COFFER DAMS

1. The contractor shall be responsible for the final layout, configuration, maintenance, and removal in their entirety of all coffer dams to be constructed within the project limits.

2. The contractor shall remove and clear all debris from within the coffer dams after construction is complete and prior to project closure.

3. The contractor shall be responsible for the maintenance of all coffer dams while they are in place, including but not limited to:
   a. Regular inspection of coffer dams, fence, and other necessary elements to ensure stability and integrity.
   b. Applying cover to the coffer dams during adverse weather conditions, and maintaining coffer dam integrity during the winter.
   c. Providing adequate provisions for drainage during construction activities.

4. The contractor shall install and maintain an access ladder or similar means of egress within each coffer dam to allow for access during construction activities.

5. The contractor shall provide and maintain all necessary safety equipment and procedures for personnel working within or around the coffer dams.

6. The contractor shall provide all necessary safety signs and barriers to prevent unauthorized access to the coffer dams.

7. The contractor shall coordinate with the project engineer and other parties as necessary to ensure safe and efficient construction.

8. The contractor shall submit a detailed operations and maintenance plan for all coffer dams to be constructed within the project limits.

9. The contractor shall provide a contingency plan for unexpected events, such as weather-related incidents, that may affect the integrity of the coffer dams.

10. The contractor shall provide all necessary documentation, including but not limited to, plans, specifications, and records, to the project engineer and other parties as necessary.

11. The contractor shall ensure that all coffer dams are constructed in accordance with the project engineer's specifications and requirements.

12. The contractor shall provide all necessary training for personnel working on or around the coffer dams.

13. The contractor shall comply with all relevant health and safety regulations and guidelines during construction activities.

14. The contractor shall provide all necessary support to the project engineer and other parties as necessary to ensure the safe and efficient construction of the coffer dams.

WASTE MANAGEMENT

1. The contractor shall not burn, bury, or otherwise dispose of construction debris, coffer dams, or other materials on-site.

2. The contractor shall provide a separate area for the storage and maintenance of coffer dams and all other materials to be disposed of on-site.

3. The contractor shall ensure that all waste materials are properly stored and maintained to prevent unauthorized access.

4. The contractor shall ensure that all waste materials are properly stored and maintained to prevent unauthorized access.

5. The contractor shall provide all necessary training for personnel working on or around the waste materials.

6. The contractor shall ensure that all waste materials are disposed of in an environmentally responsible manner.

7. The contractor shall comply with all relevant health and safety regulations and guidelines during waste management activities.

8. The contractor shall provide all necessary support to the project engineer and other parties as necessary to ensure the safe and efficient disposal of waste materials.

HAZARDOUS MATERIALS

1. The contractor shall ensure that all hazardous materials are stored and handled in accordance with all relevant regulations.

2. The contractor shall ensure that all hazardous materials are stored and handled in accordance with all relevant regulations.

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4. The contractor shall ensure that all hazardous materials are stored and handled in accordance with all relevant regulations.

GENERAL CARE OF WATER

1. The contractor shall ensure that all water bodies are protected from damage, pollution, and other contamination during construction activities.

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8. The contractor shall ensure that all water bodies are protected from damage, pollution, and other contamination during construction activities.
ZONE 3 PLANTS INSTALLED WITHIN ACCESS CORRIDOR TO BNSF REPAIR AREA AND OUTER FRINGES OF ZONE 2, SUBAREA DD.

NOT PLANTED (EXISTING WILLOW REGENERATION)
NOT PLANTED (SEPARATE PROJECT)

ZONE 3 TREES & SHRUBS INSTALLED IN FLOODPLAIN BETWEEN SUBAREA J & L. (UTILIZED PLANTS FROM SUBAREA P)

NOTES:
1. MINOR REVISIONS WERE MADE IN THE FIELD TO THE ZONE 2 AND ZONE 3 PLANT LAYOUTS.
2. REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION RAMPS.

