APPENDIX 1: KUNDIP WASTE LANDFORM AND TSF DESIGN CONCEPT – GOLDER ASSOCIATES/DUMPSOLVER (2016)

TECHNICAL MEMORANDUM

DATE 2 December 2016 **DOCUMENT No.** 1667588-001-M-Rev0

TO Ed Ainscough
ACH Global Pty Ltd

CC Paul Bennett (ACH Global), Mitchell Ladyman (Animal Plant Mineral), Sharon Arena (Animal Plant Mineral)

FROM Peter Chapman (Golder) and Mike Russell (DumpSolver) **EMAIL** pchapman@golder.com.au

CONCEPT DESIGN FOR WASTE LANDFORM AND TAILINGS STORAGE FACILITY KUNDIP GOLD PROJECT

1.0 INTRODUCTION

ACH Global Pty Ltd (ACH) has engaged Golder Associated Pty Ltd (Golder) and DumpSolver to develop a conceptual design for management of waste (overburden/waste rock and tailings) at its Ravensthorpe Gold/Copper Project (RGCP). ACH Minerals Pty Ltd, a wholly owned subsidiary of ACH, purchased the RGCP, which comprises the Kundip Mine Site and Myamba Mine Site, from Silverlake Resources Ltd (Silverlake) on 15 July 2016. The former farm-in and joint-venture agreement held between the two parties allowed for ACH Minerals Pty Ltd to acquire the project at any time during the earn in period.

This memorandum presents a summary of the waste management concept for the RGCP, to support an Environmental Protection Authority (EPA) referral for the project being prepared by Animal Plant Mineral, on behalf of ACH.

2.0 BACKGROUND AND PROJECT LOCATION

The RGCP is smaller in scale than the previously approved Phillips River Project, which was to be developed at the same site. Mining of gold and copper bearing ore will be focussed on a combination of open-pits and underground mining at Kundip Mine Site. Processing will also be contained within the Kundip Mine Site, negating the requirement for a tailings pipeline to traverse the adjacent Nature Reserve, as was previously proposed in the Phillips River Proposal.

The Kundip Mine Site is situated approximately 17 km south-east of the town of Ravensthorpe and can be accessed from the Hopetoun-Ravensthorpe Road. The Myamba Mine Site is a further 9 km south of the Kundip Mine Site and is also accessed via the Hopetoun-Ravensthorpe Road. The southern boundary of the Myamba Mine Site adjoins the Jerdacuttup Road, which runs eastwards from the Hopetoun-Ravensthorpe Road.

3.0 BASIS OF DESIGN

ACH provided Golder and DumpSolver with the anticipated waste generation schedules for the project, as follows:

- 12.3 Mm^3 of overburden/waste rock, comprising 10.6 Mm^3 from the Kaolin pit, 1.2 Mm^{3-} from the Harbour View pit and 0.5 Mm^3 from the Flag pit.
- 2.3 Mm^3 of tailings[1], generated by the process plant over an anticipated period of eight years at a maximum throughput of 0.75 Mtpa.

The waste volumes outlined above were used in conjunction with survey provided by ACH to develop concept designs for the waste landforms and the tailings storage facility (TSF), as outlined below.

[1] At an assumed dry density of 1.5 t/m^3, considered reasonable for gold tailings deposited sub-aerially in this climatic zone.

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4.0 WASTE LANDFORM CONCEPT

4.1 Overview

Using information provided by ACH, DumpSolver, with it specialist software, developed the conceptual waste landform design. The software incorporates user-defined parameters such as waste volumes, anticipated waste locations, haulage costs and land access/rehabilitation costs to optimise (minimise the cost of) waste placement in the context of the site-based spatial constraints. For the purposes of this concept design, the following assumptions were made:

- No waste would be placed within 40 m of the main pit shells for Kaolin, Harbour View and Flag. It was agreed that minor excavations NE and S of Harbour View would be available for dumping.
- No waste would be placed within the main pits (i.e. backfilling has been excluded from the concept design). An evaluation was conducted into the potential for backfilling of the Kaolin pit and it was concluded that this is unlikely to be technically viable due to scheduling constraints on ore and waste mining.
- The conservation area to the north of the Kaolin pit would not be impacted.
- Waste would be placed within the leases currently owned by ACH.
- The heritage trail and Kundip Battery, both to the west of the pits, would be retained.
- No waste would be placed further south or west of the Harbour View pit. Waste generated from both the Harbour View and Flag pits would place into the single waste landform as a means of limiting the overall disturbance footprint. Additionally, the locations of the water storage structures previously incorporated in the conceptual mine layout have been maintained.

