Emergency Remedial Action Construction Completion Report Upper Tailings Pile Van Stone Mine

Prepared for
Washington State Department of Ecology

December 26, 2012
17800-34

HARTCROWSER

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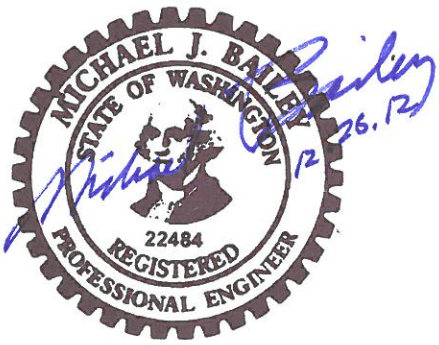
Prepared by
Hart Crowser, Inc.



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EMERGENCY REMEDIAL ACTION
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1.0 INTRODUCTION

The Van Stone Mine (Site) is located in the upper portion of the Onion Creek watershed, 23 miles northeast of Colville, Washington. A lead-zinc deposit on the Site was mined until 1993. Mining operations conducted at the Site before 1961 disposed of mill tailings in an area called the Upper Tailings Pile.

Use of the Upper Tailings Pile ended in 1961 when a major berm failure released and transported tailings into the Southeast Tributary to Onion Creek. After the failure, the Upper Tailings Pile was abandoned and a new disposal area, the Lower Tailings Pile was constructed. The Upper Tailings Pile currently covers about 9.5 acres and contains approximately 780,000 tons of tailings. Additional information on historical mining activities at the Site can be found in the Remedial Investigation/Feasibility Study Work Plan (Hart Crowser 2011).

In 2011, the Washington State Department of Ecology (Ecology) implemented the remedial investigation (RI) of the Site. During visits to the Site before and during RI fieldwork, Brendan Dowling, the Ecology Site Manager, observed failure of the southern portion of the Upper Tailings Pile and substantial ongoing erosion and downgradient transport of tailings into the Southeast Tributary of Onion Creek.

This Construction Completion Report (CCR) documents Ecology's mitigation of the ongoing tailings pile failure. Remedial action (RA) construction work was performed from October 29, 2012, to November 14, 2012. Because of the size of the failure and continuing downgradient transport of tailings into the Southeast Tributary, Ecology fast-tracked completion of the RA before the onset of 2012 winter conditions. A Hart Crowser field representative was on site to observe and document the emergency action.

This report documents the following RA elements:

- The purpose and objectives of the RA;
- A summary of work completed, including materials used and tasks executed; and
- Deviations from plans and specifications.

Annotated design drawings are provided in Appendix A. Hart Crowser daily field reports and selected site photographs are provided in Appendices B and C, respectively.

1.1 Purpose and Objectives of the Emergency Remedial Action

The purpose of the emergency remedial action was to: (1) mitigate the ongoing failure and transport of tailings from the Upper Tailings Pile; and (2) reduce the volume of precipitation ponding on the southern portion of the tailings pile.

Rather than reconstructing a berm in the area of failure and retaining rain and snowmelt on the top of the pile, the objective of the RA was to construct a designed drainage through the failure. Side slopes of the breach were to be regraded and revegetated and the channel armored with stone to retard the runoff velocity and reduce/eliminate the transport of tailings from the pile. For the purposes of design and this CCR, the tailings pile breach and areas downslope of the toe of the tailings pile were designated as Area 1.

The Upper Tailings Pile was constructed as distinct tailings disposal areas and tailings ponds separated by a drainage ditch (see Drawings C-1 and C-3). Erosion upstream of the ditch was preventing runoff from entering the ditch as intended. Regrading the ditch and immediate upstream areas, as well as armoring the ditch channel, would reestablish the intended drainage pattern and reduce the volume of water flowing through and ponding in Area 1. For this CCR, the ditch and areas upstream and downstream of the ditch were designated as Area 2.

2.0 DESCRIPTION OF WORK COMPLETED

This section describes work completed at the Site and materials used in the execution of the design plans, as presented on Drawings G-1 and G-2, and C-1 through C-4 in Appendix A. The drawings have been annotated to indicate changes to the planned design. Daily field reports (Appendix B) and selected site photographs (Appendix C) present field observations of the construction work. The hydrologic/hydraulic analysis presented in the Work Plan for Emergency Remedial Action (Hart Crowser 2012) provides the calculations used to design the actions in Areas 1 and 2.

2.1 Area 1 –Tailings Pile Breach Repair

The work at Area 1 consisted of the following work elements (see Drawings C-2 and C-4):

- The dimensions of the channel bottom created by the breach remained approximately the same. The side slopes of the breach were cut back to no steeper than a 2H:1V (horizontal to vertical) slope. Natural slopes more gradual than 2H:1V were retained and smooth transitions were created. The contractor spot-checked the channel's side slopes using a laser level and rod.

- Cut material consisting of mine tailings was used to: (1) create a new berm, generally matching the berm at the top of the slope; and (2) provide positive drainage to the newly constructed channel and eliminate localized ponding by placing the remaining spoils on top of the tailings pile and regrading.

- Geotextile was placed in the channel, anchored into side slopes, and covered with spalls. The bottom of the channel and lower 4 vertical feet of the newly graded side slopes were lined with 12 inches of 3-inch minus rock and track compacted. An additional 6 inches of 4- to 10-inch quarry spalls were placed over the 3-inch minus layer.

- The side slopes of the channel above the spalls were covered with erosion control matting consisting of loosely woven straw and coconut fiber.

- Downstream of the breach, a 6-inch layer of 3-inch minus material was placed over geotextile on the dirt access road and continuing approximately 100 feet downstream, which is the visible extent of the released tailings. An additional 6-inch layer of 4- to 10-inch material was placed on top of this layer. Along the bend in the channel downgradient of the toe of the tailings pile, a berm was constructed to direct water flow (Drawing C-2). The final constructed berm height measured approximately 1.5 to 2 feet.

2.2 Area 2 – Intermediate Drainage Improvements

Field observations indicated that runoff from the northern pile, which was intended to be conveyed via a ditch between the two piles of tailings, contributed to the pre-construction runoff volume flowing through Area 1. To minimize the volume of water flowing through Area 1 and to generally reduce future erosion potential, the following work was completed at Area 2 (see Drawings C-3 and C-4):

- Downstream of the culvert under the access road, the profile of the ditch was regraded/reestablished by removing existing piles of crushed rock and regrading to provide positive drainage. The width of the bottom of the ditch was reestablished at approximately 4 feet.

- Geotextile was placed in the channel, anchored into side slopes, and covered with spalls to a minimum of 2 feet up the channel sides. The intermediate reach of the channel was lined 4 vertical feet up the channel slopes.

- Downstream of the channel, a 6-inch layer of 3-inch minus material was placed over geotextile on the dirt access road. An additional 6-inch layer of 4- to 10-inch material was placed on top of this layer.

- Upstream of the culvert and adjacent to the access road, the drainage along the southern side of the road was regraded and lined with spalls to reduce/eliminate erosion. At the base of the ditch, runoff was directed to a culvert that directs water under the road and to the head of the intermediate reach of the channel. Both the culvert entrance and exit were improved by regrading and lining with geotextile. Additionally, the culvert was removed during construction, cleared of debris, and reinstalled to provide positive drainage.

2.3 Stormwater Best Management Practices

The contractor complied with stormwater best management practices (BMPs), which are described in Ecology's Stormwater Management Manual for Eastern Washington (Ecology 2004) and referenced in the design specifications (Drawing G-2).

During all land-disturbing activities, the contractor attempted to preserve existing natural vegetation (BMP C101) whenever possible. However, the contractor removed trees and vegetation as was needed to provide access for construction equipment to the lower portions of Areas 1 and 2, as was authorized by Ecology.

Silt fencing was installed along the lower extent of the work area across potential stormwater flow paths. The silt fencing was left in place with Ecology's approval after completing the construction work.

2.4 Access Road Maintenance

Per Ecology's request, the dirt road between the access gate and the construction area was intermittently maintained by the contractor during the course of the work and as part of demobilization from the Site. This section of the road was subjected to heavy traffic from trucks hauling rock material from the gate to the construction area, and developed large ruts because of wet weather conditions. Road maintenance consisted of scraping with a bulldozer

to even out the road surface. A small quantity of quarry spall material that was acquired for the additional channel lining in Areas 1 and 2 was placed in the two road bends between the tailings piles and underlain with geotextile as needed.

3.0 DEVIATIONS FROM SPECIFIED DESIGN

This section lists materials and construction tasks that deviated from the specified design of the emergency remedial action. Because of the unavailability of specified geotextile and channel lining rock at the time of construction, Ecology-approved substitutions were used. Additionally, winter weather conditions precluded the completion of site hydroseeding. Annotated design drawings that document the design changes are provided in Appendix A.

3.1 Geotextile

Specified geotextile was to consist of 10- to 12-ounce non-woven geotextile, such as US Fabrics US 250NW, or approved equal. The specified material was used in Area 1; however, the contractor was unable to procure enough material to complete Area 2. Therefore, 8-ounce non-woven geotextile was approved as a suitable substitute and was used in the lower half of Area 2 (see Drawing C-3).

