

EGL Ref: 9702

17 February 2026

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Attention: Cheryl Low

**MATAKANUI GOLD LIMITED
BENDIGO-OPHIR GOLD PROJECT- FAST TRACK APPROVALS ACT
RESPONSE TO OTAGO REGIONAL COUNCIL
SHEPHERDS VALLEY CREEK REALIGNMENT**

1.0 INTRODUCTION

GeoSolve Limited (GeoSolve) has undertaken a peer-review of the Bendigo-Ophir Gold Project (BOGP) Fast Track Approvals Act (FTAA) application on behalf of Otago Regional Council (ORC). Subsequently, ORC have sought responses from Matakanui Gold Limited (MGL) on questions to assist them in their understanding of the proposal, its actual and potential effects and the proposed management of those effects relating to:

- Geotechnical Engineering, Surface Water, and Erosion and Sediment Control

Engineering Geology Limited (EGL) is engaged by MGL to provide geotechnical, earthquake and dam engineering services for the BOGP. This letter sets out EGL's response to select ORC's queries dated 12 December 2025¹: Questions 4 and 6.

This letter version dated 17 February 2026 has been issued as draft to support GeoSolve's response to ORC.

2.0 ORC COMMENTS

Questions 4 and 6 have been repeated below. EGL has provided a combined response for both questions in the following sections.

Question 4

Please provide the following information in relation to the proposed diversion of both Shepherds Creek and 'SREX tributaries':

¹ Otago Regional Council. 12 December 2025. Request for further information – Matakanui Gold Limited fast-track application for the Bendigo-Ophir Gold Project. ORC Ref: RMFT25.007

- a) *Channel diversion / realignment path design details*
- b) *Engineering drawings*
- c) *Channel lengths, gradients and alignments*
- d) *Proposed construction methodology*
- e) *Erosion control or armouring details specific to the channel*
- f) *Hydraulics / flood design calculations to support channel sizing*

It is noted that the above information has already been provided for the proposed Rise and Shine Creek diversions.

Question 6

Please provide an assessment from a suitably qualified and experienced person of the flood carrying capacity of the proposed Shepherds Creek diversion channel. Specifically, this assessment should include:

- a) *Whether this channel will be capable of conveying 100-year ARI (1% AEP) flood flows.*
- b) *If the channel cannot accommodate the flows described in part (a) without overtopping,*
- c) *an assessment of the potential consequences of overtopping.*
- d) *Clarification of whether the proposed channels will be left as-constructed following closure of the mine, and if this is case then an explanation as to how their ongoing performance will be assured.*

The following sections are excerpts from the Shepherds Creek Realignment Technical Report, which is currently in progress. It contains details which address aspects of Questions 4 and 6 above.

3.0 PROPOSED REALIGNMENT OF SHEPHERDS CREEK AT SHEPHERDS VALLEY INFILL TO VALLEY EXIT

3.1. General

Shepherds Valley floor will be infilled along Shepherds Service Corridor (Figure 1) as part of the mining operation. The works are required to provide access to the valley floor and further into the site, form an operating platform for the Process Plant, and facilitate management of surface water. The earthworks will require Shepherds Creek to be realigned within an engineered channel to manage flood flows. The section of the creek through the Shepherds Valley Infill to the valley exit will be rehabilitated during operation and will remain in place in closure. This section of creek is referred to as the Shepherds Valley Infill Creek Realignment (creek realignment channel, or 'channel').

Separate dirty water diversions will be in place during construction and mine operations to treat runoff from haul roads and other disturbed areas at the Shepherds Valley Infill before discharge to the creek realignment channel.

Specific details for sections of the proposed works are described below.

3.2. Site Access Road Through Gorge

The valley exit will be filled through the 'gorge' to form the site access road. A 3D concept of the area is shown in Figure 1. The gorge is formed in TZ4 schist rock with steep side slopes as shown in the Figure 2. The opening is narrow and therefore the

site access will be formed primarily on fill with Shepherds Creek realigned on fill on the north side of the gorge. Some cut may also be required. The channel for the Shepherds Creek realignment in this zone will be lined with armour rock (riprap).

The site access road will be stabilised with a wearing course and therefore sediment control measures will not be required in this area during operation.

