



December 3, 2012

Mr. Charles Gruenenfelder
Washington State Department of Ecology
Eastern Regional Office
4601 N. Monroe
Spokane, Washington 99205

RE: Final Report
2012 Annual Performance Monitoring
Black Sand Beach Project
Stevens County, Washington
URS Job No. 36310154

Dear Mr. Gruenenfelder:

Presented in this letter report is a summary of the second annual performance monitoring event conducted at Black Sand Beach in Stevens County, Washington on October 8, 2012. The purpose of this report is to document sediment erosion and/or re-deposition changes in the Black Sand Beach that have occurred following completion of the Black Sand Beach project in October 2010. The 2012 annual performance monitoring event was performed in accordance with a Washington Department of Ecology (Ecology) – approved Performance Monitoring Plan dated March 2010. Similar to the 2011 annual performance monitoring event, the 2012 annual performance monitoring event included obtaining photographs, making visual observations, and performing a topographical survey.

BACKGROUND

Black Sand Beach is a locally recognized beach along the southeastern bank of the Columbia River just downstream from United States Geological Survey (USGS) Columbia River Auxiliary Gage Station at approximately river mile 743.

The project was conducted by Teck American Incorporated (TAI) pursuant to an Interim Action Voluntary Cleanup Program Agreement (VCP Agreement) between TAI and Ecology dated July 13, 2009. As described in the VCP Agreement and consistent with the approved March 2011 “*Black Sand Beach Project Completion Report & Performance Monitoring Plan, Black Sand Beach, Stevens County, Washington*”, annual performance monitoring is carried out to record changes in site conditions, including sediment erosion and/or re-deposition that may occur.

FIELD MONITORING SUMMARY

The 2012 performance monitoring event was performed by David Enos and Paul McCullough of URS Corporation (URS) on October 8, 2012. The monitoring event consisted of performing a

topographic survey within the project site area, documenting visual observations, and obtaining photographs at pre-selected stations.

During the performance monitoring event on-site stakeholders included:

- The Washington State Department of Ecology (Charles Gruenenfelder and Jeremy Schmidt);
- The Washington State Department of Natural Resources (Brett Walker);
- The Citizens for a Clean Columbia (Mindy Smith, Gary Crakes, Joe Wichmann); and
- TAI (Marko Adzic and Kris McCaig).

The surveyed elevation of the upper Columbia River near the site at the time of the October 8, 2012 monitoring event was between 1298 to 1299 feet above mean sea level (amsl) based on the North American Vertical Datum of 1988 (NAVD88). This river elevation at the time of the “As-Built” topographic survey performed on November 1, 2010 was 1299.3 feet amsl. The river discharge at the time of October 8, 2012 monitoring event was approximately 76,500 cubic feet per second (cfs) and the river discharge at the time of the “As-Built” topographic survey was 73,300 cfs, as reported by the USGS web site for Gage Number 12399500, Columbia River at International Boundary.

RESULTS

Results of the 2012 annual performance monitoring event, and previous monitoring events, are included in the following attachments:

- **Table 1 – Surface Elevation Measurement and Visual Observation Monitoring Results.** Table 1 compares surface elevations at established surface elevation monitoring locations at the time of the As-Built survey on November 1, 2010 and the 2011 and 2012 Annual Performance Monitoring Surveys (October 3, 2011 and October 8, 2012). Visual observations of the beach sediments are also recorded for the October 8, 2012 monitoring event.
- **Figure 1 – 2010 Topographic Survey Map:** Figure 1 illustrates 1-foot (ft) topographic elevation contours at time of As-Built Survey following completion of the Black Sand Beach project. The topographic survey was performed by a licensed land surveyor (Survey Solutions) on November 1, 2010.
- **Figure 2 – 2011 Topographic Survey Map:** Figure 2 illustrates 1-ft topographic elevation contours at the time of the 2011 Annual Performance Monitoring (October 3, 2011). This topographic survey was performed by Survey Solutions.
- **Figure 3 – 2012 Topographic Survey Map:** Figure 3 illustrates 1-ft topographic elevation contours at the time of the 2012 Annual Performance Monitoring (October 8, 2011). This topographic survey was performed by Survey Solutions.
- **Figure 4 – ISOpach 2010 As-Built Survey vs. 2011 Survey:** Figure 4 illustrates 0.5-ft contours depicting the difference in surface elevations between the 2010 and 2011

surveys. These contours illustrate areas where erosion and deposition occurred during the first year following construction. The calculated volume difference between the November 1, 2010 and October 3, 2011 topographical features is a net decrease (loss) of 401 cubic yards, as calculated using Autodesk Civil 3D[®].

- **Figure 5 – ISOpach 2011 Survey vs. 2012 Survey:** Figure 5 illustrates 0.5-ft contours depicting the difference in surface elevations between the 2011 and 2012 surveys. These contours illustrate areas where erosion and deposition occurred between 2011 and 2012. The calculated volume difference between the October 3, 2011 and October 8, 2012 topographical features is a net decrease (loss) of 77 cubic yards, as calculated using Autodesk Civil 3D[®].
- **Figure 6 – ISOpach 2010 Survey vs. 2012 Survey:** Figure 6 illustrates 0.5-ft contours depicting the difference in surface elevations between the 2010 (as-built) and 2012 surveys. These contours illustrate areas where erosion and deposition have occurred following construction in 2010. The calculated volume difference between the November 1, 2010 and October 8, 2012 topographical features is a net decrease (loss) of 478 cubic yards, as calculated using Autodesk Civil 3D[®].
- **Figure 7 – Performance Monitoring Locations:** Figure 7 depicts locations of pre-selected photographic stations and surface elevation monitoring point stations. These stations were identified in the Completion Report for subsequent monitoring and are intended to provide a consistent set of locations to document changes in beach conditions over time.
- **Figure 8 – 2010 As-Built Photographs:** Figure 8 presents a map showing positions and approximate directions that photographs were taken, as well as the corresponding photograph. Photographs depicted on this figure were taken in October 2010 and are consistent with those presented in Appendix E of the Completion Report.
- **Figure 9 – Performance Monitoring Locations and 2011 Photographs:** Figure 9 illustrates surface elevations and photographs recorded during the October 3, 2011 Annual Performance Monitoring event.
- **Figure 10 – Performance Monitoring Locations and 2012 Photographs:** Figure 10 illustrates surface elevations and photographs recorded during the October 8, 2012 Annual Performance Monitoring event.
- **Appendix A – Photographic Log:** Appendix A presents side-by-side photographs of the site at each of the designated photographic stations (PP-1 through PP-11). Each photo station is on a single page. The uppermost photograph was taken at or near completion of the project (i.e., As-Built Photograph), the middle picture was taken during the 2011 Annual Performance Monitoring event, and the lowermost photograph was taken on October 8, 2012 during the 2012 Annual Performance Monitoring event.
- **Appendix B – Supplemental Photographic Log:** Appendix B presents additional photographs taken during the 2012 Annual Performance Monitoring Event.

- **Appendix C – Large Photograph Maps:** Appendix C provides Figures 8 through 10 on larger “D-size” paper.

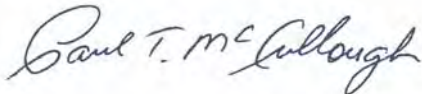
PROFESSIONAL ENGINEER’S STATEMENT

URS was retained by TAI to design, manage construction, and to conduct 2011 and 2012 Performance Monitoring events at Black Sand Beach in Stevens County, Washington. In that role, URS represents by the undersigned that it maintained active involvement in the planning and implementation of the various project activities, including performance monitoring.

This report is intended for the sole use of TAI. The scope of services performed by URS in preparing this report may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of its findings presented herein is at the sole risk of said user. Services performed by URS have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in Washington. Findings presented in this report are based on conditions observed at specific site locations at the time of the observation. Conditions may change over distance and time. No other warranty is expressed or implied.

As the designated URS representative, I hereby conclude that, to the best of my knowledge, the work summarized in this report has been satisfactorily completed in substantial compliance with the Completion Report and other related documents.

Sincerely,
URS Corporation



Paul T. McCullough, P.E.
Senior Project Engineer
Washington P.E. Certificate/License No. 43590

Attachments

cc: Marko Adzic, TAI (one copy + electronic DVD)
Karin Diven, DFW (electronic DVD)
Dave Enos, URS (one copy + electronic DVD)
Tim Erkel, USACE (one copy + electronic DVD)
Brett Walker, DNR (one copy + electronic DVD)
Joe Wichmann, CCC (one copy + electronic DVD)
Matt Wolohan, Adjacent Land Owner (one copy + electronic DVD)

TABLES

Table 1
Surface Elevation Measurement and 2012 Visual Observation Monitoring Results
Black Sand Beach, Northport, Washington

