PRIMARY GOLD

Dewatering Plan

Toms Gully Open Pit, 2014

EXECUTIVE SUMMARY

The Toms Gully open pit currently contains 2.5 gigalitres (Gl) of water while the underground workings contain 0.14 Gl of water for a total of approximately 2.64 Gl. The source of this water is predominantly groundwater of stock water quality with a contribution from surface run-off and overflow pumped from other surface water catchments.

The following dewatering scenarios have been planned and considered:

1. Treatment and discharge,
2. Assisted evaporation using fans,
3. Pumping to alternate water storages,
4. Pumping to alternate water storages in combination with assisted evaporation, and
5. Pumping to alternate water storages, assisted evaporation and treatment and discharge.

The dewatering scenarios 3 and 5 are favoured but the strategy implemented will largely depend on the site water balance at the start of dewatering.

Scenario 3 is most favoured for the following reasons:

1. Lowest risk as it does not rely on favourable/specific weather conditions/events,
2. The capital investment creates a significant asset for the Company,
3. Provides additional water storage capacity, including replacing the existing pit as storage of 'last resort',
4. The higher cost and risk of the alternatives is a disincentive to the investment community, and
5. Shortest time to dewater hence reduced timeframe to bring Toms Gully back into production.

Scenario 5 is favoured second for the following reasons:

1. Provides site infrastructure for managing water without using the pit as a storage of last resort,
2. High flexibility as it is able to manage higher influxes of water particularly in the wet season,
3. Gives the ability to reduce site water volume all year,
4. Provides a short dewatering timeframe that can be implemented during the wet season.

This scenario (5) is, however, a high capital investment and requires the implementation of the current draft WDL.

In order to achieve a total storage capacity required for the above scenarios, Primary proposes to construct a small lift on the existing evaporation ponds (located to the west of the open pit) and to construct a new process water dam to the south of old tailings.

The two existing evaporation ponds to the west of the open pit have a combined maximum capacity of approx. 0.7 Gl of water, with a combined surface area of 95,000 m^2. The external northern dam wall is planned to be lifted 3 metres, for a total height of approximately 8 meters, being the same height as the internal dam wall. Capacity following construction rises up to 0.9 Gl.

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

Primary also proposes to construct a new process water dam utilising a natural valley located to the south of the 'old tails' dam.

Attributes of the new dam include:

- Earth-fill dam requiring approximately 160,000m^3 of oxide material for construction,
- Wall height of 17m giving storage capacity of approx. 2.6Gl,
- Surface area of 360,000m^2, including approximately 26 Ha currently undisturbed,

Preliminary design of this new dam has followed the "Guidelines for the Construction of Earth-Fill Dams, Water Resources Policy, Policy #2008/1, November 2008, Department of Primary Industries and Water, Tasmania". However, final design will be completed and construction overseen by independent, qualified and experienced dam engineers following all necessary guidelines for large dams.

Construction time is estimated at 12 weeks and it is envisaged all studies and construction will be completed in order to commence pumping in the first half of 2014, with pumping conducted over a two month period during the dry season. Timing, however, is ultimately contingent on successful completion of the project finance solution by the Company.

Pumping will utilise pontoon mounted, diesel/electric pumps of up to 1,000 litres per second capacity. Pumped water will be reticulated to the evaporation ponds and new dam using 450mm PN16 HDPE pipeline.

Scenario 5 will require the purchase or hire of banks of evaporation fans and a small water treatment plant. In this scenario fans would be installed over the evaporation ponds during the dam construction period in order to reduce the site water balance i.e. the evaporation ponds would be the initial receptors for the pit water while the new process water dam was being built. The water treatment plant would be purchased and commissioned prior to the wet season if required and would be supplementary to the water storage and evaporation systems. Water would be discharged as per the WDL requirements.

The new dam will remain operational for the life of mining, and its management is addressed in the Water Management Plan. Closure planning is likely to include revegetation of valley, and opening of the dam wall to allow natural flows to resume, however, specific activities will be addressed further in the Closure Plan currently being prepared.

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

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Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

1 TOMS GULLY EXISTING SITUATION

The current situation at Toms Gully can be summarised as follows:

- It is estimated that the Toms Gully open pit contains a minimum of 2.5 Gl of water.
- In addition, it is estimated that underground development contains minimum 0.14 Gl of water.
- Therefore dewatering of Toms Gully will require minimum pumping of approx. 2.64 Gl of water from the underground works and the open pit (not including groundwater drawdown).
- The two existing evaporation ponds on the west side of the open pit have a combined capacity of approx. 0.7 Gl and combined surface areas of 95,000 m^2. Net evaporation, from these evaporation ponds is approx. 0.137 Gl pa**.**
- An annual positive water balance has been estimated by Coffey at approximately 800 Ml.