4.2 Concept Design

Adopting the assumptions (constraints) outlined above, a conceptual footprint for the waste landforms was developed using DumpSolver. The extent of the proposed waste landform is indicated in Figure A, over page and presented in plan form in Figure 1, attached. The concept design has the following features:

- Two waste landforms are proposed, to the west of the Kaolin pit and to the east of the Harbour View pit
- The waste landforms would have a footprint area of 71 ha post rehabiliation
- The northern waste landform would have a maximum height of 1020 m RL, consistent with surrounding topography
- The eastern waste landform would have a maximum height of 1030 m RL, consistent with surrounding topography
- The waste landforms would be developed with 10 m lifts with material placed at angle of repose with ~22 m wide berms
- The design is based upon a single slope, post rehabilitation, of 16 degrees

A typical cross-section for the waste landform face is presented in Figure B.

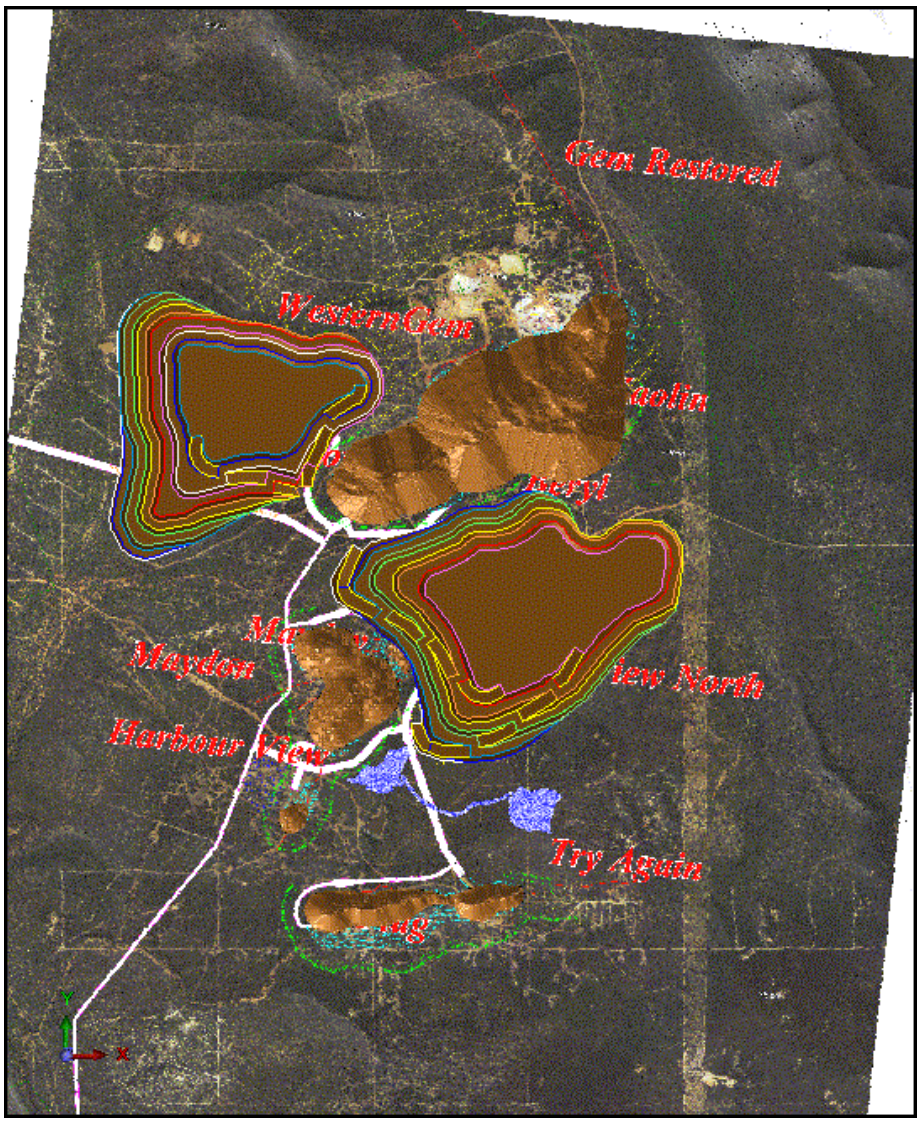

Figure A: Conceptual Waste Landform Design

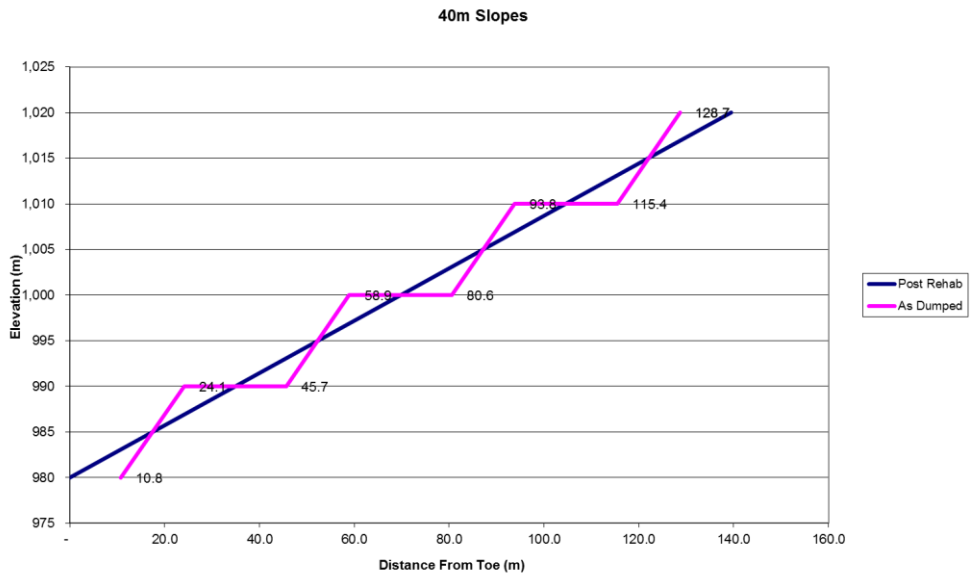

Figure B: Typical Cross-Section – Waste Landform

5.0 TSF CONCEPT

5.1 Overview

After identification of the preferred waste landforms, candidate locations for the TSF were considered. In conjunction with ACH, a cross-valley TSF was selected, to be constructed with locally borrowed material to provide sufficient capacity to retain tailings for the anticipated eight years of production. The proposed TSF is located to the south of the Flag pit, in a natural valley in the south-east corner of the ACH leases, as shown on Figure 1. The TSF provides storage capacity for 2.3 Mm^3 of tailings generated by the processing plant and has a maximum height of ~23 m.

5.2 Concept Design

At this stage, it has been conservatively assumed that the tailings would be deposited as a slurry, at an assumed beach slope of 0.5%[2] or 1V:200H, allowing a 300 mm operational freeboard, with deposition occurring primarily from the confining embankment constructed across the valley. Deposition from the embankment would result in the supernatant pond being located at the heads of the two valleys, as indicated in Figure 2, providing sufficient freeboard to contain the 1 in 100-year, 72-hour rainfall event in line with DMP[3] guidance. The concept assumes that the embankment would be constructed using the downstream raise approach, or constructed as a single embankment prior to commencement of operations, depending on availability of materials from locally and waste scheduling from the pits.