Location Id	Washington State Plane, North Zone, NAD 83 US FT		WGS 84		Surface Elevation ^{1,2} NAVD 88, US FT.						2012 Visual Observations ⁴
	Northing	Easting	Lat	Long	1-Nov-10	3-Oct-11	8-Oct-12	2010 TO 2011 Change ³ (ft)	2011 TO 2012 Change ³ (ft)	2010 TO 2012 Change ³ (ft)	
E-1	734841.08	2405298.86	48.97101	-117.64829	1299.29	NA ⁵	NA	NA	NA	NA	Station E-1 was submerged on 10/3/11 and 10/08/12. Station E-1A is adjacent to and replaces Station E-1.
E-1A	734835.67	2405302.85	48.97099	-117.64827	NA	NA	1298.43	NA	NA	NA	Gravel and sand with less than 10% black silica glass ⁶
E-2	734784.59	2405242.02	48.97086	-117.64853	1299.39	1298.65	1298.42	-0.74	-0.23	-0.97	Gravel and sand, less than approximately 5% black silica glass
E-3	734743.03	2405180.01	48.97075	-117.64880	1299.28	1299.24	1299.27	-0.04	0.03	-0.01	Gravel and sand, less than approximately 10% black silica glass
E-4	734717.57	2405196.22	48.97068	-117.64874	1304.80	1304.06	1303.44	-0.74	-0.62	-1.36	Approximately 15% black silica glass in a sand matrix
E-5	734764.95	2405256.42	48.97080	-117.64848	1304.33	1305.74	1305.94	1.41	0.19	1.61	Fine to coarse sand, about 10% gravel and approximately 15% black silica glass
E-6	734815.17	2405321.32	48.97093	-117.64820	1304.48	1305.19	1305.16	0.71	-0.04	0.68	Sand with approximately 30% black silica glass
E-7	734692.59	2405214.77	48.97061	-117.64866	1306.71	1305.34	1305.37	-1.37	0.02	-1.35	Rounded gravel with sand, less than approximately 5% black silica glass
E-8	734738.18	2405277.47	48.97073	-117.64840	1305.80	1305.65	1305.18	-0.15	-0.48	-0.62	Sand with approximately 30% black silica glass
E-9	734781.51	2405341.66	48.97084	-117.64812	1305.63	1305.80	1305.77	0.17	-0.03	0.14	Cobbles, about 10% coarse sand and small gravel, and less than 5% black silica glass
E-10	734700.58	2405276.49	48.97062	-117.64841	1306.68	1306.30	1306.69	-0.38	0.38	0.01	Coarse sand and small gravel with about 5% black silica glass
E-11	734747.68	2405345.49	48.97074	-117.64811	1306.42	1306.40	1306.53	-0.02	0.13	0.11	Gravel and cobbles with about 5% sand and 2% black silica glass
E-12	734668.68	2405296.80	48.97053	-117.64833	1310.98	1310.94	1310.90	-0.04	-0.05	-0.08	Sand with less than 3% black silica glass
E-13	734846.99	2405410.10	48.97101	-117.64782	1299.35	1299.33	1299.30	-0.01	-0.04	-0.05	Cobbles, gravel, and sand with approximately 10% black silica glass
E-14	734853.02	2405459.92	48.97102	-117.64762	1299.28	1298.47	1298.46	-0.81	-0.01	-0.82	Cobbles, gravel, and sand with approximately 10% black silica glass
E-15	734854.20	2405513.93	48.97102	-117.64739	1299.37	1299.32	1299.38	-0.05	0.06	0.01	Sand with 10% gravel and approximately 30% black silica glass
E-16	734809.86	2405394.11	48.97091	-117.64790	1305.09	1303.32	1303.32	-1.77	-0.01	-1.78	Cobbles with about 30% sand
E-17	734808.47	2405442.28	48.97090	-117.64770	1305.48	1306.68	1306.52	1.20	-0.16	1.04	Sand with approximately 30% black silica glass
E-18	734809.25	2405492.40	48.9709	-117.64749	1305.71	1305.72	1305.56	0.01	-0.16	-0.15	Fine sand with gravel, with less than 3% black silica glass
E-19	734769.19	2405375.74	48.9708	-117.64798	1307.33	1305.85	1305.39	-1.48	-0.46	-1.94	Fine to coarse sand with about 10% gravel and 15% black silica glass
E-20	734774.54	2405448.83	48.97081	-117.64768	1308.45	1308.53	1308.68	0.08	0.15	0.22	Fine sand with approximately 10% black silica glass
E-21	734729.07	2405385.60	48.97069	-117.64795	1309.66	1309.48	1309.40	-0.18	-0.07	-0.26	Fine sand with about 5% black silica glass

Notes

¹ Locations of Surface Elevation Monitoring Points are noted in Figure 8, Performance Monitoring Locations of report titled: "Completion Report & Performance Monitoring Plan" dated March 2011.

² The topographic surveys on 11/1/10, 10/3/11, and 10/08/12 were performed by Survey Solutions using Trimble R-8 GPS Receivers with a TSC2 Controller and realtime kinematic survey procedures.

³ A positive change in surface elevation corresponds to a higher elevation compared to prior survey.

A negative change in surface elevation corresponds to a lower elevation compared to prior survey.

⁴ Visual observations of beach materials were conducted at each accessible Surface Elevation Monitoring Point on October 08, 2012 by a licensed geologist.

⁵ NA = Not available

⁶ Vitreous, conchoidal fractures, translucent appearance (consistent with the appearance of granulated slag).

FIGURES

NO.	DATE	BY	REVISION DESCRIPTION
1	10/28/11	PTM	2011 PERFORMANCE MONITORING REPORT
2	11/22/12	PTM	2012 PERFORMANCE MONITORING REPORT



EQUIPMENT AND PROCEDURES
 THIS SURVEY WAS PERFORMED BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REAL TIME KINEMATIC SURVEY PROCEDURES.

SURVEYOR'S NOTES

1. THE PURPOSE OF THIS SURVEY WAS TO CONDUCT A TOPOGRAPHIC SURVEY.
2. HORIZONTAL DATUM, WASHINGTON STATE PLANE, NORTH ZONE, VERTICAL DATUM, NAVD 88. BASED ON WSDOT STATION "YONDER", LOCATED 0.25 MILES SOUTH OF WANETA BORDER CROSSING AND 52' WEST OF THE CENTERLINE OF THE WANETA CUSTOMS ROAD, THREE INCH BRASS CAP IN CEMENT, 745.055.705' N, 2.409.429.512' E, ELEV. 1,457.071'.
3. THIS MAP SHOWS ELEVATION DATA COLLECTED ON 11/01/2010, WITHIN THE NEW SAND LIMIT BOUNDARY AND ELEVATION DATA FROM 12/20/2006 MAPPING OUTSIDE SAID NEW SAND LIMIT.
4. THE WATER LEVEL STAFF GAUGE, 304' NORTHEAST OF SURVEY CONTROL #1 WAS 1296.56' AT 11:26 AM 11/01/2010 (NOTE: EQUALS 1299.46' USING THIS SURVEY DATUM).
5. SOURCE: SURVEY SOLUTIONS, SPOKANE, WASHINGTON.

GENERAL NOTE:
 SEE TABLE 1 FOR SURFACE MONITORING POINT ELEVATION DATA.

- LEGEND**
- PROPERTY LINE
 - - - - - EDGE OF WATER
 - PP-8 PHOTO STATION
 - ⊙ E-21 SURFACE ELEVATION MONITORING LOCATION
 - ▣ PORTION OF UNUSED ACCESS ROAD LEADING TO BLACK SAND BEACH
 - ▨ MATERIAL PLACED TO BLOCK ROAD ACCESS PER WDNR (LARGE ROCKS AND ROOT BALLS)
 - ▤ LIMITS OF REPLACED BEACH SAND
 - ⊞ ROCK EROSION PROTECTION PAD WITH SMALL COBBLE TOPPING
 - ⊞ EXPOSED ROCK OUTCROPPING

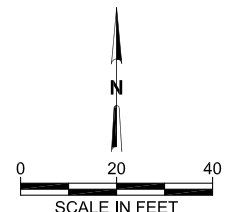
BLACK SAND BEACH PROJECT
 STEVENS COUNTY, WASHINGTON

**FIGURE 1
 2010 TOPOGRAPHIC
 SURVEY MAP**

DESIGNED BY: PTM/HDL
 DRAWN BY: CFS
 CHECKED BY: RDE
 APPROVED BY: PTM
 REVISION: REV 2
 DATE: NOV 2012

URS
 1501 4TH AVENUE, SUITE 1400
 SEATTLE, WA 98101-1616
 (206) 438-2700

SHEET
 DRAWING NO.



NO.	DATE	BY	REVISION DESCRIPTION
1	10/28/11	PTM	2011 PERFORMANCE MONITORING REPORT
2	11/22/12	PTM	2012 PERFORMANCE MONITORING REPORT



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 THIS SURVEY WAS PERFORMED BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REAL TIME KINEMATIC SURVEY PROCEDURES.

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 3. THIS MAP SHOWS NEW ELEVATION DATA COLLECTED ON 10/03/2011, GENERALLY WITHIN THE LIMITS OF THE REPLACEMENT SAND AS DESIGNATED ON THE 2010 AS-BUILT TOPOGRAPHIC SURVEY CONDUCTED ON 11/01/2010.
 4. THE WATER LEVEL STAFF GAUGE, 304' NORTHEAST OF SURVEY CONTROL #1 WAS 1296.43' AT 10:45 AM 10/03/2011 (NOTE: EQUALS 1299.33' USING THIS SURVEY DATUM).
 5. SOURCE: SURVEY SOLUTIONS, SPOKANE, WASHINGTON.

GENERAL NOTE:
 SEE TABLE 1 FOR SURFACE MONITORING POINT ELEVATION DATA.

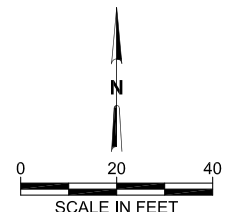
LEGEND

	PROPERTY LINE
	EDGE OF WATER
	2011 SURVEY LIMITS
	PP-8 ● PHOTO STATION
	E-21 ⊕ SURFACE ELEVATION MONITORING LOCATION
	ROCK EROSION PROTECTION PAD WITH SMALL COBBLE TOPPING
	EXPOSED ROCK OUTCROPPING

BLACK SAND BEACH PROJECT
 STEVENS COUNTY, WASHINGTON

**FIGURE 2
 2011 TOPOGRAPHIC
 SURVEY MAP**

DESIGNED BY: PTM/HDL	 1501 4TH AVENUE, SUITE 1400 SEATTLE, WA 98101-1616 (206) 438-2700	SHEET
DRAWN BY: CFS		DRAWING NO.
CHECKED BY: RDE		
APPROVED BY: PTM		
REVISION: REV 2		
DATE: NOV 2012		



NO.	DATE	BY	REVISION DESCRIPTION
1	10/28/11	PTM	2011 PERFORMANCE MONITORING REPORT
2	11/22/12	PTM	2012 PERFORMANCE MONITORING REPORT



EQUIPMENT AND PROCEDURES
 THIS SURVEY WAS PERFORMED BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REAL TIME KINEMATIC SURVEY PROCEDURES.

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1. THE PURPOSE OF THIS SURVEY WAS TO CONDUCT A TOPOGRAPHIC SURVEY.
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 3. THIS MAP SHOWS NEW ELEVATION DATA COLLECTED ON 10/08/2012, GENERALLY WITHIN THE LIMITS OF THE REPLACEMENT SAND AS DESIGNATED ON THE 2010 AS-BUILT TOPOGRAPHIC SURVEY CONDUCTED ON 11/01/2010.
 4. THE WATER LEVEL STAFF GAUGE, 304' NORTHEAST OF SURVEY CONTROL #1 WAS 1295.62' AT 1:15 PM 10/08/2012 (NOTE: EQUALS 1298.52' USING THIS SURVEY DATUM).
 5. SOURCE: SURVEY SOLUTIONS, SPOKANE, WASHINGTON.

GENERAL NOTE:
 SEE TABLE 1 FOR SURFACE MONITORING POINT ELEVATION DATA.

