Supplementary Environmental Impact Statement

Toms Gully Underground Project

July 2018

PRIMARY GOLD

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Prepared by:	Justin Robins
Position:	Manager Approvals and Tenure
Signed:	
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Approved by:	Mark Qiu
Position:	Director
Signed:	
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Acronyms

Abbreviation	*Definition*
AAPA	*Aboriginal Areas Protection Authority*
AMD	*Acid and Metalliferous Drainage*
ANCOLD	*Australia National Committee on Large Dams*
ANZECC & ARMCANZ	*Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand*
APR	*Acid Potential Ratio*
CIL	*Carbon in Leach*
CRD	*Concentrate Residual Dam*
NLC	*Northern Land Council*
Draft EIS	*DRAFT Environmental Impact Statement*
DoB	*Department of Business*
DoEE	*Department of Environment and Energy (Commonwealth)*
DoI	*Department of Infrastructure*
DPIF	*Department of Primary Industry and Fisheries*
DPIR	*Department of Primary Industry and Resources*
EIS	*Environmental Impact Statement*
EMP	*Environmental Management Plan*
EPA	*Environmental Protection Authority*
ESCP	*Erosion and Sediment Control Plan*
EPBC Act	*Commonwealth Environment Protection and Biodiversity Conservation Act 1999.*
GL	*Gigalitre*
GSE	*Groundwater Sensitive Ecosystems*
ICMC	*International Cyanide Management Code*
IECA	*International Erosion Control Associations*
MCP	*Mine Closure Plan*
MMP	*Mining Management Plan*
MNES	*Matters of National Environmental Significance (as protected under the EPBC Act)*
MRM	*Mineral Resources Management*
NEPM	*National Environment Protection Measures*
NRETAS	*Natural Resources, Environment and the Arts*
NT	*Northern Territory*
NTPFES	*NT Police, Fire and Emergency Services*
OWRD	*Oxide Waste Rock Dump*

PAF	*Potential Acid Forming*
PGO	*Primary Gold Ltd*
PMP	*Probable Maximum Precipitation*
PMST	*Protected Matters Search Tool*
QA/QC	*Quality assurance and/or quality control*
PWC	*Power and Water Corporation, NT*
ROM	*Run-of-mine storage pad for mixing of ore prior to input into plant*
SEIS	*Supplementary Environmental Impact Statement*
SWRD	*Sulphide Waste Rock Dump*
SSTVs	*Site Specific Trigger Values*
TGU	*Toms Gully Underground Project*
TPWC Act	*Territory Parks and Wildlife Conservation Act 2006*
TSF	*Tailings Storage Facility*
S.M.A.R.T	*Specific, Measurable, Achievable, Relevant and Time-bound*
WA	*Western Australia*
WAD	*Weak Acid Dissociation*
WMP	*Water Management Plan*
WRD	*Waste Rock Dump*

1 Purpose and Context

Primary Gold Limited (PGO) is proposing to re-commence underground mining and on-site processing of gold ore at the Toms Gully Underground Project (the TGU Project). Primary is a Western Australia (WA) based mineral exploration company operating in both WA and the Northern Territory (NT). TGU is located within the Old Mount Bundey Station, approximately 90 km south-east of Darwin, Northern Territory (NT) (Figure 1).

In September 2015, Primary submitted a Draft Environmental Impact Statement (Draft EIS) for the TGU Project to the Northern Territory Environmental Protection Authority (NT EPA) under the *Environmental Assessment Act.* The submitted Draft EIS entered a public and government exhibition period commencing on the 26 September 2015 and finishing on the 6 November 2015. A number of comments were received during this period, and thus the purpose of this document is to supplement the Draft EIS and to address all written submissions. This EIS supplement document includes additional information as well as the results of further site baseline investigations to provide stakeholders with a response to their submissions.

This supplement will undergo review by the Northern Territory Government to establish the adequacy of the measures to manage the environment during project implementation and operations. In combination with the previously reviewed draft Toms Gully Underground Project EIS, these documents form the environmental assessment documentation that will determine the acceptability of the project to proceed.

Submissions on the Draft EIS were received from the following government agencies, statutory bodies, non-government organisations and public during the exhibition period:

Government Departments:

- Northern Territory, Environmental Protection Authority;
- Department of Business (now known as the Department of Trade, Business and Innovation);
- Department of Health;
- Department of Infrastructure (now known as the Department of Infrastructure, Planning and Logistics);
- Department of Land Resource Management (now known as the Department of Environment and Natural Resources);
- Department of Mines and Energy (now known as the Department of Primary Industry and Resources);
- Department of Primary Industries and Fisheries (now known as the Department of Primary Industry and Resources); and
- Department of Lands, Planning and the Environment.

Statutory Body, Corporation or Commission:

- Northern Territory Police, Fire and Emergency Services;
- Power and Water Corporation;
- Tourism NT, and
- Parks and Wildlife Commission Northern Territory (now contained in the Department of Tourism and Culture).

Non-government organisations:

- Amateur Fishermen's Association Northern Territory, and

- Environmental Defenders Office (NT) Inc.

Public Comment:

- Member of the Public (no details given)

It should be noted that the government departments who provided comments during the 2015 exhibition period will be retained under their previous names for the purposes of this EIS supplement document. This is to provide context and ease of reading.

1.1. Structure of the EIS Supplement

The structure of this EIS supplement is set out as follows:

1. Update the project description and design based on feedback through the EIS process and include any additional changes to the proposed activities at TGU;
2. Summarise and respond to each submission on the Draft EIS;
3. Update the risk assessment based on further site investigations and knowledge;
4. Update the commitments table;
5. Provide all additional site investigations, baseline studies and supporting information as appendices;

As per the NT EPA administrative procedures, once this supplement is lodged, and if no further information is required, an assessment report is prepared within 35 calendar days following the supplement's submission. This report forms the basis of the NT EPA's recommendations to the Environment minister.

Additional, TGU surveys and works associated with the supplement have demonstrated that the proposal does not trigger any impacts to Matters of National Environmental Significance (MNES) protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).* Therefore referral of the proposal to the Department of Environment and Energy (DoEE) under assessment under the EPBC Act is not required. Further details of this conclusion are provided in Comment 13.

2 Project Description

The TGU Project has operated as an open cut mine and underground on and off by various operators since the late 1980s. Operations finally ceased in 2010 and the project has been on care and maintenance since. PGO acquired the TGU Project in 2013 and has since been undertaking ore definitions, feasibility studies, and environmental approvals in order to recommence operations.

The recommencement of underground mining and processing at the TGU Project will involve the mining of the existing gold resources of 1.1 million tonnes grading 8.9 g/t for 315,000 ounces of gold over a four year period.

Ore will be crushed and processed via the existing Carbon In Leach (CIL) gold processing plant that will be refurbished and re-used. Tailings produced during operations will report to the existing tailings storage facilities (TSF) 1 and 2. Waste rock generated by the project will report to the base of the existing open cut pit and underground mining voids in a staged approach as sections of the ore body are exhausted. It is also proposed to improved storage of tailings via consolidation of tailings into an upgraded TSF1 and TSF2 (preferred: designated as Option 1) or new tailings storage facilities (contingency: designated as Option 2) that are fit for purpose and are in accordance with ANCOLD 2012 guidelines. A purpose built and base compacted water storage dam (1 G.L) is also proposed for the purposes of improved management of the water balance across the TGU site.

A number of management measures are proposed during operations to reduce the Acid and Metalliferous Drainage (AMD) generation of the TGU Project. This will include the reprocessing of the tailings material in which gold will be recovered; as well as the treatment of the tailings material via a water treatment plant in which mixed metal oxides, sulfur and silica will be recovered and on-sold. This will reduce the volume of AMD tailings and the result in more benign materials. Additionally, water stored within the pit and evaporation ponds will also be treated via the water treatment plant and metal oxides, sulfur and silica will be recovered and on-sold. This will result in improved surface water quality being discharged to Mount Bundey Creek. Therefore the recommencement of operations at the TGU Project will result in a somewhat remediated site with less potential of AMD generation and thus an improved environmental outcome.

It is estimated that the total work force of 104 personnel will be required during operations and will be employed locally where possible. During project implementation and operations economic benefits to the community and government will include business generation, employment, royalty payments, rates and taxes.

Figure 1: TGU Project Location

3 Project Investigations and Amendments

In responding to stakeholder submissions within the Draft EIS process and closing identified knowledge gaps of the TGU Project, additional environmental studies have been completed to date. These include:

- Geochemical Baseline and Site Conceptual Model (Appendix A),
- Site Flood Assessment (Appendix B),
- Groundwater Modelling (Appendix C)
- Two seasonal Flora and Fauna Surveys (Appendix D),
- Aquatic Ecosystem Survey (Appendix E) and
- Assessment of the Site Specific Triggers Values for water quality (Appendix F).

This information shaped the refinements in the proposed design of the TGU project infrastructure that are documented through Sections 3.1 to 3.4. It is intended that these refinements will provide improved certainty and confidence associated with project infrastructure, management strategies and, environmental outcomes of the TGU project.

Section 4 outlines how these proposed changes together with feedback from the Draft EIS process have provided improved environmental management and outcomes for the TGU Project. Section 5 defines how the TGU Project recommencement is aligned to the NT EPA Environmental Factors and Objectives and details how each environmental objective will be met (NT EPA 2018). In order to reflect these project changes and refinements in environmental management, a number of the TGU management plan documents needed to be updated. These are as follows:

- Commitments Summary Table (Appendix G);
- Risk Assessment Framework (Appendix H);
- Acid and Metalliferous Drainage Plan (Appendix I);
- Mine Closure Plan (Appendix J);
- Site Water Balance (Appendix K); and
- Water Management Plan (Appendix L).

The project amendments detailed in this EIS supplement document have been previously submitted for consideration by the NT EPA under clause 14A of the Environmental Assessment Administrative Procedures. As part of this process the NT EPA have accepted the changes and confirmed the changes do not present a significant alteration outside the scope of the original project definition.

3.1. Establishment of a Standalone Water and Tailings Treatment Plant

Water treatment options were discussed in the Draft EIS which included three options – in-pit treatment (adding lime slurry), in-pipe treatment (using caustic to raise pH) or treatment in the processing plant (via lime dosing) Since the submission of the Draft EIS and following additional investigations, PGO have decided on a more definitive water treatment option. One of the driving factors for selecting the water treatment option was the review of the Site Specific Trigger Vales (SSTVs) for the site in conjunction with an investigation of five water treatment options to select the most site suitable (Comment 7 and 10, Section 6).

This process culminated in the Bioaqua Water Treatment Process developed by Global Aquatica being selected as the preferred option. In addition the treatment option has the potential to reprocess the existing and future tailings to remove mixed metal oxides, sulfur and silica thus reducing the acid producing profile. Removal of the various metals and minerals will both reduce the tailings volumes and adverse nature of the tailings. As part of the staged risk based approach Primary will run a field trial of the Bioaqua technology using a pilot plant to refine the process thus tailoring to site specific conditions and to meet SSTVs.

It is intended that the full scale water treatment plant will be designed to have scalability to allow flexibility to treat variations in water volumes due to operation requirements and monsoonal conditions. The location of the water treatment plant is presented in Figure 2.

3.2. Use of existing Tailings Storage Facility 1 and 2 for Containment of Tailings

To enable future management of tailings within the existing site footprint and to reduce disturbance, it is proposed to re-use both TSF1 and TSF2 for the long term disposal of tailings. To achieve this outcome, existing tailings material within both TSF1 and 2 would first be reprocessed using the Bioaqua Process discussed in Section 3.1. During this time both TSF1 and TSF2 would be assessed against the Guidelines on Planning, Design, Construction, Operation and Closure of Tailings Dams (ANCOLD 2012) and remediated to comply with these guidelines (As discussed in Comment 4, Section 6). In addition, and if required, TSF2 would have an embankment lift of 6 metres.

As a contingency measure, if the remediation cannot enable either of the facilities to be upgraded to ANCOLD 2012, then a new purpose built ANCOLD 2012 facility would be constructed. If required, the new facility would be lined to reflect the nature of the tailings material. The proposed location of the new TSF is presented in Figure 2.

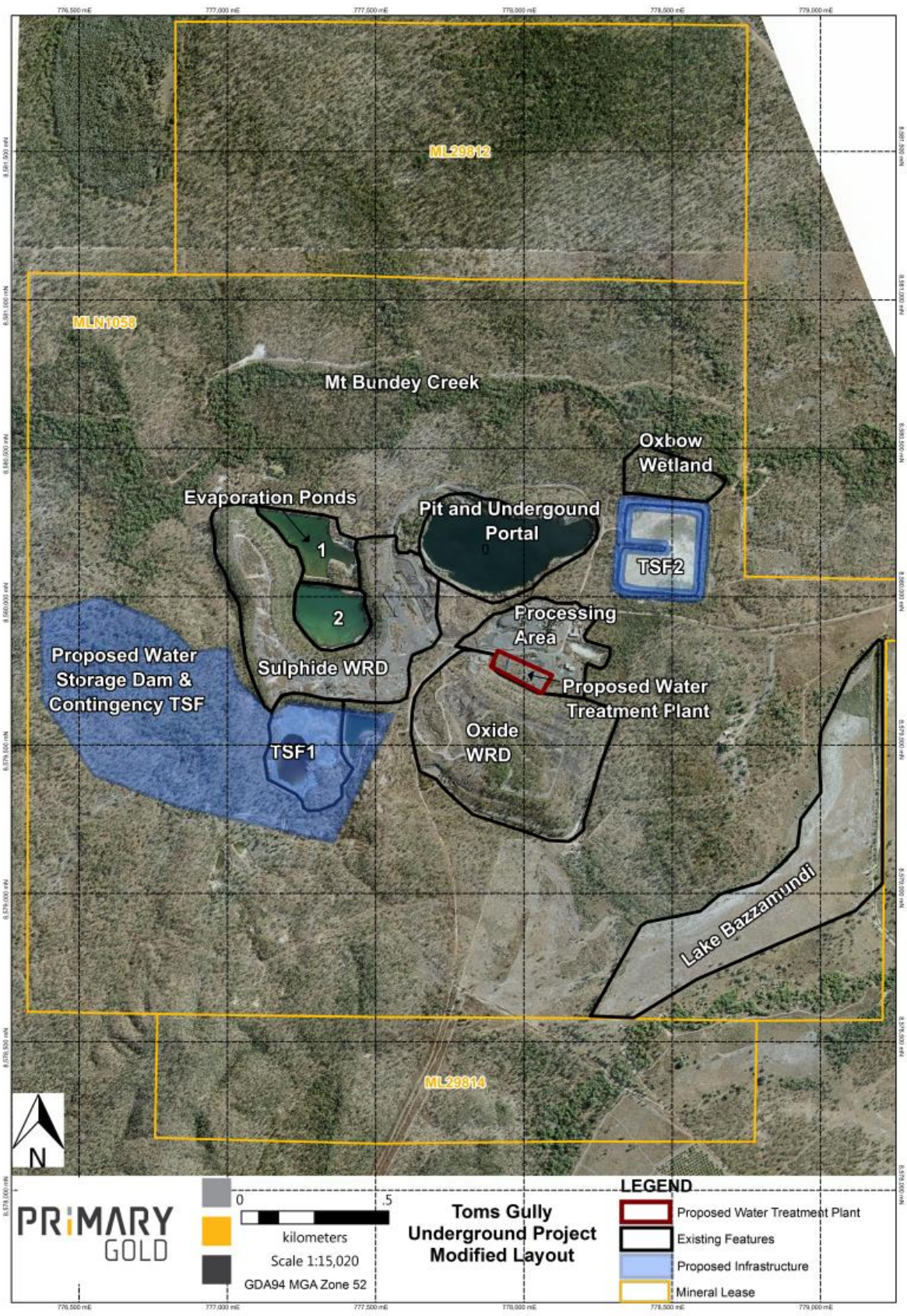

Figure 2: TGU Project Layout 2018

3.3. Replacement of Valley Water Dam (2.1 GL) with Purpose Built Water Storage Dam (1 GL)

In the Draft EIS it was proposed to construct a 2.1 GL water storage dam (WSD) by building an embankment across a small sub-catchment to the west of the Toms Gully site. It is now proposed to reduce the water storage dam to 1 GL and rather than closing off the creek line and associated sub catchment, the dam will be positioned within the same catchment – although away from the creek line. The borrow areas within the original WSD footprint for the construction of the TSF and WSD will remain the same. For the new 1 GL WSD any underlying drill holes are to be grouted and the base compacted to reduce water infiltration. The proposed location of the WSD is presented in Figure 2.

3.4. Amended Disturbance Table

Taking into consideration all of the changes outlined in Sections 3.1 – 3.3, the proposed site disturbances for the TGU Project areas are outlined in Table 3-1. The Draft EIS proposed clearing 93 hectares of vegetation for the purposes of recommencing the TGU Project. However due to further evaluation and changes to project infrastructure, the proposed clearing has reduced to 83 hectares in this EIS Supplement. The total of 83 hectares maybe less if the contingency tailings storage facility is not required.

Some minor discrepancies in disturbance area calculations were noted within the Draft EIS documents. In order to rectify the discrepancies, 2016 LiDAR imagery across the site was used to calculate disturbances associated with the project in comparison to 2013. See Table 3-1 for the most recent and accurate disturbance areas for the TGU Project.

Table 3-1: TGU Project 2018 Disturbance Table

Disturbance Domain	*2013 Disturbance Area Calculation (ha)*	*2018 Disturbance Area (ha)*	*Comments*
Oxide WRD (WRD1)	25	25	Confirmed by 2016 LiDAR imagery.
Sulphide WRD (WRD2)	20	28.5	LiDAR 2016 imagery shows a larger disturbance than previously reported.
TSF1	10	10	Confirmed by 2016 LiDAR imagery.
TSF2	12.25	13.05	2016 LiDAR imagery showed the TSF2 disturbance area as 8.66 ha and the oxbow wetland as 4.39 ha. Therefore the total disturbance for TSF2 is 13.05 ha.
Water Ponds / Dams	13.3	14	Subtracted the process pond (0.7 ha) from the Area of Infrastructure (processing area) and added it to Water Ponds/Dams.
Area of Infrastructure (processing area)	4	9.84	LiDAR 2016 imagery shows a larger area of disturbance than previously reported. Within the

Disturbance Domain	*2013 Disturbance Area Calculation (ha)*	*2018 Disturbance Area (ha)*	*Comments*
			recalculated disturbance area is a number of vegetation pockets
Drill Pads and Sumps	2.25	2.25	Confirmed by 2016 LiDAR imagery.
Tracks / Roads	2	2	Confirmed by 2016 LiDAR imagery.
Pit	-	15	LiDAR 2016 imagery was used to calculate 15 ha.
SUB TOTAL (EXISTING DISTURBANCE)	**88.8**	**119.64**	
Proposed Water Storage Dam	-	16	Proposed to construct a 1GL water storage dam for the storage of treated water and excess water on site.
Proposed contingency TSF (if Option 1 does not work)	-	9	If Option 1 (reprocessing the tailings material and upgrading the existing TSF 1 and 2 to meet ANCOLD 2012 guidelines) cannot be achieved. Then it is proposed to construct a contingency TSF which will contain all tailings and meet 2012 ANCOLD guidelines.
Proposed borrow pits and associated access tracks	-	58	Borrow pit material is required for the construction of the water storage dam embankments and the uplift of TSF2 (and possibly the contingency TSF).
SUB TOTAL (PROPOSED DISTURBANCE)	**-**	***83***	
GRAND TOTAL	***88.8***	***202.64***	

4 Changes to Environmental Measures and Management

Based on the proposed modifications and the relocation of infrastructure since the Draft EIS, the proposed environmental management and mitigation measures outlined in the Draft EIS have been refined and updated. These changes can be summarised as:

- Updated SSTVs for improved water quality management (Appendix F);
- Updated commitments summary compiled and amended to make them S.M.A.R.T (Appendix G);
- Inclusion of a standalone and dedicated water treatment plant to provide an overall water treatment strategy - managing water from across the site including pit dewatering, surface runoff, water within mining structures and operational dewatering. (refer to Section 6, Comment 10);

- The water treatment plant will also treat tailings material once the tailings have been reprocessed (the treatment involves the removal of sulphur, silica and mixed metal oxides which will be on sold). This will result in reduced volume of tailings and more benign tailings. Existing TSFs will hold the re-processed tailings and they will be assessed against ANCOLD guidelines and remediated to these standards where required (refer to Section 6, Comments 4);
- Establishment of additional surface water sampling sites, in particular around Lake Bazzamundi, to increase the surface monitoring network and gain a more comprehensive understanding of upstream and downstream interactions at the TGU site. This has also resulted in a revised and updated Water Management Plan (WMP) (refer to Section 6, Comments 5 and 8). See Appendix L for updated WMP;
- Updating of the legislative matrix to reflect all relevant agencies as detailed in (Comment 16 and 21);
- Commitment to develop and implement an Erosion and Sediment Control Plan for the TGU Project (refer to Comment 24, Section 5);
- A commitment to have a qualified wildlife handler during proposed clearing of the water storage dam area. This will ensure that any fauna species found during clearing will be relocated to undisturbed areas outside of the TGU Project footprint (refer to Section 6, Comment 58);
- Review and refinement of the risk assessment framework for the TGU Project to incorporate cumulative impacts as well as justification and discussion of risk rankings (Section 6, Comments 16). See Appendix H for updated Risk Assessment Framework;
- The Mine Closure Plan (MCP) has been revised and updated using all further baseline investigations to inform appropriate completion criteria for the TGU Project. A rehabilitation monitoring plan has been included as well as an updated closure schedule for each closure domain. See Appendix J for updated MCP;
- The Draft EIS proposed a 2.1 GL valley fill water storage dam which would be formed by building an embankment at a valley opening. This has now been replaced by a smaller, lined 1 GL purpose built water dam. This will result in a greatly reduced catchment disruption and seepage reduction. It also results in the reduction of proposed clearing by about 10 ha.

As detailed above and throughout Section 6; Primary is committed to improved environmental outcomes and ongoing stakeholder engagement during the development and implementation of the TGU Project. This will include ongoing engagement with the land users particularly in the areas of tailings management, water management and closure planning.

5 Alignment of the Toms Gully Underground Project with the NT EPA Environmental Factors and Objectives.

Since the TGU Project's Draft EIS exhibition period was completed, the NT EPA released a guideline for the purposes of undertaking environmental impact assessments as required by the NT *Environmental*

Assessment Act (EA Act). In this guideline, the NT EPA developed environmental factors and objectives to improve certainty and increase transparency within the EIA process (NT EPA 2018). The NT EPA has identified 13 environmental factors categorized under five themes of: Land, Water, Sea, Air and People & Communities. An environmental objective for each factor has been developed which reflects the values of those parts of the environment.

Primary Gold determined that the NT EPA key environmental factors for the TGU Project are as follows:

- Terrestrial flora and fauna
- Terrestrial Environmental Quality
- Aquatic Ecosystems
- Inland Environmental Quality
- Social economic and Cultural Surroundings

In trying to achieve acceptable environmental outcomes that are aligned to the EPA's objectives for each of the above factors Primary Gold has proposed a number of management measures in both the Draft EIS and EIS Supplement to reduce the risks of AMD and associated impacts at the TGU Project. The proposed measures aim to reduce further contamination of surface and groundwater as well as achieve long-term, suitable closure and rehabilitation completion criteria.

Primary Gold has strived to prevent, mitigate and manage the identified risks, particular those related to AMD and water management across the TGU Project. This was achieved by the combination of Primary's existing experience of the TGU site together with reassessing the site infrastructure, risk assessment, mitigation strategies and environmental management.

The proposed measures for the TGU Project to meet NT EPA objectives and achieve an overall improved environmental outcome can be summarised below.

Proposed measures within the TGU Project Draft EIS:

1. A valley fill Water Storage Dam (WSD) was proposed to be constructed with designed usable capacity of 2.1 Gigalitres (GL). The dam would store treated water generated from dewatering of the pit during the dry season. Treated water from the WSD would then be discharged to Mount Bundey Creek during the wet season when there was sufficient dilution capacity available. It was proposed that discharge water quality in Mount Bundey Creek would meet the ANZECC & ARMCANZ (2000a) 80% ecosystem protection guidelines;

2. Tailings to be stored in raised Tailings Storage Facility 2 (TSF2); with a HDPE liner separating old and new tailings for the deposition of 0.9 Mt of tailings. At closure capping of TSF or placement of tailings within the base of the pit;

3. Borrow pits to source clean construction materials; and

4. Use of Oxbow Wetlands as a passive water treatment for runoff from the Oxide Waste Rock Dump (OWRD).

TGU Project EIS Supplement:

1. Replacement of the originally proposed valley Water Storage Dam 2.1 GL with a 1 GL embankment enclosed and lined or compacted Water Storage Dam. The location of the new dam is presented in Figure 2. Produce discharge water quality in Mount Bundey Creek that meets updated Site Specific Trigger Values (Stauber & Batley 2018) which reflect ANZECC & ARMCANZ (2000a) 90% ecosystem protection guidelines and background conditions;

2. Selection of a preferred water treatment option provided by Global Aquatica known as the Bioaqua Process. This results in a dedicated water treatment plant using technology to strip out metals and the use of bacteria to remove sulfates;

3. Additional use of the Bioaqua Process to process both existing and future tailings to extract gold, mixed metal oxides, sulfur and silica. This reduces tailings volumes and creates more benign tailings. The same standalone water treatment plant will be used for tailings processing;

4. Proposal to reprocess tailings from TSF1 and TSF2 with an upgrade of both facilities to ANCOLD 2012 guidelines and lined if the nature of the tailings requires it (Option 1: preferred option);

5. The proposed contingency if Option 1 does not work (i.e. if TSF1 and TSF2 cannot be reused) is to construct a purpose built tailings storage facility in accordance to ANCOLD 2012 guideline. If required, lined to reflect the nature of the tailings material. The location of the proposed TSF is presented in Figure 2; and

6. Reduced vegetation clearing from 93 ha in Draft EIS to 83 ha in EIS Supplement.

The following additional works have been undertaken since the submission of the Draft EIS to provide a more comprehensive understanding of the baseline environment at TGU and therefore informing appropriate risk management and mitigation:

- Baseline investigations of the Acid Mine Drainage (AMD) conditions at TGU. This included drilling of existing waste rock dumps, pitting of the tailings storage facilities and sampling of the evaporation ponds to understand potential AMD sources, source sizes, lag periods, pathways and receptors (GHD 2018);

- Two flora and fauna surveys were completed, one prior to the wet season and one post the wet season to take into account seasonal variations and understand the potential for threatened species to be present across the site and the likely impacts to these species (Low Ecological Services 2017);

- Two aquatic ecosystem surveys were completed to further assess stream ecosystem health (GHD 2018b). These surveys also include camera monitoring for the Merten's Water and Mitchells Water Monitors;

- A LiDAR survey was completed in 2016 to better determine drainage and topography across the site. This survey formed the basis of the updated catchment and surface water assessment that included flood modelling across the TGU site;

- Continued groundwater and surface water sampling to build a larger data set across time - this has also been used to further assess ground water conditions;
- Further work on the groundwater model covering the TGU site to improve the understanding of groundwater flows;
- Investigation of various water treatment options. This included the assessment of five separate options and involved analysing surface water data or completing bench scale test work and then providing water treatment options/proposals. Based on this, one option has been selected which has the potential to treat both surface water and tailings to improve the site water quality while reducing the acid producing load in the tailings;
- A CSIRO assessment of the site specific trigger values for water quality taking into account the declared beneficial uses for the Mt Bundey Creek; and
- Refinement of the site water balance.

All of the above listed work has been used to inform and develop a site specific conceptual site model. This conceptual site model has been used to better understand the risks and impacts associated with the TGU project and resulted in a more informed risk assessment process and outcome.

5.1. NT EPA Environmental Principles

Based on the additional works and the advancement to the EIS Supplement, an assessment of the TGU's proposed activities against the recent NT EPA Factors and Objectives guideline has been undertaken.

The overall objectives of the Northern Territory Environment Protection Authority (NT EPA) are to:

a) promote ecologically sustainable development

b) protect the environment, having regard to the need to enable ecologically sustainable development

c) promote effective waste management and waste minimization strategies

d) enhance community and business confidence in the environmental protection regime of the Territory.

These objectives guide the NT EPA's decision making when fulfilling its functions under the Northern Territory Environment Protection Authority Act (NT EPA) and EA Act.

5.1.1. Ecologically sustainable development

Primary has endeavoured to ensure that the re-commencement of the TGU Project is undertaken in a manner that results in sustainable environmental outcomes. Since taking over the existing TGU Project, Primary has undertaken a number of baseline investigations (aquatic ecosystems, flora and fauna surveys, geochemical assessments, conceptual site models, flood modelling and water quality assessments) to better understand the site conditions and source-pathway-receptor model. These

studies provided a comprehensive understanding of the site characteristics which then led to appropriate risk mitigation measures and environmental management.

For example, the baseline geochemistry studies showed the sources and pathways of acid and metalliferous drainage. Primary could then apply appropriate management measures such as the proposed water treatment plant to ensure that mine dewatering and water storage are within appropriate quality (SSTVs) to discharge to Mt Bundey Creek and thus having a more sustainable outcome for aquatic ecosystems in the creek.

5.1.2. Waste minimisation

Another important objective of the NT EPA is to promote effective waste management and minimisation in the NT; this includes generation of water and its discharge into the environment. Primary has strived to align itself with this waste minimisation objective by:

- The TGU Project will not generate either domestic waste or waste from accommodation facilities;
- Purchasing will consider ways to minimise the generation of waste materials by minimising packaging and making arrangements with suppliers to minimise waste;
- Wastes will be reused or recycled where practicable;
- Sufficient and clearly labelled recycling skips will be provided to facilitate segregation of waste;
- Sufficient bins, skips and waste receptacles will be provided;
- Putrescible / crib wastes will be stored in covered waste receptacles or covered skips at all times;
- Waste storage areas will be kept tidy and adequately maintained;
- Non-hazardous wastes shall be disposed of at the TGU Project landfill in accordance with regulatory requirements;
- Hazardous wastes shall be disposed of at an appropriately licensed facility;
- During past mining operations at the mine site, waste has been disposed of in a Project landfill located within the SWRD. The TGU Project proposes to continue to dispose of non-hazardous waste materials within this landfill;
- The mine site also has an existing septic tank system in place that has been used in the past to treat sewage generated as a result of Project activities. The integrity of the sewage system shall be inspected prior to use and upgraded where required to meet regulatory standards;
- All waste water discharged to Mt Bundey Creek will be within SSTVs;
- To reduce tailings volumes and adverse chemistry at the end of mine life it is proposed to retreat the tailings to remove sulfur, mixed metal oxides and silica; and
- Where possible, waste water will be re-used within the process plant.

5.1.3. Community and business engagement

The NT EPA is committed to engaging with community and businesses to increase public confidence when undertaking environmental impacts assessments. Public participation is key in the EIA process and thus NT EPA decisions are made publicly available throughout the process.

Primary has strived to maintain stakeholder engagement as a key process in their planning and approval strategies. A register of all stakeholders associated with the recommencement of the TGU Project has been compiled and all engagements with stakeholders are recorded in the register to ensure that any expectations can be addressed fittingly. Primary has addressed all comments submitted during the Draft EIS public exhibition period and will continue to engage with stakeholders during all phases of the TGU mine life (Table 5.1)).

Primary's stakeholder engagement strategy going forward is as follows:

Table 5-1: Stakeholder Engagement Strategy

Stakeholder	Engagement Description	Timing
NT EPA	Phone call and follow up email (meeting if required)	(1) Prior to finalizing any significant changes in closure designs or operations at TGU; (2) prior to submitting any revisions/updates of the TGU MMP; or (3) immediately prior to the closure of the TGU Project.
NT DPIR	Phone call and follow up email (meeting if required)	
Northern Land Council/ TOs	Phone call and follow up email (meeting if required)	
Old Mt Bundey Pastoralist	Phone call and email (meeting if required) Primary Gold will obtain agreement from the Pastoralist of infrastructure to be retained for future responsibility of the Pastoralist.	(1) Prior to finalizing any significant changes in closure designs or operations at TGU; (2) prior to submitting any revisions/updates of the TGU MMP; or (3) immediately prior to the closure of the TGU Project.
Other government departments	Phone call and follow up email	Prior to finalizing any significant changes in operations or closure designs or immediately prior to re-commencement or closure of the TGU Project.
Local community and businesses (where relevant)	Phone call and follow up email	Prior to finalizing any significant changes in operations or closure designs or immediately prior to the recommencement and closure of the TGU Project.

