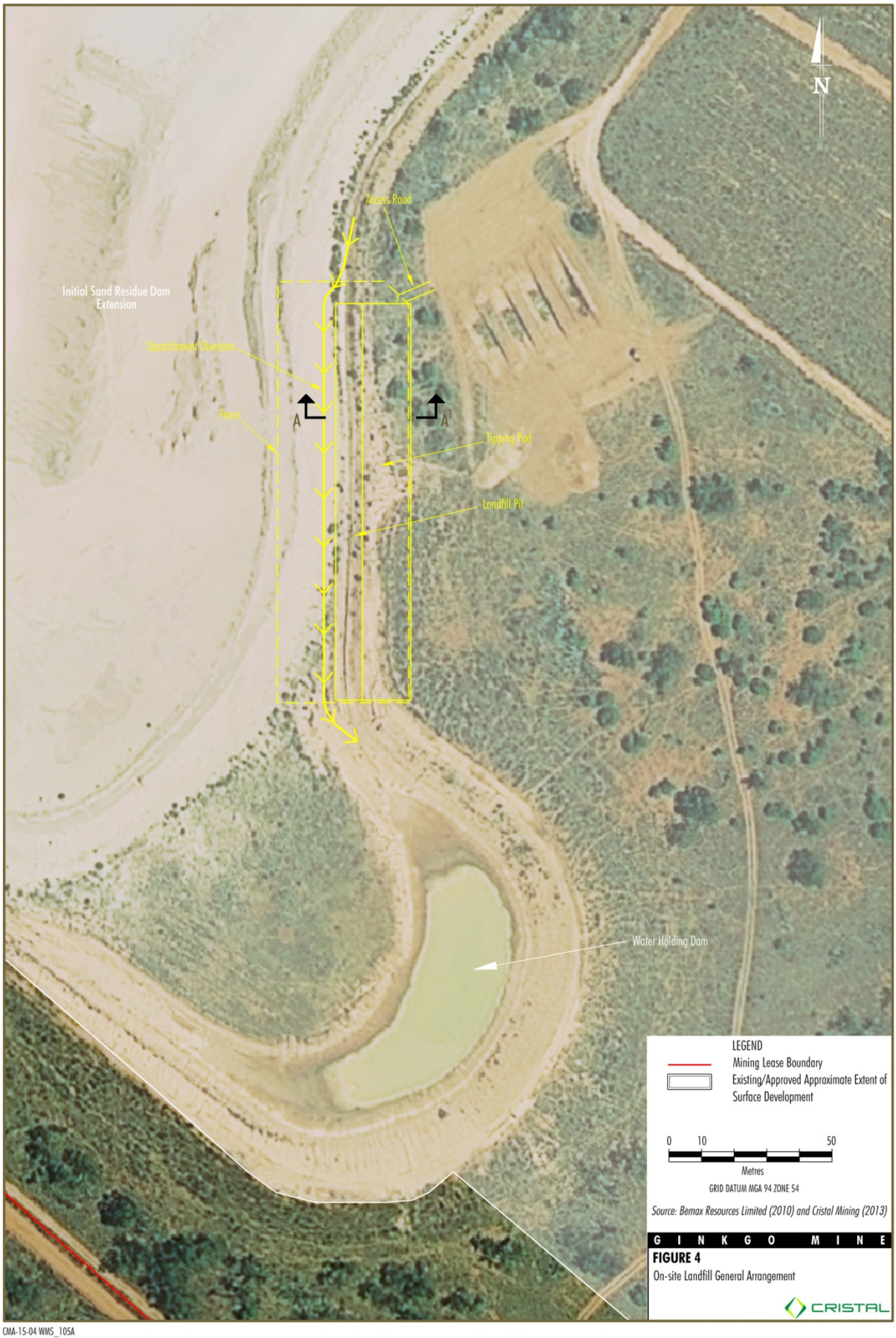

Figure 3: *Proposed On-site Landfill and Leachate Holding Dam*

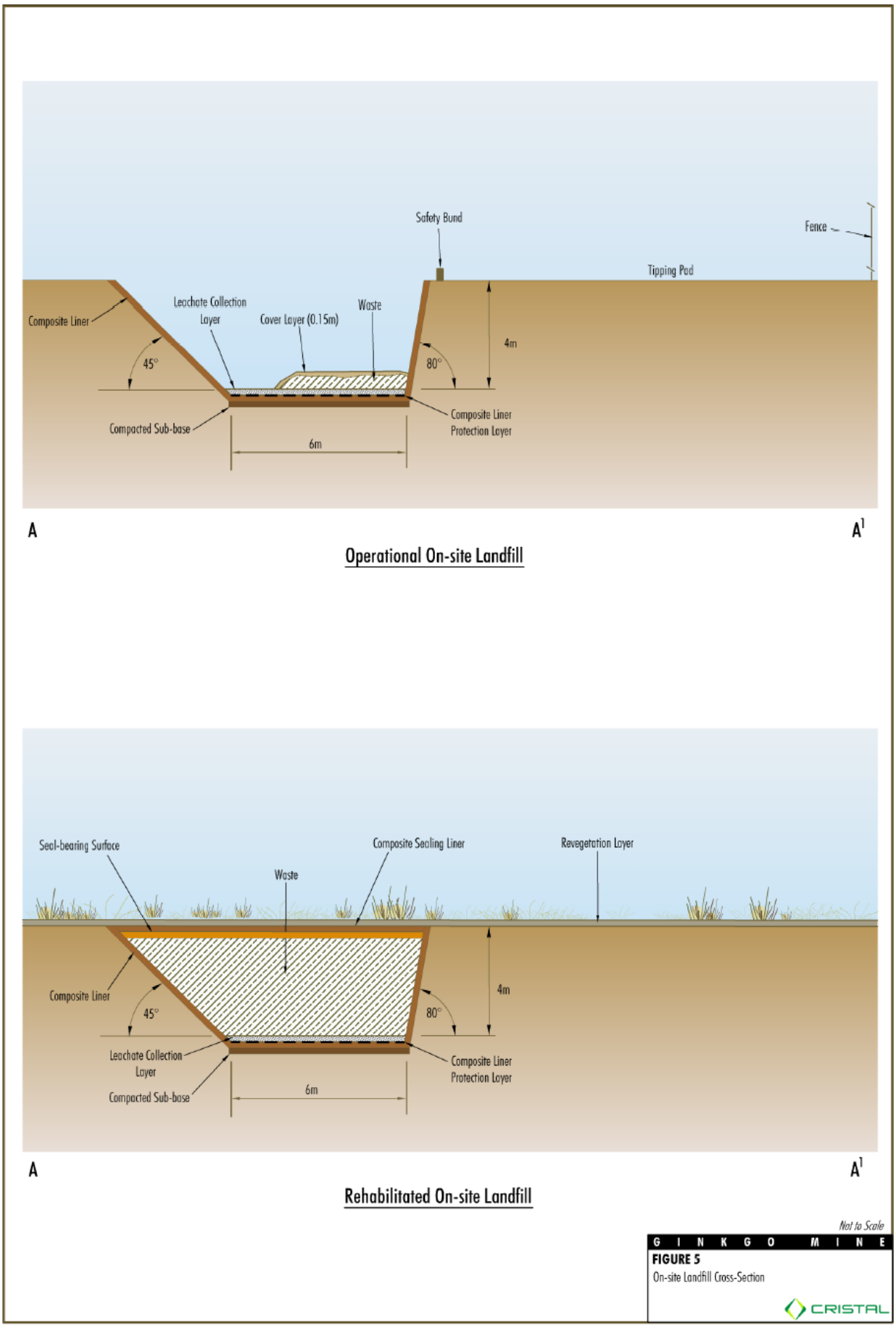

Figure 4: *Proposed Landfill Cross Section (Operational and Rehabilitated)*

3. STATUTORY CONTEXT

Under Schedule 6A of the EP&A Act, the Ginkgo Mineral Sands Mine consent (DA 251-09-01) is classified as a "transitional Part 3A project" and can be modified under the former Section 75W of the EP&A Act. The Department is satisfied that the proposed modification is within the scope of Section 75W and is relatively minor in nature. In this regard, the proposed modification involves a minor change to the approved project layout and no changes to the extraction rates or volumes. The Department's assessment indicates that the resulting environmental impacts would be substantially the same as approved for the original project.

Under Section 75W of the EP&A Act, the Minister for Planning is the approval authority for the modification application. However, under the Minister's delegation dated 16 February 2015, the Director Resource Assessments can determine the application as:

- WSC did not object to the proposed modification;
- there were no public submissions in the nature of objections; and
- Cristal has not declared any reportable political donations.

