BOULDER COUNTY PARKS & OPEN SPACE
ST. VRAIN REACH 3 FLOOD REPAIR & STREAM RESTORATION - PHASE 2 PROJECT
BOULDER COUNTY, CO
FINAL DESIGN PLANSET - ISSUED FOR CONSTRUCTION
<table>
<thead>
<tr>
<th>Sheet Number</th>
<th>Tab</th>
<th>Sheet List Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>TAB COVER</td>
<td>61</td>
</tr>
<tr>
<td>62</td>
<td>NOTES</td>
<td>63</td>
</tr>
<tr>
<td>64</td>
<td>ACCESS AND STAGING PLAN</td>
<td>65</td>
</tr>
<tr>
<td>66</td>
<td>FLOORPLAN EXTENTS</td>
<td>67</td>
</tr>
<tr>
<td>68</td>
<td>DEMOLISHED SITE PLAN 1</td>
<td>69</td>
</tr>
<tr>
<td>70</td>
<td>DEMOLISHED SITE PLAN 3</td>
<td>71</td>
</tr>
<tr>
<td>72</td>
<td>HARDS &amp; WEEK GRADING PLAN</td>
<td>73</td>
</tr>
<tr>
<td>74</td>
<td>BYPASS STRUCTURE GRADING PLAN</td>
<td>75</td>
</tr>
<tr>
<td>76</td>
<td>FISH PASSAGE CHANNEL GRADING PLAN 2</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>FBP SECTION VIEW 1</td>
<td>78</td>
</tr>
<tr>
<td>79</td>
<td>FBP SECTION VIEW 3</td>
<td>80</td>
</tr>
<tr>
<td>81</td>
<td>FBP SECTION VIEW 5</td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>FBP SECTION VIEW 6</td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>FBP SECTION VIEW 7</td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>FBP SECTION VIEW 8</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>FBP SECTION VIEW 9</td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>FBP SECTION VIEW 10</td>
<td></td>
</tr>
<tr>
<td>87</td>
<td>FBP SECTION VIEW 11</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>FBP SECTION VIEW 12</td>
<td></td>
</tr>
<tr>
<td>89</td>
<td>FBP SECTION VIEW 13</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>FBP SECTION VIEW 14</td>
<td></td>
</tr>
<tr>
<td>91</td>
<td>FBP SECTION VIEW 15</td>
<td></td>
</tr>
<tr>
<td>92</td>
<td>FBP SECTION VIEW 16</td>
<td></td>
</tr>
<tr>
<td>93</td>
<td>FBP SECTION VIEW 17</td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>FBP SECTION VIEW 18</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>FBP SECTION VIEW 19</td>
<td></td>
</tr>
<tr>
<td>96</td>
<td>FBP SECTION VIEW 20</td>
<td></td>
</tr>
<tr>
<td>97</td>
<td>BYPASS STRUCTURE DETAIL</td>
<td>98</td>
</tr>
<tr>
<td>99</td>
<td>BEACH &amp; ERODIBLE</td>
<td>100</td>
</tr>
<tr>
<td>101</td>
<td>STOP LOG DETAIL</td>
<td>102</td>
</tr>
<tr>
<td>103</td>
<td>BYPASS RUFFLE DETAIL</td>
<td>104</td>
</tr>
<tr>
<td>105</td>
<td>TIDAL MODEL DETAIL</td>
<td>106</td>
</tr>
<tr>
<td>107</td>
<td>LANDING DETAIL</td>
<td>108</td>
</tr>
<tr>
<td>109</td>
<td>SMALL ROOM DETAIL</td>
<td>110</td>
</tr>
<tr>
<td>111</td>
<td>PLANTING PLAN OVERVIEW</td>
<td>112</td>
</tr>
<tr>
<td>113</td>
<td>PLANTING EXTENTS 2</td>
<td>114</td>
</tr>
<tr>
<td>115</td>
<td>PLANTING EXTENTS 4</td>
<td>116</td>
</tr>
</tbody>
</table>

For information only:

<table>
<thead>
<tr>
<th>Volumes</th>
<th>Cut (Cy)</th>
<th>Fill (Cy)</th>
<th>Total Grading (Cy)</th>
<th>Total Export (Cy)</th>
<th>Maximum Export (Cy)</th>
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<tr>
<td>11,888</td>
<td>6,391</td>
<td>16,279</td>
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</table>

1. Includes mass grading, over excavation, and rock work.
2. Includes 30% swell factor plus no reuse of oorite material for void-filled riprap.

For information only:

<table>
<thead>
<tr>
<th>Proposed Floodplain Grading</th>
<th>Proposed Overflow Canal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Erosion Control</td>
<td>Proposed Overpass</td>
</tr>
<tr>
<td>Proposed Bridge Protection</td>
<td>Prohibited Water</td>
</tr>
<tr>
<td>Proposed Pump</td>
<td>Prohibited Floodplain</td>
</tr>
<tr>
<td>Prohibited Stream Crossing</td>
<td>Prohibited Pipeline</td>
</tr>
<tr>
<td>Existing Erosion Control</td>
<td>Existing Overpass</td>
</tr>
<tr>
<td>Existing Floodplain Area</td>
<td>Existing Floodplain</td>
</tr>
<tr>
<td>Existing Bank Protection</td>
<td>Existing Bank</td>
</tr>
<tr>
<td>Existing Erosion Control</td>
<td>Existing Erosion</td>
</tr>
<tr>
<td>Existing Overpass</td>
<td>Existing Overpass</td>
</tr>
<tr>
<td>Proposed Floodplain Area</td>
<td>Proposed Floodplain Area</td>
</tr>
<tr>
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</tr>
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</tr>
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<td>Proposed Pump</td>
<td>Proposed Pump</td>
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<tr>
<td>Proposed Stream Crossing</td>
<td>Proposed Stream Crossing</td>
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<tr>
<td>Proposed Access Road</td>
<td>Proposed Access Road</td>
</tr>
</tbody>
</table>
Safeguards and Security

The Contractor shall be responsible for all aspects of safeguarding, including, but not limited to, the following:

1. All equipment and materials shall be stored in secure locations.
2. Access to the construction site shall be controlled by authorized personnel only.
3. All equipment and materials shall be protected from theft and vandalism.

Temporary Construction Services

The Contractor shall be responsible for providing temporary construction services, including, but not limited to:

1. Temporary site offices and storage areas.
2. Temporary roads and access to the construction site.
3. Temporary electrical and plumbing services.

Temporary Sukkah Structures

The Contractor shall be responsible for the design, fabrication, and installation of temporary Sukkah structures, including, but not limited to:

1. The Sukkah structures shall be designed to withstand the forces of wind, snow, and ice.
2. The Sukkah structures shall be constructed using materials that are fire-resistant.

Temporary Sukkah Furnishings

The Contractor shall be responsible for the furnishing of temporary Sukkah structures, including, but not limited to:

1. The furnishings shall be designed to meet the requirements of the project.
2. The furnishings shall be constructed using materials that are fire-resistant.

Temporary Sukkah Lighting

The Contractor shall be responsible for the installation of temporary Sukkah lighting, including, but not limited to:

1. The lighting shall be designed to meet the requirements of the project.
2. The lighting shall be constructed using materials that are fire-resistant.