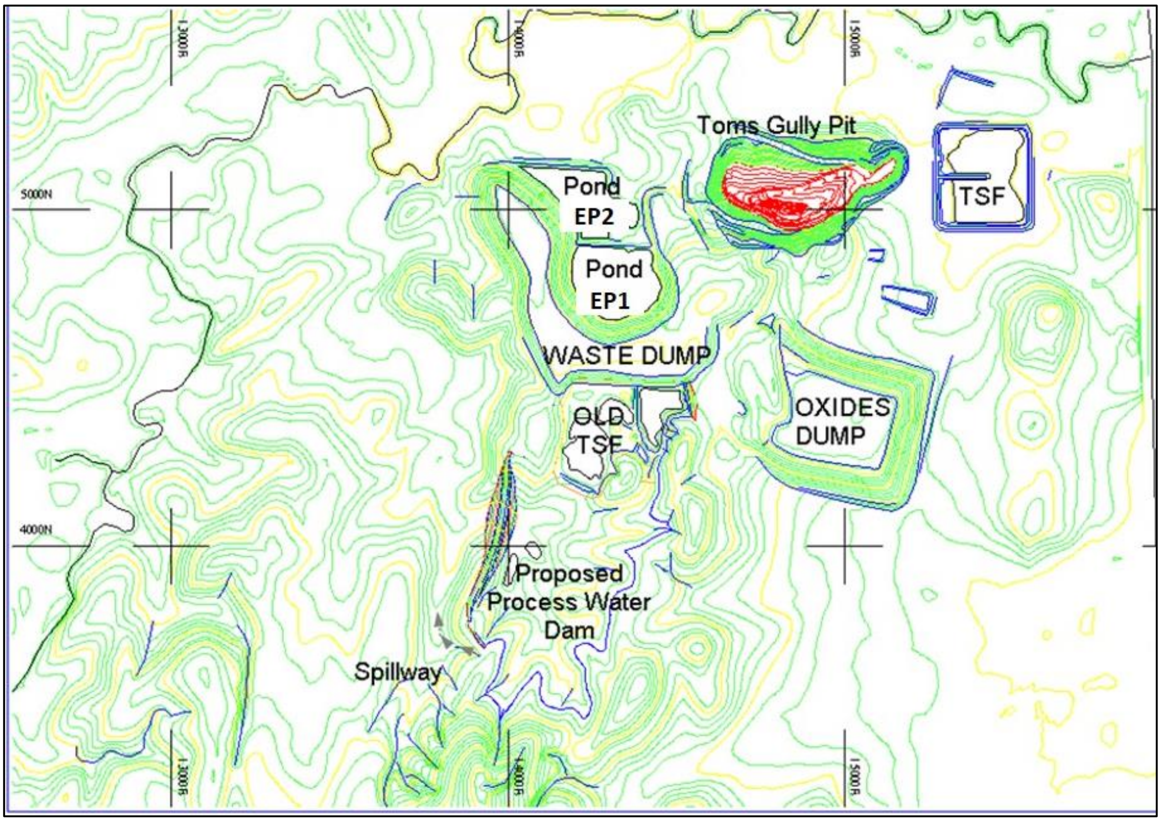

Figure 1.1 Toms Gully – Proposed Process Water Dam Location

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

2 SITE CLIMATE CONDITIONS AND WATER BALANCE MODEL

The climate of the Darwin–Katherine region is broadly classified as tropical monsoonal. Two distinct seasons can be identified, with two transitional periods between them. The dry season occurs from May to September. The hot, 'dry-wet' transition period from October to November has high humidity. The wet season occurs from December to March. The hot, 'wet-dry' transition period of April has variable winds, though dominantly westerly.

Virtually all rainfall occurs in the wet season and rainfall intensities are high, being typical of the wetter portions of the north western regions of Australia.

The Gulf of Carpentaria averages two cyclones a year, while the Arafura and Timor Seas average one a year. Cyclones in the Gulf of Carpentaria move very erratically, whereas those in the Arafura and Timor Seas tend to follow more regular tracks to the southwest. Over half the cyclones generated in the northern region of Australia move either southwest or southeast into adjoining regions. Therefore the Tom's Gully project area is an area where cyclone activity is probable. (PG TGPA Water Management Plan 2013-2014).

The water balance modelling was undertaken by Coffey Environment utilising data from previous Toms Gully water models and updated site information.

The water balance is based on the mine being in operation including the dewatering the mine. The water balance includes:

- The New Process Water Dam
- The small Process Water Pond next to the mill
- Evaporation Pond wall raise
- Processing requirements

Provisions in the water balance model have been made for both enhanced evaporation and water treatment and discharge.

