



## POSITIVE NORTON GOLD MINE SCOPING STUDY

ASX ANNOUNCEMENT

8 JULY 2015

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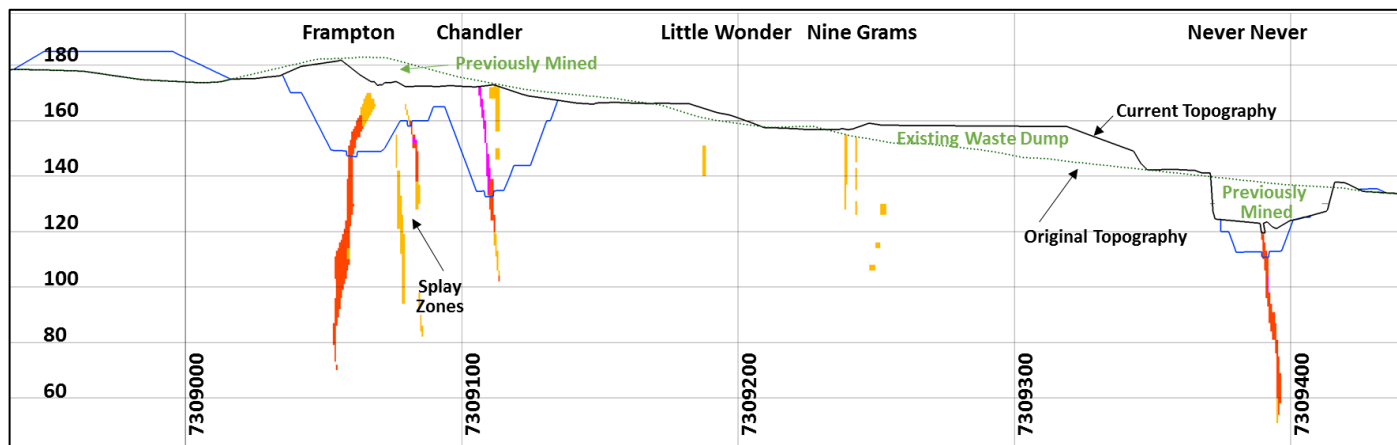
**Mantle Mining Corporation Limited (ASX: MNM)** is extremely pleased to announce completion of a positive and robust Internal Scoping Study for the reopening of the Norton Gold Mine (Table 1).

### Highlights:

- The scoping study is based on shallow 25 to 30 m pits similar to those previously mined at Norton at Frampton and Never Never, which demonstrated continuity of grade and simplicity of mining (Figure 1).
- The proposed schedule of operations includes the processing of an initial total of 61.5 kt over 2.5 years at a 6.5 g/t Au head grade. Processing is scheduled to comprise 76% Indicated Mineral Resource and 24% Inferred Mineral Resource.
- The scoping study proposes a simple 5-day per week, day shift only, operation thereby providing opportunity for increased weekly productivity with reduced overhead costs per ounce produced, pointing to potential substantial improvements in project economics.
- Metallurgical test work indicates favourable gold recoveries using a simple gravity circuit recovering 90% of the as mined gold into concentrate onsite, followed by trucking low tonnages of high grade concentrate to a toll treatment plant for subsequent 90% recovery into gold dore bars from CIL/CIP processing.
- Processing trials and advanced discussions with toll treatment plant operators suggest rapid recovery of gold over 18 hr leach cycles, at industry typical consumables consumption and with negligible impact of arsenic tails on toll treatment plant tails impoundments.
- Low expected capital cost of \$0.8 million and Industry leading All In Sustaining Cost (AISC) of \$775/oz gold indicates a potential payback period of 6 months and Net Present Value (at 8% discount rate) in excess of \$4.7 million using a notional gold price of \$1500/oz.
- The shallow pit development retains deeper development potential with multiple mineralised shears remaining open at depth and to the east and west. Additional Inferred Mineral Resource areas and as yet unsampled historic structures provide significant potential to extend the production life.

The Scoping Study referred to in this report is based on low-level technical and economic assessments, and is insufficient to support estimation of Ore Reserves or to provide assurance of an economic development case at this stage, or to provide certainty that the conclusions of the Scoping Study will be realised.

**Figure 1: Norton Gold Mine Scoping Study cross-section (Figure 3 for section location).**



**Table 1: Norton Gold Mine Scoping Study key aspects.**

Parameter		Assumption or Output
Resource base	Confidence level	<b>76% Indicated Mineral Resource</b>
		24% Inferred Mineral Resource
Mine parameters	Initial mine life	<b>2.5 years</b>
	Overburden removed (2.5 yrs)	323 000 bcm
Onsite treatment	ROM head grade	<b>6.5 g/t gold</b>
	ROM Throughput	25 000 tpa
	Recovery	<b>90%</b>
	Concentrate output 2.5 yrs	6 150 t
	Concentrate grade	58 g/t gold
Toll treatment	Recovery	<b>90%</b>
	Gold recovered	10 340 oz gold
Financial model	Gold price modelled	<b>\$1 500 /oz gold</b>
	Initial capital cost	\$0.8 million
	Total operating cost (2.5 yr)	\$6.3 million
	Total revenue (2.5 yr) (post toll treatment)	\$12.2 million
Investment criteria	All in sustaining cost (AISC)	<b>\$775 /oz gold</b>
	Payback period	6 months
	IRR	224%
	NPV (8% discount rate)	<b>\$4.7 million</b>

There is a low level of geological confidence associated with inferred mineral resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