5.2. Environmental Factors and Objectives

The NT EPA has developed environmental factors and objectives to improve certainty and increase transparency within the EIA process. The objective for each factor is targeted to ensure the object of the EA Act is achieved.

Primary has set out an approach that shows how the objectives for each of the key environmental factors for the TGU Project can be met. This includes the changes to the Draft EIS through the EIS Supplement and all additional baseline work and investigations which has provided more certainty in regards to the potential impacts of the site. See Table 5-2 for how each objective can be met.

Table 5-2: NT EPA Factors and Objectives for the TGU Project

Theme	EPA Factor	EPA Objective	Existing Site Conditions	Potential Impacts	Proposed Environmental Management Measures (Based on Draft EIS and EIS Supplement)	Predicted Environmental Outcomes
Land	Terrestrial Flora and Fauna	Protect the NT's flora and fauna so that biological diversity and ecological integrity are maintained.	**Flora and Vegetation** • Pine Creek bioregion • No flora species of conservation significance were recorded • Nine introduced species (one of which is a WoNS - Andropogon gayanus, gamba grass) • There are two broad vegetation types occurring within the TGU Project area: a) 4: Open forest, Eucalyptus with grass understorey b) 15: Woodlands, Eucalyptus with grass understorey • 4 surveyed vegetation types at TGU (GHD 2015), most of which have been disturbed **Fauna** • No threatened fauna species listed under the EPBC Act were recorded at Toms Gully (LES 2017) • One Mertens Water Monitor (*Varanus mertensi*), listed as Vulnerable under the TPWC Act was recorded 0.7 km upstream of TGU (GHD 2018) • The fauna survey recorded three species listed as near-threatened under the NT TPWC Act; the orange leaf-nosed bat (*Rhinonicteris aurantia*), the, the bush-stone curlew (*burhinus grallarius*) and the yellow-rumped mannikin (*Lonchura flaviprymna*); • Six introduced fauna species were recorded at the Toms Gully project area during both surveys, these included horse, house mouse, cane toad, pig, cat and cattle.	**Direct Clearing Impacts** • Clearing of a maximum of 83 ha of native vegetation (WSD, TSF and Borrow Pits) • Loss of native vegetation communities • Fragmentation of vertebrate fauna habitat resulting in displacement of fauna • Vehicle strike causing injury or death to native fauna • Increase in pest species impacting native fauna **Indirect Impacts** • Dust generated from mining activities resulting in reduced vegetation health and condition • Spread or introduction of weeds resulting in reduced native vegetation cover and diversity • Modification of surface water flows resulting in loss, or reduced health and condition of native vegetation	**Flora and Fauna** • Reduced clearing footprint of WSD resulting in overall 10 ha reduction from 93 ha to 83 ha • Land disturbance will be kept to the minimum necessary • Land clearing will be undertaken progressively with the amount of active disturbance minimised where possible • Progressive rehabilitation will be undertaken on disturbed areas as they become available • Monitoring will be carried out on an annual basis to assess the success of revegetation in rehabilitated areas • Inductions will provide information on protection of vegetation and ground disturbance authorisation procedures • Vehicles and mining equipment will keep to designated roads • Dust suppression will be carried out during construction and operations when weather conditions dictate • A weed hygiene system will be developed and implemented in consultation with the pastoralist • Weed inspections will be included in the rehabilitation monitoring program **Fauna** Implementation of vehicle speed limits, driving on designated tracks only for mining purposes and drive to road/weather conditions to minimise fauna strike and habitat destruction Large water bodies will have egress mats installed Internal Ground Disturbance Procedures Biodiversity Management Plan	• No flora species of conservation significance will be impacted by clearing • The only areas to be cleared are within the broad scale mapped vegetation Type 4: Eucalyptus with grass understorey (Wilson et al., 1990); which corresponds to the detailed site mapped vegetation type 1a/1 (GHD 2015). This vegetation type extends beyond the TGU Project boundary and is well represented in undisturbed areas. • Progressive rehabilitation will be undertaken • Fauna injury/death due to vehicle strikes may occur but is unlikely to impact native fauna at the population level • Clearing associated with the TGU Project will result in some habitat fragmentation but the impacts on fauna are likely to be incidental due to availability of habitat outside of the project area • The EPA objective for terrestrial flora and fauna can be met

Theme	EPA Factor	EPA Objective	Existing Site Conditions	Potential Impacts	Proposed Environmental Management Measures (Based on Draft EIS and EIS Supplement)	Predicted Environmental Outcomes
					Mine Closure Plan Traffic Management Plan	
	Terrestrial Environmental Quality	Maintain the quality of land and soils so that environmental values are protected.	• Land unit mapping of the area by Fett & Hall (1983) is available at a scale of 1:25,000. The majority of the TGU site is within Land Unit 2b: Rugged terrain associated with siltstones and greywacke of Burrells Creek formation and Upper Proterozoic dolomites and sandstones; slopes >10%; surface stone and outcrop extensive. • Three distinctive soil types have been identified for the area, which are associated with different plant communities (Primary Gold 2013b): • Skeletal and gravelly yellow lithosoils associated with low woodland; • Shallow lithosoils and deep red earths associated with open forests; and • Extensive alluvium (black soils) associated with low open woodland/grassland. • Surface elevation reaches 51 mAHD in the southwest corner of the MLN1058 and falls to 16 mAHD in the low-lying areas • An artificial wetland, Lake Bazzamundi is located in the south west corner of the mine lease, and has been used to store mine water and stock compliant bore water. • Mapping prepared by Natural Resources, Environment, the Arts and Sports (NRETAS) presented in Hill and Edmeades (2008) indicates that the TGU Project area is not considered to be an ASS risk. • Average annual rainfall of 1400 mm	• Clearing of vegetation leading to increased dust and soil erosion • Introduction of new weed species or spread of existing weed infestations due to vehicle and machinery earthwork movements • Hydrocarbon or chemical spills leading to localised soil contamination • Creation of new landforms (WSD and TSF) leading to altered surface water flows • Liberation of leachates from TSF or waste dumps leading to AMD • Ineffective rehabilitation	• See management measures for flora and fauna (above) • Ensure appropriate storage of hydrocarbons and chemicals according to Australian Standards and spill kits contained on site • Weekly inspections of storage areas • Positioning of infrastructure and water diversion structures to prevent inundation and installation of diversion drains or bunds • Ensure resourcing for rehabilitation and closure early on in planning stages • Preferred Option 1: Reprocess tailings and upgrade TSF1 to ANCOLD 2012 guidelines with lining for tailings containment and insitu rehabilitation • Contingency Option 2: if TSF1 cannot be upgraded to ANCOLD guidelines reprocess tailings and place in a new lined TSF and rehabilitate TSF1 footprint and new TSF insitu • Water treatment plant to treat all existing AMD contaminated water on site before being discharged • AMD Management Plan • Mine Closure Plan • TSF Operating Manual • Water Management Plan	• Reprocessing and treatment of existing tailings material which will result in more benign waste landforms improving environmental outcomes relating to waste minimisation and, the quality of discharge and/or seepage • The proposed water treatment plant will result in much less acidic water and thus reducing the risk of AMD contamination to terrestrial features (vegetation, soil etc.) • The EPA objective for terrestrial environmental quality can be met
Water	Aquatic Ecosystems	Protect aquatic ecosystems to maintain the biological diversity of flora and fauna and the ecological functions they perform.	• GHD (2018a) noted that coincident with reduced water quality downstream of the mine site, the relative abundance of in stream macroinvertebrates was lower for sites MBC01, SWTG2, MBC03 and SWTG3 relative to the upstream baseline site SWTG1A and reference sites on Mt Bundey Creek. • Sites MBC01 and MBC03 were rated as impaired, with reduced community composition • The highest number of fish species recorded in the May 2017 sampling event coincided with distance from the	• Discharging mine affected Water to Mt Bundey Creek • Increased salinity and/or acidity in Mt Bundey Creek affecting aquatic ecosystem health • Increased metal concentrations in Mt Bundey Creek affecting aquatic ecosystem health • Poor fish condition, as well as low abundance and diversity due	• Treatment of all mine affected water prior to discharge (quality of water to be aligning to ANZECC 90% protection guidelines and upgraded SSTVs) • Implementation and maintenance of all surface water runoff via bunds and drains to ensure all water is captured and treated before going off site	• The results from the May 2017 (GHD 2018) aquatic sampling indicated that water quality in Mount Bundey Creek is of poorest quality around TSF2. Reprocessing of tailings material and an upgraded facility as well as a water treatment plant is likely to increase the quality of water runoff and discharge into the creek, particularly around TSF2 treat water to upgrade the water quality

Theme	EPA Factor	EPA Objective	Existing Site Conditions	Potential Impacts	Proposed Environmental Management Measures (Based on Draft EIS and EIS Supplement)	Predicted Environmental Outcomes
			mine site, with the downstream site (SWTG3) returning the highest number of fish species (10); slightly more than the baseline site (SWTG1A) (8). This observation supports the water quality data, which shows recovery to near-background conditions at SWTG3. Four species were identified at MBC01, six species at SWTG2 and five at MBC03. • Fish health was also noted to be poor at MBC01, with several Spangled Perch showing signs of Tropical Ulcerative Syndrome (red spot disease); brought on by acidic pH values and subsequently elevated aluminium concentrations. A number of Seven-spot Archerfish were observed swimming sluggishly at the same site • Overall, the water quality and aquatic ecology monitoring data in GHD (2018a) suggests that water quality in Mt Bundey Creek is poorest adjacent to TSF2 and the Wetland Oxbow.	to water quality parameters that are potentially ecotoxic	• Surface water monitoring program and Site Specific Trigger Values (SSTVs) • Reprocessing of tailings which will result in a more benign TSF thus reducing any AMD runoff into the creeks • Water Management Plan (including sampling of creeks and assessing Aquatic ecosystem health) • Biodiversity Management Plan • Water Treatment Plant	• Water to be treated and water quality to meet upgraded Site Specific Trigger Values (SSTV) • The EPA objective for Aquatic ecosystems can be met
	Inland Water Environmental Quality	Maintain the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are protected.	**<u>Surface Water</u>** • At a local level, Toms Gully is within the Mount Bundey Creek catchment, which comprises a series of small ridges and dissected hills that are drained by small, steep rivulets which converge into the creek. • According to the 2018 baseline geochemistry report (GHD 2018), The Evaporation Ponds (EP1 and EP2), the RO Pond, the Old Decant Pond (ODP) and the pit lake (TGM Pit) are all storing acid and metalliferous water with varying compliance against SSTVs. • Downstream sampling locations beyond SWTG2, being SWTG3 and SWTG16 are mostly compliant with SSTVs and consistent with baseline conditions, with the exception of slightly elevated zinc and copper (SWTG3) and EC and copper (SWTG16); suggesting influences beyond that of Tom's Gully on downstream surface water quality (GHD 2018). • Positive site water balance and annual average rainfall of approximately 1400 mm **<u>Groundwater</u>** • Previous work by AGEC (2004) and Rockwater (1994) has identified three broad groundwater systems/hydrogeological units within the project area. They are:	• Increased salinity, acidity and metal concentrations into groundwater and surface water bodies as a result of AMD runoff and / or seepage • Decrease in aquatic ecosystem functioning as a result of poor water quality discharge • Accidental spills (hydrocarbon or chemical) causing contamination of surface water and groundwater • Overall positive site water balance leading to large storage volumes of potentially AMD contaminated water and AMD runoff	• Groundwater and surface water monitoring sampling program and results within upgraded SSTVs • Water treatment plant to extract metals and breakdown sulfates in existing AMD affected surface water (e.g. pit, evaporation ponds, TSF) • WSD footprint and volume to be reduced to 1 GL and lined/compacted and located away from creek lines. • All hydrocarbons and chemical storages and refueling areas will be designed and constructed in accordance with Australian Standards • Weekly inspections of storage and refueling areas will be undertaken • Vehicles and machinery will be regularly maintained and serviced to reduce likelihood of spills and leaks • Spill kits will be present onsite • Tailings material will be reprocessed resulting in more benign materials and TSF will be	• Controls to be implemented by Primary will ensure that any spills are contained and remediated to avoid impacts to surrounding water environment • Surface water management infrastructure will ensure that potentially contaminated waters are contained and treated and discharged appropriately • Improvement in water quality leading to an improved discharge quality providing protection to aquatic ecosystems and inland water environmental quality • Improved water management via re-designed water storage dam, greatly reduced catchment disruption and potential seepage reduction. Remove damming of the catchment that would have an effect on the local hydrological processes. • Improve water quality for either discharge or use by a third party for agricultural or horticultural use. Third party water usage provides economic benefits in the area adjacent to Toms Gully (i.e. social, economic and cultural surroundings). • The environmental objective for inland water environmental quality can be met and the residual impacts are acceptable.

Theme	EPA Factor	EPA Objective	Existing Site Conditions	Potential Impacts	Proposed Environmental Management Measures (Based on Draft EIS and EIS Supplement)	Predicted Environmental Outcomes
			• Upper weathered profile in the Wildman Siltstone and more distance metasediments and igneous rocks, with relatively low permeability; • "Fresh" Wildman Siltstone and other fractured rock aquifers with moderate to high permeability; and • The highly permeable ore body fault zone and the Crabb Fault • Generally, the groundwater at TGU is circumneutral to slightly acidic, with the exception of G8, which had a pH between 3.9 and 5.61. The elevated sulfate (and metals where analysed), but neutral pH in the shallow bores OB10 (-8.76 mAHD), OB11 (3 mAHD) and G1 (9.2 mAHD) suggests there has been impact from oxidised sulfides with neutralisation of acidity. This is likely to be due to seepage from the adjacent evaporation pond EP2 (GHD 2018). • Based on the chemistry of these bores and an area of white staining, suggesting a salt scald around G1, it is possible there is some local shallow discharge to Bundy Creek, 100 m to the northwest of G1. G8 had the highest elevated concentrations of several metals (aluminium, cadmium, cobalt, copper and nickel) in comparison to multiple guidelines as well as the surrounding bores. This suggests groundwater in the area is impacted by the immediately adjacent waste rock dump.		upgraded to be compliant with ANCOLD 2012 guidelines • Adherence to ANZECC 90% and SSTVs • Commitment to WRD investigations to reduce AMD producing facility • Water Management Plan (including groundwater and surface water sampling in line with SSTVs – ANZECC 90%) • Modified the size of bunds where required based on the additional completed baseline surveys/information. Maintain all drains to ensure separation of clean water and mine affected water • Utilisation of Oxbow Wetlands as passive treatment for runoff from OWRD • Annual MMP • As built TSF design report	
People and Communities	Social, Economic and Cultural Surroundings	Protect the rich social, economic, cultural and heritage values of the NT.	• No registered Aboriginal sites or other places of heritage significance at TGU. • Key stakeholders include the pastoralist, native title claimants, and the residents and businesses surrounding Mt Bundey area.	• Land degradation on surrounding pastoral stations due to weeds, dust, erosion or AMD contamination, death of livestock due to mining activities – all causing strained relationship with pastoralist • Relationships with traditional owners strained due to mining activities	• Early ongoing stakeholder engagement with underlying land users • Economic and social impact statement • Adherence to all land access agreements and pastoralist agreements • Weed and dust management measures implemented • Implementation of and adherence to Stakeholder Engagement Strategy (as per MMP and Mine Closure Plan) • Complaints register (to reported in annual MMP)	• No registered Aboriginal sites or other places of heritage significance at TGU. Key stakeholders include the pastoralist, native title claimants, and the residents and businesses surrounding MT Bundey. • The proposed TGU impacts on social surroundings are considered to be minimal. • The EPA objective for social, economic and cultural surrounds can be met

6 Responses to Draft EIS Submissions

The NT EPA examined the Draft EIS for the TGU Project, which was exhibited publicly between Saturday 26th September 2015 and Friday 6th November 2015. On the 18th November 2015, the NT EPA directed Primary Gold to undertake a Supplement to the Draft EIS which required all written comments received to be addressed (Appendix M). Written submissions on the Draft EIS were received from 10 NT Government advisory bodies, 2 non-government organisations (NGOs) and 1 member of the public. This totalled 75 comments overall.

Each of the 75 comments received have been addressed individually in Section 6. The response to comments have been set out in such a way that each comment is tabulated (as per the NT EPA format) and a response is provided below each table. In some cases a single comment has been split up into a number of comments for ease of responding to each section of that comment. Each comment (table) has been allocated a number in order to make referencing of each comment easier. In the case where similar comments were received from various agencies, the reader is directed to the response to that similar comment using the comment number.

A number of the comments received required Primary Gold to undertake further baseline investigations or studies and in some cases update various management plans. All further studies and revised management plans are provided as appendices in the back of the Supplement.

6.1. Northern Territory, Environment Protection Authority

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
1	*Risk Assessment*	*Section 6.1 of the ToR*	*Section 6.1 of the Terms of Reference (ToR) required the Environmental Impact Statement (EIS) to be undertaken in a risk assessment framework, with specific emphasis on the identification, analysis and mitigation of risks through a whole-of-project risk assessment.* *The objective of project specific risk assessment is to ensure that significant risks are identified and evaluated such that appropriate risk treatment can be implemented to mitigate risks. Risk assessment provides a mechanism to demonstrate to stakeholders that the project's environment risks are recognised, and that treatment measures are developed to adequately reduce risks to acceptable levels during the execution of a proposed action.* *The Northern Territory Environment Protection Authority (NT EPA) requires an EIS to be undertaken in a risk assessment framework. The framework as defined by the International Organisation for Standardisation ISO 3100:2009 Risk Management – Principles and Guidelines, is as follows:* *1. Establishment of context* *2. Risk identification* *3. Risk analysis* *4. Risk evaluation* *5. Risk treatment* *6. Monitoring and review* *7. Communication and consultation.* *The draft EIS noted the use of ISO 3100:2009, HB 203:2012 and HB 158:2010. However, the credibility of the output of these processes is contingent on the procedures being used correctly and thoroughly. This involves clearly defined steps from ISO 3100:2009, which start with a statement of the objective/s of a particular analysis, the context of the analysis, definition of the risk criteria to be used, and in semi-*	Risk Assessment Framework (Appendix H)

			quantitative/quantitative analyses, use of likelihood and consequence to provide ratings of the risk to attainment of the particular objective/s. All steps must be included to provide a rigorous outcome. *The NT EPA identified that the risk assessment for the Toms Gully Underground Project applied poorly defined risk criteria and there was an absence of appropriate justification for the levels of likelihood and consequence chosen. Some of the levels of likelihood and consequence chosen were unsupported by a balanced discussion and were more optimistic than realistic. For example, the likelihood levels of acid mine drainage (AMD) seepage from mine components was listed as B, meaning less than once per month, but more than once per year. Seepage is associated with mounding of groundwater and is likely to occur over most of the year, meaning the likelihood of seepage should be graded as an A (almost certain). Certainty and credibility require that justifications be provided.* *Of equal concern is the absence of an attempt to relate findings of particular risk assessments to the overall risk of failure to achieve an environmental objective. For example, surface and groundwater quality is determined to be potentially subject to impacts from a large number of risk elements (hazards). Considering only the 21 first listed risk elements, eight are rated as posing a high risk to achieving the water quality objective following mitigation, nine with a post mitigation risk rating of moderate and only three as being of low risk following mitigation. Even if the likelihoods and consequences of these risks are accepted, conventional risk assessment suggests that the risk from all 21 collectively are most conservatively treated as being additive. It seems that the only conclusion is that the water quality objective will not be achieved (i.e. the risk is extreme), and additional consideration and mitigation would be essential.* *The consideration of water quality objectives was not an isolated example of inadequate risk assessment leading to failure to recognise extreme risk. There were five risk assessments for mine rehabilitation and closure; the estimated residual risks were three moderate and two high. The only reasonable conclusion is that the risk of failing to meet rehabilitation and closure objectives would be extreme, for which additional consideration and mitigation would be necessary, based on existing knowledge of the Toms Gully Mine. It is also inappropriate to assume that the Department of Mines and Energy (DME) legacy mine levee fund would be used to meet the costs of mine rehabilitation.*	

			Other areas of concern included the absence of formal risk assessment for impacts on terrestrial biodiversity in the draft EIS or the Biodiversity Appendix. A cursory biodiversity risk assessment was included in the Risk Register. However, there was limited supporting information on how it was conducted. This was compounded by the use of more than one risk element in some analyses, which were provided without explanation. For example, three impacts on threatened species are listed as having one high and two low risks to achieve the objective. These analyses were undertaken without knowing what species are on the site (see following comment on flora and fauna surveys), or recognition of the potential impact from use of hazardous chemicals, such as cyanide. *Public confidence in the outcomes of the risk assessment is critical. It is recommended that the EIS be revised in its entirety to ensure that the risk assessment framework is clearly defined, executed and presented. The assessment needs to identify the nature of the risks and potential impacts; assess the effectiveness of the proposed mitigation and management measures; and provide sufficient information to allow the decision-makers to understand whether or not the Project will have unacceptable impacts on the environment. It will likely require additional data gathering and review of mitigation methods, including consideration of additional mine components and/or infrastructure. Genuine recognition, assessment and reduction of risk are in the company's interest; failure to do so could jeopardise the future of the project.*	

Response to Comment 1:

The Risk Assessment for the TGU project has been revised taking into consideration the NT EPA comments on the Draft EIS. Subsequently, the EIS Supplement has been developed to reflect a risk assessment framework as per the International Organisation for Standardisation ISO 31000:2009 Risk Management – Principles and Guidelines. The Risk Assessment Framework appendix has been revised to ensure that it replicates the structure of these guidelines and that all steps and procedures have been clearly outlined to demonstrate that the correct and thorough process has been used to determine risks and mitigation measures (Appendix H). The risk framework matrix and risk criteria have been simplified and reapplied to the risk assessment to ensure that appropriate likelihood and consequence ratings have been assigned. In addition – a discussion and justification section for each identified risk has been provided to ensure more realistic ratings were chosen.

The findings of the risk assessment have been discussed in detail and related back to the overall risk of failure to achieve an environmental objective. See Section 2.3.1 and Table 7 of Risk Assessment Framework in Appendix H. Where residual risks still remain high for certain EPA objectives – further mitigation and management measures have been identified and discussed (Section 2.3.1 and Table 7).

In addition to revising the risk criteria and matrix and in order to ensure that the risk assessment was conducted appropriately Primary Gold undertook further baseline studies. These additional studies assisted in comprehensively understanding potential impacts on the existing environment at the TGU Project. The additional studies undertaken since the submission of the Draft EIS are as follows:

- Baseline investigations of the Acid Mine Drainage (AMD) conditions at TGU. This included drilling of existing waste rock dumps, pitting of the tailings storage facilities and sampling of the evaporation ponds to understand potential AMD sources, source sizes, lag periods, pathways and receptors (Appendix A). The study was able to demarcate areas of AMD, delineate potential AMD pathways and receptors, size of AMD sources and potential lag/time for AMD release;

- Two flora and fauna surveys were completed, one prior to the wet season and one post the wet season to take into account seasonal variations and understand the potential for threatened species to be present across the site and the likely impacts to these species (Low Ecological Services 2017) (Appendix D);

- Two aquatic ecosystem surveys were completed to further assess stream ecosystem health (GHD 2018b). These surveys also include camera monitoring for the Merten's Water and Mitchells Water Monitors (Appendix E);

- A LiDAR survey was completed in 2016 to better determine drainage and topography across the site. This survey formed the basis of the updated catchment and surface water assessment that included flood modelling across the TGU site;

- Continued groundwater and surface water sampling to build a larger data set across time - this has also been used to further assess ground water conditions (Appendix C);

- Further work on the groundwater model covering the TGU site to improve the understanding of groundwater flows (Appendix C);

- Investigation of various water treatment options. This included the assessment of five separate options and involved analysing surface water data or completing bench scale test work and then providing water treatment options/proposals. Based on this, one option has been selected which has the potential to treat both surface water and tailings to improve the site water quality while reducing the acid producing load in the tailings; and

- A CSIRO assessment of the site specific trigger values for water quality taking into the declared beneficial uses for the Mt Bundey Creek (Stauber & Batley 2018) (Appendix F).
- Refinement of the site water balance (Appendix K).

Primary acknowledge the concerns raised regarding the overall risk of failure to achieve an environmental objective still remains high - due to the potential for collective residual risks if treated as being additive. All of the above listed work has been used to inform and develop a site specific conceptual site model. This conceptual site model has been used to better understand the risks and impacts associated with the TGU project and resulted in a more informed and robust risk assessment process and outcome. This work has improved an understanding of the sites interaction with the underlying and surrounding environs through a Source-Receptor-Pathway model. It has also allowed Primary to better define the intended management strategies.

When revising the risk assessment better definitions and, extra mitigation and management measures are to be implemented to continually improve the environmental outcome while reducing the residual risk. When a residual risk remains high or a series of risks and has the potential to culminate in an environmental objective not being met - Primary will closely monitor each of the risks through onsite monitoring and procedures. For example the proposed independent water treatment plant will be operated full time ensuring the adaptive management of water volumes and quality across the site to prevent developing issues that could lead to uncontrolled discharges and/or continuing degradation of water quality. The conceptual site model has been used to further refine the mine closure plan based on the identified sources of acid mine, distribution and potential release. The mine closure plan is a dynamic document that has been update for the EIS Supplement and will continue to be revised to reflect the ongoing accumulation of site knowledge. As part of this dynamic approach the risk associated with rehabilitation and closure will be regularly assessed to ensure rehabilitation measures and strategies will deliver the desired outcome and/or remain consistent with the final land use.

Primary Gold understand that the risk associated with closure has an overall rating of “High”. Therefore closure details have been refined to ensure SMART completion criteria and detailed closure work programs to ensure that the implementation of the Mine Closure Plan is well defined. Primary has undertaken several baseline studies across the Project (flora and fauna, water, geochemistry) to attain a better understanding of the existing conditions and how these can be managed appropriately. These studies have informed appropriate completion criteria and closure methods.

The risk assessment framework will be communicated to employees and contractors during operations to create awareness of the importance of closure objectives being met once operations cease. In addition, mitigation and management measures have been refined and well defined to ensure risks are addressed appropriately.

Primary understand that the Department of Primary Industry and Resources (DPIR) legacy mine levy fund is not an appropriate mitigation to meet the costs of mine rehabilitation. Primary will ensure early planning and financial provisioning are undertaken to secure funds for the closure and rehabilitation phase of the project. The risk assessment for mine closure has been refined and discussed in more detail to reflect the closure issues identified in the Mine Closure Plan, mitigation measures have been included to address these potential issues and more specific completion criteria has been updated.

Terrestrial biodiversity risks have now been addressed adequately using the results of the flora and fauna survey undertaken in 2017 (Low Ecological Services 2017). The proposed water storage dam has been significantly reduced in size to minimize habitat fragmentation. The vegetation proposed to be cleared for the water storage dam is well represented outside of the disturbance footprint and will not fragment any vegetation types. Therefore impacts to flora will not be significant.

All chemicals, including cyanide will be stored in bunded storage areas and will be inspected weekly to ensure no leaks or damage to containers. Cyanide management and storage will be aligned to the International Cyanide Management Code (ICMC) for the Gold Mining Industry.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
2	*Water-Existing environment and risk*	*Sections 5.2 and 6.4 of the ToR.*	*The EIS to provide information on the existing environment and risks to water resources.* *The draft EIS was deficient in the information necessary to understand the existing environment and the risks to water resources (surface and groundwater systems-hydrology, quality and quantity). In particular, the draft EIS did not satisfy the requirements of the ToR and lacked the necessary baseline information to characterize water resources. Consequently, the risks to water resources have not been adequately represented in the risk assessment (see above comment). It is difficult to assess whether the risks to water resources have been recognised and that risk treatment measures are appropriate to reduce risks to acceptable levels. The following sections highlight the deficiencies and concerns identified by the NT EPA that should be considered and addressed in the Supplement to the draft EIS (the Supplement).* *<u>Hydrogeological model</u>*	Appendix C Comment 10 and 36

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
			The draft EIS included a 2-D hydrogeological model, which was based on historic groundwater monitoring data, data from previous mine de-watering, and modelling of anticipated pumping rates. There were serious inadequacies in the model, particularly in relation to the hydrogeological characteristics of the ore body and the two known faults. The ore body and one of the faults (and possibly the second fault) have a much higher hydraulic conductivity than the surrounding rock and are variable in structure. These characteristics are likely to have an influence on local groundwater levels and the direction and speed of groundwater flows. Data from previous pit dewatering support this assumption, which identified reduced lowering of groundwater levels east of one fault and west of the other; and reductions in groundwater levels to the south-west of the pit. The variations in groundwater from geological structures requires further consideration and incorporation into a detailed hydrogeological model for the Toms Gully Mine Project. *With respect to groundwater flows, the model considered the pit to be a groundwater sink without consideration of existing or predicted groundwater mounding under mine components, such as the Waste Rock Dumps (WRDs) and Tailing Storage Facilities (TSFs). This has implications for seepage pathways and flows of contaminants, which also requires further consideration in the hydrogeological model and conceptual site model (see below).* *Monitoring of groundwater down gradient from the Toms Gully Mine has been poor. The draft EIS acknowledges that the "existing monitoring bore data is insufficient and cannot not be utilized for a 3D groundwater flow and contaminant transport modelling. In view of this, it is proposed to drill 6 additional monitoring bores (4 at the north and 2 at the south) to provide adequate spatial coverage of the site. Groundwater levels and quality will be monitored in all the bores (proposed and exiting ones) during initial dewatering and operations. The data obtained will be used for the contaminant transport modelling, which would predict the behaviour, migration and potential contamination plume(s) that would occur over time from the project. The model output would enable effective groundwater management at the site during the life of mine."*	

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
			It is recommended that additional monitoring bores be installed and data obtained to inform the hydrogeological model. The outcomes of the additional data gathering and the revised model(s) should be presented in the Supplement. At a minimum, the groundwater modelling should provide an overview of progressive groundwater drawdown over and beyond the life-of-mine, which is supported by valid and appropriate data. *The inadequacies of the hydrogeological model are linked to overall uncertainties in relation the potential pathways of contaminants/excess water and consequently the conceptual site model. The conceptual site model should utilise the findings of hydrogeological model and be of sufficient detail for the general reader to understand the sources of potential contaminants, mechanisms of their release, pathways for transport, and potential for human and ecological exposure to these potential contaminants. Seepage dynamics around the WRDs and TSFs and the degree of interconnectivity via alluvium between TSFs, WRDs, Run of Mine, evaporation ponds, stormwater sump, the Oxbow Wetland, Lake Bazzamundi and the proposed dam need to be quantified and considered further. The potential connectivity and interactions of these mine components with Mount Bundey Creek and Coulter Creek also need to be defined and quantified in respect of potential impacts on the environment.*	

Response to Comment 2:

The following response has been developed by Primary with contributions from GHD's water management department.

Taking into consideration concerns raised in the deficiency of information in respect to the existing environment and the risks to water resources, Primary has undertaken a number of further additional studies to close these knowledge gaps. These include the following:

- Site flood assessment (Appendix B)
- Groundwater modelling (Appendix C), to better understand groundwater resource and conditions, and establish the basis of the groundwater model to be built upon during operations.

- Updated SSTVs (Appendix F)
- Site Water Balance (Appendix K)
- Revised Water Management Plan (WMP) (Appendix L) Collection of additional surface and groundwater data. Including, where possible, the recommissioning of bore holes to undertake water sampling and water level monitoring. Water and tailings treatment to create water quality suitable for use and discharge from site (Comment 10).

The above works have significantly reduced the knowledge gaps identified in the Draft EIS and have enabled Primary to better understand the risks associated with water at the TGU Project. Primary have revised the results of these studies and developed informed management and mitigation measures (e.g. water treatment plant, updated SSTVs, increased surface water monitoring network) to address the inherent risks at the TGU Project. Surface and groundwater monitoring will continue on a monthly basis in accordance with the updated WMP and results will be monitored closely to identify any notable trends during operations. The results of these monitoring programs are provided to DPIR on a quarterly basis.

