
MEMORANDUM

TO: EcOz Environmental Consultants Pty Ltd

DATE: 2 March 2022

SUBJECT: Review of Castille Resources Groundwater Investigation Drilling Program

Groundwater Enterprises has been engaged to review the groundwater investigation plan for Castille Resources at their Rover 1 prospect. Mine activities at Rover 1 were approved under a 2013 Mine Management Plan. However, Castille Resources has subsequently acquired additional tenements to the north of Rover 1 and has revised their site infrastructure layout. Castille Resources plans to access the Rover 1 deposit through a box-cut located around 2.5 km north-east of Rover 1, which will be excavated through the Hooker Creek Formation to a depth of approximately 60 m. The box-cut will provide a portal to a decline which will be tunnelled/blasted through the Montejinni Limestone and the underlying basement rocks. Additional infrastructure around the box-cut includes: a waste rock dump, a processing plant and an onsite village 1 km further east. In addition, a paste plant and tailings storage facility are planned for the area overlying the Rover 1 deposit.

Rover 1 is a gold, silver and copper deposit that occurs in Neo-Proterozoic basement rocks at a depth of around 400 - 800 m below surface. The basement rocks are overlaid by approximately 120 m of Wiso Basin sediments comprising the Hooker Creek Formation and the underlying Montejinni Limestone. The Wiso Basin hosts a regional scale groundwater system. Previous investigations completed by VDM at Rover 1 in 2012 identified significant aquifers within the basal sequence of the Montejinni Limestone with lesser aquifers occurring higher in the Montejinni Limestone sequence and a watertable aquifer in the Hooker Creek Formation. VDM (2012) found that the aquifers are heterogeneous and may be of limited areal extent as a result similar groundwater conditions cannot be assumed to extend north to the box-cut and decline, where the majority of dewatering is expected to be required. The groundwater flow direction around Rover 1 was to the north/north-east. For the purpose of locating bore sites a groundwater gradient to the north/north-east has been assumed around the box-cut/northern infrastructure.

The revised groundwater investigation plan concentrates on characterising groundwater conditions in the Wiso Basin sequence around the box-cut and decline. A series of nested bores (sites 3-5) target the basal and intermediate aquifers in the Montejinni Limestone and the shallower Hooker Creek Formation. The bore configuration has been designed with the intention of undertaking an aquifer testing program to allow estimation of aquifer parameters. This information will be critical in estimating dewatering requirements and assessing potential groundwater impacts from the project. A nested site is recommended approximately 3 km north-east of the site infrastructure to act as a downgradient background monitoring point. The remainder of bores (sites 1-2, 6-8) target the watertable aquifer in the Hooker Creek Formation and are associated with assessing and monitoring contamination risk from the proposed infrastructure (i.e. processing plant, waste rock dump, TSF etc).

Although assumed to be low permeability (VDM, 2012) there is no information available on the hydraulic characteristics of the basement rocks that host the mineralised zone. This information will be needed to constrain groundwater inflows into the decline and underground workings. The drilling plan does not explicitly include any deep basement investigation bores as we recommended

completing packer tests on the bores drilled in the upcoming geotechnical program. If this is not practical than additional bores drilled into the basement may be required in the future.

A full description of the recommended bores for each drilling site and the investigation rationale is provided in Table 1. A map showing the proposed drilling sites in relation to the planned site infrastructure is provided below in Figure 1.

References

VDM Consulting (2012). Hydrogeology Investigations (Bore Drilling, Sampling, Testing and Modelling) Rover 1. Prepared for Westgold Resources Limited.

Table 1 Summary of recommended drilling sites and investigation rationale

Site ID	Easting GDA94 Z53	Northing GDA94 Z53	Site Type	No. Bores	Nominal Depths (m)	Target Formation	Investigation Rationale
1	360464	7791674	Shallow	1	40	Hooker Creek Formation	<ul style="list-style-type: none"> Down gradient baseline monitoring point for process plant. Characterise water quality and flow direction in watertable aquifer (Hooker Creek Formation)
2	360839	7791246	Shallow	1	40	Hooker Creek Formation	<ul style="list-style-type: none"> Down gradient baseline monitoring point for waste rock dump. Characterise water quality and flow direction in watertable aquifer (Hooker Creek Formation)
3	360688	7790714	Nested	2	60/120	Hooker Creek Formation Montejinni Limestone (Deep)	<ul style="list-style-type: none"> Up gradient bore in watertable from waste rock dump Establish quality and flow directions in shallow/deep aquifers. Baseline monitoring for water quality and dewatering
4	360364	7789893	Nested	3	60/90/120	Hooker Creek Formation Montejinni Limestone (Intermediate) Montejinni Limestone (Deep)	<ul style="list-style-type: none"> Test production bore site to establish aquifer parameters for modelling and dewatering estimates. Located where proposed decline enters the basement rocks. Determine quality/flow directions (vertical and horizontal) in shallow/intermediate/deep aquifers. Baseline monitoring site for dewatering.
5	359839	7790118	Nested	3	60/90/120	Hooker Creek Formation Montejinni Limestone (Intermediate) Montejinni Limestone (Deep)	<ul style="list-style-type: none"> Establish quality and flow directions in shallow/intermediate/deep aquifers. Lateral monitoring site for pumping test investigations. Aquifer/yield data for potential camp water supply.

Site ID	Easting GDA94 Z53	Northing GDA94 Z53	Site Type	No. Bores	Nominal Depths (m)	Target Formation	Investigation Rationale
							<ul style="list-style-type: none"> Background bore for baseline monitoring of water quality/dewatering
6	359502	7788084	Shallow	1	40	Hooker Creek Formation	<ul style="list-style-type: none"> Down gradient baseline monitoring point for paste plant. Characterise water quality and flow direction in watertable aquifer (Hooker Creek Formation)
7	359768	7787534	Shallow	1	40	Hooker Creek Formation	<ul style="list-style-type: none"> Down gradient bore for tailings storage facility. Characterise water quality and flow direction in watertable aquifer (Hooker Creek Formation)
8	359613	7787073	Shallow	1	40	Hooker Creek Formation	<ul style="list-style-type: none"> Up gradient monitoring point for tailings storage facility. Characterise water quality and flow direction in watertable aquifer (Hooker Creek Formation).
9	362711	7793675	Nested	2	60/120	Hooker Creek Formation Montejinni Limestone (Deep)	<ul style="list-style-type: none"> Down gradient baseline bore located in the direction of the Tennant Creek borefield. Constrain the aquifer extents beyond the immediate site infrastructure. Allow collection of baseline level and quality data to inform broader impacts on the Tennant Creek aquifer system

GROUNDWATER ENTERPRISES