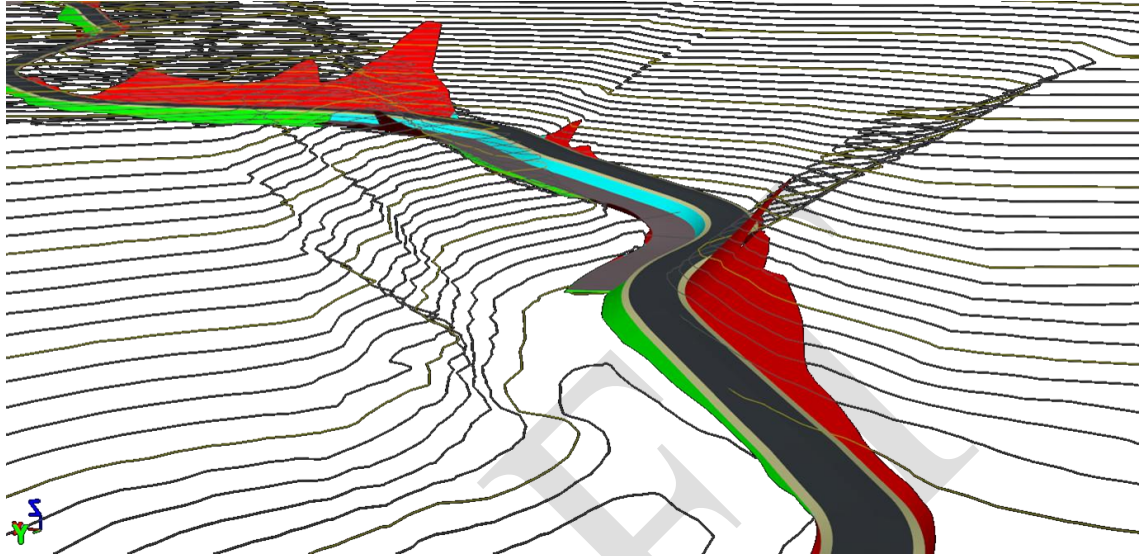


Figure 1: Site access road fill through the gorge at the exit of Shepherds Valley, looking east.



Figure 2: Photo looking east into the gorge where the site access road will pass through.

3.3. Access Road from Gorge to Process Plant

The access road from the gorge to Process Plant will follow the south side of the valley floor as shown in Figure 3. Figure 4 shows a photo of this same area. The creek currently flows along south side of the valley for a portion of this length and will need to be realigned to the north for the fill profile for the road to be formed. Where the realigned creek naturally flows against the fill, armour rock protection of the fill surface may be required for erosion protection.

The site access road will be stabilised with a wearing course and therefore sediment control measures will not be required in this area during operation.

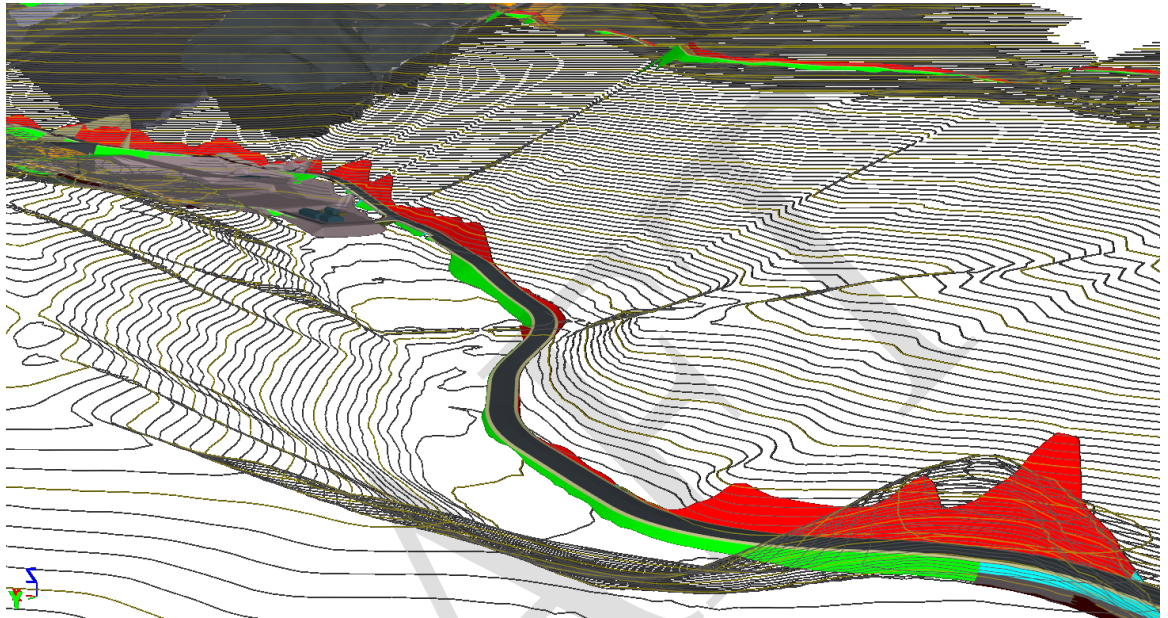


Figure 3: Looking east up Shepherds Valley towards Process Plant.



Figure 4: Photo looking east up Shepherds Valley towards Process Plant

3.4. Process Plant Area Cut to Fill Platform

A cut and fill platform will be constructed in the valley floor to form the Process Plant area. The fill will require Shepherds Creek to be located on the northern side of the valley through this area. Figure 5 shows the fill platform across the valley floor.

Generally, the existing creek alignment in the area already follows the northern side of the valley floor due to the presence of an alluvial fan and historical sluicing material to the south side of the valley. Therefore, sections of the existing creek channel may not require realignment. However, much of its length may need to be reformed in an engineered channel, potentially on fill, or moved further up the valley slope. Armour rock protection of the fill surface may be required.

The creek realignment channel will need to bypass the Process Plant Run of Mine (ROM) pad upstream of the main Process Plant area. Figure 6 shows the view looking downstream towards the Process Plant ROM Pad. Fill across the valley at the ROM pad is higher than the valley infill downstream and this section of the channel will be steep. Hence the channel will require specific protection against high velocity flows in this area.

Any contaminated runoff from the Process Plant will be collected and put into the mine water circuit, i.e. will not be discharged offsite. Any uncontaminated dirty water will be routed through sediment control features before discharge to the creek.

