



## **WHAT ARE TAILINGS STORAGE FACILITIES?**

Tailings Storage Facilities (TSF's) are purposely designed, engineered and constructed structures to permanently store tailings.

The primary purpose of a TSF is to safely contain tailings by allowing the sands to settle, consolidate and dewater. The water is recycled back to the processing plant for reuse. Because the water contains traces of chemicals, it is held captive within the plant/TSF circuit and is not released from site. With the tailings sands and water contained, there is no discernible impact to the surrounding environment.

The TSF at Ballarat Gold Mine is a compacted clay lined dam to prevent tailings and water from escaping into the groundwater.

The nature of TSF design and operation is fundamentally different from a water collection dam. TSF's are designed not to collect runoff and to remain as dry as possible. TSF's are not intended for the storage of water. Water recovered from the TSF is stored within the Process Water Tank which is positioned between the plant and the TSF. The Process Water Tank provides a water storage buffer ahead of the plant.

At the end of the TSF's usable life the dry tailings will be covered with clay, rock and topsoil and revegetated to blend in with the surrounding landscape.



***Ballarat Gold Mine is proud to adopt industry best practice and continual improvement in tailings management.***

### **1. Tailings Storage Facility**

#### **TAILINGS WATER**

Water from within the tailings slurry gradually drains as the tailings sands compact and consolidate. This water either ponds on the top of the dam or permeates to the bottom to be removed through a network of pipes.

In either case, the resultant water is pumped back to the processing plant for reuse – hence a 'closed system' whereby no tailings or water escapes.



## ELEMENTS OF A TAILINGS STORAGE FACILITY

1. TSF embankment
2. Tailings pipeline from processing plant to TSF
3. Tailings slurry discharged from a pipe on embankment
4. Internal drains to collect water which permeates to the bottom
5. Well collects water from internal drains and pumps back into TSF
6. Water in TSF pumped back to process plant for recycling
7. Stormwater diversion drain
8. TSF liner
9. One of several groundwater monitoring wells
10. Stockpiled topsoil for later use in rehabilitation
11. Process water tank
12. Constructed wetlands

## **TERRIBLE GULLY TSF**

Ballarat Gold Mine currently operates the Terrible Gully TSF as its sole tailings storage facility. The TSF is a gully infill design located immediately south of the mine and to the east of the Central Highlands Water Ballarat Sewage Treatment Plant.

The Terrible Gully TSF originally consisted of two separate cells which have recently been combined into a single cell operation with a total embankment length of approximately 1,100 m and a total storage capacity of approximately 2M m<sup>3</sup>.

At the maximum tailings height of 441mRL (above sea level), the TSF is designed to not only store the required tailings inventory, but also have sufficient freeboard to contain the stormwater from a 1:100,000 year Annual Exceedance Probability (AEP) 72-hour storm event and still have a minimum 0.6 m of freeboard left over.

Key to this is a stormwater diversion drain around the perimeter to divert surface water flows from storm events away from and around the TSF into a purpose built wetland. (It is important to note that the stormwater only becomes 'contaminated' if it mixes with the contents of the TSF). The TSF also has an emergency spillway sized with capacity for a Probable Maximum Flood (PMF) event.

The TSF design features a compacted 600 mm clay base liner at 10<sup>-8</sup> m/sec permeability and internal drainage to collect and recycle permeate water from against the liner to minimise any risk of seepage losses.

## **PROPOSED**

### **WHITEHORSE GULLY TSF**

It is anticipated that the Terrible Gully TSF will be full in 2022 and Ballarat Gold Mine is currently looking at the adjoining Whitehorse Gully for a new tailings dam.

The concept design is for a facility about the same size and with similar construction methods as the existing facility.

Ballarat Gold Mine is currently undertaking site investigations, environmental assessments and preparing engineering designs for this proposal. Ballarat Gold Mine will undertake community engagement regarding this project with the various stakeholders including our neighbours.

## WHAT GUIDELINES ARE FOLLOWED FOR BUILDING A LARGE TAILINGS STORAGE FACILITY?

The Ballarat Gold Mine tailings storage facilities meet the definition of a 'dam' as described under the Water Act 1989.

Ballarat Gold Mine is required to follow the Earth Resources Regulation (ERR) [Guideline for the Design and Management of Tailings Storage Facilities](#) to ensure that the management of its Tailings Storage Facilities and associated tailings and slimes from the mine is undertaken in a manner that is safe and protects the environment.

The guideline provides us with relevant information and requirements for preparing a mining work plan under section 40 of the [Mineral Resources \(Sustainable Development\) Act 1990 \(MRSDA\)](#).

The guideline seeks to ensure that a TSF throughout its operational life and after closure is:

- designed, constructed, operated, monitored and closed in accordance with the Australian National Committee on Large Dams' [Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure](#) (ANCOLD 2012a), other ANCOLD guidelines and State Environment Protection Policies (SEPPs) where relevant;
- safe and structurally stable;
- managed to minimise impact on public safety, public infrastructure and the environment; and
- rehabilitated to minimise social impact, adverse visual amenity and long-term risks to the environment.

The Australian National Committee on Large Dams Incorporated (ANCOLD Inc.) is an incorporated voluntary association of organisations and individual professionals with an interest in dams in Australia. ANCOLD's mission is to be the industry body, representing its Members and Associates, disseminating knowledge, developing capability and providing guidance in achieving excellence for all aspects of dam engineering, management and associated issues.

***The management of the tailings, both during and after mining, is the responsibility of Ballarat Gold Mine and is subject to advanced regulatory regimes. This means that our tailings management needs to be effective throughout the life of the operation, from initial feasibility through to closure and post-closure.***