Walsh
Environmental Scientists and Engineers, LLC
an ecology and environment company

December 29, 2011

Ms. Carrie Sheata
U.S. Army Corps of Engineers
Sacramento District
Grand Junction Regulatory Office
400 Rood Avenue
Grand Junction, CO 81501-2520

Re: 2011 Monitoring Report for the Phase 2A and 2B Edwards Eagle River Restoration Project in Eagle County, Colorado, Corps File No. SPK-2008-00608

Dear Ms. Sheata:

On behalf of the permit holder, the Eagle River Watershed Council (Council), Walsh Environmental Scientists and Engineers, LLC (Walsh) is submitting this letter report to document conditions after one full year for the Phase 2A Edwards Eagle River Restoration Project in Eagle County, Colorado, which was completed in November, 2010. This report will also document as-built conditions for the Phase 2B, which was completed in November, 2011.

Instream enhancements and riparian vegetation restoration on the Eagle River were designed to restore aquatic habitat and function to the Edwards Reach and were implemented under Nationwide #27 authorization (Corps File No. SPK-2008-00608-CW). At the close of 2011, all Phase 2A and 2B instream work was completed. Approximately 75% of the Phase 2A vegetation installation was completed and approximately 50% of the Phase 2B vegetation installation was completed. Willow stake plantings on banks and cottonwood tree plantings occurred on Phase 2A in the Spring and Fall of 2011. Additional plantings to add shrub diversity will be ongoing on both phases in future years as funding, planting conditions, and volunteer labor allow.

Contact information for the project is provided below:

APPLICANT	AGENT
Eagle River Watershed Council Attn: Melissa Macdonald 82 E. Beaver Creek Blvd. Avon, CO 81620 P.O. Box 7688	Susan Nordstrom Walsh Environmental Scientists and Engineers, LLC 4888 Pearl East Circle, Suite 108 Boulder, CO 80301 Phone: (303) 443-3282 Fax: (303) 443-0367

SITE DESCRIPTION AND LOCATION

The Edwards Eagle River project site is located in the community of Edwards in Eagle County, Colorado. Approximately 1.6 miles in total length, the project area begins about ½-mile downstream of the Edwards Spur Road Bridge and ends at the Hillcrest Drive Bridge (refer to Figure 1 – Site Location Map). Within the overall site, the river is divided into five reaches. Phase 1 instream and vegetation restoration

completed in 2009 included work in Reaches 1 and 2 and the upper part of Reach 5. Additional vegetation was planted along Lake Creek, which is a tributary to the Eagle River. Phase 2A included work in lower Reach 5 and the upper part of Reach 4. Phase 2B concentrated primarily in Reach 4 (refer to Figure 2 – Site Overview/Orientation Map).

The downstream limits are at latitude 39 degrees, 39 minutes, and 16 seconds; longitude 106 degrees, 37 minutes, and 45 seconds. The upstream limits are at latitude 39 degrees, 39 minutes, and 03 seconds; longitude 106 degrees, 36 minutes. Geographically, the project site is located in Section 36, Township 4 South, Range 83 West; Section 31, Township 4 South, Range 82 West; and Sections 5 and 6, Township 5 South, Range 82 West. The property straddles the *Wolcott, Colorado* and *Edwards, Colorado* USGS 7.5 minute quadrangle maps in Eagle County, Colorado.

PROJECT BACKGROUND AND DESCRIPTION

Authorization under Nationwide Permit #27 (Corps File No. SPK-2008-00608) was issued by the U.S. Army Corps of Engineers (Corps) for Phase 2A and Phase 2B of the Edwards Eagle River Restoration Project on September 9, 2010 and August 30, 2011, respectively. Instream and vegetation work completed in each phase is described below.

PHASE 2A
Bank Stabilization and Instream Improvements Completed November, 2010

Structural treatments were implemented during the Edwards Eagle River Phase 2A Project include: grade control structures, point bar enhancement, bank stabilization, irrigation ditch abandonment and realignment, backwater nursery enhancement, and invert adjustment at an outside bend pool. These are described in detail in the 2010 monitoring report.

Phase 2A Vegetation Improvements

Sixteen inch-diameter willow wattles (predominantly *Salix exigua* with some *Salix monticola* and *Salix planifolia*) were placed continuously along the toe of all bank layback areas and willow stakes were planted into and above the wattles. Narrowleaf cottonwood (*Populus angustifolia*) poles were planted at the tops of graded banks at treatment areas 2-13, 2-11, and 2-6. A summary of the willow and cottonwood plantings is provided in the table below, along with additional plantings installed in 2011.

Plan Sheet Number	Treatment ID	November, 2010 Vegetation Installed
3	2-13	900 linear feet of willow wattles 99 Cottonwood poles installed in Reach 4; 45 poles in Reach 5
4	2-11	250 linear feet of willow wattles 36 Cottonwood poles
4	2-10	310 linear feet of willow wattles
5	2-6	510 linear feet of willow wattles 54 Cottonwood poles

Plan Sheet #	Treatment ID	Spring and Fall 2011 Vegetation Installed
3	2-13	170 willow stakes 68 cottonwood trees, 39 golden currant, and 39 Wood's rose
4	2-12	170 willow stakes

4	2-10	200 willow stakes 20 cottonwood trees, 10 golden currant, and 10 Wood's rose
5	2-11	210 willow stakes
5	2-6	350 willow stakes 98 cottonwood trees, 49 golden currant, and 49 Wood's rose
6	2-3	200 willow stakes 24 cottonwood trees, 12 golden currant, and 12 Wood's rose (10-1-11) 26 cottonwood trees, 3 river birch, 10 sandbar willow, 6 Wood's rose, 4 redtwig dogwood, and 6 golden current (10-6-11)

Phase 2A Results

Willow wattles installed in the fall of 2010 and willow stakes installed in the spring of 2011 were inundated for much of the 2011 growing season, due to unusually high and prolonged river flows. Leaves were just beginning to emerge in mid-August. Willow leaves in the stakes used to construct wattles were visible at a rate of approximately 3-20 shoots per 10 linear feet of wattle. Vertical willow stakes were planted on graded banks in two rows. In general, survival of the vertical stakes was excellent, exceeding 85% in most areas. Survival of cottonwood poles was less than 5%.

There was some damage to graded banks as a result of the sustained high flows. Coir erosion control blanket was pulled off of approximately 200 linear feet of graded bank in the lower section of treatment 2-6. Treatment area 2-10 received 6-12 inches of sand deposition in some areas and erosion in the downstream-most 100 linear feet. A length of about 400 linear feet at the downstream end of treatment area 2-13 incurred the most damage. Erosion control blanket and willow wattles were completely removed. This area was repaired in November of 2011. Brief descriptions of the bank and vegetation condition at each treatment area follow:

Treatment area 2-13

Native grass cover on graded banks is approximately 20% from the establishing streambank seed mix. Native grass cover on areas at the top of the banks that were seeded with an upland seed mix varies, with some areas nearly bare and others showing 100% cover. The average grass cover is estimated to be 60% and in most areas, the newly-seeded areas are holding up well to heavy presence by Canada geese. Canada thistle was sprayed with herbicide in fall of 2011. There is a patch of annual weeds (approximately 100' x 50') at the top of the bank in the downstream portion of the area.

The bank damaged by high flows was repaired using the smashbank technique, in which river banks are pushed back with a large excavator bucket to a more gradual slope, but no soil is removed. Willow wattles and coir erosion control blanket were replaced, and an extra width of coir erosion control blanket was installed at the top of the bank slope.

Treatment area 2-11

The erosion control blanket is intact, and there is approximately 70% cover from the streambank seed mix. Willow stake survival averages approximately 35%. There is one area of Canada thistle approximately 12' x 30' in size at the downstream end of the treatment area.

Treatment area 2-6

For discussion purposes, this large area is divided into thirds. The downstream-most third exhibits over 90% herbaceous cover and includes primarily Baltic rush (*Juncus balticus*), bottlebrush squirreltail (*Elymus elymoides*), and Canada wildrye (*Elymus canadensis*). Willow stake survival averages 85%. Willow sprouts are emerging from willow wattles at an average rate of one per every one linear foot. In the central third, willow stake survival is approximately 60% and willow sprouts are emerging from

wattles at an average rate of two per linear foot. Native grass cover averages approximately 80%. In the upstream third, willow stake survival is approximately 50% and willow sprouts are emerging from wattles at an average rate of one per linear foot. Native grass cover ranges between 40% and 80% and there is a notable presence of sedge (*Carex spp*) from topsoil that was reserved and replaced on the bank. There are no noxious weeds present in this treatment area. Electric fence that keeps cattle off of the river banks is a major factor in the positive trend of native vegetation establishment.

The channel bottom and banks of the realigned ditch are stable and all of the transplanted sedge clumps are establishing.

Treatment area 2-10
Willow stake survival averages 90%-95%. Willow sprouts are emerging from willow wattles at an average rate of three per every ten linear feet. Emergence from the native grass seed mix is less than 10% and it appears that there may be a deposition of sand and silt on the bank as a result of the prolonged high flows. However, pre-existing grass and Baltic rush cover at the top of the bank is robust, and is likely to spread to the graded portions of the bank.

Treatment area 2-9
Banks of the side channel are stable, and the side channel was holding water into the late fall.

Treatment area 2-3
Willow stake survival on the row closer to the river averages about 10% and survival on the landward row is approximately 90%. Willow wattles were not installed on this bank. About 100 linear feet at the downstream end were damaged by high flows. This area was repaired in November of 2011 with the smashbank treatment, and clumps of existing Baltic rush were integrated. Erosion control blanket is intact on all other areas of the bank and native grass cover averages about 40%. In October of 2011, this area was the subject of a demonstration planting of long-pole containerized plants. Approximately 55 native trees and shrubs (grown by the Natural Resources Conservation Service Plant Materials Center in Los Lunas, NM) were planted.

Phase 2A Vegetation Transect Results

Belt transects were established and evaluated at three treatment areas in Phase 2A: 2-13 and 2-6 on bank right, and 2-10 on bank left. Results are as follows:

Treatment area 2-13

Parallel Belt Transect Results:
TR3Na, 20' x 50'

Species	# Live Stems 2011	Visual Estimate of Cover, 2011
Salix species	142	5%

Perpendicular Belt Transect Results:
TR3Nb, 10' x 36'

Species	# Live Stems 2011	Visual Estimate of Cover, 2011
Populus angustifolia	2	6%
Rosa woodsii	5	2%
Ribes aureum	4	2%
Salix species	3	<1%

Treatment area 2-6

Parallel Belt Transect Results:
TR4Na, 20' x 50'

Species	# Live Stems 2011	Visual Estimate of Cover, 2011
Salix species	67	5%

Perpendicular Belt Transect Results:
TR4Nb, 20' x 35'

Species	# Live Stems 2011	Visual Estimate of Cover, 2011
Populus angustifolia	3	3%
Rosa woodsii	5	2%
Ribes aureum	12	8%
Salix species	34	5%

Treatment area 2-10

Parallel Belt Transect Results:
TR3Sa,120' x 50'

Species	# Live Stems 2011	Visual Estimate of Cover, 2011
Salix species	22	1%

Perpendicular Belt Transect Results:
TR3Sb, 10' x 64'

Species	# Live Stems 2011	Visual Estimate of Cover, 2011
Populus angustifolia	4	5%
Ribes aureum	2	2%
Salix species	28	2%

Recommendations for Phase 2A

The primary vegetation maintenance activities for the 2012 growing season should include:

1) Control of Canada thistle at treatments 2-13, 2-11, and 2-10.
2) Watering of the trees and shrubs planted in October of 2011.
3) Maintaining integrity of beaver exclusion cages on cottonwood trees.
4) Watching banks to monitor establishment of willows from wattles and stakes and to ensure that erosion control blanket remains intact.

PHASE 2B

Bank Stabilization and Instream Improvements Completed in November, 2011

Two structural treatments were implemented during the Edwards Eagle River Phase 2B Project. Refer to the attached as-built drawings for treatment locations. Treatment areas are identified by number string where the "2B" indicates Phase B. Each treatment area is identified by a number and letter. The legend identifies the treatment type and these are illustrated in the construction details. In addition to the treatments detailed below, a vintage car and 36 tires were removed from the left bank.