Hydrogeological model

The original 2-D hydrogeological model has been upgraded to a 3D numerical groundwater flow model that has been calibrated with updated data that has been collected since the 2015 EIS submission. The report is contained in Appendix C. The model, when being constructed, incorporated the differing geological properties of the two known faults, the orebody and surrounding geological lithologies. The model observations can be summarized as follows:

- The modelled water head pressures indicate that the mine pit and connected underground workings remain a groundwater sink through evaporative losses from the pit surface. This will likely capture groundwater contamination from various site sources.
- The modelled water level in the mine workings have a strong rapid influence on water levels within the ore zone but have significantly less effect on groundwater outside of the zone between the two faults.
- Water levels in the various storages, including the TSFs and evaporation ponds are likely to have a significant impact on nearby groundwater levels.

The modelling confirmed the pit was a sink with the mounding of water below the waste rock dumps and tailings storage facilities likely to have an effect on shallow alluvial aquifers while below the shallow aquifers the fractured rock aquifers underlaying the site would direct water back to the pit via the current hydraulic gradient. By the groundwater being redirected back to the pit the flow of contaminants would be along that pathway.

To improve the monitoring of groundwater down gradient and better understand the flow of contaminant investigations were undertaken on the possibility of reinstating monitoring bores, the bores that could be reused were incorporated to inform both the hydrogeological model and the transport modelling. To

further improve the monitoring network it is still intended to construct the 6 bores prior to commencement of operations with the additional monitoring bores to provide adequate spatial coverage of the site. These additional data points will be used for an iterative revised and calibration of the baseline model.

As detailed in Appendix C, the groundwater modelling in association with the additional studies documented above was used to construct a conceptual site model. The site model improved the understanding of the future sources of AMD in the Sulfide and Oxide Waste Rock Dump, TSF1 and TSF2 and, evaporation pond 1 and 2 while better understanding each pathway that could create a mechanism for contaminant release. In going forward the conceptual site model is a starting point to understand the interaction of the site with Mount Bundey Creek and Coulter Creek potential impacts on the environment. It is intended during operations the site model will be iteratively refined as more data becomes available, with the subsequent model being used as a tool to aid in life of mine closure planning.

All water exiting the site will be monitored to ensure the water quality meets the site specific triggers defined for water entering Mount Bundey and Coulter Creeks, Lake Bazzamundi and pastoral areas to be irrigated. Water encountered during underground mining will be assessed for water quality and dependent on the quality will or will not be treated dependent on the quality. If poor water quality is identified during dewatering the water will be treated by the same process used for the treatment of the pit water during initial pit dewatering. Once the water treatment infrastructure is established on site it will be retained and scaled up and down to suit water treatment options dependent on variations in the onsite water balance due to seasonal conditions including but not limited groundwater recharge rates, frequency of rainfall events and size of monsoonal season. As part of the EIS Supplement the Site Water Balance and Site Water Management Plan have been updated (Appendix K and L respectively)

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
3	*Water – Existing environment and risk*	*Sections 5.2 and 6.4 of the ToR.*	*<u>Contaminant sources and water quality</u>* *Toms Gully Mine is a brownfield site, with known occurrences of poor quality seepage (e.g. AMD) from existing mine components, including the sulphide and oxide WRDs, TSF 1 and 2 and evaporation ponds 1 and 2. The historic mining infrastructure is also a source of ongoing acid leachate within the mining lease. It was estimated in the draft EIS that approximately 2.6 GL of low pH, metal-laden water is currently located in the pit; the extent and volume of contaminated groundwater on and around the Toms Gully Mine is unknown. The draft EIS stated that water from the pit would need to be treated and discharged to gain access to the underground portal.*	Appendix A, F, G, H, and I

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
			The NT EPA is concerned that characterisation of materials to inform the potential impacts of existing and new AMD, neutral mine drainage or saline drainage (NMD/SD), on water quality was not conducted because it was claimed that the nature of potential mineral contaminants are known. This is despite expressions of poor quality seepage from the oxide WRD and the proposed use of rock from the Distal Hanging Wall (>100m from the ore body) (DHW) for construction purposes. Core samples from the DHW identified the presence of arsenic and lead, which could mobilise easily into water. *Adequate sampling and testworks of materials is able to indicate which rocks and/or mine components are likely to produce AMD/NMD/SD, as well as identify the potential contaminants of concern.* *It is recommended that sampling and testwork to characterise the risk of AMD/NMD/SD from existing mine components and new operations/infrastructure/components be undertaken. The results should be presented in the Supplement, including relevant environmental management plans, where revisions are required.* *More broadly, a clear understanding of the potential for downstream transport of AMD products and/or for their accumulation / bio-accumulation in water, sediments, food-chains, and depositional environments has not been provided, nor analysed with respect to tolerances of sensitive receptors in the environment. Sediment sampling should be undertaken and analysis included in the Supplement to determine historic accumulation of AMD products, and to predict the extent this is likely to occur with proposed Project discharges.*	

Response to Comment 3:

As recommended and to better understand the impact of the existing and potential new AMD sources, a baseline geochemical study was completed that also culminated in the updating of the site conceptual model (refer to Appendix A). The study involved the following:

- consolidation of the 2015 Draft EIS work;
- the completion of further onsite sampling and testwork to demarcate and characterize the existing AMD sources within mine components; and
- detail the new potential sources of AMD associated with the restart of the Toms Gully site.

Where required, the risk assessment has been revised (Appendix H) the commitments table updated (Appendix G) and relevant environmental management plans amended including the AMD Management Plan (Appendix I).

Work on the Distal Hanging Wall (DHW) material indicated that lead was not at elevated levels and that the arsenic elevation was a function of arsenopyrite that is reasonably stable at circum-neutral pH. During mining, only small volumes of DHW material will be intersected, this material will remain in either the mining voids or within the pit boundaries.

The geochemical baseline study in association with the surface water studies, groundwater studies and aquatic surveys were used to advance the conceptual site model to provide an understanding of the potential for downstream transport of AMD products and its impact on the downstream ecosystem and depositional environments (Appendix A). Strategic sediment sampling was undertaken at the site to investigate if AMD and metalliferous products were leaving site. The sampling indicated that:

- Sediment samples collected to the south of TSF1 (TGSED01 and 02) and west of SWRD TGSED03 to 08) have a range of $pH_{1:5}$ values between 4.6 and 7.1, with a maximum EC of 175 µS/cm. They are all generally non-acid forming with a maximum S_{TOT} NAPP value of 1.2 kgH_2SO_4/t.

- TGSED09 and 10 were collected from a scalded high point to the north of SWRD. The material resembled, in part, oxide tails, thus the samples. pH_{OX} values were 6.7 and 6.8 respectively with <1.0 kgH_2SO_4/t acid formed during NAG testing, indicating benign material.

- Two samples (TGSED 11 and 12) were collected from the drainage line draining Evaporation Pond 2. These samples contained very high EC values of 2,660 and 2,520 µS/cm, suggesting the presence of sulfo-salts in the drainage line. Anecdotal evidence at the wall of Evaporation Pond 2 indicates that previous operators used overbank piping to dispose of stored water under high flow conditions during wet season; likely explaining the high EC values.

- Sample TGSED13 was collected from the RoM Pad sump. It had a $pH_{1:5}$ value of 3.7, and EC of 1,710 µS/cm, and an S_{TOT} NAPP value of 21.4 kgH_2SO_4/t. The RoM Pad sump drains via the channel that TGSED23 was collected from; adjacent to the entrance road to site. Sample TGSED23 had a $pH_{1:5}$ value of 4.0, an EC value of 392 µS/cm, and an S_{TOT} NAPP value of 6.4 kgH_2SO_4/t. The drain continues to the Oxbow Wetland where three sediment samples

were collected (TGSED24-26 inclusive). For these three samples, $pH_{1:5}$ values ranged between 4.2 and 7.7, EC values were between 187 and 528 µS/cm, and S_{TOT} NAPP values between – 45 and 1.5 kgH_2SO_4/t.

- The two samples collected in the OWRD bund (TGSED14 and 15) returned $pH_{1:5}$ values between 3.6 and 3.8, EC values between 1,410 and 6,270 µS/cm, and S_{TOT} NAPP values between 17.4 and 43.5 kgH_2SO_4/t – indicating that the sediment in the bund is from OWRD. The two samples collected between the bund and Lake Bazzamundi (TGSED16 and 17) returned $pH_{1:5}$ values that ranged between 3.8 and 3.9, EC values were between 518 and 1,900 µS/cm, and S_{TOT} NAPP values between 3.7 and 8 kgH_2SO_4/t. The five samples collected within Lake Bazzamundi (TGSED18 to 22 inclusive) returned $pH_{1:5}$ values that ranged between 3.7 and 5.1, EC values between 142 and 2,130 µS/cm, and S_{TOT} NAPP values between 1.5 and 14.1 kgH_2SO_4/t. These data would infer overtopping of the bund during wet season with AMD water containing sulfo-salts finding its way down the drainage path into Lake Bazzamundi.

The full details and results of this work are presented in Appendix A.

Based on the above findings, an assessment of the SSTVs (Appendix F) was undertaken. The updated SSTVs aim to protect the beneficial declared uses of the Mt Bundey catchment and to minimise the future extent for the accumulation of AMD products downstream from the project. The proposed water treatment plant it is intended to treat water from across the site. This includes water from the evaporation ponds, surface water runoff, water captured within the waste rock dump bunds, pit water and underground water. The water will be treated to attain the desired SSTVs before being discharged offsite or transferred to a third party.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
4	*Water – Existing environment and risk*	*Sections 5.2 and 6.4 of the ToR.*	*<u>Tailings storage</u>* *Statements about the management of the existing TSF2 in the draft EIS were confusing and generate uncertainty. For example, Appendix 11 referred to the use of the TSF2 for the placement of new tailings generated from the Toms Gully Underground Project. A CCL (liner) would be placed over the existing tailings to limit water penetrating the existing tailings and causing AMD. The liner would be placed at the time of raising the TSF2 embankment, which was stated as occurring after three to four years of operation (potentially at the end of the proposed operational life of the mine), i.e. new mine tailings would be placed in the TSF without any modification or mitigation. This differs to the information in Appendix A, which stated that*	Comment 10, Appendix A

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
			the raising of the embankment and placement of the CCL would occur after 10 months of mining and placement of additional tailings. The timing of both options appears unappealing because a period would exist where additional tailings would be placed in the TSF without the CCL. This could result in the increased interaction of existing and new tailings and contribute to additional generation of AMD. *Statements concerning TSF1 were equally confusing and likely to generate uncertainty. The only proposed undertaking in draft EIS related to the proposed management of TSF1 during operations is to collect and manage seepage flows to the evaporation ponds and to control erosion on the surface of the TSF.* *Further details are required with respect to the existing condition of TSFs and how they would be used for the Toms Gully Mine Project. At a minimum, the details should include informing pertaining to:* • *the existing TSF construction design, estimated rate and quality of seepage, risks and controls measures for short, medium and long term* • *appropriate assessment of the tailings AMD characteristics* • *methods for tailings deposition, dewatering and consolidation* • *methods for managing tailings during lifts to the TSF* • *the design and design life of the proposed liners and geosynthetic layers, including contingencies if design permeability and/or life of the liners and/or layers do not perform as predicted* • *closure of the TSF, including cover designs, seepage containment and capture, and demonstrated availability of sufficient quantities of clay to contain of PAF tailings and exclude of oxygen and water for the very long term.*	

Response to Comment 4:

To provide a clear strategy and clarification in respect to tailings management, further work was completed, this included a tailings desktop study and baseline geochemical assessments. Details provided here are an amalgamation of current and previous work with a tighter focus on site specific conditions to remove uncertainty associated with TSF1 and TSF2. Any inconsistencies in TSF1 and TSF2 management within the previous draft EIS are clarified within the EIS Supplement.

To better enhance the environmental outcomes associated with on-site tailings management a tailings desktop options study and further acid mine drainage assessment were completed (Appendix A). The tailings option study included the following:

- Consolidated and presented key information;
- Used the 2016 LiDAR survey, flood assessment, groundwater study, local geological details to investigate conceptual options for tailings containment, geotechnical aspects of containment and locations for future tailings storage facilities and amended water dam.

, In order to understand the existing tailings characteristics, an assessment for Acid Mine Drainage / Saline Drainage potential at TSF 1 and 2 (which also included assaying for gold) was completed. Gold results have indicated that early processing at the site resulted in lower gold recoveries at the process plant with tailings in TSF 1 having gold grades of between 1.5 to 3 g/t. With improved recoveries, gold grades at TSF 2 are much less. Metallurgical testing has demonstrated that tailings in TSF 1 can be reprocessed to extract the higher gold grades. The potential for reprocessing has been further enhanced by the ability to potentially recover saleable products in the form of mixed metal oxides, sulfur and silica (as discussed in Comment 10).

As detailed in Appendix A, in order to analyse the tailings, samples were collected from the tailings profile at each of tailings storage facilities using a mini-excavator and auger. The analysis indicated:

- the $pH_{1:5}$ is very low for TSF1 and medium for TSF2 – they both become very low once a rapid oxidant is added as pH_{OX}. These data are consistent with the higher ANC value within TSF2, likely as minor carbonate as shown by a median fizz value of 1. Chloride was below laboratory detection limits in both TSF1 and 2.
- EC was very high for TSF1 and TSF2.
- There are higher total sulfur and chromium reducible sulfur concentrations in TSF1 relative to TSF2; perhaps indicating an evolving process circuit over time and/or ore imported from another site for processing.
- Neither TSF1 or 2 contain sufficient neutralising capacity relative to their maximum potential acidity (based on total sulfur) to offset acid generation as demonstrated by a NPR of 0.3 and below.

- The $NAG_{7.0}$ approximates the S_{CR} NAPP, indicating the likely extent of net acid producing potential in the samples from unoxidised sulphides.

In summary the intended tailings management can be detailed as follows; reprocessing will allow for the tailings in TSF1 and TSF2 to be removed and the more benign retreated tailings to be placed in either an upgraded TSF1 or TSF2 dependent on the assessment against the Guidelines on Planning, Design, Construction, Operation and Closure of Tailings Dams (ANCOLD 2012) and required remediation (Option 1). During the assessment the existing construction design and current seepage across the facility will be investigated this would inform remediation measures for each of the TSF's to manage seepage in the medium to long term. Once tailings is removed from the facilities the existing dam embankment walls and floors can be remediated to be fit for purpose to store and manage tailings across the site. The required lining, embankment remediation and with an embankment lift for TSF2 if required will be dependent on the characterization of the retreated tailings. The process of remediating TSF 1 and 2 will remove uncertainty as Primary intend to go beyond managing seepage flows and to control erosion on the TSF surface.

- As a contingency if TSF1 and/or TSF2 cannot be upgraded to conform with ANCOLD 2012, then the reprocessed tailings from the facility are to be placed in a purpose built tailings storage facility designed to reflect the nature of the material (Option 2). To summarise:It is proposed to reprocess the tailings from TSF1 and TSF2 with an upgrade of both facilities to ANCOLD 2012 guidelines and lined if the nature of the tailings requires it (Option 1: preferred option).
- The proposed contingency if Option 1 does not work (i.e. if either TSF1 and TSF2 cannot be reused) is to construct a purpose built tailings storage facility in accordance to ANCOLD 2012 guideline. If required, lined to reflect the nature of the tailings material (Option 2: contingency option).

Once TSF1 and 2 are refilled with the reprocessed tailings the facilities are to be rehabilitated insitu. The top of the tailings pile will be profiled to form a dome to create a water shedding profile by either preferential tailings deposition or mechanical reshaping over this surface. Once completed the TSF cover will reflect the nature of the tailings (for example if the tailings has a high potential for acid formation a 2mm HDPE layer covering the material to stop the ingress of rainwater into the facility may be installed. Above the HDPE a layer of sand will be placed to preserve the liner on top of this will. A similar process will be followed for TSF1).

To implement the proposed strategy a balance between tailings recovery for reprocessing and placement of new tailings will need to be established via tailings scheduling to enable the TSF2 embankment lift to occur. By interchanging deposition between TSF1 and 2 would allow a timeframe for the TSF2 lift to occur if it is required. During the planning, design, construction and implementation phases of the proposed lift approval under the *Mining Management Act* and other associated approvals will be sought.

As detailed above, it is the intention to reprocess the existing tailings to extract gold and a range of other saleable products. This aligns to the NT EPA's "Environmental Principles" of minimizing the generation of waste, which in this situation is the reduction in tailings. When depositing the tailings it is proposed to use multiple tailings spigots to deposit the tailings around the embankment walls to:

- Sequentially discharge the tailings in thin layers to enhance preferential drying to attain high insitu tailings densities;
- Positioning the tailings to contain the supernatant water pond in close proximity to the decant system (i.e. water recovery system); and
- Where practicable minimize the size of the supernatant water pond. This limits the hydraulic water pressure head while reducing the water area available to birdlife (as discussed in Comment 14).

Due to the intended reprocessing of the tailings and subsequent lowering of the acid generating potential (via the removal of sulfur), the use of liners and geosynthetic layers may not be required to manage/contain the residual tailings. The findings of the pilot Bioaqua Process water and tailings treatment plant will provide feedback on the nature of the liner and/or geosynthetic TSF requirements. If however, a liner and/or geosynthetic liner is required the selection of the liner will involve the following selection criteria

- Containment ability;
- Resistant to climatic conditions at the Toms Gully (i.e. high heat, humidity, ultraviolet light and solar radiation);
- Chemical compatibility (i.e. resistant to the chemical characterizes of the contained tailings);
- Tear resistant and/or tensile strength reflective of the application; and
- Suitability of associated resourcing, materials and site preparation.

When implementing the engineered design, appropriate construction QA/QC will be undertaken to ensure the surface for the liner is suitably prepared and installed. After installation and during closure, monitoring the liner performance will occur. Any deviations from the expected outcomes will be investigated and if remediation is required, specialist advice will be sought in consultation with the DPIR to implement a resourced and cost effective strategy. If a geosynthetic layer is not required preliminary investigations of the clay within the immediate vicinity of the project gives an indicative volume of between 489,000 and 667,000m^2. This material is planned to be used for embankments of the new WSD. The site of the WSD (and, if required, the new tailings dam) is located where ground conditions allow excavation of source material for earthworks; and the insitu material at the base of the TSF has the potential to be conditioned and compacted to control seepage. As a contingency, suitable material for construction could be sourced from the Rustlers Roost mine area (located 13km from TGU). This will be done in consultation and with approval from DPIR to provide an alternative source of construction material.

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
5	*Water – Existing environment and risk*	*Sections 5.2 and 6.4 of the ToR.*	*<u>Water quality monitoring</u>* *The existing water quality monitoring program is primarily focused on Mount Bundey and Coulter Creeks. Different levels of management are proposed for waters entering these systems, which ultimately join north of the Arnhem Highway. Coulter Creek is proposed to receive discharges from Lake Bazzamundi, which will receive water from the dewatering bores. The quality of the water is largely unknown and it was assumed in the draft EIS that it would be of appropriate quality to release to the environment. This requires further quantification and explanation in the Supplement.* *The draft EIS also included reference to utilising Lake Bazzamundi as an irrigation field for pit dewatering bores. No details were provided on the proposed irrigation applications, including staging and the influence of seasonality to justify the use of irrigation. In addition, monitoring of groundwater to determine the influence of irrigation on groundwater quality or quantity was not provided.* *Discharges to Mount Bundey Creek are equally uncertain. The studies provided to define existing water quality, estimated discharges and the water balance were preliminary. The water balance model omitted to include significant water volumes and contaminant loads. Mount Bundey Creek will receive water, of unknown volume, and assumed quality from the water storage dam, which is included in the water balance model. Uncontrolled surface runoff and groundwater seepage from the WRDs, Oxbow wetlands, stormwater sump, TSFs, TSF decant ponds and spillway discharges from the evaporation ponds are not included. The latter receives discharges from the sulphide WRD and TSF1. Collection of discharges from TSF1 in the evaporation ponds seems to be the case based on a statement that this occurred during previous mining and it would occur in the future. No reference to this was made in the water management plan. The absence of estimates of the flows, and their quality, derives from there being limited understanding of the structure or dynamics of the infrastructure involved in determining the flow characteristics, and no effort expended to determine the basic characteristics of the flows.* *The absence of this understanding prevents implementation of a sound and robust water-monitoring program. The program is based on a trigger level legitimately assessed from records of water quality at a monitoring*	Appendix F Comment 7

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
			site upstream of the mine. Calculations are then to be made that enable controlled discharges of known contamination from the water storage dam; such that the desired low level of contamination at the downstream end of a mixing zone is achieved. This is likely to be impossible as there are unaccounted discharges of contaminated water between the control monitoring point and the monitoring point at the end of the mixing zone. *There were no estimates of total discharges to Mount Bundey Creek or Coulter Creek, or even consideration of the influence that year round discharges of water in unknown quantities or quality may have on Coulter Creek. There was no assessment of contaminated groundwater migration off the mineral lease boundary and/or potentially impacting groundwater.* *The use of very preliminary studies to predict the proposed outcomes raises a significant level of uncertainty. There is no proposed surface water quality monitoring point upstream of Lake Bazzamundi, one at the discharge point and one near the Arnhem Highway, and no control over flows to Coulter Creek. There is no assessment of potential impacts of unknown quantities of discharge on the ephemeral creek, nor any sound basis for prediction of discharge water quality or capacity to monitor or control potential impacts.* *The implementation of a valid monitoring program is further inhibited by the as yet unknown characteristics of the stream at the end of the mixing zone, and inadequate data on the likely stream flow rates. Available flow rates are based on two year's data; these being the highest and third highest rainfall years recorded at the mine. These issues raise additional concern as to the adequacy of the assessment of risk.* *There are inadequacies in the understanding of the existing water systems and the likely treatment/management required to ensure the downstream water systems, including sensitive receptors, are protected. It is recommended that the water balance, the water monitoring program and water management plan be revised. The outcomes of the revisions should be presented in the Supplement.*	

Response to Comment 5:

The water to be discharged to Lake Bazzamundi from the dewatering bores will be assessed for water quality, if the water does not meet the required water quality (SSTVs) the water will be treated through the standalone water treatment plant prior to release to Lake Bazzamundi or transferred to a third party for agricultural/horticultural activities.

The proposed water treatment plant is to be designed to provide scalability in order to allow a) consistencies of water quality across site, and b) for the changes in the volume of water to be treated as a result of monsoonal conditions or water encountered during mining. As agreed with the Pastoralist, the use of Lake Bazzamundi as an irrigation field will occur during the dry season to enhance grazing conditions and fodder production. The water irrigation will conform to good irrigation practices, such as ensuring the amount of water applied is appropriate for native vegetation and soil; timing is suited to weather conditions; water is applied uniformly and effectively and water is applied to plant roots thus limiting runoff (Connellan 2002). It is proposed that monitoring will be at the discharge point to ensure water quality meets the required criteria as the management and expertise of irrigation and crop/pasture production is the responsibility of the pastoralist. To detail the discharges of water to Mount Bundey Creek the water balance has been updated to incorporate estimated discharges volumes (Appendix K). It is proposed that water quality exiting site will meet the SSTV values detailed in Comment 7 and Appendix F. Surface water runoff will be collected for treatment and discharged as part of the overall site water treatment process. As detailed in Appendix C from the groundwater modelling the groundwater seepage from the WRDs, stormwater sump, TSFs, TSF decant pond and evaporation ponds will move towards the pit as it acts as a sink. The hydraulic gradient will be further increased due to pit and underground dewatering. In respect to the evaporation ponds, drilling of the Sulphide Waste Rock Dump (SWRD) has demonstrated that the natural topography underlying the landform prevents the flow of water from TSF1 to the evaporations ponds. Additionally, water from the southern slope of the SWRD reports to TSF1. In order to better understand the basic characteristics of flows across the site, a LiDAR survey was completed which informed the conceptual site model contained in Appendix A.

As detailed in Comment A, a more robust site model has been presented, with an outline of the intended water treatment option to achieve a set of SSTVs that have been recommended by the CSIRO to protect the downstream ecosystems. This work has informed the basis of the updated water management plan and associated water monitoring (Appendix L). By treating the water to the defined SSTVs this also takes into the account any unaccounted discharge that may be present between the control monitoring point and the monitoring point at the end of the mixing zone. This is achieved by surface water and water contained in water holding facilities onsite being collected, contained, systematically treated and disposed of removing the buildup of acid loads and reducing the hydraulic heads that drive the potential groundwater mounding beneath landforms that may lead to water entering shallow alluvial aquifers. As dewatering progresses, the groundwater sink will draw in deeper groundwater that can be treated if required.

In order to understand the potential year-round discharge to Mount Bundey Creek or Coulter Creek, information from the groundwater study, flood assessment, aquatic survey and geochemical baseline assessment were used to construct a source-pathway-receptor conceptual site model. This model provided insight into the areas of site discharge Appendix A. Additionally, based on the measured groundwater quality, an assessment was undertaken to examine the groundwater flow and associated contamination migration across the site.

To improve surface water monitoring across Lake Bazzamundi in 2016, two sites SWTG14 and 15, were established upstream of Lake Bazzamundi and one site CK7 was selected below Lake Bazzamundi. These sites in association with pre-existing monitoring sites have been used to understand the surface water in the area. It is proposed that water will be treated to ensure the quality is fit for the proposed use.

The quality and variations of the groundwater that will be dewatered has been reported in the Baseline Studies Groundwater Assessment and Modelling report presented in Appendix C. Water quality varies across site dependent on the interconnectivity with the fractured rock zones underlying the site, localized geology and mineralization encountered at the bore locations. Generally the groundwater is circum-neutral to slightly acidic with elevated sulfates. It is proposed that groundwater which does not meet the required water quality for release to the environment and the relevant water discharge licence levels will be treated through the water treatment plant that is proposed to be established to treat water from the dewatering of the Toms Gully pit.

It is proposed that dewatering water quality will be modified to take into account for soil properties, rainfall, climatic conditions and reflecting the irrigation period when supplied to the Pastoralist. Prior to any discharge these levels will be agreed with the relevant agencies. During discharge water quality at the discharge point will be monitored fortnightly to assess water chemistry against trigger levels and to detect early trends in water chemistry. If it is identified that water quality has a) exceeded trigger levels or b) a trend in deteriorating water quality is developing investigations and if required, associated actions will be taken.

From the discussion above the water balance, water management plan and monitoring has been updated to reflect the changes and further work.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
6	*Water – Existing environment and risk*	*Sections 5.2 and 6.4 of the ToR.*	*<u>Sensitive receptors</u>* *The draft EIS did not identify downstream sensitive receptors in respect of active or passive discharges of water from the Toms Gully Mine Project. This includes the identification and mapping of potable water users and sensitive receptors, such as habitats and ecosystems in Mount Bundey Creek, Coulter Creek and Mary River National Park. The nature of respective sensitivities should be*	Appendix C, Comment 37

			characterised, as well as potential impacts from the Toms Gully Underground Project on those receptors.	

Response to Comment 6:

From the draft EIS and augmented with further baseline studies the sensitive receptors associated with active and passive discharge at the TGU Project are identified as follows.

- Livestock and fauna accessing surface water (documented in section 6.3.5.3 of draft EIS);
- Water interaction with downstream vegetation (documented in section 6.3.3.3 and Figure 37 of the draft EIS); and
- Interconnected groundwater users for domestic and agricultural bores (documented in section 6.3.3.2 of the draft EIS).

The reconfigured site together with the proposed water treatment plant and tailings treatment aim to reduce the acid mine drainage loads associated with the active or passive discharges of water to both surface and groundwater.

In respect to groundwater bores, Section 4.4.5 and Figure 21 of the Draft EIS describe and map the groundwater bores. In summary, within a 5km radius of the project, 39 registered bores are listed. Of these, 19 are located externally to the project, primarily for stock and domestic use. Further details of their locations are provided in Appendix C.

As discussed in Section 6.3.3.2 of the Draft EIS and from the updated hydrogeological modelling (Appendix C), it can be determined that the 19 external bores are located away from the main fracture rock systems associated with the faults bounding the mineralisation (i.e. Crabb and Williams faults) and the mineralised zone (being the ore zone and overlying fractured siltstone). The TGU Project is unlikely to share any connection in terms of chemistry with external bores.

Currently the pit acts as a sink with water travelling down gradient from the surrounding area (Appendix C). If the pit filled and switched from a sink to a source, most flow paths would be to Mt Bundy Creek and tributaries, so the adjacent surface water would be a more likely the pathway to receptors. During operations dewatering at the Toms Gully pit will drawdown the localised water table accentuating the flow of groundwater to the pit. This water will be continually recovered via dewatering and treated if required to attain the desired water quality before release and or supplying to a third party.

At closure, to mitigate the potential for pit water quality degradation, Primary is proposing to investigate possible in-situ pit water treatment options. At this preliminary stage, discussions have occurred with the CSIRO to research the potential viability to establish an in-situ sulfate-reducing bacteria system (further information is provided in Comment 17).

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
7	*Water – Existing environment and risk*	*Sections 5.2 and 6.4 of the ToR.*	*<u>Beneficial uses</u>* *Beneficial uses have been declared for the Mary River surface and groundwater area. The declared beneficial uses are for protection of environment, riparian vegetation and agriculture. The beneficial use area comprises the Mary River catchment and includes all the named and unnamed waterways within the Mary River catchment, and the Project Area.* *Setting of target water-quality compliance levels and Site Specific Trigger Values (SSTVs) should include detail and comparative analysis of expected environmental impacts from the full range of alternative water quality compliance thresholds above the proposed 80% ecosystem protection level, to provide justification for the adoption of an 80% default level. In addition, it would be appropriate for contingency management options to be presented in the Supplement, in the event that the proposed (e.g. 80%) ecosystem protection level is found to be unachievable with the currently proposed Project configuration.*	Comment 10 and Appendix F

Response to Comment 7:

The following response contains input from Global Aquatica:

A review and analysis of the Site Specific Trigger Values (SSTV) in relation to the environmental impact of the Toms Gully Underground Project was undertaken by the CSIRO. The assessment was focused on the physical and chemical parameters appropriate for the proposed range of beneficial uses of on-site water or offsite discharge (refer to Appendix F). The assessment included the following:

- Suitability of the 80% ecosystem protection level;

- Derivation of background levels and triggers for sampling location SWTG1A located adjacent and upstream of the Toms Gully site (i.e. control unaffected by the site); and
- Provide recommendations on site specific triggers to be adopted.

The analysis compared the ANZECC Guidelines for Fresh and Marine Water Quality (ANZECC guidelines) for ecosystem protection levels with background levels; this means relating chemical concentrations that would have varying to no chronic toxicity on freshwater biota. This comparison enabled the setting of SSTV to protect aquatic biota. This protection level is also considered to afford protection to terrestrial fauna that may access surface water along Mt Bundey and Coulter Creeks. Therefore the revised set of SSTVs have been proposed to reflect a mixture of local background conditions and ecosystem values as presented in the ANZECC Guidelines. More specifically the 90% ANZECC ecosystem protection levels and water quality conditions derived from SWTG1A, reflecting background conditions have been recommended. The revised SSTVs are proposed to lessen the environmental impacts while acknowledging that the groundwater and surface water within the May River catchment have declared beneficial uses. The Mount Bundey Creek catchment has a Beneficial Use Declaration which states that stock water supply is the beneficial use extending from the Arnhem Highway Crossing north/downstream for approximately 3km with the remainder of the creek having aquatic ecosystem protection objectives aligned to aquatic ecosystem protection.

In selecting the water treatment option, attaining the set water quality values was one of the most critical factors (refer to Comment 10). Additionally, to provide contingency in the event that the proposed SSTVs are not found to be unachievable. The site has been reconfigured as follows:

- The originally proposed 2.1 GL valley fill water dam has been replaced with a water dam of a reduced size and catchment disruption,
- Reprocessing of tailings to remove and recover the deleterious elements (such as sulfur) and turn into saleable products,
- If required, construct a fit for purpose tailings storage facility if the emptied TSF1 and TSF2 cannot be reused to reduce seepage sources.

