STATIONING

OVERALL 105+00 TO 96+5

96+50 TO 88+50

88+50 TO 80+50

48+50 TO 40+5

37+00 TO 29+5

29+50 TO 21+0

105+00 TO 96+5 96+50 TO 88+5

88+50 TO 80+50

80+50 TO 72+50

72+50 TO 64+50

64+50 TO 56+50

48+50 TO 40+5

37+00 TO 29+50

29+50 TO 21+00

88+00 TO 74+0

74+00 TO 59+0

59+00 TO 44+0

37+00 TO 24+00

80+50 TO 72+50

72+50 TO 64+50

48+50 TO 40+50

37+00 TO 29+50

105+00 TO 96+50 96+50 TO 88+50

88+50 TO 80+50

80+50 TO 72+50

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56+50 TO 48+50

48+50 TO 40+50

37+00 TO 29+50

29+50 TO 21+00

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OVERFLOW CHANNEL E PLAN & PROFILE | 14+21 TO 7-50

OVERFLOW CHANNEL F PLAN & PROFILE 7+50 TO 0+00 OVERFLOW CHANNEL F PLAN & PROFILE 9+00 TO 0+00

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GRADING PLAN

GRADING PLAN

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VICINITY MAP

CLIENT CONTACT (OWNER)

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EMERGENCY WATERSHED PROGRAM CONTACT:

JEFF SICKLES, CONSTRUCTION **ENGINUITY ENGINEERING SOLUTIONS** 10106 W. SAN JUAN WAY LITTLETON, CO 80127

PROJECT CONTACT:

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PORTLAND, OREGON 97204 503-415-2359

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THK ASSOCIATES 2953 S PEORIA STEET, SUITE 101 AURORA, CO 80014 303-770-7132

CLINT HENKE, PERMITTING SPECIALIST

ERO RESOURCES 1842 CLARKSON STREET SENVER, CO 80218

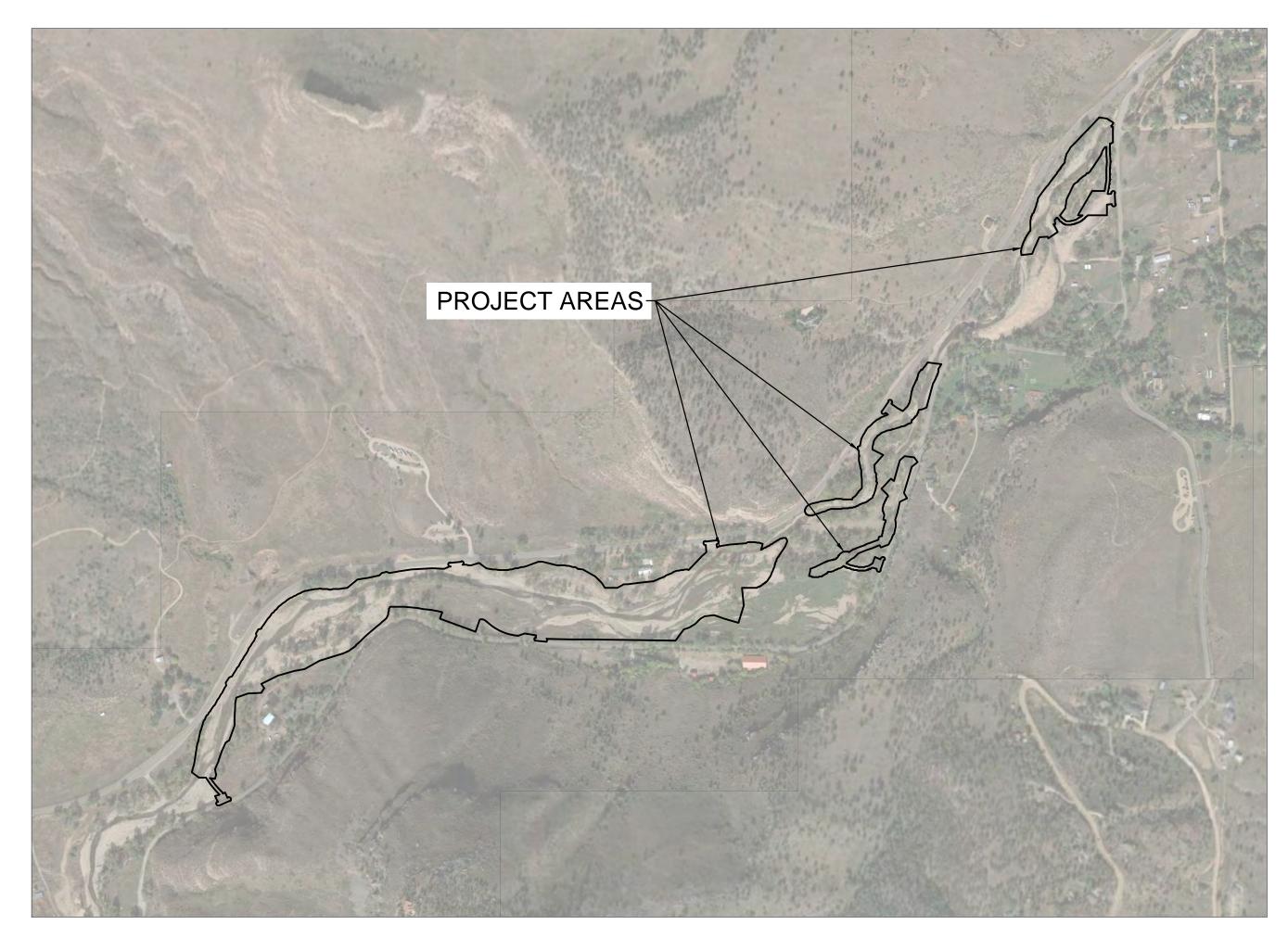
303-830-1188

BOULDER COUNTY APPROVAL: NRCS APPROVAL:

PRINT NAME PRINT NAME SIGN NAME SIGN NAME

BOULDER COUNTY PARKS AND OPEN SPACE

SOUTH ST. VRAIN CREEK RESTORATION



LOCATION MAP 1" = 500'

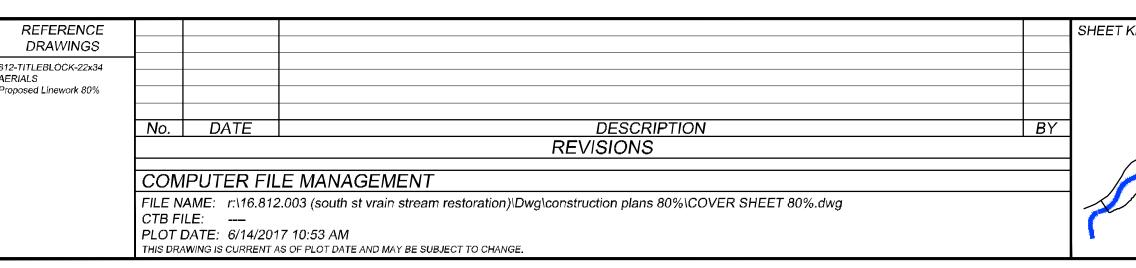


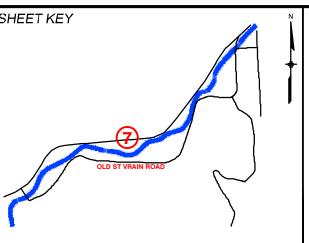




DETAILS REVEGETATION DETAILS " I CERTIFY TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, JUDGEMENT AND BELIEF, THESE PLANS MEET THE APPLICABLE NRCS STANDARDS"

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SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGNS

COVER SHEET

ON BEHALF OF	DESIGNED BY:	SDS	SCALE (22	" X 34")	DATE ISSUED:		02/17/17	DRAWING No.
SIGN GROUP, INC.	DRAWN BY:	JDL	HORIZ.	N/A				OEN 4
Г No. 16.812.003	CHECKED BY:	RDK	VERT	N/A	SHEET	1	OF 83	GENT

- DIMENSIONS AND NOTATIONS SUPERSEDE SCALE OF THE DRAWINGS
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCEPTANCE, CONVEYANCE, AND CONTROL OF ALL SURFACE AND SUBSURFACE WATER FLOWS IN AND ENTERING SOUTH ST VRAIN CREEK AFFECTED BY THIS PROJECT. THE CONTRACTOR SHALL BE 1. RESPONSIBLE FOR OPERATIONS OR ANY OTHER ACCEPTABLE MEANS TO PREVENT POLLUTION OF THE CREEK. THE CONTRACTOR SHALL SUBMIT A WATER MANAGEMENT PLAN AND CANNOT BEGIN CONSTRUCTION UNTIL THE PLAN IS APPROVED. PLAN MUST BE APPROVED BY ENGINEER.
- PARCEL, RIGHT OF WAY AND EASEMENT INFORMATION IS APPROXIMATE AND SHOULD BE VERIFIED PRIOR TO WORK.
- UNDERGROUND UTILITIES IN THE AREA OF CONSTRUCTION HAVE BEEN LOCATED FROM FIELD INVESTIGATION AND THE AVAILABLE UTILITY RECORDS. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE PROTECTION OF ANY UTILITIES AFFECTED BY THE EXECUTION OF THIS CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES AND AGENCIES AND FOR THE COORDINATION OF ALL WORK IN THE PROXIMITY OF THE UTILITIES.
- THE CONTRACTOR SHALL NOTE THAT ALL UTILITIES MAY NOT APPEAR ON THESE PLANS AND THAT THE POTENTIAL CONFLICT WITH UTILITIES SHALL BE CONSIDERED IN THE PREPARATION OF COST ESTIMATES AND BIDS.
- THE CONTRACTOR SHALL CONTACT ALL UTILITY OWNERS FOR INSPECTION WHEN WORK IS SCHEDULED ADJACENT TO THE UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING AFFECTED UTILITIES IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, AND THE REQUIREMENTS OF THE UTILITY OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND COSTS ASSOCIATED WITH INTERRUPTED OR LOST SERVICE DUE TO DAMAGE TO THESE FACILITIES.
- ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE OWNERS. THE OWNERS RESERVE THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO THE STANDARDS AND SPECIFICATIONS SHOWN IN THE CONTRACT DOCUMENTS.
- THE CONTRACTOR SHALL HAVE ONE SIGNED COPY OF THE APPROVED PLANS, ONE COPY OF THE APPROPRIATE STANDARDS AND SPECIFICATIONS, AND A COPY OF ANY PERMITS NEEDED AT THE JOB SITE AT ALL TIMES
- PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES THE CONTRACTOR SHALL MEET WITH THE OWNER'S REPRESENTATIVE AND RECORD NOTES OF EXISTING CONDITIONS OF THE SITE AND ADJACENT PROPERTY. THIS IS TO DOCUMENT EXISTING CONDITIONS. 12. THE CONTRACTOR SHALL IDENTIFY AND MARK EACH TREE TO BE REMOVED. THE PHOTO LOG SHOULD ALSO BE DEVELOPED.
- 0. THE CONTRACTOR SHALL REFER TO THE CONTRACT SPECIFICATIONS FOR DESCRIPTION OF MATERIALS REFERRED TO BY SIZE, CLASS, TYPE, DESCRIPTION, OR OTHERWISE SPECIFIED ON THE DRAWINGS.
- 1. THE CONTRACTOR IS RESPONSIBLE FOR SAVING AND PROTECTING ALL EXISTING TREES AND VEGETATION WHERE REMOVAL FOR CONSTRUCTION IS NOT MANDATORY
- 12. UNAUTHORIZED CHANGES AND USES: THE ENGINEER WHO PREPARED THESE PLANS WILL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS AND SPECIFICATIONS MUST BE IN WRITING AND MUST BE APPROVED BY THE OWNER AND THE PREPARER OF THESE PLANS.
- 13. THE CONTRACTOR SHALL NOTIFY THE OWNERS REPRESENTATIVE IMMEDIATELY OF ANY FIELD CONDITION NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS
- 4. THE CONTRACTOR SHALL PERFORM ALL WORK WITHIN THE CONSTRUCTION LIMITS AS 13. THE CONTRACTOR SHALL INSTALL TEMPORARY PLASTIC FENCE OR DEMARCATION SHOWN ON THE DRAWINGS AND DISCUSSED IN THE CONTRACT DOCUMENTS. IF THE CONTRACTOR DAMAGES ANY EXISTING SITE OR PUBLIC AMENITIES (PAVEMENTS, CURBS, CURB AND GUTTER, SOD, TREES, FENCES, ETC.) OUTSIDE OR WITHIN THE EASEMENTS OR CONSTRUCTION LIMITS, HE SHALL REMOVE AND REPAIR SUCH TO THE SATISFACTION OF THE INDIVIDUAL PROPERTY OWNERS.
- 15. ITEMS TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR, UNLESS NOTED OTHERWISE IN THE PLANS OR SPECIFICATIONS.
- 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION CONTROL THROUGHOUT THE CONSTRUCTION DURATION AND SHALL INSTALL EROSION CONTROL MEASURES AS SUGGESTED ON PLANS.
- 17. THE EXACT LIMITS OF THE CONTRACTOR'S PARKING AND STAGING AREA FOR MATERIAL STOCKPILING, OFFICE TRAILERS, AND PARKING FOR PUBLIC SHALL BE SUBMITTED BY 17. ALL TOPSOIL HARVESTED ONSITE SHALL BE APPLIED TO AREAS SEEDED WITH SEEDING THE CONTRACTOR FOR THE REVIEW AND APPROVAL OF THE OWNER'S REPRESENTATIVE
- 18. ALL REQUIRED UTILITIES FOR THE CONTRACTOR'S STAGING AREA SHALL BE ARRANGED BY THE CONTRACTOR DIRECTLY WITH THE APPROPRIATE UTILITY AGENCY. UTILITY ARRANGEMENTS SHALL BE SUBJECT TO THE APPROVAL OF THE CONTRACTOR TO BOULDER COUNTY STANDARD STORMWATER MANAGEMENT PLAN NOTES ENCLOSE AND SET UP HIS OPERATIONAL AREA. ADDITIONALLY, THE CONTRACTOR SHALL RESTORE THE SITE TO ITS ORIGINAL CONDITION TO THE SATISFACTION OF THE BEST MANAGEMENT PRACTICES OWNER'S REPRESENTATIVE UPON COMPLETION OF THE CONTRACT WORK
- 19. WASTE MATERIAL PRODUCED AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE LEGALLY DISPOSED OF OFF THE PROJECT SITE OR AS DIRECTED BY THE OWNERS REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
- 20. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS THAT ARE PERTINENT TO THIS WORK.
- 21. ANY CONSTRUCTION DEBRIS OR MUD TRACKING ONTO THE PUBLIC RIGHT-OF-WAY OR OFFICIAL PARK ROADS, RESULTING FROM THE PROJECT, SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR. THE CONTRACTOR SHALL IMMEDIATELY FIX ANY EXCAVATION, OR PAVEMENT FAILURE CAUSED BY THE PROJECT, AND SHALL PROPERLY BARRICADE THE SITE UNTIL CONSTRUCTION IS COMPLETE.
- 2. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS AT, AND ADJACENT TO THE JOB SITE, INCLUDING BUT NOT LIMITED TO TRENCH EXCAVATIONS AND SHORING, TRAFFIC CONTROL, SECURITY, AND SAFETY OF ALL PERSONS AND PROPERTY, DURING THE PERFORMANCE OF THE WORK. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY, AND SHALL NOT BE LIMITED TO NORMAL WORKING HOURS. THE DUTY OF THE OWNERS TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN OR NEAR THE CONSTRUCTION SITE.
- 23. THE CONTRACTOR SHALL NOTE THAT VERTICAL ELEVATION CALLOUTS SHOWN ON THE PLANS APPEAR IN THE FOLLOWING TWO FORMATS: 54XX.XX OR XX.XX.
- 24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY NEEDED DEWATERING OPERATIONS INCLUDING ANY REQUIRED PERMITS FOR DEWATERING OPERATIONS. 25. ALL GRADES SHOWN ARE FINISHED GRADES EXCEPT WHERE OTHERWISE NOTED ON 7
- THE DRAWINGS. 26. FIELD MODIFICATIONS WILL BE NECESSARY AS PART OF THIS PROJECT. DRAWINGS
- COORDINATE FIELD CHANGES WITH ENGINEER. 27. THE MAJORITY OF THIS PROJECT IS WITHIN EWP PERMITTING LIMITS. THE AREA

ARE CONSTRUCTION DRAWINGS, BUT WERE BASED ON 80% DESIGNS. PLEASE

- UPSTREAM OF STATION 88+50 IS OUTSIDE OF THESE LIMITS AND IS BEING FUNDED BY BOULDER COUNTY.
- 28. RIGHT OF WAY LINES DEPICTED ON PLAN SET ARE FROM BEST AVAILABLE DATA FROM

COMPUTER FILE MANAGEMENT

THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.

PLOT DATE: 6/14/2017 10:54 AM

No. DATE

CTB FILE: ---

REFERENCE

DRAWINGS 2-TITLEBLOCK-22x34

BOULDER COUNTY. RIGHT OF WAY LINES SHALL BE VERIFIED AND STAKED PRIOR TO CONSTRUCTION. CONSTRUCTION IS ONLY ALLOWED ON PARCELS WITH OWNERSHIP

<u>DEMOLITION / CLEARING AND GRUBBING NOTES</u>

REVIEW SPECIFICATIONS FOR MORE DETAIL THAN PROVIDED HERE.

ANY AVAILABLE TOPSOIL WITHIN CENTRAL STAGING AREA OR ON FLOODPLAIN BENCHES SHOULD BE STRIP AND STOCKPILED AS AVAILABLE.

3. TREES LESS THAN 6 INCH DIAMETER THAT ARE INCLUDED WITH CLEARING AND

- GRUBBING ARE NOT SHOWN ON THE PLANS FOR CLARITY. WOODY MATERIAL REMOVED UNDER CLEARING AND GRUBBING THAT ARE GREATER THAN 1 INCH DIAMETER AT BREAST HEIGHT (DBH) OF 4.5 FEET WILL BE USED IN
- FASCINES AND SLASH MATERIAL FOR LARGE WOOD STRUCTURES. WOODY MATERIAL REMOVED UNDER CLEARING AND GRUBBING THAT CANNOT BE USED AS PART OF FASCINES OR SLASH MATERIAL WILL BE CHIPPED AND SPREAD ACROSS THE FLOODPLAIN AS DIRECTED BY THE ENGINEER. ROOTWADS REMOVED AS PART OF CLEARING AND GRUBBING CAN ALSO BE CHIPPED ON SITE. APPROVAL OF MATERIAL TO BE CHIPPED SHALL BE COMPLETED BY BCPOS OR ENGINEER.
- ALL TREES WITH A TRUNK CALIPER GREATER THAN 6 INCHES DIAMETER AT BREAST HEIGHT (DBH) OF 4.5 FOOT WILL BE SALVAGED WITH ROOTWAD INTACT. SALVAGED TREES WILL BE LIMBED TO A LIMB LENGTH OF NO MORE THAN 24 INCHES, EXCEPT AS APPROVED BY ENGINEER. DESIRED ROOTWAD WIDTH IS 2.5 TO 4 TIMES THE DBH OF THE TREE. EXCEPTIONS TO SALVAGE ROOTWAD TREES ARE THOSE TREES THAT ARE NOT IN LOCATIONS ACCESSIBLE WITH AN EXCAVATOR, OR TREES THAT HAVE ROOT ÙŸÙVÒT ÙÁÕÜUY ŒÕÁUWAUØÁÜUÖSĒA
- TREES BETWEEN 1 INCH AND 6 INCH DBH ARE NOT DESIGNATED FOR REUSE AS KEY LOGS IN LARGE WOOD STRUCTURES.
- ANY TREES BETWEEN 1 INCH AND 6 INCH DBH WILL BE USED ON SITE AS DIRECTED BY THE ENGINEER FOR FASCINES OR SLASH MATERIAL AND ARE INCLUDED IN CLEARING AND GRUBBING FOR PAYMENT.
- 9. TREES LESS THAN 1 INCH DBH WILL BE CHIPPED ON SITE FOR INCORPORATION INTO EXISTING SUBSTRATE.
- 10. ONLY INVASIVE TREES WILL BE HAULED OFF SITE. ALL OTHER WOODY MATERIAL WILL BE RE-USED ON SITE.
- 11. SITE WALK REQUIRED WITH ENGINEER PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- ENGINEER SHALL BE NOTIFIED FOR INSPECTION AND APPROVAL OF THESE MARKED TREES. NO TREE OR SHRUB SHALL BE REMOVED WITHOUT PRIOR APPROVAL BY THE ENGINEER. TREES REMOVED WITHOUT PRIOR APPROVAL OF THE ENGINEER SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. REPLACEMENT TREES SHALL BE AS DESIGNATED IN THE PLANS. ANY OBJECT THAT IS NOT DESIGNATED TO BE REMOVED AND IS DAMAGED SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE ENGINEER, AT THE CONTRACTOR'S EXPENSE. BCPOS WILL BE REQUIRED TO APPROVE REPLACEMENT OF ANY ITEMS REMOVED IN ERROR THE INTENT IS TO SAVE AS MANY TREES AS POSSIBLE. CONTRACTOR SHALL EVALUATE CUT AND FILL AT EACH TREE PRIOR TO REMOVAL. FILL MATERIAL CAN BE PILED UP TO A DEPTH OF FI +AT BASED OF TREE, AND CUT MATERIAL CAN BE REMOVED AROUND A TREE UP TO A DEPTH OF FG+ WITH THE UNDERSTANDING THAT IT IS BETTER TO LEAVE A TREE IN PLACE WITH THE HOPE IT SURVIVES RATHER THAN REMOVE IT IN THE SITUATION DESCRIBED ABOVE.
- FLAGGING, ACCEPTABLE TO THE ENGINEER, ALONG THE LIMITS OF CONSTRUCTION PRIOR TO COMMENCING WITH THE CLEARING AND GRUBBING. THE ACTUAL FENCE LOCATION SHALL BE REVIEWED AND APPROVED BY THE ENGINEER AND BCPOS PRIOR 2. THE CONTRACTOR IS RESPONSIBLE FOR ALL CARE OF WATER INCLUDING BUT NOT TO INSTALLATION.
- 14. INTERNAL ACCESS ROUTES, STAGING AREAS, VEHICULAR TRAFFIC CONTROL, FULEING AND MAINTENANCE AREAS SHOULD BE FLAGGED AND NEARBY PRIVATE PROPERTIES PROTECTED WITH PLASTIC FENCE.
- 15. ALL WETLAND AREAS NEAR LAND DISTURBING ACTIVITIES SHALL BE FENCED, WITH THE EXCEPTION OF AREAS WITHIN GRADING LIMITS.
- 16. ALL TREES BEING SAVED SHALL BE FENCED ON CONSTRUCTION SIDE OF TREE AT THE DRIPLINE. IF ACCESS IS ON BACK SIDE OF TREE, THEN ENTIRE TREE SHALL BE FENCED.
- (UPLAND). TOPSOIL SHALL BE APPLIED AT A 4 INCH DEPTH. NO COMPACTION SHALL OCCUR FOLLOWING PLACEMENT. ALL APPLICATION OF TOPSOIL SHALL OCCUR AFTER SOIL CONDITIONER HAS BEEN APPLIED BUT PRIOR TO THE APPLICATION OF SEED.

DESCRIPTION

REVISIONS

FILE NAME: r:\16.812.003 (south st vrain stream restoration)\Dwg\construction plans 80%\NOTES AND LEGEND 80%.dwg

- CONTRACTOR 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.
- INTERNAL ACCESS ROUTES AND HAUL ROUTES HAVE BEEN NOTED ON THE PLAN TO LIMIT THE AMOUNT OF DISTURBANCE TRAVELING BETWEEN PROJECT AREAS. INTERNAL ACCESS ROUTES SHALL BE FLAGGED PRIOR TO THE START OF CONSTRUCTION. VERIFIED BY ENGINEER PRIOR TO WORK.
- ALL INLETS AND CULVERTS SHALL BE PROTECTED DURING ONSITE CONSTRUCTION ACTIVITIES. INLET PROTECTION LOCATIONS SHALL BE RECORDED ON THE SWMP SITE
- 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, 1. AND ALL OTHER UNUSED CONCRETE THAT ENDS UP ON THE GROUND.
- THE CONTRACTOR 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 MUST NOTIFY THE UY ÞÒÜ (ŅÁÜ ÒÚÜ ÒÙ ÒÞVŒVOX ÒÁU ÜÁÒ ÞÔ OÞ Ò ÒÜÁOT T ÖÖ OÐ ÞÓ ŠÝ É
- 8. ALL EXISTING MATURE TREES WITHIN THE DESIGNATED PROJECT AREA ARE TO BE FENCE PROTECTED IN PLACE AT DRIPLINE 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 AND THE ENGINEER.

- ALL EXCAVATION ACTIVITIES OCCURRING WITHIN 10 FEET OF THE DRIPLINE SHALL BE PERFORMED BY HAND AND IF NECESSARY ROOTS SHALL BE CLEANLY CUT NOT TORN 4. THE USE OF RIPRAP OR OTHER PROTECTION MEASURES ON THE SURFACES OF THE 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.
- 10. EXISTING STORMWATER PIPES THAT OUTFALL INTO OR UPGRADE OF THE PROJECT AREA SHALL BE ALLOWED TO CONVEY FLOW SAFELY TO THE MAIN CHANNEL. PROVIDE ANY NECESSARY EROSION AND/OR SEDIMENT CONTROL DEVICES SUCH AS EROSION CONTROL LOGS AND ROCK CHECK DAMS AS NECESSARY.
- 11. SOME WORK IS BEING PERFORMED IN WETLANDS. INSTALL APPROPRIATE BMPS AND PROTECTIVE FENCING AROUND PROPOSED LIMITS OF DISTURBANCE IN ALL WETLAND

1. THE CONTRACTOR SHALL NOT BURN, BURY, OR OTHERWISE DISCHARGE CONSTRUCTION OR DEMOLITION WASTE ON THE SITE UNLESS SPECIFIED OTHERWISE. 2. THE CONTRACTOR 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

- 1. THE CONTRACTOR 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.
- 2. THE CONTRACTOR SHALL IMMEDIATELY REPORT SPILLS TO THE PROPER REGULATORY AUTHORITY AND SHALL IMMEDIATELY NOTIFY THE ENGINEER.
- HANDLING OF CONSTRUCTION FUELS AND LUBRICANTS: A. THE CONTRACTOR SHALL EMPLOY PERSONS QUALIFIED TO HANDLE CONSTRUCTION
- EQUIPMENT FUELS AND LUBRICANTS. B. THE CONTRACTOR SHALL REFUEL AND SERVICE EQUIPMENT AWAY FROM FLOODPLAINS OF RIVERS, STREAMS AND OTHER BODIES OF WATER. THE
- CONTRACTOR SHALL ENSURE EQUIPMENT THAT ENTERS THE WATER IS FREE FROM EXTERNAL GREASE, OIL, AND MUD. C. THE CONTRACTOR SHALL PREVENT HANDLING AND FUELING OPERATIONS FROM CONTAMINATING THE GROUND. SURFACE WATER. AND GROUND WATER. THE CONTRACTOR SHALL USE CONTAINMENT BERMS AND AN IMPERMEABLE BASE
- D. REFUELING SHALL TAKE PLACE IN STAGING AREA.

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 APPLICABLE LOCAL, STATE OR FEDERAL LICENSE OR PERMIT.
- LIMITED TO DESIGNING, SUPPLYING, CONSTRUCTING, OPERATING, AND REMOVING ALL CARE OF WATER PROVISION INCLUDING COFFER DAMS AND SEDIMENT REMOVAL SYSTEMS; DESIGNING, SUPPLYING, INSTALLING, MAINTAINING, AND REMOVING PROTECTIVE WORKS FOR WINTER OPERATIONS OF CARE OF WATER SYSTEMS.
- 3. THE CONTRACTOR SHALL COMPLY WITH ALL USACE 404 PERMIT REQUIREMENTS INCLUDING ANY SPECIAL CARE REQUIREMENTS ISSUED FOR THIS PROJECT.
- 4. WHEN REQUIRED THE CONTRACTOR 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 6. PROTECTIVE WORKS SHALL BE DESIGNED BY THE CONTRACTOR AS NECESSARY TO
- INCLUDE ENCLOSURES, INSULATION, AND HEATING SYSTEMS TO ENSURE THAT DEWATERING SYSTEMS OPERATE CONTINUOUSLY AND DO NOT BECOME FROZEN DURING COLD WEATHER. 7. THE CONTRACTOR 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 SHALL DISPOSE OF SEDIMENTS IN A SUITABLE OFF- SITE WASTE DISPOSAL FACILITY.
- 8. THE CONTRACTOR 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.
- 9. TURBIDITY IS EXPECTED DURING PLACEMENT AND REMOVAL OF WATER CONTROL. IF WATERS BECOME NOTICEABLY TURBID, CONTRACTOR 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 Ò PÕ O PÒ O CHÁU LÁ P OÁU Y ÞO LÍÐAÚ Ó LÚ OÙ Ó ÞVOE/OX Ó ÉACE/Á/P Ó QÚÁ Ó QÚÔ LÓ VOU Þ È
- 10. IN THE EVENT OF UNSCHEDULED CONSTRUCTION ACTIVITY THAT RESULTS IN A VISUALLY CONSPICUOUS PLUME OF SEDIMENT, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND UNDERTAKE MITIGATION ACTIONS NECESSARY TO COMPLY WITH THE SPECIFIED CLEAN WATER CRITERIA.
- MODIFICATIONS TO THE INTERNAL ACCESS ROUTES AND HAUL ROUTES SHALL BE 11. TEMPORARY STREAM CROSSINGS MIGHT BE REQUIRED AS PART OF THIS WORK DEPENDING ON CONTRACTORS MEANS AND METHODS. LOCATION AND INSTALLATION OF TEMPORARY STREAM CROSSINGS ARE REQUIRED TO BE REVIEWED BY THE ENGINEER.

- THE CONTRACTOR IS RESPONSIBLE FOR THE FINAL LAYOUT, CONFIGURATION, MAINTENANCE, AND REMOVAL IN THEIR ENTIRETY OF ALL COFFER DAMS TO BE CONSTRUCTED WITHIN THE PROJECT SITE.
- 2. THE CONTRACTOR 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.
- 3. COFFERDAMS LOCATED IN THE WATERWAY SHALL BE PLACED IN A MANNER TO PREVENT THEIR EROSION FROM NORMAL OR EXPECTED HIGH FLOWS. FURTHERMORE, THEY SHOULD BE PLACED TO A SUFFICIENT ELEVATION TO PREVENT THEIR

OVERTOPPING DURING REASONABLY ANTICIPATED FLOOD EVENTS THAT MAY COMPROMISE THE DESIGN AND PERFORMANCE OF THE COFFERDAM.

- 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
- 6. COFFER DAMS SHALL PROVIDE A BYPASS WATERWAY THAT IS ARMORED AND OF THE
- MINIMUM DIMENSIONS SHOWN IN THE TYPICAL WATER CONTROL CHANNEL DETAIL.
- 7. ANY COFFER DAM FAILURES OR OTHER WORKS EFFORTS THAT CAUSE A PLUME OF TURBID WATER TO FLOW DOWNSTREAM SHALL BE REPORTED TO THE ENGINEER.

HEAVY EQUIPMENT OPERATIONS AND MAINTENANCE

LEGEND

* * * *

BOULDER COUNTY PARKS AND OPEN SPACE OFC

ABBREVIATIONS

BANKFULL

DOWNSTREAM

ESTIMATED

HEIGHT

LENGTH

LEFT BANK

GRADE BREAK

PREPARED FOR

EWP

GB

LB

DEPTH BANKFULL

DEPTH LOWFLOW

DIAMETER BREAST HEIGHT

EMERGENCY WATERSHED PROTECTION

AN EMPLOYEE-OWNED COMPAN'

BOTTOM

DEPTH

- 1. EQUIPMENT OPERATED BELOW THE ORDINARY HIGH WATER MARK OF THE RIVER CHANNEL, MUST BE INSPECTED AND CLEAN OF FUEL, LUBRICANT LEAKS, AND INVASIVE AQUATIC SPECIES.
- 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 DIDYMOSPHENIA, NEW ZEALAND MUD SNAILS, WHIRLING DISEASE, ZEBRA MUSSELS, AND OTHER AQUATIC HITCHHIKERS.
- 3. 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 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.

MAIN CHANNEL ALIGNMENT

LIMITS OF CONSTRUCTION

LIMITS OF DISTURBANCE

BANKFULL EXTENTS

FLOODPLAIN BENCHING

EXISTING WETLAND

EXISTING FENCE

EXISTING WATER LINE

EXISTING BANK STABILIZATION

MAX

Qbf

Qlf

QTY

RB

SSV

STA

TYP

U/S

WBF

WBED

EXISTING OVERHEAD ELECTRIC

EXISTING FIBER OPTIC CABLE (BURIED)

LOW FLOW

MAXIMUM

MINIMUM

QUANTITY

STATION

OVERFLOW CHANNEL

FLOW OR DISCHARGE

WIDTH STREAMBED

WATER SURFACE BANKFULL

WATER SURFACE LOWFLOW

ECL — EROSION CONTROL LOG

HAUL ROUTE

NTERNAL ACCESS ROUTE

—5280———— PROPOSED MAJOR CONTOUR

—5281———— PROPOSED MINOR CONTOUR

- PF — PLASTIC FENCE

----5280 --- EXISTING MAJOR CONTOUR

----5281---- EXISTING MINOR CONTOUR

——— — — PARCEL LINES

OVERFLOW CHANNEL ALIGNMENT

LEGEND

VEHICLE TRACKING CONTROL



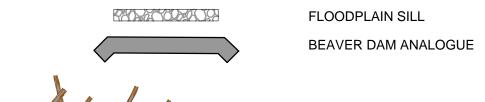
SHEET No.

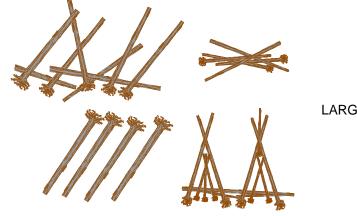
STOCKPILE CONTROL ROCK CHECK DAM

FLOW ARROW









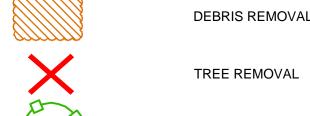
LARGE WOOD STRUCTURE

TREE PROTECTION

TREE (DECIDUOUS)

VEGETATION

MONITORING WELL



TREE (CONIFEROUS)

POWER POLE

WATER MANHOLE

STORM MANHOLE

TELEPHONE PEDESTAL

RIGHT BANK SOUTH ST VRAIN CREEK MAIN STEM **GUY WIRE**

TYPICAL **UPSTREAM** WIDTH WIDTH BANKFULL WIDTH LOWFLOW

CONTROL POINT

SIGN

2 OF 83

GEN 2

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

NOTES AND LEGEND

SOUTH ST. VRAIN CREEK RESTORATION

02/17/17 DRAWING No.

SCALE (22" X 34") DATE ISSUED: FOR AND ON BEHALF OF DESIGNED BY: SDS MATRIX DESIGN GROUP, INC. DRAWN BY: PROJECT No. 16.812.003 CHECKED BY:

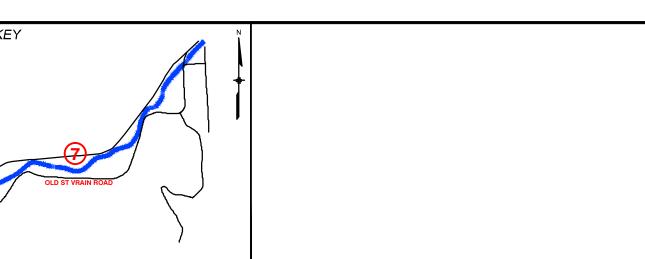
SHEET KEY

						202-00005		202-000	010	202-000)11		00001	203-00	0002	203-0	00003	203-00		203-00	1	203-000		203-00												
			EWP /	201-0	I	Removal of Struct	ures	Removal o	I	Removal of			d Excavation	Unclassified I			Excavation	Alternate E		Unclassified E		Unclassified Ex		Unclassified I	_,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	208-00	0001	209-002	00	211-03	I .	212-00005		212-00022	212-0	
Channel/Location	Stat	tion	BCPOS	Clearing and	d Grubbing	and Debris		(6 to 12 incl	I	(12+ inch [ng Native	(Complete			Offsite)	Unclassified		(Sort/Screen/S		(Sort/Screen/St		(Sort/Screen		Stormwater M	/lanagement	Time-Released	Watering	Dewate	ering	Seeding (Upla	and) Se	eeding (Riparian)	Soil Con	nditioner
			Area					(0 10 12 1110	22,	(12 1110111	J J ,	Strea	mbed)	(00p.0.0		,	,	(Extended H	,	to 12 inch	Rock)	to 24 inch F	Rock)	24+ inch	Rock)											
				A	0	LOAD		EA	4	EA		В	CY	BC	Y	BO		BC	-	TON	I	TON		TOI	N	LS	3	EA		LS	3	AC		AC	A/	4C
	From	То		PLAN	AS CONST.	PLAN AS CO	ONST.	PLAN A	AS CONST.	PLAN AS	S CONST.	PLAN	AS CONST.	PLAN A	AS CONST.		AS CONST.		AS CONST.	PLAN A	S CONST.	PLAN AS	S CONST.	PLAN A	AS CONST.	PLAN A	AS CONST.	PLAN AS	CONST.	PLAN A	AS CONST.	PLAN AS		LAN AS CONS	ST. PLAN	AS CONST.
	100+30	88+50	BCPOS	3.2		1		7		9		2,273		853		6,669		6,669		204		62		6				473				1.59	0).36	1.95	
	88+50	76+50	EWP #1	4.1		1		9		17		3,000		1,447		11,721		11,721		204		62		6		1		699		1		2.11	0	0.62	2.72	
	76+50	66+50	EWP #1	4.4				2				2,500		3,140		10,889		10,889		204		62		6				782				2.46	0).81	3.27	
Main Channel	66+50	54+00	EWP #1	3.2		1		4		1		1,490		733		3,440		3,440		204		62		6				613				1.78	0).70	2.48	
		44+50		0.6		1						475		149		234		234		204		62		6				15				0.18	0	0.01	0.19	
		30+75		0.9				6		1		633		190		1,434		1,434		204		62		6				59				0.45		0.08	0.53	
	30+75	26+00	EWP #2	1.2		1		2		3		860		867		2,074		2,074		204		62		6				108				0.71	0).11	0.82	
Overflow Channel A		2+97		1.8										3,602		-		-		204		62		6				368				0.88	0	0.92	1.79	
Overflow Channel B	10+52	2+54	EWP #1	1.2				10		3				76		3,042		3,042		204		62		6				271				0.87	0	0.24	1.11	
Overflow Channel C	11+71	1+25	EWP #1	2.4				14		13				791		3,600		3,600		204		62		6				562				1.58	0).71	2.29	
Overflow Channel D	13+50	2+15	EWP #1	1.3										727						204		62		6				223				0.85	0).31	1.16	
Overflow Channel E	8+26	0+88	EWP #1	0.4				9		2				157						204		62		6				20				0.13	0).17	0.30	
	14+21	0+00	EWP #1	1.0										107		1,695		1,695		204		62		6				108				0.69	0	0.23	0.92	
			Subtotal	22.4	0	4 ()	56	0	40	0	8,958	0	11,986	0	38,129	0	38,129	0	2,448	0	744	0	72	0	1	0	3,828	0	1	0	12.7	0 4	4.9 0	17.6	0
		BCPOS		3.2	0	1 ()	7	0	9	0	2,273	0	853	0	6,669	0	6,669	0	204	0	62	0	6	0	0	0	473	0	0	0	1.6	0 (0.4 0	2.0	0
		Proj	ect Total	25.7	0	5 ()	63	0	49	0	11,230	0	12,839	0	44,798	0	44,798	0	2,652	0	806	0	78	0	1	0	4,301	0	1	0	14.3	0 5	5.3 0	19.5	0

Channel/Location	Station	BCPUS	Correct On M	00012 Iulch Blanket	214-00 Perennial (⁷		214-0 Willow C Existing	uttings in	214-0° Willow C		214-0 Dormant	01026 Log Poles	214-01 Fascii			01040 ection Fence	214-01041 Vole Protection Fen		I-01050 and Shrubs	214-01228 Large Wood Structure Type 1	Large Wo	01229 od Structure pe 2	214-01230 Large Wood Structure Type 3	Large Wo	-01231 ood Structure ype 4	214-0 Large Wood Type	d Structure		01233 od Structure oe 6	215-01016 Transplanting Matur Willows	Soil Rete	6-0030 ention Blanket Special)
		Area	P	/C	SF	•	E	:A	E/	١	Е	A	LF		L	S	LS		EA	EA		EA	EA		EA	E/	4	E	A	EA		SY
	0 0 0 0 0 0 0	То		AS CONST.	. PLAN A	AS CONST.	PLAN	AS CONST.	PLAN /	AS CONST.	PLAN	AS CONST.	PLAN /	AS CONST.	PLAN	AS CONST.	PLAN AS CON	NST. PLAN	AS CONST	PLAN AS CONS	T. PLAN	AS CONST.	PLAN AS CONST	. PLAN	AS CONST.	. PLAN	AS CONST.	PLAN	AS CONST.	PLAN AS CON	ST. PLAN	AS CONST
	100+30 88-						48		1,412		29							473			3		1	4		4		2		28		
	88+50 76-	6+50 EWP#	1 2.72				43		1,371		9				1		1	699		1				7		5		1				
	76+50 66-								1,184				67					782		2			1	8		6		2		30		
Main Channel	66+50 54·	4+00 EWP#	1 2.48						163				104					613		1			2			3		2		20		
		1+50 EWP#							287									15			2									42		
	36+50 30-	0+75 EWP#	2 0.53						1,079									59		1	1									33		
	30+75 26-	6+00 EWP#	0.82						1,425		12							108			1									42		
Overflow Channel A	11+45 2+	+97 EWP#	1 1.25		945				904									368								1					2,621	
Overflow Channel B	10+52 2+	+54 EWP#	1.05		695				226		27							271												103	267	
Overflow Channel C	11+71 1+	+25 EWP#	1 2.04						468		21							562								2					1,241	
Overflow Channel D	13+50 2+	+15 EWP#	1.16		1,877				0									223													0	
Overflow Channel E					1,381				245									20													532	
Overflow Channel F		+00 EWP#			1,019				277									108										1			392	
		EWP Subtota		0	5,917	0	43	0	7,629	0	69	0	171	0	1	0	1 0	3,828	0	5 0	4	0	3 0	15	0	17	0	6	0	270 0	5,053	0
	ВС	CPOS Subtota	1 2.0	0	0	0	48	0	1,412	0	29	0	0	0	0	0	0 0	473	0	0 0	3	0	1 0	4	0	4	0	2	0	28 0	0	0
		Project Tota	18.5	0	5 917	0	91	0	9 041	0	98	0	171	0	1	0	1 1	4 301	0	5 0	7	0	4 0	10	0	21	0	8	0	298 0	5 053	0

Channel/Location	Statio		EWP / BCPOS Area	218-0 Noxious Manag	Weed	240-000 Protection of I Birds	Migratory	506-03 Riffle Str		506-0 Riffle Floo		506-030 Floodplain		506-03 Habitat B		506-(Overflow F	03005 Rock Ramp	506-0 Knickpoint S Struc	Stabilization \	506-00 Willow Cutting To	gs in Cobble	506-0 Bould	00431 er Toe	506-050 Import 6 to 12	0000 Inch Rock Im	506-05 port 12 to 24		506-0 Import 24+	05000 Finch Rock	508-00 Beaver Dam		607-1 Fence (l		625-0 Constructio		626-00000 Mobilization	Constru	630-00012 ction Zone Traffi Control
			Alea	L	8	EA		E/	A	L	F	LF		EA	A	E	ΕA	E/	A	LF	F	L	F	TON	V	TON	•	TO	ON	EA	١	Li	F	L	S	LS		LS
	From	То		PLAN	AS CONST.	PLAN A	S CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN AS	S CONST.	PLAN A	AS CONST.	PLAN	AS CONST	. PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN A	AS CONST.	PLAN A	S CONST.	PLAN	AS CONST.	PLAN A	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN AS C	ONST. PLAI	N AS CONST
	100+30 8	88+50	BCPOS					4		165				125						567		149		37		40		181				1,302			1			
	88+50 7	76+50 I	EWP #1	1		1		3		80				65						543				37		40		181				954		1	1	1	1	
	76+50	66+50 I	EWP #1					4		200		220		85						608		465		37		40		181				1,947			1			
Main Channel		54+00 I						2		105				40						209		47		37		40		181				817						
		44+50 I						1						20						20				37		40		181				652						
		30+75 I						1		25				20				1		40				37		40		181				148						
	30+75 2	26+00	EWP #2					1						20				1		255				37		40		181				1,871						
Overflow Channel A		2+97						-				170				1				19				37		40		181				266						
Overflow Channel B		2+54										115				1		1		13				37		40		181				261			1			
Overflow Channel C		1+25										100				-		1						37		40		181				349						
Overflow Channel D		2+15																2						37		40		181				653						
Overflow Channel E		0+88																4						37		40		181		2		951						
Overflow Channel F		0+00														1								37		40		181		_		603						
		EWP S		1	0	1	0	12	0	410	0	605	0	250	0	3	0	6	0	1.707	0	512	0	444	0	480	0	2,172	0	2	0	9.468	0	1	0	1	0 1	0
	E	BCPOS S		0	0	0	0	4	0	165	0	0	0	125	0	0	0	0	0	567	0	149	0	37	0	40	0	181	0	0	0	1,302	0	0	0	0	0 0	0
			ct Total	1	0	1	<u> </u>	16	n	575	0	605	0	375	^	2	n	6	n	2.274	0	661	0	481	0	520	0	2.353	0	2	n	10.770	n	1		1	0 1	n

REFERENCE DRAWINGS					SHEET
812-TITLEBLOCK-22x34					
					-
	No.	DATE	DESCRIPTION	BY	1
			REVISIONS]
	COM	PUTER FIL	E MANAGEMENT		1 /
	CTB FI PLOT I	LE: DATE: 6/14/201	7.003 (south st vrain stream restoration)\Dwg\construction plans 80%\QUANTITIES 80%.dwg 7 10:56 AM S OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.		