3.2 Quarry Spalls

Channel lining was to consist of 4-inch quarry spalls as specified in the Washington State Department of Transportation (WSDOT) Geotechnical Design Manual, Chapter 5 (WSDOT 2012). However, another construction operation had used all of the locally available 4-inch rock. Therefore, 3-inch quarry spalls were approved as a suitable substitute. The substitute material that was acquired from the quarry was better described as a 3-inch minus, well-graded crushed rock with a relatively large fraction of fines.

The 3-inch minus material was used for the channel lining in Areas 1 and 2, and was installed to a finished thickness of 12 inches. To provide additional protection for the channel lining, Ecology authorized the placement of an additional 6 inches of 4- to 10-inch quarry spalls over the layer of 3-inch minus material (see Drawing C-4).

The temporary silt fencing that was installed for construction stormwater control was left in place as a measure to control the potential transport of fines from the 3-inch minus material.

3.3 Hydroseeding

Due to winter weather conditions and early snow cover, hydroseeding was not attempted because of the increased risk of seed failure. Hydroseeding was postponed until conditions are amenable to seeding.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The purpose of the emergency RA was to construct a drainage from the Upper Tailings Pile to minimize or eliminate the transport of tailings from the pile. The RA was constructed according to design except as described in the preceding sections and noted in Appendix A. Because of weather conditions at the time of construction, not all of the specified work elements were completed.

Work that remains to be completed at the Site consists of hydroseeding and removing the temporary silt fence. We recommend hydroseeding at the earliest opportunity that would allow for successful seeding, after spring thaw when bare ground is exposed. The purpose of seeding is to reduce erosion in disturbed areas of the tailings pile that are not already protected by geotextile and quarry spalls.

The functioning of the drainage channels in Areas 1 and 2 should be monitored to assess overall drainage performance and effectiveness of erosion controls, and to check for sediment buildup in the drainage channels. As part of this work, the need for continued use of the temporary silt fence should be evaluated. The silt fence will be removed with Ecology's approval when conditions no longer require it.

5.0 REFERENCES

Ecology 2004. Stormwater Management Manual for Eastern Washington. Washington State Department of Ecology, Publication 04-10-076. September 2004.

Hart Crowser 2011. Final Work Plan for Remedial Investigation/Feasibility Study, Van Stone Mine, Stevens County, Washington. Prepared for the Washington State Department of Ecology Toxics Cleanup Program by Hart Crowser, Inc. September 27, 2011.

Hart Crowser 2012. Work Plan for Emergency Remedial Action, Upper Tailings Pile, Van Stone Mine. Prepared for the Washington State Department of Ecology by Hart Crowser, Inc. October 15, 2012.

WSDOT 2012. Geotechnical Design Manual. Washington State Department of Transportation, Publication M 46-03.07. April 2012.

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APPENDIX A
DESIGN DRAWINGS

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Emergency Remedial Action Upper Tailings Pile
Van Stone Mine
Stevens County, Washington

Prepared for

Toxics Cleanup Program
Department of Ecology
State of Washington

DEPARTMENT OF ECOLOGY
State of Washington

HARTCROWSER

by

Hart Crowser, Inc.

Date: December 26, 2012

MICHAEL J. BAILEY
STATE OF WASHINGTON
22484
REGISTERED
PROFESSIONAL ENGINEER
12-26-12

Mark	Description	Date	Appr.
REV. 1	DRAFT FOR REVISION	9/13/12	
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Submitted by: HART CROWSER, INC.

VAN STONE MINE

COVER SHEET

Drawing Reference Number:
G-1
Sheet 1 of 6

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GENERAL CONSTRUCTION NOTES

1) PLANS, SECTIONS, AND DETAILS ARE DIAGRAMMATIC AND FOR INFORMATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS WHERE NEEDED TO ACCOMPLISH THE WORK AND CONTACT ECOLOGY IF DISCREPANCIES ARE DISCOVERED.

2) CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES USING PUBLIC (1-800-424-5555/WWW.CALLBEFOREYOUDIG.ORG) AND PRIVATE UTILITY LOCATION SERVICES PRIOR TO START OF CONSTRUCTION. CONTRACTOR SHALL MAINTAIN SUCH UTILITY LOCATIONS THROUGHOUT PROJECT WORK, AS NEEDED, TO COMPLETE WORK.

3) ALL WORK SHALL BE IN ACCORDANCE WITH THE WASHINGTON STATE LABOR AND INDUSTRIES STANDARDS, FEDERAL OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, AND OTHER APPLICABLE COUNTY, STATE, AND FEDERAL REGULATIONS.

AREA 1 –TAILINGS PILE BREACH REPAIR

1) THE DIMENSIONS OF THE EXISTING CHANNEL BOTTOM CREATED BY THE BREACH SHALL REMAIN APPROXIMATELY THE SAME.

2) BEGINNING AT THE MOUTH OF THE BREACH AND WORKING UPSTREAM, THE SIDE SLOPES OF THE BREACH SHALL BE CUT BACK TO A 2H:1V (HORIZONTAL TO VERTICAL) SLOPE.

3) CUT MATERIAL (SPOILS), WHICH CONSISTS OF MINE TAILINGS, SHALL BE USED TO: 1) CREATE A NEW BERM, GENERALLY MATCHING THE EXISTING BERM AT THE TOP OF THE SLOPE, AND; 2) PROVIDE POSITIVE DRAINAGE TO THE NEWLY CONSTRUCTED CHANNEL AND ELIMINATE LOCALIZED PONDING BY PLACING THE REMAINING SPOILS ON TOP OF THE PILE AND REGRADING.

2

4) GEOTEXTILE SHALL BE PLACED IN THE CHANNEL, ANCHORED INTO SIDE SLOPES, AND COVERED WITH SPALLS. THE BOTTOM OF THE CHANNEL AND LOWER 4 FEET OF THE NEWLY GRADED SIDE SLOPES WILL BE LINED WITH 12 INCHES OF QUARRY SPALLS.

5) THE SIDE SLOPES OF THE CHANNEL, ABOVE THE SPALLS, SHALL BE HYDROSEEDED TO PROVIDE EROSION CONTROL. MEASURES WILL BE TAKEN, INCLUDING THE USE OF TACKIFIER AND EROSION CONTROL BLANKETS TO PREVENT THE HYDROSEED FROM BEING WASHED DOWN THE CHANNEL BEFORE THE GRASS IS ESTABLISHED.

6) DOWNSTREAM OF THE BREACH, QUARRY SPALLS SHALL BE PLACED ON THE EXISTING DIRT ACCESS ROAD AND CONTINUE APPROXIMATELY 100 FEET DOWNSTREAM, WHICH IS THE VISUAL EXTENT OF THE RELEASED TAILINGS TRANSPORT. AGAIN, GEOTEXTILE WILL BE PLACED AND COVERED WITH QUARRY SPALLS.

AREA 2 – INTERMEDIATE DRAINAGE IMPROVEMENTS

1) THE PROFILE OF THE DITCH SHALL BE REGRADED/REESTABLISHED BY REMOVING EXISTING PILES OF CRUSHED ROCK AND REGRADING TO PROVIDE POSITIVE DRAINAGE.

2

2) THE CHANNEL SHALL BE LINED WITH GEOTEXTILE AND THEN A 12-INCH-THICK LAYER OF QUARRY SPALLS, A MINIMUM OF 2 FEET UP THE CHANNEL SIDES.

3) DOWNSTREAM OF THE CHANNEL, GEOTEXTILE AND QUARRY SPALLS SHALL BE PLACED ACROSS THE ACCESS ROAD TO FURTHER PROTECT THE ROAD FROM POTENTIAL EROSION.

4) UPSTREAM OF THE DITCH AND ADJACENT TO THE ACCESS ROAD, THE DRAINAGE ALONG THE SOUTHERN SIDE OF THE ROAD SHALL BE REGRADED AND LINED WITH SPALLS TO REDUCE/ELIMINATE EROSION. AT THE BASE OF THE DITCH, RUNOFF WILL BE DIRECTED TO AN EXISTING CULVERT THAT DIRECTS WATER UNDER THE ROAD AND TO THE HEAD OF THE INTERMEDIATE DITCH. BOTH THE CULVERT ENTRANCE AND EXIT WILL BE IMPROVED BY REGRADING AND LINING WITH GEOTEXTILE AND SPALLS.

SEE POST-CONSTRUCTION NOTE 1

MATERIALS AND EXECUTION:

SEE POST-CONSTRUCTION NOTE 2

GEOTEXTILE

2

1) GEOTEXTILE SHALL CONSIST OF 10- TO 12-OUNCE NON-WOVEN GEOTEXTILE, SUCH AS US FABRICS US 250NW, OR APPROVED EQUAL. THE FABRIC WILL BE INSTALLED ACCORDING TO MANUFACTURER'S GUIDELINES FOR USE UNDER RIPRAP.

QUARRY SPALLS

1) CHANNEL LINING SHALL CONSIST OF QUARRY SPALLS AS SPECIFIED IN THE WSDOT GEOTECHNICAL DESIGN MANUAL, CHAPTER 5.

