

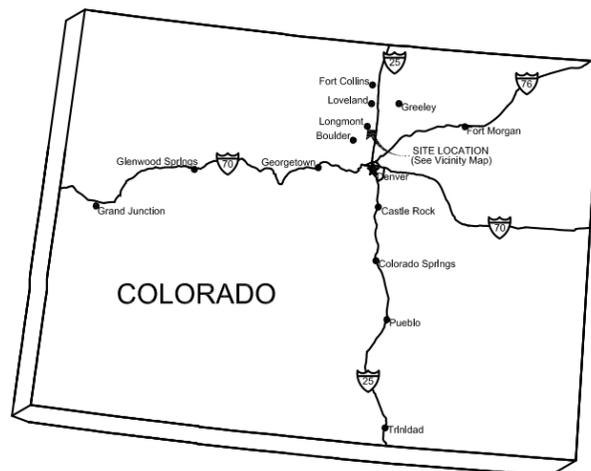
ST VRAIN CREEK REACH 3

PREPARED FOR
BOULDER COUNTY PARKS AND OPEN SPACE
BOULDER COUNTY, COLORADO

PREPARED BY



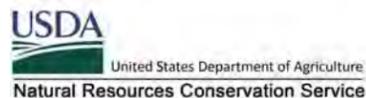
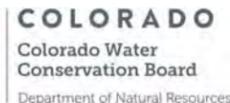
STATE MAP



NOT TO SCALE

PREPARED FOR

BOULDER COUNTY PARKS AND OPEN SPACE
5201 SAINT VRAIN RD.
LONGMONT, CO, 80503



CERTIFICATES

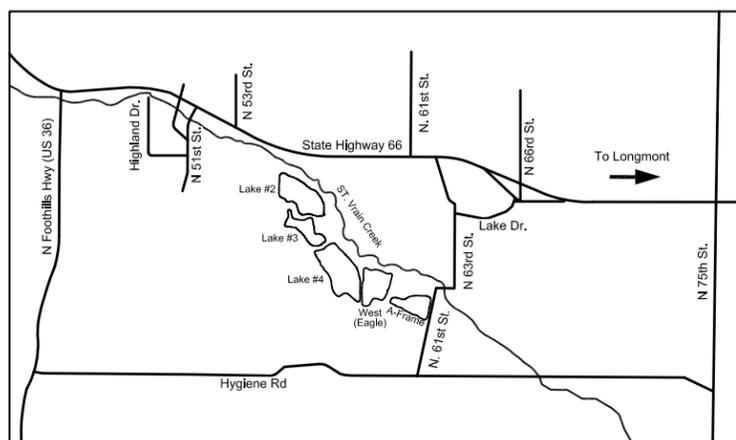
I HEREBY CERTIFY THAT THESE PLANS FOR ST VRAIN CREEK REACH 3 WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION FOR THE OWNER THEREOF.

LESTER CLINTON BROWN, PE 40189

I, ERIC LANE, DIRECTOR OF BOULDER COUNTY PARKS AND OPEN SPACE, OWNER, ON BEHALF OF THE OWNERS, HEREBY ACCEPT THESE PLANS FOR ST VRAIN CREEK REACH 3.

DIRECTOR

VICINITY MAP



CONTRACTOR: AMERICAN CIVIL CONTRACTORS
 CONTRACT NO.: 18-797
 CONTRACT DATE: AUGUST 1, 2017
 CONSTRUCTION COMPLETION DATE: MAY 25, 2018
 CONTRACT AMOUNT (FINAL): \$4,719,084.81
 Q.A. CONSULTANT: ENGINEERING ANALYTICS, INC.

AS-BUILT
6/19/2018

I HEREBY CERTIFY TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGEMENT AND BELIEF, THESE PLANS MEET APPLICABLE NRCS STANDARDS. NRCS-CO EWP PROJECT ENGINEERING GUIDANCE, 1/26/2016.



LESTER CLINTON BROWN, PE 40189

ALL WORK UNDER CONTRACT WAS INSTALLED ACCORDING TO THE AS-BUILT DRAWINGS AND SPECIFICATIONS, AND THE AS-BUILT DRAWINGS ARE A TRUE AND CORRECT RECORD.



LESTER CLINTON BROWN, PE 40189

GENERAL NOTES

- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE UTILITIES PRIOR TO CONSTRUCTION. CALL COLORADO ONE CALL BEFORE YOU DIG (UTILITY LOCATES) 1-800-922-1987 OR 811.
- CONTRACTOR MUST ENSURE THAT ALL EXISTING UTILITIES, ONSITE STRUCTURES, ADJACENT STRUCTURES AND SITES ARE PROTECTED DURING CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO MAKE SURE ALL DAMAGE IS REPAIRED.
- CONTRACTOR MUST ENSURE THAT ALL ENVIRONMENTAL CONDITIONS ARE PROTECTED THROUGHOUT CONSTRUCTION AND THE SITE IS RESTORED TO AN ACCEPTABLE STATE BY THE ENGINEER AND/OR COUNTY.
- PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES, CONTRACTOR SHALL OBTAIN NECESSARY PERMIT(S) FOR STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITY (COR-030000) AND CONSTRUCTION DEWATERING FROM THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT.
- IF NEEDED, THE COUNTY WILL WORK WITH THE CONTRACTOR TO IDENTIFY LOCAL STORAGE FOR SALVAGED ROOTWADS AND TREE BOLES. TARGET TREES WILL BE THOSE WITH A MINIMUM DIAMETER OF 12", WITH 8-12' LENGTH OF ADDITIONAL BOLE. ATTACHED ROOTWADS ARE DESIRED TO BE AS LARGE/FULL AS POSSIBLE, WITH THE DIRT ATTACHED (DO NOT TRIM OR CLEAN THE ROOTWAD). TREES SHOULD BE HANDLED LIGHTLY, USING THE THUMB OPTION ON THE EQUIPMENT TO MOVE/LIFT THE TREES.
- CONSTRUCTION OBSERVATION IS TO BE PERFORMED BY AN AUTHORIZED REPRESENTATIVE OF BOULDER COUNTY. HEREAFTER, THE GENERAL CONTRACTOR WILL BE REFERRED TO AS THE CONTRACTOR. THE PROJECT ENGINEER WILL BE REFERRED TO AS THE (ENGINEER).
- A COUNTY APPROVED ECOLOGIST WILL GUIDE AND INSPECT REVEGETATION WORK WITH THE SUBCONTRACTOR AS NEEDED WITHIN EACH REACH OF THE PROJECT. THE FOLLOWING ARE THE MAJOR MILESTONES:
 - SOIL PREPARATION & FINISH GRADING
 - SEEDING AND EROSION CONTROL BLANKET INSTALLATION
 - PLANT DELIVERY INSPECTION, LAYOUT & PLANTING
 - PUNCH LIST, SUBSTANTIAL COMPLETION & FINAL INSPECTIONS
 - SITE CHECKS SHALL BE COORDINATED BETWEEN THE ECOLOGIST & SUBCONTRACTOR PRIOR TO INITIATING SUBSEQUENT TASKS.
- RESTORATION AREAS ARE TO BE SEEDED AND PLANTED WITH THE SPECIES PROVIDED ON THE PLANT & SEED SCHEDULES. THE COUNTY APPROVED ECOLOGIST WILL LAY OUT AND FIELD FIT PLANT MATERIAL PRIOR TO INSTALLATION.
- SEEDING AND PLANTING SHALL OCCUR AS SOON AS PRACTICAL UPON COMPLETION OF EARTHWORK OPERATIONS WITHIN THE TIMEFRAMES INDICATED IN THE SEEDING AND PLANTING SPECIFICATIONS. SEEDING AND PLANTING SHALL BE AVOIDED WHEN SOIL CONDITIONS ARE INUNDATED, WET OR FROZEN.
- PLANT MATERIALS FOR THIS PROJECT HAVE BEEN ACQUIRED, AND WILL BE INSPECTED, BY THE COUNTY. THE NURSERY WILL BE RESPONSIBLE FOR DELIVERY OF THE ACQUIRED PLANT MATERIALS TO THE WORK SITE. THE DESIGNATED ECOLOGIST AND CONTRACTOR SHALL HAVE THE RIGHT TO INSPECT THE PLANT MATERIAL PRIOR TO OR UPON DELIVERY BY THE NURSERY AND REJECT NON-STANDARD OR DEFECTIVE MATERIAL. THEREAFTER, ALL MATERIALS SHALL BE CONSIDERED ACCEPTED AND THE RESPONSIBILITY OF THE CONTRACTOR. AFTER ACCEPTANCE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE PLANTS ARE MAINTAINED IN GOOD HEALTH UNTIL INSTALLATION AND FINAL ACCEPTANCE.
- TO ENSURE AVAILABILITY, SEED MAY BE ACQUIRED FOR THE PROJECT BY THE CONTRACTOR (REFER TO SEED & PLANT SCHEDULES IN THE PLANS AND SPECIFICATIONS) EXCEPT IN CASES WITHIN THE SPECIFICATIONS WHEREIN THE COUNTY WILL PROVIDE SEED. THE CONTRACTOR SHALL HAVE THE RIGHT TO INSPECT THE SEED AT ITS SOURCE PRIOR TO DELIVERY TO REJECT ANY NON-STANDARD MATERIALS THAT EXHIBIT DEFECTS THAT WOULD PROHIBIT ESTABLISHMENT & GROWTH UNDER NORMAL CONDITIONS. REJECTED MATERIAL SHALL BE WARRANTED & REPLACED IN KIND BY THE SUPPLIER AT NO COST TO THE COUNTY. THE DESIGNATED ECOLOGIST SHALL HAVE THE RIGHT TO INSPECT THE SEED PRIOR TO OR UPON DELIVERY AND REJECT ANY NON-STANDARD OR DEFECTIVE MATERIAL. THEREAFTER, ALL MATERIALS SHALL BE CONSIDERED ACCEPTED. AFTER ACCEPTANCE IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT MATERIAL IS PROPERLY MAINTAINED AND CARED FOR ONCE DELIVERED.
- CONSTRUCTION SURVEYING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY PLANTING AREA BOUNDARIES OR EXTENTS. AS-BUILT DRAWINGS SHOWING ANY DEVIATIONS OR CHANGES TO THE PLANS THAT WERE MADE IN THE FIELD SHALL BE PROVIDED BY THE CONTRACTOR/SUBCONTRACTOR AT THE END OF THE PROJECT. AS-BUILT PLANS, NOTES & PHOTOS SHALL BE PROVIDED IN DIGITAL AND HARD COPY FORM. FAILURE TO PROVIDE COMPLETE AND ACCURATE AS-BUILT INFORMATION MAY RESULT IN REDUCTION OF PAYMENT OR RETAINAGE EQUAL TO THE AMOUNT NECESSARY FOR THE CONTRACTOR TO PRODUCE ACCURATE AS-BUILT DATA.
- CONTRACTOR SHALL NOT EXPAND OR WORK OUTSIDE OF THE DESIGNATED LIMITS OF CONSTRUCTION UNLESS OTHERWISE APPROVED BY THE DESIGNATED ECOLOGIST. ALL AREAS DISTURBED DURING THE COURSE OF WORK SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION BY THE CONTRACTOR IN ACCORDANCE WITH THE PLANS & PERFORMANCE CRITERIA. ANY UNAPPROVED IMPACTS BEYOND THE LIMITS OF DISTURBANCE SHALL BE RESTORED BY THE SUBCONTRACTOR AT THE CONTRACTOR'S EXPENSE.
- SITE WORK SHALL NOT BEGIN UNTIL ALL APPLICABLE LICENSES AND CONSTRUCTION PERMITS HAVE BEEN OBTAINED BY THE CONTRACTOR. INCLUDING, BUT NOT LIMITED TO:
 - CONSTRUCTION DEWATERING PERMIT (STATE)
 - STORMWATER DISCHARGE PERMIT (STATE)
 - STREAM RESTORATION PERMIT (COMBINED GRADING PERMIT AND FLOODPLAIN DEVELOPMENT PERMIT) IS ISSUED FOR THE PROJECT BY THE BOULDER COUNTY LAND USE DEPARTMENT. (COUNTY)
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND/OR SATISFYING THE REQUIREMENTS OF ANY APPLICABLE PERMITS PERTAINING TO WETLANDS, WATERS (BOTH SURFACE AND SUBSURFACE), WATER QUALITY, WATER CONTROL DURING CONSTRUCTION ACTIVITIES, AND EROSION CONTROL.
- THE COUNTY SHALL HAVE OBTAINED A CLEAN WATER ACT (CWA) SECTION 404 PERMIT & OTHER FEDERAL PERMITS/ CLEARANCES FOR THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH SAID PERMITS.
- THE CONTRACTOR SHALL NOT GO AROUND THE CLIENT, ENGINEER OR DESIGNATED ECOLOGIST TO MODIFY PERMITS THAT WERE ALREADY IN PLACE PRIOR TO CONSTRUCTION. IF NECESSARY, THE CONTRACTOR WILL SUBMIT DRAFT CONSTRUCTION RELATED PERMITS TO THE CLIENT & ENGINEER FOR REVIEW & APPROVAL PRIOR TO SUBMITTING TO ANY AGENCY AND THEN COPY THE CLIENT AND ENGINEER ON ANY FINAL PERMIT APPLICATIONS, RESULTS OR CORRESPONDENCE WITH AGENCIES RELATED TO SAID PERMITS.
- THE CONTRACTOR SHALL GENERATE A STORM WATER MANAGEMENT PLAN & WILL BE RESPONSIBLE FOR DEVELOPING, INSTALLING AND ENSURING ALL APPLICABLE BMPS ARE INSTALLED AND PROPERLY MAINTAINED.
- HOURS OF HAULING SHALL BE FROM 8:30AM TO 4:00 PM TO LIMIT IMPACTS ON REGULAR VEHICULAR TRAFFIC ESPECIALLY DURING PEAK COMMUTER PERIODS.
- ANY WORK THAT WILL TAKE PLACE IN AND AROUND A WATER BODY MAY BE SUBJECT TO PERIODIC FLOODING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF SURFACE AND SUBSURFACE WATER AND EROSION DURING THE COURSE OF THE WORK ANY DAMAGE TO THE WORK RESULTING FROM SURFACE FLOWS, BASE FLOWS, OR FLOOD FLOWS, INCLUDING BUOYANCY FORCES, AS A RESULT OF THE CONTRACTOR NOT EFFECTIVELY PROTECTING THE WORK, SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR EXPENSE.
- EROSION CONTROL MEASURES SHALL REMAIN IN FULL FORCE DURING CONSTRUCTION ACTIVITIES AND AS REQUIRED BY THE GOVERNING JURISDICTION(S).
- PLANS, PERMITS AND CLARIFICATIONS- THE CONTRACTOR SHALL ENSURE ONE COPY OF THE FOLLOWING PLANS ARE ON SITE AT ALL TIMES:
 - CONSTRUCTION PLANS AND SPECIFICATIONS
 - STORMWATER MANAGEMENT PLAN (SWMP) GRADING, EROSION & SEDIMENT CONTROL (GESC) PLAN
 - CLEAN WATER ACT (CWA), SECTION 404 PERMIT
 - ALL OTHER PERMITS REQUIRED FOR THE PROJECT
- THE CONTRACTOR IS RESPONSIBLE FOR SUPPLYING ALL SUBCONTRACTORS WITH THE APPROVED PLANS AND PERMITS AND VERIFYING THAT ALL CONSTRUCTION IS DONE IN ACCORDANCE WITH THE APPROVED PLANS AND PERMITS.
- THE CONTRACTOR SHALL CONTACT THE ECOLOGIST IN WRITING FOR CLARIFICATION OR DISCREPANCIES ON ANY INFORMATION SHOWN IN THE PLANS.

GENERAL NOTES (CONTINUED)

- REFERENCE STANDARDS- EXCEPT WHERE OTHERWISE PROVIDED FOR IN THESE PLANS AND NOTES, BOULDER COUNTY STANDARDS SHALL APPLY.
- ANY ESTIMATE OR QUANTITIES PROVIDED IN THE PLANS OR BID SCHEDULES SHALL BE VERIFIED BY THE CONTRACTOR WHO SHALL BE RESPONSIBLE FOR DETERMINING ALL QUANTITIES AND PROVIDING WORK AND MATERIALS AS SHOWN ON THE PLANS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ON-SITE CONDITIONS AND PERFORM AN INDEPENDENT TAKE-OFF OF ALL QUANTITIES, TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES (INCLUDING UNLISTED ITEMS), AND TO SUBMIT AN ADD-ALTERNATE BID IDENTIFYING THE DISCREPANCIES PRIOR TO FINAL EXECUTION OF THE CONSTRUCTION CONTRACT. AFTER CONTRACT AWARD, THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING ANY DISCREPANCIES OR CHANGES THAT MAY BE REQUIRED AND SUBMIT CHANGE ORDERS TO THE ENGINEER FOR REVIEW, APPROVAL OR REASONABLE DENIAL.
- ALL PROPERTY PINS, INTERSECTION MONUMENTS, AND SECTION CORNERS DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION MUST BE REFERENCED AND REPLACED UNDER SUPERVISION OF A LICENSED SURVEYOR AT THE CONTRACTOR'S COST.
- ALL DESIGN-RELATED CHANGES MUST BE APPROVED BY THE DESIGN ENGINEER OR THE COUNTY.
- ALL TOPSOIL IS 4" UNLESS OTHERWISE NOTED.

EROSION NOTES

- THERE SHALL BE NO EARTH-DISTURBING ACTIVITY OUTSIDE THE LIMITS DESIGNATED ON THE ACCEPTED PLANS.
- ALL REQUIRED PERIMETER SILT AND CONSTRUCTION FENCING SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITY STOCKPILING, STRIPPING, GRADING, ETC). ALL OTHER REQUIRED EROSION CONTROL MEASURES SHALL BE INSTALLED AT THE APPROPRIATE TIME IN THE CONSTRUCTION SEQUENCE AS INDICATED IN THE APPROVED PROJECT SCHEDULE, CONSTRUCTION PLANS, AND EROSION CONTROL REPORT.
- AT ALL TIMES DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING AND CONTROLLING ON-SITE EROSION INCLUDING KEEPING THE PROPERTY SUFFICIENTLY WATERED SO AS TO MINIMIZE WINDBLOWN SEDIMENT. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR INSTALLING AND MAINTAINING ALL EROSION CONTROL FACILITIES SHOWN HEREIN.
- IN ORDER TO MINIMIZE EROSION POTENTIAL, ALL TEMPORARY (STRUCTURAL) EROSION CONTROL MEASURES SHALL:
 - BE INSPECTED AT A MINIMUM OF ONCE EVERY TWO (2) WEEKS AND AFTER EACH SIGNIFICANT STORM EVENT AND REPAIRED OR RECONSTRUCTED AS NECESSARY IN ORDER TO ENSURE THE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION.
 - REMAIN IN PLACE UNTIL SUCH TIME AS ALL THE SURROUNDING DISTURBED AREAS ARE SUFFICIENTLY STABILIZED AS DETERMINED BY THE ENGINEER.
 - BE REMOVED AFTER THE SITE HAS BEEN SUFFICIENTLY STABILIZED AS DETERMINED BY THE ENGINEER.
- DO NOT DISTURB AREAS OUTSIDE CONSTRUCTION LIMITS.

SURVEY INFORMATION

VERTICAL DATUM
BENCHMARK: LONGMONT BENCHMARK #157, NAVD88 ELEVATION=5164.76

HORIZONTAL DATUM
COLORADO STATE PLANE COORDINATES NAD 83(2011) DATUM. HORIZONTAL CONTROL BASED UPON TRIMBLE VRS NETWORK.

- NOTES**
- THIS DRAWING IS AT MODIFIED STATE PLANE. TO REDUCE TO STATE PLANE COORDINATES, SCALE AT 0.99973537 (1,00026470) ABOUT THE ORIGIN 0,0.
 - ALL PROPERTY PINS, INTERSECTION MONUMENTS, AND SECTION CORNERS DISTURBED DURING CONSTRUCTION MUST BE REFERENCED AND REPLACED UNDER THE SUPERVISION OF A LICENSED SURVEYOR.
 - THIS AUTOCAD DRAWING CONTAINS INFORMATION THAT IS NOT VISIBLE ON THE PLOTTED COPY TO OBTAIN ALL THE INFORMATION THAT IS AVAILABLE IN THIS DRAWING, ALL THE AUTOCAD LAYERS MUST BE TURNED ON AND THAWED.
 - THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK BEFORE COMMENCING NEW CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES.
 - ALL PROJECT CONTROL LISTED HEREON IS PROVIDED AS A COURTESY. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO VERIFY THE ACCURACY OF THE COORDINATES AND ELEVATIONS SHOWN PRIOR TO USING THEM FOR ANY PURPOSES.
 - ANY LOT LINES, RIGHT OF WAYS OR EASEMENTS SHOWN ARE APPROXIMATE AND ARE NOT TO BE RELIED UPON FOR FUTURE IMPROVEMENTS.
 - SURVEY WAS CONDUCTED ON AUGUST 15, 2016, BY KING SURVEYORS (WINDSOR, CO 970-686-5011).

OTHER INFORMATION

- FOR BORING LOG INFORMATION, SEE GEOTECHNICAL INVESTIGATION, ST. VRAIN CREEK BREACHES RESTORATION, HIGHWAY 36 TO HYGIENE ROAD, BOULDER COUNTY, COLORADO DATED JULY 1, 2016.

DRAWING LEGEND

- EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL)
- PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL)
- PROPOSED SPOT ELEVATIONS
- ST. VRAIN CREEK WITH STATIONING
- RAILROAD
- PARCEL BOUNDARY
- PARCEL NUMBER
- APPROXIMATE INUNDATION AREA - 2 YEAR EVENT PEAK FLOW = 850 CFS
- APPROXIMATE GEOTECHNICAL BORING LOCATION (SEE "OTHER INFORMATION" NOTE 1)
- STRUCTURE
- ACCESS ROAD
- POLLINATION STUDY AREA
- CROSS-SECTION CALL OUT
- DETAIL CALL OUT

KEY TO ABBREVIATIONS

| | | | |
|---------|-----------------------|-------|--------------------------|
| APPROX. | APPROXIMATE | MH | MANHOLE |
| CY | CUBIC YARD | NO | NUMBER |
| CJ | CONSTRUCTION JOINT | NTS | NOT TO SCALE |
| CMP | CORRUGATED METAL PIPE | OC | ON CENTER |
| CTD | CENTERED | OPNG | OPENING |
| DEMO | DEMOLISH | PL | PLATE (STEEL) |
| DTL | DETAIL | PZ | PIEZOMETER |
| DIA | DIAMETER | RCP | REINFORCED CONCRETE PIPE |
| DIP | DUCTILE IRON PIPE | REINF | REINFORCEMENT |
| D/S | DOWNSTREAM | REQD | REQUIRED |
| EA | EACH | REV | REVISION |
| EE | EACH END | ROW | RIGHT-OF-WAY |
| EF | EACH FACE | SCH | SCHEDULE |
| EJ | EXPANSION JOINT | SHT | SHEET |
| EL | ELEVATION | SQ | SQUARE |
| ELEV | ELEVATION | SS | STAINLESS STEEL |
| EQUIP | EQUIPMENT | STA | STATION |
| EW | EACH WAY | STD | STANDARD |
| EXP | EXPANSION | TBD | TO BE DETERMINED |
| FT | FEET | TOF | TOP OF FOOTING ELEVATION |
| GH | GAGE HEIGHT | TOW | TOP OF WALL ELEVATION |
| HORIZ | HORIZONTAL | TSE | TOP OF SLAB ELEVATION |
| IN | INCHES | TSE | TOP OF STEEL ELEVATION |
| JT | JOINT | TYP | TYPICAL |
| LF | LINEAR FEET | UNO | UNLESS NOTED OTHERWISE |
| MAX | MAXIMUM | U/S | UPSTREAM |
| MIN | MINIMUM | VERT | VERTICAL |
| | | XS | CROSS SECTION |

REVISIONS

| Revision | Date | Description |
|----------|-----------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Issued for As-Built Conditions |

EA Engineering Analytics, Inc.
 6000 Speer Point Road, Suite 209
 Denver, CO 80222
 (877) 488-3111

ST. VRAIN CREEK REACH 3

GENERAL NOTES



AS-BUILT
6/19/2018

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: RDP
 Designed by: LCB
 Checked by: LCB
 Scale: As Shown
 Project No. 110666
 Date: September 19, 2017
 SHEET G2

**BOULDER COUNTY STANDARD STORMWATER MANAGEMENT PLAN NOTES
(REFER TO BOULDER COUNTY STORM DRAINAGE CRITERIA MANUAL)**

BEST MANAGEMENT PRACTICES

- CONTRACTOR/PERMITTEE SHALL PERIODICALLY INSPECT ALL INSTALLED BMPS, PROVIDE MAINTENANCE, AND MAKE REPAIRS AS NECESSARY TO PREVENT THEIR FAILURE.
- SILT FENCE OR AN EQUIVALENT SHALL BE PLACED AS PERIMETER CONTROL ON ALL CONSTRUCTION ACTIVITIES THAT OCCUR ON LAND, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS, OR OTHERWISE REQUESTED, REMOVE PERIMETER CONTROLS WITHIN 30 DAYS AFTER THE DATE OF WARRANTY PERFORMANCE OF THE WORK OR IN ACCORDANCE WITH BMPS.
- VEHICLE TRACKING CONTROLS SHALL BE USED AT ALL VEHICLE AND EQUIPMENT ACCESS POINTS TO THE SITE TO PREVENT SEDIMENT EXITING THE PROJECT SITE ONTO PAVED PUBLIC ROADS. ACCESS SHALL BE PROVIDED ONLY AT LOCATIONS APPROVED BY THE ENGINEER. VEHICLE TRACKING CONTROL LOCATIONS SHALL BE RECORDED ON THE SWMP SITE MAP.
- ALL INLETS AND CULVERTS SHALL BE PROTECTED DURING ONSITE CONSTRUCTION ACTIVITIES. INLET PROTECTION LOCATIONS SHALL BE RECORDED ON THE SWMP SITE MAP.
- CONCRETE WASTED IN DESIGNATED DEWATERING AREAS SHALL BE COLLECTED, REMOVED FROM THE PROJECT SITE, AND DISPOSED OF PROPERLY. WASTED CONCRETE ALSO INCLUDES EXCESS CONCRETE REMOVED FROM FORMS, SPILLS, SLOP, AND ALL OTHER UNUSED CONCRETE THAT ENDS UP ON THE GROUND.
- THE CONTRACTOR/PERMITTEE MUST MAINTAIN A SPILL KIT ON SITE WHEN WORKING AROUND SURFACE WATERS. IF POLLUTANTS ARE SPILLED INTO ANY SURFACE WATERS DURING THE COURSE OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR/PERMITTEE MUST NOTIFY THE OWNER'S REPRESENTATIVE OR ENGINEER IMMEDIATELY.
- ALL EXISTING MATURE TREES WITHIN THE DESIGNATED PROJECT AREA ARE TO BE PROTECTED IN PLACE UNLESS OTHERWISE DIRECTED BY THE ENGINEER. PRIOR TO THE INITIATION OF WORK, THE ENGINEER SHALL MARK ANY TREES AND/OR LARGE SHRUBS TO BE REMOVED AS PART OF CONSTRUCTION ACTIVITIES. AREAS OF TREE REMOVAL SHALL BE DETERMINED AND MARKED IN COLLABORATION BETWEEN THE CONTRACTOR/PERMITTEE AND THE ENGINEER.
- ALL EXCAVATION ACTIVITIES OCCURRING WITHIN 10 FEET OF THE DRIPLINE SHALL BE PERFORMED BY HAND UNLESS OTHERWISE DIRECTED BY THE ENGINEER AND IF NECESSARY ROOTS SHALL BE CLEANLY CUT NOT TORN OR RIPPED. IF EXPOSED, TREE ROOTS SHALL BE BACKFILLED AND WATERED ON THE SAME DAY OF CUTTING AND APPROVED ROOT STIMULATOR SHALL BE APPLIED. SOILS SHALL NOT BE COMPACTED WITHIN THE DRIPLINE OF MATURE TREES UNLESS OTHERWISE APPROVED BY THE ENGINEER.

WASTE MANAGEMENT

- THE CONTRACTOR/PERMITTEE SHALL NOT BURN, BURY, OR OTHERWISE DISCHARGE CONSTRUCTION OR DEMOLITION WASTE ON THE SITE UNLESS SPECIFIED OTHERWISE.
- THE CONTRACTOR/PERMITTEE SHALL PROVIDE A PORTABLE TOILET AND ASSOCIATED MAINTENANCE SCHEDULE FOR THE CONSTRUCTION AREA SUFFICIENT TO ACCOMMODATE THE CONSTRUCTION CREW AND ALL OTHER AUTHORIZED PERSONS TO BE ONSITE DURING CONSTRUCTION ACTIVITIES.

HAZARDOUS MATERIALS

- THE CONTRACTOR/PERMITTEE SHALL TRANSPORT, USE, AND STORE HAZARDOUS MATERIALS IN ACCORDANCE WITH ALL REGULATORY REQUIREMENTS. SPILLED HAZARDOUS MATERIALS, INCLUDING HAZARDOUS LIQUID WASTES, SHALL BE REMOVED FROM THE SITE AND THE PROPERTY RESTORED TO ITS PRE SPILL STATE IN ACCORDANCE WITH REGULATORY REQUIREMENTS.
- THE CONTRACTOR/PERMITTEE SHALL IMMEDIATELY REPORT SPILLS TO THE PROPER REGULATORY AUTHORITY AND SHALL IMMEDIATELY NOTIFY THE ENGINEER.
- HANDLING OF CONSTRUCTION FUELS AND LUBRICANTS:
 - THE CONTRACTOR/PERMITTEE SHALL EMPLOY PERSONS QUALIFIED TO HANDLE CONSTRUCTION EQUIPMENT FUELS AND LUBRICANTS.
 - THE CONTRACTOR/PERMITTEE SHALL REFUEL AND SERVICE EQUIPMENT AWAY FROM FLOODPLAINS OF RIVERS, STREAMS AND OTHER BODIES OF WATER. THE CONTRACTOR/PERMITTEE SHALL ENSURE EQUIPMENT THAT ENTERS THE WATER IS FREE FROM EXTERNAL GREASE, OIL, AND MUD.
 - THE CONTRACTOR/PERMITTEE SHALL PREVENT HANDLING AND FUELING OPERATIONS FROM CONTAMINATING THE GROUND, SURFACE WATER, AND GROUND WATER. THE CONTRACTOR/PERMITTEE SHALL USE CONTAINMENT BERMS AND AN IMPERMEABLE BASE COURSE OR OTHER SYSTEM TO CONTAIN SPILLED FUEL.

GENERAL CARE OF WATER

- CARE OF WATER SHALL INCLUDE THE DESIGN OF ALL TEMPORARY CARE OF WATER PROVISIONS INCLUDING COFFER DAMS, SUMPS, PUMPING SYSTEMS, PIPELINES, CHANNELS, FLUMES, DRAINS, AND OTHER PROTECTIVE AND DEWATERING WORKS TO ALLOW FOR WORK TO BE PERFORMED UNDER DRY CONDITIONS.
- 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.
- 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.
- THE CONTRACTOR/PERMITTEE SHALL COMPLY WITH ALL USACE 404 PERMIT REQUIREMENTS INCLUDING ANY SPECIAL CARE REQUIREMENTS ISSUED FOR THIS PROJECT.
- 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.
- CARE OF WATER SHALL INCLUDE PROVISIONS FOR HANDLING GROUNDWATER, RAINSTORM RUNOFF, SNOW, SNOWMELT, AND ICE THAT MAY ENTER THE WORK AREA.
- 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.
- THE CONTRACTOR/PERMITTEE SHALL PROVIDE AND MAINTAIN SEDIMENT PONDS OR OTHER MEANS, REMOVE SEDIMENT FROM WATERS COLLECTED WITHIN ACTIVE CONSTRUCTION AREAS PRIOR TO ALLOWING IT TO ENTER OR RETURN INTO THE WATERCOURSE. CONTRACTOR/PERMITTEE SHALL DISPOSE OF SEDIMENTS IN A SUITABLE OFF SITE WASTE DISPOSAL FACILITY.
- THE CONTRACTOR/PERMITTEE SHALL MONITOR WATER TURBIDITY DURING CONSTRUCTION ACTIVITIES AND SHALL SHUT DOWN WORKS AT TIMES OF EXCESS TURBIDITY IN ORDER TO ALLOW THE WATER TO CLEAR PRIOR TO RE COMMENCEMENT OF IN STREAM WORK.
- TURBIDITY IS EXPECTED DURING PLACEMENT AND REMOVAL OF WATER CONTROL. IF WATERS BECOME NOTICEABLY TURBID, CONTRACTOR/PERMITTEES 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.
- 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

- THE CONTRACTOR/PERMITTEE IS RESPONSIBLE FOR THE FINAL LAYOUT, CONFIGURATION, MAINTENANCE, AND REMOVAL IN THEIR ENTIRETY OF ALL COFFER DAMS TO BE CONSTRUCTED WITHIN THE PROJECT SITE.
- 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 3H:1V, INSTALLATION OF APPROVED EROSION CONTROL FABRIC, AND INSTALLATION OF AN APPROVED NATIVE SEED MIX.
- 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.
- THE USE OF RIPRAP OR OTHER PROTECTION MEASURES ON THE SURFACES OF THE COFFERDAM, INCLUDING THE TOE OF COFFERDAM SLOPES EXPOSED TO HIGH VELOCITIES, IS REQUIRED.
- ALL TEMPORARY FILLS MUST BE REMOVED IN THEIR ENTIRETY FOLLOWING CONSTRUCTION ACTIVITIES AND AFFECTED AREAS GRADED TO PROPOSED CONDITIONS.
- COFFER DAMS SHALL PROVIDE A BYPASS WATERWAY THAT IS ARMORED AND OF THE MINIMUM DIMENSIONS SHOWN IN THE TYPICAL WATER CONTROL CHANNEL DETAIL.
- 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

- 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.
- TO MINIMIZE 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 DIDYMOSPHEA, NEW ZEALAND MUD SNAILS, WHIRLING DISEASE, ZEBRA MUSSELS, AND OTHER AQUATIC HITCHHIKERS.
- EQUIPMENT OPERATING WITHIN OR ADJACENT TO ANY SURFACE WATERS SHALL BE FREE OF FLUID LEAKS.
- 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 PRIOR TO USE. ALL FUELING, OILING, OR MAINTENANCE OF EQUIPMENT SHALL BE PERFORMED IN DESIGNATED UPLAND LOCATIONS, WITH ADEQUATE BMPS TO CONTAIN POTENTIAL SPILLS.

REVISIONS

| Revision | Date | Description |
|----------|-----------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Issued for As-Built Conditions |

EA Engineering Analytics, Inc.
 1800 Speer Point Road, Suite 209
 Denver, CO 80202
 (877) 488-3111

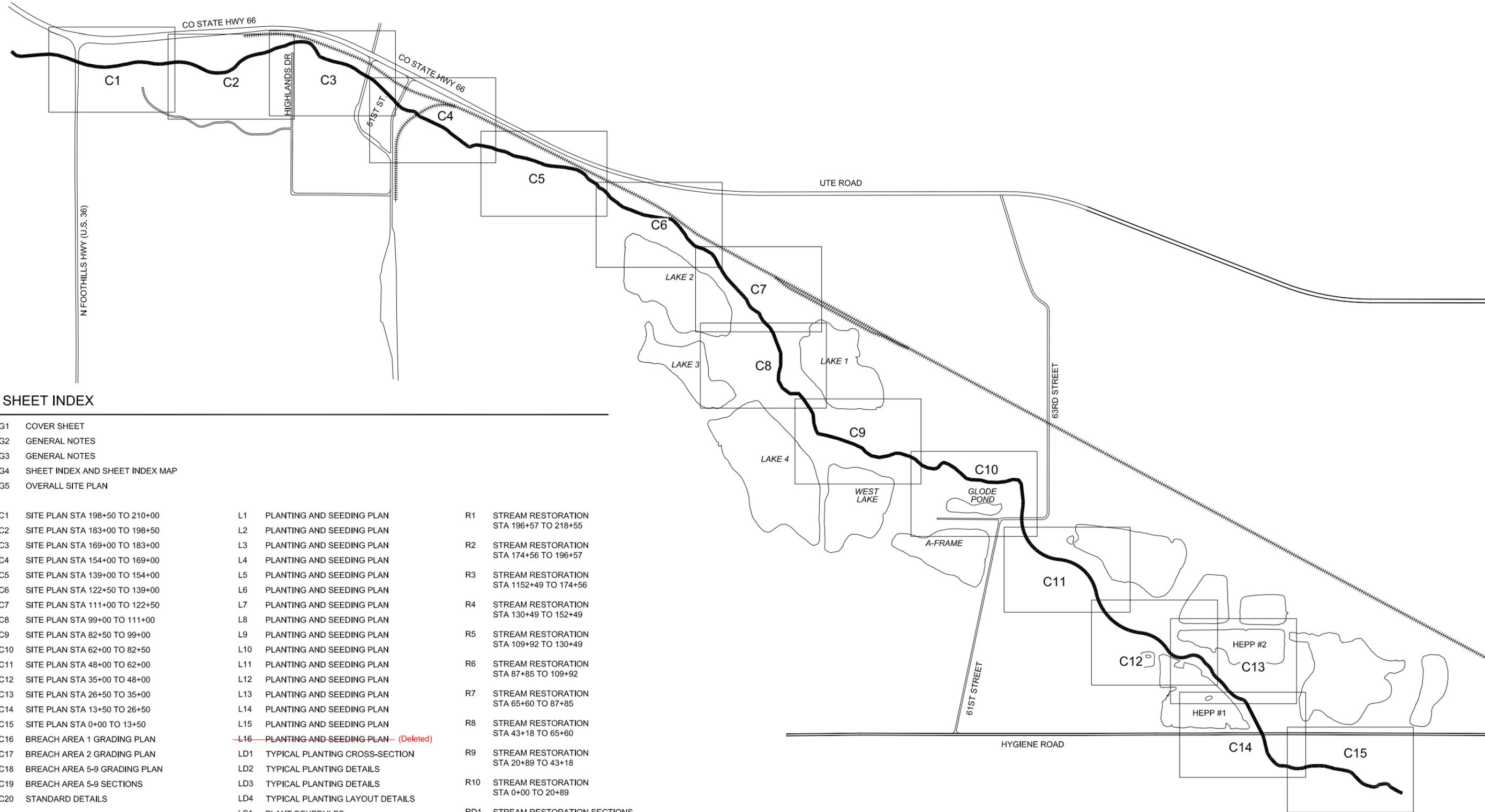
ST. VRAIN CREEK REACH 3

GENERAL NOTES



AS-BUILT
6/19/2018

| |
|--|
| SCALE VERIFICATION: 0" = 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. |
| Drawn by: RDP |
| Designed by: LCB |
| Checked by: LCB |
| Scale: As Shown |
| Project No. 110666 |
| Date: September 19, 2017 |
| SHEET G3 |



SHEET INDEX

| | | |
|------------------------------------|--|--|
| G1 COVER SHEET | L1 PLANTING AND SEEDING PLAN | R1 STREAM RESTORATION STA 196+57 TO 218+55 |
| G2 GENERAL NOTES | L2 PLANTING AND SEEDING PLAN | R2 STREAM RESTORATION STA 174+56 TO 196+57 |
| G3 GENERAL NOTES | L3 PLANTING AND SEEDING PLAN | R3 STREAM RESTORATION STA 1152+49 TO 174+56 |
| G4 SHEET INDEX AND SHEET INDEX MAP | L4 PLANTING AND SEEDING PLAN | R4 STREAM RESTORATION STA 130+49 TO 152+49 |
| G5 OVERALL SITE PLAN | L5 PLANTING AND SEEDING PLAN | R5 STREAM RESTORATION STA 109+92 TO 130+49 |
| C1 SITE PLAN STA 198+50 TO 210+00 | L6 PLANTING AND SEEDING PLAN | R6 STREAM RESTORATION STA 87+85 TO 109+92 |
| C2 SITE PLAN STA 183+00 TO 198+50 | L7 PLANTING AND SEEDING PLAN | R7 STREAM RESTORATION STA 65+60 TO 87+85 |
| C3 SITE PLAN STA 169+00 TO 183+00 | L8 PLANTING AND SEEDING PLAN | R8 STREAM RESTORATION STA 43+18 TO 65+60 |
| C4 SITE PLAN STA 154+00 TO 169+00 | L9 PLANTING AND SEEDING PLAN | R9 STREAM RESTORATION STA 20+89 TO 43+18 |
| C5 SITE PLAN STA 139+00 TO 154+00 | L10 PLANTING AND SEEDING PLAN | R10 STREAM RESTORATION STA 0+00 TO 20+89 |
| C6 SITE PLAN STA 122+50 TO 139+00 | L11 PLANTING AND SEEDING PLAN | RD1 STREAM RESTORATION SECTIONS AND DETAILS |
| C7 SITE PLAN STA 111+00 TO 122+50 | L12 PLANTING AND SEEDING PLAN | RD2 STREAM RESTORATION SECTIONS AND DETAILS |
| C8 SITE PLAN STA 99+00 TO 111+00 | L13 PLANTING AND SEEDING PLAN | RD3 STREAM RESTORATION SECTIONS AND DETAILS |
| C9 SITE PLAN STA 82+50 TO 99+00 | L14 PLANTING AND SEEDING PLAN | RD4 STREAM RESTORATION TABLES |
| C10 SITE PLAN STA 62+00 TO 82+50 | L15 PLANTING AND SEEDING PLAN | RD5 STREAM RESTORATION SECTIONS AND DETAILS |
| C11 SITE PLAN STA 48+00 TO 62+00 | L16 PLANTING AND SEEDING PLAN - (Deleted) | RD6 STREAM RESTORATION CROSS SECTIONS (1 OF 2) |
| C12 SITE PLAN STA 35+00 TO 48+00 | LD1 TYPICAL PLANTING CROSS-SECTION | RD7 STREAM RESTORATION CROSS SECTIONS (2 OF 2) |
| C13 SITE PLAN STA 26+50 TO 35+00 | LD2 TYPICAL PLANTING DETAILS | |
| C14 SITE PLAN STA 13+50 TO 26+50 | LD3 TYPICAL PLANTING DETAILS | |
| C15 SITE PLAN STA 0+00 TO 13+50 | LD4 TYPICAL PLANTING LAYOUT DETAILS | |
| C16 BREACH AREA 1 GRADING PLAN | LS1 PLANT SCHEDULES | |
| C17 BREACH AREA 2 GRADING PLAN | LS2 PLANT SCHEDULES | |
| C18 BREACH AREA 5-9 GRADING PLAN | LS3 PLANT SCHEDULES | |
| C19 BREACH AREA 5-9 SECTIONS | | |
| C20 STANDARD DETAILS | | |

SHEET INDEX MAP
1" = 600'



AS-BUILT
6/19/2018

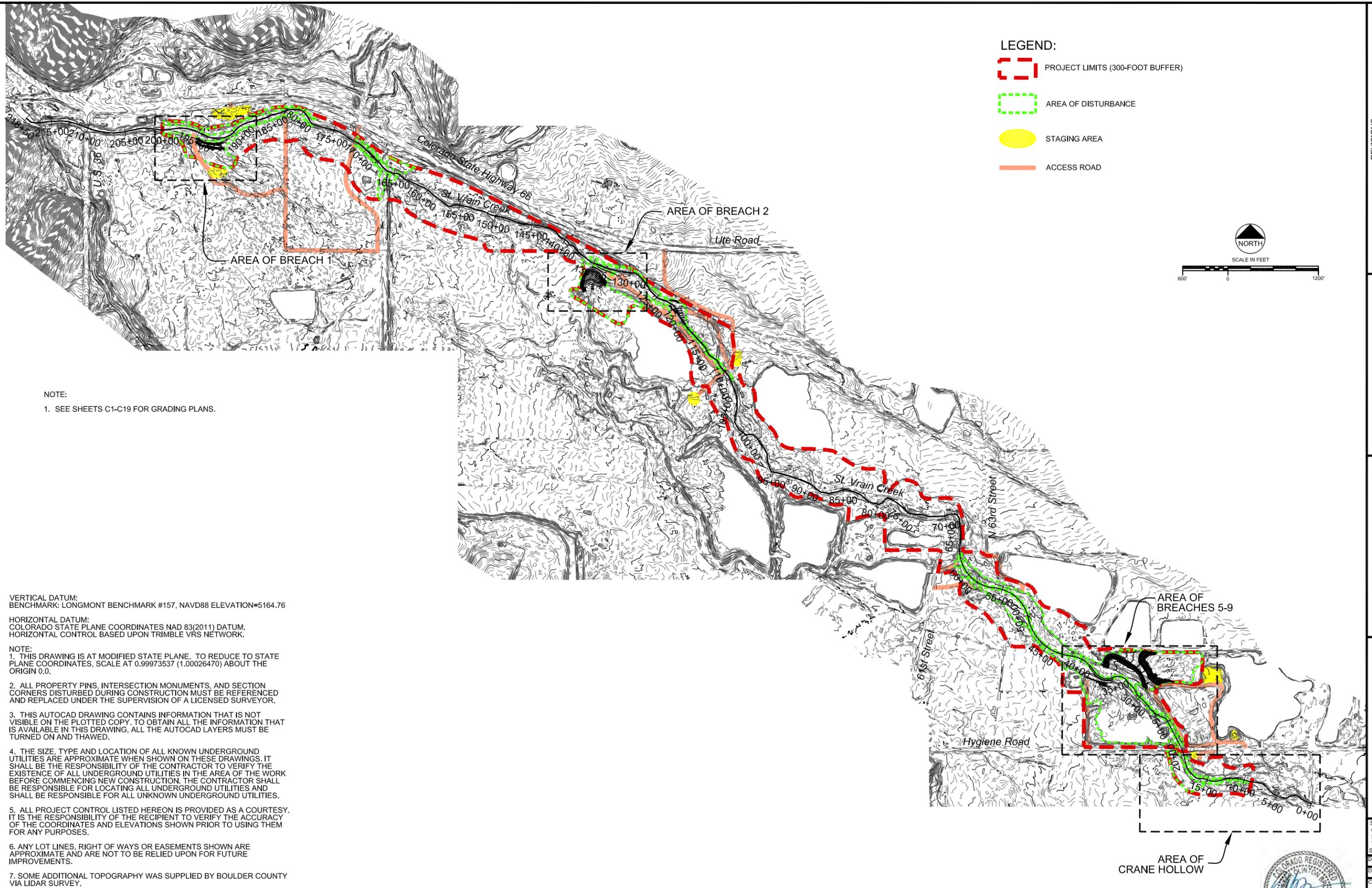
| Revision | Date | Description |
|----------|-----------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Issued for As-Built Conditions |

EA Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Denver, CO 80202
(877) 488-3111

ST. VRAIN CREEK REACH 3
SHEET INDEX AND SHEET INDEX MAP

| | |
|--|--------------------|
| SCALE VERIFICATION: | 1" |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | |
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No.: | 110666 |
| Date: | September 19, 2017 |
| SHEET | G4 |

T:\110666 St. Vrain Breaches\Cover Sheet.dwg - SAVED: 6/19/18 PRINTED: 7/6/18



NOTE:
1. SEE SHEETS C1-C19 FOR GRADING PLANS.