Smashbank (B) – Vertical banks are layed back to a more gradual slope using the bucket of a large excavator. The bank is not cut and soil is not removed. Smashbank occurred at five treatment areas:

1. 2B-1, located on bank left of Lake Creek
2. 2B-2A, located on bank left, spanning 61+50 to 64+25
3. 2B-2C, located on bank left, spanning 53+50 to 54+25
4. 2B-2D, located on bank left, spanning 52+75 to 53+00
5. 2B-3C, located on bank right, spanning 39+50 to 40+75

Bank Stabilization (D) - Vertical and erosive banks throughout the Phase 2B project reach were graded back to slopes ranging between 1.5:1 and 3.5:1, seeded with a native seed mix (for permanent stabilization), and protected in the interim with erosion control blanket. Sixteen-inch diameter willow wattles were installed at the toe of the graded bank and covered with erosion control blanket. Bank laybacks were implemented in six treatment areas:

6. 2B-3A, located on bank right, spanning 43+00 to 44+00 (3:1 layback)
7. 2B-3B, located on bank right, spanning 40+75 to 43+00 (2.5:1 to 3.5:1 layback)
8. 2B-3D, located on bank right, spanning 37+25 to 39+50 (2.5:1 to 3.5:1 layback)
9. 2B-3E, located on bank right, spanning 35+75 to 37+25 (1.5:1 to 2.5:1 layback)
10. 2B-3F, located on bank right, spanning 33+50 to 35+75 (4:1 layback)
11. 2B-3F, located on bank right, spanning 35+25 to 33+50 (2.5:1 layback)

Vegetative treatments will be implemented in 2012, when willow stakes are planted into the bank at all of the above locations, plus:

1. 2B-2B, located on bank left, spanning 60+75 to 61+50

Photographic Documentation

Replicable photo points were established for Phase 2A in 2010 and for Phase 2B in 2011. The chosen points are at key locations to provide optimum visual documentation of the instream enhancement and bank stabilization efforts. Successive photographs taken each year will be used to document changes in channel enhancements or vegetative growth and patterns, and the photos will be referenced in the monitoring reports to clarify or support the information presented. (Refer to *Photo Point Location Map* and *Photographic Documentation*).

Phase 2B Tasks for 2012

In the Spring of 2011, additional willow stakes (including planeleaf willow, *Salix planifolia* and Rocky Mountain willow, *Salix monticola*) will be planted into banks. Nursery-grown containerized narrow-leaf cottonwood trees will be planted at the tops of banks.

Please contact Walsh if you have questions on the information provided in this letter report.

Sincerely,

Walsh Environmental Scientists and Engineers, LLC

Susan Nordstrom

Cc: Melissa Macdonald, Eagle River Watershed Council

Attachments:

Figure 1 – Site Location Map
Figure 2 – Site Overview/Orientation Map
Phase 2B As-Built Plan and Profile Drawings (6 sheets)
Phase 2B As-Built Construction Details (1 sheet)
Photo Point Location Map (3 sheets)
Photographic Documentation – Phase 2A Vegetation and Engineering Treatments
Photographic Documentation – Phase 2B Vegetation Treatments

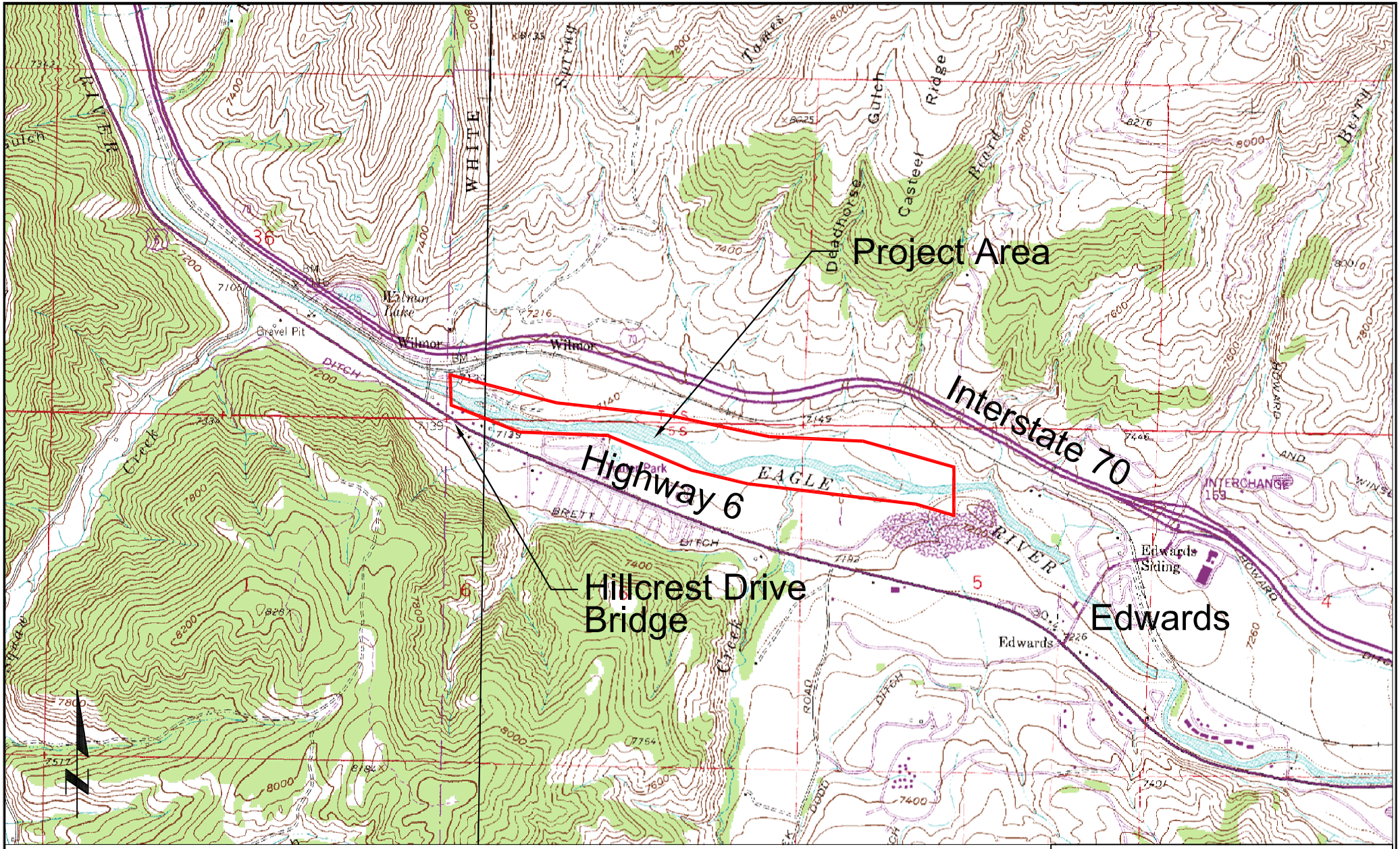
REFERENCES

U.S. Department of the Army, U.S. Army Corps of Engineers. 2008. Interim regional supplement to the Corps of Engineers wetland delineation manual: Western Mountains, Valleys, and Coast Region. Engineer Research and Development Center ERDC/EL TR-08-12.

U.S. Department of the Interior, Geological Survey. *Wolcott, Colorado* Quadrangle (7.5 minute Topographic Series). U.S. Geological Survey, Denver, Colorado.

U.S. Department of the Interior, Geological Survey. *Edwards, Colorado* Quadrangle (7.5 minute Topographic Series). U.S. Geological Survey, Denver, Colorado.

Weber, W.A., 1987. Colorado Flora: Western Slope. Colorado Associated University Press. Third Edition.



Downstream project limit: lat 39° 39' 16" long 106° 37' 45"

Upstream project limit: lat 39° 39' 03" long 106° 36'

Source: USGS Wolcott and Edwards quadrangles

SCALE: 1" = 2000'

2000 0 1000 2000

FIGURE 1: SITE LOCATION MAP

No.	Revisions	Date	By
#1			
#2			
#3			

Date:	12-20-11	Drawn By:	JB, rev SN
Project No.	900104.7404.040	Checked By:	
Drawing:	Figure 1	Sheet	1 of 1

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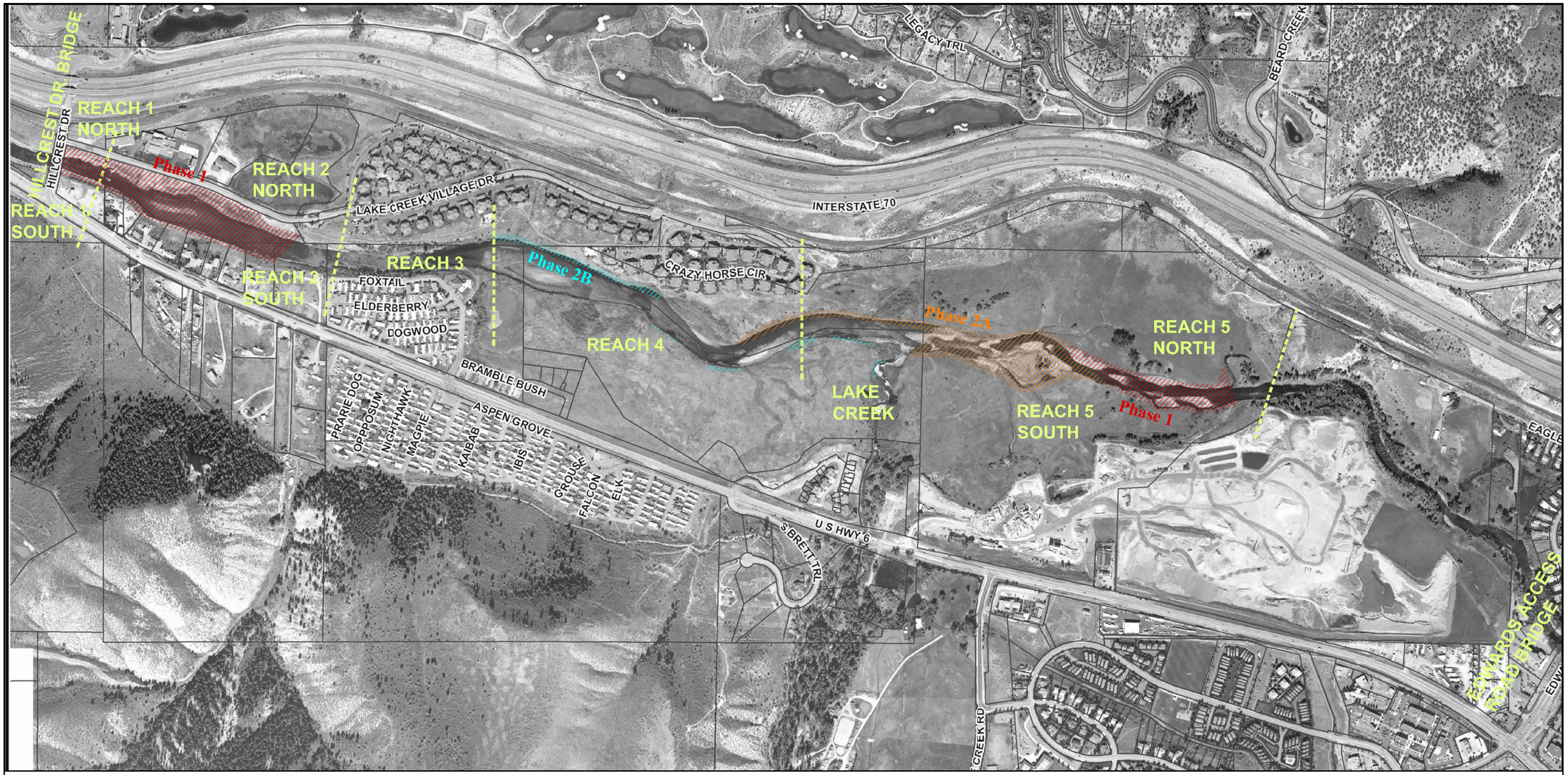
EDWARDS EAGLE RIVER RESTORATION - EAGLE RIVER WATERSHED COUNCIL



300 0 300 600

22 X 34" SCALE: 1" = 300'
11 X 17" SCALE: 1" = 600'

USAC PERMIT NUMBER: SPK-2008-00608

U:\ACAD\Wetland E&T Species\7403 - Edwards Eagle River Restoration\060 Phase III Veg Constr Support\As-Built\Figure 2 overview12-23-11.dwg

NO.	DATE	REVISIONS	BY	CHK

PROJECT NO:
DRAWN:
DESIGNED:
CHECKED:
DATE: 12-23-11

Walsh
Environmental Scientists and Engineers, LLC
an ecology and environment company
303-443-3282 Contact: Julie Ash

Eagle River Watershed Council
111 Swift Gulch Road
P.O. Box 7688
Avon, Colorado 81620
970-827-5406 Contact: Melissa Macdonald