At a management level the following measures will mitigate any impact to Beneficial Users:

- The finalisation of an Erosion Sediment Control Plan to control sediment will occur as part of the Mining Management Plan (MMP) process.
- As part of the staged development, a pilot water treatment plant (approval for plant given by DPIR) will provide input to improve the ability to attain the water SSTV with the intended treatment option.
- During operations a 'hold point' on the plant where treated water exits has measurable water quality checks. If the water quality doesn't come under those limits the valve won't open and the water is diverted back into a purpose designed water dam or the appropriate section of the plant. An alarm will also be sent to the operator.
- During the wet season, if storm water is of an appropriate quality the treated water can be mixed at the source to reach the desired SSTVs.

- Where practicable clean water will be separate from water that has interacted with site disturbances.

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
8	*Water – Existing environment and risk*	*Sections 5.2 and 6.4 of the ToR.*	*<u>Mixing zone</u>* *Further justification regarding the proposed mixing zone and dilution rates should be provided in the Supplement. Approximately 7 km of creek would be used as a 'mixing zone' before the location of the first water quality compliance point. Proposed dilution of discharge water in a mixing zone to achieve target water quality compliance levels needs to consider environmental risks of potential ecosystem accumulation / bioaccumulation of AMD products in aquatic sediments, food chains, biota or depositional areas, within and downstream of the mixing zone. Potential for future or downstream mobilisation, such as with changes in river pH, should also be considered.*	Comment 10

Response to Comment 8:

To reduce the reliance on dilution within the mixing zone of Mt Bundey Creek that can be greatly affected by seasonal variations in water levels Primary has focused on improving water quality prior to release into the environment at the point of discharge. As discussed in Comment 10, five water treatment options were assessed for suitability relative to site. From this assessment the Bioaqua Process was selected as the preferred option for treating water to meet CSIRO reviewed water SSTVs.

The potential for climatic conditions to have a large effect on the levels of water that can be discharged can limit the ability to maintain a neutral water balance across the site. By adopting SSTV levels that afford a higher level of protection than previously proposed the ability to discharge is improved and less reliance is placed on the requirement for dilution within the 7km mixing zone. By improving water quality at the source reduces the future environmental risks of AMD products in the ecosystem and aquatic sediments or depositional areas. The improved water quality both in terms of the pH and metal content is unlikely to contribute to the potential for the remobilization of AMD drainage products due to changes in river pH.

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
9	*Water Supply Dam*	*DEIS Appendix 4, Fig.7.1, p.20 / pdf.p.120*	*The proposed Water Supply Dam (WSD) footprint drains into Mount Bundey Creek. Unless groundwater modelling can prove otherwise, the WSD should be considered to have direct connectivity via seepage to Mount Bundey Creek. A detailed description is required of the geotechnical condition/porosity of strata underlying the WSD footprint, including identification of faults, strata, clays, aquifers and groundwater recharge zones. The outcomes of the geotechnical surveys should be presented in the Supplement and incorporated into the conceptual site model.*	Appendix K

Response to Comment 9:

After further baseline studies and a review of the proposed infrastructure, Primary has amended the originally proposed 2.1 GL Water Storage Dam to a 1 GL dam structure. The new dam is smaller in size limiting the potential to interconnect with the underlying groundwater recharge zones and preferential fault pathways while being outside of the creek line. Also the base of the dam is proposed to be compacted to reduce seepage. Design, construction and operation of the water storage dam will be in accordance to the ANCOLD Guidelines. The purpose of the dam is to act as a temporary storage facility for treated wastewater. Water is proposed to be removed from site via discharge to the Mt Bundey Creek and/or transferred to an adjacent pastoralist for irrigation usages. Details and the role of the water storage dam have been incorporated into the updated site water balance that is presented in Appendix K.

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
10	*Pit dewatering*	*DEIS, Section 6.3.2.5 Dewatering and*	*The draft EIS placed a high level of reliance on the effectiveness of the pit water-treatment system, which was primarily based on a literature review of water treatment techniques applied at other mine sites (e.g. Mount Todd). Uncertainty exists regarding how effective the proposed in-pit dosing and treatment would be for the purposes of treating water at the Toms Gully Mine Project. In addition, estimated costings for*	Appendix F

	and water treatment	*Operations, p.125 / pdf.p.162.*	*the reagents are presented in the draft EIS, without any discussion as to whether limes or other reagents are available and whether it is feasible for these reagents to be sourced locally or more broadly.* *There was limited discussion in the draft EIS regarding how the treatment would operate and its degree of efficiency, including how sludges would be managed and disposed. Water treatment options should be finalised and described in the Supplement. The description should include a demonstration that outputs will meet necessary water-quality thresholds and the anticipated volumes of water that will require treatment during dewatering, operations and emergencies.*	

Response to Comment 10:

In order to advance the water treatment options detailed within the Draft EIS, Primary approached five organisation/companies to investigate a tailor made site specific water treatment option for the water encountered at the TGU site. The approach to investigating water treatment options was a staged process with stage one using available water chemistry data and/or bench scale testing where required to assess the potential suitability of five differing treatment options.

The treatment options included:

- Lime and caustic;
- Passive bioreactor and biofiltration;
- Neutralised bauxite red mud residual;
- Hydrotalcite Technology (Virtual Curtain); and
- Water stripping and an active bioreactor (Bioaqua Process).

During the assessment and selection process of the preferred water treatment option a number of selection criteria were used that can summarised below:

- Achieving the desired water quality for discharge;
- Suited to specific site conditions;
- Treatment efficiency, scalability and flexibility (including speed of water treatment during dewatering, operations and emergencies);
- Potential to reuse existing infrastructure;

- Required infrastructure and resourcing above normal mining conditions;
- Cost, availability and sources of reagents;
- Life cycle and volumes of spent reagents (i.e. sludges) including beneficial uses and/or disposal; and
- Overall cost effectiveness.

The preferred water treatment option that was selected is the Bioaqua Process used by Global Aquatica. The Bioaqua Process has been developed to treat both water and the source of acid mine drainage. In the case of Toms Gully, this is the tailings in TSF1 and TSF2. A simplified explanation of how the Bioaqua Process works is presented below (i.e. the water treatment process) (see Figure 3):

- Firstly, the process removes the metals and acidity whereby cavitators break down the water into oxygen, hydrogen and hydroxy group that via chemical reactions allow metals and elements to come out of the water column, and
- Secondly once this has occurred the water is then combined with nutrients and sulfide reducing bacteria that convert the sulfate to sulfur for removal.

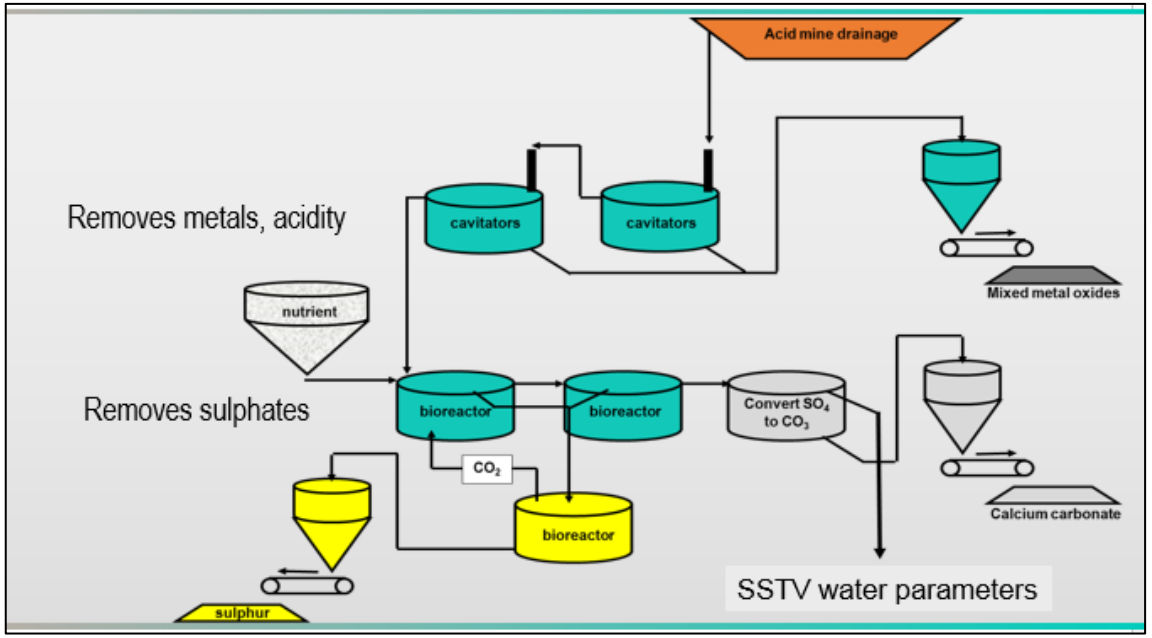

Figure 3: BioAqua Process Flow Chart

On completion of the above process, water quality meeting the desired Toms Gully SSTVs (Appendix F) is produced, thus reducing the potential amount of acid mine drainage water at Toms Gully. The extracted mixed metals oxides, sulfur and silica from both the water and tailings treatment have available markets whereby each concentrate is a saleable product thus removing the requirement for either on or off site disposal. During operations, minor amounts of sodium hydroxide, magnesium hydroxide, carbon and ethanol used in the process will be stored in bunded areas under relevant chemical storage codes. Recycled products including metal hydroxides, sulphur, calcium carbonate, magnesium hydroxide are contained in geobags next to the treatment plant for removal and on sale.

Feasibility and viability of the technology underlying the Bioaqua Process has been demonstrated at a pilot plant scale level at the Angas Zinc mine in South Australia, at the Mt Chalmers site associated with the historic Mount Morgans mine in Queensland and the Brukunga legacy site in South Australia. In addition, Global Aquatica are currently in discussions with the Angas mine owners to advance the establishment of a fully scaled water/tailings treatment plant.

To further improve the site specific certainty (i.e. continuing the staged de-risking process) for the treatment option at Toms Gully and to tailor the solution for site specific conditions, Primary has received approval for a pilot plant with the DPIR. The feedback from the field trials will refine the process to meet the requirements for the Toms Gully site thus further enhancing the proposed outcome.

It is anticipated that water quality at the discharge point will attain the SSTV, however as a contingency, if the SSTV values at the discharge point cannot be achieved then it is anticipated that the water quality target will be at the ANZECC and ARMCANZ (2000) 80% ecosystem protection guidelines level. Obtaining this value and discharging to the creek under suitable flow conditions will allow the water quality to reach a level better than the previous Draft EIS (whereby water quality of 80% ecosystem protection level after mixing was targeted) at the compliance point (i.e SWTG2). Water quality at the downstream monitoring compliance point SWTG2 would be approaching 90% after starting at 80% ecosystem protection guideline levels. In addition, by attaining the ANZECC and ARMCANZ (2000) 80% ecosystem protection guidelines level the water quality would be fit for purpose for agricultural and horticultural as it would not exceed the criteria for livestock drinking and irrigation water quality.

As indicated above, the water treatment option can be used to treat the tailings to remove the mixed metal oxides, sulfur and silica. For tailings treatment the process can be summarised as follows:

- Tailings removed from TSF1 and TSF2 by slurrying and pumping to the treatment plant,
- The water treatment process detailed above is used after the tailings is leached by the inherit acidity due to the presence of pyrite in the material. The leaching process occurs within a 2.5km section of pipe transporting the tailings from the tailing storage facility to the treatment plant.
- After the leaching process, silica is physically removed to produce a saleable product.
- The end tailings stream is greatly reduced leaving behind more benign minerals and clay.

If practicable the current intent is to also utilise this technology in other areas of the site to reduce the acid mine drainage profile across the site. It is intended the reprocessed tailings would be deposited in the upgraded TSF1 and TSF2 that conform to ANCOLD 2012 requirements.

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
11	*Pit / underground mine, storage of PAF material.*	*DEIS Appendix 11 Acid and Metalliferous Drainage Management Plan*	*The underground mine is proposed as a potential repository for potentially acid forming (PAF) material. However, there is a paucity of information with respect to the proposed mine schedule and the treatment/storage of PAF for long-term management and storage. The following information should be detailed in the Supplement:* 1. *Outline design details, staging and depths of the underground mine.* 2. *What is the storage capacity of the pit below portal level?* 3. *What designs / methods / procedures will be applied to the storage of waste rock/tailings in the underground mine or pit?* 4. *How is lag time of PAF materials incorporated into management of these materials?* 5. *How is PAF material in pit and decline walls, and runoff / groundwater seepage through this material to be characterised / managed?*	NA

Response to Comment 11:

The following response was compiled from information provided by Primary Gold's Chief Mining Engineer

1. ***Outline design details, staging and depths of the underground mine.***

Underground mining is proposed to commence in January 2020 after dewatering of the pit is complete. The underground workings are accessed from two declines in the existing pit (Figure 4). An access decline portal is at a depth of 96m below surface and the escape-way/ fresh air intake decline is at 65m below surface.

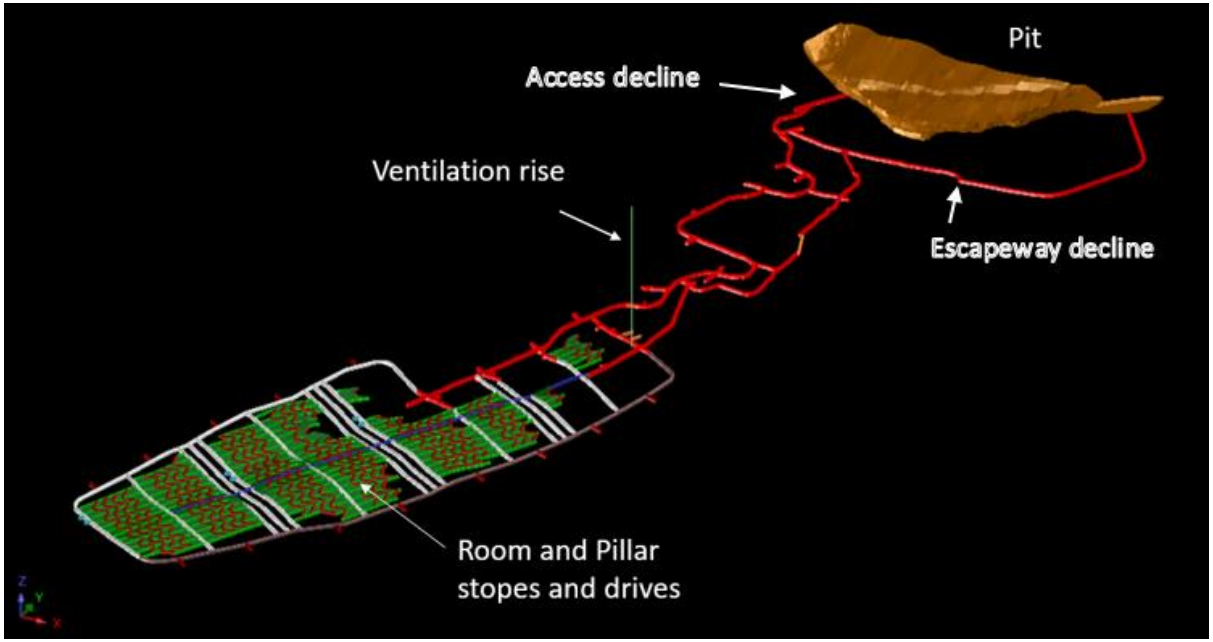

Figure 4: Showing an isometric of the Toms Gully Underground mine.

Once the declines and associated access infrastructure has been remediated the mining method will be “Room and Pillar” that is generally used for mining flat lying orebodies. This method involves mining an area on a grid pattern with material mined horizontally; pillars of rock are left to support the over burden to prevent roof collapse. At Toms Gully the Pillars are nominally set at 16m centres with the bottom section of the waste in the pillar nominally 11.5m x 11.5m. The ore in the top section of the pillar will be stripped to 6m x 6m.Figure 5 shows the proposed pillar dimensions.

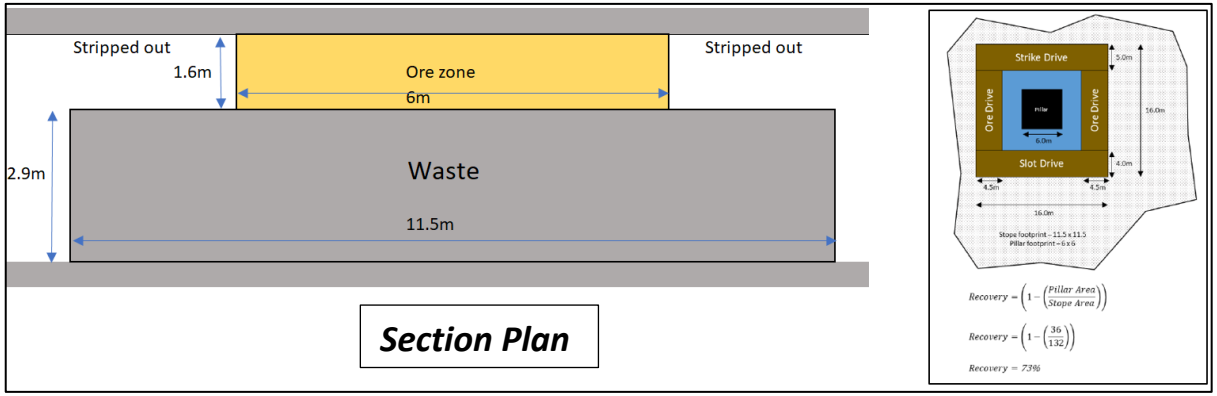

Figure 5: Showing the Dimensions of the Pillars.

Currently the deepest existing development of the mine is at 267m below surface. During operations as the orebody is removed down slope the deepest part of the proposed mine is at 289m from surface. To maintain ventilation in the underground void a new ventilation shaft is proposed to intersect the workings at a depth of 234m. This will be constructed by a rise boring machine. Fresh air will be drawn down both the Access Decline and Escapeway Decline to a central ventilation rise. Figure 6 presents a cross section along the length of the mine. Details of the mine parameters are presented in Table 6.1.

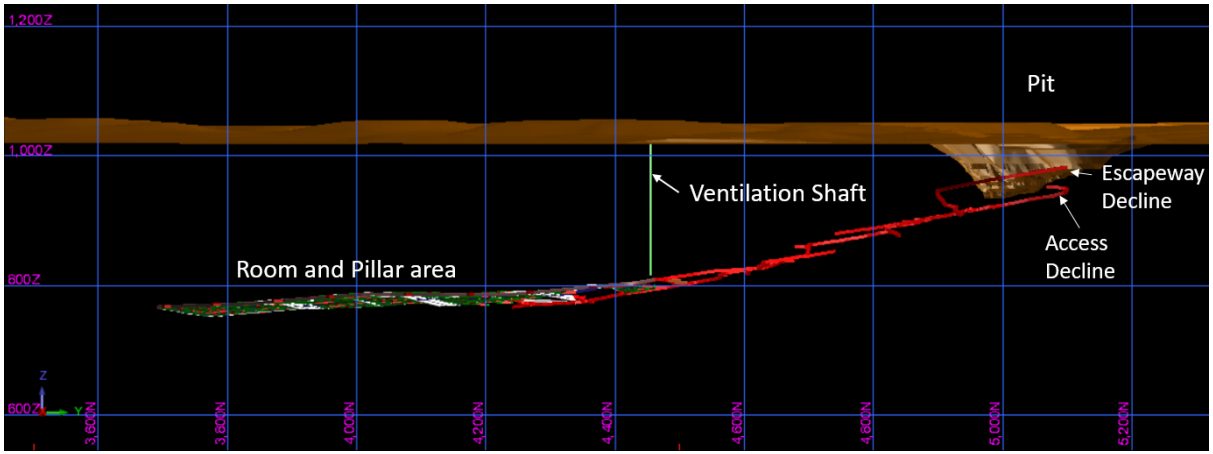

Figure 6: Long section of the mine looking west.

Table 6-1: Mine Design Parameters

Item	*Quantity (metres)*	*Gradient*	*Dimensions (metres)*	*Comment*
Declines	1,827	1 in 20 average	5.0 Wide x 5.0 High	Generally, follow ore gradient
Access drives ore/waste (slot and strike drives)	12,449	1 in 40 average	4.5 Wide x 4.5 High	Nominal height
Ore drives	7,492	1 in 20 average	4.5 Wide x 4.5 High	Follow ore gradient
Vent shaft	230	Vertical	3.0 diameter	Actual rise metres

The Access and Escapeway declines will be developed outside the orebody and linked to the orebody by crosscuts/access tunnels. When in ore material, the cross cuts and the perpendicular ore drives will be mined by splitting the development/mining face into two parts (resuing). The bottom section is fired first by normal development methods and the waste excavated by frontend loader. Then the top part is exposed it is flat backed and can be excavated as ore by a frontend loader. The method of mining waste first, then mining ore is to reduce the dilution and ore loss while developing the Room and Pillar stope area. Figure 7 provides a visual representation of the mining method detailed above.

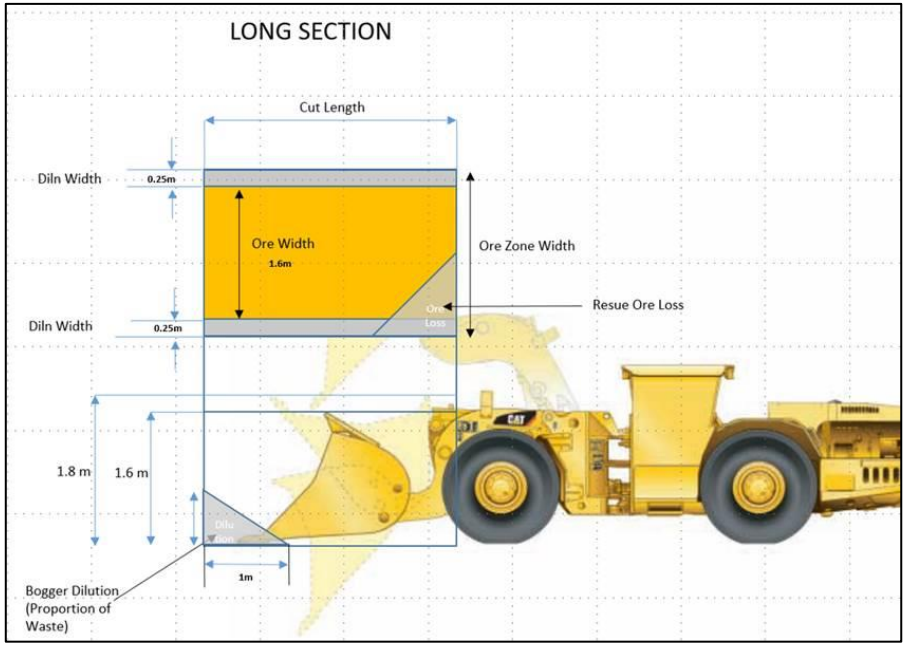

Figure 7: Proposed Ore Mining Method

To achieve the desired mining method the mining equipment detailed in Table 6-2 will be required.

Table 6-2: Equipment to be used at TGU Project

Item	*Model name*	*Max units on site during mine life*
Jumbo	Axera DD421	3
Development loader	R2900G and R1700G	2 (1 of each)
Stoping loader	R1300G	3
Longhole drill	DL430-7	2
IT	930H	2
Charge up vehicle	Normet 1610B	1

Item	*Model name*	*Max units on site during mine life*
Trucks	AD40	2
Light vehicles	Landcruiser	8
Grader	12H	1

During the life of the mine a number of stages will occur to extract the ore progressive deeper from the ore body. To illustrate the progression of the operation below are presented the mining stages in six-month intervals.

Start of mine after dewatering and rehabilitation of old declines and drives (First six months)

The first six months will be devoted mainly to development in waste in preparation for ore extraction. Also at the same time work will be completed to set up the underground ventilation site, so rise boring can be conducted. See Figure 8.

Figure 8: Initial 6 months of Dewatering and Rehabilitation of Old Declines and Drives

End of first 6-month period

The high-grade upper section of the orebody within the larger orebody will be prepared for stoping/removal by developing a Room and Pillar extraction style that criss - crosses the orebody (Figure 9).

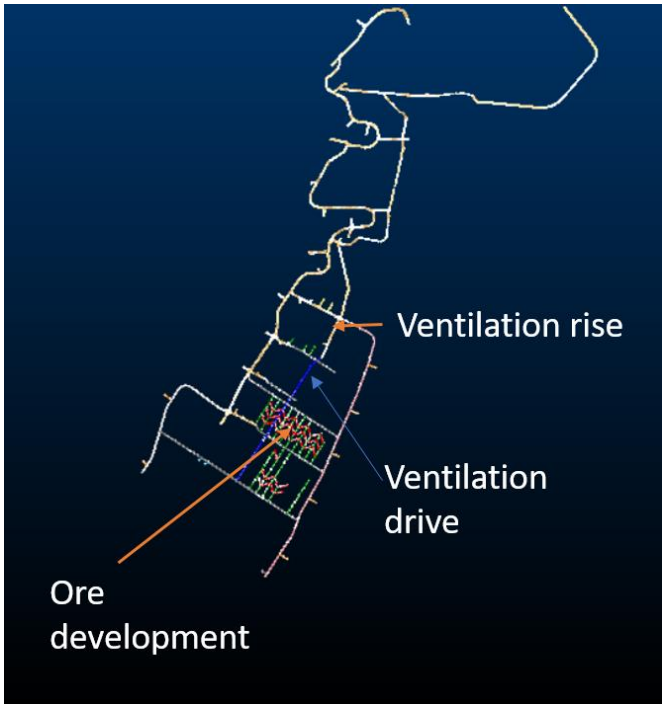

Figure 9: End of 6 Months - Preparing of Ore Extraction and Establishment of Ventilation

End of 12 months

High grade ore stoping commences with the first ore expected to be developed in the ninth month. Reduced milling will be able to start after month twelve. Decline development continues along the southern side of the orebody to access the lower orebody levels (Figure 10).

Figure 10: End of Twelve Months Extracting Ore and Accessing the Southern Side of the Orebody

End of 18 months

By the end of this 6-month period the mine is near full production with both development of ore and stope ore. Decline development continues on the northern and southern side of the orebody to further access ore at depth (Figure 11).

Figure 11: End of Eighteen Months Ore Extraction Near Full Production with the Development of Access Along the Southern and Northern Side of the Orebody.

End of 24 months

Mine is in full production with progressive ore extracted and ongoing development to expose and gain access to further ore (Figure 12).

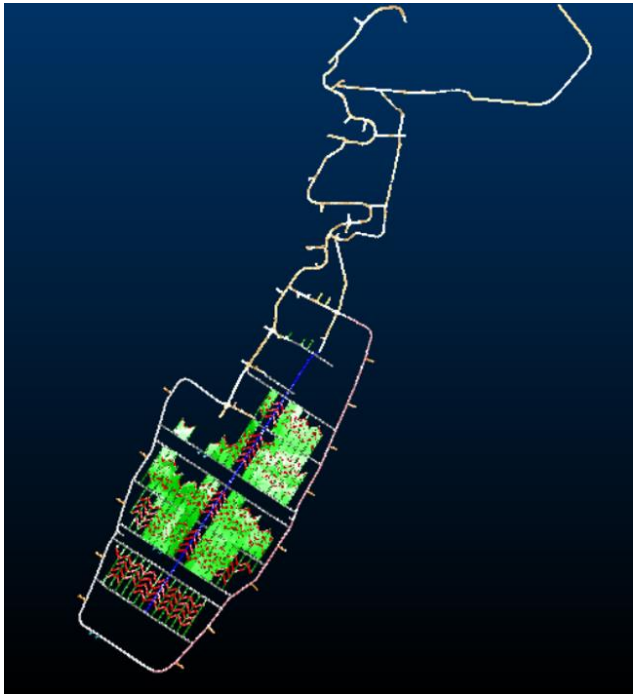

Figure 12: End of 24 Months Full Production with the Progressive Development of Ore Exposures and Access

End of 30 months

The lower grade ore top section and the bottom section of the orebody are developed to provide mill feed (Figure 13).

Figure 13: End of 30 Months Development and Mining of the Lower and Upper Orebody Section that Contain Lower Grade Ore is Undertaken.

End of 36 months and end of mining

By the 36 month all mining has been completed of the known orebody. During the 36 months prior to ore depletion underground and surface drilling will occur to assess potential orebody extension that may lead to an extension of the mine life (Figure 14).

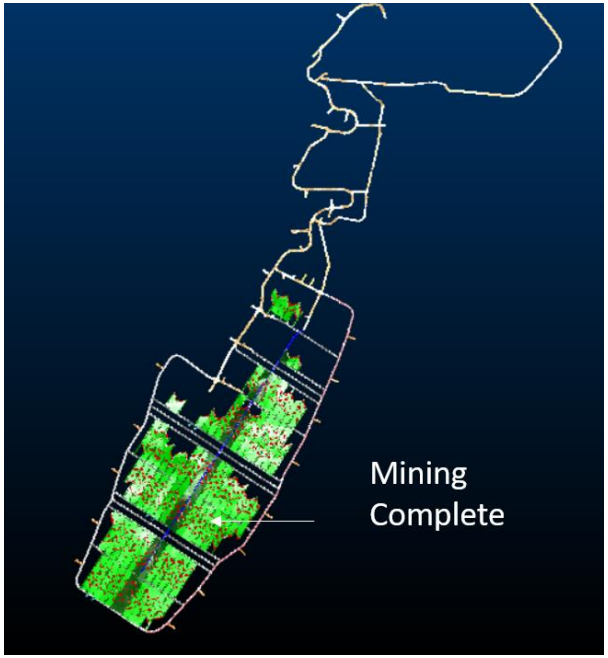

Figure 14: End of 36 Months Mining of the Lower and Upper Orebody Sections of the Orebody Completed.

2. <u>What is the storage capacity of the pit below portal level?</u>

There is no storage capacity for waste below the portal in the base of the pit. The bottom of the pit is 10m below the Access Decline portal. The pit area below the portal will be used as a water sump and emergency water catchment area. The sump will prevent flooding of the portal and underground workings in periods of heavy rain and will be used to capture runoff from the pit surfaces and waste rock positioned in the pit. The sump is required as an emergency water catchment area; and therefore the volume capacity cannot be lessened by filling with waste material.

3. <u>What designs / methods / procedures will be applied to the storage of waste rock/tailings in the underground mine or pit</u>

An in- pit waste storage facility (WSF) has been designed to cater for all the underground waste at Toms Gully. The underground waste from Toms Gully will be kept within the pit, 16 to 17m below the local water table.

Where practicable some waste will be left underground in stoping areas that have been fully mined. The quantity left underground is difficult to quantify; as scheduling and traming times for waste to be mined out of areas will determine whether it is faster to truck the waste out of the mine or tram it to a mined-out area. Thus, the in-pit WSF will not be filled up to designed levels as a volume of the waste rock will be left in the underground. None the less the design has the flexibility to contain all the waste rock to be encounter if necessary or can be closed out when a lesser volume needs to be stored. Figure 15 details the proposed waste rock placement

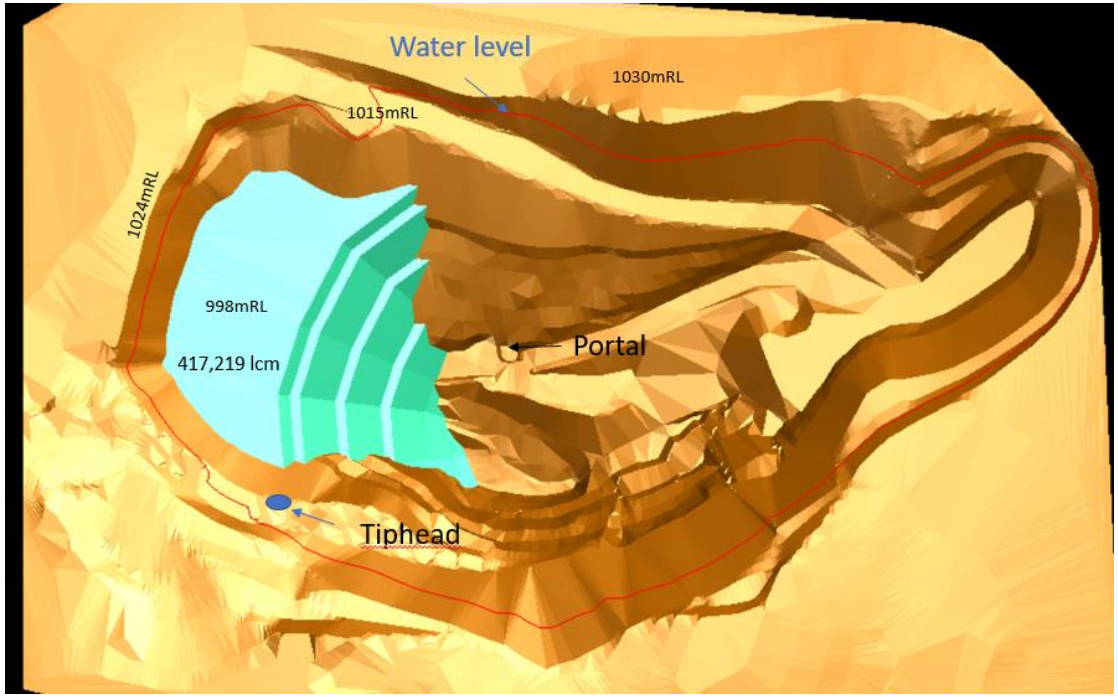

Figure 15: The Positioning of the Waste within the final in-pit Waste Storage Facility.