Deposition from the embankment results in the supernatant pond being remote from the embankment, reducing the risks associated with embankment instability, overtopping and seepage, and also providing the opportunity to raise the TSF upstream, should this be viable at a later date.

Water would be collected from the TSF by either pumps located on the supernatant ponds or fixed towers for reuse with the processing circuit. It has been assumed that the TSF would be unlined and hence a seepage collection facility has been allowed for downstream of the main embankment, providing further mitigation against the risk of seepage. The seepage collection facility could potentially be used as a temporary decant pond, if required.

The confining embankment has been conservatively assumed to be constructed at a slope of 1V:3H, about 18 degrees. The relatively flat batters will allow the slopes to be trafficked during closure, and are likely to provide a satisfactory factor of safety against instability, depending on the available construction materials and the strength of the foundation. Stability analyses will be required as part of future studies to confirm this.

A crest width of 10 m has been allowed for, providing sufficient room for a tailings delivery pipe (upstream safety barrier) on the upstream crest margin, a safety windrow on the downstream crest margin and vehicle traffic along the crest. A cross-section of the TSF is presented in Figure 3. The volume of fill required to construct the TSF is estimated to be ~980 000 m^3. It is expected that refinements to the geometry of the confining embankment, and hence the volume of fill required, will be made during future stages of design.

As noted above, the maximum embankment height would be ~23 m, resulting in the TSF being classified as a Category 1 TSF under the DMP Code of Practice issued in 2013 by virtue of the TSF being greater than 15 m in height. It is anticipated that the TSF would have a low or medium hazard category.

The disturbance areas for the TSF and associated seepage collection facility are ~30 ha and ~3 ha, respectively. A total disturbance area of ~35 ha is estimated, allowing an additional 2 ha for access roads associated with tailings delivery and water management infrastructure.

[2] Typical for gold tailings deposited sub-aerially

[3] Department of Mines and Petroleum

6.0 CLOSING REMARKS

This memorandum presents the concept designs for the waste landforms and TSF associated with the RGCP. Please do not hesitate to contact us if further clarification or elaboration is required on the design.

GOLDER ASSOCIATES PTY LTD

Peter Chapman
Associate, Principal Tailings Engineer

Mike Russell
Director, DumpSolver

PJC-MR/JJB/hsl

Attachments: Figure 1 – General Plan
Figure 2 – Proposed TSF Layout
Figure 3 – Proposed TSF Sections

