REPORT

LOWER DISPOSAL AREA – INTERCEPTOR TRENCH PROJECT

CONSTRUCTION SUMMARY REPORT

RAVENSDALE SITE

28131 Ravensdale-Black Diamond Road
Ravensdale, Washington 98051

Submitted To: Holcim (US) Inc.
1170 Transit Drive
Colorado Springs, CO 80903

Submitted By: Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052

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January 8, 2014

Project No. 073-93074-04.0600

Golder Associates

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1.0 INTRODUCTION

This report has been prepared to document the construction of the Lower Disposal Area (LDA) Interceptor Trench at the Ravensdale Site in Ravensdale, Washington. The objective of this project is to intercept groundwater to reduce inflow to the LDA and discharge intercepted groundwater via gravity flow into the existing drainage to the west.

Clearcreek Contractors, Inc. (Clearcreek) of Everett, Washington constructed the LDA Interceptor Trench between August 19, 2013 and September 21, 2013. Subcontractors to Clearcreek included Pacific Geomatic Services, Inc. of Mountlake Terrace, Washington, for surveying services, and Northwest Linings and Geotextiles, Inc. of Kent, Washington for liner services.

Golder Associates Inc. (Golder), under contract to Holcim (US) Inc. (Holcim), performed Construction Management (CM) and Construction Quality Assurance (CQA), ensuring compliance with the design plans and specifications, documenting construction activities, and performing daily flow and pH monitoring at the pipe discharge once all of the piping was connected. Construction of the LDA Interceptor Trench was to be performed in accordance with the following documents:

- *Ravensdale Site, Lower Disposal Area Interceptor Trench Design Drawings,* prepared by Golder Associates Inc., dated June 10, 2013.
- *Ravensdale Site, Lower Disposal Area Interceptor Trench Technical Specifications*, prepared by Golder Associates Inc., dated June 24, 2013.

Construction documentation included daily construction reports prepared by Golder field personnel and photographs taken throughout construction. As-Built Drawings are included in Appendix A, Daily Construction Reports are included in Appendix B, and selected photographs are included in Appendix C.

2.0 CONSTRUCTION ACTIVITIES

The major activities comprising the LDA Interceptor Trench construction included the following, listed generally in chronological order:

- Removed debris and vegetation from the ground surface along the interceptor trench alignment.
- Excavated an approximately 220-foot long and 3-foot-wide trench a minimum of 2 feet into weathered bedrock (to a maximum depth of approximately 19.5 feet below the adjacent ground surface at the interceptor trench-plug zone transition).
- Placed 80-mil linear low-density polyethylene (LLDPE) geomembrane with geotextile cushion against the west and north walls of the interceptor trench.
- Placed approximately 220 feet of perforated 6-inch high-density polyethylene (HDPE) pipe along the bottom of the interceptor trench.
- Installed approximately 80 feet of solid wall 6-inch HDPE pipe through the plug zone using the open-trench method and connected it to the perforated 6-inch HDPE pipe in the interceptor trench.
- Backfilled the interceptor trench with gravel.
- Placed low-permeability soil cap (material excavated from the Mine Spoils Borrow Area) over the top of the gravel to prevent surface water inflow.
- Backfilled the plug zone with native fill material.
- Installed a precast concrete vault containing pipe cleanout at the north end of the interceptor trench.
- Connected the solid wall 6-inch HDPE pipe to a 6.5-foot-long, 6-inch steel pipe section via flanged connection at the downstream (discharge) end of the drainage pipe where it daylights from the hillside below the main access road.
- Placed riprap armoring from the pipe discharge to the toe of the slope, and excavated a drainage swale to direct the intercepted water into the existing drainage to the west.
- Constructed the Test Pit 2 (TP-2) Collector and Drain and connected it into the main interceptor trench.
- Restored site to near-original condition, including regrading and seeding disturbed areas.
- Mowed the approximately 7-acre LDA cover.

The following sections provide a summary of the major construction activities for this project. Additional details are provided in the Daily Construction Reports, included in Appendix B.

2.1 Interceptor Trench Construction

After Pacific Geomatic Services surveyed and staked the interceptor trench alignment, Clearcreek began excavating the north-south portion of the trench, starting near piezometer B-11. The northeast-southwest portion of the trench was then excavated from B-11 to the northeast edge of the plug zone, and trench boxes and steel sheeting were temporarily placed at the transition between the trench and the plug zone. Clearcreek used two excavators (a Hitachi 330 LC and a Komatsu PC228USLC) to excavate the trench, and a large haul truck (John Deere 300D) to haul excavated material.

The interceptor trench was excavated a minimum of 2 feet into weathered bedrock. The depth ranged from approximately 6 feet below ground surface (bgs) at the north end to about 19.5 feet bgs at the interceptor trench-plug zone transition, as shown on Sheet 040 (Appendix A). A laser grade checker was used to ensure adequate slope along the bottom of the trench to provide positive drainage. Perforated 6-inch HDPE pipe was fused at the surface using a McElroy Trackstar fusing machine and then lowered down into the trench using excavator buckets.

Clearcreek employed the open-trench method, using trench boxes and steel sheeting, to place the solid wall 6-inch HDPE pipe through the plug zone. Material excavated from the plug zone was stockpiled on the south side of the trench and used as backfill. While trenching across the main access road, Clearcreek rerouted dump truck traffic over the interceptor trench to the west, using steel plates to cover the open portion of the trench as needed. The solid wall pipe was also fused at the surface using the McElroy Trackstar fusing machine and then lowered down into the trench using excavator buckets. An approximate 27-foot-long section of perforated pipe was lowered into the trench to connect the perforated pipe and the solid wall pipe within the plug zone. Romac Industries Armor Lock Restraint Couplers and Stiffeners were used to make the connections at both ends. Clearcreek used trench boxes, steel sheeting, and shoring to allow personnel to safely enter the trench to install the couplers. The plug zone was backfilled in 8- to 12-inch loose lifts and compacted by the Komatsu excavator with a hoe-pack attachment.

Following pipe placement, Clearcreek delivered a third excavator (Takeuchi-TB 250) to the site for placement of the 80-mil LLDPE geomembrane and geotextile cushion within the interceptor trench. The geomembrane was unrolled at the surface along the length of the interceptor trench and positioned against the north and west walls using two excavator buckets. Geotextile was then draped over the geomembrane on both sides with a minimum of 12 inches of overlap between panels. Clearcreek used shoring to allow personnel to enter the trench and trim the geomembrane and geotextile to conform to the

bottom of the trench. While two of the excavators held the geomembrane and geotextile cushion taught, the third excavator backfilled the trench with gravel to within 2 to 4 feet of the ground surface.

In the north-south section of the interceptor trench, gravel was placed within 2 feet of the ground surface, followed by a geotextile separation layer, followed by 2 feet of low-permeability soil cap. In the northeast-southwest section of the interceptor trench, crossing the main access road, this element of the design was changed to provide additional support for truck traffic. For this section, trench gravel was placed within 4 feet of the ground surface, followed by a geotextile separation layer, followed by 2 feet of low-permeability soil cap, followed by a second geotextile separation layer, followed by 2 feet of compacted quarry spalls and crushed rock surfacing.

At the ground surface, the low-permeability soil extended 2 feet on either side of the interceptor trench. Low-permeability soil was excavated from the Mine Spoils Borrow Area and stockpiled to the south of the project area. Clearcreek placed the low-permeability soil in 6- to 8-inch loose lifts, moisture-conditioned it with a hose and water tank on a trailer, and compacted it with the Komatsu excavator with hoe-pack attachment.

After the perforated and solid wall 6-inch HDPE piping was connected and the interceptor trench and plug zone were backfilled, Clearcreek used a small bulldozer (John Deere 430J) to regrade the roads to their original configurations, and to contour the pipe discharge slope to blend with the surrounding topography. Clearcreek installed the concrete vault for the pipe cleanout at the north end of the interceptor trench and the 6.5-foot steel pipe section at the pipe discharge. Riprap armoring (approximately 3 to 12 inches in dimension) was placed from the pipe discharge to the toe of the slope in a U-shape, approximately 1 foot thick and 8 feet wide. A drainage swale was excavated from the toe of slope to the wooded area to the west.

The total length of the interceptor trench (and perforated piping) is approximately 220 feet. The total length of solid wall piping is approximately 80 feet (through the plug zone) to the steel pipe section, and the steel pipe section is 6.5 feet long to the pipe discharge.

2.2 TP-2 Collector and Drain

In an attempt to intercept additional groundwater flow, Golder directed Clearcreek to re-excavate test pit TP-2 and expose a gravel lens that was observed to produce seepage at a rate of approximately 20 gallons per minute (gpm) during the Test Pit Investigation conducted by Golder in May 2010. TP-2 was re-excavated to dimensions of approximately 13 feet by 15 feet by 8.5 feet deep. The gravel lens was exposed at approximately 6 to 8 feet bgs. Seepage was observed at a rate of approximately 2 gpm flowing from the northeast corner of TP-2. Golder tested the pH of the water in the pit and found that it

was neutral (pH=7). On this basis, the water was determined not to be impacted by cement kiln dust (CKD), and therefore acceptable for diversion into the main interceptor trench.

The TP-2 Collector and Drain was constructed to connect into the main interceptor trench (Detail 8, Sheet 080, Appendix A). Northwest Linings and Geotextiles fabricated a pipe boot from the 80-mil LLDPE liner for the TP-2 trench pipe penetration through the geomembrane into the main interceptor trench. A 20-foot-long section of solid wall 6-inch HDPE pipe was set through the boot at approximately 15 feet bgs. Approximately 1.5 feet of pipe extended through into the main interceptor trench, and in this section, four ½-inch diameter holes were drilled around the circumference with 3-inch spacing along the axis of the pipe.

The TP-2 trench was approximately 90 feet long from TP-2 to the connection at the main interceptor trench. The bottom of TP-2 was lined with geotextile, over which approximately 10 feet of perforated 6-inch HDPE pipe was laid within TP-2 and connected to approximately 90 feet of solid wall 6-inch HDPE pipe laid along the bottom of the TP-2 trench. Trench gravel was placed around and above the perforated pipe within TP-2 to approximately 3 to 4 feet bgs. Trench gravel within TP-2 was overlain by geotextile, which was overlain by approximately 2 feet of low-permeability soil, then covered by approximately 2 feet of native fill. Pipe within the TP-2 trench was connected using a Frialen electrofusion coupling. The TP-2 trench was backfilled with native fill material that had been excavated from the trench. Native material was placed in 8- to 12-inch loose lifts and compacted by the Komatsu excavator with hoe-pack attachment.

2.3 Flow and pH Monitoring

Once all of the 6-inch HDPE piping was connected between the main interceptor trench and pipe discharge, flow and pH monitoring was performed daily throughout the remainder of construction. Daily flow and pH monitoring was performed to obtain baseline flow data and to verify that the intercepted water was not impacted by CKD. Flow and pH monitoring results are summarized in Table 1 and documented in the Daily Construction Reports included in Appendix B. Table 1 also includes monthly flow and pH monitoring results from October 2, 2013 through December 23, 2013.

2.4 Site Restoration

Upon construction completion, Clearcreek reestablished the berm that runs along the west side of the main access road, and the ditch and berm that run along the east side of the north access road (the road leading up to the north). Where low-permeability soil was exposed along the reestablished ditch, Clearcreek lined the ditch with rock (2- to 4-inch quarry spalls). Clearcreek also repaired the existing 10-inch HDPE culvert that crosses under the north access road using a new section of HDPE pipe and a Fernco Strong Back Coupler.

Clearcreek spread straw mulch over all disturbed areas and seeded the areas with native grass seed mixtures.

The Mine Spoils Borrow Area was regraded to drain toward the south, eliminate ponding, and blend with the surrounding topography. Clearcreek also reconstructed the berms that were removed to gain temporary access to the Mine Spoils Borrow Area.

After construction activities were completed, some rutting was observed in the main access road where it crossed the interceptor trench and plug zone, so Clearcreek returned to repair the road as requested by Reserve Silica Corporation. Approximately 2 to 3 feet of material was excavated from an approximate 40-foot by 40-foot area. Geotextile was placed at the bottom of the excavation, followed by a 2- to 3-foot layer of 4- to 8-inch quarry spalls, followed by 2 to 4 inches of 2-inch crushed rock surfacing material. Quarry spalls were bucket-tapped into place, and the 2-inch crushed rock surfacing material was compacted by the Komatsu excavator with hoe-pack attachment.

3.0 CONCLUSION

Based on field observations, the construction activities for this project were completed in general accordance with the approved plans and specifications.

If you have any questions, please do not hesitate to contact us.

GOLDER ASSOCIATES INC.

Vanessa M. Rayner, PE
Project Engineer

Frank S. Shuri, LG, LEG, PE
Principal and Practice Leader

VMR/FSS/cb

TABLE

Table 1: Interceptor Trench Flow and pH Monitoring

Date	Time	Flow at Interceptor Trench Discharge (gpm)	pH at Interceptor Trench Discharge	Comments
9/4/2013	17:45	0.132		Piping through main interceptor trench completed
9/5/2013	8:20	0.085		
9/6/2013	8:00	1.50	7.62	Heavy rain overnight
9/7/2013	8:15	0.357	7.05	
9/10/2013	9:15	0.067	7.49	
9/10/2013	16:00	0.066		Piping from TP-2 trench connected into main trench
9/11/2013	7:30	0.063	7.80	
9/11/2013	15:50	0.064		
9/12/2013	15:20	0.062	7.35	
9/13/2013	8:05	0.060	7.83	
9/14/2013	12:00	0.288	7.06	Significant increase in flow from previous days, but no sign of overnight rainfall
9/19/2013	10:15	0.061	7.32	
9/21/2013	9:10	0.052		
10/2/2013	13:00	0.682		
10/19/2013	8:45	0.296	7.47	
11/19/2013	9:25	0.682	7.52	Dry day after several rainy days
12/23/2013	15:25	1.22	7.27	Wet weather for several days prior

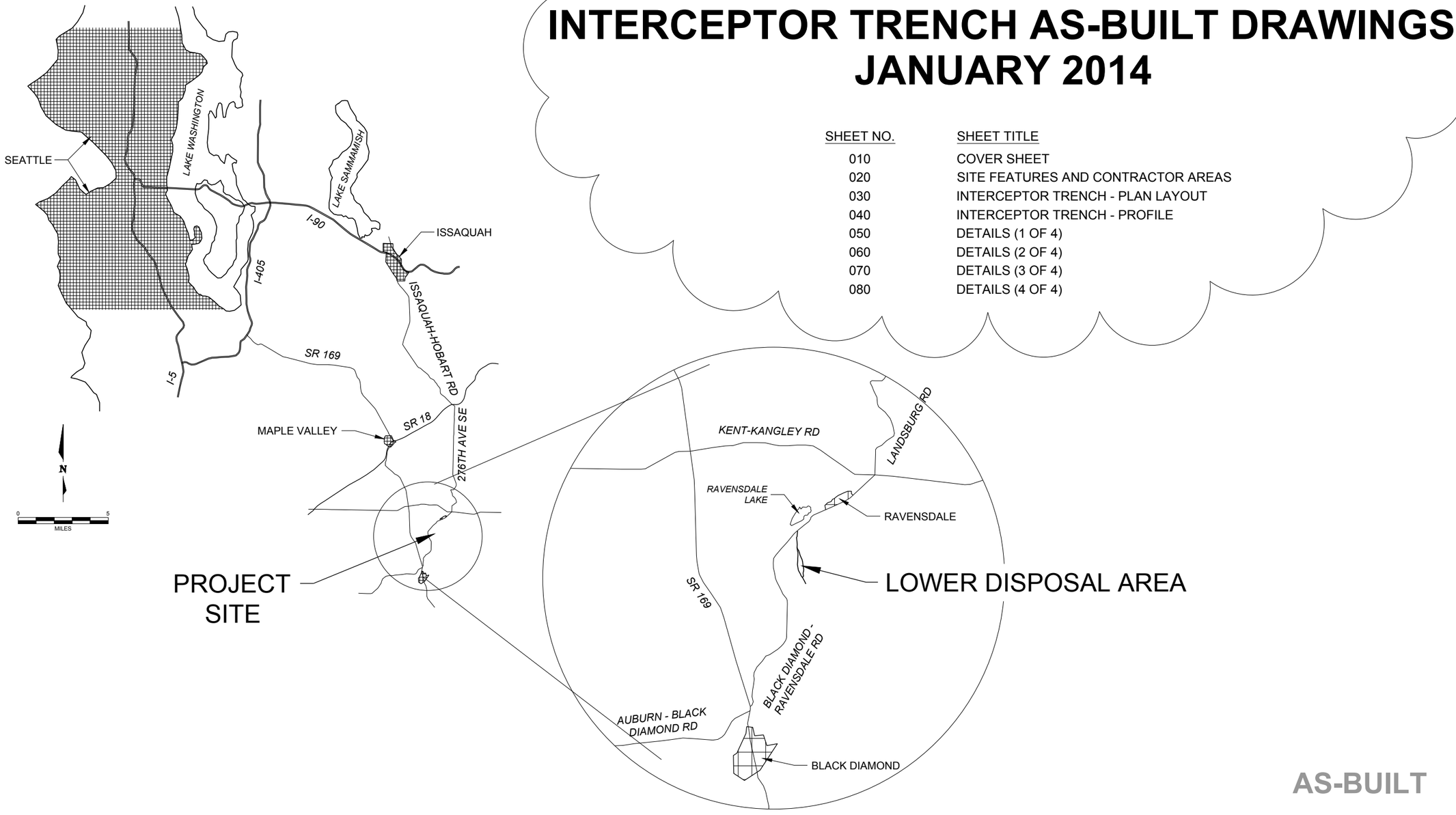
Note: gpm = gallons per minute

APPENDIX A
AS-BUILT DRAWINGS

HOLCIM (US) INC.
RAVENSDALE SITE
RAVENSDALE, WASHINGTON

LOWER DISPOSAL AREA
INTERCEPTOR TRENCH AS-BUILT DRAWINGS
JANUARY 2014

SHEET NO.	SHEET TITLE
010	COVER SHEET
020	SITE FEATURES AND CONTRACTOR AREAS
030	INTERCEPTOR TRENCH - PLAN LAYOUT
040	INTERCEPTOR TRENCH - PROFILE
050	DETAILS (1 OF 4)
060	DETAILS (2 OF 4)
070	DETAILS (3 OF 4)
080	DETAILS (4 OF 4)



AS-BUILT

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18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA USA 98052-3333
TEL: (425) 883-0777
FAX: (425) 882-5498

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	1-7-14	FSS	AS-BUILT	VMR	FSS	FSS
A	6-10-13	VMR	ISSUED FOR BID	VMR	SJM	FSS
1	5-1-13	VMR	ISSUED FOR REVIEW	VMR	SJM	FSS

FRANK S. SHURI — STATE OF WASHINGTON — 36905 — REGISTERED PROFESSIONAL ENGINEER

PROJECT
RAVENSDALE SITE
LOWER DISPOSAL AREA
INTERCEPTOR TRENCH
AS-BUILT DRAWINGS

TITLE
COVER SHEET

PROJECT No. 073-93074-04.005		
FILE No.		AS SHOWN
REV. A	SCALE	AS SHOWN
DESIGN	VMR	6-10-13
CADD	VMR	6-10-13
CHECK	SJM	6-10-13
REVIEW	FSS	6-10-13

010

NOTES

1. BASE TOPOGRAPHY OUTSIDE OF LDA FOOTPRINT PREPARED BY AERO-METRIC, INC., SEATTLE, WA FROM AERIAL PHOTOS FLOWN ON FEBRUARY 10, 2007.

   HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 27 US FEET
   VERTICAL DATUM: NDVD 29
   CONTOUR INTERVAL: 5 FT

2. BASE TOPOGRAPHY INSIDE OF LDA FOOTPRINT PREPARED BY PACIFIC GEOMATIC SERVICES, INC., MOUNTLAKE TERRACE, WA FROM FIELD DATA TAKEN ON NOVEMBER 1, 2007.

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   VERTICAL DATUM: NDVD 29
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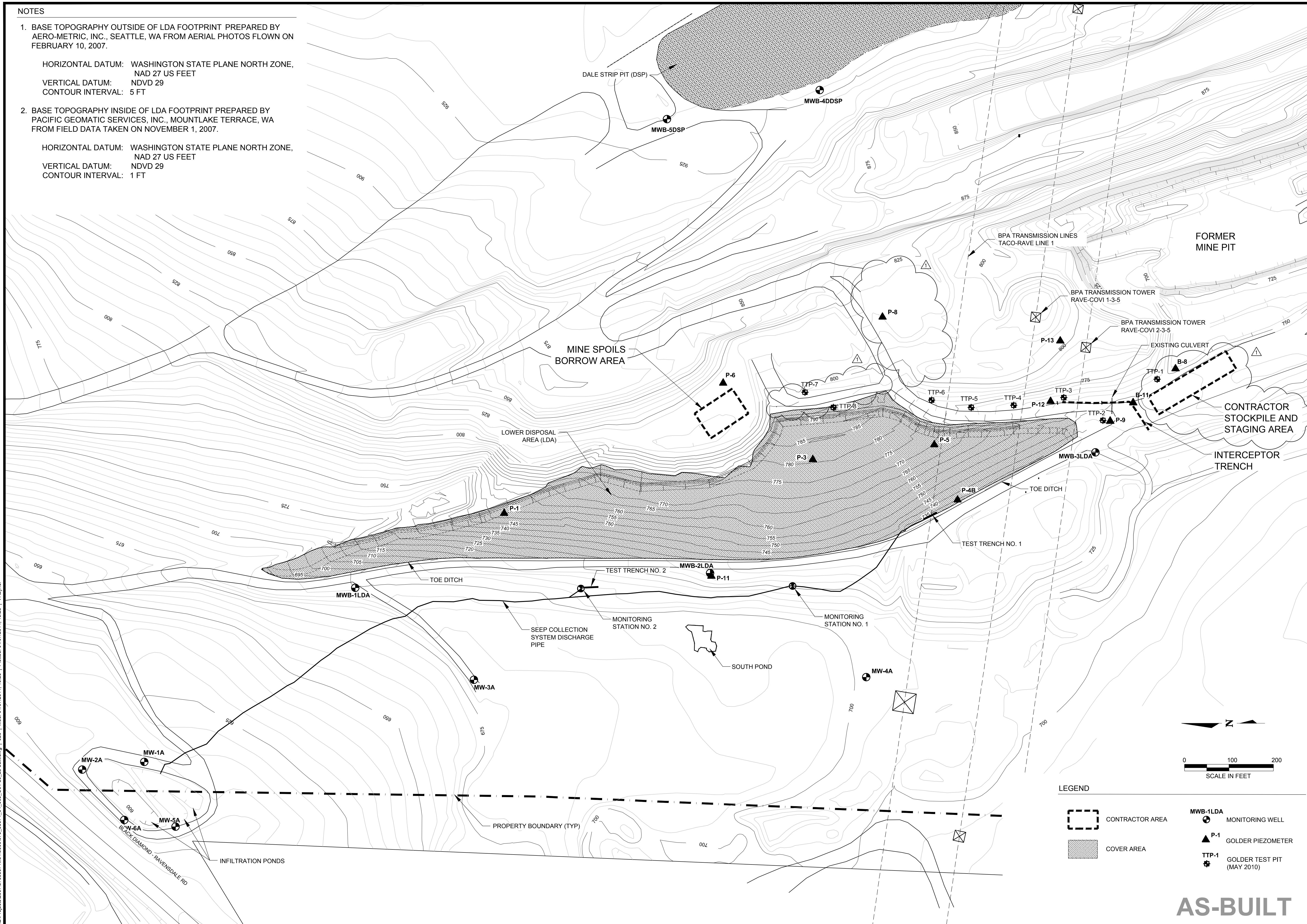

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1	1-7-14	FSS	AS-BUILT	VMR	FSS	FSS
B	6-10-13	FSS/VMR	ISSUED FOR BID	VMR	SJM	FSS
A	5-1-13	FSS/VMR	ISSUED FOR REVIEW	VMR	SJM	FSS

FRANK S. SHURI — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

PROJECT

RAVENSDALE SITE LOWER DISPOSAL AREA INTERCEPTOR TRENCH AS-BUILT DRAWINGS

TITLE

SITE FEATURES AND CONTRACTOR AREAS

PROJECT No. 073-93074-04.005		
FILE No.		AS SHOWN
REV. A	SCALE	AS SHOWN
DESIGN	FSS/VMR	6-10-13
CADD	VMR	6-10-13
CHECK	SJM	6-10-13
REVIEW	FSS	6-10-13

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NOTES

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   VERTICAL DATUM: NDVD 29
   CONTOUR INTERVAL: 5 FT

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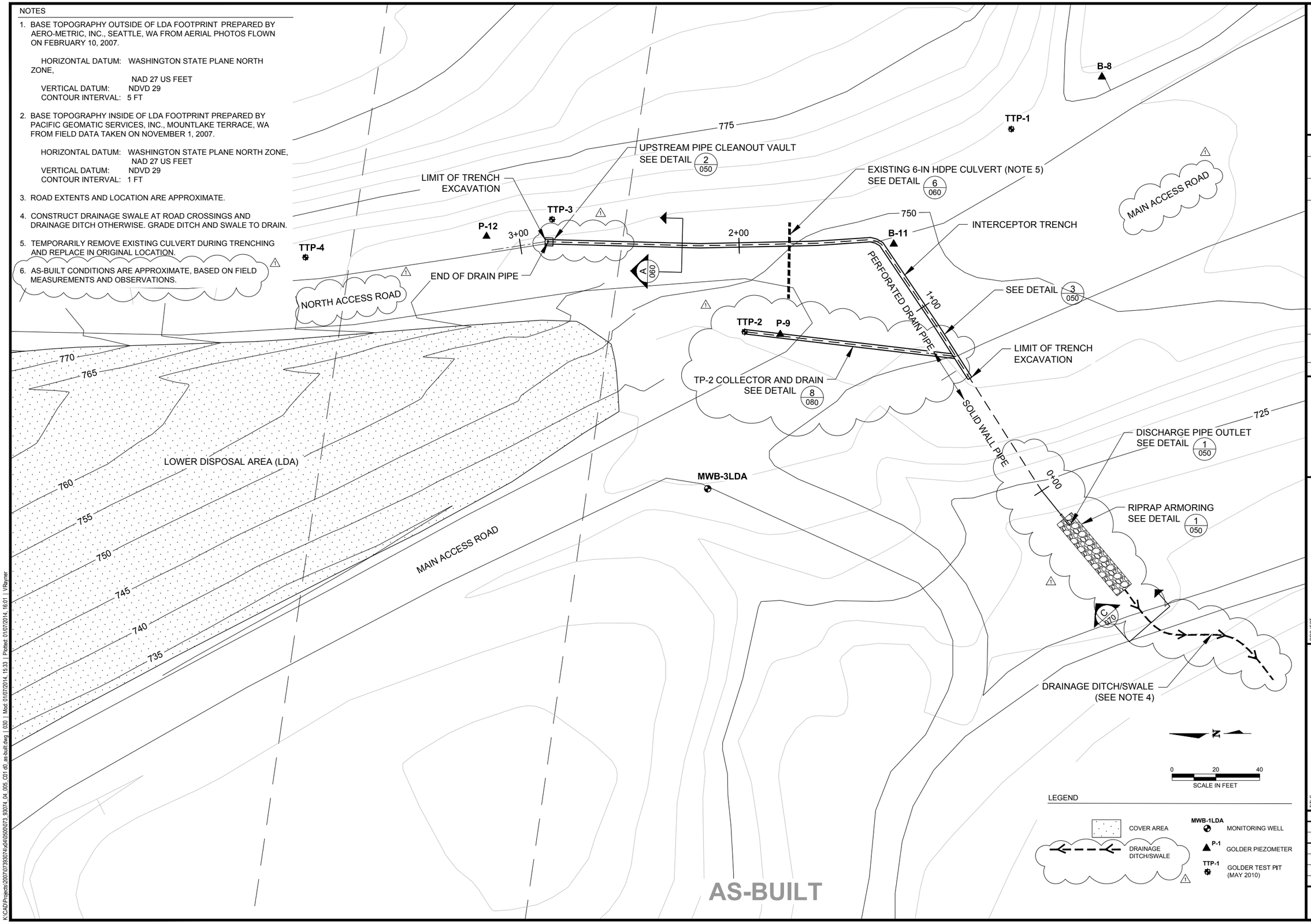
   HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 27 US FEET
   VERTICAL DATUM: NDVD 29
   CONTOUR INTERVAL: 1 FT

3. ROAD EXTENTS AND LOCATION ARE APPROXIMATE.

4. CONSTRUCT DRAINAGE SWALE AT ROAD CROSSINGS AND DRAINAGE DITCH OTHERWISE. GRADE DITCH AND SWALE TO DRAIN.

5. TEMPORARILY REMOVE EXISTING CULVERT DURING TRENCHING AND REPLACE IN ORIGINAL LOCATION.

6. AS-BUILT CONDITIONS ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS AND OBSERVATIONS.



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REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	1-7-14	FSS	AS-BUILT	VMR	FSS	FSS
A	6-10-13	FSS/VMR	ISSUED FOR BID	VMR	SJM	FSS
1	5-1-13	FSS/VMR	ISSUED FOR REVIEW	VMR	SJM	FSS

PROJECT

RAVENSDALE SITE
LOWER DISPOSAL AREA
INTERCEPTOR TRENCH
AS-BUILT DRAWINGS

TITLE

INTERCEPTOR TRENCH PLAN LAYOUT

PROJECT No. 073-93074-04.005		
FILE No.		AS SHOWN
REV. A	SCALE	AS SHOWN
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CADD	VMR	6-10-13
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REVIEW	FSS	6-10-13

030

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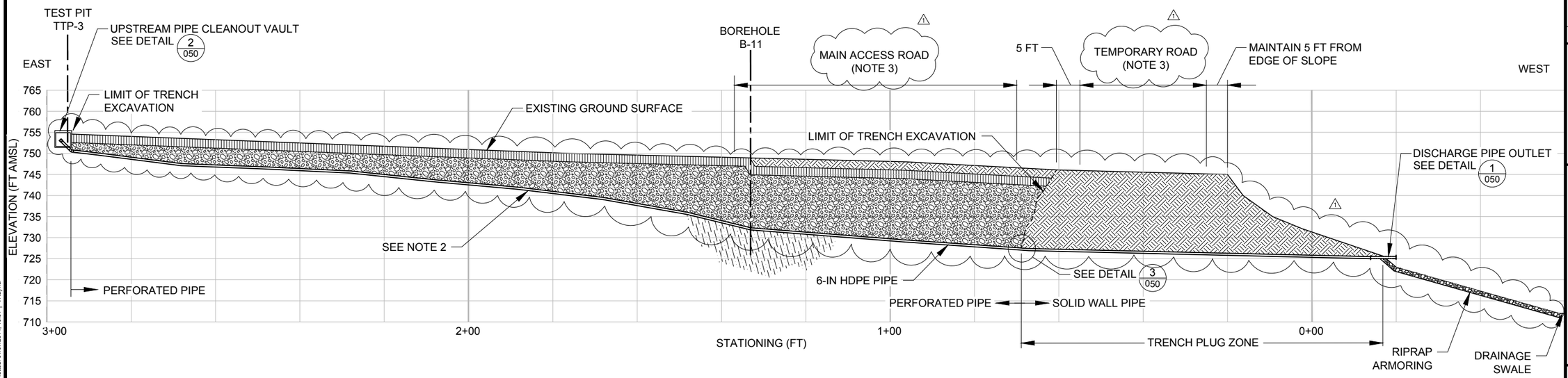
   VERTICAL DATUM: NDVD 29
   CONTOUR INTERVAL: 5 FT
2. AS-CONSTRUCTED, THE BOTTOM OF THE TRENCH EXTENDS A MINIMUM OF 3 FEET INTO WEATHERED BEDROCK. ⚠1
3. MAINTAIN OR RELOCATE MAIN ACCESS ROAD AS NEEDED TO MAINTAIN A MINIMUM 20-FT-WIDE ROAD TO ALLOW FACILITY OPERATIONS DURING CONSTRUCTION. ⚠1
4. AS-BUILT CONDITIONS ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS AND OBSERVATIONS.



0 25
SCALE IN FEET

LEGEND

- LOW-PERMEABILITY SOIL CAP
- INTERCEPTOR TRENCH GRAVEL FILL
- EXISTING SITE FILL
- BEDROCK

AS-BUILT

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⚠A	5-1-13	FSS/VMR	ISSUED FOR REVIEW	VMR	SJM	FSS

FRANK S. SHURI — Washington — STATE OF — PROFESSIONAL ENGINEER

PROJECT
RAVENSDALE SITE
LOWER DISPOSAL AREA
INTERCEPTOR TRENCH
AS-BUILT DRAWINGS

TITLE
INTERCEPTOR TRENCH PROFILE

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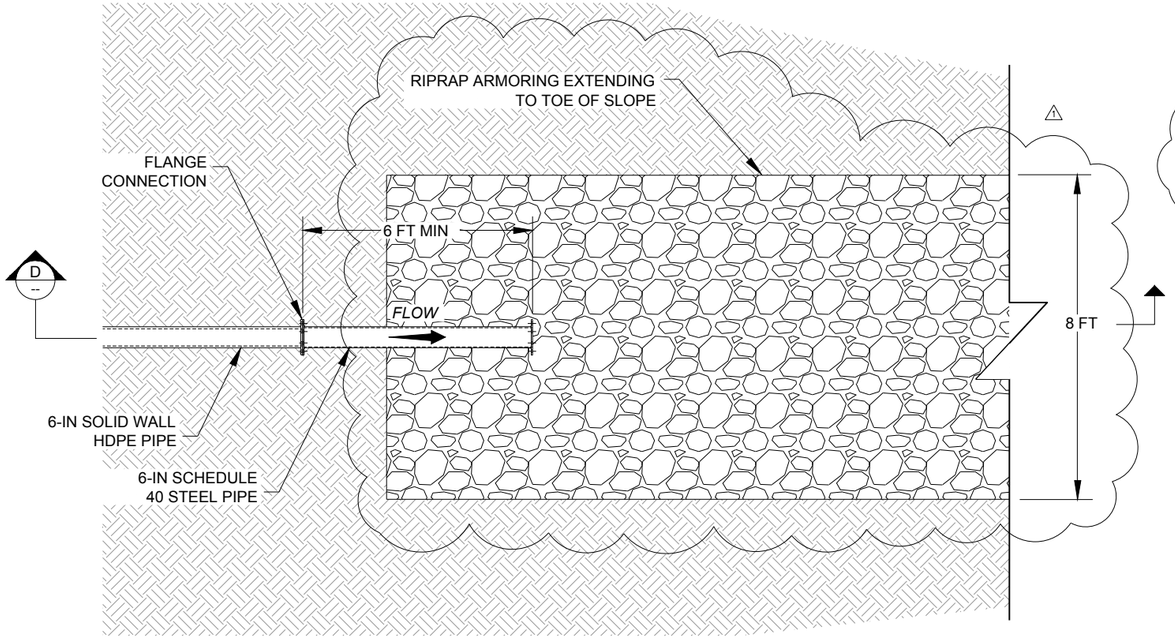
REV. A	SCALE	AS SHOWN
DESIGN	FSS/VMR	6-10-13
CADD	VMR	6-10-13
CHECK	SJM	6-10-13
REVIEW	FSS	6-10-13

