



Government of Western Australia
Department of Environment Regulation

Your ref: L5529/1988/12
Our ref: DER2016/001228
Enquiries: Paul Anderson
Phone: 9964 0916
Email: info@der.wa.gov.au

Dolly Pett
Senior Environmental Coordinator
Mt Magnet Gold Pty Ltd
PO Box 83
MOUNT MAGNET WA 6638

Email: DollyPett@rameliusresources.com.au

Dear Ms Pett

APPLICATION FOR AN AMENDMENT TO LICENCE L5529/1988/12 UNDER THE ENVIRONMENTAL PROTECTION ACT 1986 – NOTICE OF DECISION TO GRANT

I refer to your application for an amendment to licence L5529/1988/12 received on 23 November 2016, to include two new dewatering discharge locations at the Mt Magnet Gold Mine located at mining tenements M58/121, M58/193 and M58/205 MOUNT MAGNET.

As set out in our letter to you dated 13 June 2017, the Department of Environment Regulation considered your application in detail, including undertaking a detailed risk assessment, and provided a preliminary recommendation that I grant the licence amendment sought under section 59 of the *Environmental Protection Act 1986* (EP Act).

I have decided to grant the licence amendment. The licence amendment sets out the reasons for my decision.

In accordance with section 102(2) of the EP Act, if you are aggrieved by my decision to amend the licence you may lodge an appeal with the Minister for Environment in writing, setting out the grounds of that appeal, within 21 days of this notification. Should you wish to lodge an appeal, please contact the Office of the Appeals Convenor on 6567 5190 or by email at admin@appealsconvenor.wa.gov.au.

If you have any queries regarding the above information, please contact Paul Anderson as listed above.

Yours sincerely

Alana Kidd
Manager Licensing (Resource Industries)
*Officer delegated under Section 20
of the Environmental Protection Act 1986*

30 June 2017

Att: Amendment Notice

The Atrium, 168 St Georges Terrace, Perth WA 6000
Postal address: Locked Bag 33, Cloisters Square, Western Australia 6850
Phone: (08) 6467 5000 Fax (08) 6467 5562
www.der.wa.gov.au

IR-L25 FINAL



Licence Number	L5529/1988/12
Licensee	Mt Magnet Gold Pty Ltd
ACN	008 669 556
Registered business address	Suite 4, 148 Greenhill Road PARKSIDE SA 5063
Date of amendment	30 June 2017
Prescribed Premises	Category 5: Processing or beneficiation of metallic or non-metallic ore Category 6: Mine dewatering Category 64: Class II putrescible landfill site
Premises	Mt Magnet Gold Mining Tenements M58/121, M58/193 and M58/205, MOUNT MAGNET WA 6623

Amendment

The Department of Environment Regulation (DER) has amended the above licence in accordance with section 59 of the *Environmental Protection Act 1986* as set out in this Amendment Notice.

Alana Kidd

Manager Licensing – Resource Industries

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Amendment Notice

This Notice is issued under section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act. DER is currently reviewing groundwater data for this site, should further actions, or groundwater bores be required to be added to the licence, this will be done at a later date via a DER initiated licence amendment.

This notice is limited only to an amendment to include the dewatering of the St George pit and St George and Water Tank Hill underground workings with discharge to the Ruby Queen pit, dewatering of the Titan pit with discharge to the Saturn pit, and to incorporate relevant *Administrative Changes implemented within the Department of Environment Regulation* (Administrative Changes).

It should be noted that this site is in close proximity to a Priority 2 Public Drinking Water Source Area (PDWSA) of the Genga Borefield and a Priority 1 PDWSA. However, *'Distance and local hydrogeology, including the presence of an iron banding barrier, are thought to limit the ability of open pit water infiltrating and reaching the Borefield'* (DoE, 2005).

Parameters of nitrate (15 mg/L), Total Dissolved Solids (TDS) (1,700 mg/L) and arsenic (0.007 mg/L) have been found to be slightly elevated within the borefield. *"Nitrate levels are naturally high in the area possibly due to nitrogen fixing vegetation" "The Water Corporation has been granted an exemption from the Department of Health for meeting this guideline"* (DoE, 2005).

Elevated levels of nitrates (210 mg/L), TDS (20,000 mg/L) and arsenic (0.005 mg/L) have been reported in the latest Annual Environmental Report (2015-16) in the vicinity of the Tailings Storage Facilities. Groundwater data is being reviewed by DER and additional groundwater bores may be added to the licence via a DER initiated amendment, if deemed necessary to manage risk.

The Water Corporation is currently administering the Murchison program, an \$8 million program to improve water quality in Cue, Meekatharra, Mt Magnet and Sandstone, with a delivery date of 2017–18. These regions have naturally occurring underlying rock conditions that affect the quality of drinking water sourced from local bores. Water in these towns may be affected by salinity, hardness, magnesium, nitrates and silica in the groundwater.

The application for an amendment to the licence also requested the use of the Hill 50 diesel powered station (power station) to produce electrical power. Only five 1 megawatt (MW) generators are in service at the power station and are capable of generating a maximum of 5 MW. Therefore the requirement to Licence the power station is not required as the maximum capacity is below the threshold of 10 MW in accordance with the *Environmental Protection Regulations 1987*.

The following DER Guidance Statements have informed the decision made on this amendment:

- *Guidance Statement: Setting Conditions* (October 2015)
- *Guidance Statement: Risk Assessments and Decision Making* (February 2017)
- *Guidance Statement: Environmental Siting* (November 2016)

Amendment Description

This Amendment Notice is the result of an applicant initiated amendment and relates to the following:

1. Dewatering of the St George and Water Tank Hill underground workings

The dewatered effluent from the St George/Water Tank Hill underground will be pumped to the existing High-Density Polyethylene (HDPE) lined St George turkeys nest before being discharged to the Ruby Queen pit for temporary storage. The dewatered effluent is then pumped from the Ruby Queen pit to the existing HDPE lined Checker Salt Water Dam for use in the gold processing plant.

The depth to groundwater in the Ruby Queen pit is estimated at 30 mbgl which has been based upon previous bore monitoring results from a nearby bore (Groundwater bore HWB19). The depth of the Ruby Queen pit is 27 mbgl, therefore there is an estimated separation distance of about three metres between the base of the Ruby Queen pit and groundwater. However, the depth to groundwater was determined in 1989 and therefore this may have changed. Consequently, the pit lake which currently exists in the Ruby Queen pit due to the pit being used as a storage location for process water may also be made up of groundwater. Therefore, the discharge of dewatering effluent into the Ruby Queen pit has the potential to impact groundwater as a result of seepage given the pit is unlined.

A comparison of the discharge water quality from St George underground to the water quality in the Ruby Queen pit is provided below in Table 1. The water is of reasonable quality and is very similar in comparison.