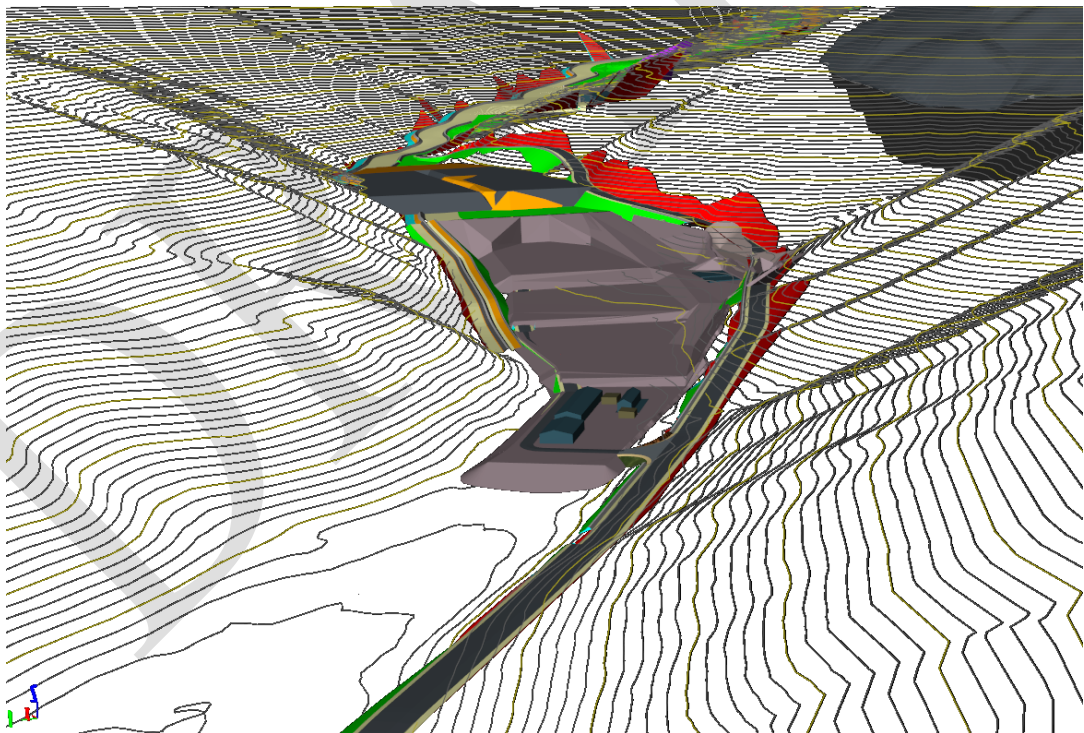


Figure 5: View looking up valley (east) towards Process Plant platform

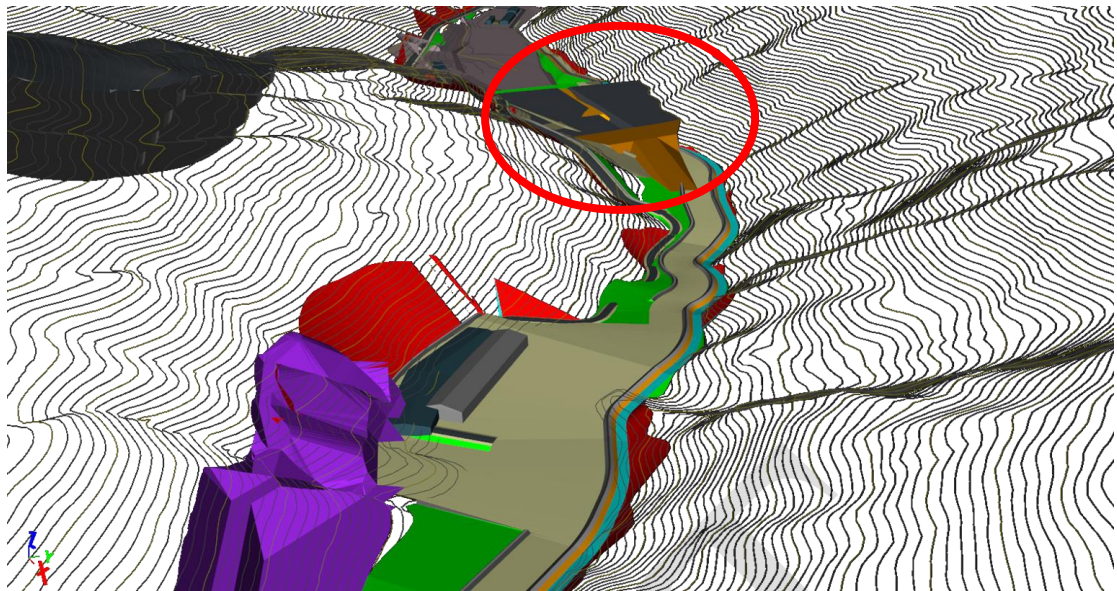


Figure 6: Shepherds Valley Infill past Underground Portals and approaching ROM pad. The ROM Pad (circled) is in orange and grey

3.5. Shepherds Valley Infill

From the Process Plant ROM Pad to the Shepherds Silt Pond, the Shepherds Valley Infill will be formed by progressively placing fill in the valley floor, as shown in Figure 7. The proposed fill depths are up to 20 m. This will require Shepherds Creek to be raised to the top of the Valley Infill. This can be achieved by either:

1. Progressively filling downstream, forming a new engineered channel for the creek on top of the fill, or
2. By cutting the creek base flow into a temporary channel on the north side of the valley, lifting the fill to this level and forming a permanent channel on the Valley Infill.