LEGEND

	PROPERTY LINE
	EDGE OF WATER
	2012 SURVEY LIMITS
	PP-8 ● PHOTO STATION
	E-21 ⊕ SURFACE ELEVATION MONITORING LOCATION
	ROCK EROSION PROTECTION PAD WITH SMALL COBBLE TOPPING
	EXPOSED ROCK OUTCROPPING, APPROXIMATE LOCATION

BLACK SAND BEACH PROJECT
 STEVENS COUNTY, WASHINGTON

**FIGURE 3
 2012 TOPOGRAPHIC
 SURVEY MAP**

DESIGNED BY: PTM/HDL	 1501 4TH AVENUE, SUITE 1400 SEATTLE, WA 98101-1616 (206) 438-2700	SHEET
DRAWN BY: CFS		DRAWING NO.
CHECKED BY: RDE		
APPROVED BY: PTM		
REVISION: REV 2 DATE: NOV 2012		

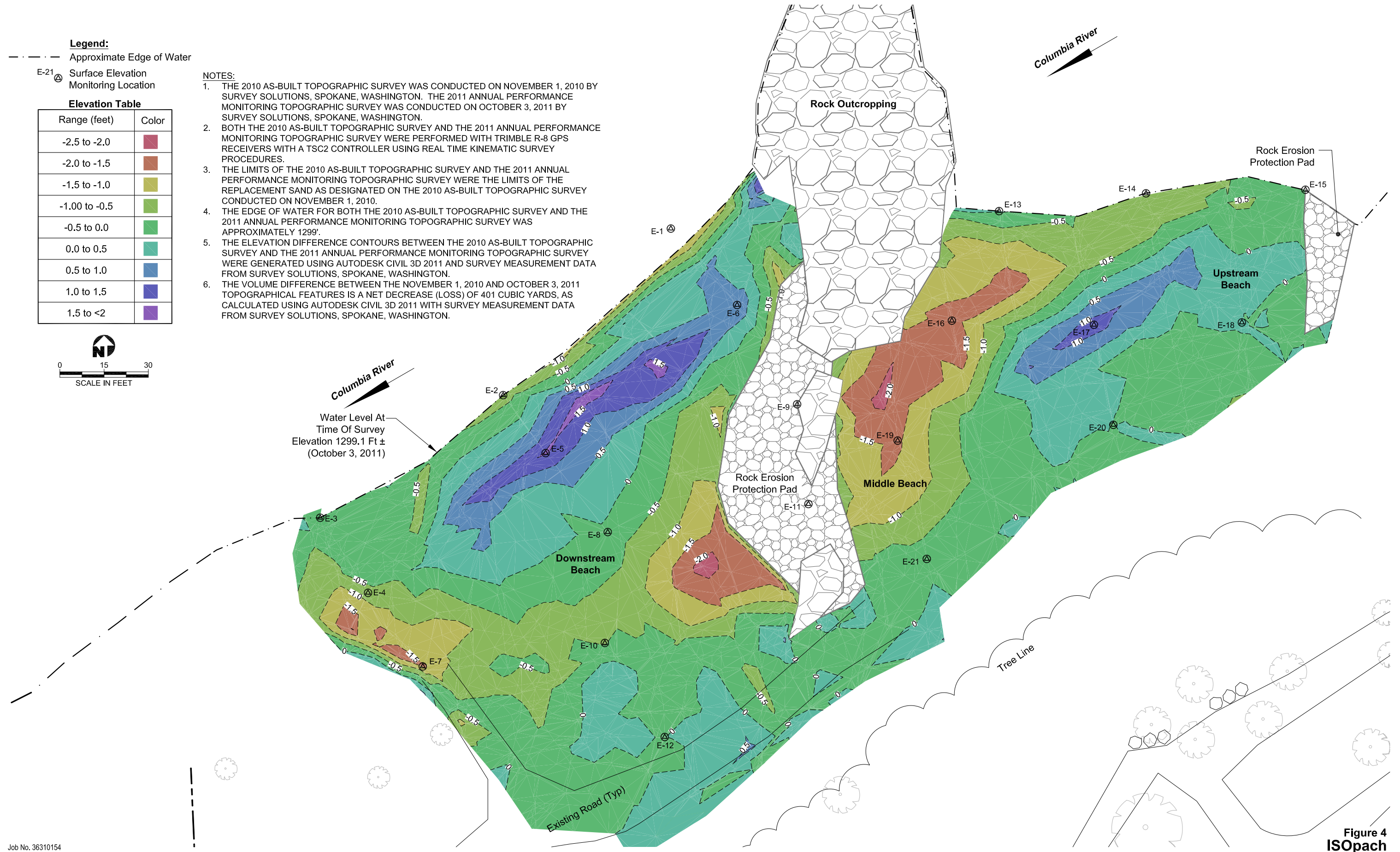
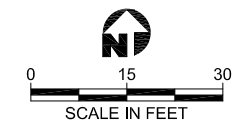
Legend:
 - - - - - Approximate Edge of Water
 E-21 @ Surface Elevation Monitoring Location

Elevation Table

Range (feet)	Color
-2.5 to -2.0	Red
-2.0 to -1.5	Orange
-1.5 to -1.0	Yellow
-1.00 to -0.5	Light Green
-0.5 to 0.0	Green
0.0 to 0.5	Teal
0.5 to 1.0	Blue
1.0 to 1.5	Dark Blue
1.5 to <2	Purple

NOTES:


1. THE 2010 AS-BUILT TOPOGRAPHIC SURVEY WAS CONDUCTED ON NOVEMBER 1, 2010 BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON. THE 2011 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WAS CONDUCTED ON OCTOBER 3, 2011 BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON.
2. BOTH THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2011 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WERE PERFORMED WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REAL TIME KINEMATIC SURVEY PROCEDURES.
3. THE LIMITS OF THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2011 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WERE THE LIMITS OF THE REPLACEMENT SAND AS DESIGNATED ON THE 2010 AS-BUILT TOPOGRAPHIC SURVEY CONDUCTED ON NOVEMBER 1, 2010.
4. THE EDGE OF WATER FOR BOTH THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2011 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WAS APPROXIMATELY 1299'.
5. THE ELEVATION DIFFERENCE CONTOURS BETWEEN THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2011 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WERE GENERATED USING AUTODESK CIVIL 3D 2011 AND SURVEY MEASUREMENT DATA FROM SURVEY SOLUTIONS, SPOKANE, WASHINGTON.
6. THE VOLUME DIFFERENCE BETWEEN THE NOVEMBER 1, 2010 AND OCTOBER 3, 2011 TOPOGRAPHICAL FEATURES IS A NET DECREASE (LOSS) OF 401 CUBIC YARDS, AS CALCULATED USING AUTODESK CIVIL 3D 2011 WITH SURVEY MEASUREMENT DATA FROM SURVEY SOLUTIONS, SPOKANE, WASHINGTON.












Job No. 36310154
 P:\ACAD\PROJECT\TecominoAlaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 4 (ISOpach - 2010 vs 2011).dwg
 Mod: 11/16/2012, 16:44 | Plotted: 11/19/2012, 15:42 | Chad_Stickel



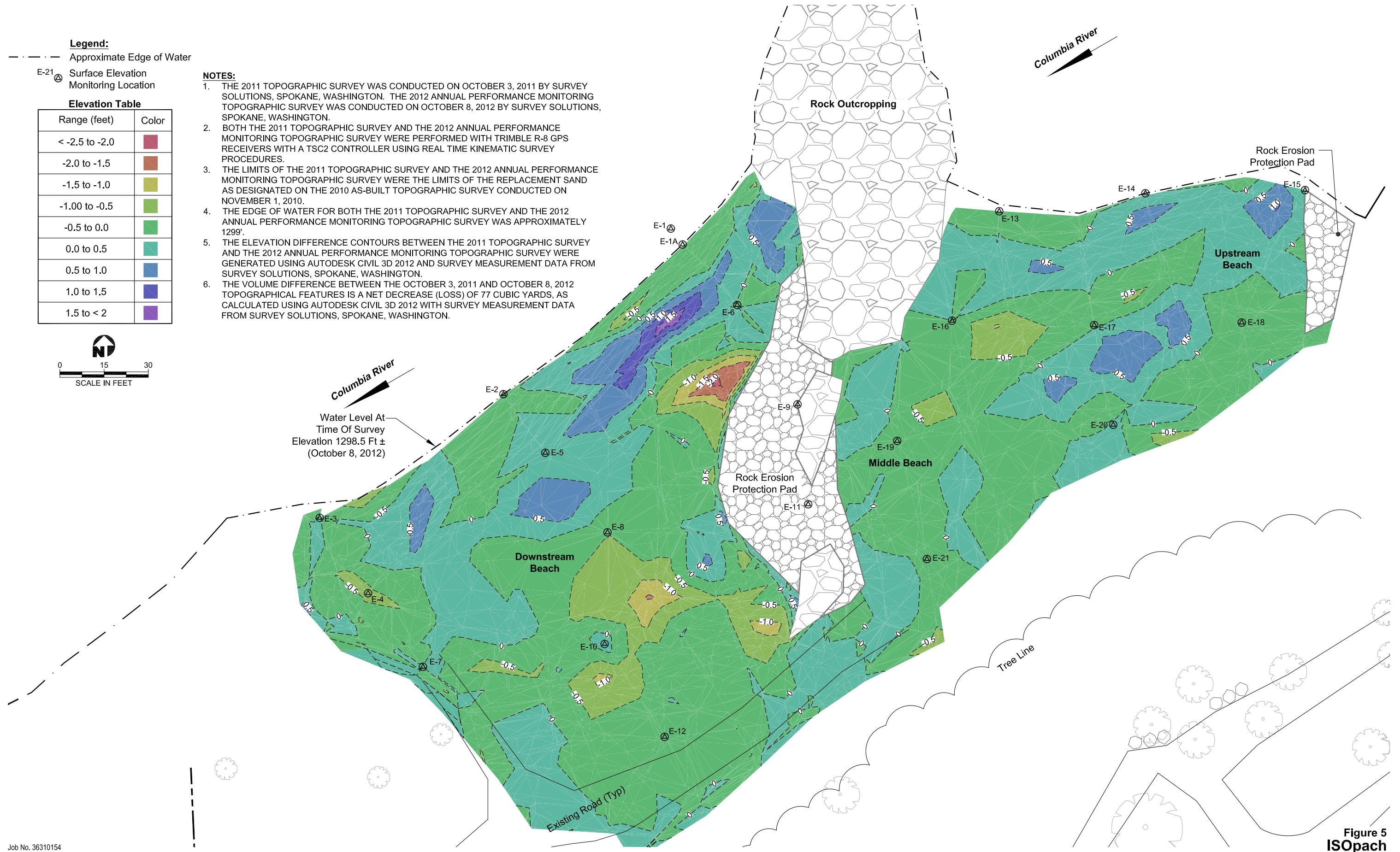
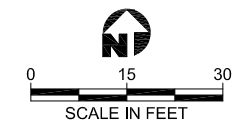
Figure 4
ISOpach
2010 Asbuilt Survey vs 2011 Survey
 Black Sand Beach
 Northport, Washington

Legend:
 - - - - - Approximate Edge of Water
 E-21  Surface Elevation Monitoring Location

Elevation Table

Range (feet)	Color
< -2.5 to -2.0	
-2.0 to -1.5	
-1.5 to -1.0	
-1.00 to -0.5	
-0.5 to 0.0	
0.0 to 0.5	
0.5 to 1.0	
1.0 to 1.5	
1.5 to < 2	

- NOTES:**
1. THE 2011 TOPOGRAPHIC SURVEY WAS CONDUCTED ON OCTOBER 3, 2011 BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON. THE 2012 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WAS CONDUCTED ON OCTOBER 8, 2012 BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON.
 2. BOTH THE 2011 TOPOGRAPHIC SURVEY AND THE 2012 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WERE PERFORMED WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REAL TIME KINEMATIC SURVEY PROCEDURES.
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 6. THE VOLUME DIFFERENCE BETWEEN THE OCTOBER 3, 2011 AND OCTOBER 8, 2012 TOPOGRAPHICAL FEATURES IS A NET DECREASE (LOSS) OF 77 CUBIC YARDS, AS CALCULATED USING AUTODESK CIVIL 3D 2012 WITH SURVEY MEASUREMENT DATA FROM SURVEY SOLUTIONS, SPOKANE, WASHINGTON.