2) SPALLS SHALL BE IMPORTED FROM LOCALLY AVAILABLE QUARRY SOURCE(S). CONTRACTOR SHALL PROVIDE CERTIFICATE OF ORIGIN FOR ECOLOGY APPROVAL PRIOR TO IMPORTING ANY MATERIAL.

SUBGRADE PREPARATION

1) IN GENERAL, ALL SUBGRADES SHALL BE PREPARED TO PROVIDE POSITIVE DRAINAGE IN ACCORDANCE WITH THE DESIGN DRAWINGS AND SHALL BE COMPACTED TO SUPPORT THE INTENDED USE, EITHER AS A LINED DRAINAGE CHANNEL OR REVEGETATED SIDE SLOPE. IN AREAS WHERE GEOTEXTILE SHALL BE PLACED, PROTRUDING ROCKS OR OTHER DEBRIS THAT WOULD AFFECT GEOTEXTILE FABRIC PLACEMENT SHALL BE REMOVED AND STOCKPILED ON THE UPSTREAM EDGE OF THE TAILINGS PILE.

SEE POST-CONSTRUCTION NOTE 3

HYDROSEED

2

1) ALL TAILINGS AREAS DISTURBED BY CONSTRUCTION THAT ARE NOT PROTECTED BY GEOTEXTILE AND QUARRY SPALLS, AND SLOPE GREATER THAN 20H:1V SHALL BE PROTECTED AT THE END OF CONSTRUCTION BY HYDROSEEDING WITH A BONDED FIBRE MATRIX (MODERATE TERM MULCH) ACCEPTABLE TO ECOLOGY.

2) THE CONTRACTOR SHALL PROVIDE THE FOLLOWING SEED MIX, CERTIFIED FREE OF NOXIOUS WEEDS:

% BY WEIGHT	KIND AND VARIETY	MIN % PURE	MIN % GERM
10	INDIAN RICEGRASS	95	85
20	SHEEP FESCUE	95	85
10	SILKY LUPINE	95	85
20	SHERMAN BIG BLUEGRASS	95	80
30	BLUEBUNCH WHEATGRASS	95	85
10	SAND DROPSEED	95	85
WEED SEED	0.25% MAX		
INERT AND OTHER CROP	3.50% MAX		

CLEARING

1) EXTENSIVE CLEARING IS NOT ANTICIPATED. HOWEVER, IF TREES OR OTHER OBSTRUCTIONS MUST BE REMOVED TO ALLOW ACCESS, ECOLOGY APPROVAL SHALL BE REQUIRED IN ADVANCE. ALL EFFORTS TO MINIMIZE CLEARING SHALL BE MADE.

STORMWATER MANAGEMENT

1) BEST MANAGEMENT PRACTICES (BMPs) CITED BELOW ARE FROM ECOLOGY'S STORMWATER MANAGEMENT MANUAL FOR EASTERN WASHINGTON, WHICH IS INCORPORATED HEREIN FOR REFERENCE.

2) IT IS ANTICIPATED THAT THIS WORK WILL TAKE PLACE DURING DRY WEATHER. HOWEVER, MATERIALS (ROCKS FOR CHECK DAMS, STRAW WADDLES, ETC.) SHOULD BE ON HAND AND AVAILABLE FOR USE IF NEEDED. SILT FENCE IS NOT GREATLY EFFECTIVE FOR FLOWS LARGER THAN 0.5 CFS; THEREFORE, IF PRECIPITATION EVENTS LARGER THAN ONE INCH OF RAIN IN FOUR HOURS ARE EXPECTED, THE CONTRACTOR SHALL UTILIZE ROCK CHECK DAMS (BMP C207) IN ADDITION TO SILT FENCE. THESE CHECK DAMS SHALL BE INSTALLED ALONG THE EROSIONAL PATHS THAT CURRENTLY FLOW FROM THE TAILINGS PILES, THROUGH THE TREES, TO THE SOUTHEAST TRIBUTARY OF ONION CREEK. THE CONSTRUCTION OF SMALL DAMS ACROSS THE EXISTING PATHWAY/SWALE WILL REDUCE THE VELOCITY OF CONCENTRATED FLOW AND DISSIPATE ENERGY AT THE CHECK DAM.

3) PRIOR TO BEGINNING ANY LAND DISTURBING ACTIVITIES, THE CONTRACTOR SHALL PRESERVE EXISTING NATURAL VEGETATION (BMP C101), WHEN POSSIBLE, AND ALSO UTILIZE BUFFER ZONES (BMP C102) IN BETWEEN THE TAILINGS PILES AND THE SOUTHEAST TRIBUTARY OF ONION CREEK.

4) THE STORMWATER MANAGEMENT MANUAL ALSO PROVIDES REQUIREMENTS FOR EXPOSED SOILS. FOR THIS PROJECT, SOIL BMPS SHALL APPLY TO TAILINGS. EXPOSED AND UNWORKED TAILINGS SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED AS SOON AS PRACTICABLE BY APPLICATION OF EFFECTIVE BMPS THAT PROTECT THE TAILINGS FROM THE EROSIVE FORCES OF RAINDROPS, FLOWING WATER, AND WIND.

5) NO TAILINGS SHALL REMAIN EXPOSED AND UNWORKED FOR MORE THAN THE TIME PERIODS SET FORTH BELOW TO PREVENT WIND AND WATER EROSION. THIS STABILIZATION REQUIREMENT APPLIES TO ALL TAILINGS DISTURBED BY CONSTRUCTION, WHETHER AT FINAL GRADE OR NOT.

DURING THE REGIONAL DRY SEASON (JULY 1 THROUGH SEPTEMBER 30): 10 DAYS

DURING THE REGIONAL WET SEASON (OCTOBER 1 THROUGH JUNE 30): 5 DAYS

6) ALL TAILINGS STOCKPILES SHALL BE STABILIZED AND PROTECTED WITH EROSION AND SEDIMENT CONTROL BMPS (INCLUDING, BUT NOT LIMITED TO, BMPS C120-126).

7) MAINTAIN TESC FOR DURATION OF CONSTRUCTION. REMOVE TESC ONLY WHEN DIRECTED BY ECOLOGY.

POST-CONSTRUCTION NOTES

2

1) DUE TO UNAVAILABILITY OF SPECIFIED ROCK MATERIAL AT THE TIME OF CONSTRUCTION, THE CHANNEL WAS LINED WITH A 12-INCH LAYER OF 3-INCH MINUS CRUSHED ROCK TOPPED WITH A 6-INCH LAYER OF 4- TO 10-INCH QUARRY SPALLS.

2) 8-OUNCE GEOTEXTILE WAS APPROVED AS A SUITABLE SUBSTITUTE IN THE LOWER HALF OF AREA 2 DUE TO SHORT SUPPLY OF SPECIFIED MATERIAL.

3) HYDROSEEDING WAS NOT COMPLETED DUE TO WEATHER CONDITIONS AND EARLY SEASON SNOW COVER.