Table 1: St George discharge water quality vs. Ruby Queen pit water quality

Parameter	St George discharge water quality 20/10/2016	Ruby Queen pit water quality 08/02/2017
pH	8.1	8.2
Electrical conductivity	7,300 µS/cm	9,400 µS/cm
Total Dissolved Solids	4,600 mg/L	5,600 mg/L
Total Suspended Solids	<5 mg/L	5 mg/L
Nitrate as NO ₃	23 mg/L	30 mg/L
Nitrite as NO ₂	<2.5 mg/L	<2.5 mg/L
Ammonia as N	0.022 mg/L	0.063 mg/L
Phosphate as P	0.007 mg/L	<0.005 mg/L
Calcium	130 mg/L	190 mg/L
Potassium	27 mg/L	31 mg/L
Magnesium	190 mg/L	190 mg/L
Sodium	1,300 mg/L	1,700 mg/L
Hardness as CaCO ₃	1,100 mg/L	1,300 mg/L
Chloride	2,100 mg/L	2,700 mg/L
Sulfate	580 mg/L	570 mg/L
Aluminum	<0.01 mg/L	0.06 mg/L
Silver	<0.001 mg/L	<0.001 mg/L
Arsenic	0.003 mg/L	0.009 mg/L
Boron	2.4 mg/L	1.9 mg/L
Bismuth	<0.001 mg/L	<0.001 mg/L
Cadmium	0.0013 mg/L	0.0004 mg/L
Cobalt	0.001 mg/L	0.003 mg/L
Dissolved Chromium (VI)	<0.005 mg/L	<0.005 mg/L
Copper	0.003 mg/L	<0.001 mg/L
Iron	0.02 mg/L	0.12 mg/L
Mercury	<0.00005 mg/L	<0.00005 mg/L
Manganese	0.21 mg/L	0.02 mg/L
Molybdenum	0.005 mg/L	0.033 mg/L
Nickel	0.031 mg/L	0.014 mg/L
Lead	<0.001 mg/L	<0.001 mg/L
Selenium	0.005 mg/L	0.006 mg/L
Zinc	0.17 mg/L	
Total CN	-	<0.004 mg/L
WAD-CN	-	<0.004 mg/L

No installation of dewatering infrastructure is required as the abstraction of water from the WTHB001 production bore, Lou Ann and St George shafts located at the St George/Water Tank Hill area is currently undertaken to abstract groundwater for use in the processing plant.

A monitoring point will be installed at the location of the dewatering effluent discharge into the unlined Ruby Queen pit.

The Department of Mines and Petroleum has granted approval under the *Mining Act 1978* (Reg. ID: 60503). The Department of Water has approved the abstraction of groundwater under the *Rights in Water and Irrigation Act 1914* (GWL151513(6)).

2. Dewatering of the Titan pit

The dewatering effluent from the Titan pit was originally discharged to the Brown Hill pit but will now be discharged into the Saturn pit via the existing dewatering infrastructure. The Titan and Saturn pits are located adjacent to each other within the

larger Galaxy pit and are only separated by a low rock/earthen wall (saddle). The existing dewatering pipeline will pump water over the saddle from the Titan pit into the Saturn pit. The saddle height is lower than the outer perimeter walls for both pits therefore any failure in the dewatering pipeline will result in the effluent being discharged into either the Titan or Saturn pits with no potential for discharge to the land.

The depth to groundwater is 170.6 mbgl and due to the excavation of the Saturn pit, the water sits in the base of the pit as a pit lake. Therefore, the discharge is directly to the groundwater.

A comparison of the discharge water quality from Titan pit to the groundwater quality in the Saturn pit is provided below. The water is of reasonable quality and is very similar in comparison. The TDS and nitrates of the dewatering discharge water is slightly higher than that of the receiving groundwater.

Table 2: Titan pit discharge water quality vs. Saturn pit groundwater quality

Parameter	Titan pit discharge water quality 26/03/2016	Saturn pit groundwater quality 27/10/2013
pH	8.2	8.1
Electrical conductivity	5,100 µS/cm	2,600 µS/cm
Total Dissolved Solids	2,800 mg/L	1,600 mg/L
Total Suspended Solids	<5 mg/L	<5 mg/L
Total Nitrogen	33 mg/L	-
Nitrate as NO ₃	92 mg/L	10 mg/L
Nitrite as NO ₂	1.7 mg/L	0.10 mg/L
Ammonia as N	0.94 mg/L	0.18 mg/L
Phosphate as P	<0.005 mg/L	0.011 mg/L
Calcium	130 mg/L	110 mg/L
Potassium	19 mg/L	21 mg/L
Magnesium	110 mg/L	94 mg/L
Sodium	690 mg/L	440 mg/L
Hardness as CaCO ₃	800 mg/L	660 mg/L
Chloride	1,300 mg/L	530 mg/L
Sulfate	300 mg/L	450 mg/L
Aluminum	<0.01 mg/L	<0.01 mg/L
Silver	<0.001 mg/L	-
Arsenic	0.001 mg/L	0.003 mg/L
Boron	0.78 mg/L	-
Bismuth	<0.001 mg/L	-
Cadmium	<0.0001 mg/L	<0.0001 mg/L
Cobalt	<0.001 mg/L	<0.001 mg/L
Dissolved Chromium (VI)	<0.005 mg/L	0.006 mg/L
Copper	<0.001 mg/L	0.001 mg/L
Iron	<0.01 mg/L	<0.01 mg/L
Mercury	<0.00005 mg/L	<0.00005 mg/L
Manganese	0.023 mg/L	0.038 mg/L
Molybdenum	0.034 mg/L	0.021 mg/L
Nickel	0.002 mg/L	0.003 mg/L
Lead	<0.001 mg/L	<0.001 mg/L
Selenium	0.017 mg/L	0.025 mg/L
Zinc	0.001 mg/L	0.007 mg/L
Total CN	-	-
WAD-CN	-	-

A monitoring point will be installed at the location of the dewatering effluent discharge into the unlined Saturn pit.

The Department of Mines and Petroleum has granted approval under the *Mining Act 1978* (Reg. ID: 43838). The Department of Water has approved the abstraction of groundwater under the *Rights in Water and Irrigation Act 1914* (GWL151513(6)).

Location, environmental siting and potential receptors.

Table 3 below lists the relevant human receptors in the vicinity of the prescribed premises.

Residential and Sensitive Premises	Distance from Prescribed Premises Boundary
Town of Mt Magnet	About 5 kilometres (km) in a south westerly direction from the Saturn pit and 3.6 km in a south westerly direction from the Ruby Queen pit.

Table 4 below lists the relevant environmental receptors in the vicinity of the prescribed premises.

Environmental receptor	Distance from Prescribed Premises Boundary
Minor tributary of the Salt River	A minor tributary runs through the Premises from the north to the south with a constructed diversion around the northern part of the tailings storage facility. The Salt River is located 20 km away.
Groundwater	<p>Depth to groundwater ranges considerably across the site. The groundwater monitoring bores that are listed on the licence surround the Checkers TSF and range between 4.25 – 31.8 mbgl (although influenced from seepage of the TSF), however, the depth to groundwater at the Ruby Queen Pit is estimated at 30 mbgl and at Saturn Pit is 170.6 mbgl. The groundwater is at the base of the Saturn Pit so the discharge of mine dewatering water is a point source emission to groundwater. The Ruby Queen pit has a depth of 27 metres so there is an estimated separation distance of 3 metres between the base of the pit and groundwater. However this was based on monitoring conducted in 1989 and due to seasonal variations, the water table could possibly have risen allowing for pit water to interact with groundwater.</p> <p>The nearest sensitive receptor is the Priority 2 water quality protection zone of the Genga Borefield which is located 2.2km due west of the Saturn pit at its closest point, while the Priority 1 water quality protection zone is located 6.6km south-west of the Saturn pit. However, <i>'Distance and local hydrogeology, including the presence of an iron banding barrier, are thought to limit the ability of open pit water infiltrating and reaching the Borefield'</i> (DoE, 2005).</p> <p><i>"Public Drinking Water Source Areas (PDWSA) are surface water catchments and groundwater areas that provide drinking water to cities, towns and communities</i></p>