Job No. 36310154
 P:\ACAD\PROJECT\TockComino\Alaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 5 (ISOpach - 2011 vs 2012).dwg
 Mod: 11/16/2012, 16:44 | Plotted: 11/19/2012, 15:42 | Chad_Stickel



Figure 5
ISOpach
2011 Survey vs 2012 Survey

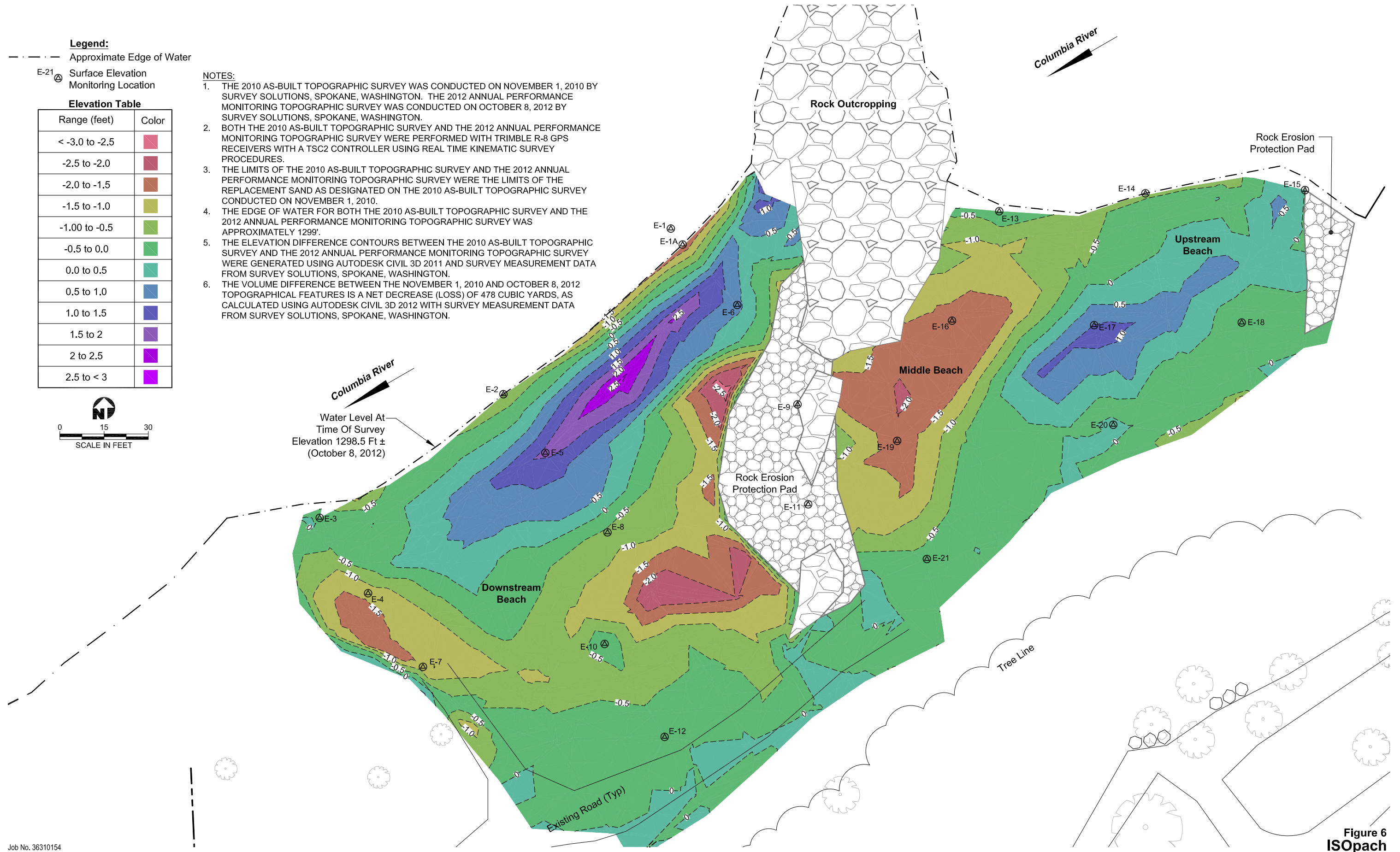
Black Sand Beach
 Northport, Washington

Legend:
 - - - - - Approximate Edge of Water
 E-21 Surface Elevation Monitoring Location

Elevation Table

Range (feet)	Color
< -3.0 to -2.5	
-2.5 to -2.0	
-2.0 to -1.5	
-1.5 to -1.0	
-1.00 to -0.5	
-0.5 to 0.0	
0.0 to 0.5	
0.5 to 1.0	
1.0 to 1.5	
1.5 to 2	
2 to 2.5	
2.5 to < 3	

- NOTES:**
1. THE 2010 AS-BUILT TOPOGRAPHIC SURVEY WAS CONDUCTED ON NOVEMBER 1, 2010 BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON. THE 2012 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WAS CONDUCTED ON OCTOBER 8, 2012 BY SURVEY SOLUTIONS, SPOKANE, WASHINGTON.
 2. BOTH THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2012 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WERE PERFORMED WITH TRIMBLE R-8 GPS RECEIVERS WITH A TSC2 CONTROLLER USING REAL TIME KINEMATIC SURVEY PROCEDURES.
 3. THE LIMITS OF THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2012 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WERE THE LIMITS OF THE REPLACEMENT SAND AS DESIGNATED ON THE 2010 AS-BUILT TOPOGRAPHIC SURVEY CONDUCTED ON NOVEMBER 1, 2010.
 4. THE EDGE OF WATER FOR BOTH THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2012 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WAS APPROXIMATELY 1299'.
 5. THE ELEVATION DIFFERENCE CONTOURS BETWEEN THE 2010 AS-BUILT TOPOGRAPHIC SURVEY AND THE 2012 ANNUAL PERFORMANCE MONITORING TOPOGRAPHIC SURVEY WERE GENERATED USING AUTODESK CIVIL 3D 2011 AND SURVEY MEASUREMENT DATA FROM SURVEY SOLUTIONS, SPOKANE, WASHINGTON.
 6. THE VOLUME DIFFERENCE BETWEEN THE NOVEMBER 1, 2010 AND OCTOBER 8, 2012 TOPOGRAPHICAL FEATURES IS A NET DECREASE (LOSS) OF 478 CUBIC YARDS, AS CALCULATED USING AUTODESK CIVIL 3D 2012 WITH SURVEY MEASUREMENT DATA FROM SURVEY SOLUTIONS, SPOKANE, WASHINGTON.



Job No. 36310154
 P:\ACAD\PROJECT\TecominoAlaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 6 (ISOpach - 2010 vs 2012).dwg
 Mod: 11/16/2012, 16:46 | Plotted: 11/19/2012, 15:41 | Chad_Stickel



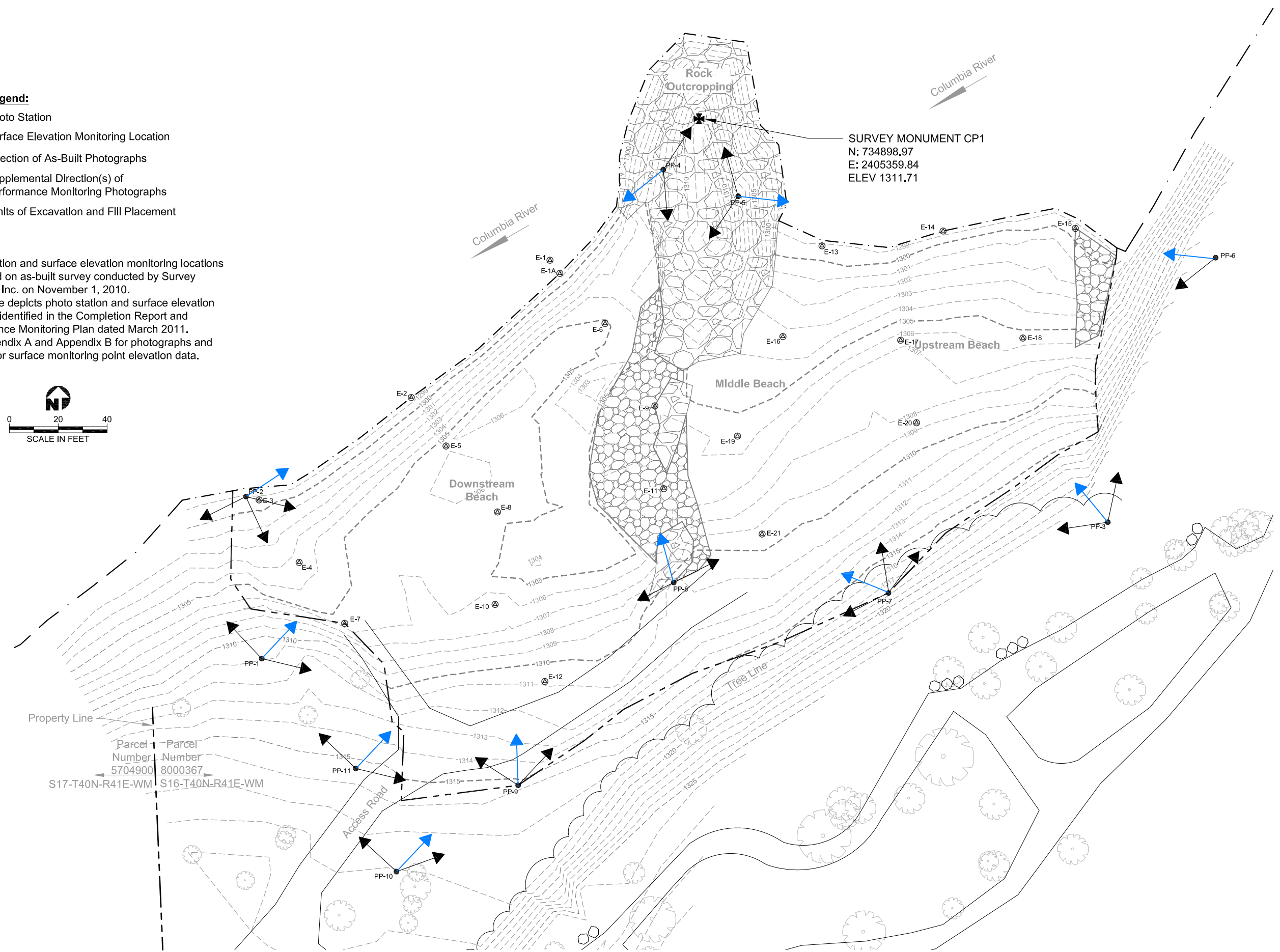
Figure 6
ISOpach
2010 Survey vs 2012 Survey