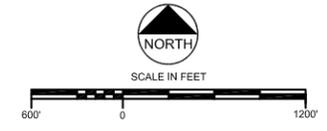
VERTICAL DATUM:
BENCHMARK: LONGMONT BENCHMARK #157, NAVD88 ELEVATION=5164.76

HORIZONTAL DATUM:
COLORADO STATE PLANE COORDINATES NAD 83(2011) DATUM.
HORIZONTAL CONTROL BASED UPON TRIMBLE VRS NETWORK.

- NOTE:
1. THIS DRAWING IS AT MODIFIED STATE PLANE. TO REDUCE TO STATE PLANE COORDINATES, SCALE AT 0.99973537 (1.00026470) ABOUT THE ORIGIN 0,0.
 2. ALL PROPERTY PINS, INTERSECTION MONUMENTS, AND SECTION CORNERS DISTURBED DURING CONSTRUCTION MUST BE REFERENCED AND REPLACED UNDER THE SUPERVISION OF A LICENSED SURVEYOR.
 3. THIS AUTOCAD DRAWING CONTAINS INFORMATION THAT IS NOT VISIBLE ON THE PLOTTED COPY. TO OBTAIN ALL THE INFORMATION THAT IS AVAILABLE IN THIS DRAWING, ALL THE AUTOCAD LAYERS MUST BE TURNED ON AND THAWED.
 4. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK BEFORE COMMENCING NEW CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES.
 5. ALL PROJECT CONTROL LISTED HEREON IS PROVIDED AS A COURTESY. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO VERIFY THE ACCURACY OF THE COORDINATES AND ELEVATIONS SHOWN PRIOR TO USING THEM FOR ANY PURPOSES.
 6. ANY LOT LINES, RIGHT OF WAYS OR EASEMENTS SHOWN ARE APPROXIMATE AND ARE NOT TO BE RELIED UPON FOR FUTURE IMPROVEMENTS.
 7. SOME ADDITIONAL TOPOGRAPHY WAS SUPPLIED BY BOULDER COUNTY VIA LIDAR SURVEY.

LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- AREA OF DISTURBANCE
- STAGING AREA
- ACCESS ROAD



| REVISIONS | |
|-----------|---|
| Revision | Description |
| 1 | 9/19/2017 Issued for Construction |
| 2 | 10/20/2017 Revised per LU comments |
| | 6/19/2018 Based for As-Built Conditions |

Engineering Analytics, Inc.
 8500 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

ST. VRAIN CREEK REACH 3
**OVERALL
 SITE PLAN**

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

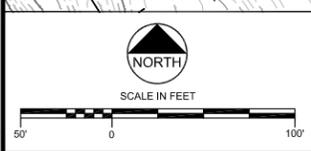
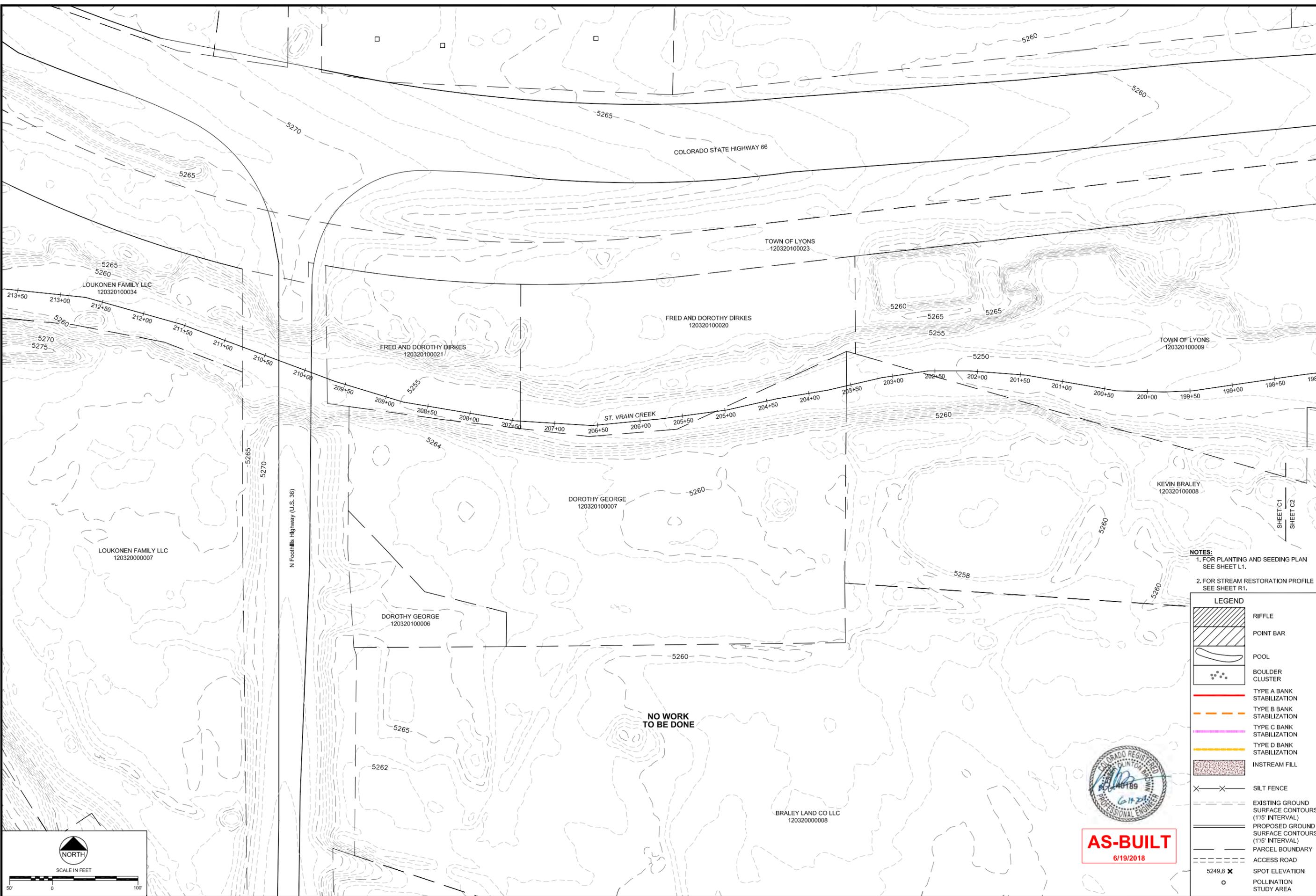
| | |
|--------------|--------------------|
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No. | 110666 |
| Date: | September 19, 2017 |
| SHEET | G5 |

AS-BUILT
6/19/2018



I:\110666 St. Vrain Breaches\Overall_Site.dwg SAVED: 6/19/18 PRINTED: 7/6/18

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg, SAVED: 6/19/18, PRINTED: 7/6/18



NO WORK TO BE DONE

NOTES:
1. FOR PLANTING AND SEEDING PLAN SEE SHEET L1.
2. FOR STREAM RESTORATION PROFILE SEE SHEET R1.

| LEGEND | |
|--------|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |



AS-BUILT
6/19/2018

| Revision | Date | Description |
|----------|-----------|---------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Revised for As-Built Conditions |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Denver, CO 80202
(877) 488-3111

ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
STA 198+50 TO 210+00
NO WORK PROPOSED

| | |
|--|--------------------------|
| SCALE VERIFICATION: 0 = 1" = 100' | Drawn by: RDP |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | Designed by: LCB |
| | Checked by: LCB |
| | Scale: As Shown |
| | Project No. 110666 |
| | Date: September 19, 2017 |
| SHEET | C1 |

COLORADO STATE HIGHWAY 66

TOWN OF LYONS
120320100023

STAGING AND STOCKPILE AREA
(LIMITS TO BE DETERMINED IN THE FIELD)

RAUL VASQUEZ
120321000036

BOULDER COUNTY
120321000038

BANK STABILIZATION
EXTENDED

APPROX. STREAM ACCESS FINAL
LOCATION TO BE DETERMINED IN
FIELD AND APPROVED BY BCPOS

APPROX. STREAM ACCESS FINAL
LOCATION TO BE DETERMINED IN
FIELD AND APPROVED BY BCPOS

BREACH 1

APPROXIMATE AREA
OF DISTURBANCE

STAGING AREA
(LIMITS TO BE DETERMINED IN THE FIELD)

NOTES:
1. FOR PLANTING AND SEEDING PLAN
SEE SHEET L2.
2. FOR STREAM RESTORATION PROFILE
SEE SHEET R2.

| LEGEND | |
|--------|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |



AS-BUILT
6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|-----------|-------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.

1600 Speer Point Road, Suite 209
Boulder, CO 80525
(970) 488-3111



ST. VRAIN CREEK REACH 3

GRADING SITE PLAN
STA 183+00 TO 198+50

| | |
|--------------------------------------|--|
| SCALE VERIFICATION: 0 = 1" = 100' | IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. |
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No.: | 110666 |
| Date: | September 19, 2017 |
| SHEET | C2 |

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg, SAVED: 6/19/18, PRINTED: 7/6/18

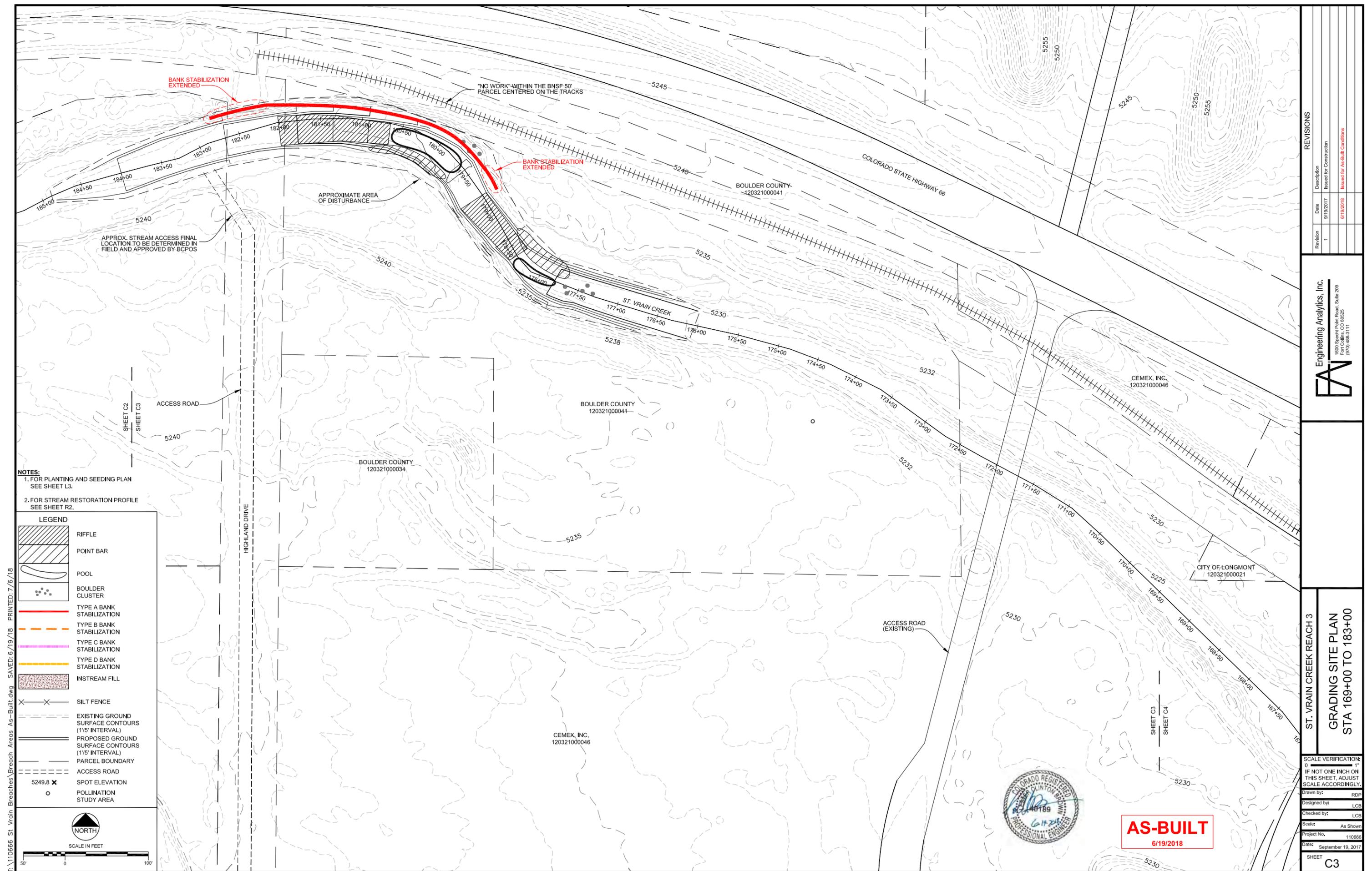


SCALE IN FEET

SEE SHEET C16 FOR GRADING PLAN

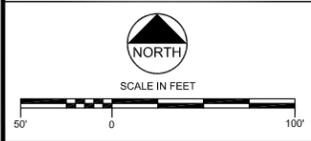
TRACKING PAD TO BE DETERMINED IN FIELD BY ENGINEER AND CONTRACTOR PRIOR TO PLACEMENT





NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L3.
 2. FOR STREAM RESTORATION PROFILE SEE SHEET R2.

| LEGEND | |
|--------|---|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1'/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1'/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |



| REVISIONS | |
|------------|--|
| Revision 1 | Date 9/19/2017 Description Issued for Construction Based for AS-Built Conditions |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

ST. VRAIN CREEK REACH 3
 GRADING SITE PLAN
 STA 169+00 TO 183+00

| | | |
|--|--------------------|----|
| SCALE VERIFICATION: | 0 | 1" |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | | |
| Drawn by: | RDP | |
| Designed by: | LCB | |
| Checked by: | LCB | |
| Scale: | As Shown | |
| Project No. | 110666 | |
| Date: | September 19, 2017 | |
| SHEET | C3 | |



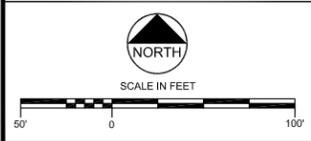
AS-BUILT
 6/19/2018

I:\110666 St. Vrain Breaches\Breaches As-Built.dwg, Saved: 6/19/18, PRINTED: 7/6/18



NOTES:
 1. FOR PLANTING AND SEEDING PLAN
 SEE SHEET L4.
 2. FOR STREAM RESTORATION PROFILE
 SEE SHEET R3.

| LEGEND | |
|--------|---|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1'/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1'/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |



| REVISIONS | |
|-----------|---|
| Revision | Description |
| 1 | Issued for Construction |
| 2 | 6/19/2018 Based for As-Built Conditions |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Denver, CO 80202
 (877) 488-3111

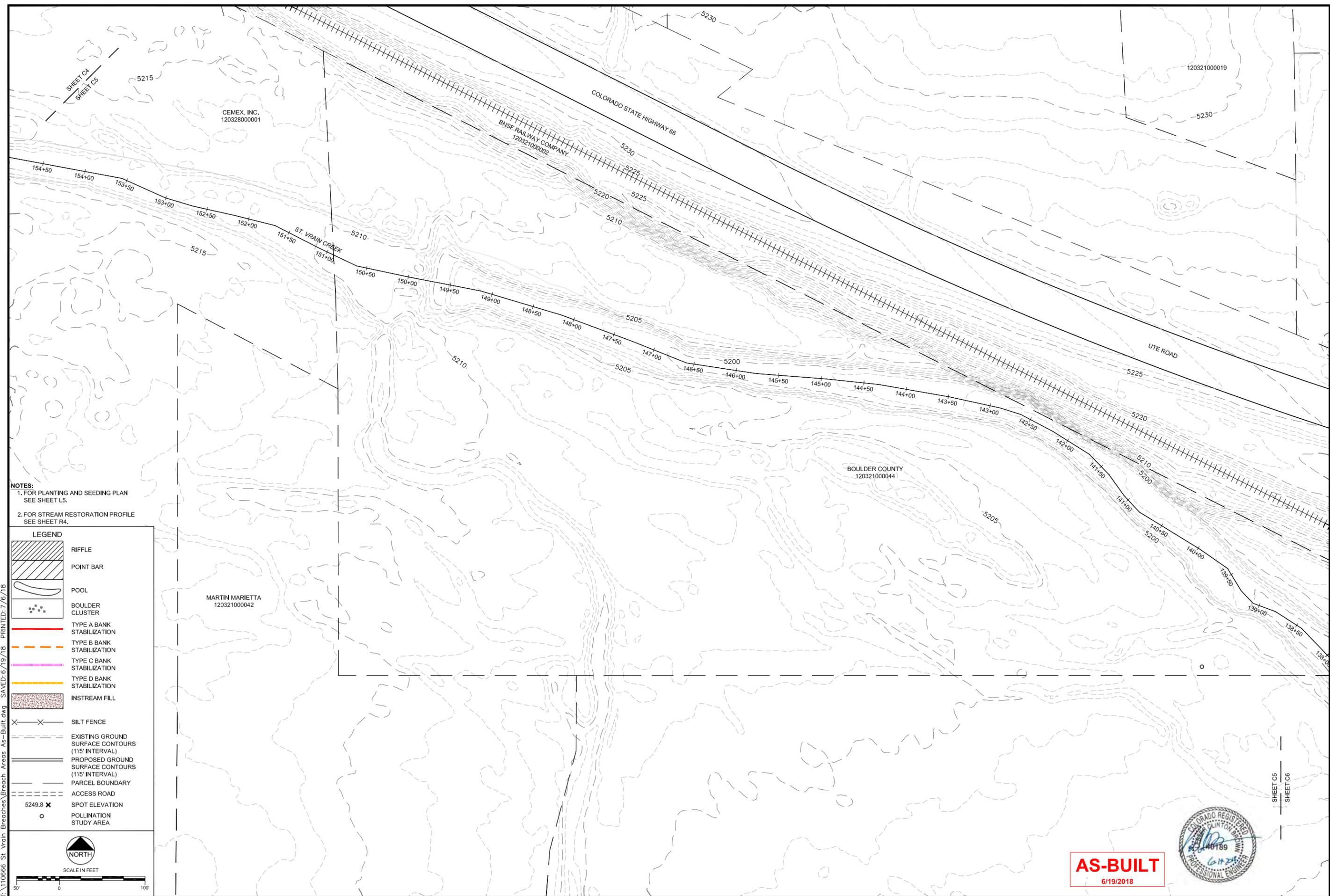
**ST. VRAIN CREEK REACH 3
 GRADING SITE PLAN
 STA 154+00 TO 169+00
 NO WORK PROPOSED**

| | |
|--|--------------------|
| SCALE VERIFICATION: 0 = 1" | |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | |
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No. | 110666 |
| Date: | September 19, 2017 |
| SHEET C4 | |

AS-BUILT
 6/19/2018

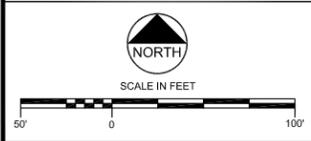


I:\110666 St. Vrain Breaches\Breach Areas As-Built.dwg, Saved: 6/19/18, PRINTED: 7/6/18



NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L5.
 2. FOR STREAM RESTORATION PROFILE SEE SHEET R4.

| LEGEND | |
|--------|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |



| REVISIONS | | |
|-----------|-----------|-------------------------------|
| Revision | Date | Description |
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

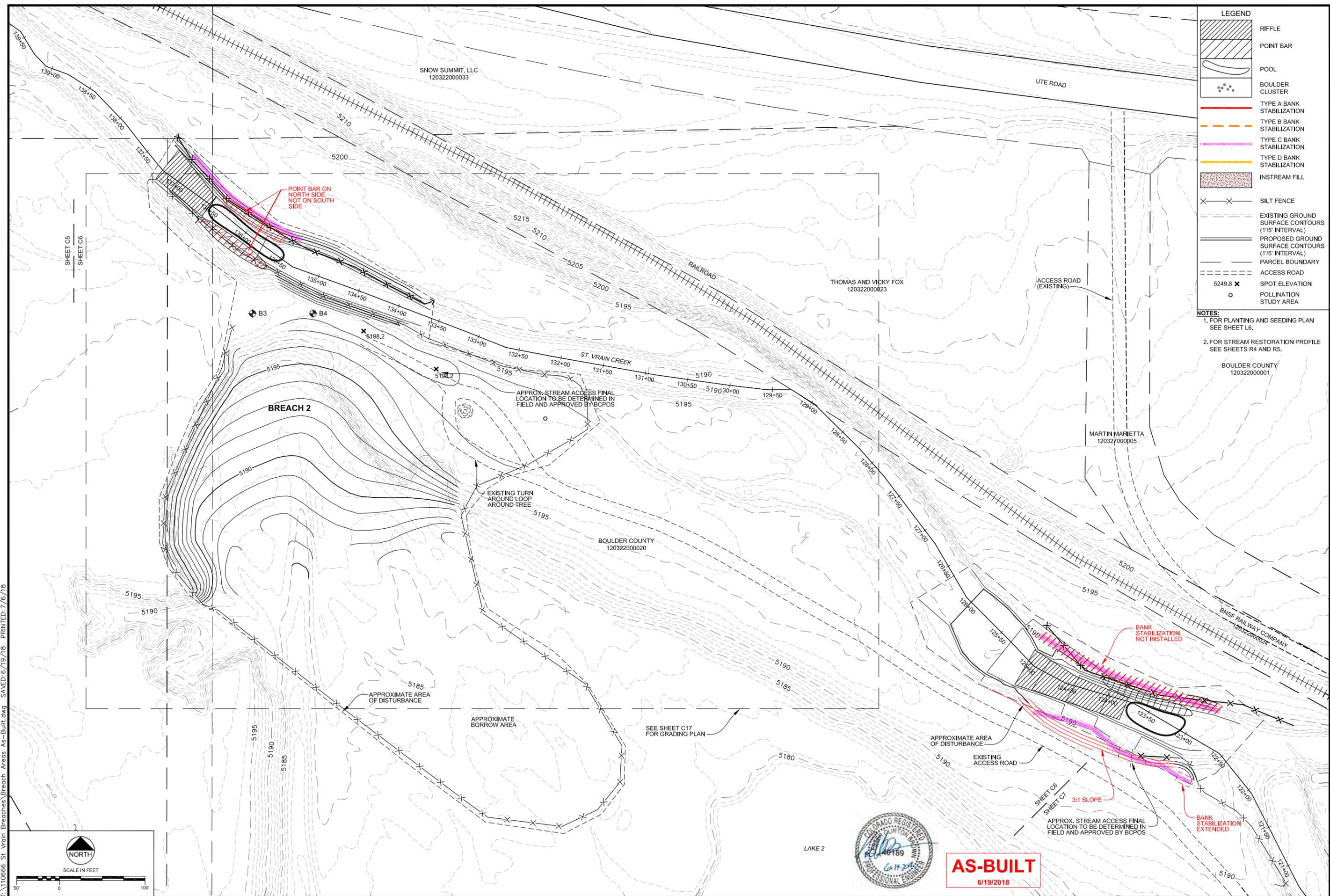
**ST. VRAIN CREEK REACH 3
 GRADING SITE PLAN
 STA 139+00 TO 154+00
 NO WORK PROPOSED**

| | |
|--|--------------------|
| SCALE VERIFICATION: 0 = 1" = 100' | |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | |
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No. | 110666 |
| Date: | September 19, 2017 |
| SHEET C5 | |

AS-BUILT
6/19/2018



I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg. SAVED: 6/19/18. PRINTED: 7/6/18



LEGEND

| | |
|----------------------|--|
| [Hatched Box] | RIFFLE |
| [Hatched Box] | POINT BAR |
| [Wavy Line] | POOL |
| [Dotted Box] | BOULDER CLUSTER |
| [Red Line] | TYPE A BANK STABILIZATION |
| [Orange Dashed Line] | TYPE B BANK STABILIZATION |
| [Pink Dashed Line] | TYPE C BANK STABILIZATION |
| [Yellow Dashed Line] | TYPE D BANK STABILIZATION |
| [Stippled Box] | INSTREAM FILL |
| [X-X] | SILT FENCE |
| [Dashed Line] | EXISTING GROUND SURFACE CONTOURS (1'5" INTERVAL) |
| [Solid Line] | PROPOSED GROUND SURFACE CONTOURS (1'5" INTERVAL) |
| [Dashed Line] | PARCEL BOUNDARY |
| [Dashed Line] | ACCESS ROAD |
| [5249.8 X] | SPOT ELEVATION |
| [O] | POLLINATION STUDY AREA |

NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L6.
 2. FOR STREAM RESTORATION PROFILE SEE SHEETS R4 AND R5.

REVISIONS

| Revision | Date | Description |
|----------|-----------|-------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 6/19/2018 | As-Built Conditions |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

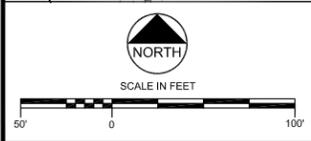
ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
STA 122+50 TO 139+00

SCALE VERIFICATION:
 0 1" = 1'
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

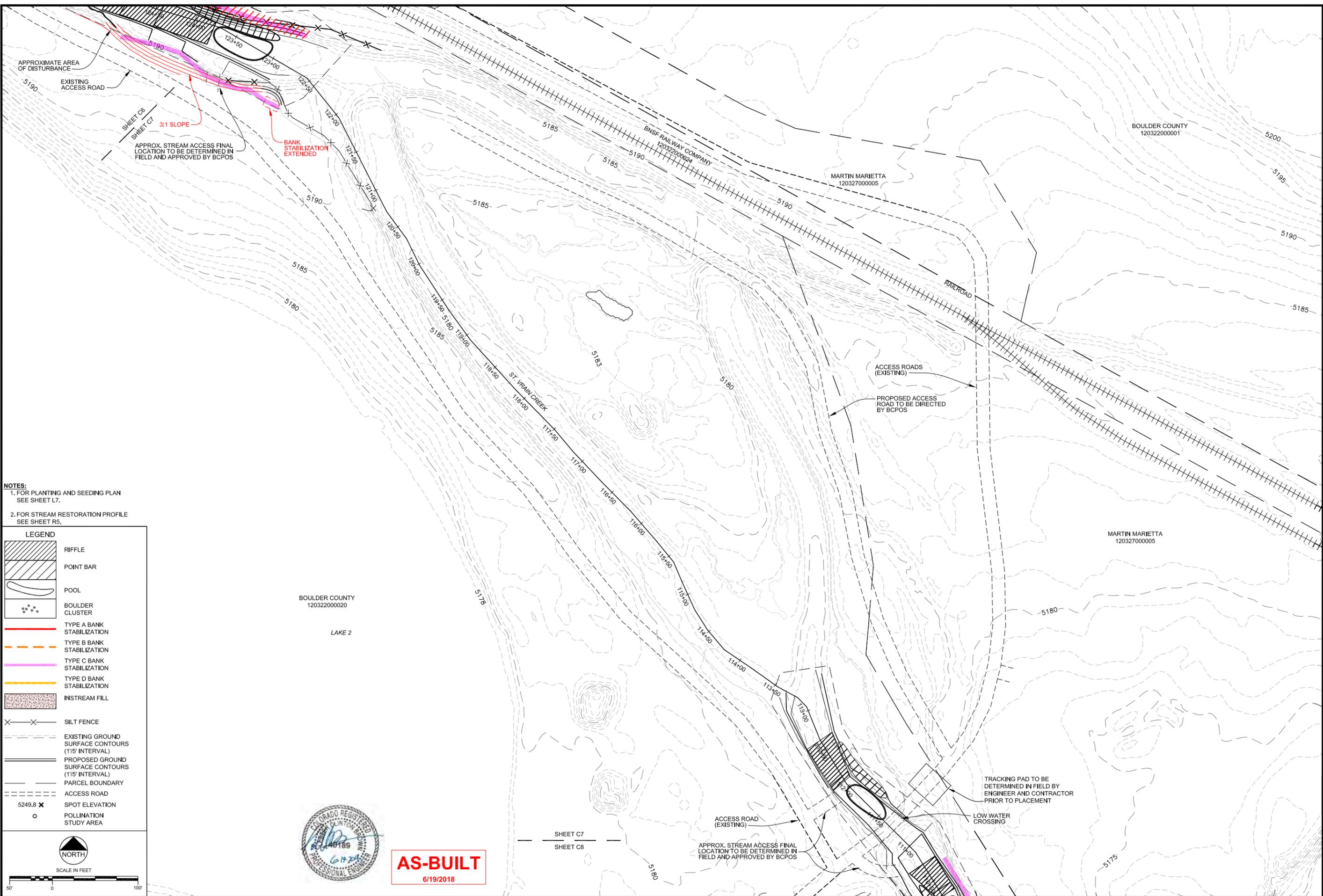
| | |
|--------------|--------------------|
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No.: | 110666 |
| Date: | September 19, 2017 |

SHEET C6

I:\110666 St. Vrain Breaches\Breaches As-Built.dwg, SAVED: 6/19/18, PRINTED: 7/6/18

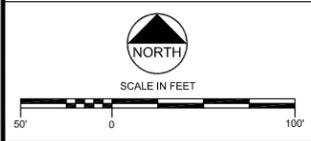


AS-BUILT
 6/19/2018



NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L7.
 2. FOR STREAM RESTORATION PROFILE SEE SHEET R5.

| LEGEND | |
|--------|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |



AS-BUILT
6/19/2018

| REVISIONS | | |
|-----------|-----------|-------------------------------|
| Revision | Date | Description |
| 1 | 6/19/2018 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
 STA 111+00 TO 122+50

| | |
|--|--------------------|
| SCALE VERIFICATION: 0 = 1" = 1' | |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | |
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No. | 110666 |
| Date: | September 19, 2017 |
| SHEET C7 | |

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg - SAVED: 6/19/18 - PRINTED: 7/6/18



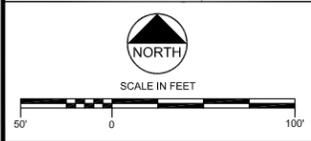
LEGEND

| | |
|--|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1'5" INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1'5" INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |

NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L8.
 2. FOR STREAM RESTORATION PROFILE SEE SHEET R6.



AS-BUILT
6/19/2018



REVISIONS

| Revision | Date | Description |
|----------|-----------|-------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.
 8600 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

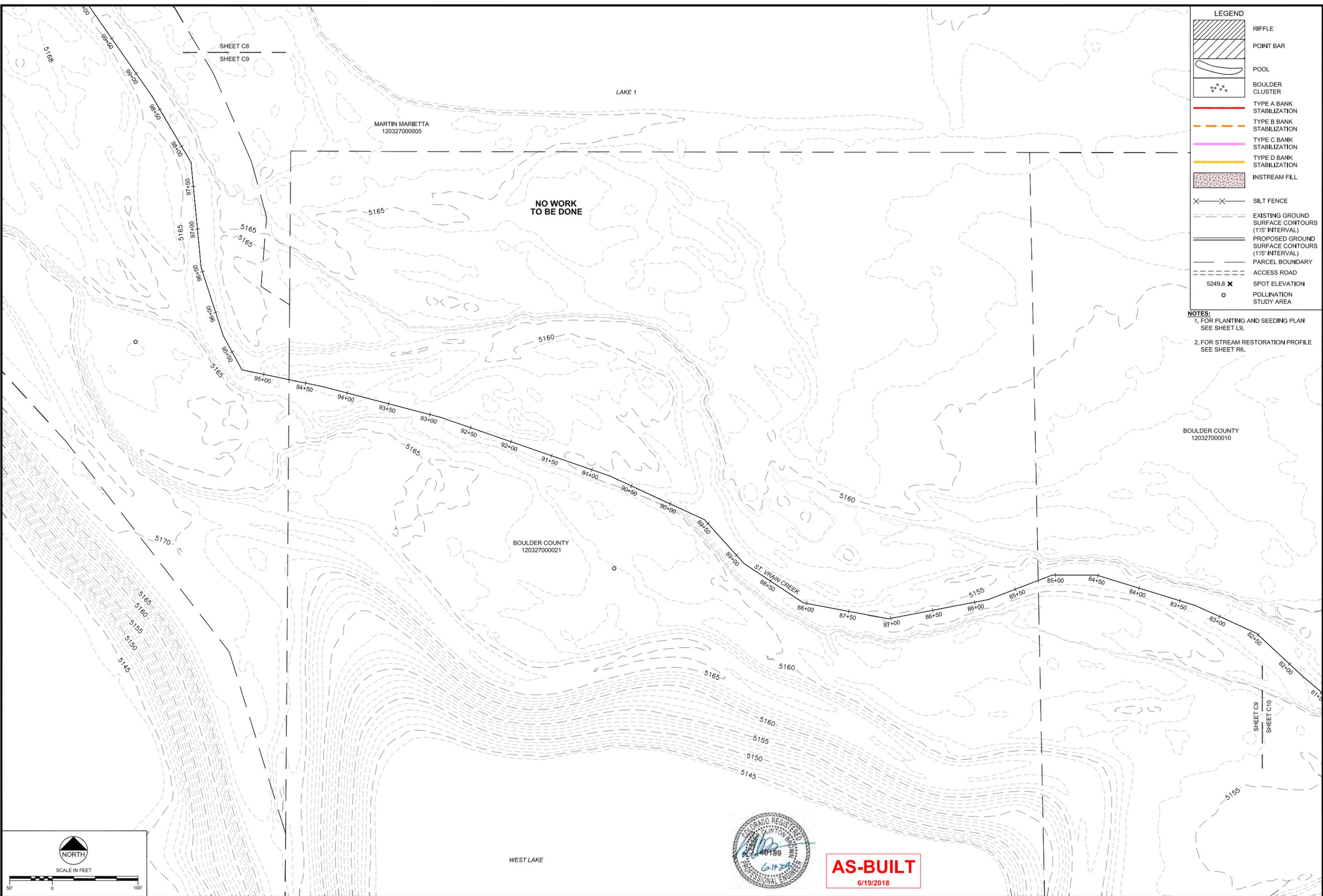
ST. VRAIN CREEK REACH 3
 GRADING SITE PLAN
 STA 99+00 TO 111+00

SCALE VERIFICATION:
 0" = 1' -
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

| | |
|--------------|--------------------|
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No.: | 110666 |
| Date: | September 19, 2017 |

SHEET C8

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg, SAVED: 6/19/18, PRINTED: 7/6/18



LEGEND

| | |
|--|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |

NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L9.
 2. FOR STREAM RESTORATION PROFILE SEE SHEET R6.

REVISIONS

| Revision | Date | Description |
|----------|-----------|---------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Revised for As-Built Conditions |

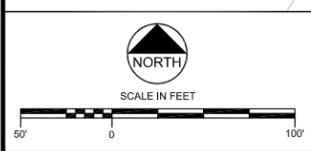
Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

**ST. VRAIN CREEK REACH 3
 GRADING SITE PLAN
 STA 82+50 TO 99+00
 NO WORK PROPOSED**

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

| | |
|--------------|--------------------|
| Drawn by: | RDP |
| Designed by: | LCB |
| Checked by: | LCB |
| Scale: | As Shown |
| Project No. | 110666 |
| Date: | September 19, 2017 |

SHEET **C9**



AS-BUILT
6/19/2018

WEST LAKE

MARTIN MARIETTA
120327000005

NO WORK TO BE DONE

BOULDER COUNTY
120327000010

BOULDER COUNTY
120327000021

ST. VRAIN CREEK
88+50



AS-BUILT
6/19/2018

LAURA LICHTER
120327000017

FOOTHILLS RESERVOIR
OUTLET CANAL

BOULDER COUNTY
120327000010

MATT CONDON / LINDA DUNLAP
120327000018

OLIGARCHY IRRIGATION CO.
120327000004

GLODE POND

63RD STREET

63RD STREET BRIDGE

61ST STREET

NOTE:
STREAM EDGE RESTORATION
ACTIVITY UNDERWAY BY
OTHERS AT BREACH 4 NOT
INCLUDED IN THIS PROJECT

BANK
STABILIZATION
NOT INSTALLED

SHEET C10
SHEET C11

- NOTES:**
- FOR PLANTING AND SEEDING PLAN
SEE SHEET L10.
 - FOR STREAM RESTORATION PROFILE
SEE SHEET R7.

LEGEND

- RIFFLE
- POINT BAR
- POOL
- BOULDER CLUSTER
- TYPE A BANK STABILIZATION
- TYPE B BANK STABILIZATION
- TYPE C BANK STABILIZATION
- TYPE D BANK STABILIZATION
- INSTREAM FILL
- SILT FENCE
- EXISTING GROUND SURFACE CONTOURS (1'/5' INTERVAL)
- PROPOSED GROUND SURFACE CONTOURS (1'/5' INTERVAL)
- PARCEL BOUNDARY
- ACCESS ROAD
- 5249.8 x SPOT ELEVATION
- POLLINATION STUDY AREA

NORTH

SCALE IN FEET

A-FRAME

REVISIONS

| Revision | Date | Description |
|----------|-----------|-------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Boulder, CO 80502
(970) 488-3111

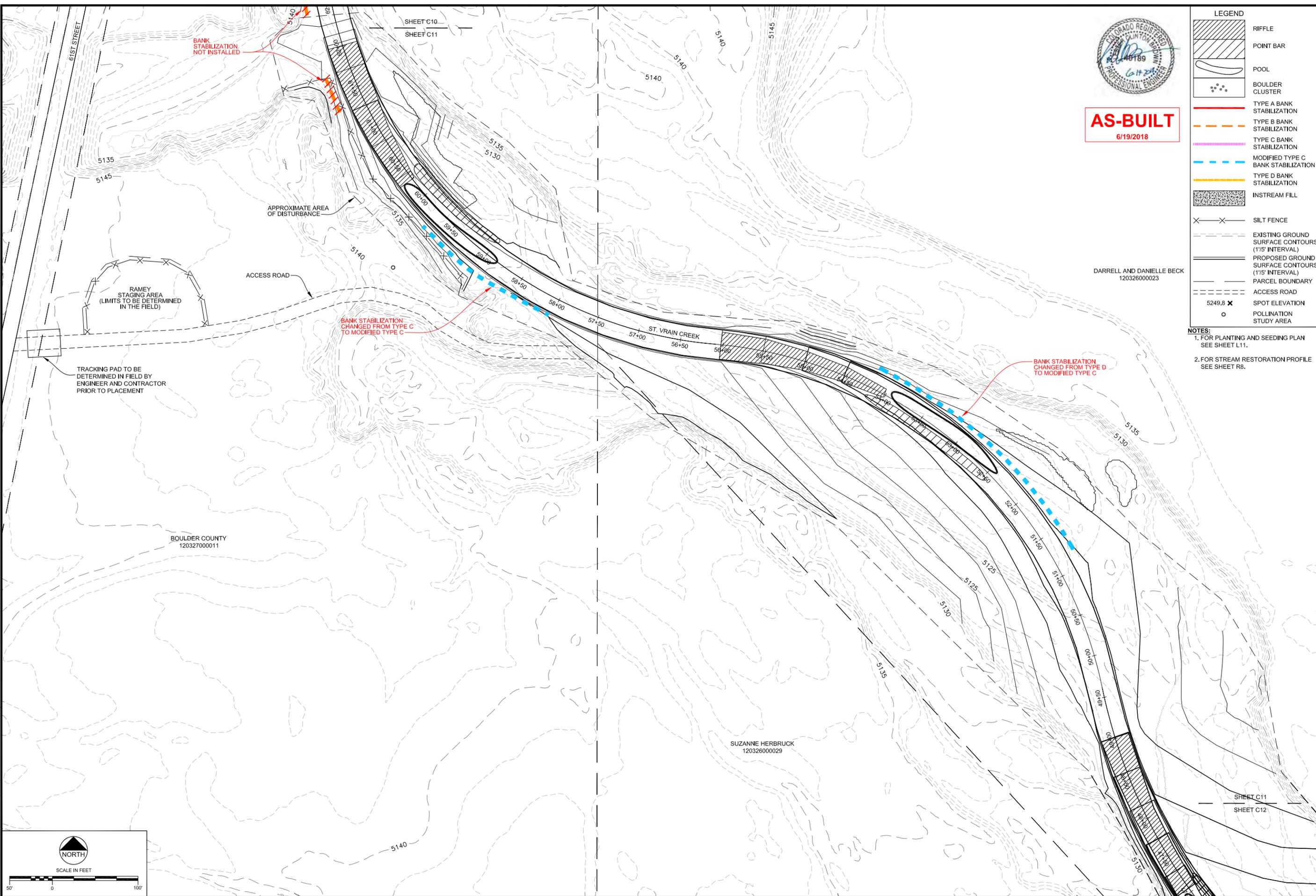
**ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
STA 62+00 TO 82+50**

SCALE VERIFICATION:
0 1" = 1'
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.

Drawn by: RDP
Designed by: LCB
Checked by: LCB
Scale: As Shown
Project No. 110666
Date: September 19, 2017
SHEET **C10**

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg, SAVED: 6/19/18, PRINTED: 7/6/18

I:\110666 St. Vrain Breaches\Breaches As-Built.dwg - Saved: 6/19/18 - PRINTED: 7/6/18



AS-BUILT
6/19/2018

LEGEND

| | |
|--|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | MODIFIED TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |

NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L11.
 2. FOR STREAM RESTORATION PROFILE SEE SHEET R6.

REVISIONS

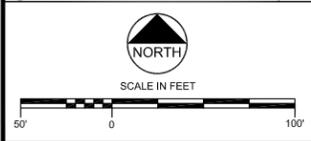
| Revision | Date | Description |
|----------|-----------|-------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | As-Built Conditions |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Boulder, CO 80525
 (970) 488-3111

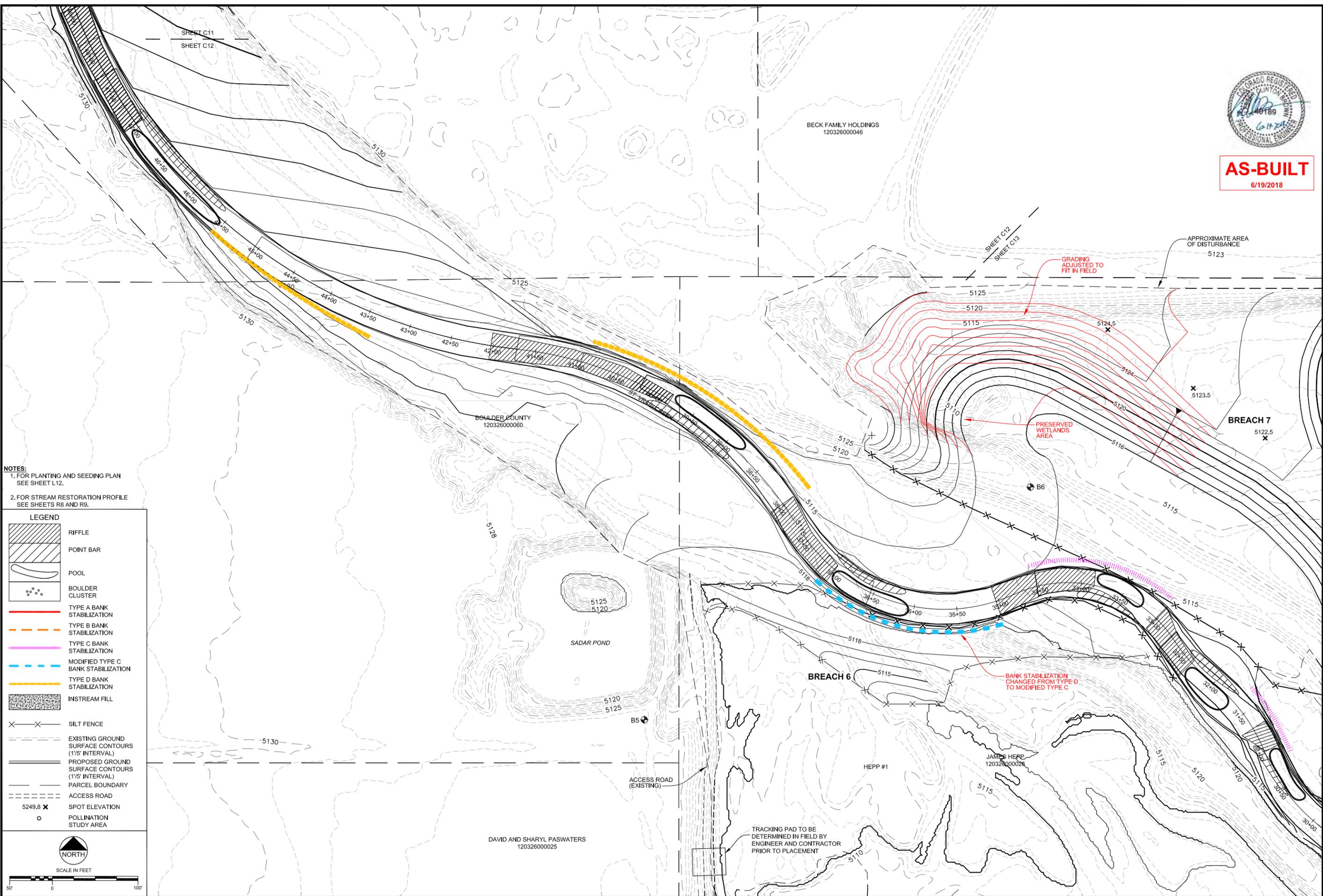
**ST. VRAIN CREEK REACH 3
 GRADING SITE PLAN
 STA 48+00 TO 62+00**

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: RDP
 Designed by: LCB
 Checked by: LCB
 Scale: As Shown
 Project No. 110666
 Date: September 19, 2017



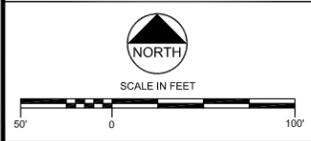
SHEET C11



AS-BUILT
6/19/2018

- NOTES:**
1. FOR PLANTING AND SEEDING PLAN SEE SHEET L12.
 2. FOR STREAM RESTORATION PROFILE SEE SHEETS R8 AND R9.

| LEGEND | |
|--------|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | MODIFIED TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |

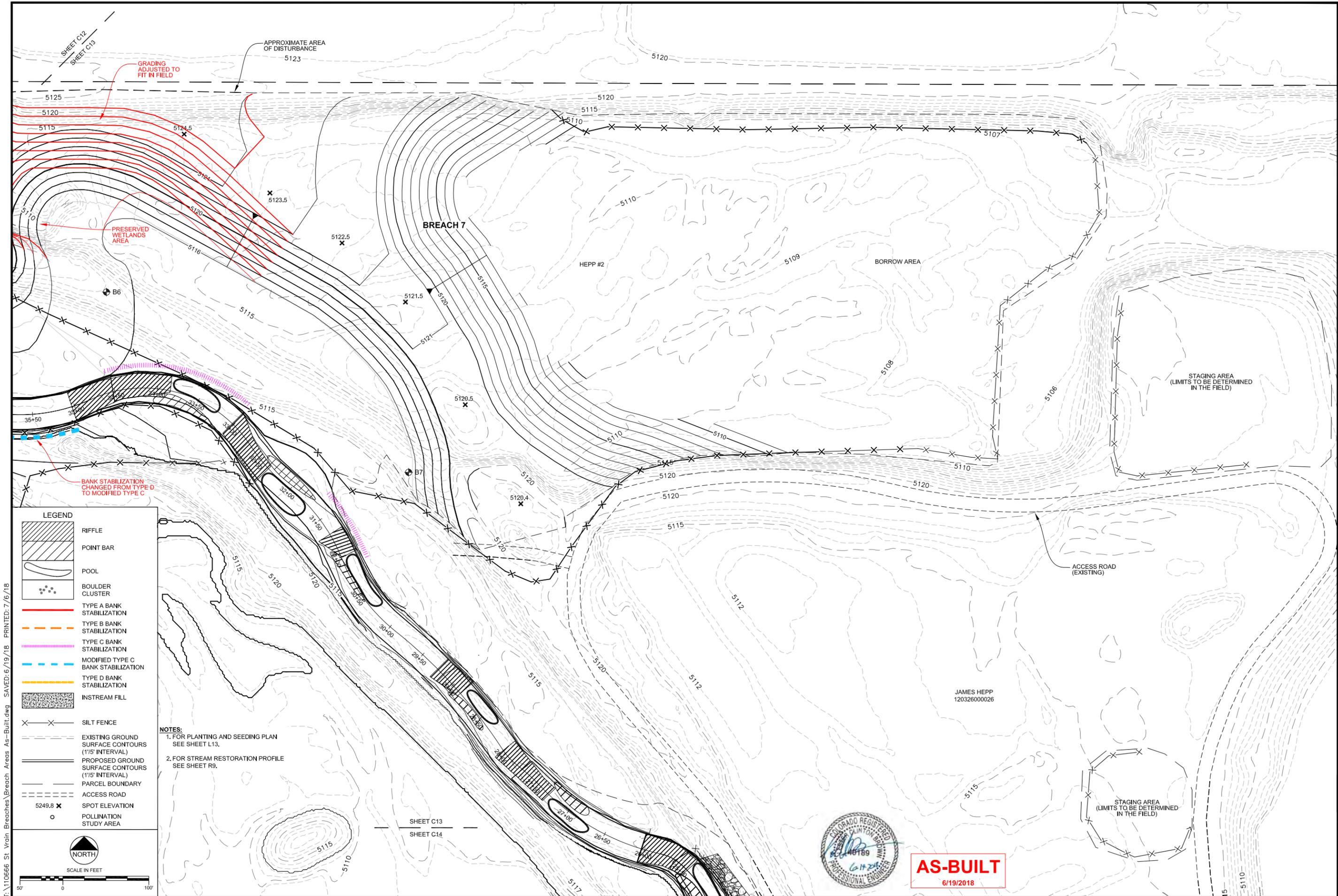


| REVISIONS | |
|-----------|-------------------------------|
| Revision | Description |
| 1 | Issued for Construction |
| 2 | Based for As-Built Conditions |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Denver, CO 80202
(303) 488-3111

ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
STA 35+00 TO 48+00

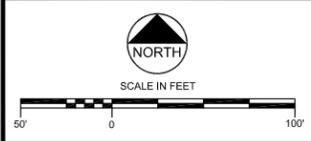
| | | |
|--|--------------------|----|
| SCALE VERIFICATION: | 0 | 1" |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | | |
| Drawn by: | RDP | |
| Designed by: | LCB | |
| Checked by: | LCB | |
| Scale: | As Shown | |
| Project No. | 110666 | |
| Date: | September 19, 2017 | |
| SHEET | C12 | |



I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg - SAVED: 6/19/18 - PRINTED: 7/6/18

| LEGEND | |
|--------|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | MODIFIED TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1'5" INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1'5" INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | SPOT ELEVATION |
| | POLLINATION STUDY AREA |

NOTES:
 1. FOR PLANTING AND SEEDING PLAN SEE SHEET L13.
 2. FOR STREAM RESTORATION PROFILE SEE SHEET R9.