	<p>throughout the state. PDWSAs are proclaimed under the Metropolitan Water Supply, Sewerage, and Drainage Act 1909 or the Country Areas Water Supply Act 1947" (DoW, 2016).</p> <p>The Mount Magnet Water Reserve Drinking Water Source Protection Plan "provides a basis for establishing planning and land use management strategies within the Water Reserve at Mt Magnet. Proclaiming water reserves under the Country Areas Water Supply Act 1947 (CAWSA) enables DoE to control potentially polluting activities, regulate land use, inspect premises and take steps to prevent or clean up pollution in accordance with the CAWSA By-laws" (DoE, 2005).</p> <p>Figure 1 shows the location of mining activities in relation to the PDWSAs.</p>
Vegetation	<p>The vegetation at the Premises is highly degraded due to historical mining for a period of over 100 years.</p>
Groundwater bores	<p>The nearest town water supply bore (Water Corporation) is located 3.2 km in a south westerly direction from the Saturn pit and 5.0 km in a south westerly direction from the Ruby Queen pit.</p> <p>The nearest privately owned bore (use unknown) is 3.7 km away in a westerly direction from the Saturn pit. The nearest privately owned bore (use unknown) is 2.0 km away in a westerly direction from the Ruby Queen pit (DOW, GIS WIN groundwater sites).</p> <p>A nearest livestock watering groundwater bore is located 1.8km away from the St George/Water Tank Hill mining area (DOW, GIS WIN groundwater sites).</p>

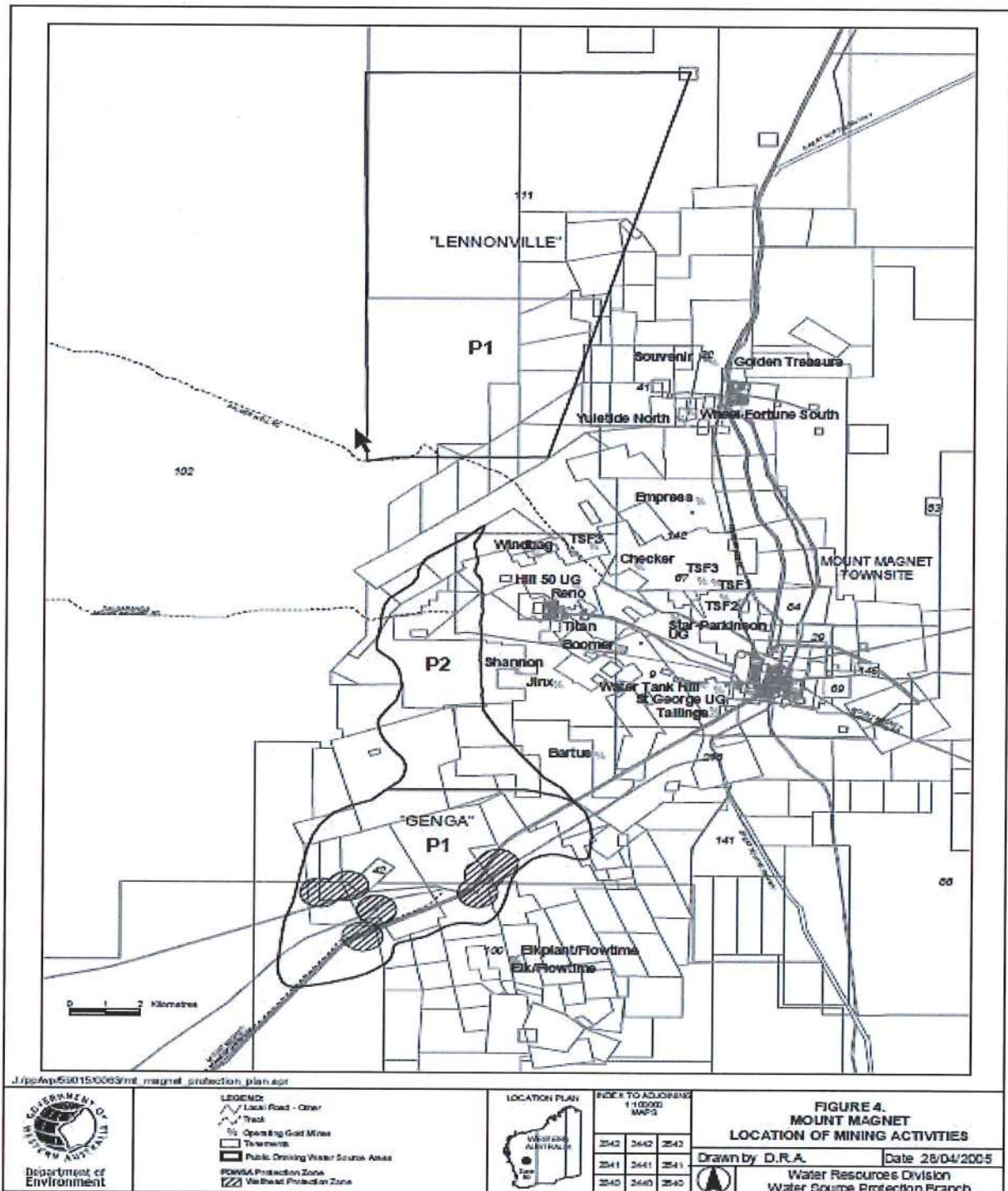


Figure 1. Location of mining activities in relation to the PDWSAs

Risk assessment

Tables 5 and 6 below apply a risk assessment to the potential emissions which may arise from the amendment application. The table identifies whether these emissions present a material risk requiring regulatory controls.

Risk Assessment

Table 5. Risk assessment for the dewatering of the St George pit lake and St George and Water Tank Hill underground workings with discharge of the dewatering effluent into the Ruby Queen pit

Activity	Potential emission	Potential receptors	Potential pathway	Potential impacts	Risk	Reasoning
Dewatering of the St George and Water Tank Hill underground workings	<p>Discharge to ground water: Discharge of dewatering effluent to the Ruby Queen pit</p>	<p>Groundwater: Depth of the Ruby Queen pit is 27 mbgl with groundwater estimated at 30 mbgl. Salinity levels of water in the Ruby Queen Pit are approximately 5,600 mg/L which may have been influenced by interaction with the groundwater as there is only an estimated separation distance of 3 m between the base of the pit and groundwater. Salinity levels in the closest groundwater monitoring bore (about 1 km north of Ruby Queen pit) is approximately 10,000 mg/L TDS.</p>	<p>Soil: Interaction of pit water with groundwater aquifers through seepage Water: Direct interaction of pit water with groundwater aquifers</p>	Contamination of local groundwater	Medium	<p>Groundwater is currently abstracted from the Lou Ann and St George Shafts and production bore WTHB001 (groundwater) at the St George/Water Tank Hill mining area (mining area) and is then pumped to the Ruby Queen pit for temporary storage. The water is then pumped to the lined Checker Salt Dam for use in the processing plant. The Licensee will now include the dewatering of the underground workings at this location to maintain dry conditions ahead of mining activities. A total of 250,000 (approximately 0.25 GL) tonnes per year will be abstracted from the mining area and discharged into the Ruby Queen pit.</p> <p>Ground water samples were taken from the mining area on the 25 October 2016 and indicate the groundwater is moderately saline with a total dissolved solid (TDS) of 4,600 mg/L, slightly alkaline with a pH of 8.1 and low in heavy metals. Water samples were taken from the Ruby Queen pit on the 8 February 2017 and indicate the pit water is moderately saline with a TDS of 5,600 mg/L, slightly alkaline with a pH of 8.2 and low in heavy metals. The sampling results indicate the ionic composition of the groundwater and the pit water are similar in quality and therefore no impacts to groundwater are expected.</p> <p>The Ruby Queen pit is only used for temporary storage before the water is transferred to the lined Checker Salt Dam for use in the processing plant. Dewatering effluent is pumped to the HDPE lined St George turkeys nest and settlement ponds prior to being pumped to the Ruby Queen pit. This allows for the settlement of suspended solids in the dewatering effluent prior to discharge into the Ruby Queen pit. It also provides a catchment for any potential hydrocarbons that may be present.</p> <p>The nearest privately owned groundwater bore (use unknown) is located 2km away in a westerly direction. An open mined pit is located 700 metres in a south west direction from the Ruby Queen pit. Any water migration that may occur from the Ruby Queen pit is expected to present at the pit as a result of groundwater flow in a south west direction.</p> <p>The Licensee has committed to:</p> <ul style="list-style-type: none"> installing a monitoring point in the dewatering pipeline prior to the discharge into the Ruby Queen pit;