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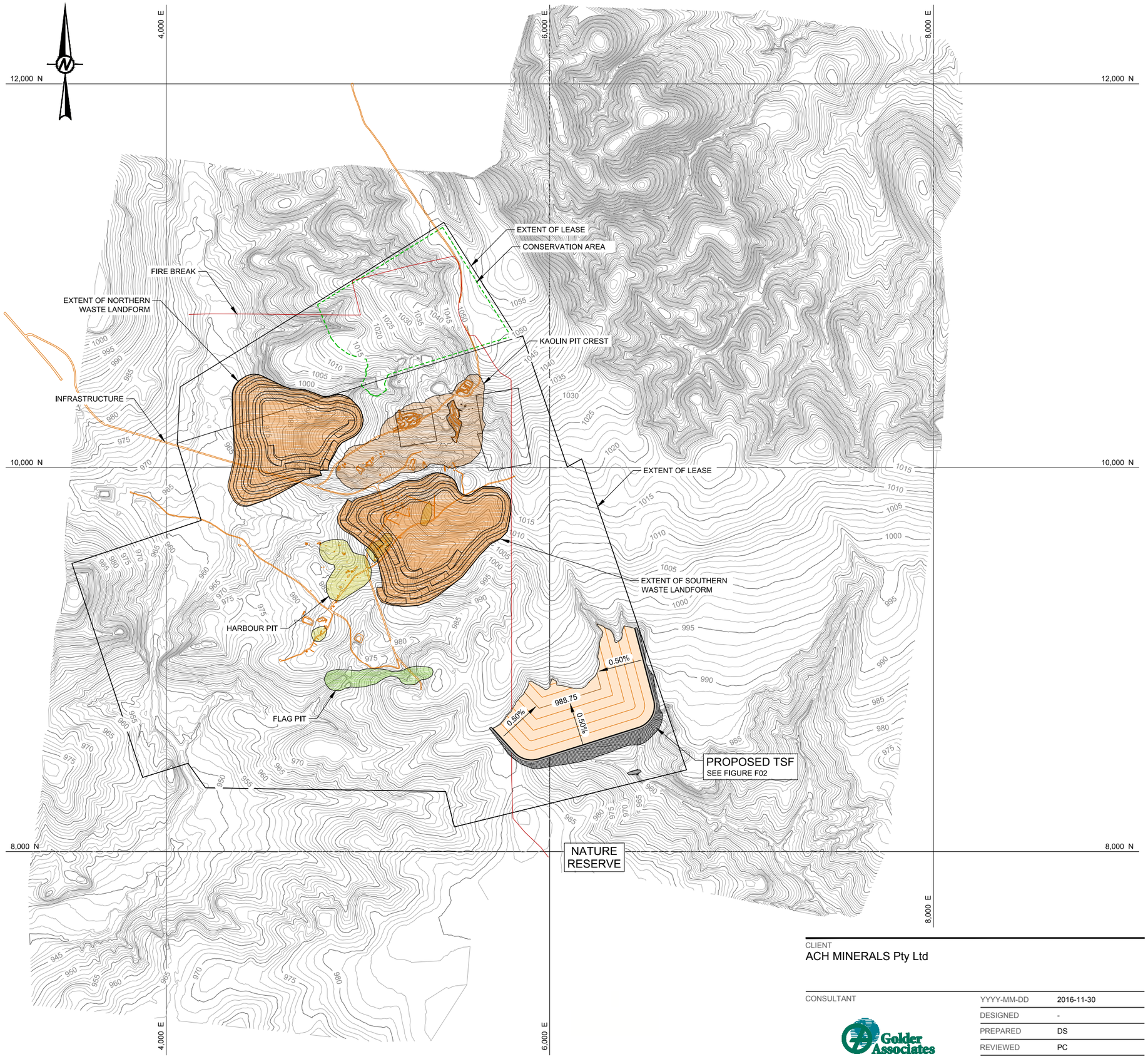

NOTE (S)

1. BASE CONTOURS TAKEN FROM DUMPSOLVER, DATED 7 NOV 2016 DELIVERED IN FORMAT CONT_LOCAL1.DWG.
2. COORDINATE SYSTEM IS LOCAL GRID.