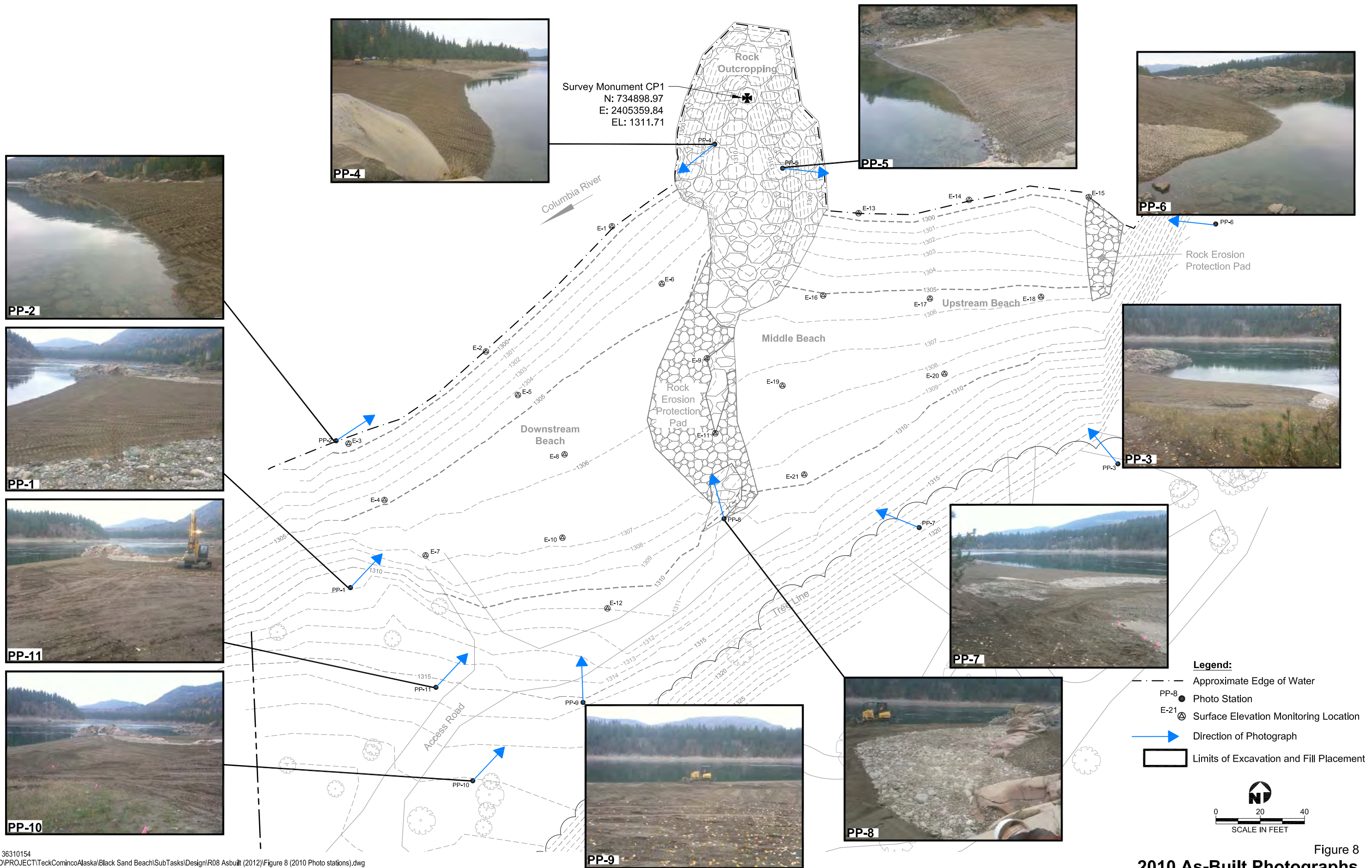
Black Sand Beach
 Northport, Washington

- Legend:**
- PP-8 ● Photo Station
 - E-21 ⊕ Surface Elevation Monitoring Location
 - ➡ Direction of As-Built Photographs
 - ➡ Supplemental Direction(s) of Performance Monitoring Photographs
 - ▭ Limits of Excavation and Fill Placement

Notes:

1. Photo station and surface elevation monitoring locations are based on as-built survey conducted by Survey Solutions Inc. on November 1, 2010.
2. This figure depicts photo station and surface elevation locations identified in the Completion Report and Performance Monitoring Plan dated March 2011.
3. See Appendix A and Appendix B for photographs and Table 1 for surface monitoring point elevation data.

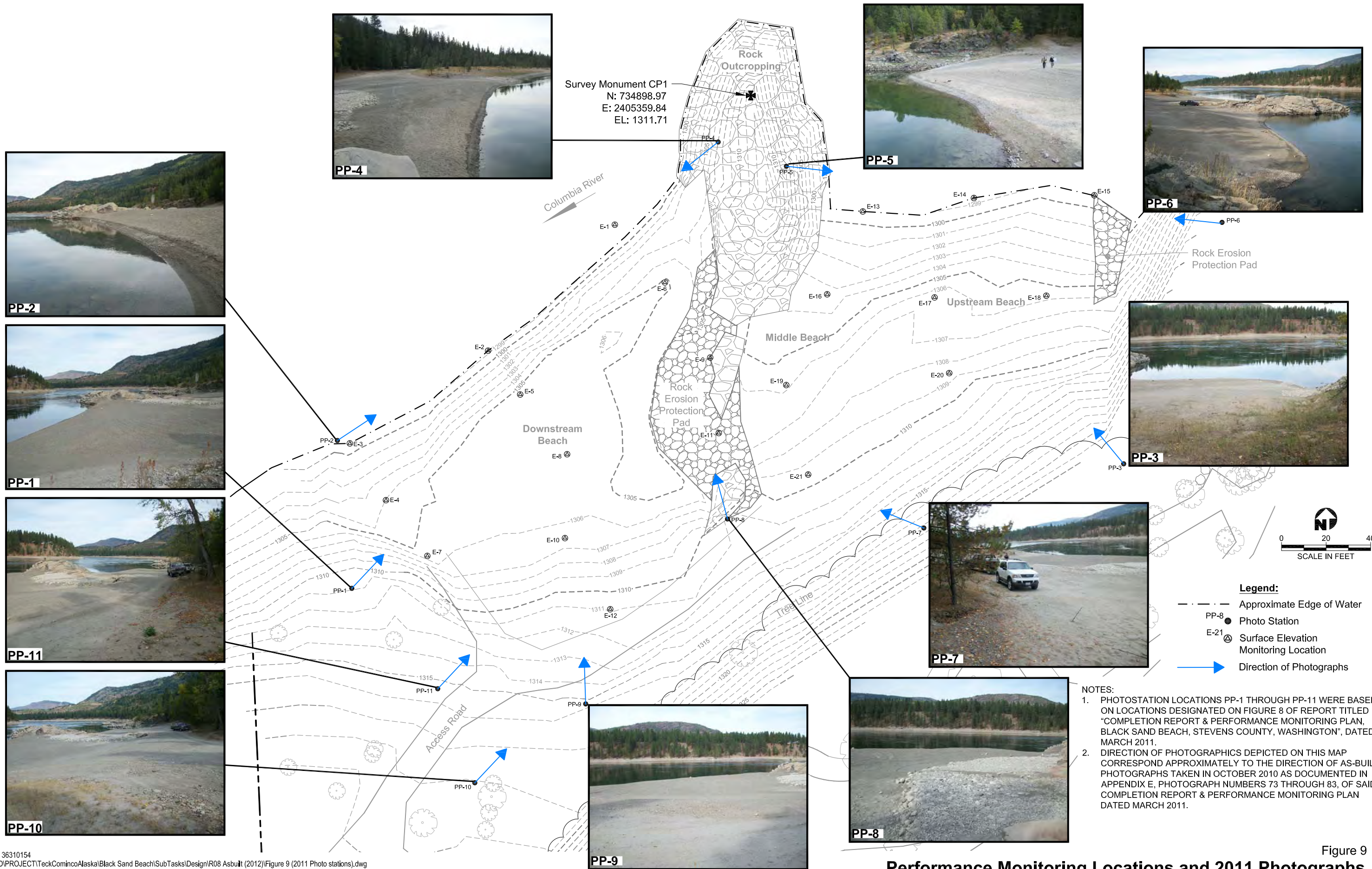




Job No. 36310154
 P:\ACAD\PROJECT\TeckCominco\Alaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 8 (2010 Photo stations).dwg
 Mod: 11/16/2012, 14:08 | Plotted: 11/16/2012, 17:02 | Chad_Stickel