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VAN STONE MINE

NOTES/SPECIFICATIONS

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Sheet 2 of 6

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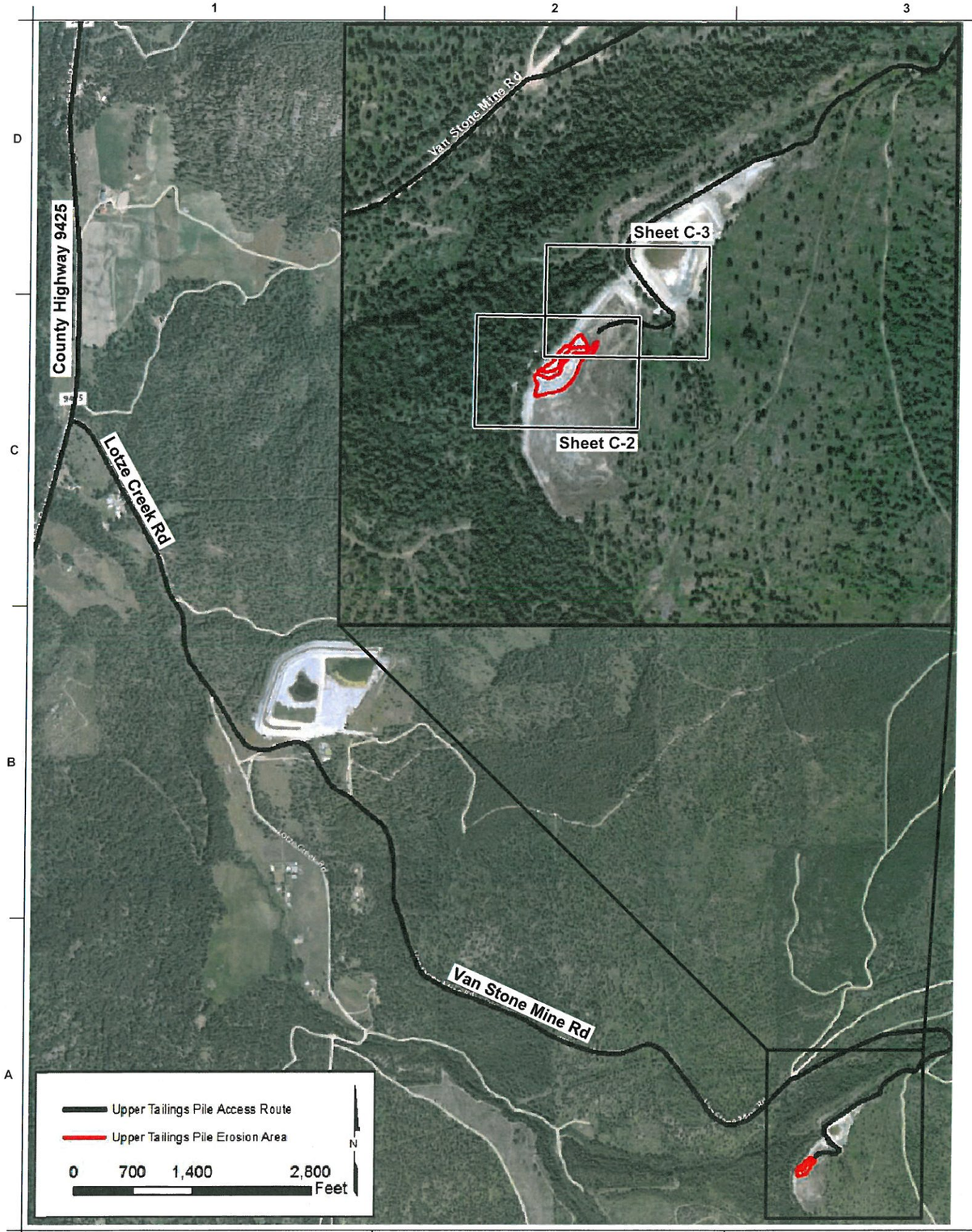
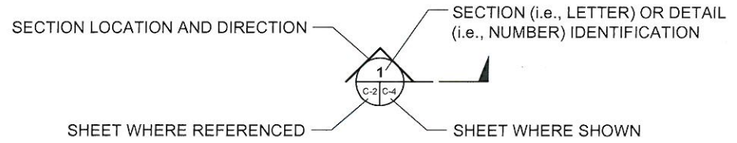
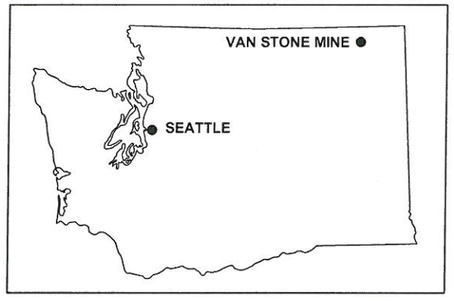


LIST OF PLANS

KEY TO SYMBOLS



REGIONAL MAP



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VAN STONE MINE

VICINITY AND REGIONAL MAPS, LIST OF PLANS, AND SYMBOLS

Drawing Reference Number: **C-1**

Sheet 3 of 6

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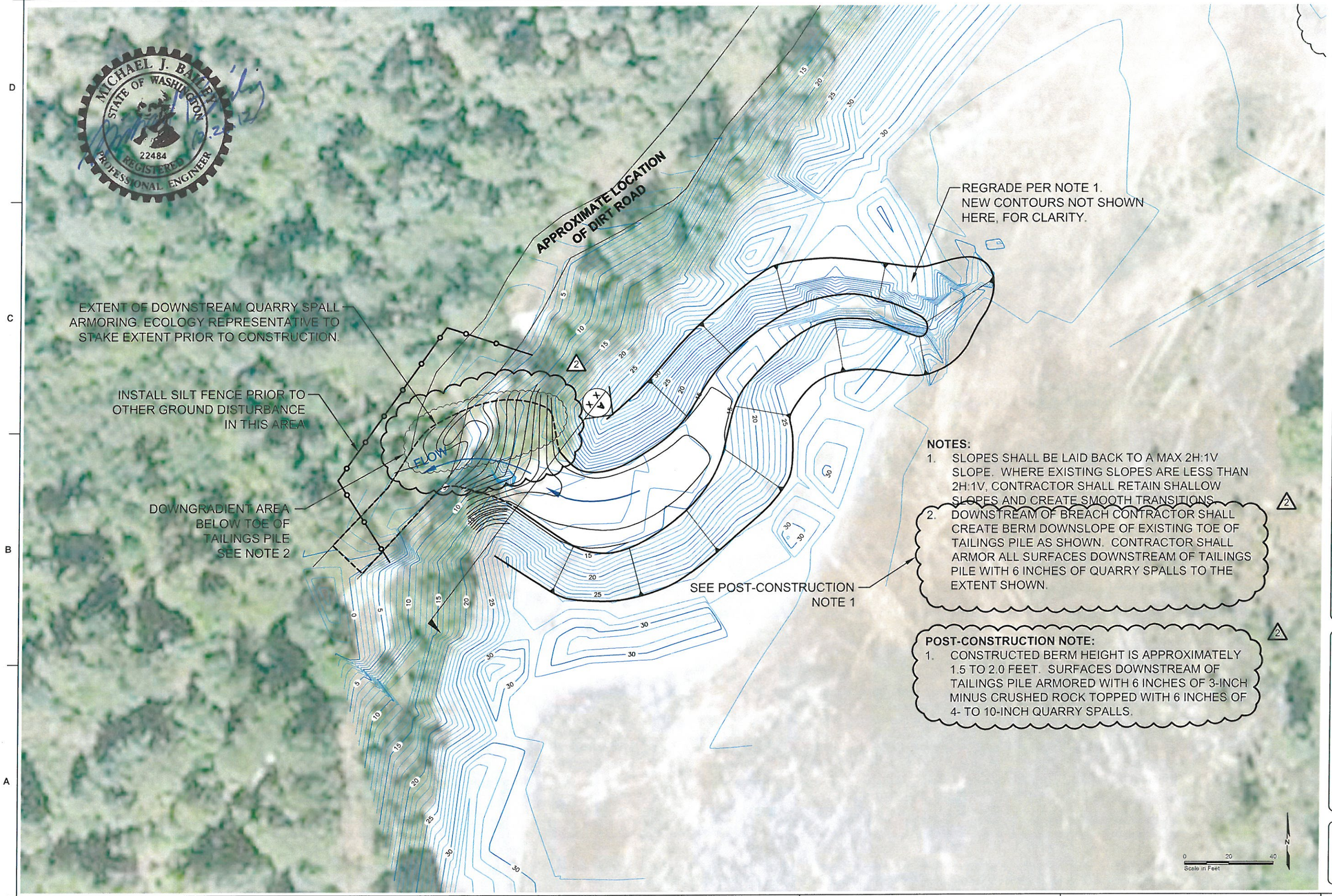

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NOTES:

1. SLOPES SHALL BE LAID BACK TO A MAX 2H:1V SLOPE. WHERE EXISTING SLOPES ARE LESS THAN 2H:1V, CONTRACTOR SHALL RETAIN SHALLOW SLOPES AND CREATE SMOOTH TRANSITIONS.
2. DOWNSTREAM OF BREACH CONTRACTOR SHALL CREATE BERM DOWNSLOPE OF EXISTING TOE OF TAILINGS PILE AS SHOWN. CONTRACTOR SHALL ARMOR ALL SURFACES DOWNSTREAM OF TAILINGS PILE WITH 6 INCHES OF QUARRY SPALLS TO THE EXTENT SHOWN.

POST-CONSTRUCTION NOTE:

1. CONSTRUCTED BERM HEIGHT IS APPROXIMATELY 1.5 TO 2.0 FEET. SURFACES DOWNSTREAM OF TAILINGS PILE ARMORED WITH 6 INCHES OF 3-INCH MINUS CRUSHED ROCK TOPPED WITH 6 INCHES OF 4- TO 10-INCH QUARRY SPALLS.

