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File # 14-00001-01

June 2, 2014

Westmoreland Coal Company
CVRI - Obed Mountain Mine

RE: Obed Mountain Mine – Solids Recovery Project
Phase 2 Monitoring and Response Plan

1.0 INTRODUCTION

The following Monitoring and Response Plan has been developed for use in the second Phase of the Solids Recovery Plan that was prepared for the mitigation operations for the Obed incident.

2.0 BACKGROUND

Water and fines resulting from the Obed Incident were released into the adjacent environment including Apetowun Creek, Plante Creek and ultimately the Athabasca River.

For the purposes of the management of the remediation program, Apetowun and Plante Creeks was divided into three zones of influence. The zones were defined by the amount of disturbance that occurred during the release:

- Zone 1 - Mineral Surface Lease to the Shell Bridge
  - Highest impact to terrestrial and aquatic resources
- Zone 2 – Shell Bridge to the Plante Creek Confluence
  - Minimal impact to terrestrial and aquatic resources
- Zone 3 – Plante Creek Confluence to the Athabasca River
  - Minimal impact to terrestrial and aquatic resources

The damage sustained by the creeks during the release included downed timber, deposition of solids and the erosion of the creek banks and facilities such as road crossings. The most significant damage occurred in the upper 5 km of Apetowun Creek. The upper 5 km's stretches from the MSL boundary below the Main Tailings Pond to the blowout area which is located approximately 1.3 km's downstream of the DX road crossing of Apetowun Creek. The blowout area is the point where the highest impact to the terrestrial and aquatic resources of Apetowun Creek ended. There was minimal damage to Plante Creek though there was solids deposition in some areas.

Millennium EMS Solutions Ltd. (MEMS) was engaged by CVRI to manage the remediation work for the affected parts of Apetowun and Plante Creeks. To facilitate the remediation work MEMS developed the Solids Recovery Plan.

The Plan was implemented during the period of early February to early April, 2014 when a significant amount of work was completed to mitigate the damage that occurred in Zone 1 (the upper 5 km of Apetowun Creek).

Work consisted of:

- downed timber management;
- creek channel rehabilitation;
- creek channel reconstruction;
- sediment recovery;
- erosion control; and
- construction of four sediment traps.

The creek remediation work and the installation of the sediment traps on Apetowun Creek that was completed during the February to April, 2014 period are considered to be Phase 1 of the Solids Recovery Plan.

3.0 MONITORING AND RESPONSE PLAN

MEMS has prepared the following monitoring and response plan that will be utilized for the Phase 2 operations on the impacted areas. Phase 2 will include additional work on the Phase 1 area that was not identified because of snow cover and the remediation that may be required on the remaining areas of Zones 2 and 3 (Apetowun Creek and Plante Creek) that will be identified during the spring 2014 creek assessment.

The following work plan is based on the following components:

3.1 Monitoring

Monitoring for Phase 2 of the Solids Recovery Plan will consist of the following activities:

- assessment of work completed during the first phase of the project;
- monitoring of the structure, function and sediment accumulation of the sediment traps;
- monitoring of the water quality in Apetowun and Plante Creeks to identify impacts to the creek water quality; and
- assessment of the Zone 2 and 3 areas of Apetowun and Plante Creeks that were not included in the Phase 1 activities.

3.1.1 Phase 1 Activity Assessment

A complete bio-physical assessment will be carried out on the areas that were remediated during the Phase 1 activity period. The assessments will be completed by:

- Project Management Personnel;
- Qualified Aquatic Environment Specialists (QAES);
- Wildlife Habitat Specialists; and
- Soils and Vegetation Specialists.

It is anticipated that the assessment will be completed in early June but will depend on when the snow and moisture conditions allow the assessment to be completed.

The assessment will include:

- Stability of the Recontoured Creek Banks
  - Portions of stream banks were graded to remove overhanging, under cut banks and will be assessed for potential issues.
- Stability of the Reconstructed Creek Sections
  - A section of the creek required reconstruction and will be assessed for stability and for the function of fisheries enhancements.
- Impediments to Fish Passage
  - In some areas overhanging banks and timber accumulations were left in place as potential habitat enhancements. These areas will be assessed to ensure they do not present an impediment to fish passage and are providing fisheries habitat value.

- Effectiveness of the Downed Timber Management
  - Timber accumulations will be assessed to ensure they do not present an impediment to wildlife passage.
  - Spread timber and wood debris will be assessed to ensure they are not channeling surface runoff and causing erosion.
- Assessment of Intact Vegetation
  - Areas where the original vegetation cover is intact will be assessed to determine if the vegetation will be need to be enhanced by willow or coniferous tree plantings.
- Potential Sediment Remobilization Areas
  - Due to the snow cover all of the sediment deposition areas could not be identified during the Phase 1 activities. Remaining solids deposits will be identified and assessed to determine the potential for remobilization and what remedial activities will be required to remove the deposits or to stabilize them in place.
- Effectiveness of Erosion Control Installations
  - Erosion control consisting of straw bales, jute matting and silt fence were installed in areas with a potential for erosion. These areas will be assessed to determine if the installations are effective and if additional work is required.
  - All other areas within Phase 1 will be assessed to determine if the installation of erosion control is required.
- Original Vegetation
  - There are areas where the original vegetation is intact but is partially covered with a veneer of solids. The assessment will be used to determine if there is value in leaving the thin deposits of sediment in place thus retaining the original vegetative cover.
- Invasive Plant Management
  - The Phase 1 work was completed under winter conditions and straw bales were used as part of the erosion control installations. There is a potential that weeds were introduced during the Phase 1 period.
  - The work areas will be assessed for invasive plans and if required a weed control program will be developed by the vegetation specialists.

The assessment results will be used to fine tune the revegetation planning for the Phase 1 activities that have been completed.