SHEET C13
SHEET C14



AS-BUILT
6/19/2018

| REVISIONS | | |
|-----------|-----------|--------------------------------|
| Revision | Date | Description |
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Issued for As-Built Conditions |

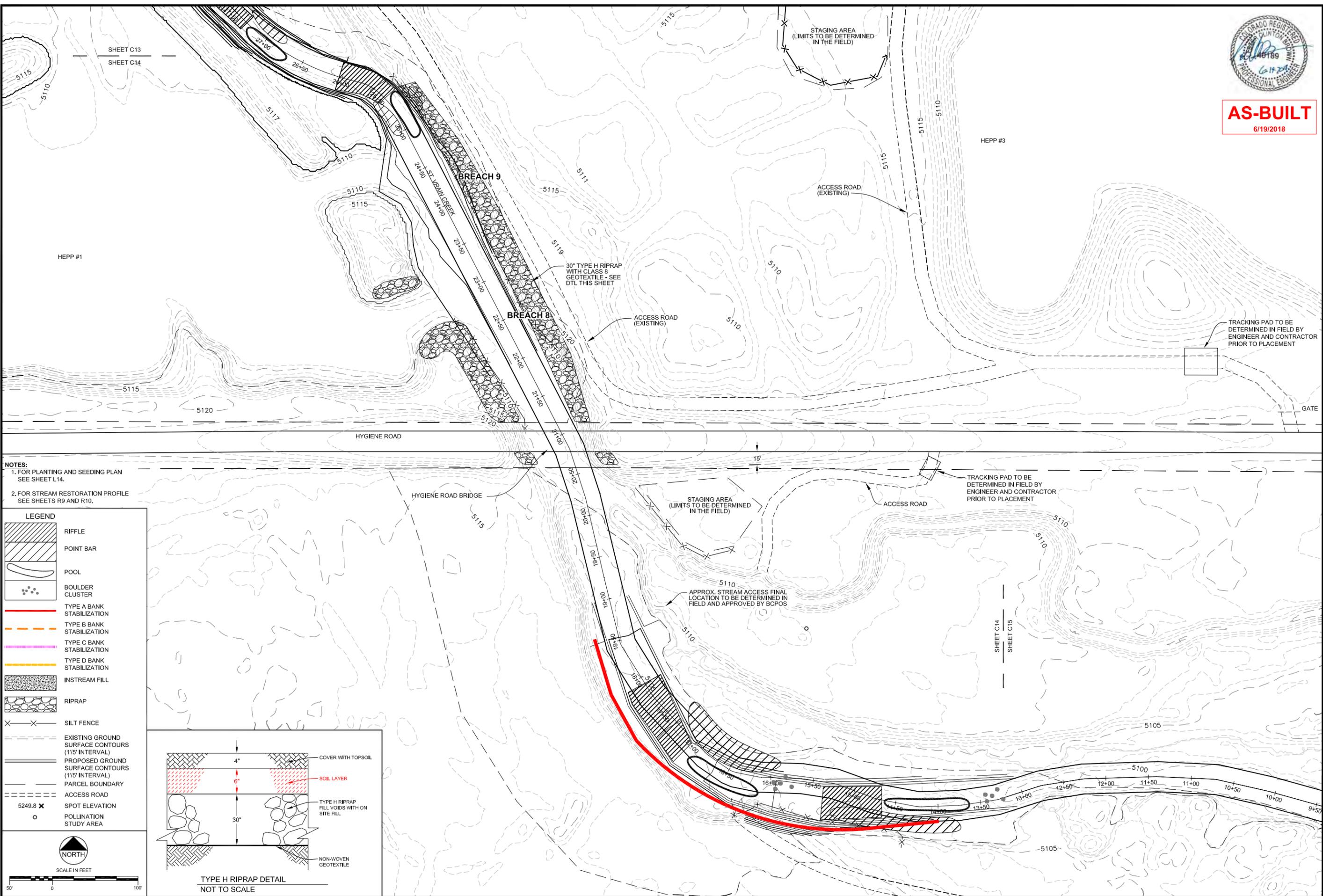
EA Engineering Analytics, Inc.
 8600 Speer Point Road, Suite 209
 Denver, CO 80225
 (970) 488-3111

ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
 STA 26+50 TO 35+00

| |
|--|
| SCALE VERIFICATION: 0 = 1" = 100' |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. |
| Drawn by: RDP |
| Designed by: LCB |
| Checked by: LCB |
| Scale: As Shown |
| Project No. 110666 |
| Date: September 19, 2017 |
| SHEET C13 |

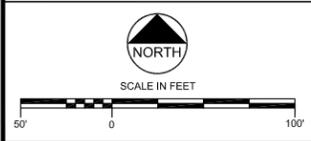
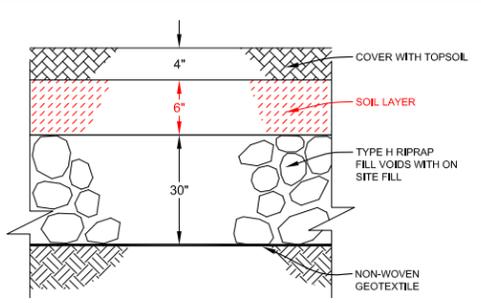


AS-BUILT
6/19/2018



NOTES:
1. FOR PLANTING AND SEEDING PLAN SEE SHEET L14.
2. FOR STREAM RESTORATION PROFILE SEE SHEETS R9 AND R10.

| LEGEND | |
|--------|--|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | INSTREAM FILL |
| | RIPRAP |
| | SILT FENCE |
| | EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL) |
| | PARCEL BOUNDARY |
| | ACCESS ROAD |
| | 5249.8 X SPOT ELEVATION |
| | POLLINATION STUDY AREA |



| Revision | Date | Description |
|----------|------------|-------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 10/20/2017 | Revised per LU comments |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Denver, CO 80202
(970) 488-3111

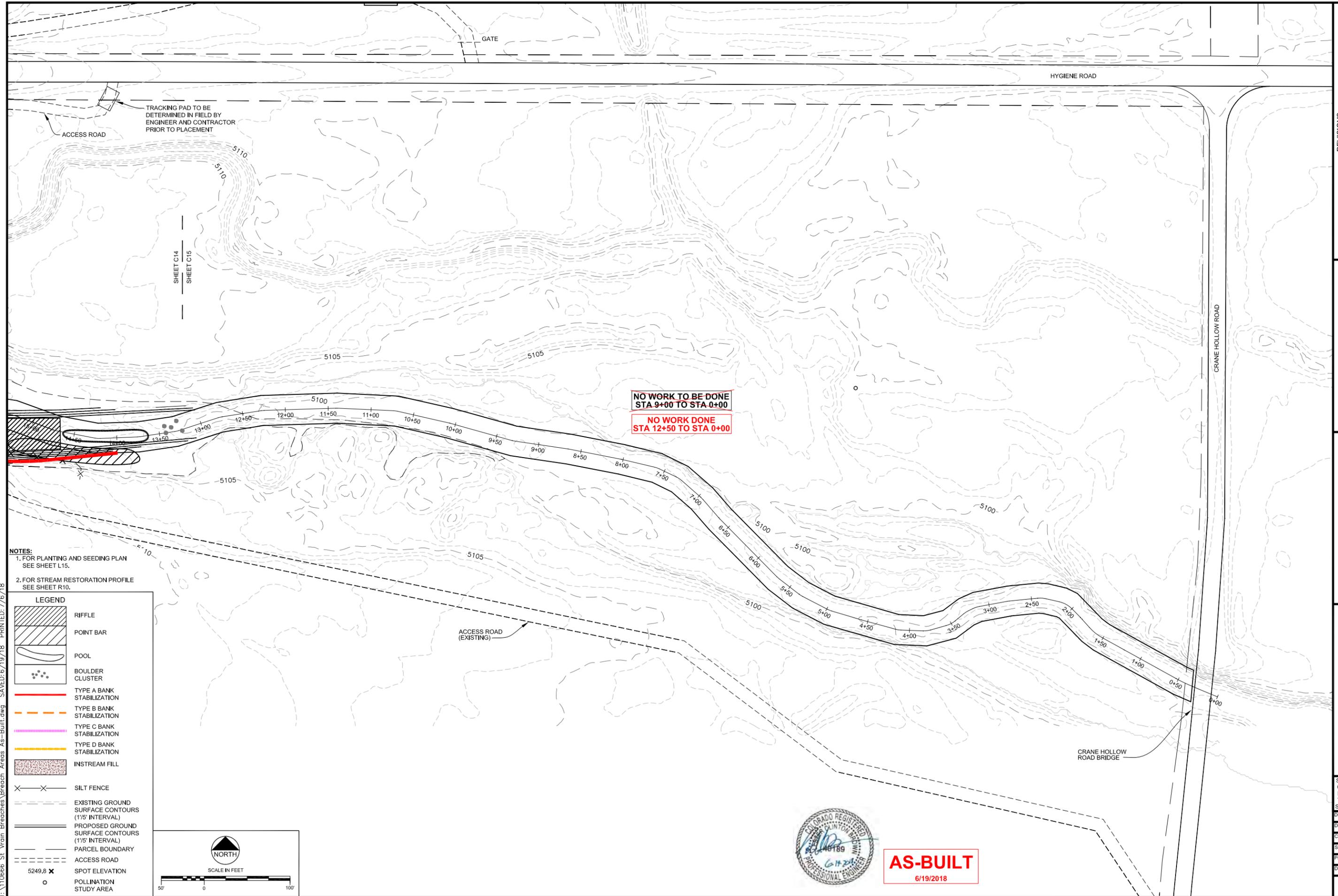
ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
13+50 TO 26+50

SCALE VERIFICATION:
0 = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.

Drawn by: RDP
Designed by: LCB
Checked by: LCB
Scale: As Shown
Project No. 110666
Date: September 19, 2017

SHEET **C14**

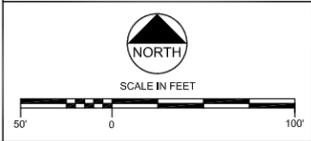
I:\110666 St. Vrain Breaches\Breaches As-Built.dwg - Saved: 6/19/18 - PRINTED: 7/6/18



NOTES:
 1. FOR PLANTING AND SEEDING PLAN
 SEE SHEET L15.
 2. FOR STREAM RESTORATION PROFILE
 SEE SHEET R10.

LEGEND

- RIFFLE
- POINT BAR
- POOL
- BOULDER CLUSTER
- TYPE A BANK STABILIZATION
- TYPE B BANK STABILIZATION
- TYPE C BANK STABILIZATION
- TYPE D BANK STABILIZATION
- INSTREAM FILL
- SILT FENCE
- EXISTING GROUND SURFACE CONTOURS (1/5' INTERVAL)
- PROPOSED GROUND SURFACE CONTOURS (1/5' INTERVAL)
- PARCEL BOUNDARY
- ACCESS ROAD
- 5249.8 SPOT ELEVATION
- POLLINATION STUDY AREA



**NO WORK TO BE DONE
 STA 9+00 TO STA 0+00**

**NO WORK DONE
 STA 12+50 TO STA 0+00**



AS-BUILT
 6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|------------|---------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 10/20/2017 | Revised per LU comments |
| | 6/19/2018 | Revised for As-Built Conditions |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Denver, CO 80202
 (303) 488-3111

ST. VRAIN CREEK REACH 3
GRADING SITE PLAN
 STA 0+00 TO STA 13+50

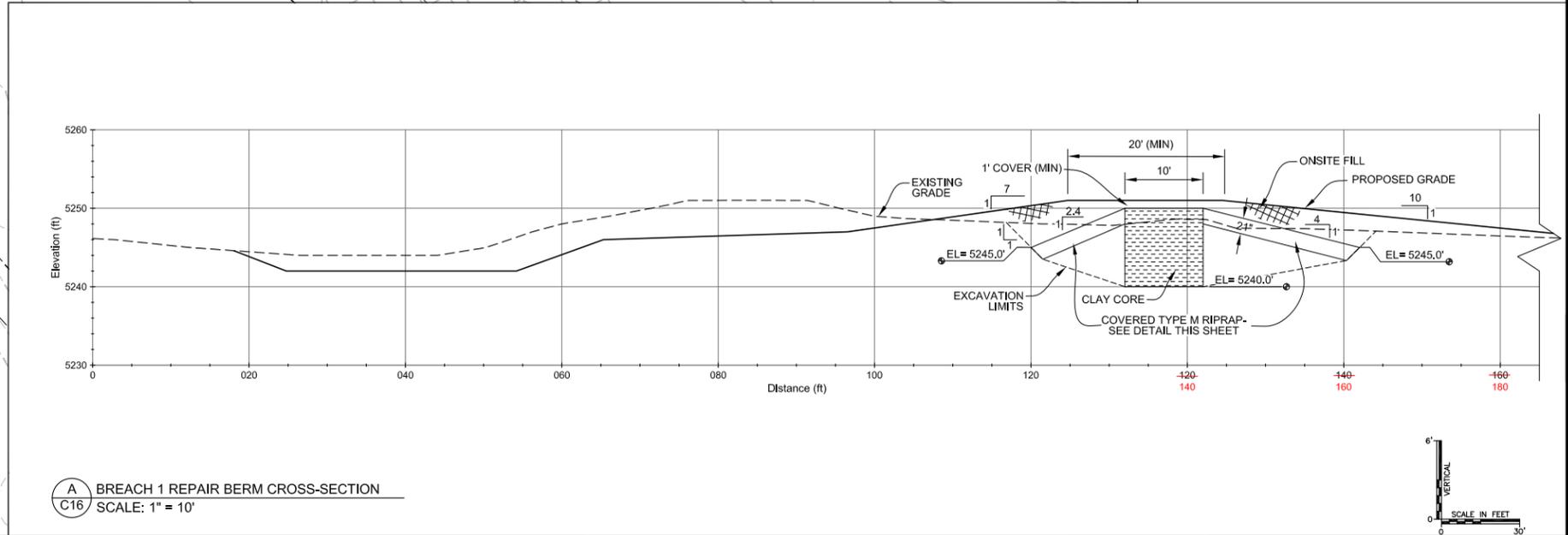
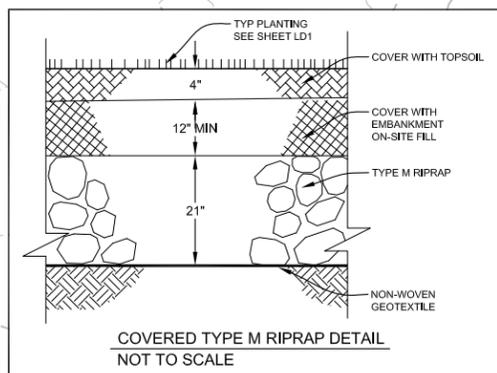
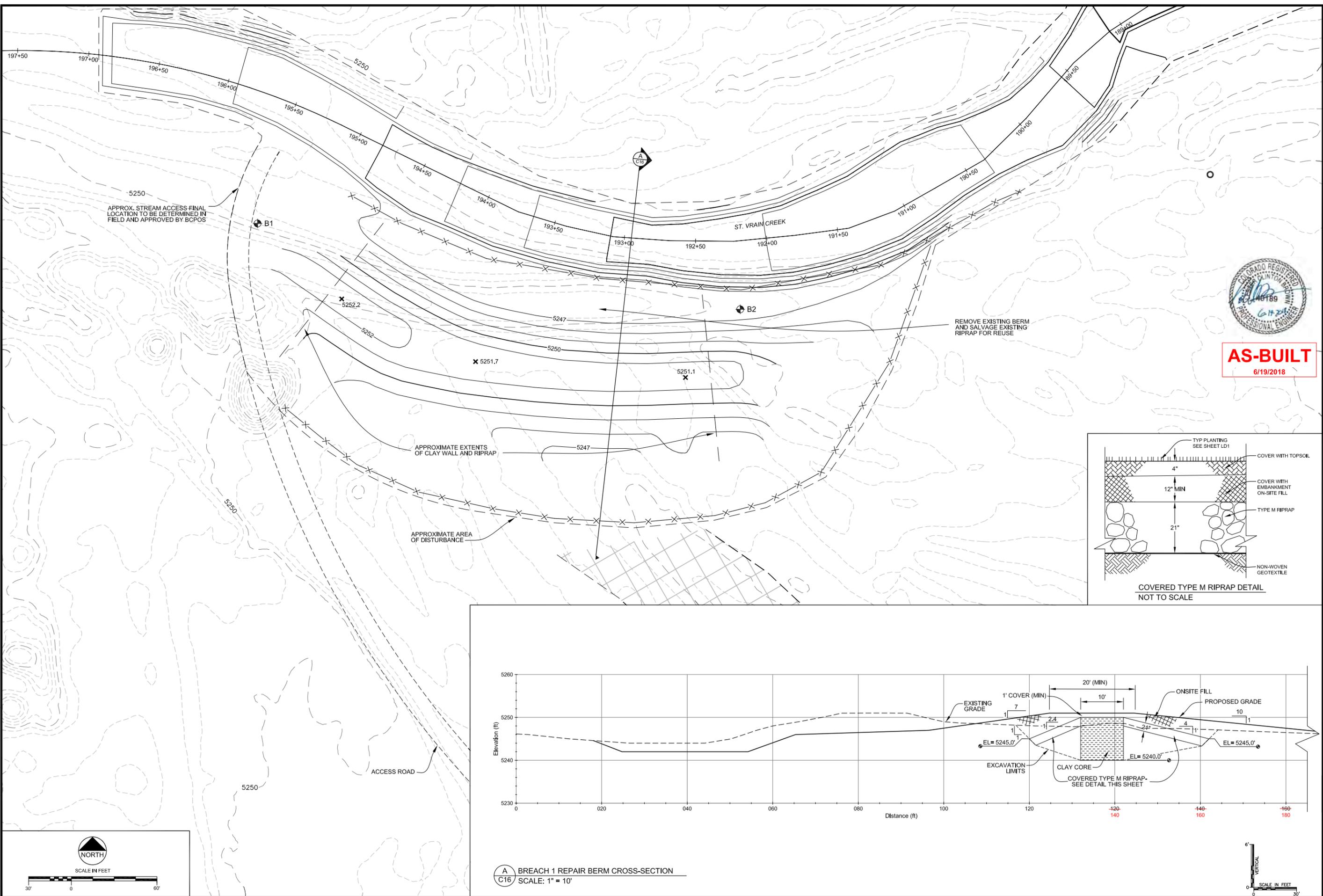
SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON
 THIS SHEET, ADJUST
 SCALE ACCORDINGLY.

Drawn by: RDP
 Designed by: LCB
 Checked by: LCB
 Scale: As Shown
 Project No. 110666
 Date: September 19, 2017

SHEET **C15**

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg, Saved: 6/19/18, PRINTED: 7/6/18

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg - SAVED: 6/19/18 - PRINTED: 7/6/18



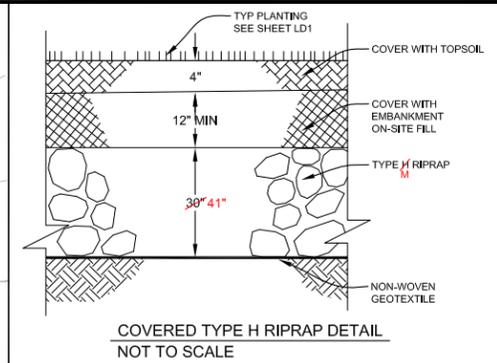
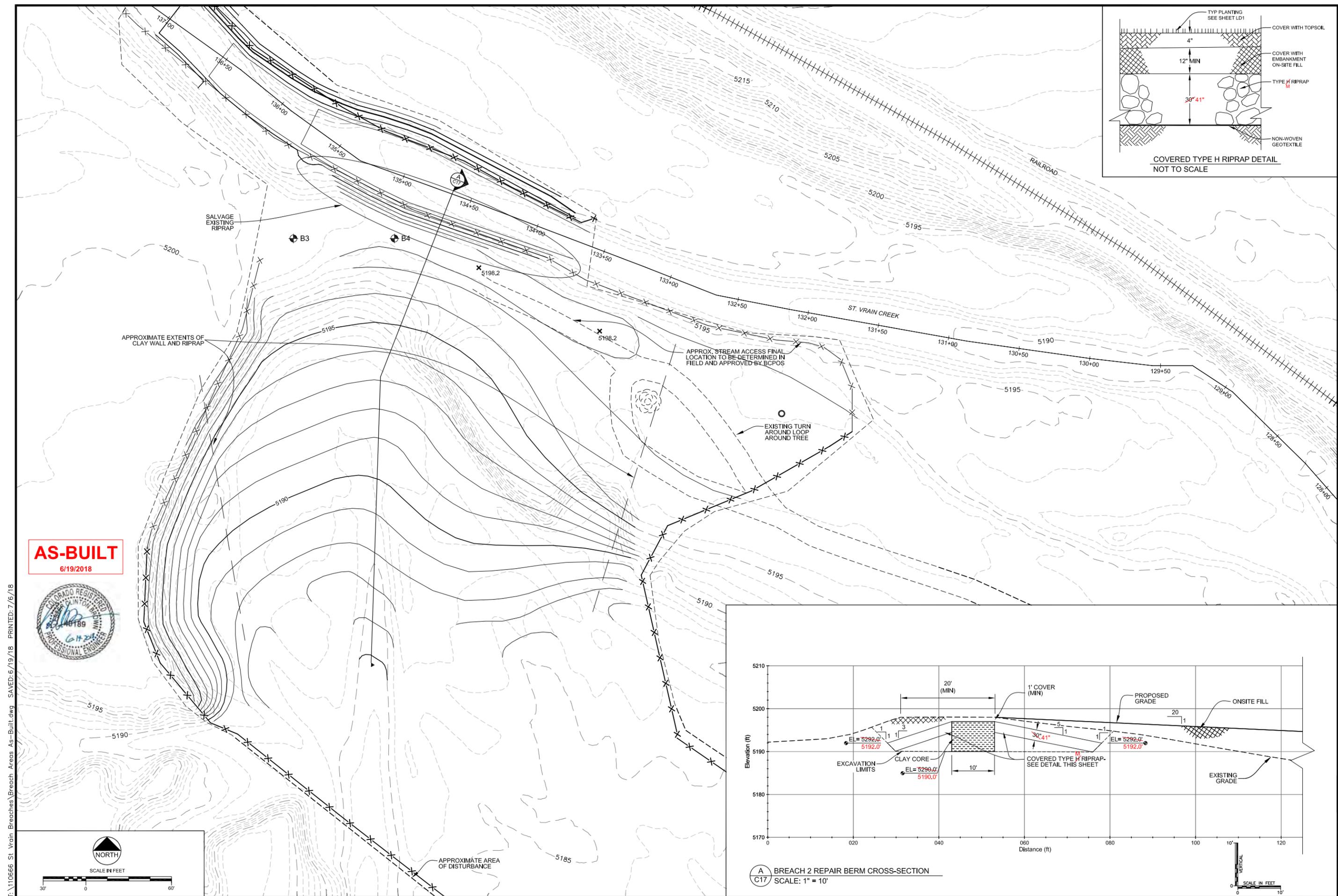
AS-BUILT
6/19/2018

| Revision | Date | Description |
|----------|-----------|-------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

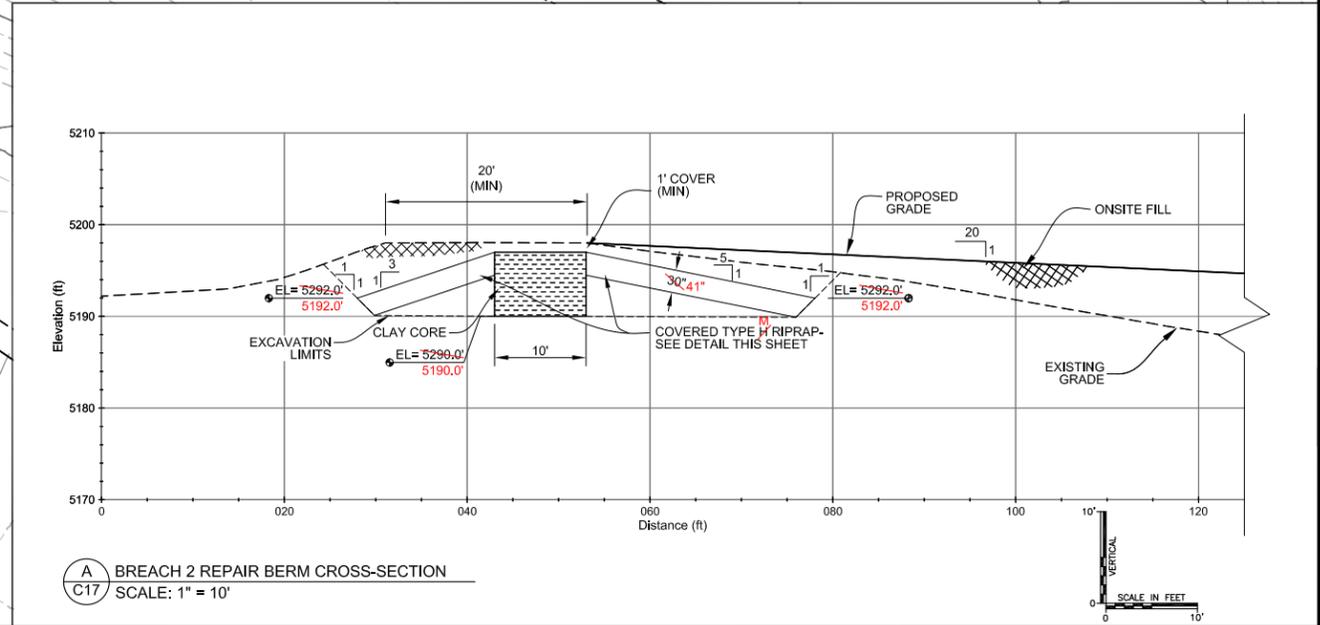
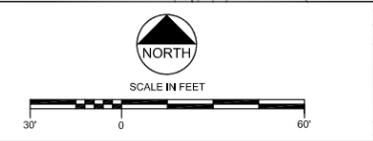
EA Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Denver, CO 80202
(970) 488-3111

ST. VRAIN CREEK REACH 3
BREACH AREA 1
GRADING PLAN

SCALE VERIFICATION:
0 = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.
Drawn by: RDP
Designed by: LCB
Checked by: LCB
Scale: As Shown
Project No. 110666
Date: September 19, 2017
SHEET C16



AS-BUILT
6/19/2018



| REVISIONS | |
|-----------|-------------------------------|
| Revision | Description |
| 1 | Issued for Construction |
| 2 | Based for As-Built Conditions |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Boulder, CO 80525
(970) 488-3111

ST. VRAIN CREEK REACH 3
BREACH AREA 2
GRADING PLAN

SCALE VERIFICATION:
0 = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.
Drawn by: RDP
Designed by: LCB
Checked by: LCB
Scale: As Shown
Project No. 110666
Date: September 19, 2017
SHEET **C17**

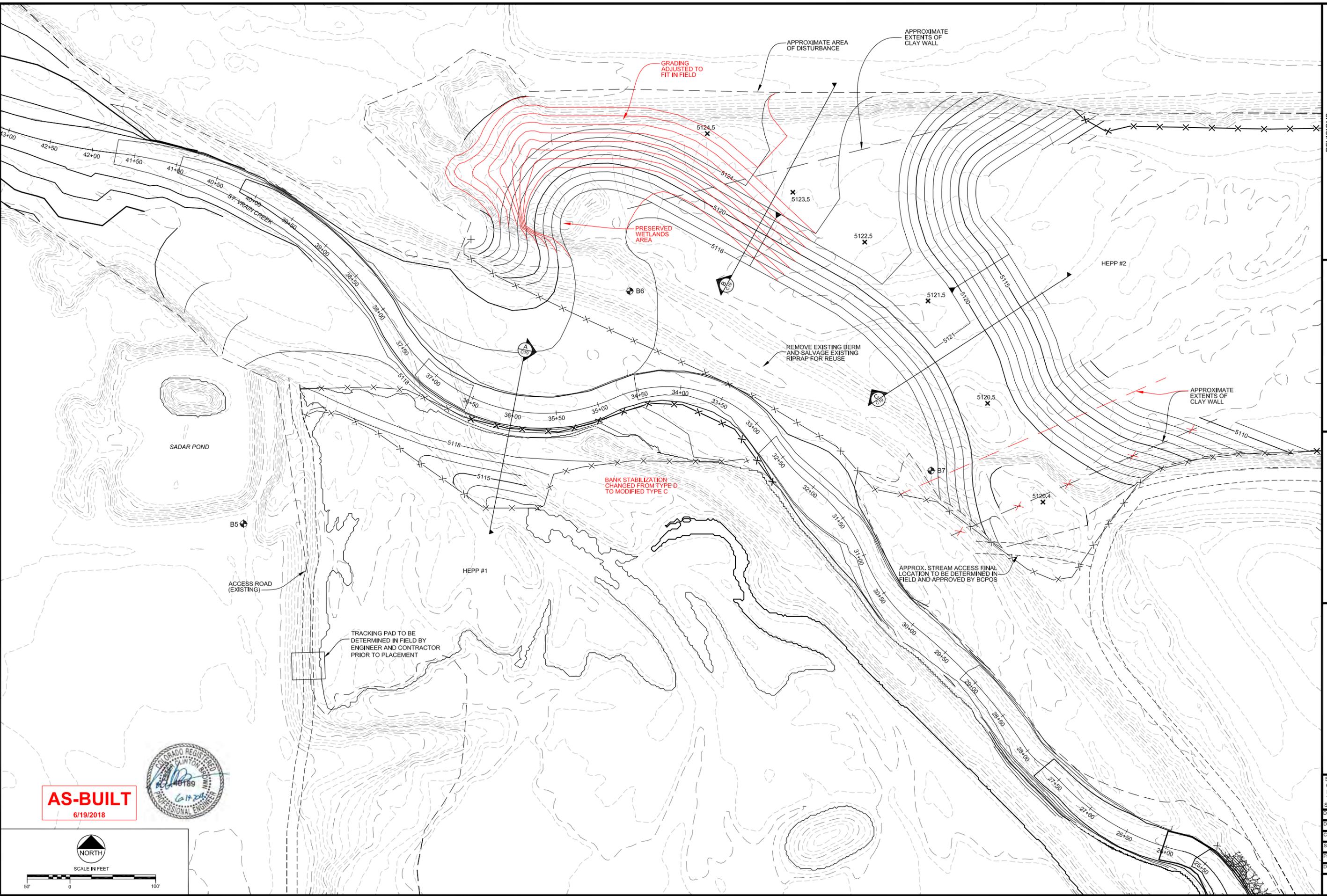
I:\110666 St. Vrain Breaches\Breach Areas As-Built.dwg, Saved: 6/19/18, PRINTED: 7/6/18

I:\110666 St. Vrain Breaches\Breaches Areas As-Built.dwg - SAVED: 6/19/18 - PRINTED: 7/6/18

AS-BUILT
6/19/2018



SCALE IN FEET



REVISIONS

| Revision | Date | Description |
|----------|-----------|-------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Denver, CO 80202
(970) 488-3111

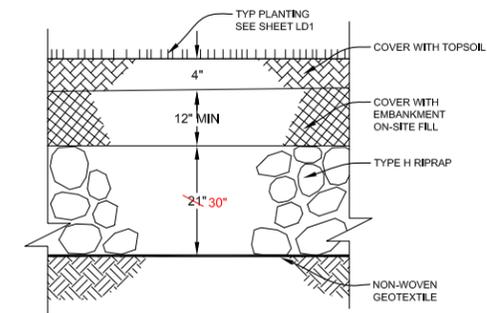
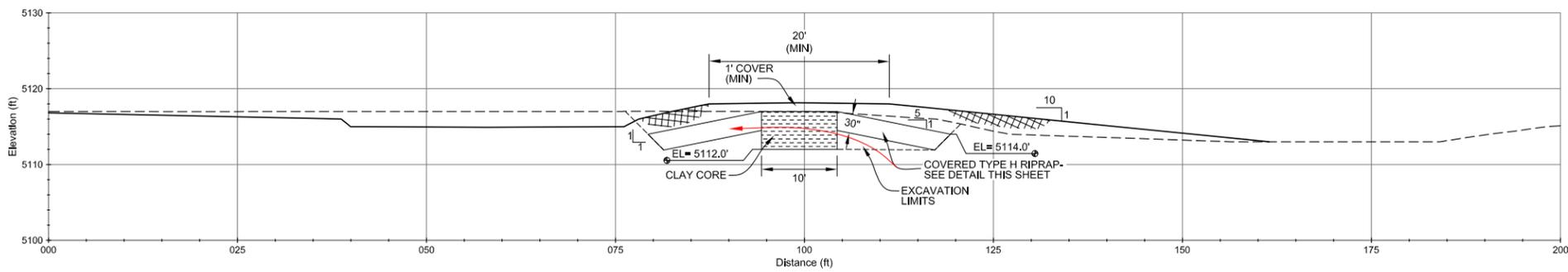


ST. VRAIN CREEK REACH 3
BREACH AREA 5-9
GRADING PLAN

SCALE VERIFICATION:
0 = 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

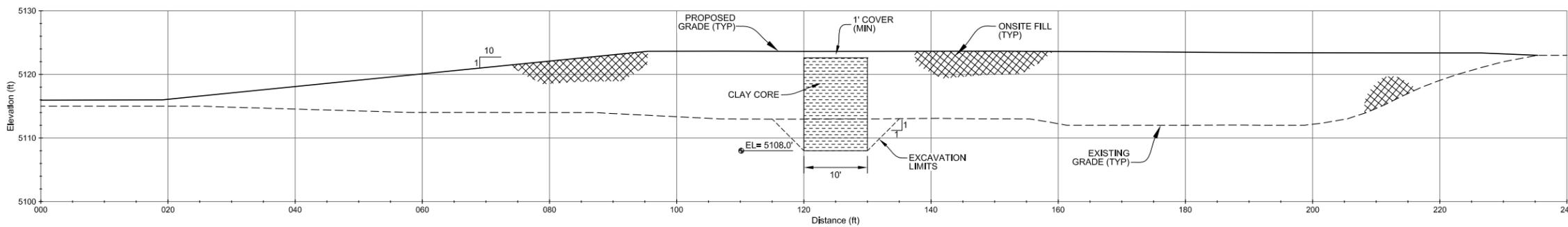
Drawn by: RDP
Designed by: LCB
Checked by: LCB
Scale: As Shown
Project No. 110666
Date: September 19, 2017

SHEET C18

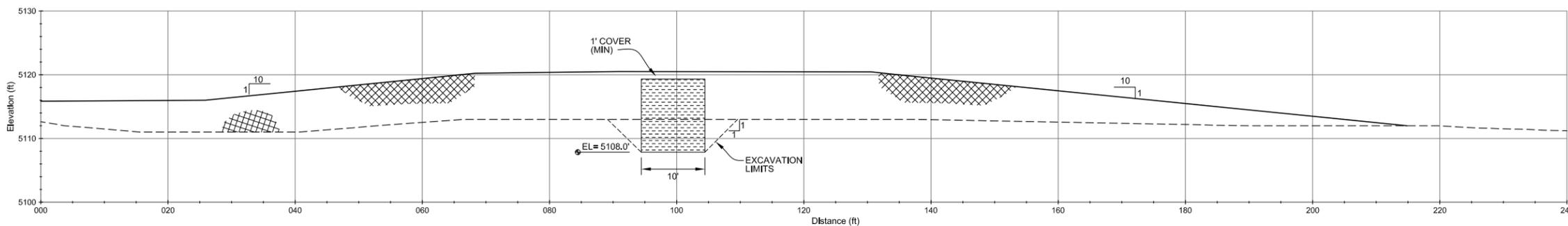


A BREACH 6 REPAIR BERM CROSS-SECTION
C18 SCALE: 1" = 10'

COVERED TYPE H RIPRAP DETAIL
NOT TO SCALE



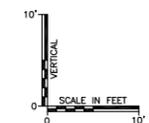
B BREACH 7 REPAIR BERM CROSS-SECTION 1
C18 SCALE: 1" = 10'



C BREACH 7 REPAIR BERM CROSS-SECTION 2
C18 SCALE: 1" = 40'



AS-BUILT
6/19/2018



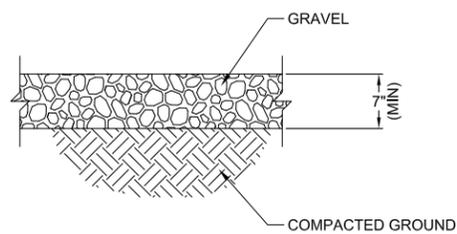
| REVISIONS | |
|-----------|-------------------------------|
| Revision | Description |
| 1 | Issued for Construction |
| | Based for As-Built Conditions |

Engineering Analytics, Inc.
2600 Speer Point Road, Suite 209
Denver, CO 80205
(970) 488-3111

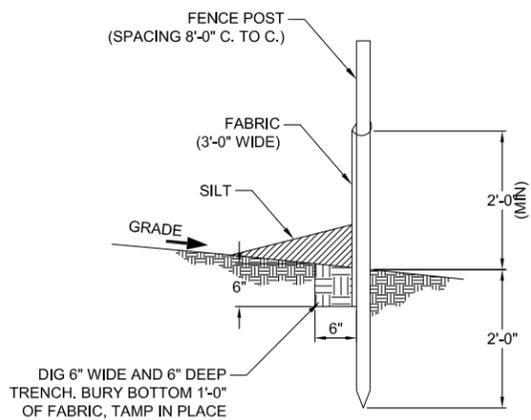
ST. VRAIN CREEK REACH 3
BREACH AREA 5-9
CROSS-SECTIONS

| | | |
|--|--------------------|----|
| SCALE VERIFICATION: | 0 | 1" |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | | |
| Drawn by: | RDP | |
| Designed by: | LCB | |
| Checked by: | LCB | |
| Scale: | As Shown | |
| Project No. | 110666 | |
| Date: | September 19, 2017 | |
| SHEET | C19 | |

I:\110666 St. Vrain Breaches\Breach Areas As-Built.dwg, SAVED: 6/19/18, PRINTED: 7/6/18



✓ TRACKING PAD DETAIL
NTS



✓ SILT FENCE DETAIL
NTS



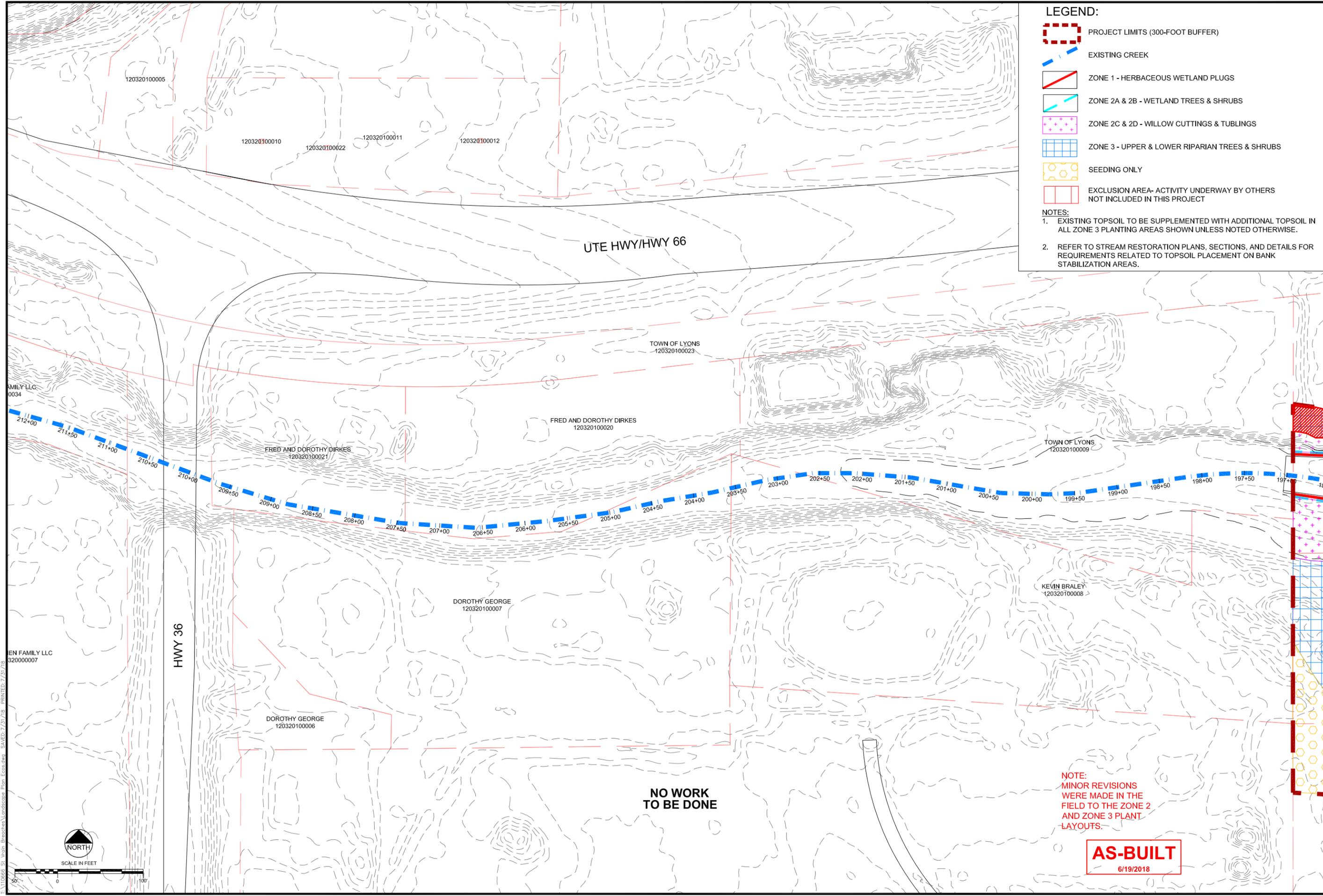
AS-BUILT
6/19/2018

| Revision | Date | Description |
|----------|-----------|-------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| | 6/19/2018 | Based for As-Built Conditions |

Engineering Analytics, Inc.
2600 Speer Point Road, Suite 209
Denver, CO 80225
(970) 488-3111

ST. VRAIN CREEK REACH 3
STANDARD DETAILS

SCALE VERIFICATION:
0 = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.
Drawn by: RDP
Designed by: LCB
Checked by: LCB
Scale: As Shown
Project No. 110666
Date: September 19, 2017
SHEET C20



LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.