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VAN STONE MINE

AREA 1 SITE PLAN

Drawing Reference Number: **C-2**

Sheet 4 of 6

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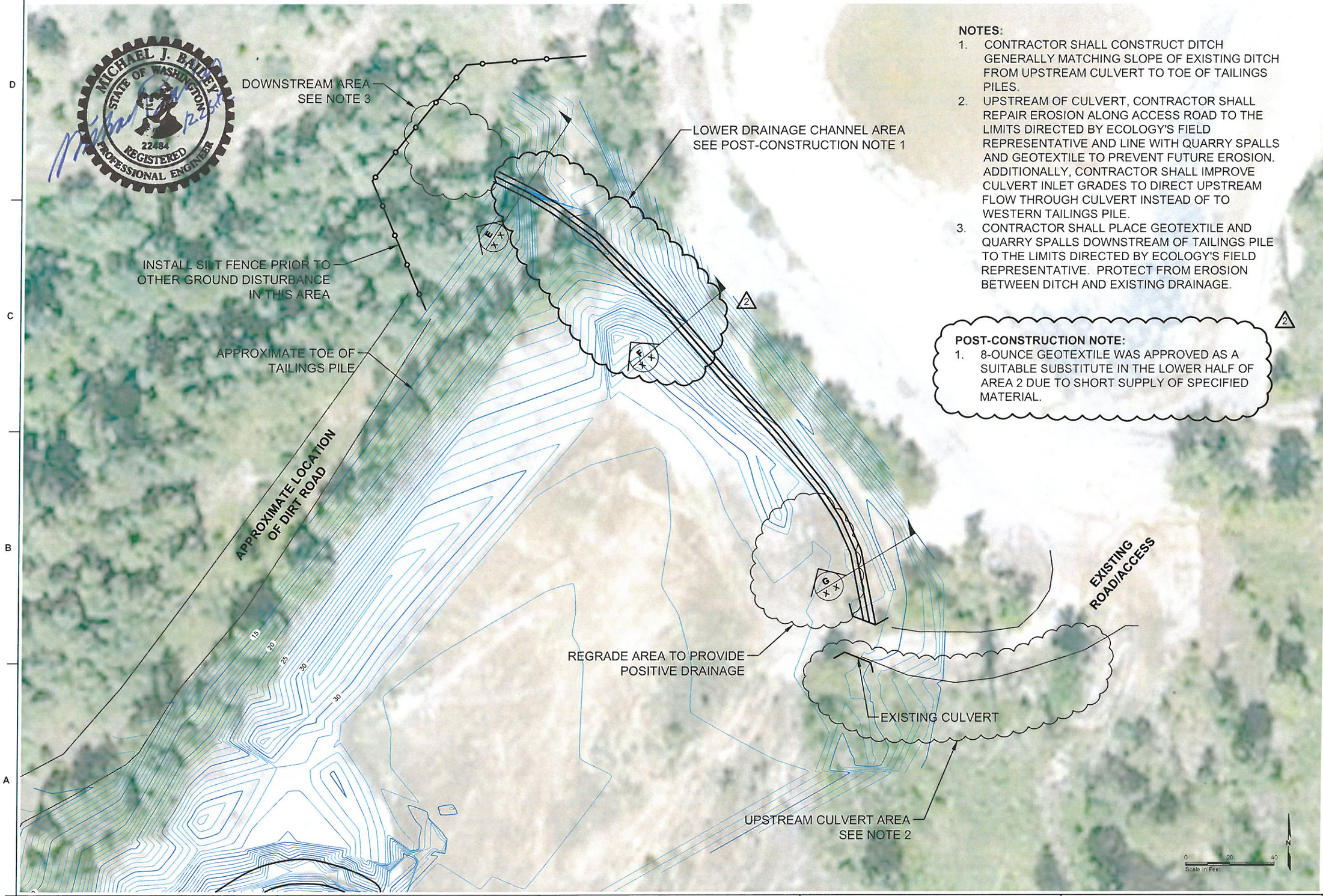

MICHAEL J. BAILEY
STATE OF WASHINGTON
22484
REGISTERED
PROFESSIONAL ENGINEER

NOTES:

1. CONTRACTOR SHALL CONSTRUCT DITCH GENERALLY MATCHING SLOPE OF EXISTING DITCH FROM UPSTREAM CULVERT TO TOE OF TAILINGS PILES.
2. UPSTREAM OF CULVERT, CONTRACTOR SHALL REPAIR EROSION ALONG ACCESS ROAD TO THE LIMITS DIRECTED BY ECOLOGY'S FIELD REPRESENTATIVE AND LINE WITH QUARRY SPALLS AND GEOTEXTILE TO PREVENT FUTURE EROSION. ADDITIONALLY, CONTRACTOR SHALL IMPROVE CULVERT INLET GRADES TO DIRECT UPSTREAM FLOW THROUGH CULVERT INSTEAD OF TO WESTERN TAILINGS PILE.
3. CONTRACTOR SHALL PLACE GEOTEXTILE AND QUARRY SPALLS DOWNSTREAM OF TAILINGS PILE TO THE LIMITS DIRECTED BY ECOLOGY'S FIELD REPRESENTATIVE. PROTECT FROM EROSION BETWEEN DITCH AND EXISTING DRAINAGE.

POST-CONSTRUCTION NOTE:

1. 8-OUNCE GEOTEXTILE WAS APPROVED AS A SUITABLE SUBSTITUTE IN THE LOWER HALF OF AREA 2 DUE TO SHORT SUPPLY OF SPECIFIED MATERIAL.

HARTCROWSER

Mark	Description	Date	Appr.
	DRAFT FOR REVISION	9/13/12	
REV. 1	ISSUED FOR CONSTRUCTION	10/12/12	
REV. 2	REVISED WITH POST-CONSTRUCTION NOTES	12/26/12	

Designed by: CP | Date: 12/26/12 | Rev. 2
Drn by: EL | Ckd by: MJB
Reviewed by: MJB
Job Number: 178600-34
Submitted by: HART CROWSER, INC.
File name: 178600-34-005.dwg
Plot date:
Plot scale: SEE DRAWING

VAN STONE MINE

AREA 2 SITE PLAN

Drawing Reference Number: **C-3**

Sheet 5 of 6

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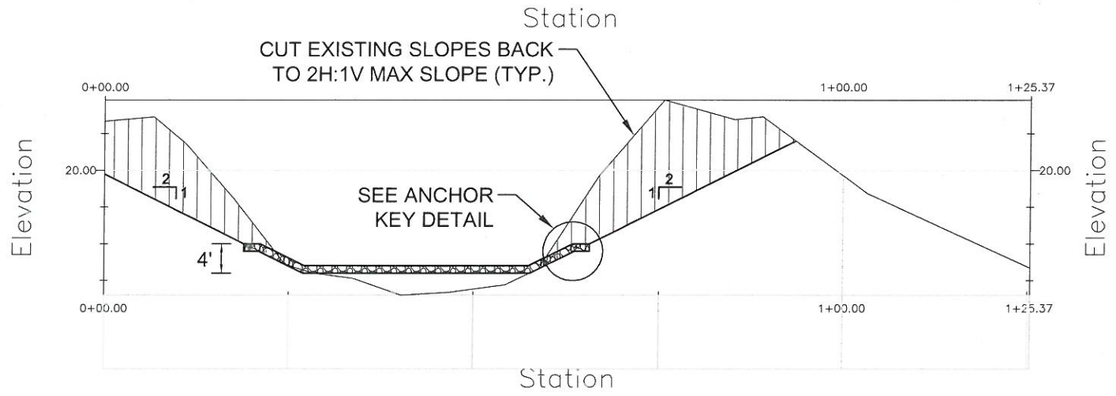
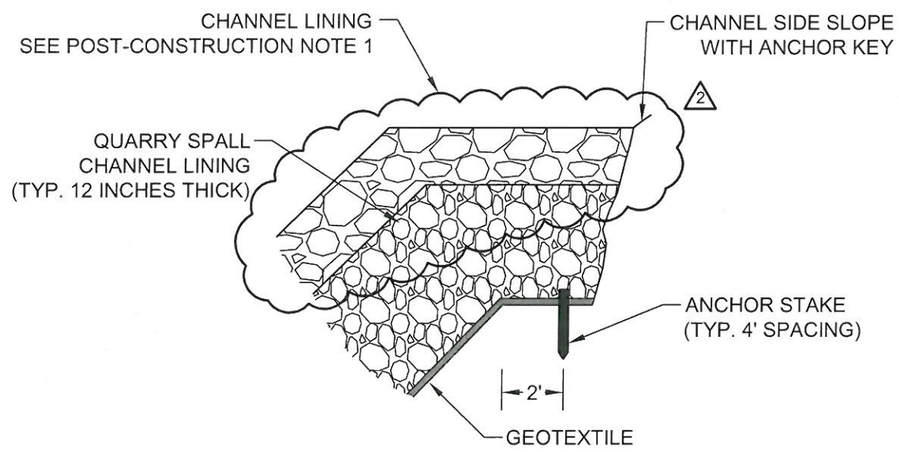
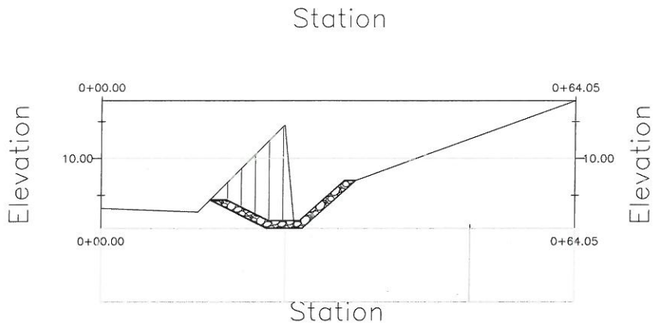


SECTION A

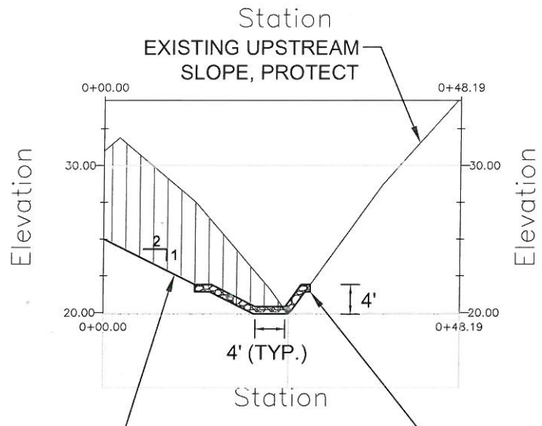


TYP. ANCHOR KEY DETAIL

(NOT TO SCALE)



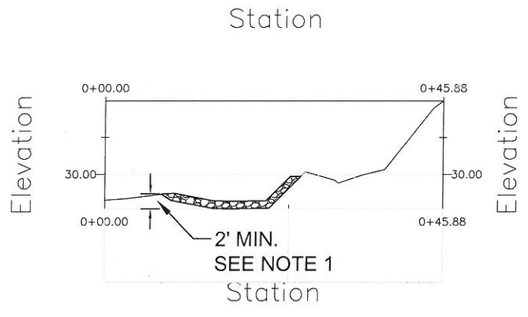
SECTION E



PROPOSED DOWNSTREAM CHANNEL SLOPE, TYP. 2H:1V (MAX.) SLOPE

SECTION F

GEOTEXTILE, SEE TYP. ANCHOR KEY DETAIL



SECTION G

NOTES:

1. IN UPSTREAM AREAS WHERE EXISTING DITCH SLOPES ARE FLAT, CONTRACTOR SHALL GRADE TO CREATE A MINIMUM 4' WIDE BOTTOM, 2' TALL DOWNSTREAM SIDE SLOPE AT 2H:1V (MAX) SLOPE.