Temporary Sukkah Heating

The Contractor shall be responsible for the installation of temporary Sukkah heating, including, but not limited to:

1. The heating shall be designed to meet the requirements of the project.
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Temporary Sukkah Sanitation

The Contractor shall be responsible for the provision of temporary Sukkah sanitation, including, but not limited to:

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Temporary Sukkah Security

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The Contractor shall be responsible for the provision of temporary Sukkah fire protection, including, but not limited to:

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Temporary Sukkah Ventilation

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1. The ventilation shall be designed to meet the requirements of the project.
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Temporary Sukkah Acoustics

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NOTE: CONTRACTOR TO PREPARE AND SUBMIT METHOD STATEMENT FOR CONSTRUCTION OF ACCESS ROAD AND SHALL INCLUDE A PROOF ROLL.
FISH PASSAGE CHANNEL FDP CROSS SECTIONS

FDP XS 95

FDP XS 153

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=10'
2X VERTICAL EXAGGERATION

PROPOSED CONDITION (PC)  PROPOSED CUT

EXISTING CONDITION (EC)  PROPOSED FILL

SECTIONS LOOKING DOWNSTREAM
FISH PASSAGE CHANNEL FDP CROSS SECTIONS

FDP XS 241

FDP XS 398

HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'
2X VERTICAL EXAGGERATION

EXISTING CONDITION (EC)
PROPOSED CONDITION (PC)
PROPOSED CUT
PROPOSED FILL

SECTIONS LOOKING DOWNSTREAM
FISH PASSAGE CHANNEL FDP CROSS SECTIONS

FDP XS 490

FDP XS 590

Sections looking downstream

Horiz. Scale: 1" = 20'
Vert. Scale: 1" = 10'
2X Vertical Exaggeration

PROPOSED CONDITION (PC)  PROPOSED CUT
PROPOSED FILL  EXISTING CONDITION (EC)
FISH PASSAGE CHANNEL FDP CROSS SECTIONS

FDP XS 903

FDP XS 936  ROUGHLY CONNECTS TO SECTION 0+72 OF SUPPLY CHANNEL, SEE SHEET C18

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=10'
2X VERTICAL EXAGGERATION

SECTION LOOKING DOWNSTREAM

EXISTING CONDITION (EC)  PROPOSED CONDITION (PC)  PROPOSED CUT  PROPOSED FILL
FISH PASSAGE CHANNEL FDP CROSS SECTIONS

FDP XS 168108

FDP XS 168132

HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'
2X VERTICAL EXAGGERATION

SECTIONS LOOKING DOWNSTREAM

EXISTING CONDITION (EC)  PROPOSED CONDITION (PC)  PROPOSED CUT

PROPOSED FILL
FISH PASSAGE CHANNEL SECTIONS

EXISTING CONDITION (EC)
PROPOSED CONDITION (PC)
PROPOSED CUT
PROPOSED FILL

SECTIONS LOOKING DOWNSTREAM
HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'
2X VERTICAL EXAGGERATION
THE SECTION ABOVE ROUGHLY CONTINUES AS SECTION 10+25 ON SHEET C11
ACCESS ROAD AND FLOODPLAIN GRADING SECTIONS

SECTIONS LOOKING DOWNSTREAM

HORIZ. SCALE: 1" = 20'
VERT. SCALE: 1" = 10'
2X VERTICAL EXAGGERATION

EXISTING CONDITION (EC)
PROPOSED CONDITION (PC)
PROPOSED CUT
PROPOSED FILL

103+00

103+50
PROPOSED SUPPLY CHANNEL

FISH PASSAGE CHANNEL

UPPER BYPASS STRUCTURE CREST SECTION

OPENINGS THROUGH STRUCTURE CREATES FIRST 50 CFS OF FLOW DOWN THE SUPPLY CHANNEL.

STAGED CHANNEL ENGAGES AT FLOWS HIGHER THAN 50 CFS.

OPENINGS THROUGH STRUCTURE OF FISH PASSAGE CHANNEL TO SHEET FILE WALL.

FISH PASSAGE STRUCTURE CONCRETE TOWARDS Bypass CHANNEL.

STAGED CHANNEL ENGAGES AT FLOWS HIGHER THAN 50 CFS.

MAIN CHANNEL PROFILE

BYPASS STRUCTURE CREST

HORIZONTAL SCALE: 1" = 10', VERTICAL SCALE: 1" = 2', 5X VERTICAL EXAGGERATION

STATION (FT)
ELEVATION (FT)

SUPPLY CHANNEL PROFILES

C1
C2
SHEETPILE PLAN LAYOUT
1" = 5' - 0"

SHEETPILE ELEVATION
1" = 5' - 0"

OBSERVATIONS THROUGH SHEET PILE WALL
BYPASS/SUPPLY SIDE
SHEETPILE ELEVATION OF THE TOP OF THE SHEET PILE WITHOUT THE C-CHANNEL TIE (END THICKNESS OF 3/4"
TOP END OF C-CHANNEL ON OXIDIZED)
FINAL WIDTH OF 4", SHIELDED OUT OF A 4".
TOP END OF 2" C-CHANNEL ON OXIDIZED SIDE
5'-0"
5'-0"
5'-0"
10'-0"
10'-0"
10'-0"
10'-0"
10'-0"
CATWALK AND STOP LOG SUPPORT DETAIL

1. CATWALK SUPPORT FRAMEWORK DETAILS

2. STOP LOG DETAIL

3. CATWALK SUPPORT FRAMEWORK DETAILS
NOTES:
1. THE BYPASS RIFFLE WILL BE CONSTRUCTED OF TYPE H VOID-FILLED RIPRAP AND FINISHED WITH A TOP DRESSING OF COBBLES PER MHFD MIXING SPECIFICATIONS.
2. CONTRACTOR SHALL POTHOLE TO DETERMINE THE NEED FOR BEDDING PRIOR TO BEGINNING VOID-FILLED CONSTRUCTION.
3. ENGINEER AND/or CONSTRUCTION INSPECTOR WILL OBSERVE THE MATERIAL MIXING AND WILL APPROVE OF THE MIX BEFORE IT IS PLACED.
4. MATERIAL WILL BE PLACED IN A SINGLE LIFT UNTIL TO PROPOSED GRADES AND FINISHED WITH HABITAT BOULDER PLACEMENT AND COBBLE TOP LAYER.
5. FISH PASSAGE ACROSS THE BYPASS RIFFLE WILL BE FACILITATED WITH EXTENSIVE HABITAT BOULDER CLUSTERS ACROSS THE FACE OF THE RIFFLE.
6. HABITAT BOULDER CONFIGURATIONS WILL BE PRIMARILY THREE AND FOUR BOULDER CONFIGURATIONS THAT CREATE THE MAXIMUM DISTURBANCE IN FLOW PATHS.
7. THE CLUSTERS WILL BE PLACED PER ENGINEER DIRECTION IN THE FIELD TO CREATE OVERLAPPING DISTURBANCES THE LOWER VELOCITY AREAS IN FLOW PATHS AND BOULDERS WILL HAVE VARIABLE HEIGHTS TO ENGAGE AT A RANGE OF DESIGN FLOWS FROM LOW FLOW TO BANKFULL FLOW.
8. CLUSTERS WILL BE TOED DOWN INTO THE VOID-FILLED RIPRAP FOR STABILITY.
9. TYPE M VOID-FILLED RIPRAP SHALL BE PLACED IN AREAS OF FILL WITHIN THE EXTENTS SHOWN ALLOWING FOR 2 FT OF NATIVE ALLUVIUM AND/OR TOPSOIL COVER, PER THE REVEGETATION PLANS.
10. TYPE M RIPRAP SHALL BE PLACED TO MINIMIZE VOIDS AND ENSURE GOOD CONTACT BETWEEN ALL RIPRAP Voids. MATERIAL ON THE SURFACE SHALL BE FILLED WITH NATIVE ALLUVIUM.
11. RIPRAP AND BOULDERS IN EXISTING BYPASS STRUCTURE SHALL BE REMOVED AND STOCKPILED FOR USE IN RIFFLE CREST FOOTERS BEFORE INSTALLING TYPE M RIPRAP OR TYPE M VOID-FILLED RIPRAP.
12. TYPE M RIPRAP SHALL HAVE A MINIMUM WIDTH OF 2.5 FT (762 MM), WHICH MAY REQUIRE EXCAVATION OF EXISTING MATERIAL IN SOME AREAS.
NOT TO SCALE