AN EMPLOYEE-OWNED COMPANY

	5010	RADO L	econ	7
STORY.	18	0/8e/	A CO	S
S	3	117/17	D.	
	A DOS	ONAL E		

SOUTH ST. VRAIN CREEK RESTORATION

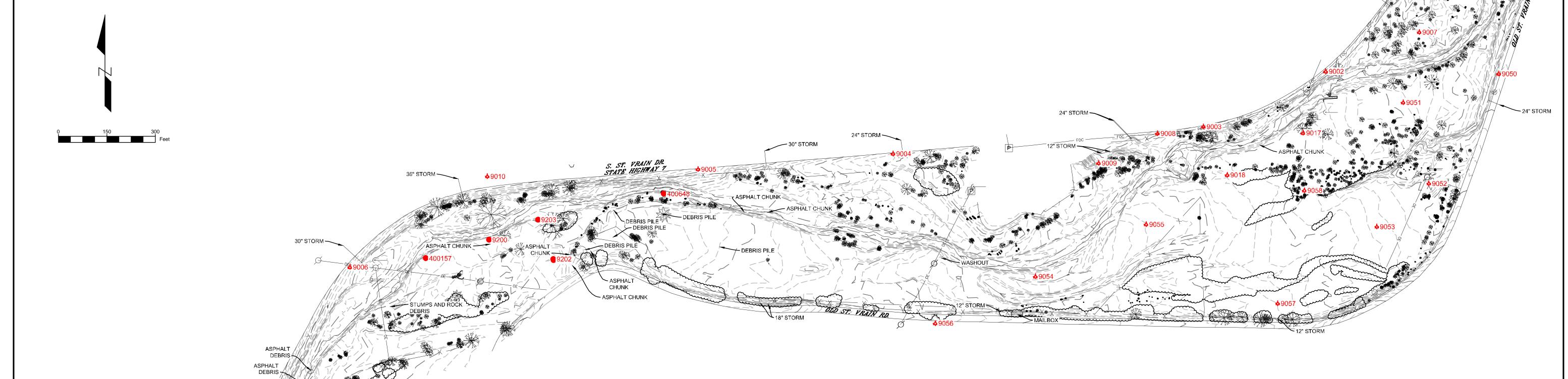
BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

QUANTITIES

DESIGNED BY:	SDS	SCALE (22	2" X 34")	DATE ISSUED:		02/17/17	DRAWING No.
DRAWN BY:	JDL	HORIZ.	N/A				OFNO
CHECKED BY:	RDK	VERT	N/Λ	SHEET	3	OF 83	I GEN3

SOUTH ST. VRAIN CREEK RESTORATION TOPOGRAPHIC SURVEY

A PORTION OF LAND LOCATED IN THE NORTHEAST QUARTER OF SECTION 26, THE NORTHWEST QUARTER OF SECTION 25 AND THE SOUTH HALF OF SECTION 24, TOWNSHIP 3 NORTH, RANGE 71 WEST OF THE 6TH P.M., AND THE WEST HALF OF SECTION 19, TOWNSHIP 3 NORTH, RANGE 71 WEST OF THE 6TH P.M., TOWN OF LYONS, COUNTY OF BOULDER, STATE OF COLORADO.



		Point To	able	
Point #	Elevation	Northing	Easting	Description
9000	5396.49	1320514.84	3061791.97	CP-60D NAIL
9008	5416.53	1319581.57	3060727.23	CP-60D NAIL
9001	5402.88	1320094.22	3061475.33	CP-60D NAIL
9002	5410.89	1319773.98	3061248.17	CP-60D NAIL
9003	5415.33	1319602.47	3060869.55	CP-60D NAIL
9004	5426.72	1319518.70	3059908.25	CP-60D NAIL
9005	5440.80	1319470.56	3059304.28	CP-60D NAIL
9006	5453.34	1319167.31	3058226.11	CP-60D NAIL
9007	5401.27	1319895.60	3061537.79	CP-60D NAIL
9009	5415.93	1319489.67	3060544.86	CP-60D NAIL
9010	5452.61	1319448.46	3058651.57	CP-60D NAIL
9011	5394.51	1320047.76	3061874.66	CP-60D NAIL
9012	5401.09	1321681.96	3062646.82	CP-60D NAIL
9013	5398.57	1321800.78	3062709.82	CP-60D NAIL
9014	5363.74	1321673.04	3062847.45	CP-60D NAIL
9015	5366.35	1321539.46	3062844.34	CP-60D NAIL
9016	5371.73	1321363.14	3062760.50	CP-60D NAIL
9017	5409.62	1319583.14	3061178.10	CP-60D NAIL
9018	5411.47	1319453.02	3060943.21	CP-60D NAIL
9019	5464.19	1318685.89	3057931.79	CP-60D NAIL
9020	5465.87	1318400.94	3057728.63	CP-60D NAIL

		Poir	nt Table	
Point #	Elevation	Northing	Easting	Description
9021	5469.94	1318215.40	3057587.73	CP-60D NAIL
9022	5477.22	1318173.50	3057327.64	CP-60D NAIL
9023	5463.49	1318229.43	3057730.26	CP-60D NAIL
9024	5470.11	1318038.69	3057762.02	CP-60D NAIL
9050	5398.17	1319766.57	3061784.15	CP-60D NAIL
9051	5404.06	1319677.51	3061487.76	CP-60D NAIL
9052	5404.71	1319426.31	3061567.58	CP-60D NAIL
9053	5407.60	1319292.40	3061406.35	CP-60D NAIL
9054	5422.55	1319138.27	3060349.22	CP-60D NAIL
9055	5416.96	1319299.82	3060691.93	CP-60D NAIL
9056	5428.42	1318993.10	3060038.81	CP-60D NAIL
9057	5413.20	1319054.58	3061099.45	CP-60D NAIL
9058	5409.78	1319404.86	3061181.78	CP-60D NAIL
9101	5368.31	1322865.64	3063534.33	3.25IN-AC-RLS-4846
9200	5443.32	1319251.76	3058656.61	NO-4 REBAR
9201	5443.62	1319188.38	3058856.18	2IN-AC-KING-CP-JMC
9202	5443.58	1319192.20	3058855.71	NO-4-REBAR
9203	5440.10	1319314.20	3058807.91	2IN-AC-BLDR-CNTY-HALL-07
9204	5365.97	1321905.36	3063037.06	2.5IN-BC-IN-WW
9206	5455.61	1318631.87	3058516.13	PK-NAIL-PANEL-PNT
9207	5485.20	1326079.04	3064535.42	BM-3.5IN-BC-NGS-CP-LYONS

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN

UTILITY INFORMATION SHOWN HEREON IS FROM APPARENT SURFACE EVIDENCE ONLY, AND MAY OR MAY NOT BE COMPLETE. THIS SURVEY MAY NOT ADDRESS FULL UTILITY INFORMATION OF ALL AVAILABLE UTILITIES FOR THIS SITE. INTERESTED PARTIES REQUIRING MORE COMPLETE LOCATION INFORMATION ARE DIRECTED TO CALL THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 FOR ON-SITE MARKING OF UNDERGROUND UTILITIES.

PROJECT BENCHMARK: (#9108) A FOUND 3-1/2" BRASS CAP STAMPED "LYONS 1985" SET IN A ROCK OUTCROPPING AND LOCATED APPROXIMATELY 100' SOUTHEAST OF THE CITY OF LYONS WATER TANK HAVING A PUBLISHED NAVD88 ELEVATION OF 5485.20 U.S. SURVEY FEET.

THIS SURVEY IS ACCURATE AS OF NOVEMBER 15, 2016 AND REPRESENTS SITE CONDITIONS AS OF THAT DATE.

SURVEYOR'S CERTIFICATION:

I, JUSTIN A. CONNER, A COLORADO LICENSED PROFESSIONAL LAND SURVEYOR, DO HEREBY STATE, FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC., THAT THIS SURVEY WAS CONDUCTED BY ME OR UNDER MY DIRECT SUPERVISION AND THE INFORMATION SHOWN IS ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

JUSTIN A. CONNER, PLS 38421 FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC.

					9020
REFERENCE DRAWINGS					SHEET KE
AERIALS 812-TITLEBLOCK-22x34 812-TITLEBLOCK-22x34					 -
	No. DAT	TE	DESCRIPTION REVISIONS	BY	_
			GEMENT It vrain stream restoration)\Dwg\construction plans 80%\SURVEY CONTROL 80%.dwg		
	PLOT DATE: 6	/14/2017 10:57 AM	AND MAY BE SUBJECT TO CHANGE.		•

SHEET KEY N	<u>s</u>	YMB(<u>OL LEGEND</u>
		©	CLEANOUT
			SURVEY CONTROL POINT
		*	CONIFEROUS TREE (DIAMETER
7	,	*	DECIDUOUS TREE (DIAMETER)
OLD ST VRAIN ROAD		φ.	FIRE HYDRANT
		•	FOUND MONUMENT (AS NOTE
1		*	IRRIGATION CONTROL VALVE

SYMB	<u>OL LEGEND</u>		
69	CLEANOUT	*	LIGHT POLE (AS NOTE
卆	SURVEY CONTROL POINT	89	SANITARY MANHOLE
米	CONIFEROUS TREE (DIAMETER)		SIGN
*	DECIDUOUS TREE (DIAMETER)	S	STORM MANHOLE
•	FIRE HYDRANT	P	TELEPHONE PEDESTA
•	FOUND MONUMENT (AS NOTED)	⟨ ∨∧ ⟩	WATER METER





PROJECT No. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION BOULDER COUNTY PARKS AND OPEN SPACE

FINAL DESIGN

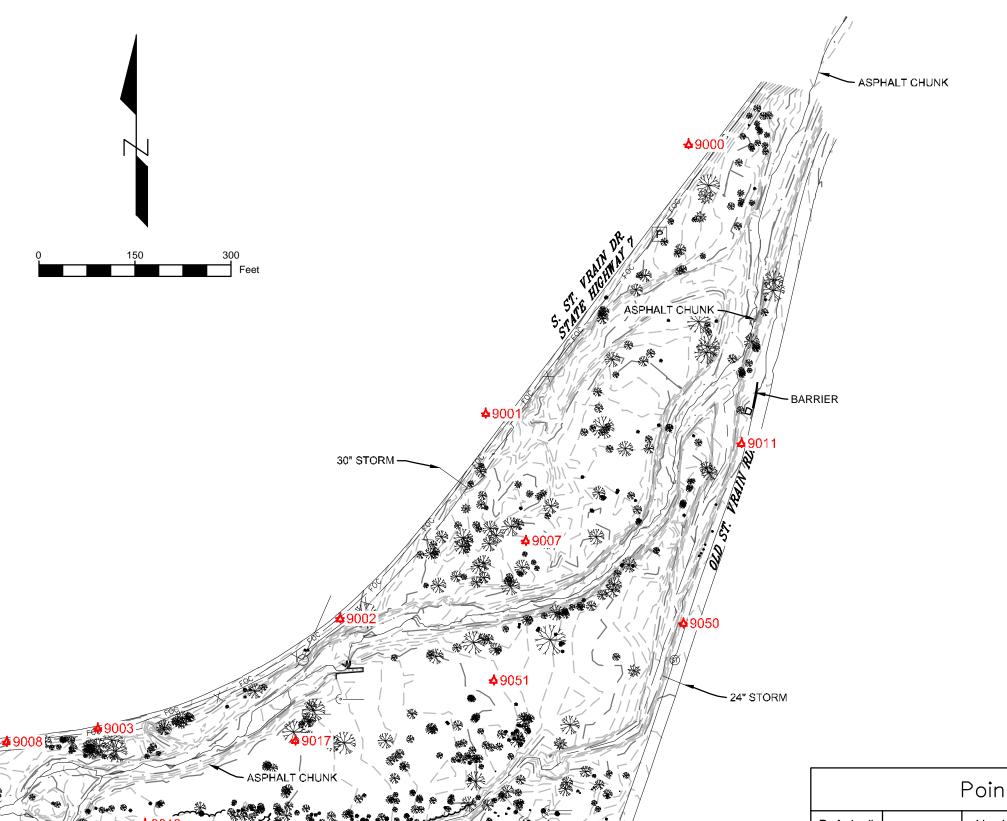
SURVEY CONTROL

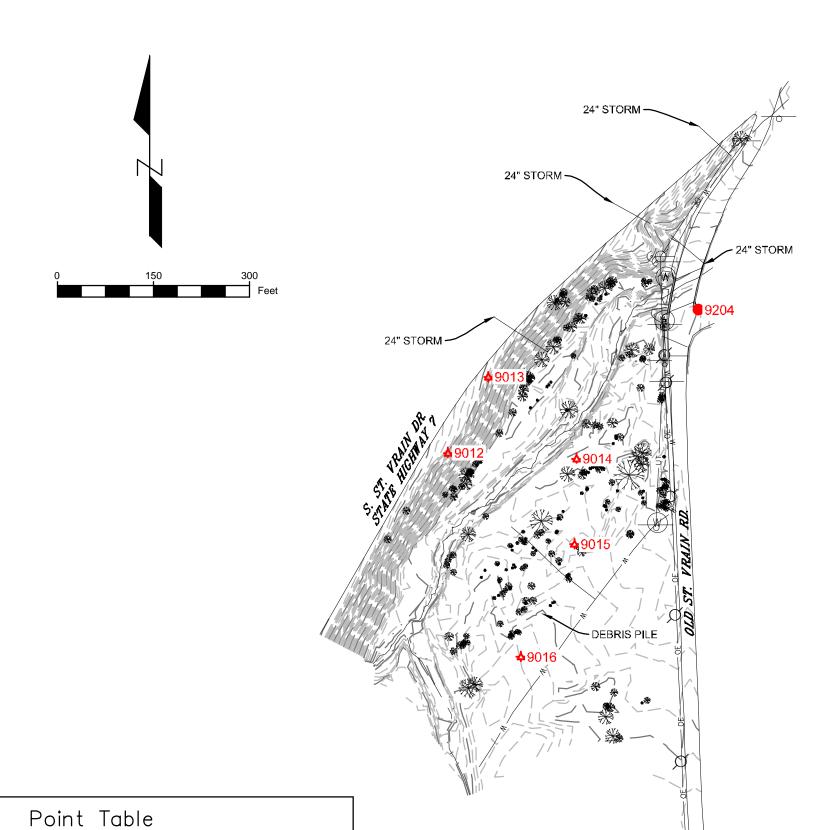
ESIGNED BY:	SDS	SCALE (22'	" X 34")	DATE (SSUED:		02/17/17	DRAWING No.
RAWN BY:	JOL	HORIZ.	1"= 30'				0 = 1 / /
		morniz.	7 - 30	OUEET		05 00	/ ZHNI ∕I
HECKED BY:	RDK	VERT.	N/A	SHEET	4	OF 83	

SOUTH ST. VRAIN STREAM RESTORATION

TOPOGRAPHIC SURVEY

A PORTION OF LAND LOCATED IN THE NORTHEAST QUARTER OF SECTION 26, THE NORTHWEST QUARTER OF SECTION 25 AND THE SOUTH HALF OF SECTION 24, TOWNSHIP 3 NORTH, RANGE 71 WEST OF THE 6TH P.M., AND THE WEST HALF OF SECTION 19, TOWNSHIP 3 NORTH, RANGE 71 WEST OF THE 6TH P.M., TOWN OF LYONS, COUNTY OF BOULDER, STATE OF COLORADO.





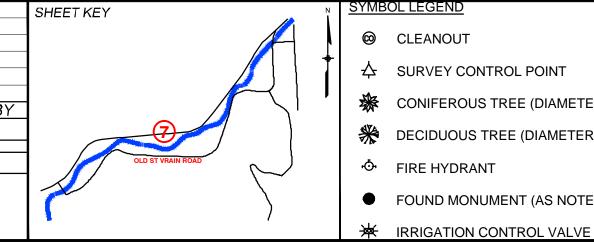
	Point Table						
Point #	Elevation	Northing	Easting	Description			
9000	5396.49	1320514.84	3061791.97	CP-60D NAIL			
9008	5416.53	1319581.57	3060727.23	CP-60D NAIL			
9001	5402.88	1320094.22	3061475.33	CP-60D NAIL			
9002	5410.89	1319773.98	3061248.17	CP-60D NAIL			
9003	5415.33	1319602.47	3060869.55	CP-60D NAIL			
9004	5426.72	1319518.70	3059908.25	CP-60D NAIL			
9005	5440.80	1319470.56	3059304.28	CP-60D NAIL			
9006	5453.34	1319167.31	3058226.11	CP-60D NAIL			
9007	5401.27	1319895.60	3061537.79	CP-60D NAIL			
9009	5415.93	1319489.67	3060544.86	CP-60D NAIL			
9010	5452.61	1319448.46	3058651.57	CP-60D NAIL			
9011	5394.51	1320047.76	3061874.66	CP-60D NAIL			
9012	5401.09	1321681.96	3062646.82	CP-60D NAIL			
9013	5398.57	1321800.78	3062709.82	CP-60D NAIL			
9014	5363.74	1321673.04	3062847.45	CP-60D NAIL			
9015	5366.35	1321539.46	3062844.34	CP-60D NAIL			
9016	5371.73	1321363.14	3062760.50	CP-60D NAIL			
9017	5409.62	1319583.14	3061178.10	CP-60D NAIL			
9018	5411.47	1319453.02	3060943.21	CP-60D NAIL			
9019	5464.19	1318685.89	3057931.79	CP-60D NAIL			
9020	5465.87	1318400.94	3057728.63	CP-60D NAIL			

	I Office Table							
Point #	Elevation	Northing	Easting	Description				
9021	5469.94	1318215.40	3057587.73	CP-60D NAIL				
9022	5477.22	1318173.50	3057327.64	CP-60D NAIL				
9023	5463.49	1318229.43	3057730.26	CP-60D NAIL				
9024	5470.11	1318038.69	3057762.02	CP-60D NAIL				
9050	5398.17	1319766.57	3061784.15	CP-60D NAIL				
9051	5404.06	1319677.51	3061487.76	CP-60D NAIL				
9052	5404.71	1319426.31	3061567.58	CP-60D NAIL				
9053	5407.60	1319292.40	3061406.35	CP-60D NAIL				
9054	5422.55	1319138.27	3060349.22	CP-60D NAIL				
9055	5416.96	1319299.82	3060691.93	CP-60D NAIL				
9056	5428.42	1318993.10	3060038.81	CP-60D NAIL				
9057	5413.20	1319054.58	3061099.45	CP-60D NAIL				
9058	5409.78	1319404.86	3061181.78	CP-60D NAIL				
9101	5368.31	1322865.64	3063534.33	3.25IN-AC-RLS-4846				
9200	5443.32	1319251.76	3058656.61	NO-4 REBAR				
9201	5443.62	1319188.38	3058856.18	2IN-AC-KING-CP-JMC				
9202	5443.58	1319192.20	3058855.71	NO-4-REBAR				
9203	5440.10	1319314.20	3058807.91	2IN-AC-BLDR-CNTY-HALL-07				
9204	5365.97	1321905.36	3063037.06	2.5IN-BC-IN-WW				
9206	5455.61	1318631.87	3058516.13	PK-NAIL-PANEL-PNT				
9207	5485.20	1326079.04	3064535.42	BM-3.5IN-BC-NGS-CP-LYONS				

WATER VALVE

				SHEE
]
				4
				1
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No.	DATE	DESCRIPTION	BY	
		REVISIONS		
COM	PUTER FIL	E MANAGEMENT		1
CTB FI	LE: DATE: 6/14/201	7 10:59 AM		
	COM FILE N. CTB FI PLOT I	COMPUTER FIL FILE NAME: r:\16.812 CTB FILE: PLOT DATE: 6/14/201	REVISIONS COMPUTER FILE MANAGEMENT FILE NAME: r:\16.812.003 (south st vrain stream restoration)\Dwg\construction plans 80%\SURVEY CONTROL 80%.dwg	REVISIONS COMPUTER FILE MANAGEMENT FILE NAME: r:\16.812.003 (south st vrain stream restoration)\Dwg\construction plans 80%\SURVEY CONTROL 80%.dwg CTB FILE: PLOT DATE: 6/14/2017 10:59 AM

MATCHLINE SEE SHEET 4



YMB	<u>OL LEGEND</u>		
©	CLEANOUT	*	LIGHT POLE (AS NOTE
	SURVEY CONTROL POINT	<u>ss</u>	SANITARY MANHOLE
米	CONIFEROUS TREE (DIAMETER)		SIGN
*	DECIDUOUS TREE (DIAMETER)	\$1	STORM MANHOLE
Ф	FIRE HYDRANT	Р	TELEPHONE PEDESTA
•	FOUND MONUMENT (AS NOTED)	₩ Ŋ	WATER METER

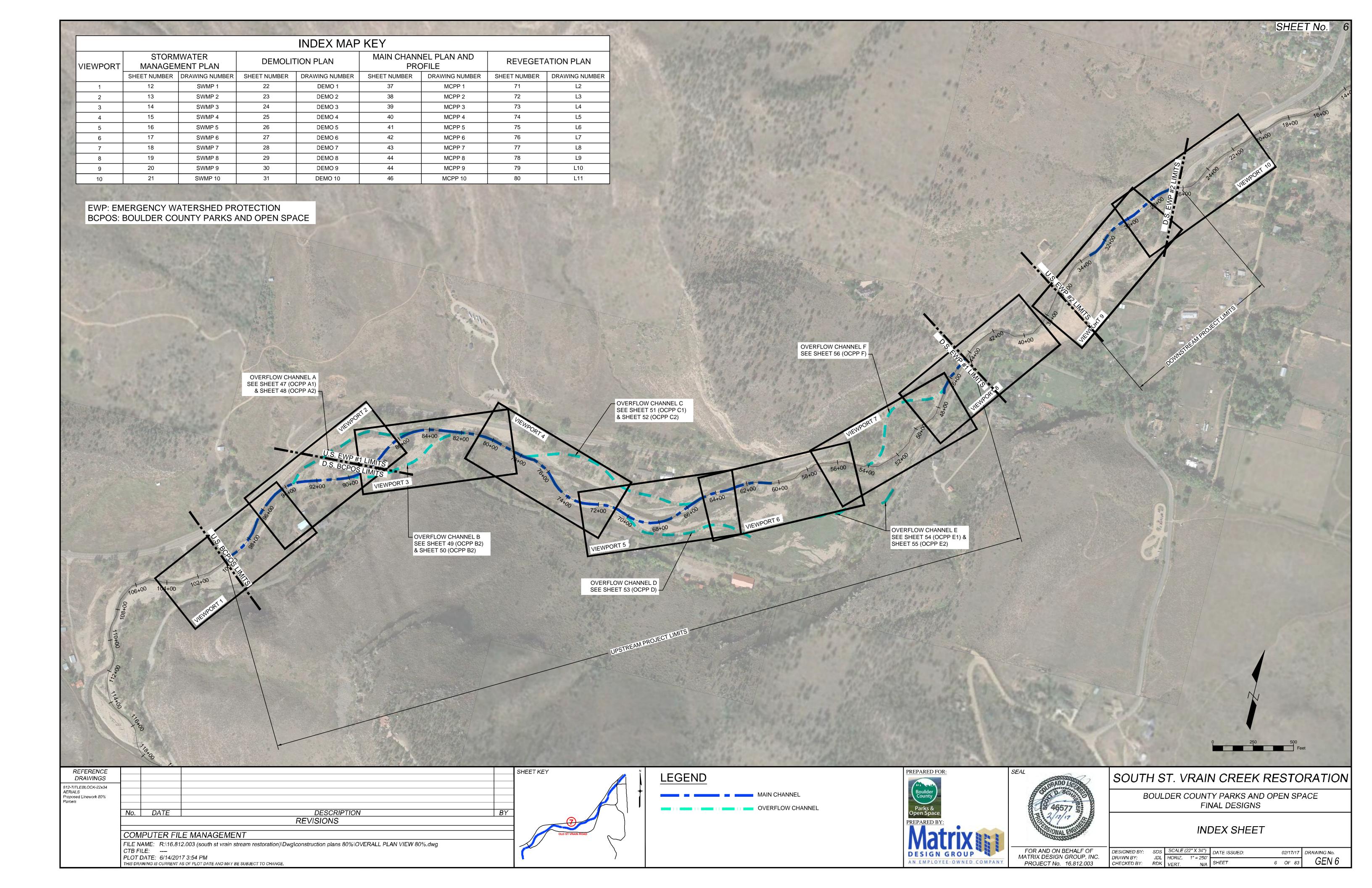


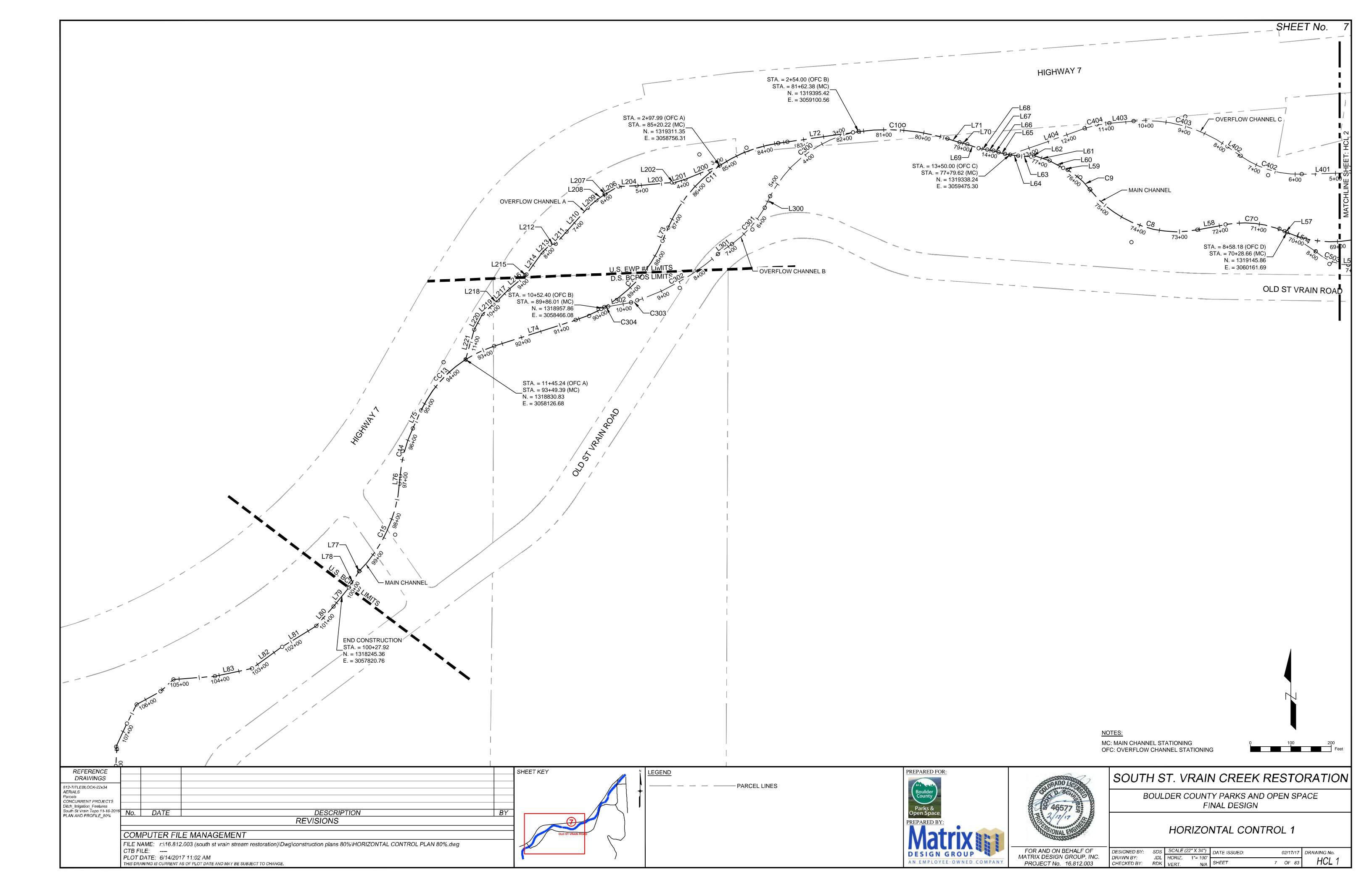


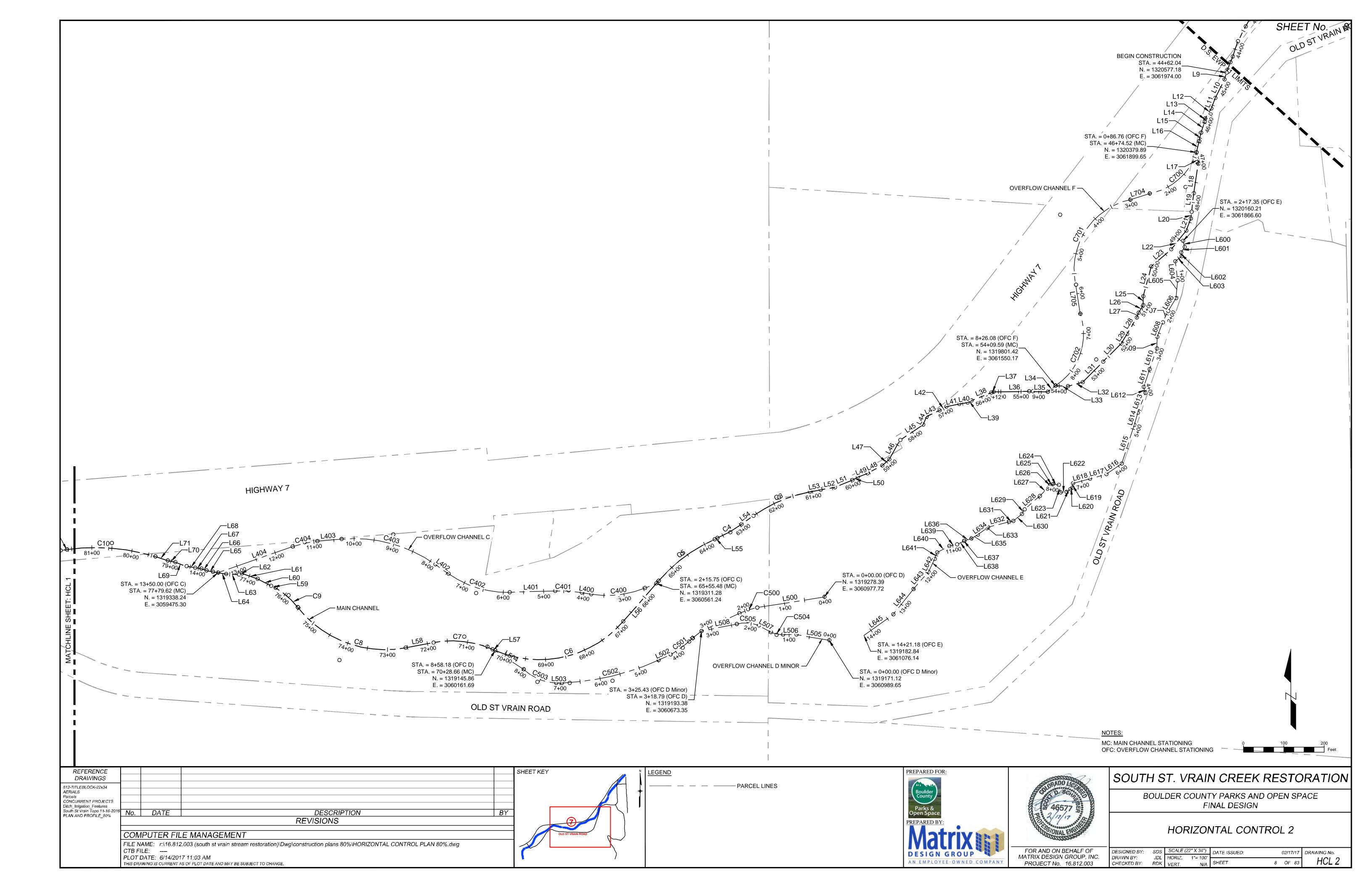
SOUTH ST. VRAIN CREEK RESTORAT
BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

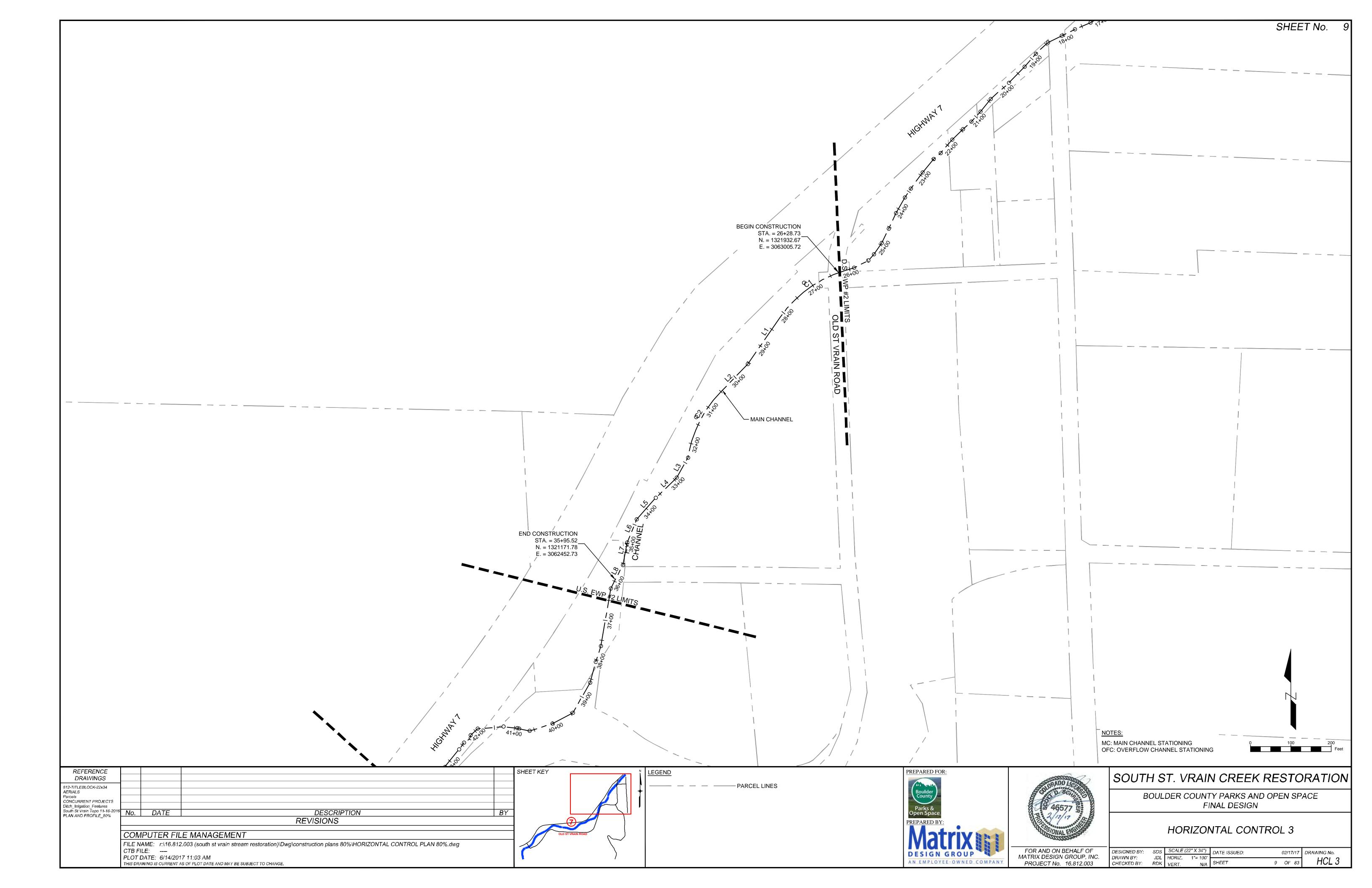
SURVEY CONTROL

_								
	DESIGNED BY:	SDS	SCALE ('22" X 34")	DATE ISSUED:		02/17/17	DRAWING No.
	DRAWN BY:	JDL	HORIZ.	1" = 150'				OFNE
	CHECKED BY:	RDK	VERT.	N/A	SHEET	5	OF 83	GEN 3