LEGEND:
- PROJECT LIMITS (50'-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLANTS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 3 D & 30 - WILLOW CUTTINGS & SEEDING
- ZONE 3 - UPLAND & LOWER IMPERVIOUS TREES & SHRUBS
- SECONDARY
- EXCLUDED AREA-ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT
- DOLLAR CREEK

SCALE: 1" = 100'

DRAWN: DARRYL SMITH & KRISTIN BECKER
REVISIONS: DARRYL SMITH & KRISTIN BECKER

PLANTING AND SEEDING PLAN

AS-BUILT
6/18/2016
NOTES:
1. CROSS-REFERENCE ABOVE TYPICAL CROSS-SECTION WITH PLANTING AND SEEDING SCHEDULES.
2. TRANSITION OR EXTENSION OF SPECIES BETWEEN ZONES MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS, SLOPE, HYDROLOGY, MICRO-HABITAT, SOIL TEXTURE & MOISTURE CONDITIONS.
3. THE ECOLOGIST OVERSEEING PLANTING OPERATIONS WILL MAKE DISCRETIONARY CALLS ON PLANT LOCATIONS BASED ON IN-FIELD CONDITIONS.
4. ALL PLANTING AND SEEDING EFFORTS IN ALL ZONES ARE INTENDED TO INCREASE SOIL COHESION, REDUCE EROSION POTENTIAL, STABILIZE SEDIMENT AND ENHANCE THE RESILIENCE OF THE STREAMBANKS AND RIPARIAN CORRIDOR WITHIN THE PROJECT LIMITS.

TYPICAL RIPARIAN PLANT COMMUNITY CROSS-SECTION
PLANT SPACING DETAIL

PLAN: NTS

NOTES:
1. REFER TO PLANT SCHEDULES FOR SPACING REQUIREMENTS.

TUBLING PLANTING DETAIL

CROSS-SECTION NTS

NOTES:
1. REFER TO PLANT SCHEDULES FOR SPECIES SIZE AND QUANTITY.

TREE & SHRUB PLANTING DETAIL

CROSS-SECTION NTS

NOTES:
1. WHERE APPLICABLE, CUT EROSION CONTROL FABRIC IN A "X" PATTERN AND LAY BACK PRIOR TO INSTALLING PLANTS. RETURN FABRIC TO ORIGINAL POSTION AND STAPLE/TAKE TO THE GROUND.
2. MAINTAIN AS DIRECTED IN NOTES & SPECIFICATIONS.
3. REFER TO PLANT SCHEDULES.
Length of Planting Area Varies

ZONE 3 - UPPER RIPARIAN TREES & SHRUBS
ZONE 3 - LOWER RIPARIAN TREES & SHRUBS
ZONE 2D & 2C - WILLOW CUTTINGS & TUBLINGS
ZONE 2B & 2A - WETLAND TREES & SHRUBS
ZONE 1 - HERBACEOUS WETLAND PLUGS

KEY:
+ ZONE 3 - UPPER RIPARIAN TREE (CEL RET)
○ ZONE 3 - UPPER RIPARIAN TREE (PRU AME)
○ ZONE 3 - UPPER RIPARIAN SHRUB (RIB CER)
+ ZONE 3 - LOWER RIPARIAN SHRUB (SYM OCC)
ZONE 3 - LOWER RIPARIAN - (CRA ERY)
+ ZONE 3 - LOWER RIPARIAN - (POP DEL)
ZONE 3 - LOWER RIPARIAN (PRU VIR)
○ ZONE 3 - LOWER RIPARIAN (ROS WOO)
○ ZONE 3 - LOWER RIPARIAN (RIB AUR)
III ZONE 2D & 2C - WILLOW CUTTINGS & TUBLINGS (SAL EXI & SAL IRR)
ZONE 2B & 2A - WETLAND TREES & SHRUBS (VARIOUS SPECIES)
ZONE 1 - WETLAND HERBS (VARIOUS SPECIES)

NOTES:
1. REFER TO PLANT SCHEDULES FOR PLANT SYMBOLOGY, QUANTITY & SPACING
2. FOR EVERY 1 POP DEL PLANT, GROUP THE FOLLOWING PLANTS:
   A. 1 - CEL RET EVERY 7TH GROUP
   B. 1 - PRU AME EVERY 3RD & 4TH GROUP
   C. 2 - RIB CER EVERY 7TH GROUP
   D. 1 - CRA ERY EVERY 7TH GROUP
   E. 2 - PRU VIR EVERY 3RD GROUP
   F. 2 - ROS WOO EVERY 3RD GROUP
   G. 2 - RIB AUR EVERY 3RD GROUP
   H. 2 - SYM OCC EVERY 2ND GROUP
3. REPEAT PATTERN SHOWN WITHIN PLANTING AREAS SHOWN ON THE PLANS,
4. WIDTH OF PLANTING ZONES MAY VARY (COMPRESS OR EXPAND) DEPENDING BANK SLOPE, WIDTH OF FLOODPLAIN, PROPERTY OWNERSHIP, PROJECT BOUNDARY & LIMITS OF DISTURBANCE.

TSL
TREE AND SHRUB LAYOUT PATTERN & ZONATION DETAIL

PLAN NTS
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**ST. VRAIN CREEK REACH 3**

**SCALE VERIFICATION:**

If not one inch on this sheet, adjust scale accordingly.