TYPICAL FLOODPLAIN AND CHANNEL GRADING CROSS SECTION

NOTES:
1. THIS TYPICAL SECTION CONVEYS GENERAL SPATIAL RELATIONSHIPS OF PRIMARY FEATURES IN A MULTI-STAGE CHANNEL. THE DIMENSIONS AND CONFIGURATION OF SITE SPECIFIC LANDSCAPE FEATURES AND CHANNEL ARE SHOWN ON THE PLAN AND PROFILE SHEET (E-7-6-0) AND THE SECTION SHEETS (E-7-6-0).
2. CHANNEL BED MATERIAL WILL BE REMOVED, STORED, AND REPLACED WITHIN A 250' X 250' SQ. LONG SECTION OF THE NEW PASSAGE CHANNEL. EXCAVATIONS THAT WILL BE DISTURBED AS PART OF THE NEW PASSAGE CHANNEL EXTENDS AT LEAST 25' IN BOTH DIRECTIONS IN AND AROUND THE PRIMARY FEATURES AND AREAS WITH A SMALLER ZONE WILL BE AVOIDED TO THE EXTEND PRACTICAL. ADDITIONAL MATERIAL MAY BE RECLAIMED FROM AREAS PROPOSED TO BE DREDGED TO OFFSET ADDITIONAL MATERIAL NEEDED.
3. THE CHANNEL BED MATERIAL WILL BE PLACED IN THE PROPOSED NEW PASSAGE CHANNEL TO A DEPTH OF 0.5 FEET IN POOLS AND RAPIDS. WHERE MATERIAL IS NOT SPECIFIED, THE PLACED MATERIAL SHALL HAVE A COD OF 4-10 AND MEET THE GRADE SHOWN ON THE SHEET.
4. THE ENGINEER WILL DETERMINE THE LOCATION OF HORIZONTAL TO OPERATE SMALL SCALE STREAM CHANNEL AND LANDSCAPE FEATURES NOT SHOWN ON THE PLAN SHEET PROVIDED THEY ARE IN LINE WITH THE VISION OF THE PROJECT AND NOT THE INTERESTS
5. ANY VIOLATION OF THE EXISTING CHANNEL AND LANDSCAPE FEATURES ROAD DESIGN HAZARDS WHEN PROPOSED TO BE DREDGED, AVOID OR MEDICATE MATERIALS ARE RECLAIMED FROM AREAS PROPOSED TO BE DREDGED TO OFFSET ADDITIONAL MATERIAL NEEDED.
6. REFER TO THE DESIGN CONTROL SHEETS FOR EXTENTS OF EROSION CONTROL PLANNET AND EROSION CONTROL PLANNET AND THE NEW PASSAGE CHANNEL. ALL LOW BENDS AND AREAS SHOWN 4.1 OR GREATER SHALL HAVE EROSION CONTROL PLANNET OR BARRED INSTALLED ON BENDS. THE PLANNET MATTING SHALL BE INSTALLED UP TO THE TOP OF THE BANK.
7. ALL GRADING SMALL SOIL MATERIAL REMOVAL EXPEDITED WASTE SHOWN ON THE SHEETS OF VESTRANational OR EROSION CONTROL EROSION CONTROL PLANNET OR BARRED INSTALLED ON BENDS. THE PLANNET MATTING SHALL BE INSTALLED UP TO THE TOP OF THE BANK.
8. DESIGN INTERFACES SPECIFIED ON EFFECTIVE FILL INSTALLATION WITH THE 2-YR EXPLANATE COMING FROM Phase 1 TOTAL.
1. All wood structures will be installed with the oversight of the engineer. Contractor will provide 3 days advance notice before wood installation with a summary of available log diameters, lengths and species.

2. Place rootwad toe protection according to stations listed in the table above.

3. It is the contractor's responsibility to provide trucks and operators to haul large wood material to the installation site. Large wood material for structures shall be secured from the following sources:
   - Salvaged trees removed during construction grading activities.

4. The contractor shall take care to protect the rootwads from damage during handling of large wood material.

5. Contractor shall immediately notify the engineer if a specified log size is not available.

6. The location and configuration of large wood structures may vary in field due to site conditions.

7. Specified diameter of logs shall be measured at breast height (DBH). Lengths of logs shall include the rootwad portions of the log if the rootwad is present. Log size shall be within 3 inches of the specified diameter.

8. Final burial depths and length shall be specified by the engineer during construction once the final lengths and diameters are provided by the contractor. Burial depth and burial length shall match or exceed specified dimensions. The tilt angle of the log is provided only as a recommendation. Final tilt angles may vary from plans provided the logs have the required burial depths and burial lengths.

9. Log orientation angles are measured between the log and the bank. A log with an orientation angle of 0 degrees shall be placed parallel to the bank, and a log with a 90 degree orientation angle shall be placed perpendicular to the bank.

10. Log orientation angles will be specified during construction once the final log lengths and diameters are provided by the contractor, or specified by the engineer in the field.

11. Limit trench widths associated with log installation in cut to the log diameter plus 2 feet and minimize bank disturbance. Following construction the contractors shall stabilize the disturbed banks by methods noted on these plans.

12. Backfill log trenches with native alluvium. Machine packing by tracking over the logs and patting the soils with the bucket of the excavator.

13. Where multiple rootwads are installed to protect a bank from erosion, position the logs so the rootwads overlap slightly to avoid water jetting between logs.
NOTES:

1. CONTRACTOR SHALL POT-HOLE IN THE PROPOSED SOIL RIPRAP AREA WITH ENGINEER PRESENT PRIOR TO BEGINNING THE PLACEMENT OF MATERIAL TO CONFIRM SUB GRADE MATERIALS.

2. IF SUB GRADE MATERIALS HAVE BEEN MINED OF COBBLE & GRAVEL OR OTHERWISE NOT A WELL GRADED MIX OF NATIVE ALLUVIUM, THE CONTRACTOR WILL BE REQUIRED TO PLACE BEDDING PRIOR TO SOIL RIPRAP INSTALLATION.

3. APPROXIMATELY 4" OF TOP EXISTING MATERIAL SHALL BE STOCKPILED SEPARATELY FOR RE-USE IN THE SOIL RIPRAP.

4. ALL CONNECTIONS WITH EXISTING GROUND ON THE EDGE OF TREATMENT AREA SHALL CONNECT SMOOTHLY WITH THE SURROUNDING SURFACE AND SHALL NOT ENCOURAGE CONCENTRATED FLOW AT THE EDGES OF THE TREATED AREAS.
LEGEND:

ZONE 5 - UPLAND SEEDING
ZONE 4 - UPLAND SEEDING & PLANTING
ZONE 3 - RIPARIAN SEEDING & PLANTING
ZONE 2 - WILLOW CUTTINGS & WETLAND SEEDING
ZONE 1 - AQUATIC HABITAT (NO REVEGETATION)

SOIL RIPRAP AREA
STRAW/COCONUT BLANKET
COIR FABRIC
PLANTING SUB-AREA LABEL

NOTES:
1. PLACE AMENDED TOPSOIL IN ZONES 5, 4 & 3.
2. ZONES 4 & 5 ARE TO BE SEeded WITH UPLAND-RIPARIAN SEED MIX.
3. ZONE 3 ARE TO BE SEeded WITH WETLAND SEED MIX, REFER TO PLANT SCHEDULE.
4. MAJOR PLANTING AREAS DIVIDED INTO PLANTING SUB-AREAS & DESIGNATED WITH ALPHA-NUMERIC LABELS.
5. REFER TO PLANT DISTRIBUTION SCHEDULES TO DETERMINE QUANTITY OF PLANTS PER SUB-Area.
6. REFER TO SPECIFICATIONS.
NOTES:
1. PLACE AMENDED TOPSOIL IN ZONES 5, 4, 3 & 2.
2. ZONES 5, 4 & 3 ARE TO BE SEEDED WITH UPLAND-RIPARIAN SEED MIX.
3. ZONE 2 TO BE SEeded WITH WETLAND SEED MIX.
4. REFER TO PLANT SCHEDULES.
5. MAJOR PLANTING AREAS DIVIDED INTO PLANTING SUB-AREAS & DESIGNATED WITH ALPHANUMERIC LABELS.
6. REFER TO PLANT DISTRIBUTION SCHEDULES TO DETERMINE QUANTITY OF PLANTS PER SUB-AREA.
7. REFER TO TYPICAL PLANTING DETAILS.
8. REFER TO SPECIFICATIONS.
LEGEND:
- ZONE 5 - UPLAND SEEDING
- ZONE 4 - UPLAND SEEDING & PLANTING
- ZONE 3 - RIPARIAN SEEDING & PLANTING
- ZONE 2 - WILLOW CUTTINGS & WETLAND SEEDING
- ZONE 1 - AQUATIC HABITAT (NO REVEGETATION)
- SOIL RIPRAP AREA
- STRAW/COCONUT BLANKET
- COIR FABRIC
- PLANTING SUB-AREA LABEL