4. CONSULTATION

The modification application was placed on the Department website on 27 August 2015 and was referred to relevant government agencies for comment. None of these agencies objected to the proposed modification. A summary of their comments is provided below:

Office of Environment and Heritage (OEH) noted that an impact assessment on biodiversity would potentially be required if vegetation clearing is undertaken. OEH also noted that an Aboriginal Heritage Impact Permit would be required if the proposed disturbance impacted on any items or sites of Aboriginal Cultural Significance. However, the Department notes that the proposed landfill and compost heap would be located entirely within the approved disturbance footprint of the mine, and no native trees would be cleared for the chicken enclosure.

Department of Primary Industries (DPI Water) was satisfied there was low risk to the groundwater resource given the proposed design of the landfill and the leachate holding dam (including the leachate barrier system) and the continued implementation of Cristal's Borefield Impact Management Plan. DPI Water recommended monitoring of the proposed holding dam water level to ensure adequate freeboard is maintained at all times. DPI Water also recommended monitoring of the volume of pumped leachate from the landfill to identify any potential leakage from the barrier system and if necessary, the need for any contingency responses.

Environmental Protection Authority (EPA) recommended that the landfill should be constructed and managed strictly in accordance with the EA and relevant waste legislation and NSW government guidelines. EPA also recommended removal of the existing development consent conditions relating to Cristal's use of the Pooncarie landfill. The EPA also noted that Cristal would be required to seek a variation to its existing Environment Protection Licence.

The Division of Resources and Energy noted that Cristal would be required to submit a revised Mining Operations Plan.

WSC supports the proposal.

5. ASSESSMENT

In assessing the merits of the proposal, the Department has considered:

- the modification application and accompanying EA;
- agency submissions;
- the existing conditions of consent;
- relevant environmental planning instruments, policies and guidelines; and
- the requirements of the EP&A Act.

The Department considers potential impacts resulting from the proposed modification would be relatively minor, noting the small size of the landfill and also that the nearest private dwelling is located 10 km away.

A summary of the Department's assessment of all relevant issues is provided in Table 1 below.

Table 1*: Assessment of Issues*

Issue	***Consideration***	***Recommendation***
Surface water and Groundwater	• Potential impacts to water include contamination of surface water by leachate-containing runoff from disturbed areas of the landfill, and leachate infiltration to groundwater in the vicinity of the pit. • The Department considers these risks to be relatively minor given the small quantity of waste proposed for disposal in the landfill, the low rainfall at the mine, and the absence of any well-defined natural drainage channels and permanent surface water features within the site. There are also no known surface water users that would be affected and the nearest groundwater user is approximately 10 km away from the site. • Notwithstanding the above, Cristal is proposing to minimise surface water runoff reporting to the pit to minimise leachate generation by diverting clean water around the landfill, and to implement erosion and sediment controls according to Cristal's Integrated Erosion and Sediment Control Plan. • To minimise leachate infiltration to the shallow groundwater, Cristal is also proposing to line the landfill with a leachate barrier and collection system comprising a: – compacted sub-base; – composite liner; – composite liner protection layer; and – leachate collection layer. • The holding dam would also be lined with a composite liner, composite liner protection layer and a thin clay layer. • The Department is satisfied with the design measures proposed in the EA and has recommended conditions requiring the landfill to be constructed and operated in accordance with the EA and relevant waste legislation and waste guidelines. • The Department has also recommended an update to the Water Management Plan to include monitoring of the volume of pumped leachate to identify changes indicating potential leakage from the barrier system, and monitoring of water levels in the holding dam to prevent overflow.	• Ensure waste generated by the development is appropriately stored, handled and disposed of in accordance with relevant waste legislation and NSW government guidelines. • Provide an engineer's report prior to commissioning of the landfill verifying that construction of the landfill and leachate holding dam is in accordance with *Environmental Guidelines: Solid Waste Landfills (EPA, 2015)*. • Implement an updated Water Management Plan to include monitoring measures and contingency response in the event of leachate seepage.
Rehabilitation	• The proposed rehabilitation of the landfill would include construction of a final capping layer comprising a 0.3 m thick seal-bearing surface overlain by a composite sealing liner beneath the revegetation layer (see Figure 2). This capping layer would be constructed to: – reduce rainwater infiltration into the landfill; – reduce sediment and contaminated runoff; and – minimise odour and gas.	
Air Quality and Gas Emissions	• Air quality impacts are already controlled under strict conditions of consent, and the EA considers that there would be no significant changes to air quality emissions from the proposed modification. Operational activities associated with the landfill would be minor in the context of the existing operations at the mine, and would be unlikely to result in any appreciable air quality impacts at sensitive receivers, the closest of which is located 10 km away from the site. • Gas production from the landfill would represent a low risk to the environment, health and amenity due to the small quantities of waste that would be disposed of and the minimisation of putrescible waste by composting. • Odour would be controlled by compacting each layer of waste and covering the compacted waste with a layer of soil 0.15 m thick. A 0.30 m layer of soil would be used to cover areas where no more waste would be applied. • Cristal would continue to manage air quality through its Air Quality Management Plan, which would be updated in accordance with existing conditions.	• No additional conditions are required to manage air quality impacts.