**Engineering Analytics, Inc.**

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Fort Collins, CO 80525

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1455 WASHBURN STREET
Erie, Colorado 80516

(P): 970-812-3267

**Issued for Construction**

9/19/2017

**Issued for As-Built Conditions**

6/19/2018

**Polygon Adjustments**

11/07/2017

**Comment Revisions**

7/31/2018

**Total Potted Plants Installed (All Zones):**

**Total Plants Installed by Boulder County (All Zones):**

**Total Cuttings Installed (All Zones):**
<table>
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<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Preferred Size/Form</th>
<th>Indicator Status</th>
<th>Zone (Relative to WSCC)</th>
<th>Plant Spacing (in feet)</th>
<th>Percent of Mix</th>
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<td>Narrowleaf willow</td>
<td>10-15 inch tubing</td>
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<td>Black willow</td>
<td>10-15 inch tubing</td>
<td><strong>Slow</strong></td>
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<td>3-6</td>
<td>20</td>
<td>20</td>
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<td>Alder</td>
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<td><strong>Slow</strong></td>
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<tr>
<td><em>Salix nigra</em></td>
<td>Black willow</td>
<td>10-15 inch tubing</td>
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**TOTAL PLANTS DELIVERED:** 10,167

**SHORT OF ORIGINAL PLANT:** 0,468

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**AS-BUILT NOTES:**

**General Notes:**
As-built changes for the plant schedules and locations in the field are provided to the best of the contractor's knowledge based on information provided by BCPD and ACG. Final plant quantities, species, size, and form data provided to BCPD by BCPD is incorporated without audit.

**Plant Distribution Schedule History:**
Initial plant distribution schedules issued on 02/21, breaking master plant schedule in subareas (smaller planting projects).

**Plant Species, Quantity and Location Changes:**
Items in red italics indicate changes to total quantities in a cell of column 5 that were not being planted when this report ran out of time.
NOTE: GRADING WITHIN THE STREAM AND ADJACENT AREAS MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS AND SHALL BE PERFORMED IN A MANNER THAT PROTECTS TREES OR OTHER FEATURES AS DIRECTED IN THE FIELD.
"Type A bank stabilization was constructed in this area without a planting bench (3" topsoil layer and nursery grown plants) due to concerns from the contractor, project time constraints, and location on BNSF railroad property. ALL OTHER ELEMENTS OF TYPE A BANK STABILIZATION INSTALLED PER DESIGN PLAN.

"3" Topsoil Layer and Nursery Grown Plants not installed on this Type A (BS-14).

CONSTRUCTED PER DESIGN PLAN - NO DEVIATIONS

NOTE: GRADING WITHIN THE STREAM AND ADJACENT AREAS MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS AND SHALL BE PERFORMED IN A MANNER THAT PROTECTS TREES OR OTHER FEATURES AS DIRECTED IN THE FIELD.
NOTE: GRADING WITHIN THE STREAM AND ADJACENT AREAS MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS AND SHALL BE PERFORMED IN A MANNER THAT PROTECTS TREES OR OTHER FEATURES AS DIRECTED IN THE FIELD.
BS-13 switched to south bank to better fit existing conditions and provide bank stabilization on the outside bend.

Bank stabilization (BS-13 - Type C) constructed in two sections (136+00 to 135+50) and (135+25 to 134+50) to preserve an existing tree providing stabilization on the bank and shade to the stream channel. BS-13 shortened by 30’ from original design plan.

Note: Grading within the stream and adjacent areas may vary depending on actual field conditions and shall be performed in a manner that protects trees or other features as directed in the field.
Bank Stabilization (BS-11) removed due to removal of bifurcation structure construction from the project scope.

Bank Stabilization (BS-12) stationing modified due to existing conditions (stable-vegetated banks were left as existing). As-Built stationing 124+10 to 122+80. BS-12 shortened by 50’ from original design plan.

See Below - Sheet R6 for modifications.
**Riffle Beginning (RB-15) Elev. changed to 5173.1' (STA. 112+60)**

**Riffle End (RE-15) Elev. changed to 5171.75' (STA. 112+05)**

Riffle 14 - Stationing was shifted downstream due to location of overhead conveyor. Construction equipment was not able to work under conveyor. As-Built stationing (RB - 110+55) (RE - 110+05). Shifted 20' downstream from original design.

