HERMOSA
TAILINGS FACILITY RISK

Risk Assessment Findings (GISTM Requirement 15.1 B3)

A failure modes and effects analysis (FMEA) was completed for the existing tailings storage facility (TSF) and Tailings Storage Facility 1 (TSF1), a proposed expansion to the existing TSF. To inform the FMEA and consequence classification assessment, a semi-quantitative risk assessment (SQRA) and a probabilistic analysis approach was undertaken for the existing TSF.

Based on the FMEA results, dam breach analysis (DBA) was performed to quantify downstream impacts. Credible failure modes assessed for the DBA include:

- Overtopping;
- Instability of stacked tailings under seismic or static loading;
- Dynamic (seismic) or static liquefaction (localized resulting in slope failure); and
- Base displacement.

The existing TSF and TSF1 were assessed for the probability of failure against each of these failure modes. The FMEA workshops were conducted with a range of experts from the environmental, social and cultural, risk and compliance, health, safety, and security, engineering, and operational fields.

Credible Flow Failure Risk Assessment Outcomes (GISTM Requirement 15.1 B4)

Dam breach assessments for the existing TSF and TSF1 were conducted for the following scenarios in line with international practice:

- Existing TSF: A flood induced failure where water transfer from the TSF to the external Underdrain Collection Pond (UDCP) is not functioning and stormwater runoff fills the West Internal Detention Pond (WIDP) and overtops the TSF Perimeter Road (embankment) causing erosion of the embankment and subsequent release of the detained stormwater downstream.
- TSF1: A fair weather and flood induced failure where water transfer from the TSF to the external UDCP is not functioning and stormwater runoff fills the WIDP from an extreme storm event or multiple storm events. A subsequent TSF dry stack slope failure (slump) displaces the stormwater in the WIDP resulting in the stormwater overtopping the TSF Perimeter Road (embankment) thereby, causing a flood wave to propagate downstream.
- TSF1: A slope failure of the dry stack.

Table 1 summarises the impact assessments and environmental and human exposure and vulnerability to tailings facility credible flow failure scenarios for each the existing TSF and TSF1 (expansion to the existing TSF).

TSF	Credible Flow Failure Scenario	Assessment Outcomes	Environmental and Human Exposure
Existing TSF	Overtopping of the TSF Perimeter Road (embankment) causing a release of stormwater from the WIDP due to: • The TSF1 piped outfall, that transfers solutions from the TSF1 to the external UDCP is not functioning; and • An extreme storm event (1,000-yr/24-hr) fills the WIDP and then overtops the TSF Perimeter Road (embankment) until failure.	Inundation mapping shows that the flood wave does not result in incremental impacts to downstream infrastructure considering the breach was simulated concurrently with a 1,000-yr/24-hr storm event.	Stormwater runoff released from the WIDP is expected to result in erosion and have low likelihood of health effects.
TSF1 Expansion (expansion to the Existing TSF)	Displacement of water detained within the WIDP due to: • The TSF piped outfall, that transfers solutions from the TSF to the external UDCP is not functioning; • An extreme storm event or multiple storm events fill the WIDP with stormwater runoff (the stormwater is not removed via contingency pumping); and • There is a TSF dry stack slope failure (slump) at the WIDP location which displaces the water and results in an overtopping of the TSF Perimeter Road causing a flood wave to propagate downstream.	Inundation mapping shows that the flood wave does not cause incremental impacts to downstream infrastructure under the fair weather scenario or the as well as flood induced scenario (prorated regional 72-hour probable maximum precipitation event).	Stormwater runoff released from the WIDP is expected to result in erosion and have low likelihood of health effects.
TSF1 Expansion (expansion to the Existing TSF)	A slope failure (slump) of the dry stack due to instability of the stacked tailings (under seismic or static loading conditions) or liquefaction (dynamic or static) resulting in a	Slope failure runout analysis shows that the slump does not result in incremental impacts to	A subsequent precipitation event could cause filtered tailings to be transported to the natural drainages via stormwater runoff.

TSF	Credible Flow Failure Scenario	Assessment Outcomes	Environmental and Human Exposure
	localized slope failure.	downstream infrastructure.	No significant loss or deterioration of habitat is expected and low likelihood of health effects.

Table 1: Credible Flow Failure Risk Assessment Outcomes (Existing TSF and TSF1)