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

3 INCREASED WATER STORAGE

3.1 New Process Water Dam

Note: The following section outlines in-house, preliminary design which have followed the "Guidelines for the Construction of Earth-Fill Dams, Water Resources Policy, Policy #2008/1, November 2008, Department of Primary Industries and Water, Tasmania". However, final design will be completed and construction overseen by independent, qualified and experienced dam engineers following all necessary guidelines for large dams.

Construction of a new Process Water Dam is proposed to the south of the existing waste dump. The location is selected due to its proximity to the Toms Gully Pit and favourable topography. It will also allow containment of the tailings from the Old TSF, where significant erosion of the containment walls has been observed.

Preliminary designs have the lowest point of the new dam at approx. 1,030 mRL, in a creek at approx. coordinates 13,940E and 4,100N and maximum wall height of 17 meters i.e. top of the wall at 1,047 mRL.

The wall will be approximately 525m long, 85m wide at the base and 6m wide on top (to permit light vehicles and service vehicles access along the crest of the dam wall and require approx. 140,000m^3 for construction. Oxide material required for construction will be sourced from the oxide waste dump which has a volume of approximately 3.1 million cubic meters.

A small wall, shown in red below, will be required on the North East corner of the new dam. The corner wall needs to be raised to 1,047mRL. This wall will be 125m long, approx. 7m high at the deepest point, 6m wide at the top, and requires approx. 4,300 m^3 of material for construction.

The maximum water level will be at approx. 1,046.5 mRL which requires construction of a new spillway on the south east side of the reservoir, approximate location at 13,910mE and 3,720mN. The spillway will be constructed at 0.5m below the western wall height to ensure the maximum dam capacity can be safely maintained. The spillway wall requires 590m^3 of material for construction. The wall length of 52m, height up to 1.5m and width on top of 5 - 6m will allow travel on the crest both during and after construction.

The proposed new dam will have storage capacity of approximately 2.8Gl to 1046.5m allowing for 0.5m free board. Freeboard is the vertical distance from the top of the embankment to the level of the spillway and needs to take into account potential wave action. As a rule of thumb the wave height can be calculated by Hawksley's formula [H = 0.0138(F)0.5], where H is the wave height in metres and F is the fetch distance over the longest exposed water surface expressed in metres. For the new Process Water Dam, the fetch distance is 500m and the wave height is approx. 0.3m.

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Phone +61 8 9488 8874
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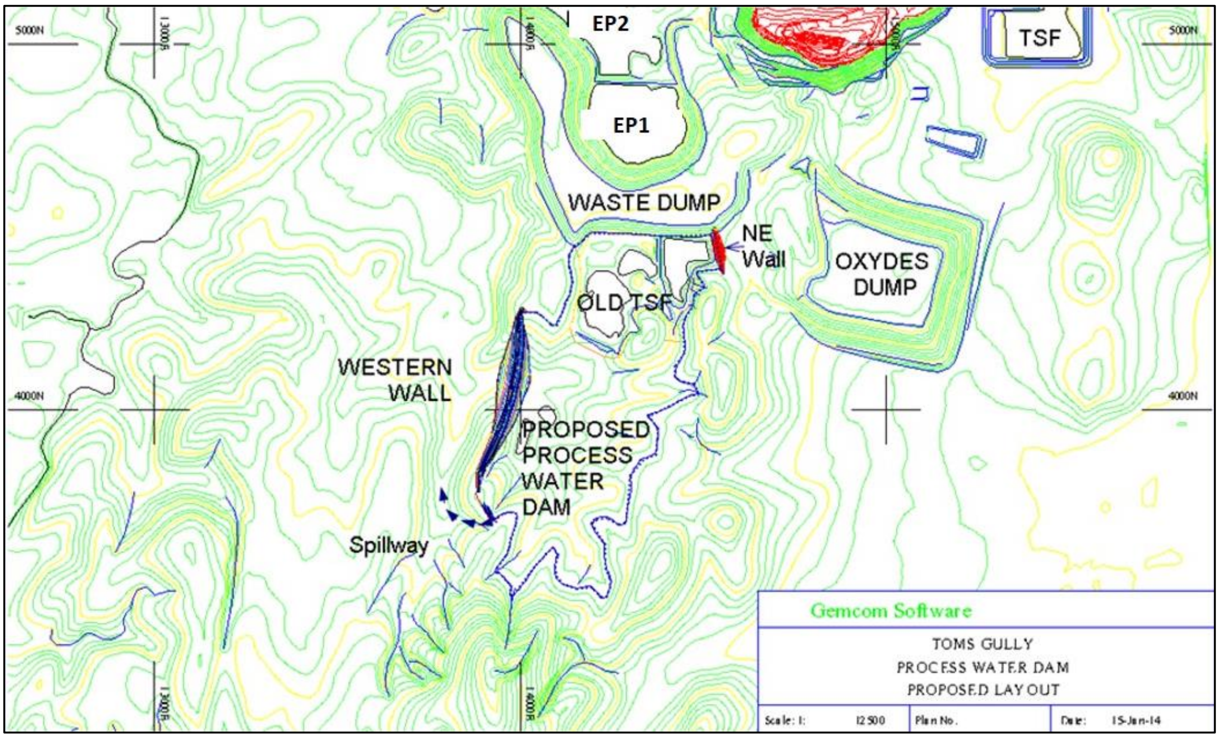