3.1.2 Sediment Traps

The configuration and operation of the sediment traps is a new concept requiring monitoring to determine the effectiveness of the traps operation. In addition, the traps were constructed under winter conditions which could lead to stability issues. The sediment accumulation rates for these facilities are not known and will depend on the rate of upstream sediment generation and the effectiveness of the traps performance in capturing suspended solids.

The sediment traps were designed by Matrix Solutions Inc. (Matrix). Matrix has developed a monitoring plan for the operations of sediment traps. The monitoring plan is provided in Attachment 1.

3.1.2.1 Sediment Accumulation

As previously stated the sediment accumulation rate is not known as it depends on several factors that are difficult to predict. An ongoing assessment of sediment deposition depths will be completed to determine when accumulated sediment should be removed. The traps are shallow enough that a visual inspection will provide a reasonable assessment of sediment accumulation. There are several methods to physically measure sediment accumulation ranging from dropping a weighted tape measure to the bottom and measuring the depth of the sediment to remote sensors (depth sounders) mounted on remote control boats. The measured water depth is compared to the as-built bottom elevation and the sediment accumulation is calculated.

If it is determined that the accumulated sediment needs to be removed a sediment removal plan will be developed.

Matrix has also developed a sediment removal form that will be used to guide the removal process. The sediment removal form is also provided in Attachment 1.

3.1.3 Water Quality Background

The Apetowun and Plante Creek monitoring results will provide information on the water quality in the various sections of the two watercourses. The performance of the Solids Recovery Project mitigation programs (recontouring, revegetation and sediment traps) will evaluated by comparing the results with the water quality of the receiving watercourse which is the Athabasca River.

3.1.4 Apetowun and Plante Creeks Water Quality

The water quality will be monitored to provide information of the state of Apetowun and Plante Creeks. A suite of water quality parameters will be monitored to determine effects of the Project on the creeks. The parameter that will used to determine effects of the remedial work will be turbidity.

The QAES's have been monitoring water quality (turbidity) downstream of the Phase 1 remediation areas. The monitoring has been completed to determine project effects on the receiving environment. This monitoring will continue during the additional remediation work that may be completed during the Phase 2 operations.

There has been a network of datasondes installed that provide real-time water quality monitoring information. The datasondes located on Apetowun and Plante Creek provide information that can be used to identify project effects on the water quality in the creeks. The datasonde information can be monitored on the Sutron internet site.

There are two datasondes located on Apetowun Creek. APC is located approximately 100 m upstream of the DX crossing and APC D/S is located approximately 400 m downstream of ST2. These sondes provide water quality information from the Obed Mountain Mine (OMM) MSL boundary to the ST2 facility.

In addition there are two data sondes located on Plante Creek. PLC U/s provides water quality information from above the confluence with Apetowun Creek and PLC provides information after the Apetowun confluence.

The water quality monitoring will be ongoing and will provide notice that effects to the creeks are occurring. This will allow actions to be initiated to identify where the effects are occurring and what mitigation will be required.

Water quality monitoring for the two creeks will consist of:

- Daily review of real-time datasonde information from the datasondes located on Apetowun and Plante Creeks.
- Insitu water sampling at selected locations to provide warning of water quality issues.
- Insitu water sampling at specific points to investigate identified issues.

Samples for compliance reporting will be sent to the laboratory for total suspended solids (TSS) analysis.

3.1.5 Lower Apetowun Creek and Plante Creek

The Phase 1 activities have focussed on the remediation of the incident damage to the upper 5 km of Apetowun Creek. During the aerial recon completed on the lower Apetowun and Plante Creeks there were several areas of interest noted that may require remediation work. The Phase 2 bio-physical assessment will identify any remediation activities that need to be completed on the lower Apetowun

Creek and Plante Creek. Areas that will have to be accessed under winter conditions will be mapped for planning the work.

3.2 Response

In the event that the monitoring program shows that there are issues affecting the water quality in Apetowun and Plante Creeks the Project team will investigate. The project team will evaluate the issue to determine if a response will be required. There will be four basic levels of response to issues arising from environmental impacts to Apetowun and Plante Creeks:

Remediation using heavy equipment: There may be areas where there is a significant amount of work requiring the use of heavy equipment. Work may consist of removing accumulations of sediment and stabilizing erosional areas. Access will have to be developed to get the equipment to the work areas. The equipment used may consist of excavators, hauling units, pumps and vacuum trucks.

Remediation using labour: This method will be used where there is stabilization work that can be completed by labour crews. There may be smaller erosion areas or sediment deposition areas that require the installation of erosion control materials. Materials such as jute mats, silt fence and straw bales will be used to stabilize the areas. Access will be by ATV and will either use prepositioned erosion control materials or haul in the required equipment and materials.

Solids removal using labour: This method will be used to remove sediment from areas where there is no access for heavy equipment. This method will rely on labour to gather and transport sediment to a temporary stockpile site where the material will be loaded into trucks for transport to the disposal area. Access to these areas will be by ATV's pulling small trailers to transport personnel and equipment and to haul out recovered solids.

Pumping: In areas where water entering the Apetowun system is causing impacts to the remediation work pumping systems will be installed to intercept the water. Depending on water quality the water will either be pumped to undisturbed forested areas where it will infiltrate into the ground or pumped around the remediation area directly into the creek. The water could also be pumped to temporary holding areas where it will be stored until the water quality allows it to be released into the receiving environment.

3.2.1 Contractor Availability

The contractor personnel and equipment will be held on a "on call" basis to ensure that it is immediately available in the event of a significant event requiring immediate action.

3.2.2 Response Planning

In the event actions are required to respond to an environmental impact from the project remediation activities the onsite personnel will contact the on call contractor and mobilize personnel and equipment to the impact area. Project staff in conjunction with the contractor supervisory personnel will prepare the work face plans to ensure that the appropriate equipment is used in an effective manner to mitigate the impacts to the water quality in Apetowun and Plante Creeks.