LINE	TABLE (I	DESIGN)
LINE No.	LENGTH	DIRECTION
L1	139.36'	ÙHI »ÁHÎ ŒG ÈEGÄY
L2	95.00'	ÙII »ÁFÏ ÓÆÏ ÈGFÄY
L3	56.46'	ÙGJ»ÁGÎ (ÁA.Ì ĚLGÄÝ
L4	72.46'	ÙIÍ»ÁÍÌÓÁHIÈÍÄY
L5	70.97'	ÙIF»ÁG€GÁÌÈDIÄY
L6	61.91'	ÙGG»ÁFFØÁUÈFÄY
L7	56.74'	ÙFF»ÁFÏ (ÁÍÈÈÌÄY
L8	65.18'	ù gî »Á í Ó HFÈ HÌ ÄY
L9	17.93'	ÙFÍ »ÁÍ JÓÁHGÐĚ HÄY
L10	50.98'	ÙGÎ »ÁL€ØÆFEĽHÄY
L11	28.12'	ÙG€»ÁGGGÁFHÉÍÍÄY
L12	28.71'	ÙHG>ÁEÎ ŒŒĒ HÄY
L13	7.18'	ùi»ÁrgaÃigežíäy
L14	29.64'	ÙFÌ»ÁIJ ÓÁFÈÈ €ÄY
L15	21.29'	ÙFG»Á€€ØÁ, FÌÈHGÄY
L16	28.64'	ÙFI»Á∈IÓÉ∈GÈGÏÄY
L17	29.03'	ÙJ»Á€IÓÁGHÈIGÄÒ
L18	73.53'	ùì »Ái Gaágì ÈHI ÄY
L19	46.75'	ùî »ÁGİ ÓÆİ BÊJÄY
L20	16.44'	ÙÏ »ÁHÏ ÓÆF€ÈĞİ ÄY
L21	32.46'	ÙG€»ÁFIÓÁ FÈEIÄY
L22	58.97'	ÙHJ»Á€€ØÁÍÈÐÏÄY
L23	65.25'	ÙIJ»ÁGÏÓGHÈEÌÄY
L24	76.89'	ÙFI»Á Í ÓÆ ÎÈÈHÄY
L25	21.81'	Ù€»Á€Í ØFFGÈÈEI ÄY
L26	22.11'	ÙHF»ÁGÏÓÁJÈHÏÄY
L27	12.81'	ÙŒF»ÁÍÍŒÁHHÈFÄY
L28	47.10'	ÙH€»ÁGÎÓAF€ÈEÍÄY
L29	28.03'	ÙHG ÁFFÓLHGÀ GÄY
L30	63.29'	ÙII»ÁIGOÁIHÉÈJÄY
L31	71.48'	ÙII»ÁIHOÁIGÉÌÄY
L32	37.92'	ÙÏI»ÁFIÓÁHIÈDÏÄY
L33	31.17'	ÞÌÏ»ÁFÌØ€JĒÏÄY
L34	24.30'	ÙÍG≫ÁFÏÓÁÎÈĚIÄY

LINE	TABLE (I	DESIGN)
LINE No.	LENGTH	DIRECTION
L35	45.65'	ÞÌÌ»ÁÍIÓÁGÈÈÌÄY
L36	88.34'	ÙÌJ»ÁTÎ ØÁTFÈJÏÄY
L37	6.09'	ÙÏG»ÁFÎ ØFIÈÏFÄY
L38	52.67'	ÙÎÌ»ÁEÍÓÆÍĚEÄY
L39	11.02'	ÙÎF»ÁHÍ CÁ IÈÌIÄY
L40	21.22'	ù쀻ÁGÌQÁÏÈÉÍÄY
L41	32.41'	ÙÏÌ»Á€€ØÁ HÈ €ÄY
L42	19.22'	Ù΀»ÁIFÓÆÍĒÈÌÄY
L43	35.43'	ÙÎÍ»ÁÆFØÉÍÈEIÄY
L44	22.18'	ÙGH»ÁG€ÓAFÎËÌÄY
L45	68.28'	ÙÍλÁFÏÓÁ GÈÈJÄY
L46	55.00'	ÙGJ»ÁHÍÓÁÎÈĒ€ÄY
L47	22.95'	ÙIÌ»ÁHGÆÁIÉEGÄY
L48	41.74'	ÙÎG≫ÁFÍÓÁFÍÈĞJÄY
L49	25.34'	ÙÎÌ»ÁGÌQÁHÍÈÈIÄY
L50	15.21'	ÙÎF»ÁLHØÁ-GÈÐFÄY
L51	47.08'	ÙÎ Ï »ÁHÌ QÁ FÈHÏ ÄY
L52	35.49'	ÙÏJ»ÁFJØÁHŒÈIÄY
L53	27.21'	ÙÏJ»ÁI€ÓÁFGÈÈIÄY
L54	35.72'	ÙÍI»Á H TÁHÍĒLÄY
L55	7.33'	ÙÎÍ»ÁÎI ØÆHĒE GÄY
L56	134.08'	ÙIF»Á€€ÓÁGÎÈGÌÄY
L57	6.59'	ÞÎλÁG€GÃÎÈÈÄY
L58	70.81'	ÙÏ J»ÁGI ÓÁGÏ ÉÈ HÄY
L59	11.71'	ÞÎÌ»ÁFIÓÁGIÉÉÎÄY
L60	37.80'	ÞÎF»ÁÍJÓÁHIÈÐE ÄY
L61	40.80'	ÞÏF»ÁFJÓÆFĒÈÌÄY
L62	8.10'	ÙÏ F»ÁGGGÁ HÈÎÄY
L63	31.93'	ÞÌÏ»ÁFÏÓGGEÈÈ€ÄY
L64	33.03'	ÞÌF»Á€JÓÁHLÈÌGÄY
L65	16.49'	ÞÏÏ »ÁHFÓÆIÐĚHÄY
L66	13.36'	ÞÏ€»ÁIFÓÁÍÉLÌÄY
L67	15.16'	ÞÌ F»ÁFJÓGJÉÐÌ ÄY
L68	22.01'	ÞÌ€×ÁÍFØÆJÉLÏÄY

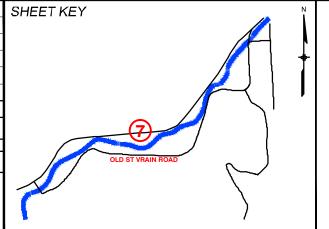
LINE .	TABLE (I	DESIGN)
LINE No.	LENGTH	DIRECTION
L69	29.58'	ÞÎJ»ÁHGÁÁFÎÈD€ÄY
L70	19.56'	ÞÏÏ »ÁHI ÓÁH LĚ GÄY
L71	31.97'	ÞÏG×ÁIØF€ÈÈ€ÄY
L72	201.73'	ÙÌF»ÁIJÓÁFÎÈÈ€ÄY
L73	35.52'	ÙGH»ÁEIOÁFÌÈÈJÄY
L74	211.86'	ÙÏG»ÁFÏÓÁHÏÈÐJÄY
L75	49.13'	ÙGI»ÁÍGÆÁÍÉLÄY
L76	19.72'	ÙI»ÁIGÁFFÉI€ÄY
L77	0.73'	ÙII »ÁHJÓÁ GHÌ FÄY
L78	47.36'	ÙHG»Á€GÁGIÈJÎÄY
L79	60.42'	ÙHJ »ÁFÏ ØÁHGÈLHÄY
L80	64.42'	ÙIF»ÁNHÓÁÌÈÐIÄY
L81	98.91'	ÙÍÌ»ÁGÍQÁHIÈLÍÄY
L82	92.24'	ÙÍI »ÁHGAÁ GÈÈ HÄY
L83	93.90'	ùì »Áeï dárhEchäy
L200	91.84'	ùîì»ÁGFØAÏĚÏÄY
L201	28.31'	ÙÏG×ÁÎÓÆFÈEĨÄY
L202	6.25'	ÞÌÌ»Á€€ÓÆJĚÍÄY
L203	87.61'	ÙÌI »ÁÍHÓÁFÎÈÈFÄY
L204	45.19'	ùìï»ÁFìÓAFGÈHGÄY
L205	36.98'	ÙÎ €»ÁFÎ ØFFEË €ÄY
L206	36.98'	ÙÎ €»ÁFÎ ØFFEË €ÄY
L207	1.46'	ÙÍÍ»ÁH⊜ÓÁFÉÍÄY
L208	25.66'	ÙÍÍ»ÁH⊜ÓÁFÉÍÄY
L209	28.80'	ÙIÌ»ÁHÎOÁFÏÈLÏÄY
L210	79.44'	ÙIF»ÁIIÓÁGÍÉÌHÄY
L211	39.75'	ÙIF»ÁHFÓÁGÌÈFÌÄY
L212	14.32'	ÙÌ F»ÁEÎ ÓÁFFÈÌ GÄY
L213	27.41'	ÙII»ÁÍÍÓÁJÈHÏÄY
L214	66.97'	ÙHÍ»ÁLGÆÍÍÈÌHÄY
L215	4.14'	ÙÍI»Á⊖⊖ÓÁ-ÎÈDÌÄY
L216	53.84'	ÙIÌ»ÁÍÌÓÁGHÉÌJÄY
L217	37.44'	ÙIÍ »ÁIGÓÉ ÈÉÉ ÄY
L218	15.79'	ÙIÏ»ÁH€ÓÆÎÈÈÍÄY

LINE No.	LENGTH	DIRECTION
	_	ÙIÏ »Á HÓA HÈH€ÄY
L219	35.53'	
L220	43.80'	ÙGÏ »Á Í ÓÁ JÈEI ÄY
L221	76.70'	ÙFÎ »ÁFI ŒG Ê GÄY
L300	31.31'	ÙGI »ÁÍÌ ÓFHĒÌÄY
L301	42.30'	ÙÍI»Á€GŒÁÌÈĒGÄY
L302	57.45'	ù쀻ÁGGÁAFÈFIÄY
L400	24.14'	ÞÌ€»ÁÍHÓÁFFÉÌFÄY
L401	112.99'	ÙÌÌ »ÁGFÓÆHÈÌ€ÄY
L402	40.02'	ÞÍI»ÁNÍÓÁHHÈGÍÄY
L403	60.35'	ùìí»ÁEFÓÁÏÈEHÄY
L404	196.19'	ÙÏ€≫ÁL€ÓÁL€ÈGJÄY
L500	168.89'	ÙÌ€»ÁÍÎÓÁHÈÏÄY
L502	33.22'	ÙÎ I »ÁÎ CHÁFFÉÌ FÄY
L503	14.12'	ÞÌJ»ÁHÎÓÁJÈFÄY
L504	84.93'	ÞÍÎ »ÁGÌ GÁ HÈHÎ ÄY
L505	82.45'	ÞÌ€»ÁHGÁGFÉÈÌÄY
L506	32.95'	ÞÌJ»ÁG€ÓÁHÍÈÉÍÄY
L507	34.24'	ÞÎ F»ÁGI ÓÆHÈGGÄY
L508	88.99'	ùïì »Á cối đạ hì thời lày
L600	16.00'	ÙFH»ÁFÌ ÓFÌ ÈH ÄÒ
L601	15.80'	ÙHI»ÁHFÓÁÏÈHGÄY
L602	9.27'	ÙFF»ÁIOÁFHÈE€ÄÒ
L603	20.42'	ÙÍF»ÁHÎÓÁCHĒÌÄY
L604	48.10'	ÙÏ »ÁFFØÁ €ÈË €ÄÒ
L605	43.85'	ÙÍ»ÁHFŒÁÍÈÌÄY
L606	37.74'	ÙHF»Á€JÓGIÈFIÄY
L607	31.26'	ÙGÍ »ÁGGGÁI FÈF€ÄY
L608	38.34'	ÙOF»ÁEÌ ÓFGĒÏÄY
L609	28.74'	ÙF»Á H ÁLÆÈEÄY
L610	54.58'	ÙFJ»ÁFÏ ÓÁGÎ ÊÎ Î ÄY
L611	46.02'	ÙFÌ »ÁGGÁÍÌ ÈÏ IÄY
L612	15.45'	ÙFÍ »Á GÁFÍ È HÄÒ
L613	52.79'	ÙG€»ÁÍFÓÁ GÈGGÄY
 L614	31.19'	ÙFÍ»ÁÍÌÓÁ,€ÉÌGÄY

LINE TABLE (DESIGN)					
LINE No.	LENGTH	DIRECTION			
L615	100.86'	ÙFÌ»Á€IÓÁJÈÈÍÄY			
L616	46.37'	ÙÍÍ»ÁAÎ ØÁHÌÈÈÎÄY			
L617	41.73'	ÙÏI»ÁA GOÁÄÏĚIÄY			
L618	43.86'	ÙÏ I »ÁÍ JÓÁ Í ÈĒJÄY			
L619	10.75'	ÙI»ÁFIQÁ ÏÈÌÄY			
L620	7.10'	ÙÍλÁIÌ ÓÁGIÈÐÏÄY			
L621	11.39'	ÙÍF»ÁG€ØH€ÌHÄY			
L622	14.58'	ÙÌλÁHHÁÍÌÈHÄY			
L623	19.05'	ÞFH»ÁÍJŒÉÎËÎÄY			
L624	15.03'	ÞÌ G×ÁGI ÓÆFÈFÍ ÄV			
L625	7.15'	ÙÏI»ÁFÏÓÁÌÈÈÌÄY			
L626	1.41'	ÙGG»ÁGÏÓAGÎÉTÌÄY			
L627	36.10'	ÙI H»Á FŒHÎ È FÄY			
L628	50.18'	ÙIÌ »ÁI€ÓÁGÎÈHJÄY			
L629	13.29'	ÙGJ»ÁIÏØÁHÌĒĖÏÄY			
L630	27.32'	ÙÍ€»ÁHGÁÍHÈG€ÄY			
L631	11.51'	ÙÏÌ»ÁGÌÓÁFĚJÄY			
L632	53.01'	ÙÏÍ»ÁÍHÓÁÎÈEHÄY			
L633	3.97'	ÙÍ€»ÁFGÓÁÎÈÈÌÄY			
L634	27.87'	ÙÍ H»Á F Ó Á G Ì H ÄY			
L635	18.41'	ÙÍJ»ÁFÌÓFÍÈFÍÄY			
L636	18.70'	ÙÏ H»ÁF€ÓÁFFÉÌ HÄY			
L637	0.75'	ÙÎλÁFÌÓÁHHĚGÄY			
L638	18.82'	ÙÎH»ÁG⊖€ÓAGÏĒÎJÄY			
L639	19.90'	ùïì »ÁGFÓRÉIÈHÍÄY			
L640	34.06'	ùî F»ÁGJÓÁ JÈÐÏÄY			
L641	16.92'	ÙGF»ÁHÎ (ÁLÎ ÈHÏ ÄY			
L642	35.46'	ÙGÍ »ÁHÍ ØFF€ÈEEÄY			
L643	57.01'	ÙIF»ÁEÏØFIËÏJÄY			
L644	80.41'	ÙHÌ »ÁGÌ ÓÆG ÈÌ€ÄY			
L645	88.67'	ÙÍI»ÁFÎ QÁ Ì ÈCÎ ÄY			
L704	50.04'	ÙÏG≫ÁFJÓÁFÌÈĒÍÄY			
L705	72.36'	Ùì»ÁiïÓáìÈ≕€ÄÒ			

CURVE TABLE (DESIGN)							
CURVE No.	RADIUS	LENGTH	DELTA	CH. DIRECTION	CH. LENGTH		
C1	300.00'	202.13'	Hì»HÎŒIÄ	VÁÁ H»Á I CEFÄÁY	198.33'		
C2	300.00'	172.03'	HG×Í FŒJÄ	ÙÁGÏ ×Í FOGÌ ÄÁY	169.68'		
C3	350.00'	153.39'	GÍ≫EÎCHÏÄ	ÙÂÏ ≫ĒĈIÄÁY	152.17'		
C4	350.00'	69.28'	FF»G€©ÜÄ	ÙÂN€≫FHCJÄÁY	69.16'		
C5	400.00'	173.79'	GI »Í HCHÏ Ä	ÙÁ H»GÏŒÍÄÁY	172.43'		
C6	275.00'	348.66'	Ï G>HÌ CHÏ Ä	ÙÁÏ »FJCÍ ÄÁY	325.78'		
C7	250.00'	149.41'	HI»FI0€ÎÄ	Þ H»À ŒI ÄÝ	147.20'		
C8	275.00'	299.49'	ÎG>CHÓCIÄ	ÞÂÍJ»GHŒÍÄÁY	284.91'		
C9	201.06'	73.52'	ĞLĴÎ k≆	YÀA LŒJAÀY	73.11'		
C10	500.00'	222.03'	GÍ »GÎ CHGÄ	ÞÁÍÍ»GÏŒÏÄÁY	220.21'		
C11	350.00'	358.88'	ÄÍÐIKÍÌ	ÙÁ G>GÎ CÌ ÄÁY	343.36'		
C12	350.00'	300.68'	IJ≫FHŒJÄ	YÀÄÍĴÐ∋ k«ÏÀÚ	291.52'		
C13	300.00'	248.26'	ΙΪ »G ĆGÄ	ÙÁIÌ »HÍ ŒGÄÁY	241.24'		
C14	350.00'	122.23'	G€≫€€CHÄ	YÀRIDDO Ì« ITÀÚ	121.61'		
C15	350.00'	243.08'	HJ» I CFFÄ	YÀÄÏĴÌ k ĐÀÚ	238.22'		
C300	309.10'	267.06'	IJ≫H€ŒÍÄ	ÙÁI G>ŒFĆJÄÁY	258.83'		
C301	283.35'	122.75'	GI»IJ © €Ä	ÙÁIG>FHCIÄÁY	121.80'		
C302	576.64'	248.73'	ÄLOD K ID	YÀÄ∋⊕ÐIÌk⊛ÂÂÚ	246.80'		
C303	576.64'	248.73'	ÄLOD k D	YÀÄ∋⊕ÐIÌk ∋ÂÚ	246.80'		
C304	48.05'	18.38'	Ä ∰BÌk≀ŦĐ	ÙÂĴ J »GI ĆÏ ÄÁY	18.27'		
C400	250.00'	135.75'	HF»€Î C€Ä	ÙÂ H» HHC Ì ÄÁY	134.09'		
C401	350.00'	65.74'	F€»lĴlk∋F	ÞÂÎ×FÎŒIÄÁY	65.65'		
C402	250.00'	160.96'	HλÍHCCHÄ	ÞÄHNFŒÍÄÁY	158.20'		
C403	350.00'	245.62'	I€»FOCH€Ä	ÞÁÍI ×Í FCÌ ÄÁY	240.61'		
C404	250.00'	62.62'	FI »GFŒÏÄ	ÙÂÏ×ÍFCCIÄÁY	62.46'		
C500	171.67'	45.87'	FÍ »FÌ ŒÆÄ	ÙÁIG>FÏŒÎÄÁY	45.73'		
C501	239.01'	68.11'	FÎ »FJŒÍÄ	YÀÄHÌÌL Ì«Ò ÀÌÚ	67.88'		
C502	652.60'	247.21'	GF»IGOEÍÄ	ÙÁÎÌ × I CCÌ ÄÁY	245.73'		
C503	128.67'	89.44'	HJ W JŒÌÄ	ÞÁÎÏ »FI ĆI ÄÁY	87.65'		
C504	62.82'	31.22'	GÌ »GÌ (CBÌ Ä	ÞÁÍÌ »IÎ ŒHÄÁY	30.90'		
C505	85.23'	55.59'	НЇ »СЭСЕ€Ä	ÞÂλ€HCHÍÄÝ	54.61'		
C700	150.14'	162.59'	ÎG≫€GCFÄ	ÙÁIÌ »HÌ CI ÄÁY	154.76'		
C701	176.48'	278.62'	J€»GÏCCFÄ	ÙÁHG>HÎŒÏÄÁY	250.57'		
C702	152.58'	203.56'	ïî»Gî©∃Ä	ÙÆFJ»€IŒÎÆÁY	188.79'		

REFERENCE DRAWINGS					SHEET	
812-TITLEBLOCK-22x34 AERIALS Parcels CONCURRENT PROJECTS Ditch_Irrigation_Features South St Vrain Topo 11-16-2016 PLAN AND PROFILE_80%	No.	DATE	DESCRIPTION	BY	-	
	REVISIONS COMPUTER FILE MANAGEMENT					
	FILE NAME: r:\16.812.003 (south st vrain stream restoration)\Dwg\construction plans 80%\HORIZONTAL CONTROL PLAN 80%.dwg CTB FILE: PLOT DATE: 6/14/2017 11:03 AM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.					





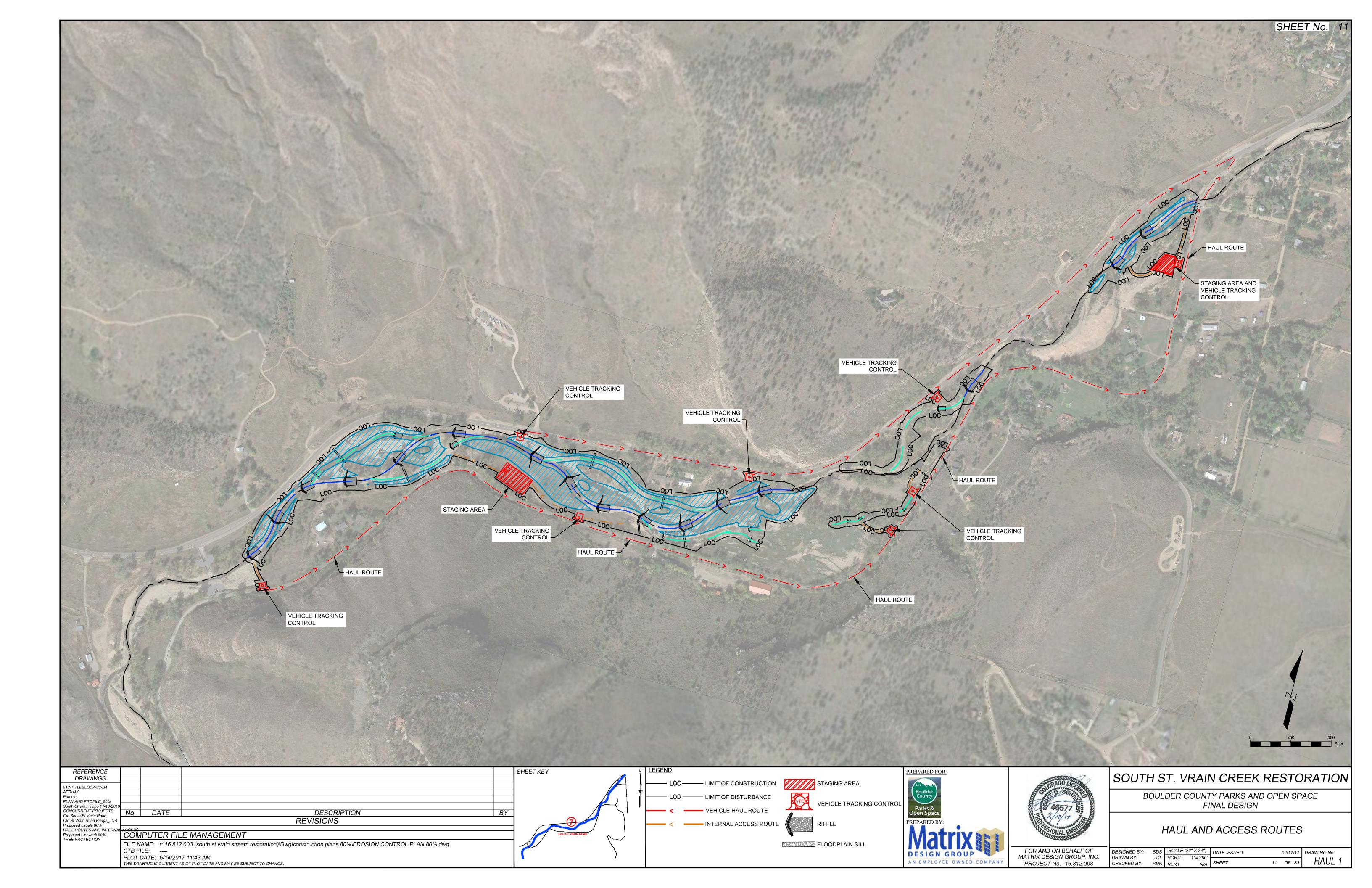


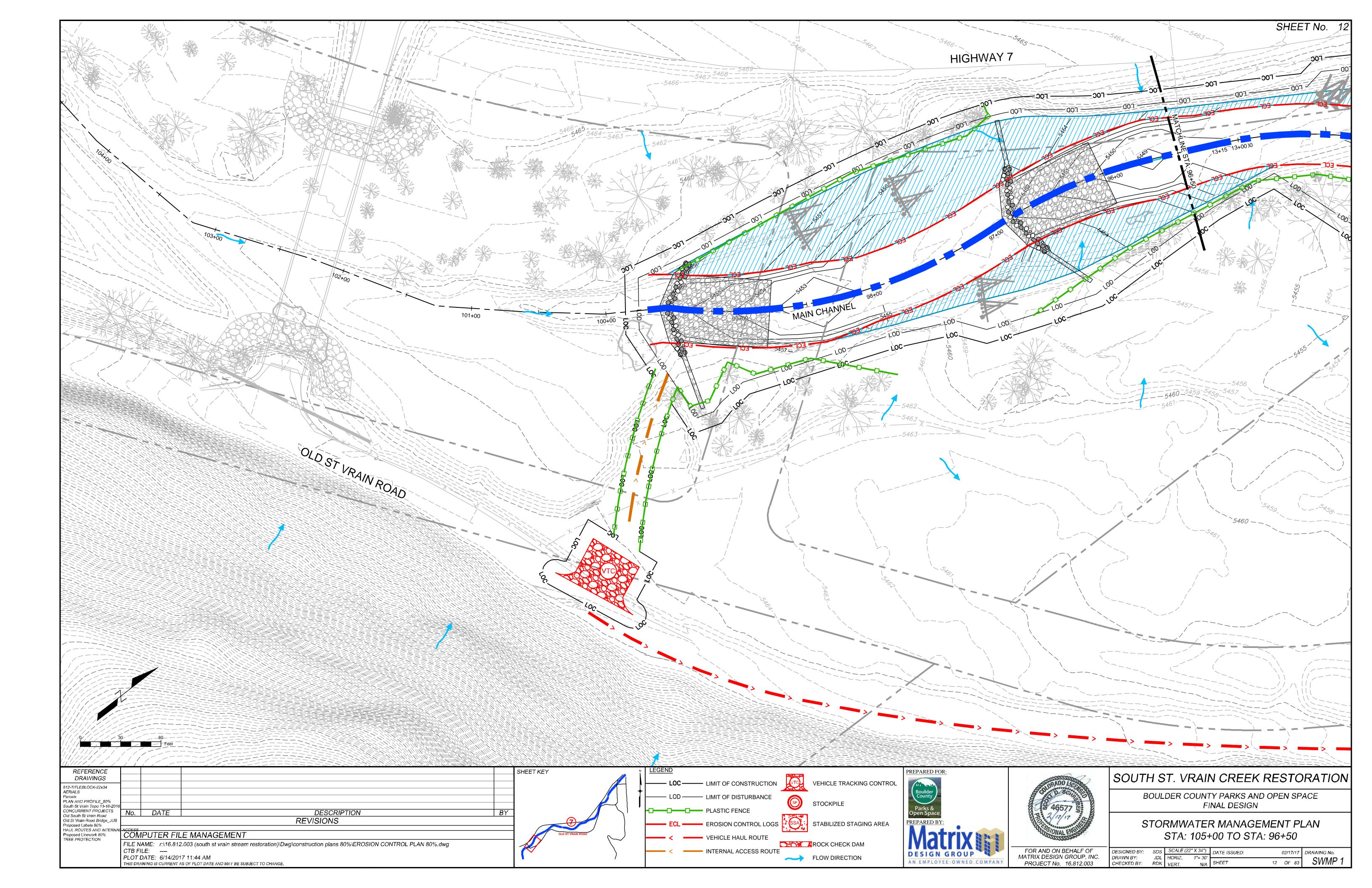
SOUTH ST. VRAIN CREEK RESTORATION

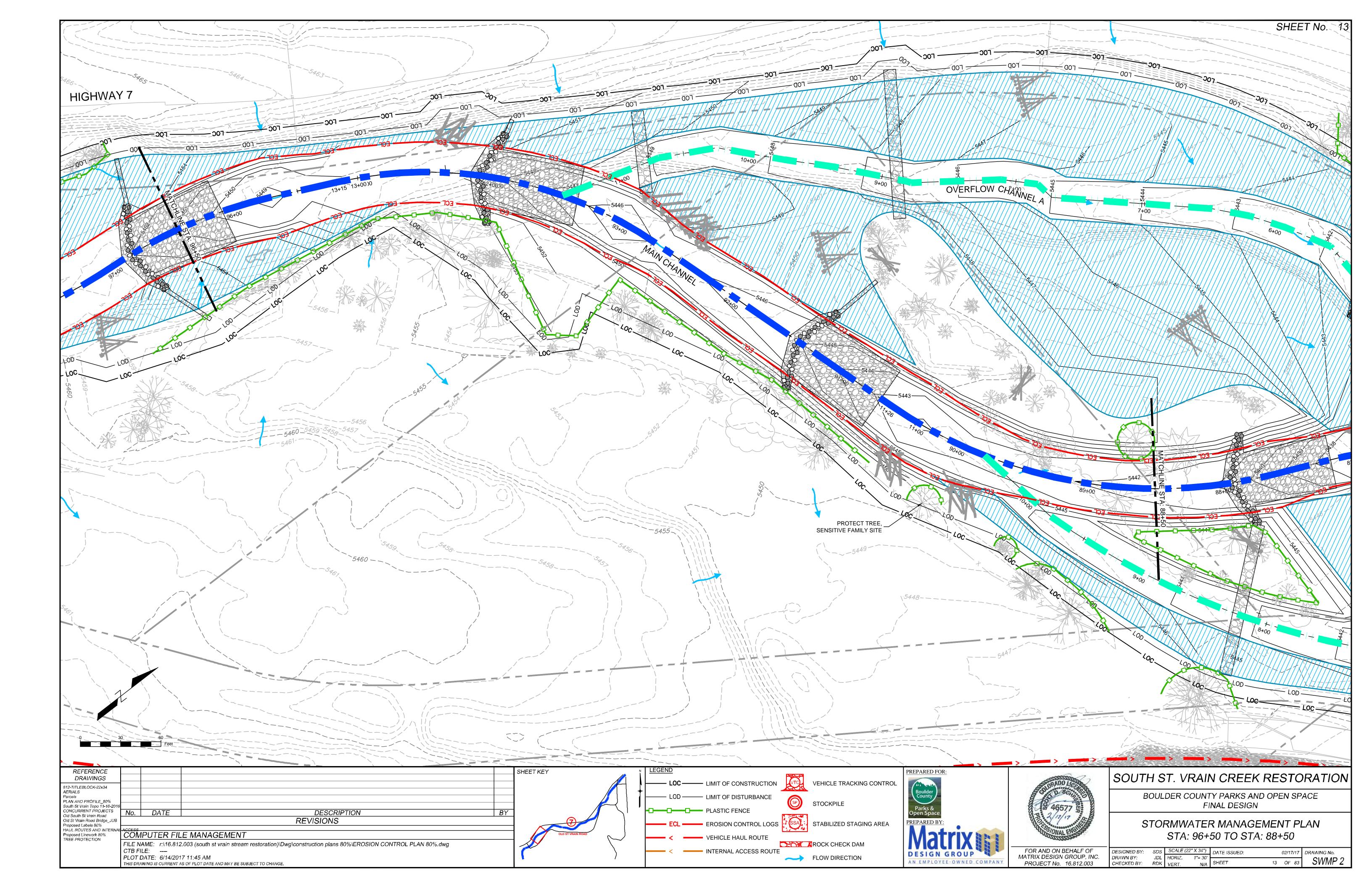
BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

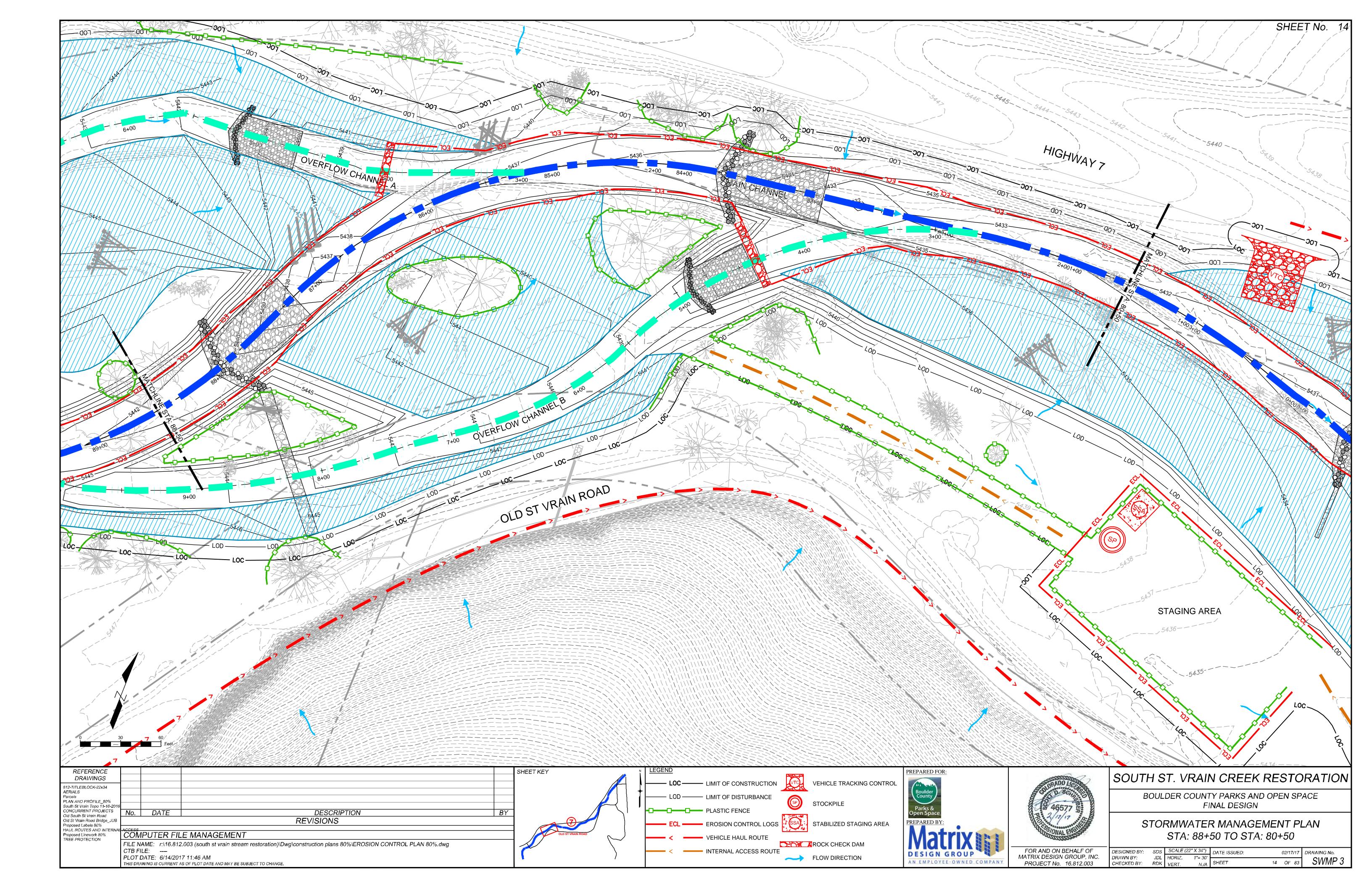
> HORIZONTAL CONTROL LINE & CURVE TABLES

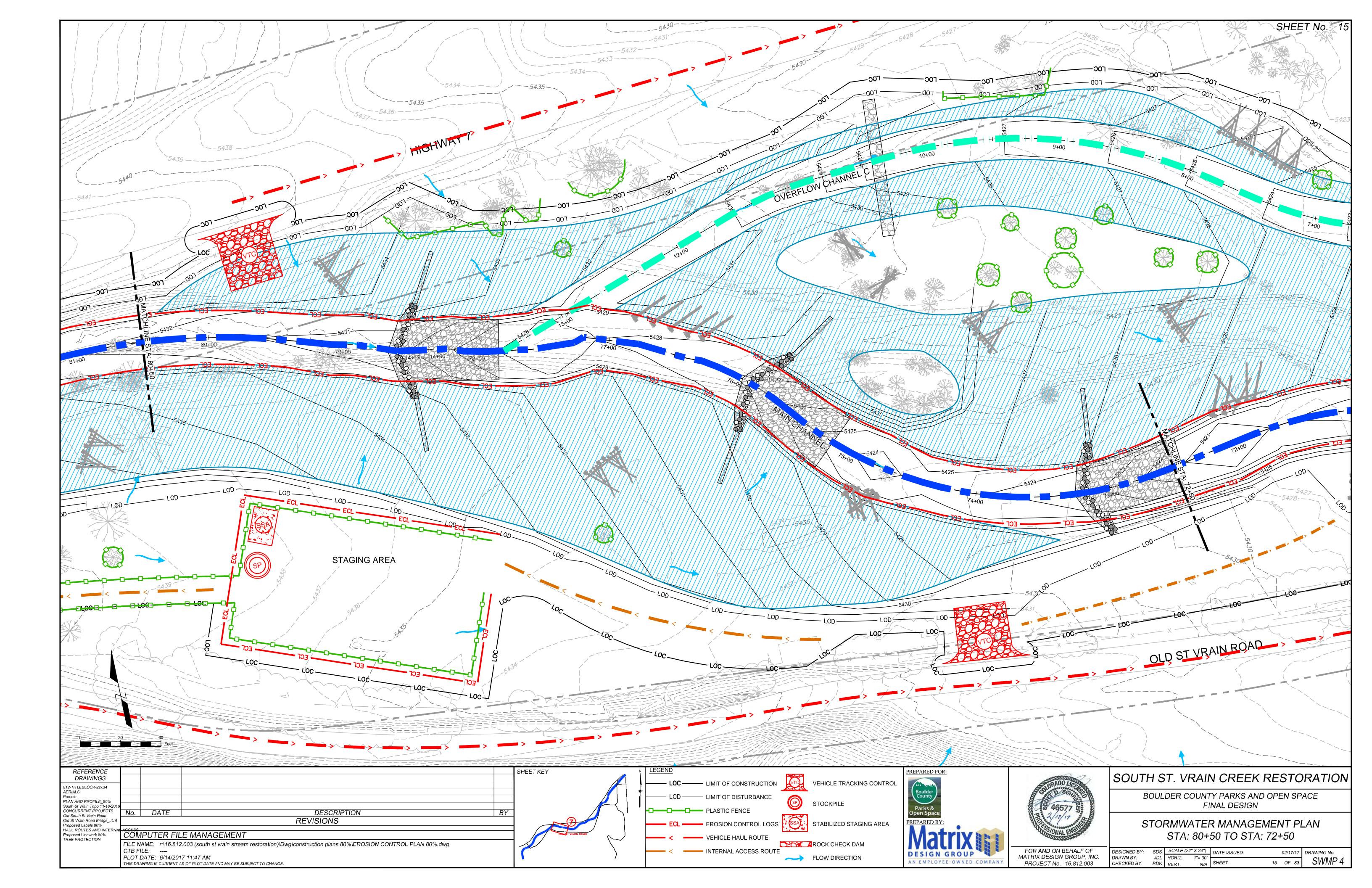
SIGNED BY:	SDS	SCALE (22	2" X 34")	DATE ISSUED:	0	2/17/17	DRAWING No.
AWN BY:	JDL	HORIZ.	N/A				1101 4
ECKED BY:	RDK	VERT.	N/A	SHEET	10	OF 83	HCL 4