POST-CONSTRUCTION NOTE: 2

1. DUE TO UNAVAILABILITY OF SPECIFIED ROCK MATERIAL AT THE TIME OF CONSTRUCTION, THE CHANNEL WAS LINED WITH A 12-INCH LAYER OF 3-INCH MINUS CRUSHED ROCK TOPPED WITH A 6-INCH LAYER OF 4- TO 10-INCH QUARRY SPALLS.

MICHAEL J. BAILEY
STATE OF WASHINGTON
22484
REGISTERED
PROFESSIONAL ENGINEER
12.26.12

Horizontal Scale in Feet
0 10 20
0 5 10
Vertical Scale in Feet
Vertical Exaggeration x2

HARTCROWSER

Mark	Description	Date	Appr.
	DRAFT FOR REVISION	9/13/12	
REV. 1	ISSUED FOR CONSTRUCTION	10/1/2012	
REV. 2	REVISED WITH POST-CONSTRUCTION NOTES	12/26/12	

Designed by: CP
Drawn by: EL
CAD by: MJB
Reviewed by: MJB
Submitted by: HART CROWSER, INC.
Date: 12/26/12 Rev. 2
Job Number: 17800-34
File name: 178005d-003.dwg
Plot date:
Plot scale: SEE DRAWING

VAN STONE MINE

SECTION VIEWS

Drawing Reference Number: **C-4**

Sheet 6 of 6

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APPENDIX B
FIELD REPORTS

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HARTCROWSER

Hart Crowser, Inc.
1700 Westlake Ave N, Suite 200
Seattle, Washington 98109-3056
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 17800-34
Field Report No. 1
Page 1 of 1
DATE 10/29/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0930
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1530
CLIENT Washington State Department of Ecology
WEATHER AM fog, 40s, breezy; PM partly sunny, lower 60s, wind w/ gusts
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor mobilizing equipment to site and beginning quarry spall import. Material staging areas established.
Contractor started installation of sediment control measures.
Contractor activities ceased at approx. 1530.

Communications/Coordination Notes:
Project kick-off meeting on site this morning w/ HC senior engineer (C. Poulsen), HC field engineer (P. Smiltins), Ecy. site manager (B. Dowling), and contractor.
Ecy. site manager provided verbal authorization to contractor to remove trees/vegetation, as needed, for access to lower portion of Area 1 and dirt road.

Earthwork Activities:
Contractor cleared lower portion of Area 1 tailing pile breach to allow excavator access to dirt road.
Contractor importing quarry spalls from Knife River (Colville, WA). Spalls initially dumped in staging area located before gate to upper tailings pile. Off-road dump truck used to transport spalls from there to second staging area in Area 1.

Temporary Erosion and Sediment Control Activities/Inspection:
Contractor cleared Area 1 silt fence locations. Silt fence installation for Areas 1 and 2 to continue Tue a.m. per contractor.

Deviations from Plans and Specifications: None observed.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1700 Westlake Ave N, Suite 200
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206.324.9530

Job No. 17800-34
Field Report No. 2
Page 1 of 1
DATE 10/30/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0710
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1600
CLIENT Washington State Department of Ecology
WEATHER AM overcast, 40s, late showers; PM fog, 50s, showers
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, nor the contractor's employees and agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in the contractor's work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor completed installation of sediment control measures and commenced with earthwork in Area 1. Contractor activities ceased at approx. 1600.

Communications/Coordination Notes:
HC rep attended contractor morning safety meeting and site walk-through for contractor crew members new to site. Ecy. site manager (B. Dowling) on site from approx. 1130 to 1450.

Earthwork Activities:
Contractor began pulling back left and right banks in upper portion of Area 1 breach, approx. following survey stakes to attain 2H:1V slope. Contractor indicated slopes will be verified at later time. Contractor began widening upper portion of channel in this section to approx. 10 ft. Area 1 earthwork completed today from 0-ft to approx. 100-ft marks.

Contractor continued quarry spall import from Knife River (Colville, WA). Approx. 600 cubic yards to be imported. Per contractor, quarry spall material is 3-inch minus (material type authorized prior to work start).

Temporary Erosion and Sediment Control Activities/Inspection:
Area 1 and 2 silt fence installation completed.

Deviations from Plans and Specifications:
As noted above, 3-inch minus quarry spall material authorized for use prior to work start.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
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206.324.9530

FIELD REPORT

Job No. 17800-34
Field Report No. 3
Page 1 of 2
DATE 10/31/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0730
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1600
CLIENT Washington State Department of Ecology
WEATHER AM fog, 40s, occ. showers; PM fog, 50s
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, nor the contractor's employees and agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in the contractor's work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor continued earthwork in Area 1. Quarry spall import completed.
Contractor activities ceased at approx. 1600.

Communications/Coordination Notes:
HC rep attended contractor morning safety meeting.
Contractor supervisor off site at approx. 1330.

Earthwork Activities:
Contractor continued sloping north and south banks in Area 1 breach upgradient of tailings pile toe. North bank sloping was completed using excavator bucket and then track compacted by bulldozer. Contractor spot checked slope of north bank using laser level and rod, which measured approx. 2.5H:1V. Majority of south bank was sloped and track compaction by end of day. Channel bottom is at approx. design width, with sloping to be completed.

Excess material that was removed from the Area 1 breach during sloping was temporarily stockpiled on the tailings pile north and south of the breach. Contractor is spreading and grading the stockpiled material north and south of Area 1, along existing berm at tailings pile boundary.

Temporary Erosion and Sediment Control Activities/Inspection:
Overall silt fence integrity appears OK. North section of Area 1 silt fence on dirt road temporarily left open to provide equipment access between Areas 1 and 2.

Deviations from Plans and Specifications: None observed.

Requests for Information/Change Requests:
1. Contractor question: Is slope of Area 1 channel bottom specified? HC rep response: Per plans, dimensions of channel bottom should be approx. similar to existing condition. Channel bottom finished slope should be similar to

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Job No. 17800-34
Field Report No. 3
Page 2 of 2
DATE 10/31/12

existing slope.
2. Contractor question: Dimensions (height) specified for berm at bottom of Area 1, downgradient of tailings pile toe? HC rep response: Berm dimensions not specified in plans. HC rep referred question to C. Poulsen.
3. Contractor question: Extent of erosion-control matting on channel slopes specified? HC rep response: Per plans, measures such as tackifier or erosion control matting to be used to prevent hydroseed from being washed down slope. Contractor will place erosion-control matting to top of slope.

Other Issues:
Contractor expressed concern regarding site accessibility for hydroseeding truck. Specifically, condition of upper section of Van Stone Mine Road deteriorating due to recent precipitation and quarry spall hauling from staging area (significant mud and ruts). In addition, contractor noted tight corners in some locations that may be problematic for the hydroseeding truck to navigate. Contractor suggested that some road modifications/repairs may be needed.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1700 Westlake Ave N, Suite 200
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206.324.9530

FIELD REPORT

Job No. 17800-34
Field Report No. 4
Page 1 of 1
DATE 11/1/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0730
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1530
CLIENT Washington State Department of Ecology
WEATHER AM overcast, 40s, rain; PM overcast, 50s, rain
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, nor the contractor's employees and agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in the contractor's work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor continued earthwork and started placement of geotextile in Area 1.
Contractor activities ceased at approx. 1530.

Communications/Coordination Notes:
HC rep attended contractor morning safety meeting.
HC rep responded to 10/31/12 contractor question regarding height of berm at bottom of Area 1 after consulting with C. Poulsen. Berm height set at approx. 2 ft.
Ecy. site managers John R. and Chuck G. briefly visited the site mid-afternoon to see the tailings pile work.

Earthwork Activities:
Contractor continued track compacting and shaping north and south banks in Area 1 upgradient of tailings pile toe. Contractor spot checked slopes of both banks in multiple locations using laser level and rod. In general, bank slopes are steeper at upgradient end of Area 1 and become more gradual downgradient. North bank slope ranged from approx. 2H:1V to 2.5H:1V. South bank slope ranged from approx. 2H:1V to greater than 3H:1V.