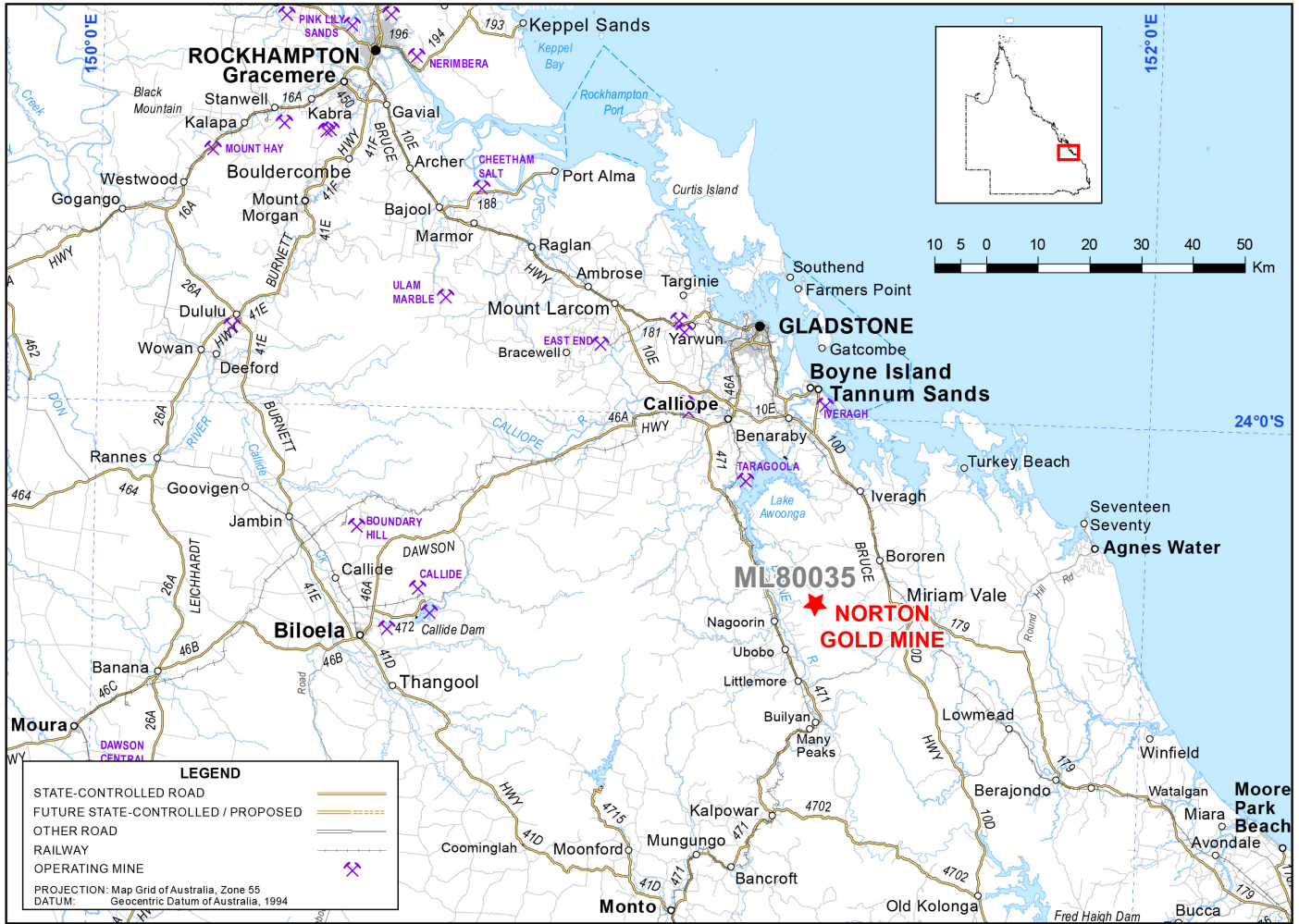
**Mantle’s Managing Director, Ian Kraemer, noted:**

“The Company is delighted to have delivered such positive outcomes from the recently completed Scoping Study. By focusing on a small, low risk starter mine at shallow depths, with input from the mine contractor who carried out prior mining at the site, the team has delivered a result with an all in sustaining cost projection among the lowest in Australia where our peers routinely put into production operations around the \$1 000 AISC mark. We have already acquired some of the capital equipment and located all other required equipment and will now move to secure the remaining funds required to get this mine into production at the earliest possible time. We remain confident that the cash returns projected from Norton will allow Mantle to grow into the next phase of its expansion plans and are looking forward to the next 12 months in this journey.”

**Location, Ownership and Tenure:**

The Norton Gold Mine is located within the historic Norton gold field and is less than 100 km south of the port city of Gladstone, Queensland (Figure 2).

**Figure 2: Norton Gold Mine project location.**



Mining Licence (ML) 80035 includes the majority of the historic gold lodes within the Norton gold field. ML 80035 is held 100% by Mantle pending transfer of a 10% equity interest to Avanti Mining & Contracting Pty Ltd. Avanti, pursuant to recent Sale and Purchase and Joint Venture agreements, will provide project management services for the mine.

At Norton gold and silver is contained in high grade, sub-vertical shears which outcrop at or near the surface. ML 80035 contains eight significant shear systems, four of which have been previously mined and which are the focus of previous drilling, the current resource estimate and current redevelopment studies.

The property was previously mined in three phases:

- Mining between 1878 and 1906 (and up to 1930) produced an estimated 9200 t @ 41 g/t Au,
- Mining by Pacific Goldmines NL in 1997 at Never Never open pit produced 4713 t @ 9.5 g/t Au,
- Mining by Norton Gold Fields in 2004 to 2005 at Never Never and Frampton produced 14 500 t @ 8.1 g/t Au, 600 t of which remains onsite in high grade stockpiles.

## **Project Summary:**

Mantle has completed an internal scoping study based on inputs from internal work and external specialists and sub-contractors that include:

- ResEval Pty Ltd completed an independent Resource Estimate (announced 15 May 2015),
- Charlton Mine Civil and Earthmoving Pty Ltd provided mine design criteria and contract mining input,
- ResEval Pty Ltd provided mine schedules, grade and volume calculations,
- Charlton Mine Civil and Earthmoving Pty Ltd managed environmental and permitting requirements,
- Avanti Mining and Contracting Pty Ltd managed process design, costing and market engagement,
- A number of consultants and sub-contractors, managed by the abovementioned main consultants, provided technical services and cost quotes to underscore the technical and financial assumptions,
- Mantle Mining Corporation Limited provided internal geological services, financial modelling and overall Scoping Study project management and control.

The project is reliant on a third party processing plant that will treat the concentrate in an existing gold leach plant. Strong interest from several parties is the basis of the scoping study but the results are considered market sensitive due to ongoing negotiations. Processing could be on a toll treatment basis or a direct concentrate sales basis. For this market release the details of the operating costs breakdown are not disclosed while contracts are yet to be finalised.