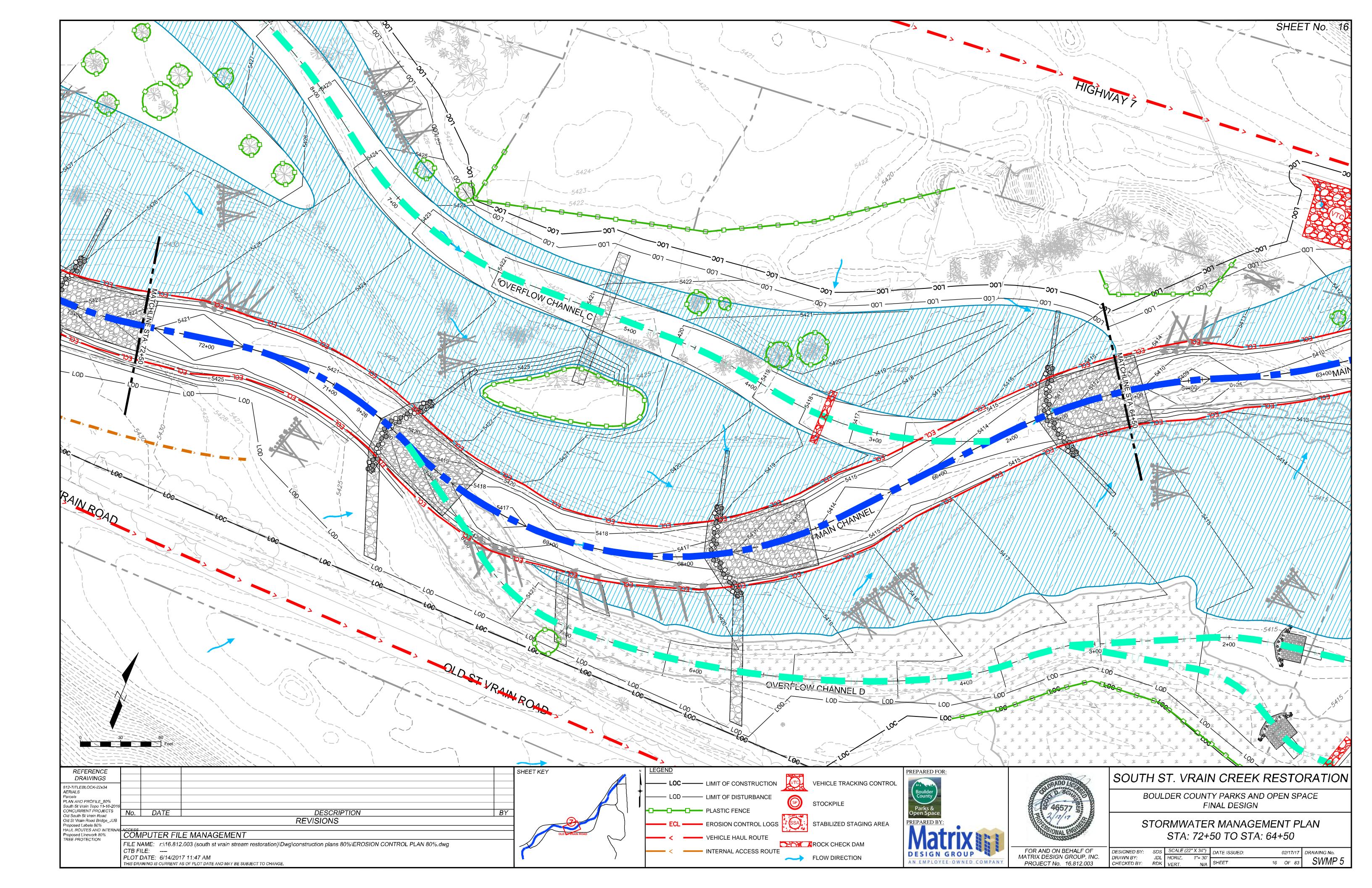


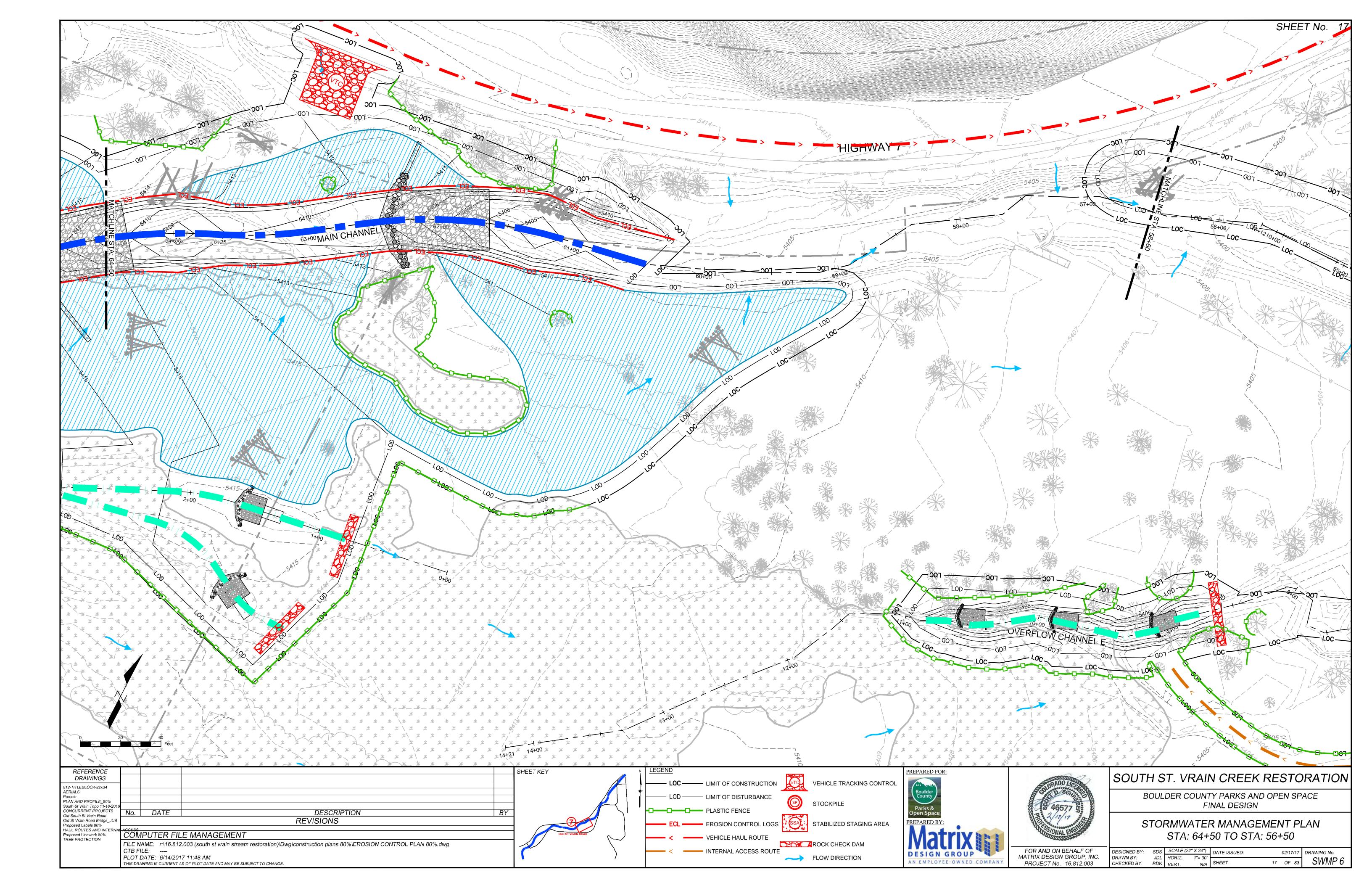


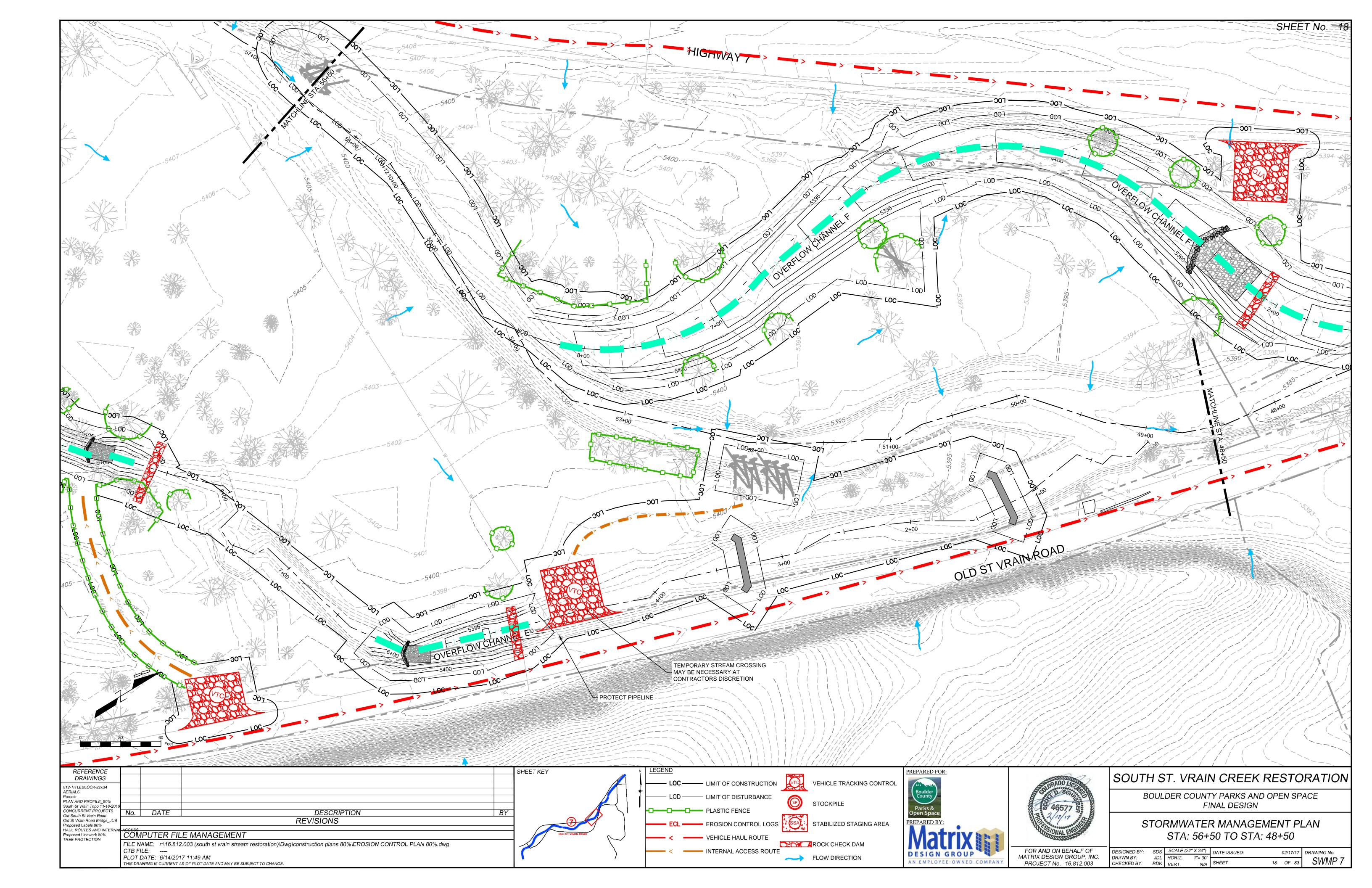


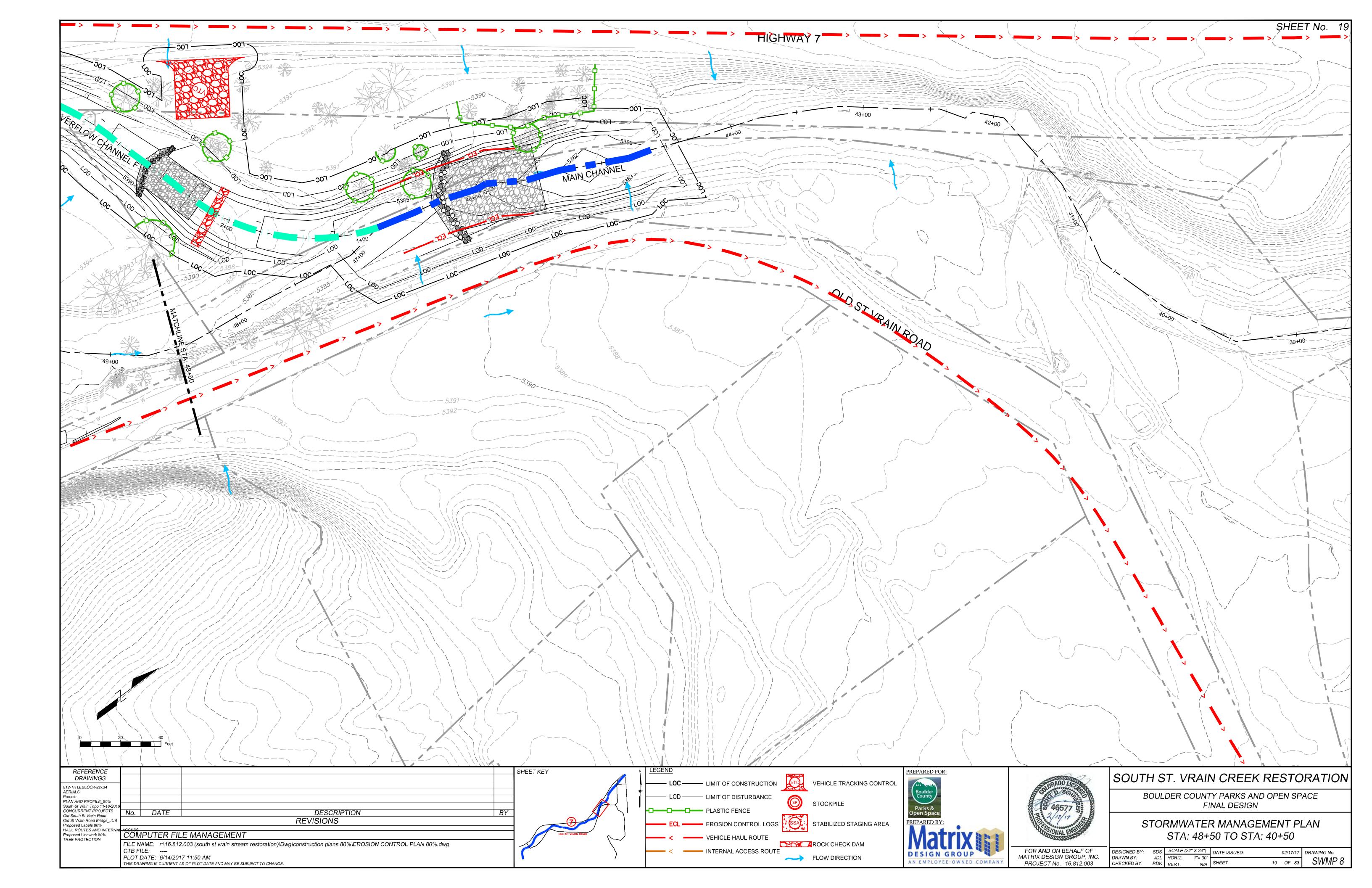


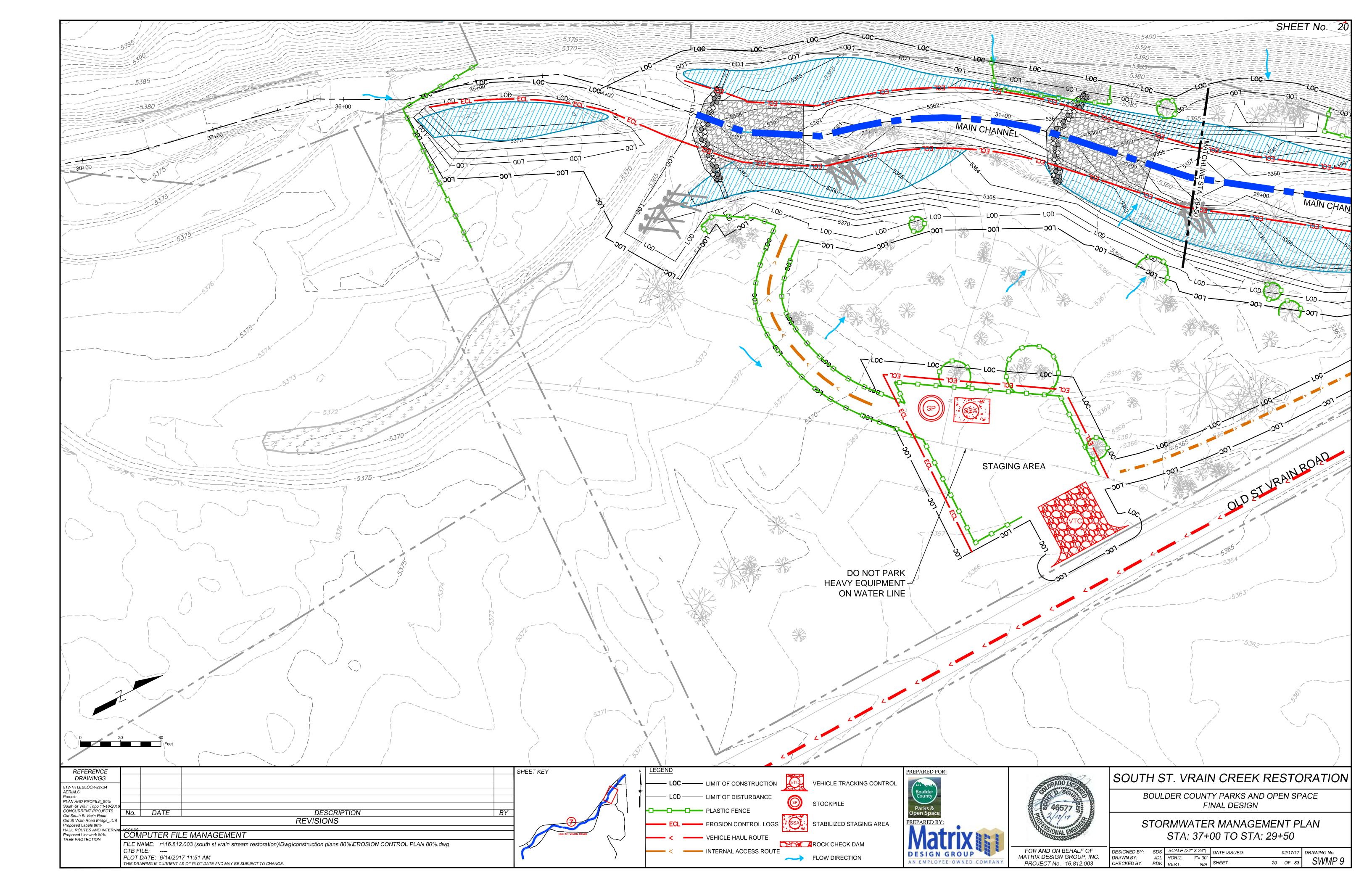


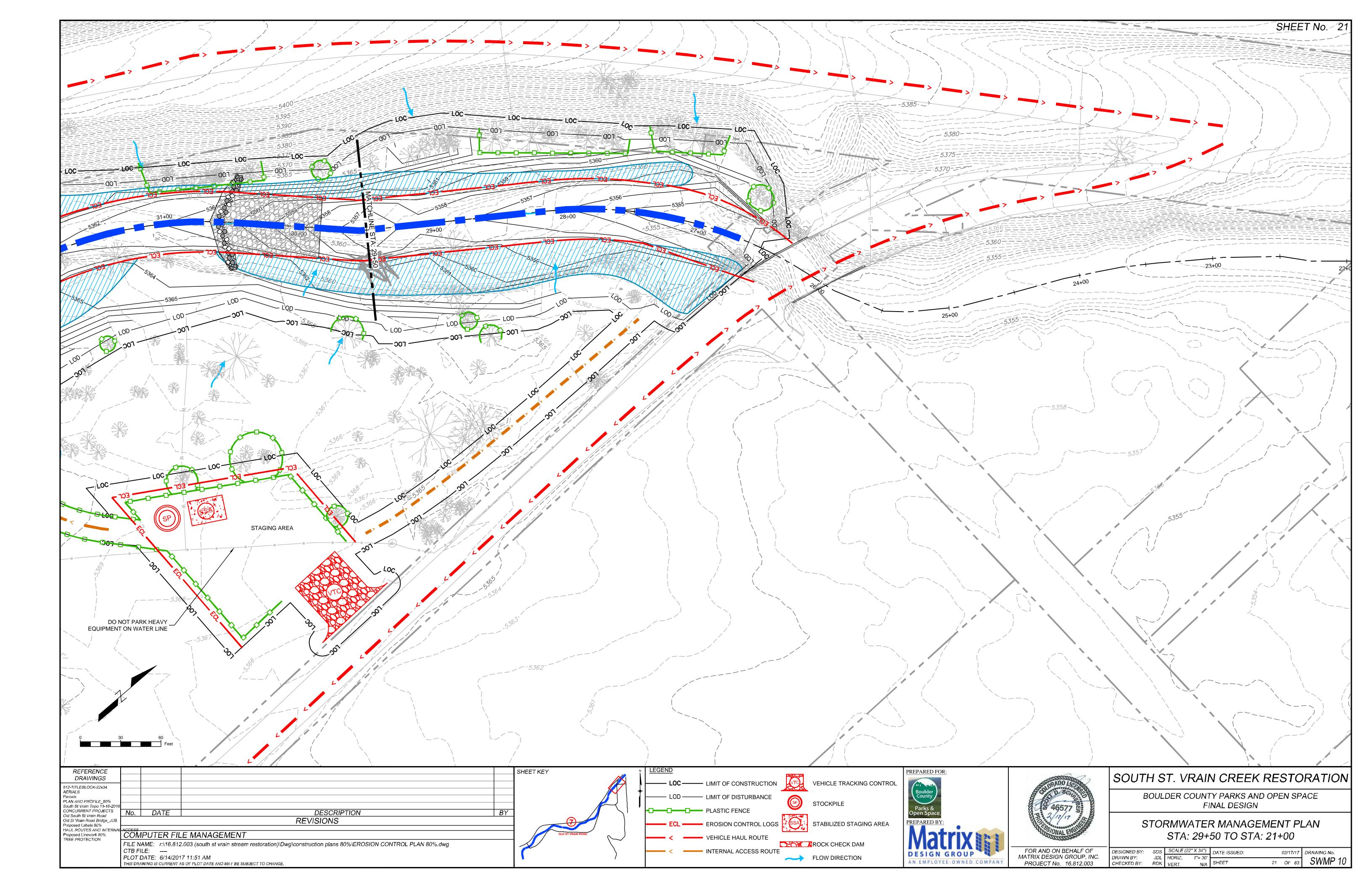


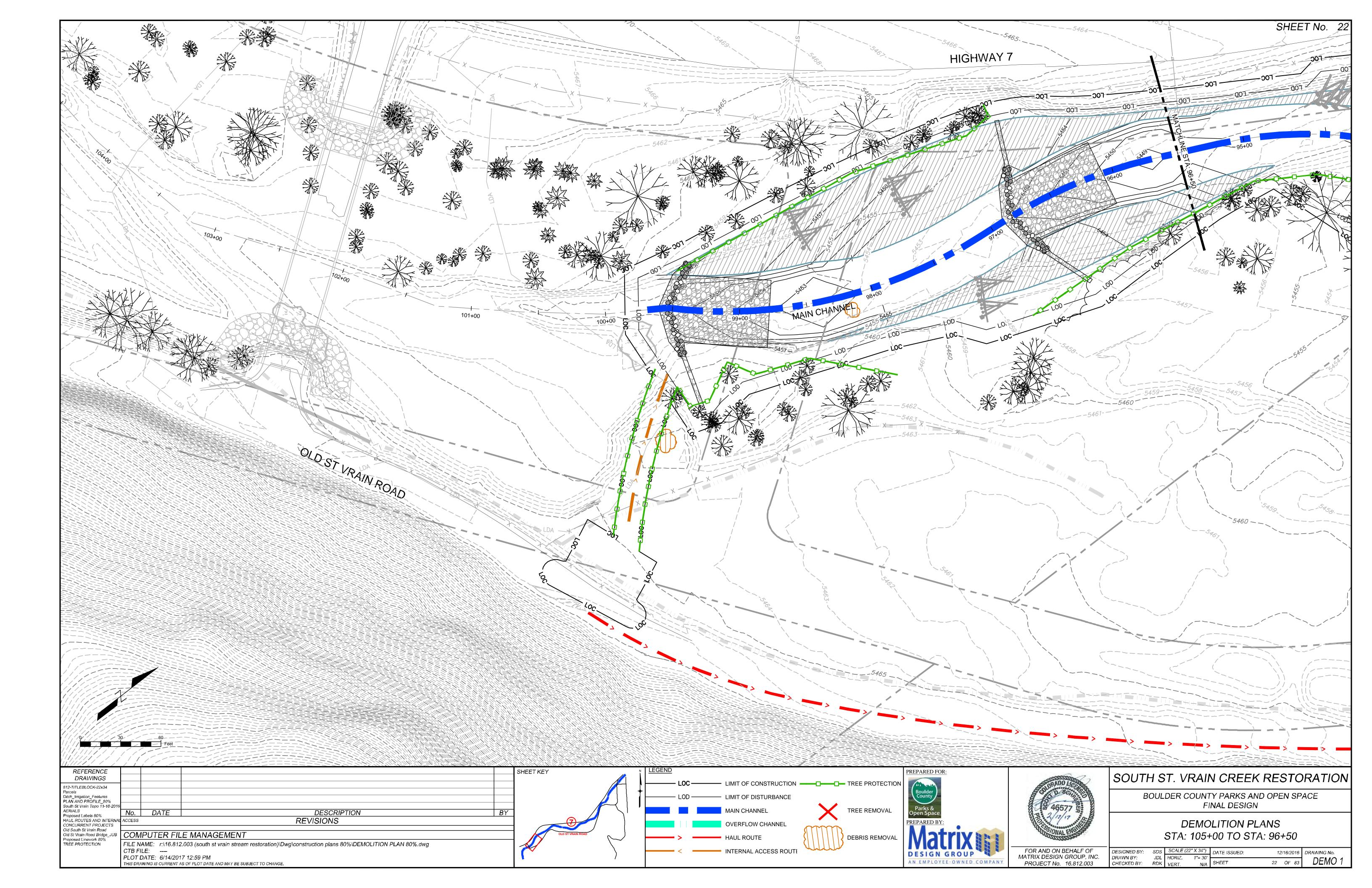


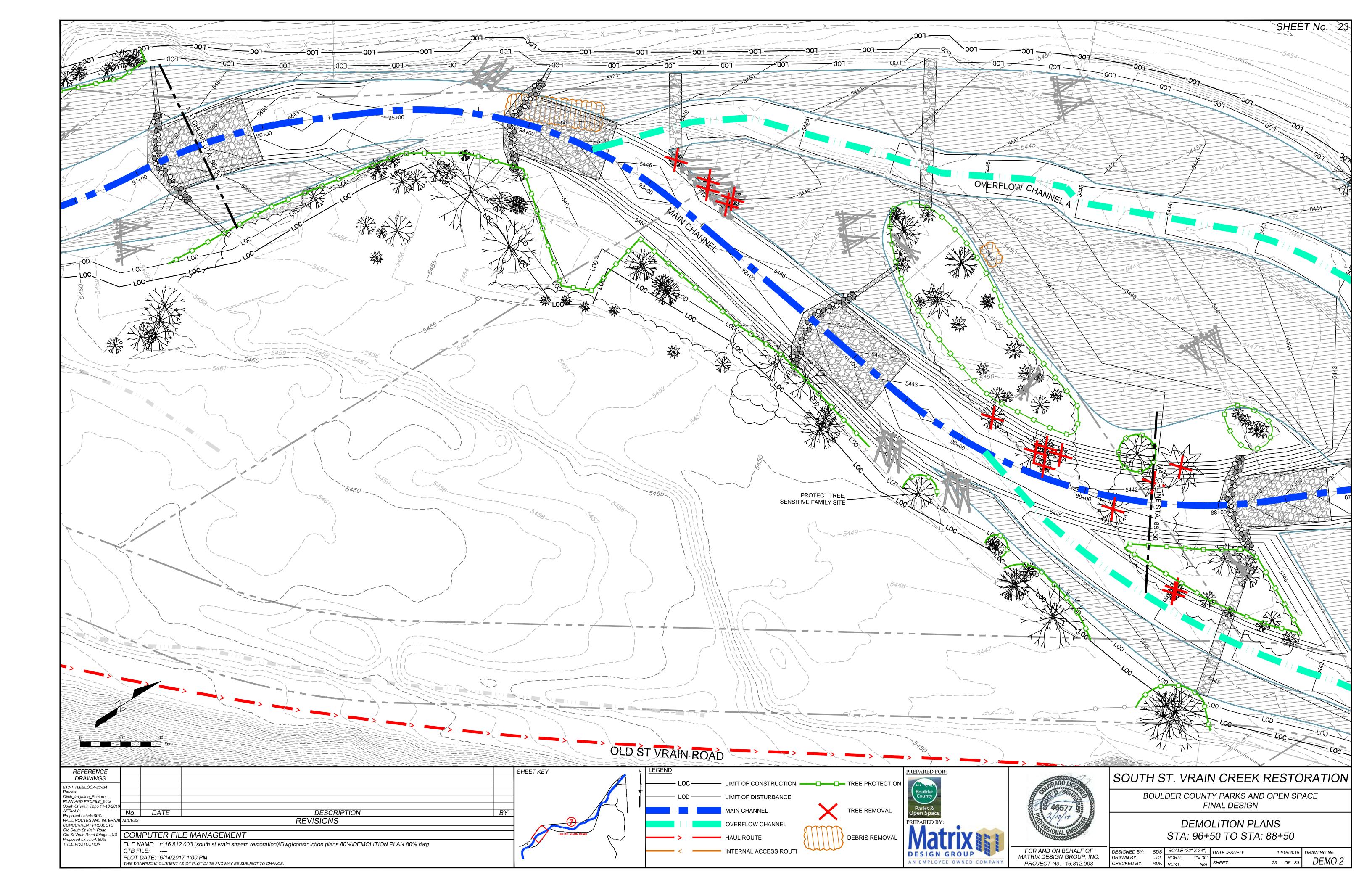


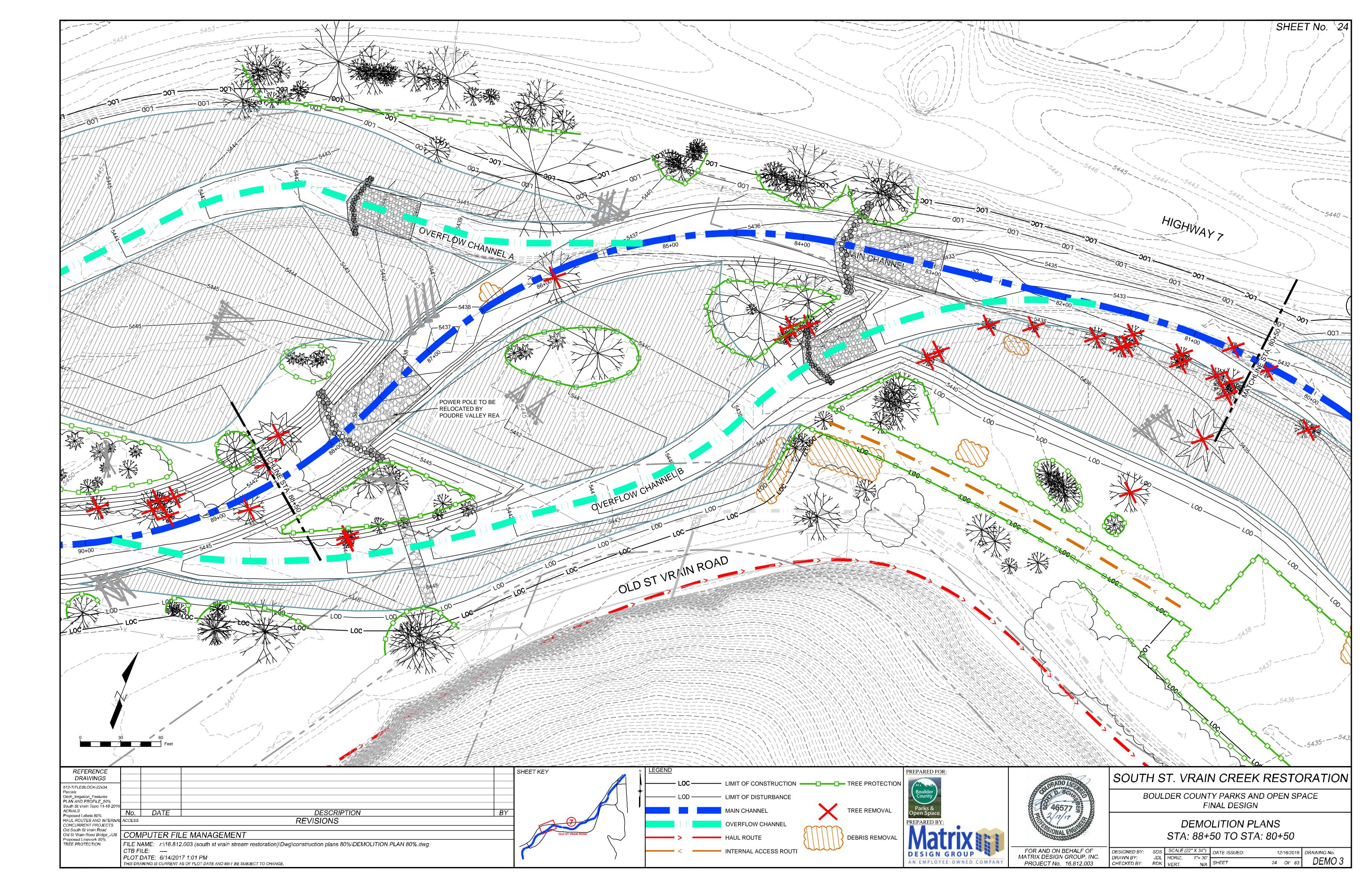


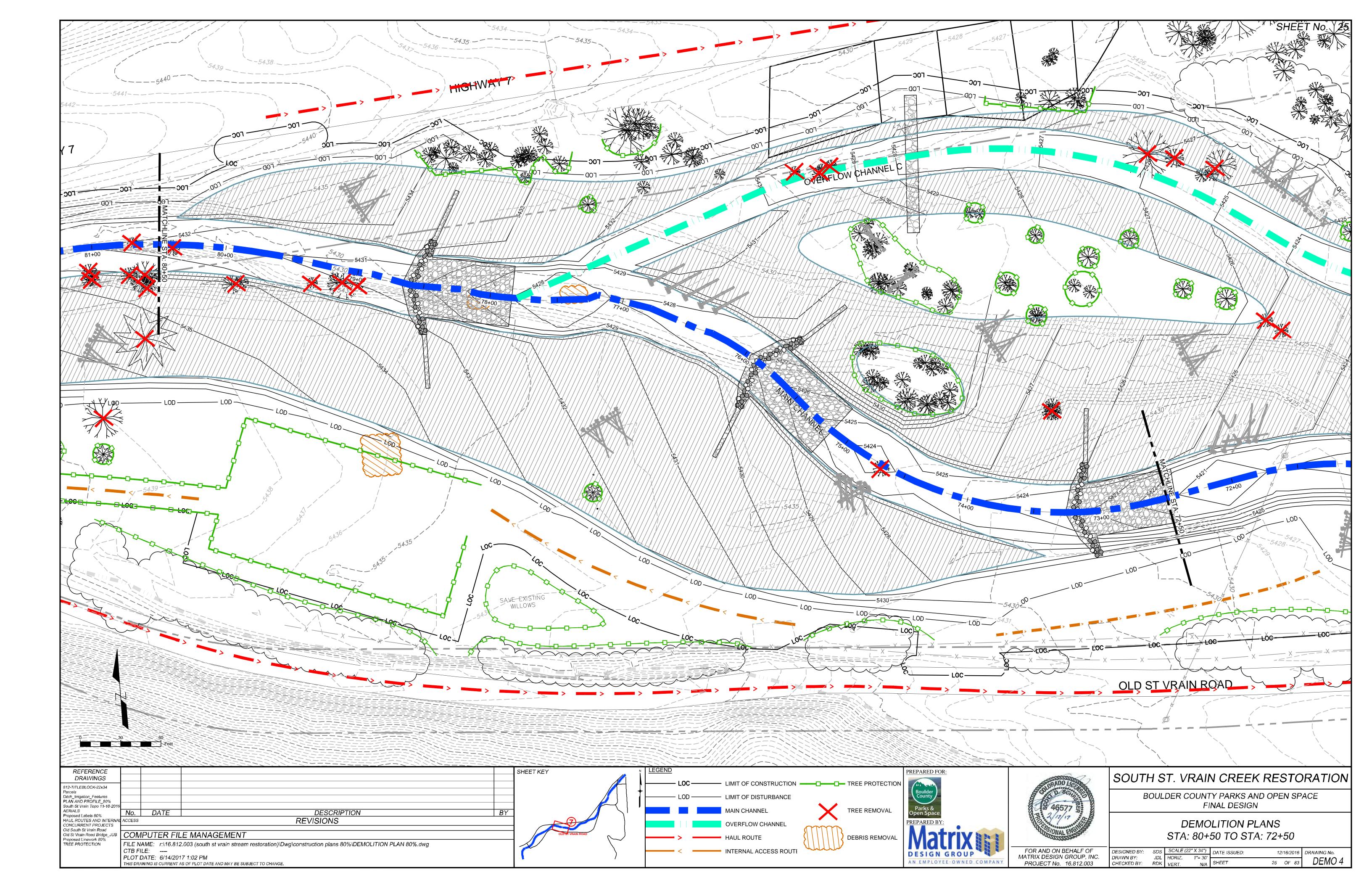


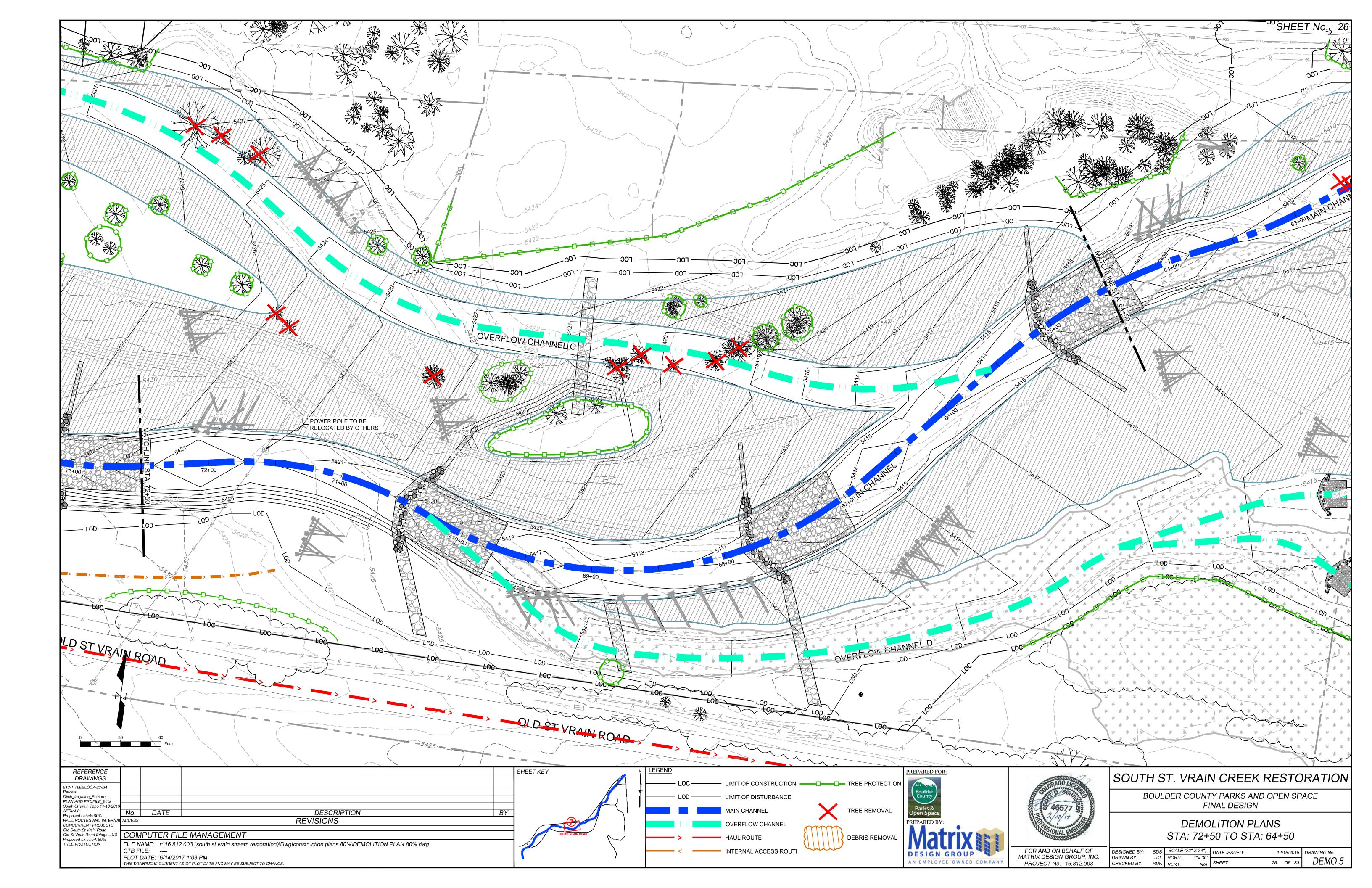


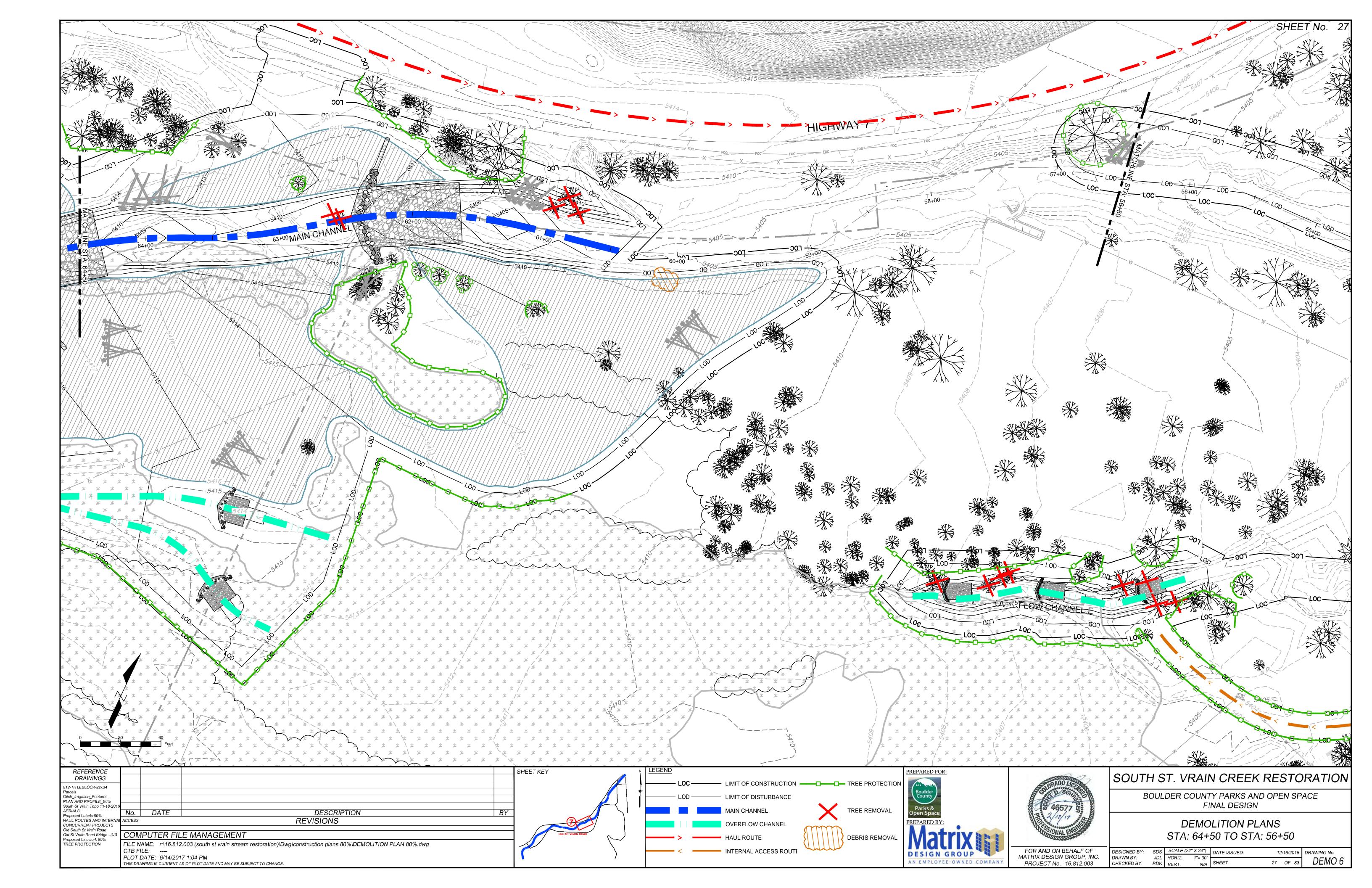