To design the waste storage facility the following process was undertaken:

Waste storage facility required volume estimation:

- Waste out of underground is 794,024 tonnes
- Average SG is 3.09 t/m3
- Insitu volume mined is 263,883 m3 (794,024/3.09)
- Swell factor is 1.25, assume some compaction from truck rolling compaction
- Thus, swelled waste from underground is 329,853 lcm (m3) in volume (263,883 x 1.25)
- Volume in WSF design is 417,219 m3

Designed in-pit WSF can contain all the underground waste with 87,400 lcm spare capacity.

The initial base of the in-pit WSF will be filled from the bottom of the west side of the pit. A ramp in the WSF will be constructed to allow the waste to be deposited as high as possible directly from the portal entrance. This will reduce the number of trucks required to operate underground. The base of the WSF will be constructed to provide a more stable base through a bottom up construction approach.

Once the WSF is too high to place waste from the internal ramp, a tip head will be constructed on the southern ramp of the existing pit. This tip head will be located below the expected final water table level to ensure any waste spilled near or below the tip head on the pit walls is underwater at mine closure. On average 9 to 10 truckloads will be tipped each shift; approximately 410 tonnes per shift. A dozer can easily spread this amount of waste in 2 hours.

Trucks will short tip the waste on the ramp at the tip head area. A bulldozer will be used to push the waste over the tip head into the WSF base below. The bull dozer will be also be used to form the WSF in the pit to design specifications.

Radio communications will be used between the bulldozer and any vehicle travelling in or out of the portal when the bulldozer is pushing over the tip head above. The bulldozer will stop while vehicles enter or leave the portal. In addition, a 4 metre high safety bund will be used at the eastern end of the WSF to prevent any rocks rolling into the portal area. Figure 16 below provides details of the

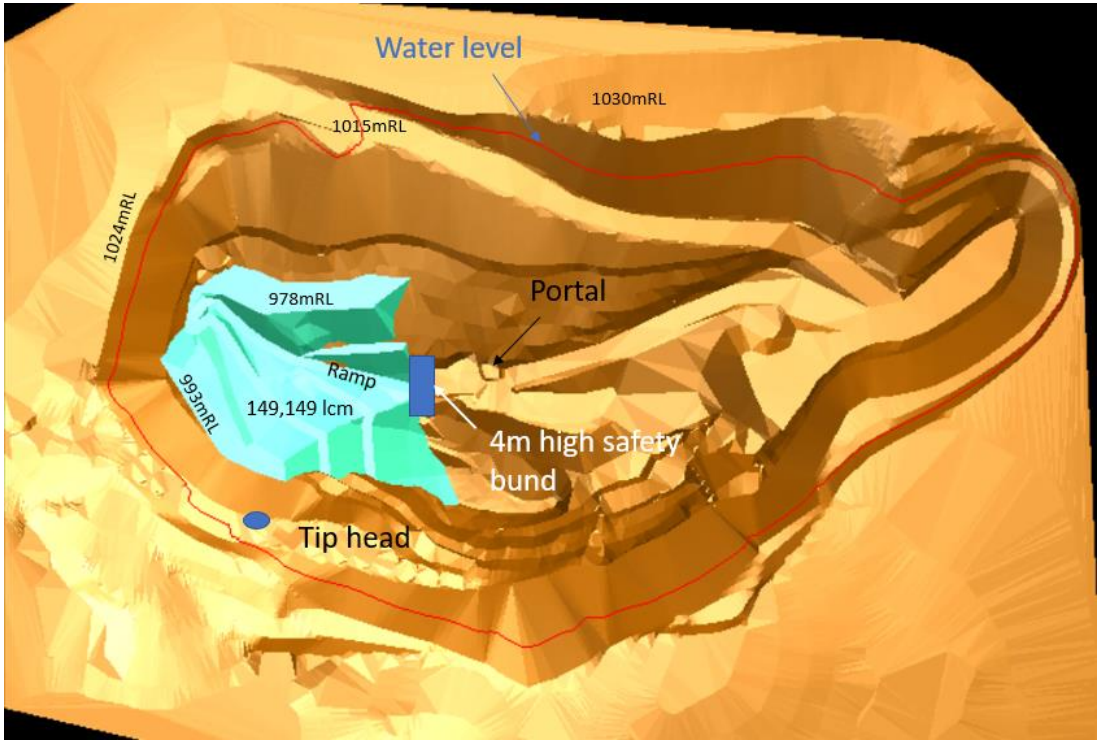

Figure 16: The initial Waste Storage Facility at the bottom of the pit before tipping waste from higher levels.

From the baseline geochemical work it is estimated that the lag time for the breakdown of sulfides to generate acid mine drainage is between 6 to 12 months (Appendix A). Taking into consideration the lag time of the PAF materials and to limit the egress of oxygen and water the following measures have been adopted during construction:

- The initial use of bottom-up construction will occur in this method of construction (viz. paddock dumping and dozing of existing lift before construction of next lift), this will evenly mix the various sized particles and clasts in each lift. Once positioned compaction from wheel rolling of earthmoving equipment over the dump creates a less permeable layer to limit the egress of water and oxygen. Subsequently the bull dozer levelling and contouring will be also form less permeable through this process at higher levels up the profile at across the top surfaces of the WSF thus limiting the egress of rain water.

- Once completed the top surface and external slopes of the WSF are to be contoured to be water shedding. It is anticipated that the external slope angles will be 18 degrees.
- The WSF has been positioned above the pit area below the portal which will be used as a sump. Water that intersects the WSF will drain into this sump area for collection.

All material mined from underground will be treated as PAF unless otherwise demonstrated and will be placed in the WSF (Appendix I). During operations visual mapping and where required sampling will occur to assess the surface area and distribution of acid producing material in the pit and decline walls this assessment will be used to inform the closure strategy for the pit and underground. Water collected from the within the pit and underground will be classified as a poor quality for use in the plant or for transfer to the evaporation pond for subsequent treatment.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
12	*Biodiversity – Aquatic*	*Section 5.3 of the ToR required the EIS to describe fauna, flora, vegetation communities and aquatic ecosystems of the Project area and impact footprint. Description of aquatic fauna should, as a minimum include fish, frog and macro-invertebrate communities.*	*The NT EPA considers that the sampling program to inform the assessment of aquatic biodiversity is unlikely to have characterised the presence and abundance of existing species. This is because the program was restricted to a single round of sampling and the quality control and quality assurance measures were poorly documented (e.g. lack of replication of samples at each sample site). It is recommended that the sampling program to characterise the aquatic biodiversity be revised. The fish study and future monitoring should also be revised to ensure that the level, number and types of samples taken are appropriate to inform the assessment. The NT EPA reiterates that sampling effort must conform to requirements of the NT EPA, the Department of Land Resource Management, and DME as at other mine sites and the importance of appropriate survey/program timing, locations and methodology.* *It was concerning that the sample site SWTG02, downstream of the proposed mixing zone, was not sampled. The proposed replacement is not considered an appropriate alternative because it is a small ephemeral stream with differing water chemistry, hydrology, etc. The location of an appropriate sample site downstream of the proposed mixing zone is critical to*	Appendix E

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
			understanding the existing environment and informing the proposed water quality monitoring program. The Supplement should include consideration of an appropriate sample site located downstream of the proposed mixing zone. Suitable discussion is required to justify the sample location, sampling methods, and additional sampling required to be undertaken if difficulties are encountered. For example, the use of automated samplers should be considered where there are hazards, such as crocodiles, that could restrict sampling efforts.	

Response to Comment 12:

Taking into account the concerns raised in respect to aquatic biodiversity - two aquatic surveys have now been completed (Appendix E). Both surveys included a revised methodology with replicate samples, water quality testing and sampling at site SWTG02. The 2017/2018 aquatic survey has been completed; however the final report is still in preparation.

The surveys were conducted during May 2017 and May 2018 as this timing best captured the 2016/2017 and 2017/2018 monsoonal conditions and better informed the assessment of aquatic biodiversity. The 2017 survey findings are presented in Appendix E. In addition, the report incorporated the results from the 2010, 2012 and 2015 sampling events to assess the conditions over time. This information was used in the construction of the Conceptual Site Model that has been discussed in Comment A. The findings of the most recent 2017/18 will be assessed and used to increase the understanding of the aquatic systems adjacent to and downstream of the Toms Gully mine site.

During both surveys, further safety precautions were adopted which allowed the sampling of SWTG02 downstream of the mixing zone. For future aquatic surveys it is intended that SWTG02 will continue to be sampled as it provides the best access downstream of the site. Additionally, where required, further measures will be considered to enhance sampling safety at the site in the future.

Aquatic ecosystem monitoring will occur annually going forward. An additional sampling site upstream of SWTG1A has been established as per the 2016/2017 report recommendations.

The results of the 2016/2017 sampling round indicate the following:

- Some sites featured low pH and high conductivity compared with sites upstream of mining infrastructure, as well as elevated concentrations of dissolved metals. Even though low pH and elevated EC is a feature of the study area based on the findings of GHD (2015), some values were outside of the SSTVs. The location of those sites in relation to existing mine infrastructure suggests a possible impact of the site on the water quality in receiving waters, though local factors cannot be ruled out.

- An additional four species of fish were added to those collected in 2015, for 17 of the 37 known species of the area found in Mount Bundey Creek. Electrofishing was successfully undertaken at all sites in 2017, and additional methods that were undertaken resulted in a greater number of fish being collected, but did not result in additional species being caught.

- Some fish species collected at a single site adjacent to Toms Gully Mine were found to be in poor condition, swimming sluggishly or having legions. The cause of which is unknown, but could be related to localised poor water quality at that site.

- A total of 55 macroinvertebrate taxa were recorded from the study area in May 2017 from 13 sites. Those fauna included all taxa sampled previously by Crocodile Gold in 2010 and 2012 and GHD in 2015 as well as some additional taxa. Accordingly, taxa richness was generally higher this year compared to previous years. Although taxa richness was higher, the macroinvertebrate community did not comprise a high number of pollution sensitive families, regardless of site type. This denotes that the community of the study area is made up of robust families that are less sensitive to changes in water quality and flow.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
13	*Biodiversity – Terrestrial*	*Section 5.3 of the ToR required the EIS to describe fauna, flora, vegetation communities and aquatic ecosystems of the Project area*	*The draft EIS did not include the results of flora or fauna surveys for the Toms Gully Underground Project, despite a number of threatened species identified as possibly occurring on the site. Species include:* • *black-footed tree-rat* • *bare-rumped sheathtail bat* • *northern quoll* • *fawn antechinus*	Appendix D, E and N Comment 23

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		and impact footprint.	• *pale field-rat* • *gouldian finch* • *partridge pigeon* • *floodplain monitor* • *mertens' water monitor* • *mitchell's water monitor* *The NT EPA recommends that flora and fauna surveys be undertaken and reported in the Supplement. Particular focus is needed on areas proposed to be disturbed by the Project and of areas potentially impacted by the Project. Where potential threatened species habitat is present, appropriately designed targeted surveys should be undertaken to determine actual presence or absence of the species.* *Background material provided in the Carpentaria Gold Public Environmental Report (1988) reports the presence of the northern quoll (Dasyurus hallucatus) and the partridge pigeon (eastern) (Geophaps smithii smithii) on the Toms Gully Underground Project. This is not acknowledged in the draft EIS, nor has there been an assessment of the potential presence of the species on site.* *In addition, the draft EIS listed the bare-rumped sheathtail bat (Saccolaimus saccolaimus) as only occurring in Kakadu. It is found in a wide variety of places other than Kakadu and should be considered as part of the assessment of the Toms Gully Underground Project.*	

Response to Comment 13:

On the recommendation of the NT EPA and to better understand the potential for threatened species across the site, Primary commissioned two targeted flora and fauna surveys. One occurred in November 2016 (late dry season) and the other May 2017 (early week season). The two surveys were to assess

seasonal diversity and target the list of threatened species detailed above. In addition, as part of the aquatic monitoring, camera trapping was performed at a number of sites to investigate the presence of Mertens' water monitor and Mitchell's water monitor. The findings of the surveys are presented in Appendix D.

In summary, the results of the surveys were as follows:

- No flora species of conservation significance were recorded at the TGU Project during the surveys;
- The fauna survey recorded three species listed as near-threatened under the NT TPWC Act; the orange leaf-nosed bat (*Rhinonicteris aurantia*), the, the bush-stone curlew (*burhinus grallarius*) and the yellow-rumped mannikin (*Lonchura flaviprymna*);
- One Merten's water monitor (*Varanus mertensi*) was recorded at the Rustlers Roost mine site which is located approximately 10 km south east of Toms Gully. The Mertens water monitor is listed as vulnerable under the NT TPWC Act;
- The aquatic survey camera traps recorded one Merten's water monitor which was located approximately 0.7km upstream of the Toms Gully site on Mt Bundey Creek;
- Camera imagery during the aquatic survey recorded the pale-field rat at two sites, these rats are listed as Vulnerable under the NT TPWC Act. The closest of these sites is located approximately 2 kilometres downstream from the site along Mt Bundey Creek on the northern side of the Arnhem Highway. The other location is further downstream from the first location;
- No fauna species listed under the *Environmental Protection Biodiversity and Conservation Act 1999* were recorded; and
- Six introduced fauna were recorded during the fauna survey – house mouse, cane toad, cattle, horse and pig.

In addition to the surveys, the proposed infrastructure for the Toms Gully start-up has been revised and has resulted in a 10 hectare reduction in the areas to be cleared. It is also proposed to have a trained fauna handler present during the clearing onsite to relocate any fauna found whilst clearing. The three near-threatened species recorded on site are either bat or bird species – the proposed clearing for the TGU project is unlikely to have a significant impact on bird species habitat and therefore unlikely to impact these species at a population level. Based on these surveys it is considered that the proposal is unlikely to adversely affect threatened species in the area.

To assess whether the recommencement of the TGU Project required referral to the Commonwealth Government under the *EPBC Act 1999*a desktop assessment was completed using the survey data and literature. The results of the desktop assessment combined with suitable habitat found at the TGU Project informed the fauna survey of the threatened species likely to occur at the TGU site. The fauna survey targeted a search for these likely threatened species at the TGU Project. No species listed under the EPBC Act were recorded during the two seasonal fauna surveys.

Based on the results of the desktop assessment, fauna surveys and unsuitable habitat for threatened species in the immediate vicinity of the TGU Project the recommencement of the TGU Project was unlikely to significantly impact any species listed under the EPBC Act. Therefore the proposal to recommence the TGU Project was not referred under the EPBC Act. The desktop assessment is provided as Appendix N.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
14	*Wastes and Hazardous Materials*	*Section 4.2 of the ToR required the EIS to provide relevant information with respect to other waste management, including but not limited to: information on potentially hazardous materials to be used or produced and methods for storage, transport, handling, containment, disposal and emergency management of these materials, including fuel*	*The use and handling of cyanide has not been included in the draft EIS. Cyanide storage, handling, use, recycling, disposal and/or measures to protect the bird community from cyanide after disposal should be addressed in the Supplement to the draft EIS (the Supplement). The risk assessment for the Toms Gully Underground Project and the Hazardous Materials Management Plan should also be revised accordingly with respect to cyanide, the risks to the environments (including human health) from its use and the proposed mitigation measures.*	Comment 74

Response to comment 14:

As mentioned in Table 3, Section 2.6.4 of the Draft EIS one of the standards and codes of practice relevant to the Toms Gully Underground Project is the International Cyanide Management Code (ICMC). During operations the management of sodium cyanide including storage, handling, use, recycling, and disposal will be aligned to this code where practicable – this will minimize impacts to the bird life community at Toms Gully

Primary will focus on maximizing the recycling of cyanide through the processing plant, including within the tailings dam. The loss of cyanide has an economic cost to the viability of the Toms Gully operation and as such it is in the best interest of Primary to recycle cyanide. Recovery of cyanide from the tailings

storage facility involves reclaiming water frequently before the breakdown of cyanide occurs through natural degradation reactions in the presence of sunlight that leads to less toxic and strongly complexed forms.

The existing tailings management strategy and design have been reviewed in light of the recommencement of the TGU Project, this includes the reprocessing of tailings to remove mixed metal oxides, sulfur and silica. This has resulted in intention to reuse the existing tailings storage facilities to consolidate existing tailings to provide secure, long-term storage of materials containing cyanide complexes and to avoid potential losses via seepage, overtopping, breaching, and pipe/channel failure.

Industry studies that assessed the effect of cyanide on wildlife have recognised that when Weak Acid Dissociation (WAD) cyanide levels are at or below 50mg/L in tailings dams containing freshwater a good level of wildlife protection is present (Donato et al. 2007). Primary intend to target this level at the tailings dam pond while restricting bird life access where practical. These measures may include but are not limited to:

- Floating balls;
- Drinking water troughs design for site specific bird species behaviour;
- Raptor decoys/scarers; and
- Air powered scarers

The risk assessment has been updated to include inherent cyanide risks, management and mitigation measures and residual risk (Appendix H). The Hazardous Materials Management Plan will be revised in respect to cyanide; this will be done as part of the Mining Management Plan preparation. The management plan will be updated to reflect risks associated with cyanide to surrounding environs (including human health) and will outline finalized management measures.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
15	*Indigenous and*	*Section 5.4 of the ToR required the EIS to include a description of*	*Surveys to identify sites or objects of historic or cultural heritage significance were not included in the draft EIS. The NT EPA expects that appropriate surveys, including details of the survey*	NA

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
	cultural heritage	*Indigenous and non-Indigenous sites, places or objects of historic or cultural heritage significance, and surveys used to identify sites or objects of historic or cultural heritage significance, with outline of survey location and effort.*	*locations and efforts, will be undertaken by a qualified professional and the results presented in the Supplement.* *The proponent has acquired a clearance certificate although a copy was not provided with the draft EIS. It seems to be from some time ago and may require updating to avoid risk to the proponent.*	

Response to Comment 15:

Primary is committed to the protection of Indigenous sacred sites and cultural heritage. As required by the NT EPA, Primary has completed a heritage survey covering the current TGU site area as well as all future activities. On completion of the survey, the Aboriginal Areas Protection Authority (AAPA) (date 30 July 2015) issued an Authority Certificate for the mining operations at the Toms Gully Gold Mine within MLN1058 and ML29814. To ensure currency of the Authority Certificate Primary will consult with the AAPA on an as needs and regular basis. All updated AAPA Authority Certificates and heritage surveys will be provided in the MMP process.

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
16	Cumulative impacts	Chapter 18	*The table cross-referencing the requirements of the ToR and the text of the draft EIS identified that cumulative impacts were addressed in Chapter 18. However, most of Chapter 18 repeated material from various parts of the draft EIS without drawing attention to or assessing cumulative impacts. In some cases, potential external impacts were noted but were not considered further (e.g. mine sites Quest 29 & Rustlers Roost, livestock and pastoral activities on Mount Bundey Station, etc.).* *Cumulative impacts can be from different actions within a project affecting a particular receptor, or the actions of more than one project (past, current or future) impact on a receptor. The former types of cumulative impact were not assessed, other than for some receptors e.g. threatened species, where the multiple hazards were lumped and assessed as a single hazard, without explanation. Cumulative impact assessment of the second type was not undertaken. It is recommended that the cumulative impact assessment of the draft EIS be revised in respect of this comment and provided in the Supplement.*	Appendix A and H

Response to Comment 16:

As part of the EIS Supplement, cumulative impacts have been revised and taken into consideration in the updated Risk Assessment Framework (Appendix H). The actions of the surrounding mine sites and pastoral activities have been assessed as part of the risk assessment. The potential cumulative impacts these activities may contribute to the TGU Project on the surrounding environment have also been discussed as per below.

Regional Cumulative Impacts

In addition to the TGU Project having impacts on environmental values, a number of other activities / projects on a more regional scale could also be potentially contributing to environmental impacts. At a regional scale to the TGU Project, surrounding mine sites such as Quest 29 and Rustlers Roost as well as pastoral activities from stations such as Old Mount Bundey are notable actions. The Old Mount Bundey Station was purchased by new owners in 2016, who have intensified the use of the land to the east of Coulter Creek, reestablishing plantations of mangoes, and utilising the paddocks with access to the creek for grazing and holding of cattle. The interactions between these activities and the TGU Project have been assessed in terms of geomorphology, groundwater and surface water flow, topography and ecosystem functioning. It should be noted that both the Rustlers Roost and Quest 29 mine sites are

currently on care and maintenance and have not been operational since the late 1980s. Therefore the sites have a minor potential to contribute to the cumulative impact at the Toms Gully site.

Quest 29 is approximately 14 kms south east from TGU (or 19 km upstream) whilst Rustlers Roost is approximately 12 km south (or 16 km upstream). Topography and associated drainage between the three sites suggests a portion of the surface water is directed away from the creek that flows past the TGU site and thus limits the volume of surface water mixing from each site. Water Quality testing at SWTG1A a sample location positioned upstream of Toms Gully has recorded water quality for the major elements and physical parameters better than the 95% protection level of the ANZECC Australia and New Zealand Guidelines for Fresh and Marine Water Quality with the exception for aluminum that fluctuates between the 80% protection level. The upstream elevated levels of aluminum are probably a function of naturally high background levels (Schultz 2002). Therefore cumulative impacts to surface water flow and quality between the mine sites is deemed negligible.

Mapped geological units across all three sites suggest no interconnectivity between geomorphology (Ahmed 2000). Rustlers Roost and TGU share geological unit characterised by greywacke, shale, siltstone, tuff, phyllite, chert, carbonaceous shale, banded iron formation (BIF), dolostone, however it has a greater topography than TGU and thus groundwater connectivity and flow is unlikely between the two sites.

Mapped vegetation units across all three sites show that each site is largely within their own vegetation unit (Wilson et al. 1990). All three sites share vegetation characterized by eucalyptus with grass understorey – however this vegetation type is extensive in range and well represented beyond all three sites. Thus clearing associated with the TGU project and the other sites is not deemed to have a significant cumulative impact. The immediate vicinity of the TGU Project has been fenced off from livestock grazing since 2013 and thus flora and fauna at the site are not subject to a combination of mining activities (clearing) and cattle grazing.

Controlled and uncontrolled fires in the region occur annually and create fire mosaics of varying sizes dependent on seasonal fire loads and fire breaks (both natural and manmade). Primary Gold has maintained firebreaks around the site to restrict fire from reaching infrastructure and inadvertently protecting vegetation within the project's envelope. On occasions, Primary Gold may undertake controlled burning (with all permitting in place) to create a patch work fire zones inside the project**.** The purpose of this is to manage fire loads by cool burns within the project. This will prevent the potential for large external fires beyond Primary's control entering the site when fire loads are high. High fire loads can also result in hot burns which have a greater effect on vegetation recovery after bushfires –controlled burns will minimize this impact.

Project Cumulative Impacts

When considering the cumulative impacts at the project level the spatial, temporal, linked and source impacts of the project need investigation. These impacts then need to be considered in the context of their effect on habitat value, water quality and socio economic aspects (Franks et al. 2010). In order to determine these cumulative impacts, baseline studies of the existing (or pre-impacted) environment needs to be characterised and understood. Baseline studies provide a benchmark against which potential impacts can be measured and addressed (Franks et al. 2010) (Appendix A).

Since lodging the draft EIS, Primary has undertaken numerous additional baseline studies to ensure that any impacts and associated risks are fully understood and appropriate mitigation measures can be applied.

This additional baseline work has included the following:

- assessment of current acid mine drainage conditions,
- existing flora and fauna environment (including any conservation significant species),
- aquatic ecosystems within Mt Bundey and Coulter Creek,
- surface water and groundwater characterisation – including the investigations into water treatment options
- tailings characterisation and management and
- the development of site specific trigger values.

These additional studies ensured that the totality of impacts on the receiving environment were understood and therefore was able to better inform the risk assessment and avoid a piecemeal decision making and design process.

The localised impacts of the existing and future Toms Gully activities can be divided into spatial and temporal components. At a site level the cumulative level impacts can be categorized into two areas:

a) Existing conditions created by past mining and mine rehabilitation which are:

- The formation of acid mine drainage and erosion, and resultant water quality (key pathways: groundwater and surface water; receptors: aquatic ecosystems and fauna, including livestock);
- Ecosystem and biodiversity modification and habitat value associated with past land practices and levels of mine rehabilitation (receptor: flora and fauna species); and

- Legacy of mining on the local community (receptor: recreational fishers and adjacent/immediate landowners).

b) Future developments and activities outside or within preexisting infrastructure:

- Changes in acid mine drainage and erosion conditions (either lessened or enhanced), and resultant water quality (key pathway: groundwater and surface water; receptor: aquatic ecosystem and fauna, including livestock);
- Ecosystem and biodiversity modification associated with mining operations (encompassing clearing of habitat, traffic, dust, noise, feral animals and weeds) and subsequent mine rehabilitation thus effecting habitat value (receptor: flora and fauna); and
- Effect of mining on the local community (receptor: employees, contractors, recreational fishers and adjacent/immediate landowners).

During the preparation of the EIS supplement, the receptors - flora and fauna, aquatic ecosystems, livestock and community (including landowners, local community, employees and contractors) were a fundamental consideration in the project's decision making and revised design process.

Water Quality

In particular, care was taken to consider water quality to ensure that the combination of acid mine drainage, vegetation clearing, dust and chemical storage would not result in a cumulative impact that is more detrimental than the impacts of the individual items. This led to the following design measures and additional investigations at TGU:

- A pilot water treatment plant solution and associated tailings re-processing, these measures will reduce the quantity of AMD contaminated materials on site,
- Limited vegetation clearing requirements and implementation of ground disturbance procedures to avoid any unnecessary clearing
- Commitments to preparing procedures/plans to limit the potential impacts of chemical spills as well as bunded storage of these materials and weekly inspections (e.g. Hazardous Substances Management Plan)
- Management of sediment and dust around TGU via drainage infrastructure and watering carts (e.g. Erosion and Sediment Control Plan) and
- Identifying and managing actions that have the potential to degrade water quality (e.g. uncontrolled runoff, discharging water into Mt Bundey creek) thus affecting receptors described above.

With these considerations each environmental impact and associated aspect was considered both in terms of the broader ecosystem and the receptor (Appendix H).

Habitat Value

A number of significant fauna species are listed to potentially occur in the general area, however none of these species were found at the TGU project during the fauna surveys, except for a single Mertens Water Monitor (*Varanus mertensi*) 0.7 km upstream of Toms Gully Mine (GHD 2018c). Three species listed as near-threatened under the NT TPWC Act; the orange leaf-nosed bat (*Rhinonicteris aurantia*), the, the bush-stone curlew (*burhinus grallarius*) and the yellow-rumped mannikin (*Lonchura flaviprymna*) were recorded during the fauna survey. The three near-threatened species recorded on site are either bat or bird species – the proposed clearing for the TGU project is unlikely to have a significant impact on bird species habitat and therefore unlikely to impact these species at a population level. All species have a widespread distribution in the region and there is no critical habitat for the listed species mitigation and management measures (LES 2017).

As discussed in the Draft EIS the Mary River catchment covers a total area of 8,100 km^2. Implementation of the project will result in an additional footprint of approximately 83 hectares or 0.83 km^2 which is 0.0002% of the total catchment. At a project level infrastructure has been amended which has resulted in a reduction in habitat disturbance, less surface water disruption, and management measures have been put in place to improve water quality and tailings chemistry. In combination with the proposed environmental management measures detailed Chapter 15 of the Draft EIS these measures will lessen the potential for the development of cumulative impacts.

Socio-Economic Aspects

Socio-economic effects of the project and management have been discussed in detail within Chapter 12. Beside the environmental impacts the proposed project will contribute to further employment and economic activity in the region. To manage these community impacts the following measures will be adopted:

- Open communication with all stakeholders (including landowners adjacent and downstream).
- Continual engagement with the local communities, with open and responsive dialogue.
- Identify issues early and consult with the affected groups.
- Providing employment and training opportunities for local communities.

- Comply with regulatory requirements and stakeholder commitments.

The regional and project level cumulative impacts have been identified and assessed across the lifecycle of the TGU Project. This includes all of the activities from exploration, through to post-closure and from extraction and processing through to recycling and waste management. The cumulative impact process is an iterative one and will be reviewed annually as part of the risk assessment to ensure all new risks are identified and appropriately mitigated. By implementing the mitigation and measurement measures for each individual impact and then monitoring environmental and social performance across the site, the potential for cumulative impacts are minimised. If monitoring demonstrates a deviation from the predicted outcome and where necessary remediation measures will be implemented. These measures will also take into account the potential for future cumulative impacts. Based on the discussion above and the further work underlying this EIS supplement no specific management measures in regard to the cumulative impacts are proposed.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
17	*Commitments*	*The ToR required the EIS to include a table listing commitments made by the Proponent, which are linked to the EMP in order in order to assess the performance of the actions.*	*Many of the commitments provided in the draft EIS are not measureable nor do they have timeframes. When providing a commitment it should follow the Specific, Measureable, Attainable, Realistic and Timely (SMART) principle, where possible.* *For example, a commitment relevant to section 14.1.2 of the draft EIS reads: "A fire management works/action programme shall be implemented which will detail spatial and temporal aspects of wildfires and hazard reduction burns, mapping of fire extents and documentation of fire effects and control outcomes." When will this programme be developed and implemented? How will its efficiency be determined to allow for continual improvement of the programme?* *The Supplement should include a complete table listing commitments made by the Proponent.*	NA

Response to Comment 17:

An updated commitments table detailing a complete list of commitments from the Draft EIS and EIS Supplement has been provided in Appendix G. All commitments have been revised to ensure they meet Specific, Measureable, Attainable, Realistic and Timely (SMART) criteria.

Comment No.	***Topic***	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
18	*Quality assurance and quality control*	*Section 8.3 of the ToR requires the EIS to include the results of quality assurance / quality control (QA/QC) testing are to be provided where data are used to support statements or findings in the EIS. Sufficient discussion should accompany the data to demonstrate that the QA/QC and data are suitable and fit for purpose.*	*The draft EIS does not include information pertaining to the reliability and accuracy of the data used to satisfy the requirements of the ToR. It is recommended that the relevant sections of the draft EIS and appendices (e.g. water quality monitoring, sediment/soil sampling, etc.) be revised accordingly and the results and discussion regarding QAQC be provided in the Supplement.*	NA

Response to Comment 18:

All studies and investigations undertaken since the submission of the Draft EIS have undertaken QA/QC of the data to ensure it is fit for purpose to demonstrate the current site conditions.

Discussion of data QAQC or fit-for-purpose are contained in the relevant documents and reports that support this EIS supplement.

Comment No.	Topic	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
19	Rehabilitation and closure	-	*The draft EIS noted that the WSD would be retained following closure for pastoral purposes. With specific reference to the long-term use of this feature, further information is required to provide certainty that the WSD will be stable, non-polluting, free-of weeds and fit for purpose. The Supplement should include methods for revegetation and measures to reduce risks for the short, medium and long-term. Invariably, this will be linked to considerations of weed management, site / WSD water balance and management of topsoil / soil profiles.* *More broadly, the operational period of the mine is short and rehabilitation and closure would commence thereafter. Well-developed details of rehabilitation and closure are critical during the early stages of mine planning and should be provided in the Supplement. This should include finalisation of rehabilitation and closure objectives for key Project components and infrastructure, such as tailings disposal/consolidation, water dams and planned works (if any) on the WRDs.*	NA

Response to Comment 19:

In the case that the proposed WSD is to be retained following closure for pastoral purposes and prior to the WSD being passed to the pastoralist; Primary will undertake the following:

- A geotechnical survey to assess the long term structural stability of the water dam walls to confirm the structure is fit for purpose;
- Assess the WSD area for the presence of weeds and control accordingly: and
- Assess the water quality and associated sediments within the dam to ensure suitable livestock quality.