EDWARDS EAGLE RIVER RESTORATION
SITE OVERVIEW/ORIENTATION

Figure 2

CREEK & RIVER OVERVIEW WITH EDUCATIONAL SIGNAGE

210506101017

IMPROVE EXISTING NATIVE TRAIL & ADD TRAIL MARKERS

INSTALL WILDLIFE-FRIENDLY CATTLE EXCLUSION FENCE IN THE FUTURE IF NEEDED

POTENTIAL TRAIL EXTENSION USING GOCO FUNDS

RESTORE RIPARIAN OVERSTORY

MINIMUM AND MAXIMUM BARS (TYP)

LAKE CREEK ORRIDOR

ENHANCE RIPARIAN OVERSTORY

RESTORE RIPARIAN OVERSTORY

RAISE SIDE CHANNEL INVERT TO ALLOW FLOOD ACCESS ONLY

Reach 5

210505200009

VEGETATION KEY

- RIPARIAN OVERSTORY
  Cottonwood
  Blue spruce ~ Douglas fir
- RIPARIAN SHRUB
- MONTANE
  Ponderosa pine ~ Juniper
  Silver buffaloberry ~ Big sage
  Rubber rabbitbrush
- TRAILHEAD
- TRAIL
- WILDLIFE OVERLOOK/ FISHING DECK

RIVER KEY

- EXISTING THALWEG
- PROPOSED THALWEG
- BIOENGINEERED BANK STABILIZATION TREATMENT
- BIOTECHNICAL BANK STABILIZATION TREATMENT
- ALTERNATING BAR WITH BOULDER OR LOG FRAME
  Minimum and maximum
- HABITAT LOG
- LOG SPUR
- SUBMERGED FISH STRUCTURE
- HABITAT BOULDER
- RIVER ACCESS FOR PEDESTRIANS
  Sitting boulders no willows
- 1658+00 FLOOD INFORMATION REPORT RIVER STATIONING
- PARCEL
  210506101016
  (Tier A = blue, Tier B = green, Tier C = cyan)

ACCESS & EASEMENT CONSIDERATIONS

No.	Revisions	Date	By
#1	Reconfigured encroachement/PC thalweg	3.22.08	JB
#2	Added Parcel Identification	4.14.08	JB
#3			

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EDWARDS EAGLE RIVER RESTORATION - EAGLE RIVER WATERSHED COUNCIL

SCALE: 1" = 200'
200 0 100 200

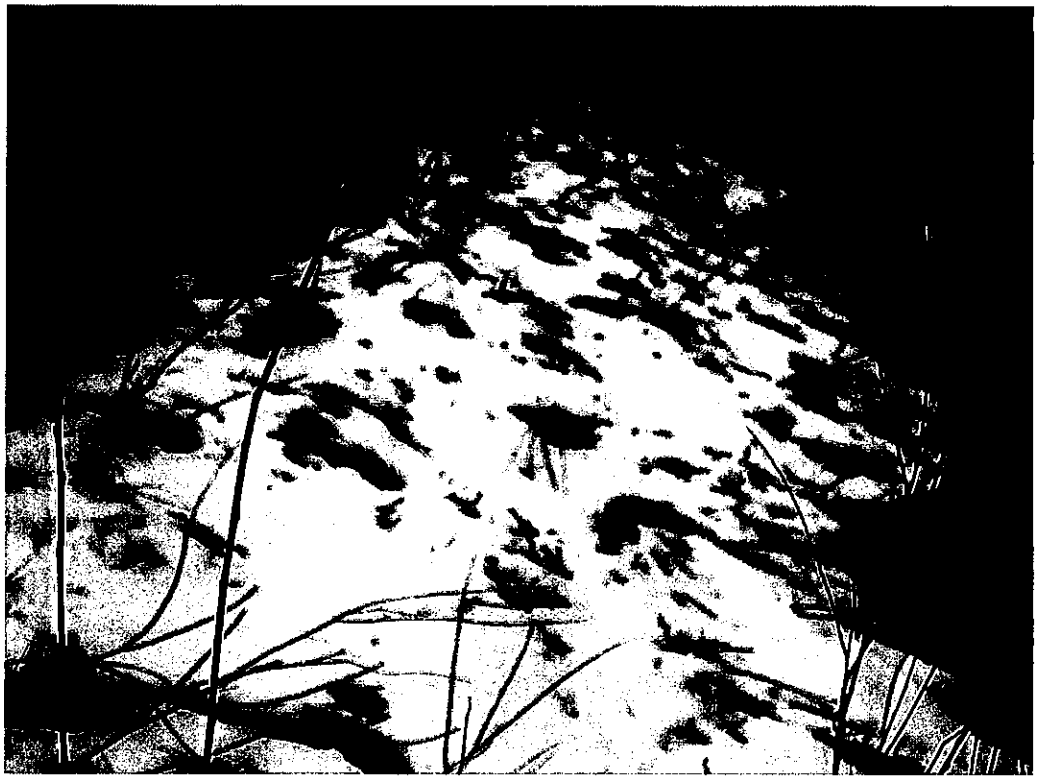
Date:	November 7, 2006	Drawn By:	SS
Project No.	7403-030	Checked By:	JEA
Drawing:	F-3	Sheet	3 of 3

EAGLE RIVER PHASE 2B
2011 MONITORING REPORT
VEGETATION TREATMENTS

Point 2BV8L: Treatment area 2B-1 at Lake Creek looking downstream, before grading.

Point 2BV8L: 11-11-11 Treatment area 2B-1 looking upstream, after smashbank treatment.

Point 2BV7L: 11-11-11 Treatment area 2B-2A looking downstream, as-built.



Point 2BV6L: 11-11-11 Treatment area 2B-2Cb looking downstream, as-built.

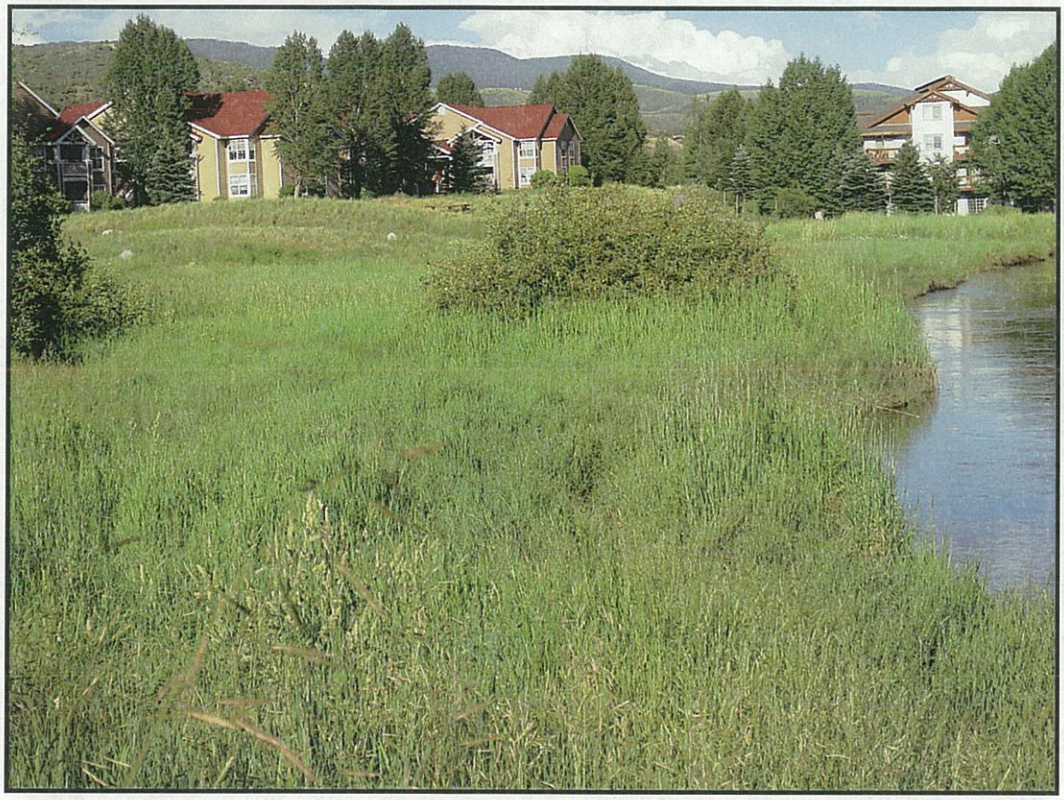
Point 2BV5L: 11-11-11 Treatment area 2B-2Ca looking upstream, as-built.

Point 2BV4L: 11-11-11 Treatment area 2B-2Da and 2B2Db looking downstream, as-built.

Point 2BV3L: 11-1-11 Treatment area 2B-2E looking downstream, as-built.

Point 2BV2L: 11-11-11 Treatment area 2B-2Fb looking upstream, as-built.

Point 2BV1L: 11-11-11 Treatment area 2B-2Ba looking downstream, as-built.

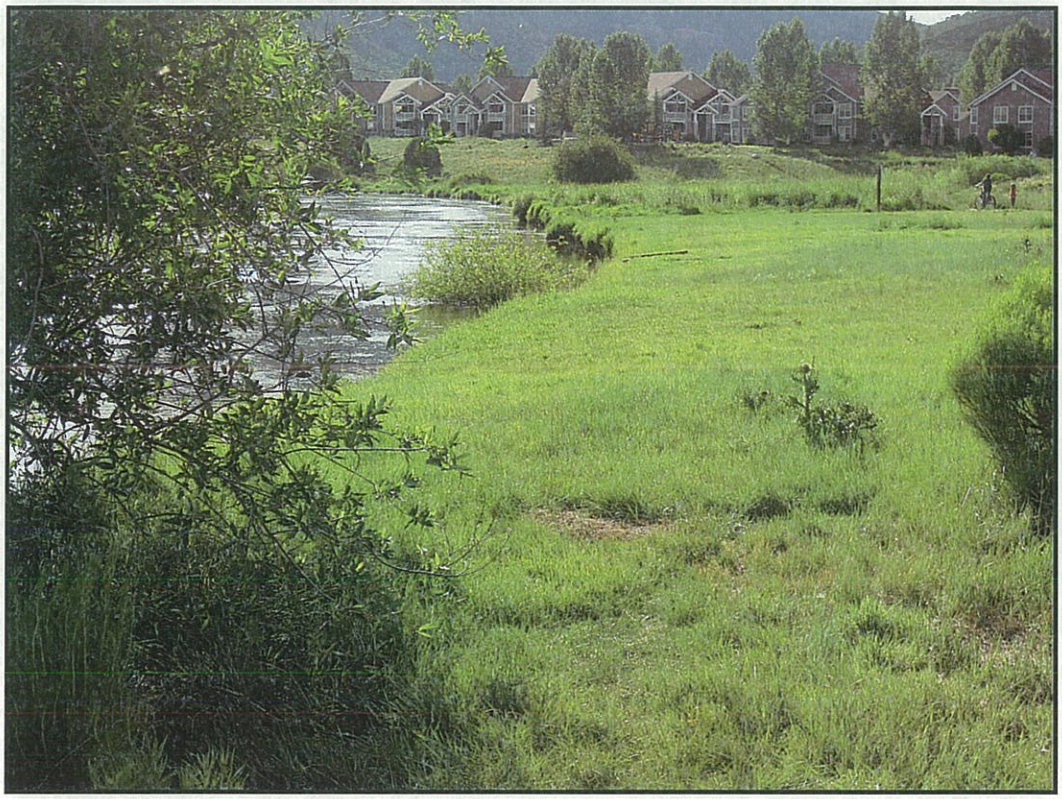


Point 2BV1R: 7-13-11 Treatment area 2b-3F looking upstream prior to grading.

Point 2BV1R: 11-18-11 Treatment area 2B-3F as-built.