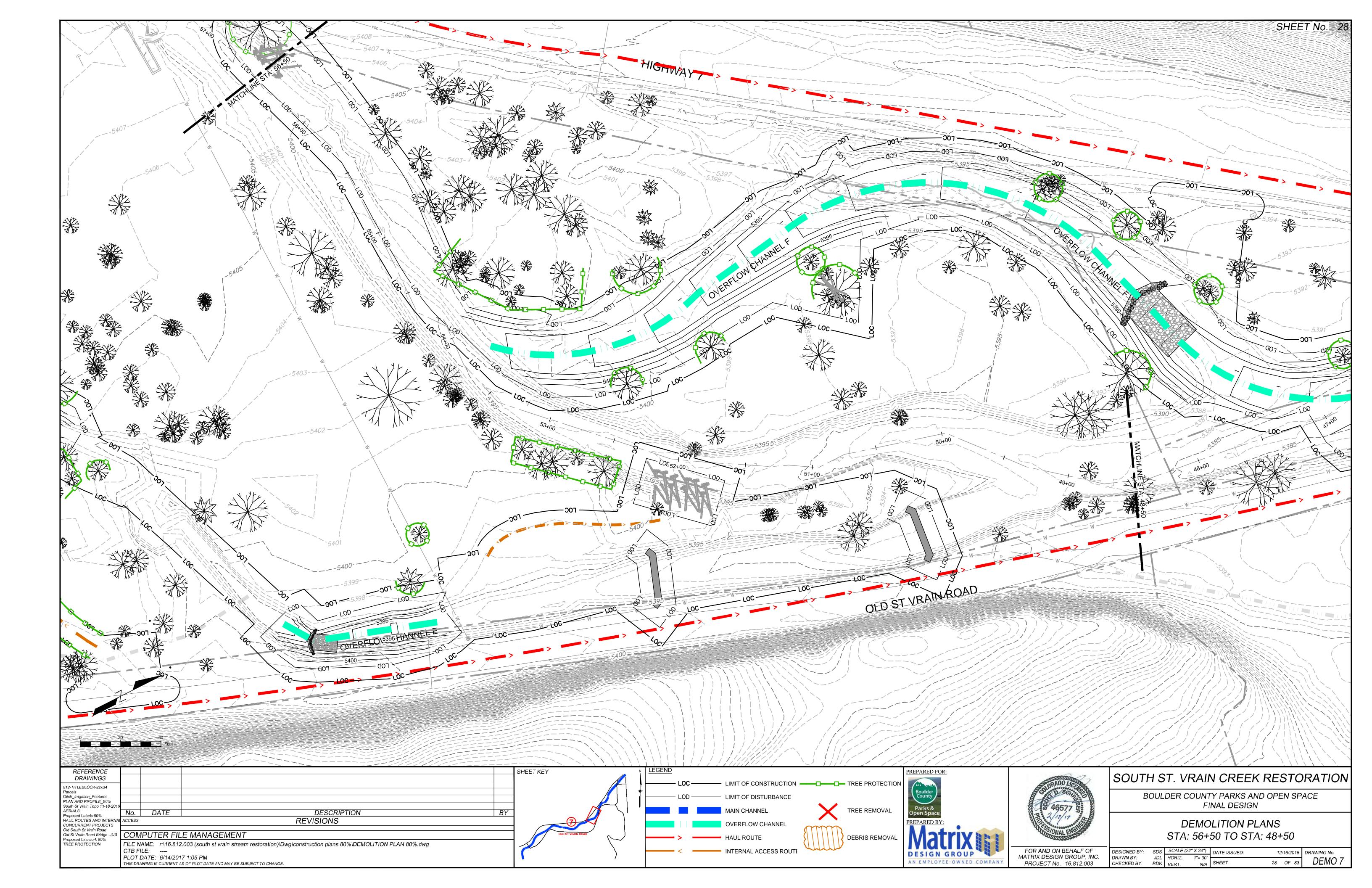


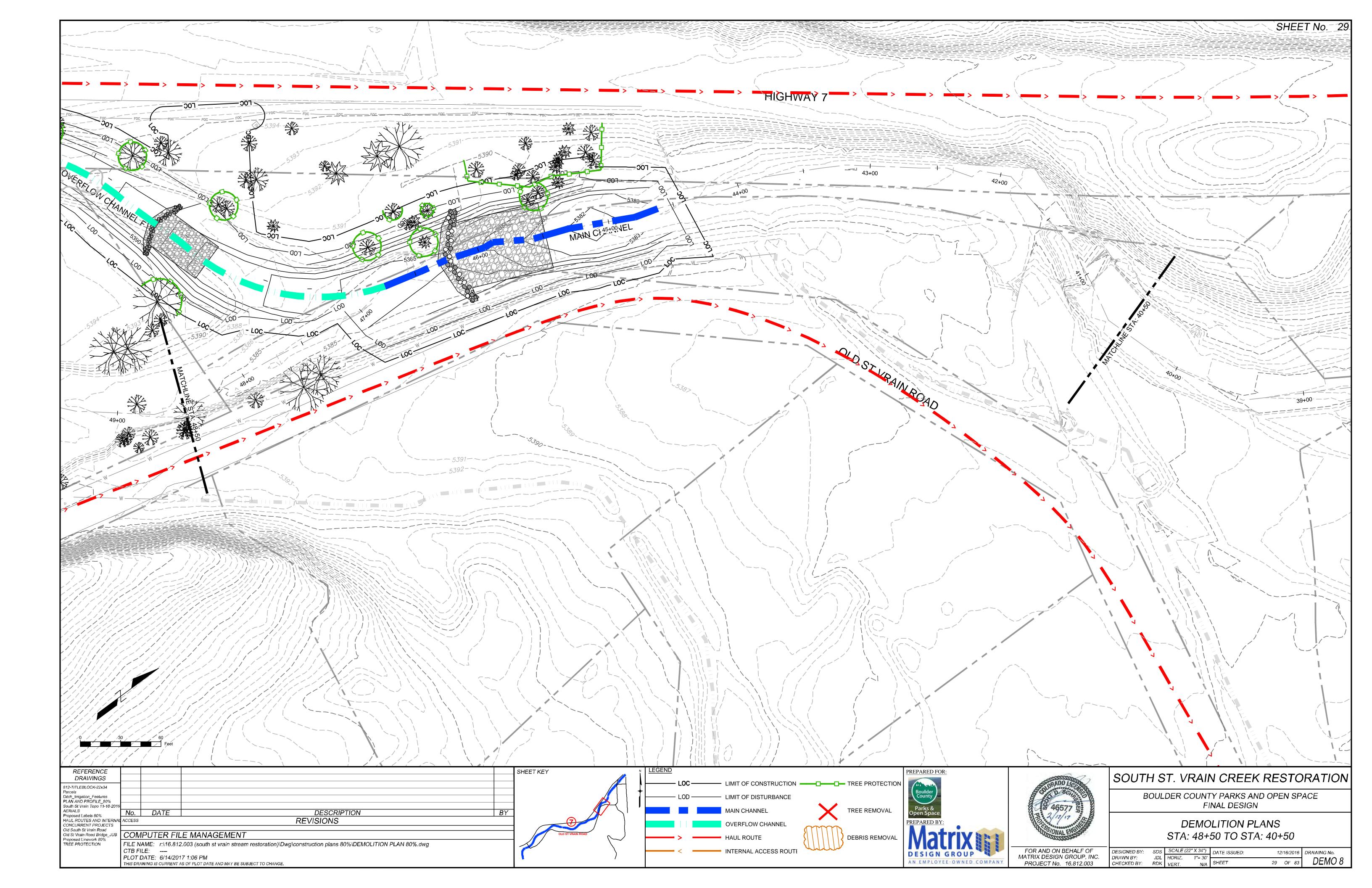


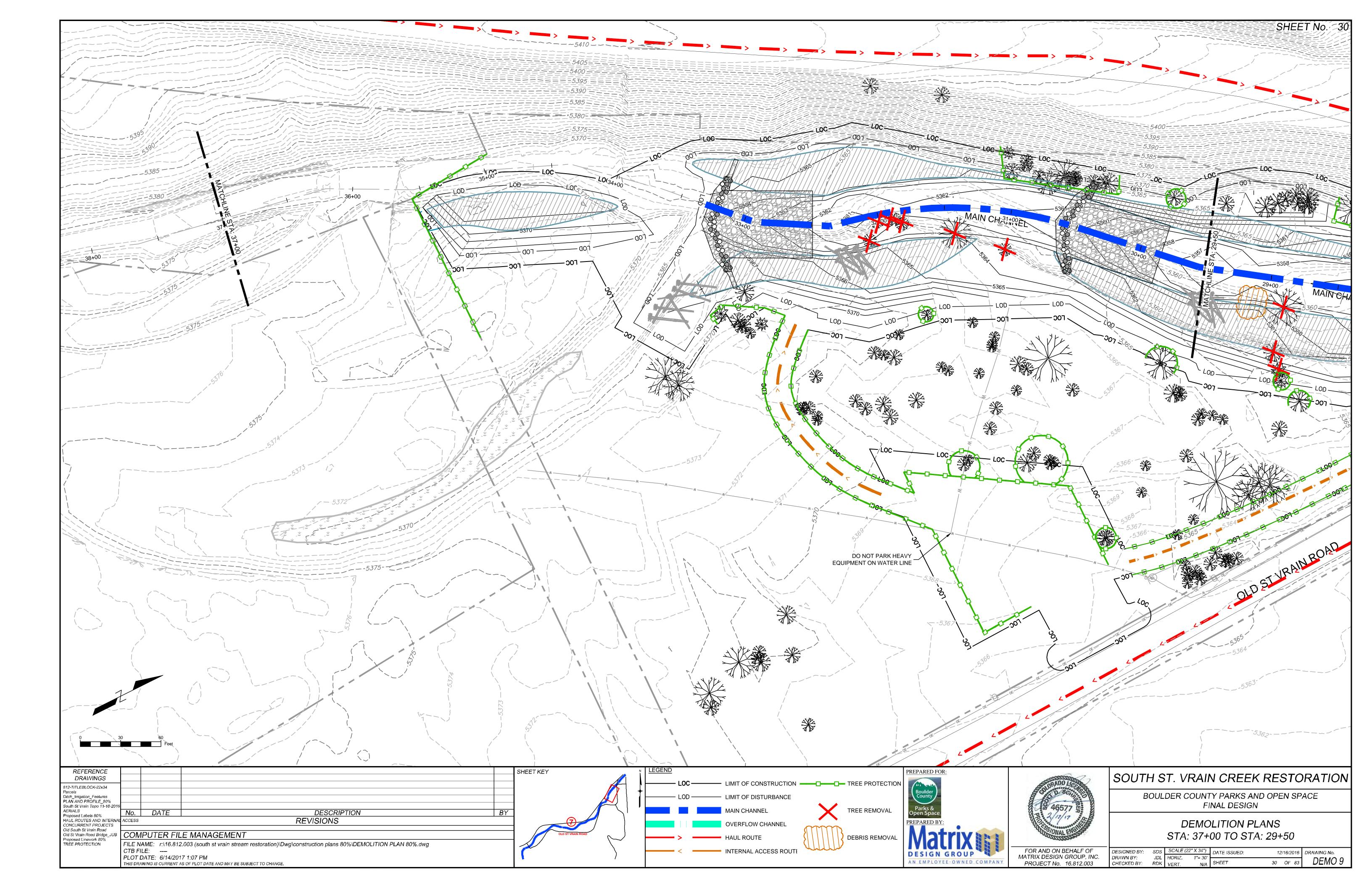


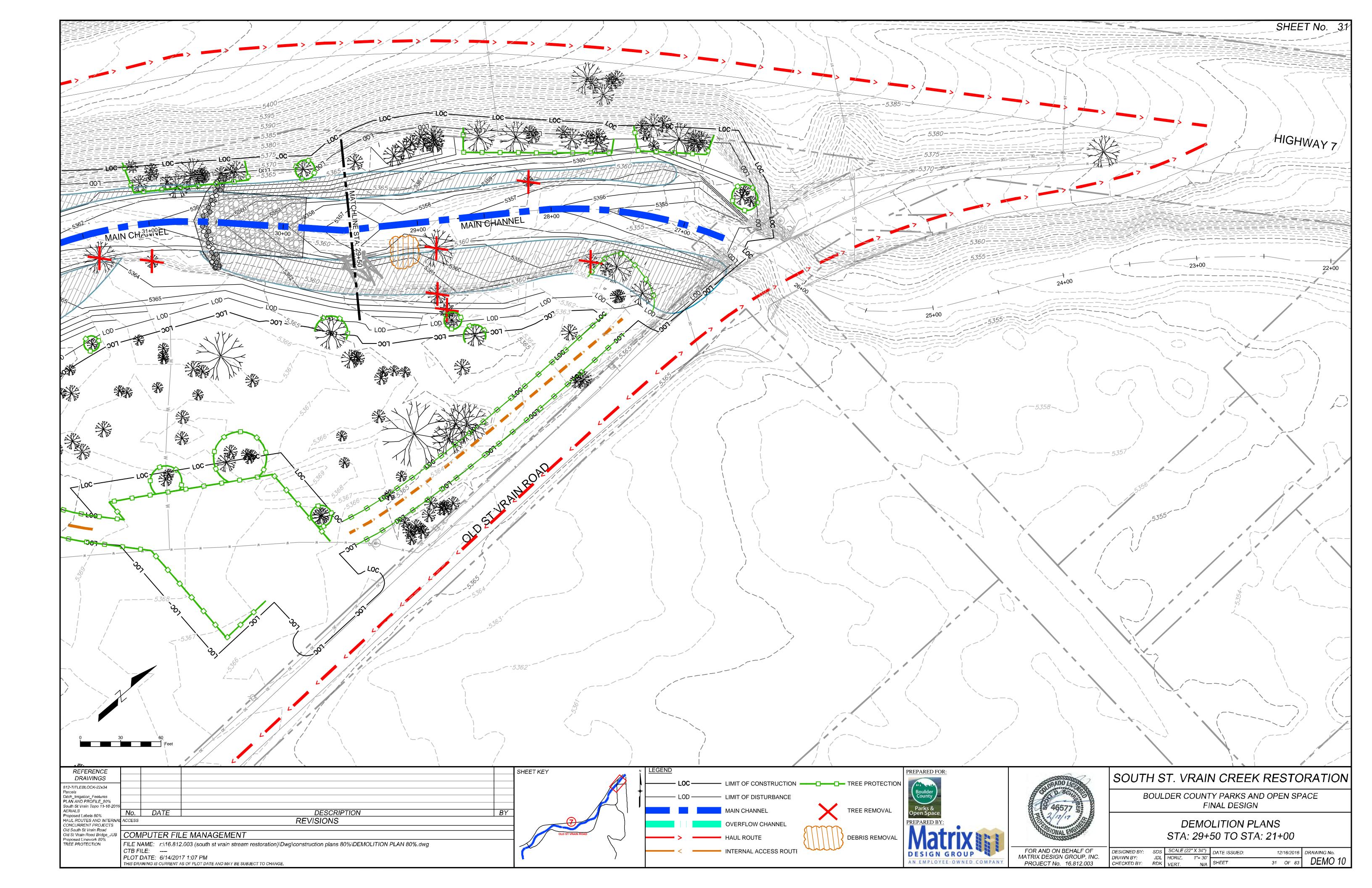


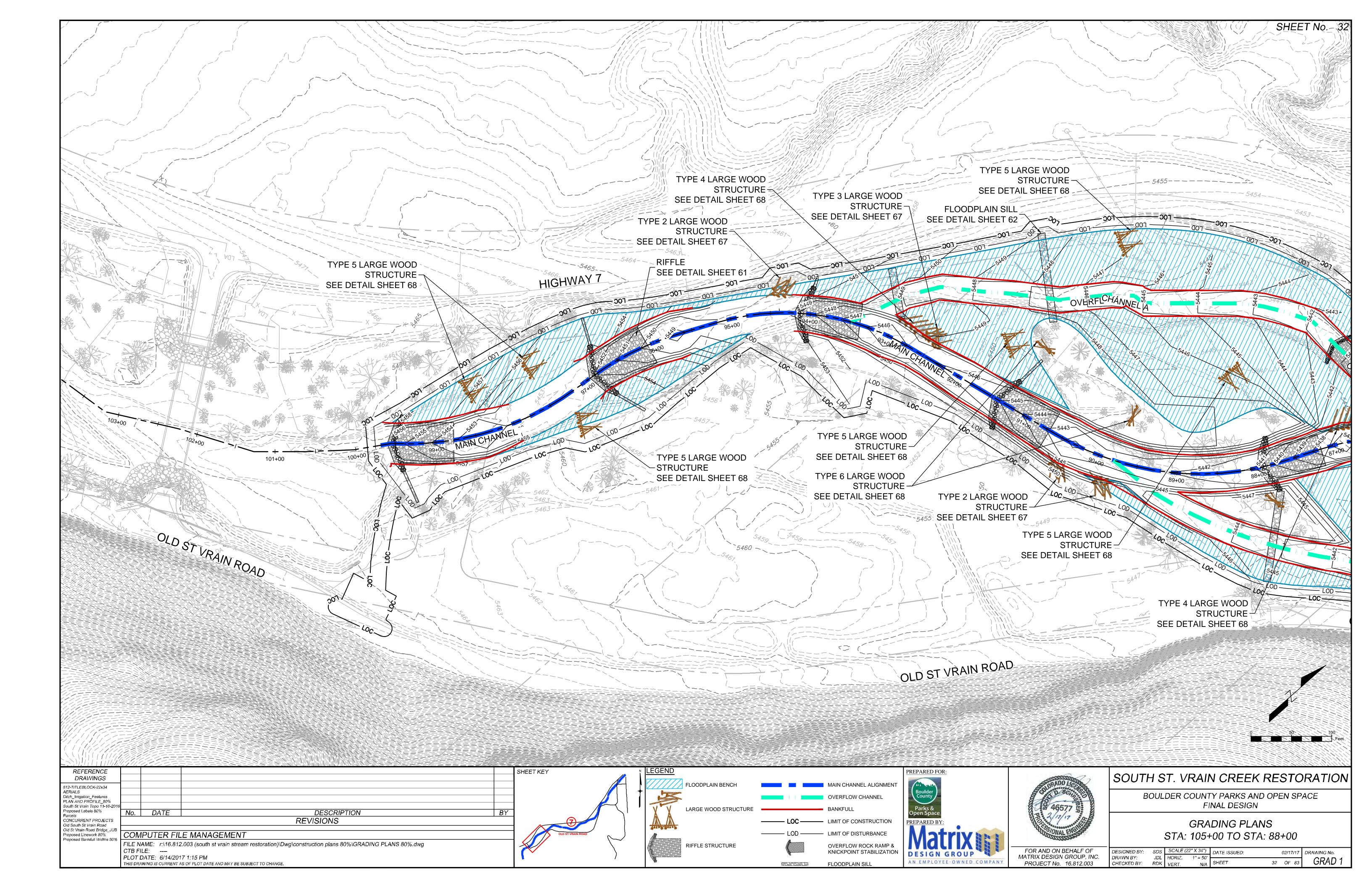


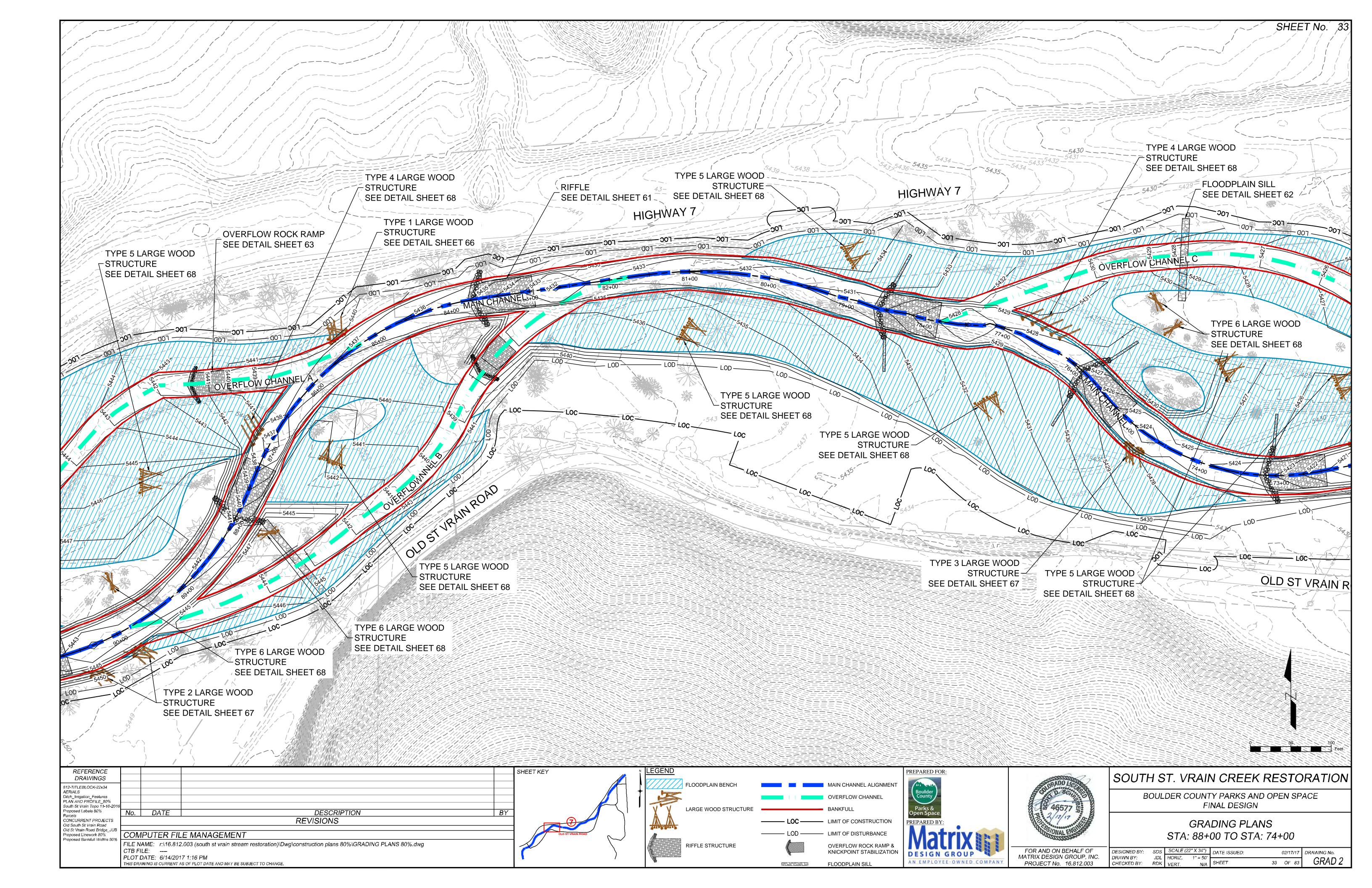


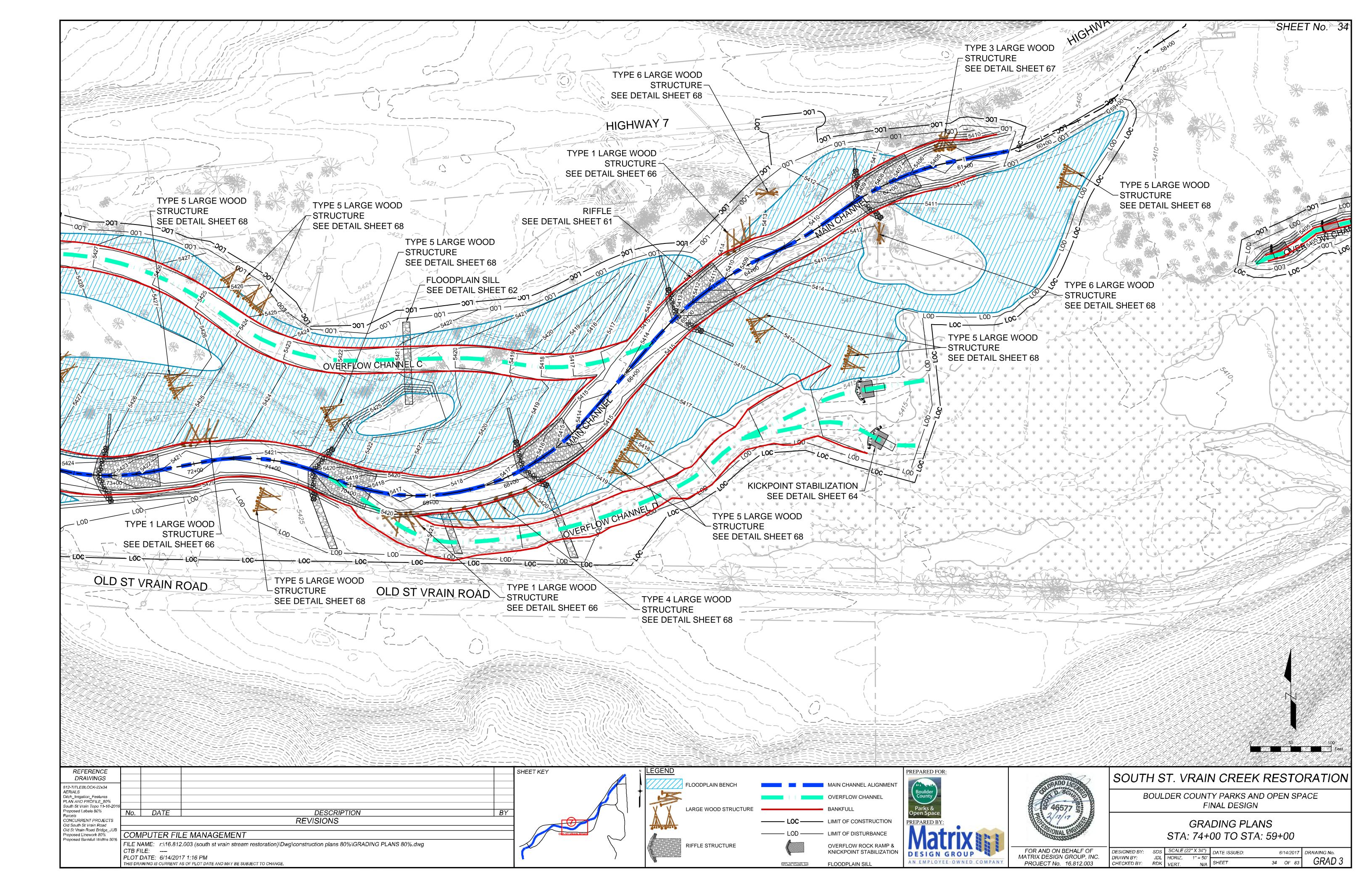


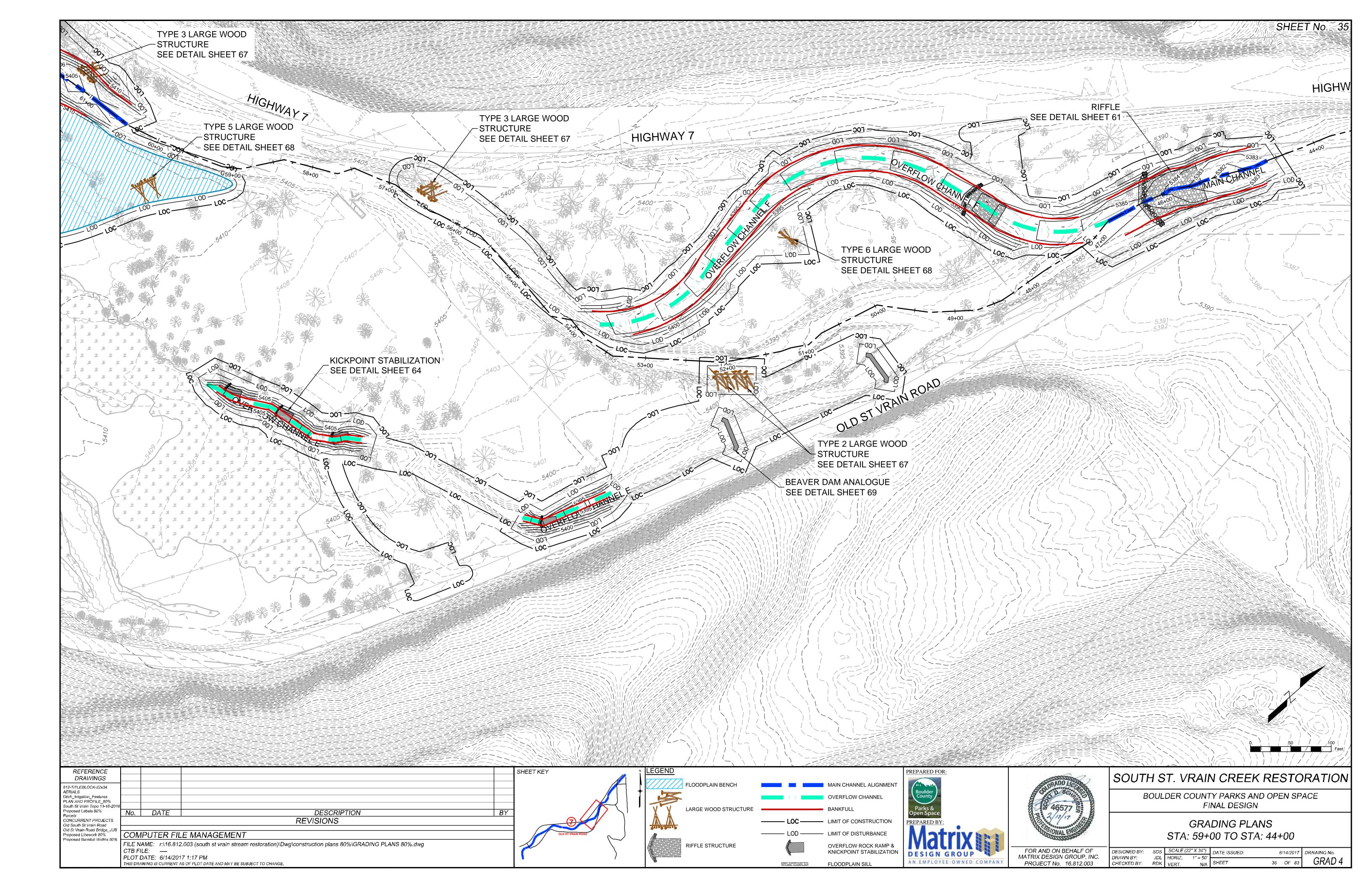


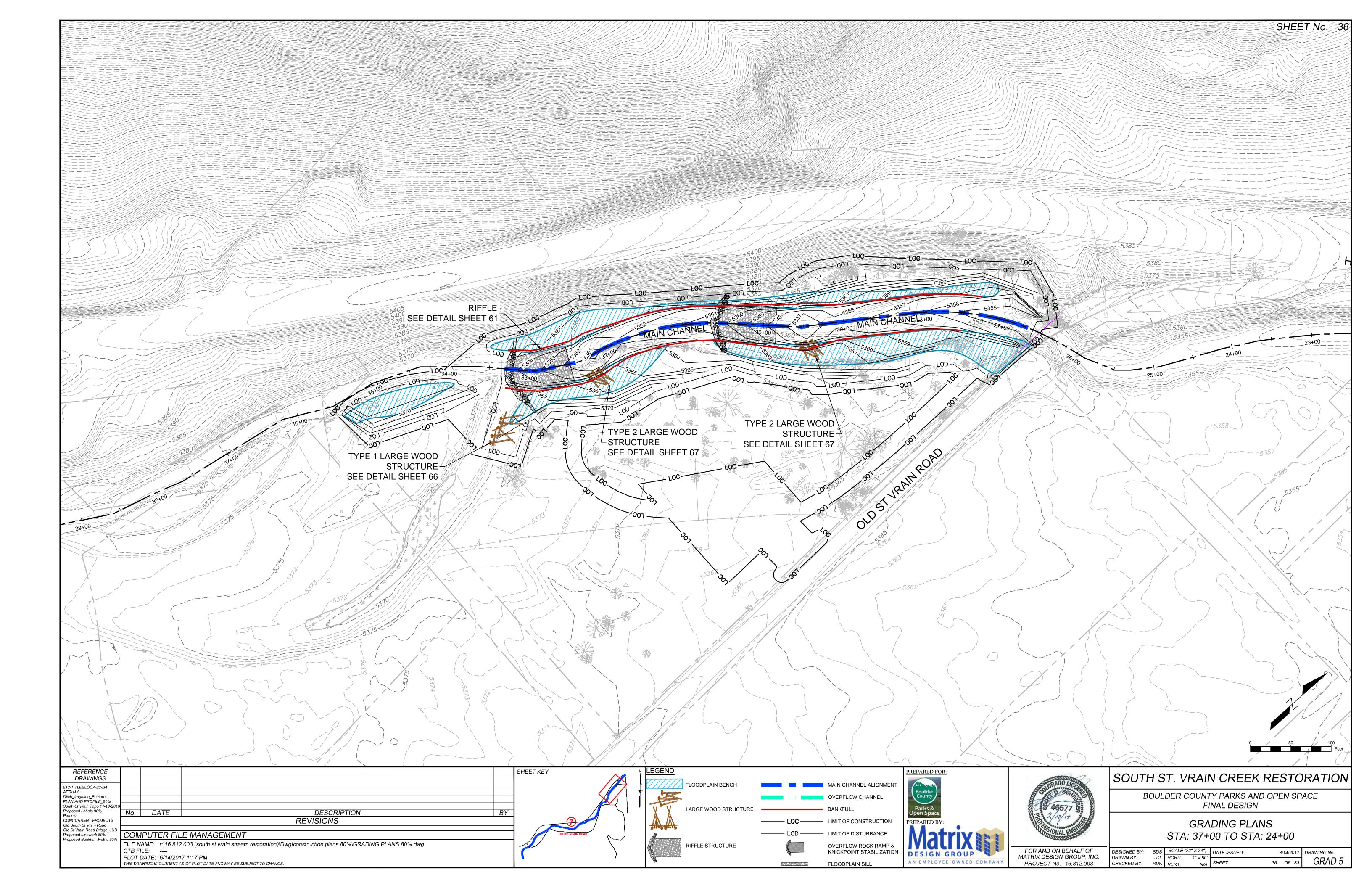


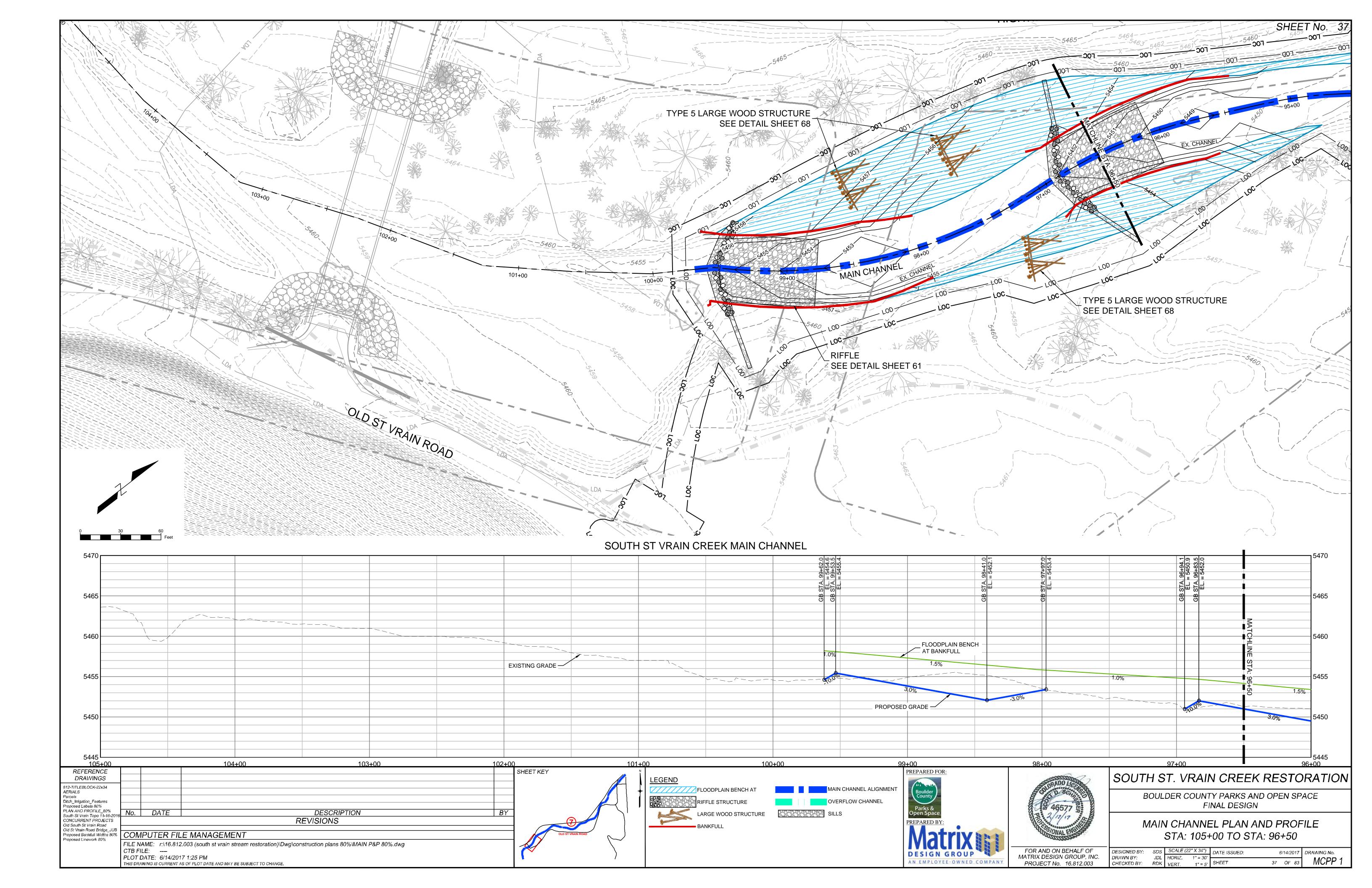


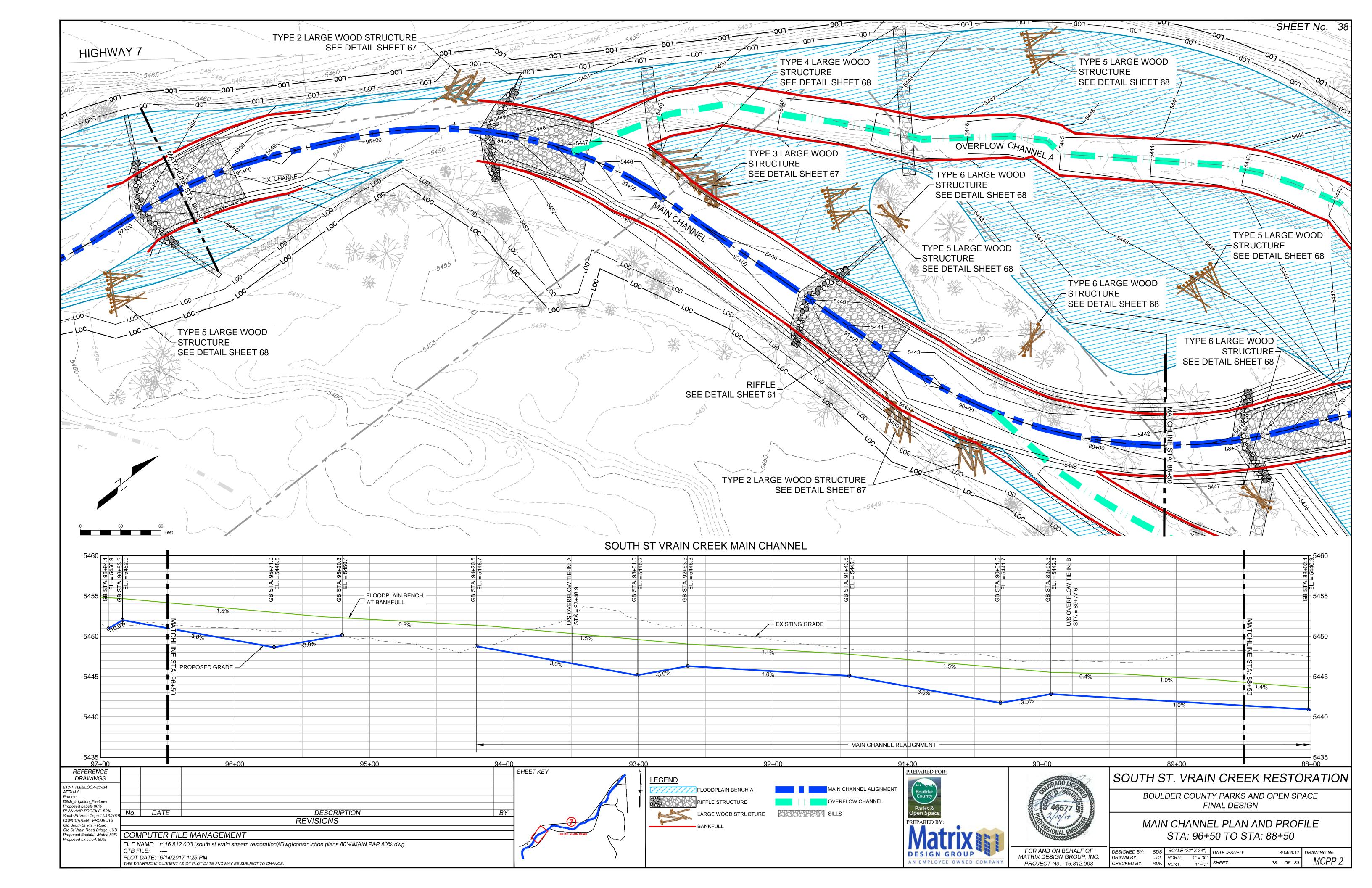


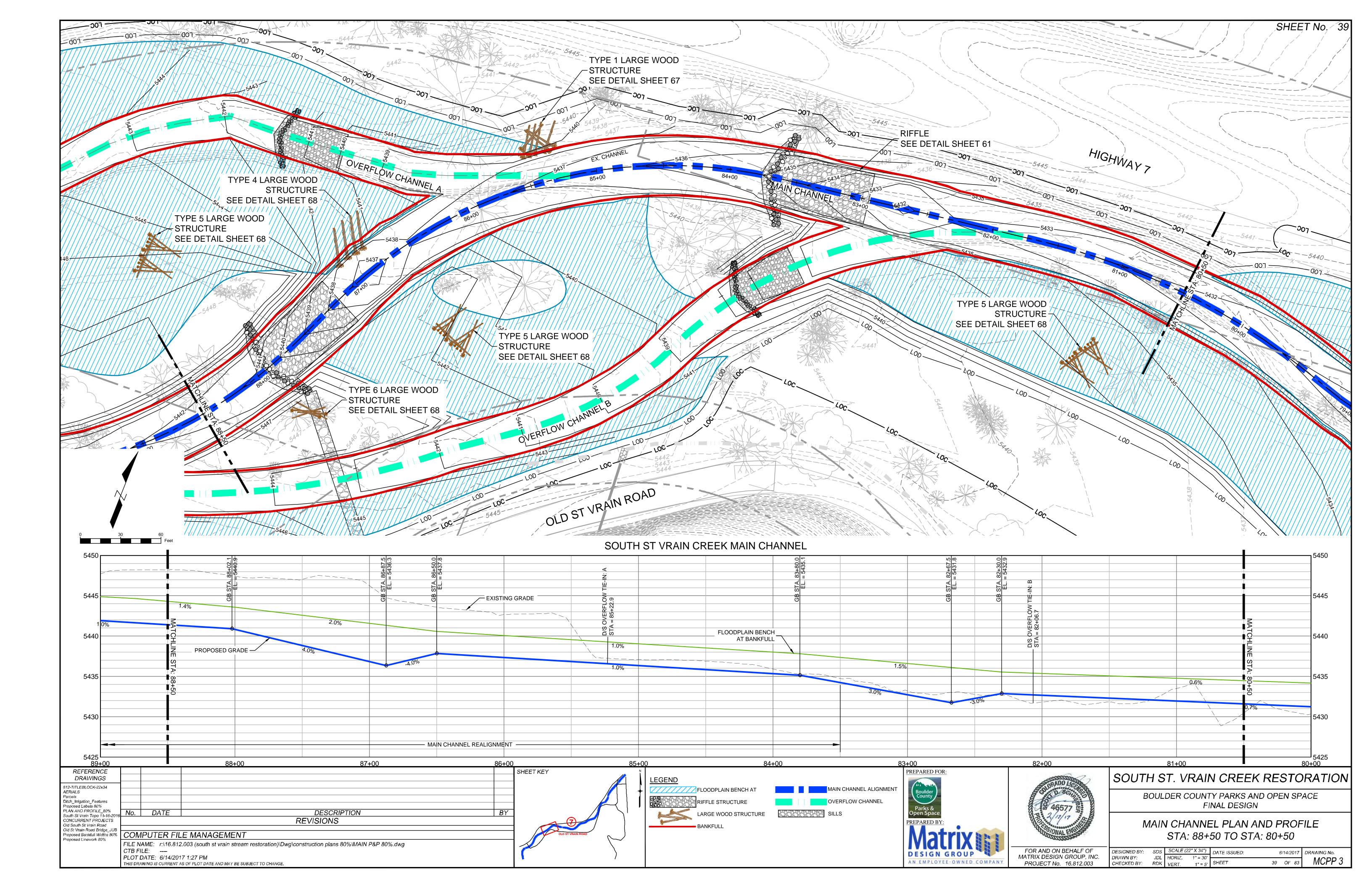


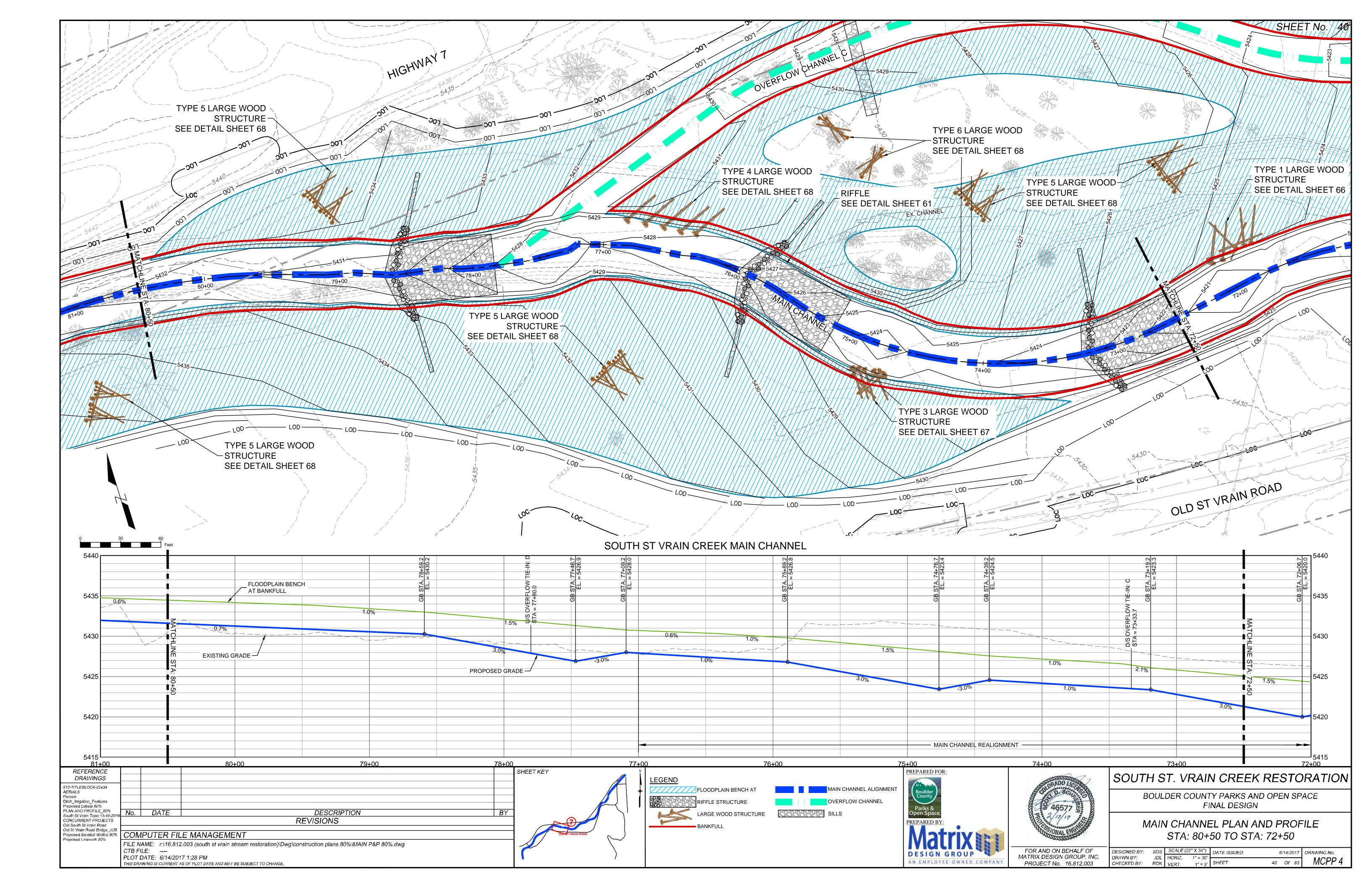