Figure 8
2010 As-Built Photographs
 Black Sand Beach
 Northport, Washington

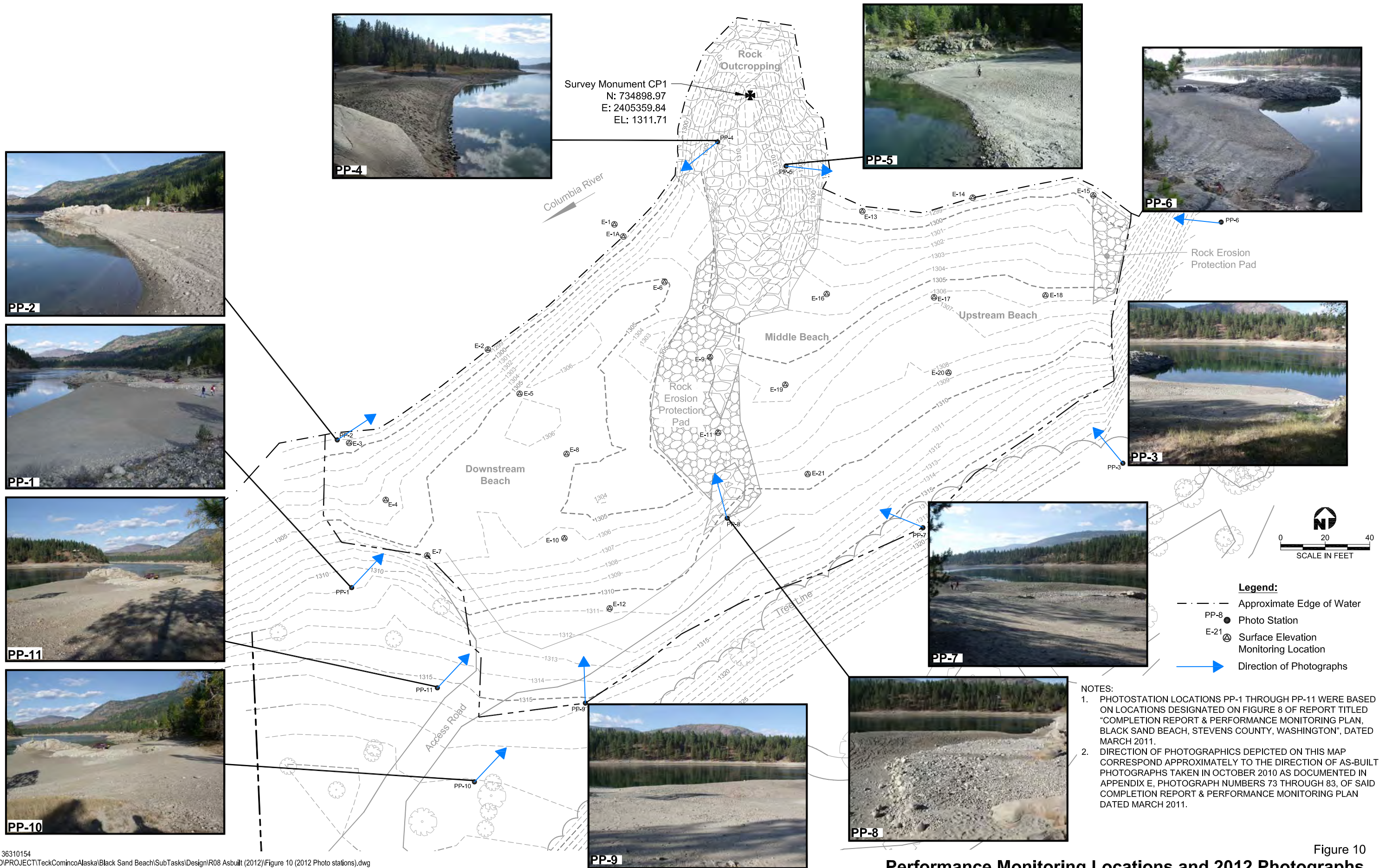


- NOTES:**
1. PHOTOSTATION LOCATIONS PP-1 THROUGH PP-11 WERE BASED ON LOCATIONS DESIGNATED ON FIGURE 8 OF REPORT TITLED "COMPLETION REPORT & PERFORMANCE MONITORING PLAN, BLACK SAND BEACH, STEVENS COUNTY, WASHINGTON", DATED MARCH 2011.
 2. DIRECTION OF PHOTOGRAPHICS DEPICTED ON THIS MAP CORRESPOND APPROXIMATELY TO THE DIRECTION OF AS-BUILT PHOTOGRAPHS TAKEN IN OCTOBER 2010 AS DOCUMENTED IN APPENDIX E, PHOTOGRAPH NUMBERS 73 THROUGH 83, OF SAID COMPLETION REPORT & PERFORMANCE MONITORING PLAN DATED MARCH 2011.

Figure 9
Performance Monitoring Locations and 2011 Photographs
 Black Sand Beach
 Northport, Washington

Job No. 36310154
 P:\ACAD\PROJECT\TeckCominco\Alaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 9 (2011 Photo stations).dwg
 Mod: 11/16/2012, 14:09 | Plotted: 11/16/2012, 17:02 | Chad_Stickel





Job No. 36310154
 P:\ACAD\PROJECT\TecominoAlaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 10 (2012 Photo stations).dwg
 Mod: 11/16/2012, 14:24 | Plotted: 11/16/2012, 17:02 | Chad_Stickel



Performance Monitoring Locations and 2012 Photographs

Figure 10
 Black Sand Beach
 Northport, Washington

APPENDIX A
PHOTOGRAPHIC LOG



APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

URS Project No.:
36310154

Photo No.
1a

Photo Taken: 10/28/10
Direction Taken: Northeast

Description:
Photo Station No. 1 (Completion Report and
Performance Monitoring Plan, March 2010)
Washington State Plane, North Zone NAD 83, US Ft
N. 734678.06
E. 2405180.90



Photo No.
1b

Photo Taken: 10/03/11
Direction Taken: Northeast

Description:
Photo Station No. 1 (2011 Annual Performance
Monitoring Report, December 2011)
Washington State Plane, North Zone NAD 83, US Ft
N. 734678.06
E. 2405180.90



Photo No.
1c

Photo Taken: 10/08/12
Direction Taken: Northeast

Description:
Photo Station No. 1 (2012 Annual Performance
Monitoring Report, November 2012)
Washington State Plane, North Zone NAD 83, US Ft
N. 734678.06
E. 2405180.90





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

URS Project No.:
36310154

Photo No.
2a

Photo Taken: 10/28/10
Direction Taken: Northeast

Description:

Photo Station No. 2 (Completion Report and Performance Monitoring Plan, March 2011)
Washington State Plane, North Zone NAD 83, US Ft
N. 734744.33
E. 2405174.42



Photo No.
2b

Photo Taken: 10/03/11
Direction Taken: Northeast

Description:

Photo Station No. 2 (Completion Report and Performance Monitoring Plan, March 2011)
Washington State Plane, North Zone NAD 83, US Ft
N. 734744.33
E. 2405174.42



Photo No.
2c

Photo Taken: 10/08/12
Direction Taken: Northeast

Description:

Photo Station No. 2 (2012 Annual Performance Monitoring Report, November 2012)
Washington State Plane, North Zone NAD 83, US Ft
N. 734744.33
E. 2405174.42





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

**URS Project No.:
36310154**

**Photo No.
3a**

**Photo Taken: 10/28/10
Direction Taken: Northwest**

Description:
Photo Station No. 3 (Completion Report and
Performance Monitoring Plan, March 2011)

Washington State Plane, North Zone NAD 83, US Ft

N. 734733.88
E. 2405527.09



**Photo No.
3b**

**Photo Taken: 10/03/11
Direction Taken: Northwest**

Description:
Photo Station No. 3 (Completion Report and
Performance Monitoring Plan, March 2011)

Washington State Plane, North Zone NAD 83, US Ft

N. 734733.88
E. 2405527.09



**Photo No.
3c**

**Photo Taken: 10/08/12
Direction Taken: Northwest**

Description:
Photo Station No. 3 (2012 Annual Performance
Monitoring Report, November 2012)

Washington State Plane, North Zone NAD 83, US Ft

N. 734733.88
E. 2405527.09





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

URS Project No.:
36310154

Photo No.
4a

Photo Taken: 10/28/10

Direction Taken: Southwest

Description:

Photo Station No. 4 (Completion Report and Performance Monitoring Plan, March 2011)

Washington State Plane, North Zone NAD 83, US Ft

N. 734878.14

E. 2405345.23



Photo No.
4b

Photo Taken: 10/03/11

Direction Taken: Southwest

Description:

Photo Station No. 4 (Completion Report and Performance Monitoring Plan, March 2011)

Washington State Plane, North Zone NAD 83, US Ft

N. 734878.14

E. 2405345.23



Photo No.
4c

Photo Taken: 10/08/12

Direction Taken: Southwest

Description:

Photo Station No. 4 (2012 Annual Performance Monitoring Report, November 2012)

Washington State Plane, North Zone NAD 83, US Ft

N. 734878.14

E. 2405345.23





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

**URS Project No.:
36310154**

**Photo No.
5a**

**Photo Taken: 10/28/10
Direction Taken: Northeast**

Description:
Photo Station No. 5
(Completion Report and Performance Monitoring Plan,
March 2011)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734867.28
E. 2405375.81



**Photo No.
5b**

**Photo Taken: 10/03/11
Direction Taken: Northeast**

Description:
Photo Station No. 5
(2011 Annual Performance Monitoring Report ,
December 2011)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734867.28
E. 2405375.81



**Photo No.
5c**

**Photo Taken: 10/08/12
Direction Taken: Northeast**

Description:
Photo Station No. 5
(2012 Annual Performance Monitoring Report ,
November 2012)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734867.28
E. 2405375.81





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
6a

Photo Taken: 10/28/10
Direction Taken: West

Description:

Photo Station No. 6
(Completion Report and Performance Monitoring Plan,
March 2011)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734842.12
E. 2405571.21



Photo No.
6b

Photo Taken: 10/03/11
Direction Taken: West

Description:

Photo Station No. 6
(2011 Annual Performance Monitoring Report,
December 2011)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734842.12
E. 2405571.21



Photo No.
6c

Photo Taken: 10/08/12
Direction Taken: West

Description:

Photo Station No. 6
(2012 Annual Performance Monitoring Report,
November 2012)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734842.12
E. 2405571.21





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

URS Project No.:
36310154

Photo No.
7a

Photo Taken: 10/28/10
Direction Taken: Northwest

Description:
Photo Station No. 7
(Completion Report and Performance Monitoring Plan,
March 2011)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734705.11
E. 2405437.47



Photo No.
7b

Photo Taken: 10/03/11
Direction Taken: Northwest

Description:
Photo Station No. 7
(2011 Annual Performance Monitoring Report ,
December 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734705.11
E. 2405437.47