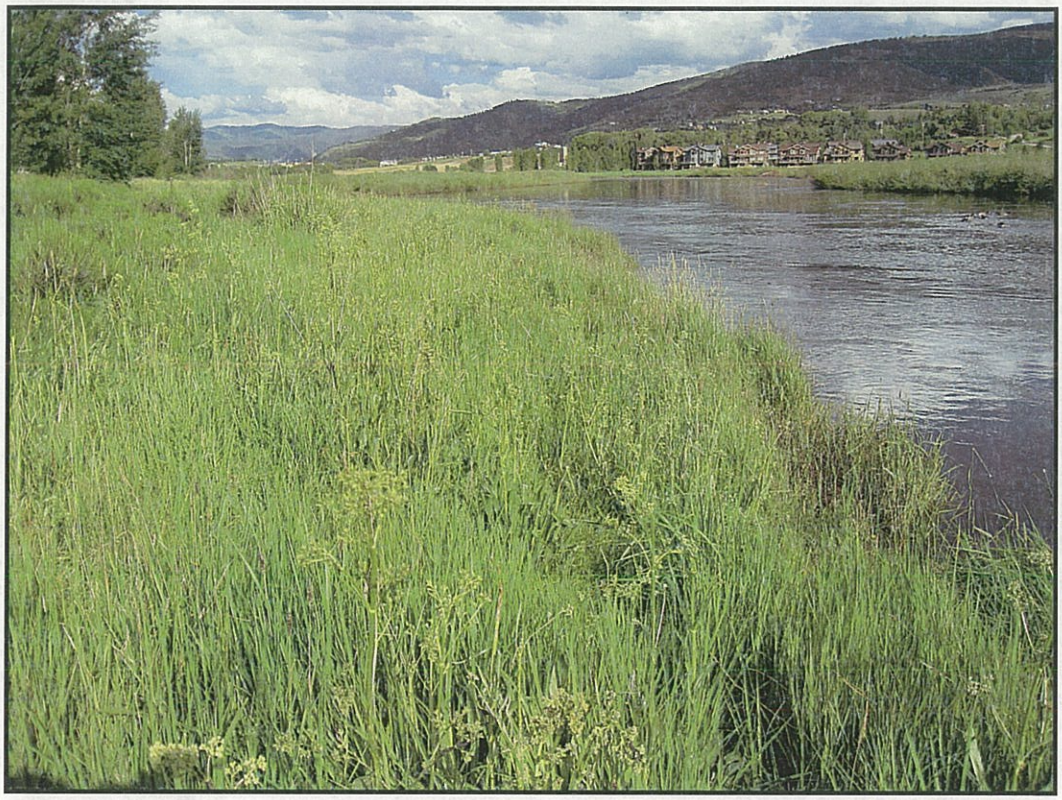
Point 2BV2R: 7-13-11 Treatment area 2B-3D looking upstream prior to grading.

Point 2BV2R: 11-18-11 Treatment area 2B-3D as-built.



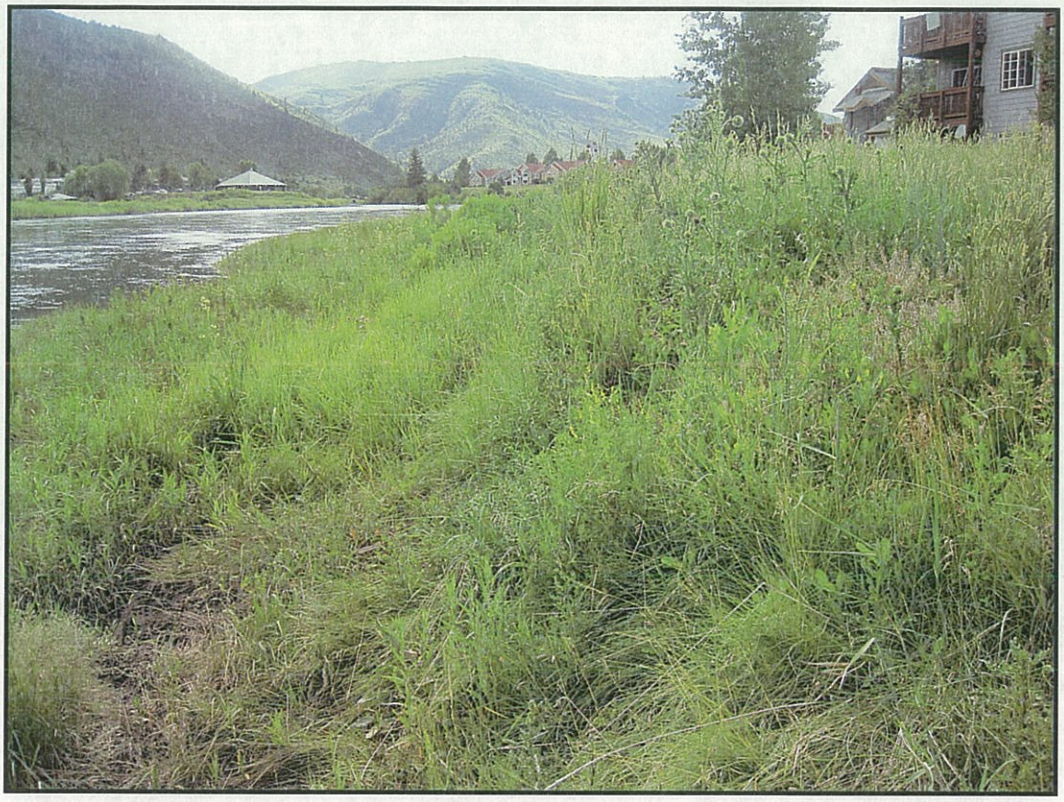
Point 2B3VR: 7-13-11 Treatment area 2B-3C looking upstream prior to grading.

Point 2B3VR: 11-18-11Treatment area 2B-3C as-built.



Point 2BV4R: 7-13-11 Treatment area 2B-3B looking upstream prior to grading.

Point 2BV4R: 7-13-11 Treatment area 2B-3B as-built.



Point 2BV5R: 7-13-11 Treatment area 2B-3A looking downstream, before grading.

Point 2BV5R: 11-18-11Treatment area 2B-3A, as-built.

EAGLE RIVER PHASE 1
2011 MONITORING REPORT
ENGINEERING TREATMENTS

Point 1S1L: October 2008

Point 1S1L: 11-11-11

Point 1S2L: November 2008 during construction, looking across the river at Bar 1-17 from right bank.

Point 1S2L: 11-11-11 Reach 2, left bank, looking downstream to Bar 1-17.

Point 1S3L: November 2006

Point 1S3L: 11-11-11 Reach 2, looking downstream along Boulder/cobble Toe Treatment 1-16.

Point 1S4L: June 2008

Point 1S4L: 11-11-11 Reach 5, left bank, looking downstream to Bar 1-9.

Point 1S5L: June 2008

Point 1S5L: 11-11-11 Reach 5, left bank, looking upstream to Plug 1-6.

Point 1S6L: June 2008

Point 1S6L: 11-11-11 Reach 5, left bank, looking upstream to existing grade control augmentation. Habitat logs are also visible.

Point 1S7L: June 2008

Point 1S7L: 11-11-11 Reach 5, side channel along left bank, looking downstream at side channel.

Point 1S8L: 10-13-10

Point 1S8L: 819-11Reach 5, side channel along left bank, looking upstream at side channel.

Point 1S9L: September 2006

Point 1S9L: Photo not available for 2011

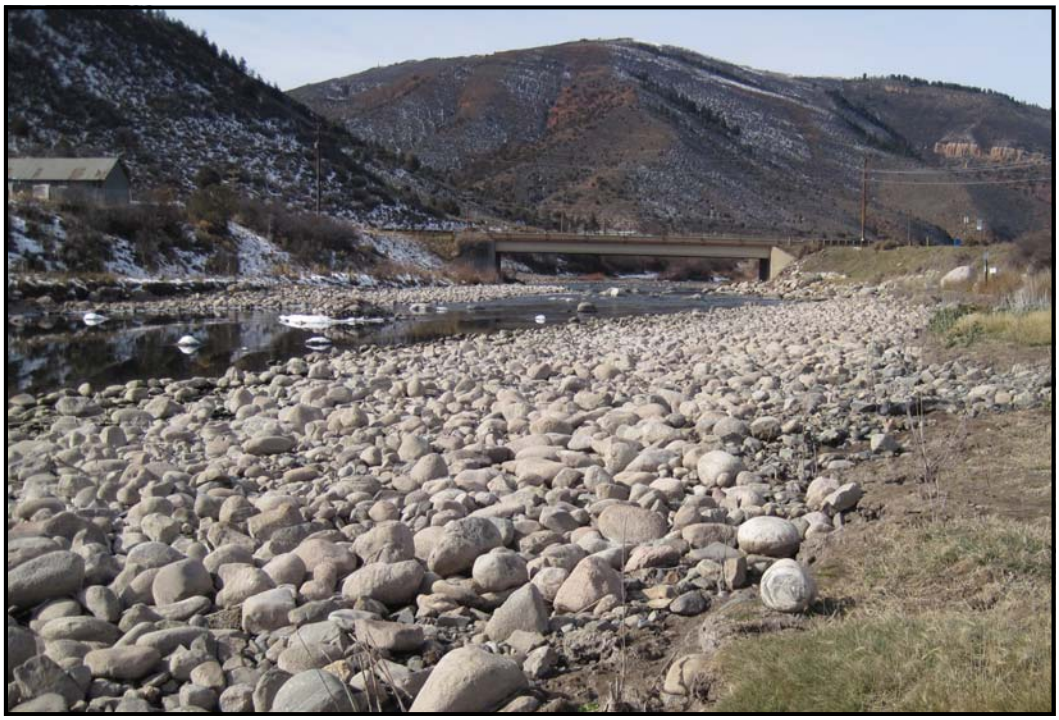
Point 1S10L: June 2008

Point 1S10L: Photo not available for 2011.

Point 1S1R: December 2007

Point 1S1R: 1-1-11 Reach 1, right bank, looking upstream from Hillcrest Drive bridge, showing Bars 1-20 and 1-22.

Point 1S2R: September 2008



Point 1S2R: 1-11-11 Reach 1, right bank, looking downstream to Hillcrest Drive bridge, across Bar 1-20.

Point 1S3R: October 2008

Point 1S3R: 11-11-11 From the boat launch, looking across/up river toward Bar 1-17 (in background).

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Point 1S4R: November 2006 Reach 2, right bank, looking upstream at Bar 1-15a.

Point 1S4R: 11-11-11 Reach 2, right bank, looking upstream at Bar 1-15a, with Bar 1-15 in the background.

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Point 1S5R: November 2006

Point 1S5R: 11-11-11 Reach 2, right bank, looking downstream to Bar 1-15b.

Point 1S6R: November 2006

Point 1S6R: 11-18-11 Reach 5, right bank, looking upstream at Bar 1-8. Outlet of realined ditch is in foreground.

Point 1S7R: November 2006

Point 1S7R: 11-18-11 Reach 5, right bank, looking upstream at Bar 1-1.

Point 1S8R: November 2006

Point 1S8R: 11-18-11Reach 5, right bank, looking downstream) to Bar 1-4.

Point 1S9R: November 2006

Point 1S9R: 8-15-11 Reach 5, right bank, looking upstream to oxbow confluence and Bar 1-1.

EAGLE RIVER PHASE 2A
2011 MONITORING REPORT
ENGINEERING AND
VEGETATION TREATMENTS

Point 2V1R: 10-5-10 Treatment area 2-13 looking downstream, before grading.

Point 2V1R: 8-15-11 Treatment area 2-13 looking downstream, 1 year after bank layback and willow wattle installation. (Willow wattles are underneath erosion control blanket at toe of slope.)

Point 2V2R: 7-23-10 Treatment area 2-13 looking upstream, before grading.

Point 2V2R: 8-15-11 Treatment area 2-13 looking upstream.

Point 2S1R: 9-2-10 Treatment area 2-11 looking upstream, before work.

Point 2S1R: 8-15-11 Treatment area 2-11 after bank layback, willow wattle installation, and cobble bar enhancement. Fence was moved northward (to the left) to keep cattle off the river bank.

Point 2V3R: 9-2-10 Treatment area 2-6 looking upstream, before grading.

Point 2V3R: 8-15-11 Treatment area 2-6 after bank layback, ditch abandonment, willow wattle installation, and cobble toe reinforcement.

Point 2V4R: 10-5-10 Treatment area 2-6 looking downstream, before grading.

Point 2V4R: 8-15-101 Treatment area 2-6 after bank layback, willow wattle installation, and cobble toe reinforcement.

Point 2V1L: 11-18-06 Treatment area 2-10 looking downstream, before grading. Confluence of Lake Creek is at left center.

Point 2V1L: 8-15-11 Treatment area 2-10 after fence removal, bank layback, willow wattle installation, and cobble toe reinforcement.

Point 2S1L: 11-12-10 Treatment area 2-8 looking south into side channel, before enhancements.

Point 2S1L: 11-18-11 Treatment area 2-8 looking south into side channel, afteren-hancements.

Point 2S2L: 10-5-10 Treatment area 2-7 looking downstream at beginning of construction of cobble bar enhancement.