Figure 3.1 Layout of the proposed dam

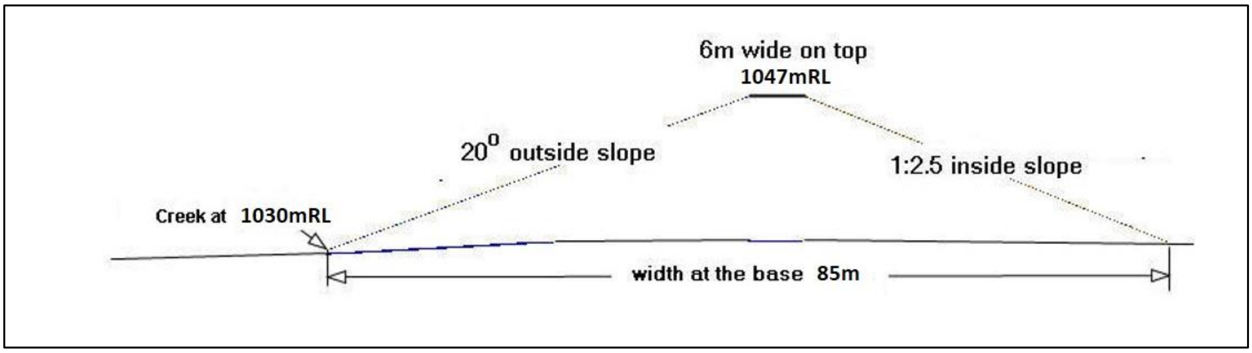

Figure 3.2 Indicative Vertical section through Western Process Water Dam Wall

3.2 Evaporation Ponds Raise

Note: The following section outlines in-house, preliminary design which have followed the "Guidelines for the Construction of Earth-Fill Dams, Water Resources Policy, Policy #2008/1, November 2008, Department of Primary Industries and Water, Tasmania". However, final design will be completed and construction overseen by independent, qualified and experienced dam engineers following all necessary guidelines for large dams.

To further increase the water storage and surge capacity of the site it is intended to increase the capacity of the evaporation ponds which is currently estimated at approximately 0.7Gl. Preliminary designs have been completed in order to ascertain construction quantities and capacity gains for various lift height scenarios,

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

which show the potential to increase effective capacity towards 0.9Gl by lifting the earth-wall dam a further 53m (i.e. 8m total height).

This will allow for an increased volume to be pumped from the pit while the New Process Water Dam is being constructed. The evaporation ponds will also be the site for the evaporation fans.

The existing outer dam wall of EP2 is of high quality construction with no seepage currently observed and it is proposed to raise the height of this wall by 3 metres. This approach allows use of the existing dam wall already well keyed into the ground as the base of the wall. This also ensures that both ponds can be operated at the same level to provide maximum utilisation of the evaporation ponds.

Preliminary designs are based on the use of compacted clay material to construct the upgraded wall. The base of the wall will be expanded on both, the upstream and downstream, sides from the existing wall. The existing ground surface will be stripped of top soil before constructing the wall.

The upgraded wall will have dimensions of approximately 8 metres in height, be approximately 500m long and 6m wide on top to permit light vehicles and service vehicles access along the crest of the dam wall. The maximum width at the base of the new wall will be approximately 44.5m. To achieve this, a new collector drain will be constructed approximately 3m from the wall.

A spillway will be constructed on the east side of the wall in a location which will ensure that the evaporation ponds be safely operated and any spilled water will be safely diverted into the existing creeks, preventing erosion of the embankment wall and avoiding the open pit or other infrastructure.