NOTES:
1. PLACE AMENDED TOPSOIL IN ZONES 5, 4, 3 & 2.
2. ZONES 5, 4 & 3 ARE TO BE SEEDED WITH UPLAND-RIPARIAN SEED MIX.
3. ZONE 2 IS TO BE SEEDED WITH WETLAND SEED MIX.
4. REFER TO PLANT SCHEDULES.
5. MAJOR PLANTING AREAS DIVIDED INTO PLANTING SUB-AREAS & DESIGNATED WITH ALPHA-NUMERIC LABELS.
6. REFER TO PLANT DISTRIBUTION SCHEDULES TO DETERMINE QUANTITY OF PLANTS PER SUB-AREA.
7. REFER TO TYPICAL PLANTING DETAILS.
8. REFER TO SPECIFICATIONS.
6. REFER TO PLANT DISTRIBUTION SCHEDULES TO DETERMINE QUANTITY.
ST VRAIN CREEK - PHASE 2
100% DESIGN
PLANT SCHEDULES
3/8/2020

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Plant Symbol</th>
<th>Indicator Status</th>
<th>Height at 20 years (in feet)</th>
<th>Spread (in feet)</th>
<th>Preferred Size / Form</th>
<th>Plant Spacing</th>
<th>Percent of Mix</th>
<th>Total Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZONE 4 - UPLAND TREES &amp; SHRUBS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chrysothamnus nauseosus</td>
<td>Rabbitbrush</td>
<td>CHRNAU</td>
<td>Ni</td>
<td>3</td>
<td>3</td>
<td>14&quot; tall 1-gal.</td>
<td>3.0</td>
<td>30%</td>
<td>21</td>
</tr>
<tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Krascheninnikovia lanata</td>
<td>Winterfat</td>
<td>KRALAN</td>
<td>Ni</td>
<td>3</td>
<td>3</td>
<td>14&quot; tall 1-gal.</td>
<td>3.0</td>
<td>10%</td>
<td>6</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Pentaphylloides floribunda</td>
<td>Shrubby cinquefoil</td>
<td>PENFLO</td>
<td>Ni</td>
<td>3</td>
<td>3</td>
<td>14&quot; tall 1-gal.</td>
<td>3.0</td>
<td>10%</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prunus americana</td>
<td>American Plum</td>
<td>PRUAME</td>
<td>UPL</td>
<td>24</td>
<td>24</td>
<td>14&quot; tall 1-gal.</td>
<td>12.0</td>
<td>10%</td>
<td>6</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ribes cereum</td>
<td>Wax currant</td>
<td>RIBCER</td>
<td>UPL</td>
<td>3</td>
<td>3</td>
<td>14&quot; tall 1-gal.</td>
<td>3.0</td>
<td>10%</td>
<td>6</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symphoricarpus occidentalis</td>
<td>Snowberry</td>
<td>SYMCC</td>
<td>UPL</td>
<td>3</td>
<td>3</td>
<td>14&quot; tall 1-gal.</td>
<td>3.0</td>
<td>30%</td>
<td>21</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
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<td></td>
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<td></td>
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<td>68</td>
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</tbody>
</table>

| **ZONE 3 - RIPARIAN TREES & SHRUBS** |                   |              |                  |                              |                 |                        |               |                |                |
| Symphoricarpus occidentalis| Snowberry         | SYMCC        | UPL              | 3                            | 3               | 14" tall 1-gal.       | 3.0           | 30%            | 340            |
| *Populus deltoids var. mondflera| Plains cottonwood| POPDEL       | FAC              | 80                           | 40              | 14" tall 1-gal.       | 30.0          | 50%            | 17             |
| Prunus virginiana var. melanocarpa| Chokecherry     | PRUVR        | FACU             | 15                           | 15              | 14" tall 1-gal.       | 7.5           | 10%            | 102            |
| Rosa woodsii              | Wood's rose       | ROSWOO       | FACU             | 3                            | 3               | 14" tall 1-gal.       | 3.0           | 30%            | 340            |
| Ribes aureum              | Golden currant    | RIBAUR       | FACU             | 5                            | 5               | 14" tall 1-gal.       | 3.0           | 30%            | 340            |
| *Populus angustifolia     | Narrowleaf cottonwood| POPANG      | FACW             | 60                           | 30              | 14" tall 1-gal.       | 30.0          | 50%            | 17             |
| **TOTAL**                 |                   |              |                  |                              |                 |                        |               |                | 1,156          |

* Indicates overhead canopy strata

| **ZONE 2 - WETLAND TREES & SHRUBS** |                   |              |                  |                              |                 |                        |               |                |                |
| Alnus incana               | Alder             | ALNINC       | FACW             | 15                           | 15              | 14" tall 1-gal.       | 3.0           | 5%             | 292            |
| Salix amygdaloides         | Peachleaf willow  | SALAMY       | FACW             | 45                           | 60              | 14" tall 1-gal.       | 3.0           | 5%             | 292            |
| Salix exigua               | Coyote willow    | SALEXI       | FACW             | 5                            | 5               | 48" cutting          | 3.0           | 90%            | 5,260          |
| **TOTAL**                 |                   |              |                  |                              |                 |                        |               |                | 5,844          |

**NOTES:**
1. ZONE 4 & ZONE 3 TREES AND SHRUBS WILL BE DIVIDED INTO GROUPS CONTAINING EACH OF THE SPECIES LISTED ABOVE.
2. PLANT GROUPS WILL BE LOCATED IN THE FIELD BY THE ECOLOGIST USING COLOR CODED PIN FLAGS.
3. EACH PLANTING ZONE WILL BE SEEDED USING A CORRESPONDING UPLAND AND WETLAND SEED MIX. (REFER TO SEED SCHEDULES)
4. PLACE VOLE CAGES ON POPDEL, POPANG, PRUAME & PURUVIR, PART OF BID ALTERNATIVE.
**NOTES:**

1. PLANTING ZONES 5, 4, AND 3 ARE TO BE SEEDED WITH THE ABOVE MIX.
2. SEED SHALL BE OBTAINED AND DELIVERED TO CONTRACTOR BY OWNER.
3. SEEDS PER SQUARE FOOT SHOWN AT DRILL SEEDING RATE. BROADCAST SEEDING RATE IS TWICE THE DRILL SEEDING RATE.