4.0 PROJECT SUPERVISION AND REPORTING

MEMS will provide the following personnel to undertake supervision, administration and monitoring of all of the remediation activities.

4.1 Onsite Personnel

4.1.1 Onsite Project Manager

The onsite project manager will be responsible for ensuring that the goals of the Phase 2 remediation plans are achieved. The manager will coordinate all monitoring and response activities. The manager will be responsible for all client/government liaison activities and will ensure that all site reporting duties are completed. The project manager will engage in all Public Consultation activities that occur.

The onsite project manager will ensure that all the safety procedures are in place and are followed.

4.1.2 Project Coordinator

The project coordinator will ensure that all of the individual field work projects are completed in a manner to meet the remediation plan goals and to protect the environment. The Project coordinator will ensure that monitoring personnel are present and completing their assigned duties.

4.1.3 Environmental Monitors

MEMS will assign a monitor to each of the work crews that are undertaking remediation work. The monitor will ensure that the site specific goals of the program are met and will ensure that the response activities are completed in an environmentally responsible manner.

4.1.4 Project Administrator

MEMS will provide a dedicated administrator who will be responsible for all of the administrative aspects of the remediation project. Work will include the preparation of project update and cost reports and the handling of subcontractor invoices.

4.1.5 Qualified Aquatic Environmental Specialist (QAES)

MEMS will provide a QAES to oversee any work involving the bed and bank of Apetowun and Plante Creeks. The QAES will ensure that the work is completed in a manner to minimize impacts to the aquatic environment. The QAES will complete WQ monitoring during all activities that may impact the creek. The QAES will provide advice on creek bank rehabilitation and creek isolation work.

4.1.6 Soil, Vegetation and Wildlife Specialists

Soils, vegetation and wildlife specialists will be provided to provide assessments of soil, vegetation and wildlife habitat issues that are identified.

4.1.7 Reporting

The results of the bio-physical assessment and the onsite monitoring will be reported internally to MEMS and the Obed Mine. The monitoring results will be used in the overall project reporting to the regulatory agencies.

5.0 SAFETY

The Phase 2 remediation program will be carried out under the umbrella of the OMM safety program. The onsite project manager will be responsible for ensuring that the safety program is applied to the requirements of the OMM. The safety program will consist of:

- Hazard Assessment;
- Pre-job Safety Instruction;
- Toolbox and Project Safety Meetings; and
- Emergency Response Planning.

Hazard assessments will be updated as new site conditions are encountered or if the job tasks change.

6.0 WORK SEQUENCE

The following conceptual work sequence provides some detail on how the monitoring and response program will progress.

- Step 1: Biophysical assessment of Apetowun and Plante Creeks.
- Step 2: Review the assessment results and identify areas where work is required.
- Step 3: Prioritize the work requirements and determine personnel and equipment needs.
- Step 4: Ensure that all approvals/agreements that are required to enter the lands and to do the work are received. It is anticipated that all the required approvals are in place but there may be additional site specific resource company and Public lands approvals required to complete the Phase 2 work.
- Step 5: Enter onto the lands and complete the work. Water quality monitoring will be carried out during all project activities. Document all activities.

Water quality, sediment traps monitoring and sediment trap maintenance will be ongoing throughout the 2014 period.

7.0 CLOSURE

We thank you for the opportunity to be of assistance to CVRI. Should you have any questions, please contact either of the undersigned at 780 496-9048.

Yours truly,

Millennium EMS Solutions Ltd.

Prepared by:

Al Watson C.E.T
Senior Project Manager

Reviewed by:

Kevin Peters
Project Manager

ATTACHMENT ONE

Apetowun Creek Sediment Trap Monitoring
Matrix Solutions Inc.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

MEMORANDUM

TO: Al Watson, C.E.T., Millennium EMS Solutions Ltd.

FROM: Katy Curtis, P.Eng., Matrix Solutions Inc.

RE: Apetowun Creek Sediment Trap Monitoring (ST1, ST2A, ST2B, ST3), Version 1

DATE: April 29, 2014

1 GENERAL

As part of the Solids Recovery Plan, four traps were constructed on Apetowun Creek between January and April 2014, in order from upstream to downstream:

- Sediment Trap 1 (ST1)
- Sediment Trap 2A (ST2A)
- Sediment Trap 2B (ST2B)
- Sediment Trap 3 (ST3)

These sediment traps should be monitored for their overall stability, sediment removal performance, and for fish passage adequacy. The proposed monitoring program consists of:

- Permanent Instrumentation in Apetowun Creek for continuous flow, turbidity, and temperature monitoring
- Daily visual inspections for trap stability, spot turbidity monitoring, fish passage confirmation, and sedimentation estimates
- Evaluation and analysis of sediment removal
- Site inspections by the hydrotechnical design engineer and Qualified Aquatic Environmental Specialist (QAES), where required

The monitoring is recommended to commence in May 2014 and continue until the sediment traps are decommissioned. Trap modifications may be required as a result of the inspections under this plan. This monitoring plan is considered a "living document" and is expected to evolve throughout the life of the sediment traps.

The proposed monitoring plan is described below, and the following forms are attached:

- Inspection Form (specific to each sediment trap)
- Sediment Removal Form (generic to all four sediment traps)

2 PERMANENT INSTRUMENTATION IN APETOWUN CREEK (CONTINUOUS, COMMENCING MAY 2014)

The following instrumentation is recommended to be installed in Apetowun Creek and remain in place until the sediment traps are decommissioned:

- Levelogger equipment at a minimum of two locations (i.e., near the bridge at ST2A and ST2B, and downstream near ST3). Rating curves will be generated.
- Staff gauge immediately upstream of each trap
    - ST3 requires an additional staff gauge downstream of the trap inlet to monitor the flow split between the trap and the creek.
- Temperature loggers at each sediment trap
- Turbidity monitoring equipment (Data Sondes)

Data from these instruments shall be provided to the hydrotechnical engineer for review on a monthly basis, or more frequently if required.