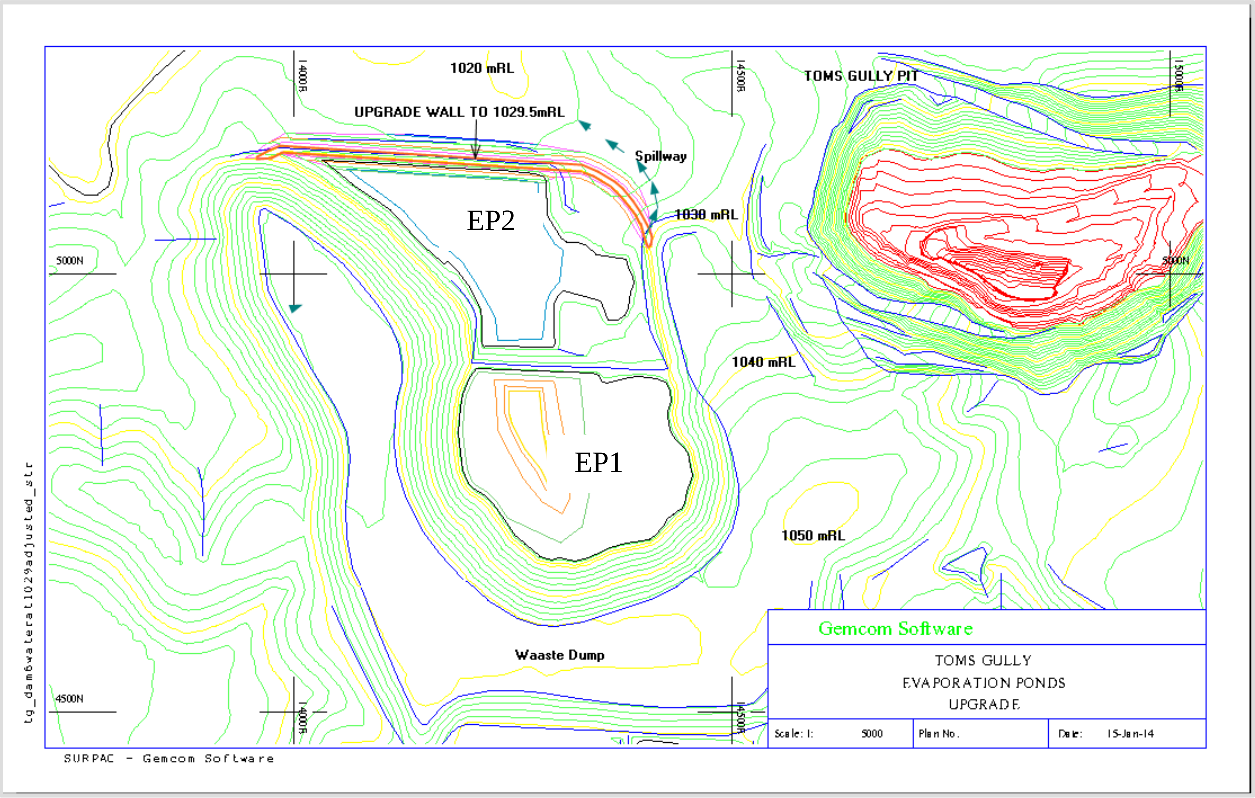

Fig 3.3 Evaporation Ponds Wall Upgrade - Layout

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Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
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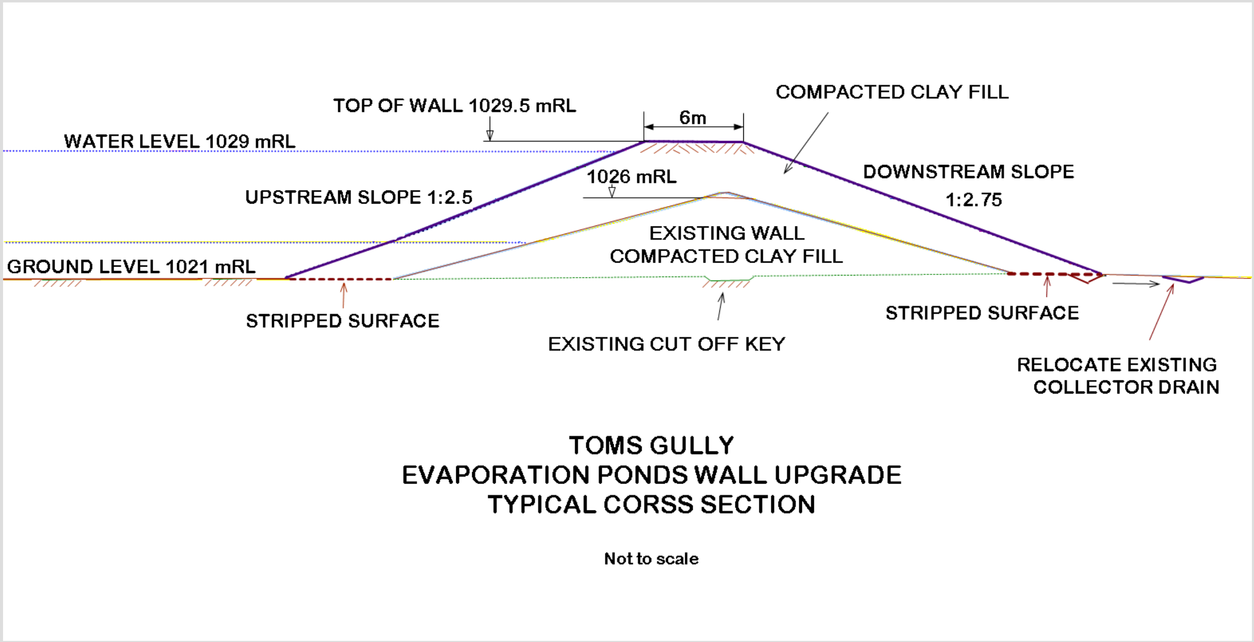