	<p>Discharge to land: Associated with overtopping of the pit walls.</p>	<p>Vegetation: Native vegetation at the Premises is highly degraded due to historical mining and pastoral grazing.</p> <p>Groundwater: Depth to groundwater in this area is estimated at 30 mbgl. Salinity levels of water in the Ruby Queen Pit are approximately TDS 5,600 mg/L which may have been influenced by interaction with the groundwater as there is only an estimated separation distance of 3 m between the base of the pit and groundwater.</p> <p>Salinity levels in the closest groundwater monitoring bore (about 1 km north of Ruby Queen pit) is</p>	<p>Land: Direct discharge to soils and surface waters, and infiltration through soils to groundwater</p>	<p>Contamination of surrounding land, surface water and groundwater with brackish water affecting soil, surface water and groundwater quality and causing vegetation stress or death.</p>	<p>Low</p>	<ul style="list-style-type: none"> recording the amount of water drawn and discharged monthly; and assess discharge water quality through sampling and analysis. <p>The Delegated Officer therefore considers that impacts from the dewatering water discharge will be minor as the discharge location (Ruby Queen pit) is located onsite (so offsite impacts are not expected) and impacts are expected to be minimal due to the similar water chemistry, and the likelihood of occurrence is possible. The risk rating for dewatering water discharge is therefore medium.</p>
						<p>The Delegated Officer considers the material risk at the Premises has remained unchanged with the discharging of dewatering effluent to the Ruby Queen pit.</p> <p>The Ruby Queen pit is not located within a drinking water area with the nearest Water Corporation production bore located 5.0 km away. The nearest privately owned bore to Ruby Queen pit is 2.0 km away in a westerly direction. The Ruby Queen pit is surrounded by mined pits. Any dewatering effluent discharged to the environment from overtopping is expected to discharge into these pits.</p> <p>The nearest surface water is the Salt River which is located 20 km away. Any discharged dewatering effluent from ruptured pipelines is not expected to reach the river.</p> <p>Vegetation in this area is heavily degraded as a result of grazing and mining activities.</p> <p>Depth to groundwater in this area is approximately 30 mbgl. If any discharged dewatering effluent from ruptured pipelines reaches the groundwater it is not expected to cause any detrimental environmental impacts as it is reasonably good quality water.</p> <p>The Licensee has committed to maintaining a minimum freeboard of 2m below the pit spill level by pumping water to the Checker Salt Water Dam for use in the processing plant.</p> <p>The Delegated Officer therefore considers that impacts from the dewatering water discharge to land from overtopping will be slight as the discharge location (Ruby Queen pit) is located onsite (so offsite impacts are not expected) and impacts are expected to be minimal due to the reasonably good quality water, and the likelihood of occurrence is possible. The risk rating for overtopping is therefore low.</p>

		<p>approximately 10,000 mg/L TDS.</p> <p>Surface water: Minor drainage channels located on the Premises which only flow during extreme rainfall events. The nearest surface water is the Salt Lake which is 20 km south.</p>				
	<p>Pipeline rupture to land: Associated with transport of dewatering effluent</p>	<p>Vegetation: Native vegetation at the Premises is heavily degraded due to historical mining and pastoral.</p> <p>Groundwater: Depth to groundwater in the area of the pipeline corridor varies between 30 to 130 mbgl.</p> <p>Surface water: Minor drainage channels located on the Premises which only flow during extreme rainfall events. The nearest surface water is the Salt Lake which is 20 km south.</p>	<p>Land: Direct discharge to soils and surface waters and infiltration through soils to groundwater</p>	<p>Contamination of surrounding land, surface water and groundwater with brackish water affecting soil, surface water and groundwater quality and causing vegetation stress or death.</p>	<p>Low</p>	<p>The Delegated Officer considers there has been no change in the risk to the environment from the transporting of dewatering effluent to the Ruby Queen pit in existing pipelines.</p> <p>The Ruby Queen pit is not located within a drinking water area with the nearest Water Corporation production bore located 5.0 km away. The nearest livestock bore to the pipeline is 1.8 km away in a south easterly direction. Any discharged dewatering effluent from ruptured pipelines is not expected to reach these bores.</p> <p>The nearest surface water is the Salt River which is located 20 km away. Any discharged dewatering effluent from ruptured pipelines is not expected to reach the river.</p> <p>Vegetation in this area is heavily degraded as a result of grazing and mining activities.</p> <p>Depth to groundwater in the area of the pipeline corridor varies between 30 to 130 mbgl. Any discharged dewatering effluent from ruptured pipelines is not expected to reach the groundwater.</p> <p>In accordance with condition 1.3.9, daily inspections of all dewatering pipelines are conducted and recorded to identify potential damage, leaks, or other issues which can be addressed to prevent total pipeline failure.</p> <p>The Delegated Officer therefore considers that impacts from the dewatering water discharge to land from pipeline ruptures will be slight as the discharge location is located onsite (so offsite impacts are not expected) and impacts are expected to be minimal due to the depth of the groundwater, and the likelihood of occurrence is possible. The risk rating for pipeline ruptures is therefore low.</p>

Table 6. Risk assessment for the dewatering of the Titan pit lake with discharge of the dewatering effluent into the Saturn pit

Activity	Potential emission	Potential receptors	Potential pathway	Potential impacts	Risk	Reasoning
<p>Dewatering of the Titan pit lake</p>	<p>Discharge to ground water: Discharge of dewatering effluent to the Saturn pit groundwater</p>	<p>Groundwater: Depth to groundwater in this area is about 170.6 mbgl. Salinity levels of groundwater in the Saturn pit are approximately TDS 1,600 mg/L</p>	<p>Water: Interaction of pit water with groundwater aquifers</p>	<p>Contamination of local groundwater</p>	<p>Low</p>	<p>The Delegated Officer considers the material risk at the Premises from the discharging of dewatering effluent to the Saturn pit has remained unchanged.</p> <p>Dewatering effluent from the dewatering of the Titan pit is currently discharged into the Brown Hill pit (1km north) as authorised through Licence condition 2.2.1. The total discharged is 250,000 tonnes per annum. The Licensee now plans to commence mining of the Brown Hill pit and therefore the dewatering effluent will now be discharged into the Saturn pit.</p> <p>The Saturn and the Titan pits are located adjacent to each other. The water quality of each pit is of similar ionic composition as the pits are located within the larger Galaxy pit and are only separated by a low saddle and are part of the same fractured rock aquifer. Water samples taken from the Titan pit on the 17/6/2015 indicates a TDS of 2,400 mg/L and a pH of 8.2. Water sampling from the Saturn pit is no longer possible as a result of safety concerns however, sampling conducted in 2013 indicated a TDS of 1,600 mg/L and a pH of 8.1. The TDS levels are now expected to be higher as a result of evaporation and it would be appropriate to assume that TDS levels would now be similar to the Titan pit because sampling of the Titan pit for the past 2 years has shown salinity levels have risen from 1,800 mg/L TDS to the current 2,400 mg/L TDS.</p> <p>The Licensee has committed to installing a sampling point in the existing Saturn pit dewatering discharge pipeline. The monitoring point will be installed at the closest point to the discharge into the pit that can be safely accessed.</p> <p>Licence condition 3.2.1 requires routine monitoring of the dewatering effluent from the Titan pit into the Brown Hill pit. This requirement of the Licence will be amended to remove the sampling of the discharge into the Brown Hill pit and will be replaced with the sampling of the dewatering effluent discharged into the Saturn pit.</p>