3 VISUAL INSPECTIONS (INITIALLY DAILY, COMMENCING MAY 2014)

Since the traps were constructed in frozen winter conditions, minor settling and sloughing at the traps can be expected and will be repaired, as required. It is recommended that daily visual inspections with turbidity monitoring be undertaken using the attached "Inspection Form" which includes the following:

- Turbidity sampling in the trap and creek, at locations determined by the QAES
- Visual estimates of sediment accumulation
- Walking the perimeter of the sediment trap looking for signs of instability
- Observations of vegetation re-growth and erosion from overland runoff
- Observations of rock armouring displacement or debris accumulation (i.e., timber) in the traps and at the inlet/outlets
- Changes in the trap inlet/outlet that could present a barrier to fish passage.
- Cleaning of floc blocks and re-positioning of treated jute curtains, if present.

The key aspect with the daily visual inspections is to identify changes or anything unusual that has changed since the previous inspection. These inspection forms shall be maintained for long term record keeping.

Initially, it is recommended that the hydrotechnical engineer and QAES participate in these inspections on a monthly basis and after major storm events. After the 2014 flood season (i.e., July 2014), this requirement, and the need for daily inspections, should be re-assessed.

4 EVALUATION AND ANALYSIS OF SEDIMENT REMOVAL PERFORMANCE (ONGOING, COMMENCING MAY 2014)

The sediment accumulation rates in the traps will not be known until operational experience is gained, and will depend on several factors including the upstream sediment generation rates, particle sizes,

streamflow rates, and water temperature. The sediment accumulation will be visually estimated during the daily inspections, and can be physically measured on a monthly or as-need basis using a remote-controlled hydrographic survey boat or a weighted tape measure.

The attached "Sediment Removal Form" shall be used which includes the following:

- Sediment removal procedure, including fish isolation
- Sketches of each sediment trap so that accumulation areas can be identified
- Space to record the volume of sediment removed.

5 EVALUATION OF FISH PASSAGE (ONGOING, COMMENCING MAY 2014)

Sediment Traps 1, 2A and 2B were all designed to allow fish passage. Construction occurred during low flows, and the fish passage criteria was visually approved by the QAES and hydrotechnical engineer on site. If future changes naturally occur to the inlet or outlet that present possible barriers to fish passage, these will be identified on the "Inspection Form" and the QAES and hydrotechnical engineer will be notified.

INSPECTION FORM

INSPECTOR: _____
DATE: _____
TIME: _____
PRECIPITATION IN THE LAST 24HRS (mm): _____
WEATHER CONDITIONS: _____

STAFF GAUGE WATER LEVELS (mark locations on sketch)
#1 (m): _____
#2 (m): _____ If applicable

TURBIDITY
#1 (NTU): _____ in creek, ____m upstream of trap inlet
#2 (NTU): _____ in trap, near inlet
#3 (NTU): _____ in trap, near outlet
#4 (NTU): _____ in creek, ____m downstream of trap outlet

SUMMARY:

	Yes	No
Overall stability issues		
Fish passage issues		
Sediment removal required		

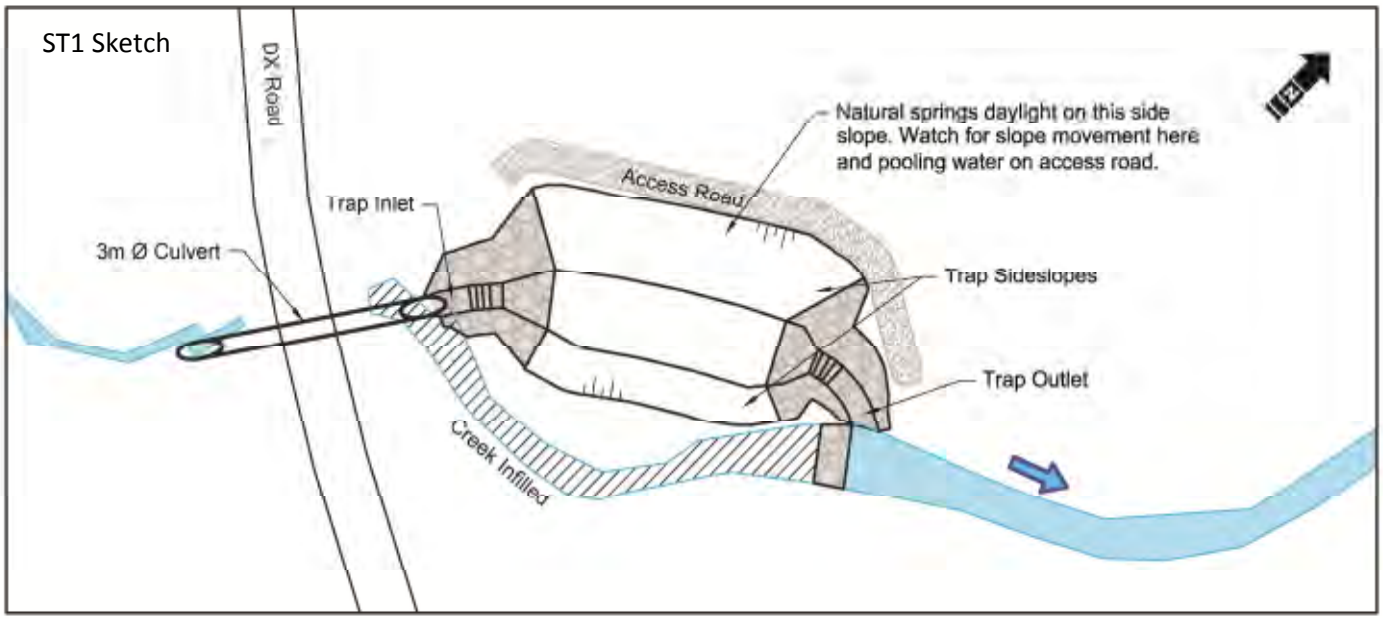
NOTES:

- Bring tape measure/ camera/ spray paint/ survey stakes
- Note anything unusual or anything that has changed since the last inspection
- Use attached sediment trap sketches to indicate problem areas
- If floc blocs are present, ensure the blocks are submerged in water and wipe off accumulated sediment.