EN FAMILY LLC
320000007

HWY 36

SCALE IN FEET

0 50 100

NORTH

REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/11/2018 | Comment Revisions |

Engineering Analytics, Inc.

1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERE, COLORADO 80516
(970) 940-3236

ecos
ecosystem services

ST. VRAIN CREEK REACH 3

PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017

SHEET **L1**

NO WORK TO BE DONE

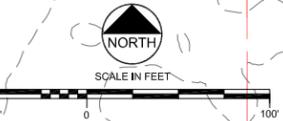
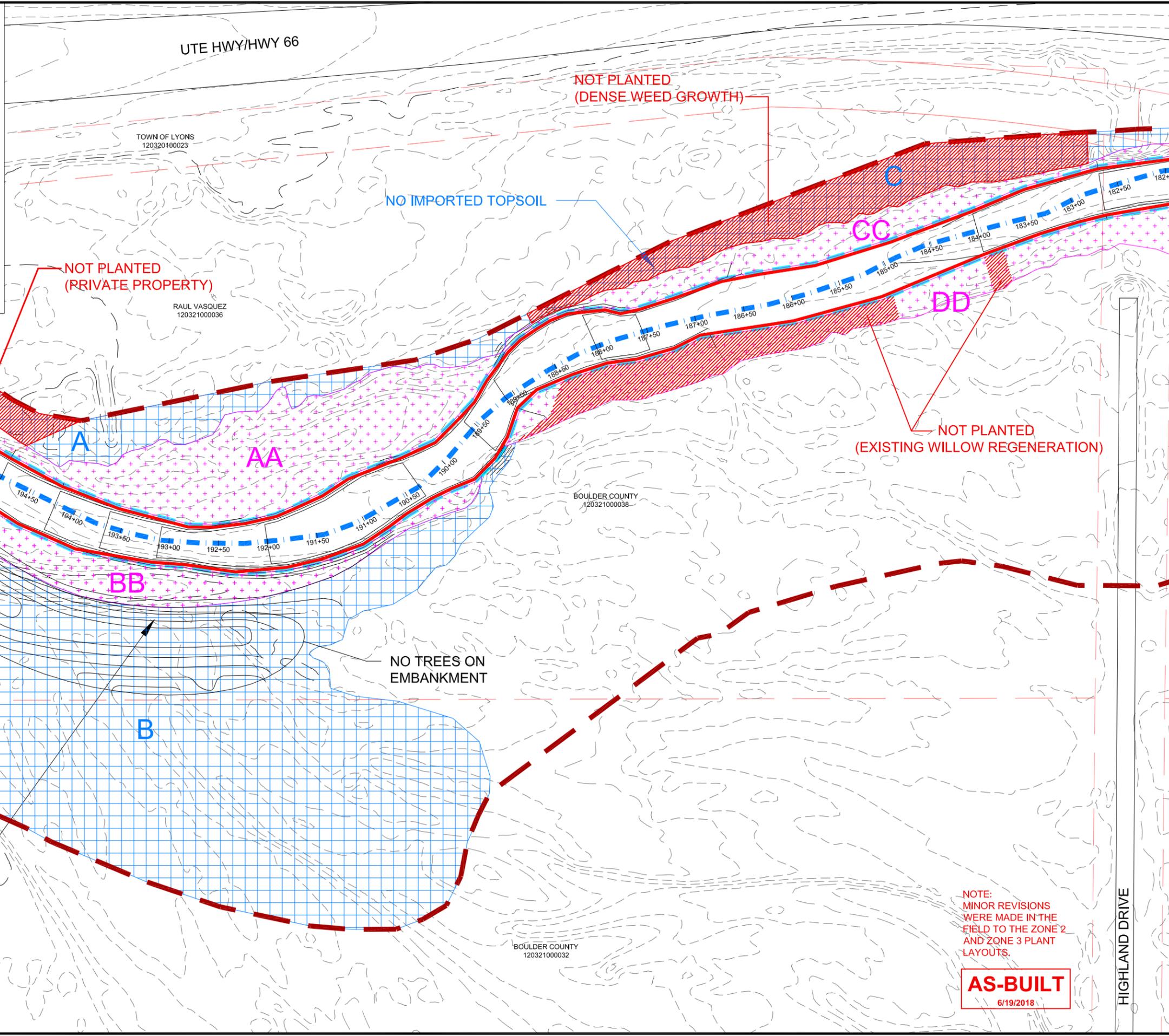
NOTE:
MINOR REVISIONS WERE MADE IN THE FIELD TO THE ZONE 2 AND ZONE 3 PLANT LAYOUTS.

AS-BUILT
6/19/2018

LEGEND:

-  PROJECT LIMITS (300-FOOT BUFFER)
-  EXISTING CREEK
-  ZONE 1 - HERBACEOUS WETLAND PLUGS
-  ZONE 2A & 2B - WETLAND TREES & SHRUBS
-  ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
-  ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
-  SEEDING ONLY
-  EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

- NOTES:**
1. EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
 2. REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.



| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

Engineering Analytics, Inc.
 1600 Speer Point Plaza, Suite 200
 Fort Collins, CO 80525
 (970) 488-3111

1445 WASHBURN STREET
 ERIE, COLORADO 80516
 (970) 948-3236

ecos
 ecosystem services

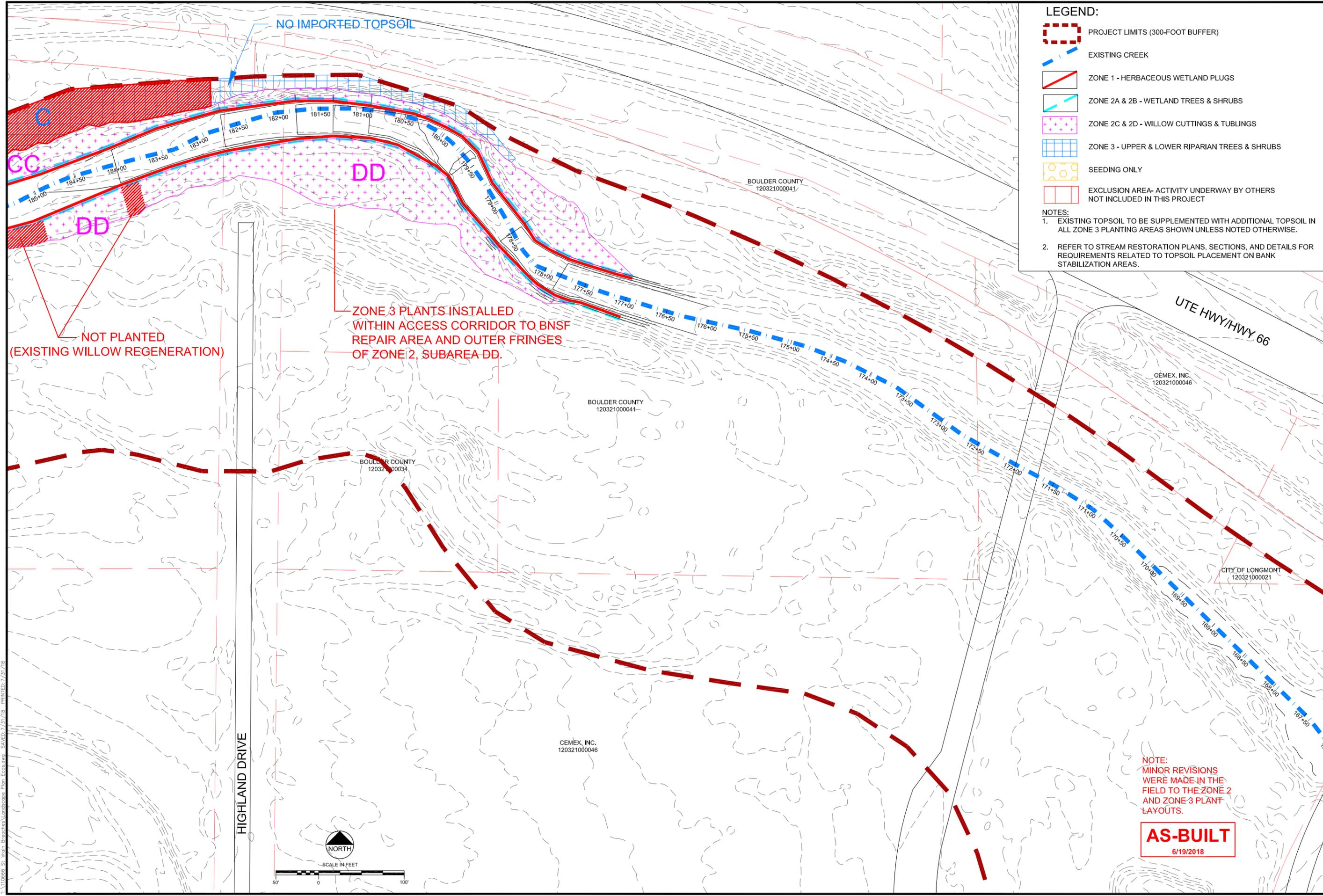
**ST. VRAIN CREEK REACH 3
 PLANTING AND
 SEEDING PLAN**

| |
|--|
| SCALE VERIFICATION: 0" = 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. |
| Drawn by: JBD |
| Designed by: ECOS |
| Checked by: GEG |
| Scale: As Shown |
| Project No. 110668 |
| Date: September 19, 2017 |
| SHEET L2 |

NOTE:
 MINOR REVISIONS
 WERE MADE IN THE
 FIELD TO THE ZONE 2
 AND ZONE 3 PLANT
 LAYOUTS.

AS-BUILT
 6/19/2018

I:\110668 - St. Vrain - Breaches - Landscape Plan - Ecos.swg SAVED: 7/21/18 FileID: 7/21/18



NO IMPORTED TOPSOIL

LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

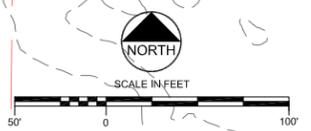
- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.

NOT PLANTED
(EXISTING WILLOW REGENERATION)

ZONE 3 PLANTS INSTALLED
WITHIN AGCESS CORRIDOR TO BNSF
REPAIR AREA AND OUTER FRINGES
OF ZONE 2, SUBAREA DD.

NOTE:
MINOR REVISIONS
WERE MADE IN THE
FIELD TO THE ZONE 2
AND ZONE 3 PLANT
LAYOUTS.

AS-BUILT
6/19/2018



| REVISIONS | | | |
|-----------|------------|--------------------------------|-------------------------|
| Revision | Date | Description | Issued for Construction |
| 1 | 9/19/2017 | Issued for Construction | |
| 2 | 11/07/2017 | Polygon Adjustments | |
| 3 | 6/19/2018 | Issued for AS-Built Conditions | |
| 4 | 7/21/2018 | Comment Revisions | |

Engineering Analytics, Inc.
1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

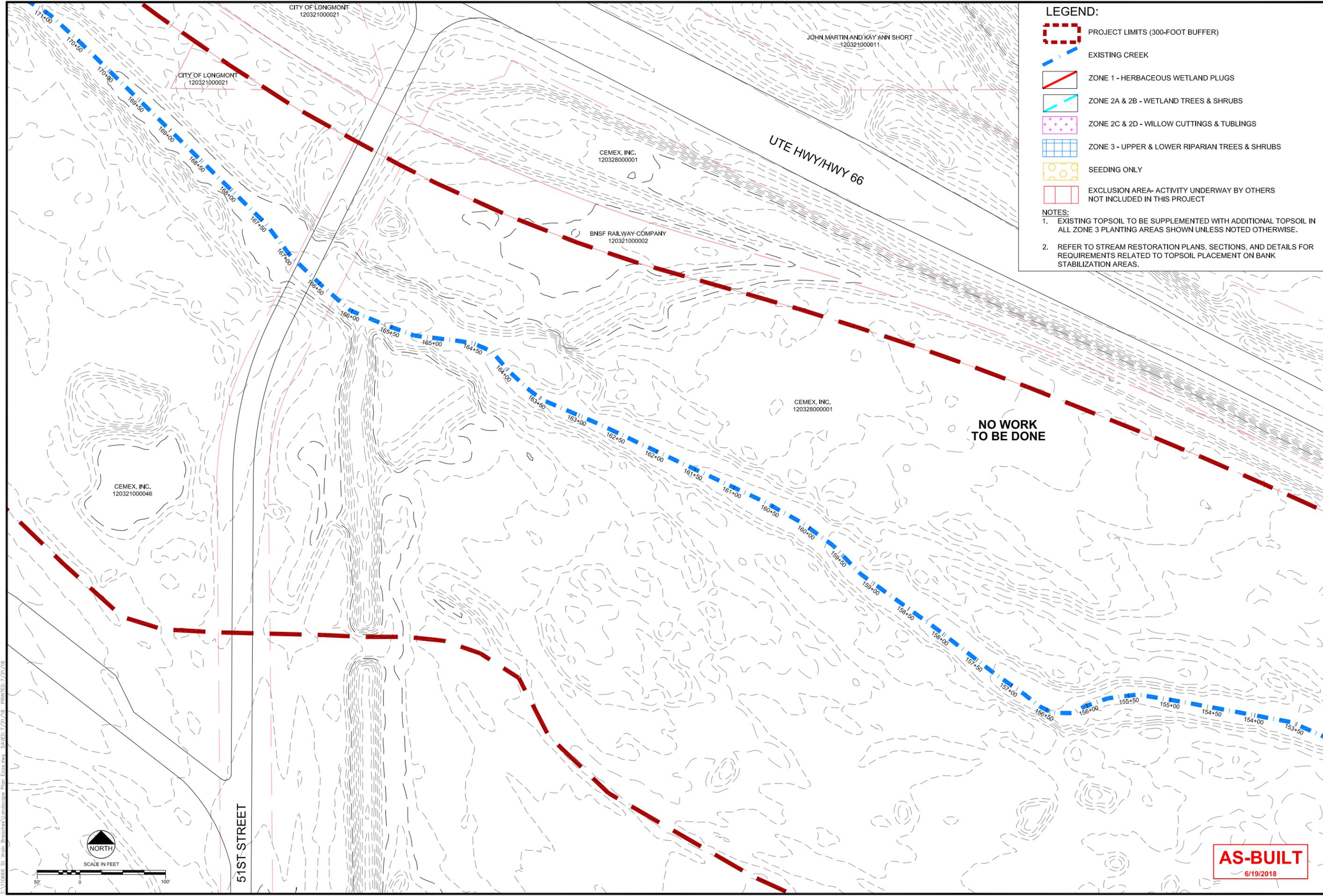
1455 WASHBURN STREET
ERIE, COLORADO 80516
TEL: 970-612-3267

ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L3**

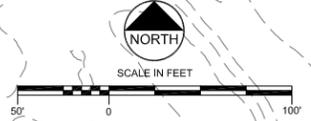


LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.



51ST STREET

NO WORK TO BE DONE

AS-BUILT
6/19/2018

| REVISIONS | |
|-----------|--|
| Revision | Description |
| 1 | 9/19/2017 Issued for Construction |
| 2 | 11/07/2017 Polygon Adjustments |
| 3 | 6/19/2018 Issued for AS-Built Conditions |
| 4 | 7/21/2018 Comment Revisions |

Engineering Analytics, Inc.
1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1445 WASHBURN STREET
ERE, COLORADO 80516
(970) 948-32367

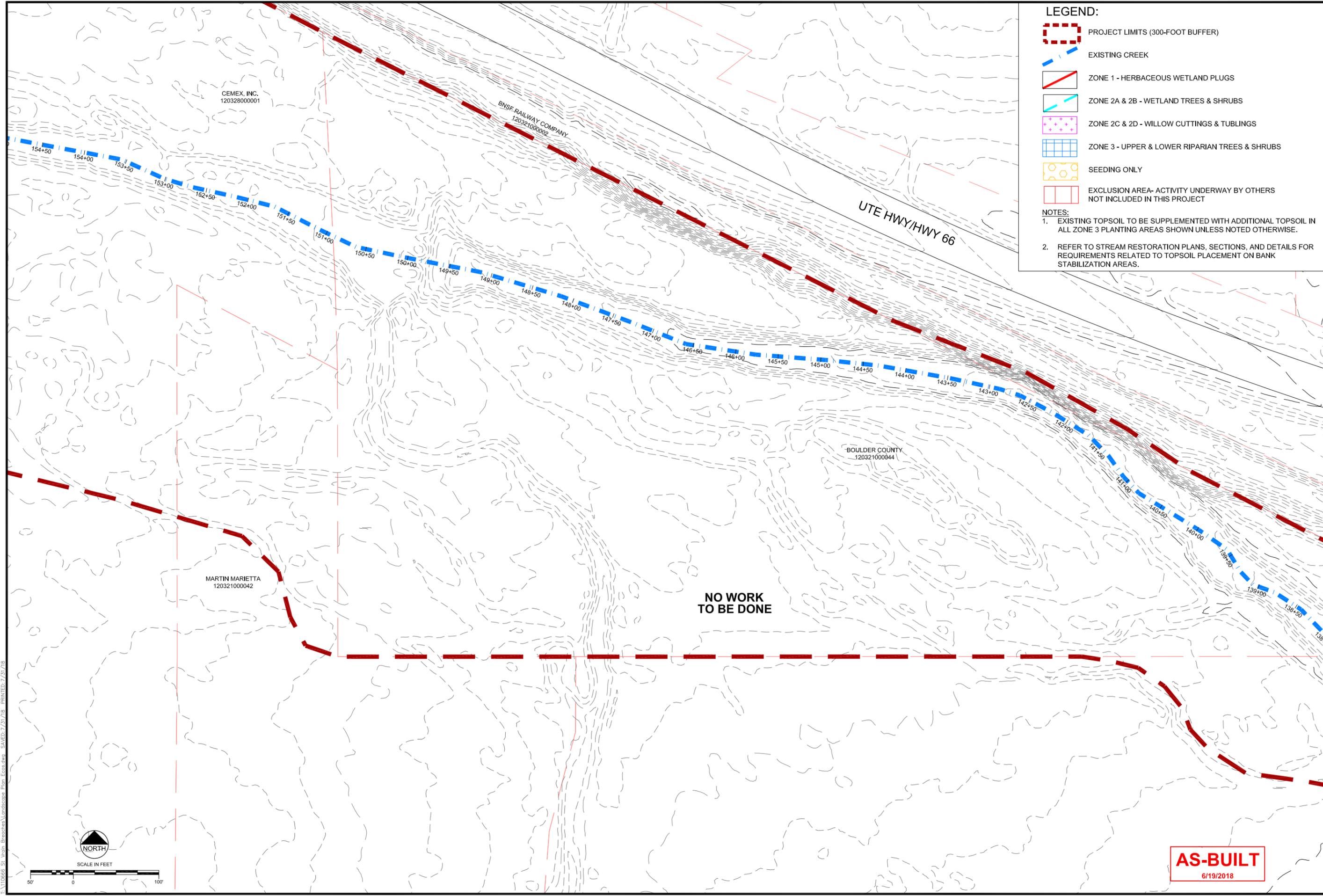
ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 50 100
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET L4

I:\110668 - St. Vrain - Erosion/Landscaping Plan - Ecos.dwg SAVED: 7/21/18 PLOT: 7/21/18

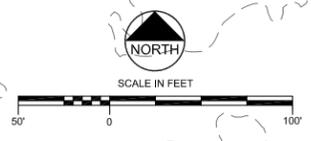


LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.



AS-BUILT
6/19/2018

| REVISIONS | |
|-----------|--|
| Revision | Description |
| 1 | 9/19/2017 Issued for Construction |
| 2 | 11/07/2017 Polygon Adjustments |
| 3 | 6/19/2018 Issued for AS-Built Conditions |
| 4 | 7/21/2018 Comment Revisions |

Engineering Analytics, Inc.
1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERE, COLORADO 80516
(970) 940-312-3267

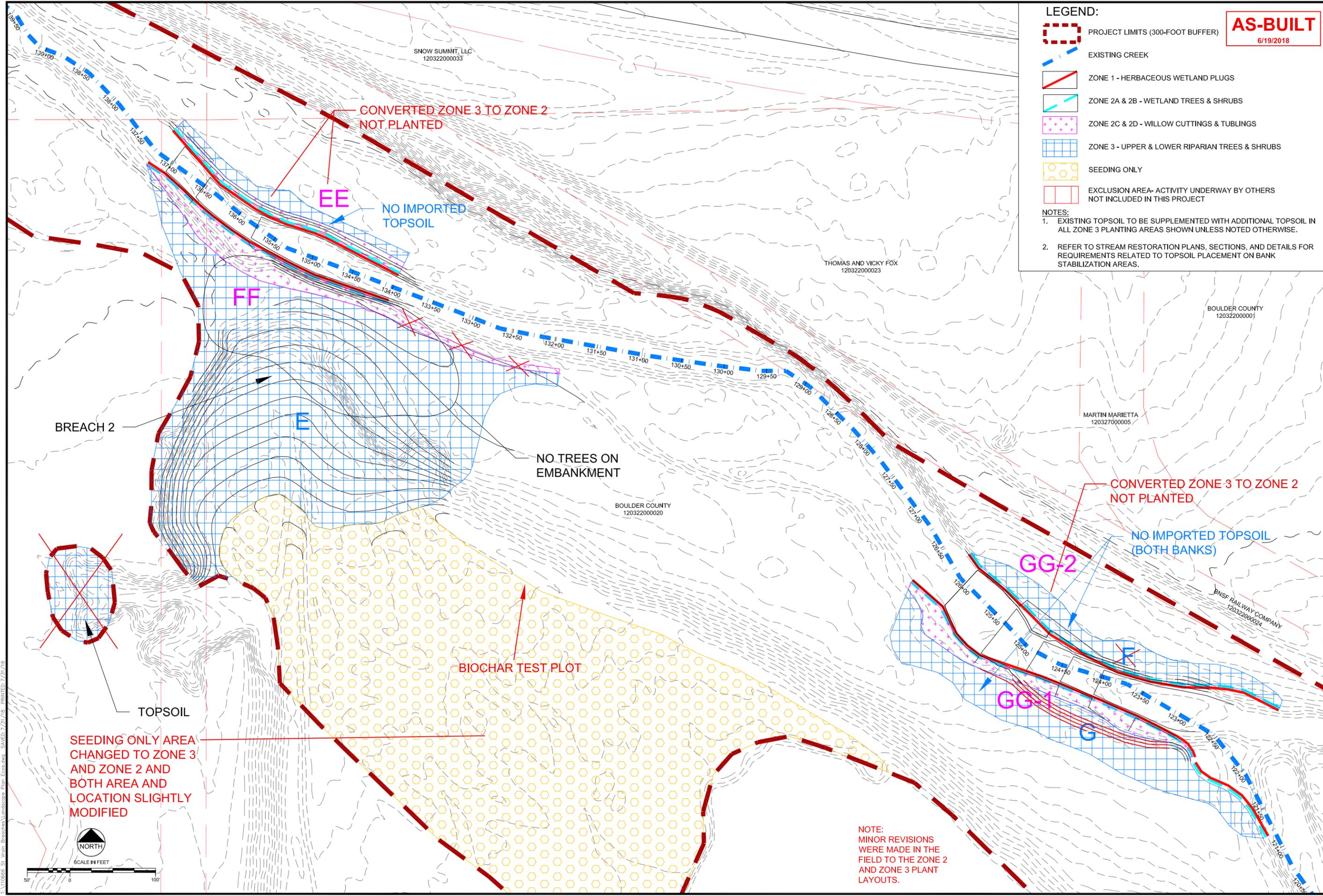
ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET L5

F:\110668 - St. Vrain - Erosion/Landscape Plan - Ecosys.dwg - SAVED: 7/31/18 - PLOT: 7/31/18



LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.

AS-BUILT
6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

Engineering Analytics, Inc.
1600 Speer Point Plaza, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERE, COLORADO 80516
(970) 940-3236

ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

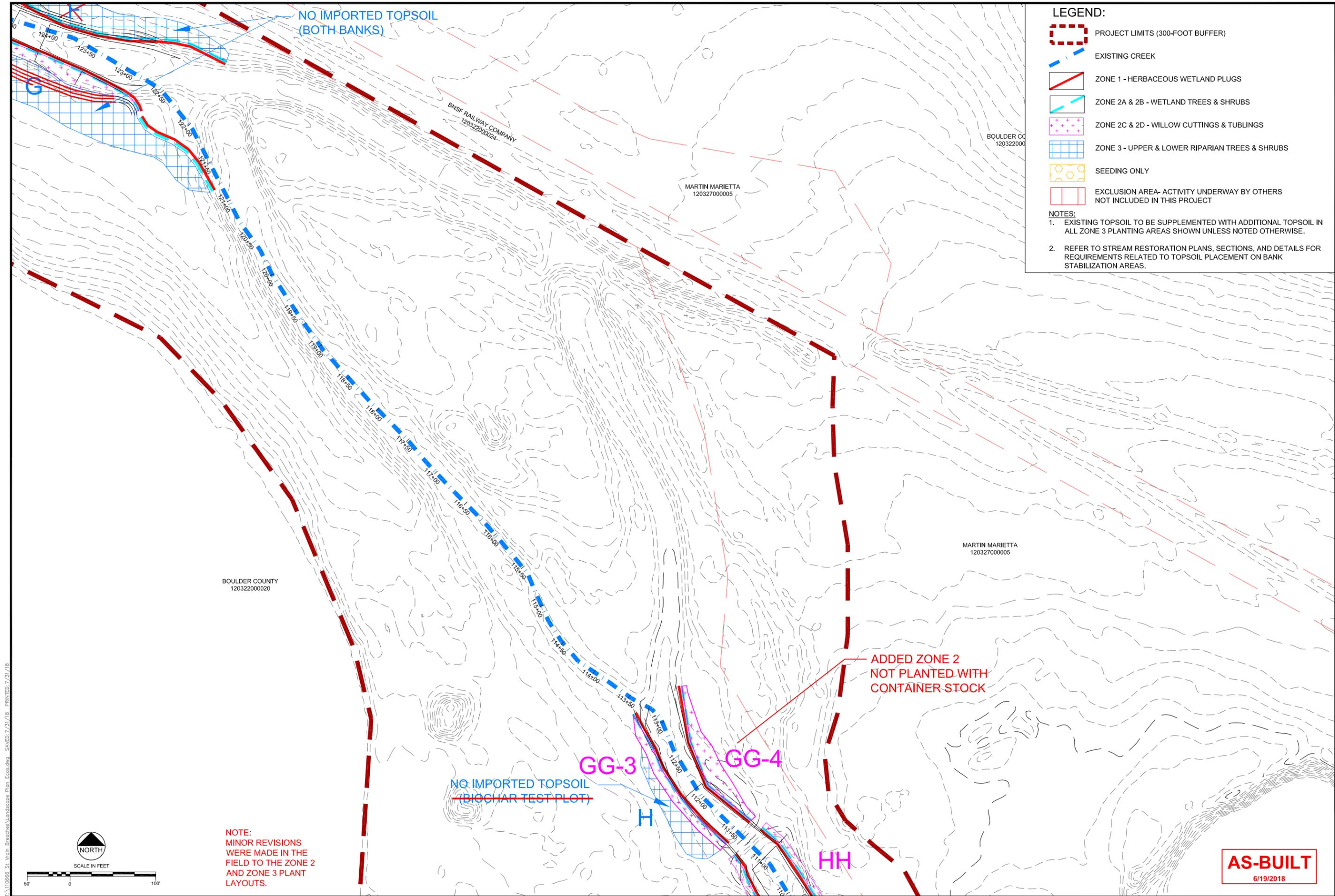
Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L6**

E:\110668 - St. Vrain - Breaches - Landscape Plan - Ecos.dwg - SAVED: 7/31/18 FileID: 7/31/18



SEEDING ONLY AREA CHANGED TO ZONE 3 AND ZONE 2 AND BOTH AREA AND LOCATION SLIGHTLY MODIFIED

NOTE: MINOR REVISIONS WERE MADE IN THE FIELD TO THE ZONE 2 AND ZONE 3 PLANT LAYOUTS.



LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.

REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for AS-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

Engineering Analytics, Inc.
 1600 Speer Point Plaza, Suite 200
 Fort Collins, CO 80525
 (970) 488-3111

ecos
 ecosystem services

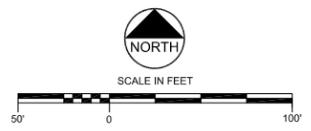
1455 WASHBURN STREET
 ERIE, COLORADO 80516
 (970) 940-3123/367

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
 Designed by: ECOS
 Checked by: GEG
 Scale: As Shown
 Project No. 110668
 Date: September 19, 2017
 SHEET L7

F:\110668 - St. Vrain - Erietas - Landscape Plan - Ecos.dwg SAVED: 7/21/18 PLOTID: 7/21/18

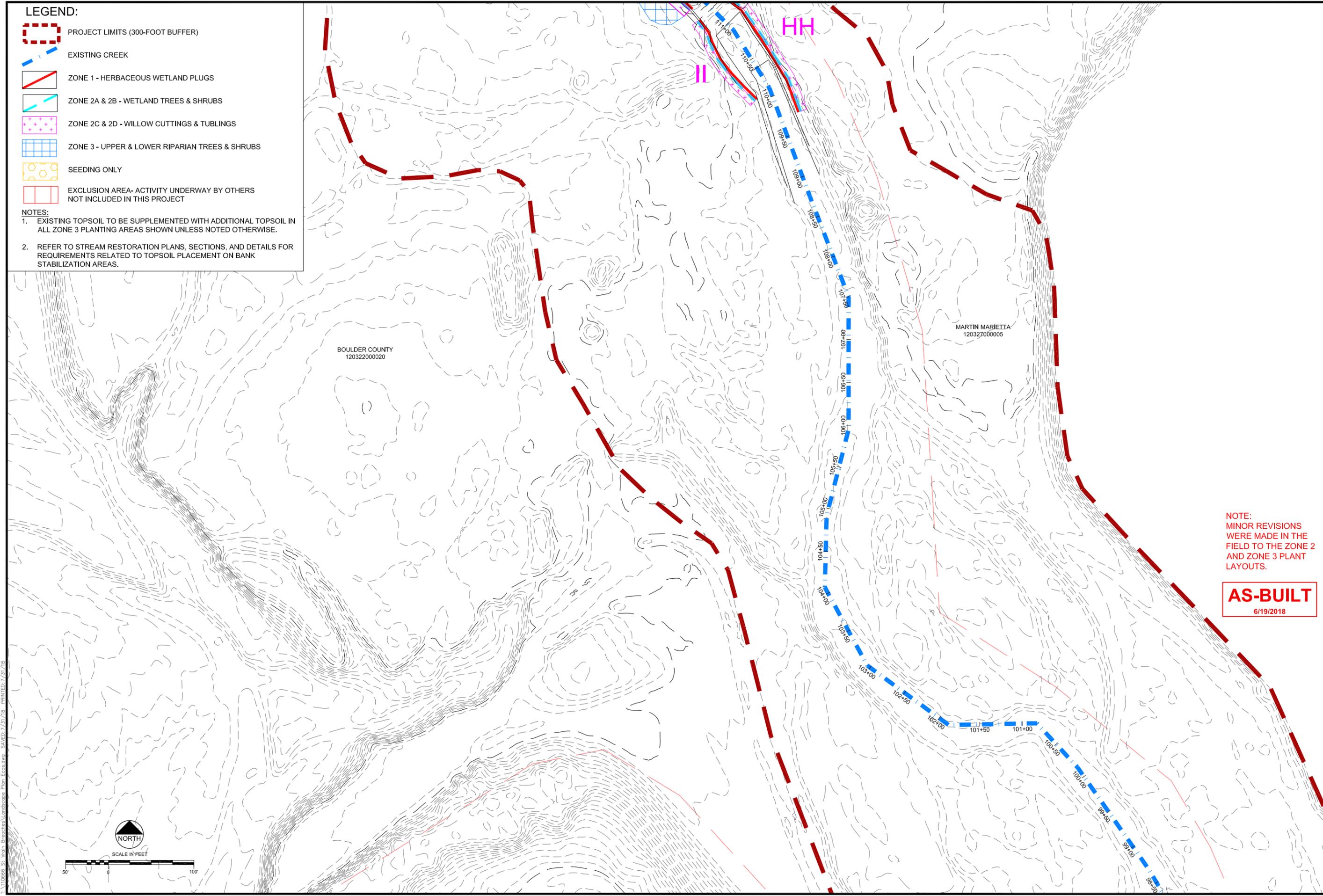


NOTE:
 MINOR REVISIONS WERE MADE IN THE FIELD TO THE ZONE 2 AND ZONE 3 PLANT LAYOUTS.

AS-BUILT
 6/19/2018

- LEGEND:**
-  PROJECT LIMITS (300-FOOT BUFFER)
 -  EXISTING CREEK
 -  ZONE 1 - HERBACEOUS WETLAND PLUGS
 -  ZONE 2A & 2B - WETLAND TREES & SHRUBS
 -  ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
 -  ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
 -  SEEDING ONLY
 -  EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

- NOTES:**
1. EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
 2. REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.



NOTE:
MINOR REVISIONS
WERE MADE IN THE
FIELD TO THE ZONE 2
AND ZONE 3 PLANT
LAYOUTS.

AS-BUILT
6/19/2018

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

Engineering Analytics, Inc.
1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERIE, COLORADO 80516
(970) 974-3236

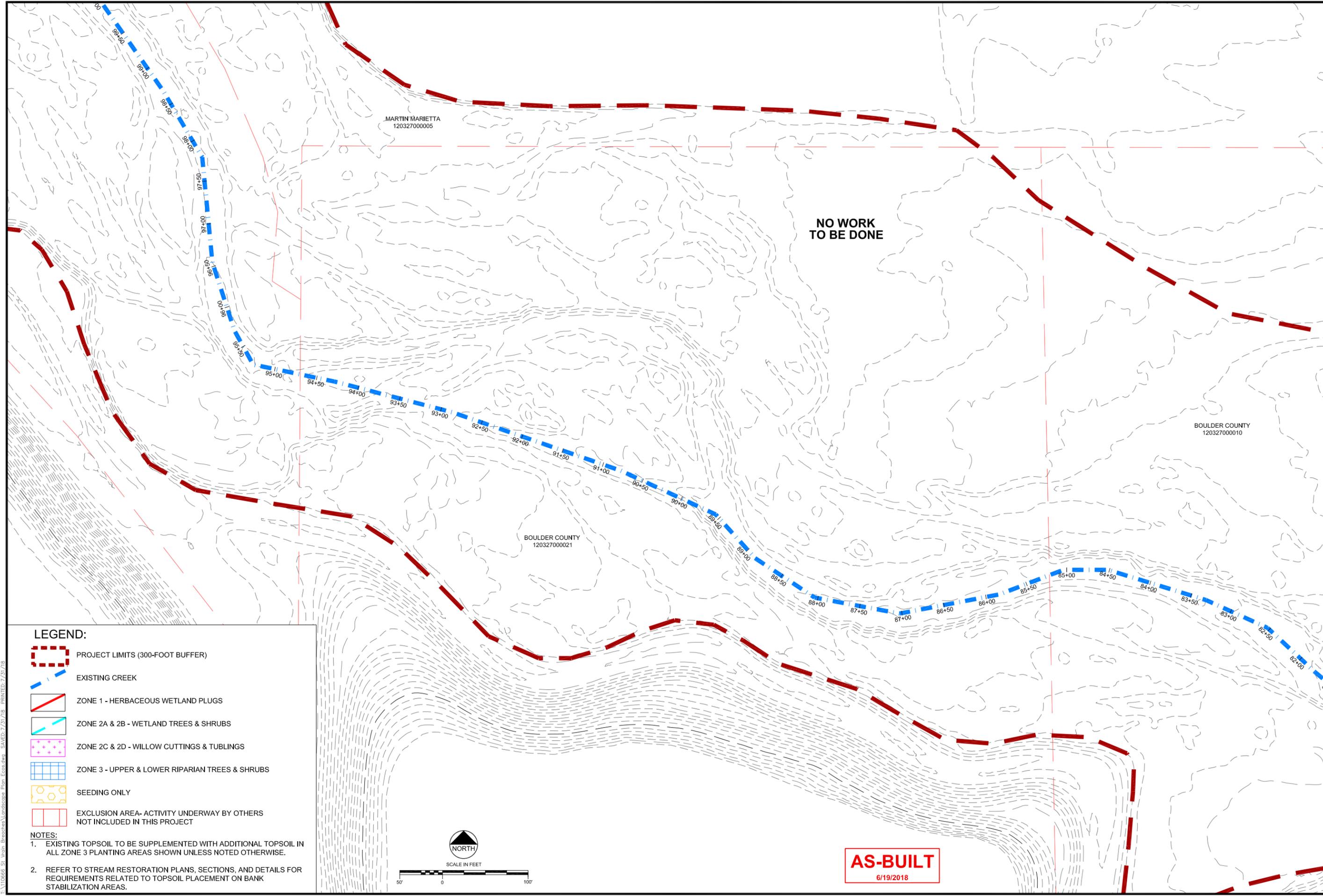
ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 = 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

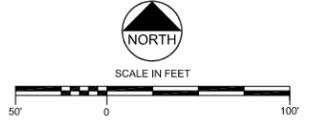
Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L8**

I:\110668 - St. Vrain - Eriochina - Landscape Plan - Ecos.dwg - SAVED: 7/21/18 - PLOT: 7/21/18



- LEGEND:**
- PROJECT LIMITS (300-FOOT BUFFER)
 - EXISTING CREEK
 - ZONE 1 - HERBACEOUS WETLAND PLUGS
 - ZONE 2A & 2B - WETLAND TREES & SHRUBS
 - ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
 - ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
 - SEEDING ONLY
 - EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

- NOTES:**
1. EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
 2. REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.



AS-BUILT
6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

Engineering Analytics, Inc.
1600 South Point Blvd., Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERE, COLORADO 80516
(970) 948-3236

ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

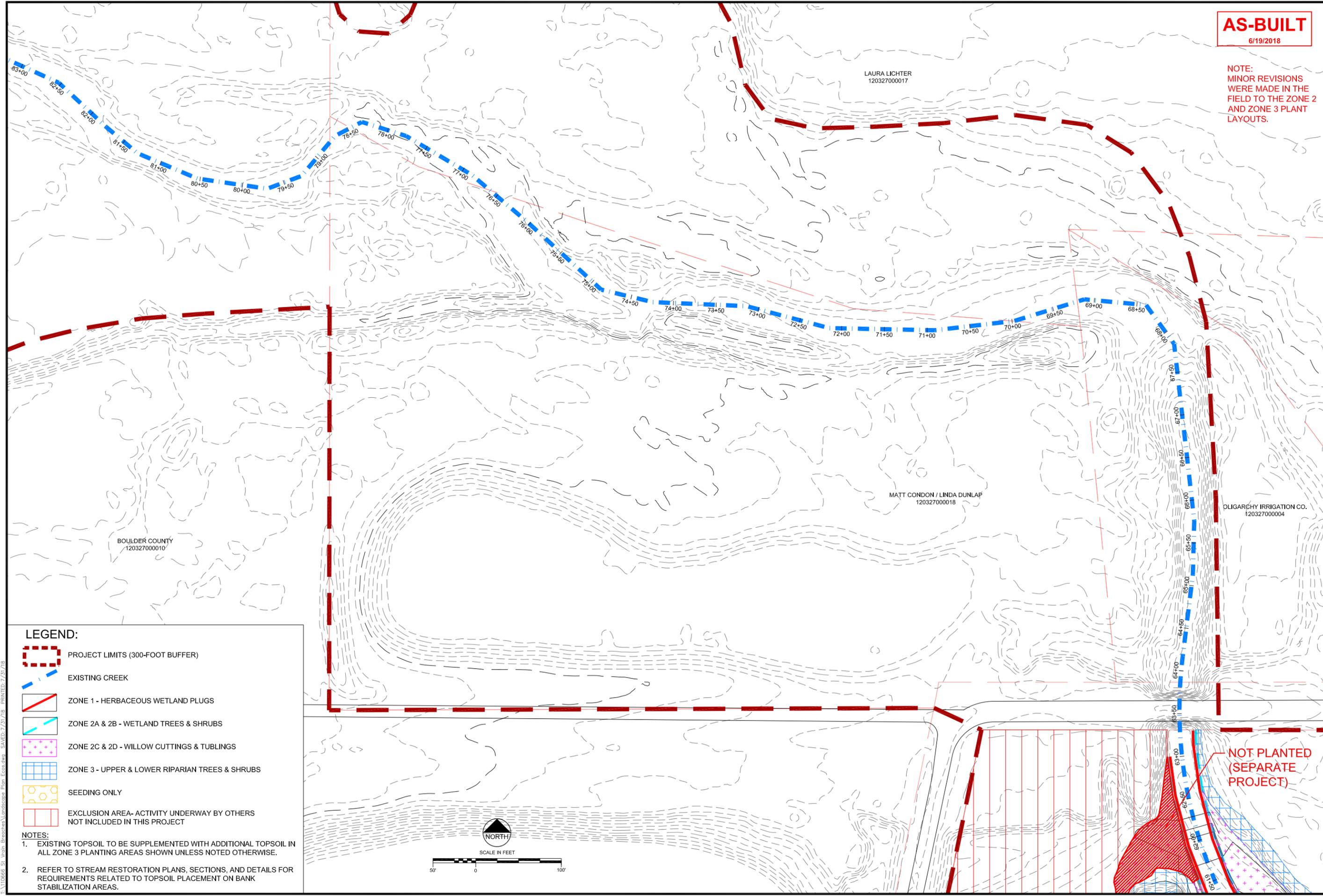
SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L9**

I:\110668 - St. Vrain - Erosion/Landscaping Plan - Ecosys.dwg SAVED: 7/21/18 PLOT: 7/21/18

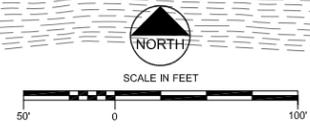
AS-BUILT
6/19/2018

NOTE:
MINOR REVISIONS
WERE MADE IN THE
FIELD TO THE ZONE 2
AND ZONE 3 PLANT
LAYOUTS.



- LEGEND:**
- PROJECT LIMITS (300-FOOT BUFFER)
 - EXISTING CREEK
 - ZONE 1 - HERBACEOUS WETLAND PLUGS
 - ZONE 2A & 2B - WETLAND TREES & SHRUBS
 - ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
 - ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
 - SEEDING ONLY
 - EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

- NOTES:**
1. EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
 2. REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.



REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

EA Engineering Analytics, Inc.
1600 Speer Point Road, Suite 200
Fort Collins, CO 80525
(970) 488-3111

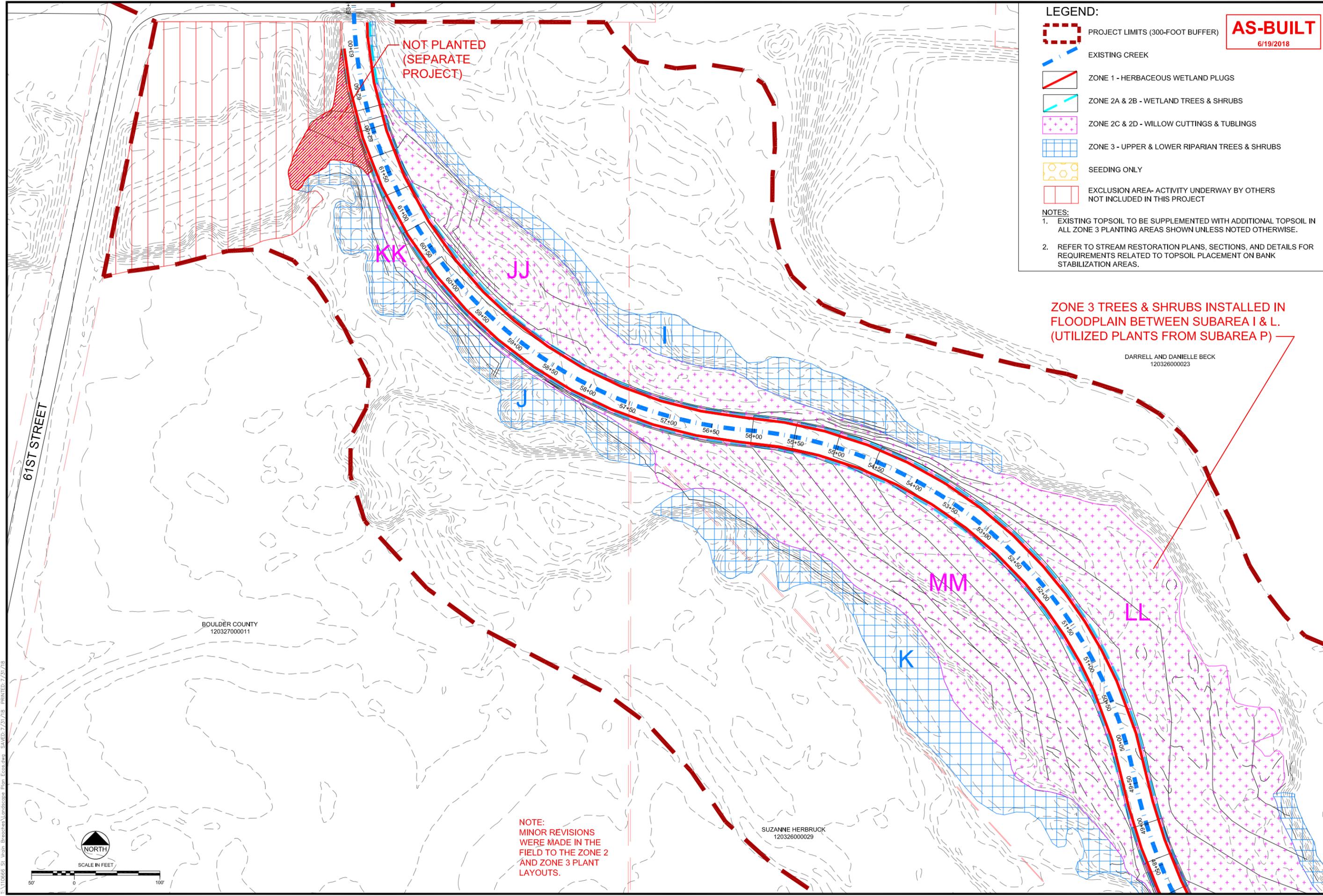
1445 WASHBURN STREET
ERIE, COLORADO 80516
(970) 949-3236

ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 10 1'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L10**



LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

AS-BUILT
6/19/2018

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.

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

DARRELL AND DANIELLE BECK
120326000023

SUZANNE HERBRUCK
120326000029

NOTE:
MINOR REVISIONS WERE MADE IN THE FIELD TO THE ZONE 2 AND ZONE 3 PLANT LAYOUTS.

