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Mr Laura Rehn
Environmental Operations
Northern Region
Environmental Protection Agency
PO Box 5391
Townsville Qld 4810

11 December 2013

Dear Ms Rehn

Re: Transitional Environment Program (TEP) MAN17020

In accordance with the commitments made in the TEP please accept this report on site surface water flows at the Highway Reward mine.

Investigative surface water sampling including flow measurements at specific locations has been instigated to provide data on the sources of contamination noted in the submitted draft TEP document and to inform the TEP reports below. The sampling program is described in Appendix One. The TEP sample points are also shown in Figure 2 as green dots with black outlines.

SW6 FLOW PATH DRAIN

The flow path towards SW6 runs along the western side of the base of the Highway Waste rock dump. Flows along this path are measured at SF2 and downstream of that at TEP sample sites 001, 002 and 003. All TEP sample sites have been dry when inspected.

Small flows have been recorded at SF2 (see Figure 4 and Figure 5) but to date (as of 08.00 11/12/13) no flow has been recorded downstream of the weir with all runoff water in the drain soaking into the ground.

SW6 FLOW PATH WRD

The major flows from the Highway WRD at SF2 weir can be seen in Figure 4 and Figure 5. 113 mm of rain was recorded between 9 May and 22 November before significant flow was measured at the weir.