(TO BE COMPLETED AFTER INSPECTION)

LOCATON	PROBLEMS	YES	NO	If 'YES', take photographs, measure, describe below, and mark locations on sketch provided. If practical, mark problem area in the field using stakes and/or spray-paint to monitor incremental changes.
TRAP INLET	Displacement of rock armouring.			
	Debris causing blockage.			
	Piping (presence of fine silt) in seepage flow, making water murky.			
	Floc blocks (if present) are not fully submerged or covered in sediment, or dissolved.			
TRAP OUTLET	Displacement of rock armouring.			
	Debris causing blockage.			
	Piping (presence of fine silt) in seepage flow, making water murky.			
	Erosion/scour in creek downstream of outlet			
ACCESS ROAD AND DISTURBED AREA ADJACENT TO TRAP	Settling/ sinkholes/ cavities			
	Rutting			
	Erosion from runoff			
	Cracks (longitudinal or transverse)			
	Bare zones in re-vegetation area			
TRAP	Curtains (if present) are dislodged or sagging			
	Debris floating			

LOCATON	PROBLEMS	YES	NO	If 'YES', take photographs, measure, describe below, and mark locations on sketch provided. If practical, mark problem area in the field using stakes and/or spray-paint to monitor incremental changes.
TRAP SIDESLOPES	Slope movement (slide/ slough/ bulge)			
	Cracks (longitudinal or transverse)			
	Seepage (natural springs)			
	Erosion from runoff			
	Bare zones in re-vegetation area			



Sediment Accumulation Notes: (provide estimates of water depth at inlet, middle, and outlet of trap. Note deposition pattern. Provide recommendations for sediment removal.)

Fish Passage Notes: (ST1, ST2, and ST2B are designed and constructed to maintain fish passage through the trap. ST3 is designed and constructed to maintain fish passage through the creek and deter fish passage through the trap. However, fish can likely access the trap during high flows. Note any changes to fish passage, such as formation of ledges >30cm, or water depth <3cm, or isolation of fish in the trap-specifically ST3)

General notes, observations, recommendations:

INSPECTION FORM

INSPECTOR: _____
DATE: _____
TIME: _____
PRECIPITATION IN THE LAST 24HRS (mm): _____
WEATHER CONDITIONS: _____

STAFF GAUGE WATER LEVELS (mark locations on sketch)
#1 (m): _____
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#4 (NTU): _____ in creek, ____m downstream of trap outlet

SUMMARY:

	Yes	No
Overall stability issues		
Fish passage issues		
Sediment removal required		

NOTES:

- Bring tape measure/ camera/ spray paint/ survey stakes
- Note anything unusual or anything that has changed since the last inspection
- Use attached sediment trap sketches to indicate problem areas
- If floc blocs are present, ensure the blocks are submerged in water and wipe off accumulated sediment.

(TO BE COMPLETED AFTER INSPECTION)

LOCATON	PROBLEMS	YES	NO	If 'YES', take photographs, measure, describe below, and mark locations on sketch provided. If practical, mark problem area in the field using stakes and/or spray-paint to monitor incremental changes.
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	Cracks (longitudinal or transverse)			
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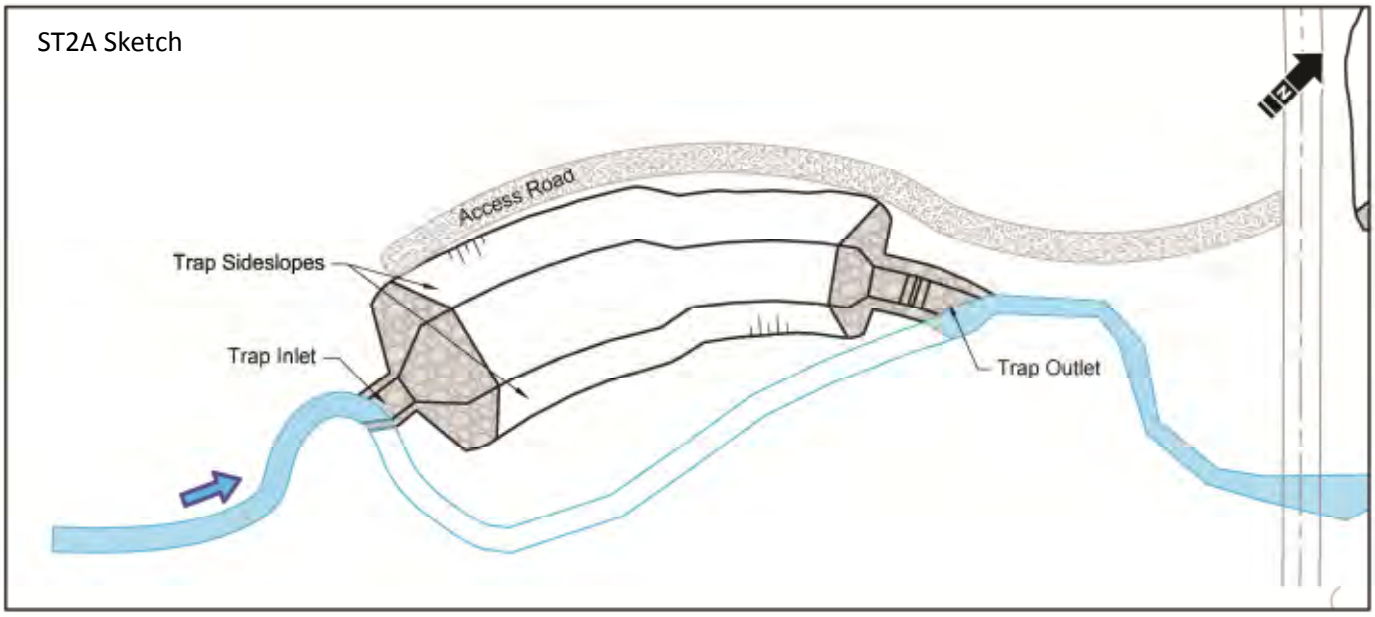
TRAP	Curtains (if present) are dislodged or sagging			
	Debris floating			