BOULDER COUNTY
120327000011

61ST STREET



REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

Engineering Analytics, Inc.
1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERIE, COLORADO 80516
(970) 940-3236

ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L11**

F:\110668 - St. Vrain - Eriochina - Landscape Plan - Ecos.dwg SAVED: 7/21/18 PLOT: 7/21/18

AS-BUILT
6/19/2018

BECK FAMILY HOLDINGS
120326000046

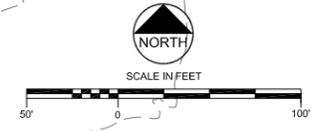
BOULDER COUNTY
120326000060

DAVID AND SHARYL PASWATERS
120326000025

NOTE:
MINOR REVISIONS
WERE MADE IN THE
FIELD TO THE ZONE 2
AND ZONE 3 PLANT
LAYOUTS.

- LEGEND:**
-  PROJECT LIMITS (300-FOOT BUFFER)
 -  EXISTING CREEK
 -  ZONE 1 - HERBACEOUS WETLAND PLUGS
 -  ZONE 2A & 2B - WETLAND TREES & SHRUBS
 -  ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
 -  ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
 -  SEEDING ONLY
 -  EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

- NOTES:**
1. EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
 2. REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK



BREACH 5

NO TREES ON
EMBANKMENT

BREACH 6

REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

Engineering Analytics, Inc.
1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

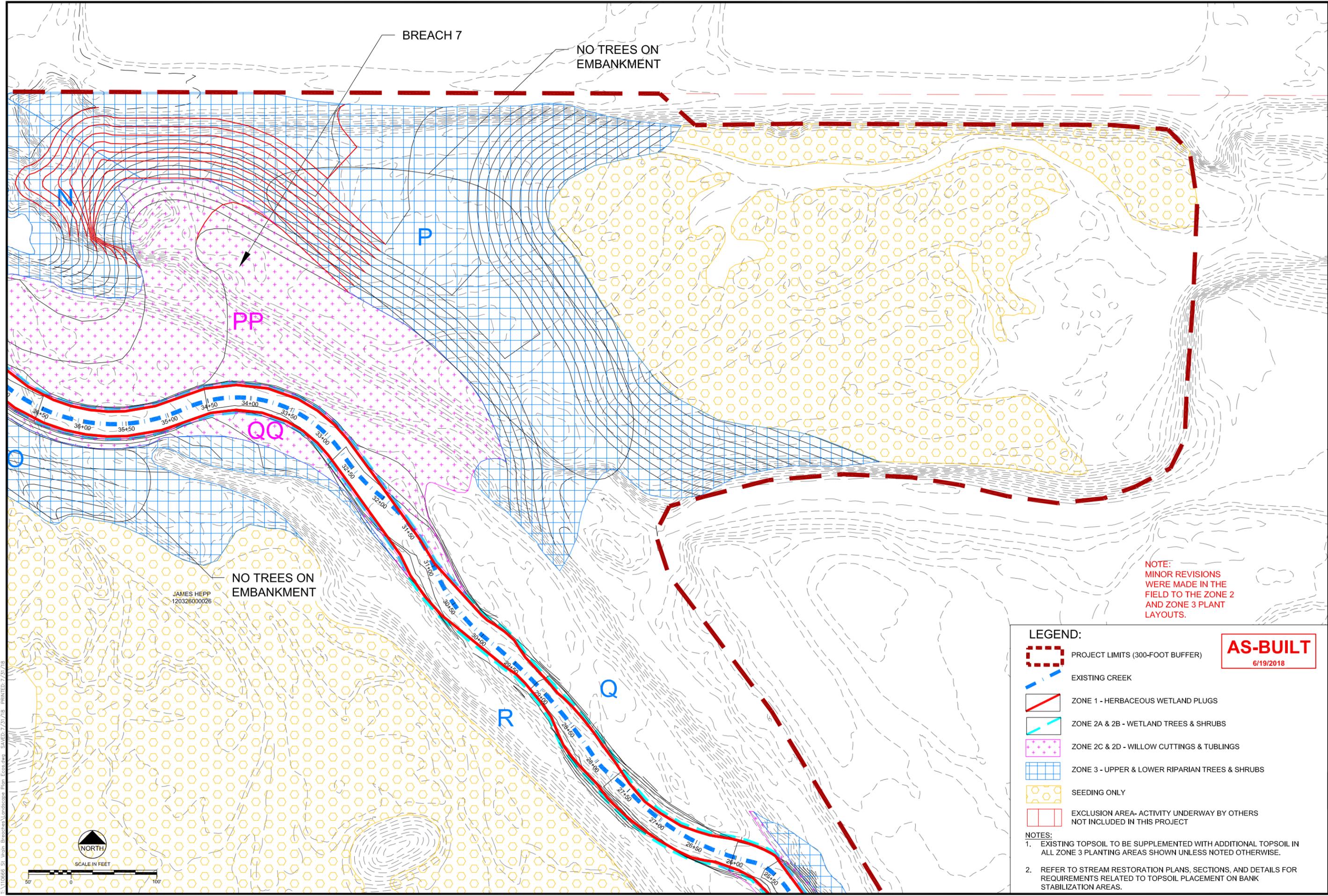
1455 WASHBURN STREET
ERIE, COLORADO 80516
(970) 940-3123/367

ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L12**



JAMES HEPP
120326000026

NO TREES ON
EMBANKMENT

BREACH 7

NO TREES ON
EMBANKMENT

NOTE:
MINOR REVISIONS
WERE MADE IN THE
FIELD TO THE ZONE 2
AND ZONE 3 PLANT
LAYOUTS.

LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

AS-BUILT
6/19/2018

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.

ST. VRAIN CREEK REACH 3

PLANTING AND SEEDING PLAN

Engineering Analytics, Inc.
1600 Speer Point Plaza, Suite 200
Fort Collins, CO 80525
(970) 488-3111

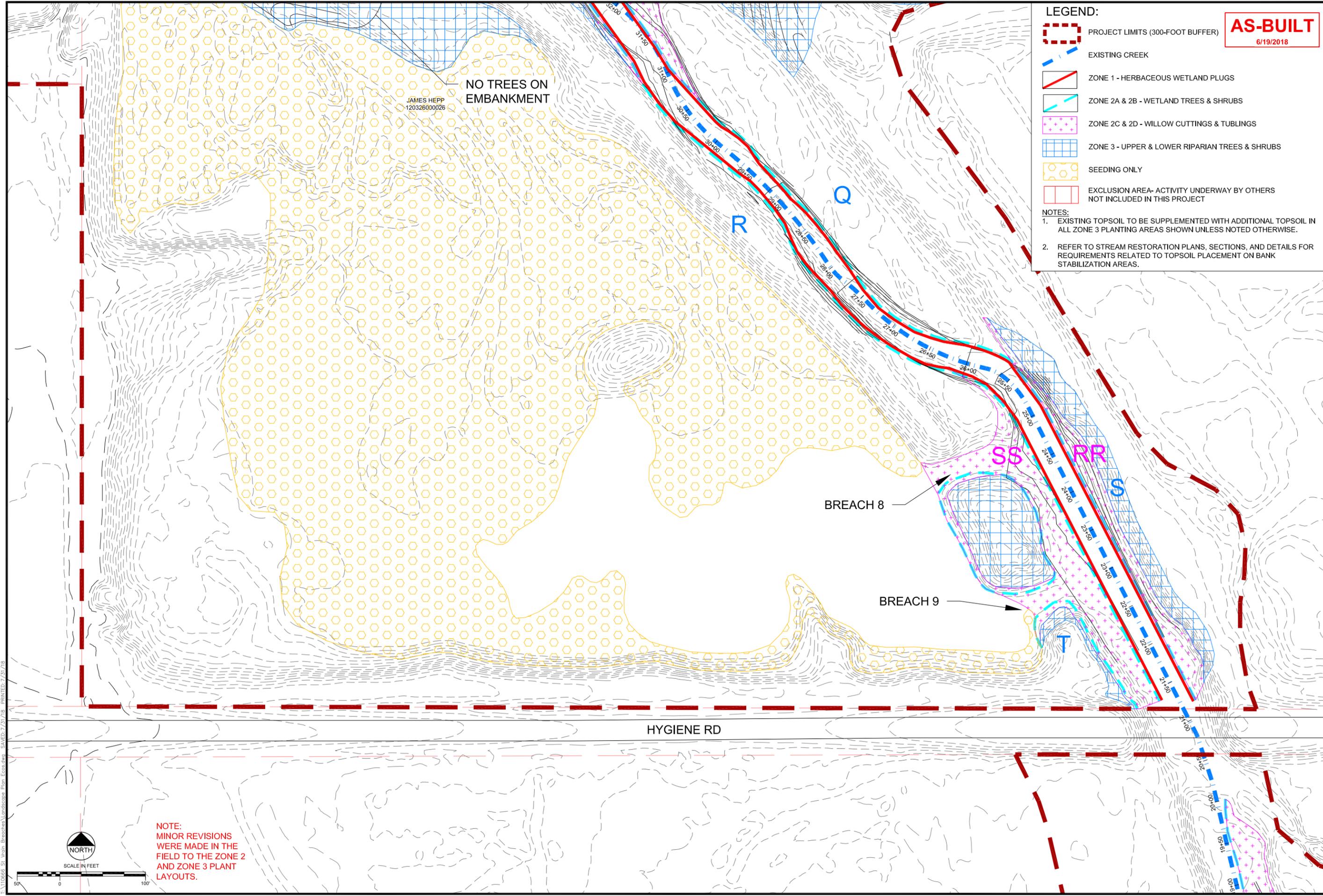
1445 WASHBURN STREET
ERE, COLORADO 80516
TEL: 970-612-3267

ecos
ecosystem services

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for AS-Built Conditions |
| 4 | 7/21/2018 | Comment Revisions |

SCALE VERIFICATION:
0 = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET L13



LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

- EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
- REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.

AS-BUILT
6/19/2018

| REVISIONS | | | |
|-----------|------------|--------------------------------|------------|
| Revision | Date | Description | Issued for |
| 1 | 9/19/2017 | Issued for Construction | |
| 2 | 11/07/2017 | Polygon Adjustments | |
| 3 | 6/19/2018 | Issued for AS-Built Conditions | |
| 4 | 7/21/2018 | Comment Revisions | |

Engineering Analytics, Inc.
1600 Speer Point Plaza, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1445 WASHBURN STREET
ERE, COLORADO 80516
(970) 940-32367

ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

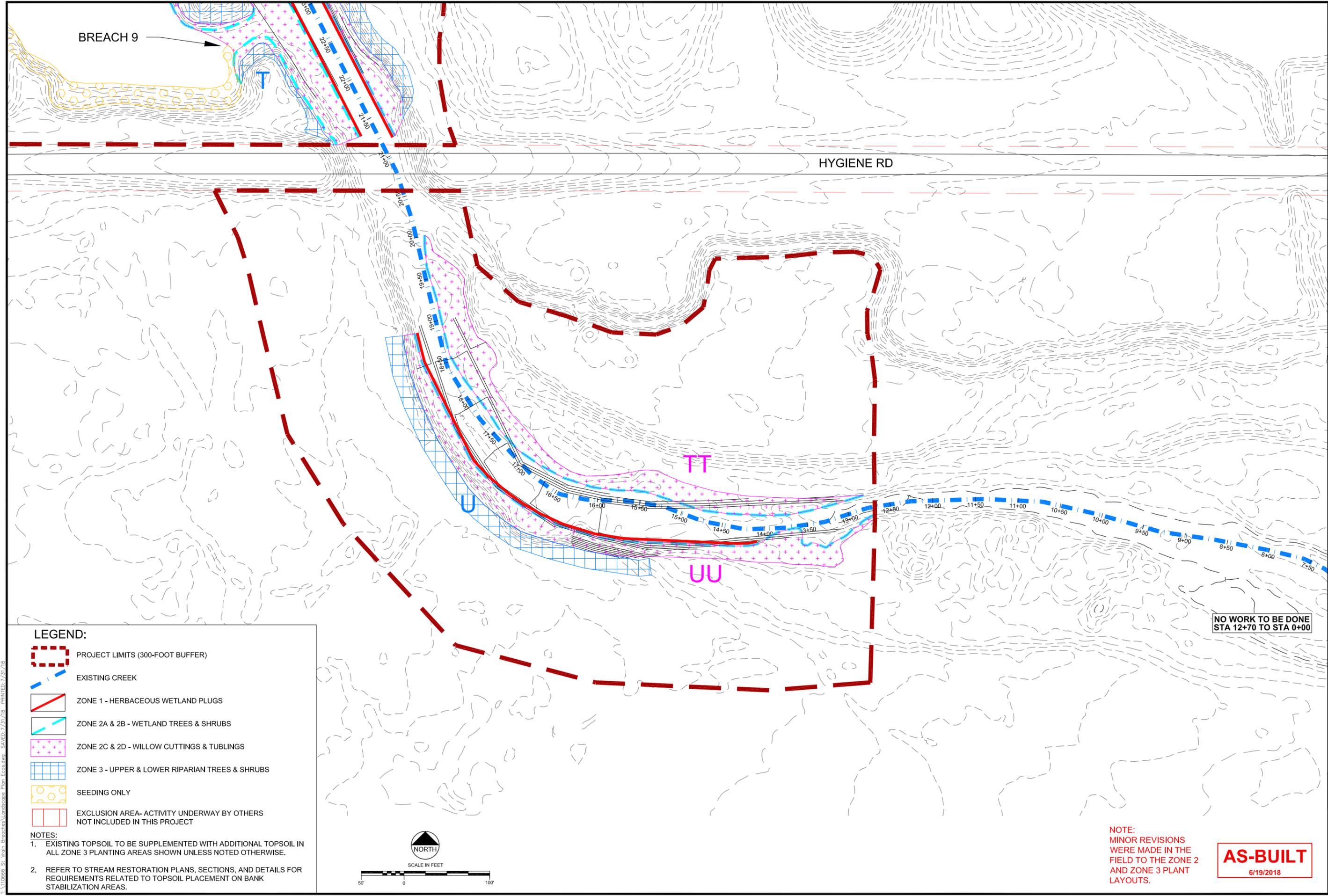
Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L14**

NOTE:
MINOR REVISIONS WERE MADE IN THE FIELD TO THE ZONE 2 AND ZONE 3 PLANT LAYOUTS.

NORTH

SCALE IN FEET
0 50 100

F:\110668 - St. Vrain - Erosion/Landscape Plan - Ecosys - SAVED: 7/21/18 - PLOT: 7/21/18



BREACH 9

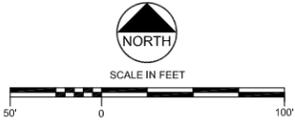
HYGIENE RD

LEGEND:

- PROJECT LIMITS (300-FOOT BUFFER)
- EXISTING CREEK
- ZONE 1 - HERBACEOUS WETLAND PLUGS
- ZONE 2A & 2B - WETLAND TREES & SHRUBS
- ZONE 2C & 2D - WILLOW CUTTINGS & TUBLINGS
- ZONE 3 - UPPER & LOWER RIPARIAN TREES & SHRUBS
- SEEDING ONLY
- EXCLUSION AREA- ACTIVITY UNDERWAY BY OTHERS NOT INCLUDED IN THIS PROJECT

NOTES:

1. EXISTING TOPSOIL TO BE SUPPLEMENTED WITH ADDITIONAL TOPSOIL IN ALL ZONE 3 PLANTING AREAS SHOWN UNLESS NOTED OTHERWISE.
2. REFER TO STREAM RESTORATION PLANS, SECTIONS, AND DETAILS FOR REQUIREMENTS RELATED TO TOPSOIL PLACEMENT ON BANK STABILIZATION AREAS.



NO WORK TO BE DONE STA 12+70 TO STA 0+00

NOTE:
MINOR REVISIONS WERE MADE IN THE FIELD TO THE ZONE 2 AND ZONE 3 PLANT LAYOUTS.

AS-BUILT
6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/31/2018 | Comment Revisions |

EA Engineering Analytics, Inc.
1600 South Point Blvd, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERE, COLORADO 80516
(970) 940-3236

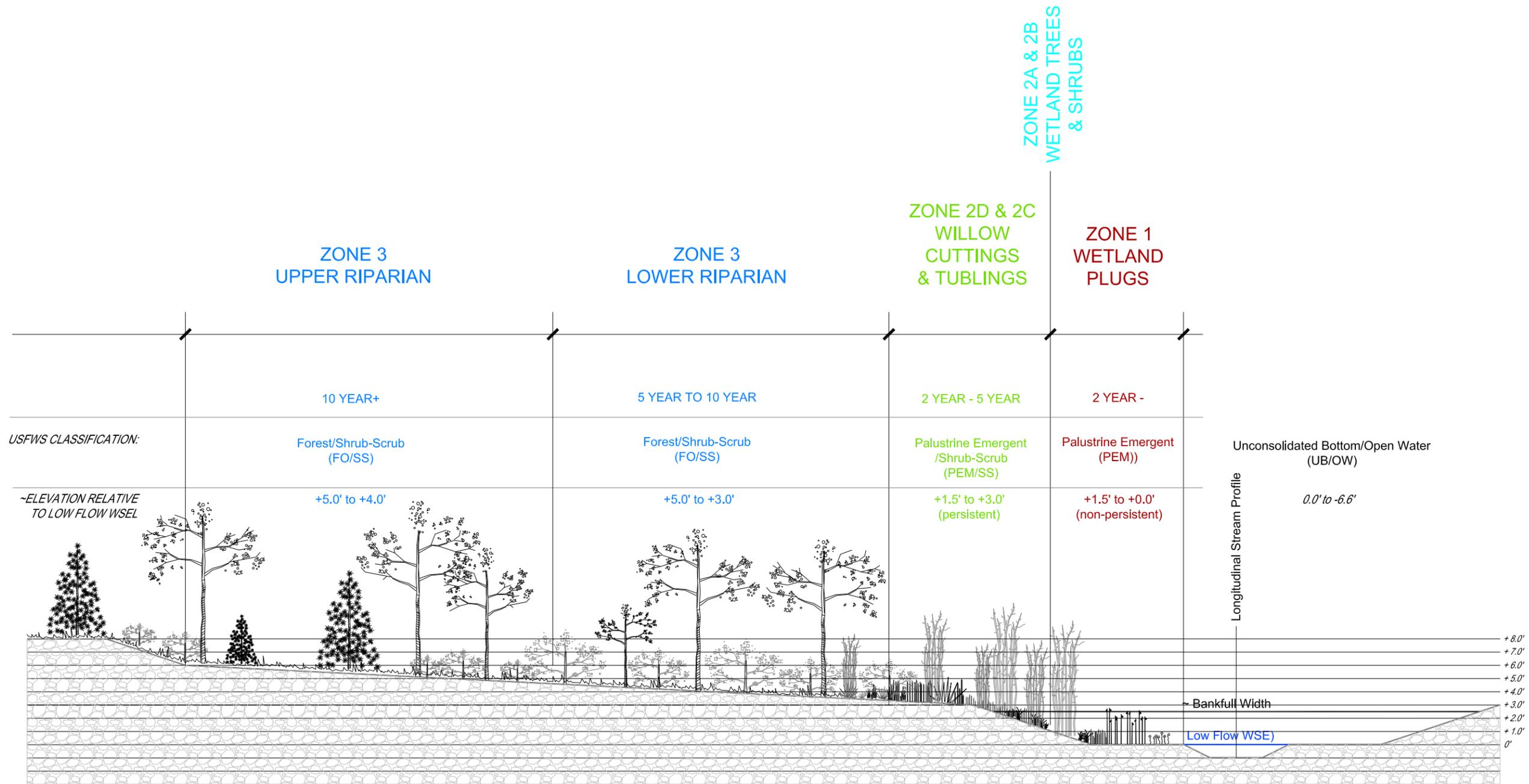
ecos
ecosystem services

ST. VRAIN CREEK REACH 3
PLANTING AND SEEDING PLAN

SCALE VERIFICATION:
0 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET **L15**

F:\110668 - St. Vrain Creeks\Landscaping Plan - Ecosys.dwg SAVED: 7/31/18 PLOT: 7/31/18



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

P-XS
TYPICAL RIPARIAN PLANT COMMUNITY CROSS-SECTION
 CROSS-SECTION NTS

AS-BUILT
 6/19/2018

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/31/2018 | Comment Revisions |

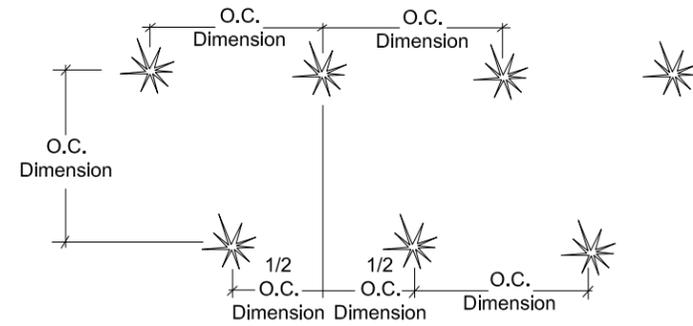
Engineering Analytics, Inc.
 1600 Specht Point Road, Suite 200
 Fort Collins, CO 80525
 (970) 488-3111

1455 WASHBURN STREET
 ERIE, COLORADO 80516
 (P) 970-812-3267

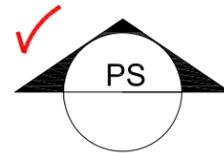
ecos
 ecosystem services

ST. VRAIN CREEK REACH 3
**TYPICAL PLANTING
 CROSS-SECTION**

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.
 Drawn by: JBD
 Designed by: ECOS
 Checked by: GEG
 Scale: As Shown
 Project No. 110668
 Date: September 19, 2017
 SHEET LD1

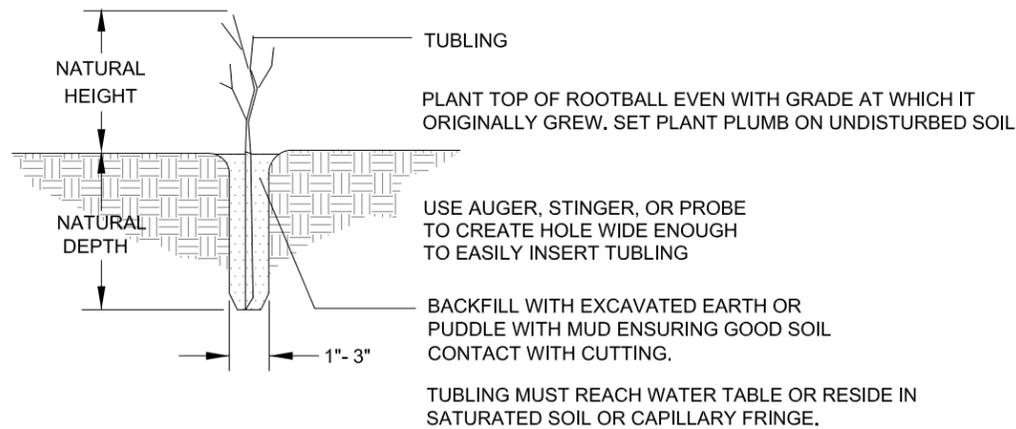


NOTES:
1. REFER TO PLANT SCHEDULES FOR SPACING REQUIREMENTS.

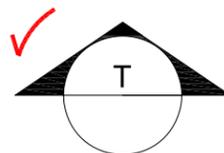


PLANT SPACING DETAIL

PLAN: NTS

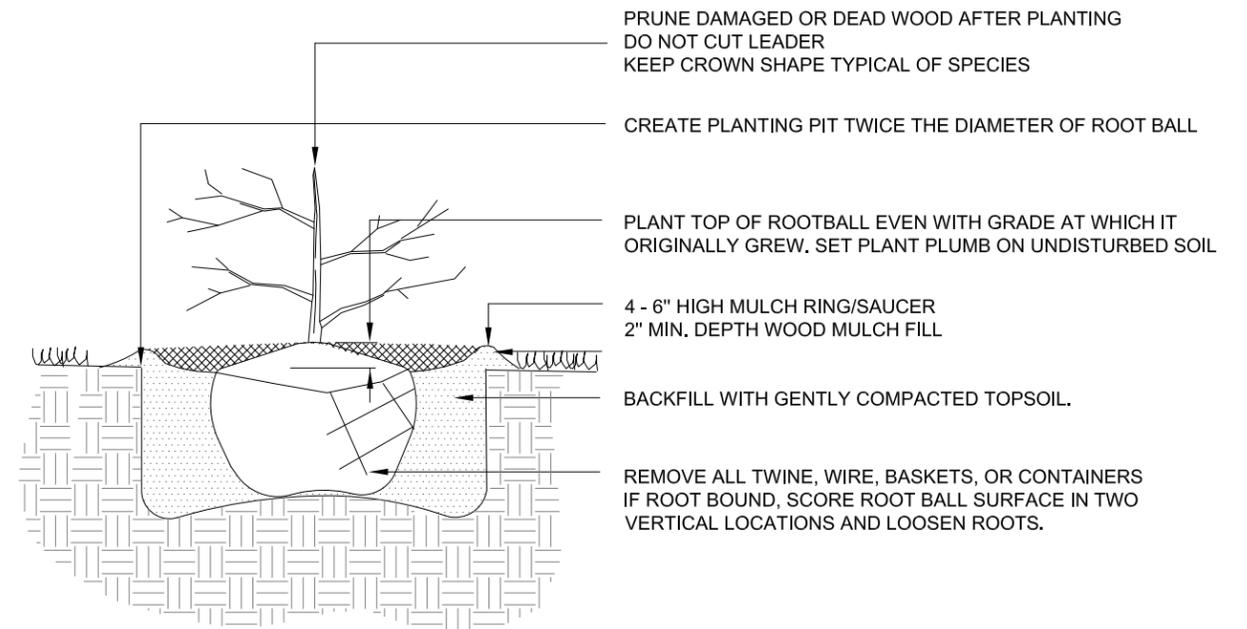


NOTES:
1. REFER TO PLANT SCHEDULES FOR SPECIES SIZE AND QUANTITY.

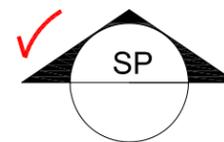


TUBLING PLANTING DETAIL

CROSS-SECTION NTS



NOTES:
1. WHERE APPLICABLE, CUT EROSION CONTROL FABRIC IN A "+" PATTERN AND LAY BACK PRIOR TO INSTALLING PLANTS. RETURN/CLOSE FABRIC TO ORIGINAL POSITION AND STAPLE/STAKE TO THE GROUND.
2. MAINTAIN AS DIRECTED IN NOTES & SPECIFICATIONS.
3. REFER TO PLANT SCHEDULES.



TREE & SHRUB PLANTING DETAIL

CROSS-SECTION NTS

AS-BUILT
6/19/2018

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/31/2018 | Comment Revisions |

Engineering Analytics, Inc.
1600 Specht Point Road, Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERIE, COLORADO 80516
(970) 974-3123/3267

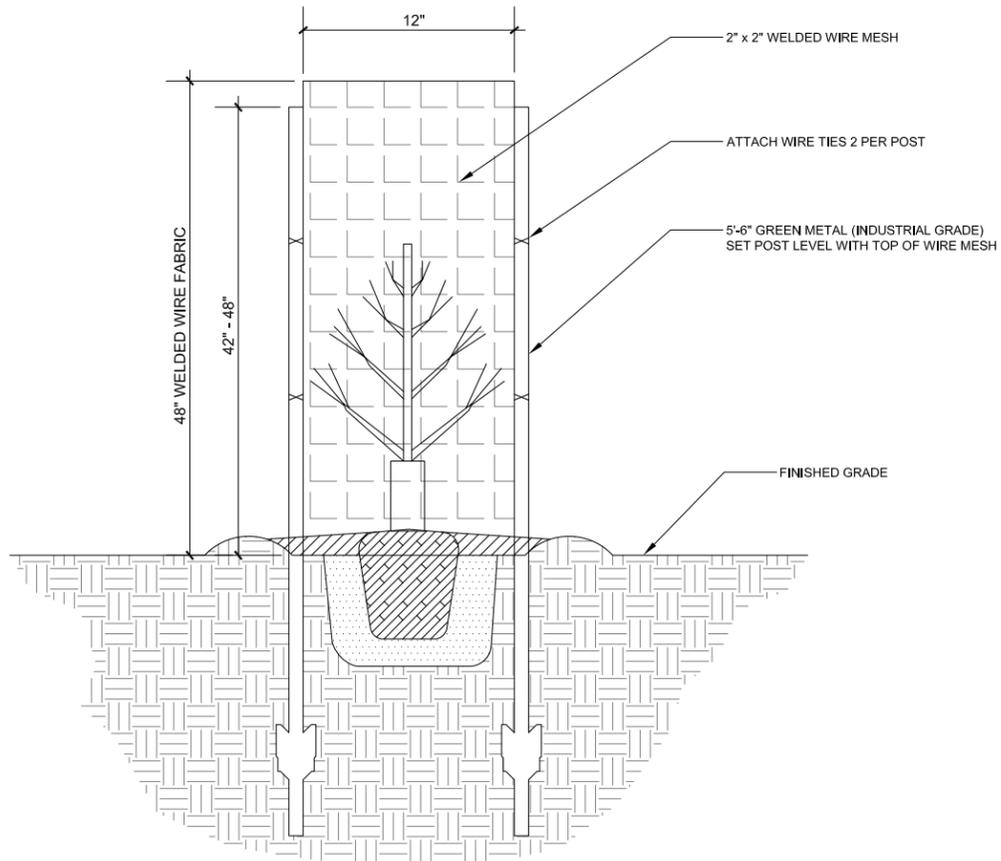
ecos
ecosystem services

ST. VRAIN CREEK REACH 3

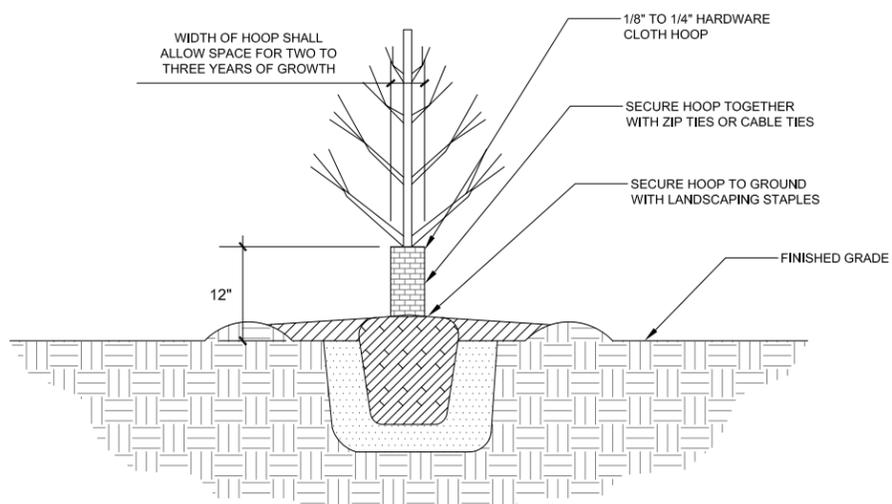
TYPICAL
PLANTING DETAILS

SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.

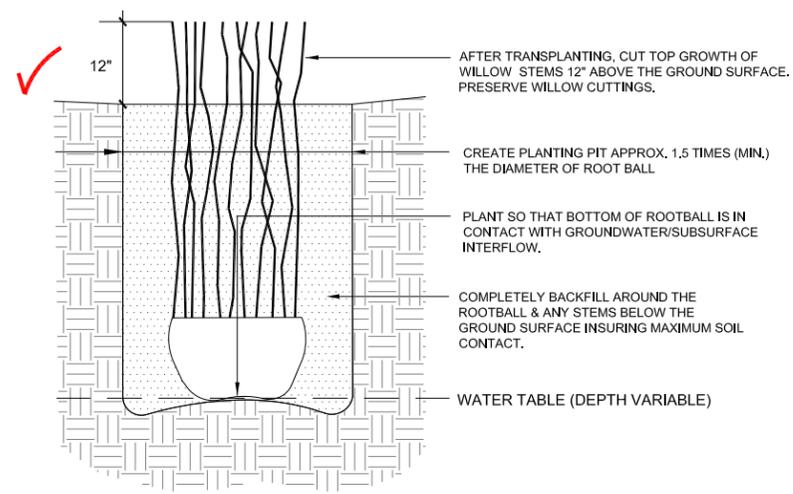
Drawn by: JBD
Designed by: ECOS
Checked by: GEG
Scale: As Shown
Project No. 110668
Date: September 19, 2017
SHEET LD2



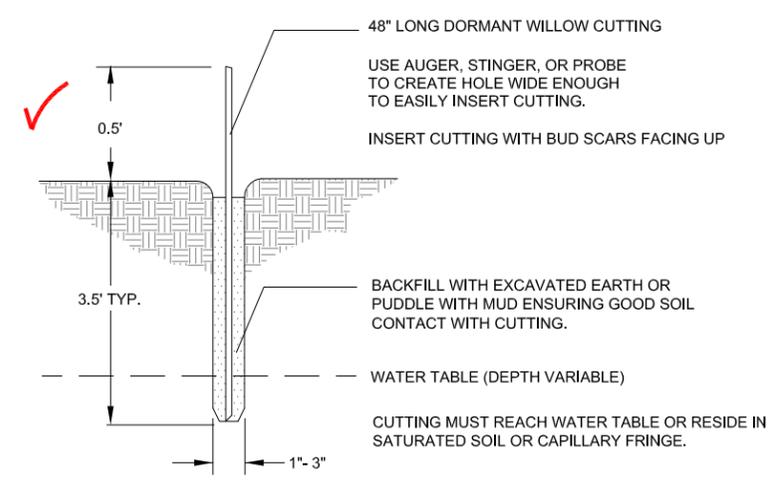
BP BEAVER PROTECTION FENCE
SCALE NTS



VP VOLE PROTECTION FENCE
SCALE NTS



WC WILLOW CLUMP HARVEST & TRANSPLANT DETAIL
CROSS-SECTION NTS



- NOTES:**
- REFER TO PLANT SCHEDULES FOR SPECIES SIZE, QUANTITY AND SPACING.
 - REFER TO PLANTING PLANS FOR LOCATIONS.
 - UNDERSIZED CUTTINGS, LACK OF COMPLETE SOIL CONTACT, PENETRATION INTO PERISTENTLY SATURATED SOIL ARE MAJOR CAUSES OF CUTTINGS FAILURE.
 - CUTTINGS MUST BE PLANTED IN CAPILLARY FRINGE (SATURATED SOIL) OR LOCATED ON BANK IN ORDER TO REACH WATER TABLE.
 - HARVESTING: HARVEST DORMANT CUTTINGS IN EARLY SPRING (APPROX. MARCH 1 TO 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 LOPPERS, BRUSH CUTTERS OR PRUNERS. CUTTINGS SHALL BE CUT CLEAN, AVOIDING BARK STRIPPING AND STEM SPLITTING. STRIP ALL SIDE BRANCHES AND DEAD WOOD. CUTS SHALL BE MADE 6 TO 8 INCHES FROM THE GROUND. THE HARVESTING SITE MUST BE LEFT CLEAN. EXCESS WOODY DEBRIS SHALL BE PILED NEATLY AND/OR EVENLY DISTRIBUTED AROUND THE HARVEST SITE.
 - BINDING: CUTTINGS SHALL BE BOUND TOGETHER SECURELY WITH TWINE AT THE COLLECTION SITE, IN GROUPS OF 10, 25, OR 50 FOR EASE OF HANDLING, COUNTING, AND PROTECTION DURING TRANSPORT. DIP THE TOP 6" OF CUTTINGS IN NATURALLY COLORED LATEX PAINT, LET DRY, THEN WRAP CUTTINGS IN MOIST/SATURATED FABRIC, BURLAP OR SIMILAR MATERIAL.
 - STORAGE AND TRANSPORTATION: IF NOT PLANTED IMMEDIATELY, STORE AND MAINTAIN CUTTINGS IN A MOIST, DARK CELLAR, CAVE, OR REFRIGERATOR BETWEEN 32 AND 40 DEGREES (F) FOR NO LONGER THAN 8 MONTHS UNTIL TIME OF PLANTING. CUTTINGS SHALL BE PROTECTED FROM SUN, FREEZING AND DRYING DURING TRANSPORTATION AND AT ALL TIMES.
 - DELIVERY AND PLANTING: CUTTINGS SHALL BE PLANTED ON THE SAME DAY AS DELIVERY TO THE SITE. CUTTINGS THAT CAN NOT BE PLANTED ON THE SAME DAY SHALL BE PLACED BACK IN DARK/COLD STORAGE UNTIL THEY CAN BE PLANTED. CUTTINGS SHALL BE INSPECTED AND APPROVED UPON DELIVERY, AT THE STORAGE FACILITY, OR THEIR SOURCE. COMPLETELY SUBMERGE AND SOAK CUTTINGS BETWEEN 3 AND 7 DAYS TO FULLY HYDRATE IMMEDIATELY PRIOR TO PLANTING.
 - OPTIMALLY, PLANTING OF CUTTINGS SHOULD OCCUR IN EARLY SPRING WHEN WATER IS AT NORMAL LOW FLOW LEVELS (APPROX. APRIL 15 TO MAY 15). IF PROJECT TIMING DICTATES, CUTTINGS MAY HAVE TO BE PLANTED IN THE FALL AFTER LEAF-DROP (APPROX. OCT. 1 TO DEC. 31). RUN-OFF CONDITIONS WILL VARY FROM YEAR TO YEAR, MONTH TO MONTH AND MUST BE MONITORED BY THE CONTRACTOR.
 - CUTTINGS SHALL BE PLANTED IN ROWS STARTING APPROX. 0.5 FEET ABOVE THE NORMAL WATER SURFACE ELEVATION IN THE CAPILLARY FRINGE (MOIST SOIL) OR UP TO AN ELEVATION IN WHICH THE BOTTOM OF THE CUTTINGS WILL REACH THE LOCAL WATER TABLE ONCE INSTALLED. MECHANICAL OR HAND DRIVEN STINGERS SHALL BE USED TO CREATE A HOLE WIDE ENOUGH TO EASILY INSERT CUTTINGS TO THE DEPTH INDICATED ON THE DETAIL. INSERT CUTTINGS SO THAT BUDS POINT SKYWARD. BACK FILL/PUDDLE PLANTING PIT WITH MUD IN SEPARATE "LIFTS" AS NECESSARY TO AVOID AIR POCKETS. WATER BETWEEN EACH LIFT, AND TAMP TO ELIMINATE VOIDS TO ENSURE SOIL IS IN CONTACT WITH CUTTINGS. TAMPING SHOULD CREATE A SLIGHT SAUCER AROUND EACH CUTTING TO CAPTURE AND HOLD NATURAL PRECIPITATION.
 - CUTTINGS SHALL BE INSERTED SO THAT NO GREATER THAN 6 INCHES ARE ABOVE THE GROUND. THE TOPS OF CUTTINGS SHALL BE TRIMMED SQUARE, NOT ANGLED. THIS DOES NOT ELIMINATE THE NEED TO PLANT CUTTINGS TO THEIR SPECIFIED DEPTH.

WC WILLOW CUTTING DETAIL
CROSS-SECTION NTS

AS-BUILT
6/19/2018

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/31/2018 | Comment Revisions |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

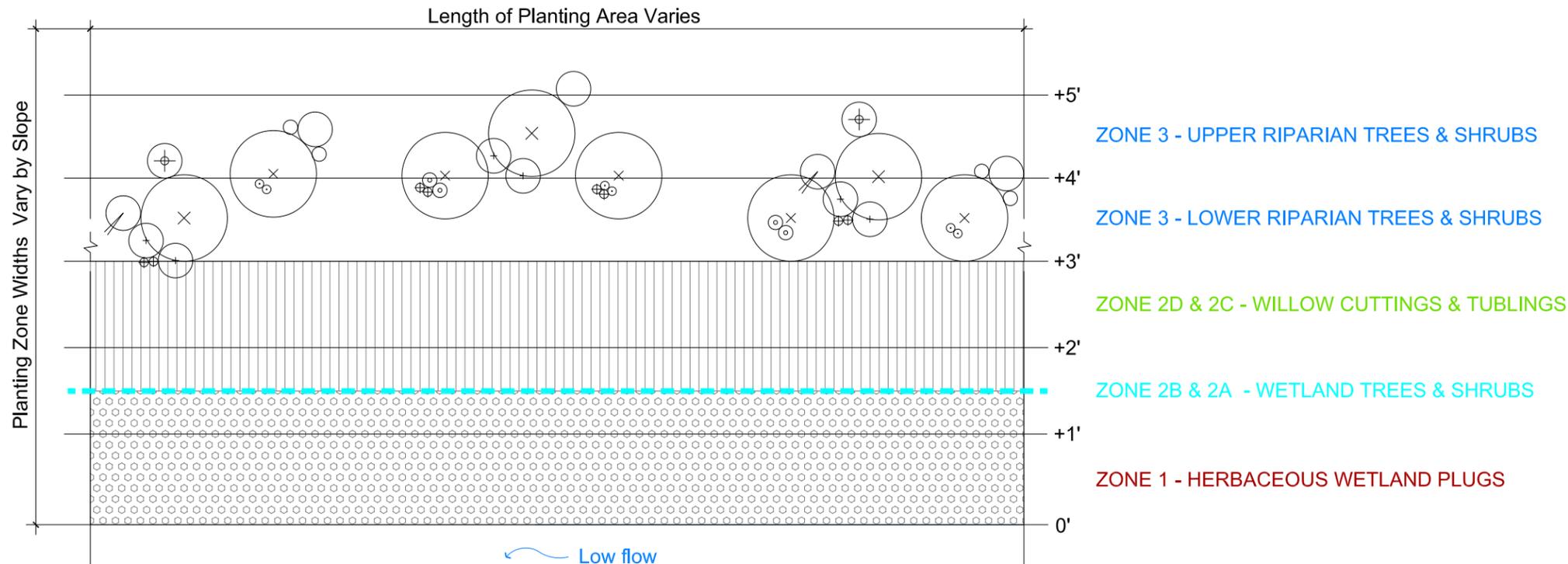
1445 WASHBURN STREET
ERIE, COLORADO 80516
(970) 949-3123/3267

ecosystem services

ST. VRAIN CREEK REACH 3
TYPICAL PLANTING DETAILS

| | |
|--|--------------------|
| SCALE VERIFICATION: | 0' = 1" |
| IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | |
| Drawn by: | JBD |
| Designed by: | ECOS |
| Checked by: | GEG |
| Scale: | As Shown |
| Project No. | 110668 |
| Date: | September 19, 2017 |
| SHEET | LD3 |

C:\Users\St.Vrain\Bentley\Layouts\Detail\ECOS\As-Built\DWG_SAVED\2018\18_PRINTED\20181018



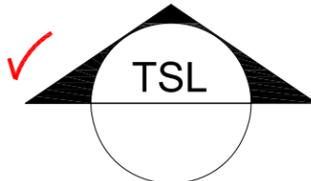
KEY:

-  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)
-  ZONE 2D & 2C - WILLOW CUTTINGS & TUBLINGS (SAL EXI & SAL IRR)
-  ZONE 2B & 2A - WETLAND TREES & SHRUBS (VARIOUS SPECIES)
-  ZONE 1 - WETLAND HERBS (VARIOUS SPECIES)

REFER TO PLANT SCHEDULES FOR PLANT SPECIES SYMBOLOGY & SPACING

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 - CRY 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
2. REPEAT PATTERN SHOWN WITHIN PLANTING AREAS SHOWN ON THE PLANS.
3. WIDTH OF PLANTING ZONES MAY VARY (COMPRESS OR EXPAND) DEPENDING BANK SLOPE, WIDTH OF FLOODPLAIN, PROPERTY OWNERSHIP, PROJECT BOUNDARY & LIMITS OF DISTURBANCE.



TREE AND SHRUB LAYOUT PATTERN & ZONATION DETAIL
PLAN NTS

AS-BUILT
6/19/2018

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for As-Built Conditions |
| 4 | 7/31/2018 | Comment Revisions |

EA Engineering Analytics, Inc.
1600 Speer Point Blvd., Suite 200
Fort Collins, CO 80525
(970) 488-3111

1455 WASHBURN STREET
ERIE, COLORADO 80516
(P) 970-412-3267

ecosystem services

ST. VRAIN CREEK REACH 3
TYPICAL PLANTING
LAYOUT DETAILS

| | |
|---|--------------------|
| SCALE VERIFICATION: 0' = 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY. | |
| Drawn by: | JBD |
| Designed by: | ECOS |
| Checked by: | GEG |
| Scale: | As Shown |
| Project No.: | 110668 |
| Date: | September 19, 2017 |
| SHEET | LD4 |

ST. VRAIN RIVER - REACH 3 RESTORATION (80% DESIGN)

| | | ACRES (BY PLANTING ZONE): | | | | |
|---------------|------|---------------------------|---------|---------|------|-----------|
| Seeds per SF: | 50 | 1 | 2A & 2B | 2C & 2D | 3 | SEED ONLY |
| TOTAL ACRES: | 41.7 | - | - | - | 21.0 | 20.7 |

UPPER RIPARIAN SEED SCHEDULE

4/13/2017

| Scientific Name | Common Name | Variety | Region 5 Indicator Status | Seasonality | * Percent of Mix | Seeds per SF | Seeds per AC | * Seeds per LB | * LBS/PLS per AC | Drill Seeding Total LBS | Broadcast Seeding Total LBS |
|---|--------------------------|---------|---------------------------|-------------|------------------|--------------|--------------|----------------|------------------|-------------------------|-----------------------------|
| <i>Bouteloua curtipendula</i> | side-oats grama | TBD | UPL | W | 5.0% | 2.5 | 108900 | 191,000 | 0.57 | 23.78 | 47.55 |
| <i>Bouteloua gracilis</i> | blue grama | TBD | UPL | W | 15.0% | 7.5 | 326700 | 825,000 | 0.40 | 16.51 | 33.03 |
| <i>Koeleria macrantha</i> | Prairie Junegrass | TBD | UPL | C | 5.0% | 2.5 | 108900 | 2,315,400 | 0.05 | 1.96 | 3.92 |
| <i>Hesperostipa comata</i> | needle-and-thread | TBD | UPL | C | 5.0% | 2.5 | 108900 | 115,000 | 0.95 | 39.49 | 78.98 |
| <i>Nassella viridula</i> | green needlegrass | TBD | UPL | C | 5.0% | 2.5 | 108900 | 181,000 | 0.60 | 25.09 | 50.18 |
| <i>Achnatherum hymenoides</i> | indian ricegrass | TBD | FACU | C | 5.0% | 2.5 | 108900 | 141,000 | 0.77 | 32.21 | 64.41 |
| <i>Elymus canadensis</i> | Canada wildrye | TBD | FACU | C | 7.5% | 3.8 | 163350 | 115,000 | 1.42 | 59.23 | 118.46 |
| <i>Elymus trachycaulus</i> | slender wheatgrass | TBD | FACU | C | 5.0% | 2.5 | 108900 | 159,000 | 0.68 | 28.56 | 57.12 |
| <i>Pascopyrum smithii</i> | western wheatgrass | TBD | FACU | C | 15.0% | 7.5 | 326700 | 110,000 | 2.97 | 123.85 | 247.70 |
| <i>Schizachyrium scoparium</i> | little bluestem | TBD | FACU | W | 5.0% | 2.5 | 108900 | 260,000 | 0.42 | 17.47 | 34.93 |
| <i>Elymus elymoides</i> | bottlebrush squarreltail | TBD | FACU | W | 5.0% | 2.5 | 108900 | 192,000 | 0.57 | 23.65 | 47.30 |
| <i>Sporobolus cryptandrus</i> | sand dropseed | TBD | FACU | W | 5.0% | 2.5 | 108900 | 5,298,000 | 0.02 | 0.86 | 1.71 |
| <i>Elymus lancoletatus psammophilus</i> | streambank wheatgrass | TBD | FACU | C | 5.0% | 2.5 | 108900 | 156,000 | 0.70 | 29.11 | 58.22 |
| <i>Panicum virgatum</i> | switchgrass | TBD | FAC | W | 7.5% | 3.8 | 163350 | 389,000 | 0.42 | 17.51 | 35.02 |
| <i>Sporobolus airoides</i> | alkali sacaton | TBD | FAC | W | 5.0% | 2.5 | 108900 | 1,758,000 | 0.06 | 2.58 | 5.17 |
| | | | | | 100.0% | 50.0 | | | 10.60 | 441.85 | 883.71 |

NOTES:
 All planting areas are to be seeded in addition to the those areas designated as "Seeding Only. (Refer to seed schedules)
 Upper riparian seeding areas include planting Zone 3 and Seed Only areas.
 All planting and seeding efforts shown on the plans in all zones are intended to increase soil cohesion, reduce erosion potential, stabilize sediment and enhance the resiliency of the streambanks and riparian corridor within the project limits.
 Seed shall be delivered individually bagged, not pre-mixed.
 Species listed above sorted by indicator status first, then alphabetical.
 Indicator Status derived from national List of Plant Species That Occur in Wetlands (Region 5 - Great Plains).