Point 2S2L: 11-18-11 Treatment area 2-7 looking downstream.

EAGLE RIVER PHASE 2B
2011 MONITORING REPORT
VEGETATION TREATMENTS

Point 2BV8L: Treatment area 2B-1 at Lake Creek looking downstream, before grading.

Point 2BV8L: 11-11-11 Treatment area 2B-1 looking upstream, after smashbank treatment.

Point 2BV7L: 11-11-11 Treatment area 2B-2A looking downstream, as-built.

Point 2BV6L: 11-11-11 Treatment area 2B-2Cb looking downstream, as-built.

Point 2BV5L: 11-11-11 Treatment area 2B-2Ca looking upstream, as-built.

Point 2BV4L: 11-11-11 Treatment area 2B-2Da and 2B2Db looking downstream, as-built.

Point 2BV3L: 11-1-11 Treatment area 2B-2E looking downstream, as-built.

Point 2BV2L: 11-11-11 Treatment area 2B-2Fb looking upstream, as-built.

Point 2BV1L: 11-11-11 Treatment area 2B-2Ba looking downstream, as-built.

Point 2BV1R: 7-13-11 Treatment area 2b-3F looking upstream prior to grading.

Point 2BV1R: 11-18-11 Treatment area 2B-3F as-built.

Point 2BV2R: 7-13-11 Treatment area 2B-3D looking upstream prior to grading.

Point 2BV2R: 11-18-11 Treatment area 2B-3D as-built.

Point 2B3VR: 7-13-11 Treatment area 2B-3C looking upstream prior to grading.

Point 2B3VR: 11-18-11Treatment area 2B-3C as-built.

Point 2BV4R: 7-13-11 Treatment area 2B-3B looking upstream prior to grading.

Point 2BV4R: 7-13-11 Treatment area 2B-3B as-built.

Point 2BV5R: 7-13-11 Treatment area 2B-3A looking downstream, before grading.

Point 2BV5R: 11-18-11Treatment area 2B-3A, as-built.

EAGLE RIVER PHASE 1
REACHES 1, 2, and 5
2011 MONITORING REPORT

PHOTOGRAPHIC DOCUMENTATION
VEGETATION

Point 1V1L: 6-12-09 Pre-planting, from Hillcrest Bridge looking upstream at cobble bar 1-22.

Point 1V1L: 8-19-11 15 additional cottonwood trees were planted this year.

Point 1V2L: 10-30-08 Pre-planting, from Cobble Bar 1-22 looking downstream at riparian terrace.

Point 1V2L: 8-19-11

Point 1V3L: 10-30-08 Pre-planting, from Cobble Bar 1-22, looking upstream.

Point 1V3L: 8-19-11

Point 1V4L: 10-30-08 Pre-planting, from Cobble Bar 1-17, looking downstream.

Point 1V4L: 8-19-11

Point 1V5L: 6-26-09 Pre-planting, adjacent to Cobble Bar 1-17, looking upstream.

Point 1V5L: 8-19-11

Point 1V6L: 9-26-08 Pre-planting, at bank Treatment Area 1-16, looking upstream.

Point 1V6L: 8-19-11

Point 1V7L: 10-30-08 Pre-planting, looking downstream toward Treatment Area 1-17.

Point 1V7L: 8-19-11

Point 1V8L: 6-25-09 Pre-planting, looking upstream at side channel.

Point 1V8L: 8-19-11

Point 1V9L: 6-25-09 Pre-planting, looking upstream at side channel.

Point 1V9L: 8-19-11

Point 1V10L: 6-25-09 Pre-planting, where side channel joins river, looking down-stream toward Cobble Bar 1-9.

Point 1V10L: 8-19-11 Willows on bank; cottonwoods and mixed shrubs behind.

Point 1V11L: 8-14-09 Pre-planting, at upstream end of side channel.

Point 1V11L: 8-19-11 Willows, dogwood, and currant on bank; cottonwoods, hawthorns, and mixed shrubs behind.

Point 1V12L: 6-3-08 Pre-planting, looking downstream.

Point 1V12L: 11-11-11

Point 1V13L: 10-30-08 Pre-planting, looking downstream at recently-installed log-rock deflectors.

Point 1V13L: 11-11-011 Willows, dogwood, honeysuckle, and currant on bank; hawthorns, and mixed shrubs behind.

VR+3 Overview: 6-25-08 Pre-planting, looking downstream from upstream end of project area.

VR+3 Overview: 8-19-11 Looking downstream from upstream end of project area.

Overview 2: Photo not available for 2011.

Point 1V1R: 8-7-09 Pre-planting, looking upstream from the Hillcrest Bridge toward Cobble Bar 1-20.

Point 1V1R: 8-15-11

Point 1V2R: 7-14-09 Pre-planting, looking downstream from Cobble Bar 1-20 toward the Hillcrest Bridge.

Point 1V2R: 8-15-11

Point 1V3R: 7-14-09 Pre-planting, looking upstream from Cobble Bar 1-20 toward the boat launch.

Point 1V3R: 11-11-11

Point 1V4R: 8-7-09 Pre-planting, looking upstream from the boat launch.

Point 1V4R: 8-15-11

Point 1V5R: 11-09 Pre-planting, looking upstream from Cobble Bar 1-15.

Point 1V5R: 8-15-11 Looking upstream from Cobble Bar 1-15; willow and birch plantings in foreground.

Point 1V6R: 10-20-09 Pre-planting, looking downstream from Cobble Bar 1-15.

Point 1V6R: 8-15-11 Willows, birch, alder, dogwood, honeysuckle, and currant near bank, with cottonwoods and mixed shrubs behind. Silver buffaloberry, three-leaf sumac, wax currant, and big sage interplanted with existing shrubs on upper bank.

Point 1V8R: 11-24-08 Pre-planting, looking upstream from Cobble Bar 1-8.

Point 1V8R: 11-18-11 Willows, dogwood, honeysuckle, and currant near bank, with cottonwoods, blue spruce, and mixed shrubs behind.

Point 1V9R: 11-24-08 Pre-planting, looking downstream from Cobble Bar 1-4.

Point 1V9R: 11-18-11

Point 1V10R: 11-24-08 Pre-planting, looking upstream from Cobble Bar 1-4.

Point 1V10R: 11-18-11 Willows, dogwood, honeysuckle, and currant near bank, with cottonwoods, blue spruce, and mixed shrubs behind.

Point 1V11R: 11-9-06 Pre-planting, at Treatment 1-3.

Point 1V11R: 8-15-11

Point 1V12R: 11-18-08 Pre-planting, at Treatment 1-3 looking downstream.

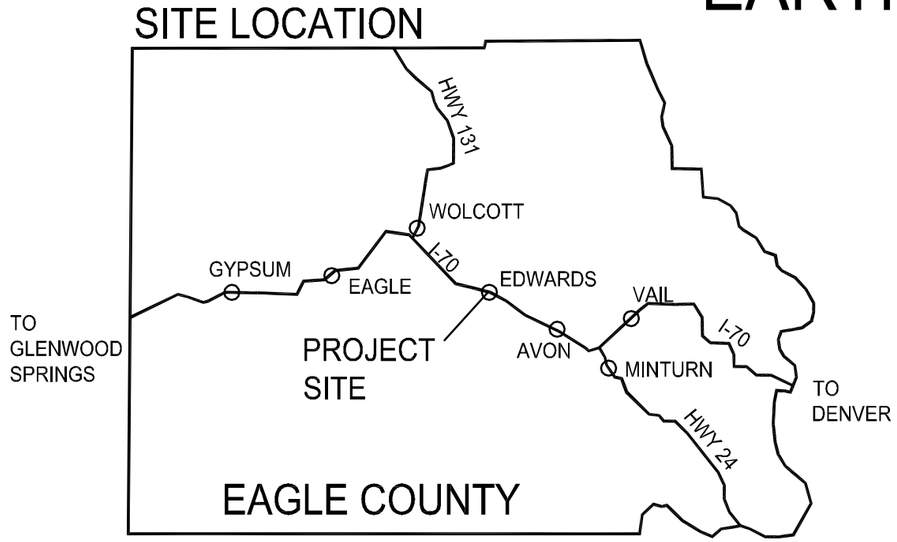
Point 1V12R: 11-18-11

Point 1V13R: 9-29-09 Immediately post-planting, at apex of oxbow, looking south.

Point 1V13R: 11-15-11

EDWARDS EAGLE RIVER RESTORATION PHASE 2B
EARTHWORK AND REVEGETATION

SITE LOCATION



SHEET INDEX

AS-BUILT

N

0 300 600

11x17 SCALE: 1" = 600'

U:\ACAD\Wetland E&T Species\7403 – Edwards Eagle River Restoration\Phase 4 Concept\Eagle 2B Const Dwg 9-1-11.dwg

NO.	DATE	REVISIONS	BY	CHK
1	9-1-11		SN	

PROJECT NO:	900104 7404.030
DRAWN:	SN, JB
DESIGNED:	JEA
CHECKED:	JEA
DATE:	07-19-11

Walsh
Environmental Scientists and Engineers, LLC
an ecology and environment company
303-443-3282 Contact: Julie Ash

Eagle River Watershed Council
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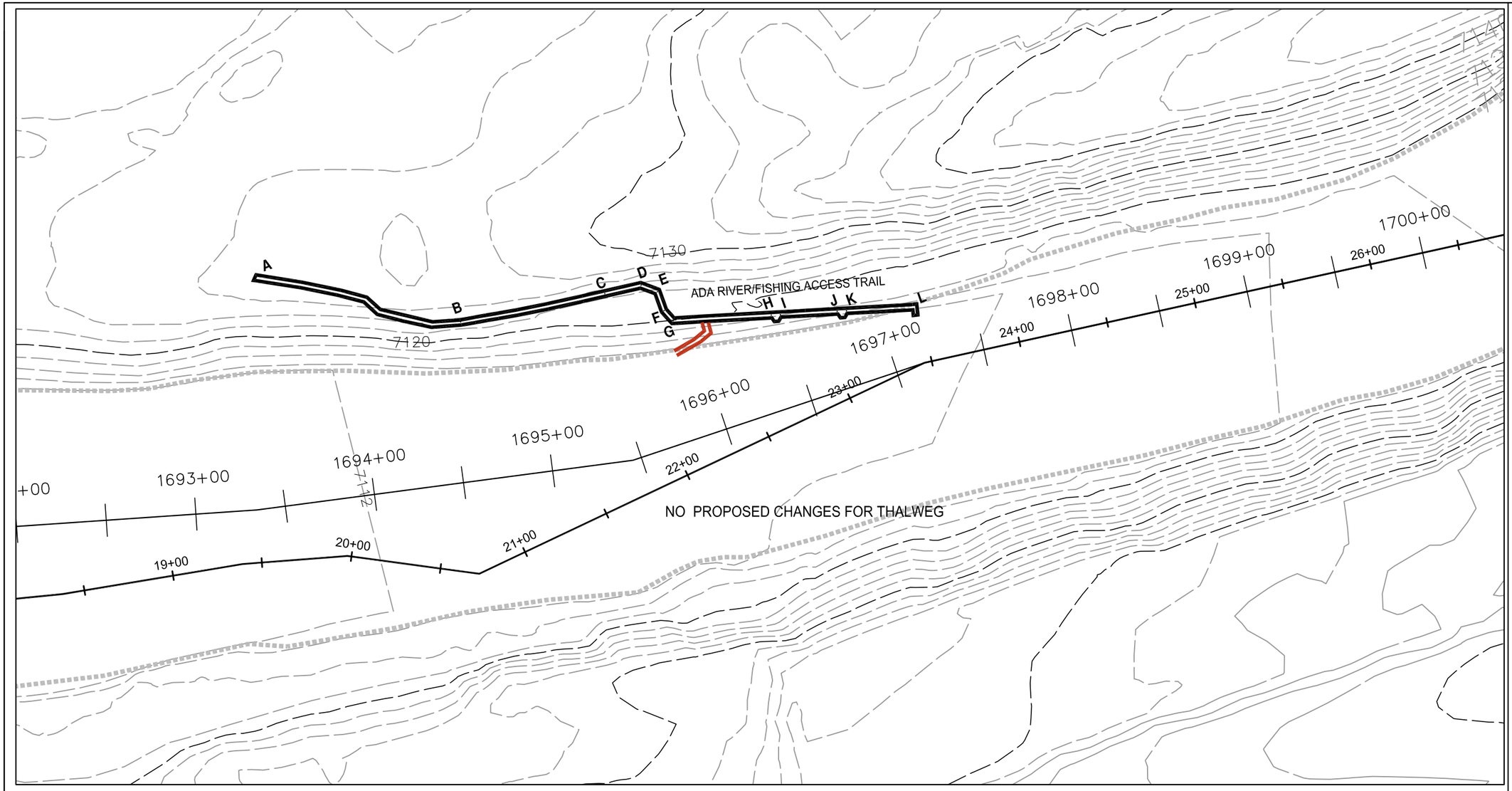
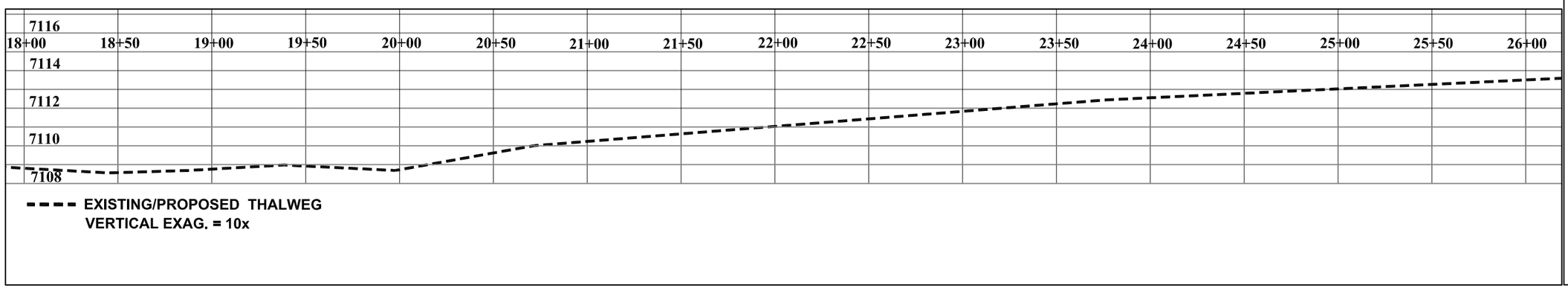
Avon, Colorado 81657
970-827-5406 Contact: Melissa Macdonald