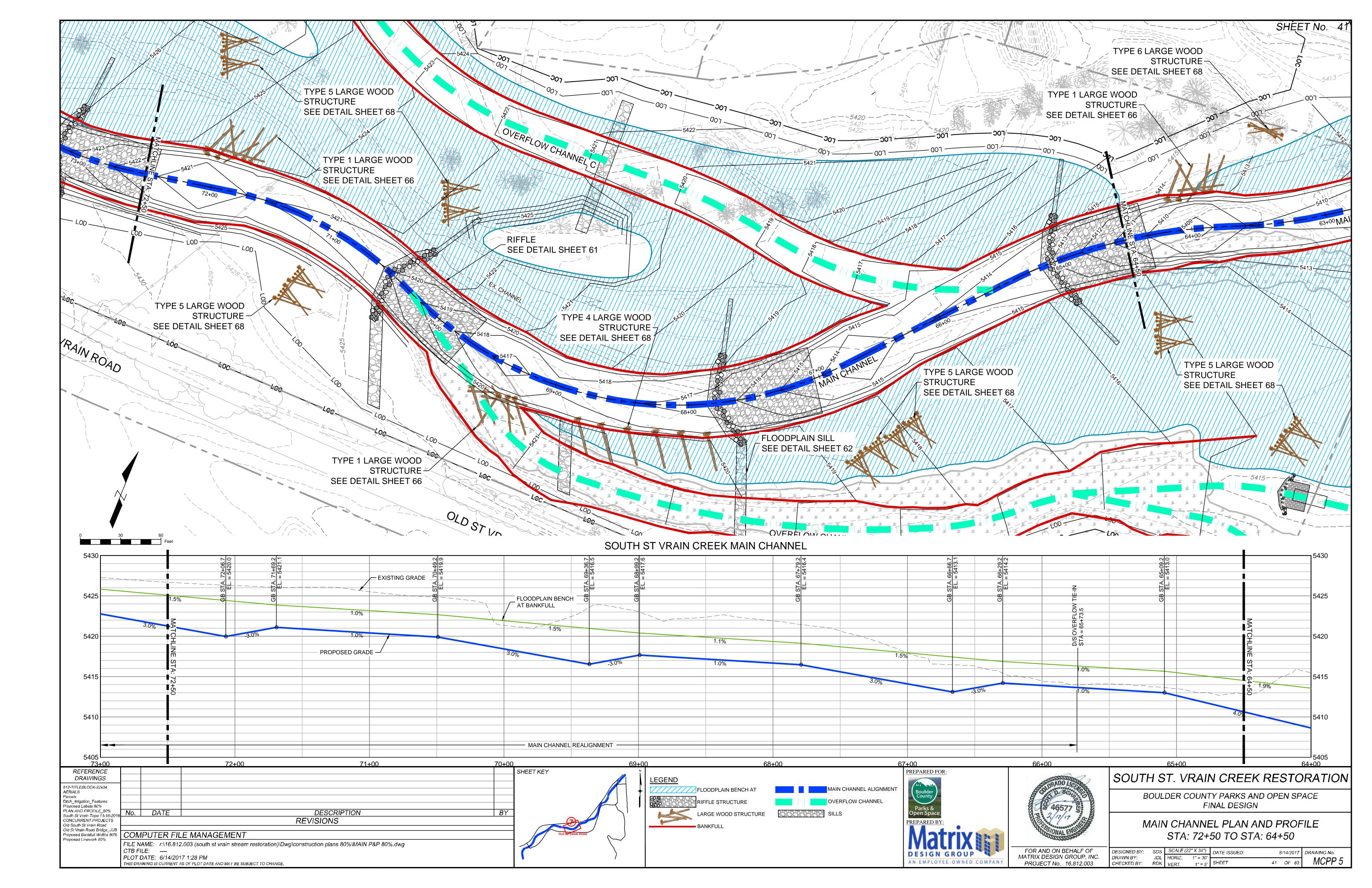


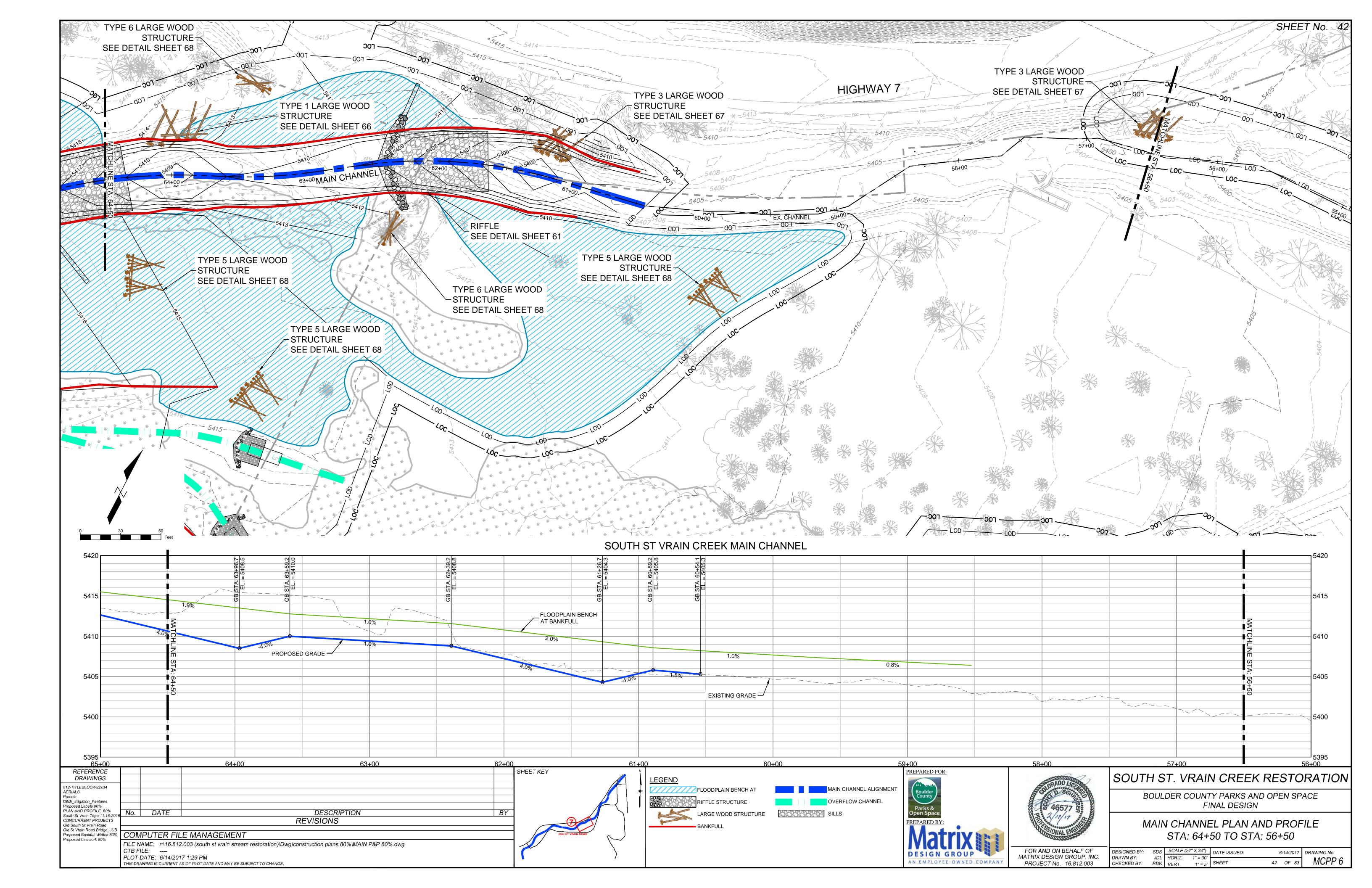


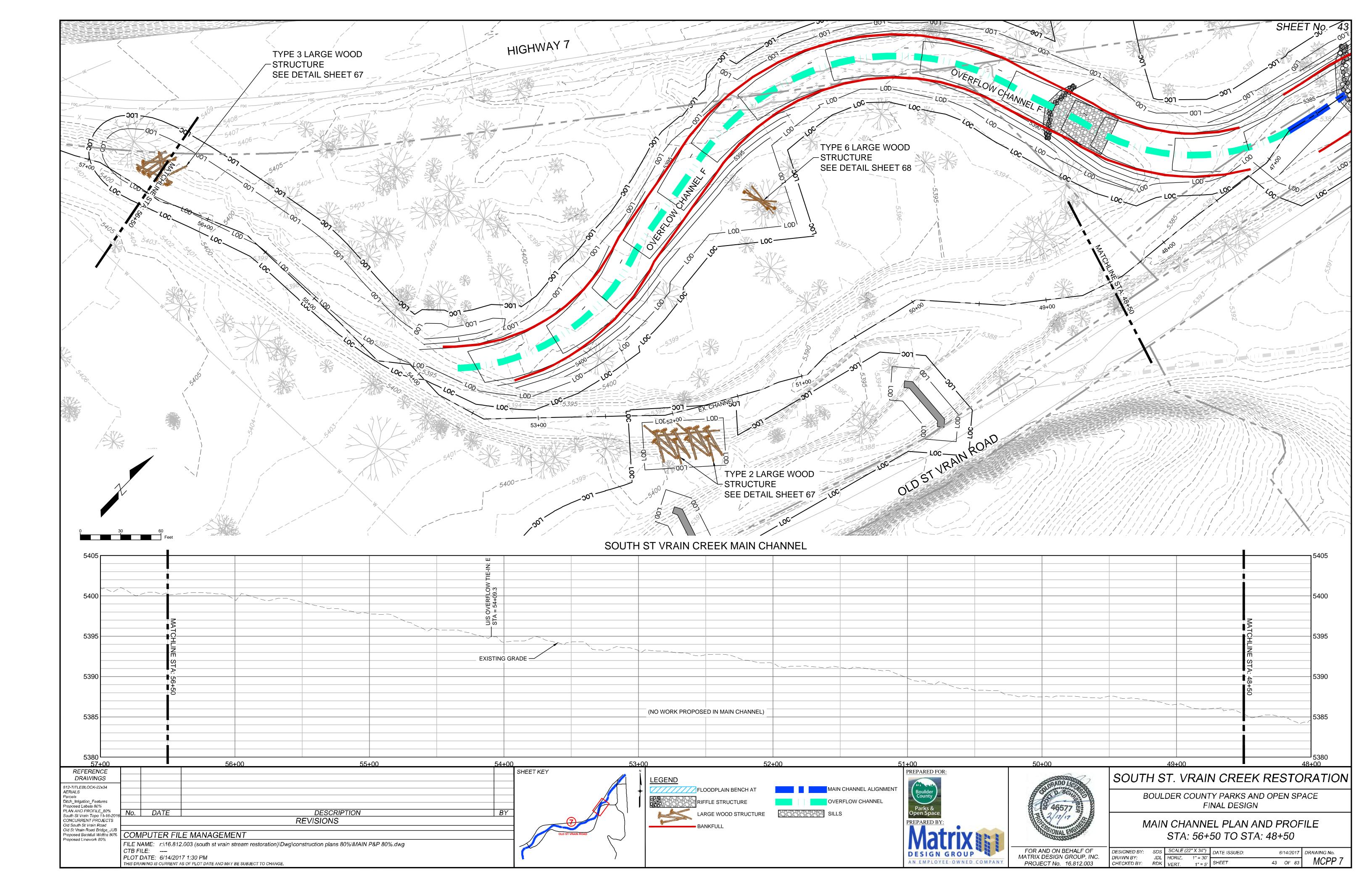


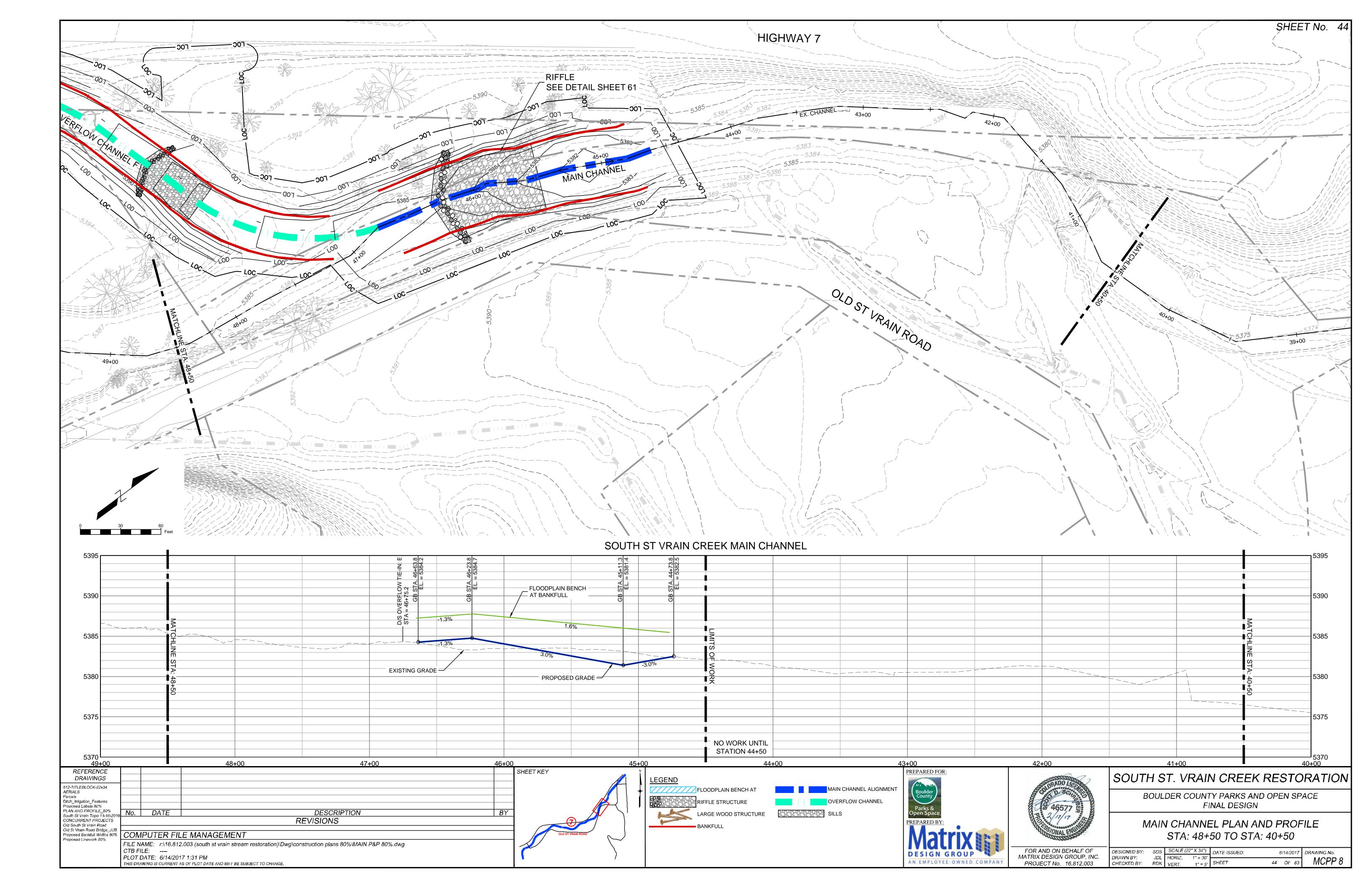


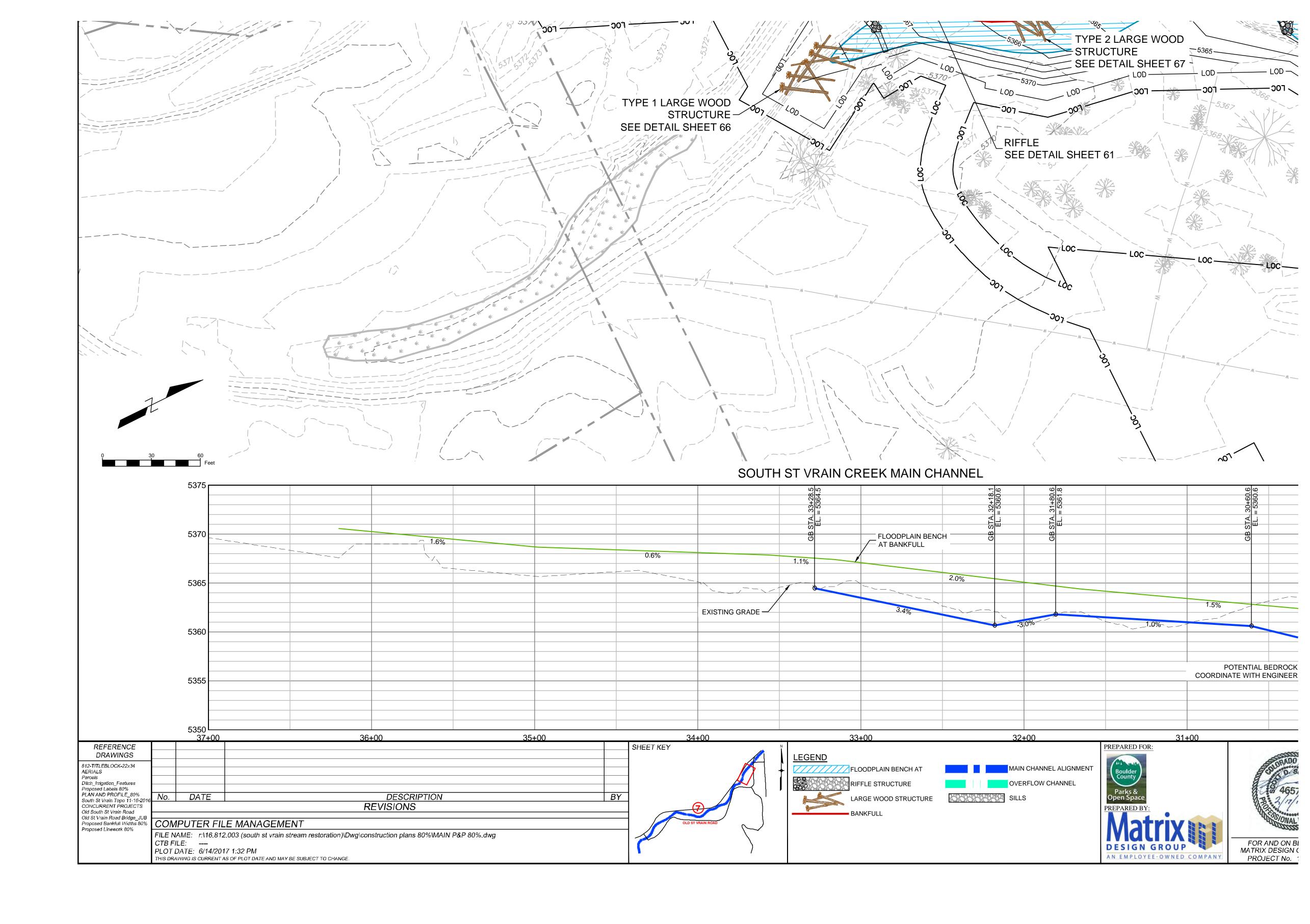


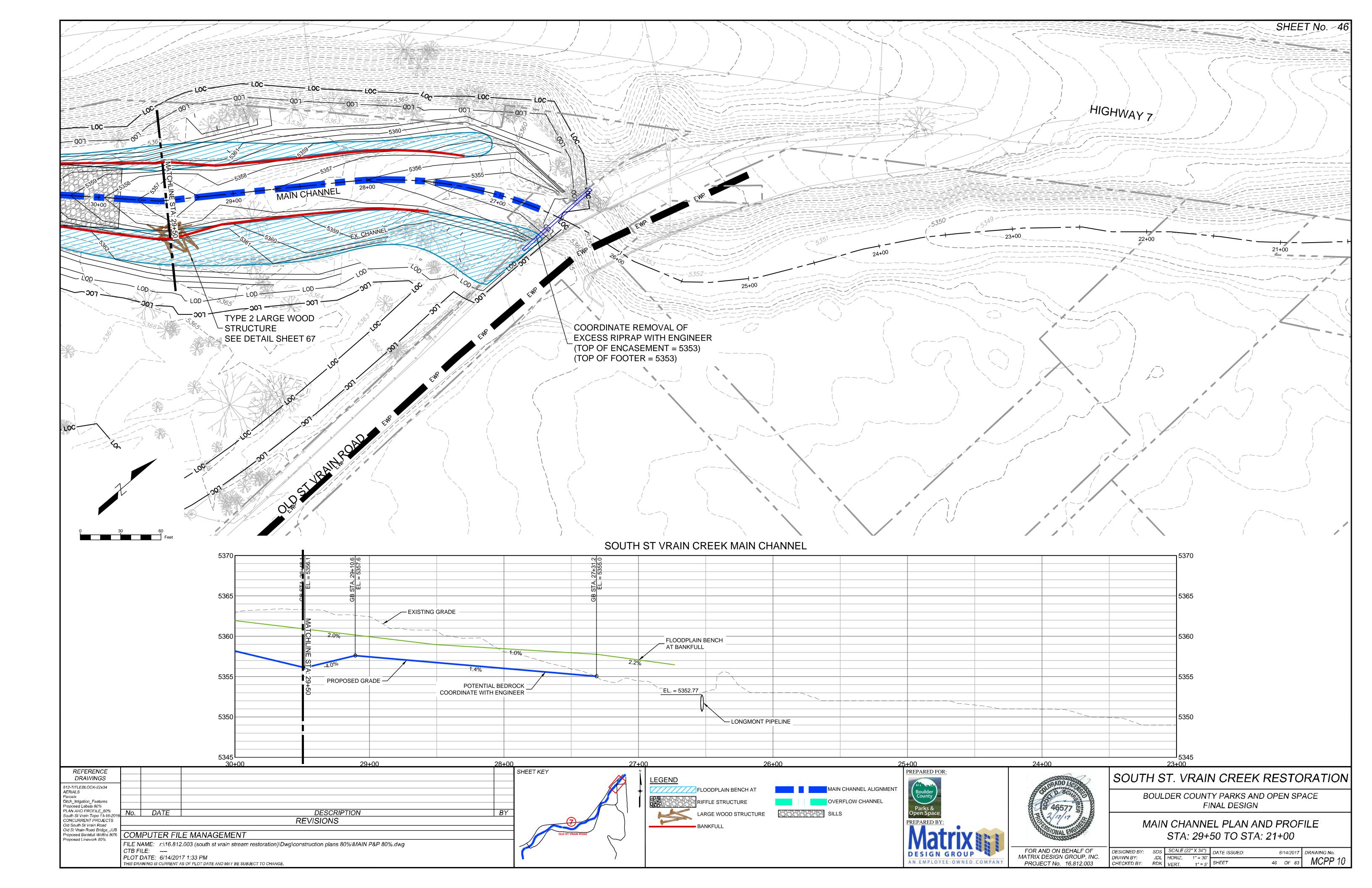


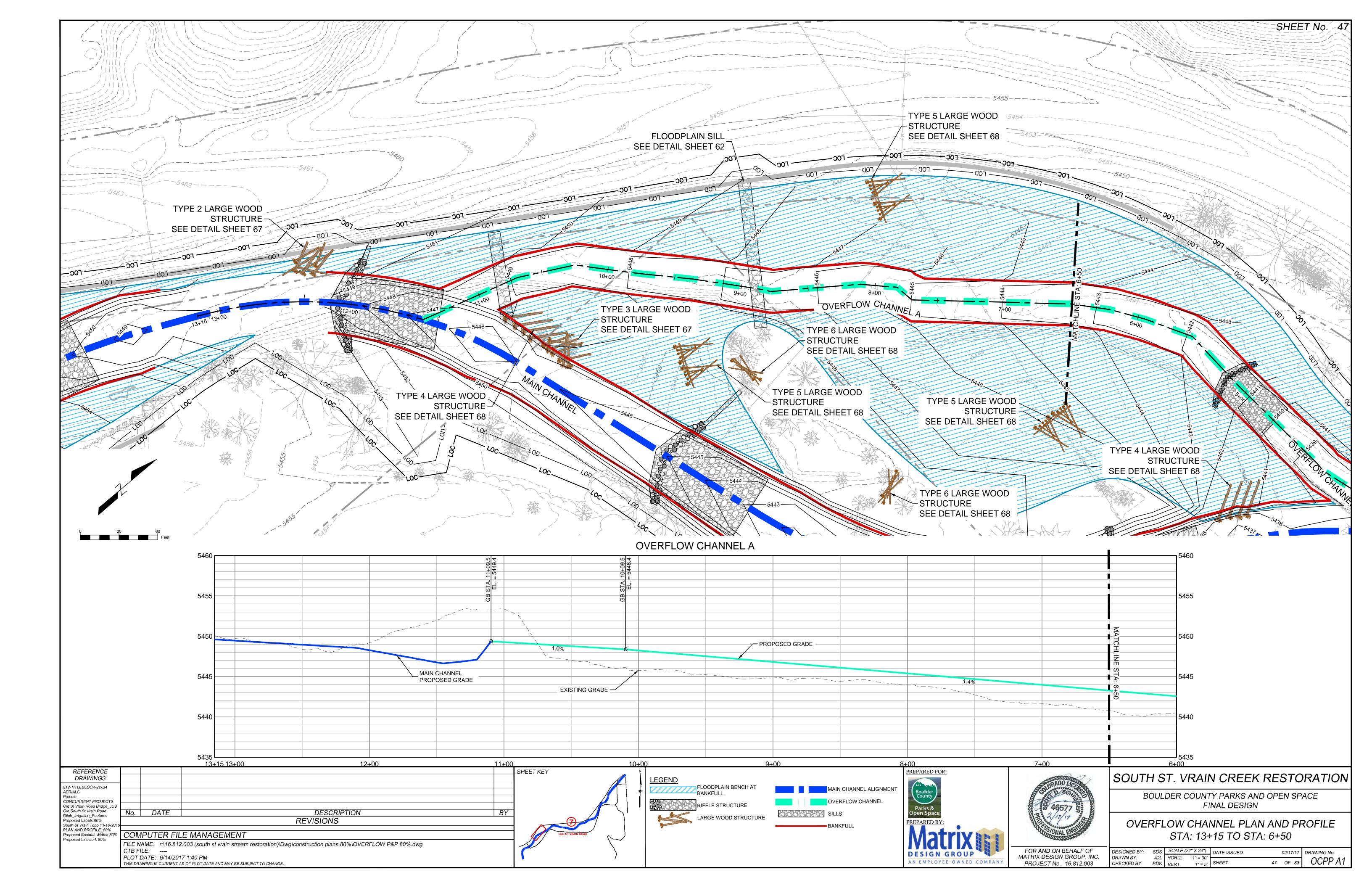


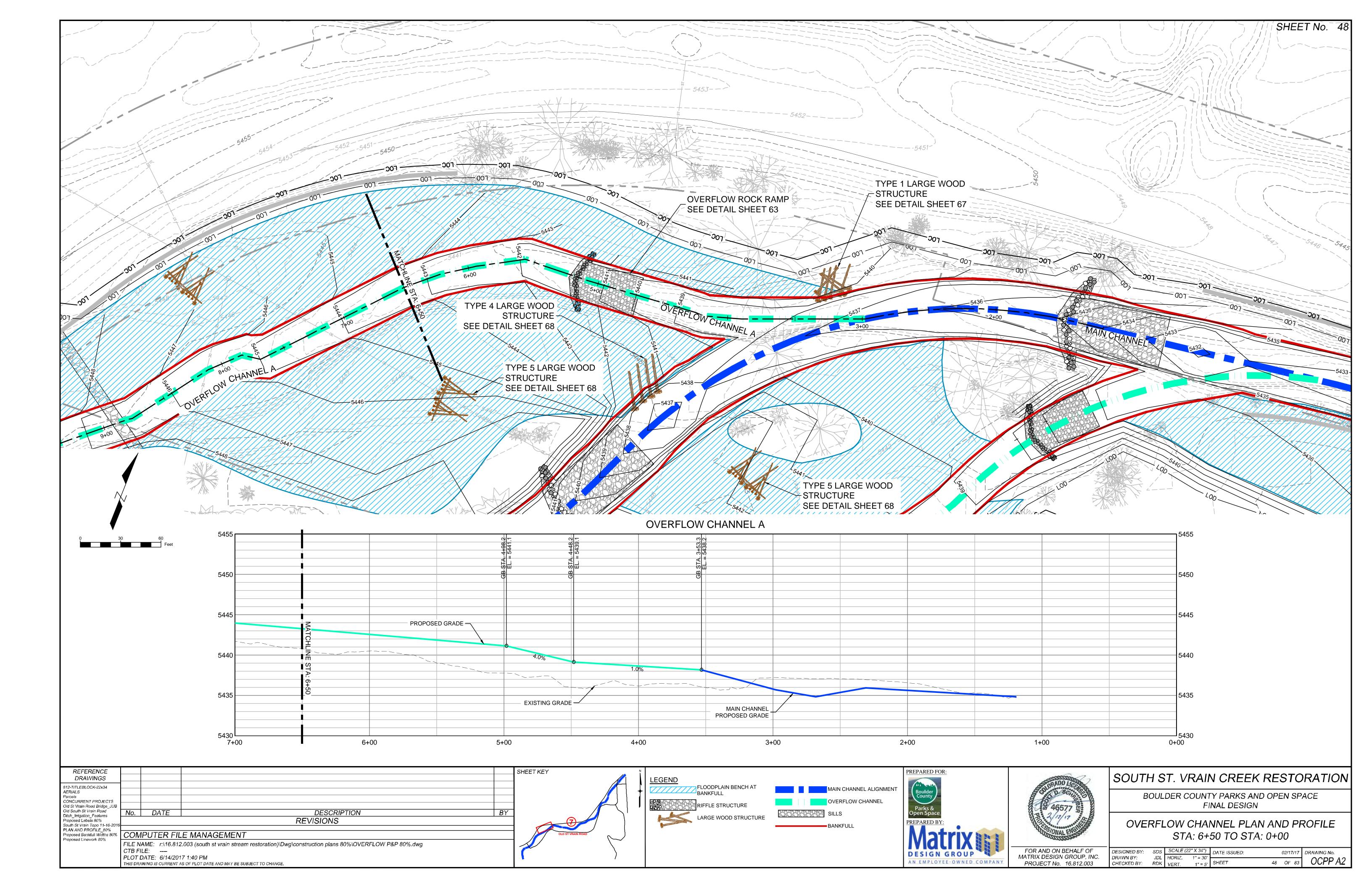


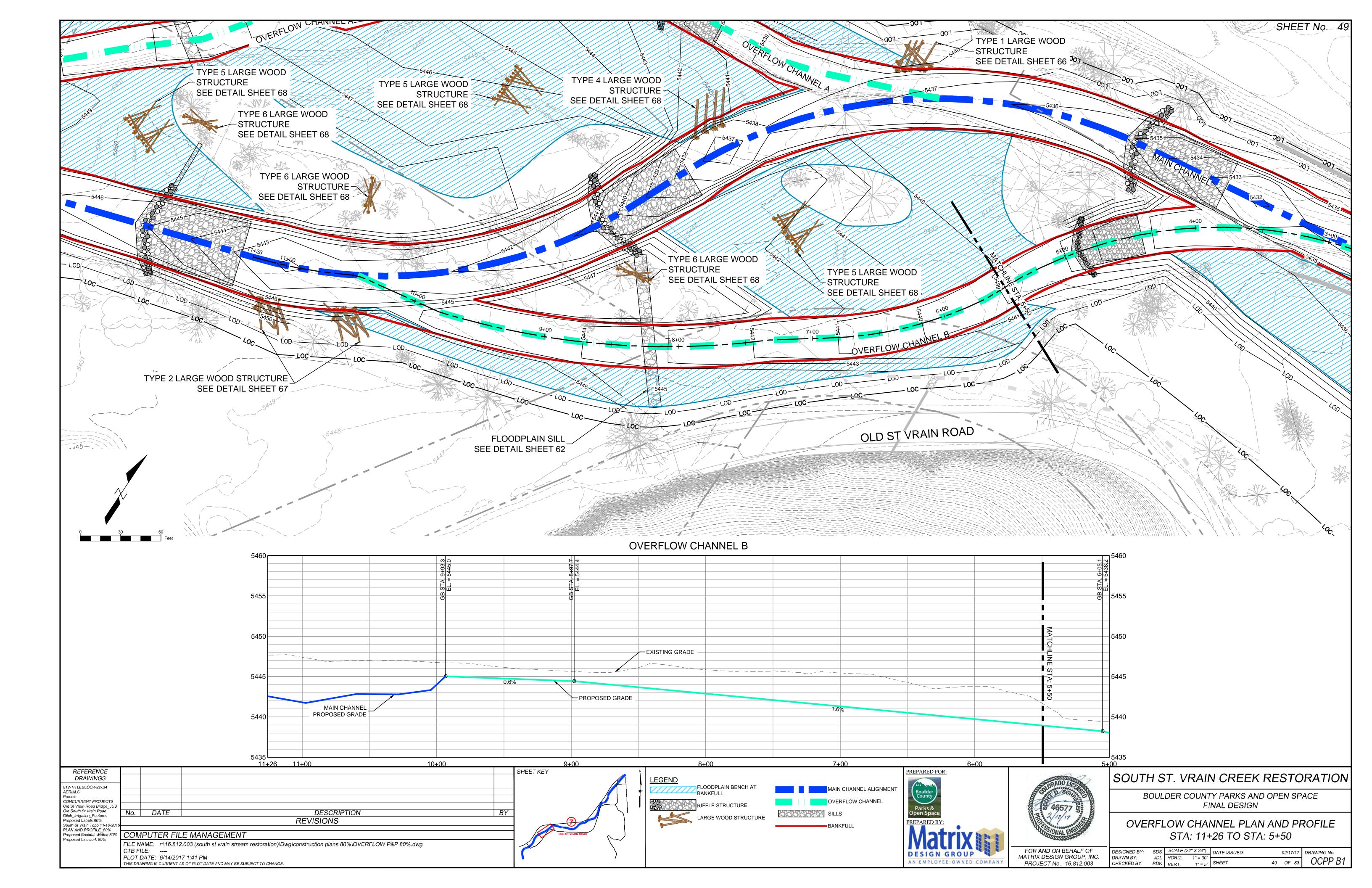


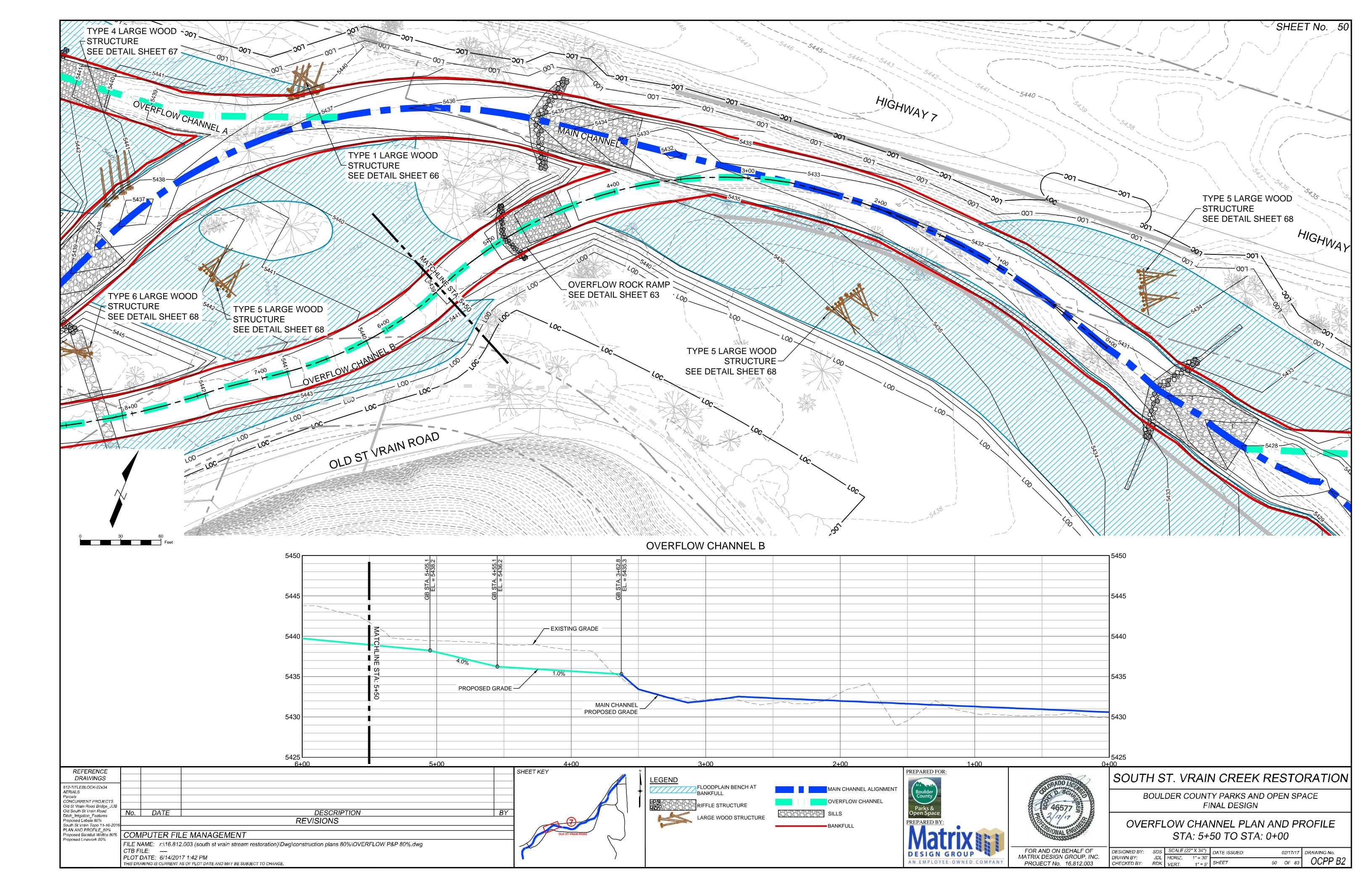


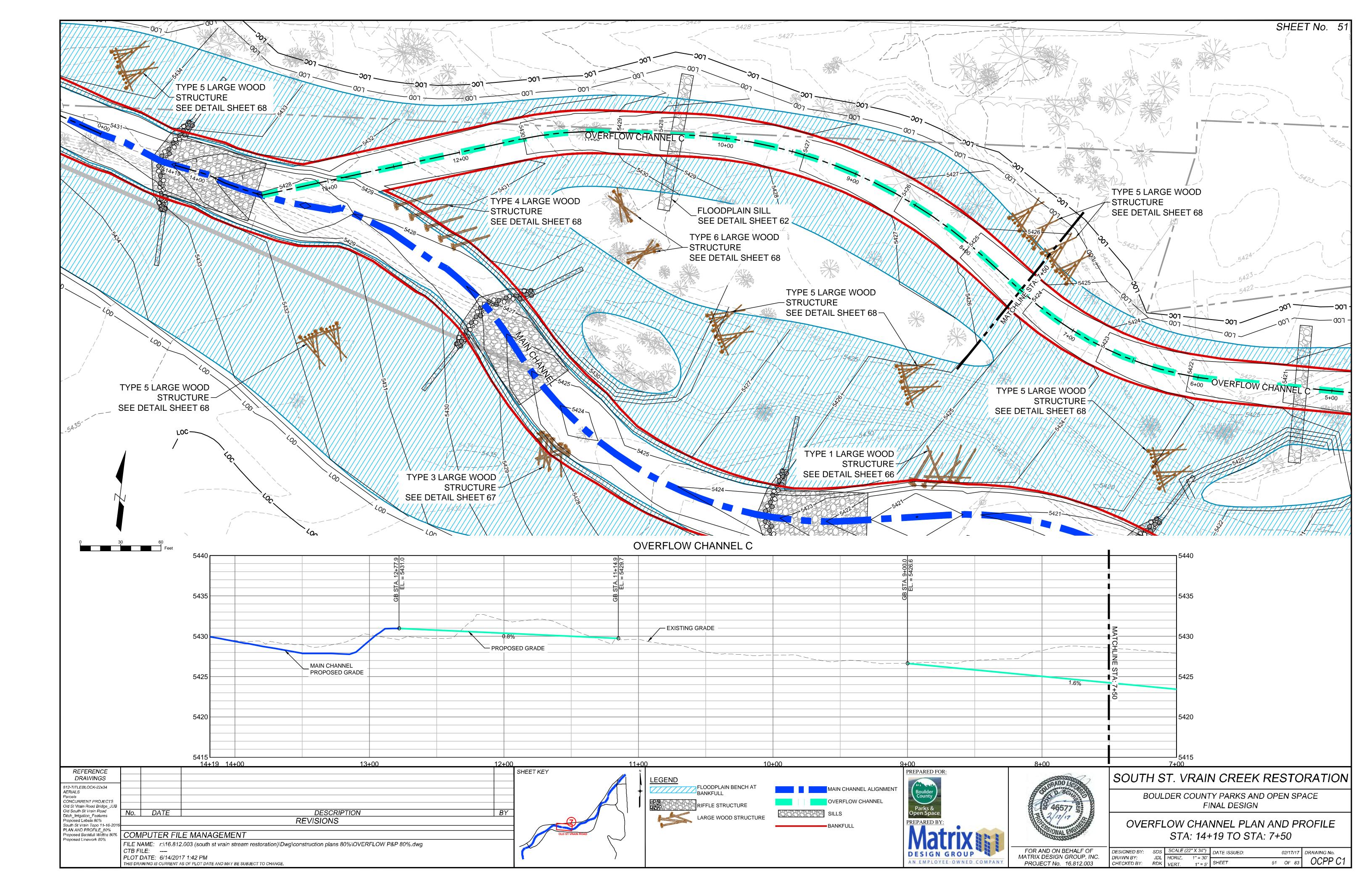


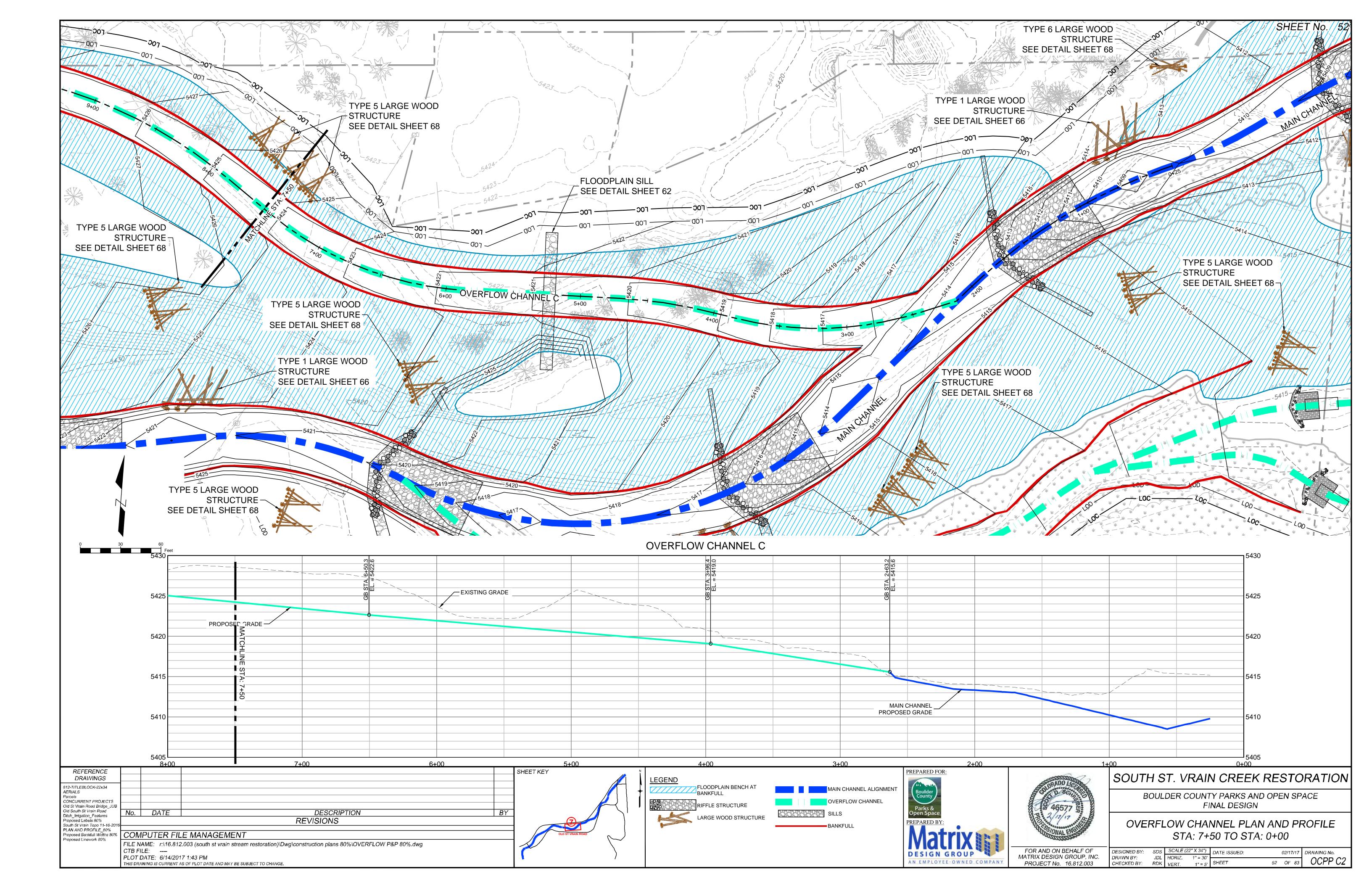