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1:20,000 METRES

CLIENT
ACH MINERALS Pty Ltd

PROJECT
ACH WASTE MANAGEMENT CONCEPT

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-11-30
DESIGNED	-
PREPARED	DS
REVIEWED	PC
APPROVED	-

TITLE
GENERAL PLAN

PROJECT NO.	CONTROL	REV.	FIGURE
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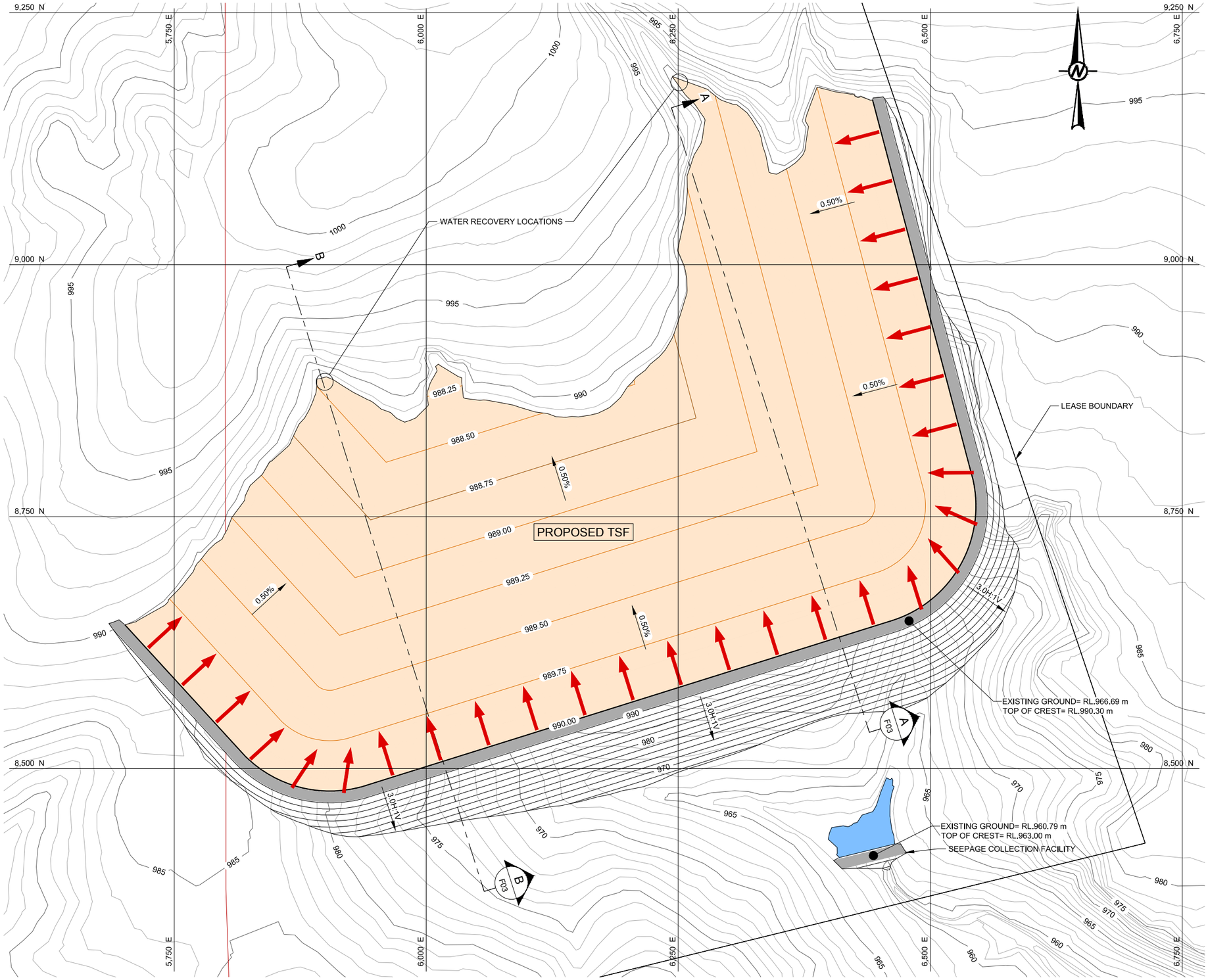
NOTE (S)

1. BASE CONTOURS TAKEN FROM DUMPSOLVER, DATED 7 NOV 2016 DELIVERED IN FORMAT CONT_LOCAL1.DWG.
2. COORDINATE SYSTEM IS LOCAL GRID.

LEGEND

DEPOSITION FROM EMBANKMENT



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CLIENT
ACH MINERALS Pty Ltd

PROJECT
ACH WASTE MANAGEMENT CONCEPT

CONSULTANT
Golder Associates

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PREPARED	DS
REVIEWED	PC
APPROVED	-