EDWARDS EAGLE RIVER RESTORATION
PHASE 2B EARTHWORK & REVEGETATION
COVER





LEGEND

- EXISTING CONTOUR, 2-ft interval
  - Major
  - Minor
- PROPOSED CONTOUR, 1-ft.interval
  - Major
  - Minor
- APPROXIMATE EDGE OF CHANNEL
- 1740+00 FLOOD INFORMATION REPORT STATION LINE
- 51+00 CONSTRUCTION STATION LINE
- (A) BANK TREATMENT TYPE See Detail Sheets
- 2B-2A TREATMENT ID NUMBER First number = phase Second number = Treatment Area #
- PHASE 2A COBBLE BAR
- SECTIONS

0 30 60

11x17 SCALE: 1" = 60'

AS-BUILT

TREATMENT TYPE KEY

REFER TO DETAIL SHEETS

B	SMASHBANK
C	VEGETATIVE BANK STABILIZATION
D	GRADING AND VEGETATIVE BANK STABILIZATION

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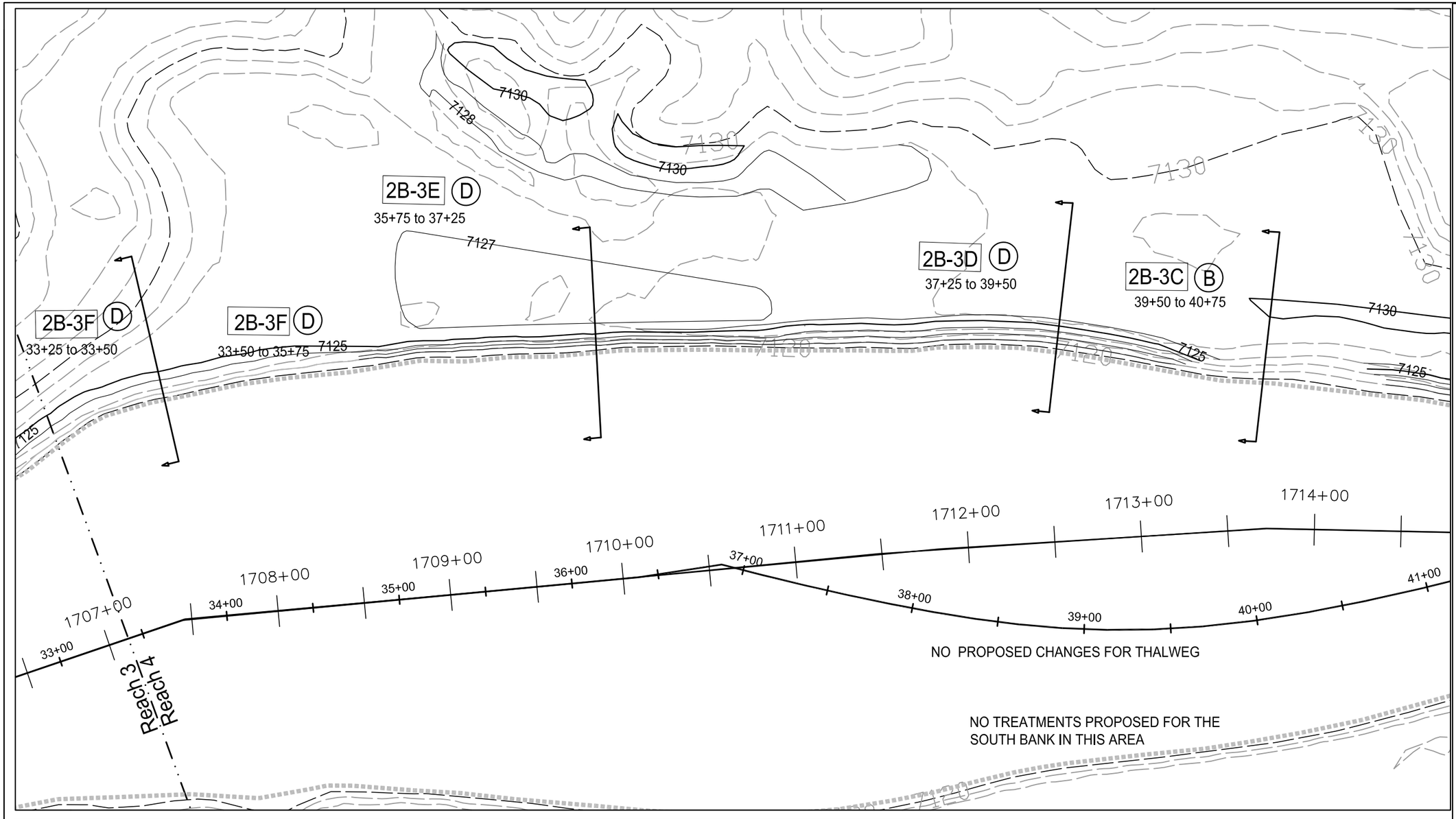
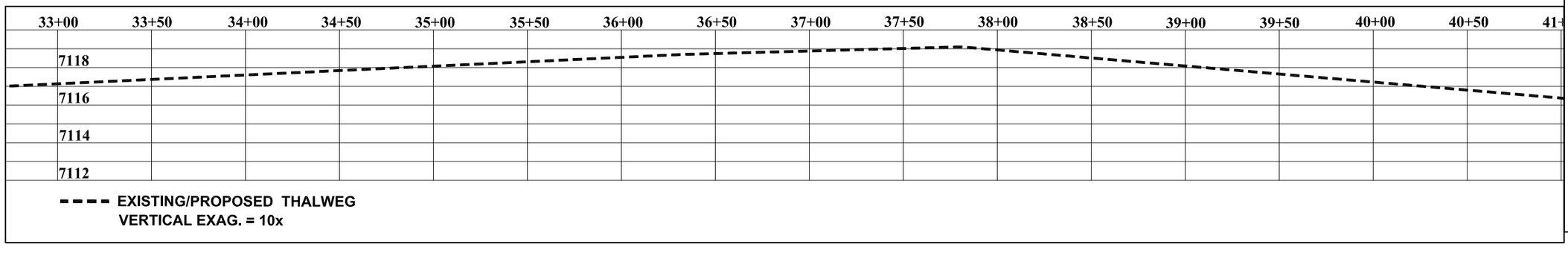
EDWARDS EAGLE RIVER RESTORATION
PHASE 2B EARTHWORK & REVEGETATION
PLAN AND PROFILE 17+00 TO 27+00





LEGEND

EXISTING CONTOUR, 2-ft interval
Major
Minor

PROPOSED CONTOUR, 1-ft.interval
Major
Minor

APPROXIMATE EDGE OF CHANNEL

1740+00
FLOOD INFORMATION REPORT STATION LINE

51+00
CONSTRUCTION STATION LINE

(A) BANK TREATMENT TYPE
See Detail Sheets

2B-2A TREATMENT ID NUMBER
First number = phase
Second number = Treatment Area #

PHASE 2A COBBLE BAR

SECTIONS

0 30 60

11x17 SCALE: 1" = 60'

AS-BUILT

TREATMENT TYPE KEY

REFER TO DETAIL SHEETS

B SMASHBANK

C VEGETATIVE BANK STABILIZATION

D GRADING AND VEGETATIVE BANK STABILIZATION

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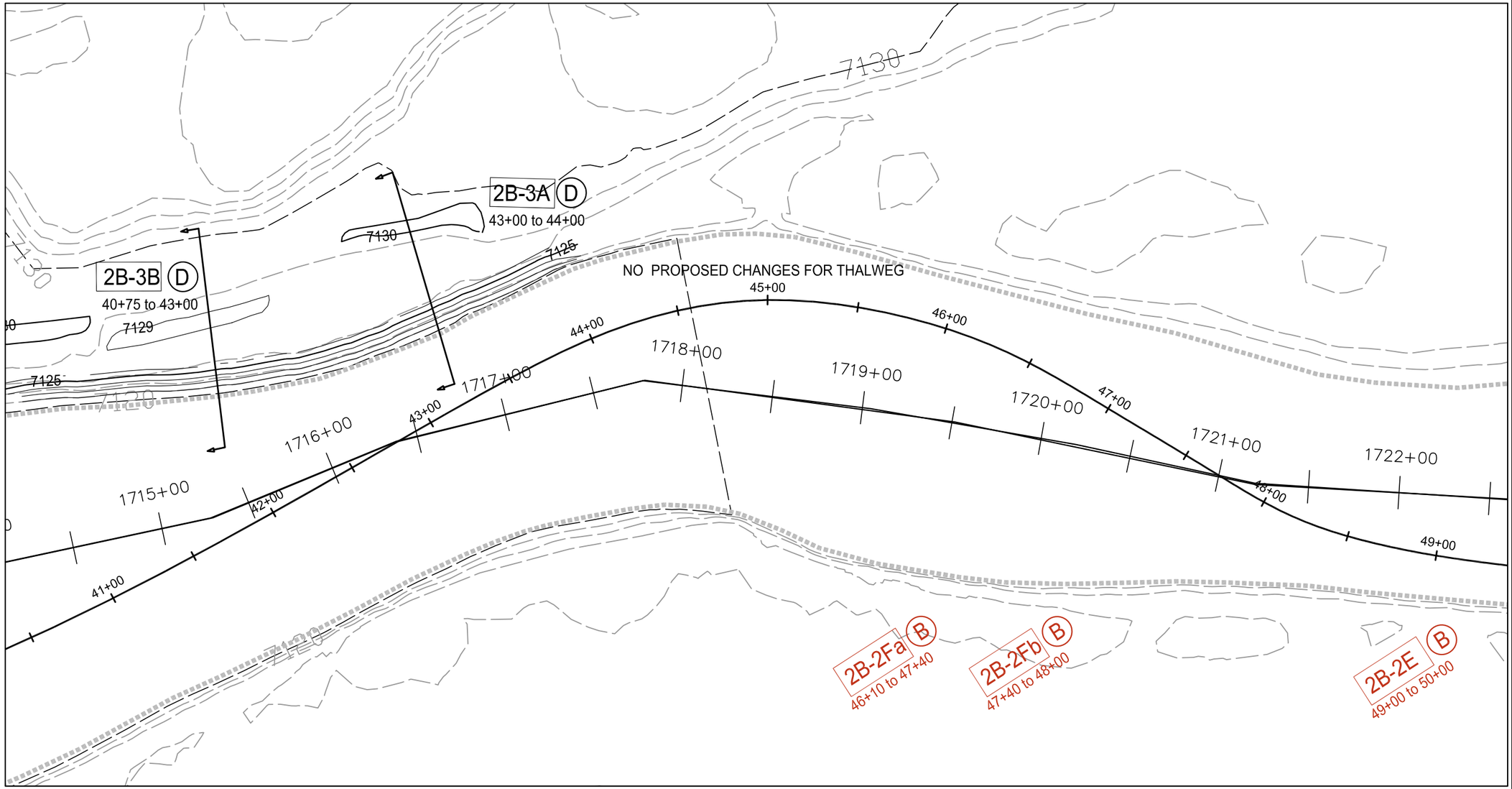
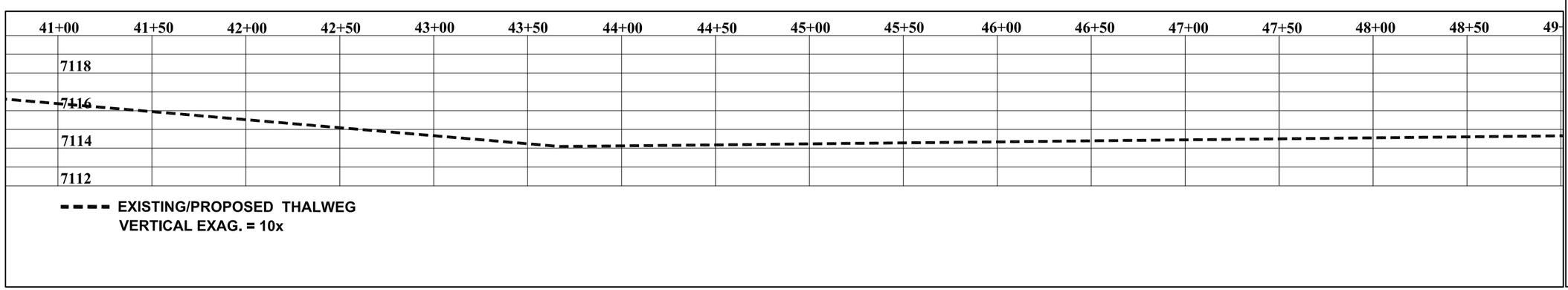
EDWARDS EAGLE RIVER RESTORATION
PHASE 2B EARTHWORK & REVEGETATION
PLAN AND PROFILE 33+00 TO 41+00