040

NOTES

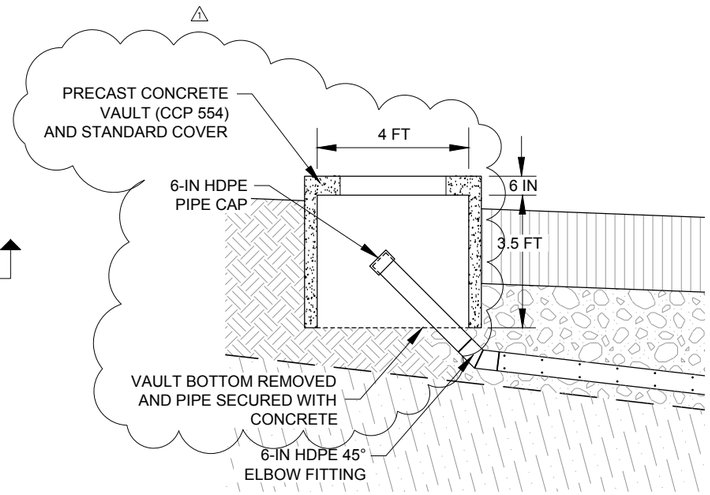
1. MINIMUM DIMENSIONS SHOWN. ADJUST IN FIELD TO SUIT CONDITIONS AS APPROVED BY CONSTRUCTION MANAGER.
2. AS-BUILT CONDITIONS ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS AND OBSERVATIONS. △1



DISCHARGE PIPE OUTLET PLAN

1 --

SCALE IN FEET 0 2 4



UPSTREAM PIPE CLEANOUT VAULT SECTION

2 --

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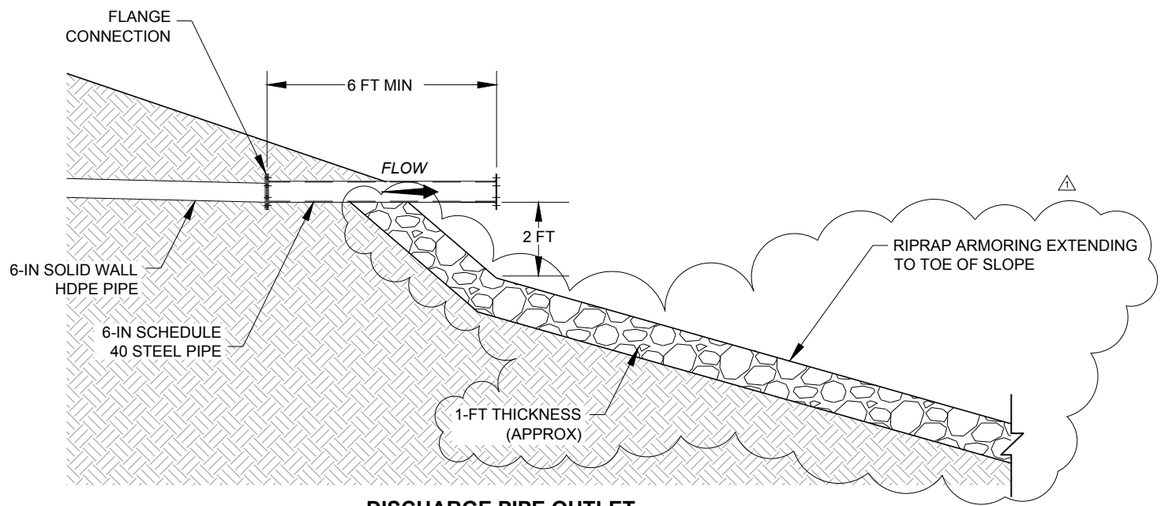

DISCHARGE PIPE OUTLET SECTION

D --

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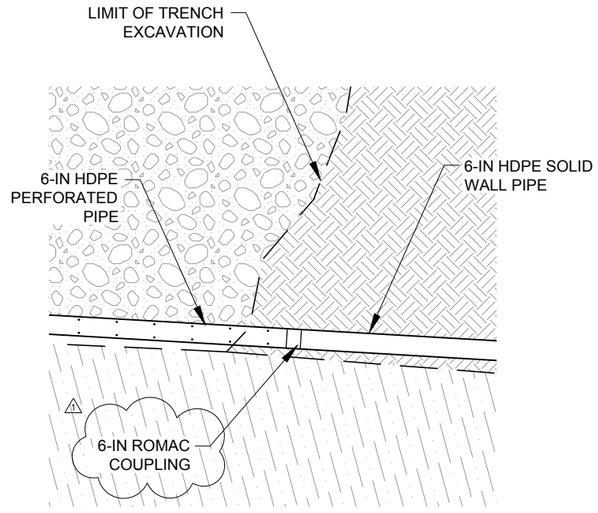

PIPE TRANSITION DETAIL

3 --

SCALE IN FEET 0 2 4

AS-BUILT

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△1	1-7-14	FSS	AS-BUILT	FSS	VMR
△A	6-10-13	FSS/VMR	ISSUED FOR BID	SJM	VMR
△A	5-1-13	FSS/VMR	ISSUED FOR REVIEW	SJM	VMR

PROJECT

RAVENSDALE SITE
LOWER DISPOSAL AREA
INTERCEPTOR TRENCH
AS-BUILT DRAWINGS

TITLE

DETAILS (1 OF 4)

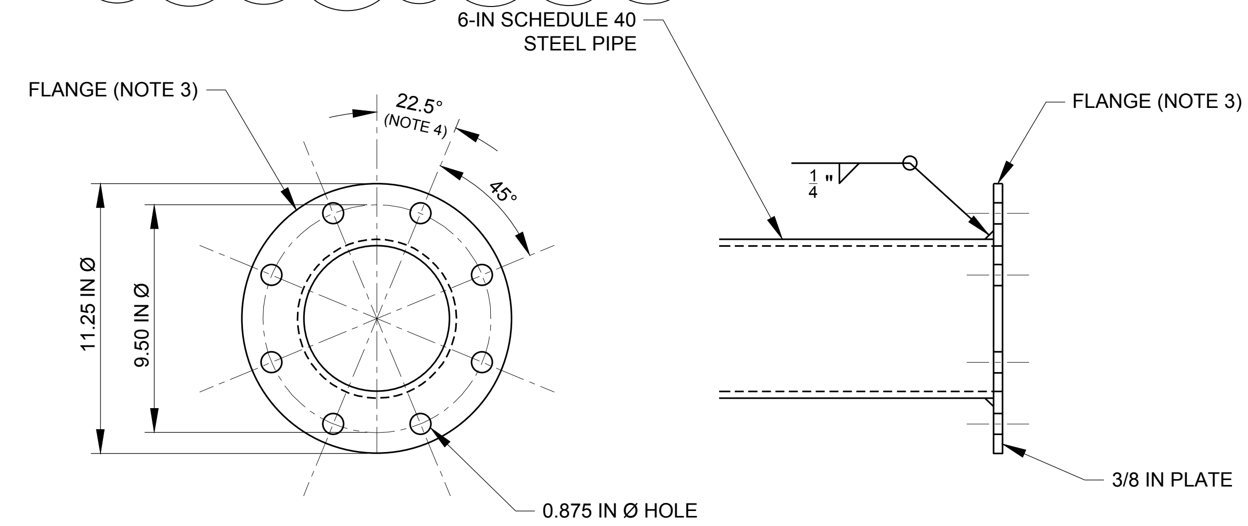
PROJECT No. 073-93074-04.005		
FILE No.		AS SHOWN
REV. A	SCALE	AS SHOWN
DESIGN	FSS/VMR	6-10-13
CADD	VMR	6-10-13
CHECK	SJM	6-10-13
REVIEW	FSS	6-10-13

050

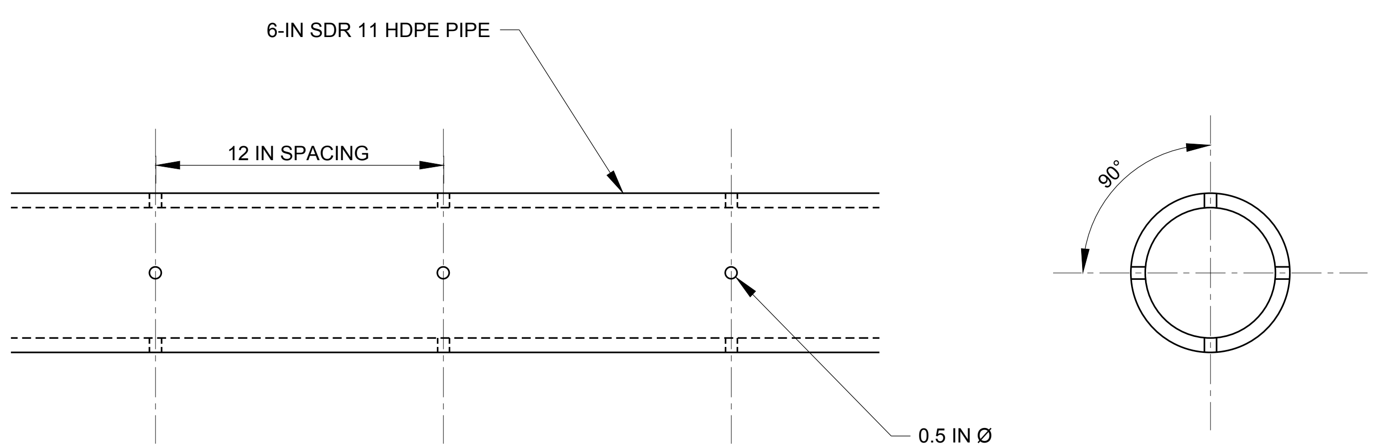
NOTES

1. EXCAVATE BOTTOM OF INTERCEPTOR TRENCH INTO WEATHERED BEDROCK UNTIL REFUSAL, AS DIRECTED BY THE ENGINEER, OR TO A MAXIMUM DEPTH OF 20 FT, WHICHEVER IS LESS. ACTUAL THICKNESS OF WEATHERED ZONE MAY VARY.
2. REPLACE EXISTING HDPE CULVERT FOLLOWING INSTALLATION OF INTERCEPTOR TRENCH. USE EXISTING PIPE IF IN ACCEPTABLE CONDITION. EXISTING PIPE HAS AN APPROXIMATE 0.8-FT OUTER DIAMETER AND 0.15-FT WALL THICKNESS.
3. PROVIDE THE FOLLOWING COMPONENTS:
   - 3/8-IN THICK STEEL PLATE FOR BLIND FLANGE, COATED.
   - EIGHT 3/4-IN DIAMETER STAINLESS STEEL BOLTS, LENGTH AS REQUIRED, WITH NUTS AND WASHERS BOTH SIDES.
   - 1/8-IN THICK NEOPRENE GASKET, HOLES PUNCHED AS REQUIRED FOR BOLTS, OUTER DIAMETER TO MATCH BLIND FLANGE.

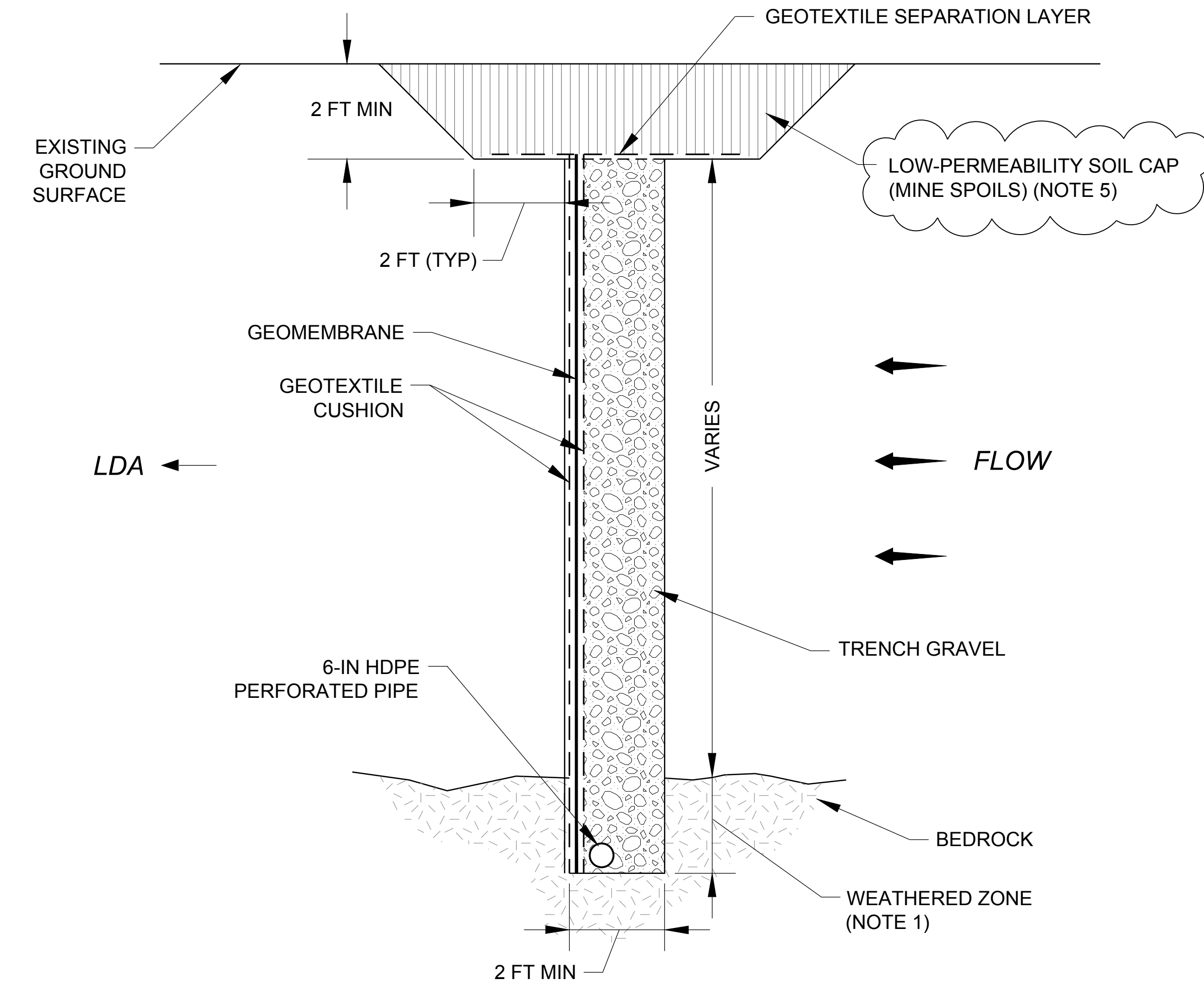
   DELIVER THESE COMPONENTS TO CONSTRUCTION MANAGER. DO NOT INSTALL.
4. INSTALL WITH HOLES IN ORIENTATION AS SHOWN AT DISCHARGE END.
5. DURING CONSTRUCTION, THE SOIL CAP DESIGN WAS MODIFIED FOR THE NORTHEAST-SOUTHWEST SECTION OF THE TRENCH, CROSSING THE MAIN ACCESS ROAD. THIS ELEMENT OF THE DESIGN WAS CHANGED TO PROVIDE ADDITIONAL SUPPORT FOR TRUCK TRAFFIC. FOR THE NORTHEAST-SOUTHWEST SECTION, GRAVEL WAS PLACED TO WITHIN 4 FEET OF THE GROUND SURFACE, FOLLOWED BY A GEOTEXTILE SEPARATION LAYER, FOLLOWED BY 2 FEET OF LOW-PERMEABILITY SOIL CAP, FOLLOWED BY A SECOND GEOTEXTILE SEPARATION LAYER, FOLLOWED BY 2 FEET OF QUARRY SPALLS AND CRUSHED ROCK SURFACING.