Contractor completed the berm at the bottom of Area 1 and then began cutting a continuous shelf on both banks for geotextile anchoring. Shelf location was determined per plan requirements, measuring from the bottom of channel using a laser level and rod.

Contractor began placement and staking of geotextile in Area 1. Geotextile placement was completed from the bottom of the drainage to approx. 100 ft from the top. Contractor plans to complete placement of geotextile and start quarry spall placement in Area 1 tomorrow.

Temporary Erosion and Sediment Control Activities/Inspection:
Overall silt fence integrity appears OK. North section of Area 1 silt fence on dirt road was completed, which had been temporarily left open to provide equipment access between Areas 1 and 2.

Deviations from Plans and Specifications: None observed.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER ~~PROJECT~~ MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1700 Westlake Ave N, Suite 200
Seattle, Washington 98109-3056
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206.324.9530

FIELD REPORT

Job No. 17800-34
Field Report No. 5
Page 1 of 1
DATE 11/2/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0730
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1500
CLIENT Washington State Department of Ecology
WEATHER AM overcast/fog, 50s; PM overcast, 50s
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor completed earthwork and placement of geotextile in Area 1. Contractor completed majority of bulk placement of quarry spalls in Area 1.
Contractor activities ceased at approx. 1500.

Earthwork Activities:
Contractor completed the shelf on both banks of the Area 1 drainage channel for geotextile anchoring. To meet plan requirements, shelf location was determined by measuring from the bottom of channel using a laser level and rod. Contractor completed placement and staking of geotextile in Area 1 after completion of the anchoring shelf.

Contractor placed quarry spalls in the Area 1 channel, working downgradient from the top of the channel, and from the center outwards. The spalls were track compacted by bulldozer and excavator during the placement process. To meet plan requirements, the depth of the spall layer was monitored by measuring height difference relative to top of the anchoring shelf using a laser level and rod. The majority of the bulk placement of quarry spalls in Area 1 was completed today, with final spreading and grading to be completed later.

Temporary Erosion and Sediment Control Activities/Inspection: Overall silt fence integrity appears OK.

Deviations from Plans and Specifications: None observed.

Other Issues:
Contractor expressed concern that the delivered quantity of quarry of spalls might not be enough to complete the project, and additional quarry spall material may need to be ordered.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1700 Westlake Ave N, Suite 200
Seattle, Washington 98109-3056
FAX 206.328.5581
206.324.9530

Job No. 17800-34
Field Report No. 6
Page 1 of 2
DATE 11/5/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0745
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1530
CLIENT Washington State Department of Ecology
WEATHER AM mostly sunny, 50s, breezy; PM mostly sunny, 60s
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor has nearly completed placement and grading of quarry spalls in Area 1, and has begun placement of erosion control matting. Contractor activities ceased at approx. 1530.

Communications/Coordination Notes:
Ray Wilson (NRC project manager) on site from approx. 0930 to 1015.
Contractor ordered additional quarry spall material from Knife River, expecting 5 trucks today and 7 tomorrow, to be delivered to staging area at the site gate. Contractor providing one of their trucks to assist with hauling due to present unavailability of Knife River trucks.

Earthwork Activities:
Contractor has nearly completed placement of quarry spalls in Area 1. Contractor fine graded the placed spall material to meet plan thickness requirements, spot checking using a laser level and rod. Contractor has begun placement and staking of erosion control matting on Area 1 channel slopes to be hydroseeded. Matting that has been placed extends from just beyond top of slope to the edge of the quarry spall material. Matting consists of loosely woven straw and coconut fiber.

Temporary Erosion and Sediment Control Activities/Inspection: Overall silt fence integrity appears OK.

Deviations from Plans and Specifications: None observed.

Requests for Information/Change Requests:
Contractor noted potential need for additional geotextile to complete Area 2. The 10- to 12-oz geotextile specified is not available until next week. Contractor acquired 8-oz material (2 rolls), which is presently heaviest material available, to be approved by Ecy. Contractor will deplete existing material first before using 8-oz material.

R. Wilson noted that quarry spall 3-inch minus material appears to contain a greater proportion of finer-grained

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Job No. 17800-34
Field Report No. 6
Page 2 of 2
DATE 11/5/12

material than anticipated. He suggested hydroseeding lower 4 ft of Area 1 drainage channel for added stability where quarry spalls have been placed, being of the opinion that the higher content of finer-grained material may be amenable to seed growth. HC rep will forward suggestion to C. Poulsen and Ecy. for consideration.

A suggestion and question from contractor regarding silt fence removal: If the apparent higher content of finer-grained material in the quarry spalls is of concern, R. Wilson suggested that the silt fence could be left in place until fines have been washed out. If silt fence is not to be left in place for longer period, can the silt fence be removed once the erosion control matting is in place but before hydroseeding?

Planned Activities/Approaching Milestones:
Considering today's progress, contractor anticipates the following schedule for project completion this week:
Tue: Continue placement of erosion control matting in Area 1. Start Area 2 work.
Wed: Anticipate earthwork at least 95% complete in Areas 1 and 2.
Thu: Hydroseed.
Fri: Demobilization.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

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Job No. 17800-34
Field Report No. 7
Page 1 of 2
DATE 11/6/12
S M [T] W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0645
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1540
CLIENT Washington State Department of Ecology
WEATHER AM fog/overcast, 50s, sl. breeze; PM mostly cloudy, 60s
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor continued placement of erosion control matting in Area 1 and started earthwork in Area 2. Additional quarry spall delivery continued. Contractor activities ceased at approx. 1530.

Communications/Coordination Notes:
Delivery of additional quarry spall material from Knife River continued today. Contractor used one of their trucks to assist with hauling due to present unavailability of Knife River trucks. In total, contractor anticipates delivery of approx. 200 CY of quarry spall material in addition to the original 600 CY delivered.

Ecology has expressed concern regarding last week's condition of the access road between site gate and upper tailings piles, and inquired about improvement options. HC rep informed contractor of this concern. Contractor indicated that easiest repair would be to scrape road surface with bulldozer during demobilization from site. In addition, quarry spall material with or without geotextile could be placed as needed for added stability. HC rep forwarded contractor response to HC project manager via email.

Earthwork Activities:
Contractor continued placement of erosion control matting in Area 1. Placement on southern bank completed today, with work to continue on northern bank tomorrow.

Contractor started earthwork in Area 2 downgradient of culvert. Bottom of ditch 4 ft in width was established, and tailings pile slope on west side of ditch was laid back to attain 2H:1V slope specified in plans. Slope to be verified by contractor. Anchoring shelf for geotextile material was cut into eastern slope.

Temporary Erosion and Sediment Control Activities/Inspection: Overall silt fence integrity appears OK.

Deviations from Plans and Specifications: None observed.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Job No. 17800-34
Field Report No. 7
Page 2 of 2
DATE 11/6/12

Planned Activities/Approaching Milestones:
Considering today's progress, contractor anticipates the following schedule for project completion this week:
Wed: Complete erosion control matting placement. Anticipate earthwork at least 95% complete in Areas 1 and 2.
Thu: Hydroseed.
Fri: Demobilization.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

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206.324.9530

FIELD REPORT

Job No. 17800-34
Field Report No. 8
Page 1 of 2
DATE 11/7/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0650
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1550
CLIENT Washington State Department of Ecology
WEATHER AM mostly sunny, 40s, breeze; PM mostly sunny, 50s, sl. gusts
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor completed placement of erosion control matting in Area 1. Contractor continued earthwork in Area 2, completing geotextile installation and majority of quarry spall placement. Contractor activities ceased at approx. 1545.

Communications/Coordination Notes:
Two additional contractor laborers working on site today. Contractor continued to haul quarry spall material to site using their truck with trailer.

HC rep responded to contractor's questions from 11/5/12: Per C. Poulsen, 8-oz geotextile is OK to use. Silt fence is to be left in place after completion of the work. The quarry spall material is not to be hydroseeded.

Contractor notified HC rep of the following: Per R. Wilson, hydroseeding subcontractor has only 1-acre supply of specified seed mix on hand; however, area requiring hydroseeding is currently approx. 2 to 3 acres. Because additional seed mix is not available until next week, the subcontractor may choose to postpone hydroseeding until necessary supply is on hand. Currently awaiting updated information from contractor.

Earthwork Activities:
Contractor completed Area 1 erosion control matting placement. Hand raking in progress to even quarry spall surface in Area 1 channel. The removal of the temporary entry ramp at the upgradient end of Area 1 is in progress as of the end of today's work.

Tailings pile slope on west side of Area 2 ditch graded to approx. 2.5H:1V slope. Excess tailings that were removed from Area 2 placed on top of tailings pile to west of ditch and graded to drain. Anchoring shelf for geotextile installation completed along either side of Area 2 ditch downgradient of existing culvert. Contractor temporarily removed culvert, cleared it of accumulated soil/debris, and reinstalled with sloping for positive drainage. Contractor completed excavation of ditch upstream of the culvert. Geotextile installation and the majority of quarry spall placement in Area 2 were completed. Quarry spall material grading is in progress, working upgradient from outlet of

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

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CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Job No. 17800-34

Field Report No. 8

Page 2 of 2

DATE 11/7/12

ditch. Quarry spall layer thickness checked during grading using laser level and rod to meet plan requirements.