Noise	• Noise emissions are controlled under the existing conditions of consent, and the EA considers that additional noise emissions from the proposed modification would be minor in the context of the existing operations at the mine. Although trucks would be used to transport waste to the landfill from other areas of the mine site, no additional machinery, plant or equipment would be required. Furthermore, the modification would reduce the number of heavy vehicles on the public road as waste would no longer need to be transported to Pooncarie landfill for disposal using the local road network. • Cristal would continue to manage noise impacts through its Noise Management Plan, which would be updated in accordance with existing conditions.	• No additional conditions are required to manage noise impacts.
Biodiversity	• The landfill and the compost system would be located within the approved surface development footprint and there would be no material change to the approved impacts. • The chicken enclosure would be constructed of chicken wire and have a footprint of 0.01 ha. The location has been selected to avoid the need to clear native trees. • Given the relatively minor nature of the disturbance associated with the proposal, the Department is satisfied that there would be no significant impacts on vegetation. • Cristal would continue to manage biodiversity impacts through its Flora and Fauna Plan, which would be updated in accordance with existing conditions.	• No additional conditions are required to manage biodiversity impacts.
Aboriginal Cultural Heritage	• The landfill and the compost system would be located within the approved surface development footprint and there would be no material change to the approved impacts on Aboriginal cultural heritage items. • No known Aboriginal heritage sites are located within the proposed chicken enclosure footprint. • Cristal would continue to manage Aboriginal cultural heritage through its Aboriginal Cultural Heritage Management Plan, which would be updated in accordance with existing conditions.	• No additional conditions are required to manage Aboriginal cultural heritage impacts.

6. RECOMMENDED CONDITIONS

The Department has drafted a notice of modification for the proposed modification (see Appendix A) as well as a consolidated version of the development consent as modified (see Appendix B).

The Department has recommended changes to the conditions requiring:

- an update to the Site Water Management Plan to include:
  - contingency plans to deal with leachate seepage;
  - monitoring of the pumped leachate volumes; and
  - monitoring of holding dam water levels;
- design, construction and operation of the landfill to be consistent with the EPA guideline document *Draft Environmental Guidelines: Solid Waste Landfills (EPA, 2015)*;
- the construction of the landfill and holding dam be verified by a suitably qualified engineer prior to commissioning; and

The Department has also recommended a number of minor administrative amendments to the conditions including updates to various definitions to reflect recent changes to government departments.

Cristal has reviewed the recommended conditions and does not object to them.

7. CONCLUSION

The Department has assessed the modification application and supporting information in accordance with the relevant requirements of the EP&A Act.

Based on this assessment, the Department is satisfied that the proposed modification is reasonable and would allow Cristal to manage its waste more efficiently without resulting in any significant change in environmental impacts beyond those associated with the original project. It would also take trucks off the

local road network and reduce reliance on Pooncarie landfill, which has very little capacity remaining capacity.

8. RECOMMENDATION

It is recommended that the Director, Resource Assessments, as delegate of the Minister:

- **consider** the findings and recommendations of this report;
- **determine** that the modification is within the scope of Section 75W of the EP&A Act;
- **approve** the application under Section 75W, subject to conditions; and
- **sign** the attached notice of modification (Appendix A).

13/10/15

Raul Freeman
A/Team Leader
Resource Assessments

21.10.15.

Mike Young
Director
Resource Assessments

APPENDIX A: NOTICE OF MODIFICATION

APPENDIX B: CONSOLIDATED DEVELOPMENT CONSENT

APPENDIX C: ENVIRONMENTAL ASSESSMENT

APPENDIX D: SUBMISSIONS AND RESPONSE TO SUBMISSIONS