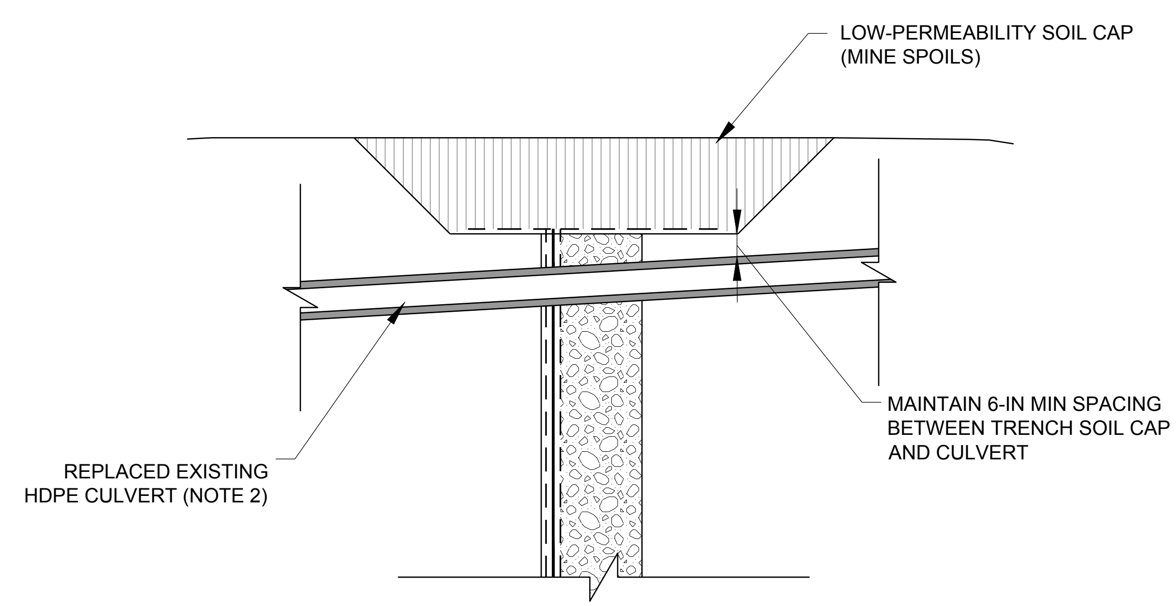
4 -- **STEEL PIPE AND FLANGE**



5 -- **HDPE PIPE PERFORATIONS**



A 030 **INTERCEPTOR TRENCH TYPICAL SECTION**



6 -- **REPLACED CULVERT SECTION**

NOT TO SCALE

AS-BUILT

Golder Associates
GOLDER ASSOCIATES INC.
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA USA 98052-3333
TEL: (425) 883-0777
FAX: (425) 882-5498

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	1-7-14	FSS	AS-BUILT	VMR	FSS	FSS
B	6-10-13	FSS/VMR	ISSUED FOR BID	VMR	SJM	FSS
A	5-1-13	FSS/VMR	ISSUED FOR REVIEW	VMR	SJM	FSS

FRANK S. SHURI, STATE OF WASHINGTON, PROFESSIONAL ENGINEER

PROJECT
RAVENSDALE SITE
LOWER DISPOSAL AREA
INTERCEPTOR TRENCH
AS-BUILT DRAWINGS

TITLE
DETAILS (2 OF 4)

PROJECT No. 073-93074-04.005		
FILE No.		AS SHOWN
REV. A	SCALE	AS SHOWN
DESIGN	FSS/VMR	6-10-13
CADD	VMR	6-10-13
CHECK	SJM	6-10-13
REVIEW	FSS	6-10-13

060

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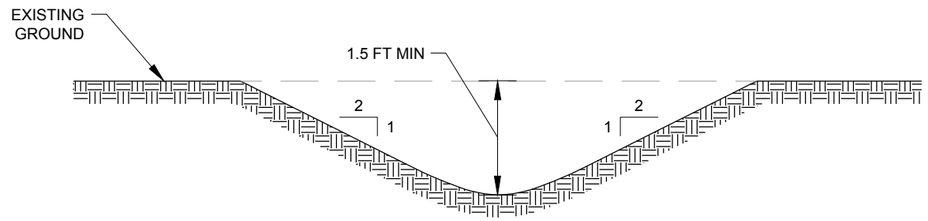
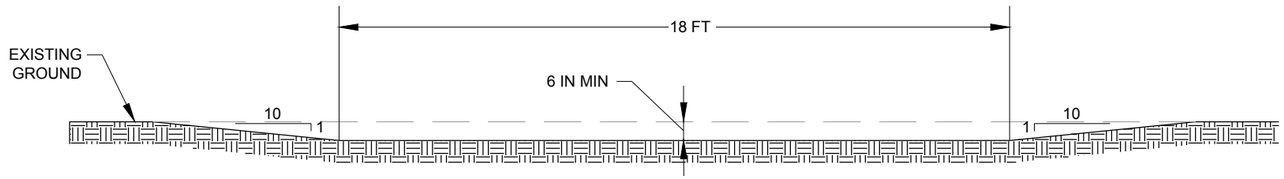
NOTES

1. SUPPORT MESH SHALL BE REQUIRED IF SPACING BETWEEN POSTS IS INCREASED OR IF IN THE OPINION OF THE CONSTRUCTION MANAGER, THE SILT FENCE IS NOT ADEQUATELY SUPPORTED TO FUNCTION AS INTENDED.
2. EXTEND SUPPORT MESH AT LEAST 3 INCHES INTO TRENCH.



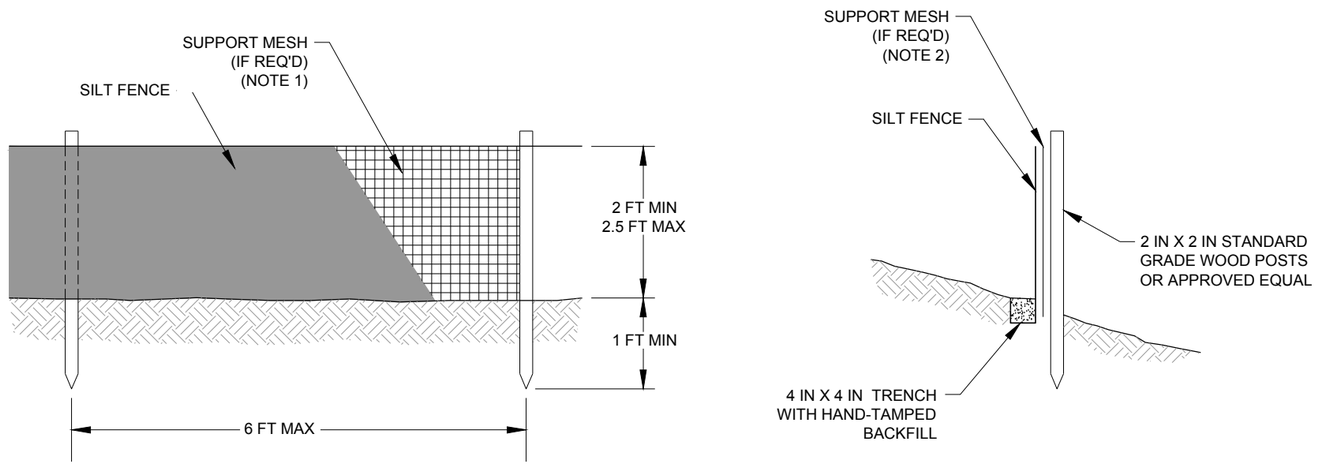
B 030 — **DRAINAGE DITCH TYPICAL SECTION**

SCALE IN FEET: 0 1 2



C 030 — **DRAINAGE SWALE TYPICAL SECTION**

NOT TO SCALE



7 -- — **SILT FENCE DETAILS**

NOT TO SCALE

AS-BUILT

Golder Associates

GOLDER ASSOCIATES INC.
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA USA 98052-3333
TEL: (425) 883-0777
FAX: (425) 882-5498

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
A	1-7-14	FSS	AS-BUILT	VMR	FSS	
B	6-10-13	FSS/VMR	ISSUED FOR BID	VMR	SJM	FSS
A	5-1-13	FSS/VMR	ISSUED FOR REVIEW	VMR	SJM	FSS

FRANK S. SHURI — STATE OF WASHINGTON — 35006 — REGISTERED PROFESSIONAL ENGINEER

PROJECT: RAVENSDALE SITE
LOWER DISPOSAL AREA
INTERCEPTOR TRENCH
AS-BUILT DRAWINGS

TITLE: **DETAILS (3 OF 4)**

PROJECT No. 073-93074-04.005		
FILE No.		AS SHOWN
REV. A	SCALE	AS SHOWN
DESIGN	FSS/VMR	6-10-13
CADD	VMR	6-10-13
CHECK	SJM	6-10-13
REVIEW	FSS	6-10-13

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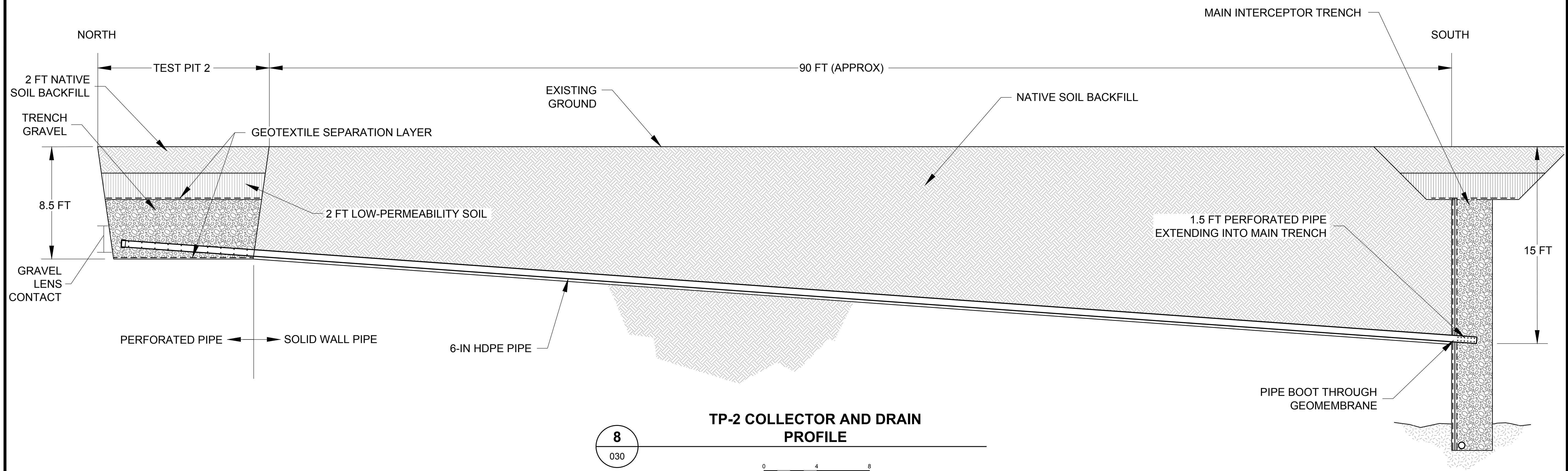
NOTES

1. AS-BUILT CONDITIONS ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS AND OBSERVATIONS.



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030

TP-2 COLLECTOR AND DRAIN PROFILE

0 4 8
SCALE IN FEET

AS-BUILT

Golder Associates

GOLDER ASSOCIATES INC.
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA USA 98052-3333
TEL: (425) 883-0777
FAX: (425) 882-5498

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
A	1-7-14	FSS	AS-BUILT	VMR	FSS	FSS

FRANK S. SHURI
STATE OF WASHINGTON
PROFESSIONAL ENGINEER

PROJECT
RAVENSDALE SITE
LOWER DISPOSAL AREA
INTERCEPTOR TRENCH
DESIGN

TITLE
DETAILS (4 OF 4)

PROJECT No. 073-93074-04.005		
FILE No.		AS SHOWN
REV. A	SCALE	AS SHOWN
DESIGN	FSS	12-26-13
CADD	VMR	12-26-13
CHECK	VMR	12-26-13
REVIEW	FSS	12-26-13

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APPENDIX B
DAILY CONSTRUCTION REPORTS

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 081913dje

DATE: 8/19/13 S S [M] T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road

PROJECT NO: 073-93074-04.0500

TASK DESCRIPTION: CQA on construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP. High 75 Low 63

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Vanessa Rayner

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald- Clearcreek
Laborer/Operator	Matt Clayton- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No	MATERIALS DELIVERED
Hitachi-Zaxis 330 LC track mounted excavator	**1**	**Yes**		8- 40' lengths of 6" diameter HDPE pipe, perforated w/ ½" holes 4 per 12" : Jim Eagle 6" IPS SDR 11 ASTM F714 PE 4710 200 PSI
Komatsu-PC228USLC track mounted excavator				5- 6" mechanical joint retainers (pipe couplers): Romac Industries, Inc. model # RG-PVC for PVC pipe 3" to 12"
John Deere-300D Pay Hauler				1- 6" Cast iron 90 degree elbow 1- 6" Cast iron 45 degree elbow 1- 6" Cast iron flange
				OFFICIAL VISITORS TO JOB SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Meet Vanessa Rayner onsite for site orientation and to go over HASP. Contractor getting equipment delivered to site this morning, HDPE piping and fittings, trench boxes, steel sheeting and small excavator.

Surveyor onsite at 9:30am to mark out interceptor trench location, Casey Hilliard with Pacific Geomatic Services. He left site at 11:20am with trench marked out.

9:50am excavation begins on interceptor trench working south-west from piezometer B-11. Mine spoils/ fill encountered from surface to approx. 15-16' b.g.s. Below 15'-16' b.g.s., yellowish-orange fine grained sandstone/ weathered bedrock was encountered. Trench dug to approx. 19' b.g.s. in this area. Total length of trench dug on this segment running s.w. today was 24'. Trench approx. 5' across

12:30pm crew switched over to excavating north section of interceptor trench working north from piezometer B-11. Similar lithology to south-west section of trench near corner, mine spoils/fill encountered until approx.15' b.g.s. then below that the yellowish-orange fine grained sandstone/weathered bedrock was encountered. As trench was dug north, sandstone/weathered bedrock daylighted towards surface as was predicted from previous test pits dug in area. Total length of excavated trench in north running section today was approx. 100'. Trench was 3' wide and started at 19' b.g.s near piezometer B-11 and at end of work day was -8' b.g.s 32' south of vault with weathered bedrock encountered at approx. -4' b.g.s. at this location.

Golder Associates Inc.

Sandstone/weathered bedrock located near piezometer B-11.

North section of interceptor trench.

QA ACTIVITY SUMMARY

All trenches excavated today were dug a minimum of 2' into weathered bedrock.

Trenches dug also appeared to have sufficient fall to insure drainage towards interceptor outfall.

No was water encountered in trench excavation today.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Location of discharge pipe outlet varies from the drawings on plan sheets, outlet is mid-way up slope instead of at toe as shown in drawings. Vanessa Rayner contacted Frank Shuri to inform him of difference in elevations and engineer recommends that rip-rap apron below pipe discharge be extended to bottom of slope.

Mechanical joint retainers delivered to site, were not approved by engineer. The Romac Industries, Inc., RG-PVC Mechanical Joint Retainers are NOT compatible with HDPE pipe as indicated on manufacturer specifications included with joint retainers. Vanessa Rayner was notified of this information and at end of work day email was sent to ClearCreek Contractors to inform them that retainers were not approved by engineers and that an engineer approved alternative would have provided to fuse/join pipe.

SAFETY COMMENTS

Trenches covered with steel plates at end of day.

SIGNATURE	TITLE
David Erickson	Field Technician

DAILY CONSTRUCTION REPORT

REPORT NO.: 082013dje

DATE: 8/20/13 S S M [T] W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road

PROJECT NO: 073-93074-04.0500

TASK DESCRIPTION: CQA on construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP. High 76 Low 62

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE	NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
David Erickson	Foreman	Mitch McDonald- Clearcreek
	Laborer/Operator	Matt Clayton- Clearcreek
	Laborer/Operator	Phil Steele- Clearcreek
	Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No	MATERIALS DELIVERED
Hitachi-Zaxis 330 LC track mounted excavator	**1**	**Yes**		6- dump truck loads + pups of -7/8" rounded washed rock
Komatsu-PC228USLC track mounted excavator				1-Partial roll of 100 mil smooth HDPE liner, smooth, one side black one side white, totaling 4500 sq. ft. 2-Rolls of Mirafi 180N Non-woven geotextile cushion fabric 15' x 300', Part # 00002 121162160; roll #'s 22935805 and 22949501
John Deere-300D Pay Hauler	**1**	**Yes**		3- Romac Industries, Amor Link 6.83 x 8, OD Range 6.54-6.73, 340 PSI, 304 SS, EPMD. + stiffeners
McElroy Trackstar fusing machine	**1**	**Yes**		

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Work activities started today with contractor using Komatsu excavator to grub vegetation on top of trench plug zone and shaping rip-rap apron ditch for discharge pipe outlet on down slope of plug zone.

Hitachi excavator continuing the excavation of north section of interceptor trench(where they had left off at end of day yesterday) At vault location, trench was dug approx. -6' b.g.s. with sandstone/weathered bedrock located -3' b.g.s. Total length of north-south trench measured from bend in trench near piezometer B-11 to limit of trench excavation to the north is approx. 162'.(62' of that dug today) Trench excavation completed by 9:10am

9:40am contractor begins fusing 6" perforated HDPE pipe together with McElroy Trackstar fusing machine.

2:05pm contractor sets 172' length of 6" perforated HDPE pipe into north-south section of interceptor trench using both excavators onsite. 90 degree elbow fused onto pipe at south end and last 10 'section of pipe is in south-west section of interceptor trench.

3:00pm contractor leaves site. Due to unapproved geomembrane and geotextile delivered onsite earlier today, work activities are temporarily halted until approved geomembrane and geotextiles are delivered to site.

Tonage of 6 loads of -7/8" rounded gravel delivered today:

1st load- 30.2 tons=20.83 yards
2nd load- 30.25 tons=20.86 yards
3rd load-30.53 tons=21.06 yards
4th load-29 tons=20 yards
5th load-29.33 tons=20.23 yards
6th load-30.92 tons=21.32 yards

Discharge pipe outlet.

North section of interceptor trench with 6” perforated pipe.

Golder Associates Inc.

QA ACTIVITY SUMMARY

All trenches excavated today were dug a minimum of 2' into weathered bedrock.

Trenches dug also appeared to have sufficient fall from surface to insure drainage once completed.

No was water encountered in trench excavation today.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

100 mil HDPE liner delivered onsite is not engineer approved. As per conversation with Vanessa Rayner, it was agreed by engineer and Clearcreek that 80 mil LLDPE would be used.

Non-woven geotextile delivered to site is not engineer approved. The Mirafi 180N fabric that was delivered has a weight of 8oz per yard. Project specifications indicate that minimum weight of non-woven geotextile is 12oz per yard.

6" pipe couplers delivered today, Romac Industries manufactured Armor Link couplers are HDPE pipe compatible but not yet engineer approved.

Loose sand/ridges from 8" long teeth on excavator bucket was observed in bottom of north trench. As directed, contractor removed loose sand and compacted remaining material at bottom of trench before pipe installation.

.

SAFETY COMMENTS

Trenches covered with steel plates and roped off with caution tape at end of day.

SIGNATURE	TITLE
David Erickson	Field Technician

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 082113dje

DATE: 8/21/13 S S M T [W] Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, Wa, 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: CQA on construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP. High 75 Low 62

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE	NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
David Erickson	Foreman	Matt Clayton- Clearcreek
Vanessa Rayner	Laborer/Operator	Mike Dearborn- Clearcreek
	Laborer/Operator	Phil Steele- Clearcreek
	Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No	MATERIALS DELIVERED
Hitachi-Zaxis 330 LC track mounted excavator	**1**	**Yes**		5- dump truck loads + pups of -7/8" rounded washed rock
Komatsu-PC228USLC track mounted excavator *machine broke down at 1:45pm today	**1**	**Y/N**		*correction to daily field report from 8/19/13. Out of the 8, 40' sections of 6" HDPE pipe delivered, 2 of those 40' sections were not perforated and were solid walled pipe with same ratings
John Deere-300D Pay Hauler	**1**	**Yes**		
McElroy Trackstar fusing machine				

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Work activities started today with contractor using both excavators to dig trench through trench plug zone. Smaller excavator started digging trench near drainage pipe discharge apron and larger excavator dug trench from above on haul road. Matt Clayton reported initially with laser grade checker that bottom of trench at corner near piezometer B-11 was 728.72 and that he was going to excavate trench at discharge pipe outlet to 727.72 which would give only give about 1' of fall for a 140' long run of pipe but would keep within the 20' maximum depth of trench as stated in specifications. Discussion with Matt included that weathered bedrock near piezometer B-11 was deeper than anticipated -15' to -16' b.g.s. and that Clearcreek removed extra material from the trench in that area at their own discretion.(trench dug approx. -19' b.g.s.) Matt agreed to excavate trench down an additional 1' bringing the outfall trench elevation to 726.28 giving approximately 2.44' of fall for the approx. 140' long run of pipe. Vanessa Rayner on site today and she called Frank Shuri to discuss amount of fall that would be required for this segment of trench. Frank stated that 2'-3' of fall for this run of pipe would be sufficient as long as pipe had positive drainage. As work day progressed Matt Clayton left site to retrieve supplies and remaining crew continued excavating trench working north-east across haul road. Vanessa spoke with remaining crew about amount of fall that was required and reiterated that engineer wanted at least 2'-3' of fall in pipe from trench section running from piezometer B-11 to discharge pipe outlet. Vanessa stated that laborer was a little confused about grade checking he was doing and what depths he was instructing operator to dig to.