Fig 3.4 Evaporation Ponds Wall Upgrade - Typical Cross Section

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

4 WALL CONSTRUCTION METHODOLOGY

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The following information has been considered for the design requirements:

- A number of test pits may need to be excavated at the location of the proposed Western Wall and soil tests carried out to investigate the foundations of the dam and ensure they are sufficient for the embankment size.
- An important aspect of the embankment design is the construction of the keyway or cut-off. The total height of the keyway should be 1 - 1½ times the height of the dam wall. The keyway is designed to minimise seepage under the embankment and increase the stability of the dam. As a minimum it will be excavated 600 mm down into impervious soil and rock and backfilled with the appropriate quality compacted clay. It will extend for the length of the embankment including the hillside flanks, but does not need to be extended under the spillway where the spillway is cut into rock.

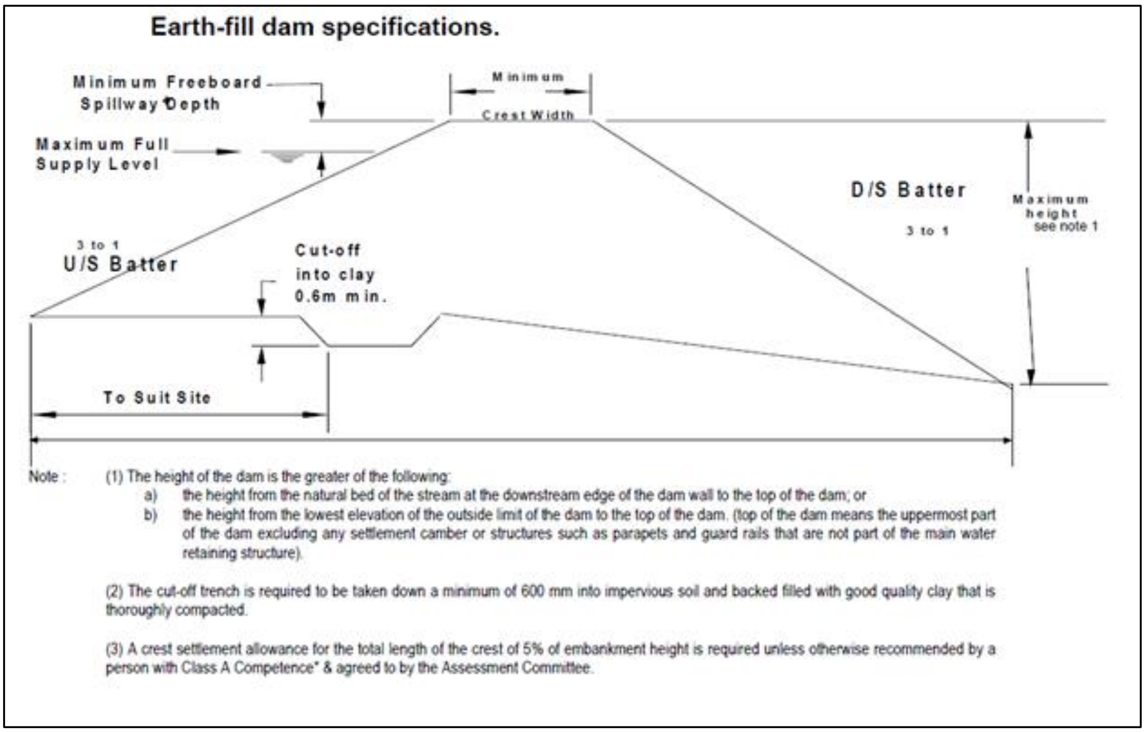

Figure 4.1 Earth-fill Dam Specifications

- If rock is encountered under the embankment, appropriate measures should be taken to cut off seepage along the rock/soil contact and to prevent seepage in the rock joints coming into contact with the embankment soil.

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

- An outlet pipe will be installed in the base of the dam wall. The pipe will be minimum Class 9 rating. The pipe will be installed in a separate trench before work on the embankment commences.
- Leaks in earth-filled dams that lead to dam failures are often the result of inadequate compaction levels. Therefore it is important that effective compaction is achieved. This can be undertaken by applying the required compaction effort to high clay content materials. The fill material will be installed in layers no more than 150mm, with maximum size of rocks less than 50mm.