The above process will be done in consultation with the pastoralist and DPIR. Once finalized the dam would passed to the pastoralist for integration into the land management practices associated with the pastoral station. The responsibility of the dam will be the pastoralist and a signed agreement in place at closure.

If the facility for any reason was not retained after closure the embankment walls would be removed and used as capping material for the TSF with the base of the facility re-contoured and scarified with topsoil previously recovered from the footprint respread over the area. The mine closure plan (MCP) has been updated to reflect further baseline studies, the updated conceptual site model and any changes associated with this EIS Supplement (Appendix J). The additional baseline studies have been used to form completion criteria that are specific, appropriate and achievable; the studies have also been used to update the risk assessment associated with mine closure and rehabilitation risks. The further baseline studies provided an understanding of the current mine site conditions relative to surrounding ecosystem and receptors. For example, the drilling of the waste rock dumps and trenching of the TSF has provided a better understanding of the potential acid forming material within these facilities. From this work, it is intended to reprocess the tailings to extract gold as well as treat tailings to remove mixed metal oxides, silica and sulfur. This reprocessing and treating of tailings will reduce the acid generating profile of the tailings and will improve the insitu capping and rehabilitation of the TSF. The baseline studies conducted across the waste rock dumps have defined the quality and potential acid loads within the dumps. The results from this geochemical baseline assessment will be used for developing investigations into the closure strategy and remediation of the WRDs.

Rehabilitation and closure objectives have been developed for each closure domain with an associated rehabilitation closure schedule in place. A rehabilitation monitoring plan has been developed and is proposed to be undertaken annually post closure. The recommencement of the TGU Project only proposes to construct the water/tailings treatment plant, WSD and borrow pits – closure objectives for these aspects have been developed in the revised MCP.

6.2. Department of Business

Comment No.	*ToR Item / Draft EIS Section*	*Comment*	*Related Comment and/or Appendices*
20		*The Department of Business (DOB) does not have any major issues in relation to the Draft EIS.* *DOB notes that this project would provide socio-economic benefits to the region as well as the broader Territory economy. The estimated contribution of the project to the Australian GDP and the NT GSP are however, overestimated.*	NA

Response to Comment 20:

Noted. Primary will endeavour to employ locally where possible as well as contract local businesses.

6.3. Department of Health

Comment No.	Comment	Related Comment and/or Appendices
21	***Environmental Health Branch / Department of Health*** *The Environmental Health Branch of the Department of Health has reviewed the Toms Gully Draft Environmental Impact Statement (EIS) and has the following comments:* *Section 2.4.14 Public and Environmental Health Act and Regulations should include reference to the Wastewater management legislative requirements detailed in the Public and Environmental Health Regulations which will be relevant when reinstating office blocks, workshops etc. and any associated ablution facilities. Fact sheet 700 provides further advice on wastewater management requirements.* *The Terms of Reference (Section 5.7.2 Assessment of Risks to Human Health and Safety) included the requirement to consider aspects to human health and safety from project impacts on downstream ecosystems including fish for human consumption. The draft EIS has not satisfactorily covered this issue of fish for human consumption.* ***Medical Entomology / Department of Health*** *There are no Medical Entomology comments on the above EIS. The mosquito section provided in the draft EIS is satisfactory.*	Comments 5 to 7

Response to Comment 21:

Primary acknowledge the Wastewater management legislative requirements detailed in the Public and Environmental Health Regulations. This legislation requirement will be included in the project's legislation matrix. Primary will ensure that when reinstating offices, workshops and associated ablution all wastewater regulatory requirements will be complied with. This matrix will be regularly reviewed to maintain up to date details on the relevant compliance, incident reporting and regulatory requirements.

Work in the Edith River in proximity to the Mt Todd Gold Mine (Welch 2010) highlighted the complexity of metal concentration in fish tissue due to understanding the regional catchment perspective, geology and overall catchment land use. The study also concluded from a human consumption perspective

the actual risk to human health needs to be put into the context of specific dietary intakes, gender, age and lifestyles of people who regularly consume fish from the catchment. Associated with these factors was the potential likelihood that individuals could achieve the amounts of fish tissue required to consistently exceed the guidelines. From this interplay of factors it was considered the potential effect on human health was likely to be low. A further human dietary risk assessment in 2012 (FSANZ 2013) from limited fish sampling on the same river system and the Daly River found that inorganic arsenic, cadmium, copper, manganese, nickel were considered to pose a negligible additional dietary exposure risk.

It is acknowledged that the Mt Bundey and greater Mary River catchment differ to the Edith catchment. However, the same level of complexity associated with the physical ecosystem and fish consumption is present with the first public access fishing spot being approximately 7km from the TGU site; from this perspective the risk to human health could be considered low. At a management level, Primary acknowledges protecting the risk to human health and safety from project impacts on downstream ecosystems is important. To reduce the potential risk related to human consumption of fish, Primary has made is focused on improving the water quality prior to discharge off site or transfer to a third party.

To minimize the risk to human health, studies have been completed by CSIRO to review the Site Specific Trigger Values at TGU to ensure an appropriate water quality being achieved before discharge (Comments 5-7). Additionally, the implementation of a water treatment plant to achieve the appropriate water quality. This water treatment plant removes the reliance of dilution and mixing prior to water reaching the downstream monitoring point SWTG2 (Comment 5-7). The preferred water treatment option has been selected for its capacity to reduce metal and metalloids to 90% ecosystem protection as per ANZECC Guidelines as well as bring pH to a range from 6 to 8.

The Medical Entomology / Department of Health comment is noted and mosquito management will continue during operations.

6.4. Department of Infrastructure

Comment No.	*Comment*	*Related Comment and/or Appendices*
22	*The Department of Infrastructure (DoI), Engineering and Environment Services on behalf of the Department have reviewed the draft Environmental Impact Statement for comment and have no comment on the proposed mine at this time. It is the view of DoI that works are expected to have a low impact on existing infrastructure managed by the Department. Any issues associated with roads are expected to be addressed by the Department of Transport.*	NA

Response to Comment 22:

Noted. In the event that any issues associated with roads arise during operations, the Department of Transport will be consulted.

6.5. Department of Land Resource Management (DLRM)

The comment provided by the DLRM has been split into 5 separate comments to provide a specific response to each topic.

Comment No.	Comment	Related Comment and/or Appendices
23	*The Department of Land Resource Management has assessed the information contained in the above EIS and provides the following comments:* *No systematic survey of biodiversity values has been undertaken across the tenement as part of the EIS, and threatened species assessments are restricted to desktop analyses of existing distributional information. The Department's database records and vegetation/ habitat mapping of the area provide an indication of the potentially significant biodiversity values likely to be present on the tenements although they do not allow a complete assessment of risks associated with the proposal.* *Vegetation mapping undertaken by the proponent as part of the EIS has identified the presence of sensitive/significant riparian and wetland vegetation within the project area, the majority of which is in an intact ('residual') or slightly modified condition. The mitigation measures outlined in Section 8.4.1 of the EIS to minimise disturbance associated with the operations are supported.* *Table 4 of Appendix 6 recommends the adoption of buffer zones between sensitive/significant vegetation communities and ground disturbance associated with construction activities on-site in accordance with the NT Land Clearing Guidelines. This approach is supported, particularly in relation to minimising impacts on downstream wetland and aquatic ecosystems.* *A number of threatened fauna species have been assessed by the Department as possibly occurring within the project area:* • *Northern Quall Dasyurus hallucatus (Endangered, Environment Protection and Biodiversity Conservation Act (EPBC Act); Critically Endangered, Territory Parks and Wildlife Conservation Act (TPWC Act))* • *Bare-rumped Sheathtail Bat Saccolaimus nudicluniatus (Critically Endangered, EPBC Act) Black-footed Tree-rat Mesembriomys gouldii (Endangered EPBC Act; Vulnerable TPWC Act)* • *Fawn Antechinus bellus (Endangered TPWC Act)* • *Pale Field-rat Rattus tunneyi (Vulnerable TPWC Act)*	Comment 13, Appendix D, E and J

Comment No.	Comment	Related Comment and/or Appendices
	• *Gouldian Finch Erythrura gouldiae (Vulnerable, EPBC Act)* • *Partridge Pigeon Geophaps smithii (Vulnerable, EPBC Act)* • *Mitchell's Water Monitor Varanus mitchelli (Vulnerable, TPWC Act)* • *Merten's Water Monitor Varanus mertensi (Vulnerable TPWC Act)* • *Floodplain Monitor Varanus panoptes (Vulnerable TPWC Act).* *No targeted survey of fauna has been undertaken over the tenement. However, as the additional above- ground disturbance on the tenement is limited to the construction of the water storage dam, risks to local populations of these species is likely to be low.* *No threatened plant species have been recorded from within the tenements. The EIS identified three threatened plant species as having some potential to occur within the project area and assessed the likelihood of these species being present on site as either 'unlikely' or 'highly unlikely'.* *The Department's Flora and Fauna Division assessment supports the EIS findings for Goodenia quadrifida (Vulnerable EPBC Act and) Schoutenia ovata (Endangered, TPWC Act) that there is a low likelihood that suitable habitat for these species is present within the areas proposed to be disturbed as part of mining operations.* *The EIS documentation does not adequately support the proponent's conclusion that the threatened shrub Helicteres macrothrix (Endangered, EPBC Act) should be considered 'highly unlikely' to occur within the project area. Helicteres macrothrix is known from the Mt Bundey area on the lower slopes and colluvial pediments of the Mt Bundey Granite and Mt Goyder Syenite, with other sub-populations of H. macrothrix being recorded on the Wildman Siltstone in the Lake Bennet area. Both of the Wildman Siltstone and the Mount Goyder Syenite are present within the project area, with the proposed water storage dam lying wholly within a mapped area of Wildman Siltstone (see Figure 1 below).* *Although there are no records of the species within the tenements, no targeted survey has been undertaken in potentially suitable habitat present within the project area.* *If H. macrothrix is present within the tenement, the construction of above-ground infrastructure has the potential to represent a risk to the local population as a result of reduction in area of occupancy, fragmentation and impacts upon habitat quality. The proponent*	

Comment No.	Comment	Related Comment and/or Appendices
	should determine the presence or absence of the species on the tenement by targeted survey. If present, assessment of the potential risks to this species associated with all aspects of the proposal (including direct, off-site and indirect impacts) should be undertaken. Appropriate risk minimisation / mitigation measures should be described. *Comprehensive details have been provided outlining site rehabilitation and closure associated with the Tom's Gully Mine operations. Although these cover a range of possible closure scenarios, it is anticipated that the measures outlined in the EIS should allow effective revegetation of the mine site if implemented in accordance with best practice industry standards.* *In addition, it is recommended that revegetation goals aim to re-establish vegetation communities characteristic of the pre-clearing vegetation mosaic of the local area. This would increase the likelihood of successful revegetation outcomes and integration of the disturbed areas into the surrounding landscape.*	

Response to Comment 23:

The comment provided by the DLRM is similar to the Comment 13 received by the NT EPA in relation to terrestrial biodiversity. Therefore the following response should be read in conjunction with Comment 13.Primary acknowledges the concerns raised in respect to insufficient biodiversity survey efforts. Therefore Primary commissioned two targeted flora and fauna surveys across the TGU Project area. These were undertaken across two seasons, November 2016 and May 2017, these surveys provided a better understanding of the potential risks of the TGU Project on threatened species. The findings indicated that no threatened flora or fauna species were present within the area of the proposed activities. Except for one Mertens Water Monitor (*Varanus mertensi*), listed as Vulnerable under the TPWC Act was recorded 0.7 km upstream of TGU (GHD 2018, Appendix E).

Primary acknowledges the comments raised by the DLRM in respect to the management of riparian and wetland vegetation and buffers will be maintained during operations.

To investigate the presence of the threatened shrub *Helicteres macrothrix,* two targeted flora surveys for this species were undertaken. The flora surveys were undertaken in both the dry and wet seasons to ensure flowering seasons were captured (LES 2017, Appendix D). Both flora surveys searched extensively

for the threatened shrub, *Helicteres macrothrix,* neither survey recorded the shrub. Plants looking similar to *Helicteres macrothrix* were collected and sent to the NT Herbarium for identification. All of the collected specimens were identified as *Helicteres darwinensis* - a plant listed as least concern under the *TPWC Act*. Based on the results of the two targeted flora surveys (in which the species was not recorded) and based on the nature of the proposed activities (minimized clearing); it is considered that the potential to impact *Helicteres macrothrix* is low. As an ongoing precautionary measure, Primary proposes that site inductions include identification sheets for *Helicteres macrothrix.* These will be provided to the workforce so that potential plant species are marked so that they can be avoided.

Revegetation objectives have been updated within the MCP (Appendix J) and will aim to re-establish vegetation communities similar to the pre-clearing vegetation mosaic within the surrounding local area. Primary has selected natural analogues of the pre-clearing vegetation mosaic within the local area to match specific closure domains which are similar in aspect/slope and soil type (see Section 6 and Table 13 within the MCP, Appendix J). The analogues will be used to measure the success of post mining vegetation communities and ensure the nominated closure criteria are achieved as per the MCP. As vegetation generates after rehabilitation both the rehabilitation and analogue will be monitored to allow the comparison of rehabilitation performance to a nature system but also compare behavior across sites during periods of usually season events and fire occurrences. Rehabilitation monitoring will be undertaken annually at the TGU Site as per the rehabilitation monitoring plan (Table 33 in Appendix J). The monitoring will provide feedback and increase the likelihood of successful revegetation outcomes thus integrating into the surrounding landscape.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
24	*The draft EIS references the Erosion and Sediment Control guidelines (NRETAS, 2006) in Section 2.6.3*	*The Draft EIS makes reference to developing an Erosion and Sediment Control Plan (ESCP). However, the EIS does not describe what erosion and sediment control (ESC) strategies will be undertaken during the life of the mine.* *To service environmental management objectives associated with the use and land disturbing activities, the Department recommends that an ESCP be developed, and be cross-referenced with the Mine Closure Plan. The ESCP will support environmental management of land disturbing activities by facilitating preparation of work costs and schedules, provide direction for site management and personnel responsible for implementing ESC and rehabilitation measures, and assist monitoring activity.*	Appendix J

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		The ESCP should include details of permanent and temporary erosion and sediment control methods and treatments to be implemented during both the construction (development) and operational phases (including post-extraction) of the project. The ESCP should address management of vegetation clearance; management of road formation and drainage, including stabilised crossings and discharge points; and ESC measures for mine pits (e.g. surface water diversion, stockpile stabilisation and sediment control) where applicable. The Mine Closure Plan should address final landform and drainage and related stabilisation measures, soil management and establishment of vegetation cover, including ground cover standards/targets, monitoring and contingency. *The ESCP can be based on site plan maps and should include notes on timing of works, flagging of No-Go areas, types of ESC structures to be installed, and reference to the Rehabilitation Plan. Map symbols should be used to indicate locations of works, and be referenced in the legend. Standard drawings or other information sheets, giving detail of ESC structures or methodologies, should be included as attachments.* *It is recommended that ESCP preparation is undertaken by a suitably qualified and experienced professional in ESC planning, and be approved by, and implemented to the satisfaction of the Department of Mines and Energy, to ensure the applicant takes sufficient measures to avoid or minimise sediment runoff during both the construction and operational phases, to prevent environmental harm or nuisance.* *The IECA Best Practice Erosion and Sediment Control Guidelines 2008 may be referenced as a guide to the type of information that should be included in an ESCP.* *Additionally the Soils and Construction Volume 2E Mines and Quarries document also has useful information that will assist in the development of E&SC and ESCP's. Information regarding erosion and sediment control and ESCP content, including standard drawings, is available at: http://www.austieca.com.au/, http://lrm.nt.gov.au/soil/management, and http://www.environment.nsw.gov.au/resources/stormwater/08208soilsconststorm2e.pdf*	

Response to Comment 24:

The nature of the TGU Project site is that some areas have already revegetated and are not proposed to be cleared as part of the recommencement of operations. As revegetation has been established for a number of years, the rate of sediment erosion has reduced thus reflecting a stabilised environment, in particular for the existing waste rock dumps.

For the areas proposed to be cleared or disturbed, an Erosion and Sediment Control Plan (ESCP) will be prepared by a suitably qualified and experienced professional in ESC planning. This will be undertaken as part of the Mining Management Plan (MMP) submission to DPIR. This ESCP will be cross referenced with the MCP to ensure closure objectives are able to be met. Both the MMP and MCP will incorporate regulator input from the Draft EIS and EIS supplement.

Below are a number of erosion and sediment control (ESC) strategies that will be included during clearing, establishment and rehabilitation over the life of the mine to minimise erosion and ensure discharged water quality (i.e. sediment load) is appropriate. These strategies include but are not limited to:

- All clearing will be conducted in a manner that minimises the amount of disturbance as much as practicable;
- Separation of “clean” surface water that has not entered the site from surface water that has interacted with the site (i.e. water that has been exposed to disturbed areas);
- Where practical retain vegetation buffers;
- Progressive clearing and rehabilitation to limit the areas of disturbance at any given time;
- The discharge structures will be constructed with a zone of keyed in rip rap (rock armouring) to reduce water velocity and disperse the water over a wider area;
- Discharge areas will be regularly inspected during rainfall events for erosion. If the area is eroding remediation work will be undertaken to minimise the potential for ongoing erosion;
- If monitoring of the discharge highlights the presence of sediment discharge above accepted limits measures will be taken to improve the water resonance time in the sediment trap to improve sediment settling volumes; and
- Disturbed areas will be reshaped to ensure that they are ‘keyed-in’ with the surrounding landscape as much as practicable. This will reduce the potential for erosion in these areas by ensuring that any disturbed soil is already at ground level, and any surface water flows are allowed to pass over the area without altering the surface flow regime (i.e. avoids concentration of flow in sheet flow areas).

In addition, the ESCP will:

- Detail the timing of work and the installation of controls.
- Demarcate no-go areas.
- Allocation of roles and responsibilities for implementation.
- Have all hydrological design calculations will be reviewed by a suitably qualified engineer.
- The Erosion and Sediment Control Plan and on-ground implementation will be in accordance with (IECA 2008).

Comment No.	***Comment***	***Related Comment and/or Appendices***
25	*The Draft EIS addresses the concerns of the Department's Weed Management Branch regarding weed spread both within the property and to clean areas outside. The proponent recognises the densely infested areas of NT Portion 4937, particularly those infested with gamba grass, and will take measures to reduce the impact of these weeds. These measures will involve seasonal control, vehicle hygiene protocols, monitoring for incursions, and, if needed, liaison with appropriate government agencies to ensure conformity with the Weeds Management Act. The draft EIS and supporting documentation identifies that these measures will apply during the construction, operational, closure and post closure rehabilitation phases of the project.* *The Weed Management Branch may conduct random inspections of NT Portion 4937 to ensure weeds have not been spread within or introduced to the site.*	NA

Response to Comment 25:

Noted, Primary will implement weed management as detailed in the Draft EIS. The plan to be implemented during development is to ensure vehicles, import materials and equipment do not introduce or spread declared or potential weeds across the site.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
26	*Section 6.6.1 and Appendix 12*	*The draft EIS only includes a brief description of the water monitoring program in Section 6.6.1 (Water Monitoring). This description does not include detail of the distribution of monitoring sites or the design to detect mining impact.* *Appendix 12 (Biodiversity management Plan) includes some information regarding previous work in relation to aquatic ecosystems; however this does not include any additional detail on design. The macroinvertebrate survey identified taxa to family level only. Though common practice, this constrains any effort to describe patterns of aquatic biodiversity. The comment that potential impacts may be confounded by habitat differences highlights the need for explicit description of the design to detect mining impacts.* *The measures described in the EIS should be adequate to address the previously identified risks that relate to groundwater.*	Comment 3 and 5 Appendix E and Appendix L.

Response to Comment 26:

The water management plan has been updated to better reflect water monitoring and is included as Appendix L. If water quality at the discharge point exceeds the set triggers based on SSTV investigations will be implemented to establish the source of the elevated elements and action taken to remediate the issue. Further aquatic surveys have been completed (Appendix E), where practicable the aquatic fauna have been identified to a species level, refer to Comments 3 and 5 for more details. In order to better understand risks to groundwater and potential impacts, further groundwater modelling has been undertaken, see Appendix C for more details.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
27	Flood Assessment and Water Management	*Flood modelling was carried out by the proponent using XPRAFTs and HECRAS modelling to determine peak flood levels and food extent for a 1% AEP, 72 hour flood event. Based on the flood modelling, embankment protection at the Tailings Storage Facility and an increase in the embankment level has been proposed. However, it has been*	Appendix B

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		recommended that the results of the flood modelling study are not used for detailed design due to the limitations of the topographic survey, and that a more detailed survey is carried out for the design stage. *The proposed water management strategy and mitigation measures for the project has been designed by water balance simulation modelling for the mine system (Figure 4.2 in EIS), to assess expected performance against performance indicators: water supply reliability, excess water production and spillway frequency and site water inventory, including reviews of mine expansion designs, expected future stored water inventory in Water Supply Dam and modelling under a 1 in 100 year 72 hour rainfall event. Historic climate data was used to run the model.* *It is understood that the new dam height would be 12 to 14m, which may require a permit under the Water Act.*	

Response to Comment 27:

To improve site planning and design in respect to potential flooding across the site, a LiDAR survey was completed in 2016. This survey was used to generate a high resolution digital terrain model across the site and surrounding catchments. This flood mapping has then been used as a planning tool to refine the proposed infrastructure in the EIS Supplement (Appendix B). Primary will investigate and confirm the requirement for a permit under the Water Act for the water storage dam height.

6.6. Department of Mines and Energy (DME)

The comment provided by the DME has been split into 5 separate comments to provide a specific response to each topic.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
28	*Project Description* (p.vi) of Draft EIS	*"Mining underground to the south of the existing underground workings" (p. vi)* Has a geotechnical assessment been undertaken for the underground workings? Operations ceased in part due to difficult ground conditions.	NA

Response to Comment 28:

A geotechnical assessment has not been completed for the existing underground workings as these areas are currently underwater. Once the open pit and underground mining voids are dewatered a geotechnical assessment will be completed. The staged development and remediation of the workings will occur based on the geotechnical assessment to allow for safe working conditions. The staged assessment and remediation will include the following:

- A systematic geotechnical assessment to identify stability risks, water depressurisation requirements and localised ground conditions thus providing recommendations and identifying areas needing remediation,
- Rock mass stabilisation including rock bolting, messing and shotcreting where required, and
- Adapting the mining method to best suit ground conditions, safety requirements and operational constraints.

The above process will be undertaken by geotechnical specialist in consultation with Primary management, DPIR and NT WorkSafe.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
29	Project Description (p.vi) of Draft EIS	*"Approximately 0.9 Mt of tailings to be stored in raised Tailings Storage Facility 2 (TSF2)" (p.vi)* *"Removal or capping in-situ of tailings in TSF1 and TSF2" (p.vi)* Trees growing on the TSF walls may be creating seepage pathways which could lead to piping. The trees need to be removed.	NA

Response to Comment 29:

Noted, as part of the lift, Primary will undertake a geotechnical assessment in accordance to ANCOLD 2012 guidelines and remove the trees prior to construction of the embankment.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
30	Project Description (p.vi) of Draft EIS	*"A WSD is proposed to be constructed with designed usable capacity of 2.1 Gigalitres (GL)" (p. vii)* Are there any exploration drill holes through the proposed WSD area that may potentially impact on the WSD and the underground operations (i.e. create a water flow path)?	NA

Response to Comment 30:

In the Draft EIS it was proposed that 2.1 GL water storage dam (WSD) would be constructed by building an embankment across a small sub-catchment to the west of the Toms Gully site. The size of this water dam has been reduce to 1 GL. Rather than closing off the creek line and associated sub catchment the facility will be positioned away from the creek line and will not result in water being positioned over the underground workings. If drill holes above the orebody are identified and they connect the underground workings to the surface and allow the flow of water - then these holes are to be grouted to prevent water infiltration.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
31	<u>*Project Description*</u> (p.vi) of Draft EIS	*There are references to 85-93 ha of clearing throughout the document, for example:* *"Clearing of 93 ha of generally disturbed vegetation for the WSD and borrow material." (p. vi)* *"Clearing of approximately 93 he of native vegetation (54 ha being for WSD, the remainder for borrow materials, new access and drainage) " (p. ix).* *However 'Section 3.1 Proposed Project Key Characteristics' states "Clearing of 85 ha of native vegetation for the WSD and borrow material." (p.22).* Primary Gold Limited is required to clarify the exact amount of clearing proposed in the EIS.	NA

Response to Comment 31:

The proposed clearing area proposed within the EIS Supplement is 83 hectares. An updated site disturbance table for the TGU Project (including existing and proposed areas) is provided in Section 3.4. – this is the most recent and accurate disturbance area calculations and supersedes all previous versions.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
32	*Existing Environment* (p.xi) of Draft EIS	*Existing Environment* *Groundwater at Toms Gully exhibits variability in salinity (S04) and pH range conditions are present indicative of localised AMD contamination of groundwater. A number of bores access groundwater in the surrounding areas." (p.xi).* Have baseline surveys been completed? Provide data and summarise the results. If baseline surveys have not been undertaken, Primary Gold Limited is required to provide evidence to support this statement.	Appendix C

Response to Comment 32:

Baseline groundwater sampling and groundwater modelling have been completed since the submission of the Draft EIS (details are provided in Appendix C). Further sampling has indicated that groundwater quality is variable across the site. Work completed by GHD (2018b) in advancing the groundwater model has detailed that the site is underlain by surficial and shallow alluvium/colluvium with groundwater at depth controlled by fractured rock aquifer zones. The localised variability in chemistry tends to reflect where mining landforms (including tailings dams and waste rock dumps) intersect the alluvium cover and deeper fractured rock zones. Away from the fractured rock zones water flow is greatly reduced when encountering less permeable country rock of the Wildman Siltstone and Mount Goyder Syenite. In addition, surrounding the syenite is a 500m wide alteration halo in the siltstone making this zone generally more resistant to weathering. Under current conditions and groundwater levels the Toms Gully pit is operating as a hydrological sink whereby groundwater within fractured rock zones across the site (including underlying mining landforms) flows back to the pit thus minimising lateral groundwater flow within the fractured rock zones. On the recommencement of mining the pit will be dewatered with subsequent water treated resulting in a greater hydraulic gradient to the pit with water surrounding the site flowing back to the pit resulting in a further minimisation of groundwater movement away from the existing pit. The groundwater model will be updated and refined as more data becomes available during operations thus improving the understanding of groundwater behaviour and chemistry.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
33	Existing Environment (p.xi) of Draft EIS	*A list of threatened and vulnerable flora and fauna species has not been included in this section of the EIS. Provide a list of which species have potential to be impacted by activities associated with the project* *"The likelihood of occurrence of threatened and migratory species within 10 km of the TGU Project site was assessed based on desktop searches and literature review." (p. xii)* • When was this assessment completed? • Note that the Environmental Protection and Biodiversity Conservation Act Threatened Species list has been updated as of 8 July 2015. These changes may be relevant to the project and can be found at: https://www.environment.gov.au/news/2015/07/14/six-species-listed-under-epbc-act Please ensure that you are aware of these changes. *"One of these, the Gouldian Finch, is listed a vulnerable under the EPBC Act..." (p. xii)* • *The Gouldian Finch is listed as Endangered under the EPBC Act and Vulnerable under the TPWC Act.*	Comment 13 and Appendix D

Response to Comment 33:

The following response should be read in conjunction with Comments 13 and Appendix D.

The original desktop biodiversity assessment was completed in September 2015. In response to the concerns raised, two flora and fauna surveys have been completed over the project area. Both surveys had a targeted search for the Gouldian Finch, no individuals were recorded. All work associated with the flora and fauna surveys, assessments and reporting has used the most recent *Environmental Protection and Biodiversity Conservation Act 1999* threatened species lists.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
34	Impact Summary (p. xv) of Draft EIS	*"Given the small proportion of catchment and flow contribution made by Mount Bundey Creek, any impacts on Mount Bundey Creek are not expected to impact upon the wetlands of the Mary River system." (p. xvi)* ● Discharging treated water (typically high in EC) will have an effect and the ratios are not yet determined. Further investigation is required into the anticipated quality and quantity of flow and impact on the Mary River system.	Comments 10 Appendix F

Response to Comment 34:

In order to address risks and impacts associated with surface water quality and quantity at the TGU Project, Primary has focused on exploring the best site specific water treatment option to reduce the impact of site water on the Mary River system. The options investigated are discussed in Comment 10. It is proposed that the selected option will increase pH while reducing the high level of EC and associated metals to the achieve at least the SSTV values that have been formulated by CSIRO based on site conditions and the 90% ANZECC level for the protection of fresh and marine water quality (Appendix F). The SSTV are designed for the downstream declared beneficial uses, to allow water discharge during longer periods and for the potential seasonal use for agricultural and horticultural by third parties. Preliminary discussions have occurred with the pastoralist on the potential use of treated mine water. The pastoralist is supportive but has stressed the supplied water needs to be fit for purpose. By attaining the SSTVs the ratios will be reduced while the removal of water from the site water balance will led to less water across the site and less potential seepage. In addition, during operations seepage will flow towards the pit due the ongoing dewatering.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
35	Outcomes (p. xvii) of Draft EIS	*"Placing all tails in-pit unless sufficient cover materials can be located and a suitable long-term cover design approved" (p.xvii)* *The investigations undertaken by Primary Gold Limited should be adequate to determine the availability of sufficient cover material. A commitment should be made to one of the options.*	NA

Response to Comment 35:

As part of mine closure planning, it is proposed to reprocess the tailings in order to recover gold. It is also proposed to treat the remaining tailings, once reprocessed, to extract mixed metal oxides, sulphur and silica which will be recovered and removed from site as saleable products. In using this process the tailings volume is greatly reduced while the potential acid mine drainage generation is also reduced. It is intended that residual tailings after reprocessing and treatment will be deposited in either TSF1 or TSF2, after it has been confirmed the facilities can be upgraded to comply with ANCOLD 2012 guidelines.