Cleanwater above the southern side of the valley infill will bypass the operational area via culverts before discharge into the creek channel. Any haul roads cut into this slope will have perimeter controls (i.e. windrows and table drains with check bunds) and local sediment retention bunds to treat water before discharging to slopes and gullies. Runoff water above haul roads will be diverted to cleanwater gullies using contour bunds and culverted past the haul roads.

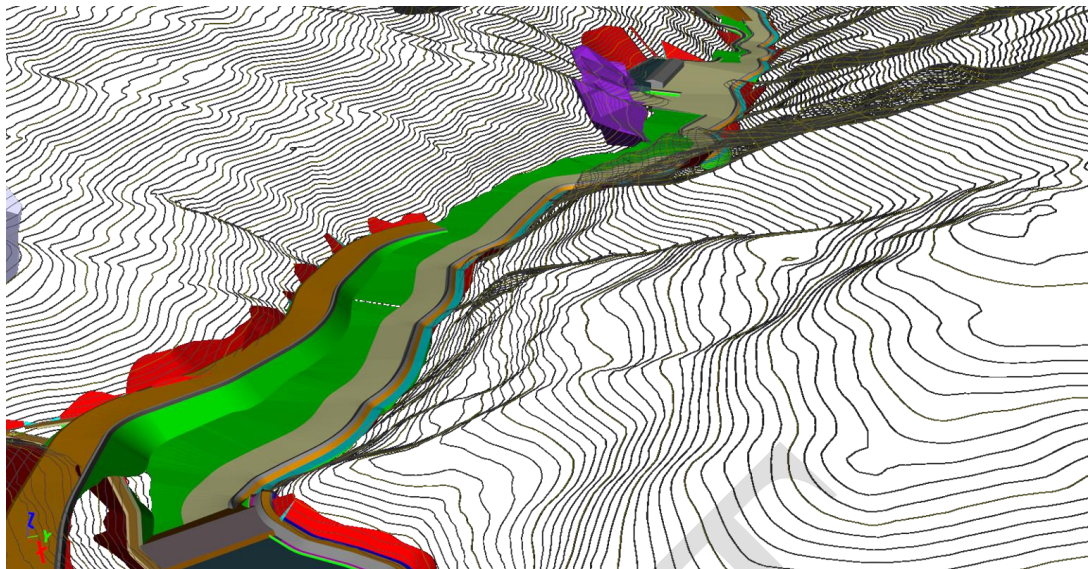


Figure 7: Shepherds Valley Infill from Shepherds Silt Pond to the Underground Portals, looking northwest

4.0 DESIGN OBJECTIVES AND CRITERIA

4.1. Objectives

Shepherds Creek Realignment Channel

In the mine operation phase, the design objective of the Shepherds Creek realignment channel is to manage clean surface water runoff for a design storm event, while also meeting freshwater ecology objectives. In closure, the design objective for the channel is to remain and function with minimal additional rehabilitation or ongoing maintenance.

Dirty Water Diversions and Sediment Management Controls

The design objective for dirty water diversions and sediment management controls is to divert and treat runoff from disturbed ground areas and haul roads during operation, such that there is no uncontrolled sediment discharge for a design storm event.

Creek Rehabilitation

The Shepherds Creek realignment channel through the Shepherds Valley Infill to the valley exit will be rehabilitated in mine operation. The objective of rehabilitation from a freshwater ecology perspective is to enhance and improve aquatic ecological values to Shepherds Creek. This is to be achieved through mimicking pre-existing stream conditions where possible. The details for creek rehabilitation design will be covered in a separate freshwater ecology stream design report. The objective of the civil engineering design is to size the engineered channel dimensions and specify appropriate substrate to allow for the successful ecological rehabilitation and uplift of the creek.

The following principals are proposed in the draft Resource Consent Conditions (Schedule 2, 22):

- a) As much as practicable, the diversion should be designed with an average width of no less than 0.8 m, and preferably 1 m for Shepherds Creek, and no less than 0.5 m for Rise and Shine Creek.
- b) As much as possible, the stream diversion channel must be a similar length and stream area than the channel to be reclaimed. This aims to ensure that there is no loss of extent and values of the watercourse.
- c) The channel design does not have to replicate the form of the channel to be reclaimed but would benefit from a low-flow (or baseflow) channel, a bank full channel and where available, a floodplain area.
- d) As much as possible, water flow should mimic the hydrology of the existing watercourse (i.e., flows intermittently or permanently same as existing channel).
- e) The channel should mimic, as much as practicable, the natural meanders of the stream to be reclaimed.
- f) Hydrologic heterogeneity and instream habitat complexity can be achieved through the creation of natural features such as runs, riffles and small and large pools

In addition, the following principles from the Freshwater Ecological Management Plan (Ref. 1) will be adopted where possible:

- g) The final substrate present should mimic that naturally occurring in similar sized tributaries in the wider catchment to the extent that this is practicable,
- h) As much as practicable, the stream diversion channel should be constructed offline and prior to any instream works within the channel to be reclaimed,
- i) The stream profile should allow the planting of riparian vegetation close to and extending over and into the water surface at the margins to create ample stream edge habitat.