LEGEND

- EXISTING CONTOUR, 2-ft interval
  - Major
  - Minor
- PROPOSED CONTOUR, 1-ft.interval
  - Major
  - Minor
- APPROXIMATE EDGE OF CHANNEL
- 1740+00 FLOOD INFORMATION REPORT STATION LINE
- 51+00 CONSTRUCTION STATION LINE
- (A) BANK TREATMENT TYPE See Detail Sheets
- 2B-2A TREATMENT ID NUMBER First number = phase Second number = Treatment Area #
- PHASE 2A COBBLE BAR
- SECTIONS

0 30 60

11x17 SCALE: 1" = 60'

AS-BUILT

TREATMENT TYPE KEY

REFER TO DETAIL SHEETS

B	SMASHBANK
C	VEGETATIVE BANK STABILIZATION
D	GRADING AND VEGETATIVE BANK STABILIZATION

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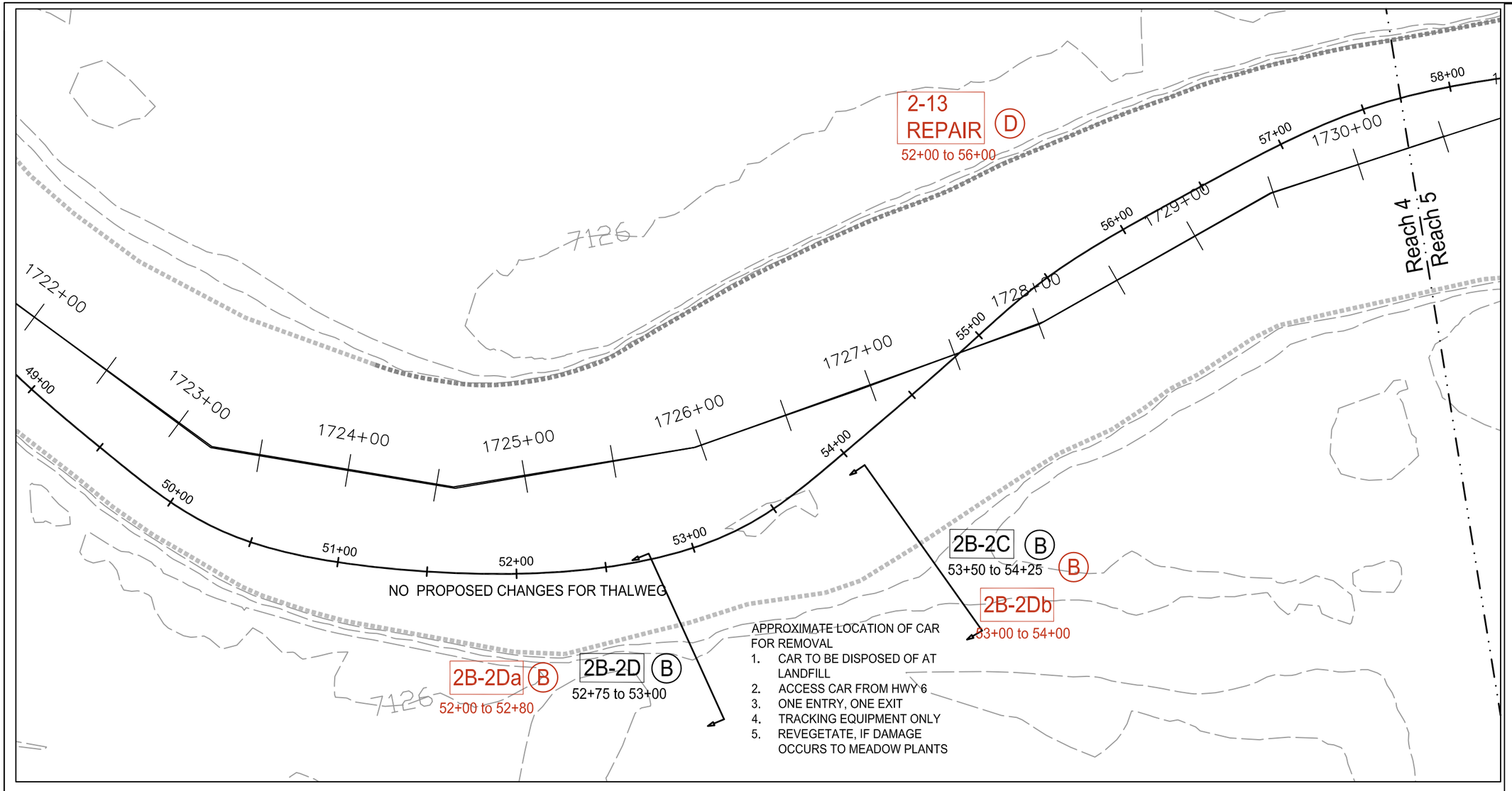
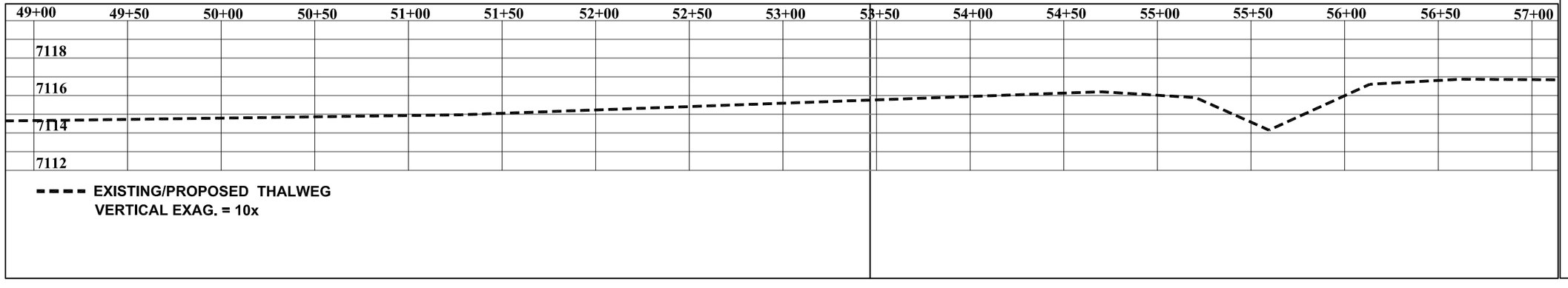
EDWARDS EAGLE RIVER RESTORATION
PHASE 2B EARTHWORK & REVEGETATION
PLAN AND PROFILE 41+00 TO 49+00





LEGEND

- EXISTING CONTOUR, 2-ft interval
  - Major
  - Minor
- PROPOSED CONTOUR, 1-ft.interval
  - Major
  - Minor
- APPROXIMATE EDGE OF CHANNEL
- 1740+00 — FLOOD INFORMATION REPORT STATION LINE
- 51+00 — CONSTRUCTION STATION LINE
- (A) — BANK TREATMENT TYPE See Detail Sheets
- 2B-2A — TREATMENT ID NUMBER
  - First number = phase
  - Second number = Treatment Area #
- PHASE 2A COBBLE BAR
- SECTIONS

AS-BUILT

0 30 60

11x17 SCALE: 1" = 60'

TREATMENT TYPE KEY

REFER TO DETAIL SHEETS

B	SMASHBANK
C	VEGETATIVE BANK STABILIZATION
D	GRADING AND VEGETATIVE BANK STABILIZATION

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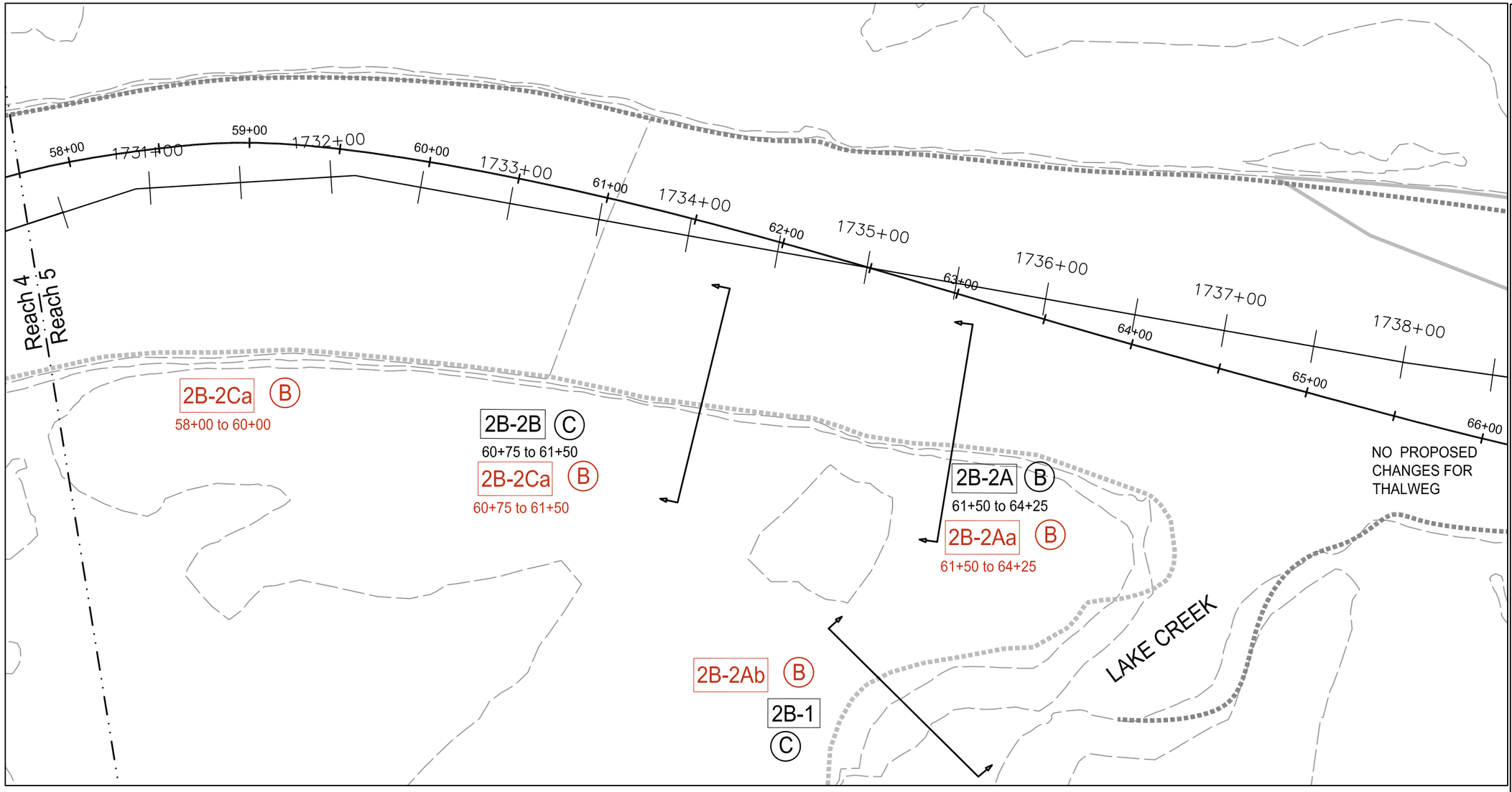
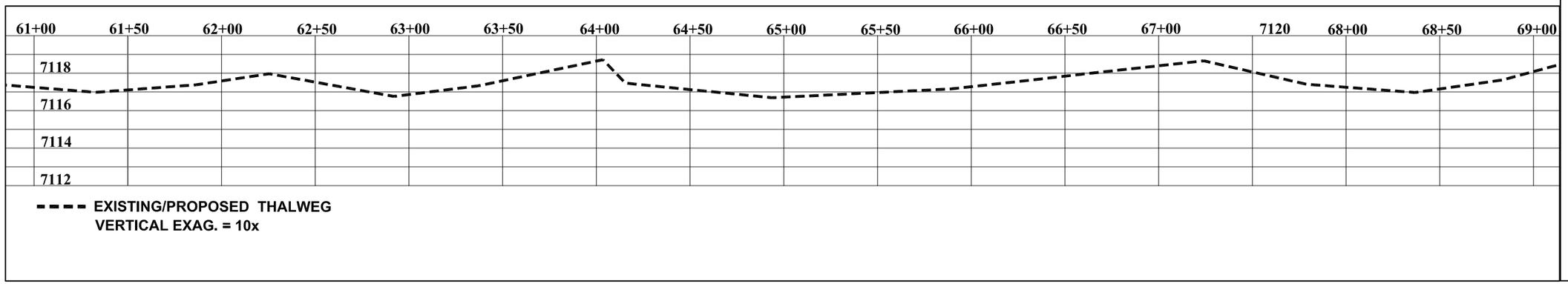
EDWARDS EAGLE RIVER RESTORATION
PHASE 2B EARTHWORK & REVEGETATION
PLAN AND PROFILE 49+00 TO 57+00