The study is based predominately (76%) on higher confidence Indicated Mineral Resources with some Inferred Mineral Resources at the margins of the gold structures targeted. The Mineral Resource was independently estimated by ResEval Pty Ltd based on 111 historic drill holes. Further details are provided in ASX announcement of 15 May 2015, which includes a general description of the project location.

## **Mine Design Parameters:**

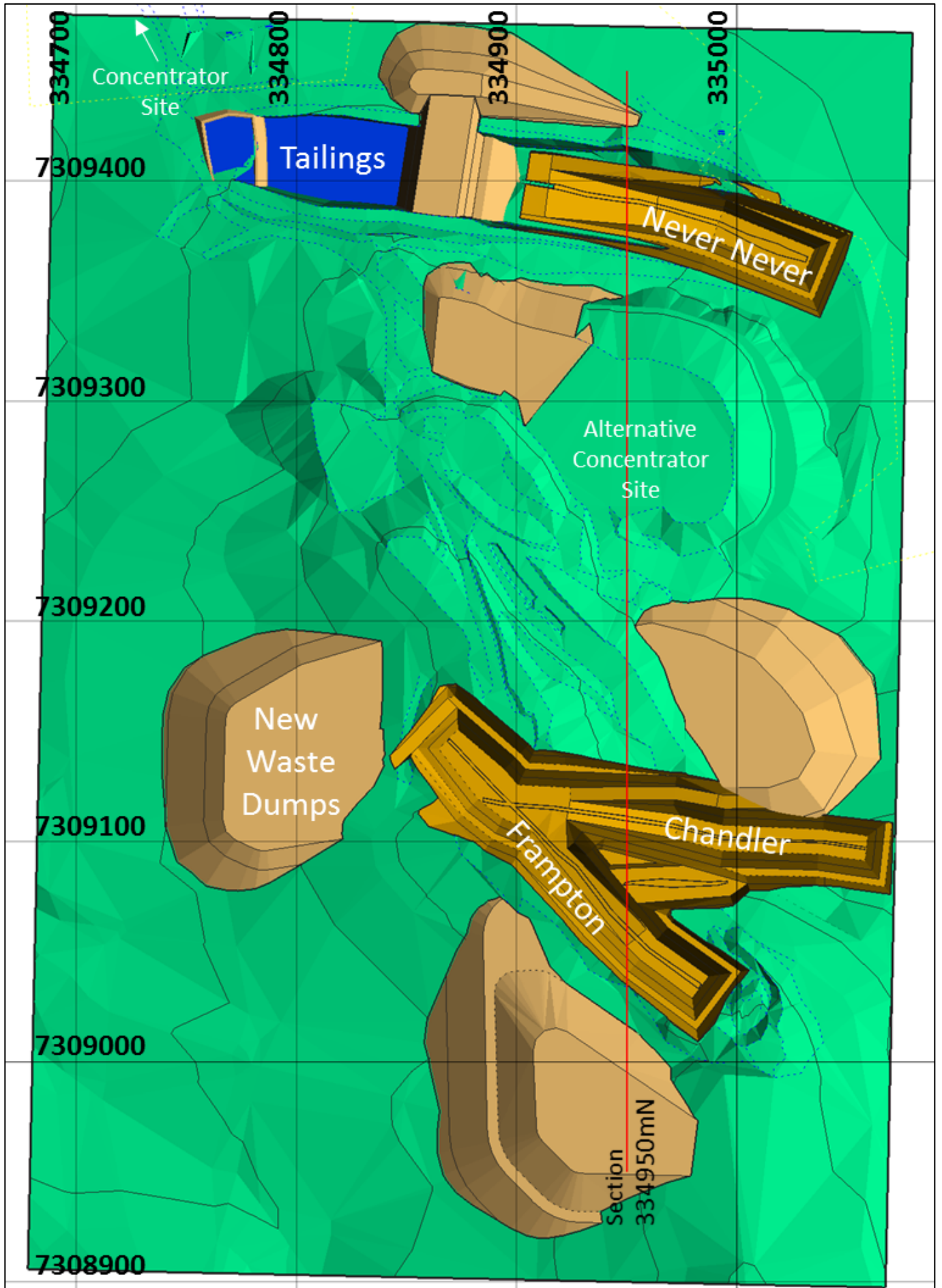
The general mine layout is summarised in Figure 3 with potential waste and tailings storage sites. Key aspects of the proposed design include:

- Initial water supply will be from the partly flooded Never Never pit,
- Low cost start-up tailings storage within the back filled area of the Never Never pit,
- Longer term tailings storage in the western half of the Never Never pit,
- Additional waste dump sites with sufficient capacity close to both working pits,
- Centrally located processing facility (concentrator site) for short haulage distances.

Proposed mining is to a maximum depth of 25 to 30 m. This is similar to the existing 25 m depth at Never Never. The limited depth extent maintains a low strip ratio averaging 14 bcm : 1 bcm. There is significant potential to extend the mine life with:

- Depth extension to the existing pits as all resources continue below the designed floor,
- Develop other Inferred Mineral Resource areas at Nine Grams, Little Wonder and Stockwork (see ASX Release 15 May 2015),
- Explore and develop other known historic mining areas at All Nations and extensions to Chandler and Little Wonder (see ASX Releases 24 Feb 2015 & 30 April 2015).

Figure 3: Plan view of Norton Gold Mine site layout (Figure 1 for section view).



## Mineral Resource Estimate:

The project was estimated using 111 historic drill holes and considered the results of grade control sampling from previous mining at Frampton and Never Never (Table 2). The Indicated Mineral Resource areas are drilled at a spacing of around 25 m. At both Frampton and Never Never previous mining in 1988/9 and 2004/5 demonstrated the mine-ability of the structures are at similar grades and tonnages as currently estimated.

**Table 2:** Total Mineral Resource by area and classification, above 2 g/t Au cut-off.

Domain/Lode	Location	Indicated			Inferred			Total		
		Kt	Au g/t	Ag g/t	Kt	Au g/t	Ag g/t	Kt	Au g/t	Ag g/t
Frampton	South	61.4	4.97	11.6	6.2	5.29	12.7	67.6	5.00	11.7
Chandler	South	18.6	10.60	17.1	7.2	5.63	8.4	25.7	9.21	14.7
Frampton Splays	South				17.8	3.30	5.8	17.8	3.30	5.8
LW NG SW	Central				58.3	3.49	10.9	58.3	3.49	10.9
Never Never	North	26.5	5.82	20.4	51.6	4.17	14.8	78.2	4.73	16.7
<b>Total</b>		<b>106.5</b>	<b>6.16</b>	<b>14.7</b>	<b>141.1</b>	<b>3.9</b>	<b>11.6</b>	<b>247.6</b>	<b>4.88</b>	<b>13.0</b>

Mining Factors are applied to the Resource for the Scoping Study and include:

- 3% dilution at zero grade gold,
- 6% mining loss.