Figure 1

Flow Monitoring Locations Highway Reward

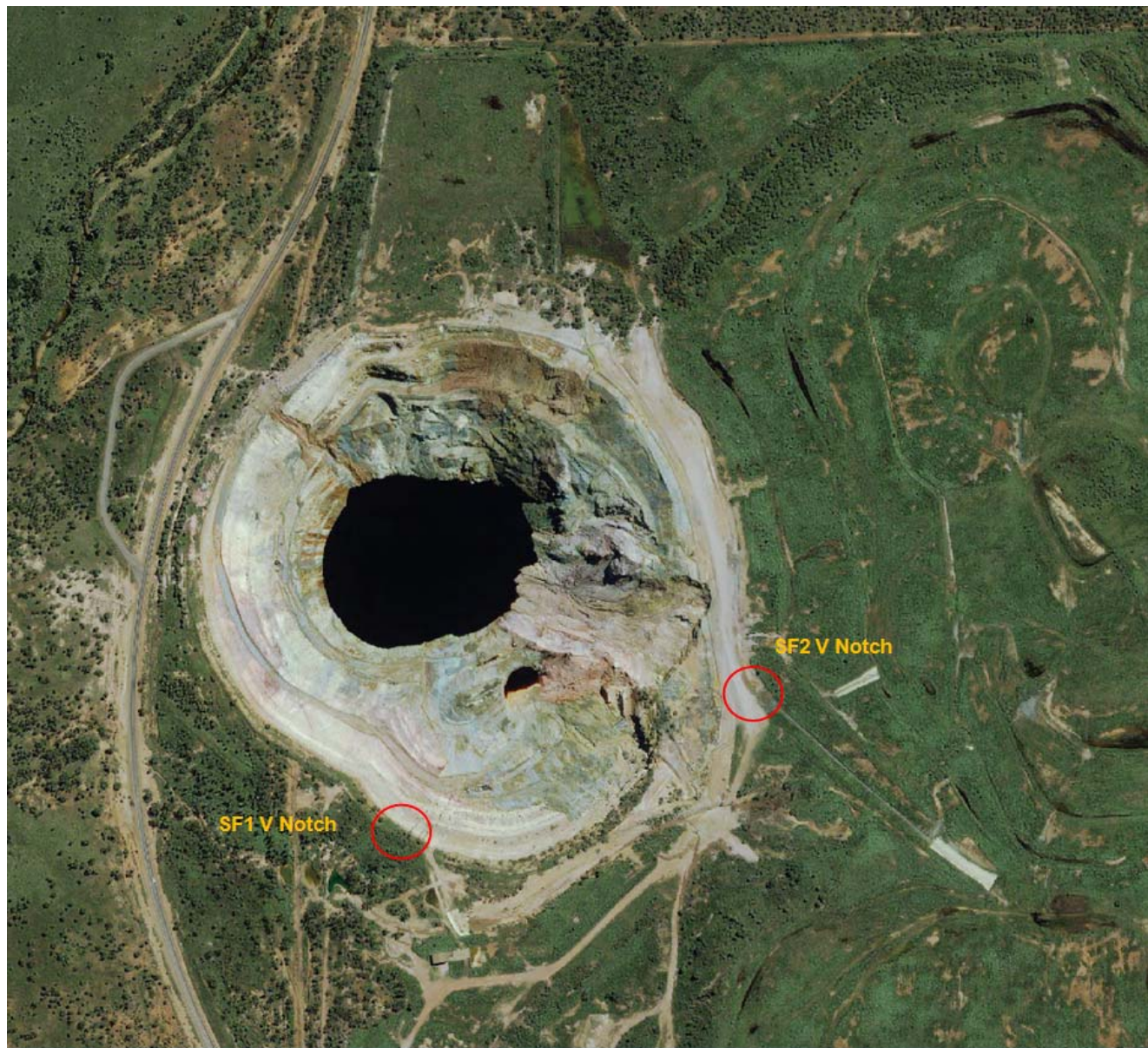


Figure 2 Site Flow Lines and Sample Points



SW5 FLOW PATH

As with the above, this site has been dry when inspected. No flows have left the site to the west towards SW5.

Figure 3 SW5 - TEP Sample Site 11 -



PIT V-NOTCH

The pit v notch SF1 has provided similar flow regimes to SF2 and can be seen in Figure 4 and Figure 5.