4.2. Shepherds Creek Realignment Design Criteria

4.2.1. Design Event

Shepherds Creek Realignment Clean water

Realigned or existing Shepherds Creek section downstream of Shepherds Silt Pond shall be designed for 1 in 100-year AEP storm using climate change scenario Representative Concentration Pathway (RCP) 8.5.

EGL recommend that the channel is designed and detailed for operation and closure, to minimise bonding requirements.

Dirty Water

Dirty water diversions for the Shepherds Engineered Landform (ELF), the area between Shepherds ELF and the Rise and Shine (RAS) pit, and the haul roads leading to the Run of Mine (ROM) pad area including the Shepherds Valley Infill shall be designed for a 1 in 20-year AEP storm using climate change scenario Representative Concentration Pathway (RCP) 8.5.

4.2.2. Channel Erosion Protection

The Shepherds Creek realignment channel shall be designed to ensure peak flows during the design event do not cause any significant erosion.

4.2.3. Seepage losses

The channel shall be detailed such that there is no significant loss of base flow to ground.

4.2.4. Ecological Considerations

Where space allows, the channel shall be wide enough to accommodate stream rehabilitation requirements such as mimicking a natural meander.

The channel shall include a low flow base channel, and where space allows, a wider flood plain area.

Where this doesn't compromise erosion protection design, the channel base detail should include substrate similar to the naturally occurring existing substrate.

5.0 SHEPHERDS CREEK REALIGNMENT CHANNEL

5.1. Hydraulic Assessment

Shepherds Creek design flows have been assessed at two locations; at the Process Plant ROM Pad and the gorge at the valley exit.

Equivalent runoff coefficients indicated in Table 1 were obtained using the Curve Number Method (Ref. 1).

Rainfall runoff has been assessed with a unit hydrograph approach, and flood routing undertaken using the HEC-HMS modelling programme (Version 4.12). The peak flow estimates are summarised in Table 2, showing a design peak flow rate of 17.6 m³/s past the ROM pad at the Process Plant, and 20.4 m³/s at the valley exit for a 6-hour duration storm. Hydraulic routing curves are attached.

The design flows have been assessed using rainfall depths obtained from the NIWA High Intensity Rainfall System (HIRDS) version 4, for RCP8.5, for period 2031 to 2050. This is the most extreme climate change scenario and we consider this appropriate for the assessment of design flows during mine operation.

In closure, this would be equivalent performance to RCP2.6, for period 2081 to 2100, for a 6-hour duration event (peak flow).

Table 1: Shepherds Creek 1 in 100 AEP (RCP8.5, 2031 to 2050) Rainfall Depths, Runoff Coefficients and Runoff Depths (mm)

Duration	Rainfall Depth (mm)	Equivalent Runoff Coefficients			Runoff Depth (mm)		
		Undisturbed	ELF	Silt pond surface	Undisturbed	ELF	Silt pond surface
1 hr	33.5	0.41	0.21	1.0	14	7	33.5
2 hr	45.4	0.49	0.28	1.0	22	13	45.4
6 hr	71	0.61	0.40	1.0	43	28	71
12 hr	91.1	0.67	0.47	1.0	61	43	91.1
24 hr	113	0.72	0.53	1.0	81	60	113
48 hr	137	0.75	0.58	1.0	103	79	137
72 hr	149	0.77	0.60	1.0	115	89	149

Table 2: Shepherds Creek 1 in 100 AEP (RCP8.5, 2031 to 2050) Peak Flow Estimates

Duration (hr)	Process Plant ROM Pad Flows (m ³ /s)	Gorge at Valley Exit Flows (m ³ /s)
1	14.3	17.1
2	15.8	19.0
6	17.6	20.4
12	16.3	18.6
24	13.4	15.1
48	12.8	14.4
72	12.3	13.8

5.2. Channel Details - Operation

5.2.1. Dimensions and Erosion Protection

Channel slope gradients along the realignment are expected to vary from 1V in 30H to 1V in 5H. The section past Shepherds Valley infill has an average gradient of 1V in 15H, past the Process Plant the average gradient is 1V in 30H. To achieve the ecological design objectives, sections will need to be formed at different gradients and vary between approximately 1V in 5H and 1V in 30H.

Small water drop structures can be added to the creek to achieve ecological objectives. These have benefits in minimising the size of armour rock.

The sizing of the channel and freeboard has been assessed using the methods described in the 'Design of Roadside Channels with Flexible Linings' by Kilgore & Cotton (2005) (Ref. 3).

Armour rock protection will be required along the channel bed and side slopes. A preliminary assessment of the required erosion protection has been undertaken using the design peak flows and the range of channel slopes

anticipated along the realignment. Preliminary riprap sizing has been determined using the methodology outlined in Kilgore & Cotton (2005) (Ref. 3), and indicative armour rock sizes for various channel slopes are provided in Table 3. A Mannings's n of 0.065 has been adopted for riprap.

A minimum channel bed width of 3 m has been assumed as part of this assessment.