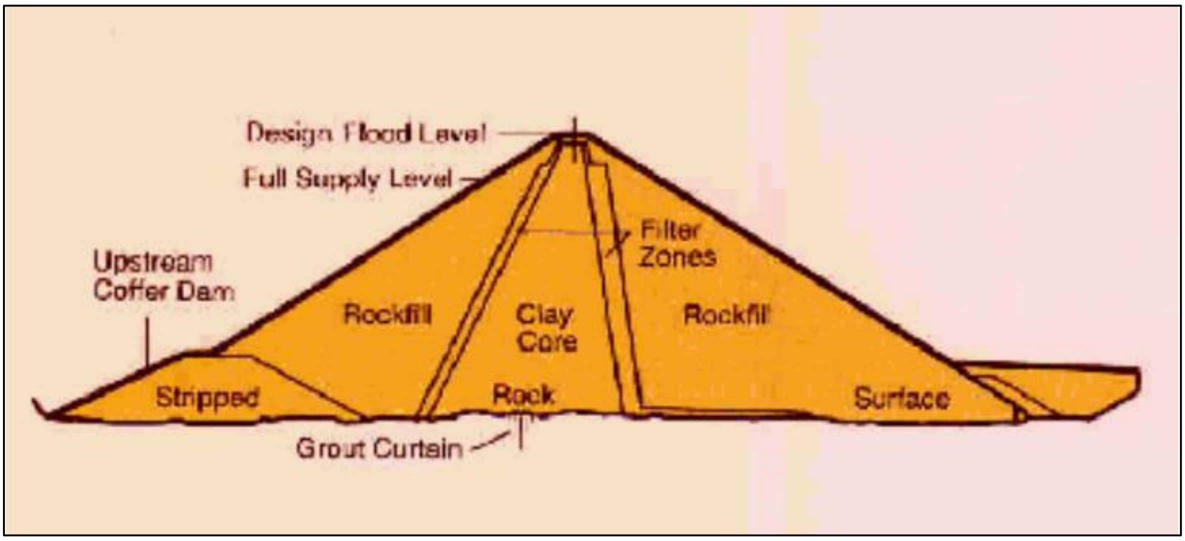

Figure 4.2 Vertical Section through Typical dam wall

- Special care will be taken to ensure that the upstream and downstream batters are well compacted and trimmed to a design slope batter. For Toms Gully, the outside batters designs are at approx. 20 degrees (2.75 horizontal to 1 vertical). This design was adopted to match final rehabilitation requirements for the wall slope. Similarly the inside batters are shallower than recommended at 2.5 horizontal to 1 vertical.
- Settlement of soil banks is common and an allowance will be made for settlement of the dam embankment. The embankment may settle to a level where it is overtopped by water and failure will result. Or, over time, settlement may result in the height of the embankment becoming lower than the spillway. Clay soil can settle in excess of 10% of the dam's height; however a well compacted and constructed clay dam embankment is unlikely to settle more than 5%. An allowance of 5% of the height of the embankment (along its length) to cater for settlement may be necessary.
- The purpose of the spillway is to pass flood flows without overtopping the dam wall. Particular attention will be paid to providing adequate width and depth (or freeboard) of the spillway. The following guidelines apply to spillways:
  - The absolute minimum width of a spillway is three metres.
  - The spillway should be cut in solid material (preferably rock) that will resist erosion.
  - In no circumstances should a spillway be blocked by either logs becoming wedged in the spillway or the spillway being purposely filled in to increase the capacity of the dam.

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

- Freeboard is the vertical distance from the top of the embankment to the level of the spillway. From a dam stability perspective the absolute minimum is 0.50 metres, usually with an additional 0.25 metres to take into account potential wave action. As a rule of thumb the wave height can be calculated by Hawksley's formula [H = 0.0138(F)0.5], where H is the wave height in metres and F is the fetch distance over the longest exposed water surface expressed in metres. For the new Process Water Dam, the fetch distance is 400m and the wave height is approx. 0.3m.
- Once the dam has been constructed, regular maintenance and inspections are required to ensure it remains in a good operating condition.
- The dam should be filled as slowly as possible, preferably not more than 0.3 meters depth per day to let the new embankment adjust to the increasing water loads. The need for caution cannot be overstated because breaching of the dam and the resulting wave of water may cause considerable damage downstream or loss of human life, and it is most likely that the dam owner will be held responsible. It is estimated that 7 weeks of pumping at 12 hours per day at 1,000 litres per second fills the Process Water Dam to full capacity, at average filling rate of 0.3 m/day.

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

5 DEWATERING METHODOLOGY

Primary Gold requires the Toms Gully pit and underground to be dewatered to enable the mine to be rehabilitated prior to site moving into production. The main method of dewatering will be to pump the Pit water to the new process water dam and upgraded evaporation ponds. At these points, the water balance can be managed as required with the assistance of a combination of assisted evaporation and treatment & discharge. The degree of reliance on the above will depend on the relative timing of dewatering activities in relation to the prevailing season.

As discussed in previous sections, Primary is planning to establish a combination of temporary and whole mine life infrastructure that will be installed prior to and during the dewatering.