Figure 4 Flows and Rainfall

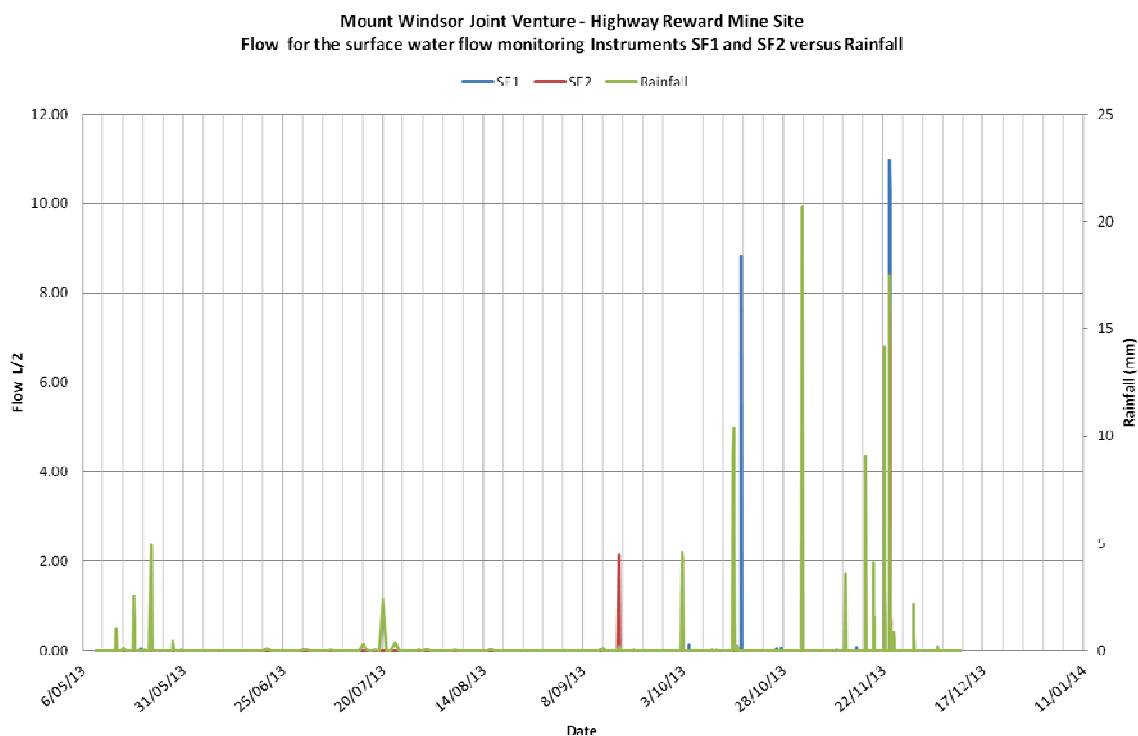
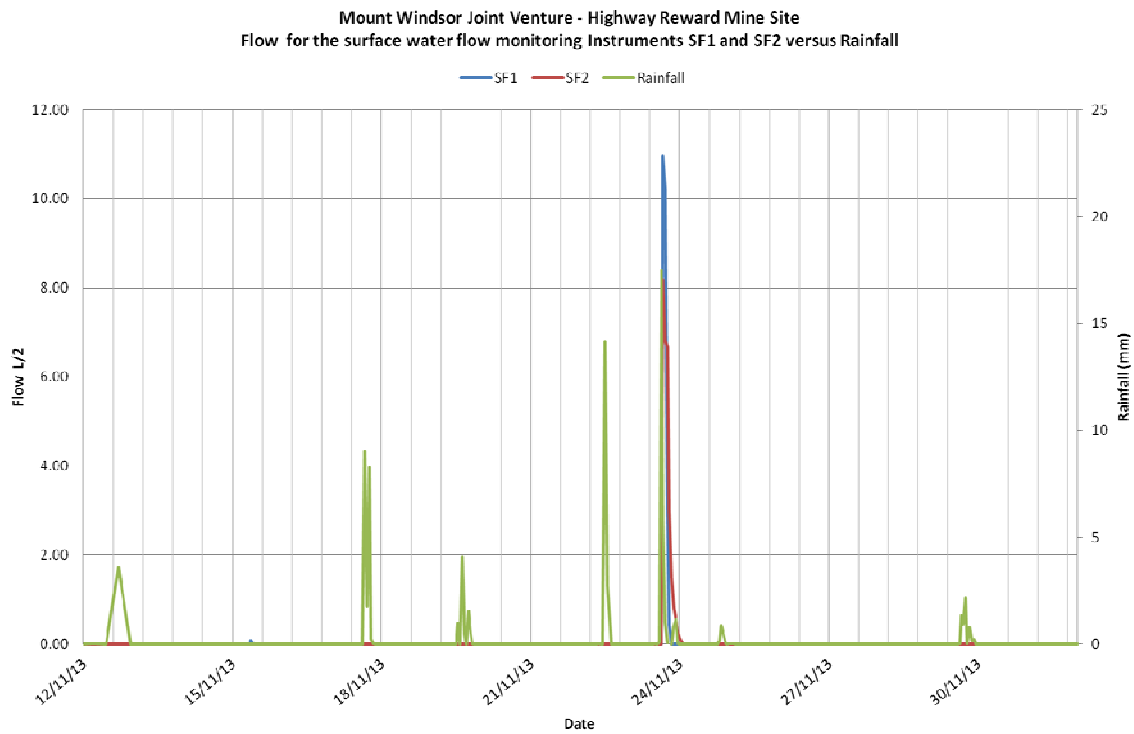


Figure 5 **Flows and Rainfall November**



SURVEY PIT WATER HEIGHT

The height of water in the pit has not increased due to the inflows recorded since 9 May 2013. During this time 123.2 M³ of runoff has flowed into the pit through this v notch.

Figure 6 **Pit Water Height** **Sep 11** **August 13**



SUMMARY

Initial rainfall and flow events indicate that the amount of infiltration, ponding and evaporation is higher than expected, reducing the runoff reporting to the weirs (and eventually off site) after each periodic rainfall event.