### UPLAND SEED SCHEDULE (ZONES 5 & 4)

### RIPARIAN SEED SCHEDULE (ZONE 3)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Region 5 Indicator Status</th>
<th>Seasonality</th>
<th>* Percent of Mix</th>
<th>* LBS/PLS per AC</th>
<th>Drill Seeding Total LBS</th>
<th>Broadcast Seeding Total LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achnatherum hymenoides</td>
<td>Indian ricegrass</td>
<td>FACU</td>
<td>C</td>
<td>5.0%</td>
<td>0.77</td>
<td>1.53</td>
<td>3.06</td>
</tr>
<tr>
<td>Andropogon halli</td>
<td>Sand bluestem</td>
<td>NI</td>
<td>W</td>
<td>5.0%</td>
<td>0.96</td>
<td>1.91</td>
<td>3.82</td>
</tr>
<tr>
<td>Andropogon gerardii</td>
<td>Big bluestem</td>
<td>FACU</td>
<td>W</td>
<td>5.0%</td>
<td>0.84</td>
<td>1.66</td>
<td>3.32</td>
</tr>
<tr>
<td>Bouteloua curtipendula</td>
<td>side-oats grama</td>
<td>UPL</td>
<td>W</td>
<td>5.0%</td>
<td>0.57</td>
<td>1.13</td>
<td>2.26</td>
</tr>
<tr>
<td>Bouteloua gracilis</td>
<td>blue grama</td>
<td>UPL</td>
<td>W</td>
<td>10.0%</td>
<td>0.26</td>
<td>0.52</td>
<td>1.05</td>
</tr>
<tr>
<td>Buchloe dactyloides</td>
<td>Buffalograss</td>
<td>FACU</td>
<td>W</td>
<td>5.0%</td>
<td>1.94</td>
<td>3.85</td>
<td>7.71</td>
</tr>
<tr>
<td>Calamovilfa longifolia</td>
<td>Prairie sandreed</td>
<td>NI</td>
<td>C</td>
<td>5.0%</td>
<td>0.40</td>
<td>0.79</td>
<td>1.58</td>
</tr>
<tr>
<td>Elymus canadensis</td>
<td>Canada wildrye</td>
<td>FACU</td>
<td>C</td>
<td>5.0%</td>
<td>0.95</td>
<td>1.88</td>
<td>3.75</td>
</tr>
<tr>
<td>Elymus lanceolatus</td>
<td>Streambank wheatgrass</td>
<td>FACU</td>
<td>C</td>
<td>5.0%</td>
<td>0.71</td>
<td>1.40</td>
<td>2.80</td>
</tr>
<tr>
<td>Elymus trachycaulus</td>
<td>slender wheatgrass</td>
<td>FACU</td>
<td>C</td>
<td>5.0%</td>
<td>0.68</td>
<td>1.36</td>
<td>2.72</td>
</tr>
<tr>
<td>Hesperostipa comata</td>
<td>needle-and-thread</td>
<td>UPL</td>
<td>C</td>
<td>5.0%</td>
<td>0.95</td>
<td>1.88</td>
<td>3.75</td>
</tr>
<tr>
<td>Koeleria macrantha</td>
<td>Prairie Junegrass</td>
<td>UPL</td>
<td>C</td>
<td>5.0%</td>
<td>0.05</td>
<td>0.09</td>
<td>0.19</td>
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<tr>
<td>Panicum virgatum</td>
<td>switchgrass</td>
<td>FACU</td>
<td>W</td>
<td>5.0%</td>
<td>0.28</td>
<td>0.55</td>
<td>1.11</td>
</tr>
<tr>
<td>Pascopyrum smithii</td>
<td>western wheatgrass</td>
<td>FACU</td>
<td>C</td>
<td>10.0%</td>
<td>1.98</td>
<td>3.92</td>
<td>7.85</td>
</tr>
<tr>
<td>Schizachyrium scoparium</td>
<td>little bluestem</td>
<td>FACU</td>
<td>W</td>
<td>5.0%</td>
<td>0.42</td>
<td>0.83</td>
<td>1.66</td>
</tr>
<tr>
<td>Sorghastrum abvenaceum (mutans)</td>
<td>Indian grass</td>
<td>FACU</td>
<td>C</td>
<td>5.0%</td>
<td>0.64</td>
<td>1.27</td>
<td>2.54</td>
</tr>
<tr>
<td>Sporobolus airoides</td>
<td>Alkali sacaton</td>
<td>FACU</td>
<td>C</td>
<td>5.0%</td>
<td>0.06</td>
<td>0.12</td>
<td>0.25</td>
</tr>
<tr>
<td>Sporobolus cryptandrus</td>
<td>sand dropseed</td>
<td>FACU</td>
<td>W</td>
<td>5.0%</td>
<td>0.02</td>
<td>0.04</td>
<td>0.08</td>
</tr>
</tbody>
</table>

**Total Seed Schedule:**

- **50 Seeds per SF:** 2.0
- **Total Acres:** 1.1

- **Planting Zones:**
  - **Zone 5:** 0.83
  - **Zone 4:** 0.05
  - **Zone 3:** 1.1

**100% Design Seed Schedules for ST VRAIN CREEK - PHASE 2**

**Seed Schedules for Upland (Zones 5 & 4) and Riparian (Zone 3)**

**NOTES:**

1. PLANTING ZONES 5, 4, AND 3 ARE TO BE SEEDED WITH THE ABOVE MIX.
2. SEED SHALL BE OBTAINED AND DELIVERED TO CONTRACTOR BYOWNER.
3. SEEDS PER SQUARE FOOT SHOWN AT DRILL SEEDING RATE. BROADCAST SEEDING RATE IS TWICE THE DRILL SEEDING RATE.
STS RAIN CREEK - PHASE 2
100% DESIGN
SEED SCHEDULES
1/24/2020

**NOTES:**
1. PLANTING ZONE 2 IS TO BE SEEDED WITH THE ABOVE MIX.
2. SEED SHALL BE OBTAINED AND DELIVERED TO CONTRACTOR BY OWNER.
3. SEEDS PER SQUARE FOOT SHOWN AT DRILL SEEDING RATE. BROADCAST SEEDING RATE IS TWICE THE DRILL SEEDING RATE.

### WETLAND SEED SCHEDULE (ZONE 2)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Region 5 Indicator Status</th>
<th>Seasonality</th>
<th>* Percent of Mix</th>
<th>* LBS/PLS per AC</th>
<th>Drill Seeding Total LBS</th>
<th>Broadcast Seeding Total LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panicum virgatum</td>
<td>Switchgrass</td>
<td>FAC</td>
<td>W</td>
<td>5.0%</td>
<td>0.28</td>
<td>0.32</td>
<td>0.64</td>
</tr>
<tr>
<td>Poa palustris</td>
<td>Fowl bluegrass</td>
<td>FAC</td>
<td>C</td>
<td>7.5%</td>
<td>0.05</td>
<td>0.06</td>
<td>0.12</td>
</tr>
<tr>
<td>Paspalum smithii</td>
<td>Western wheatgrass</td>
<td>FACU</td>
<td>C</td>
<td>10.0%</td>
<td>1.98</td>
<td>2.25</td>
<td>4.50</td>
</tr>
<tr>
<td>Asclepias incarnata</td>
<td>Swamp milkweed</td>
<td>FACW</td>
<td>C</td>
<td>2.5%</td>
<td>0.35</td>
<td>0.40</td>
<td>0.80</td>
</tr>
<tr>
<td>Asclepias speciosa</td>
<td>Showy milkweed</td>
<td>FACW</td>
<td>C</td>
<td>2.5%</td>
<td>0.76</td>
<td>0.86</td>
<td>1.72</td>
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<tr>
<td>Carex praegracilis</td>
<td>Meadow sedge</td>
<td>FACW</td>
<td>C</td>
<td>5.0%</td>
<td>0.06</td>
<td>0.07</td>
<td>0.14</td>
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<tr>
<td>Distichlis spicata</td>
<td>Inland saltgrass</td>
<td>FACW</td>
<td>W</td>
<td>5.0%</td>
<td>0.21</td>
<td>0.24</td>
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<tr>
<td>Juncus ensifolius</td>
<td>Swordleaf rush</td>
<td>FACW</td>
<td>C</td>
<td>2.5%</td>
<td>0.02</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>Juncus tenuis</td>
<td>Poverty rush</td>
<td>FACW</td>
<td>C</td>
<td>5.0%</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Juncus torreyi</td>
<td>Torrey rush</td>
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<td>5.0%</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Salix exigua</td>
<td>Sandbar willow</td>
<td>FACW</td>
<td>C</td>
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<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
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<tr>
<td>Spartina pectinata</td>
<td>Prairie cordgrass</td>
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<td>0.55</td>
<td>0.63</td>
<td>1.26</td>
</tr>
<tr>
<td>Sparganium eurycarpum</td>
<td>Burreed</td>
<td>OBL</td>
<td>C</td>
<td>2.5%</td>
<td>2.40</td>
<td>2.72</td>
<td>5.45</td>
</tr>
<tr>
<td>Carex emoryi</td>
<td>Emory’s sedge</td>
<td>OBL</td>
<td>C</td>
<td>10.0%</td>
<td>0.45</td>
<td>0.51</td>
<td>1.02</td>
</tr>
<tr>
<td>Carex nebrascensis</td>
<td>Nebraska sedge</td>
<td>OBL</td>
<td>C</td>
<td>5.0%</td>
<td>0.20</td>
<td>0.23</td>
<td>0.46</td>
</tr>
<tr>
<td>Carex pelita</td>
<td>Wooly sedge</td>
<td>OBL</td>
<td>C</td>
<td>5.0%</td>
<td>0.34</td>
<td>0.38</td>
<td>0.77</td>
</tr>
<tr>
<td>Eleocharis palustris</td>
<td>Spikerush</td>
<td>OBL</td>
<td>C</td>
<td>5.0%</td>
<td>0.18</td>
<td>0.20</td>
<td>0.40</td>
</tr>
<tr>
<td>Juncus arcticus</td>
<td>Baltic rush</td>
<td>OBL</td>
<td>C</td>
<td>5.0%</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Scirpus palidus</td>
<td>Pale bulrush</td>
<td>OBL</td>
<td>C</td>
<td>2.5%</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Schoenoplectus americanus</td>
<td>Three-square</td>
<td>OBL</td>
<td>C</td>
<td>5.0%</td>
<td>0.27</td>
<td>0.31</td>
<td>0.62</td>
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</table>