As a contingency measure if the tailings treatment is not as effective as anticipated; TSF 1 will be reprocessed to recover the gold contained in the tailings. This material will be placed in a purpose built and lined tailings storage facility or placed in an upgraded and lined TSF 1 that complies with ANCOLD 2012 guidelines. For tailings in TSF2 the tailings will be capped insitu with a water shedding cover to prevent the egress of water into the tailings profile.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
36	Outcomes (p. xvii) of Draft EIS	*The TGU Project will not use any waste rock, or bring any to the surface, but will complete more detailed investigations to enable a regional 3D groundwater model to consider long-term contaminant transport so that options for the WROs can be identified and assessed." (p.xvii)* *In Section 6.3.5.1 Groundwater Modelling (p.138) there is a commitment to "a 3D impact assessment flow model' to be implemented in the pre-mining phase. The outcomes of this modelling will provide clarity for water and tailings storage and WRD options.* Primary Gold Limited need to provide a commitment to the 3D Groundwater modelling (and costs) prior to approval.	Comment 2 and Appendix C

Response to Comment 36:

To better understand the groundwater baseline conditions and in response to other comments raised on the Draft EIS the proposed 3D groundwater modelling was advanced as part of the EIS supplement. Details of the modelling are provided in Comment 2 and Appendix C. Primary commits to further validate, refine and update the Toms Gully 3D groundwater model as additional information comes to hand, conditional boundaries are further refined and

operational inputs are updated to match site observations. The ongoing feedback loop will enhance the model, thereby improving the decision making process around groundwater management at closure.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
37	Draft EIS Table 3(p.xix): Assessment Summary of Key Environmental Factors	<u>*Acid and Metalliferous Drainage*</u> *"Dewatering and treating the pit water minimises the risk of AMD leachates in water being discharged to the environment." (p.xix)* *"The TGU Project has the potential to virtually eliminate the long-term risk and liability associated with acid producing tailings and the subsequent risk of leachate migrating into the groundwater and off-site, runoff and downstream contamination and embankment failure."* • A key concern would be the potential for pit leaching AMD contaminated water into surrounding groundwater systems, and furthermore, surface water catchments. • Geotechnical and groundwater studies should be undertaken during the feasibility stage to ensure adequate baseline data is collected and available for comparison during Life of Mine (LOM). • Further information regarding waste rock characterisation is necessary to completely understand the potential impacts associated with this project over time. An initial waste rock characterisation assessment should be undertaken during feasibility, and supported by regular interval (quarterly or bi-annual) reporting to ensure that any changes within waste rock chemistry and composition are identified promptly and managed appropriately.	Comment 28 and Appendix A

Response to Comment 37:

The conceptual site model has been updated as part of the EIS Supplement the update incorporated further studies covering baseline geochemical conditions, groundwater modelling, surface water assessment and aquatic surveys. This new baseline data forms the starting point for Life of Mine planning process. During operations the conceptual site model will be updated to a site model that will be used for closure planning. Included in the update will be data from the pit and underground workings to estimate the distribution and potential for acid forming material. This work cannot occur until the workings become

exposed after dewatering. A step wise process will be adopted once the pit is dewatered and during operations investigations will be completed to define the extend of sulfidic material in the pit walls, sulfidic material in the underground workings and all the sources of surface water input from areas surrounding the pit. Closure planning of the pit will be informed by this work. At the completion of mining the pit will act as a sink as has currently been observed from the groundwater modelling. Closure planning is to investigate pit filling and potential insitu management of potential acidic water. At a preliminary level discussions with the CSIRO as to whether a bacterial sulfate reduction bioremediation system based on biological neutralisation of Acid Mine Drainage could be viable.

As discussed in Comment 28 geotechnical surveys will be undertaken as access becomes available to assess actual ground conditions. As part of the feasibility stage a conceptual geotechnical assessment has been completed to assess the most cost effective and efficiency mining method for the Toms Gully orebody. Further groundwater studies and associated data acquisition have been used to construct a site groundwater model (Appendix C). The data and model provides a reference to baseline conditions at the current Toms Gully site for comparison to conditions during operations and closure.

As detailed in Section 7 of the draft EIS (earlier stage AMD assessment) and Appendix A of this Supplement (subsequent AMD assessment) two phases of AMD assessment have been completed. The early phase assessment focused on the rock chemistry of the waste and ore to be mined while the later phase focused on current site conditions. The latter assessment included drilling of the waste rock dumps/RoM, grab sampling stockpiles and pitting of the tailings dams to estimate the volume of acid forming minerals and potential timeframes for oxidation. Both assessments have provided Primary with a baseline understanding of current conditions and rock to be encountered during mining. It is fully acknowledged by Primary that ongoing regulatory discussions about waste rock will occur to ensure that any changes within waste rock chemistry and composition are identified promptly and managed appropriately.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
38	Draft EIS Table 3 (p.xxi): Assessment Summary of Key Environmental Factors	*<u>Infrastructure Integrity and Suitability</u>* *"A review of the WRDs will be completed during the operation of TGU and be used to determine the feasibility of improvement options for these features." (p.xxi)* • This review should be undertaken during the feasibility stage of the project.	Appendix A

Response:

As part of the baseline geochemical assessment of the existing conditions the oxide and sulfide waste rock dumps were drilled to understand the volume, distribution and lag time of the potentially acid forming material. The findings are contained in Appendix A and can be summarised as follows:

Oxide Waste Rock Dump (OWRD).

- The median $pH_{1:5}$ value for the 114 samples analysed was 4.4 and increases to 5.6 as pH_{OX} when a rapid oxidant is introduced. A median $EC_{1:5}$ of 96 µS/cm, suggests a very low potential for saline drainage, supported by a very low median chloride value of <10 mg/kg.
- The median total sulfur value for the 114 samples was 0.04%. The median chromium reducible sulfur concentration was 0.01%. This would suggest the presence of a majority of acid-forming and non-acid forming sulfate species in the total sulfur content reported from the OWRD. Mineralogical evidence supports the presence of pyrite (accounted for in chromium reducible sulfur) and jarosite (accounted for in total sulfur), with calcite and dolomite also present as acid consuming species.
- When the NAPP value is adjusted to consider the median value of 85 percent non-pyritic sulfur, assumed to be jarosite as identified under XRD analysis, the NAPP value becomes 0.4 kgH_2SO_4/t – a value likely more representative of the content of the OWRD.
- As noted above, when the median total sulfur NAPP value of 0.9 kgH_2SO_4/t (or the jarosite-adjusted value of 0.4 kgH_2SO_4/t) is considered along with the median pH_{OX} value of 5.6, waste rock in the OWRD may be seen as being potentially acid forming (low capacity).
- Using the jarosite-adjusted NAPP value of 0.4 kgH_2SO_4/t, a density of 2.6 t/m^3 (PGO 2013) and GHD's estimated volume of 3,967,800 m^3, there remains a total potential acid load of around 3,761 tonnes of H_2SO_4 in the OWRD.
- It is also important to note that sulfur concentrations are relatively low in the OWRD, and there are pockets of neutralising carbonate present at up to around 11%. The median NAG test results support a low acid forming capacity.
- As part of the OxCon testing, Earth Systems Analytical (ESA) undertook sulfur speciation on two bulk samples collected from the OWRD. ESA concluded that both bulk samples were unlikely to be acid generating.
- The results the presence of several reduced and oxidised, acid and non-acid forming sulfur species. However, the 2017 sampling data showed a median total sulfur value of 0.04%, with an average of 0.05% over 114 samples, which indicates manageable long-term risk.

Sulfide Waste Rock Dump (SWRD).

- The median $pH_{1:5}$ value for the 79 samples analysed was 3.8 decreasing to 3.2 as pH_{OX} when a rapid oxidant is introduced. A median $EC_{1:5}$ of 1,340 µS/cm suggests a high potential for saline drainage, despite the very low median chloride value of <10 mg/kg.
- The median total sulfur value for the 79 samples was 0.62%, with the median chromium reducible sulfur value of 0.21%. This would suggest the presence of a majority of acid-forming and non-acid forming sulfate species in the total sulfur content reported from the SWRD. Mineralogical evidence supports the presence of up to 1.4% pyrite and arsenopyrite up to 0.4% (accounted for in chromium reducible sulfur) and up to 8.9% jarosite (accounted for in total sulfur), along with minor siderite (a neutral species) and alunite ($KAl_3(SO_4)_2(OH)_6$ – a sparingly soluble acid forming sulfate mineral). Gypsum, calcite and dolomite (up to 4.8% in one sample) were also present to add neutralising capacity.
- Using the conservative total sulfur median NAPP to account for the presence of other acid forming sulfur species, a median NAPP value of 16.2 kgH_2SO_4/t is reported. When only considering chromium reducible sulfur, the median NAPP value is 3.1 kgH_2SO_4/t; however, given the presence of non-pyritic sulfur species, this value would underestimate the acid forming risk. When the NAPP value is adjusted to consider the median value of 62 percent non-pyritic sulfur, assumed to be jarosite as identified under XRD analysis, the NAPP value becomes 13.5 kgH_2SO_4/t – a value likely more representative of the content of the SWRD.
- As noted above, when the median total sulfur NAPP value of 16.2 kgH_2SO_4/t is considered along with the median pH_{OX} value of 3.2, may be seen as being potentially acid forming (high capacity). Using the jarosite-adjusted NAPP value of 13.5 kgH_2SO_4/t, a density of 2.6 t/m^3 (PGO 2013) and GHD's estimated volume of 3,267,800 m^3, there remains a total potential acid load of around 115,031 tonnes of H_2SO_4 in the SWRD.
- In summary, the SWRD contains a large potential acidity store and must be managed to account for this. This observation is supported by the median NAG test results of 8.6 kgH_2SO_4/t with a pH_{OX} of 3.2.
- As part of the OxCon testing, Earth Systems Analytical (ESA) undertook sulfur speciation on five bulk samples collected from the SWRD. The analysis indicated that SWRD possibly contain lower total and sulfide sulfur concentrations than anticipated. Four of the five total sulfur concentrations were below the median value of 0.62%, with the median value for the five samples being 0.2%; below the 79 sample median value of 0.62%. That fact notwithstanding, the sulfur speciation demonstrates the presence of all key acid and non-acid forming species in the SWRD.

In summary, the data from both the SWRD and OWRD indicate that while there remains unoxidised sulfides and weatherable acid forming sulfates in both dumps, the measured pyrite oxidation rates are proceeding at a relatively benign pace that makes management of the oxidation products achievable.

During operations it is proposed to treat the acid mine drainage generated by the above waste rock dumps through the sites proposed standalone water treatment plant as part of the overall site water treatment aimed to attain the site specific triggers values (refer to Comment 7) to allow water discharge from site. As part of life of mine closure planning during operations the waste rock dumps will be further assessed/reviewed to select a closure strategy suited to an effective management strategy at closure.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
39	ES Table 3: Assessment Summary of Key Environmental Factors	<u>*Rehabilitation and Closure*</u> *"Ensuring waste rock generated by the TGU Project does not leave the pit (it is either stored underground or placed at the base of the pit to be inundated with water post closure." (p.xxiii)* • At what rate will inundation occur? Slowly refilling the pit with water will increase the risk of the pit being full of very poor quality water. This would not be an acceptable long-term closure strategy if the resulting water quality is poor. • Primary Gold Limited must provide information regarding all options for AMD management. • A Mine Closure Plan should be developed within the early stages of mining, if not before, to ensure that progressive rehabilitation will be undertaken, and, that appropriate management strategies are in place should premature closure of the mine occur.	Appendix I and J

Response to Comment 39:

From anecdotal observations and evidence the filling of the Toms Gully pit since the cessation of mining in 2010 has occurred at a rate of between 3 to 9 metres per year dependent on the annual recharge reflecting the volume of rain during the monsoon season and the level of pit being filled (i.e. in the deeper levels of the pit the smaller the volume of water required to raise the water level by one metre). As a contingency to pit filling and with tailings treatment continuing after mining cessation, treated water could be directed from being discharged or passed to a third party to increase the refilling rate. Additionally, during the monsoon season when rain events result in surface water and related flow of the Mount Bundey Creek clean surface water could be redirect into the pit from surrounding catchments.

In association with the geochemical baseline studies the Acid Mine Drainage Management Plan has been updated. As part of the upgrade other options for waste rock disposal were considered that included adding to the existing waste rock dumps and recreating a new standalone waste rock dump. It was concluded that the placement of waste rock in the pit and underground was the most viable option. Placement of the waste rock outside the pit would result

in a further acid mine drainage source above ground as insufficient resources are not available to provide a strategy to prevent the ingress of water and oxygen into the material. In regard to the tailings it is proposed to reprocess the tailings to remove sulfur and mixed metal oxides that will lower the acid producing potential and dispose of the residual tailings in upgraded TSFs Further details on the management of AMD are presented in the AMDMP that is Appendix I.

The mine closure plan has been upgraded to reflect the environmental studies and closure planning work based on the studies. The document details management strategies to close out the mine. The closure mine plan is presented in Appendix J.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
40	ES Table 3: Assessment Summary of Key Environmental Factors	*3.8.1 Existing Infrastructure* • DME require tailings and dams to be constructed in accordance with the Guidelines on Planning, Design, Construction, Operation and Closure of Tailings Dams (ANCOLD Guidelines 2012). • Primary Gold Limited must assess if the original TSF has been built to ANCOLD 2012 before creating a lift. • TSF2 and the Water Supply Dam (WSD) must be developed in accordance with ANCOLD 2012. • TSF2 is close to Mount Bundey Creek and could cause ongoing issues if there is further loading of tailings. Removal to the pit may be the only closure option and security would have to reflect this.	Comment 10

Response to Comment 40:

Primary commits to the following:

- Ensuring all new tailings and water containment structures are fit for purposes and constructed in accordance with the Guidelines on Planning, Design, Construction, Operation and Closure of Tailings Dams (ANCOLD 2012).
- If recommissioning and lifting an existing tailings dam an assessment will be completed to confirm if the original structure has been built to ANCOLD 2012 and if required undertake remediation work to enable compliance to ANCOLD 2012 before constructing the lift.

- TSF2 and the revised Water Supply Dam (WSD) are to be developed in accordance with ANCOLD 2012 guidelines.
- Primary will continue to develop and refine a closure strategy for TSF2 this strategy will also take into account the closest to Mount Bundey Creek, future tailings volumes and minimizing future residual environmental risk associated with the tailings. Based on work to date regarding the water treatment and associated tailings treatment it is proposed to treat the tailings as described in Comment 10 leading to tailings with a greatly reduced potential to generate acid mine drainage.

It is proposed that for the contingency tailings storage facility (if required) site investigations will be part of the preliminary development of the TSF design to ensure the ground conditions are fully assessed and the tailings storage facility design reflects these conditions and any variations. The preliminary work will be part of moving to a TSF final design that can be fully assessed by the Department of Primary Industry and Resources. All work and designs will be aligned to ANCOLD 2012

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
41	ES Table 3: Assessment Summary of Key Environmental Factors	*3.8 Tailings Management and 3.8.2 Method and Management* *"TSF2 has approximately 125,000t of remaining capacity; sufficient for the first six months of production before additional capacity is required." (p.39)* *"In the past, excess water from the TSFs has been directed by pipe to the pit, however with the resumption of mining, this system will be re-configured to direct overflow to the evaporation ponds. The additional freeboard provided by the TSF raise, and the administrative controls to keep 1 m of freeboard, makes this scenario unlikely." (p.40)* • TSF 2 is already overflowing in one section. It is difficult to see how this facility has capacity for 6 months before a lift is attempted. • DME may not approve use of this facility in its current state. *"The walls of TSF2 will be raised by 7.8 m to create sufficient capacity and a Geosynthetic Clay Liner (GCL) will be installed over the existing tailings to reduce the risk of seepage to groundwater. The walls will be constructed of material won from construction of the new WSD and adjacent borrow pits." (p.40)*	NA

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		• To ensure the integrity of the TSF is not compromised, the current TSF must be assessed for compliance with Guidelines on Planning, Design, Construction, Operation and Closure of Tailings Dams (ANCOLD Guidelines 2012). • Any proposed changes to TSF2 should be planned, designed and constructed in accordance with Guidelines on Planning, Design, Construction, Operation and Closure of Tailings Dams (ANCOLD Guidelines 2012). • What is the final footprint of TSF2? Please provide details.	

Response to Comment 41:

After completion of the baseline studies a review of the site configuration and intended infrastructure was undertaken from this TSF2 still has capacity to deposit tailings. The area described in the comment above as overflowing is a function of inappropriate tailings deposition when the tailings discharge outlet was not moved regularly to allow an even deposition of tailings that has resulted in a high point with water draining to the eastern side of the facility. As detailed previously prior to any deposition in TSF2 or TSF1 an assessment and upgraded to comply with ANCOLD 2012 will be undertaken. However, it has been proposed that tailings from TSF2 will be retreated to remove gold, mixed metal oxides, sulfur and silica during this tailings removal will provide further capacity within the tailings storage facility. To ensure approval of the facility as part of the mining management plan process the Department will be consulted to ensure adequate information is provided demonstrating the facility and proposed changes are fit for purpose in accordance to the Guidelines on Planning, Design, Construction, Operation and Closure of Tailings Dams (ANCOLD2012). As detailed in Section 3.4 the footprint of the TSF2 is 8.66 hectares.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
42	3.9.1 Pit Dewatering	*Pit Dewatering* *"Pit dewatering is required to enable access to the underground workings. The pit water quality does not meet the quality requirements to enable it to be released. The pit has been used as a storage area for poor quality runoff water and the exposed walls of the pit are expected in places to have exposed PAF materials." (p.42)*	Comment 10 and 37

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		What measures will be implemented to treat/prevent impact from exposed PAF materials during dewatering?	

Response to Comment 42:

The water that is removed from the pit for will be subsequently treatment to meet the SSTVs (refer to response to Comment 10) for subsequent disposal. Once dewatered a sump will be established at the base of the pit below the underground portal to capture incidental rainfall that has intersected the pit walls, floor and waste material, this water with be treated to obtain the required water quality prior to release. As discussed in response to Comment 37 during operations an assessment will be undertaken to identify the potential for acid mine drainage from the pit walls this investigation will be used to inform the proposed pit closure strategy.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
43	4.3.3.1 Surface Water Quality Sampling	"In-*situ physical and chemical water quality sampling was undertaken as part of the Aquatic Ecology Study (GHD 2015a). Water quality was measured at 13 sites between 17 and 21 April using a YS/ 650 MDS multi- parameter water quality meter."* "It *should be noted that conditions on-site were unusually dry for the time of year due to lower rainfall over the 2014/15 wet season."* (p.65) Has follow up sampling been planned or undertaken?	NA

Response to Comment 43:

Two follow up aquatic surveys incorporating feedback from the Draft EIS (refer to Comment 12) were completed in May 2017 and May 2018. The survey in 2017 occurred after the 2016/2017 wet season that was wetter than average (BoM 2018a) survey occurred after a season that had a January rainfall that was the highest ever recorded or the second highest since 1904 (BoM 2018b).

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
44	4.5.3 Fauna	*"GHD (2015d) undertook an assessment to identify the potential for listed threatened species within the TGU Project site (Appendix 6)" (p. 90).* • Despite referencing the ToR in "2.6.2 Terrestrial Flora and Fauna Survey Guidelines", Primary Gold Limited has not undertaken any field based threatened species studies in the areas they intend to clear. Primary Gold Limited has undertaken a small desktop search, which has failed to assess the presence or absence of the Yellow Snouted Gecko (Lucasium occultum) which occurs to the north east of the mine. As this species is known to occur in open forest dominated by Eucalyptus tetradonta and E.miniata (DLRM Yellow Snouted Gecko Online Fact Sheet), which is the same vegetation type present in the proposed WSD, Primary Gold Limited needs to discuss the species. • If Primary Gold Limited chooses to not conduct field-based surveys they should provide evidence in the terms of existing records to justify a desktop assessment.	Comment 13 and Appendix D

Response to Comment 44:

To better understand the potential for threatened species to be present across the project two targeted flora and fauna surveys were completed that included searches for the yellow snouted gecko. The survey results are presented in Appendix D. Refer to the response to Comment 13 regarding details of the fauna survey.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
45	Toms Gully Draft EIS Part B 6.3.2.2 Water flows	*"During the operations phase, dewatering will be largely from bores located to the east of the pit located directly amongst the proposed underground workings. The water from bores will be released directly to Lake Bazzamundi (as has been done previously), adding to the flows in Coulter Creek on a more continuous basis for the life of the underground mining." (p.120)* *6.3.6.1 Water Discharge* *"The water management system relies on the treatment and release to Coulter Creek of native bore water from around the underground operations ...The steady state release of water to Lake Bazzamundi would therefore be around 300 to 800 ML/yr." (p.155)* *"The capacity of Lake Bazzamundi is estimated at 50 ML, allowing for evaporation and seepage losses, it is likely that a significant portion of this water would flow through the Lake and into Coulter Creek." (p.155)* • Water may be flowing off site from Coulter Creek during the dry season and during periods of no/low flow. • What is the anticipated water quality? • What is the proposed water quality testing regime?	Comment 7 and Appendix F

Response to Comment 45:

The following response should be read in conjunction with the response to Comment 7. The quality of the water discharged from dewatering will be monitored with excess water that cannot be used on site discharged to Lake Bazzamundi and, potentially use by third parties for agricultural and/or horticultural purposes. The water quality from operational dewatering will be of a better quality than the water currently located in the pit and underground as insufficient time will be available for the interaction of water and sulfide minerals to degrade the water quality. However the quality will be monitored overtime and if required the water is to be treated to generate water quality that will be suitable for discharge or the intended uses. It is proposed that water quality monitoring will occur at the discharge point and at the sites that are currently being monitored.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
46	6.3.2.4 Surface Water Quality and Derivation of Site Specific Trigger Values	*"Default trigger values can be selected from the ANZECC & ARMCANZ (2000a) Guidelines, however, site derived trigger values are preferred to regionally derived trigger values (GHD 2015g)."(p.123)* Have these Site Specific Trigger Values (SSTV) been agreed upon by NTEPA and all other involved stakeholders?	Comment 7 and Appendix F

Response to Comment 46:

The original site specific triggers were not agreed to with the NT EPA and other stakeholders. Subsequent to the Draft EIS further work was completed on the SSTV, this work included an assessment by CSIRO and a revision of the SSTV. The revised SSTV have been adopted as part of the supplement response to the Draft EIS. Further details on the SSTV are presented in Comment 7.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
47	6.3.2.6 Water Discharge	The discussion on water quality and treatment is very ad hoc. There is no decision or commitment regarding treatment and no commitment to dilution ratios etc. EC levels are a major stressor to freshwater aquatic life and would need significant reduction before leaving the site. Livestock levels of 3000 are not appropriate for the downstream Mary River. There is no discussion on installing flowmeters or telemetry to determine required flow for water release. It is not possible to assess any environmental impact without further detailed information.	Comment 10

Response to Comment 47:

The following response should be read in conjunction with the response to Comment 10.To define a clearer water treatment option Primary undertook an assessment of water treatment options that could be suitable for the Toms Gully Underground Project. Based on the assessment the Bioaqua Process was selected, concurrent with this process an assessment and revised of the SSTVs has occurred this process selected SSTVs to delivered the desired outcome in relation to the declare beneficial uses defined for the Mt Bundey Creek in the immediate vicinity of the site. To monitor discharge volumes flow meters will be installed with this information feeding into the site water balance and reported under the relevant legislation. It is intended to monitor water quality at the discharge point and also at the established points along Mt Bundey Creek.

Comment Number	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
48	6.3.2.6 Water Discharge	What method of construction of the base of the WSD will be used (if any) to prevent potential influences to and from groundwater? The local groundwater has been influenced by the Sulphide WRD and is poor quality. Nearby monitoring bore GB pH is 4.7 and EC is 1940. The WSD could also further reduce ground water quality (e.g. high EC levels post treatment) if not constructed with an appropriate base. *"An analysis of current pit water quality against the SSTVs shows that cobalt and zinc would only require dilution ratios around 250:1 to meet the SSTVs..." (p.126)* A dilution ration of 250:1 could be difficult to achieve. Long term water storage and its affects will need to be considered.	Comment 7

Response to Comment 48:

The WSD has been reconfigured resulting in a reduction in size and positioning of the facility. In addition, it is intended that the quality of the water discharged to the WSD will be better than the water quality proposed in the Draft EIS. Please refer to Comment 7 for further detail. If required the base of the WSD will be conditioned insitu and compacted to limit the seepage of water.

As a result of the standalone water treatment plan (to meet the revised SSTVs) the reliance on a 250:1 dilution ratio is no longer required.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
49	6.3.3.4 Seepage from TSFs	*6.3.2.4 Surface Water Quality and Derivation of Site Specific Trigger Values* *"Whilst the pit water balance modelling indicates there is minor potential for seepage of poorer quality water from the pit during wet seasons, any contamination is highly likely to remain localised as the pit forms a groundwater sink during the dry season." (p.135)* *Table 33: Summary of Surface Water Quality On-site (GHD 2015b) states (p.124):* *"SWTG Tails 1 exceeded the SSTV with a median value of 0.009mg/L" for Total Cyanide. "Only SWTG Tails 1 exceeded the SSTV with a median value of 1,200ug/L" for Arsenic.* *"The exceptions were EP2 and SWTG Tails 1 with median values of 49 and 55ug/L respectively" for Chromium.* • Water Quality analysis identified that Total Cyanide, Arsenic and Chromium trigger values were exceeded. • These exceedances further demonstrate that a 3D groundwater model needs to be developed.	Comment 2 and Appendix C

Response to Comment 49:

The following response should be read in conjunction with Comment 2 detailing the further groundwater modelling. Primary acknowledges the conditions at the TSF 1 and evaporation pond 2, however it needs to be noted that SSTV are derived for the purpose of water quality monitoring and protection of aquatic

ecosystems in the vicinity and downstream of the site. The presence of elevated cyanide, arsenic and chromium is a function of the ore processing and containment of this material in purpose designed TSF and evaporation pond. The containment of this material is an ongoing management focus during operations to ensure SSTV are not exceeded in the surrounding environment and aquatic ecosystems outside of containment areas on the mine. In the longer term these facilities will be a key focus during life of mine closure planning to provide long term closure strategies and solutions so that tailings material and potential leachates are contained.

In respect to this comment and others raised during the assessment of the Draft EIS, further work covering groundwater, surface water, baseline acid mine drainage conditions, flora and fauna, site specific trigger values and aquatic conditions have been completed to understand the site specific source, pathway and receptors so that a conceptual site model could be constructed for the site and which can be calibrated and revised during operations. This revised model will aid in closure planning and the ongoing refinement of site closure strategies.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
50	6.3.2.7 Mine Closure	*"A more rapid filling of the pit could to reduce the potential for AMD products to form, accumulate and concentrate in the pit water." (p.127).* How would more rapid filling be achieved?	Comment 39

Response to Comment 50:

Please refer to Comment 39.

Comment Number	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
51	6.3.3.3 Groundwater Dependent Ecosystems	*"The map indicates that Mount Bundey Creek has potential for groundwater dependency." (p.132)* • Primary Gold Limited is required to provide further information to support this statement, i.e. monitoring etc.	Appendix C

Response to Comment 51:

The following response should be read in conjunction with the response to Comments 2-5. As discussed in the groundwater report (Appendix C) the pit has acted as a groundwater sink with limited interconnectivity to Mt Bundey Creek and surface water. The limited interconnectivity is a function of the geology whereby localised fractured rock zones associated with the ore zone or faults has very limited surface expression. Base on the above detail no monitoring is being proposed or has been undertaken.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
52	*6.3.3.7 Mine closure*	*"Upon mine closure, the pit will be allowed to fill, and given the reactivity of the AMD materials, the pit water quality is likely to return to these conditions." (p.136)* It will not be acceptable to allow pit water to go back to previous poor water quality post closure.	NA

Response to Comment 52:

As part of the life of mine closure planning process early stage investigations have commenced to assess the viability and potential for water treatment through the use of natural bacteria within a conducive environment to cause biological sulfate reduction. Toms Gully pit like other sites that experience acid mine drainage potentially have exposed sulfides in the pit walls that when exposed to water and oxygen create water chemistry that has elevated concentrations of sulfate and metals with low pH. The process of biological sulfate reduction that removes sulfate, metals and acidity from water relies on the activity of naturally occurring sulfate reducing bacteria (SRB) that reduce sulfate to hydrogen sulfate in the presence of a suitable carbon source. Preliminary discussed have occurred with CSIRO to potentially investigate the viability of such a system at the Toms Gully pit.

Comment Number	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
53	*6.3.4 Contaminants of Concern*	*"The catchments of both Mount Bundey Creek and Coulter Creek can be seen to be cleared for agricultural grazing downstream of the Toms Gully site". (p.136)* • This statement confirms that a major risk involved with this project is exposure of livestock to unacceptable water quality in the event of an accidental discharge etc. • Contaminated areas and potentially contaminated areas must be fenced to exclude stock.	NA

Response to Comment 53:

In 2013, to prevent the ingress of livestock onto the site a livestock exclusion fence was erected around the Toms Gully site. This fence has excluded livestock from the waste rock dumps, RoM, tailings storage facilities, pit and process plant area. In addition, the fences position in association with heavy vegetation limits access on the northern side of Mt Bundey Creek. Primary is committed to working with underlying land users to ensure livestock do not get access to the site.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
54	6.3.5.3 Conceptual Contaminant Transport - Dewatering Phase	*"It is proposed that the Section of Mount Bundey Creek as it flows through the Mining Lease be used as a mixing zone." (p.140)* • Primary Gold Limited should provide further information to clarify what is being mixed in the creek. • Mixing in the creek is generally not acceptable as this may lead to erosion of the creek bed. Primary Gold Limited should consider constructing a rock check riffle area where the water is being pumped to.	Comment 7 and 10

Response to Comment 54:

To clarify, the statement on p140 was referring to the mixing of water discharged (if approved) from site. Originally it was proposed to discharge water treated to livestock drinking water quality standards from the site with this water mixed with Mount Bundey Creek water (naturally occurring water quality) to dilute the discharged water thus improving the water quality of the discharge downstream from the site. Subsequent work in response to the Draft EIS comments has resulted in Primary investigating the potential to further treat water on site resulting in improved discharge quality before combining with Mount Bundey Creek water. Details of the treatment option and proposed discharge water quality as defined by SSTVs are detailed within Comment 7 and 10.

Discharge points along Mount Bundey Creek are to be designed with rock armouring and engineered to prevent erosion. More detailed design will be incorporated in the Erosion Sediment Control Plan.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
55	6.3.5.3 Conceptual Contaminant Transport - Dewatering Phase	*"Potential receptors are identified outside of the operating area as:* *-Livestock in grazing areas;* *-Fauna living in or accessing Mount Bundey or Coulter Creek water; and* *-Groundwater." (p. 141)* • Primary Gold Limited acknowledges the potential receptors but the first two receptors (i.e. livestock and fauna) are not discussed in detail within the document. Further information is required.	NA

Response to Comment 55:

The reference to livestock in grazing areas relates to the potential areas in the immediate vicinity of Mt Bundey Creek. In regard to fauna living in or accessing Mt Bundey Creek this relates to fauna in the located in close proximity to the site.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
56	6.5 Residual Risks And Contingency	*Table 38: Contingency Measures for Water Management:* *"Alternative water treatment" has been listed as a contingency measure for "Water treatment does not meet quality requirements to enable discharge to Mount Bundey Creek" (p.164).* • What is the alternative water treatment? Further information is required.	Comment 10

Response to Comment 56:

As discussed in Comment 10 the Bioaqua Process has been selected as the water treatment option. In addition, contingency measures if the SSTVs are not meet have also been presented.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
57	8.3.1.2 Indirect Impacts	*"Whilst the vegetation is mapped as GDE, previous operators have not caused vegetation death in the creek, and the short window of operations limits the risk of impact to GDEs." (p.196)* • Primary Gold Limited is required to provide evidence to support this statement.	Comment 51

Response to Comment 57:

Please refer to response on Comment 51.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
58	*8.4.2 Terrestrial Fauna*	*"To minimise the potential for fauna injury or death, the following mitigation measures shall be implemented:* *-Fencing shall be installed around the TGU Project site;* *-Speed limits shall be applied and enforced within the TGU Project site; and* *Selected personnel shall be trained in wildlife rescue protocols. All other staff shall notify trained staff of any incidences of fauna injury or death. Incidents shall be investigated with follow up measures implemented". (pp. 208-209).* • These mitigation measures are acceptable for post clearing; however Primary Gold Limited has not provided mitigation measures for fauna death during clearing. Primary Gold Limited should consider ensuring a suitably qualified fauna handler is on site during the land clearing operations.	NA

Response to Comment 58:

Trained personnel in wildlife rescue are to be present during clearing operations.

Comment Number	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
59	8.6 Monitoring and Reporting	*Table 45: Biodiversity monitoring actions Aquatic and riparian ecosystems:* *"Implement a bio-monitoring program to include the monitoring of fish species. Results from these future programs shall be compared against the baseline fish survey results recorded by GHD (2015a) to determine if the TGU Project is having any adverse impacts on fish species and downstream fisheries". (p.211)* • Primary Gold Limited has committed to annual monitoring of fish downstream. Monitoring should also include the Merten's Water Monitor (Varanus mertensi) and Mitchell's Water Monitor (Varanus mitchelli) as these two threatened species may be present downstream and could be affected by changes to vegetation etc. as mentioned in the Table 4 of the Biodiversity Report (Appendix 6).	Appendix E

Response to 59:

As part of the annual aquatic survey (Appendix E), camera monitoring has been included for the Merten's Water Monitor (*Varanus mertensi*) and Mitchell's Water Monitor (*Varanus mitchelli*).