Please feel free to call me if you have any questions.

Yours sincerely

A handwritten signature in black ink, consisting of a stylized 'S' followed by a horizontal line.

Stephen Kent
For Thalanga Copper Mines JV
Ph 07 5439 7877 / 0417 574 799

APPENDIX ONE - HIGHWAY REWARD TEP SURFACE WATER SAMPLING

Additional surface water sampling is proposed for the TEP to:

- Investigate and find the source/s of high acidity and copper which are reporting to the sample site SW6, and
- Demonstrate that no surface water is flowing towards sample site SW5.

The location of each proposed sample site is shown in Figure 7 below. These are show in more detail later in the report along with sampling requirements. Sampling is proposed fortnightly during the wet season (1 November - 30 April) and monthly during the dry season each year. It is anticipated that the sample sites will be dry on many occasions. At these times, the results (dry) shall be recorded and no samples taken.

Figure 7 Sample Locations



TEP 001

TEP 001 is designed to sample the ARD leachate emanating from the NE corner of the base of the Highway waste rock dump (HWRD). This leachate has been shown to contain high concentrations of acidity and copper at times but is expected to only result in low flows. The contaminated leachate may be due to surface sulphide oxidation of influent rainfall from rocks containing visible sulphides (the yellow stained rocks in Figure 8) or it may be due to seepage of ARD from within the HWRD.

4177017 E
7748140 S

Figure 8 **TEP001**



A catch drain and sample sump has been constructed at this point to ensure that all seepage is captured and seepage flows can be measured. The seep collection drain only directs surface flows from either side of the NE point of the dump to a central location where the sump is situated. The approximated location is drawn in Figure 9. The length of the drain is approximately 10 m (5 m either side of the sump).

Figure 9 Seepage collection



Table 1 TEP 001 Sample parameters

TEP001	
Sample parameters	
Field	pH & EC & Flow
Lab	Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 002

TEP 002 is the drain east of the HWRD and immediately north of the eroded drop structure where exposed sulphidic material can be seen oxidising

417092 E

7747948 S

Figure 10

TEP 002



Table 2 TEP 002 Sample Parameters

TEP002

Sample
parameters

Field pH & EC & Flow

Lab Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

For flow measurement, a small sump is envisaged in the drain as shown in Figure 10 with flow collection as per TEP 001.

TEP 003

TEP 003 is immediately north of sulphide oxidation staining coming from the road to the west of the drain. A small sump has been dug to facilitate flow measurement.

417114 E

7747841 S

Figure 11` TEP 003



Table 3 TEP 003 Sample Parameters

TEP003

Sample
parameters

Field	pH & EC & Flow
Lab	Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 004 - V Notch Weir

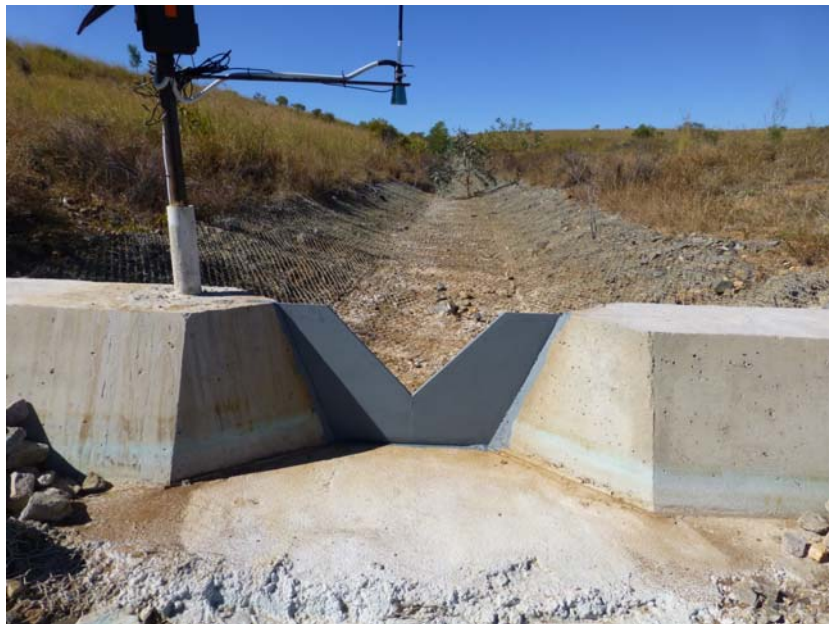
TEP 004 is the V notch weir. Flow is recorded automatically by the monitoring station.