**Riffle Beginning and End Elevations were changed due to elevation of the invert of an existing concrete box culvert so that flows were not restricted and to maintain riffle slope and proper riffle/pool sequence function.**

Bank Stabilization (BS-10) stationing modified due to overhead conveyor and stable vegetated banks on the downstream end. As Built stationing 110+55 to 109+75. Shortened by 15' from original design plan.
NOTE: GRADING WITHIN THE STREAM AND ADJACENT AREAS MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS AND SHALL BE PERFORMED IN A MANNER THAT PROTECTS TREES OR OTHER FEATURES AS DIRECTED IN THE FIELD.
Bank Stabilization (BS-9B) removed from project (not needed).

Bank Stabilization (BS-8A) removed from project (not needed).

Bank Stabilization (BS-8) Changed to Modified Type C. ADDED - SHEET RD3A

Bank Stabilization (BS-7) Changed to Modified Type C. ADDED - SHEET RD3A
Bank Stabilization (BS-4) Changed to Modified Type C. ADDED - SHEET RD3A
Bank Stabilization (BS-1) constructed as Type B from stations 13+95 to ~15+75 due to existing conditions and tie-in points. Upstream of station 15+75 to 18+60 was constructed as Type A per original design plan.
1. MEANDERING LOW FLOW THALWEG UP TO 8 FEET WIDE BY APPROXIMATELY 6 INCHES DEEP TO BE CONSTRUCTED IN ALL AREAS WHERE STREAM IMPROVEMENTS OCCUR. THALWEG TO BE FIELD LOCATED BY OWNER'S STREAM RESTORATION SPECIALIST.

2. CHANNEL GRADING TO TIE-IN TO EXISTING VEGETATION LINE AND/OR BANKFULL CHANNEL WIDTH.
1. Install a continuous layer of willow cuttings during placement of soil filled riprap.
2. Approximately 3 willow cuttings shall be placed side by side per linear foot.
3. Minimum 3" layer of native sand or topsoil required.
4. Willow staking shall be installed at bankfull elevation.
5. Willow cuttings shall extend beyond riprap into native material.
6. Willow cuttings shall be harvested from approved locations.
7. Cuttings shall be a minimum length of 4'.
NURSERY GROWN PLANTS NOTE
1. REFER TO PLANT SCHEDULES FOR SPACING.

ROOTWAD DETAIL

ROOTWAD notes:

GENERAL "ROOTWAD" CHARACTERISTICS:

1. TREES MUST BE NATIVE, NON-INVASIVE, SPECIES AND CAN SPECIFICALLY NOT INCLUDE "CRACK WILLOW."

2. TREES SHALL BE HEALTHY WITHOUT HOLLOW OR ROTTEN FEATURES AND WITHOUT SPLIT TRUNKS. BARK SHALL NOT BE REMOVED.

3. TREES MUST INCLUDE A BOLE WITH ATTACHED ROOT BALL.

4. TREE BOLE DIAMETER MUST BE 12 INCHES IN DIAMETER OR LARGER AS MEASURED FOUR AND A HALF FEET ABOVE THE TOP OF THE ROOT BALL.

5. TREE BOLE LENGTH MUST BE 8 TO 12 FEET MEASURED ABOVE THE TOP OF THE ROOT BALL, AS LONG AS IT CAN BE REASONABLY HANDLED/TRANSPORTED.

6. ROOT BALLS SHALL BE AS LARGE AND FULL AS POSSIBLE WITH ROOTS LEFT CONNECTED. THE MINIMUM ROOT BALL DIAMETER IS 8 FEET. ROOT BALL SHALL NOT BE TRIMMED OR CLEANED.

7. BRANCHES ATTACHED TO THE BOLE SHALL BE LEFT CONNECTED AND MAY BE TRIMMED TO A MINIMUM LENGTH OF TWO FEET AS MEASURED FROM THE OUTSIDE DIAMETER OF THE ATTACHED BOLE.
MODIFIED TYPE C BANK STABILIZATION (2-26-18)

- STANDARD TYPE C BANK STABILIZATION TO BE USED ALONG ENTIRE STABILIZATION AREA.
- ROOTWADS TO BE INTEGRATED INTO CONSTRUCTED BANK ON 20’ INTERVALS IN POOL AND GLIDE AREAS AS IDENTIFIED IN THE FIELD. RANDOM PLACEMENT IN SPACE IS ENCOURAGED.
- ROOTWADS TO BE SECURED INTO BANK WITH 6” COMPACTED MOSSILE AND 2 TONS OF TYPE H RIPRAP.

ADDED

SHEET RD3A
Modified Type C Bank Stabilization - Typical Detail
ALL SECTIONS ARE TAKEN IN THE UPSTREAM DIRECTION.