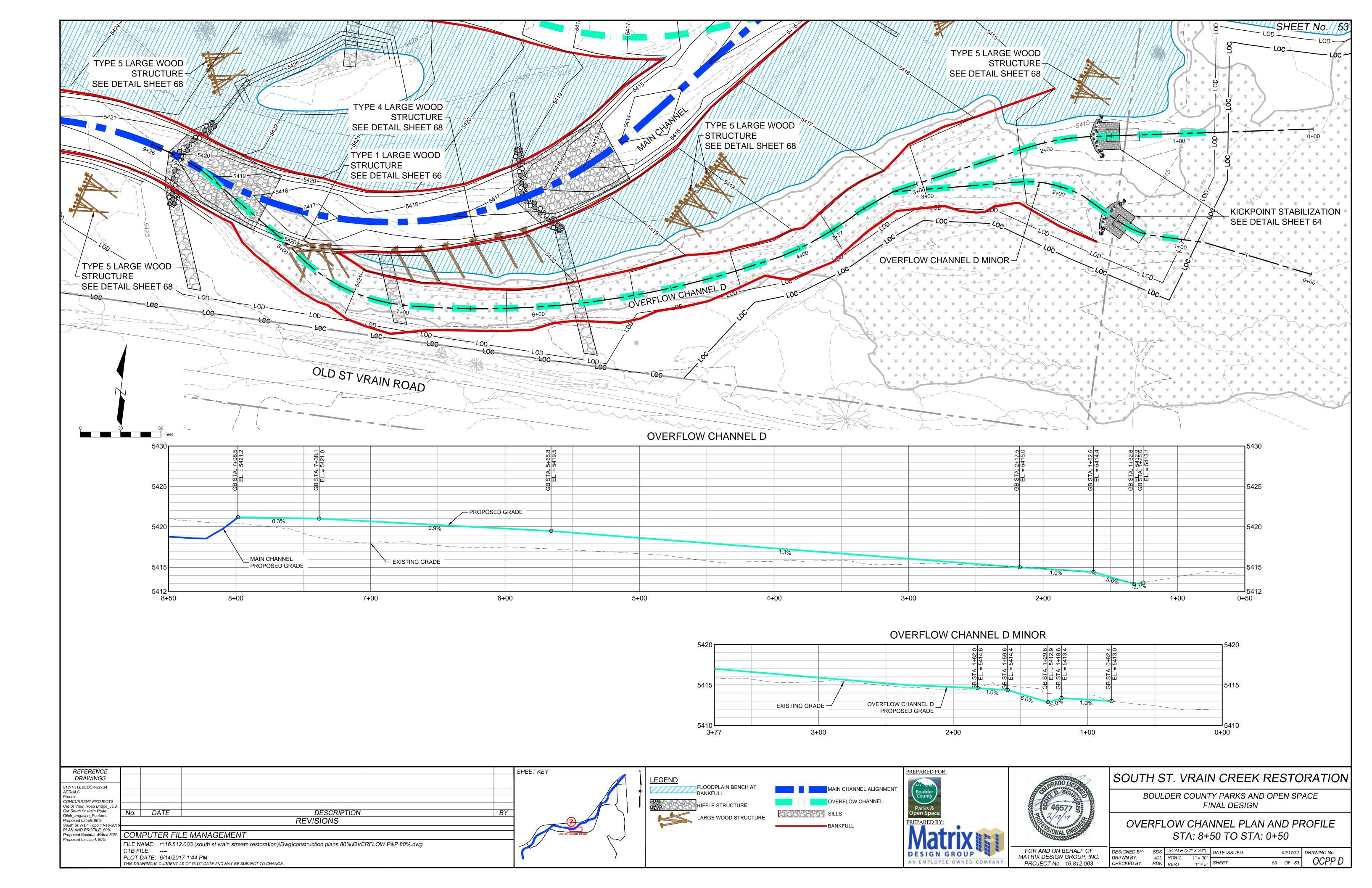


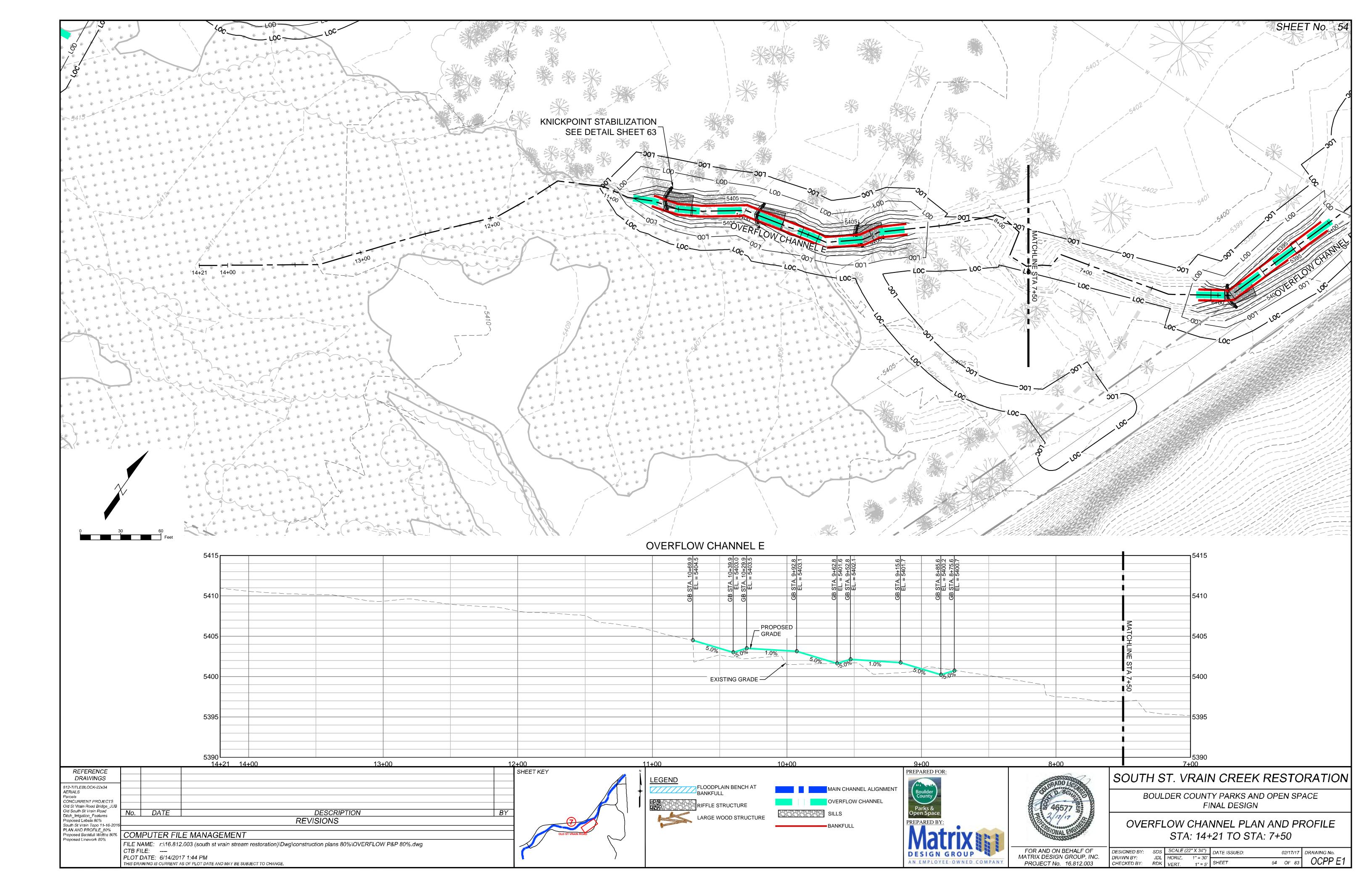


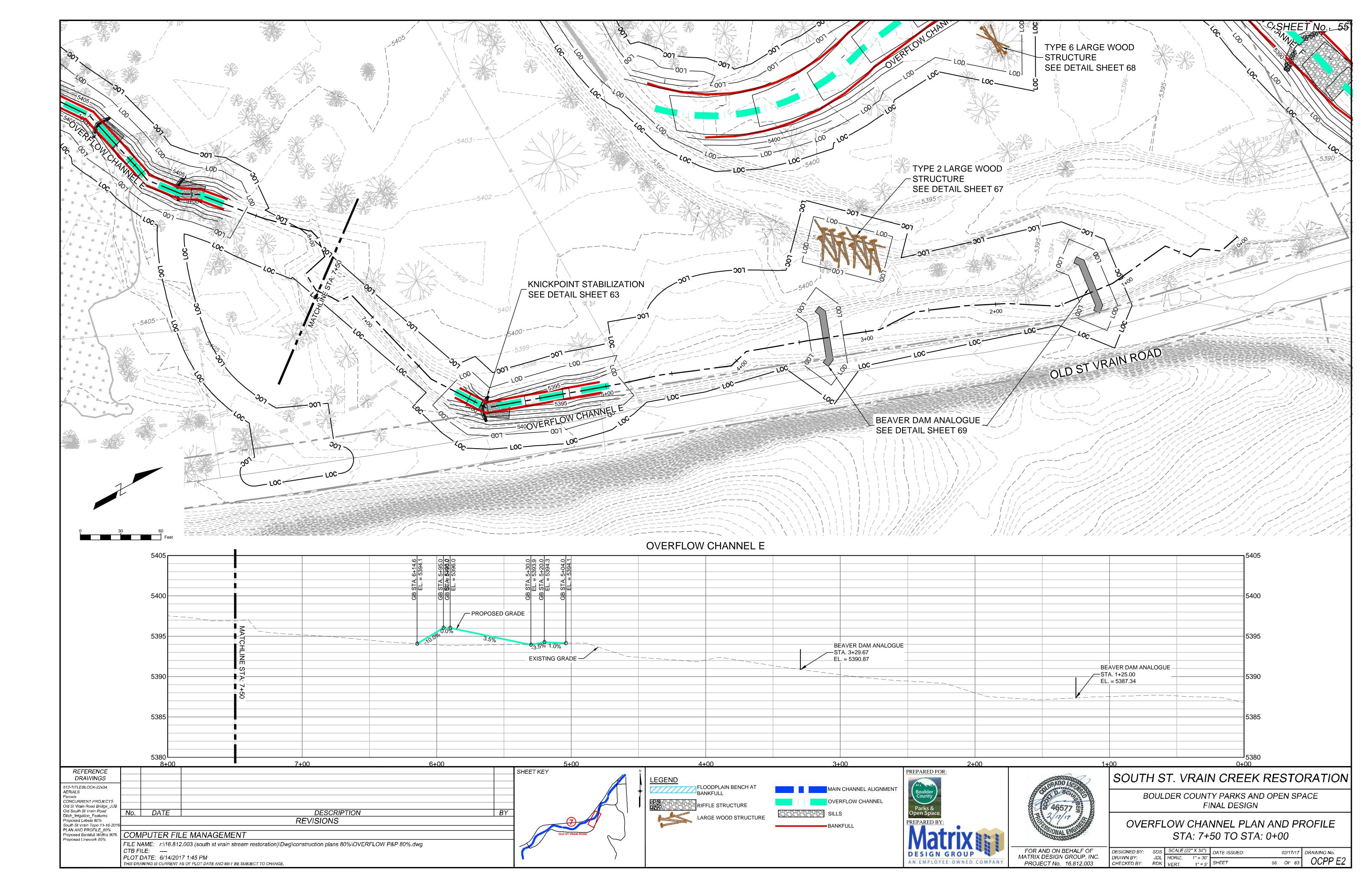


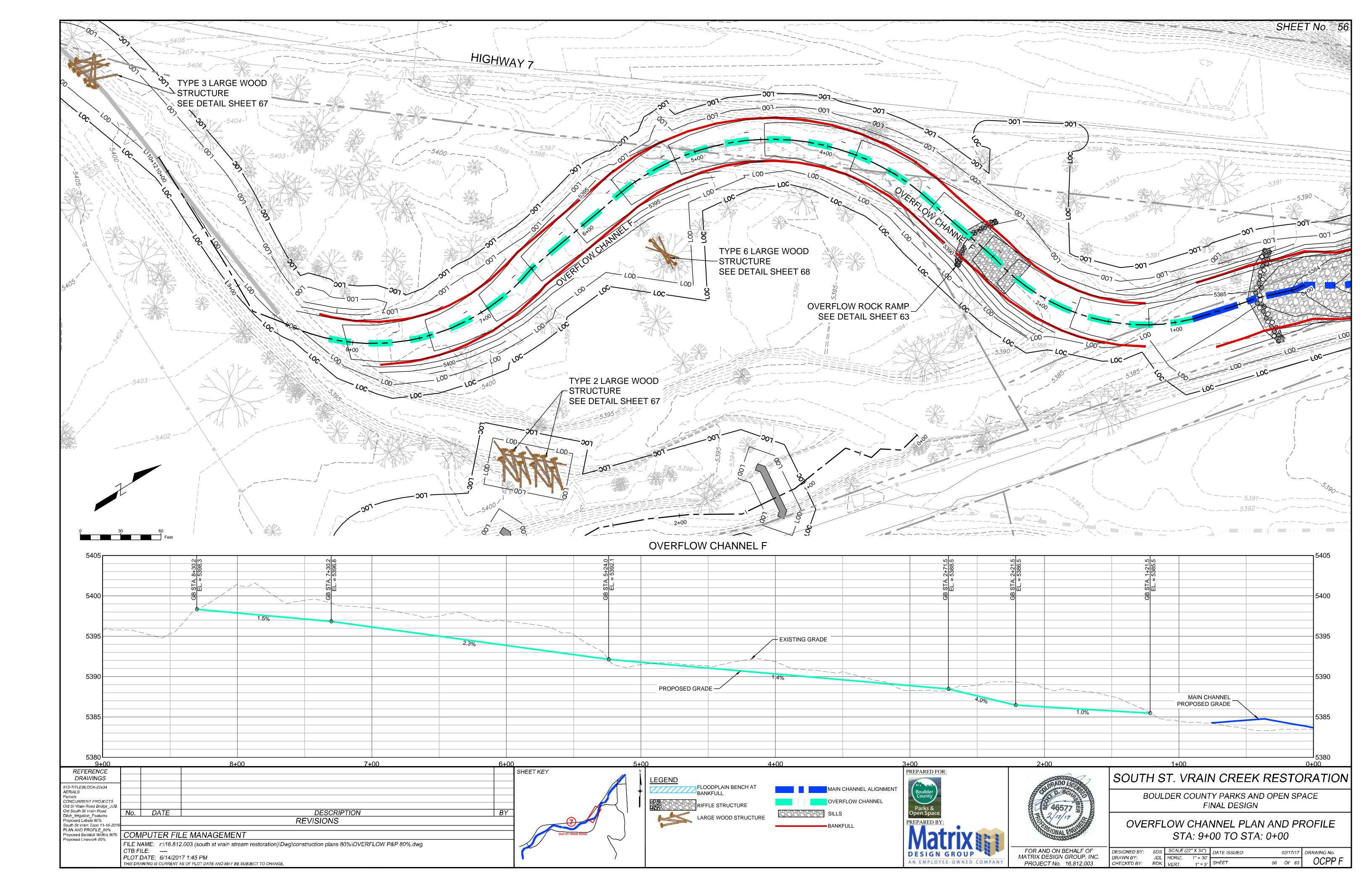


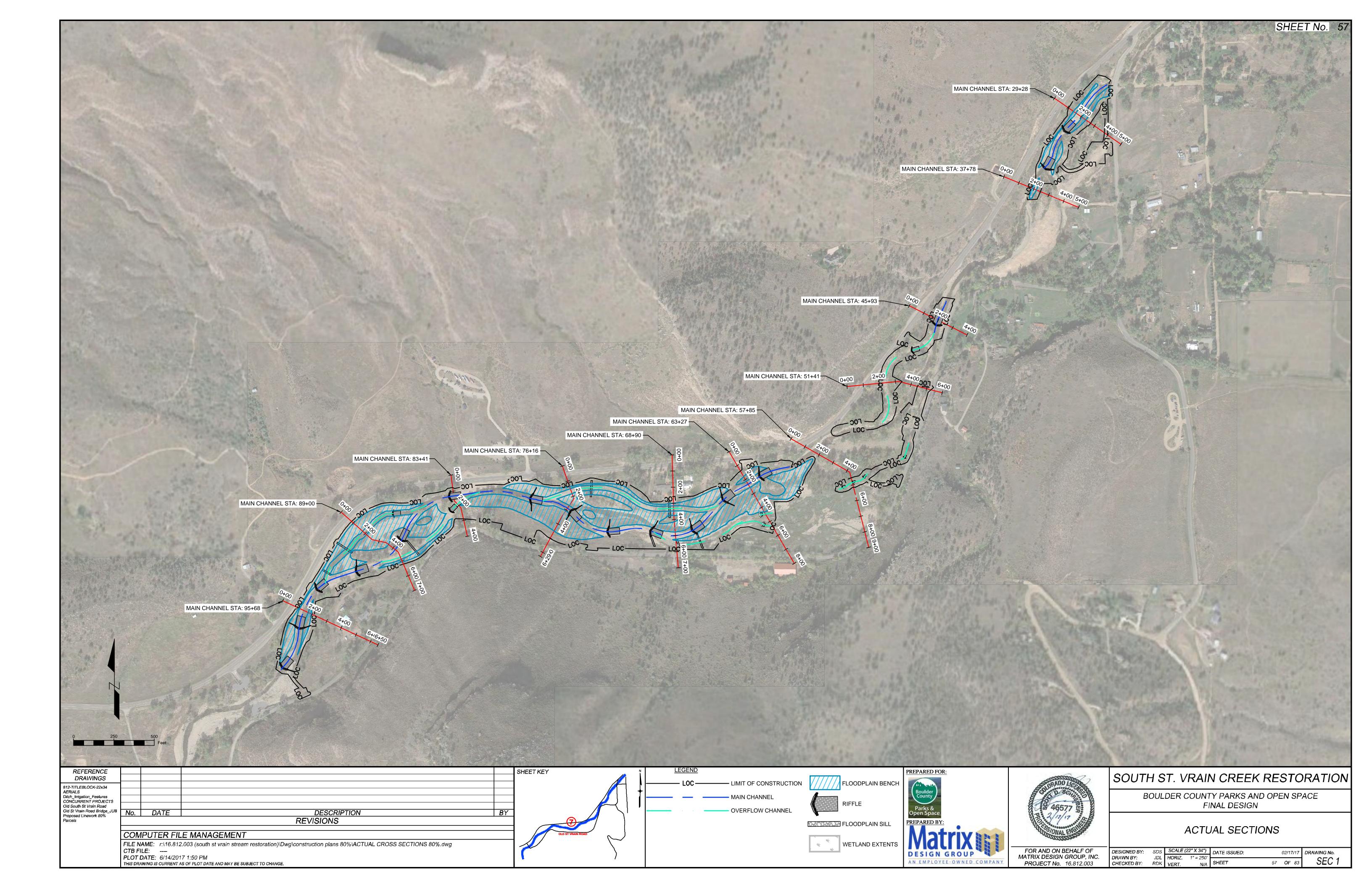






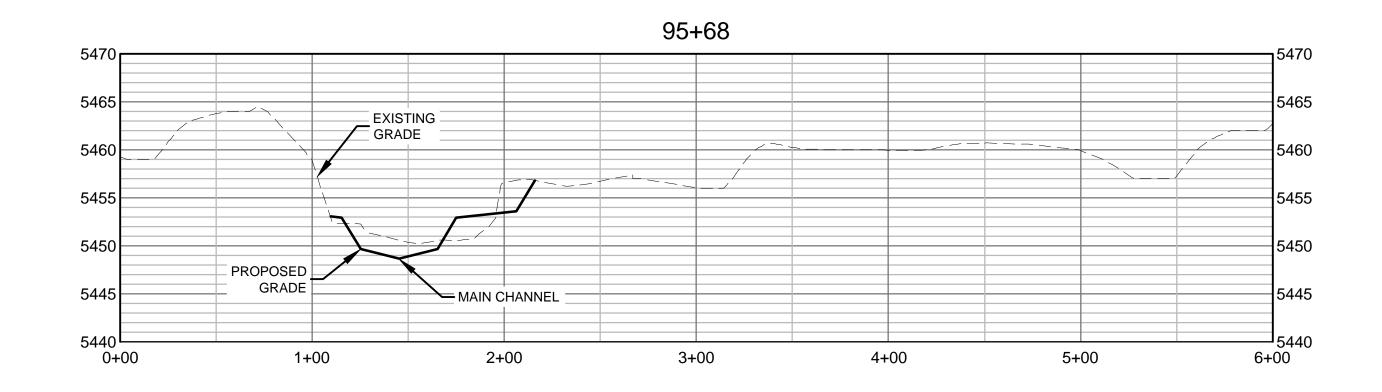


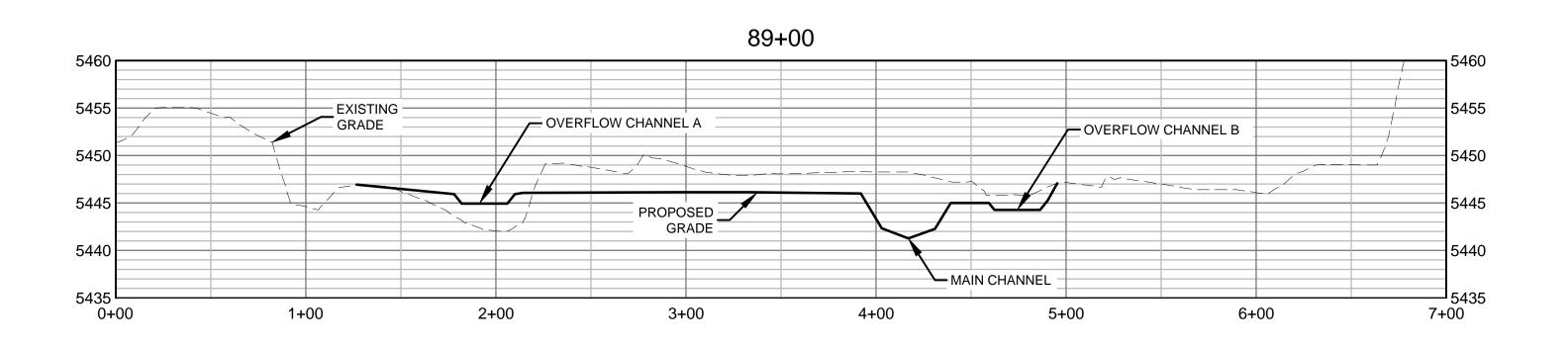


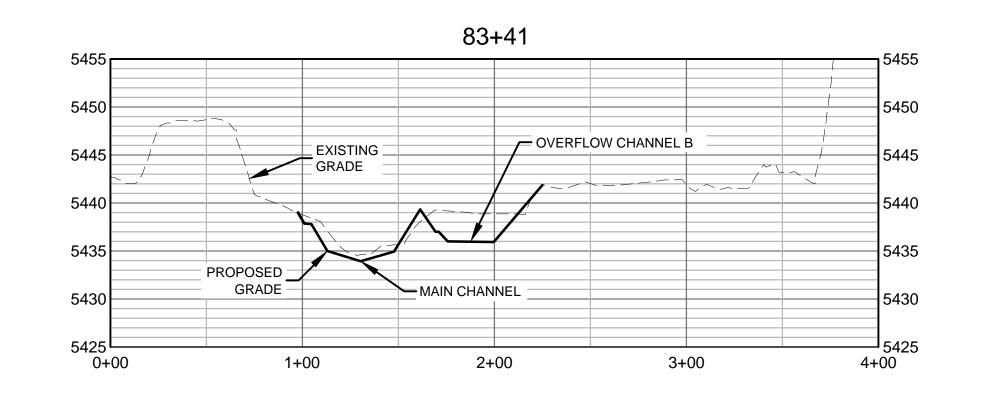


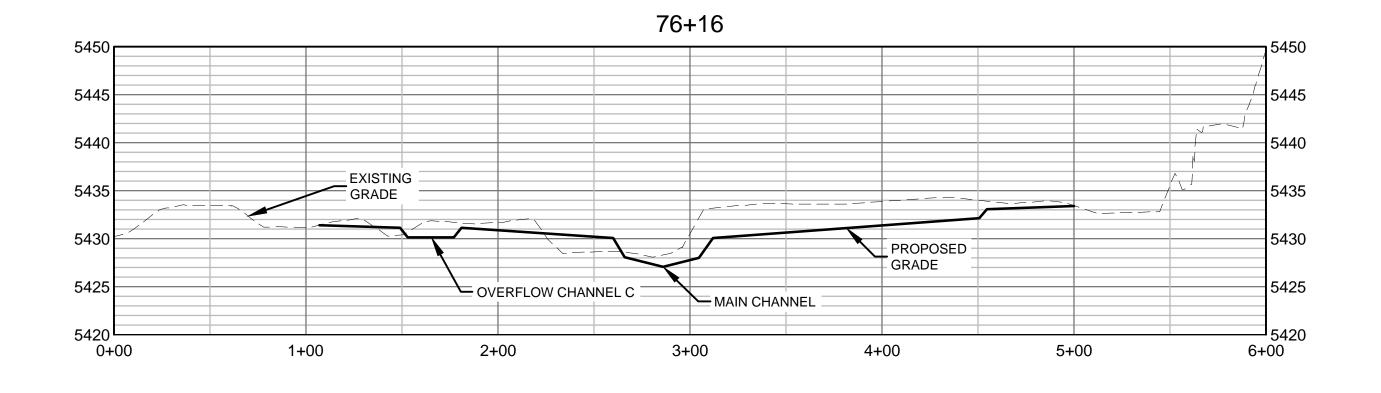
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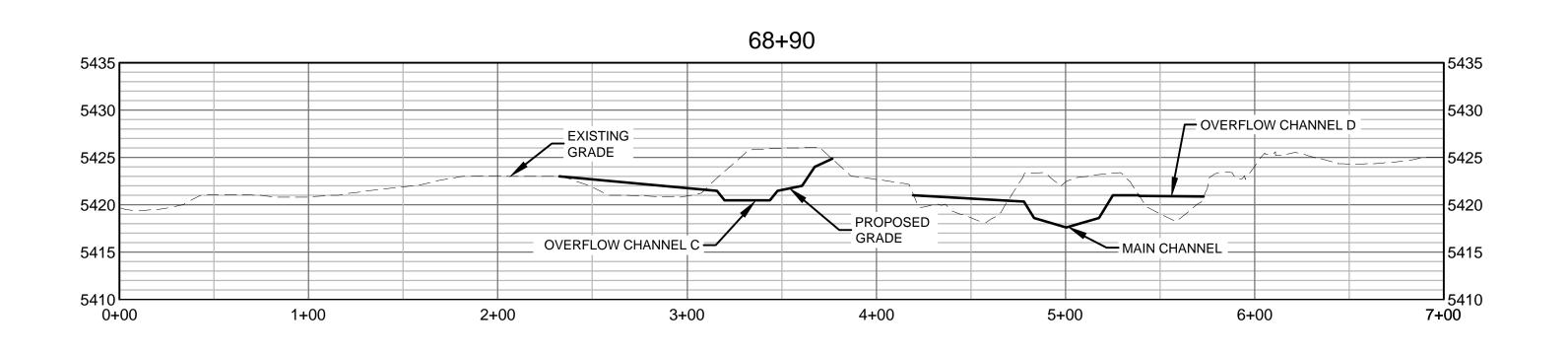
1. CROSS SECTIONS ARE LEFT TO RIGHT LOOKING DOWNSTREAM