ST. VRAIN RIVER - REACH 3 RESTORATION (80% DESIGN)

| | | ACRES (BY PLANTING ZONE): | | | | |
|---------------|------|---------------------------|---------|---------|---|-----------|
| Seeds per SF: | 50 | 1 | 2A & 2B | 2C & 2D | 3 | SEED ONLY |
| TOTAL ACRES: | 17.1 | 1.5 | 0.6 | 15.0 | - | - |

LOWER RIPARIAN SEED SCHEDULE

4/13/2017

| Scientific Name | Common Name | Variety | Region 5 Indicator Status | Seasonality | * Percent of Mix | Seeds per SF | Seeds per AC | * Seeds per LB | * LBS/PLS per AC | Drill Seeding Total LBS | Broadcast Seeding Total LBS |
|----------------------------------|---------------------|---------|---------------------------|-------------|------------------|--------------|--------------|----------------|------------------|-------------------------|-----------------------------|
| <i>Panicum virgatum</i> | switchgrass | TBD | FAC | W | 5.0% | 2.5 | 108900 | 389,000 | 0.01 | 0.17 | 0.34 |
| <i>Carex praegracilis</i> | meadow sedge | TBD | FACW | C | 5.0% | 2.5 | 108900 | 1,816,000 | 0.06 | 1.03 | 2.05 |
| <i>Pascopyrum smithii</i> | western wheatgrass | TBD | FACU | C | 10.0% | 5.0 | 217800 | 110,000 | 1.98 | 33.86 | 67.72 |
| <i>Distichlis spicata</i> | inland saltgrass | TBD | FACW | W | 5.0% | 2.5 | 108900 | 520,000 | 0.21 | 3.58 | 7.16 |
| <i>Juncus tenuis</i> | Poverty rush | TBD | FACW | C | 5.0% | 2.5 | 108900 | 51,300,000 | 0.00 | 0.04 | 0.07 |
| <i>Juncus torreyi</i> | Torrey rush | TBD | FACW | C | 5.0% | 2.5 | 108900 | 12,300,000 | 0.01 | 0.17 | 0.34 |
| <i>Salix exigua</i> | Sandbar willow | TBD | FACW | C | 15.0% | 7.5 | 326700 | 10,000,000 | 0.03 | 0.56 | 1.12 |
| <i>Spartina pectinata</i> | prairie cordgrass | TBD | FACW | W | 5.0% | 2.5 | 108900 | 197,000 | 0.55 | 9.45 | 18.91 |
| <i>Carex emoryi</i> | Emory's sedge | TBD | OBL | C | 10.0% | 5.0 | 217800 | 485,000 | 0.45 | 7.68 | 15.36 |
| <i>Carex nebrascensis</i> | Nebraska sedge | TBD | OBL | C | 5.0% | 2.5 | 108900 | 534,100 | 0.20 | 3.49 | 6.97 |
| <i>Carex pellita</i> | woolly sedge | TBD | OBL | C | 5.0% | 2.5 | 108900 | 312,075 | 0.35 | 5.97 | 11.93 |
| <i>Glyceria grandis</i> | American mannagrass | TBD | OBL | C | 5.0% | 2.5 | 108900 | 1,280,000 | 0.09 | 1.45 | 2.91 |
| <i>Juncus balticus</i> | Baltic rush | TBD | OBL | C | 10.0% | 5.0 | 217800 | 8,000,000 | 0.03 | 0.47 | 0.93 |
| <i>Schoenoplectus americanus</i> | three-square | TBD | OBL | C | 5.0% | 2.5 | 108900 | 400,000 | 0.27 | 4.66 | 9.31 |
| <i>Scirpus microcarpus</i> | small fruit bulrush | TBD | OBL | C | 5.0% | 2.5 | 108900 | 4,500,000 | 0.02 | 0.41 | 0.83 |
| | | | | | 100.0% | 50.0 | | | 4.27 | 72.98 | 145.95 |

NOTES:
 All planting areas are to be seeded in addition to the those areas designated as "Seeding Only. (Refer to seed schedules)
 Lower riparian seeding areas include planting Zones 1, 2A, 2B, 2C, and 2D.
 All planting and seeding efforts shown on the plans in all zones are intended to increase soil cohesion, reduce erosion potential, stabilize sediment and enhance the resiliency of the streambanks and riparian corridor within the project limits.
 Seed shall be delivered individually bagged, not pre-mixed.
 Species listed above sorted by indicator status first, then alphabetical.
 Indicator Status derived from national List of Plant Species That Occur in Wetlands (Region 5 - Great Plains).

ST. VRAIN RIVER - REACH 3 RESTORATION (80% DESIGN)

| | | ACRES (BY PLANTING ZONE): | | | | |
|---------------|------|---------------------------|---------|---------|------|-----------|
| Seeds per SF: | 25 | 1 | 2A & 2B | 2C & 2D | 3 | SEED ONLY |
| TOTAL ACRES: | 41.7 | - | - | - | 21.0 | 20.7 |

UPPER RIPARIAN FORB SEED SCHEDULE

4/13/2017

| Scientific Name | Common Name | Variety | * Percent of Mix | Seeds per SF | Seeds per AC | * Seeds per LB | * LBS/PLS per AC | Drill Seeding Total LBS | Broadcast Seeding Total LBS |
|-------------------------------------|----------------------|-------------|------------------|--------------|--------------|----------------|------------------|-------------------------|-----------------------------|
| <i>Artemisia frigida</i> | silver sage | TBD | 20.0% | 5.0 | 217800 | 449,600 | 0.48 | 20.20 | 40.40 |
| <i>Ericameria nauseosa</i> | rubber rabbitbrush | TBD | 20.0% | 5.0 | 217800 | 400,000 | 0.54 | 22.71 | 45.41 |
| <i>Gaillardia aristata</i> | perennial gaillardia | TBD | 20.0% | 5.0 | 217800 | 132,000 | 1.65 | 68.81 | 137.61 |
| <i>Linum lewisii</i> | blue flax | Maple grove | 20.0% | 5.0 | 217800 | 170,000 | 1.28 | 53.43 | 106.85 |
| <i>Machaeranthera tanacetifolia</i> | prairie aster | TBD | 20.0% | 5.0 | 217800 | 408,000 | 0.53 | 22.26 | 44.52 |
| | | | 100.0% | 25 | | | 4.49 | 187.40 | 374.79 |

NOTES:
 All planting areas are to be seeded in addition to the those areas designated as "Seeding Only. (Refer to seed schedules)
 Lower riparian seeding areas include planting Zones 1, 2A, 2B, 2C, and 2D.
 All planting and seeding efforts shown on the plans in all zones are intended to increase soil cohesion, reduce erosion potential, stabilize sediment and enhance the resiliency of the streambanks and riparian corridor within the project limits.
 Seed shall be delivered individually bagged, not pre-mixed.
 Species listed above sorted by indicator status first, then alphabetical.
 Indicator Status derived from national List of Plant Species That Occur in Wetlands (Region 5 - Great Plains).

ST. VRAIN RIVER - REACH 3 RESTORATION (80% DESIGN)

| | | ACRES (BY PLANTING ZONE): | | | | |
|---------------|------|---------------------------|---------|---------|---|-----------|
| Seeds per SF: | 25 | 1 | 2A & 2B | 2C & 2D | 3 | SEED ONLY |
| TOTAL ACRES: | 17.1 | 1.5 | 0.6 | 15.0 | - | - |

LOWER RIPARIAN FORB SEED SCHEDULE

4/13/2017

| Scientific Name | Common Name | Variety | * Percent of Mix | Seeds per SF | Seeds per AC | * Seeds per LB | * LBS/PLS per AC | Drill Seeding Total LBS | Broadcast Seeding Total LBS |
|-----------------------------|-----------------------|---------|------------------|--------------|--------------|----------------|------------------|-------------------------|-----------------------------|
| <i>Asclepias incarnata</i> | swamp milkweed | TBD | 15.0% | 3.8 | 163350 | 68,000 | 2.40 | 41.08 | 82.16 |
| <i>Asclepias speciosa</i> | showy milkweed | TBD | 15.0% | 3.8 | 163350 | 58,000 | 2.82 | 48.16 | 96.32 |
| <i>Glycyrrhiza lepidota</i> | wild licorice | TBD | 10.0% | 2.5 | 108900 | 58,000 | 1.88 | 32.11 | 64.21 |
| <i>Helianthus nuttallii</i> | Nuttall's sunflower | TBD | 15.0% | 3.8 | 163350 | 216,800 | 0.75 | 12.88 | 25.77 |
| <i>Monarda fistulosa</i> | wild bergamot/beebalm | TBD | 15.0% | 3.8 | 163350 | 1,272,500 | 0.13 | 2.20 | 4.39 |
| <i>Solidago canadensis</i> | Canada goldenrod | TBD | 15.0% | 3.8 | 163350 | 1,950,400 | 0.08 | 1.43 | 2.86 |
| <i>Verbena hastata</i> | blue vervain | TBD | 15.0% | 3.8 | 163350 | 1,792,800 | 0.09 | 1.56 | 3.12 |
| | | | 100.0% | 25 | | | 8.15 | 139.41 | 278.83 |

NOTES:
 All planting areas are to be seeded in addition to the those areas designated as "Seeding Only. (Refer to seed schedules)
 Seed shall be delivered individually bagged, not pre-mixed.
 All planting and seeding efforts shown on the plans in all zones are intended to increase soil cohesion, reduce erosion potential, stabilize sediment and enhance the resiliency of the streambanks and riparian corridor within the project limits.
 Seed shall be delivered individually bagged, not pre-mixed.
 Species listed above sorted by indicator status first, then alphabetical.
 Indicator Status derived from national List of Plant Species That Occur in Wetlands (Region 5 - Great Plains).

AS-BUILT
6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|------------|--------------------------------|
| 1 | 9/19/2017 | Issued for Construction |
| 2 | 11/07/2017 | Polygon Adjustments |
| 3 | 6/19/2018 | Issued for AS-BUILT Conditions |
| 4 | 7/31/2018 | Comment Revisions |

Engineering Analytics, Inc.
 1600 South Point Road, Suite 200
 Fort Collins, CO 80525
 (970) 488-3111

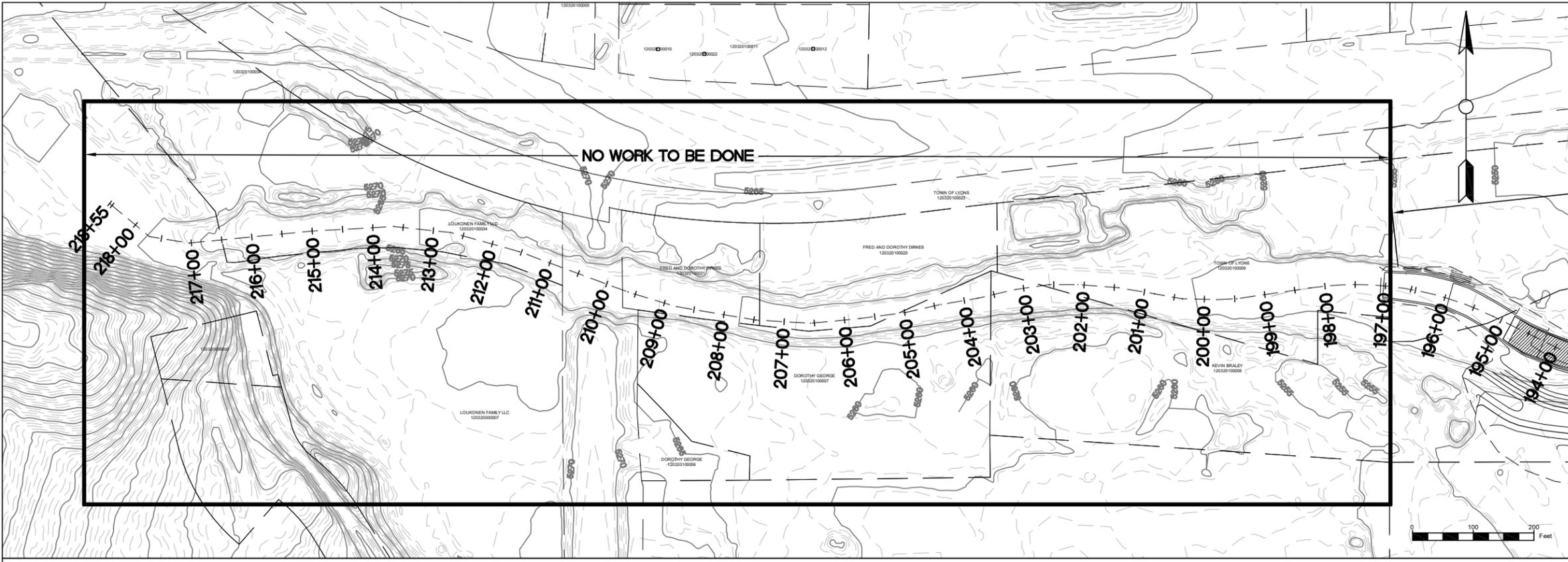
1455 WASHINGTON STREET
 ERIE, COLORADO 80516
 (970) 974-3236
 ecos
 ecosystem services

ST. VRAIN CREEK REACH 3

PLANT SCHEDULES

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.
 Drawn by: JBD
 Designed by: ECOS
 Checked by: GEG
 Scale: As Shown
 Project No. 110668
 Date: September 19, 2017
 SHEET LS1

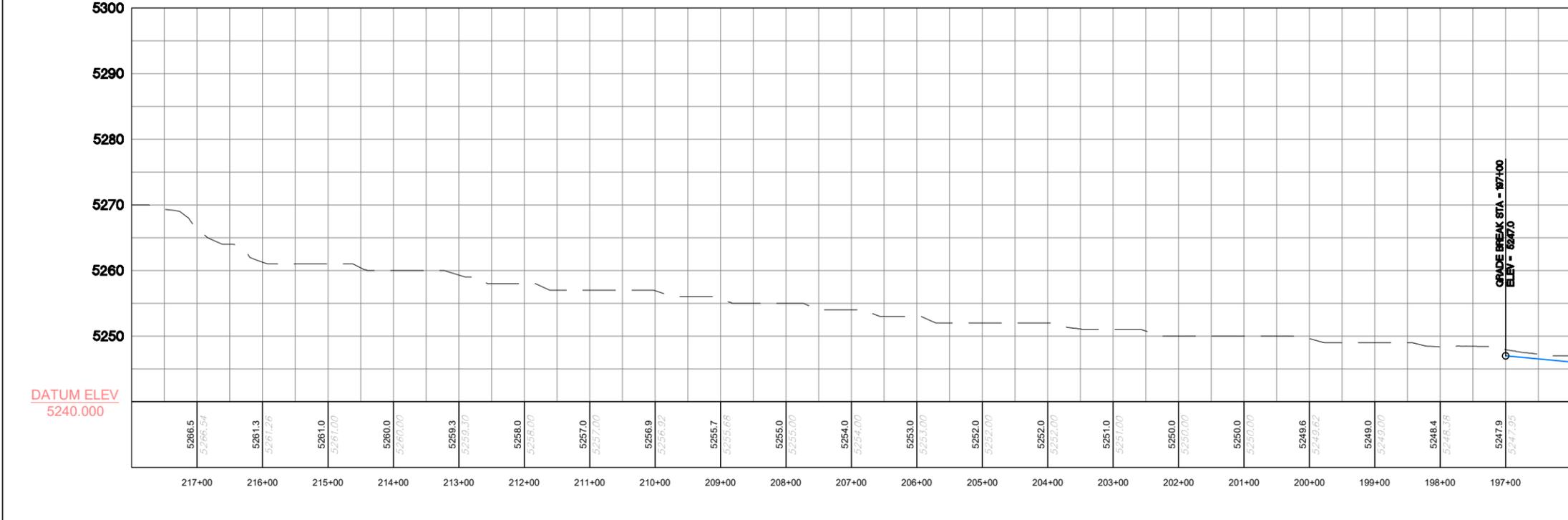
AS-BUILT
6/19/2018



LEGEND

| | |
|--|---------------------------|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | PROPERTY BOUNDARY |

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.



REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

EA Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
3715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 196+57 TO 218+55

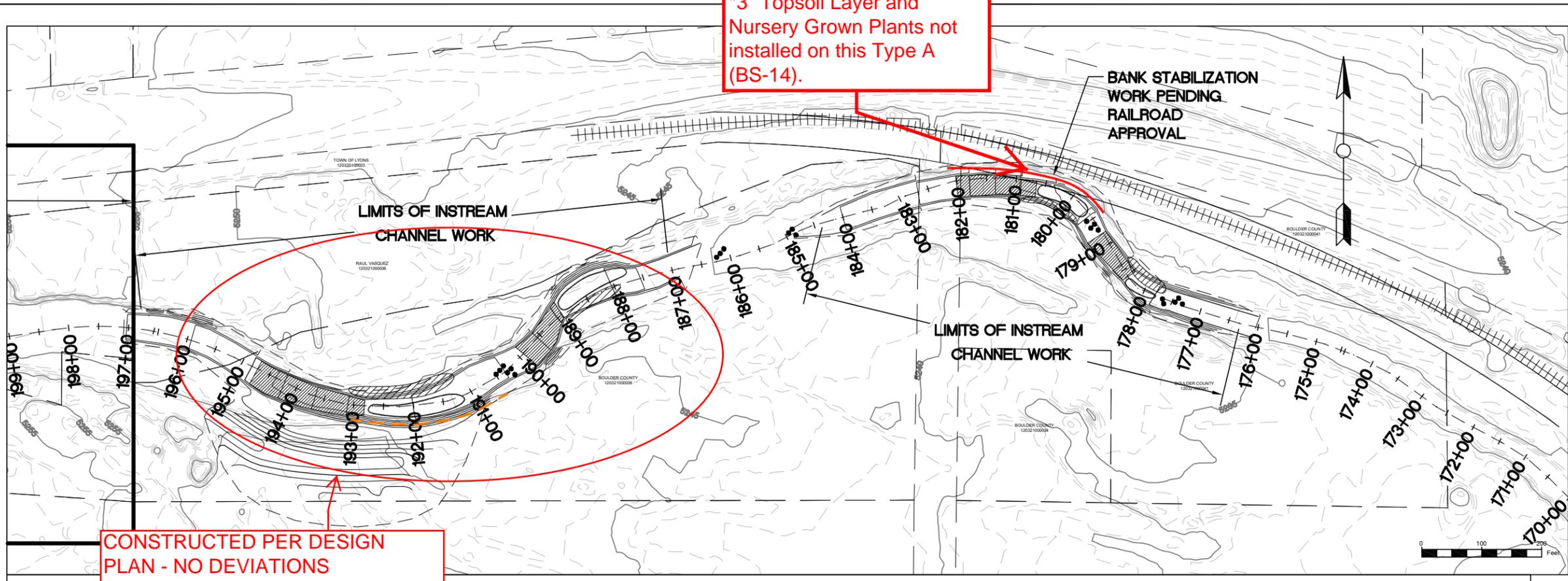
SCALE VERIFICATION:
0 = 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: LIS
Designed by: TJT
Checked by: TJT
Scale: As Shown
Project No. 110666
Date: April 13, 2017



AS-BUILT
6/19/2018

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

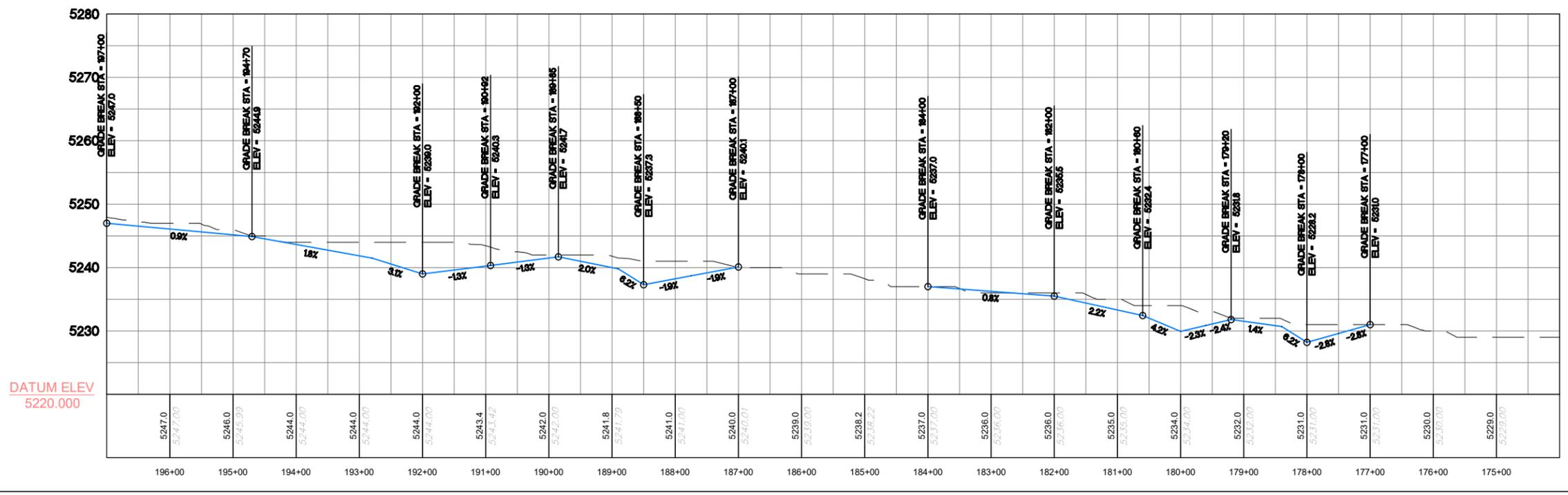


CONSTRUCTED PER DESIGN PLAN - NO DEVIATIONS

LEGEND

| | |
|--|---------------------------|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | PROPERTY BOUNDARY |

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.



REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |



ECOLOGICAL RESOURCES CONSULTANTS, INC.
37715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 174+56 TO 197+57

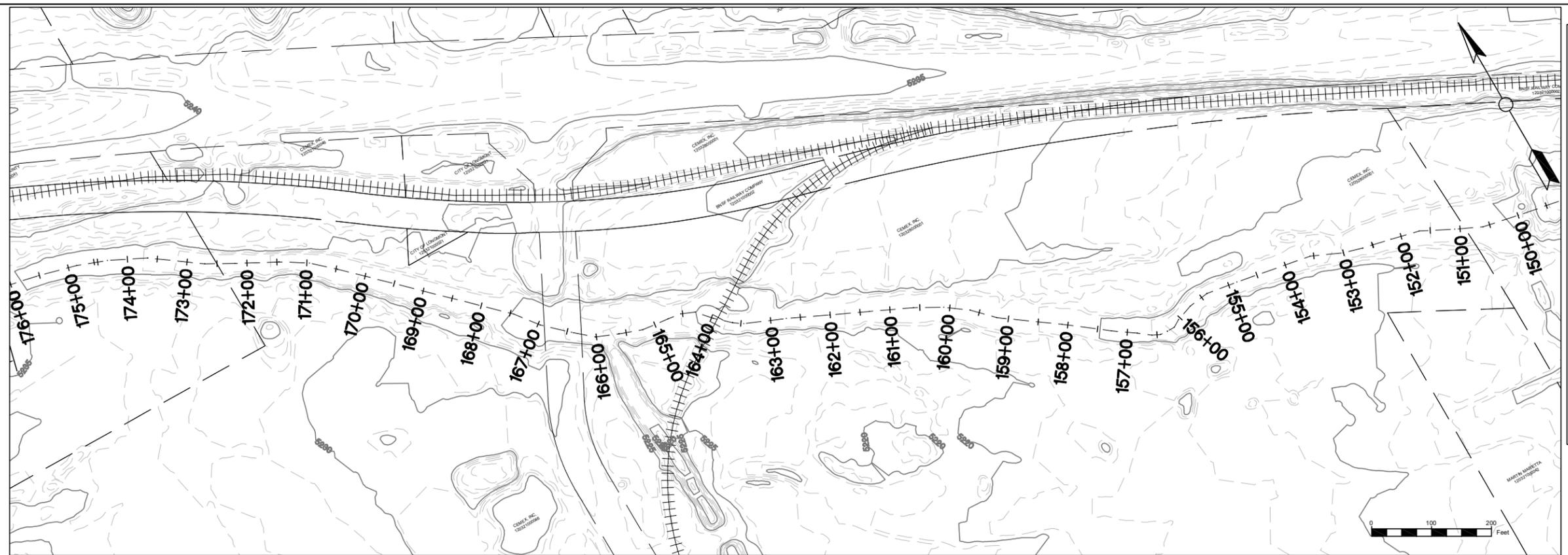
SCALE VERIFICATION:
0 = 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

| | |
|--------------|----------------|
| Drawn by: | ERC |
| Designed by: | ERC |
| Checked by: | ERC |
| Scale: | As Shown |
| Project No.: | 110668 |
| Date: | April 13, 2017 |

SHEET R2

9/19/2017 3:43:13 PM

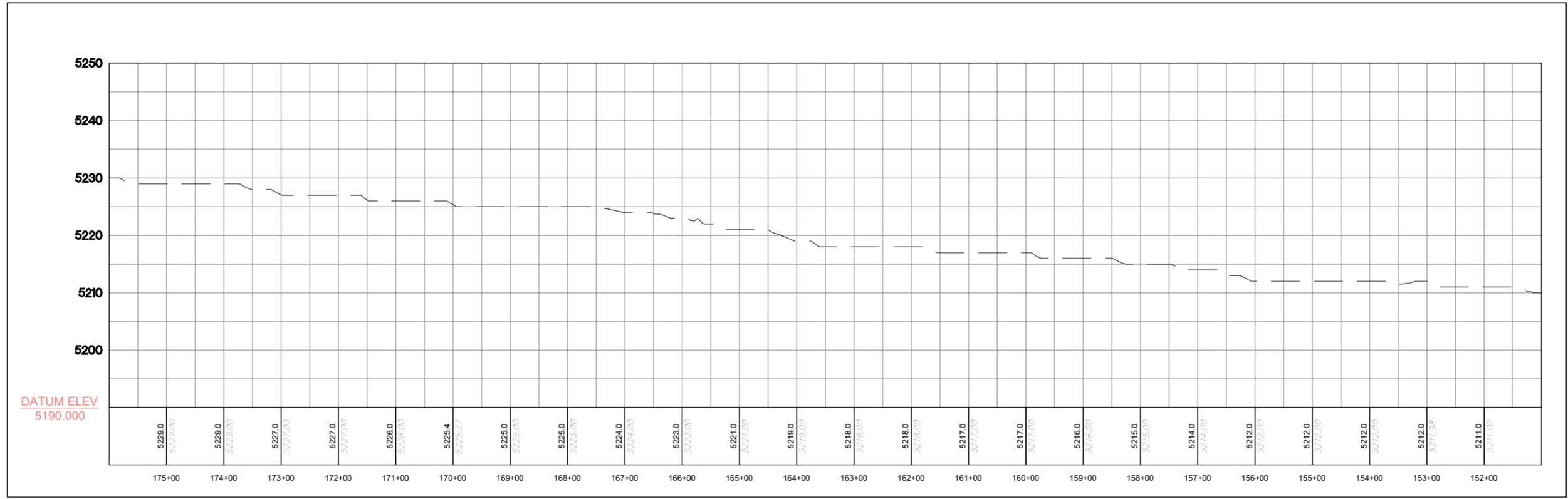
AS-BUILT
6/19/2018



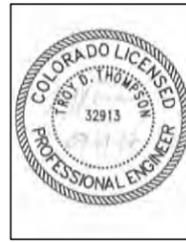
LEGEND

| | |
|--|---------------------------|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | PROPERTY BOUNDARY |

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.



DATUM ELEV
5190.000



REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

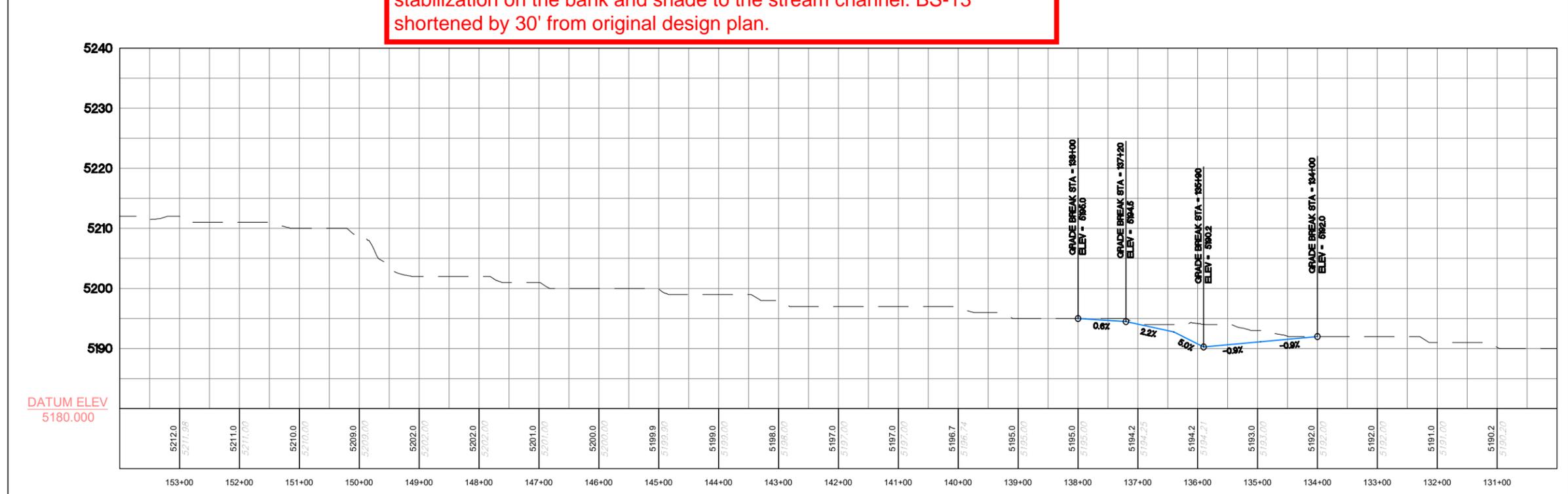
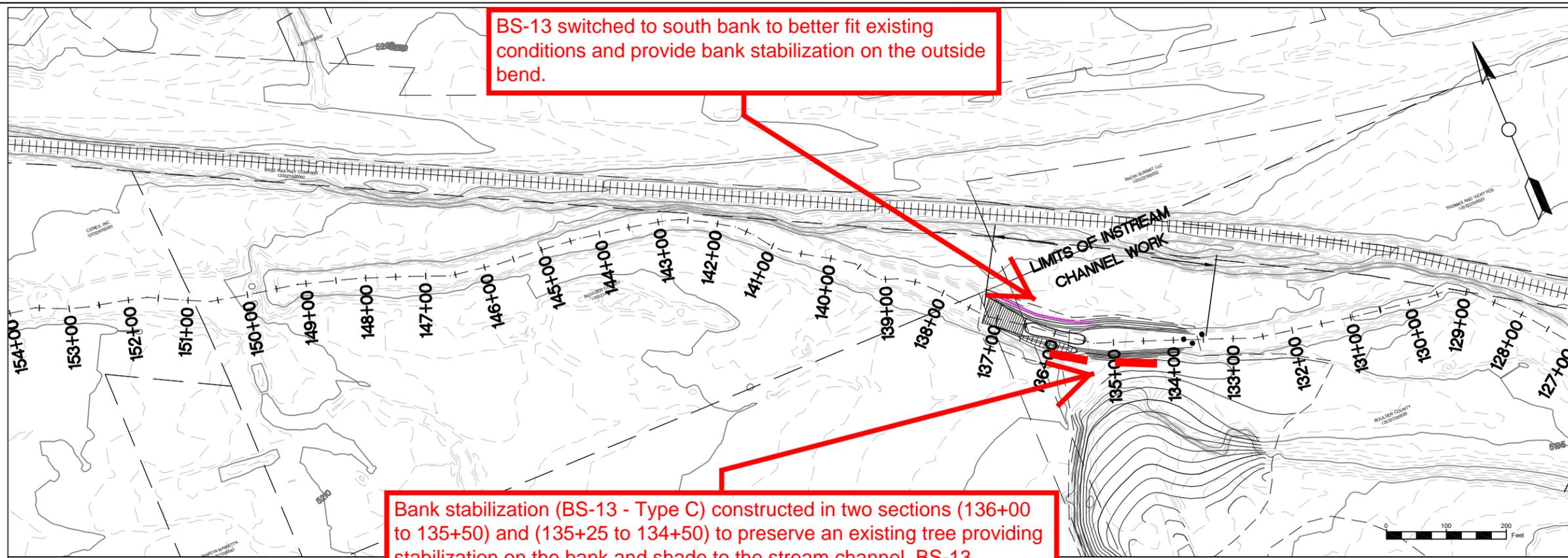
ECOLOGICAL RESOURCES CONSULTANTS, INC.
37715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 152+49 TO 174+56

SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY

Drawn by: ERC
Designed by: ERC
Checked by: ERC
Scale: As Shown
Project No. 110668
Date: April 13, 2017

SHEET
R3



LEGEND

- RIFFLE
- POINT BAR
- POOL
- BOULDER CLUSTER
- TYPE A BANK STABILIZATION
- TYPE B BANK STABILIZATION
- TYPE C BANK STABILIZATION
- TYPE D BANK STABILIZATION
- PROPERTY BOUNDARY

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.

**AS-BUILT
6/19/2018**

REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Fort Collins, CO 80525
 (970) 488-3111

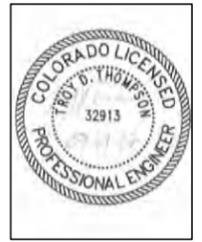
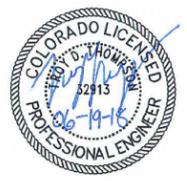
ECOLOGICAL RESOURCES CONSULTANTS, INC.
 37715 US HIGHWAY 40, SUITE 1204
 EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
 STA 130+49 TO 152+49

SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: ERC
 Designed by: ERC
 Checked by: ERC
 Scale: As Shown
 Project No. 110668
 Date: April 13, 2017

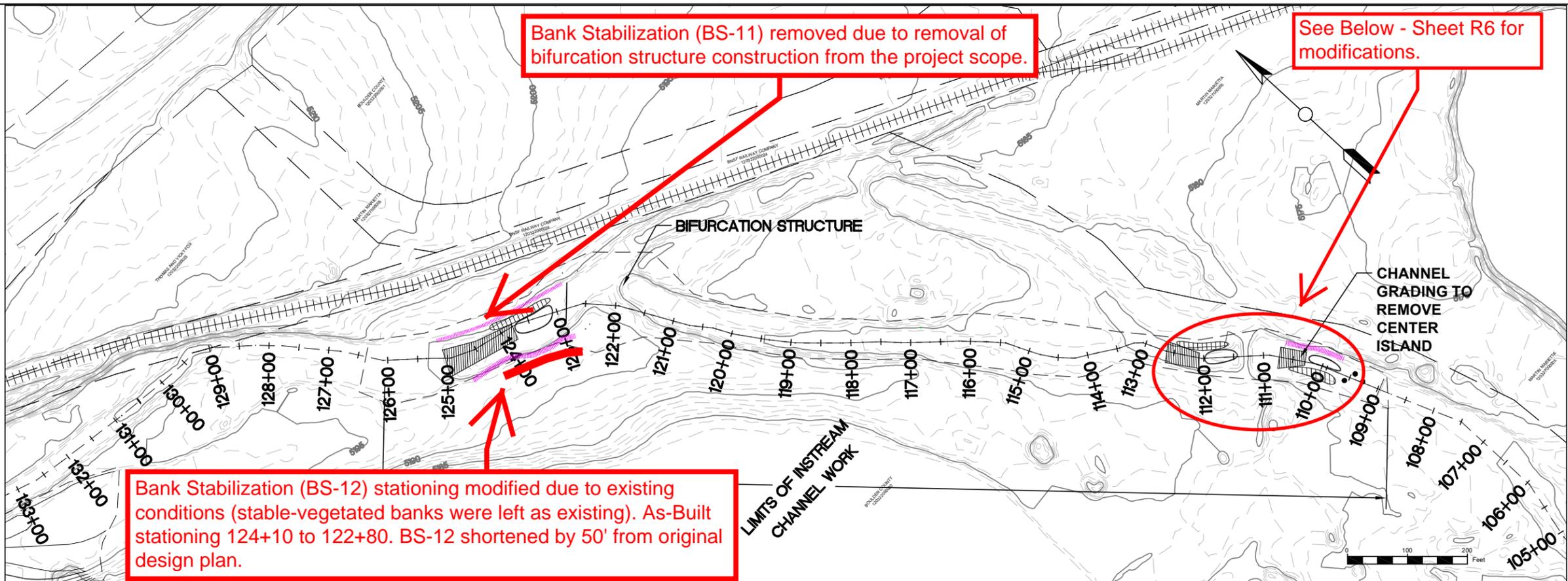
SHEET **R4**



Bank Stabilization (BS-11) removed due to removal of bifurcation structure construction from the project scope.

See Below - Sheet R6 for modifications.

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.



LEGEND

- RIFFLE
- POINT BAR
- POOL
- BOULDER CLUSTER
- TYPE A BANK STABILIZATION
- TYPE B BANK STABILIZATION
- TYPE C BANK STABILIZATION
- TYPE D BANK STABILIZATION
- PROPERTY BOUNDARY

AS-BUILT
6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

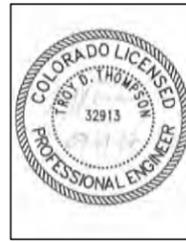
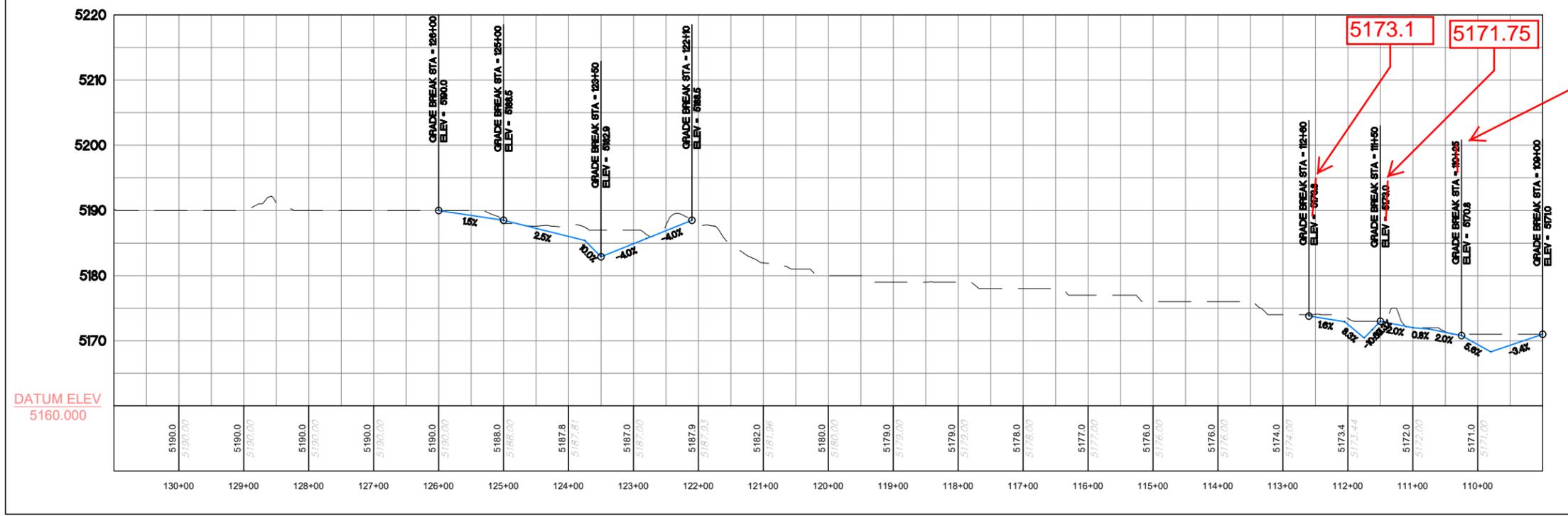
ECOLOGICAL RESOURCES CONSULTANTS, INC.
37115 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 109+92 TO 130+49

SCALE VERIFICATION:
0 = 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: ERC
Designed by: ERC
Checked by: ERC
Scale: As Shown
Project No. 110668
Date: April 13, 2017

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.



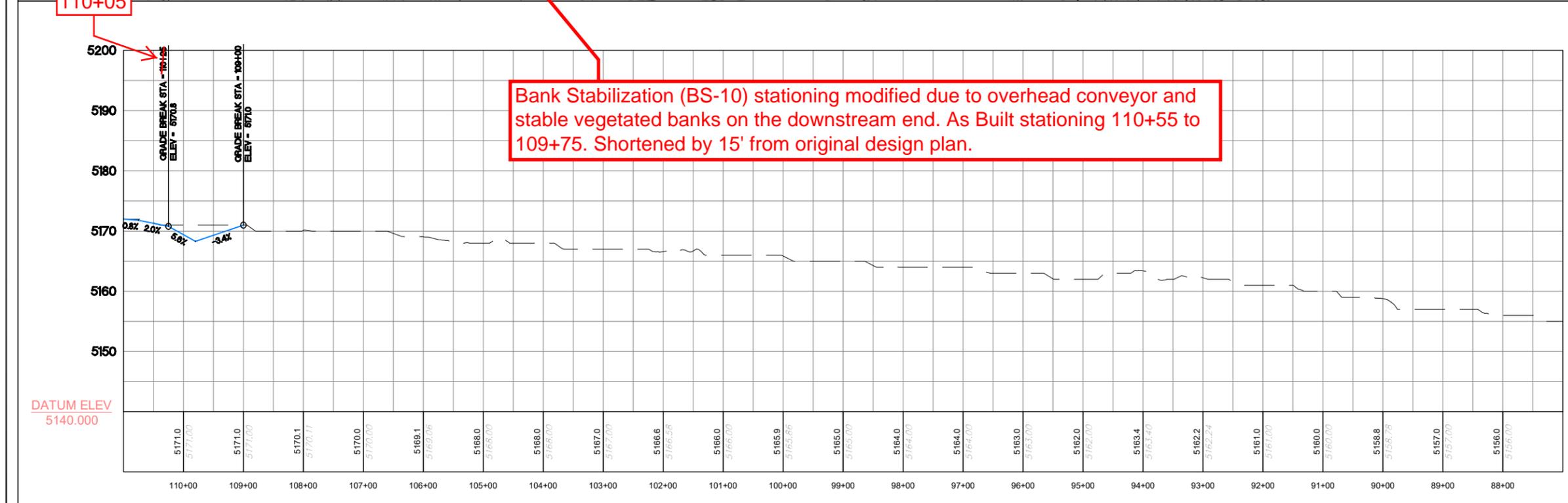
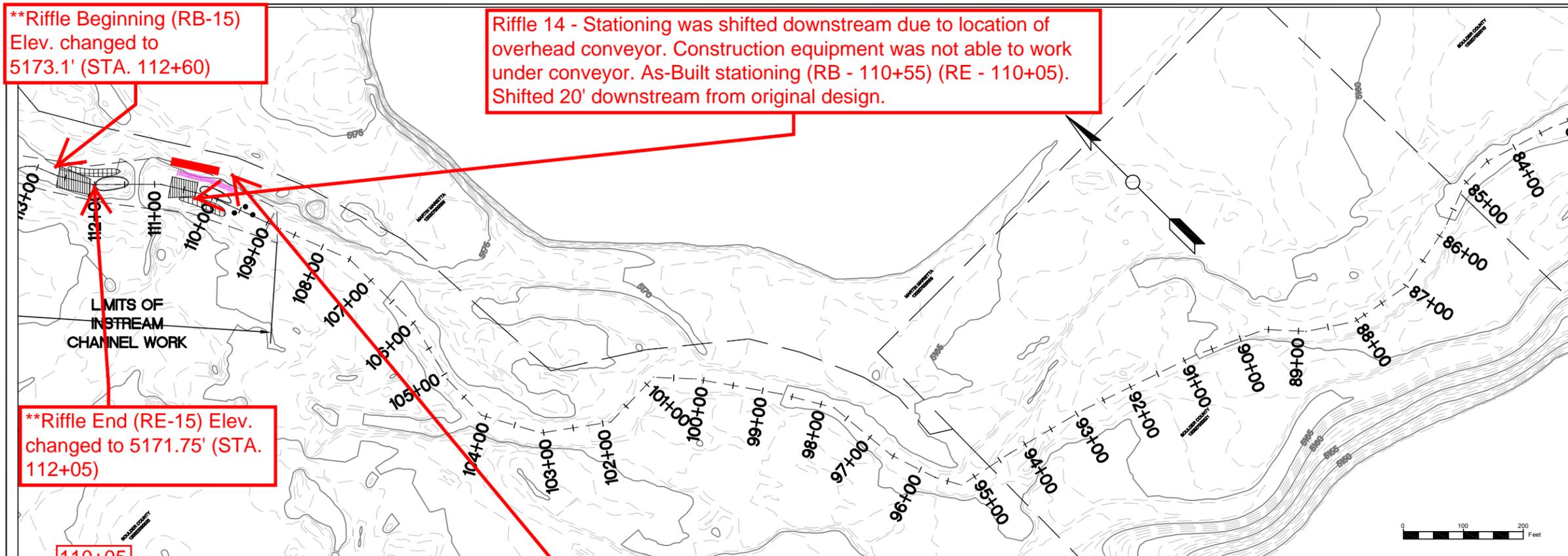
****Riffle Beginning (RB-15)**
Elev. changed to
5173.1' (STA. 112+60)

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

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

Bank Stabilization (BS-10) stationing modified due to overhead conveyer and stable vegetated banks on the downstream end. As Built stationing 110+55 to 109+75. Shortened by 15' from original design plan.