The schedule assumed for the scoping study assumes mining of the Frampton-Chandler and then the Never Never pits. Since Chandler lies downhill from Frampton a top down mining sequence results in the majority of the higher grade Chandler being scheduled later in the sequence (Table 3). This provides some upside if Chandler were targeted for earlier production.

**Table 3:** Scoping Study annual schedule with factored Mineral Resource above 2 g/t Au cut-off.

Year	Location	Waste Material		Mill Feed			Feed by Classification		Strip Ratio
		kt	kbcm	kt	kbcm	Au g/t	kt Indicated	kt Inferred	
Year 1	Frampton	403	157	25.0	9.6	5.6	17.8	7.2	16
Year 2	Frampton	263	101	25.0	8.9	7.2	18.6	6.4	11
Year 3	Never N	167	65	11.5	4.0	6.7	10.5	1.0	14
<b>Total</b>		<b>833</b>	<b>323</b>	<b>61.5</b>	<b>22.5</b>	<b>6.5</b>	<b>46.9</b>	<b>14.7</b>	<b>14</b>

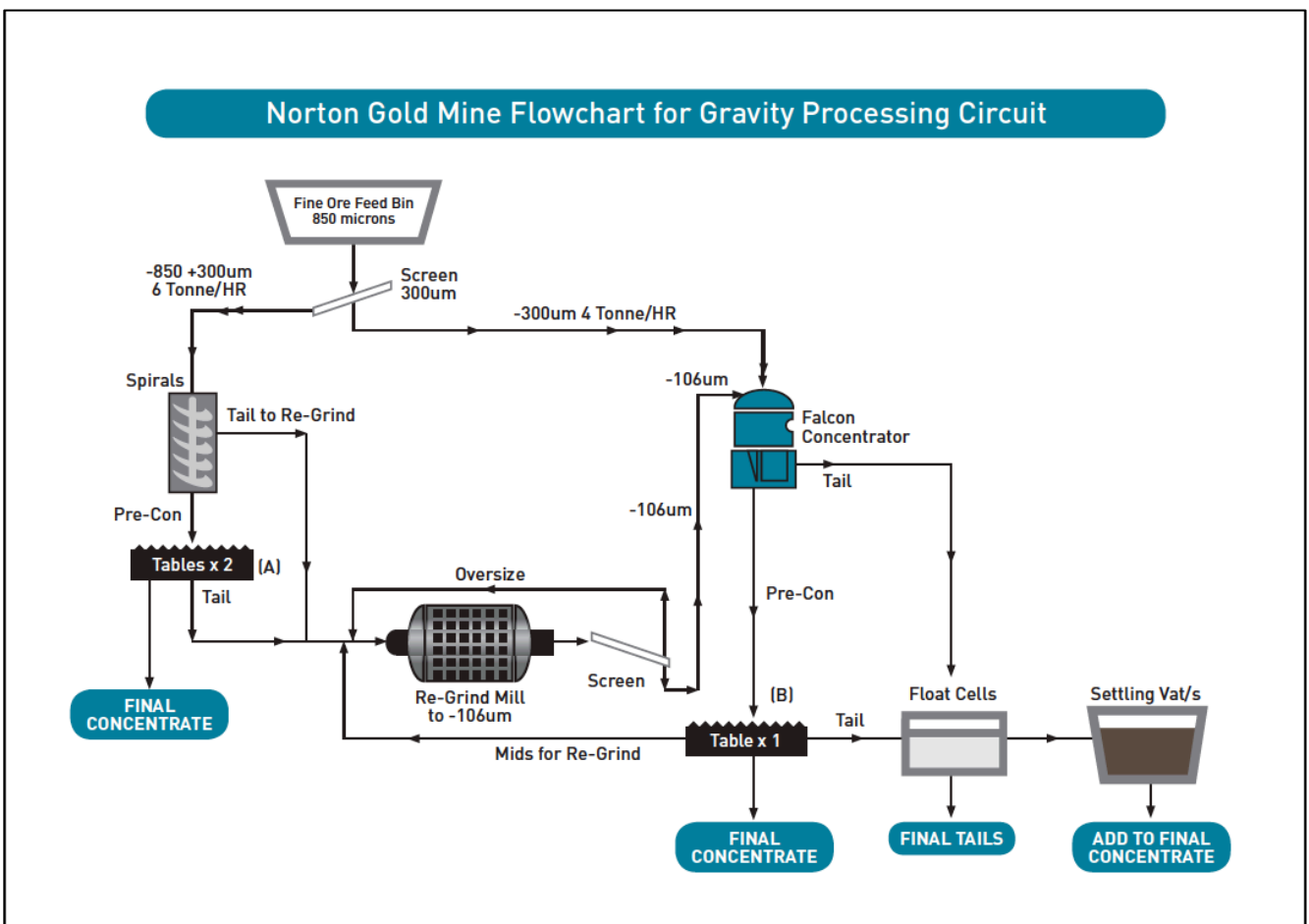
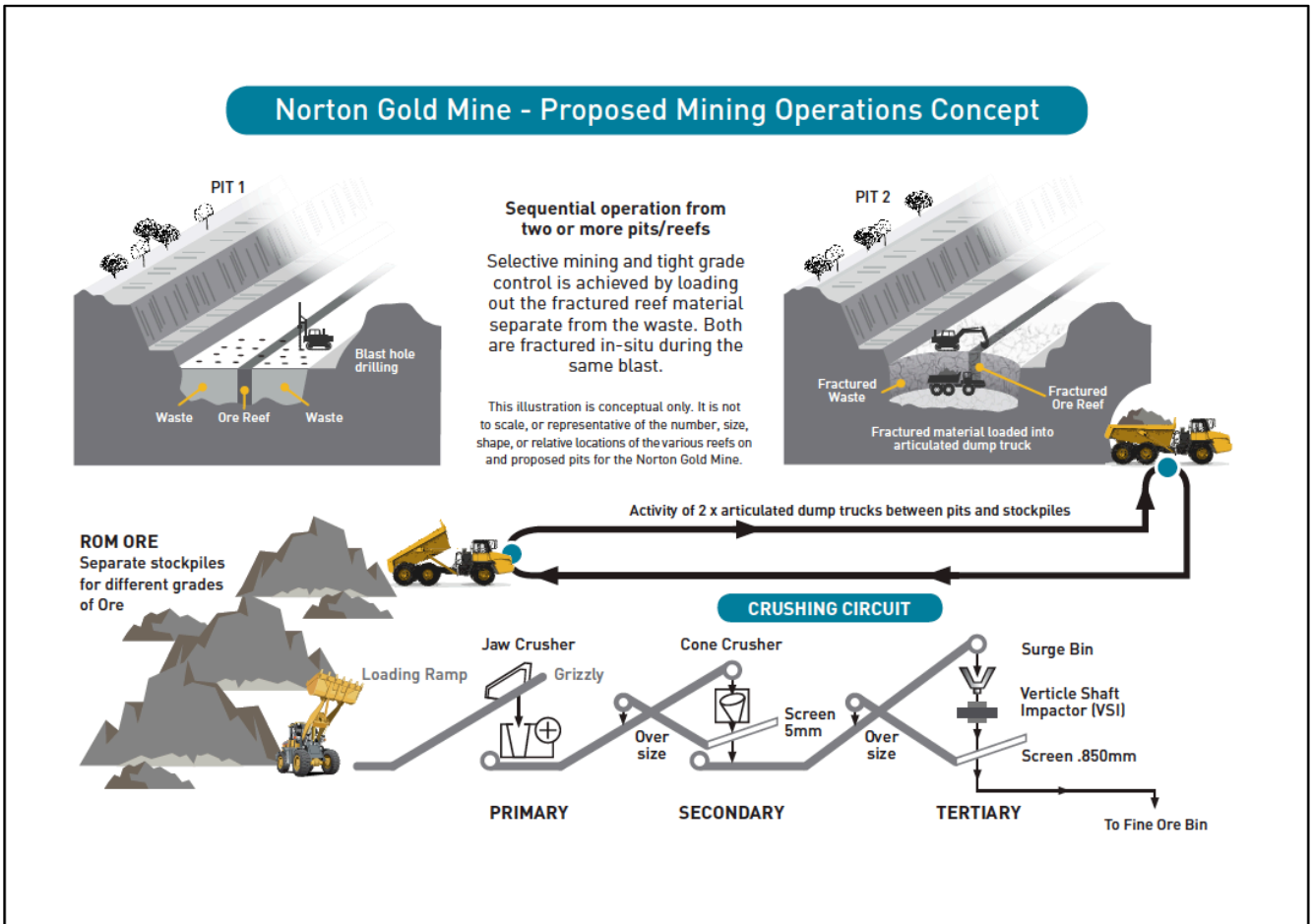
## Metallurgy and Processing:

Testwork has been undertaken on multiple samples from the minesite, including on a fresh bulk sample of typical mineralisation to be mined from Frampton.

A detailed processing flowchart (Figure 4) has been defined and all required components located and pricing provided. Some initial components have already been acquired and either delivered to site (Primary jaw crusher), awaiting delivery (Spirals) or awaiting delivery for minor overhaul (Screens).

Testwork has indicated an optimal primary gravimetric table feed of -850 micron, screened to produce a 300 micron undersize with the +300 reporting to spirals and tables and the -300 to a spinner concentrator (Falcon or other). Coarse tails are ground in the ball mill to -106 micron to be fed to the spinner concentrator. Concentrator pre-con is fed to a final table. -106 micron tails are then fed to a float cell. Trials have consistently shown that 90% of the gold in the mined material is recovered into the final concentrate.

Figure 4: Norton Gold Mine Mining and Processing flowchart.

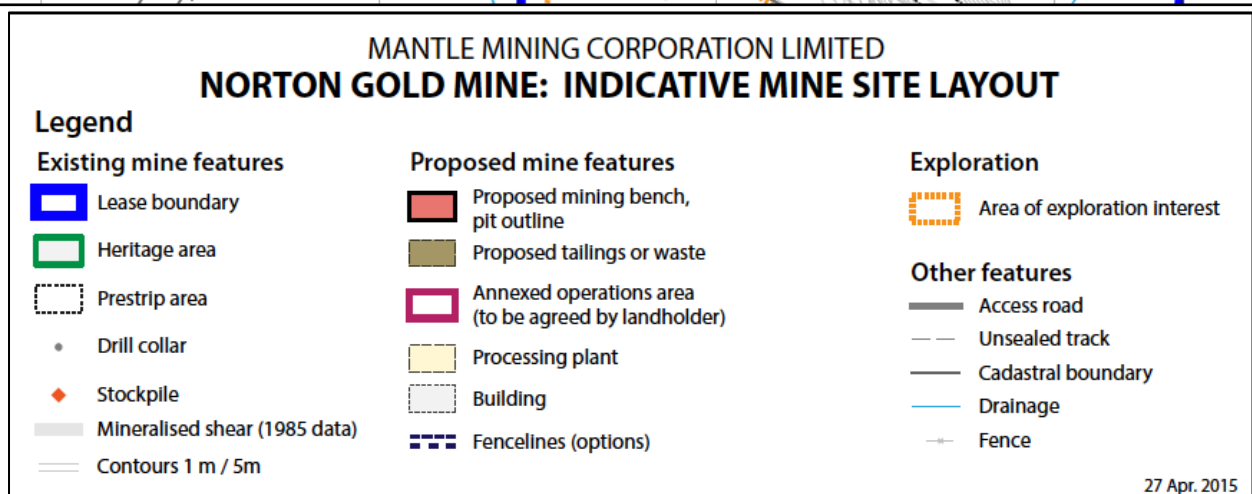
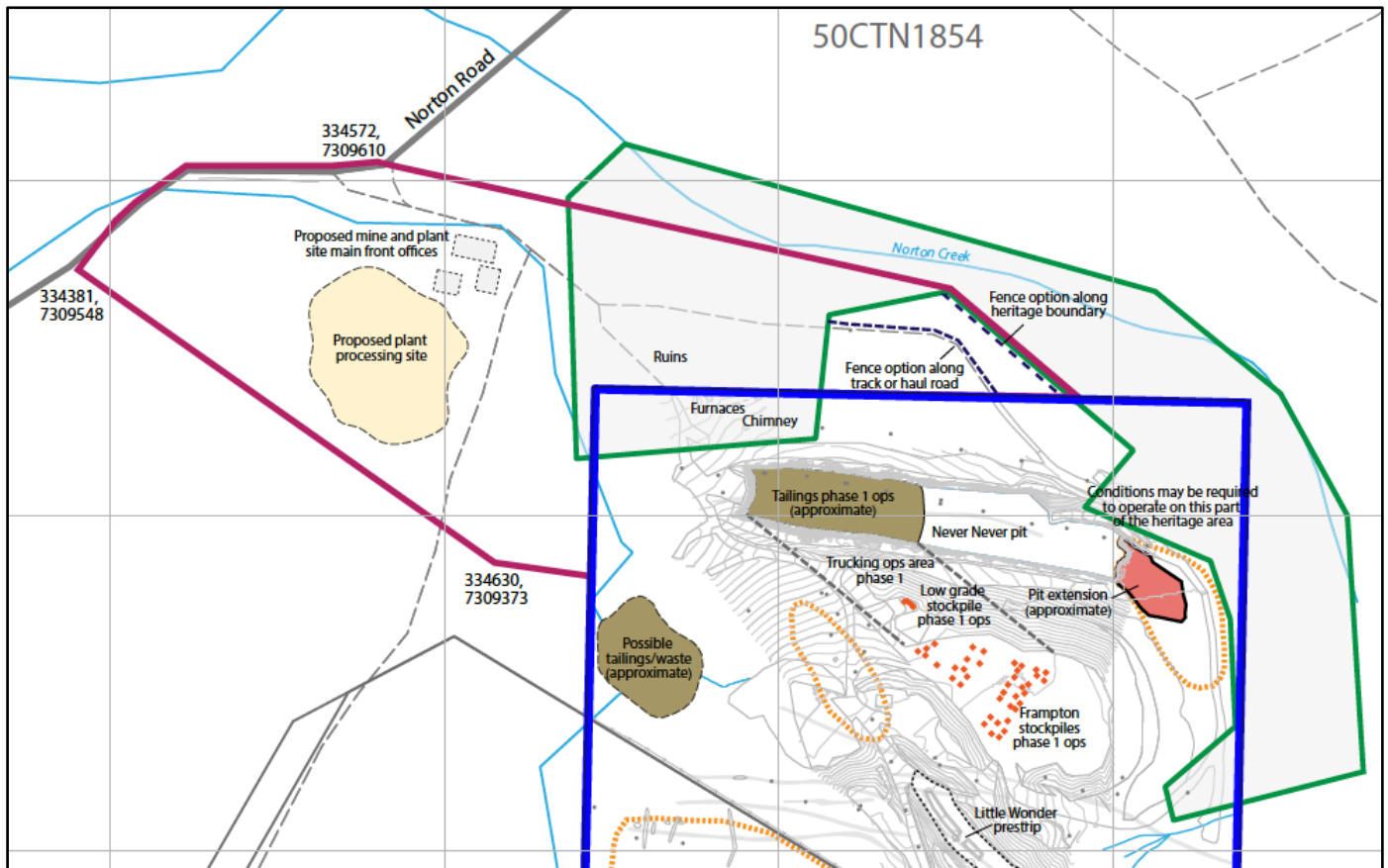


**Environment, Heritage and Access:**

Detailed ecological and cultural heritage surveys and landholder agreements have been completed to ensure that there are no impediments to undertaking the proposed mining and processing activities onsite (Figure 5):

- There are no Native Title impediments,
- There are no Cultural Heritage impediments,
- There are no endangered ecosystem impediments,
- Conduct, Compensation and Rental agreements have been executed with the Landholder,
- Positive consultation is ongoing with stakeholders, local municipalities and relevant regulators.

**Figure 5: Norton Gold Mine environment, heritage and landholder access areas.**



The mine site is located in the upper catchment of Gladstone’s water supply dam and it is essential that potential for environmental impacts are minimised. The design approach of processing a high grade concentrate onsite for



trucking to an offsite CIP/CIL processing plant where all potentially acid generating tails are ultimately impounded means that use of leaching chemicals and storage of acid generating waste onsite at the Norton Gold Mine are negated or minimised.

The mine site has previously been permitted on this same basis and all relevant stakeholders and regulators are working positively with Mantle and our representatives Charlton Mine Civil and Earthmoving Pty Ltd And Avanti Mining and Contracting Pty Ltd to ensure all requisite re-permitting is received.

The mine site is adjacent to a registered Cultural Heritage area. The heritage designation is based on ruins remaining from the mining operations carried out in the late 18<sup>th</sup> century. Regulations specify minimum stand-off distances for mining near the heritage area and these distances allow for full mining under the proposed scoping study design.