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
60	13.3.1.2 Operations	*"If adequate funds are not available during operations, and the mine enters premature closure/care and maintenance, or if inadequate funds are available at the end of mine life, there is potential for rehabilitation to be incomplete or not commenced." (p.250)* • It is strongly advised that progressive rehabilitation is undertaken to reduce the likelihood of insufficient funds at the end of the mine phase. • Primary Gold Limited has obligations under the Mining Management Act (MMA) to ensure sufficient funds and resources are available to conduct rehabilitation and deposited prior to authorisation and commencement of operations. *"Thus if the TGU Project was to close due to inadequate funding, the treated pit dewatering water is expected to be suitable for use by livestock and would be safely stored in the WSD." (p.250)* • Primary Gold Limited should also provide contingencies for if the water is not suitable for livestock, i.e. fencing the WSD. • How will Primary Gold Limited ensure that WSD water is suitable post life of mine?	NA

Response to Comment 60:

When practical within the project where areas become available progressive rehabilitation will be scheduled during operations to manage and reduce the projects liabilities. Prior to commencement the environmental security will be calculated and lodged with the Department as part of the *Mining Management Act* authorisation. In addition, during operations the company will undertake internal financial provisioning to have monies available at the end of the project to implement closure and rehabilitation.

By implementing the Bioaqua process for water treatment it is anticipated that the water quality will be above that of livestock drinking guidelines. At closure to ensure the water quality within the WSD is suitable for post closure life an assessment will be completed.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
61	13.3.4 Long term positive water balance and acid mine drainage issues from waste rock dumps	*"WRDs are not part of the TGU Project. At closure, Primary Gold will not have completed any substantial capping or relocation of materials that will prevent or improve their current behaviour as a source of AMD". (p.252)* • As the title holder and Operator of the site, Primary Gold Limited has obligations under the MMA to establish, implement and maintain an appropriate environment protection management system for the site. This includes the AMD management on site.	Comment 38

Response to Comment 61:

Noted, further work detailing the existing AMD conditions at the WRD are contained in Comment 38. Life of mine closure planning will incorporate a whole of site approach.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
62	13.3.5.1 Rehabilitation Materials	*"Clearing the WSD will allow the salvage of topsoil. Other potentially valuable rehabilitation materials will be identified and salvaged where possible. Consideration will be given to:* *- Timber salvage;* *- Retention of cleared bush and scrub material;* *- Collection of seed; and* *- Retention of boulders and logs for fauna habitat." (p.253-254).*	NA

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		• Where will Primary Gold Limited store and manage this material? How will Primary Gold Limited manage the material to prevent it from slowly eroding into the current water system?	

Response to Comment 62:

The location of the topsoil stockpiles will be selected to:

- minimise erosion by being positioned away from drainage lines and to avoid large upstream catchments and, to be outside of the inundation zone of 1 in 100yr 72 hour flood event, and
- located a short distance from where the material has been salvaged to reduce the breakdown of the soil's physical properties by mechanical handling.

In addition, to manage and prevent the stockpiles from eroding into the drainage lines: The topsoil stockpiles will have:

- Established, a perimeter bund with recovered vegetation with water directed to a sediment settling pond. By bunding with vegetation this allows water to move through the vegetation with sediment being captured.
- Truck paddock dumped to create an egg carton pattern whereby water is held within small catchments between topsoil piles to allow great water infiltration thus enhancing revegetation.

Once the erosion and sediment control measures and infrastructure have been finalised under the EIS process they will be incorporated into the Project's Erosion and Sediment Control Plan.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
63	13.3.5.1 Rehabilitation Materials	*"As the TGU Project is located on the Old Mount Bundey Pastoral Station, the rehabilitation prescription will be developed in consultation with the Pastoralist prior to presentation in the MMP." (p.253).* • Primary Gold Limited must include the rehabilitation plan in the EIS and include specific key performance indicators that should be met. • Primary Gold Limited must also detail rehabilitation monitoring (including post closure rehabilitation monitoring).	Appendix J

Response to Comment 63:

An updated closure mine closure plan has been submitted as Appendix J. The mine closure plan includes details of the key performance indicators (SMART completion criteria) and a revised rehabilitation monitoring plan. As the mine closure plan is a dynamic document key performance indicators and rehabilitation monitoring regularly refined as operations proceed.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
64	13.3.6 Future Land Use	*"The remainder of MLN1058 forms the pastoral grazing precinct which includes the new WSD and existing Lake Bazzamundi and other areas unaffected by mining." (p.254)* • Primary Gold Limited needs to provide a commitment that if the WSD and Lake Bazzamundi are affected by mining they will also form part of the livestock exclusion precinct.	Appendix J

Response to Comment 64:

If identified that the WSD and Lake Bazzamundi are affected by mining that will result in adverse effects to pastoral activities, in consultation with the underlying pastoralist and the relevant regulators these areas will be included in the livestock inclusion precinct or remediated. During closure planning it is intended these areas will be integrated into the future land use practices that exist in areas surrounding the site.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
65	13.3.7.1 of Draft EIS: Open Pit and Underground	*"Infrastructure not containing contaminating materials and not of any commercial value will be left in-situ; (p.257)* How will Primary Gold Limited ensure this infrastructure does not present a health and safety risk or affect the amenity of the rehabilitated site as it slowly deteriorates?	NA

Response to Comment 65:

During decommissioning and in consultation with the pastoralist and/or other third parties that have an interest in the area, it is proposed that non-contaminated items that are to remain will be assessed for long term safety and health risk while ensuring that any third party taking ownership of the structures have a capacity to manage the infrastructure into the future.

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
66	Section 14.3.3 of Draft EIS: Monitoring	*"Due to the remoteness of the TGU Project site and the minor levels of dust and exhaust emissions envisaged to be generated, dust and exhaust emission levels are not proposed to be Monitored"* *"The condition of surrounding vegetation shall be visually monitored for evidence of excessive dust deposition causing vegetation damage". (p.284)* • Primary Gold Limited should be aware that the site is very close to a major highway. Construction of the WSD will generate extensive dust that could affect driving conditions on the highway. Therefore it is necessary that dust monitoring and mitigation is carried out during these works. • How often will Primary Gold Limited monitor the dust deposition on existing vegetation? Primary Gold Limited should discuss trigger values for the amount of dust etc., prior to vegetation disturbance.	NA

Response to Comment 66:

During clearing and construction activities for the WSD, proposed dust mitigation measures to be implemented are as follows:

- Construction works shall be restricted during times of high wind in the direction of station dwellings; and
- Clearing shall be restricted to the minimum required.

In addition, the following steps to manage dust will be taken:

- A conservative and progressive approach to vegetation clearances will be followed, ensuring a minimum area is clear at any one time and the majority of the area is still vegetated and undistributed. Areas outside of the active mining operation that have been disturbed during construction of site infrastructure will be rehabilitated as soon as practicable to reinstate the natural erosion resistance.
- Dust generation will be mitigated by regular applications of appropriate quality water by a water cart along construction and cleared areas to reduce dust from mine traffic and wind.

- Vehicle speeds will be limited around site.

Dust monitoring will comprise daily visual monitoring as to be able to monitor dust on a daily basis, managers within the WSD and mining area, will observe current dust conditions. Depending on conditions this will facilitate management measures for example, more frequent water application via a water cart. Dust deposition limits are not specified in the Northern Territory or in the National Environment Protection Measures (NEPM) for Ambient Air Quality guidelines.

For the purposes of monthly visual monitoring of dust on vegetation, Primary will inspect the vegetation if a medium coating of dust is present this generally represents between 4 g/m²/month to 15g/m²/month for dust deposition. Doley & Rossato (2010) work indicated that above 15g/m²/month direct physical effects of mineral dust on vegetation becomes apparent. If this coating of dust is observed then measured will be implemented to prevent further dust deposition.

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
67	Draft EIS, Section 11, Human Health and Safety	References should include the Guidance Note on Public Health Risk Management of Asbestiform Minerals Associated with Mining: *http://www.public.health.wa.gov.au/cproot/5387/2/Guidance Note on Public Health Risk Management of Asbestos Associated with Mining Activities.pdf*	NA

Response to Comment 67:

Noted, a reference will be included for the health risk management of asbestiform minerals as per the most recent guideline published in 2013... Based on the localized geology and the style of mineralization the potential for asbestiform minerals is low at the Toms Gully operation. During project planning and at an operational level as part of ongoing risk management if the geological conditions change whereby the formation of Asbestiform minerals is more favourable an assessment of the potential risk of asbestiform minerals will occur and if required suitable management measures will be implemented to protect public health.

6.7. Department of Primary Industry and Fisheries (DPIF)

Comment No.	*ToR Item / Draft EIS Section*	*Comment*	*Related Comment and/or Appendices*
68	EIS	*The attached draft EIS has been assessed as not falling with DPIF interests.*	NA

Response to Comment 68:

Noted.

6.8. NT Police, Fire and Emergency Services (NTPFES)

Comment No.	EIS Section	Comment	Related Comment and/or Appendices
69	Section 3.7.4 of Draft EIS	*The Northern Territory Police, Fire and Emergency Services (NTPFES) note the proposed project site is approximately 1km from the Arnhem Hwy at Mt Bundey and have considered the traffic impact to the surrounding area with respect to traffic safety. A slow-turning large truck in and out of site onto a highway where the speed limit of 130km/p/hr applies is considered hazardous. Transport infrastructure has been addressed in the 'Draft Environmental Impact Statement' provided under s 3.7.4 stating that road signage will be installed on both northern and southern approaches on the highway warning of the entrance in accordance with AustRoad requirements and to the satisfaction of the Department of Transport NT. Signage is also promised for the turning vehicles exiting the site onto the Arnhem Hwy with a stop sign and vehicle speed limits will be addressed and signposted within the project site. The NTPFES note this site to have potential for an increased need for traffic enforcement activity in the region to ensure the safety of the project staff as well as other road users. The NTPFES request that any significant changes to the proposed transport infrastructure and notice prior to the commencement of the project for the awareness of local police.* *The NTPFES also note that the workforce is set to peak at 104 employees including management (proposed to be sourced mainly locally) and the project proposes to outsource accommodation at nearby accommodation facilities. It is noted that there is no proposal of new accommodation infrastructure. The workforce accommodated at local accommodation facilities will be transported by coach to work each day from the accommodation facilities, minimising disruption to traffic. Again, the NTPFES would like to be informed of any significant increase in workforce as this may impact the requirement of police resourcing in the region.* *The project acknowledges application of the Bushfires Act and Regulations with regards to assessing risk and management of fires.*	NA

Response to Comment 69:

Primary acknowledges the NTPFES comment and prior to commencement of operations; NT Police will be notified. During operations Police will be informed of any significant changes to the proposed transport infrastructure and/or any significant increases in workforce.

6.9. Power and Water Corporation (PWC)

Comment No.	*ToR Item / Draft EIS Section*	*Comment*	*Related Comment and/or Appendices*
70	Draft EIS	*No comments from PWC for the project.*	NA

Response to Comment 70:

Noted.

6.10. Tourism NT

Comment No.	*ToR Item / Draft EIS Section*	*Comment*	*Related Comment and/or Appendices*
71	Draft EIS:	*Water* *There is a volume of detail surrounding environmental provisions for the project from initial refurbishment and production through to rehabilitation and closure. The mine has existing Acid Metalliferous Drainage (AMD) and water*	Comments 1 to-5

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
	Water, Closure, Transport, Visual Amenity	*issues from existing mine infrastructure. There appear to be risks with leaving the existing infrastructure in its current state as well as in refurbishing and closing the mine.* *There are monitoring and management plans to ensure surface and groundwater quality is protected and to prevent, mitigate and manage AMD and sediment seepage and discharge to nearby waterways. Tourism NT notes the importance of the Mary River catchment and wetlands as recreational fishing/ boating and wildlife areas.* *The area is prone to high rainfall, and a drainage and pumping strategy is in place to reduce risk of mine flooding, however we note this is yet to be fully tested.* *Closure* *The mine has had several operational periods under various ownerships. The ability to extract all remaining ore would advance the project towards final completion, facilitating closure and environmental rehabilitation. The costs associated with closure will be addressed as part of ongoing submission of the Toms Gully Mining Management Plan (MMP), we would advise funds be set aside for this purpose.* *Transport* *The Arnhem Highway is heavily utilised by tourists, however incremental traffic from the Primary Gold project is judged to not have a material impact on volumes.* *Visual Amenity* *The mine will have low visibility from the road; the top of the TSF tailings dam wall may be visible from the road.* *Utilisation of short term accommodation by project workforce* *The Tom Gully project has a short life span of 40 months. At the peak of operation there will be over 100 people employed. The local area is serviced by two tourist villages and a moderate increase in "corporate" demand will likely result in a positive outcome for these two tourist villages by raising occupancy rates and assist to smooth out the effects of seasonality.*	Comment 1 to 5

Response to Comment 71:

In respect to mine closure planning, Primary will undertake early financial provisioning to set aside funds in anticipation for the cost associated with end of mine closure. During start up and operations Primary will work with DPIR to manage the closure liabilities and reduce closure costs by progressive

rehabilitating areas on longer required, where practicable remediating areas of historic activities, resolving closure uncertainties and implementation of agreed upon closure strategies.

Primary acknowledges comments relating to the use of the Arnhem Highway and traffic volumes as one of a number of road users all road rules and requirements will be complied with.

Where practicable, Primary will endeavor to utilize local accommodation and facilities therefore contributing to local economies.

6.11. Parks and Wildlife Commission of the Northern Territory

Comment Number	*ToR Item / Draft EIS Section*	*Comment*	*Related Comment and/or Appendices*
72	Draft EIS	*Thank you for the opportunity to comment on the EIS for the Tom's Gully Project. The project is located in close proximity to the Mt Bundy and Coulter Creeks which run into the Mary River and enter the Mary River National Park which is approximately 6km downstream. The Mary River National Park is one of the Northern Territory's most important parks for biodiversity conservation and protects natural values that are nationally and internationally significant.* *The Mary River NP is a site of national Conservation Significance and is noted as the most significant and reliable breeding habitat for magpie geese in the Northern Territory and is important breeding and feeding grounds for water, shore and sea-birds. The wetlands are also important habitat for many fish species and other aquatic life.* *Tourism is a major economic driver in the Northern Territory and the Park's wetlands are important destinations for tourists and recreational Fishers with a number of commercial operators servicing the tourism and recreational fishing sector within and adjacent to the park.* *We have reviewed the EIS and in relation to the Mary River NP support the comments made by DLRM in relation to the lack of detail in the draft EIS provided on erosion and sediment control strategies and the level of detail provided in relation to the water monitoring program to enable detection of mining impacts.*	Comment 2 to 8

Response to Comment 72:

The importance of the Mary River National Park in respect to biodiversity conservation, protection of natural values and tourism is acknowledged by Primary. A response to the DLRM comments has been provided in Comment 2 through to Comment 8; Comment 6 specifically refers to managing potential impacts to the Mary River National Park. As part of the Mine Management Plan submission, Primary will prepare an Erosion and Sediment Control Plan to manage and mitigate the potential for sediment liberation across site. In addition, work has been undertaken to select a water treatment option to be used to meet defined water quality Site Specific Trigger Values formulated by the CSIRO to which the monitoring data will be compared to at regular intervals during operations. If the SSTV are triggered an initial investigate and associated management action if required will occur. It is also anticipated that regular fortnightly water monitoring with data reviews will enable the identification of developing trends and patterns prior to triggering SSTV that will provide feedback and detect if mining impacts are resulting in a deviation from the anticipated water quality outcomes. More details of the proposed water monitoring are presented in the Water Management Plan Appendix L

6.12. Amateur Fisherman's Association NT (AFANT)

Comment No.	***ToR Item / Draft EIS Section***	***Comment***	***Related Comment and/or Appendices***
73	Draft EIS: Introduction, Identified Risks, Conclusion	*Introduction* *The Amateur Fishermen's Association of the Northern Territory (AFANT) welcomes the opportunity to provide comment on the Tom's Gully Underground Project Environmental Impact Statement. Recreational fishing is an important social and cultural component of the Northern Territory lifestyle as well as being a major tourism drawcard and a significant contributor to the economy. Recreational fishing surveys and fishing tour operator data indicates that more than 35,000 Territory residents and 54,000 visitors participated in recreational fishing in the Territory in 2010 and recreational fishing was estimated to contribute at least $100 million directly to the Northern Territory economy during 2014. Recreational fishing provides significant cultural, economic and social contributions to the Northern Territory and unless proper environmental procedures and management practices are put in place for Tom's Gully Underground Project (TGUP) there may be unacceptable negative impacts on this industry.*	Comments 2 -5 (water quality) Comment 7 (SSTVs) Comment 12 (Aquatic ecosystems), Comment 24 (erosion and sedimentation)

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		Identified Risks *While there are a number of significant environmental risks to be considered in the assessment of this project proposal, AFANT will confine its comments to those issues with the potential to impact on recreational fishing. These recognised risks include;* • *Proposed management of water quality and quantities;* • *Management of waste rock and other material with potential to produce Acid Mine Drainage (AMD) and/or saline drainage (SD);* • *Erosion and sedimentation;* • *Financial risk and the rehabilitation bond* *AFANT is especially concerned with the health of downstream aquatic ecosystems in Mount Bundey Creek and Mary River National Park as a result of the Tom's Gully Underground Project (TGUP) as these areas include the iconic fishing locations of Hardies Billabong, Corroboree Billabong, Shady Camp and the Mary River system. Our main concerns revolve around the discharge of water into Mount Bundey Creek, separation of clean water and dirty water through the mine site, sedimentation and surface water run-off and the storage of tailings to minimise downstream contamination risks and the potential acidification of groundwater through AMD. AFANT understands that treated water is proposed to be stored in a 2.1 GL capacity WSD on-site and then be discharged to Mount Bundy Creek during subsequent wet seasons when there is sufficient dilution capacity available. AFANT is comfortable with the water being treated to meet 80% ANZECC and ARMCANZ (2000a) criteria however we believe that environmental factors need to be considered in regards to planned wet season water releases. This concern relates to a strong El Nino influence resulting in more extreme weather events but reduced overall rainfall in the Mary River Catchment. AFANT would like the proponent to acknowledge that this likely reduction in overall rainfall will have an effect on wet season discharges and could result in TGUP being unable to discharge as frequently as needed to maintain a sufficient dilution capacity.* *AFANT also has concerns regarding the storage of tailings in TSF2. This dam is designed to store 350,000 t of tailing solids with an average beaching slope of 1v:120h, at an assumed density of 1.2 t/m³ while maintaining a 0.5 m freeboard, even during an extreme rainfall event (1:100 year, 72 hour duration). While these concerns*	Comment 1 (Financial risk and rehabilitation)

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		relate to use of the 1:100 year extreme rainfall event AFANT believes this data should be more precautionary based on the large number of extreme weather events in the past thirty years rather than the lower average rainfall events of the past one hundred years. Rainfall events in the Mary River Catchment have frequently been recorded at higher than the 1:100 levels by NT Parks and AFANT believes there is a serious risk of TSF2 overflowing and contaminating the downstream environment unless a more precautionary slope and greater freeboard is put in place. *AFANT also believes greater measures need to be put in place for the management of stormwater and the potential for on-site erosion and sediment loads during these extreme weather events. These greater control measures also include sediment control and erosion runoff during the clearing of approximately 93 ha of native vegetation at TGUP (54 ha being for WSD, the remainder for borrow materials, new access and drainage) during the construction phase prior to operation.* *AFANT would also like more information to be made available by the proponent regarding the groundwater monitoring network of on-site. The EIS identifies that there is potential at TGUP for a water table fluctuation of up to 3.5M between the wet and dry seasons and groundwater seepage has been identified as possible issue from the WRD, Evaporation ponds and TSF's. This raises concerns about possible groundwater flow of AMD and contaminated water from the site into aquatic habitats downstream. AFANT believes a more robust groundwater monitoring system with expanded monitoring sites must be put into place prior to TGUP becoming operational.* *A number of potential issues and risks contained in the EIS also need to be considered in relation to the current financial environment and potential environmental impacts if economic factors go against TGUP. While the EIS addresses the best case scenario regarding financial viability it is essential that all alternatives be considered as well as the international financial situation in regards to the gold price and exchange rates plays a big part in ensuring the viability of this project.* *History has shown that past Northern Territory governments have been willing to circumvent best practice environmental management and bend the regulatory process in order to get mines up and running or keep struggling mines operating. This is a significant risk that needs to be managed for TGUP.*	

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		The mine management plans and future rehabilitation stages of the TGUP need to be conducted, regulated and enforced by government. In addition there is a potential financial risk to taxpayers if this project fails and government funding is required for the clean-up and rehabilitation. This risk must be factored into the bond prior to the TGUP approval. It is essential that this bond needs to be of sufficient value to address the size and scale of current risks and threats at the site and any newly identified future risks given the size of this facility and the cost of managing the ongoing operational requirements of the site like pumping and water management that will need to be conducted in the event of an emergency shut down or if the mine goes into caretaker mode. *<u>Conclusion</u>* *AFANT has a strong commitment to ensuring the protection and the quality of recreational fishing in the Northern Territory. Recreational fishing is a major contributor to the economy and lifestyle of the Northern Territory and must be nurtured and enhanced by the Government for current and future generations.* *We have an extremely strong interest in ensuring that the proposed mining operations and post closure rehabilitation of the site can be conducted in a manner that removes any current and future water and pollution risks at the TGUP site We would welcome the opportunity for greater engagement and consideration of AFANT's views.*	

Response to Comment 73:

Primary acknowledges AFANT for its support of Site Specific Trigger Values set at meet 80% ANZECC and ARMCANZ (2000a) criteria. Taking into consideration the concerns raised relating to strong El Nino influence resulting in more extreme weather events but reduced overall rainfall in the Mary River Catchment. Primary has invested time and resources to investigate water treatment options that treat the water to meet revised SSTVs that have an improved water quality than the 80% ANZECC and ARMCANZ (2000a) criteria (see response to Comment 7). By ensuring the water quality meets the revised trigger values prior to discharge the dependence on sufficient dilution capacity is greatly reduced.

In regard to the freeboard, whilst maintaining a 0.5 m freeboard during extreme rainfall event, Primary will also use a standalone water treatment plant to manage the water balance across the site by treating water to allow discharge or supply to a third party by removing water from site this will mitigate the built up of water during the monsoon season allowing the maintenance of freeboard.

To manage potential sediment that could be liberated during storm events, an Erosion and Sediment Control Plan will be prepared as part of the Mining Management Plan and implemented during the project restart. The plan will cover the construction phase and related disturbance of the new infrastructure intended for the site (see response to Comment 24).

Where possible site groundwater monitoring bores have been re-commissioned to provide further groundwater data that has been used in advancing the groundwater assessment and model. This updated work has been incorporated into the conceptual site model. In implementing the restart, a commitment has been given by Primary to drill a further 6 monitoring bores thus expanding the monitoring network during operations and closure.

In respect to financial viability of the restart of the Toms Gully, Primary has considered the changing financial and environmental factors while conducting the feasibility study in 2013. In 2018 additional studies, using current gold prices and other current costs, have shown the project to be still viable. Recently increases in costs have been offset by an increase in gold price. New technologies have been developed such as ore sorting, which is currently being used to test the Toms Gully ore which will potentially reduce ore dilution and increase profitably at the site. Below is a sensitivity analysis table from the 2013 studies that details the effect of varying costs on the viability of the operation. During operations financial provisioning will occur to provide funds for unexpected closure and rehabilitation as well as care and maintenance.

	Gold Price	Spot US$1,400 & FX 0.9 (A$1,555/oz)	US$1,600 & FX 0.9 (A$1,780/oz)	US$1,100 & FX 0.85 (A$1,295/oz)
Ore	C1 Costs	A$670-675/oz	A$670-675/oz	A$ 670-675/oz
Reserve	C3 Costs	A$1,140-1,150/oz	A$1,175-1,180/oz	A$1,080-1,090/oz
	Project Free Cash	**A$63,000,000**	**A$92,000,000**	**A$32,000,000**
	C3 Costs less start-up costs	A$950-960/oz	A$985-990/oz	A$890-900/oz
Feasibility	C1 Costs	A$660-665/oz	A$660-665/oz	A$660-665/oz
Study	C3 Costs	A$1,060-1,070/oz	A$1,085-1,095/oz	A$990-995/oz
	Project Free Cash	**A$143,000,000**	**A$194,000,000**	**A$86,000,000**
	C3 Costs less start-up costs	A$930-940/oz	A$980-990/oz	A$885-890/oz

Note: C3 costs are higher at higher gold prices as the Northern Territory royalties are linked to profit. Similarly, C3 costs reduce at lower gold prices.

Figure 17: Cashflow before Tax Sensitivity Analysis

Primary, as part of the restart, proposed to engage key stakeholders to ensure they are informed and their expectations and concerns can be understood. A stakeholder engagement strategy is provided in Table 5-1.

6.13. Environmental Defenders Office

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
74	Draft EIS: Cyanide management and Closure and Rehabilitation	*The Environmental Defenders Office of the Northern Territory (EDO NT) welcomes the opportunity to make a submission in relation to the proposed underground gold mine of Primary Gold Ltd (PG) at Tom's Gully.* *We are pleased that PG has responded to numerous early concerns of the Environmental Protection Authority, specifically that waste rock material will not be used for construction, that a new water supply dam is built, and that waste rock is kept underground. We are pleased that many issues that plague the McArthur River Mine appear to have been considered and addressed in PG's proposal at this early stage. However, after considering PG's draft Environmental Impact Statement (EIS) we still have the following concerns:* *1. Risk of elevated cyanide levels in Tailings Storage Facility (TSF) Cell 2* *There are recent documented West Australian cases of gold mine TSF's containing elevated levels of cyanide[1]. Given the occurrence of the Gouldian Finch, listed as Vulnerable under the Environmental Protection and Biodiversity Conservation Act 1999, within a 10km radius of the mine site and the known possibility of birds drinking TSF water it is troubling that the EIS does not propose a method for appropriately managing this risk.* *2. Closing and rehabilitation* *Further, given the short lifetime of the mine we are concerned about the lack of an appropriate closure or rehabilitation plan at this point in time. The EIS proposes that various options for closure and rehabilitation be investigated but does not provide a timeframe for this process. Given the old mine is already contaminating the environment and that recommencement of mining activities will increase stress on the mine's surroundings, PG should already have a plan in place regarding rehabilitation and closure of the Sulphide Waste Rock Dump, the Oxide Waste Rock Dump and TSF Cell 1.* *[[1] See for instance: Griffiths, S.R. et al. 'Factors Influencing the risk of wildlife cyanide poisoning on a tailings storage facility in the Eastern Goldfields of Western Australia' (2009) Ecotoxicology and Environmental Safety*	Comment 14 and Appendix J

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
		72(5), p 1579-1586; Donato, D.B. et al. 'A critical review of the effects of gold cyanide-bearing tailings solutions on wildlife' (2007) Environment International 33(7), p 974-984] *At the very least there should be a timeline for the development of rehabilitation or closure plans and a deadline for their submission to the Department of Mines and Energy. In considering this aspect we note that the gold mining industry is currently very volatile and that past closure plans for this mine have not been successful. It would be devastating if this project increased the environmental degradation already occurring.*	

Response to Comment 74:

Risk of elevated cyanide levels in TSF 2

The following response should be read in conjunction with Comment 14.

During operations - cyanide within the tailings that reports to the tailings dam and is not recovered in water back to the plant - is either lost through volatilization as hydrogen cyanide gas or complexes with metals such as zinc and lead or reacts with sulfur to form thiocyanate. Once formed these complexes are tightly bound and are subject to biological oxidation presenting a greatly reduced risk to wildlife compared to more reactive forms measured as weak acid dissociable (WAD) cyanide and free cyanide. The total cyanide levels recorded in TSF 1 and 2 represent the less reactive forms of cyanide with median values of 0.09mg/L well below the more reactive WAD cyanide levels of 50mg/L that are deemed to afford wildlife protection in freshwater tailings storage facilities (Donato *et al.* 2007). As discussed in Comment 14, Primary will investigate and adopt measures to reduce the potential for interaction between birdlife and tailings storage facilities.

During operations Primary propose to undertake the following measures to protect birdlife around the TSF. These measures can be summarized as follows:

- Targeting the 50mg/L of WAD cyanide in supernatant tailings water. Tailings water will be analysed for the level of WAD cyanide.
- Minimise the tailings supernatant water pond as far as practicable reducing the surface water area thus making the TSF areas less attractive compared to other water bodies in the area (including Annies Dam).

- Primary propose to investigate the use of gas cannons, drinking troughs or other alternatives that are best suited for site specific conditions and bird species observed at the site.
- As part of regular monitoring of the TSF personnel that are responsible for the daily inspections will monitor the TSF for evidence of fauna illness or fatalities. If bird mortality/sickness is more than one a day, the incidents will be investigated and suitable measures implemented based on consultation with experts in the field and relevant regulators

Closing and Rehabilitation

As part of the further EIS supplement work, options were investigated in regard to the management and closure of the tailings and associated storage facilities (Comment 1). It is proposed to retreat the tailings to extract gold, mixed metal oxides sulfur and silica. Approval has been granted for an onsite pilot plant. A large focus the EIS Supplement was to better define a wholistic conceptual site model while addressing concerns raised for the Draft EIS (Comment 1). Of the current and future project impacts highlighted by the model is the potential to liberate acid mine drainage products when the site is exposed to water during monsoonal conditions. To understand the potential sources of minerals that could produce acid drainage a systematic sampling campaign was completed that included the drilling of the Oxide and Sulfide Waste Rock Dumps, pitting of Tailings Storage Facilities 1 and 2, and stockpile and sediment sampling. The work highlighted that within the waste rock dumps the acid loads were being liberated at a slow but manageable rate.

This initial work has provided a basis for an update of the Mine Closure Plan that has been submitted with the EIS Supplement. A closure schedule, rehabilitation monitoring plan and SMART completion criteria have been updated in the revised MCP. As the mine closure plan is part of the dynamic life of mine closure process as further work is completed during operations the closure strategies will be refined with the document updated (Appendix J).

6.14. Public Comment

Comment No.	ToR Item / Draft EIS Section	Comment	Related Comment and/or Appendices
75	EIS (Public Comment)	*I would like to make the following comments about the Toms Gully EIS. These comments are in relation to the biodiversity chapter and report.* *It is not sufficient that they have not undertaken any fauna surveys for this EIS. I don't agree with the determination of likelihood of threatened species within the site. The report does not refer to any fauna surveys that were conducted previously. Considering no surveys have been undertaken in the area, how can they decide if a species is likely to be present or absent from the site? Just because there are no records on the DLRM database of a species in the mine site, it does not mean they do not occur there. If they were to do surveys, then they could at least have some level of certainty. At the moment it appears to be a guess as to what could be on site.* *Considering the large area to be cleared for the new raw water dam, I believe that some sort of fauna surveys should be undertaken in that area.*	Comment 13 and Appendix D.

Response to Comment 75:

Taking into consideration the concerns raised regarding terrestrial fauna impacts, Primary commissioned two seasonal flora and fauna surveys. These were undertaken in November 2016 and May 2017 (Appendix D). The surveys included on-ground targeted fauna surveys, no threatened species were recorded during the fauna survey. The timing of the surveys were to ensure that seasonal variation across the site was better understood thus informing the likelihood for threatened species to be present across the site. The studies did record the following near-threatened species under the NT TPWC Act; the orange leaf-nosed bat (*Rhinonicteris aurantia),* the, the bush-stone curlew (*burhinus grallarius*) and the yellow-rumped mannikin (*Lonchura flaviprymna*). The aquatic ecosystem study recorded one Mertens Water Monitor (*Varanus* mertensi), listed as Vulnerable under the TPWC Act, 0.7 km upstream of TGU (GHD 2018). Refer to the response to Comment 13 for more details.

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8 Appendices

Appendix A – Geochemical Baseline Study and Site Conceptual Model

Appendix B – Site Flood Assessment

Appendix C – Groundwater Modelling

Appendix D – Flora and Fauna Survey

Appendix E – Aquatic Ecosystem Survey

Appendix F – Update Site Specific Trigger Values

Appendix G – Commitments Summary Table

Appendix H– Risk Assessment Framework

Appendix I – Acid and Metalliferous Drainage Management Plan

Appendix J – Mine Closure Plan

Appendix K– Site Water Balance

Appendix L – Water Management Plan

Appendix M – NT EPA Correspondence on Primary Gold's Draft EIS

Appendix N – Assessment of EPBC 1999 Referral

Appendix O – Tailings Storage Facility Conceptual Geotechnical Options Study