	<p>Discharge to land: Associated with overtopping of the pit walls.</p>	<p>Vegetation: Native vegetation at the Premises degraded due to historical mining and pastoral grazing. Groundwater: Depth to groundwater in this area is about 170.6 mbgl. Salinity levels of groundwater in the Saturn pit are approximately TDS 1,600 mg/L Surface water: Minor drainage channels located on the Premises which only flow during extreme rainfall events. The nearest surface water is the Salt Lake which is 20 km south.</p>	<p>Land: Direct discharge to soils and surface waters, and infiltration through soils to groundwater</p>	<p>Contamination of surrounding land, surface water and groundwater with brackish water affecting soil, surface water and groundwater quality and causing vegetation stress or death.</p>	<p>Low</p>	<p>The Delegated Officer therefore considers that impacts from the dewatering water discharge will be slight as the discharge location (Saturn pit) is located onsite (so offsite impacts are not expected) and impacts are expected to be minimal due to the similar water chemistry, and the likelihood of occurrence is possible. The risk rating for dewatering water discharge is therefore medium.</p>
	<p>Pipeline rupture to land: Associated</p>	<p>Vegetation: Native vegetation at the Premises degraded due to historical mining and</p>	<p>Land: Direct discharge to soils and surface waters, and</p>	<p>Contamination of surrounding land, surface water and groundwater with</p>	<p>Low</p>	<p>The Delegated Officer considers the material risk at the Premises has remained unchanged with the discharging of dewatering effluent to the Saturn pit. The Licensee has provided a water balance for the Saturn and Ruby pits (MWES consulting, March 2017). The water balance model shows the available pit volume for the Saturn pit is 14.3 giga litres (GL). Annual discharge to the Saturn pit is estimated at about 0.6 GL (discharge volume and inflows) therefore the available storage in the Saturn pit is over the lifetime of the operation. If any overtopping occurred at the Saturn pit, the discharge would happen at the lowest point being the saddle between the Saturn and Titan pits. As a result all dewatering effluent would discharge back into the Titan pit. Depth to groundwater is 170.6 mbgl and therefore any discharge to the land is not expected to have any impacts on groundwater. The nearest surface water is located about 20 km away and any overtopping is not expected to have any impacts. The Delegated Officer therefore considers that impacts from the dewatering water discharge to land from overtopping will be slight as the discharge location (Saturn pit) is located onsite (so offsite impacts are not expected) and impacts are expected to be minimal due to the reasonably good quality water, and the likelihood of occurrence is unlikely. The risk rating for overtopping is therefore low.</p>
	<p>Pipeline rupture to land: Associated</p>	<p>Vegetation: Native vegetation at the Premises degraded due to historical mining and</p>	<p>Land: Direct discharge to soils and surface waters, and</p>	<p>Contamination of surrounding land, surface water and groundwater with</p>	<p>Low</p>	<p>The Delegated Officer considers there has been no change in the risk to the environment from the transporting of dewatering effluent in existing dewatering pipelines. The Licensee will use existing dewatering pipelines located</p>

	with transport of dewatering effluent	<p>pastoral grazing.</p> <p>Groundwater: Depth to groundwater in this area is about 170.6 mbgl. Salinity levels of groundwater in the Saturn pit are approximately TDS 1,600 mg/L</p> <p>Surface water: Minor drainage channels located on the Premises which only flow during extreme rainfall events. The nearest surface water is the Salt Lake which is 20 km south.</p>	infiltration through soils to groundwater	brackish water affecting soil, surface water and groundwater quality and causing vegetation stress or death.		<p>between the Titan and Saturn pits.</p> <p>The saddle height between the Titan and Saturn pits is lower than the outer perimeter walls for both pits therefore any failure in the dewatering pipeline will result in the effluent being discharged into either the Titan or Saturn pits with no potential for discharge to the land.</p> <p>The Delegated Officer therefore considers that impacts from the dewatering water discharge to land from pipeline ruptures will be slight as the discharge location (Saturn pit) is located onsite (so onsite impacts are not expected) and impacts are expected to be minimal due to the reasonably good quality water, and the likelihood of occurrence is unlikely. The risk rating for pipeline ruptures is therefore low.</p>
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Decision

The Delegated Officer has determined that the key emissions associated with the dewatering discharge to the Ruby Queen and Saturn pits is dewatering effluent being discharged to groundwater, and accidental discharge of saline dewatering effluent to land from overtopping and pipeline failure.

The Delegated Officer has included new conditions and amended existing conditions in the licence for:

- discharging dewatering effluent from the Titan pit into the Saturn pit;
- discharging dewatering effluent from the St George and Water Tank Hill underground to the Ruby Queen pit; and
- the routine monitoring and analysis of dewatering effluent discharged from the Titan pit into the Saturn pit and the St George and Water Tank Hill underground to the Ruby Queen pit.

Other Amendments

The Delegated Officer has also made changes to the Licence in accordance with administrative changes implemented within DER as published on DER's webpage, as follows:

- Addition of definitions for 'Annual Audit Compliance Report' and 'Department', and updates to the definition of 'CEO for the purpose of correspondence';
- Update of emission reference points in Condition 2.2.1, Table 2.2.1 to include Ruby Queen and Saturn Pits;
- Update of monitoring locations in Condition 3.2.1, Table 3.2.1 to include Ruby Queen and Saturn Pits and inclusion of additional monitoring parameters to be consistent and comparable to the ambient groundwater monitoring regime;
- Update of condition 4.1.2 for the Annual Audit Compliance Report;
- Removal of condition 1.2.1 as it is an explanatory condition to provide clarification of the operation of the Licence and DER considers it is not enforceable or risk based;
- Removal of the map of emission points defined in Table 2.2.1 and replace with updated maps to show the new emission points;
- Removal of the map of monitoring locations defined in Table 3.2.1 and replace with updated maps to show the new monitoring locations; and
- Updated reporting forms in Schedule 2.

Amendment History

Instrument	Issued	Amendment
L5529/1988/12	16/06/2016	Licence amendment for the removal of an obsolete groundwater monitoring bore and the replacement with new groundwater monitoring bores, update of Schedule 1 maps, change landfill category from 89 to 64 as a result of an increase in the throughput from 5,000 tpa to 10,000 tpa, and correction of monitoring reference in Table 3.4.1.
L5529/1988/12	30/06/2017	Amendment Notice 1 for the discharge of mine dewatering water to Ruby Queen and Saturn Pits.

Amendments

- The licence is amended by the addition of the following definitions shown in bold underline below:

'Anniversary Date' means 30 June of each year;

'Annual Audit Compliance Report' means a report in a format approved by the CEO as presented by the Licensee or as specified by the CEO from time to time and published on the Department's website'

'Department' means the department established under section 35 of the Public Sector Management Act 1994 and designated as responsible for the administration of Division 3 Part V of the EP Act';

- The licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below.

'CEO' for the purpose of correspondence means:

Chief Executive Officer
 Department Administering the Environmental Protection Act 1986
 Locked Bag 33
 CLOISTERS SQUARE WA 6850
 Email: info@der.wa.gov.au

Department Div.3 Pt. V EP Act
Locked Bag 33 Cloisters Square
Perth WA 6850
info@der.wa.gov.au

- The Licence is amended by the deletion of the following conditions:

~~1.2.1 The Licensee shall immediately recover, or remove and dispose of spills of environmentally hazardous materials outside an engineered containment system.~~

- Condition 2.2.1 of the licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below.

2.2.1 The Licensee shall ensure that where waste is emitted to groundwater from the emission point in Table 2.2.1, and identified on the map of emission points in Schedule 1, it is done so in accordance with the conditions of this Licence.