**Revenue Estimates:**

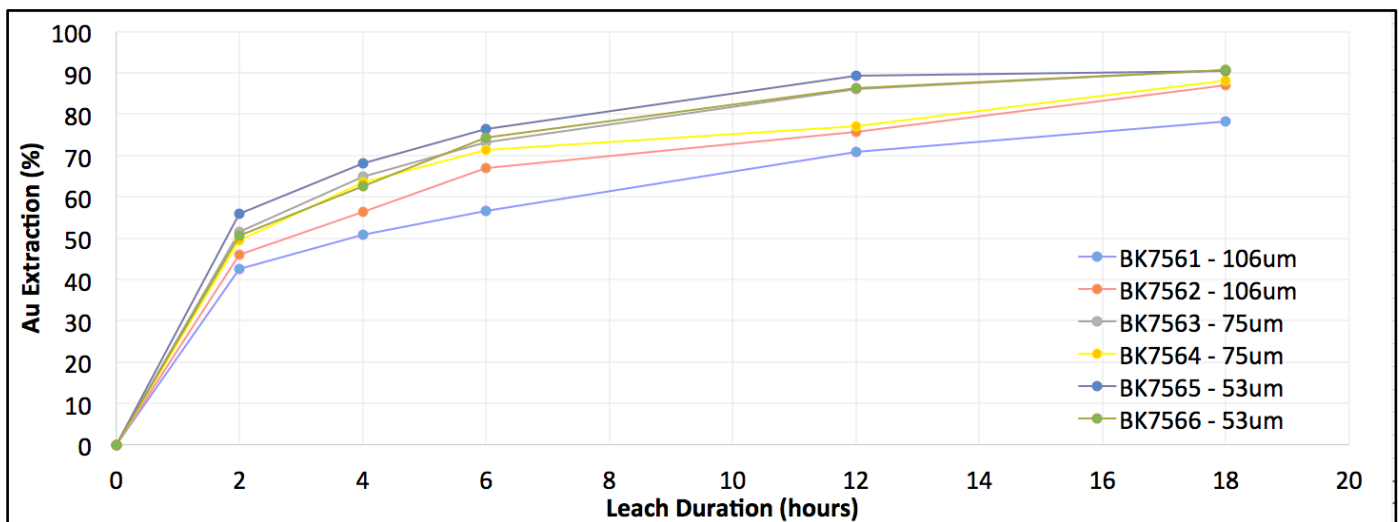
The high grade concentrate produced onsite will be trucked to a toll treatment plant where it will be fed into a ball mill grinding to 53 microns prior to leaching to recover final gold dore. Revenue will be dictated by final negotiated mill costs that may be by toll treatment or direct sales of concentrate. For the scoping study, toll treatment is assumed with treatment costs and toll treatment margin deducted from revenue received.

Concentrate samples have been tested in an external accredited laboratory (ALS Balcatta, WA) under the guidance of a senior metallurgist, and plant managers at the toll treatment plants. Staged grind sizes simulating typical industry standard ball mills have been used. The results show that at the 53micron grind size, 90% recovery of gold in the high grade concentrate is recovered in 18 hours (Table 4 and Figure 6).

**Table 4:** Concentrate leach trial results (ALS Balcatta, WA).

Test ID	Grind Size P80 (µm)	Calc. Au Head Grade (g/t)	Au Extraction (%)					Au Tail Grade (g/t)	Reagents (kg/t)	
			2-hr	4-hr	6-hr	12-hr	18-hr		NaCN	Lime
BK7561	106	100.4	42.6	50.9	56.5	71.0	78.3	21.8	1.35	1.16
BK7562	106	107.2	45.9	56.5	66.9	75.7	86.9	14.0	1.35	1.26
BK7563	75	110.8	51.4	65.0	73.3	86.1	90.6	10.4	1.44	1.26
BK7564	75	106.0	49.6	63.3	71.3	77.2	88.1	12.6	1.49	1.37
BK7565	53	103.7	55.8	68.0	76.5	89.4	90.6	9.77	1.35	1.52
BK7566	53	124.3	50.6	62.5	74.3	86.4	90.7	11.6	1.41	1.44

**Figure 6:** Concentrate leach test curves (ALS Balcatta, WA).



Recovery of gold from these leach trials is supported from prior recoveries when the mine operated in 1997 and 2004/5 that were recorded at 90% and 93% respectively.

Final sales and marketing negotiations are now underway. As the concentrate is high grade, transport costs are low per tonne thereby allowing for toll treatment or direct sales to most markets in Eastern Australia. Freight rates to Eastern China have been provided by major national and international freight operators and are similar into China via Port of Gladstone or via road to Victoria. Rates to process plants in Queensland are much lower.

Final revenues paid are derived from the mining recovery factors, the 90% recovery of gold into concentrate at the Norton mine, the final recovery of 90% of the gold from the concentrate at the third party CIP/CIL plant, the toll treatment charges and the assumed gold price of \$1500 /oz.

**Cost Estimates:**

Mining is by a contractor so mining equipment costs are excluded from capital cost estimates and are included as wet hire plant rates in the operating costs. Detailed operating cost breakdowns are not disclosed since drill and blast services, waste removal and grade control and selective mining and haulage is to be delivered under third party contracts currently under negotiation that remain confidential to the contractor. Capital items (shown in Figure 3) yet to be acquired have all been located and priced and are summarised in Table 5.

**Table 5: Capital costs**

Capital area	Item	Cost (\$)
General site services	Security	30,000
	Camp and offices	20,000
	Communications and lighting	25,000
	Pumps and pipes	75,000
	Compressors	25,000
	Generators	25,000
Initial earthworks	Roads	10,000
	Lined tailing dam	75,000
	Earthworks	50,000
Crushing equipment	Secondary crusher	40,000
	Tertiary crusher	60,000
	Ball mill	40,000
Processing equipment	Screens and conveyors	65,000
	Gravity tables	60,000
	Concentrators	40,000
	Float cells settlement vats	50,000
Sub total		690,000
Contingency (10%)		69,000
<b>Total</b>		<b>759,000</b>

Total operation cost for the 2.5 year period is estimated to be \$6.3 million. This cost includes all site costs, contract drill and blast and mining, site processing to produce the high grade concentrate, transport of concentrate to the toll treatment plant, state royalties, insurances and all related corporate overheads. The largest operating expenses are drill and blast costs and waste and selective mining costs in large part related to diesel costs and contractor plant costs. Processing costs by and large are much less per ounce gold produced and there remains further upside to reduce these by installing 3 phase power to the site once the scale of operations so justifies.