Temporary infrastructure includes:

- Pumps in the pit and underground depending on the stage of dewatering
- Generators for the pumps
- HDPE water lines

Pumping will utilise pontoon mounted, diesel/electric pumps of up to 1,000 litres per second capacity. Pumped water will be reticulated to the evaporation ponds and new process water dam using 450mm PN16 HDPE pipeline.

Permanent infrastructure includes:

- New Process Water Dam
- Wall raise on Evaporation Ponds (if required)

Primary will construct the New Process Water Dam (NPWD) prior to starting the dewatering from the mine. While the NPWD is being constructed temporary infrastructure will be installed to enable pumping to the evaporation ponds and to the NPWD once construction is finalised.

When the portal has been fully exposed the underground workings will be progressively dewatered using portable pump stations that be regularly moved to follow the water down the decline. The water will be pumped to the surface up the decline and then pumped to the NPWD or Evaporation Ponds.

It is expected that the pit and underground workings can be dewatered within 2 months. This assumes the following:

- 2.64 Gl water to be pumped
- Up to 1000 l/s
- Pumping 24 hrs/day
- Pumping 25 days/mnth

The major assumption for this scenario is that the dewatering occurs in the dry season and that evaporation is greater than precipitation.

Primary Gold Limited ACN 122 726 283
Level 1, 17 Ord Street, West Perth, WA 6005.
Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

Primary also intends to use enhanced evaporation using fans and/or water discharge via a water treatment plant if the site water balance at the time of the mine workings dewatering project requires. Both supplementary methods will require additional infrastructure.

Evaporation fans are available from a variety of vendors and are a well proven mechanical technique to simulate favourable evaporation conditions and accelerates the evaporation process. The equipment enables large volumes of water to be transferred from a liquid to vapour, transferring water back to the atmosphere.

Evaporation fans have been used extensively in Africa, North & South America and significantly, in areas similar terrains and climate in Australia, including:

- Newlands (Glencore Xstrata),
- Isaac Plains (Vale Australia),
- Mt Morgan (Qld Gov.),
- Gove (RIO)
- Claremont (RIO)
- Palmer Nickel (QNI)

The factors that allow evaporation are described below:

Parameters associated with evaporation of aqueous drops in air are ambient air temperature and relative humidity, as well as aspects related to the droplet itself: its size and relative velocity. A water droplet falling through air, or floating in air, is subject to evaporation and will decrease in size. During a relatively short transient time, the droplet cools down due to evaporation, until it reaches its wet-bulb temperature. At the same time, a thin layer of saturated vapour forms around the droplet, and since the temperature of the droplet is lower than that of the ambient air, heat flows towards the droplet and accelerates the evaporation process.

The potential for droplet evaporation or growth is typically assessed through a consideration of cloud microphysics theory. More specifically, a Kohler curve representing two competing factors: the curvature effect which raises the saturation vapour pressure as the droplet gets smaller, and the solute factor which lowers the saturation vapour pressure as the droplet gets smaller. Each Kohler curve represents the variation of equilibrium relative humidity (super saturation) with droplet radius for a fixed mass of solution in water.

For example, consider a droplet with an initial size and mass of solution. An increase in relative humidity would cause the droplet to increase in size, first at sub saturation levels (<100% relative humidity) and then at super saturation levels (conversely, a decrease in relative humidity will result in the droplet shrinking). As the droplet increases in size, the solution becomes weaker and the Kelvin curvature effect becomes the dominant influence (at the high point on the curve – the activation point). Beyond the activation point, lower relative humidity will allow the drop to grow further.

Fans are available in modular banks with the number and configuration adaptable to the specific requirements. It is estimated that evaporation rates of between 10-14 l/s are achievable per fan assuming throughput of 27 l/s with an evaporation rate of up to 50%. Each bank of four fans would therefore be able to evaporate between 40-56 l/s.

Fans will be aligned to optimise the prevailing wind directions of the season ensuring the mist is carried back over the ponds. They will also be installed with automated operating system and weather station to

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Phone +61 8 9488 8874
info@primarygold.com.au www.primarygold.com.au

monitor humidity, wind direction and wind speed etc to ensure that evaporation is optimised, but also so that the system can be automatically shut-down when conditions unsuitable e.g. when the wind direction is not in the preferred direction (back over the water body).

For the water treatment and discharge option, a small water treatment plant would be hired or purchased and use either lime or caustic soda for pH control. This facility could be located at either the NPWD or the Evaporation Ponds.

Treated water would be discharged only during creek flow (ie during the wet season) and be in line with the current draft WDL that is currently with the EPA. This WDL will only be activated if active discharge is required in the future. This is likely to only be required during the wet season once operations have begun to significantly reduce the site water balance after dewatering of the pit and underground is complete.

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