The final extent and specification of erosion protection, and channel bed width, will be refined during detailed design. There is an opportunity to reduce riprap extent and size.

Table 3: Summary of Channel Dimensions and Armour Rock Requirements for the Range of Channel Slopes Along the Creek Realignment

Channel Slope	Min. Channel Bed Width (m)	Minimum Freeboard (mm)	Maximum Side Slope	Minimum Riprap D ₅₀ (mm)	Minimum Riprap Thickness (mm)
1 in 5	3.0	300	1:2.5	700	1300
1 in 10	3.0	300	1:2.5	400	800
1 in 20	3.0	300	1:2.5	260	500
1 in 30	3.0	300	1:2.5	250	500

5.2.2. Base flow and Substrate

Armour rock will be infilled with smaller sized gravels to mimic naturally occurring substrate onsite. This will provide a suitable surface for ecological rehabilitation of the stream, including riparian planting. This will also reduce the risk of base flow seeping into the underlying fill.

Where space permits, the channel will be widened to allow for shallower side-slopes, riparian planting and other ecological enhancement features.

EGL anticipates a smaller channel will be shaped within the channel bed to convey base flow. This will be sized for the average estimated Shepherds Creek flow rate of approximately 18 l/s during operations (based on operations water balance model results Ref. 4).

5.2.3. Seepage

The base flow across the channel floor is likely to be lost as seepage into the underlying fill without specific detailing of the channel. Where the channel is constructed in fill, it will be lined with a Zone A low permeability layer across the channel floor. This liner can be constructed using suitable site-won materials.

Under flood flow conditions, most of the water will be conveyed through the channel over a short duration, and seepage is not considered a significant risk. As a result, Zone A lining is required only on the channel bed.

The details for creek rehabilitation design in closure will be covered in a separate freshwater ecology stream design report.

Civil engineering channel details provided in the sections above remain applicable to the channel design in closure, should additional improvements be undertaken.

6.0 APPLICABILITY

This letter has been prepared by EGL (Engineering Geology Limited) solely for the benefit of Matakaniui Gold Limited as our client with respect to the particular brief given to us for the Bendigo-Ophir Gold Project. If used by other parties and/or used in any other context or for any other purposes, no warranty or representation is given as to its accuracy and no liability is accepted for loss or damage arising directly or indirectly from reliance on the information in it.

The author of this letter acknowledges that this letter will be relied on by a Panel appointed under the Fast Track Approvals Act 2024 and these disclaimers do not prevent that reliance.

Your Sincerely

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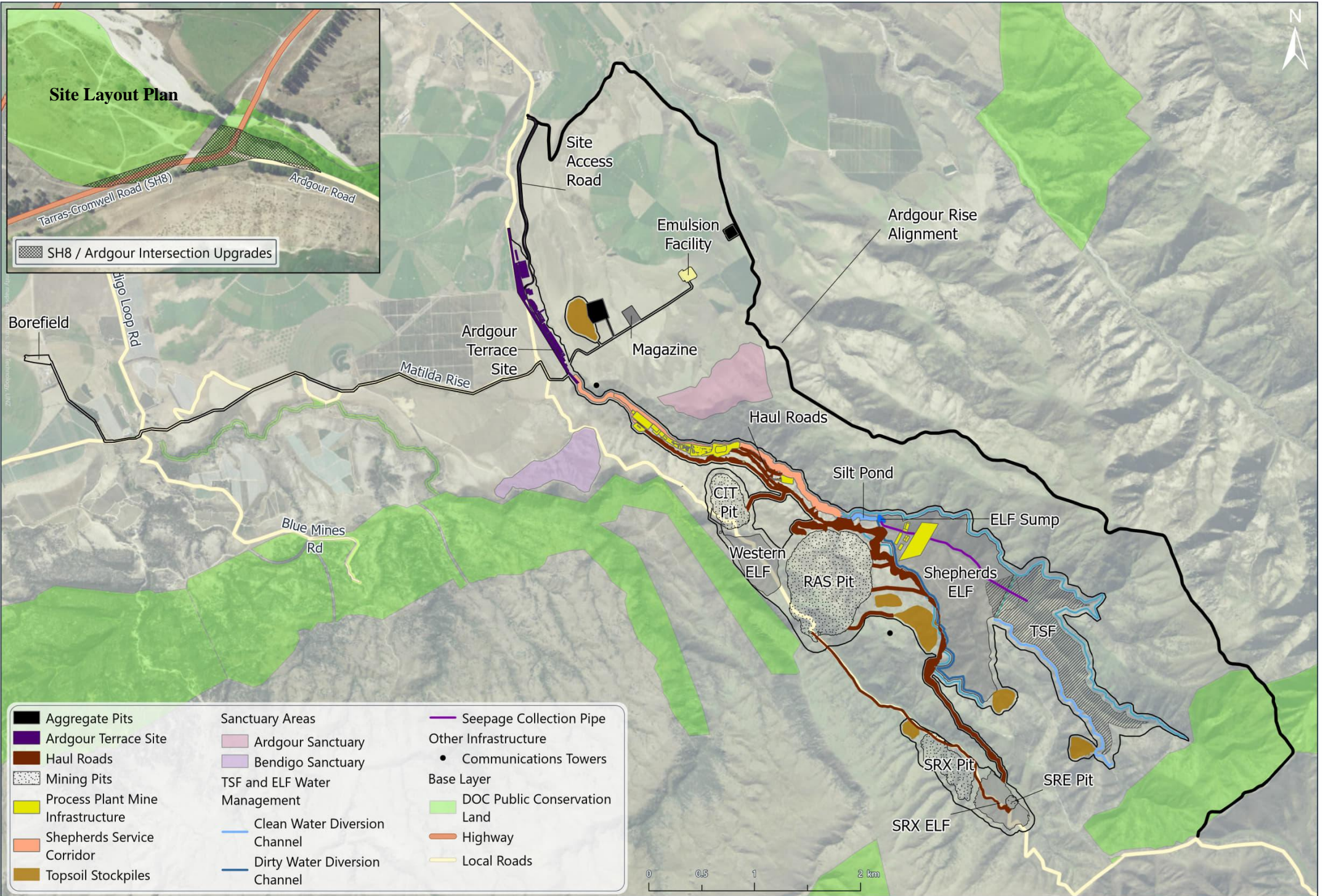
Attachments:

Site Layout Plan
Hydraulic Routing Curves

REFERENCES

1. Boffa Miskell Limited. 23 October 2025. Bendigo Ophir Gold Project, Freshwater Ecology Management and Monitoring Plan, Prepared for Matakanui Gold Limited.
2. Urban Hydrology for Small Watersheds (1986, TR-55)
3. Kilgore, R. T., & Cotton, G. K. (2005). Design of roadside channels with flexible linings (Hydraulic Engineering Circular No. 15, 3rd ed.; FHWA NHI 05 114). Federal Highway Administration, National Highway Institute.
4. Table 21. MWM, 2025. Water and Load Balance Model Report: Bendigo-Ophir Gold Project, Doc. No.: J-NZ0233-016-R-Rev1. Dated 10 October 2025. Appendix N, document B06C of BOGP Fast Track Substantive Application

DRAFT



Aggregate Pits	Sanctuary Areas	Seepage Collection Pipe
Ardgur Terrace Site	Ardgur Sanctuary	Other Infrastructure
Haul Roads	Bendigo Sanctuary	Communications Towers
Mining Pits	TSF and ELF Water Management	Base Layer
Process Plant Mine Infrastructure	Clean Water Diversion Channel	DOC Public Conservation Land
Shepherds Service Corridor	Dirty Water Diversion Channel	Highway
Topsoil Stockpiles		Local Roads