Material removed from trenching today down to 721' was primarily landfill-fill/debris most likely dumped over edge when placed due to lack of consolidation and frequent caving of trench during trench excavation today. Soil is described as a brownish-orange, silty-sand with gravel and cobbles, compact to loose, damp. First 2' below road surface quarry spalls 4" to 6" in diameter.

1:00pm Matt Clayton, Vanessa and myself drove down to inspect plugged catch basin located below lower disposal area that is currently plugged and that will be cleaned out by Clearcreek with change order. Vanessa described work to be done including berm construction near plugged catch basin.

1:45pm hydraulic hose on Hitachi excavator broke leaving machine immobile with bucket extended into bottom of trench and tracks blocking half of haul road. Contractor stated that mechanic was in route from Marysville but it would be several hours before machine was fixed. All crew except for Matt left site at 2:00pm.

2:30 Matt Clayton used laser grade checker to check depths of trench dug today and he estimated that trench had been dug down to 721' approx. 40' north-east of outfall. Sometime during the shift today laborer had instructed operator to dig down an additional +/- 5' than what had been agreed upon earlier in the day. Matt is afraid that trench is now so deep that outfall pipe will not have the 2' drop onto rip-rap apron as detailed in plans. Matt's plan for tomorrow is fill in low area with +/- 2' of compacted fill to raise trench to somewhere around 723'-724' which would still give pipe run close to 5' of fall from B-11 to outfall.

Elevation of piezometer B-11 from Golder files 747.8', surveyor's stake placed next to B-11 on 8/19/13 was 747.83'

Golder Associates Inc.

Tonnage of 5 loads of -7/8" rounded gravel delivered today by Palmer Coking and Coal:
1st load- 29.36 tons
2nd load- 30.00 tons
3rd load-32.67 tons
4th load-28.42 tons
5th load-30.80 tons

Trench excavation through plug zone looking north-east.

Water in trench near piezometer B-11.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

No submittals have been received from Clearcreek regarding any materials onsite including -7/8" rounded gravel, rip-rap, 6" pipe couplers-Romac Industries manufactured Armor Link

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SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 082213dje

DATE: 8/22/13 S S M T W [Th] F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA, 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction Manager/CQA on construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP. High	TEMP. Low
68	56

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Vanessa Rayner
Frank Shuri (site visit near end of day)

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Matt Clayton- Clearcreek(until 11:00am)
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator *machine broke down at 1:45pm today	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	

MATERIALS DELIVERED

3 - rolls of PermeaTex 4120/R120 geotextile cushion, 300' x 15' (500 SQ FT.)
Roll #'s 110115643,110115642,110115635

1 - roll of Argu 80 mil LLDPE textured geomembrane liner, 23' wide, roll #338590-08, factory stickers removed from roll so total length unknown appears to be a full roll

VISITORS TO SITE

Dave Hamacher- Safety Manager for Clearcreek

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Work activities started today with contractor continuing excavation of south-west/northeast running section of trench working to the north-east across haul road. Conversation with Matt Clayton, plan for today is to fill in low spot in trench that was over-excavated yesterday with 1'-2' of compacted fill which would give 140' long pipe run from piezometer B-11 approx. 4' of fall. Fill excavated this morning has changed in color from a brownish-orange fill to a dark grey/black fill with a higher content of wood debris. Dark-gray/black fill was a silty-sand w/ gravel and cobbles similar composition to brownish-orange fill encountered yesterday with the addition of larger wood debris. Darker color fill in a wedge shape day lighting in middle of haul road approx. 76' north-east from south-west end of discharge pipe and running at 45 degree downward angle towards pipe outfall to the south-west.

9:05 Large cave-in on south wall of trench in plug zone. No trench boxes or other shoring methods were installed at time of collapse. An area approx.10' x 30' fell into trench plus some additional material stockpiled nearby nearing filling trench up to current road surface. Smaller benched trench is now large excavation significantly increasing area to be backfilled once pipe is installed. Estimated at least ½ day of work lost to collapse.

11:00am acting foreman Matt Clayton pulled offsite by Dave Hamacher, remaining crew onsite stated that Matt had not been following Clearcreek safety procedures or following directions Mitch McDonald had given him for the commencement of work.

12:20pm 81' long section of solid wall HDPE dragged into trench in plug zone, one end has HDPE flange fused onto it to bolt up to 7' steel outfall pipe. Trench boxes set into place securing trench walls.

1:30pm trench grade checked w/ laser grade checker. Contractor verified that pipe has 4' of fall in section running from piezometer B-11 to outfall.

2:30 Frank Shuri arrives onsite to do walk through

3:30 Contractor left site

3:45 during walk through with Frank it is observed that contractor had not secured north section of trench with any kind of mechanical barrier, safety fence, steel sheeting, etc. Rob Liden and Mitch McDonald with Clearcreek notified of situation. Laborer was sent back to site and used caution tape to secure trench. Mitch was notified that orange safety fence was required by specifications and Mitch stated that orange fence would be onsite tomorrow.

During walk through with Frank Shuri he requested that test pit #2 gets re-excavated to expose gravel lens that produced 10 gpm flow when it was originally dug. pH of water will be tested to determine if flow is from CKD area or from other source.

Also w/ Frank we walked up to mine mine spoils borrow area to inspect the soils that will be used for low permeability cap. To get access to the area several 4' berms will have to be removed. Soil to be used was a yellow, clayey fine grained sand with silt.

Golder Associates Inc.

Trench looking north-east from discharge pipe outlet before collapse.

Area of trench collapse on south side of trench.

Large benched excavation looking north-east after collapse.

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Golder Associates Inc.

QA ACTIVITY SUMMARY

See Above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence needs to be installed along trench at end of end of each work day.

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SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 082313dje

DATE: 8/23/13 S S M T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA, 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow [Cloudy] *Windy Fog*
*Other*_____

TEMP. High 71 Low 60

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE	NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
David Erickson	Foreman	Mitch McDonald-Clearcreek
Vanessa Rayner	Laborer/Operator	Mike Dearborn- Clearcreek
	Laborer/Operator	Phil Steele- Clearcreek
	Laborer/Operator	Marshall Brown- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

None today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Work activities started today with contractor continuing excavation of south-west/northeast running section of trench working to the north-east across haul road.

Fill excavated today was a mixture of brownish-orange fill to a dark grey/black fill (possibly coal spoils) with a higher content of wood debris similar to what was excavated yesterday.

9:45am roll of 80 mil LLDPE geomembrane thickness was verified with digital calipers, measured 0.08 inches=80 mil

Sample taken of -7/8" rounded washed gravel onsite

11:05am 6" solid walled HDPE pipe set into final place where it will be connected to perforated pipe at north-east limit of plug zone. Total length of pipe is 81'. At discharge outfall a HDPE flange was fused on end to connect to metal pipe.

12:00 begin backfilling 6" HDPE pipe in plug zone. Soil that was originally removed from trench was placed back into excavation in 8" to 12" loose lifts and was compacted with Komatsu excavator with hoe-pack attachment.

2:20pm at the request of Frank Shuri, Test pit #2 is re-dug.

0'-3' brown, compact silty-sand with gravel and cobbles, dry, organics. (mine spoils/fill)

3'-6' transition to light orange, loose, silty-sand with gravel, wet.

*6'-8' water producing gravel lens, brownish-gray, gravel with sand and trace silt, loose, wet, estimated flow 2 g.p.m. flow concentrated in north-east corner of pit indicating water is flowing south(coming from CKD area) see photos. *note this material was not encountered when excavating main infiltration trench.*

8'- ? orange, mottled, sandstone, compact, damp. (weathered bedrock similar to what was encountered in main interceptor trench). Pit was only approx. 8' b.g.s. hole caving in frequently loose backfill from previous digging of pit. Statigraphy somewhat jumbled also most likely due to previous digging in this area.

**amount of water observed in interceptor trench today in the corner of trench near piezometer B-11 has increased slightly. Water appears to have migrated through orange sandstone at bottom of trench. Water approx. 6"-7" deep and puddle was 3' x 5'*

Contractor onsite from 7:00am to 4:00pm

Golder Associates Inc.

Compaction of fill in pipe plug zone.

Water infiltrated into trench near piezometer B-11.

North and east walls of Test Pit #2 re-dig.

East and south walls of Test Pit #2 re-dig.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

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SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

DAILY CONSTRUCTION REPORT

REPORT NO.: 082413dje

DATE: 8/24/13 S S M T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow [Cloudy] *Windy Fog*
*Other*_____

TEMP.

High	Low
69	60

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Vanessa Rayner

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald-Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Marshall Brown- Clearcreek(onsite at 10:00am)

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

None Today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with the excavation of interceptor trench from plug zone working north-east across haul road. Contractor made arrangements with mine to close haul road today for trench excavation across road. Soil excavated today similar to previous fill/ mine spoils removed in this area, a mixture of brownish-orange silty-sand with gravel and cobbles with addition of large wood debris (telephone pole sections/ railroad ties) Fill sloping in layers dipping towards the south-west. Upper 2' of trench road base, consisting of quarry spalls. Fill removed was loose and unconsolidated, trench walls very unstable, collapsing every few scoops. Contractor only has 2 trench boxes onsite and one is in use at perforated pipe/solid pipe joint at beginning of plug zone and the other 20' x 10' box would not span far enough for length of trench that needs to be dug today for road crossing.

9:00am Contractor decides fill is too unstable to continue digging and the 15'-20' of trench running north-east from plug zone that was started this morning was backfilled. Contractor jumps over to where he stopped excavating trench several days ago near piezometer B-11 and starts digging to the south-west where fill was compact and trench walls stayed intact.

Water that infiltrated into the bottom of test pit #2 was tested for pH level to determine if it had been impacted by CKD area to the north. A Thermo Scientific Orion Star A211 pH meter was used to test water and was calibrated prior to use. Water level = 6' 10" from ground surface. Bottom of test pit measured at -7' 4" b.g.s .

pH= 6.67 @ 10:45am 1st sample

pH=7.04 @ 11:40am 2nd sample

-measurement taken today on upper trench length and depth for billing purposes, Vanessa Rayor recorded data in her field notes

1:10pm contractor has excavated enough material to add a short section of perforated pipe into trench. A 15' length of 6" perforated HDPE was connected to perforated pipe already in trench approx. 10' south-west of B-11. Connection was made with a Romac Industries Armor Series flexible clamp with stiffener.

2 cut pieces of 6" perforated pipe remain on surface after installation, one 16' length and one 9' length.

2:50pm contractor stages textured 80 mil LLDPE geomembrane at top of trench near clean out. Several holes were observed in liner, they appeared to be done at factory or warehouse with forklift. Holes were marked with spray paint and due to orientation of roll starting at shallow end of trench holes will be cut off roll and not used in construction.

3:05 contractor used both excavators' onsite to position geomembrane into place along north and west walls of infiltration trench. Once in position Perma Tex 12oz geotextile fabric was draped over geomembrane on both sides with a minimum 12" overlap on each panel. -7/8" rounded washed gravel was then slowly added to trench working any excess geomembrane out towards loose end of liner. As the gravel level rose inside of trench it began to pull geotextile and geomembrane downwards. The geotextile fabric "sandwich" hid geomembrane so potential wrinkles and slack in liner were hidden from view. Mitch with Clearcreek was notified that fabric would have to be opened up so that it could be verified that liner was going in without wrinkles. Mitch decided to end work day at that point and address issue in the morning.

** water level in the corner of trench near piezometer B-11 has risen slightly today. 6" HDPE pipe in trench is now submerged by 1" to 2" and puddle length is slightly longer.*

Contractor onsite at 7:00am

Contractor left site at 5:30pm

Golder Associates Inc.

Water in trench today near piezometer B-11.

Gravel lens and water in Test Pit #2 tested today.

Geomembrane staging along trench.

Geotextile/geomembrane "sandwich" getting backfilled

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

Geotextile “sandwich” needs to be opened to allow inspection of geomembrane, contractor agrees and fabric will be opened at begging of next shift.

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SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 082513dje

DATE: 8/25/13 S [S] M T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP.

High	Low
72	55

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald-Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Marshall Brown- Clearcreek
Laborer/Operator	Jim Burke- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

None today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor cutting open geotextile fabric "sandwich" so geomembrane could be inspected for defects. Once fabric was open no wrinkles or defects were visible from surface in section 20' to 40' south-west of piezometer B-11. Contractor proceeded to backfill trench with -7/8" rounded washed gravel. As contractor backfilled working east closer to corner of trench near B-11 it was observed that liner was not contouring to bottom or to corner of trench with installation methods being used. With only two excavator's onsite, one excavator had to let go of liner in order to backfill trench allowing slack in liner. Using a long piece of PVC pipe geotextile fabric was pulled away from geomembrane at corner of trench exposing several wrinkles in the liner 8" to 14". Backfilling was stopped immediately. Contractor was notified that they would have to come up with another method to install geomembrane without causing wrinkles and damage to liner. It was suggested that a 3rd excavator be brought onto site so that 2 machines could hold geomembrane in place keeping slack out of trench and the 3rd excavator could backfill with gravel.

Call to Rob Liden at 9:00am he was informed of this information and he agreed that Clearcreek would have to add additional equipment or come up with a different method to install geomembrane into trench.

Call to Frank Shuri, Frank was informed of situation mentioned above and he agrees that contractor will have to re-group and figure out a better way to install geomembrane without damaging it.

Contractor ends shift early today due to wrinkles in liner and lack of equipment to install liner properly.

Contractor backfilled over steel plate covering trench box where perforated pipe joins to solid pipe at east end of plug zone so haul road could be re-opened tomorrow.

Contractor onsite at 7:00am
Contractor left site at 11:30am

Golder Associates Inc.

Geomembrane at corner of trench.

Geomembrane on north section of trench.

Temporary haul road.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

Contractor needs to remove large wrinkles from geomembrane in trench. Additional equipment needs to be brought on site or another method to install liner needs to be used.

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SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 082613dje

DATE: 8/26/13 S S [M] T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP.

High	Low
72	55

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Vanessa Rayner
Frank Shuri

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald-Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere 430J Bulldozer	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

Chris Martin- Department of Ecology

Madeline Wall-Department of Ecology

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor waiting for new equipment to be delivered.(speed shoring, mini excavator and dozer)

8:30am another 1' to 2' of material is removed from test pit #2. Previous digging did not expose bottom of gravel lens producing water. As before, water seeping from gravel lens is focused in the north-east corner of test pit. Stream of water coming from lens 2"-3" wide and flow was steady. After material was removed weathered bedrock was exposed, a mottled orange and little gray sandstone, medium to fine grained, wet, compact, is visible below gravel lens now at approx. -8' b.g.s. This sandstone is similar in composition to sandstone/weathered bedrock encountered in interceptor trench.

9:00am Frank Shuri arrives onsite. We examine lithology test pit #2 and discuss options for tying test into main interceptor trench. Elevations will have to be verified to insure enough fall from tp 2 pit into main interceptor trench.

9:30 Vanessa Rayner onsite and speed shoring arrives. Contractor sat around for about 2.5 hrs doing no work except for digging in tp-2 which was about ½ hr for one operator

9:50 speed shoring is set and contractor enters trench to cut off excess geomembrane in bottom of trench and to contour it to slope of trench at bottom.

12:20 Chris Martin and Madeline Wall from the Department of Ecology are arrive onsite. Vanessa Rayner gives them a tour of construction site.

2:10pm contractor moves over to corner of trench near piezometer B-11 to attempt to pull up on liner with two excavators in tandem to remove/reduce wrinkles that were observed on 8/25/13 . Once excavators were positioned correctly, majority of wrinkles on corner of trench were removed. Larger wrinkle at very bottom of trench could not be pulled out and will have to be cut out. (wrinkle most likely formed from upward slope of trench and some excess liner) Mitch stated that he would need an additional aluminum shoring box delivered to site to enter trench in this deep location near B-11.

Contractor sets up laser grade checker to check elevations of drainage pipe in interceptor trench compared to elevation of water in test pit #2. Contractor reported that there is 6.7' of fall in pipe run from corner of trench near piezometer B-11 to pipe outfall. Contractor originally reported that there was 4' of fall in that pipe run when trench was dug several days ago. Water level in test pit #2 was reported 1.3' higher than top of 6" drainage pipe at 90°elbow in corner of trench near piezometer B-11.

2:50 begin the re-dig of test pit #4

0-2' brown, silty-sand w/ gravel and organics, wet, loose

2'-2.5' weathered bedrock hit, orange, mottled, sandstone, very dense, dry. No water seeps visible. Digging stopped at 2.5' sandstone very dense and excavator had difficulty digging through it. Teeth on bucket slowly chipped away at sandstone. (about ½ hr of time for 1 operator)

3:10pm move over to test pit #2 to remove a little more material out of north wall of excavation to expose more of gravel lens. Excavation walls very unstable and large collapse's occurred while we were digging. Gravel lens changes from gray to black in color as we dig deeper into north wall but is still loose gravel lens. On east wall gravel lens about 2' thick, after another 1'-2' of material was taken from north wall lens reduced to 3" to 6" and digging was stopped, majority of lens now exposed.