**Total:** 100.0% 8.15 9.26 18.51
**TREATMENTS PER ZONE**

<table>
<thead>
<tr>
<th>Decomposition</th>
<th>Topsoil</th>
<th>Soil Amendment</th>
<th>Seeding</th>
<th>Mulch</th>
<th>Planting</th>
<th>Wildlife Cages</th>
<th>Indicative Status</th>
<th>Inundation Boundary</th>
<th>Classification</th>
<th>Elevation Relative To Low Flow WSEL</th>
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</thead>
<tbody>
<tr>
<td>12&quot; Min.</td>
<td>12&quot; Min</td>
<td>12&quot; Min</td>
<td>UPLAND/RIparian (Drill)</td>
<td>SPRAY-ON</td>
<td>SEED ONLY</td>
<td>VOLE (PRE-ME)</td>
<td>UPLAND (XERIC)</td>
<td>10 YEAR+</td>
<td>ZONE 1 AQUATIC BED (LOTIC)</td>
<td>+6.0' and Higher</td>
</tr>
<tr>
<td>6&quot; Min.</td>
<td>6&quot; Min.</td>
<td>6&quot; Min</td>
<td>UPLAND/RIparian (Drill)</td>
<td>SPRAY-ON</td>
<td>SEED ONLY</td>
<td>VOLE (PRE-ME)</td>
<td>UPLAND (XERIC)</td>
<td>10 YEAR+</td>
<td>ZONE 2 WETLAND (HYDRIC)</td>
<td>+3.0' and +5.0'</td>
</tr>
<tr>
<td>0'</td>
<td>0'</td>
<td>ALL</td>
<td>UPLAND/RIparian (Drill)</td>
<td>SPRAY-ON</td>
<td>SEED ONLY</td>
<td>VOLE (PRE-ME)</td>
<td>UPLAND (MESIC)</td>
<td>2 YEAR TO LOW FLOW</td>
<td>ZONE 3 RIPARIAN (MESIC)</td>
<td>+2.0' and +4.0'</td>
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<tr>
<td></td>
<td></td>
<td>ALL</td>
<td>WETLAND (HYDRIC)</td>
<td>SPRAY-ON</td>
<td>SEED ONLY</td>
<td>NONE</td>
<td>UPLAND (XERIC)</td>
<td>2 YEAR TO LOW FLOW</td>
<td>ZONE 4 WETLAND (HYDRIC)</td>
<td>+1.0' and +3.0'</td>
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</tbody>
</table>

**NOTES:**
2. Transition or extension of species between zones may vary depending on actual field conditions, slope, hydrology, microhabitat, soil texture & moisture conditions.
3. The ecologist overseeing planting operations will make discretionary calls on plant locations based on field conditions.
4. Riparian/Wetland transplant clumps will be located in the field.

**TYPICAL RIPARIAN PLANT COMMUNITY CROSS-SECTION**

**CROSS-SECTION NTS**
WINTERFAT (KRA LAN) - 2 PER GROUP AT 3' SPACING
RABBITBRUSH (CHR NAU) - 7 PER GROUP AT 3' SPACING
WAX CURRANT (RIB CER) - 2 PER GROUP AT 3' SPACING
AMERICAN PLUM (PRU AME) - 2 PER GROUP AT 12' SPACING
CINQUEFOIL (PEN FLO) - 2 PER GROUP AT 3' SPACING
SNOWBERRY (SYM OCC) - 7 PER GROUP AT 3' SPACING

22 TOTAL PLANTS PER GROUP
(3 GROUPS BASED ON SPECIES QUANTITIES IN PLANT SCHEDULES)

TYPICAL GROUP OF PLANTS WITH INDICATOR STATUS OF NI & UPL

ZONE 4 PLANT GROUPINGS

SNOWBERRY (SYM OCC) - 10 PER GROUP AT 3' SPACING
PLAINS COTTONWOOD (POP DEL) - 1 PER GROUP AT 30' SPACING
OR
NARROWLEAF COTTONWOOD (POP ANG) - 1 PER GROUP AT 30' SPACING
CHOKECHERRY (PRU VIR) - 3 PER GROUP AT 7.5' SPACING
ROSE (ROS WOO) - 10 PER GROUP AT 3' SPACING
GOLDEN CURRANT (RIB AUR) - 10 PER GROUP AT 3' SPACING

34 TOTAL PLANTS PER GROUP
(34 GROUPS BASED ON SPECIES QUANTITIES IN PLANT SCHEDULES)

TYPICAL GROUP OF PLANTS WITH INDICATOR STATUS OF UPL - FACU

ZONE 3 PLANT GROUPINGS

NOTES:
1. REFER TO PLANT SCHEDULES.
2. EACH PLANT GROUP LOCATED IN THE FIELD WILL BE REPRESENTED BY ONE (1) COLOR-CODED PIN FLAG (I.E., PINK & YELLOW)
1. REFER TO PLANT SCHEDULES FOR SPACING REQUIREMENTS.

PLANT SPACING DETAIL

- EVENLY SPACE & ANCHOR CAGE TO GROUND WITH 3 - 12" LONG SOD STAPLES.
- TREE PIT
- T-POSTS
- PREVAILING WIND
- NATURAL HEIGHT

NOTES:
- REFER TO PLANT SCHEDULES FOR SPACING REQUIREMENTS.

TREE PLANTING DETAIL

- PLANT TOP OF ROOT BALL EVEN WITH GRADE AT WHICH IT ORIGINALLY GREW.
- SET PLANT PLUMB ON UNDISTURBED SOIL TO CREATE HOLE WIDE ENOUGH TO COVER ROOTBALL & ANY STEMS BELOW THE GROUND SURFACE.
- TUBLING MUST REACH WATER TABLE (DEPTH VARIABLE) AND MUST BE MONITORED BY THE CONTRACTOR.
- WHEN WATER IS AT NORMAL LOW FLOW LEVELS (APPROX. APRIL 15 TO MAY 15 OR JUNE 15 - APRIL 15) PRIOR TO LEAFING OUT, OR LATE FALL (APPROX. OCT. 1 - NOV. 30) AFTER LEAF DROP. CUT STEMS AT THE "ROOT" END OF EACH CUTTINGS AT A 45-DEGREE ANGLE USING DROP. CUT STEMS AT THE "ROOT" END OF EACH CUTTINGS AT A 45-DEGREE ANGLE USING

NOTES:
- REFER TO PLANT SCHEDULES FOR SPECIES SIZE, QUANTITY AND SPACING.