Temporary Erosion and Sediment Control Activities/Inspection:
Overall silt fence integrity appears OK. Because silt fence will be left in place for a longer period, contractor will add additional posts for reinforcement.

Deviations from Plans and Specifications: None observed.

BY: P. Smiltins

HART CROWSER REPRESENTATIVE

REVIEWED BY:

HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1700 Westlake Ave N, Suite 200
Seattle, Washington 98109-3056
FAX 206.328.5581
206.324.9530

Job No. 17800-34
Field Report No. 9
Page 1 of 2
DATE 11/8/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0715
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1220
CLIENT Washington State Department of Ecology
WEATHER AM high clouds, 30s, frost; PM high clouds, 40s, gusts
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, nor the contractor's employees and agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in the contractor's work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor continued earthwork and completed placement of erosion control matting in Area 2. Contractor activities ceased at approx. 1215.

Communications/Coordination Notes:
DNR rep for area briefly on site at approx. 1125, inquiring about the construction activities and how long work will continue. HC rep indicated that work may continue tentatively through 11/14/12.
Pending change order authorization and acquisition of 4-in quarry spall material, contractor off site until tentatively 11/12/12.
At approx. 1230, HC rep met B. Dowling on access road on his way to the site and provided brief status update for the site work.

Earthwork Activities:
Majority of spall placement completed in Area 2. Contractor checked spall layer thickness using laser level and rod to meet plan requirements. Shaping of Area 2 ditch slopes in progress. Contractor installed erosion control matting in Area 2 on tailings pile slope on west side ditch.

Temporary Erosion and Sediment Control Activities/Inspection: Overall silt fence integrity appears OK.

Deviations from Plans and Specifications: None observed.

Requests for Information/Change Requests:
Per Ecy. request, additional 4-in quarry spall material to be placed in Area 1 and 2 channels over existing material. Contractor located available material (approx. 300 CY). Pending change order authorization, contractor tentatively plans to haul and start placement of 4-in spall material on 11/12/12.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

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FIELD REPORT

Job No. 17800-34
Field Report No. 9
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DATE 11/8/12

Planned Activities/Approaching Milestones:
As of this AM, contractor anticipates the following schedule to complete the site work:
Fri: Contractor off site.
Mon: Begin hauling and placement of 4-in material.
Tue: Continue hauling and placement.
Wed: Hydroseed, dress up site, demobilize.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

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FIELD REPORT

Job No. 17800-34
Field Report No. 10
Page 1 of 1
DATE 11/12/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0815
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1520
CLIENT Washington State Department of Ecology
WEATHER AM overcast, 30s, snow overnight; PM overcast, 30s, snow showers
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, nor the contractor's employees and agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in the contractor's work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor started import of 4-inch material. No earthwork was conducted today because of snow accumulation in Areas 1 and 2. Contractor activities ceased at approx. 1515.

Communications/Coordination Notes:
Trent Lang (Vaagen Bros.) briefly on site at approx. 1200 to see work completed to date.

Earthwork Activities:
Contractor did not perform any earthwork in Areas 1 and 2 today. Because of snow accumulation and developing slick conditions, contractor bulldozed road to ground surface between gate and upper tailings pile.

Temporary Erosion and Sediment Control Activities/Inspection: Overall silt fence integrity appears OK.

Deviations from Plans and Specifications:
Per Ecology/HC, a 0.5-foot-thick layer of 4-inch quarry spall material is to be placed over existing 3-inch minus material in Areas 1 and 2. Hauling of 4-inch material commenced today.

Requests for Information/Change Requests:
Contractor expressed concern regarding placement of quarry spall material on top of accumulated snow in Area 1 and 2 channels. Contractor question: What is maximum allowable snow depth on top of which quarry spall material can be placed? HC rep forwarded question to C. Poulsen for input.

Other Issues:
Approx. 4 to 5 inches of snow accumulation at site as of work start today, with additional snow showers in the afternoon. Snowy roads slowed material hauling.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

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Job No. 17800-34
Field Report No. 11
Page 1 of 1
DATE 11/13/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0720
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1530
CLIENT Washington State Department of Ecology
WEATHER AM overcast, 30s, snow; PM overcast, upper 30s
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor continued import of additional quarry spall material and proceeded with placement in Areas 1 and 2. Contractor activities ceased at approx. 1515.

Earthwork Activities:
Contractor continued material import today, and anticipates final load to be delivered tomorrow. Contractor completed placement of quarry spall material in Area 2 downgradient of the culvert. Majority of quarry spall material was placed in Area 1. Contractor placed material over snow remaining in Area 1 and 2 channels. Because grade marking on ground surface are covered by snow, contractor visually approximated thickness of placed material.

Temporary Erosion and Sediment Control Activities/Inspection: Overall silt fence integrity appears OK.

Deviations from Plans and Specifications: None observed.

Other Issues:
Snowfall that had accumulated at the site yesterday (approx. 4 to 5 inches) remained today, with ground surface completely covered. Contractor indicated that hydroseeding subcontractor will not place hydroseed on snow, only on bare ground. Additionally, snowy road may be problematic for hydroseeding vehicle accessibility to upper tailings piles.

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
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Job No. 17800-34
Field Report No. 12
Page 1 of 2
DATE 11/14/12
S M T W Th F S

JOB Van Stone Mine Emergency Remedial Action
ARRIVAL TIME ~0745
LOCATION Onion Creek watershed, 23 mi N of Colville, WA
DEPARTURE TIME ~1530
CLIENT Washington State Department of Ecology
WEATHER AM overcast, 30s, 1-2 in. new snow overnight; PM overcast, upper 30s
PURPOSE OF OBSERVATIONS Construction Observation and Documentation
HC REPRESENTATIVE P. Smiltins
HC PROJECT MANAGER S. Hughes
CONTRACTOR NRC Environmental, Inc.
PERMIT NO.
CONTRACTOR REP.
JOB PHONE

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SPECIFIC OBSERVATIONS:

Summary of Field Activities:
Contractor completed import of additional quarry spall material and placement in Areas 1 and 2. Contractor starting demobilization of equipment from site. HC rep demobilized from site.

Communications/Coordination Notes:
Contractor started equipment demobilization to staging area at gate. Crew returning to Spokane.
Contractor indicated hydroseeding tentatively postponed due to snow coverage, to be confirmed with project manager and Ecology.

Earthwork Activities:
Additional quarry spall completed. Approx. 350 CY delivered in total.
Contractor completed placement of quarry spall material in Areas 1 and 2. Because grade markings on ground surface are covered by snow, contractor visually estimated thickness of placed material in range of approx. 6 to 8 inches.
Contractor scraped/graded tailings pile surface between Areas 1 and 2, and to the south of Area 1.
Contractor placed geotextile and rock on NW corner of access road on upper tailings pile for maintenance.

Temporary Erosion and Sediment Control Activities/Inspection: Overall silt fence integrity appears OK. Silt fence to be left in place after completion of work.

Deviations from Plans and Specifications:
Hydroseeding tentatively postponed due to snow coverage.

Other Issues:
Snowfall that had accumulated at the site yesterday (approx. 4 to 5 inches) remained today with additional new snow overnight of about 1 to 2 inches. Contractor indicated that hydroseeding subcontractor will not place hydroseed on

BY: P. Smiltins
HART CROWSER REPRESENTATIVE

REVIEWED BY:
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

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FIELD REPORT

Job No. 17800-34

Field Report No. 12

Page 2 of 2

DATE 11/14/12

snow, only on bare ground. Additionally, snowy road may be problematic for hydroseeding vehicle accessibility to upper tailings piles. Additionally, snowy road is concern for demobilizing contractor's equipment from site.

BY: P. Smiltins

HART CROWSER REPRESENTATIVE

REVIEWED BY:

HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

APPENDIX C
SITE PHOTOGRAPHS

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Photograph 1 – Initial condition of intermediate channel, Area 2, 10/30/12.

Photograph 2 – Initial condition of intermediate channel, Area 2, 10/30/12.

Photograph 3 – Initial condition of Area 1 from south side of breach, 10/30/12.

Photograph 4 – Pulling back Area 1 slopes, 10/31/12.

Photograph 5 – Grading the channel in Area 1, with extent of geotextile visible, 11/02/12.

Photograph 6 – Erosion control matting placed above channel lining in Area 1, 11/07/12.

Photograph 7 – Erosion control matting placed above channel lining in Area 2, 11/08/12.

Photograph 8 – Area 2 channel condition downgradient of culvert at end of construction, 11/14/12.

Photograph 9 – Area 1 channel condition at end of construction, 11/14/12.

Photograph 10 – Area 1 channel condition downgradient of tailings pile toe at end of construction, 11/14/12.

Photograph 11 – Condition of Area 2 intermediate channel at end of construction, 11/14/12.

Photograph 12 – Area 2 channel condition upgradient of culvert and adjacent to access road, 11/14/12.