Contractor on site at 7:00am

Contractor left site at 4:00pm

Golder Associates Inc.

North-west corner of test pit #2 today .

Test Pit #4 re-dig today.

Geomembrane at corner of interceptor trench.

North section of interceptor trench.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

Contractor needs to remove large wrinkle from geomembrane in bottom of trench.

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SIGNATURE	TITLE
David Erickson	Field Technician

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 082713dje

DATE: 8/27/13 S S M [T] W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP. High 75 Low 61

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald-Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Marshall Brown- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere 430J Bulldozer	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

None today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor doing "busy work" while waiting for new aluminum shoring box to be delivered to site.

8:40am aluminum shoring box arrives onsite. Contractor having difficult time using new shoring box in conjunction with steel plates.

10:10am shoring is set up and contractor cuts out wrinkle/excess liner in bottom of trench near corner of trench near piezometer B-11. Contractor begins backfilling area with -7/8" gravel. Contractor used three excavators to install liner, 2 smaller machines held liner in place and the 3rd machine backfilled with the -7/8" gravel. Wrinkles on corner were pulled out using the 2 excavators before gravel was filled in that area. As In previous installation, geomembrane was "sandwiched" with 2 pieces of 12oz geotextile cushion before backfilling and the panels of fabric were overlapped with a minimum of 12"

12:20pm contractor preps road up to mine spoils borrow area where low permeability soil cap material will be mined. Several 4' berms were knocked down to build road. Soil in borrow area was a yellow, plastic silt with trace fine grained sand, loose, dry.

1:00pm corner of interceptor trench backfilled to- 2' b.g.s. with-7/8" rounded washed gravel. A separation layer of 12oz geotextile cushion was placed on top of gravel. Trench walls were then "keyed" in (an extra 2' taken out near top of trench to allow for a better surface seal with impermeable soil cap.) Soil cap material was then placed on top of fabric. Soil cap backfill is dry and needs to be moisture conditioned. There is not a watering truck onsite yet so material placed today will have to be removed and watered then compacted back above trench. Contractor prepping for switching haul road over to the east so west section of trench can be dug near plug zone. Conversation with Frank Shuri, he stated that contractor could use water in pit located to the south of site to hydrate soil cap material.

Contractor onsite at 7:00am

Contractor off site at 4:30pm

Golder Associates Inc.

Two excavators pulling wrinkles from geomembrane.

12oz geotextile fabric placed on top of drainage gravel.

Mine spoils borrow area and low permeable soil cap backfill.

Placement of soil cap for temporary haul road re-route.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

Contractor needs watering truck and/or other method to hydrate soil cap backfill.

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SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

DATE: 8/28/13 S S M T **W** Th F	REPORT NO.: 082813dje
	PROJECT NAME: Ravensdale Interceptor Trench
SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051	PROJECT NO: 073-93074-04.0600
TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench	GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*	TEMP.		GROUND CONDITIONS *(Circle all that apply)*
Clear	High	Low	*Dry* **Damp** *Wet* *Frozen*
Rain Snow Cloudy Windy Fog	72	61	*Other*_____
*Other*_____			

GCS/GAI PERSONNEL ON SITE	NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
David Erickson	Foreman	Mitch McDonald-Clearcreek
	Laborer/Operator	Mike Dearborn- Clearcreek
	Laborer/Operator	Phil Steele- Clearcreek
	Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere 430J Bulldozer	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

None Today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor continuing to backfill northern section of interceptor trench with -7/8" rounded washed gravel. Installation of geomembrane/geotextile same as previous work days. A layer of 12oz geotextile cushion was placed on each side of geomembrane with 12" overlaps before gravel backfill was added. Gravel was brought up to -2" b.g.s. Northern section of trench was backfilled up to concrete clean out vault.

12:30 contractor focuses work effort on re-routing haul road to the east so that western section of trench toward plug zone can be excavated and finished. Hillside and ditch had to be re-graded to accommodate truck traffic.

2:30 haul road re-route completed. Contractor began excavating interceptor trench working south-west towards plug zone in the same area that was collapsing on Saturday 8/24/13. Soil removed a mixture of light and dark colored fills/mine spoils and trench walls were collapsing as they did previously in this area. Large tree stump encountered -8' b.g.s., 20' east of plug zone. Operator having difficulties removing large stump, slowly chipping away at it with large excavator.

Contractor onsite at 7:00am

Contractor off site at 3:30pm

Golder Associates Inc.

Geomembrane/geotextile installation along north section of trench.

12oz geotextile fabric placed behind geomembrane along trench wall.

Northern section of trench backfilled with gravel.

Large stump encountered in trench excavation today.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

Golder Associates Inc.

Contractor needs watering truck and/or other method to hydrate soil cap backfill.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 082913dje

DATE: 8/29/13 S S M T W [Th] F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear *[Rain]* *Snow* *Cloudy* *Windy* *Fog*
*Other*_____

TEMP.

High	Low
64	60

GROUND CONDITIONS *(Circle all that apply)*
Dry *Damp* *[Wet]* *Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald-Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere 430J Bulldozer	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

None Today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor mitigating heavy rains this morning. New haul road diversion made to the east (right over piezometer B-11) too soft, constructed partially with impermeable soil cap material. Haul road was moved back to original location over plug zone to the south-west.

Excess liner trimmed off northern section of trench.

10:30am heavy rain continues and contractor decides to cancel work day due wet conditions.

Head into office to meet with Vanessa Rayner.

Contractor onsite at 7:00am

Contractor off site at 10:30am

Golder Associates Inc.

Temporary haul road diversion to the east.

Construction site looking north.

Interceptor trench looking south-west.

Interceptor trench outfall.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

Contractor needs watering truck and/or other method to hydrate soil cap backfill.

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SIGNATURE	TITLE

Golder Associates Inc.

David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 083013dje

DATE: 8/30/13 S S M T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow [*Cloudy*] *Windy Fog*
*Other*_____

TEMP.

High	Low
65	61

GROUND CONDITIONS *(Circle all that apply)*
Dry [*Damp*] *Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere 430J Bulldozer	1	Yes	

MATERIALS DELIVERED

1 dump truck and pup of quarry spalls from Washington Rock and Quarries-Kapowsin Pit, 2" to 4" rock.
31.16 Tons

VISITORS TO SITE

None Today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor placing impermeable soil cap material along north section of interceptor trench. Soil was mined from mine spoils borrow area to the north of construction site and was a yellow, plastic silt with trace fine grained sand, loose, dry. Prior to soil placement, trench walls were "keyed" in (an extra 2' taken out on each side of trench near top of to allow for a better surface seal with impermeable soil cap.) Then a separation layer of 12oz geotextile fabric was placed on top of drainage gravel and bench created by keying in trench. Soil cap material was then placed on top of geotextile fabric in 6" to 8" loose lifts and was moisture conditioned with hose and watering tank on trailer. Each lift was compacted with Komatsu excavator with hoe-pack attachment.

Quarry spalls delivered to site today were used to stabilize temporary haul road on east side of side of trench that was closed yesterday due to rains.

Contractor onsite at 7:00am
Contractor off site at 3:00pm

Golder Associates Inc.

2' "key in" of trench.

12oz geotextile fabric and loose soil cap looking north.

Moisture conditioning soil cap material.

Compaction of soil cap with hoe-pack attachment.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

SIGNATURE	TITLE
David Erickson	Field Technician

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 090313dje

DATE: 9/3/13 S S M [T] W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear [*Rain*] *Snow* [*Cloudy*] *Windy* *Fog*
*Other*_____

TEMP.

High	Low
66	61

GROUND CONDITIONS *(Circle all that apply)*
Dry *Damp* [*Wet*] *Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald- Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere 430J Bulldozer	1	Yes	

MATERIALS DELIVERED

None Today.

VISITORS TO SITE

None Today.

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor "chipping" away at large stump/log encountered last week in trench with Hitachi excavator.

8:50am stump removed from trench, contractor begins installing trench box and supplemental steel sheeting to finish last remaining section of trench/perforated pipe. Water accumulation observed in bottom of trench, possible surface run off from rain today and last week. Contractor takes water sample so pH can be read to determine origin. A Thermo Scientific Orion Star A211 pH meter was used to test pH of trench water and was calibrated prior to usage.

9:10am trench water pH = 6.76

Contractor is authorized to discharge trench water into vegetation near interceptor trench outfall

9:30am after installing steel sheets along sides of trench box, contractor realizes that bucket of large Hitachi excavator cannot fit all the way into bottom of box to dig trench due to soil and trench collapse's squeezing box together at the bottom. Mike and Kevin leave site to pick up longer trench box cross supports which will widen trench box an additional 12"

11:20am Mike and Kevin back on site with longer trench box cross supports.

11:50am contractor resumes excavating trench, large cave-ins occurring as contractor digs. This is the same unstable area that was encountered last week. Fill removed a mixture of orange and black mine spoils/construction waste.

1:00pm steel sheets removed from test pit #2.Water level in pit has risen drastically possibly due to heavy rains last week and today. From current ground surface, water level was measured at 3' 8". On 8/24/13 water level in test pit 2 was measured at 6' 10" below ground surface.

1:10pm contractor 2 steel sheets short of shoring up trench that needs to be completed. Approx. 9 steel sheets onsite currently.

1:30pm contractor sets up trash pump to remove water from trench

Contractor onsite at 7:00am

Contractor off site at 2:15pm

Golder Associates Inc.

Water in bottom of trench.

Trench caving on south wall.

Shoring system in place.

Water level in test pit #2.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

DATE: 9/4/13 S S M T W Th F	REPORT NO.: 090413dje
	PROJECT NAME: Ravensdale Interceptor Trench
SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051	PROJECT NO: 073-93074-04.0600
TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench	GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*	TEMP. High	TEMP. Low	GROUND CONDITIONS *(Circle all that apply)*
Clear Rain Snow [*Cloudy*] *Windy Fog* *Other*_____	66	60	[*Dry*] *Damp Wet Frozen* *Other*_____

GCS/GAI PERSONNEL ON SITE	NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
David Erickson	Foreman	Mitch McDonald- Clearcreek
	Laborer/Operator	Mike Dearborn- Clearcreek
	Laborer/Operator	Phil Steele- Clearcreek + Andrew Hinton @2:45
	Laborer/Operator	Kevin Bailey- Clearcreek +Mason Bailey @2:45

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No	MATERIALS DELIVERED
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes		200' of 6" SDR 11 HDPE pipe, solid walled
Komatsu-PC228USLC track mounted excavator	1	Yes		1 dump truck + pup of -7/8" rounded washed gravel, 30.23 tons
John Deere-300D Pay Hauler	1	Yes		
McElroy Trackstar HDPE pipe fusing machine	1	Yes		VISITORS TO SITE
Takeuchi-TB 250 mini excavator	1	Yes		Paul Curett- Superintendent with Clearcreek

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor installing steel sheets that were delivered this morning to supplement 10' x 20' shoring boxes in trench. Contractor then began removing sluff that had fallen into trench.

Water level in t.p. 2 has dropped about 6" since yesterday.

**note from yesterday, conversation with Frank Shuri about sub-grade in trench. Surface water runoff and possible water producing layer encountered in trench has left 6" to 12" of water in trench. Contractor will attempt to remove water and then add dry fill and bucket tap into place in low spots if possible. If contractor cannot accomplish this, additional drain rock will added into trench.*

9:50am contractor having g difficulty pumping water out of interceptor trench with 3" trash pump. Difficulty keeping prime water in pump and pump does not have enough drawing power to pull water up 20' to ground surface.

10:00am trench water tested for pH level, pH=6.93

10:50am grade checked near perforated pipe that was installed last week, contractor reports that grade is about 1' high on section of trench that was dug this morning. Additional soil was removed, very hard, bucket of Hitachi excavator having difficultly digging through it.

11:05am contractor gets submersible pump onsite and begins pumping water out of trench.

12:05pm water sample taken from discharge hose, pH= 7.31

Mitch thinks that water in bottom of trench is draining from up gradient and not a water producing lens encountered in trench. "boil" of water seen in bottom of trench is actually end of 6" HDPE pipe from upslope trench.

2:00pm both ends of previously installed pipe are exposed. Subgrade at solid pipe/perforated pipe connection is a gray, silty-sand w/ gravel and cobbles, very dense, dry.

3:00pm a 27' length of 6" HDPE perforated pipe set into trench. In order to make connection, a 3' 4" section was cut off, so total length was 23' 8". Connections were made with Romac Industries Armor Link couplers. Alignment of two trenches that were dug separately was slightly off, one trench coming north-east from plug zone and the other coming south-west from piezometer B-11. Contractor stated that Armor Link coupler's allowed for 6°of angle when attached. After connection's were made, it was difficult to determine if 6° angle was exceeded in coupler's from ground surface but angles were observed in both coupler's. It was necessary to use breaker bars to bend pipe into place to make both connections. Contractor stated that both connections were secure and 6° was not exceeded.

4:10pm all connections on HDPE were completed, entire length of 6" HDPE is now installed into interceptor trench from concrete clean out to outfall.

5:30pm contractor uses 2 excavator's to pull wrinkles out of geomembrane and position liner on trench wall. Contractor having difficulty installing geotextile on both sides of liner.

5:45pm Water flowing out of interceptor trench outfall, series of flow tests were done.

52 seconds for 1 pint/16.9 fluid ounces

57 seconds for 1 pint/16.9 fluid ounces

61 seconds for 1 pint/16.9 fluid ounces.
6:00pm contractor done working for the day, 6" perforated pipe covered with 2'-3' of -7/8" drain rock in case of trench collapse overnight.

Contractor onsite at 7:00am
Contractor off site at 6:15pm

Water in bottom of trench.

6" HDPE pipe connections with Armor Link couplers.

Water flow at interceptor outfall.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 090513dje

DATE: 9/5/13 S S M T W [Th] F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow [Cloudy] Windy Fog
*Other*_____

TEMP. High 62 Low 60

GROUND CONDITIONS *(Circle all that apply)*
Dry Damp [Wet] Frozen
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald- Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	

MATERIALS DELIVERED

VISITORS TO SITE

Runel Cruz w/ Northwest Linings
Gerardo Salgodo w/ Northwest Linings

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor placing 12oz. geotextile fabric on both sides of geomembrane that was positioned into trench yesterday. After fabric was in place contractor placed several feet of -7/8" rounded washed rock into bottom of trench.

8:20am Flow test at outfall

88 seconds for 1 pint/16.9 fluid ounces

9:00am near the end of shift yesterday, contractor realized that the piece of geomembrane that was cut off full roll was 8' short of completing geomembrane curtain all the way to plug zone as shown in plans. (contractor cut off a piece of geomembrane 150'-200' long in hopes that it would be enough to line entire ditch length from cleanout to plug zone without needing any seems welded) Mitch w/ Clearcreek requests to backfill trench as is and not extending liner by 8'. Contractor was told yesterday that he would have to extend geomembrane with a welded on panel. At Mitch's request a call was placed to Frank Shuri to see if geomembrane could be short, Frank stated that geomembrane would have to be installed as per plans with geomembrane ending at plug zone boundary.

10:45 contractor begins digging trench for tie-in to t.p. 2 starting at main interceptor trench working north towards test pit. Conversation with Mitch about elevations and he stated that the bottom of t.p. 2 measure's -14' b.g.s and that bottom of trench where t.p. 2 pipe would tie-in was -19' b.g.s

T.P. 2 trench lithology as dug today working from main trench(trench 80'+ long so lithology is generalized for length of trench)

0-2' road base, quarry spalls 4" to 6" rock

2'-4' orange-brown fill silty-sand w/ gravel and cobbles, loose, dry, wood debris

4'-6' transition to darker brown/black fill

6'-8' gray, 2' x 2' section of water producing gravel w/ silt and sand (looks similar to gravel producing lens in t.p. #2) only seen on east wall of trench closer to t.p 2

8'- large wood debris hit near main interceptor trench same stump or cedar log that was encountered in main trench excavation

Trench dug to -15' b.g.s near interceptor trench. Difficult to log trench below 8' b.g.s due to view obstruction and the mixing of soils in excavator bucket. At -15' b.g.s soil a gray silty-sand, loose, wet.

**At -6' b.g.s. 14" diameter steel corrugated storm pipe hit, 9' north of main interceptor trench. Pipe 1/3 to ½ full of hardened sediment and rock, dry.*

11:50am Crew from Northwest Linings onsite to weld on 8' wide by 12' tall geomembrane panel onto curtain and to do penetration for t.p. 2 tie-in pipe.

Liner contractor used extrusion welder to attach panel and prior to attachment geomembrane surface was scuffed with grinding wheel.

1:20pm 20' long piece of 6" HDPE pipe was set into t.p. 2 trench at interceptor trench. Trench depth approx. -15' b.g.s.

1:45pm Liner contractor fabricates pipe boot from 80 mil LLDPE liner for t.p. 2 pipe penetration through geomembrane curtain in main trench.

6" HDPE stuck into interceptor trench approx. 1'-1.5' and ½" diameter holes were drilled, 4 holes around circumference w/ 3" spacing.

3:10pm contractor wraps remaining geomembrane w/ 12oz. geotextile.(8'x12' piece attached today)
3:40pm begin backfilling trench with -7/8" rounded washed rock, a plywood board was used to separate boundary from drain rock to plug zone soil.

Contractor onsite at 7:00am
Contractor off site at 5:00pm

Culvert encountered in test pit 2 drainage trench.

Extrusion welding of 8' x12' panel.

Test pit 2 drainage pipe penetration.

Test pit #2

QA ACTIVITY SUMMARY
See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*
Orange safety fence installed around all trenches at end of work day.

SIGNATURE	TITLE
David Erickson	Field Technician

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 090613dje

DATE: 9/6/13 S S M T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow [*Cloudy*] *Windy Fog*
*Other*_____

TEMP.