CUTTINGS IN A MOIST, DARK CELLAR, CAVE, OR REFRIGERATOR BETWEEN 32 AND 40 DEGREES FAHRENHEIT. CUTTINGS MAY BE STORED IN MOIST/SATURATED FABRIC, BURLAP OR SIMILAR MATERIAL DURING TRANSPORT & STORAGE. EXCESS WOODY DEBRIS SHALL BE PILED NEATLY AND/OR EVENLY DISTRIBUTED AROUND THE HARVEST SITE.

CUTTINGS SHALL BE PLANTED ON THE SAME DAY AS DELIVERY OR_MINIMUM_10 DAYS PRIOR TO DELIVERY. CUTTINGS THAT CAN NOT BE PLANTED ON THE SAME DAY SHALL BE PLACED IN MOIST/ SATURATED FABRIC, BURLAP OR SIMILAR MATERIAL DURING TRANSPORT & STORAGE. EXCESS WOODY DEBRIS SHALL BE PILED NEATLY AND/OR EVENLY DISTRIBUTED AROUND THE HARVEST SITE.

CUTTINGS IN A MOIST, DARK CELLAR, CAVE, OR REFRIGERATOR BETWEEN 32 AND 40 DEGREES FAHRENHEIT. CUTTINGS MAY BE STORED IN MOIST/SATURATED FABRIC, BURLAP OR SIMILAR MATERIAL DURING TRANSPORT & STORAGE. EXCESS WOODY DEBRIS SHALL BE PILED NEATLY AND/OR EVENLY DISTRIBUTED AROUND THE HARVEST SITE.

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**Erosion Control Fabric Detail**

**Notes:**

1. Where feasible, fabric will be rolled out and installed parallel with the stream.
2. Upstream pieces will overlap downstream pieces and upstream pieces will overlap downstream pieces.
3. Fold overlapping seams at least twice and then stake.
4. After initial staking, stake fabric as necessary so that it is completely flush with the ground surface.
5. Seed, rake & install straw mulch at specified rates prior to laying fabric.
6. Seed, rake & mulch all key trenches prior to laying fabric.
7. At the fish passage channel, the fabric on the floodplain/berms shall extend to the top of bank and all disturbed slopes: 1 shall have fabric.
8. See the erosion control measure plans for the locations of cor and straw/coconut blanket.

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**Typical Trench Detail**

**Cross-Section: NTS**

- **Wood Wedge Stake:**
  - 24" x 2" x 4" Diagonal-Cut
  - 6" Overlap (Min.)

- **Fabric or Blanket (Typ.):**
  - 12" x 12" Key Trench
  - Unless shown differently on other details.

- **Compacted Fill (Typ.):**
  - 24" x 2" x 4" Wood Wedge Stake

- **Toe Trenches:**
  - Section: NTS

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**Stake Detail**

**Cross-Section: NTS**

- **Wood Wedge Stake:**
  - 24" x 2" x 4" Wood Wedge Stake
  - 3" Overlap (Min.)

- **Fabric (Nedia Koir Mat 700 or Equivalent):**
  - 24" x 2" x 4" Wood Wedge Stake

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**Erosion Control Fabric Details**

**Plan & Cross-Section NTS**

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**Notes:**

1. Where feasible, fabric will be rolled out and installed parallel with the stream.
2. Upstream pieces will overlap downstream pieces, and upstream pieces will overlap downstream pieces.
3. Fold overlapping seams at least twice and then stake.
4. After initial staking, stake fabric as necessary so that it is completely flush with the ground surface.
5. Seed, rake, and install straw mulch at specified rates prior to laying fabric.
6. Seed, rake, and mulch all key trenches prior to laying fabric.
7. At the fish passage channel, the fabric on the floodplain/berms shall extend to the top of bank and all disturbed slopes: 1 shall have fabric.
8. See the erosion control measure plans for the locations of cor and straw/coconut blanket.
NOTES:
1. CONTRACTOR SHALL FOLLOW ALL COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT STORMWATER AND WATER CONTROL REGULATIONS, BOULDER COUNTY STORMWATER QUALITY PERMIT (SWQP) GUIDANCE FOR CONSTRUCTION PROJECTS NEAR WATERWAYS AS WELL AS REQUIREMENTS IN VOLUME 3, CHAPTER 7 OF THE URBAN STORM DRAINAGE CRITERIA MANUAL (UDFCD, 2010).
2. AS CALLED FOR IN THE COUNTY'S 2016 STORM DRAINAGE CRITERIA MANUAL, BIODEGRADABLE HYDRAULIC FLUIDS MUST BE USED IN ALL EQUIPMENT AND MACHINERY USED BELOW EXISTING WATER SURFACE.
3. PRIOR TO TRANSPORTING EQUIPMENT TO THE SITE, ALL MACHINERY MUST BE CLEANED AND REMOVE AQUATIC NUISIBLE SPECIES (ANS) AND SEEDS IN ACCORDANCE WITH STATE OF COLORADO ANS REGULATIONS. THIS INVOLVES EITHER STEAM (HEAT) OR CHEMICAL CLEANING, NOT JUST POWER WASHING, AS WELL AS A 5-DAY WAITING PERIOD BEFORE EQUIPMENT IS BROUGHT ON SITE.
4. "SPILL KITS" FOR EMERGENCY POLLUTANT ISOLATION, AND WRITTEN CLEAN-UP PROCEDURES, MUST BE ONSITE AT ALL TIMES DURING CONSTRUCTION ACTIVITY, AND NEAR ALL AREAS OF OPERATION.
5. WHEN POSSIBLE, LARGE DOWNED WOODY MATERIAL SHALL REMAIN, PARTICULARLY IF EMBEDDED IN STREAM DEPOSITS.
6. WHEN POSSIBLE, STANDING DEAD TREES (SNAGS) SHALL REMAIN IN PLACE.
7. ALL TREE REMOVAL SHALL OCCUR BETWEEN SEPTEMBER 1 AND MARCH 31 (MBTA NON-NESTING SEASON FOR MIGRATORY BIRDS), OR OTHERWISE CLEARED BY MBTA 3RD PARTY SPECIALIST.
8. ALL NATIVE VEGETATION SHALL BE CONSIDERED FOR PROTECTION OR RELOCATION.