Table 2.2.1: Emission points to groundwater

Emission point reference	Description	Source including abatement
Brown Hill and Titan pits Saturn pit	Dewatering waste water discharge into disused mine pits.	Water from dewatering of the Saturn, Mars, Titan and Perseverance pits.
Ruby Queen pit		<u>Water from dewatering of the St George open pits and St George/Water Tank Hill underground</u>

5. Condition 3.2.1 of the licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below.

3.2.1 The Licensee shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

Table 3.2.1: Monitoring of point source emissions to groundwater				
Emission point reference	Parameter	Units	Averaging Period	Frequency
Dewatering discharge outlet into the Titan and Brown Hill Saturn and Ruby Queen pits	Volumetric flow rate	m ³ /day	Monthly	Continuous
	<u>Aluminium</u>	mg/L	Spot sample	Annually
	Arsenic			
	Cadmium			
	Chromium			
	<u>Cobalt</u>			
	Copper			
	<u>Iron</u>			
	<u>Lead</u>			
	Manganese			
Mercury				
Molybdenum				
Nickel				
<u>Selenium</u>				
Total recoverable hydrocarbons				
Zinc				
	Standing water level in pits	mbgl		Quarterly
	Total dissolved solids	mg/L		
	Total Nitrogen	mg/L		
	pH ¹	-		

Note 1: In-field non-NATA accredited analysis permitted.

6. Condition 4.1.2 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below.

~~4.1.2 The Licensee shall complete an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous annual period.~~

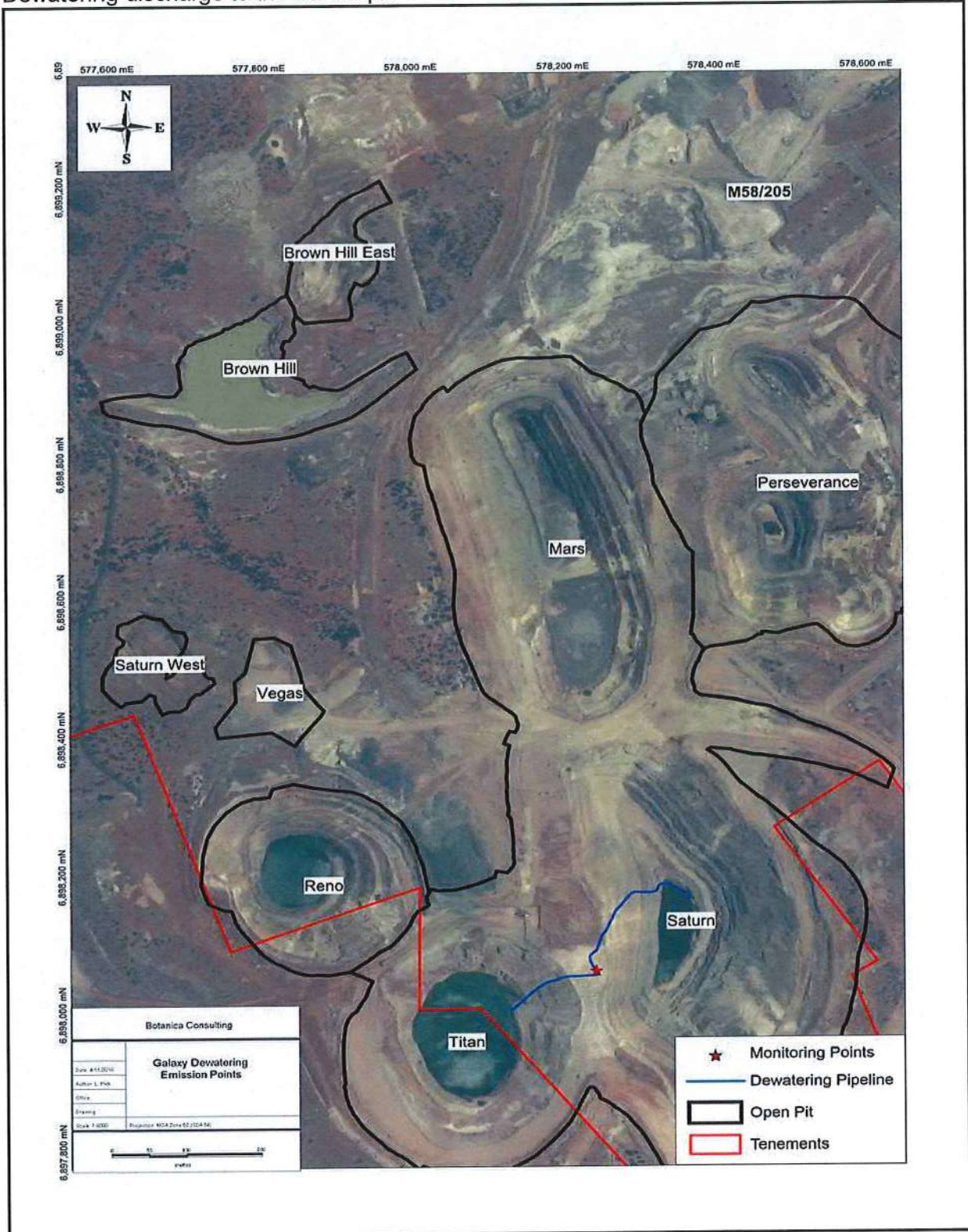
The Licensee must submit to the CEO within 90 days after the Anniversary Date, an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the Conditions of this Licence for the annual period.

7. The licence is amended by the removal of the Annual Audit Compliance Report template in Schedule 2.
8. The Licence is amended by removing the map in Schedule 1 Map of emission points and insertion of the maps below:

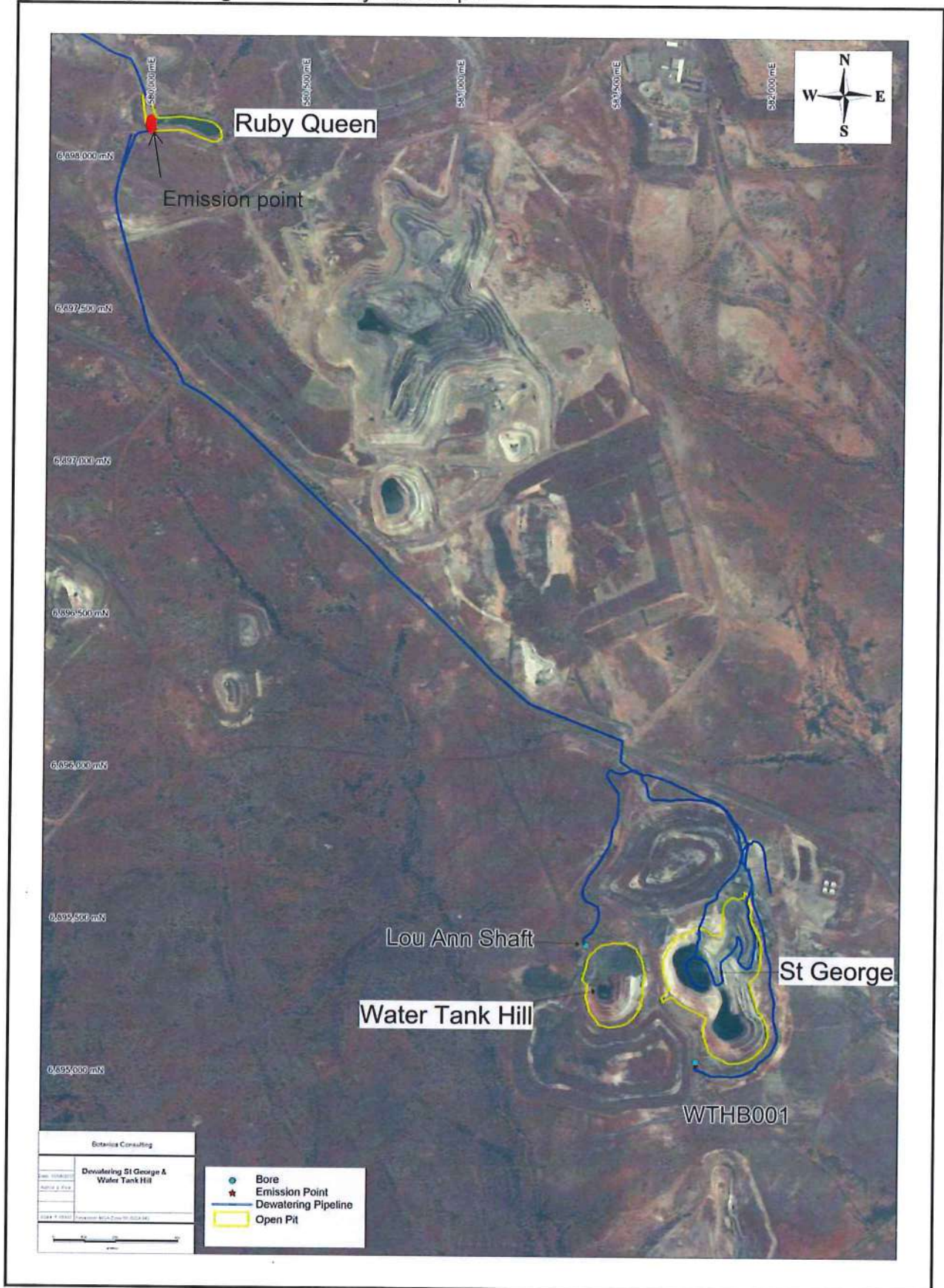
Map of emission points

The location of the emission points defined in Table 2.2.1 are shown in the maps below.