TITLE
PROPOSED TSF LAYOUT

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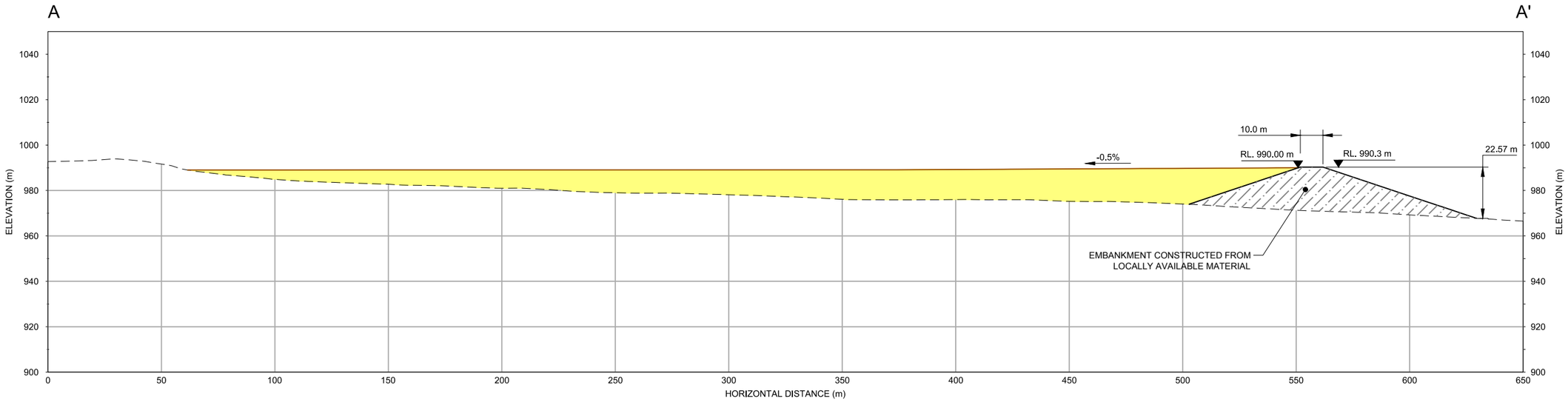

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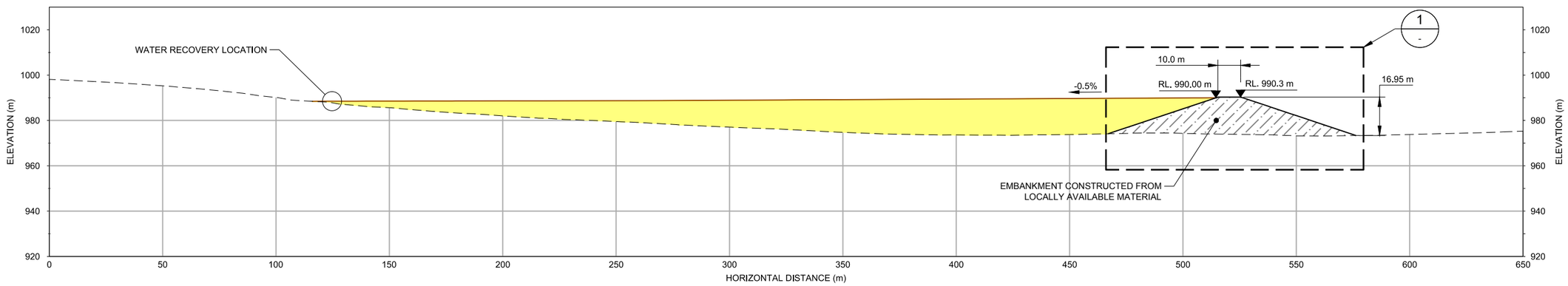

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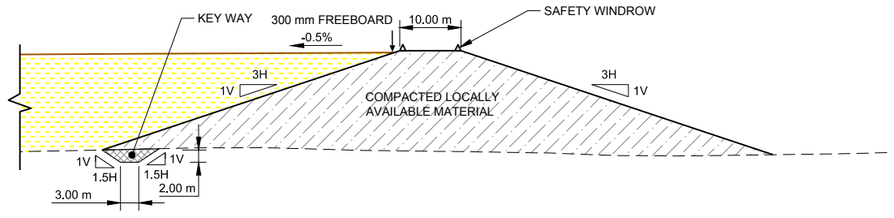

SCALE 1:1,000 m — 1 — TYPICAL EMBANKMENT DETAIL — -

0 50 100
1:2,000 METRES

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PROJECT
ACH WASTE MANAGEMENT CONCEPT

TITLE
PROPOSED TSF SECTIONS

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REVIEWED	PC
APPROVED	-

PROJECT NO.	CONTROL	REV.	FIGURE
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