417183 E

7747661 S

Figure 12

TEP 004



A sample can be collected from behind the v notch plate.

Table 4 TEP 004 Sample parameters

TEP004

Sample
parameters

Field	pH & EC
Lab	Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 005

TEP 005 is designed to sample the first obvious inputs to the gabion (and eventually revetment mattress) drain intersecting the HWRD and the Reward WRD (RWRD). The drain which flows into the main drain has two sources - above and to the immediate left of the drain (looking upwards TEP 006) coming down the left hand side of the drain TEP 005. A small sump has been dug in the yellow stained flow path for collection of samples and flow measurements.

417374 E
774511 S

Figure 13 TEP 005



Table 5 TEP 005 Sample parameters

TEP005

Sample
parameters

Field	pH & EC & flow
Lab	Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 006

TEP is to the immediate north of the gabion drain and collects surface flows which run alongside the revetment mattress and report into the gabion drain above TEP 005.

417377 E

7747524 S

Figure 14

TEP 006



Table 6 TEP 006 Sample parameters

TEP006

Sample
parameters

Field	pH & EC & flow
Lab	Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 007

TEP 007 is at the top of the revetment mattress where sulphide oxidation appears to be taking place. A small sump has been dug to facilitate sampling and flow measurement.

417441 E

7747435 S

Figure 15 TEP 007



Table 7 TEP 007 Sample parameters

TEP007

Sample
parameters

Field pH & EC & flow

Lab Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 008

TEP 008 is at the base of an eroding flow path immediately above the revetment mattress drain and flowing into it. TEP 009 is at the top of the structure / flow path.

417528 E

7747539 S

Figure 16 TEP 008



Figure 17 TEP 008 Close



Samples can be collected in flow paths along the rocks and drops and similarly flow measurement collected. (TEP 009 also)

Table 8 TEP 008 Sample Parameters

TEP008

Sample
parameters

Field pH & EC & flow

Lab Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 009

TEP 009 is at the top of the flow path used for TEP 008.

417506 E

7747506 S

Figure 18 **TEP 009**



A sample sump / collection point near the top of the "structure is used - along a "natural" flow path.

Table 9 **TEP 009 Sample parameters**

TEP009

Sample
parameters

Field pH & EC & flow

Lab Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 010 and TEP 011

These sample locations relate to SW5 and are designed to demonstrate that no contaminated water flows from the site towards SW5.

TEP 010 is a sample at the v notch weir with flows automatically recorded at the weir.

Table 10 **TEP 010 Sample parameters**

TEP010

Sample
parameters

Field pH & EC

Lab Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)

TEP 011 is a sample point immediately to the west of the fenced lease boundary and along the flow path to the official SW5 point.

416598 E

7747447 S

Figure 19 **TEP 011**



It is envisaged that TEP 011 will be dry or will only contain localised flows (i.e. not specifically from the mine site). Hence the sampling in dry conditions will involve recording that no flow is present and taking a photographic record towards the site as per Figure 19. In the event that there is water at TEP 011, a sample shall be taken.

Table 11 **TEP 011 Sample parameters**

TEP011

Sample
parameters

Field pH & EC

Lab Acidity, Total & Dissolved metals (Cd, Cu, Pb, Se, Mo, Zn)