High	Low
62	60

GROUND CONDITIONS *(Circle all that apply)*
Dry Damp [*Wet*] *Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Cathy Smith

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald- Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	

MATERIALS DELIVERED

Liner seaming tape-Tapecoat MS 40mil 2"x 50' stock #4700250MS; H-50 BLK Seaming Tape 6"x50' stock #4706050HB

3 loads (dump truck + pup) of -7/8" rounded washed rock, weight of each load= 37.7 tons, 32.22 tons, 31.40 tons

VISITORS TO SITE

Cathy Smith -principal engineer w/ Golder Associates

Dave Hamacher- Safety person w/ Clearcreek

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor continuing to backfill main interceptor trench w/ -7/8" drain rock where they left off at end of shift yesterday.

8:05am Flow rate test at trench outfall

*5 seconds for 1 pint/16.9 fluid ounces *heavy overnight rain*

8:20am conversation with Frank Shuri, discussed contractor's proposal to use Layfield Moldable Sealant and Layfield single sided tape to fuse an additional panel onto geomembrane curtain already in trench. In order for contractor to unroll liner in a vertical position along trench wall they had to cut 10' off roll so it would fit under cross bars of trench box. Liner curtain now needs to be extended vertically +/- 8'. Contractor was not ready to weld this panel on yesterday when liner crew was onsite yesterday and liner crew cannot return to site until 9/10/13 delaying progress of job. Frank Shuri approved the use of Layfield Moldable Sealant and Layfield single sided tape to attach geomembrane panel.

9:05am water sample at outfall for pH

pH=7.62

11:30 conversation with Dave Haumacher w/ Clearcreek, he picked up liner seaming tape at Layfield this morning. He stated that double sided tape Tapecoat MS 40mil 2"x50' was essentially to hold 2 geomembrane panels in place and then the H-50 6" seaming tape actually makes the seal in between two panels. Contractor proceeds with geomembrane panel seaming in trench. Panels were positioned with an overlap of least 6" and surface of geomembrane was cleaned off with a wire brush and rags before sealant tape was applied. Contractor used a 3" wide roller to apply double sided Tapecoat tape then the 6" H-50 seaming tape.

12:45pm Cathy Smith with Golder arrives onsite for a health and safety plan audit. Cathy is given a site tour and the background of project.

2:45pm seaming additional geomembrane panels completed, contractor then places 12oz geotextile fabric on both sides of seamed on panel and backfills area w/ -7/8" drain rock.

3:50pm contractor pulls remaining trench boxes out of interceptor trench and begins backfilling remaining "wedge" of plug zone. Due to recent rainfall, stockpiled soil onsite appears to be over optimum moisture. Contractor attempts to dig drier soil out of embankment nearby but that soil also appears over optimum moisture. Lifts were placed in 8" to 12" loose lifts and compaction efforts were made with Komatsu excavator with hoe-pack attachment. As contractor compacted lifts with hoe-pack, pumping was observed. Call to Frank Shuri, soil conditions are discussed and Frank's main concern was future settlement of trench backfill and even at an over optimum moisture soil appeared to still have engineering properties.

Contractor onsite at 7:00am

Contractor off site at 5:00pm

Golder Associates Inc.

H-50 seaming tape.

Geomembrane seaming with H-50 tape.

Compaction of plug zone fill.

Trench backfilled with -7/8" drain rock.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

SIGNATURE	TITLE
David Erickson	Field Technician

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 090713dje

DATE: 9/7/13 S S M T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow Cloudy Windy Fog
*Other*_____

TEMP. High 64 Low 60

GROUND CONDITIONS *(Circle all that apply)*
Dry Damp Wet Frozen
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Mitch McDonald- Clearcreek
Laborer/Operator	Marshall Brown - Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Jim Burke- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Hitachi-Zaxis 330 LC track mounted excavator		Yes	
Komatsu-PC228USLC track mounted excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
McElroy Trackstar HDPE pipe fusing machine	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	

MATERIALS DELIVERED

VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift began today with contractor continuing to backfill remaining "wedge" in plug zone. Fill used was mined out of nearby embankment and was a brown, silty-sand with gravel and cobbles. Soil was placed in 8" to 12" loose lifts and compaction efforts were done with Komatsu excavator with hoe-pack attachment.

8:15am Flow rate test at trench outfall

21 seconds for 1 pint/16.9 fluid ounces

pH=7.05

**test pit 2 drain pipe approx. 12' east of perforated/solid pipe connection at plug zone.*

8:55am contractor begins pumping water out of t.p. 2, water discharged over embankment near outfall of interceptor trench. Water tested for pH level, pH=7.23

Time spent so far on t.p. 2 drainage, test pit was dug 2-3 times= 2 hours for 1 operator and as of today, 30' of trench dug at -15' b.g.s at deep end(1 operator 2 hrs). + installing pipe through liner, booting pipe with liner crew (2 hrs)

Contractor re-grading area around plug zone to match existing slope and to move haul road back over plug zone.

10:15am Mitch checks t.p. 2 drainage trench grade with laser grade checker. Mitch stated that with the bottom of t.p. 2 at -8' b.g.s there will be 2.9' of fall in pipe from t.p. 2 drain sump to interceptor trench.

10:50am t.p. 2 mucked out and weathered bedrock/orange sandstone approx. -8' to -9' b.g.s start digging t.p. 2 drainage trench starting at t.p. 2 working south towards interceptor trench. Top 4' of trench fill brown silty-sand w/gravel and cobbles. -4' to -4.5' small lens of orange sandstone, 4.5'-5.5' very dense olive-gray, gravel w/ sand and trace silt.

**small water producing gravel lens crossed when excavating t.p. 2 trench. Seep approx. 2' x 2' and are -4' to -6' b.g.s located 15' south of test pit 2 drainage sump.*

2:45pm 6" HDPE pipe for t.p. 2 drainage staged next to trench, perforations were drilled into pipe ½" diameter, with 4 holes per 6". Additional holes were drilled for small gravel lens that was encountered in trench 15' from pit as requested by Frank Shuri.

Depth of trench where it comes into pit is approx. +/- -8' b.g.s. which is close to the bottom of water producing gravel lens in pit but not below it to maximize drainage which is what was described to contractor when elevations of trench were discussed before construction started. Mitch confrontational about trench elevations when questioned about how he determined depths, grade, etc. Call to Frank Shuri, he would like Vanessa Rayner to check elevations Monday morning 9/9/13 to determine if trench will be deep enough. Work is stopped until elevations of t.p. 2 can be sorted out.

4:30pm call from Paul Curett Superintendant with Clearcreek, he was upset that work was stopped at 3:00pm today so situation described above about t.p. 2 trench elevations was reiterated to him. Paul said that Mitch had described situation differently and I informed Paul about Mitch's confrontational behavior today and all week when some of Mitch's construction methods and adherence to plan specifications were questioned. Mitch's confrontational behavior began when work was stopped to due to installation methods of geomembrane curtain were causing large wrinkles around corner of trench on 8/25/13.

Golder Associates Inc.

Contractor onsite at 7:00am
Contractor off site at 3:30pm

Water producing gravel seep in test pit 2 trench. (center of photo)

Test pit 2 before clean out.

Test pit 2 drainage trench. Seep is large cobbles on trench bottom. (center)

Top of main interceptor trench, drain rock wrapped in 12oz geotextile.

QA ACTIVITY SUMMARY

Golder Associates Inc.

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

Orange safety fence installed around all trenches at end of work day.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 090913dje

DATE: 9/09/13 S S [M] T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP.

High	Low
68	60

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Vanessa Rayner

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Superintendent	Paul Curett
Site Supervisor	Rob Liden

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Komatsu-PC228USLC track mounted excavator	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	

MATERIALS DELIVERED

VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Meet Vanessa Rayner on site so she can check elevation of test pit 2 drainage trench.

Paul Curett and Rob Liden onsite at 8:00am to discuss job progress/concerns and issues. No crew onsite today. Paul state that Mitch was upset about stopping work on 9/7/13 at 3:00pm due to questions about depth/grade of tp 2 trench. Concerns of grade were discussed with Paul and Rob as well as confrontational behavior exhibited by foreman Mitch McDonald. It was explained to Paul and Rob that Mitch set elevations when test pit 2 was full of water so knowing exactly how deep to set drainage trench would only be approximate without pumping water out, removing sluff and exposing bottom of gravel lens.

Paul stated that no work would be done today but work would continue tomorrow with another foreman.

Site walk done with Vanessa Rayner.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

See above.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

DAILY CONSTRUCTION REPORT

REPORT NO.: 091013dje

DATE: 9/10/13 S S M [T] W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP.

High	Low
80	64

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Vanessa Rayner

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Andrew Hinton Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Rob Liden- Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Komatsu-PC228USLC track mounted excavator	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere-300D Pay Hauler	1	Yes	
Hitachi-Zaxis 330 LC track mounted excavator	1	Yes	

MATERIALS DELIVERED

VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift started today with contractor removing sluff that had fallen into t.p. 2 drainage sump. Water producing gravel lens was exposed again and weathered bedrock (orange mottled sandstone) below it. Elevation of trench for t.p. 2 that was dug on 9/7/13 appears to be close to the bottom of gravel lens. Vanessa Rayner field engineer onsite observed trench depth and gravel lens and her opinion was that trench depth/HDPE pipe depth was adequate for drainage. Contractor placed 1'-2' of dry fill into bottom of t.p. 2 and bucket tapped soil into place to raise subgrade to bottom of gravel lens. A piece of 12oz geotextile was then placed across bottom of pit.

9:15am flow rate test at interceptor trench outfall

112 seconds for 1 pint/16.9 fluid ounces

pH of water sample = 7.49

Additional perforations were drilled into t.p. 2 drainage pipe in attempt to catch water produced in gravel lens that was encountered when excavating trench for t.p. 2. Trench up to and just past seep was lined with 12oz geotextile fabric. A -7/8" rounded washed rock was then backfilled around perforated zone of pipe to approx. 2.5' above trench bottom covering trench seep and in direct contact with water producing gravel lens.

1:30pm -7/8" drainage rock added to t.p. 2 sump to approx. -3'-4' b.g.s

Length of HDPE pipe in t.p. 2 trench that will be fused to 20' long section already in trench is approx. 80', so total pipe length is +/- 100' long. Connection of two pipes was done with a Thermo HDPE coupler.

From ground surface it appeared that HDPE drainage pipe in t.p. 2 trench had slight "bellies". Due to unshored trench walls it was difficult to observe pipe and continuity of trench subgrade. This was brought to the attention of Rob Liden and his response was that "bellies" were not large enough to affect drainage of pipe since pipe run had a fall of '2 to 3' from t.p. 2 drainage sump over to main interceptor trench.

After thermo couple was attached, contractor backfilled t.p. 2 trench with native soil that was originally removed from trench. (brown, silty-sand w/gravel and cobbles, moist to wet) Lifts were placed in 8" to 12" loose lifts and compacted with Komatsu excavator w/ hoe pack attachment.

Offset for 14" steel corregated storm pipe that was hit when digging t.p. 2 drainage trench is 59' south piezometer P-9. Frank Shuri was called about culvert, since pipe was 1/3 to ½ full of hardened sediment/rocks and appeared not have seen any water in some time, Frank's instructions were to backfill trench without repairing or capping culvert.

4:00pm flow rate test at interceptor trench outfall

114 seconds for 1 pint/16.9 fluid ounces

Contractor onsite at 7:00am

Contractor off site at 5:30pm

Golder Associates Inc.

Bottom of test pit #2 and water producing gravel lens.

Placement of 6" HDPE pipe into test pit #2 and trench.

Perforated pipe, 12oz fabric and drainage rock in test pit #2.

Drainage rock in test pit #2 and trench seep.

Golder Associates Inc.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

See above.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 091113dje

DATE: 9/11/13 S S M T [W] Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
[Clear] *Rain Snow Cloudy Windy Fog*
*Other*_____

TEMP.	
High	Low
65	60

GROUND CONDITIONS *(Circle all that apply)*
[Dry] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Andrew Hinton Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Komatsu-PC228USLC track mounted excavator	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
John Deere-300D Pay Hauler(until 2:40pm)	1	Yes	

MATERIALS DELIVERED

VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift started today with contractor cleaning mud off Hitachi excavator, which was hauled offsite at 8:30am. Contractor still has quite a bit of backfilling to accomplish onsite and the loss of large excavator will reduce productivity. Komatsu excavator will have to switch back and forth between bucket and hoe-pack.

7:30am Flow rate test at interceptor trench outfall

120 seconds for 1 pint/16.9 fluid ounces

pH of outfall water = 7.80

Additional -7/8" rounded washed gravel added to test pit 2 drainage sump, gravel approx. 2'-3' b.g.s. contractor spent .5 to 1 hour adding additional gravel to sump.

9:40am contractor begins backfilling main interceptor trench. Work halted due to contractor not "keying" in sides of trench as plans show. Crew upset that an additional material (approx. 2' wide by 4' deep) will have to be excavated from trench side walls, contractor did not have plan set so plan sheet with trench details were shown to contractor showing key in and geotextile overlap on bench.

10:30am sides of trench are "keyed" in and a piece of 12oz geotextile fabric was placed across drainage rock and onto keyed bench.

Crew realizes that more low permeable soil is needed to complete interceptor trench and test pit drainage, large pay hauler will be taken offsite today so contractor hauls down 2 more loads of low-perm soil.

11:30am Contractor's work pace has appeared to have slowed today, so far in 4.5 hrs of shift, 40' of trench was keyed in, 1 load of gravel added to tp 2 and 1 loose lift of low perm material was placed on tp 2

11:45am crew begins backfilling test pit 2 and interceptor trench with low permeable soil (yellow plastic silt mined from mine spoils area) Watering trailer was used to moisture condition soil and material was placed in 8" to 12" loose lifts. Compaction efforts were made with Komatsu excavator with hoe-pack attachment. As instructed by engineer Frank Shuri design change will be implemented on remaining interceptor trench and on test pit 2 drainage sump. Plans originally called for -7/8" drain rock -2" b.g.s and then from -2' to 0' would be impermeable soil cap. Due to concerns with erosion and heavy traffic loads over trench, impermeable layer will dropped down to -4' to -2' b.g.s and from -2' to 0' b.g.s native soil/stockpiled material removed from trench will be used to backfill remaining -2' of trench.

1:50pm contractor using mini-excavator to place native fill on top of impermeable soil cap. Komatsu excavator backfilling t.p. 2 trench with native fill switching in-between hoe pack and bucket. Mike and Andrew of Clearcreek have done no work in the last 2 hours, they have been sitting in truck or watching Phil and Kevin backfill with excavator's

2:20pm work stopped to load trench boxes onto flatbed

2:40pm John Deere Pay Hauler(large off road dump truck) taken offsite

3:10pm trench boxes loaded and hauled away. Unused geomembrane and geotextile loaded and taken offsite.(full roll of 100 mil HDPE, full roll of 8oz geotextile)

3:30pm contractor returns to backfilling t.p. 2 trench.

3:50pm Flow rate test at interceptor trench outfall
118 seconds for 1 pint/16.9 fluid ounces

Contractor onsite at 7:00am
Contractor off site at 4:10pm

Moisture conditioning of low permeable soil over test pit 2 sump.

Compaction of low-permeable soil over interceptor trench.

Soil used to backfill top 2' of interceptor trench.

Looking south-west over infiltration trench after backfill.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

See above.

SIGNATURE	TITLE
David Erickson	Field Technician

DAILY CONSTRUCTION REPORT

REPORT NO.: 091213dje

DATE: 9/12/13 S S M T W [Th] F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow [*Cloudy*] *Windy Fog*
*Other*_____

TEMP.

High	Low
60	57

GROUND CONDITIONS *(Circle all that apply)*
[*Dry*] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson
Vanessa Rayner

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Andrew Hinton Clearcreek
Laborer/Operator	Phil Steele- Clearcreek
Laborer/Operator	Kevin Bailey- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Komatsu-PC228USLC track mounted excavator	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
Track mounted dump vehicle	1	Yes	

MATERIALS DELIVERED

4’ 8” x 4’ 8” x 3’ 6”concrete vault

6” diameter, 6’ long steel epoxy coated pipe, double flanged.

VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift started today with contractor compacting upper lift of what remains of interceptor trench with Komatsu excavator with hoe-pack attachment. Soil used was primarily what was dug out for “key” in of trench which was gravel with brown silty-sand and cobbles. Some impermeable soil (yellow plastic silt) that was used in-between 4’-2’ b.g.s in trench backfill was mixed in at surface.

9:00am head down to travertine bench with Vanessa Rayner and Andrew Hinton. Look at scope of work, original estimate had new berm size at 2’ high and 25’ long but when measured berm was approx. 45’ long and about 1’ tall at catch basin but got taller as road dipped downhill with a height of 3’-4’. Andrew stated that he might need a change order and would discuss berm with Rob Liden. It was suggested that material to construct berm be dug from side of road up near travertine bench where road widened to save Clearcreek time. Frank Shuri was called and he ok’d the use of this material instead of hauling down low-perm soil and mixing it with other fill that would have to be mined from another location somewhere at landfill/mine.

10:15am rest of Clearcreek crew comes down to travertine bench with a track-mounted dump vehicle, small excavator and submersible pump.

10:40am begin pumping down plugged catch basin using 2” discharge hose and submersible pump, water was pumped into 4” clean out located 36’ north of plugged catch basin.

11:20am water completely pumped out of c.b., sediment in catch basin approx. 18” deep and was mostly sand w. trace silty reddish brown.

11:40am begin constructing berm near plugged catch basin. Soil was mined from road shoulder south of catch basin near travertine bench and was a moist, orange-brown sandy-silty with gravel. Soil was placed with Takeuchi mini-excavator and was bucket tapped in place.

2:45pm berm work completed, berm approx. 4’ tall on down slope end and approx. 2’ tall next to catch basin where it starts on upslope end. Contractor used a fish tape and was able to get fish tape up through 4” 90° elbow cb outlet and into 3’-4’ long pipe connecting c.b. to main 4” line and was unable to get past “T” at main line intersection.