LOCATON	PROBLEMS	YES	NO	If 'YES', take photographs, measure, describe below, and mark locations on sketch provided. If practical, mark problem area in the field using stakes and/or spray-paint to monitor incremental changes.
TRAP SIDESLOPES	Slope movement (slide/ slough/ bulge)			
	Cracks (longitudinal or transverse)			
	Seepage (natural springs)			
	Erosion from runoff			
	Bare zones in re-vegetation area			

ST2A Sketch



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General notes, observations, recommendations:

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SUMMARY:

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Sediment removal required		

NOTES:

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- Use attached sediment trap sketches to indicate problem areas
- If floc blocs are present, ensure the blocks are submerged in water and wipe off accumulated sediment.

(TO BE COMPLETED AFTER INSPECTION)

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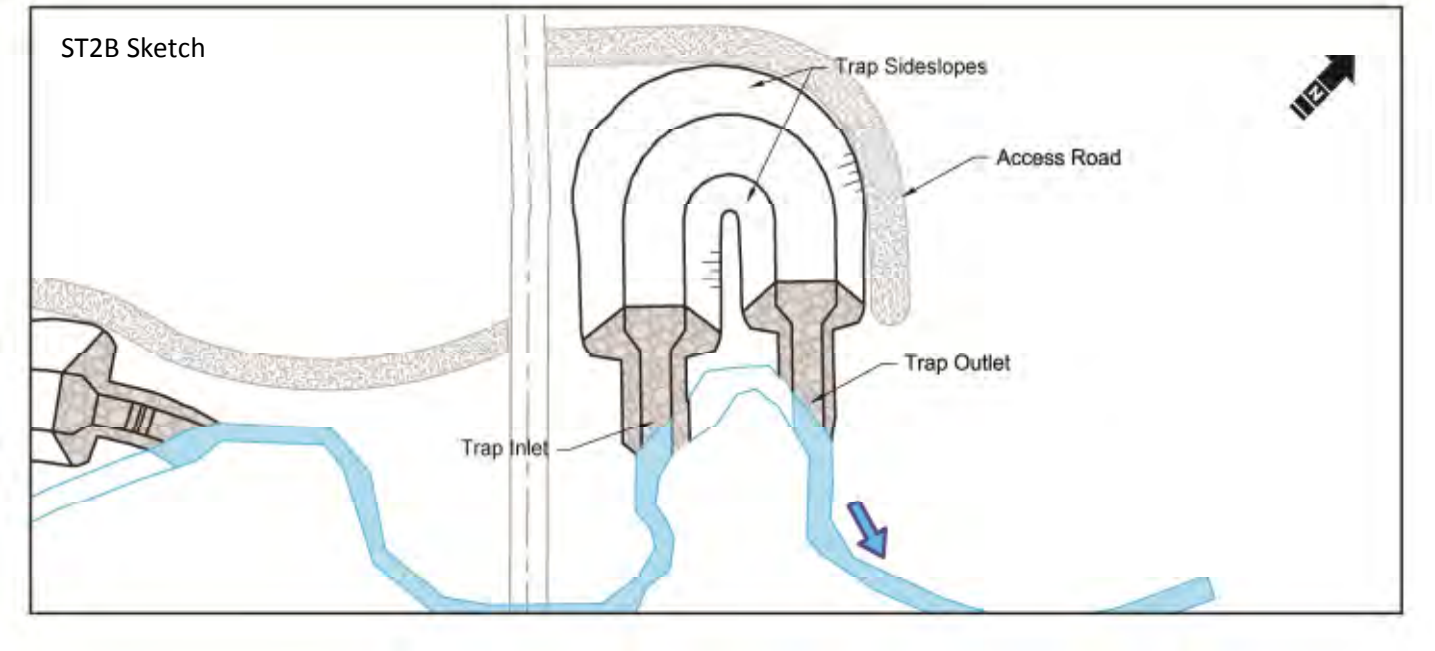
	Rutting			
	Erosion from runoff			
	Cracks (longitudinal or transverse)			
	Bare zones in re-vegetation area			
TRAP	Curtains (if present) are dislodged or sagging			
	Debris floating			

LOCATON	PROBLEMS	YES	NO	If 'YES', take photographs, measure, describe below, and mark locations on sketch provided. If practical, mark problem area in the field using stakes and/or spray-paint to monitor incremental changes.
TRAP SIDESLOPES	Slope movement (slide/ slough/ bulge)			
	Cracks (longitudinal or transverse)			
	Seepage (natural springs)			
	Erosion from runoff			
	Vegetation (bare areas)			

ST2B Sketch



Sediment Accumulation Notes: (provide estimates of water depth at inlet, middle, and outlet of trap. Note deposition pattern. Provide recommendations for sediment removal.)