GENERAL PRINCIPLES FROM BOULDER COUNTY STORM DRAINAGE CRITERIA MANUAL FOR WORK IN WATERWAYS (SECTION 1302.1; BOULDER COUNTY, 2016):
1. EVERY EFFORT SHALL BE MADE TO BALANCE THE PROTECTION OF RIPARIAN HABITAT AND PROTECTION OF THIS STREAM/STREAMWAY ITSELF.
2. NO CONSTRUCTION EQUIPMENT SHALL BE OPERATED WITHIN THE WATERWAY OR BELOW THE EXISTING WATER SURFACE UNLESS SPECIFICALLY AUTHORIZED BY THE STORMWATER QUALITY PERMIT ISSUED BY BOULDER COUNTY, AND ANY OTHER APPLICABLE STATE OR FEDERAL PERMIT. APPLICANTS ARE ENCOURAGED TO CREATE A DRY WORK SURFACE UNLESS THIS WOULD RESULT IN DRIVING OUT A LARGE SECTION OF THE WATERWAY AND MAKING IT UNHABITABLE BY AQUATIC LIFE.
3. WHEN WORK TAKES PLACE WITHIN A CHANNEL, A TEMPORARY WATER DIVERSION TO BYPASS THE WORK AREA IS GENERALLY REQUIRED TO STABILIZE THE WORK AREA AND CONTROL EROSION DURING CONSTRUCTION. DIVERSIONS TYPICALLY REQUIRE AN IMPERVIOUS LINER TO MINIMIZE SEEPAGE INTO THE WORK AREA.
4. Dewatering operations will be required after the diversion is in place to manage seepage and other dry work surfaces. The water level at the work site should be below the subgrade at levels sufficient to provide a solid work surface that resists deformation during subgrade compaction.
5. ACCESS MUST BE PLANNED AND OBTAINED TO MINIMIZE ENTRY INTO THE WATERWAY AND DISTURBANCE TO THE CHANNEL. ENGINEERED TEMPORARY STREAM CROSSINGS MAY BE CONSTRUCTED ONLY WITH COUNTY APPROVAL WHEN AN ACTIVELY FLOWING WATERWAY NEEDS TO BE CROSSED REGULARLY BY CONSTRUCTION VEHICLES. DESIGN CONSIDERATIONS ARE INCLUDED IN VOLUME 3 OF THE UDFCD STORM DRAINAGE CRITERIA MANUAL.
6. CONSIDER HISTORICAL FLOW RECORDS FOR THE SUBJECT WATERWAY AND OTHER LOW-FLOW PERIODS THAT MAY BE CREATED BY DIVERSION/WATER DELIVERIES.
7. DURING CUT AND FILL OPERATIONS, AVOID LETTING WASTE OR EXCESS MATERIAL ENTER WATERWAYS OR PLACING IT ON UNSTABLE AREAS. EXCAVATED MATERIAL SHOULD BE CAREFULLY MOVED TO AREAS INSIDE THE 100-YEAR FLOODPLAIN.
8. EVERY EFFORT SHALL BE MADE TO BALANCE THE PROTECTION OF RIPARIAN HABITAT AND PROTECTION OF THIS STREAM/STREAMWAY ITSELF.
REFER TO SHEETS L1-L8 FOR PLANTING PLAN AND SEED SCHEDULE TO IDENTIFY PLANTING ZONES.
REFER TO SHEETS L1-L8 FOR PLANTING PLAN AND SEED SCHEDULE TO IDENTIFY PLANTING ZONES.
General Care of Water Standard Notes
1. No construction equipment shall be operated below the existing water surface unless specifically authorized by the stormwater quality permit issued by Boulder County, and any other applicable local, state or federal license or permit.
2. The Contractor/permittee is responsible for all Care of Water including but not limited to designing, supplying, constructing, operating, and removing all care of water provision including coffer dams and sediment removal systems; designing, supplying, installing, maintaining, and removing protective works for winter operations of care of water systems.
3. The Contractor/permittee shall comply with all USACE 404 permit requirements including any special care requirements issued for this project.
4. When required the Contractor/permittee shall design temporary stream diversions to facilitate upstream fish passage. Instream velocities shall be limited to 7 ft/sec when this provision is required.
5. Care of water shall include provisions for handling groundwater, rainstorm runoff, snow, snowmelt, and ice that may enter the work area.
6. Protective works shall be designed by the Contractor/permittee as necessary to include enclosures, insulation, and heating systems to ensure that dewatering systems operate continuously and do not become frozen during cold weather.
7. The Contractor/permittee shall provide and maintain sediment ponds or other means to collect sediment from waters collected within active construction area prior to allowing it to enter into the watercourse. Contractor/permittee shall dispose of sediments in a suitable offsite waste disposal facility.
8. The Contractor/permittee shall monitor water turbidity during construction activities and shall shut down work at times of excess turbidity in order to allow the water to clear prior to recommencement of in-stream work.
9. Turbidity is expected during placement and removal of water control, if waters become noticeably turbid, Contractor/permittee should promptly halt operations to allow waters to clear prior to resuming operations. Furthermore, shutdowns for silty or turbid water may be specified by the Engineer or the Owner’s Representative, at their discretion.
10. In the event of unscheduled construction activity that results in a visually conspicuous plume of sediment, Contractor/permittee shall immediately notify the Engineer and undertake mitigation actions necessary to comply with the specified clean water criteria.

Coffer Dams Standard Notes
1. The Contractor/permittee is responsible for the final layout, configuration, maintenance, and removal of the entirety of all coffer dams to be constructed within the project site.
2. The Contractor/permittee is responsible for the reclamation to original or better condition, of all areas impacted by the construction of coffer dams. Reclamation may include but is not limited to the restoration of stable slopes typically equal to or less than 3%:24, installation of approved erosion control fabric, and installation of an approved native seed mix.
3. Cofferdams located in the waterway shall be placed in a manner to prevent their erosion from normal or expected high flows. Furthermore, they should be placed to a sufficient elevation to prevent their overtopping during reasonably anticipated flood events that may compromise the design and performance of the cofferdam.
4. The use of riprap or other protection measures on the surfaces of the cofferdam, including the toe of the cofferdam slope exposed to high velocities, is required.
5. All temporary fills must be removed in their entirety following construction activities and areas graded to proposed conditions.
6. Coffer dams shall provide a bypass waterway that is armored and of the minimum dimensions shown in the typical water control channel detail.
7. Any coffer dam failures or other works efforts that cause a plume of turbid water to flow downstream shall be reported to the Engineer.

Heavy Equipment Operations and Maintenance Standard Notes
1. Equipment operated below the ordinary high water mark of the river channel, must be inspected and clean of fuel, lubricant leaks, and invasive aquatic species.
2. To maintain the spread of invasive species, all equipment shall be power-washed and free of weeds prior to its delivery to the project area. If equipment was used in another wet area within 10 days of initiating work, decontamination practices should be employed to minimize the spread of diatomophytes. New Zealand mussel, shellfish disease, polychaete, and other aquatic hitchhikers.
3. All equipment operating within or adjacent to any surface waters shall be free of oil leaks.
4. Biodegradable hydraulic fluids shall be utilized for all equipment operating in surface waters. The Contractor/permittee shall submit a list of equipment operating with certified non-toxic, biodegradable hydraulic fluids to the engineer for approval prior to use. All fueling, oiling, or maintenance of equipment shall be performed in designated upland locations, with adequate CMs to contain potential spills.

NOTE: TERMS BMP AND CM ARE INTERCHANGEABLE
SSA-1, STABILIZED STAGING AREA

1. SSA Plan View
   - Lockdown of staging areas
   - Contractors not allowed
   - Size of staging area with approval from the local jurisdiction

2. Stabilization area should be appropriate for the needs of the site, considering the value in a larger area to stabilize following construction.

3. SSA shall be stabilized prior to any operations on the site.

4. The stabilized staging area shall consist of a minimum of 3" thick granular material.

5. Unless otherwise specified by the local jurisdiction, rockshall consist of DST soil at 95% passing by coarse aggregate or 9" (300) rock.

6. Additional permittance may be required but not limited to silo fence and construction fencing.

STABILIZED STAGING AREA MAINTENANCE NOTES

1. Inspect SSA prior to use, and maintain in a good operating condition.

2. Maintenance of SSA shall be periodic and monitored.

3. SSA shall consist of DST soil at 95% passing coarse aggregate or 9" (300) rock.

4. Additional permittance may be required but not limited to silo fence and construction fencing.

STABILIZED STAGING AREA MAINTENANCE NOTES

1. Stabilized staging area shall be removed at the end of construction.

2. Stabilized material shall be removed or, if approved by the local jurisdiction, used on-site.

3. The area covered with topsoil, seeded and fenced or otherwise stabilized by a manner approved by the local jurisdiction.

NOTE: Many municipalities prohibit the use of recycled concrete as similar material.

The stabilized staging area shall be used with the following exceptions:

- Recycled aggregate shall be used in areas where recycled concrete has previously been used.

- Local jurisdictions may approve the use of recycled concrete as similar material.

- Specialized aggregate shall be used in areas where recycled concrete has previously been used.

- Local jurisdictions may approve the use of recycled concrete as similar material.

DETAILED SSA-1 ONLY APPLIES TO LARGE STAGING AREA AT NORTHWEST AREA OF PROJECT SITE.

STABILIZATION OF THE STAGING AREAS NEAR THE BYPASS STRUCTURE (MODIFIED STABILIZED STAGING AREAS) SHALL INCLUDE STOPLINE STABILIZATION AND PERIMETER SILT FENCING ONLY.