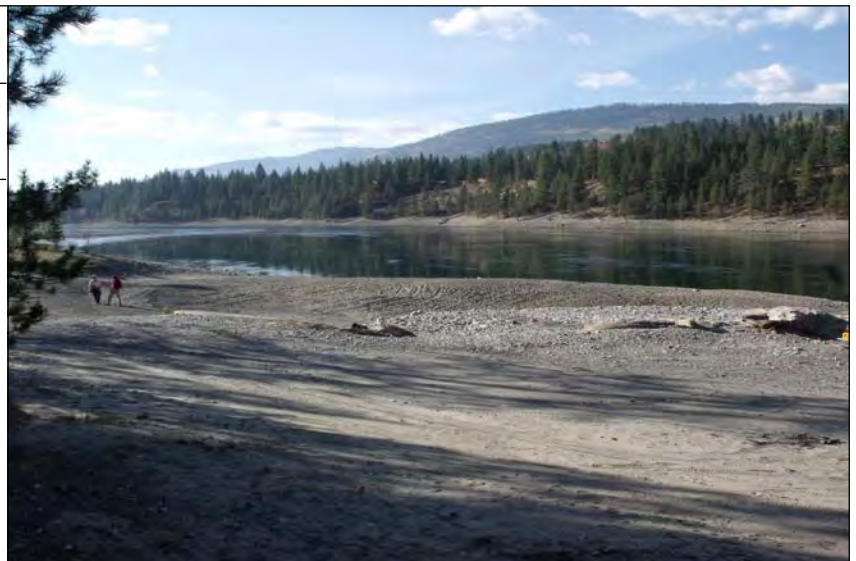
Photo No.
7c

Photo Taken: 10/08/12
Direction Taken: Northwest

Description:
Photo Station No. 7
(2012 Annual Performance Monitoring Report ,
November 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734705.11
E. 2405437.47





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
8a

Photo Taken: 10/28/10
Direction Taken: Northwest

Description:
Photo Station No. 8
(Completion Report and Performance Monitoring Plan,
March 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734709.15
E. 2405349.41



Photo No.
8b

Photo Taken: 10/03/11
Direction Taken: Northwest

Description:
Photo Station No. 8
(2011 Annual Performance Monitoring Report,
December 2011)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734709.15
E. 2405349.41



Photo No.
8c

Photo Taken: 10/08/12
Direction Taken: Northwest

Description:
Photo Station No. 8
(2012 Annual Performance Monitoring Report,
November 2012)

Washington State Plane, North Zone, NAD 83, US Ft

N. 734709.15
E. 2405349.41





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

URS Project No.:
36310154

Photo No.
9a

Photo Taken: 10/28/10
Direction Taken: North

Description:

Photo Station No. 9
(Completion Report and Performance Monitoring Plan,
March 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734626.25
E. 2405285.80



Photo No.
9b

Photo Taken: 10/03/11
Direction Taken: North

Description:

Photo Station No. 9
(2011 Annual Performance Monitoring Report,
December 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734626.25
E. 2405285.80



Photo No.
9c

Photo Taken: 10/08/12
Direction Taken: North

Description:

Photo Station No. 9
(2012 Annual Performance Monitoring Report,
November 2012)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734626.25
E. 2405285.80





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

**Black Sand Beach Project
Stevens County, Washington**

URS Project No.:
36310154

Photo No.
10a

Photo Taken: 10/28/10
Direction Taken: North

Description:
Photo Station No. 10
(Completion Report and Performance Monitoring Plan,
March 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734590.89
E. 2405236.06



Photo No.
10b

Photo Taken: 10/03/11
Direction Taken: North

Description:
Photo Station No. 10
(2011 Annual Performance Monitoring Report,
December 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734590.89
E. 2405236.06



Photo No.
10c

Photo Taken: 10/08/12
Direction Taken: North

Description:
Photo Station No. 10
(2012 Annual Performance Monitoring Report,
November 2012)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734590.89
E. 2405236.06





APPENDIX A: PHOTOGRAPHIC LOG

**Teck American
Incorporated**

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
11a

Photo Taken: 10/28/10
Direction Taken: Northeast

Description:
Photo Station No. 11
(Completion Report and Performance Monitoring Plan,
March 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734633.06
E. 2405219.44



Photo No.
11b

Photo Taken: 10/03/11
Direction Taken: Northeast

Description:
Photo Station No. 11
(2011 Annual Performance Monitoring Report,
December 2011)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734633.06
E. 2405219.44



Photo No.
11c

Photo Taken: 10/08/12
Direction Taken: Northeast

Description:
Photo Station No. 11
(2012 Annual Performance Monitoring Report,
November 2012)

Washington State Plane, North Zone
NAD 83, US Ft

N. 734633.06
E. 2405219.44



APPENDIX B
SUPPLEMENTAL PHOTOGRAPHIC LOG



**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-01

Photo Taken:
10/08/12

Direction Taken:
Northeast

Description:

Photo Station No. 1



Photo No.
B-02

Photo Taken:
10/08/12

Direction Taken:
Northwest

Description:

Photo Station No. 1





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-03

Photo Taken:
10/08/12

Direction Taken:
Southeast

Description:

Photo Station No. 1



Photo No.
B-04

Photo Taken:
10/08/12

Direction Taken:
Northeast

Description:

Photo Station No. 2





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-05

Photo Taken:
10/08/12

Direction Taken:
Southeast

Description:

Photo Station No. 2



Photo No.
B-06

Photo Taken:
10/08/12

Direction Taken:
West

Photo Station No. 2





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-07

Photo Taken:
10/08/12

Direction Taken:
North

Description:

Photo Station No. 3



Photo No.
B-08

Photo Taken:
10/08/12

Direction Taken:
Southwest

Description:

Photo Station No. 4





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-09

Photo Taken:
10/08/12

Direction Taken:
Southwest

Description:

Photo Station No. 4



Photo No.
B-10

Photo Taken:
10/08/12

Direction Taken:
South

Description:

Photo Station No. 4





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-11

Photo Taken:
10/08/12

Direction Taken:
East

Description:

Photo Station No. 5



Photo No.
B-12

Photo Taken:
10/08/12

Direction Taken:
East

Description:

Photo Station No. 5





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-13

Photo Taken:
10/08/12

Direction Taken:
South

Description:

Photo Station No. 5



Photo No.
B-14

Photo Taken:
10/08/12

Direction Taken:
West

Photo Station No. 6





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-15

Photo Taken:
10/08/12

Direction Taken:
West

Description:

Photo Station No. 6



Photo No.
B-16

Photo Taken:
10/08/12

Direction Taken:
Southwest

Description:

Photo Station No. 6





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-17

Photo Taken:
10/08/12

Direction Taken:
Northwest

Description:

USGS Gauging Station



Photo No.
B-18

Photo Taken:
10/08/12

Direction Taken:
Northwest

Description:

USGS Gauging Station





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-19

Photo Taken:
10/08/12

Direction Taken:
Northwest

Description:

Photo Station No. 7



Photo No.
B-20

Photo Taken:
10/08/12

Direction Taken:
Northwest

Description:

Photo Station No. 7





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-21

Photo Taken:
10/08/12

Direction Taken:
West

Description:

Photo Station No. 7



Photo No.
B-22

Photo Taken:
10/08/12

Direction Taken:
Northwest

Photo Station No. 8





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-23

Photo Taken:
10/08/12

Direction Taken:
North

Description:

Photo Station No. 8



Photo No.
B-24

Photo Taken:
10/08/12

Direction Taken:
Northeast

Description:

Photo Station No. 8





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-25

Photo Taken:
10/08/12

Direction Taken:
West

Description:

Photo Station No. 8



Photo No.
B-26

Photo Taken:
10/08/12

Direction Taken:
Northwest

Description:

Photo Station No. 8





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-27

Photo Taken:
10/08/12

Direction Taken:
North

Description:

Photo Station No. 9



Photo No.
B-28

Photo Taken:
10/08/12

Direction Taken:
North Northwest

Description:

Photo Station No. 9





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-29

Photo Taken:
10/08/12

Direction Taken:
North Northwest

Description:

Photo Station No. 9



Photo No.
B-30

Photo Taken:
10/08/12

Direction Taken:
Northeast

Photo Station No. 10





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-31

Photo Taken:
10/08/12

Direction Taken:
Northeast

Description:

Photo Station No. 10



Photo No.
B-32

Photo Taken:
10/08/12

Direction Taken:
Northeast

Description:

Photo Station No. 10





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-33

Photo Taken:
10/08/12

Direction Taken:
Northeast

Description:

Photo Station No. 11



Photo No.
B-34

Photo Taken:
10/08/12

Direction Taken:
Northeast

Description:

Photo Station No. 11





**APPENDIX B:
SUPPLEMENTAL PHOTOGRAPHIC LOG**

Teck American
Incorporated

Black Sand Beach Project
Stevens County, Washington

URS Project No.:
36310154

Photo No.
B-35

Photo Taken:
10/08/12

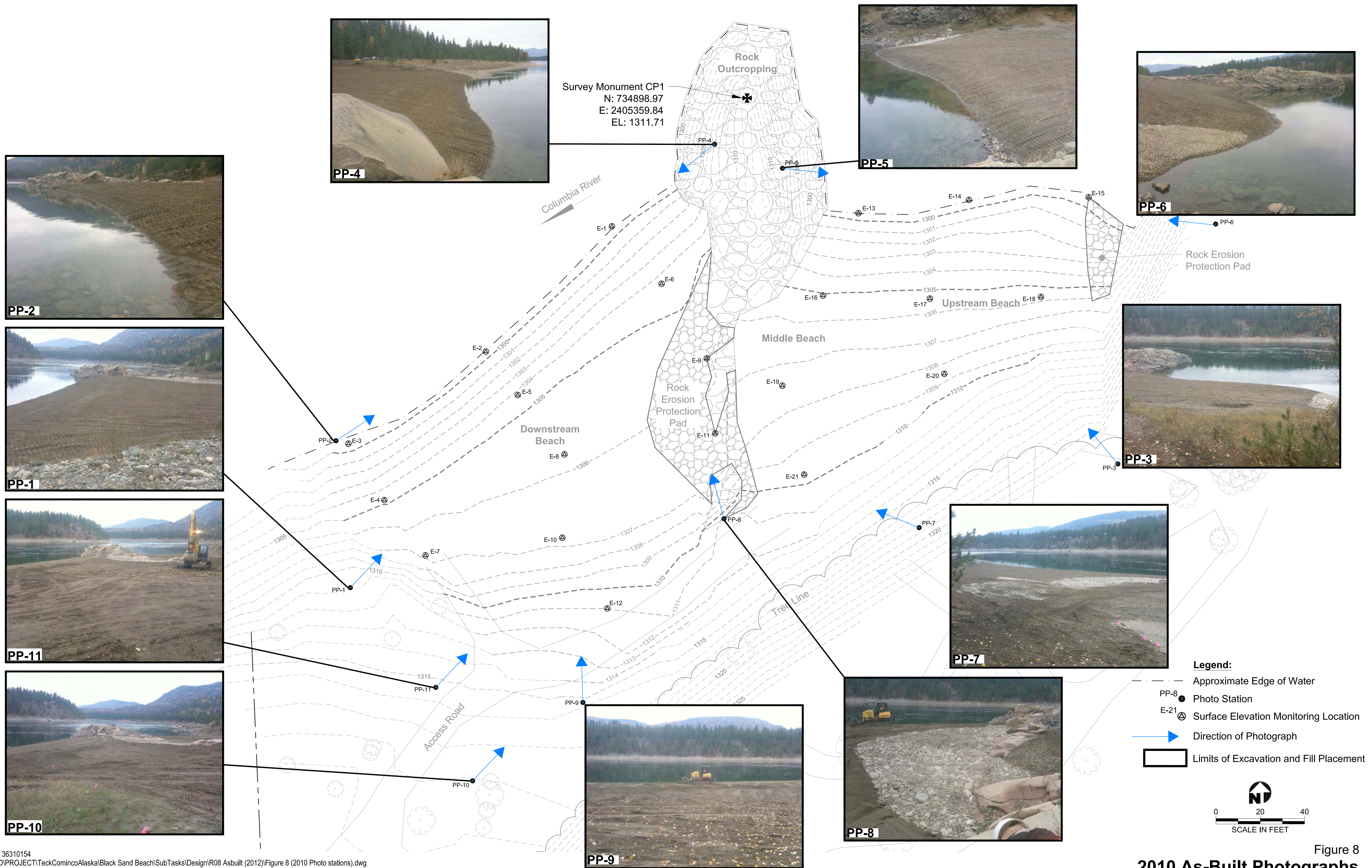
Direction Taken:
North

Description:

Photo Station No. 11



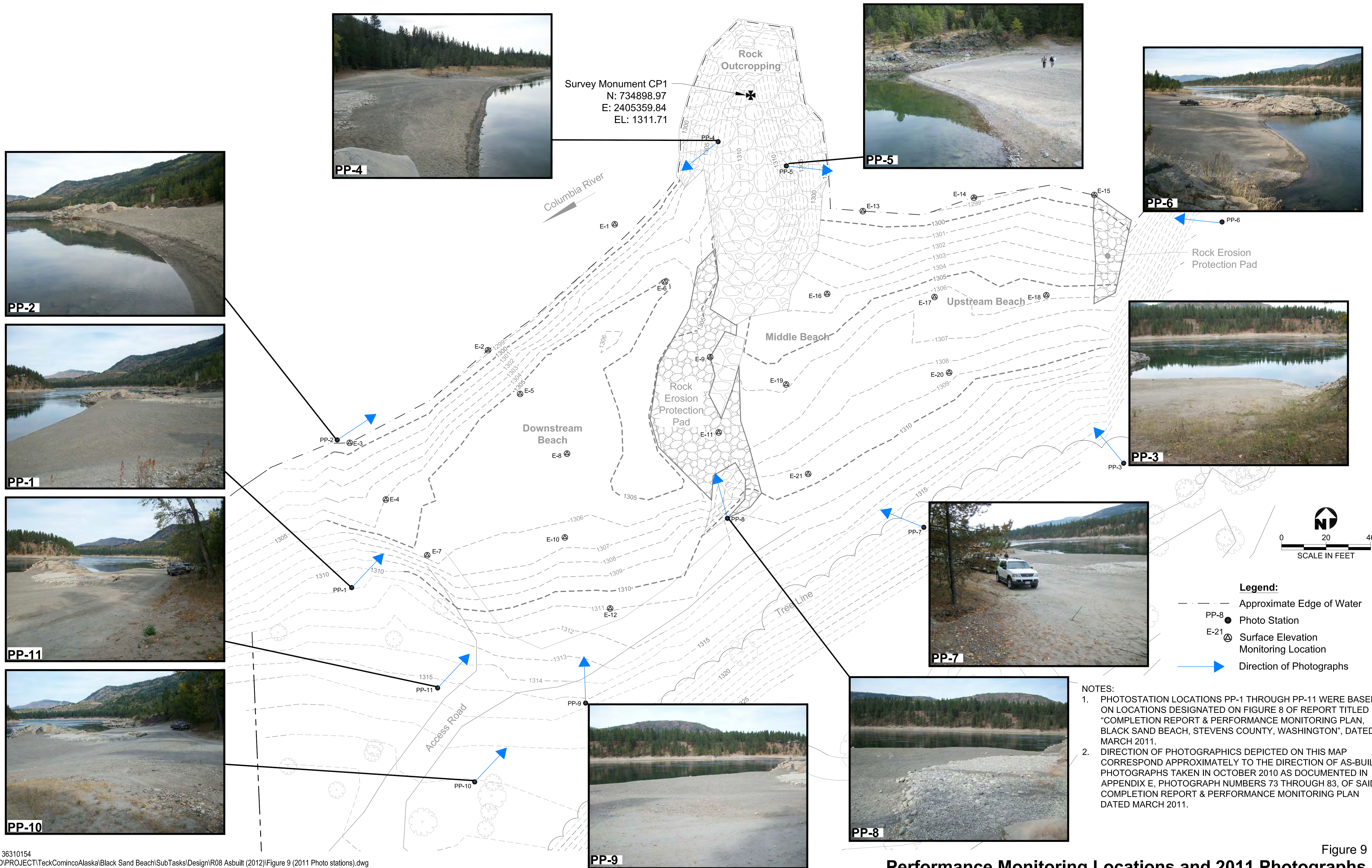
APPENDIX C
LARGE PHOTOGRAPH MAPS



Job No. 36310154
 P:\ACAD\PROJECT\TeckCominco\Alaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 8 (2010 Photo stations).dwg
 Mod: 11/16/2012, 14:08 | Plotted: 11/28/2012, 11:40 | Chad_Stickel



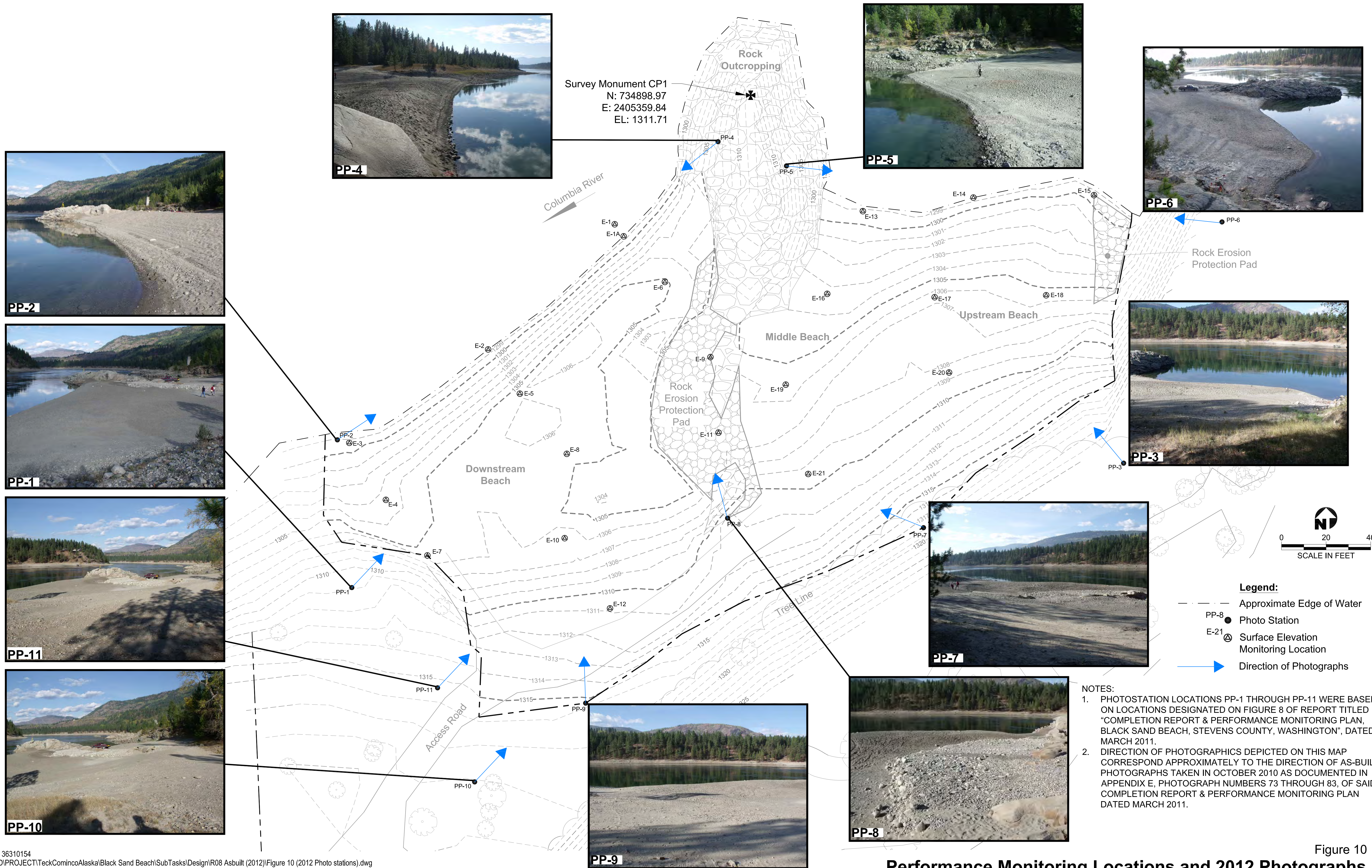
Figure 8
2010 As-Built Photographs
 Black Sand Beach
 Northport, Washington



- NOTES:**
1. PHOTOSTATION LOCATIONS PP-1 THROUGH PP-11 WERE BASED ON LOCATIONS DESIGNATED ON FIGURE 8 OF REPORT TITLED "COMPLETION REPORT & PERFORMANCE MONITORING PLAN, BLACK SAND BEACH, STEVENS COUNTY, WASHINGTON", DATED MARCH 2011.
 2. DIRECTION OF PHOTOGRAPHICS DEPICTED ON THIS MAP CORRESPOND APPROXIMATELY TO THE DIRECTION OF AS-BUILT PHOTOGRAPHS TAKEN IN OCTOBER 2010 AS DOCUMENTED IN APPENDIX E, PHOTOGRAPH NUMBERS 73 THROUGH 83, OF SAID COMPLETION REPORT & PERFORMANCE MONITORING PLAN DATED MARCH 2011.

Figure 9
Performance Monitoring Locations and 2011 Photographs
 Black Sand Beach
 Northport, Washington





Job No. 36310154
 P:\ACAD\PROJECT\TeckCominco\Alaska\Black Sand Beach\SubTasks\Design\R08 Asbuilt (2012)\Figure 10 (2012 Photo Stations).dwg
 Mod: 11/16/2012, 14:24 | Plotted: 11/28/2012, 11:45 | Chad_Stickel



Figure 10
Performance Monitoring Locations and 2012 Photographs
 Black Sand Beach
 Northport, Washington