Fish Passage Notes: (ST1, ST2, and ST2B are designed and constructed to maintain fish passage through the trap. ST3 is designed and constructed to maintain fish passage through the creek and deter fish passage through the trap. However, fish can likely access the trap during high flows. Note any changes to fish passage, such as formation of ledges >30cm, or water depth <3cm, or isolation of fish in the trap-specifically ST3)

General notes, observations, recommendations:

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

OBED MOUNTAIN MINE
APETOWUN SEDIMENT TRAP 3 (ST3)

INSPECTION FORM

INSPECTOR: _____
DATE: _____
TIME: _____
PRECIPITATION IN THE LAST 24HRS (mm): _____
WEATHER CONDITIONS: _____

STAFF GAUGE WATER LEVELS (mark locations on sketch)
#1 (m): _____
#2 (m): _____ If applicable

TURBIDITY
#1 (NTU): _____ in creek, ____m upstream of trap inlet
#2 (NTU): _____ in trap, near inlet
#3 (NTU): _____ in trap, near outlet
#4 (NTU): _____ in creek, ____m downstream of trap outlet

SUMMARY:	**Yes**	**No**
Overall stability issues		
Fish passage issues		
Sediment removal required		

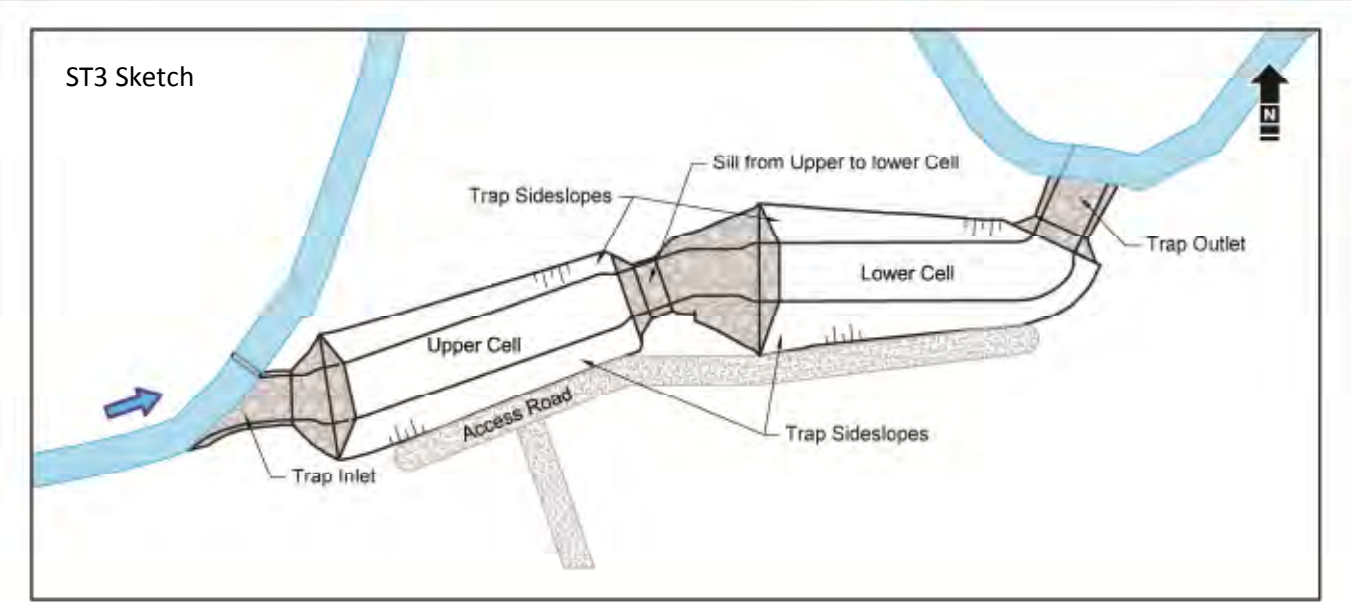
NOTES:

- Bring tape measure/ camera/ spray paint/ survey stakes
- Note anything unusual or anything that has changed since the last inspection
- Use attached sediment trap sketches to indicate problem areas
- If floc blocs are present, ensure the blocks are submerged in water and wipe off accumulated sediment.

(TO BE COMPLETED AFTER INSPECTION)

LOCATON	PROBLEMS	YES	NO	If 'YES', take photographs, measure, describe below, and mark locations on sketch provided. If practical, mark problem area in the field using stakes and/or spray-paint to monitor incremental changes.
TRAP INLET	Displacement of rock armouring.			
	Debris causing blockage.			
	Piping (presence of fine silt) in seepage flow, making water murky.			
	Floc blocks (if present) are not fully submerged or covered in sediment, or dissolved.			
TRAP OUTLET	Displacement of rock armouring.			
	Debris causing blockage.			
	Piping (presence of fine silt) in seepage flow, making water murky.			
	Erosion/scour in creek downstream of outlet			
SILL FROM UPPER TO LOWER CEC	Displacement from rock armoring			
	Debris			
ACCESS ROAD AND DISTURBED AREA ADJACENT TO TRAP	Settling/ sinkholes/ cavities			
	Rutting			
	Erosion from runoff			
	Cracks (longitudinal or transverse)			
	Bare zones in re-vegetation area			

LOCATON	PROBLEMS		YES	NO	If 'YES', take photographs, measure, describe below, and mark locations on sketch provided. If practical, mark problem area in the field using stakes and/or spray-paint to monitor incremental changes.
TRAP	Curtains (if present) are dislodged or sagging	upper			
		lower			
	Debris floating	upper			
		lower			
TRAP SIDESLOPES	Slope movement (slide/ slough/ bulge)	upper			
		lower			
	Cracks (longitudinal or transverse)	upper			
		lower			
	Seepage (natural springs)	upper			
		lower			
	Erosion from runoff	upper			
		lower			
	Bare zones in re-vegetation area	upper			
		lower			