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Process Plant ROM

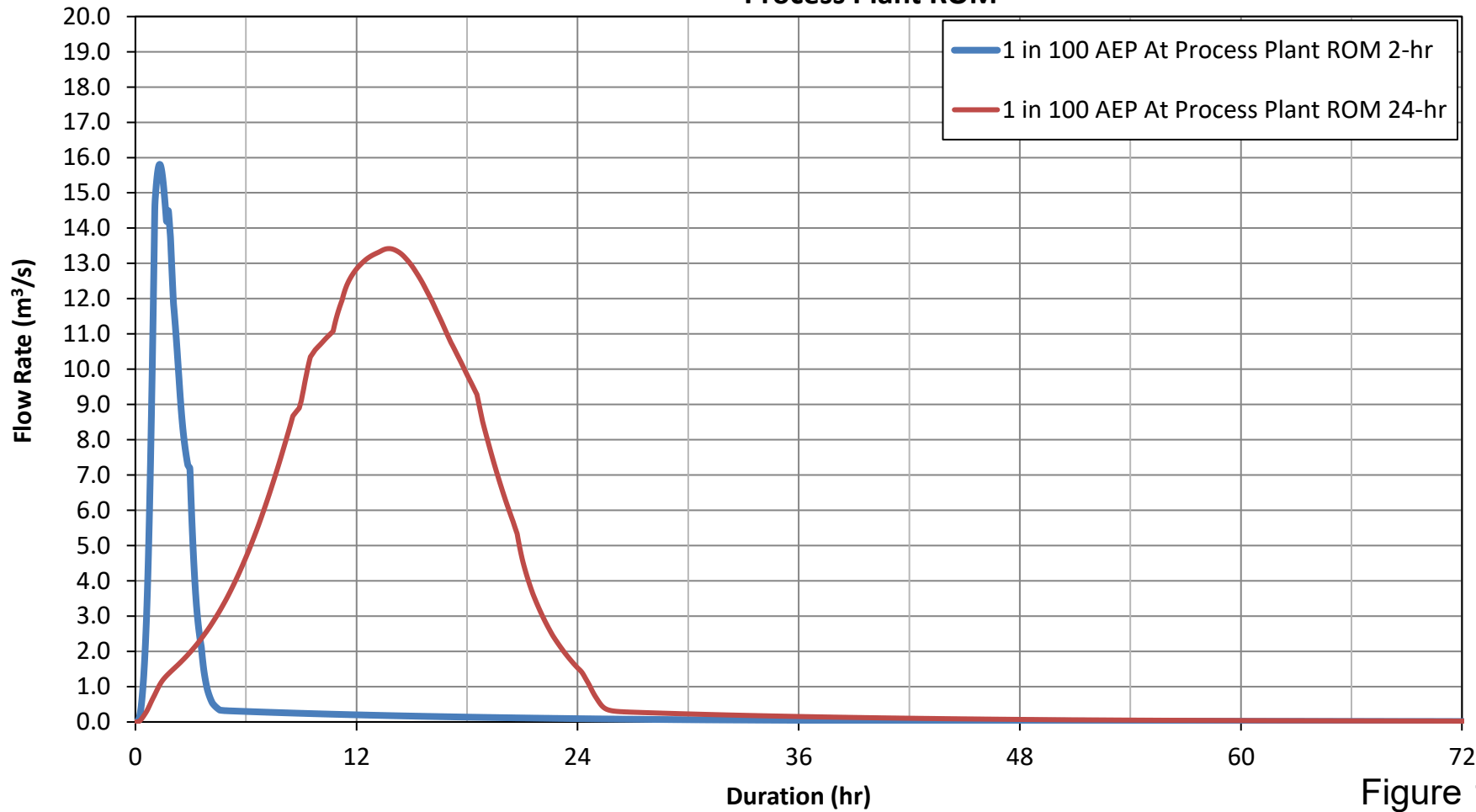


Figure 10



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MATAKANUI GOLD LIMITED
BENDIGO OPHIR GOLD PROJECT
Shepherds Creek Flow
Hydraulic Routing Curves

Ref. No: 9702
Date: Jan 2025
Drawn: PQ

Shepherds Creek Gully Exit

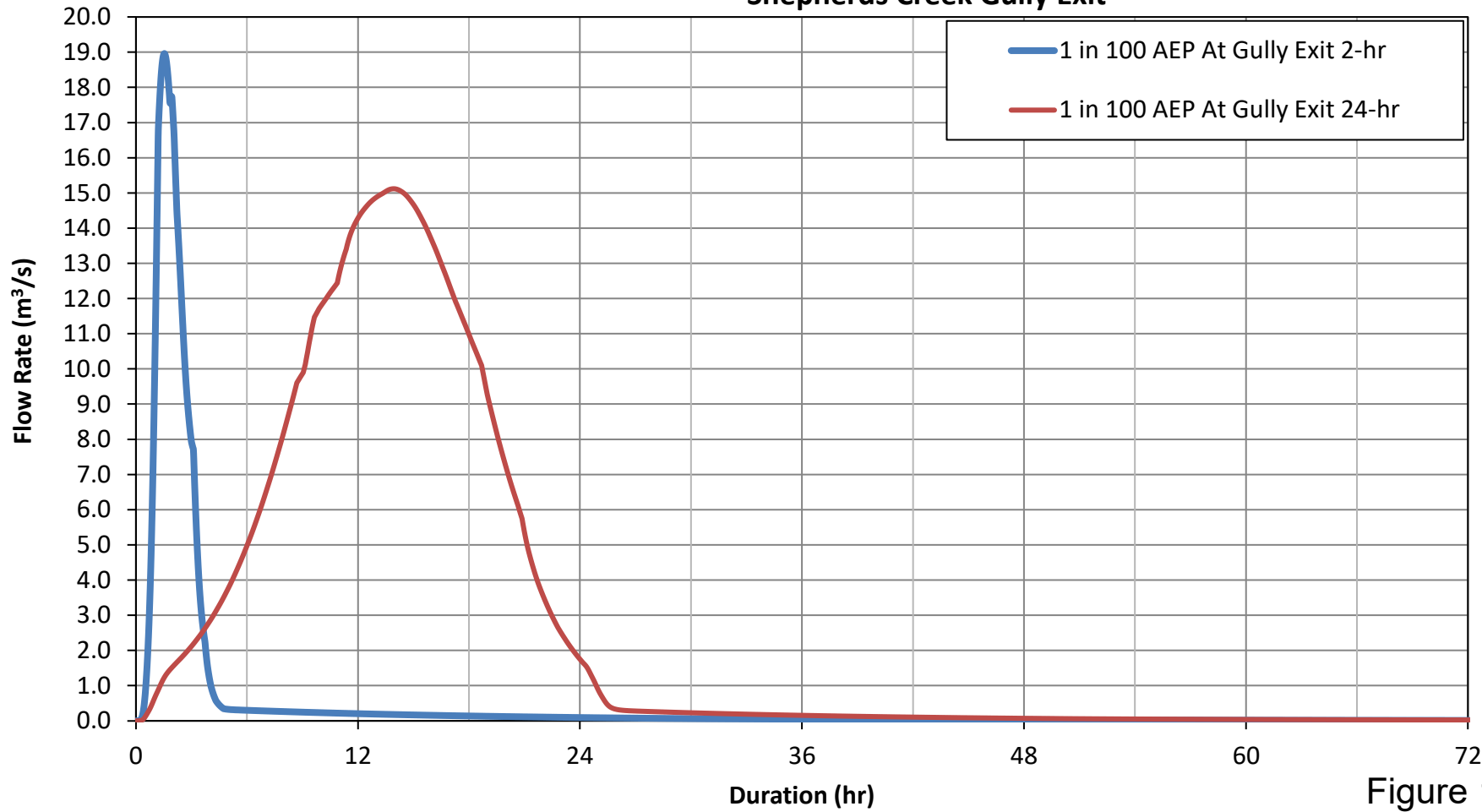


Figure 13



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MATAKANUI GOLD LIMITED
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