Dewatering discharge to the Saturn pit



Dewatering discharge to the Ruby Queen pit

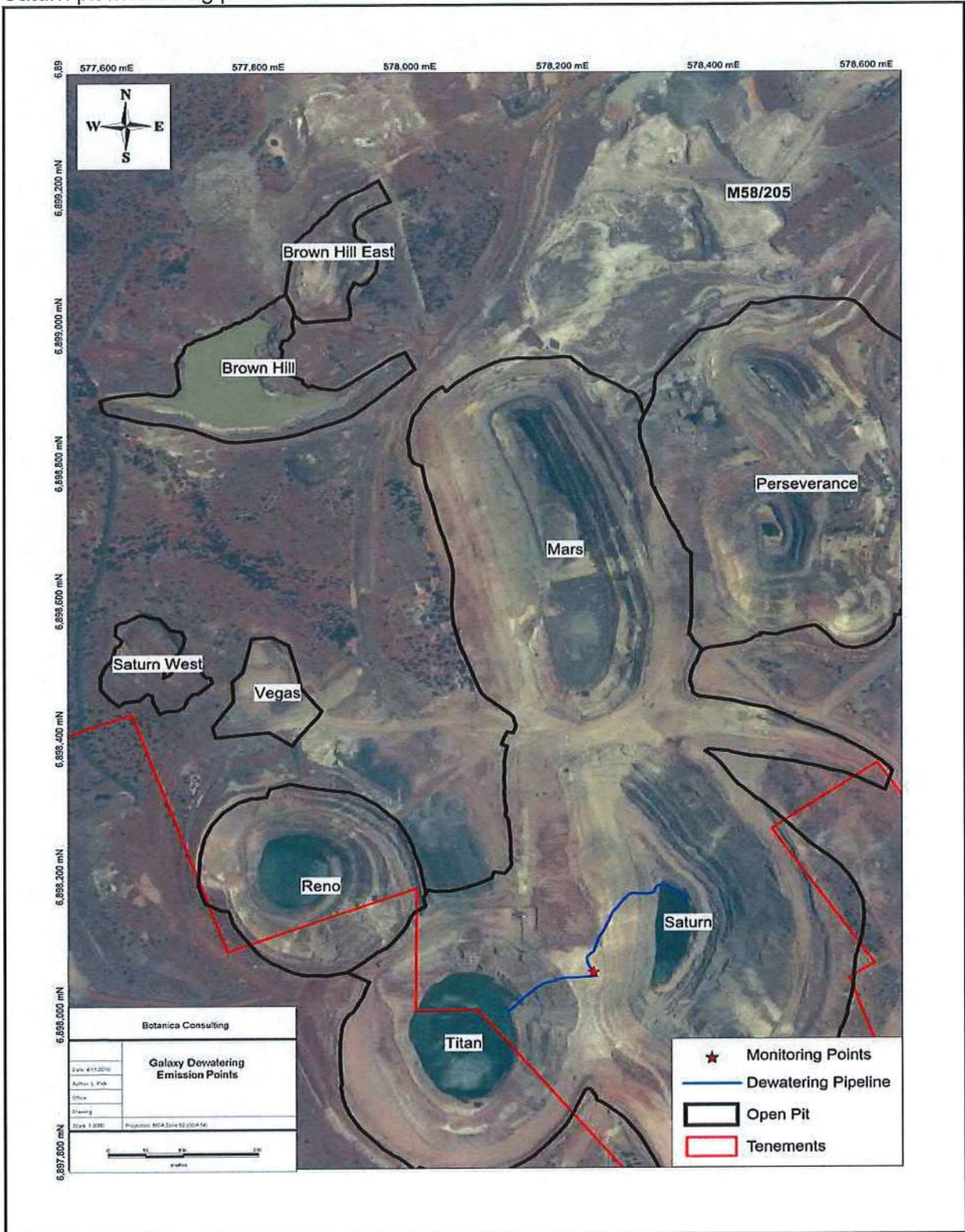


9. The Licence is amended by removing the map in Schedule 1 Map of monitoring locations and insertion of the maps below:

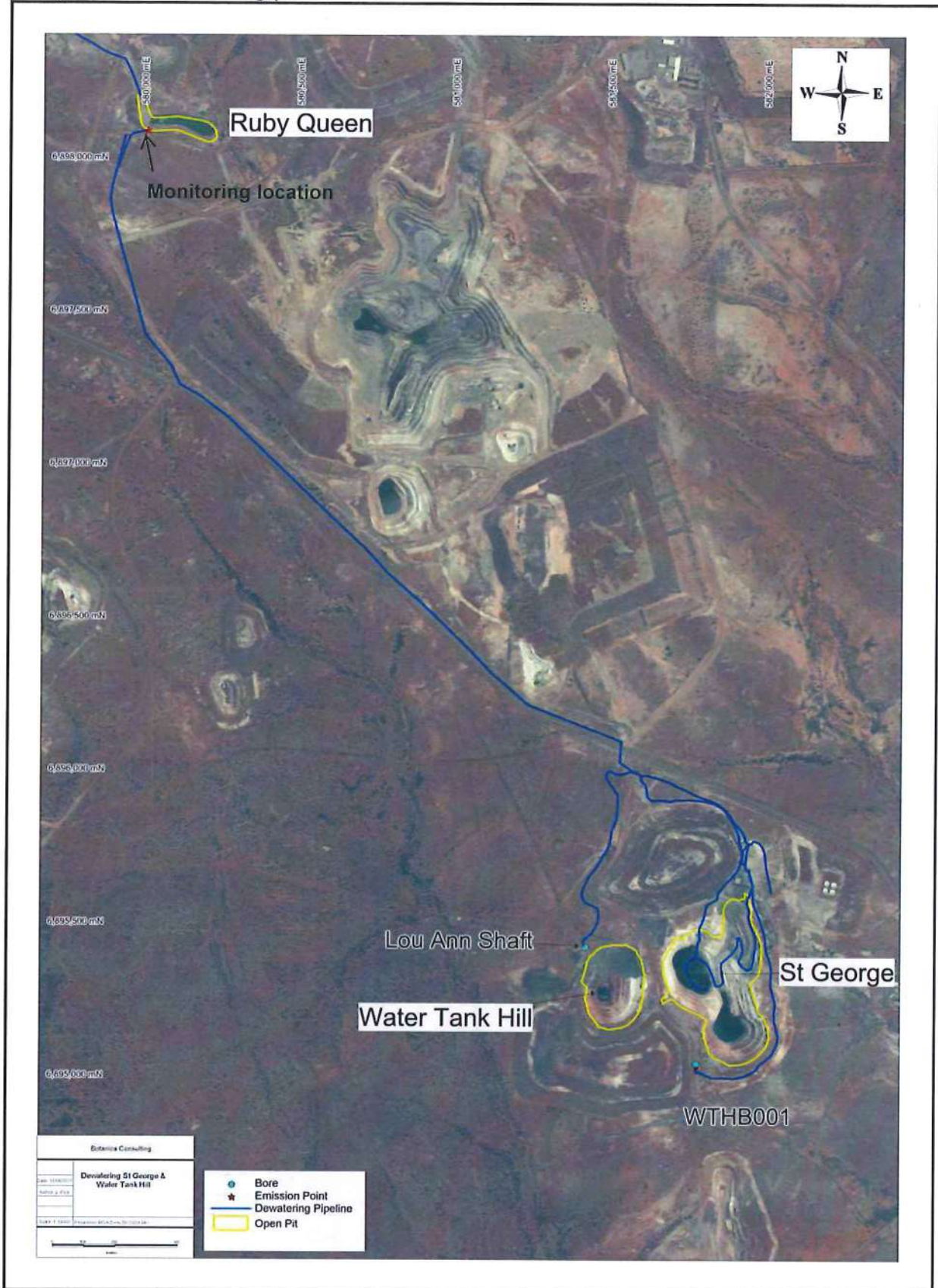
Map of monitoring locations

The locations of the monitoring points defined in Table 3.2.1 are shown below.

Saturn pit monitoring point



Ruby Queen monitoring point



10. The Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below for the forms contained in Schedule 2.

Emission point	Parameter	Result	Averaging period	Sample date & times
Dewatering discharge into Titan Saturn pit	Volumetric flow rate	m ³ /day	Monthly	
	Standing water level	mbgl	Spot sample	
	pH	-		
	Arsenic	mg/L		
	Aluminium	mg/L		
	Chromium	mg/L		
	Cobalt	mg/L		
	Iron	mg/L		
	Lead	mg/L		
	Selenium	mg/L		
	Cadmium	mg/L		
	Copper	mg/L		
	Manganese	mg/L		
	Mercury	mg/L		
	Molybdenum	mg/L		
Nickel	mg/L			

Licensee: Mt Magnet Gold Pty Ltd
 Form: GR1
 Name: Monitoring of point source emissions to groundwater
 Period :

	Total dissolved solids	mg/L	
	Total nitrogen	mg/L	
	Total recoverable hydrocarbons	mg/L	
	Zinc	mg/L	

Signed on behalf of Mt Magnet Gold Pty Ltd: Date:

Licence: L5529/1988/12
 Form: GR1
 Name: Monitoring of point source emissions to groundwater

Licence: Mt Magnet Gold Pty Ltd
 Period :

Emission point	Parameter	Result	Averaging period	Sample date & times
Dewatering discharge into Brewn-Hill Ruby Queen pit	Volumetric flow rate	m ³ /day	Monthly	
	Standing water level	mbgl	Spot sample	
	pH	-		
	Arsenic	mg/L		
	Aluminium	mg/L		
	Chromium	mg/L		
	Cobalt	mg/L		
	Iron	mg/L		
	Lead	mg/L		
	Selenium	mg/L		
	Cobalt	mg/L		
	Cadmium	mg/L		
	Copper	mg/L		
	Manganese	mg/L		
	Mercury	mg/L		
	Molybdenum	mg/L		
	Nickel	mg/L		
Total dissolved solids	mg/L			
Total nitrogen	mg/L			

Licence: L5529/1988/12
 File No: CEO188/17

	Total recoverable hydrocarbons	mg/L	
	Zinc	mg/L	

Signed on behalf of Mt Magnet Gold Pty Ltd: Date:

Appendix 1: Key Documents/References

	Document Title	Availability
1	DER <i>Guidance Statement on Regulatory principals</i> , July 2015	Accessed at https://www.der.wa.gov.au
2	DER <i>Guidance Statement on Setting conditions</i> , September 2015	
3	DER <i>Guidance Statement on Licence duration</i> , November 2014	
4	DER <i>Guidance Statement on Licensing and works approval processes</i> , September 2015	
5	Administrative changes implemented within DER	
6	Licence amendment application and supporting documentation received 23 November 2016	DER record A1364275
7	DER notification of proposed amendment dated 13 June 2017	DER record A1449697
8	Mt Magnet Gold Pty Ltd comments on draft 21 day amendment notice received 28 June 2017	DER record A1462514
9	DoE (2005), Mount Magnet Water Reserve Drinking Water Source Protection Plan. Department of Environment. Water Resources Protection Series (WRP no.38)	DOW record
10	DoW (2016) Water quality protection note no. 25 Land use compatibility tables for public drinking water source areas	DOW record
11	Mt Magnet Gold Pty Ltd waiver form dated 28/06/2017	A1462545

Appendix 2: Summary of Licence Holder Comments

The Licensee was provided with the draft Amendment Notice on 13 June 2017 for review and comment. The Licensee responded on 28 June 2017 with comments and provided a waiver form for the remaining comment period (until 30 June 2017). A summary of the comments is provided below.

Comments received	Summary of Licence Holder Comments	DER response
28/06/2017	<p>1. Is Mt Magnet Gold Pty Ltd able to monitor for Total Chromium instead of Cr (III) and Cr (VI), with a commitment to undertake further speciation should the sample results exceed the limits set out in the table;</p> <p>2. What is the justification for including Thallium in the list of parameters to be monitored? Advice from Mt Magnet geologists is that Thallium is unlikely to be present in high levels in the Mount Magnet area as the ores are generally oxidised and low-sulphide; and</p> <p>3. What is the justification for including Total and WAD Cyanide in the list of parameters to be monitored? Given that the amendment is limited only to include the dewatering of the Titan pit and St George / Water Tank Hill underground workings.</p>	<p>1. The Delegated Officer notes and agrees that sampling for Cr (III) and Cr (VI) in dewatering discharge waters is not necessary. Sampling for Total Chromium (Cr) in emissions to groundwater is already an existing requirement of the Licence. Cr consists primarily of trivalent Cr (III) and hexavalent Cr (VI) forms. Sampling for Cr undertaken by the Licensee, with the results presented in the Annual Environmental Report, indicates the levels are below the minimum detection level. Sampling for Cr will still remain a requirement of the Licence. The Delegated Officer may reconsider the sampling requirements if sampling results for Cr indicate an increasing trend.</p> <p>2. The Delegated Officer notes and agrees that levels of Thallium are unlikely to be present in high levels in the Mt Magnet area due to the low sulphide type ores (naturally a majority of Thallium is bound with Sulphide). Therefore the sampling for Thallium in dewatering discharge water is unnecessary.</p> <p>3. The Delegated Officer notes and agrees that the sampling for Total and WAD Cyanide in pit water at the Titan and St George/Water Tank Hill pits is not necessary.</p>

The Delegated Officer considers the likelihood of these contaminants being present in the pit waters is rare as the pits are located about 2 and 5 km away respectively from the tailings storage facility (TSF), the closest upstream groundwater sampling bores located at the TSF indicate cyanide levels are well below the licence limit for those bores, and the receiving pits for the dewatering discharge are located closer to the TSF than the dewatering sources.

Sampling for Total and WAD Cyanide in ambient groundwater monitoring bores located at various locations around the Premises remains a requirement of the licence. The results are presented in the Annual Environmental Report which is submitted to DER.