Conversation with Andrew Hinton, he stated that since plug was not in catch basin itself, Rob Liden had told him that cleaning out 4” pipe was out of scope and not included in original bid.

Additional earthwork completed today: Slope at interceptor trench outfall was re-shaped and small berm was built on top along shoulder of haul road.

10” HDPE culvert that was cut in order to construct upper interceptor trench was exposed for repair.

Ditch for same culvert that was cut, that flows over test pit 2 drainage trench was also dug.

Ditch was dug up at mine spoils area along access road to encourage drainage where low-permeable soil was mined out for interceptor trench construction. Trench was dug to divert surface water away from LDA area below. Berms that were removed to gain access to mine spoils area were also reconstructed.

3:20pm Flow rate test at interceptor trench outfall
121 seconds for 1 pint/16.9 fluid ounces
pH of outfall water = 7.35

Contractor onsite at 7:00am
Contractor off site at 3:15pm

Sediment level in plugged catch basin on travertine bench.

Berm construction on travertine bench.

10" HDPE culvert to be repaired.

Drainage ditch dug on mine spoils bench.

QA ACTIVITY SUMMARY
See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*
See above.

SIGNATURE	TITLE
David Erickson	Field Technician

DAILY CONSTRUCTION REPORT

DATE: 9/13/13 S S M T W Th [F]	REPORT NO.: 091313dje
	PROJECT NAME: Ravensdale Interceptor Trench
SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051	PROJECT NO: 073-93074-04.0600
TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench	GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*	TEMP. High	TEMP. Low	GROUND CONDITIONS *(Circle all that apply)*
Clear Rain Snow [*Cloudy*] *Windy Fog* *Other*_____	61	60	[*Dry*] *Damp Wet Frozen* *Other*_____

GCS/GAI PERSONNEL ON SITE	NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
David Erickson	Foreman	Andrew Hinton Clearcreek
	Laborer/Operator	Mike Dearborn- Clearcreek
	Laborer/Operator	Kevin Bailey- Clearcreek
	Laborer/Operator	Phil Steele- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No	MATERIALS DELIVERED
Komatsu-PC228USLC track mounted excavator	1	Yes		4' 8" x 4' 8" x 3' 6"concrete vault
Takeuchi-TB 250 mini excavator	1	Yes		6" diameter, 6' long steel epoxy coated pipe, double flanged.
				VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift started today with contractor loading steel sheets used for shoring onto flat bed truck. Time also spent picking up and loading trash into dump truck.

Time also spent chipping hole into bottom concrete clean out vault for 6" HDPE pipe penetration at top of trench. Cleanout dimensions, 4' 8" x 4' 8" and 3' 6" deep.

8:05am Flow rate test at interceptor trench outfall

126 seconds for 1 pint/16.9 fluid ounces

pH of outfall water = 7.83

Travertine bench this morning: new berm built around catch basin yesterday overflowing near high end next to c.b. onto road and off road into forest next to c.b. Shovel was used to redirect flow back down road

10:30am crew finishes load steel sheets and begins excavating hole for concrete clean out

**Dan an operator that works at landfill/mine stops by site and voices concerns about the re-construction of haul road. Road surface is now a blend of native soil(brown silty-sand with gravel and cobbles), quarry spalls and a small amount impermeable soil(yellow plastic silt) When interceptor trench was initially dug, a woven geotextile road mat and 2' of quarry spalls were removed from road and quarry spalls ended up getting mixed in with the rest of fill removed from trench. Dan had concerns about road rutting out and settling over time and during wet weather. He stated that if owner of landfill has to fix road, Golder will receive the bill for the work. Frank Shuri was notified of conversation above. Due to the large amount of rock and quarry spalls in upper 2' of trench backfill, Frank felt that settlement would be minimal and with grading done by the mine disruption would be minimal or non-existent. Frank also mentioned that he had a conversation with the president of Clearcreek and that Clearcreek would fix road at later date if there was a problem with rutting and settlement.*

1:30pm contractor installs 6' long, 6" steel extension pipe at end of outfall pipe. Steel pipe had a green epoxy coating and was installed with the proper bolt hole orientation as per plans to allow for future valve or blind flange. Contractor then dug outfall ditch running below steel outfall pipe out to bioswale. Contractor was instructed to dig a 2'-3' wide U-shaped trench down to bio-swale and armor ditch with quarry spalls as per conversation w/ Frank Shuri prior to work. After trench was lined with quarry spalls trench ended up 6'-8' wide. Bioswale was dug out below trench extending into forest at low spot that previously marked by engineer.

Contractor onsite at 7:00am

Contractor off site at 3:15pm

Golder Associates Inc.

6" pipe penetration into concrete clean out vault.

Outfall ditch excavation.

Outfall ditch completed.

Bioswale excavation.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

See above.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

REPORT NO.: 091413dje

DATE: 9/14/13 [S] S M T W Th F

PROJECT NAME: Ravensdale Interceptor Trench

SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051

PROJECT NO: 073-93074-04.0600

TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench

GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*
Clear Rain Snow [*Cloudy*] *Windy Fog*
*Other*_____

TEMP.

High	Low
64	60

GROUND CONDITIONS *(Circle all that apply)*
[*Dry*] *Damp Wet Frozen*
*Other*_____

GCS/GAI PERSONNEL ON SITE
David Erickson

NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
Foreman	Andrew Hinton Clearcreek
Laborer/Operator	Mike Dearborn- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No
Komatsu-PC228USLC track mounted excavator	1	Yes	
Takeuchi-TB 250 mini excavator	1	Yes	
Vacuum/Jetting Trailer	1	Yes	

MATERIALS DELIVERED

None today.

VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

Shift started today with c contractor working to unplug catch basin on travertine bench. Contractor used a motorized pipe snake to snake out 4" main line near plugged c.b. Snake was fed in at clean out working uphill towards c.b.

8:40am pipe snake gets past "T" in mainline that ties into plugged c.b. Water level begins to drop in c.b. and bermed area nearby that has pooled. Contractor stated that there was hair on pipe snake near drill bit end so it appears an animal had gotten into pipe causing plug.

Grass seed was spread where soil was mined to construct berm around travertine catch basin. Contractor used hand held grass seed spreader and used a DuraTurf brand, High traffic Mix grass seed that was purchased at the local hardware store. Andrew Hinton with Clearcreed was shown specs for grass seed, mulch and fertilizer. He stated that spreading grass seeding by hand was all that could be done today.(no straw, mulch or fertilizer)

-on arrival to site today, landfill employees were removing soil/dbris that had been dumped in front of locked gate yesterday. Description of truck and driver that was parked in front of gate yesterday on departure from site was given to landfill employees.

-Drainage holes made in sediment cleanout at top of interceptor trench. 2, 2" diameter holes were drilled into bottom of concrete cleanout.

-10" Culvert was repaired that was cut during construction of interceptor trench, a 10' long piece of HDPE IPS SDR 11 was attached to existing culvert with a Fern-Co Strong back coupler with stainless band, 10" x 10"

-ditch restored along side of road running along north section of interceptor trench. Small berm was built next to ditch to match ditch uphill from interceptor trench.

-general re-grading work done in construction area, berm near piezometer P-9

*-bio-swale at bottom of outfall ditch was grass seeded with same mix used at travertine bench. It was mentioned to contractor that any disturbed area's needed to be seeded, i.e. entire outfall slope, tp #2 area, new berm at travertine bench, etc. Andrew stated that outfall slope was too large to do by hand and that it didn't have grass on it when construction started. Also, Andrew stated that grass seeding methods(no mulch or straw used to hold seed in place) and what was to be seeded would have to be worked out later between Rob Liden and Golder. Conversation with Frank Shuri, he stated that grass seed mix used today was ok but mulching, fert, and what was to be seeded would have to be worked out with Clearcreek. *today last day of construction, contractor demobing completely after today's shift.*

12:00 Flow rate test at interceptor trench outfall

*26 seconds for 1 pint/16.9 fluid ounces *increase from last 5-6 days of flow tests, no visible signs of overnight rain onsite.*

pH of outfall water = 7.06

CONSTRUCTION ITEMS/ISSUE'S REMAINING AT END OF DEMOBILIZATON TODAY

Clearcreek needs to provide blind flange for outfall, Andrew provided 8, stainless steel nuts/bolts and gasket.

Golder Associates Inc.

Grass seed/mulch interceptor trench outfall slope, test pit 2 area, new berm at travertine bench. Methods of seeding also need to be worked out, e.i. straw, hyrdo seed, etc. CKD area needs to be mowed, Clearcreek stated that mowing work would be contracted out but has not been completed as of 9/14/13.

Contractor onsite at 8:00am
Contractor off site at 1:30pm

Travertine bench catch basin plugged.

Travertine bench catch basin unplugged after work.

10" HDPE Culvert repair.

Ditch/berm restoration along upper haul road.

QA ACTIVITY SUMMARY

See above.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

See list above with remaining construction items to be addressed.

SIGNATURE	TITLE
David Erickson	Field Technician

Golder Associates Inc.

DAILY CONSTRUCTION REPORT

DATE: 9/21/13 S S M T W Th F	REPORT NO.: 092113dje
	PROJECT NAME: Ravensdale Interceptor Trench
SITE LOCATION: 28131 Ravensdale-Black Diamond Road, Ravensdale, WA 98051	PROJECT NO: 073-93074-04.0600
TASK DESCRIPTION: Construction manager/CQA overseeing construction of interceptor trench	GOLDER CONSTRUCTION MANAGER: David Erickson

WEATHER *(Circle all that apply)*	TEMP. High	TEMP. Low	GROUND CONDITIONS *(Circle all that apply)*
Clear Rain Snow Cloudy Windy Fog *Other*_____	65	60	*Dry Damp Wet Frozen* *Other*_____

GCS/GAI PERSONNEL ON SITE	NO. SUBCONTRACTOR PERSONNEL BY JOB CATEGORY	
David Erickson	Foreman	Andrew Hinton Clearcreek
Vanessa Rayner	Laborer/Operator	Phil Stevens- Clearcreek
	Laborer/Operator	Jason Bartholimul- Clearcreek

EQUIPMENT ON SITE *(Brief description)*	No. Units	Working Yes	Working No	MATERIALS DELIVERED
Komatsu-PC138us track mounted excavator	1	Yes		8 bails of straw
Takeuchi-TB 250 mini excavator	1	Yes		2, 50lbs bags of grass seed ForageMax brand, All purpose pasture mix
Dump Truck	1	Yes		Rock for road repair delivered sometime before today's shift: Several loads of -2" crushed rock(approx. 3 loads truck + pup) Several loads of 4" to 8" quarry spalls(approx. 5-6 loads)
				VISITORS TO SITE

CONSTRUCTION ACTIVITY SUMMARY *(Brief description of work in progress)*

9:10am Flow rate test at interceptor trench outfall

144 seconds for 1 pint/16.9 fluid ounces

Contractor on site today for haul road repair and to finish remaining items on construction punch list.

Meet Vanessa Rayner on site, go over items on final construction punch list. Contractor arrives onsite at 8:00am, punch list given to Andrew Hinton. He was under the impression that today's work would only be repair of haul road and some additional grass seeding. Vanessa Rayner stated she had conversation with Rob Liden yesterday discussing the remaining items on punch list, Rob had not commicated this withAndrew. Vanessa also explained to Andrew that the mine/landfill also wanted the entire driving surface repaired and not just the width of haul road.(Some rutting observed closer piezometer B-11 east of haul road.) Andrew stated that there was not enough quarry spalls and rock onsite to repair entire driving surface today but focus would be on haul road. Andrew also stated that lining inboard side of ditch along upper portion of interceptor trench would need to be a change order and he would not do that work today.

Contractor used mini-excavator to dig out outfall bio-swale a little deeper so that water would not pond. Area surrounding bio-swale was also cleaned up.

Komatsu Excavator was used to excavate -2'-3' b.g.s. on haul road for repair. Area dug out was approximately 40' x 40' . A piece of Mirafi 180N geotextile fabric was placed in bottom of excavation before 4" to 8" quarry spalls were placed. Spalls were bucket tapped into place and then a finishing lift of -2" crused rock approx. 2"-4" thick was placed and compacted with Komatsu Excavator with hoe-pack bucket attachment. After 40' x 40' area on haul road was repaired contractor attempted to repair rutting area east towards B-11. Quarry spalls almost gone so contractor dug an additional area 20' x 10' and -1' b.g.s. used remaining spalls for shallower repair and temporary fix.

<u>Other items done on punch list today</u>

-road was re-graded near clean-out vault to remove temporary drainage ditch that was dug across road.

-leaning bollard for well MWB-3LDA northwest of site was straitened out withexcavator bucket

-corner berm near piezometer P-9 had additional soil added to it and was re-worked

<u>Area's grass seeded today with all purpose pasture mix seed</u>

-Test pit 2 drainage sump area +straw mulch

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-Interceptor trench outfall slope +straw mulch
-bio-swale below outfall and surrounding area +straw mulch
-travertine bench berm, road and shoulder of road +straw mulch
-upper infiltration trench berm and ditch

CONSTRUCTION ITEMS/ISSUE'S REMAINING AT END OF DEMOBILIZATON TODAY

Clearcreek needs to provide blind flange for outfall, Andrew provided 8, stainless steel nuts/bolts and gasket.
LDA area needs to be mowed, Clearcreek stated that mowing work would be contracted out but has not been completed as of 9/14/13.
Line inboard side of ditch along upper portion of interceptor trench with rock.
Re-grade Mine Spoils Borrow Area to south and eliminate ponding.
Provide 3 keys(or specialized both tools) for cleanout vault access hatch.
Provide as built drawings

Contractor onsite at 8:00am
Contractor off site at 3:30pm

Haul road repair with geotextile fabric and quarry spalls

Finished road repair with -2" top course.

Outfall slope grass seeded and mulched.

Travertine bench berm and road grass seeded and mulched.

QA ACTIVITY SUMMARY
See above.

Golder Associates Inc.

ISSUES AND RESOLUTIONS *(Describe conditions, meetings and discussions, action taken)*

See list above with remaining construction items to be addressed.

SIGNATURE	TITLE
David Erickson	Field Technician

FORM QCA-02A R1

APPENDIX C
CONSTRUCTION PHOTOGRAPHS

Ravensdale Site – LDA Interceptor Trench Construction

PHOTO 1

Surveyed interceptor trench alignment and staking (looking northeast across main access road).

8-19-2013

PHOTO 2

Excavating the north-south portion of the interceptor trench (looking north, Lower Disposal Area [LDA] is to the left of the north access road).

8-20-2013

PHOTO 3 North-south portion of interceptor trench with perforated 6-inch high-density polyethylene (HDPE) pipe (looking south, north access road to the right, main access road at bottom of hill). 8-20-2013	
PHOTO 4 Joining sections of 6-inch HDPE pipe – butt fusion method. 8-21-2013	

PHOTO 5 Placing solid wall 6-inch HDPE pipe through plug zone (looking southwest). 8-23-2013	
PHOTO 6 Compacting backfill in plug zone (looking south). 8-23-2013	

PHOTO 7 Placing perforated 6-inch HDPE pipe in northeast-southwest portion of interceptor trench (looking north). 8-24-2013	
PHOTO 8 Positioning geomembrane against north and west walls of interceptor trench (looking north). 8-24-2013	

PHOTO 9

Backfilling northeast-southwest portion of interceptor trench with gravel (looking north).

8-24-2013

PHOTO 10

Preparing to trim geomembrane and geotextile to contour to trench bottom (looking north).

8-26-2013

PHOTO 11 Backfilling north-south portion of interceptor trench with gravel and placing geotextile separation layer (looking north). 8-27-2013	
PHOTO 12 North-south portion of interceptor trench backfilled with gravel (looking south). 8-28-2013	

PHOTO 13 Moisture-conditioning and compacting low-permeability soil cap along north-south portion of interceptor trench (looking north). 8-30-2013	
PHOTO 14 Compaction of low-permeability soil cap along north-south portion of interceptor trench (looking north). 8-30-2013	

PHOTO 15 Work at interceptor trench-plug zone transition with main access road temporarily re-routed to west (looking southwest). 9-3-2013	
PHOTO 16 HDPE pipe connections at the interceptor trench-plug zone transition with Romac Industries Armor Lock Restraint Couplers and Stiffeners (looking southwest). 9-4-2013	

PHOTO 17 Trench box and steel sheeting at interceptor trench-plug zone transition (looking northeast). 9-5-2013	
PHOTO 18 TP-2 trench HDPE pipe penetration into main interceptor trench (looking north). 9-5-2013	

PHOTO 19 Northeast-southwest portion of interceptor trench backfilled with gravel; note intersection of TP-2 trench to right (looking southwest). 9-6-2013	
PHOTO 20 Excavation of TP-2 trench; note seepage in TP-2 in foreground (looking south). 9-7-2013	

PHOTO 21 Perforated 6-inch HDPE pipe at the bottom of TP-2 (looking east). 9-10-2013	
PHOTO 22 Gravel backfill above perforated 6-inch HDPE pipe in TP-2 (looking south). 9-10-2013	

PHOTO 23 Backfill of TP-2 trench (looking east). 9-10-2013	
PHOTO 24 Low-permeability soil cap placement over gravel and geotextile separation layer in TP-2 (looking north). 9-11-2013	

PHOTO 25 Moisture-conditioning and compacting low-permeability soil cap over northeast-southwest portion of interceptor trench (looking southwest). 9-11-2013	
PHOTO 26 Preparing to place concrete vault over pipe cleanout at north end of interceptor trench (looking south). 9-13-2013	

PHOTO 27 Concrete vault over pipe cleanout at north end of interceptor trench (looking north). 9-19-2013	
PHOTO 28 Reconstruction of main access road (looking north, north access road in background). 9-21-2013	

PHOTO 29 Pipe discharge, riprap armoring, and drainage swale into woods to west (looking southwest). 10-19-2013	
PHOTO 30 Pipe discharge slope (looking northeast). 10-19-2013