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General notes, observations, recommendations:

SEDIMENT REMOVAL FORM

SEDIMENT TRAP ID: _____
INSPECTOR: _____
DATE: _____

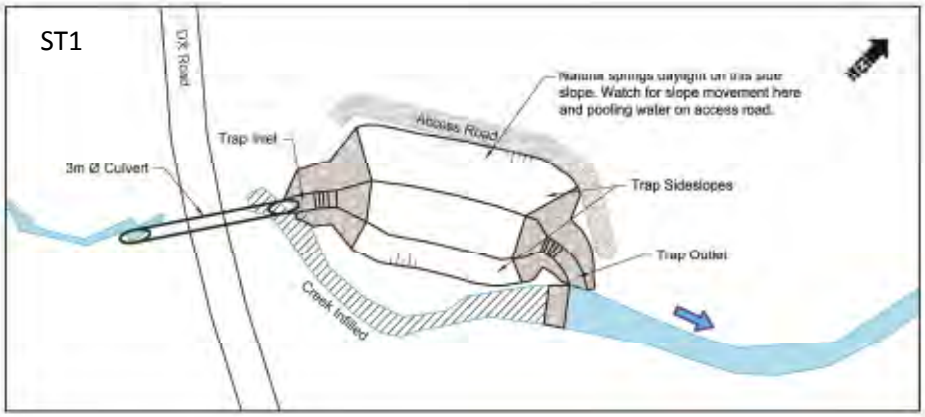
PROCEDURE

1. **Isolate the sediment trap:**
   - All Traps: Place fish block nets at the inlet and outlet of the trap. Option to use 6" or 8" pump bypass around trap. Pump bypass does not necessarily need to convey the entire creek flow.
   - ST3 Option: Use sandbags at the inlet and outlet to completely block flow through the trap and pass all flows through the natural creek.
2. **Perform Fish Rescue in sediment trap:** (approx. 1 day)
   - All Traps: A Qualified Aquatic Environment Specialists (QAES) will perform a fish salvage in the trap.
3. **Remove the sediment:**
   - All Traps: Use vacuum trucks to remove sediment from the trap. This should not cause elevated turbidity levels in the trap. The sediment will be hauled to the disposal area which is currently the Red Pit at the mine. The volume of solids and deposition patterns that are removed will be tracked below.
   - ST3 Option: If sandbags are used for the isolation (Step 1), then sediment removal can be accomplished with a long-stick hoe and haul trucks instead of a vacuum truck. Gradually remove sand bags to restore flow to minimize temporary elevated turbidity levels in the trap.
4. **Remove the isolation and resume trap operation:**
   - All Traps: Once the sediment removal is completed, remove the fish block nets and pump bypass.
   - ST3 Option: Allow water in the sediment trap to settle until the turbidity is within acceptable limits, as determined by the QAES. Then gradually remove the sandbags and allow flow through the sediment trap.

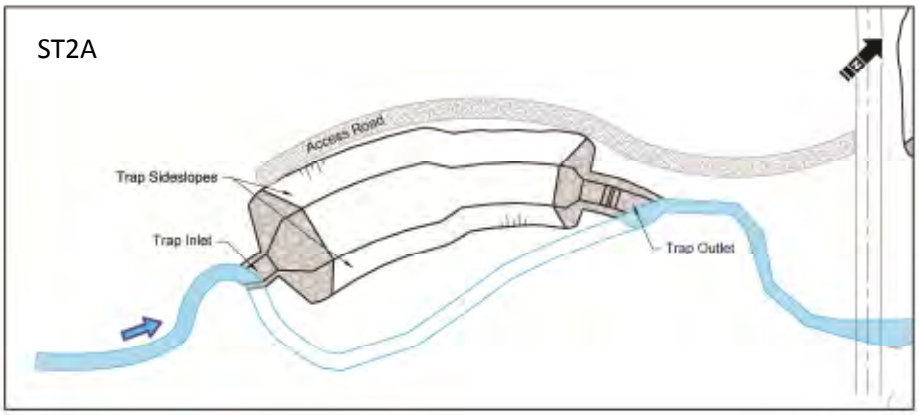
RECORD

Method of Removal (vacuum/excavator/other)	
Describe the sediment accumulation (location in trap/approx. depth). Use sketches on reverse side.	
Issues (equipment access, plugged intake hose, etc.)	
Sediment Volume Removed (m^3) and TSS value (to calculate % water and % sediment)	
Lab particle size analysis	

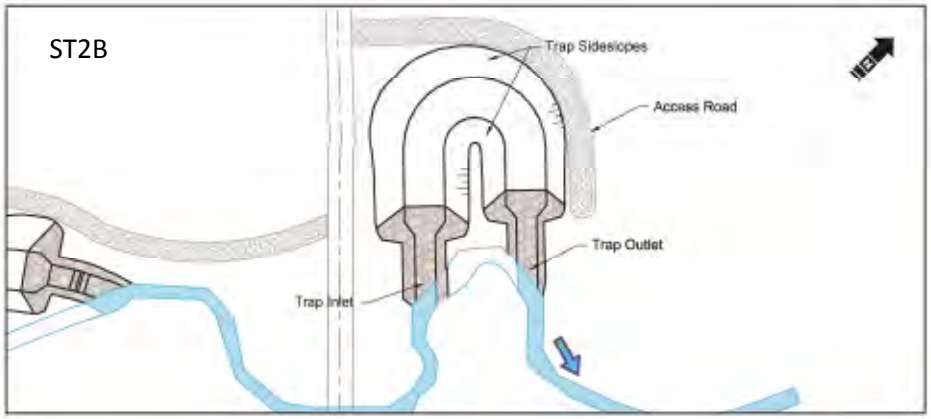
ST1



ST2A



ST2B



ST3