LEGEND

- EXISTING CONTOUR, 2-ft interval
  - Major
  - Minor
- PROPOSED CONTOUR, 1-ft.interval
  - Major
  - Minor
- APPROXIMATE EDGE OF CHANNEL
- 1740+00 — FLOOD INFORMATION REPORT STATION LINE
- 51+00 — CONSTRUCTION STATION LINE
- (A) — BANK TREATMENT TYPE See Detail Sheets
- 2B-2A — TREATMENT ID NUMBER First number = phase Second number = Treatment Area #
- PHASE 2A COBBLE BAR
- SECTIONS

0 30 60

11x17 SCALE: 1" = 60'

AS-BUILT

TREATMENT TYPE KEY

REFER TO DETAIL SHEETS

B	SMASHBANK
C	VEGETATIVE BANK STABILIZATION
D	GRADING AND VEGETATIVE BANK STABILIZATION

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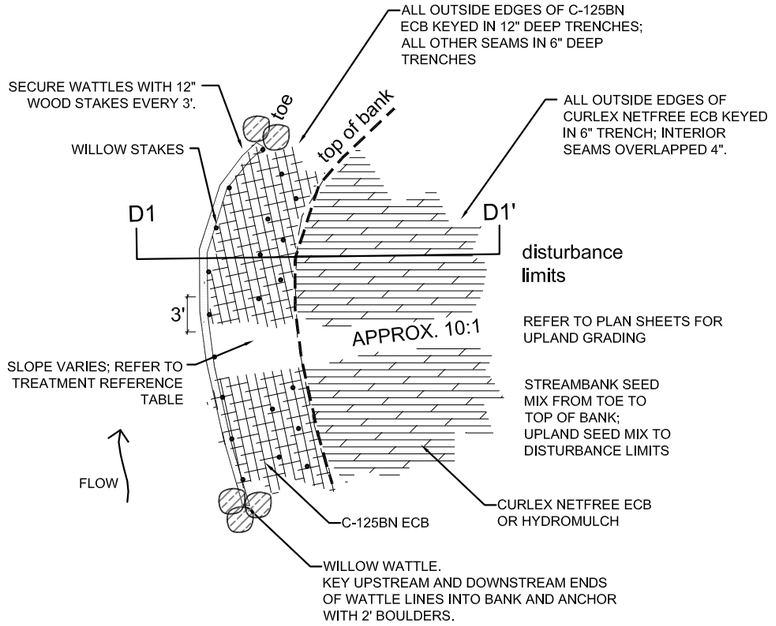
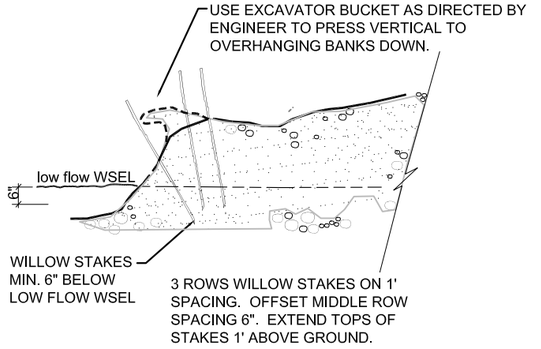
EDWARDS EAGLE RIVER RESTORATION
PHASE 2B EARTHWORK & REVEGETATION
PLAN AND PROFILE 61+00 TO 69+00



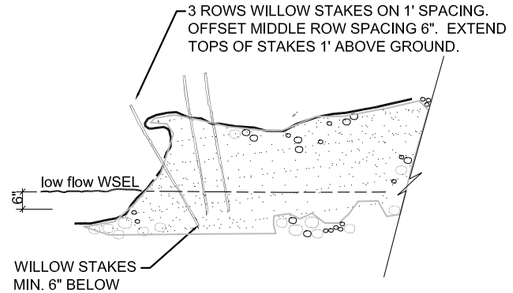
TYPE D TREATMENT: GRADING AND VEGETATIVE BANK STABILIZATION
PLAN, NTS

TREATMENT REFERENCE TABLE

TMT AREA	BANK	STATION	LF	Z	TMT TYPE	PROPOSED TREATMENT
2B-1	Left	Lake Creek	150	N/A	C	Willow staking only
2B-2A	Left	61+50 - 64+25	275	N/A	B	Smashbank
2B-2B	Left	60+75 - 61+50	75	N/A	C	Willow staking only
2B-2C	Left	53+50 - 54+25	75	N/A	B	Smashbank
2B-2D	Left	52+75 - 53+00	25	N/A	B	Smashbank
2B-3A	Right	43+00-44+00	100	3	D	Layback at 3:1 with wattle toe
2B-3B	Right	40+75 - 43+00	225	2.5-3.5	D	Layback at 2.5:1 to 3.5:1 with wattle toe
2B-3C	Right	39+50 - 40+75	125	N/A	B	Smashbank
2B-3D	Right	37+25 - 39+50	225	2.5-3.5	D	Layback at 2.5:1 to 3.5:1 with coir log toe
2B-3E	Right	35+75 - 37+25	150	1.5-2.5	D	Layback at 1.5:1 to 2.5:1 with wattle toe
2B-3F	Right	33+50 - 35+75	225	4	D	Layback at 4:1 with wattle toe
2B-3F	Right	33+25 - 33+50	25	2.5	D	Layback at 2.5:1 with wattle toe

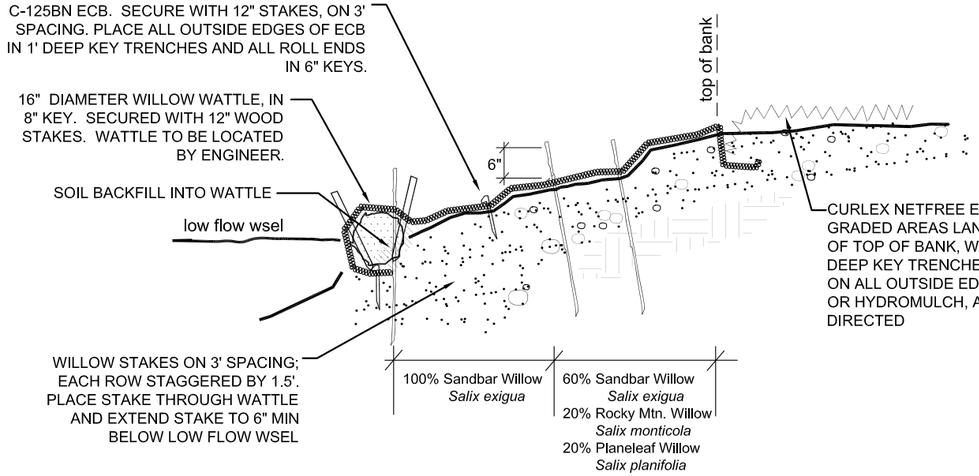


TYPE B TREATMENT: SMASHBANK AND VEGETATIVE BANK STABILIZATION
SECTION, NTS



WILLOW STAKE PLANTING:
1. SOAK STAKES IN WATER FOR 5 TO 7 DAYS BEFORE PLANTING.
2. PLANT THE STAKES IMMEDIATELY AFTER BEING REMOVED FROM THE WATER AND PROTECT THEM AT ALL TIMES FROM SUN, FREEZING, AND DRYING.
3. PLANT THE STAKES BY PRESSING THE ANGLED END INTO THE SOIL. IF SOIL FIRMNESS PREVENTS THIS METHOD, THEN USE A DIBBLE BAR, REBAR, OR SIMILAR EQUIPMENT TO CREATE A PILOT HOLE SLIGHTLY SMALLER THAN THE DIAMETER OF THE STAKE. A MINIMUM OF $\frac{3}{4}$ OF THE LENGTH OF THE STAKE SHOULD BE IN THE SOIL.
4. PLANT THE STAKES AT A DEPTH SUFFICIENT SO THAT AT LEAST 6 INCHES OF THE STAKE IS IN CONTACT WITH MOIST SOIL BELOW THE WSEL. THE UPPER END OF THE STAKES AND POLES SHOULD EXTEND 6 INCHES ABOVE THE GROUND SURFACE. TRIM UPPER END TO THIS HEIGHT.
5. PRESS SOIL AROUND THE STAKE TO ENSURE CONTACT WITH SOIL. BACKFILL THE PLANTING HOLE WITH MUD OR SOIL IN LIFTS, WATERING BETWEEN EACH LIFT AND TAMPING TO FILL VOIDS.

TYPE C TREATMENT: VEGETATIVE BANK STABILIZATION
SECTION, NTS



TYPE D TREATMENT: GRADING AND VEGETATIVE BANK STABILIZATION
SECTION, NTS

ORDER OF OPERATIONS:
1. REFER TO TABLE FOR ELEMENTS AND QUANTITIES IN EACH TREATMENT.
2. VARY SLOPE GRADE AS POSSIBLE, LEAVING MINOR IRREGULARITIES.
3. DIG 8-INCH-DEEP KEY TRENCH FOR WILLOW WATTLE. PLACE C-125BN IN TRENCH AND SECURE WITH STAKES AT 1 ' SPACING.
4. INSTALL WILLOW WATTLE OVER KEY TRENCH.
5. PLACE SALVAGED SOIL/SOD. PLACE A LIGHT COVERING OF SOIL OVER TOP OF AND BEHIND WATTLE.
6. BROADCAST STREAMBANK SEED MIX AND RAKE TO COVER WITH 0.5" SOIL.
7. PULL C-125BN OVER SLOPE, FITTING SNUGLY OVER WATTLE TO ENSURE CONTACT OF WILLOW STAKES WITH SOIL.
8. INSTALL UPLAND SEED AND CURLEX 1 NETFREE ECB FROM TOP OF SLOPE TO GRADING LIMITS, WITH 0.5' KEY TRENCHES ON ALL OUTSIDE EDGES. (OR HYDROMULCH, AS DIRECTED)
9. INSTALL WILLOW STAKES INTO WATTLES (IN SPRING OF 2012).

AS-BUILT

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EDWARDS EAGLE RIVER RESTORATION
PHASE 2B EARTHWORK & REVEGETATION

DETAILS