## Valuation and Sensitivity:

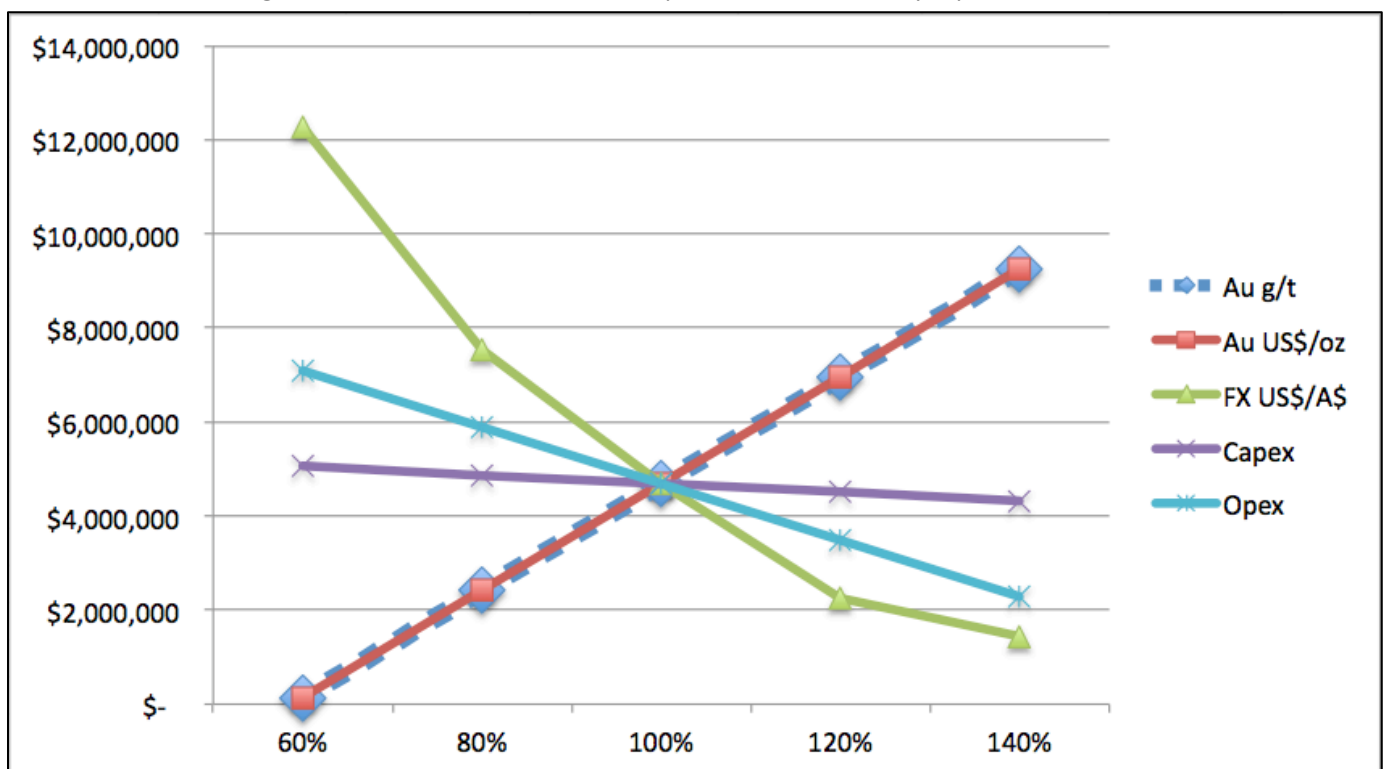
A detailed Production, Profit and Loss and Cash flow model has been setup on a quarter by quarter basis and options based on detailed mine designs and mining sequences run for 2, 3 and 5 year mining cases. These cases essentially alternate between lower and higher strip ratios respectively, each recovering differing tonnages of shear material for processing. The best case scenario was then chosen as the base case, that being the 2.5 year option.

Table 1 on page 2 above summarised all key aspects and results of the scoping study. The base case assumes mining of 25 000 tpa of 6.5 g/t Au material, that is processed onsite at a 90% recovery into a concentrate which is then transported to a toll treatment plant for a subsequent 90% recovery into gold dore bars. Approximately 10 300 oz of gold is recovered into dore over the 2.5 yr initial mine life.

The scoping study projects that the Norton Gold Mine will be a low capital cost, low all in sustaining cost, high grade gold mine. At base case assumptions, the mine is projected to deliver a Net Present Value (NPV 8%) of \$4.7 million over its initial 2.5 yr life. The projected ASIC of only \$775/oz produced from the CIL/CIP plant is extremely robust when compared to both the modelled gold price of \$1500/oz and typical Australian ASICs of around \$1000/oz.

As for most gold mines, the largest sensitivities to positive returns are related to gold price and gold grade. However, the US\$ gold price is to a large extent offset by traditionally similar movements in the A\$/US\$ foreign exchange rate. Capital and operating cost sensitivities are projected to be low (Figure 7).

**Figure 7:** NPV (8% discount rate) of post tax cash flow key input sensitivities.



Note: Gold price and gold grade have the same impact on project economics hence their trend lines overlap.

As a result, the scoping study projects an extremely robust, low cost and high margin mine. The mine design is considered low risk due to it having being previously mined and currently similarly designed with relatively shallow pits. Substantial upside exists for extended mine life and increased monthly productivity from currently defined resources and potential exploration upside.

## **About Mantle Mining Corporation Limited**

Mantle Mining (ASX: MNM) is an Australian based minerals exploration and mine development company. Mantle's principal activities are to acquire exploration tenements and locate economically developable deposits of coal and gold. It is Mantle's intention to progress mineral deposits through feasibility and into mining operations, to the benefit of all stakeholders.

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### **Competent Persons Statements:**

The information in this report that relates to Mineral Resources is based on information compiled by John Horton, Principal Geologist of ResEval Pty Ltd, who is a Fellow of the Australasian Institute of Mining and Metallurgy, a Member of the Australian Institute of Geoscientists. Mr Horton has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Horton consents to the inclusion in the report of matters based on his information in the form and context in which it appears.

The Mineral Resources included in this announcement were first reported in a report titled "Norton Gold Mine Mineral Resource Estimate" on 15 May 2015 and is available to view on [www.mantlemining.com](http://www.mantlemining.com). The company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

### **Company Disclaimers:**

This release contains forward-looking statements. The actual results could differ materially from a conclusion, forecast or projection in the forward-looking information. Certain material factors or assumptions were applied in drawing a conclusion or making a forecast or projection as reflected in the forward-looking information.

The Norton Gold Mine Project is at the Scoping Study phase and although reasonable care has been taken to ensure that the facts are accurate and/or that the opinions expressed are fair and reasonable, no reliance can be placed for any purpose whatsoever on the information contained in this document or on its completeness. Actual results and developments of the project and forecast may differ materially from those expressed or implied by these forward looking statements depending on a variety of factors. A key conclusion of the Scoping Study, which is based on forward looking statements, is that the Norton Gold Mine Project is considered to have positive economic potential.