**** 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.**



LEGEND

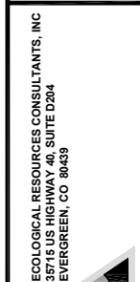
| | |
|--|---------------------------|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | PROPERTY BOUNDARY |

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.

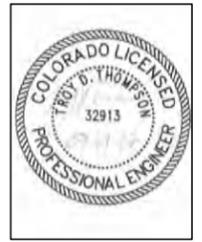
AS-BUILT
6/19/2018

REVISIONS

| Revision | Date | Description |
|----------|----------|-------------------------|
| 1 | 06/19/17 | ISSUED FOR CONSTRUCTION |



ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 87+85 TO 109+92



SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

| | |
|--------------|----------------|
| Drawn by: | ERC |
| Designed by: | ERC |
| Checked by: | ERC |
| Scale: | As Shown |
| Project No.: | 110668 |
| Date: | April 13, 2017 |
| SHEET | R6 |

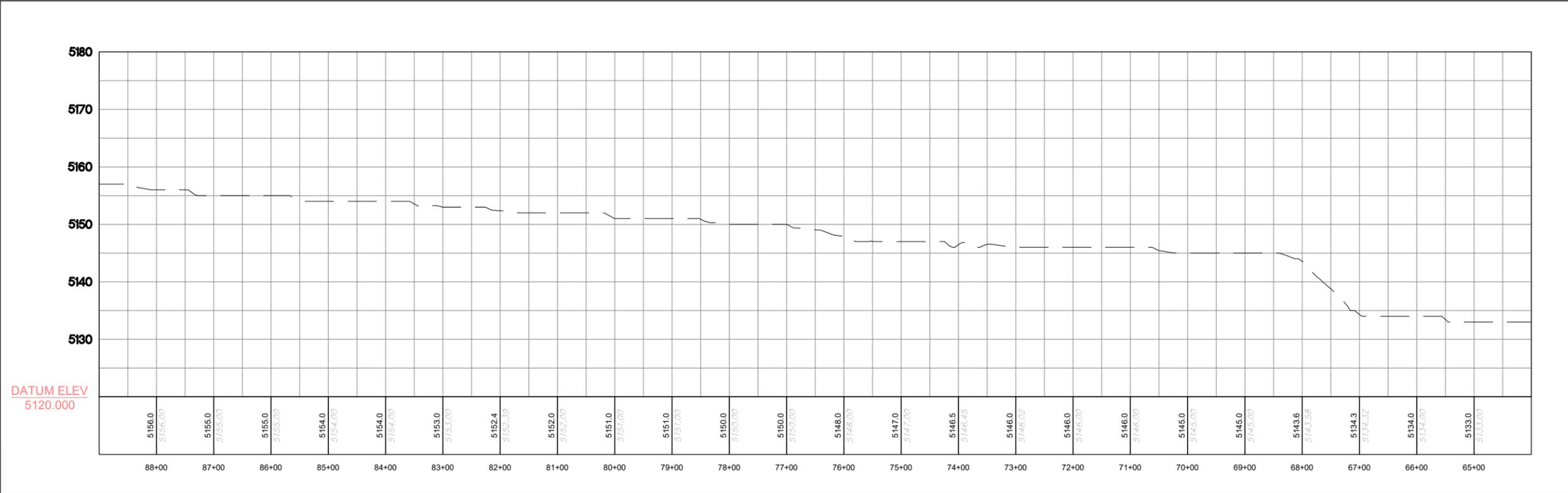
AS-BUILT
6/19/2018



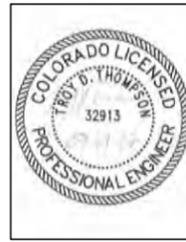
LEGEND

- RIFFLE
- POINT BAR
- POOL
- BOULDER CLUSTER
- TYPE A BANK STABILIZATION
- TYPE B BANK STABILIZATION
- TYPE C BANK STABILIZATION
- TYPE D BANK STABILIZATION
- PROPERTY BOUNDARY

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.



DATUM ELEV
5120.000



REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

EA Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
37715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 65+60 TO 87+85

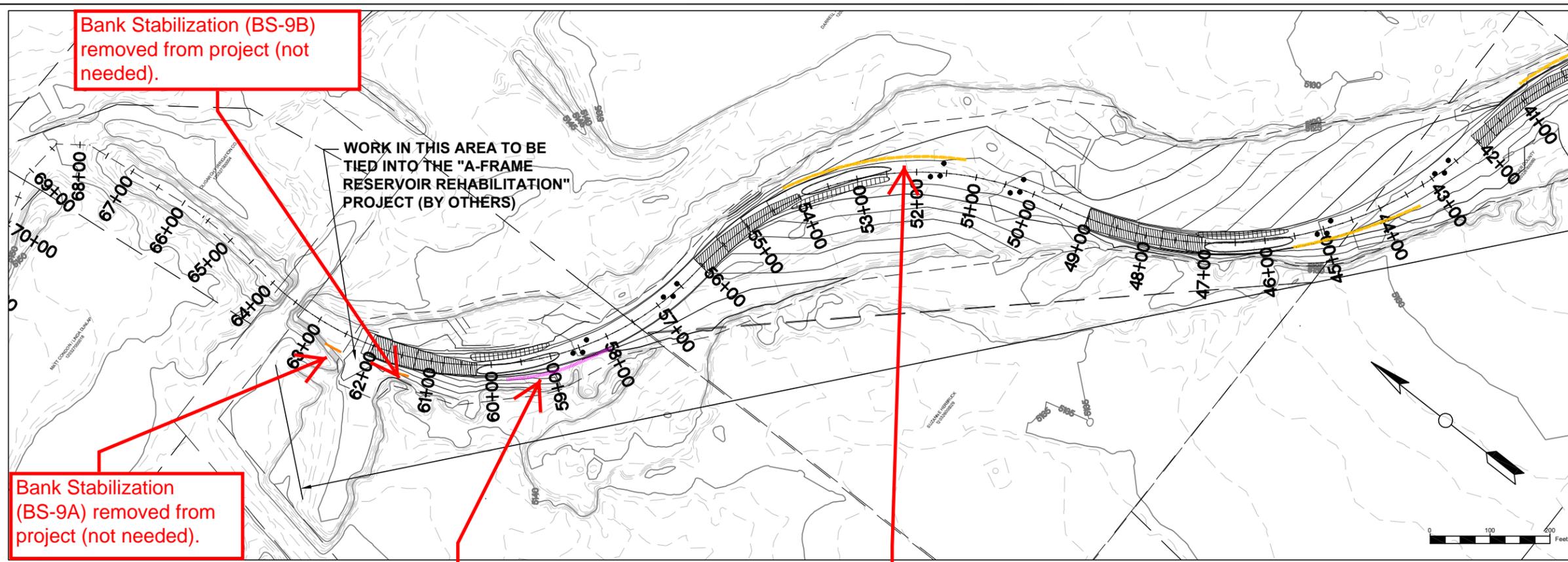
SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: ERC
Designed by: ERC
Checked by: ERC

Scale: As Shown
Project No. 110666
Date: April 13, 2017

SHEET R7

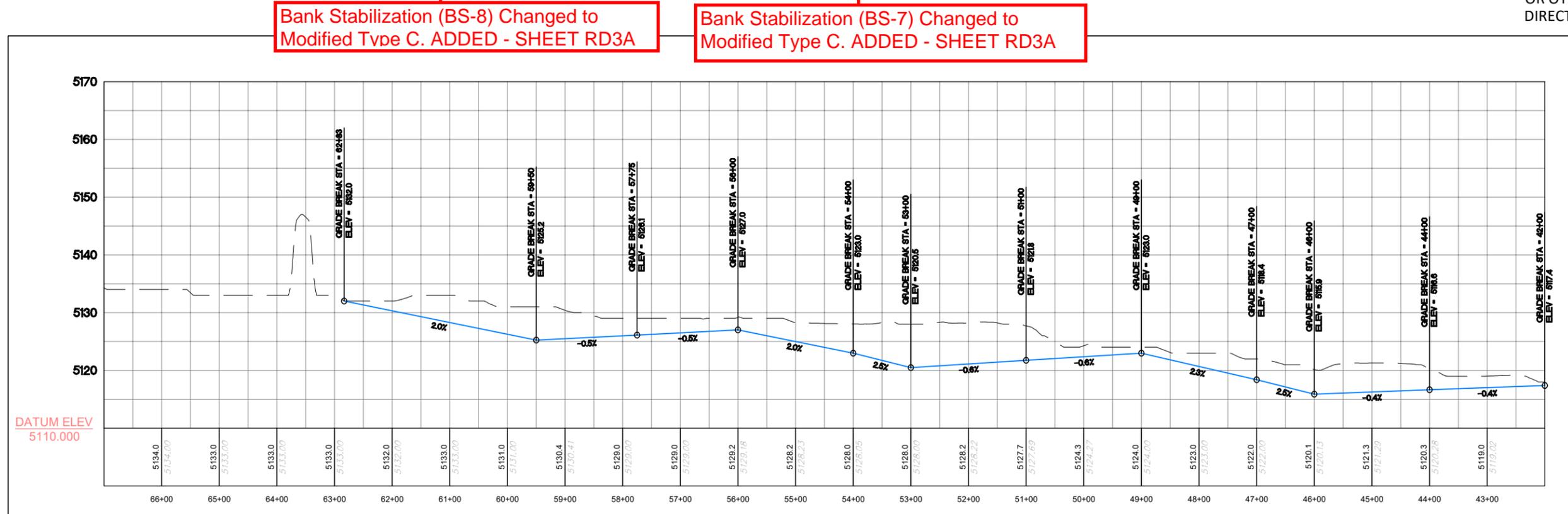
AS-BUILT
6/19/2018



LEGEND

| | |
|--|---------------------------|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | PROPERTY BOUNDARY |

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-8) Changed to Modified Type C. ADDED - SHEET RD3A

Bank Stabilization (BS-7) Changed to Modified Type C. ADDED - SHEET RD3A

REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 485-3111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
3715 US HIGHWAY 40, SUITE 1204
EVERGREEN, CO 80439



ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 43+18 TO 65+60

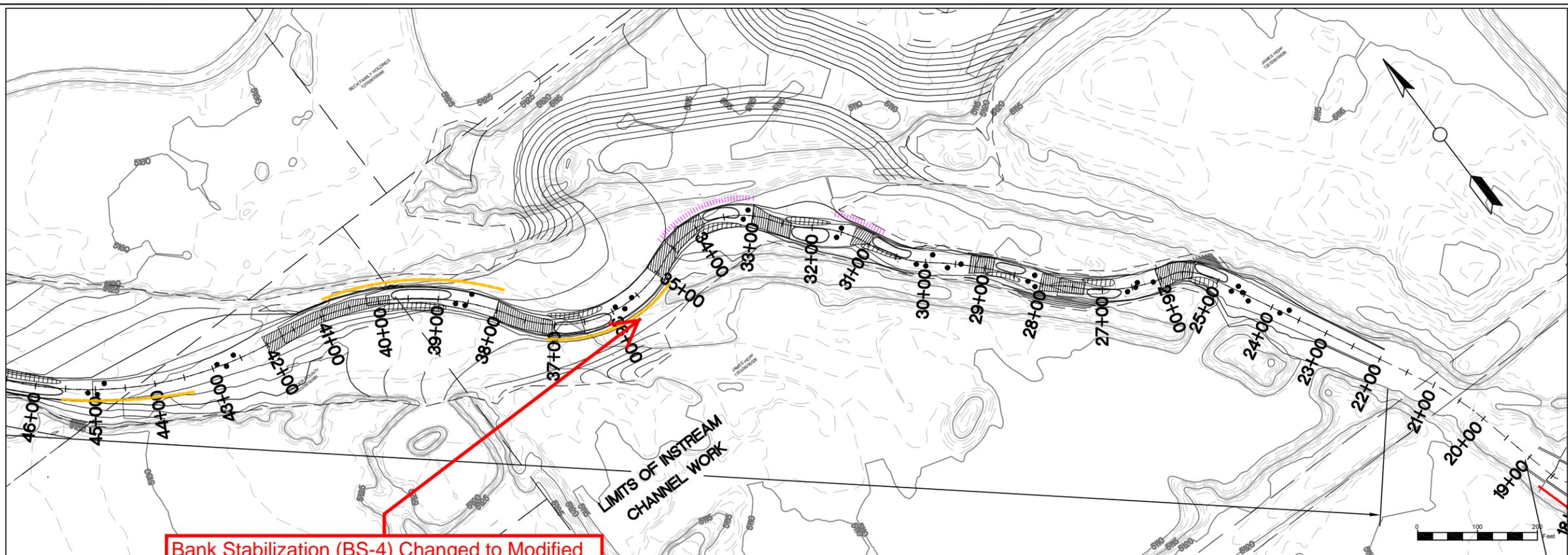
SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: ERC
Designed by: ERC
Checked by: ERC
Scale: As Shown
Project No.: 110666
Date: April 13, 2017

SHEET **R8**

9/19/2017 3:23:21 PM

AS-BUILT
6/19/2018

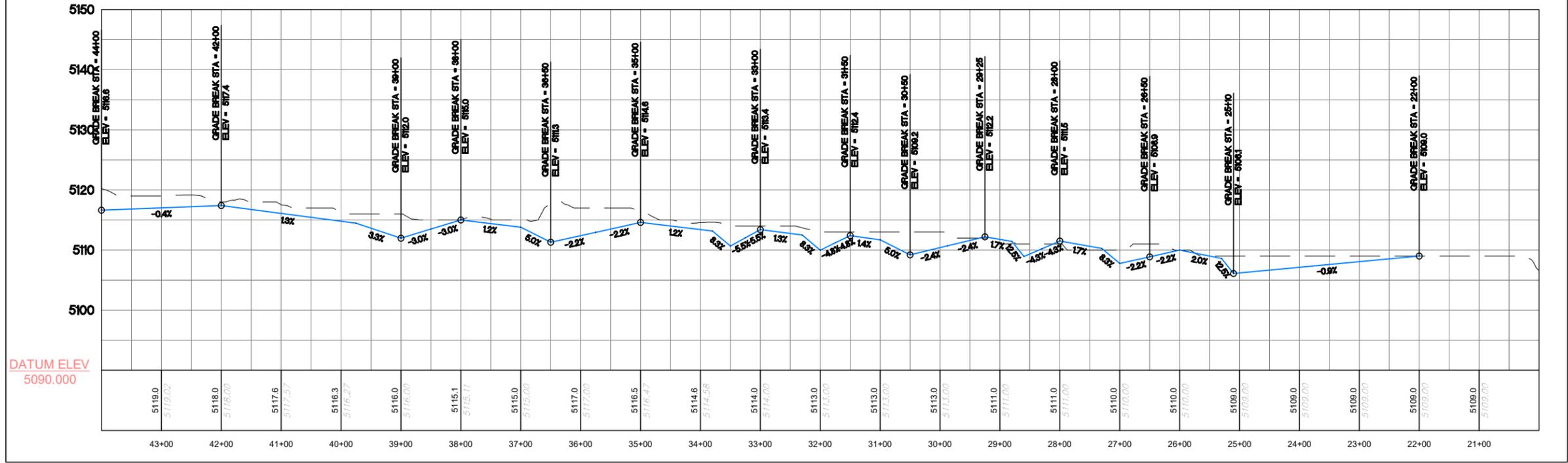


Bank Stabilization (BS-4) Changed to Modified Type C. ADDED - SHEET RD3A

LEGEND

| | |
|--|---------------------------|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | PROPERTY BOUNDARY |

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.



REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
1600 South Point Road, Suite 209
Fort Collins, CO 80525
(970) 485-3111

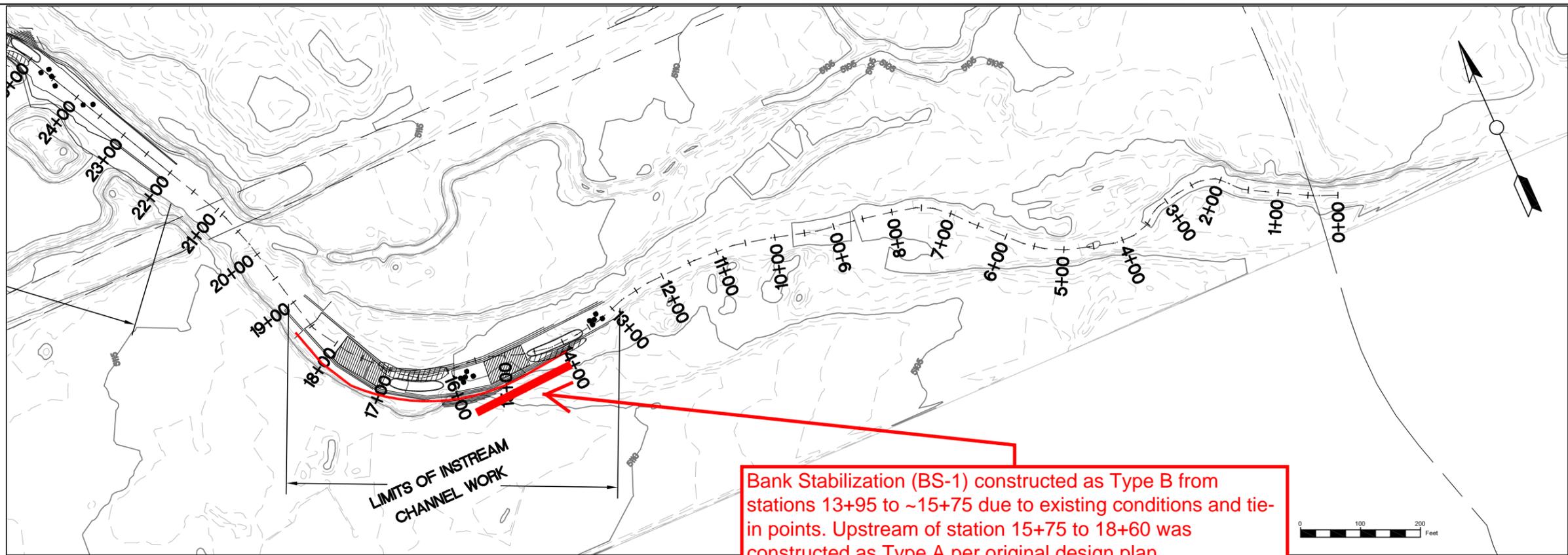
ECOLOGICAL RESOURCES CONSULTANTS, INC.
3715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 20+89 TO 43+18

SCALE VERIFICATION:
0 = 1" = 10'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

| | |
|--------------|----------------|
| Drawn by: | ERC |
| Designed by: | ERC |
| Checked by: | ERC |
| Scale: | As Shown |
| Project No.: | 110666 |
| Date: | April 13, 2017 |



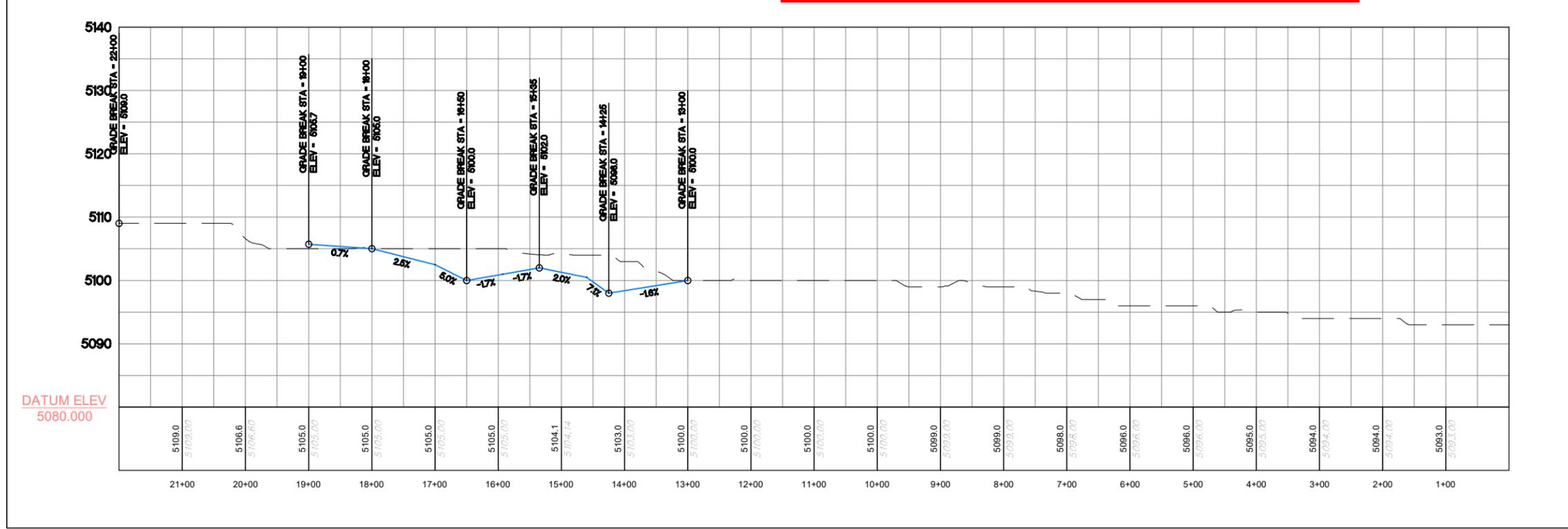


LEGEND

| | |
|--|---------------------------|
| | RIFFLE |
| | POINT BAR |
| | POOL |
| | BOULDER CLUSTER |
| | TYPE A BANK STABILIZATION |
| | TYPE B BANK STABILIZATION |
| | TYPE C BANK STABILIZATION |
| | TYPE D BANK STABILIZATION |
| | PROPERTY BOUNDARY |

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-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.



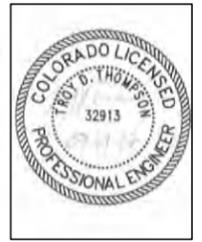
REVISIONS

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
37715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

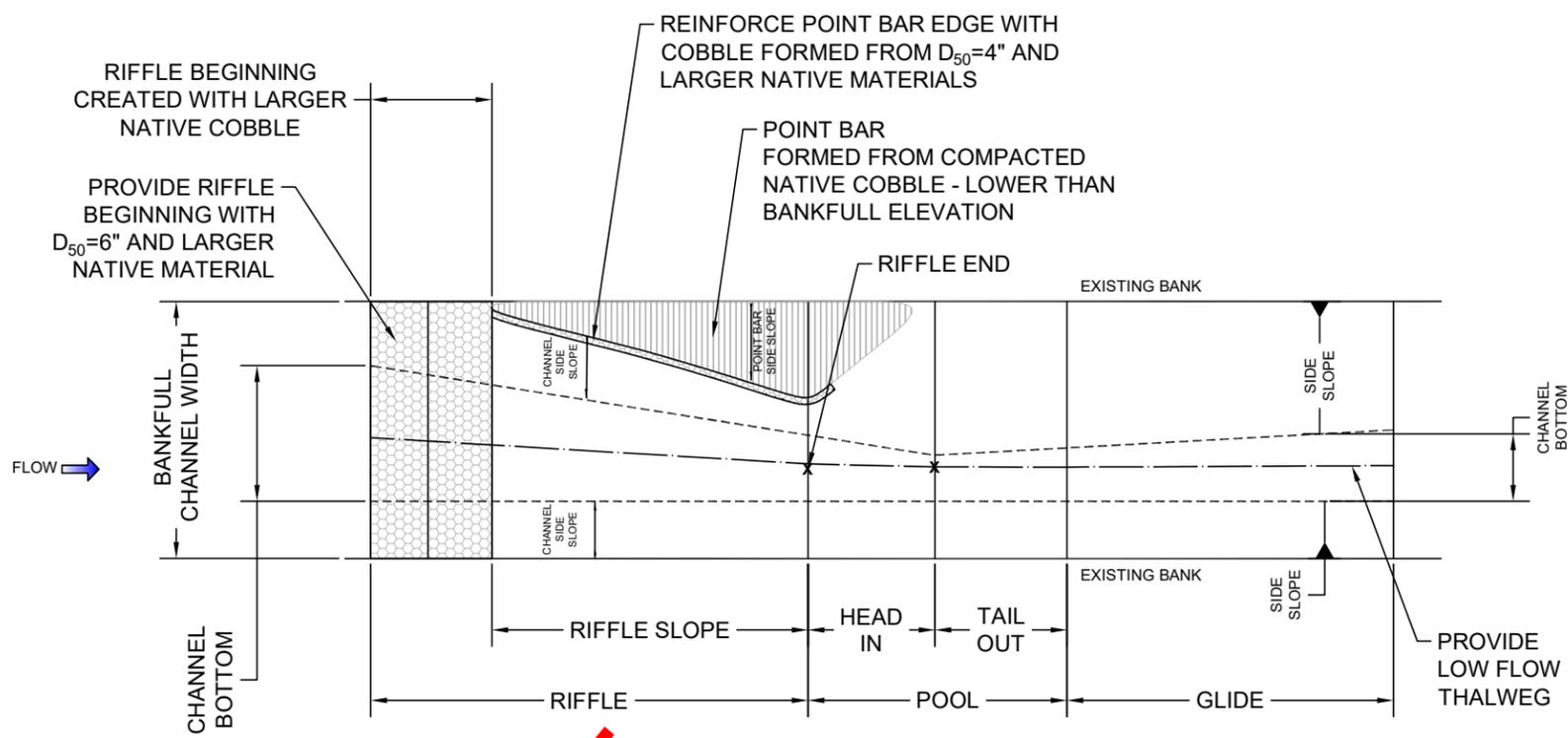
ST. VRAIN CREEK REACH 3
STREAM RESTORATION
STA 0+00 TO 20+89



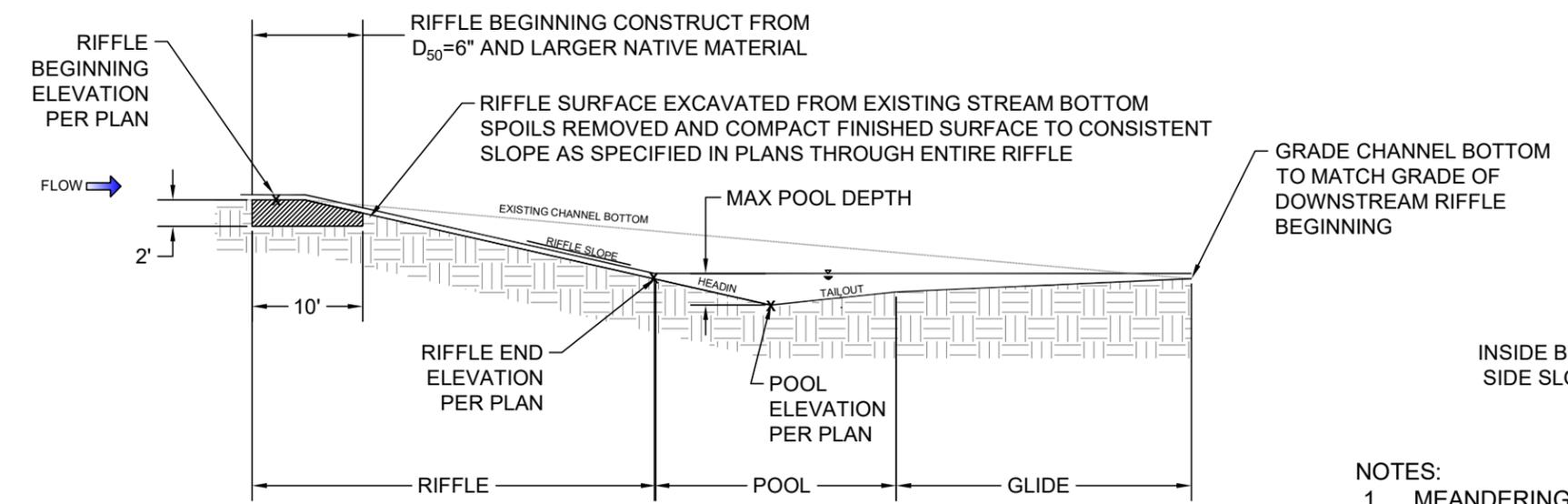
SCALE VERIFICATION:
0 = 1" = 100'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

| | |
|--------------|----------------|
| Drawn by: | ERC |
| Designed by: | ERC |
| Checked by: | ERC |
| Scale: | As Shown |
| Project No.: | 110666 |
| Date: | April 13, 2017 |

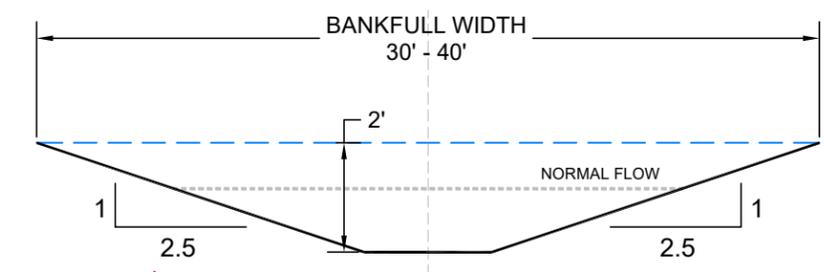
SHEET
R10



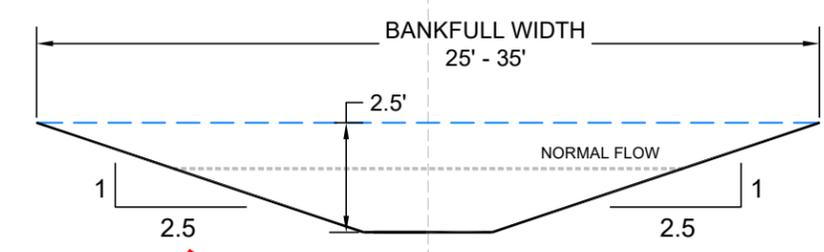
✓ RIFFLE-POOL SEQUENCE TYPICAL PLANVIEW
Scale: NTS



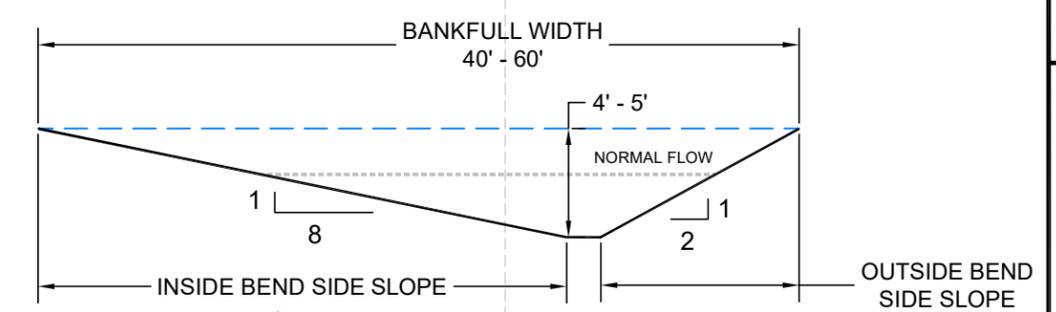
✓ RIFFLE-POOL SEQUENCE TYPICAL PROFILE
Scale: NTS



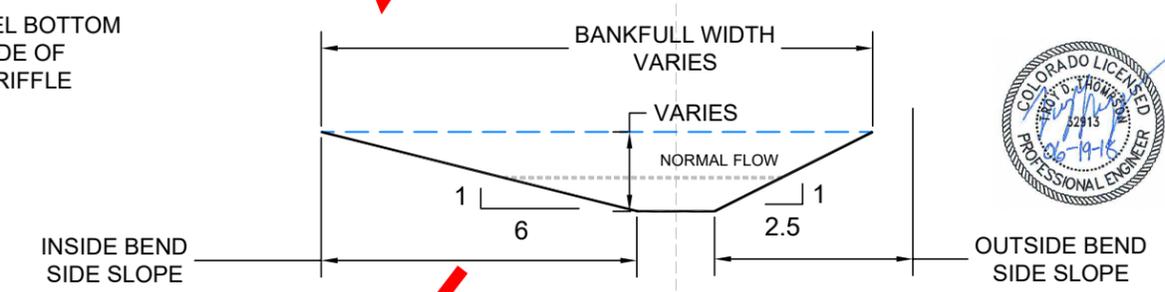
✓ TYPICAL CHANNEL RIFFLE BEGINNING SECTION



✓ TYPICAL CHANNEL RIFFLE END SECTION



✓ TYPICAL CHANNEL - POOL SECTION



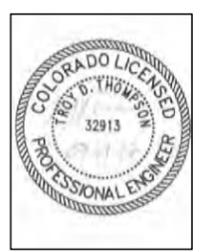
✓ TYPICAL CHANNEL - MIDDLE OF GLIDE

- NOTES:
- 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.
 - CHANNEL GRADING TO TIE-IN TO EXISTING VEGETATION LINE AND/OR BANKFULL CHANNEL WIDTH.

| REVISIONS | |
|-------------------------|------------|
| Description | Date |
| ISSUED FOR CONSTRUCTION | 09/19/2017 |
| 1 | |

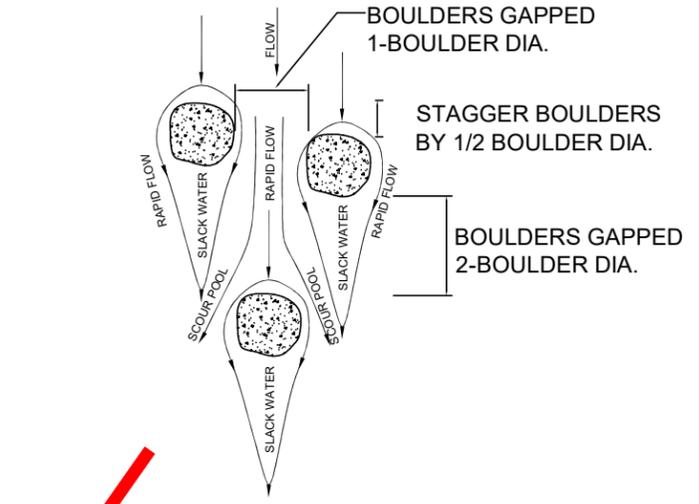
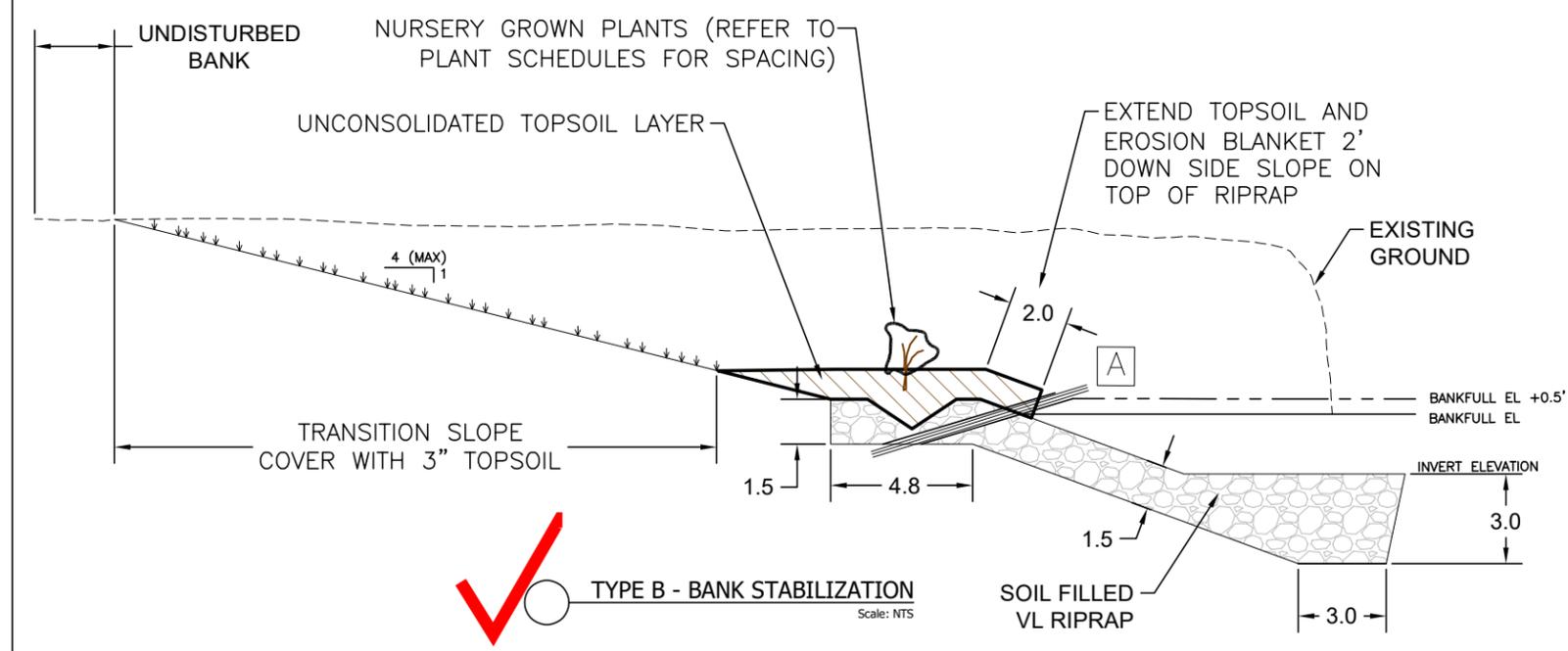
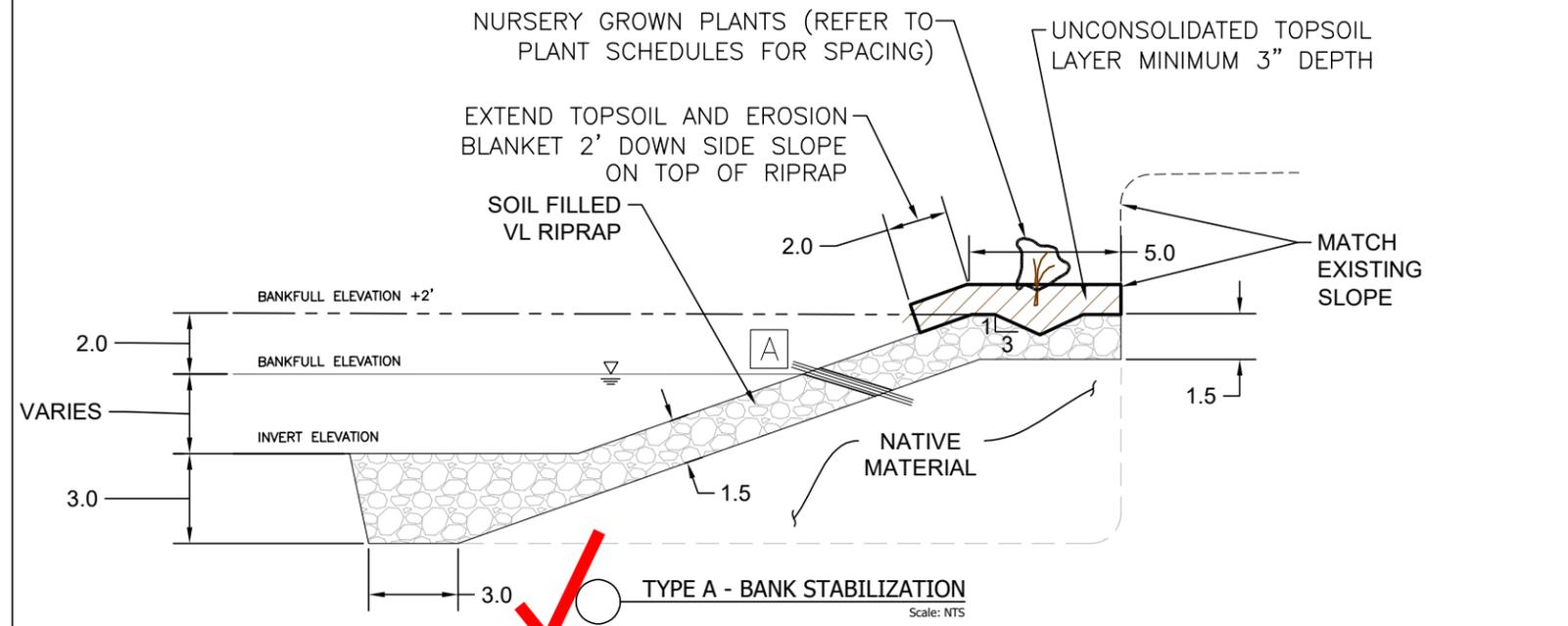
Engineering Analytics, Inc.
1600 Speck Point Road, Suite 209
Fort Collins, CO 80525
(970) 485-3111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
37115 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439



ST. VRAIN CREEK REACH 3
STREAM RESTORATION
SECTIONS AND DETAILS

| |
|--|
| SCALE VERIFICATION: 0 = 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY |
| Drawn by: LJS |
| Designed by: TJT |
| Checked by: TJT |
| Scale: As Shown |
| Project No. 110666 |
| Date: April 13, 2017 |
| SHEET RD1 |



BOULDER CLUSTERS (BC)

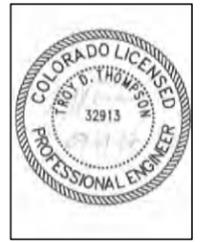
BC NOTES:

1. NATIVE BOULDERS SALVAGED INSTREAM, 1 TO 1 1/2 DIA.
2. TOP OF ALL BOULDERS WILL BE SET BELOW THE BANKFULL FLOW ELEVATION
3. CREATE SCOUR HOLE IN RAPID FLOW PATH AREAS
4. BOULDERS SHOULD BE SET TOWARDS STREAM CENTER MAINTAINING 5' SPACE FROM BANK EDGE

WILLOW STAKING



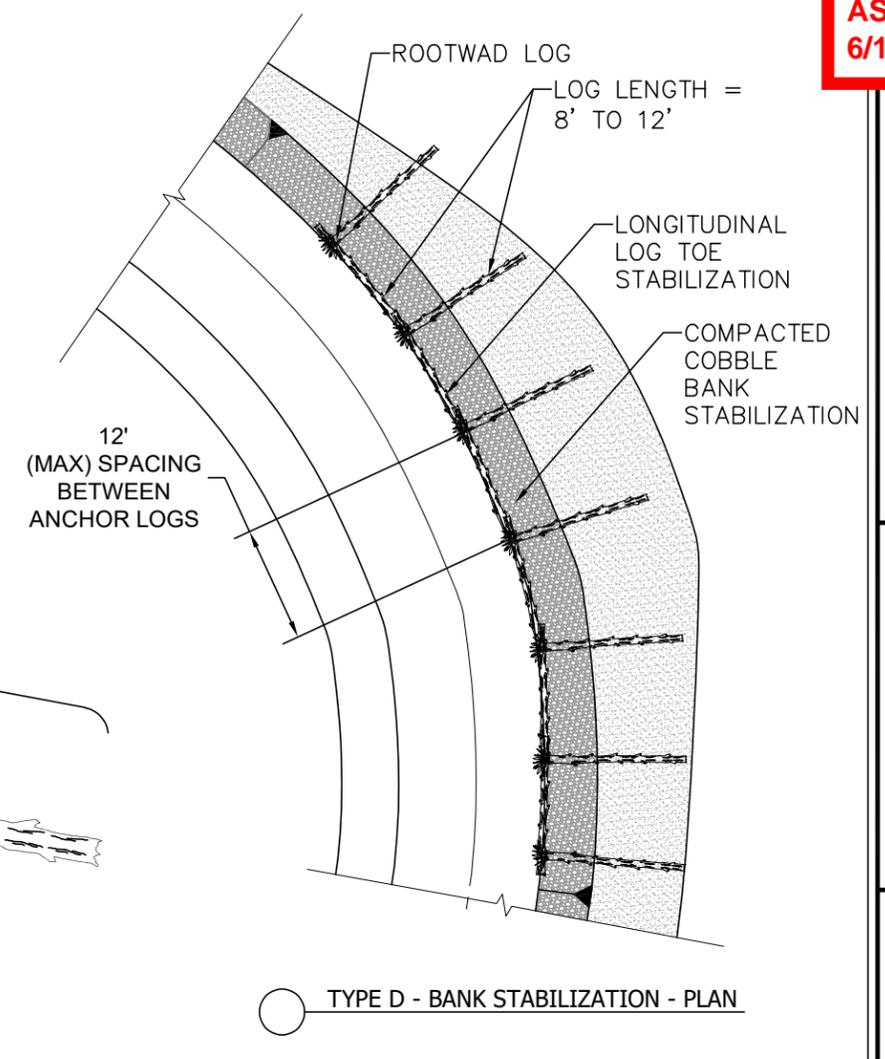
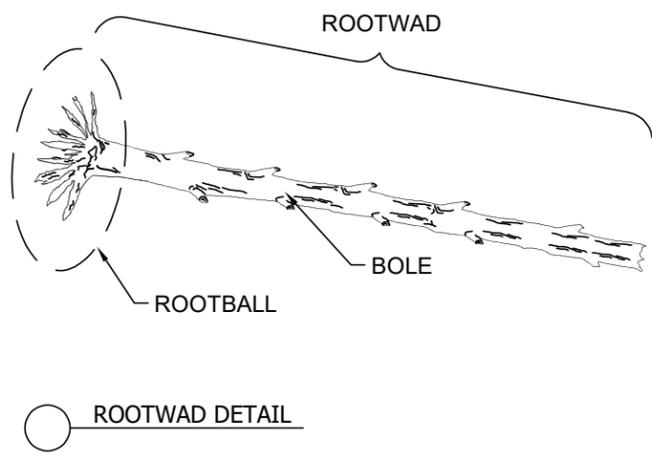
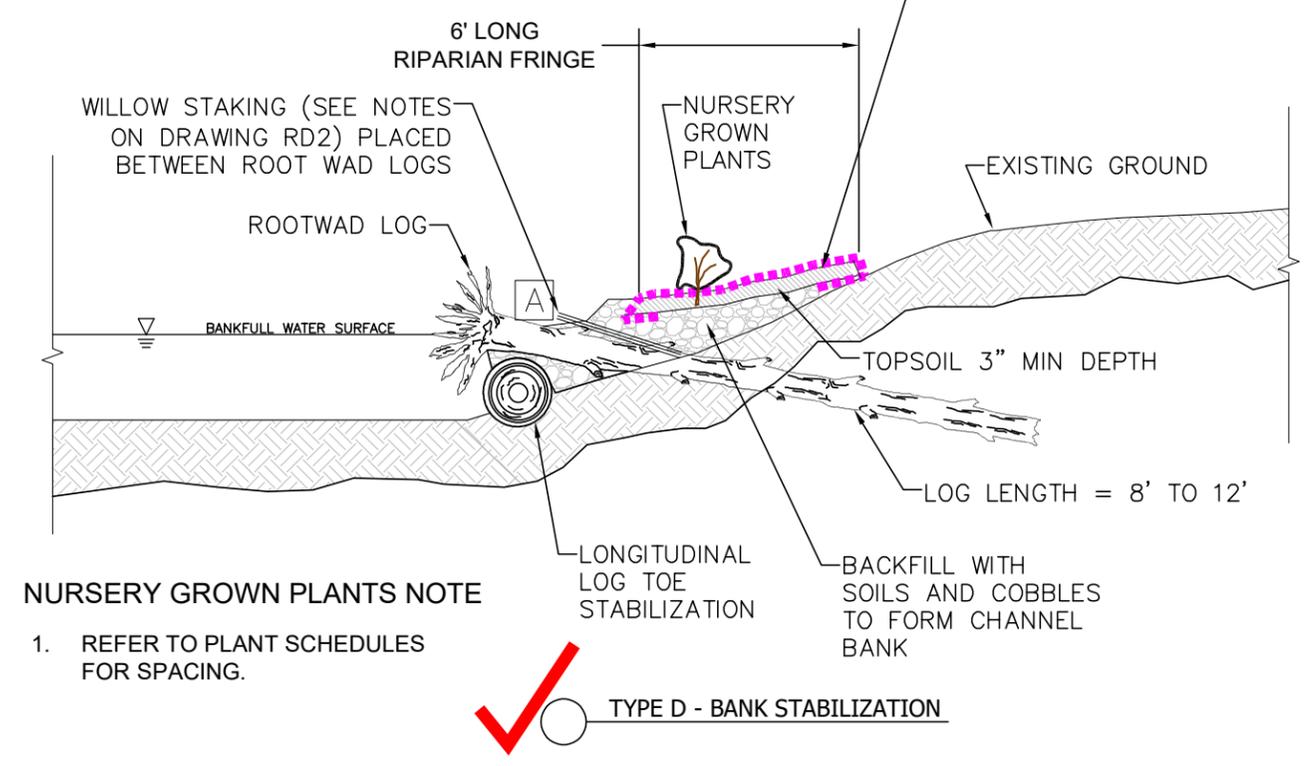
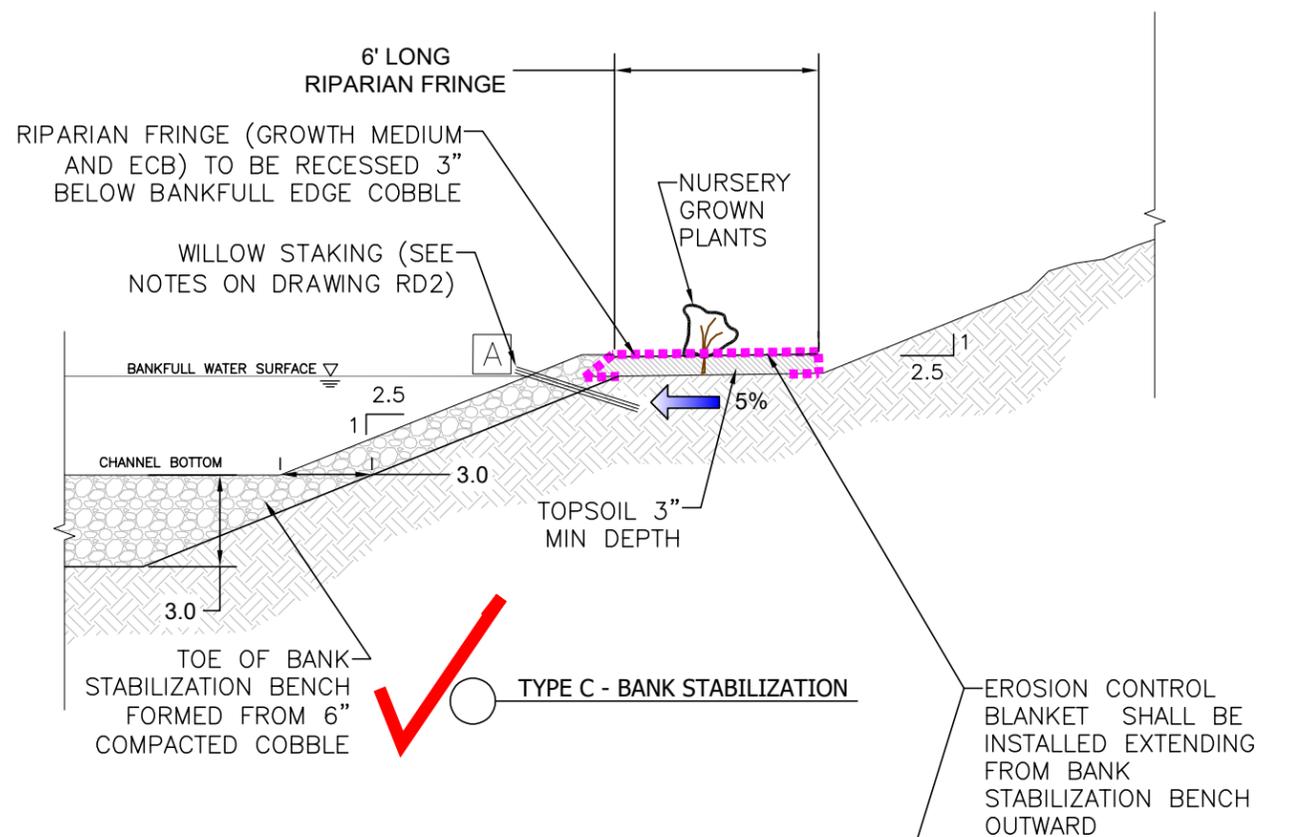
1. INSTALL A CONTINUOUS LAYER OF WILLOW CUTTINGS DURING PLACEMENT OF SOIL FILLED RIPRAP
2. APPROXIMATELY 3 WILLOW CUTTINGS SHALL BE PLACED SIDE BY SIDE PER LINEAR FOOT
3. MINIMUM 3" LAYER OF NATIVE SAND OR TOPSOIL REQUIRED
4. WILLOW STAKING SHALL BE INSTALLED AT BANKFULL ELEVATION
5. WILLOW CUTTINGS 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'



| REVISIONS | |
|-----------|-------------------------|
| Revision | Description |
| 1 | ISSUED FOR CONSTRUCTION |
| | |
| | |
| | |

| | |
|---|--|
| Engineering Analytics, Inc. 1600 Speer Point Road, Suite 209 Fort Collins, CO 80525 (970) 485-3111 | ECOLOGICAL RESOURCES CONSULTANTS, INC. 37115 US HIGHWAY 40, SUITE D204 EVERGREEN, CO 80439 |
|---|--|

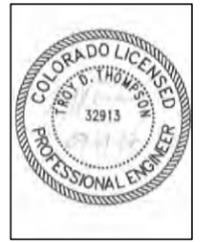
| | |
|---|---|
| ST. VRAIN CREEK REACH 3 | SCALE VERIFICATION: 0 = 1" = 1' IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY |
| STREAM RESTORATION SECTIONS AND DETAILS | Drawn by: LJS |
| | Designed by: TJT |
| | Checked by: TJT |
| | Scale: As Shown |
| | Project No. 110666 |
| | Date: April 13, 2017 |
| | SHEET RD2 |



ROOTWAD NOTES:

GENERAL "ROOTWAD" CHARACTERISTICS:

- TREES MUST BE NATIVE, NON-INVASIVE, SPECIES AND CAN SPECIFICALLY NOT INCLUDE "CRACK WILLOW."
- TREES SHALL BE HEALTHY WITHOUT HOLLOW OR ROTTEN FEATURES AND WITHOUT SPLIT TRUNKS. BARK SHALL NOT BE REMOVED.
- TREES MUST INCLUDE A BOLE WITH ATTACHED ROOT BALL.
- 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.
- 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.
- ROOT BALLS SHALL BE AS LARGE AND FULL AS POSSIBLE WITH ROOTS LEFT CONNECTED. THE MINIMUM ROOT BALL DIAMETER IS 6 FEET. ROOT BALL SHALL NOT BE TRIMMED OR CLEANED.
- 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 ATTRIBUTED BOLE.



| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
1600 Speer Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
37715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION SECTIONS AND DETAILS

SCALE VERIFICATION:
0 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: LJS
Designed by: TJT
Checked by: TJT
Scale: As Shown
Project No. 110666
Date: April 13, 2017
SHEET RD3

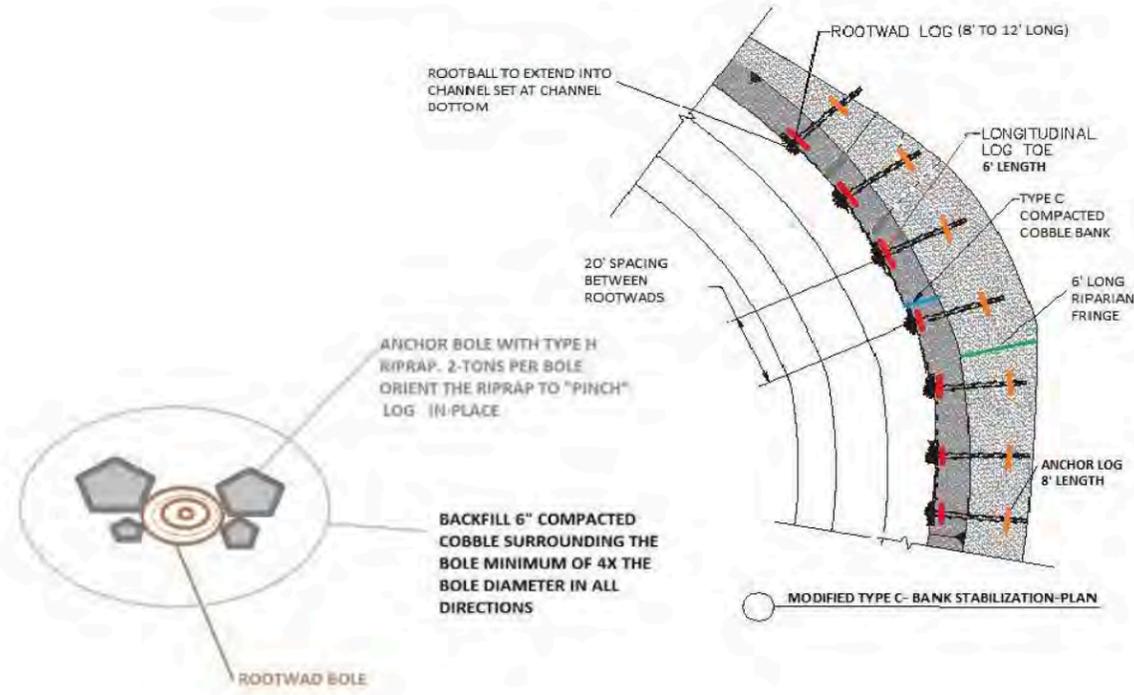
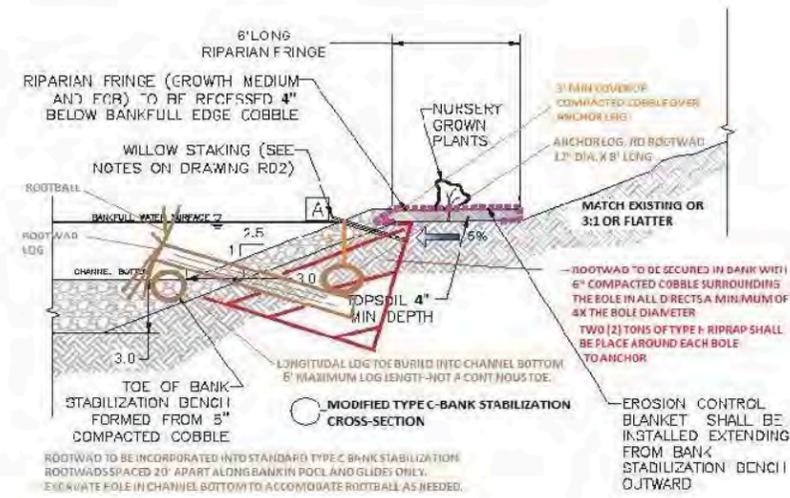
ADDED

SHEET RD3A
Modified Type C Bank
Stabilization - Typical Detail



MODIFIED TYPE C BANK STABILIZATION (2-26-18)

- STANDARD TYPE C BANK STABILIZATION TO BE USED ALONG ENTIRE STABILIZATION AREA.
- ROOTWADS TO BE INCORPORATED INTO CONSTRUCTED BANK ON 20' INTERVALS IN POOL AND GLIDE AREAS AS IDENTIFIED IN THE FIELD. RANDOM VARIATION IN SPACING IS ENCOURAGED.
- ROOTWADS TO BE SECURED INTO BANK WITH 6" COMPACTED COBBLE AND 2 TONS OF TYPE H RIPRAP.



| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

Engineering Analytics, Inc.
1420 Speck Point Road, Suite 200
Fort Collins, CO 80525
(970) 483-1111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
35716 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
SECTIONS AND DETAILS

SCALE VERIFICATION:
0 = 1" = 1'
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY.

Drawn by: LIS
Designed by: TJT
Checked by: TJT
Scale: As Shown
Project No: 110666
Date: April 13, 2017

**AS-BUILT
6/19/2018**

| 80% Design Feature Layout | | | | | |
|---------------------------|----|---------|------------------|--------------|-------------------|
| Feature | # | Station | Thalweg El. (ft) | Riffle Slope | Bankfull El. (ft) |
| Match | | 1300 | 5100.0 | | Match |
| Pool | 1 | 1425 | 5098.0 | | Match |
| Riffle End | 1 | 1460 | 5100.5 | | Match |
| Riffle Beginning | 1 | 1535 | 5102.0 | 2.00% | Match |
| Middle Glide | 2 | 1592.5 | 5101.0 | | Match |
| Pool | 2 | 1650 | 5100.0 | | Match |
| Riffle End | 2 | 1700 | 5102.5 | | Match |
| Riffle Beginning | 2 | 1800 | 5105.0 | 2.50% | Match |
| Match | | 1900 | 5105.7 | | Match |
| Match | | 2200 | 5109.0 | | Match |
| Pool | 3 | 2510 | 5106.1 | | Match |
| Riffle End | 3 | 2530 | 5108.6 | | Match |
| Riffle Beginning | 3 | 2600 | 5110.0 | 2.00% | Match |
| Middle Glide | 3 | 2650 | 5108.9 | | Match |
| Pool | 4 | 2700 | 5107.8 | | Match |
| Riffle End | 4 | 2730 | 5110.3 | | Match |
| Riffle Beginning | 4 | 2800 | 5111.5 | 1.75% | Match |
| Middle Glide | 4 | 2830 | 5110.2 | | Match |
| Pool | 5 | 2860 | 5108.9 | | Match |
| Riffle End | 5 | 2880 | 5111.4 | | Match |
| Riffle Beginning | 5 | 2925 | 5112.2 | 1.70% | Match |
| Middle Glide | 5 | 2987.5 | 5110.7 | | Match |
| Pool | 6 | 3050 | 5109.2 | | Match |
| Riffle End | 6 | 3100 | 5111.7 | | 5114 |
| Riffle Beginning | 6 | 3150 | 5112.4 | 1.40% | 5114.4 |
| Middle Glide | 6 | 3175 | 5111.2 | | 5114.6 |
| Pool | 7 | 3200 | 5110.0 | | 5114.7 |
| Riffle End | 7 | 3230 | 5112.5 | | 5114.9 |
| Riffle Beginning | 7 | 3300 | 5113.4 | 1.30% | 5115.4 |
| Middle Glide | 7 | 3325 | 5112.0 | | 5115.6 |
| Pool | 8 | 3350 | 5110.7 | | 5115.7 |
| Riffle End | 8 | 3380 | 5113.2 | | 5115.9 |
| Riffle Beginning | 8 | 3500 | 5114.6 | 1.20% | 5116.6 |
| Middle Glide | 8 | 3575 | 5113.0 | | 5116.7 |
| Pool | 9 | 3650 | 5111.3 | | 5116.8 |
| Riffle End | 9 | 3700 | 5113.8 | | 5116.9 |
| Riffle Beginning | 9 | 3800 | 5115.0 | 1.20% | 5117.0 |
| Middle Glide | 9 | 3850 | 5113.5 | | 5117.3 |
| Pool | 10 | 3900 | 5112.0 | | 5117.6 |
| Riffle End | 10 | 3975 | 5114.5 | | 5118.1 |
| Riffle Beginning | 10 | 4200 | 5117.4 | 1.30% | 5119.4 |
| Middle Glide | 10 | 4400 | 5116.7 | | 5121.0 |
| Pool | 11 | 4600 | 5115.9 | | 5122.6 |
| Riffle End | 11 | 4700 | 5118.4 | | 5123.4 |
| Riffle Beginning | 11 | 4900 | 5123.0 | 2.30% | 5125.0 |
| Middle Glide | 11 | 5100 | 5121.8 | | 5126.1 |
| Pool | 12 | 5300 | 5120.5 | | 5127.3 |
| Riffle End | 12 | 5400 | 5123.0 | | 5127.9 |
| Riffle Beginning | 12 | 5600 | 5127.0 | 2.00% | 5129.0 |
| Middle Glide | 12 | 5775 | 5126.1 | | 5130.3 |
| Pool | 13 | 5950 | 5125.3 | | 5131.7 |
| Riffle End | 13 | 6025 | 5127.8 | | 5132.3 |
| Riffle Beginning | 13 | 6200 | 5131.6 | 2.20% | 5133.6 |
| Match | | 6300 | 0.0 | | Match |

5117.1

11055

11005

5171.75

5173.1

| 80% Design Feature Layout | | | | | |
|---------------------------|----|---------|--------|-------|--------|
| Match | | 10900 | 5171.0 | | Match |
| Pool | 14 | 10980 | 5168.3 | | Match |
| Riffle End | 14 | 11025 | 5170.8 | | Match |
| Riffle Beginning | 14 | 11075 | 5171.8 | 2.00% | Match |
| Match | | 11100 | 5172.0 | | Match |
| Match | | 11150 | 5173.0 | | Match |
| Middle Glide | 15 | 11162.5 | 5171.7 | | Match |
| Pool | 15 | 11175 | 5170.4 | | Match |
| Riffle End | 15 | 11205 | 5172.9 | | Match |
| Riffle Beginning | 15 | 11260 | 5173.8 | 1.60% | Match |
| Pool | 21 | 12350 | 5182.9 | | Match |
| Riffle End | 21 | 12375 | 5185.4 | | Match |
| Riffle Beginning | 21 | 12500 | 5188.5 | 2.50% | Match |
| Match | | 12600 | 5190.0 | | Match |
| Match | | 13400 | 5192.0 | | Match |
| Middle Glide | 22 | 13495 | 5191.1 | | Match |
| Pool | 22 | 13590 | 5190.2 | | Match |
| Riffle End | 22 | 13640 | 5192.7 | | Match |
| Riffle Beginning | 22 | 13720 | 5194.5 | 2.20% | Match |
| Match | | 13800 | 5195.0 | | Match |
| Match | | 17700 | 5231.0 | | Match |
| Middle Glide | 23 | 17750 | 5229.6 | | Match |
| Pool | 23 | 17800 | 5228.2 | | Match |
| Riffle End | 23 | 17840 | 5230.7 | | Match |
| Riffle Beginning | 23 | 17920 | 5231.8 | 1.40% | Match |
| Middle Glide | 24 | 17960 | 5230.9 | | Match |
| Pool | 24 | 18000 | 5229.9 | | Match |
| Riffle End | 24 | 18060 | 5232.4 | | Match |
| Riffle Beginning | 24 | 18200 | 5235.5 | 2.20% | Match |
| Match | | 18400 | 5237.0 | | Match |
| Match | | 18700 | 5240.1 | | Match |
| Middle Glide | 25 | 18775 | 5238.7 | | Match |
| Pool | 25 | 18850 | 5237.3 | | Match |
| Riffle End | 25 | 18890 | 5239.8 | | Match |
| Riffle Beginning | 25 | 18985 | 5241.7 | 2.00% | 5243.7 |
| Middle Glide | 26 | 19092.5 | 5240.3 | | 5244.4 |
| Pool | 26 | 19200 | 5239.0 | | 5245.1 |
| Riffle End | 26 | 19280 | 5241.5 | | 5245.6 |
| Riffle Beginning | 26 | 19470 | 5244.9 | 1.80% | 5246.9 |
| Match | | 19700 | 5247.0 | | Match |

| 80% Bank Stabilization Table | | | | | |
|------------------------------|--------|--------------|--------------|----------------|--------------|
| Bank Stabilization ID | Type | Upstream End | | Downstream End | |
| | | Station | Top El. (ft) | Station | Top El. (ft) |
| BS-1 | Type A | 18+60 | 5110 | 13+95 | 5105 |
| BS-2 | Type C | 31+70 | 5115 | 30+80 | 5114 |
| BS-3 | Type C | 34+60 | 5116 | 33+00 | 5116 |
| BS-4 | Type D | 37+10 | 5117 | 35+00 | 5117 |
| BS-5 | Type D | 40+85 | 5117 | 38+00 | 5117 |
| BS-6 | Type D | 45+55 | 5121 | 43+40 | 5119 |
| BS-7 | Type D | 54+20 | 5126 | 51+20 | 5124 |
| BS-8 | Type C | 59+75 | 5130 | 58+00 | 5130 |
| BS-9A | Type B | 61+60 | 5132.5 | 61+30 | 5132.5 |
| BS-9B | Type B | 62+75 | 5135.5 | 62+45 | 5135.5 |
| BS-10 | Type C | 110+65 | 5174 | 109+70 | 5173 |
| BS-11 | Type C | 124+50 | 5190 | 122+50 | 5189 |
| BS-12 | Type C | 124+80 | 5191 | 123+00 | 5187 |
| BS-13 | Type C | 137+00 | 5198 | 135+45 | 5195 |
| BS-14 | Type A | 182+70 | 5241 | 179+20 | 5236 |
| BS-15 | Type B | 193+00 | 5242 | 190+50 | 5241 |

NOTE: ELEVATIONS MAY BE ADJUSTED IN THE FIELD BASED ON ACTUAL CONDITIONS,

**REVISED 80%
Bank Stabilization
Table**

Bank Stabilization Table - Revised February 20, 2018

| Bank Stabilization ID | Type | Upstream End | | Downstream End | |
|-----------------------|-----------------|--------------|--------------|----------------|--------------|
| | | Station | Top El. (ft) | Station | Top El. (ft) |
| BS-1 | Type A | 18+60 | 5110 | 15+75 | 5105 |
| BS-1 continued | Type B | 15+75 | 5103 | 13+95 | 5103 |
| BS-2 | Type C | 31+70 | 5114.5 | 30+80 | 5114.0 |
| BS-3 | Type C | 34+60 | 5116.3 | 33+00 | 5115.5 |
| BS-4 | Modified Type C | 37+10 | 5116.4 | 35+00 | 5116.6 |
| BS-5 | Type D | 40+85 | 5118.2 | 38+00 | 5117.0 |
| BS-6 | Type D | 45+55 | 5120.5 | 43+40 | 5119.8 |
| BS-7 | Modified Type C | 54+20 | 5125.6 | 51+20 | 5125.2 |
| BS-8 | Modified Type C | 59+75 | 5130.1 | 58+00 | 5129.6 |
| BS-9A | Type B | 61+60 | Removed | 61+30 | Removed |
| BS-9B | Type B | 62+75 | Removed | 62+45 | Removed |
| BS-10 | Type C | 110+55 | 5173.7 | 109+75 | 5173.0 |
| BS-11 | Type C | 124+50 | Removed | 122+50 | Removed |
| BS-12 | Type C | 124+10 | 5188.0 | 122+80 | 5188.0 |
| BS-13 | Type C | 136+00 | 5196.4 | 135+50 | 5194.5 |
| BS-13 continued | Type C | 135+25 | 5194.5 | 134+50 | 5194.5 |
| BS-14 | Type A | 182+70 | 5239.9 | 179+20 | 5235.8 |
| BS-15 | Type B | 193+00 | 5244.9 | 190+50 | 5244.3 |

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

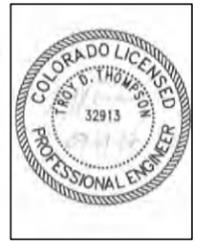
EA Engineering Analytics, Inc.
1600 Speer Point Road, Suite 200
Fort Collins, CO 80525
(970) 485-3111

ECOLOGICAL RESOURCES CONSULTANTS, INC.
3715 US HIGHWAY 40, SUITE 1204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
TABLES

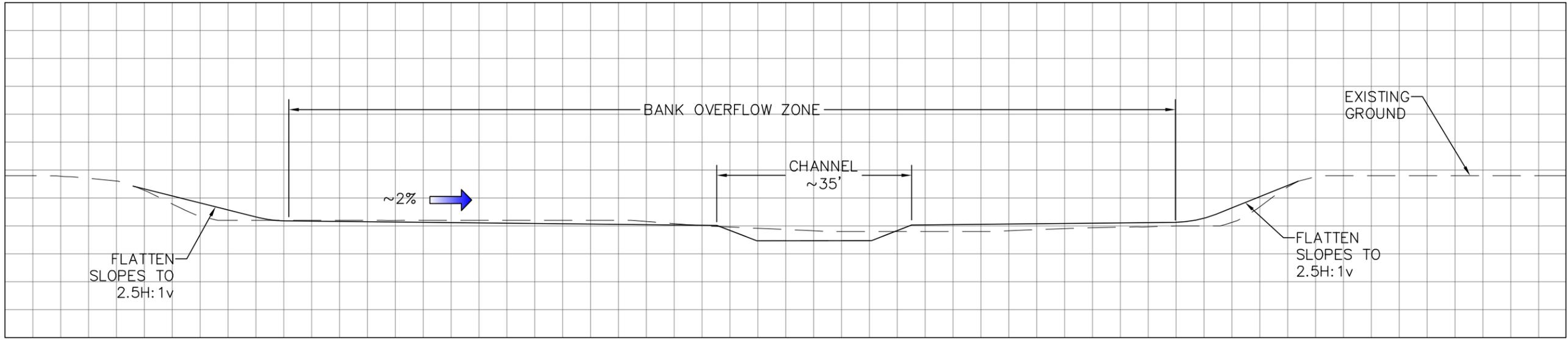
SCALE VERIFICATION:
0" = 1"
IF NOT ONE INCH ON
THIS SHEET, ADJUST
SCALE ACCORDINGLY

Drawn by: LJS
Designed by: TJT
Checked by: TJT
Scale: As Shown
Project No. 110668
Date: April 13, 2017

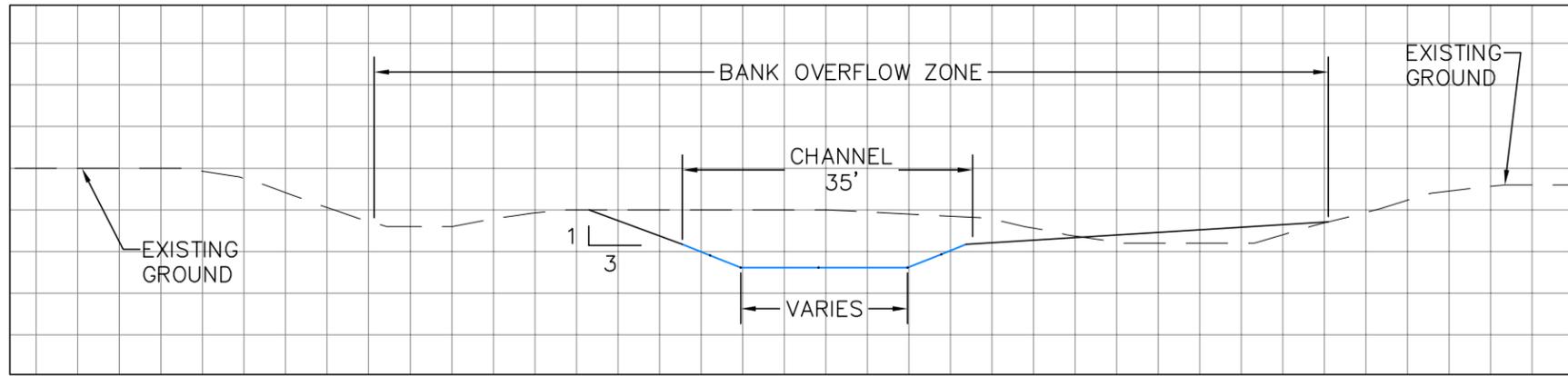


SHEET
RD4

9/19/2017 3:35:04 PM



○ TYPICAL CROSS SECTION THRU WIDE OVERBANK ZONE
Scale: NTS



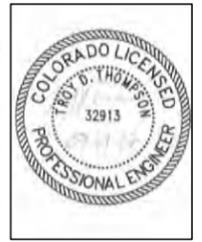
○ TYPICAL CROSS SECTION THRU NARROW OVERBANK ZONE
Scale: NTS

| REVISIONS | |
|-----------|-------------------------|
| Revision | Description |
| 1 | ISSUED FOR CONSTRUCTION |

EA Engineering Analytics, Inc.
1600 Speck Point Road, Suite 209
Fort Collins, CO 80525
(970) 488-3111

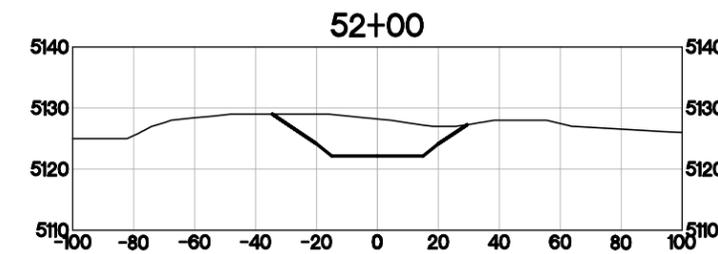
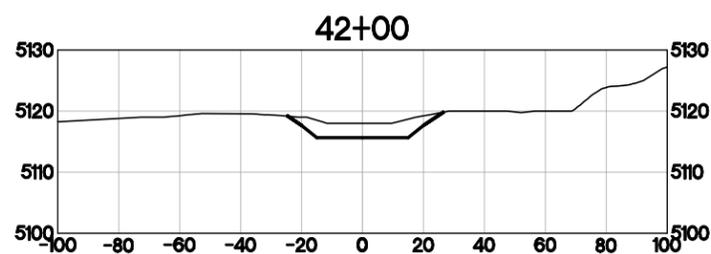
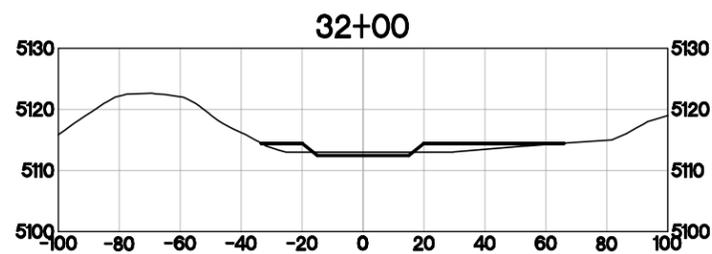
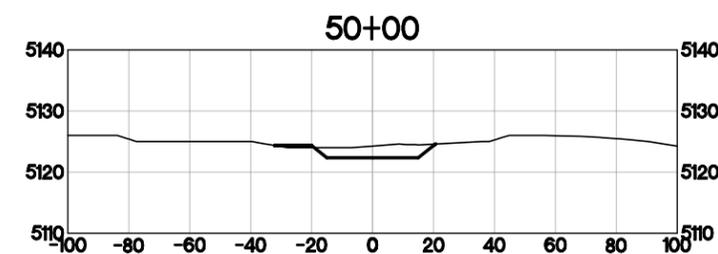
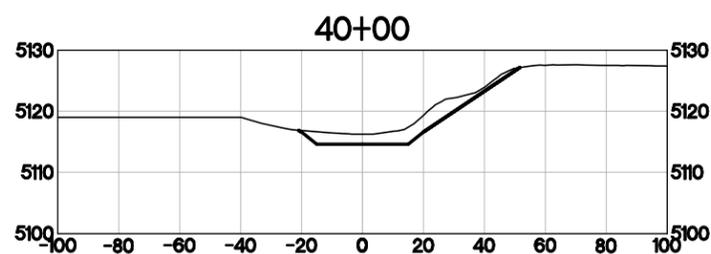
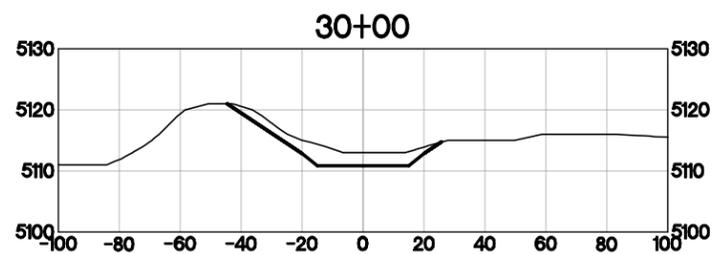
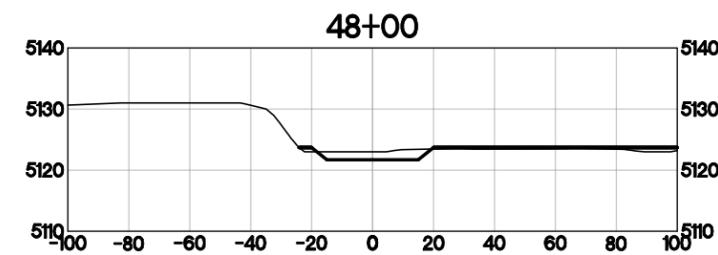
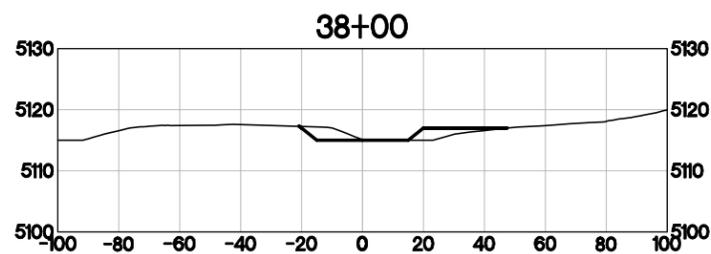
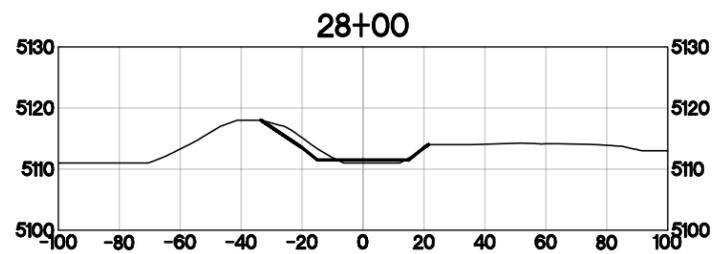
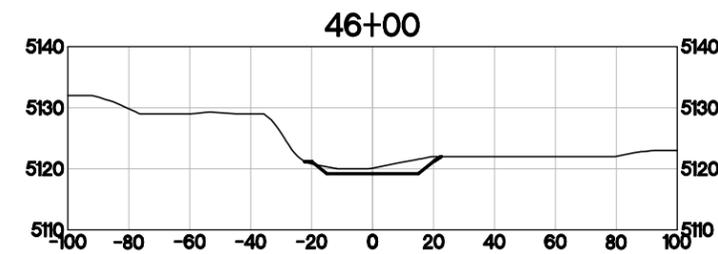
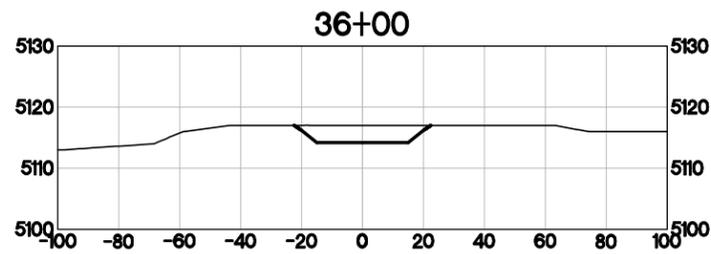
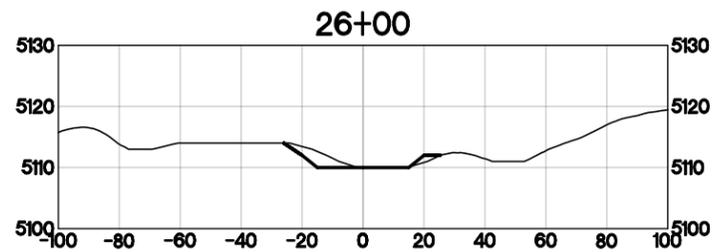
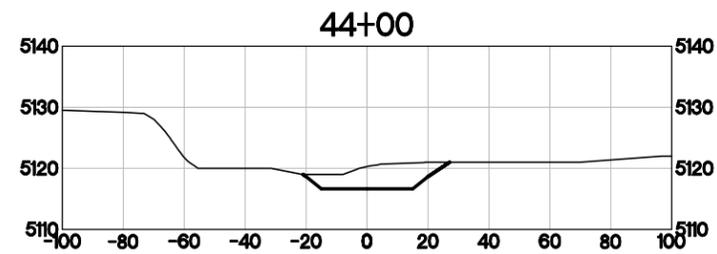
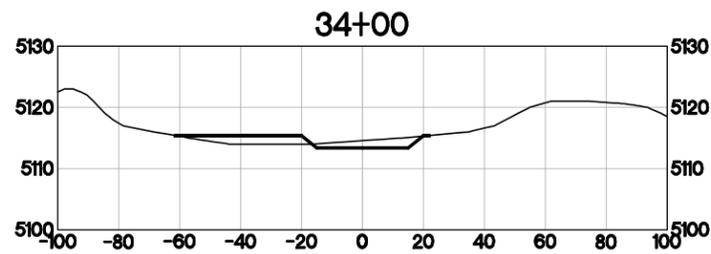
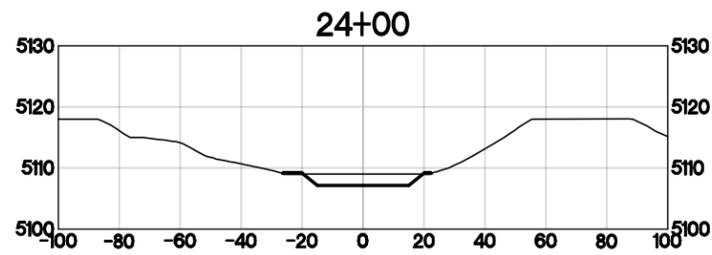
ECOLOGICAL RESOURCES CONSULTANTS, INC.
37715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
SECTIONS AND DETAILS



SCALE VERIFICATION:
0 = 1" = 10'
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: LJS
Designed by: TJT
Checked by: TJT
Scale: As Shown
Project No. 110668
Date: April 13, 2017
SHEET RD5



ALL SECTIONS ARE TAKEN IN THE UPSTREAM DIRECTION.

| Revision | Date | Description |
|----------|------------|-------------------------|
| 1 | 09/19/2017 | ISSUED FOR CONSTRUCTION |

EA Engineering Analytics, Inc.
 1600 Speer Point Road, Suite 209
 Fort Collins, CO 80525
 (970) 485-3111

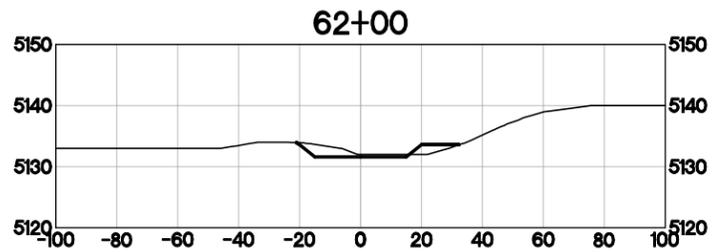
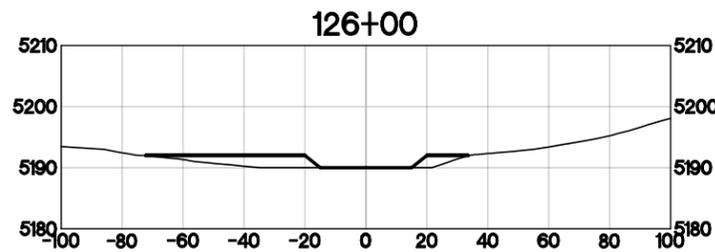
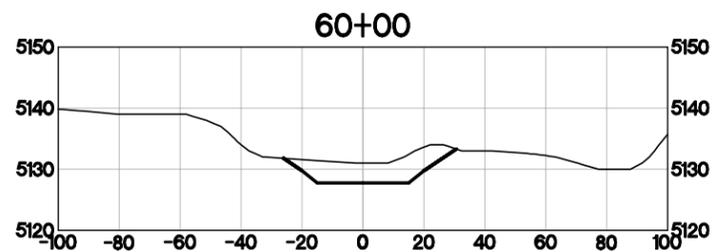
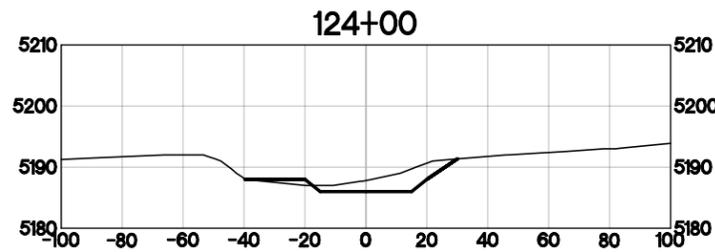
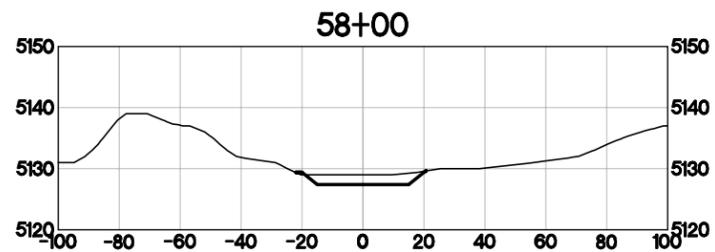
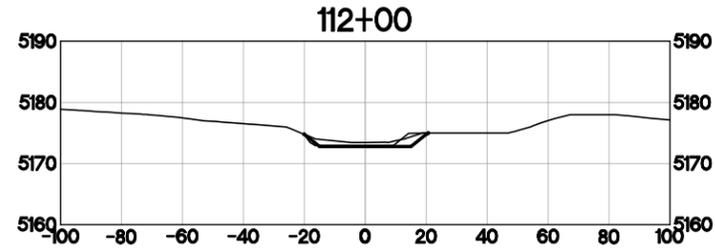
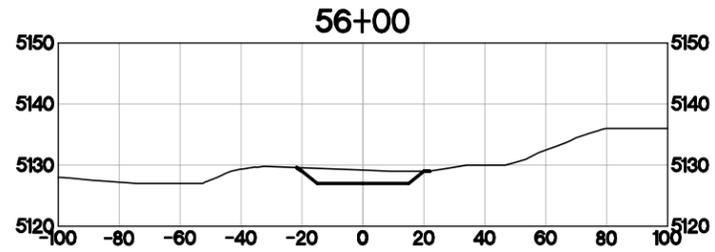
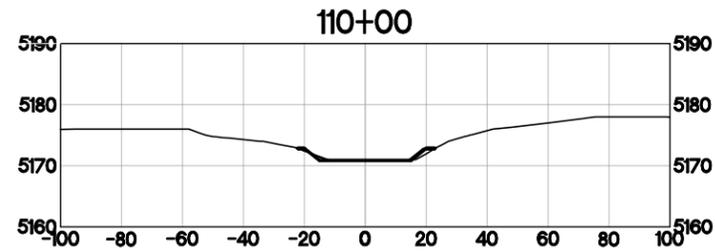
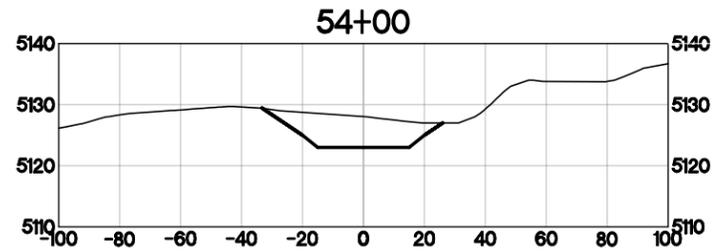
ECOLOGICAL RESOURCES CONSULTANTS, INC.
 38715 US HIGHWAY 40, SUITE D204
 EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
 STREAM RESTORATION
 CROSS SECTIONS (1 OF 2)



SCALE VERIFICATION:
 0" = 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Drawn by: LJS
 Designed by: TJT
 Checked by: TJT
 Scale: As Shown
 Project No. 110666
 Date: April 13, 2017
 SHEET RD6



ALL SECTIONS ARE TAKEN IN THE UPSTREAM DIRECTION.



| REVISIONS | |
|-----------|-------------------------|
| Revision | Description |
| 1 | ISSUED FOR CONSTRUCTION |



ECOLOGICAL RESOURCES CONSULTANTS, INC.
37715 US HIGHWAY 40, SUITE D204
EVERGREEN, CO 80439

ST. VRAIN CREEK REACH 3
STREAM RESTORATION
CROSS SECTIONS (2 OF 2)

| |
|--|
| SCALE VERIFICATION: 0 = 1" = 10' IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY |
| Drawn by: LJS |
| Designed by: TJT |
| Checked by: TJT |
| Scale: As Shown |
| Project No. 110668 |
| Date: April 13, 2017 |
| SHEET RD7 |