REFERENCE DRAWINGS					SHEET KEY
812-TITLEBLOCK-22x34 AERIALS Ditch_Irrigation_Features CONCURRENT PROJECTS Old South St Vrain Road Old St Vrain Road Bridge_JUB Proposed Linework 80%	No.	DATE	DESCRIPTION DESCRIPTION	BY	
Parcels	FILE N. CTB FI PLOT I	AME: r:\16.812 LE: DATE: 6/14/201	REVISIONS E MANAGEMENT .003 (south st vrain stream restoration)\Dwg\construction plans 80%\ACTUAL CROSS SECTIONS 80%.dwg 7 1:50 PM s of PLOT DATE AND MAY BE SUBJECT TO CHANGE.		OLD ST VRAIN ROAD



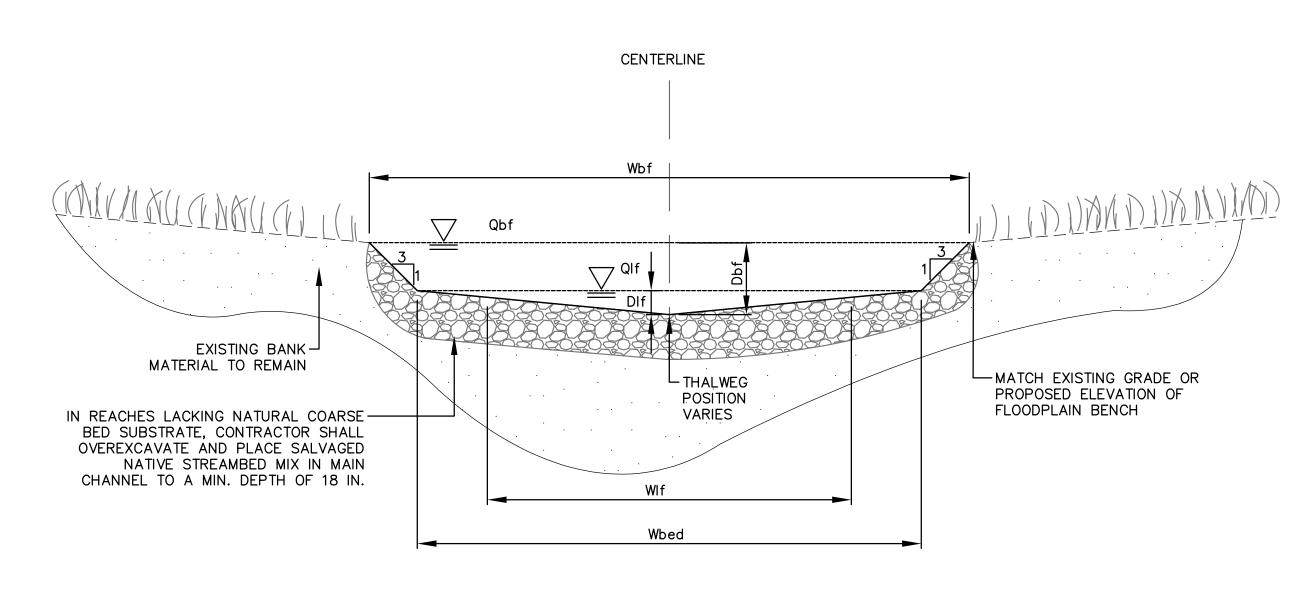


SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

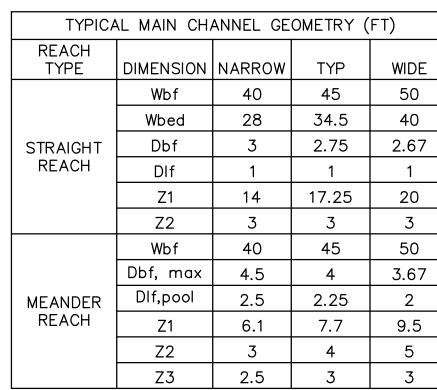
> ACTUAL SECTIONS STA: 63+27 TO STA: 29+28

DESIGNED BY:	SDS	SCALE (2	22" X 34")	DATE ISSUED:		02/17	/17	DRAWING No.
DRAWN BY:	IΠ	HORIZ.	1"= 50'					
DIVAVIA DI.			1 - 30					CEC 2
CHECKED BY:	RDK	VERT.	1"= 10'	SHEET	58	OF	83	OLU J



MAIN CHANNEL GRADING SECTION FOR STRAIGHT REACHES

NOT TO SCALE



CENTERLINE

Wbf

Qbf

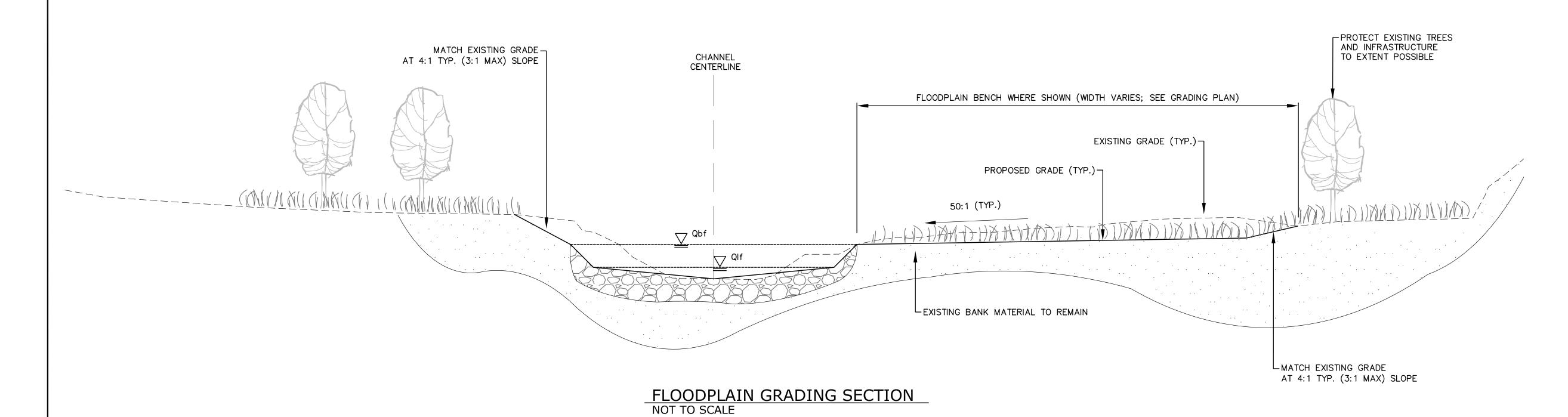
Z3

MATCH EXISTING GRADE OR PROPOSED ELEVATION OF FLOODPLAIN BENCH

POSITION VARIES

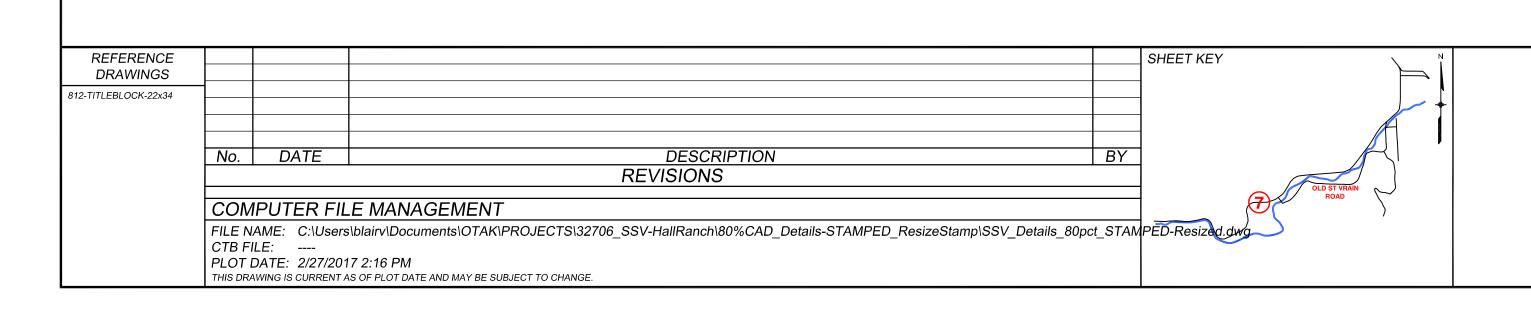
IN REACHES LACKING NATURAL COARSE BED SUBSTRATE, CONTRACTOR SHALL OVEREXCAVATE AND PLACE SALVAGED NATIVES STREAMBED MIX IN MAIN CHANNEL TO A MIN. DEPTH OF 18 IN.

MAIN CHANNEL GRADING SECTION FOR MEANDER REACHES NOT TO SCALE



SSV S	TATION	BANKFULL WIDTH		
START	END	(FT)		
Tie-in	26+52	Match Existing		
26+52	27+02	Transition		
27+02	33+28	45		
33+28	33+53	Transition		
33+53	44+49	Match Existing		
44+49	44+74	Transition		
44+74	46+64	50		
46+64	46+89	Transition		
46+89	60+04	Match Existing		
60+04	60+54	Transition		
60+54	64+41	45		
64+41	64+91	Transition		
64+91	67+91	50		
67+91	68+41	Transition		
68+41	73+00	45		
73+00	74+00	Transition		
74+00	80+00	50		
80+00	81+00	Transition		
81+00	89+41	45		
89+41	90+41	Transition		
90+41	91+91	50		
91+91	92+41	Transition		
92+41	94+21	45		
94+21	91+31	Transition		
91+31	95+10	Match Existing		
95+10	95+20	Transition		
95+20	96+84	50		
96+84	96+94	Transition		
96+94	97+87	Match Existing		
97+87	97+97	Transition		
97+97	99+55	50		
99+55	99+62	Transition		
99+62	Tie-in	Match Existing		

BANKFULL CHANNEL WIDTH





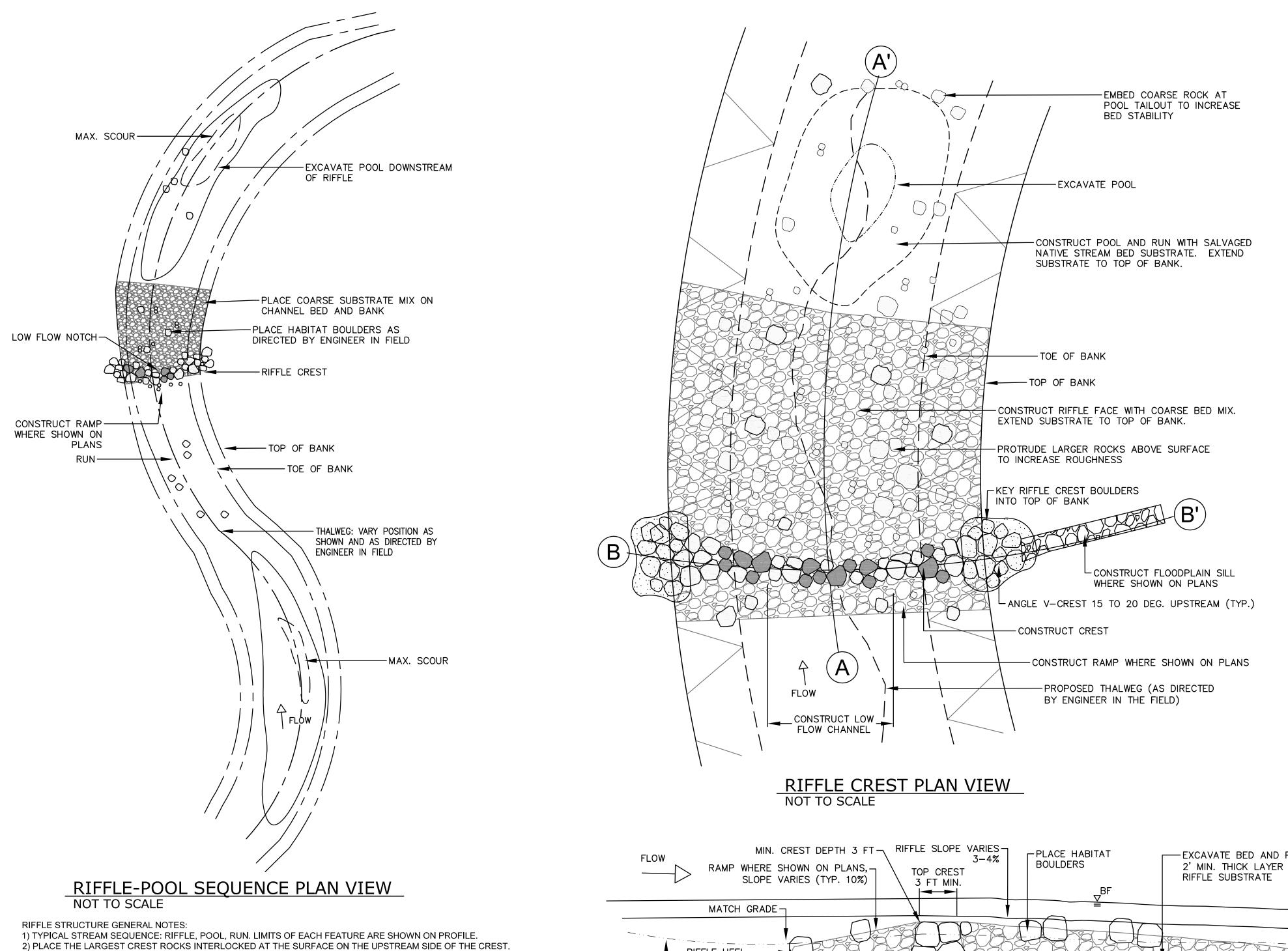


SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

MAIN CHANNEL DETAILS

AWN BY: RB HORIZ. NTS		
AWN BY: RB HORIZ. NTS ECKED BY: LS VERT. NTS SHEET 60 OF 83	DET 1	



NOT TO SCALE

-EXTEND RIFFLE CREST BOULDER MIX ACROSS LOW FLOODPLAIN BENCH (UP TO 10' EACH SIDE) AND KEY INTO UPPER BANK A MIN. OF 6'. BACKFILL 12" OF NATIVE SOIL AND PLANT ABOVE RIFFLE CREST BOULDERS.

IN THE CASE OF A LOW BANK, SUCH AS A -FLOODPLAIN BENCH EXTENDING MORE THAN 10' FROM TOP OF BANK, PLACE 3' WIDE AND 2.5' DEEP FLOODPLAIN SILL FOR AN ADDITIONAL DISTANCE OF UP TO 40' EACH SIDE (50' TOTAL EACH SIDE INCLUDING BOULDER MIX). BACKFILL 12" OF NATIVE SOIL AND PLANT ABOVE SILL.

-BACKFILL VOIDS BETWEEN CREST BOULDERS WITH COARSE SUBSTRATE MIX 3 TO 7% SLOPI -FLOODPLAIN BENCH

> $^{f L}$ PLACE RIFFLE CREST (BOULDER MIX) TO A MIN. DEPTH OF 3'

RIFFLE CREST CROSS SECTION VIEW (B-B') NOT TO SCALE

	RIFFLE LAYOUT TABLE						
RIFFLI	E CREST		RIFFLE FACE		INCLUDE	INCLUDE RIFFLE	
SSV STA	ELEV. (FT)	SLOPE (%)	WIDTH (FT)	LENGTH (FT)	RAMP?	FLOODPLAIN SILL?	
30+61	5360.57	4.00%	45	90	NO	NONE	
33+28	5364.46	3.45%	45	90	NO	BOTH BANKS	
46+24	5384.75	3.00%	50	90	YES	NONE	
62+39	5408.80	4.00%	45	90	NO	NONE	
65+09	5413.00	4.00%	45	90	NO	BOTH BANKS	
67+79	5416.45	3.00%	50	90	NO	LEFT BANK	
70+49	5419.90	3.00%	45	90	NO	LEFT BANK	
73+19	5423.35	3.00%	45	90	NO	LEFT BANK	
75+89	5426.80	3.00%	50	90	NO	BOTH BANKS	
78+59	5430.25	3.00%	50	90	NO	BOTH BANKS	
83+80	5435.14	3.00%	45	90	NO	NONE	
88+02	5440.92	4.00%	45	90	NO	NONE	
91+43	5445.08	3.00%	50	90	NO	LEFT BANK	
94+20	5448.74	3.00%	45	90	NO	LEFT BANK	
96+84	5451.99	3.00%	50	90	YES	BOTH BANKS	
99+53	5455.43	3.00%	50	90	YES	RIGHT BANK	

		_		
RIFFLE CRES	T GRADATION		RIFFLE FACE	GRADATION
	ER MIX		COARSE SUE	SSTRATE MIX
RAIN SIZE	DIA (IN)		GRAIN SIZE	DIA (IN)
D,MIN	24		D,MIN	SAND
D16	30		D16	2
D50	36		D50	6
D84	42		D84	12
D,MAX	48		D,MAX	24

FLOODPLAIN SILL GRADATION						
FLOODPLAIN SILL MIX						
GRAIN SIZE	DIA (IN)					
D,MIN	SAND					
D16	4					
D50	12					
D84	24					
D,MAX	36					
	·					

POOL AND RUN GRADATION					
NATIVE STRI	EAMBED MIX				
GRAIN SIZE	DIA (IN)				
D,MIN	SAND				
D16	0.5 TO 1				
D50	2 TO 4				
D84	5 TO 7				
D,MAX	18 TO 24				

FLOW RAMP WHERE SHOWN ON PLANS, SLOPE VARIES (TYP. 10%) RIFFLE SLOPE VARIES TOP CREST 3 FT MIN.	PLACE HABITAT BOULDERS 2' MIN. THICK LAYER OF RIFFLE SUBSTRATE	AT LOW FLOW ASSUMING A WAR	2.5 FT ATER
MATCH GRADE		RIFFLE TOE EMBED COARSE F	
		LOW FLOW	
EXISTING CHANNEL BED			
RAMP CREST BASE	RIFFLE FACE		
LENGTH VARIES AS 6 FT MIN. SHOWN ON PLANS; BOULDER MIX COARSE SUBSTRATE MIX	TYP. LENGTH — 90 FT (EXTEND RIFFLE BED MATERIAL 15 FT. MIN. BEYOND LIMITS OF PONDING); COARSE SUBSTRATE MIX	POOL	RUN
RIFFLE CREST PROFILE VI	<u>IEW (A-A')</u>	TYP. PONDED LENGTH — 75 FT; NATIVE STREAMBED MIX BEYOND LIMITS OF RIFFLE FACE	LENGTH VARIES; NATIVE STREAMBED MIX

	OF 18 INCHES OR AS DIRECTED IN THE AND LOCATIONS OF RIFFLE FLOODPL	FIELD BY ENGINEER. AIN SILLS MAY VARY IN FIELD PER DIRECTION BY ENGINEER.		NOT TO SCALL
REFERENCE DRAWINGS				SHEET KEY
812-TITLEBLOCK-22x34	No. DATE	DESCRIPTION REVISIONS	BY	OLD ST VIDAN
	COMPUTER FILE MANAGE FILE NAME: C:\Users\blairv\Documer CTB FILE: PLOT DATE: 2/27/2017 2:22 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AN	ts\OTAK\PROJECTS\32706_SSV-HallRanch\80%CAD_Details-STAMPED_Resize	eStamp\SSV_Details_80pct_STAMI	PED-Resized.dwg

3) TO PROTECT BANKS FROM EROSION IN THE VICINITY OF THE RIFFLE STRUCTURES, THE CONTRACTOR SHALL EXTEND PLACEMENT OF RIFFLE ROCK TO THE TOP OF CHANNEL BANKS. THE WIDTH COLUMN IN THE RIFFLE LAYOUT TABLE (THIS SHEET) IS CONSIDERED THE BANKFULL WIDTH, AND MATCHES THE LOCAL CHANNEL WIDTH.

EARTHWORK ACTIVITIES, ALTHOUGH THE CONTRACTOR MAY NEED TO IMPORT A SIGNIFICANT PORTION OF THIS SIZE ROCK. THE CREST BOULDERS CAN BE ANGULAR, AND MAY SLIGHTLY EXCEED THE SPECIFIED D100 SIZE IF LARGER MATERIAL IS AVAILABLE. REFER TO PROJECT SPECIFICATIONS FOR MORE INFORMATION. 7) FOR POOL AND RUN SEGMENTS WITHIN REALIGNED PORTIONS OF THE MAIN CHANNEL, ENGINEER SHALL VERIFY EXPOSED SUBSTRATE MATERIAL APPROXIMATELY MATCHES THE GRADATION OF THE NATIVE STREAMBED MATERIAL FOUND IN EXISTING CHANNEL. IF EXPOSED BED SUBSTRATE COMPRISES OF FINER

GRAIN SIZES, CONTRACTOR SHALL RECONSTRUCT THE BED WITH SALVAGED NATIVE STREAMBED MIX TO A

4) SHAPE RIFFLE BED TO CREATE A 1 FT DEEP, 15 FT WIDE LOW FLOW PATH THROUGH STRUCTURE. 5) THE SOURCE OF BED MATERIAL FOR THE RIFFLE RAMP AND RIFFLE FACE SHALL BE SALVAGED COARSE SUBSTRATE MIX. SCREENING OF EXCAVATED MATERIAL IS EXPECTED TO BE NECESSARY TO MEET THE REQUIRED GRADATION. SEE PROJECT SPECIFICATIONS FOR MORE INFORMATION ON SCREENING ROCK.

6) THE SOURCE OF RIFFLE CREST ROCK SHALL PREFERENTIALLY BE SALVAGED BOULDERS DURING

FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC.

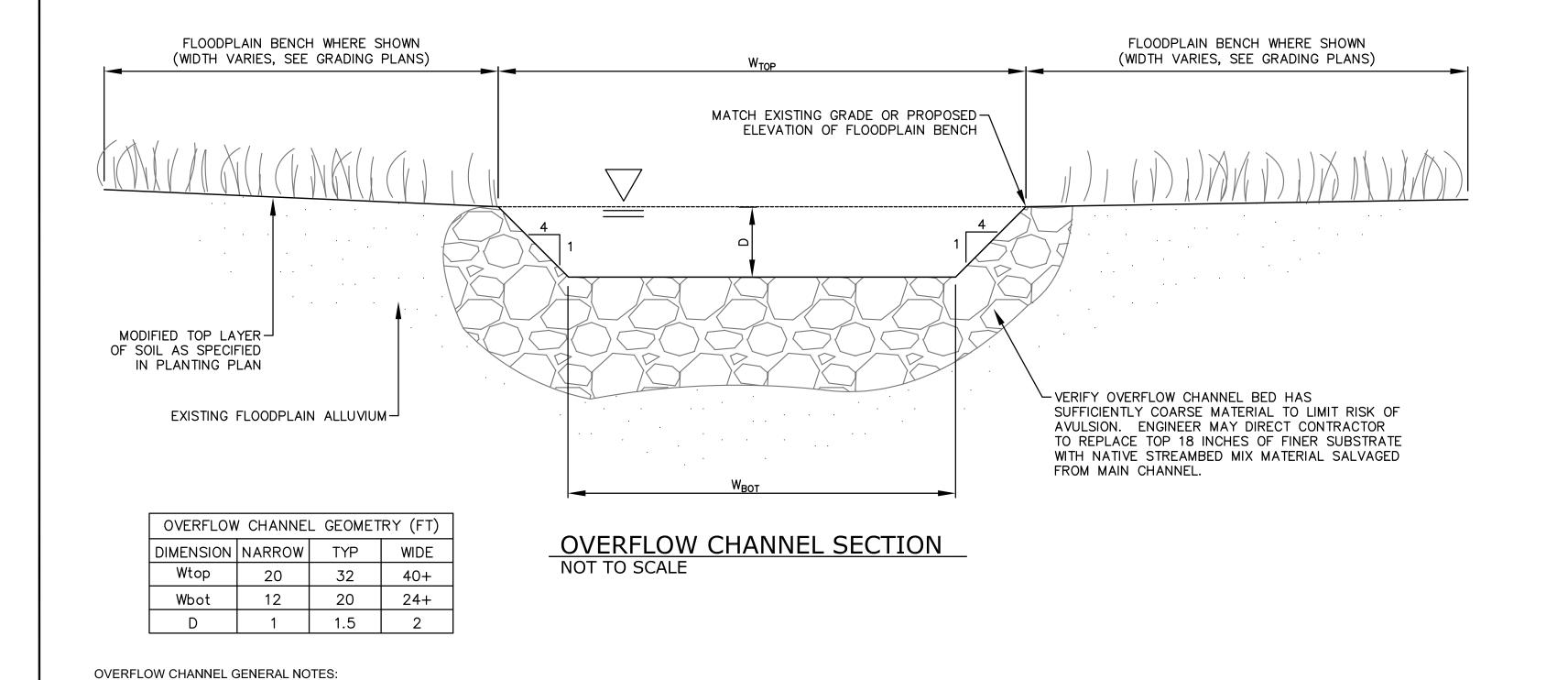
PROJECT No. 16.812.003

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

RIFFLE DETAILS

CHECKED BY: LS VERT. NTS SHEET 61 OF 83 DET 2	DESIGNED BY:	MGR	SCALE (2.	2" X 34")	DATE ISSUED:		02/03/17	DRAWING No.
					SHEET	61	OF 83	DET 2

SOUTH ST. VRAIN CREEK RESTORATION



1) OVERFLOW CHANNELS ARE INTENDED TO INCREASE FREQUENCY OF FLOODPLAIN

REFER TO PLAN AND PROFILE SHEETS FOR GRADING EXTENTS.

THE FIELD BY ENGINEER.

2) ENGINEER SHALL VERIFY EXPOSED SUBSTRATE MATERIAL APPROXIMATELY MATCHES THE

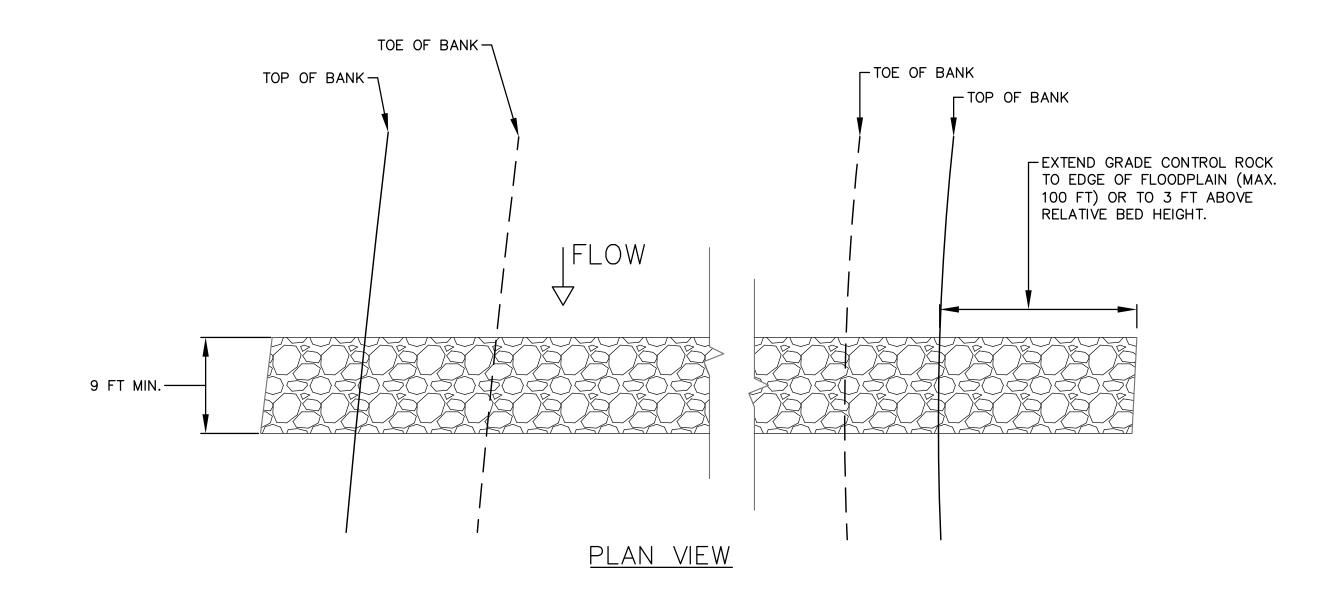
3) OVERFLOW CHANNEL SECTION AND GEOMETRY TABLE ARE SHOWN AS A GENERAL GUIDE.

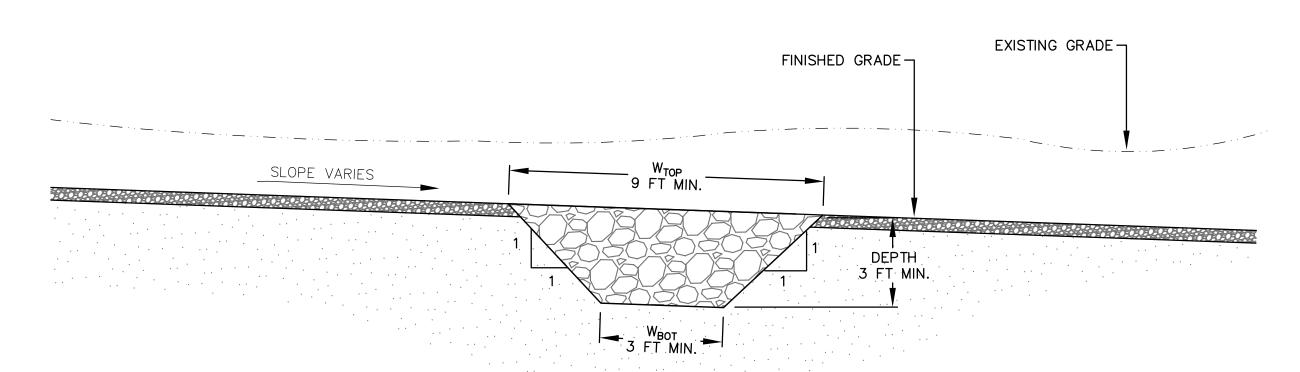
4) CONFIGURATIONS AND GEOMETRY OF OVERFLOW CHANNELS MAY BE REFINED IN FIELD PER ENGINEER DIRECTION TO AVOID IMPACTS TO EXISTING VEGETATION AND INFRASTRUCTURE.

GRADATION OF THE NATIVE STREAMBED MATERIAL FOUND IN EXISTING CHANNEL. IF EXPOSED BED SUBSTRATE COMPRISES OF FINER GRAIN SIZES, CONTRACTOR SHALL RECONSTRUCT THE BED WITH SALVAGED NATIVE STREAMBED MIX TO A DEPTH OF 18 INCHES OR AS DIRECTED IN

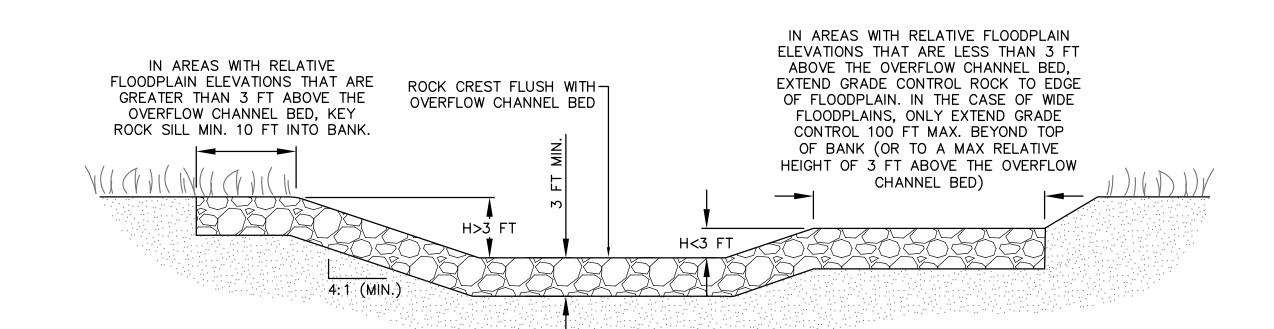
FLOODPLAIN SILL LOCATIONS							
CHANNEL ID	STATION	LENGTH (FT)					
OFC A	8+95	110					
OFC A	10+80	60					
OFC B	8+10	115					
OFC C	10+40	100					
MAINL OTEM	67+80	95					
MAIN STEM RIGHT BANK	68+90	55					
	70+50	70					

FLOODPLAIN SI	ILL GRADATION				
FLOODPLAIN SILL MIX					
GRAIN SIZE	DIA (IN)				
D,MIN	SAND				
D16	4				
D50	12				
D84	24				
D,MAX	36				





PROFILE VIEW

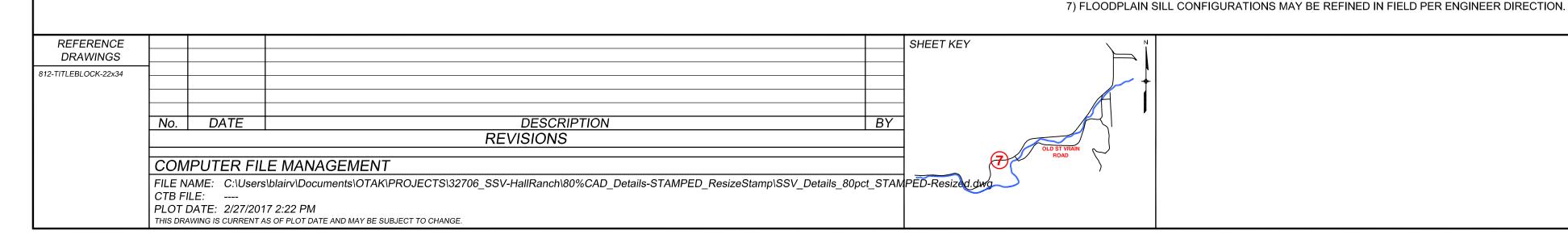


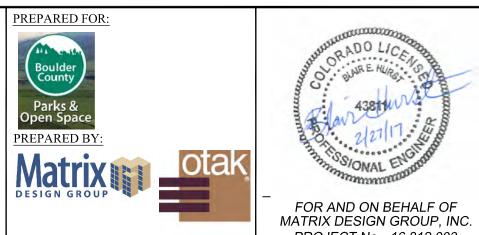
FLOODPLAIN SILL GENERAL NOTES:

- 1) FLOODPLAIN SILL STRUCTURES ARE INTENDED TO PROVIDE GRADE CONTROL IN OVERFLOW
- CHANNELS NEAR EXISTING INFRASTRUCTURE AND SENSITIVE WETLAND HABITAT. 2) THE SOURCE OF FLOODPLAIN SILL ROCK SHALL PREFERENTIALLY BE SALVAGED MATERIAL MATCHING THE GRADATION OF THE FLOODPLAIN SILL MIX, ALTHOUGH THE CONTRACTOR MAY NEED TO IMPORT A PORTION OF THIS LARGER BOULDERS IN THE MIX. THE BOULDERS CAN BE ANGULAR, AND MAY SLIGHTLY EXCEED THE SPECIFIED D100 SIZE IF LARGER MATERIAL IS
- AVAILABLE. REFER TO PROJECT SPECIFICATIONS FOR MORE INFORMATION. 3) TO PROTECT THE SILL FROM BEING FLANKED DURING HIGH FLOWS, THE CONTRACTOR SHALL KEY THE FLOODPLAIN SILL INTO THE BANK AND/OR FLOODPLAIN AS SHOWN ON THE DETAIL. 6) REFER TO PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.

CROSS SECTION VIEW OF CREST

ROCK RAMP DETAIL NOT TO SCALE







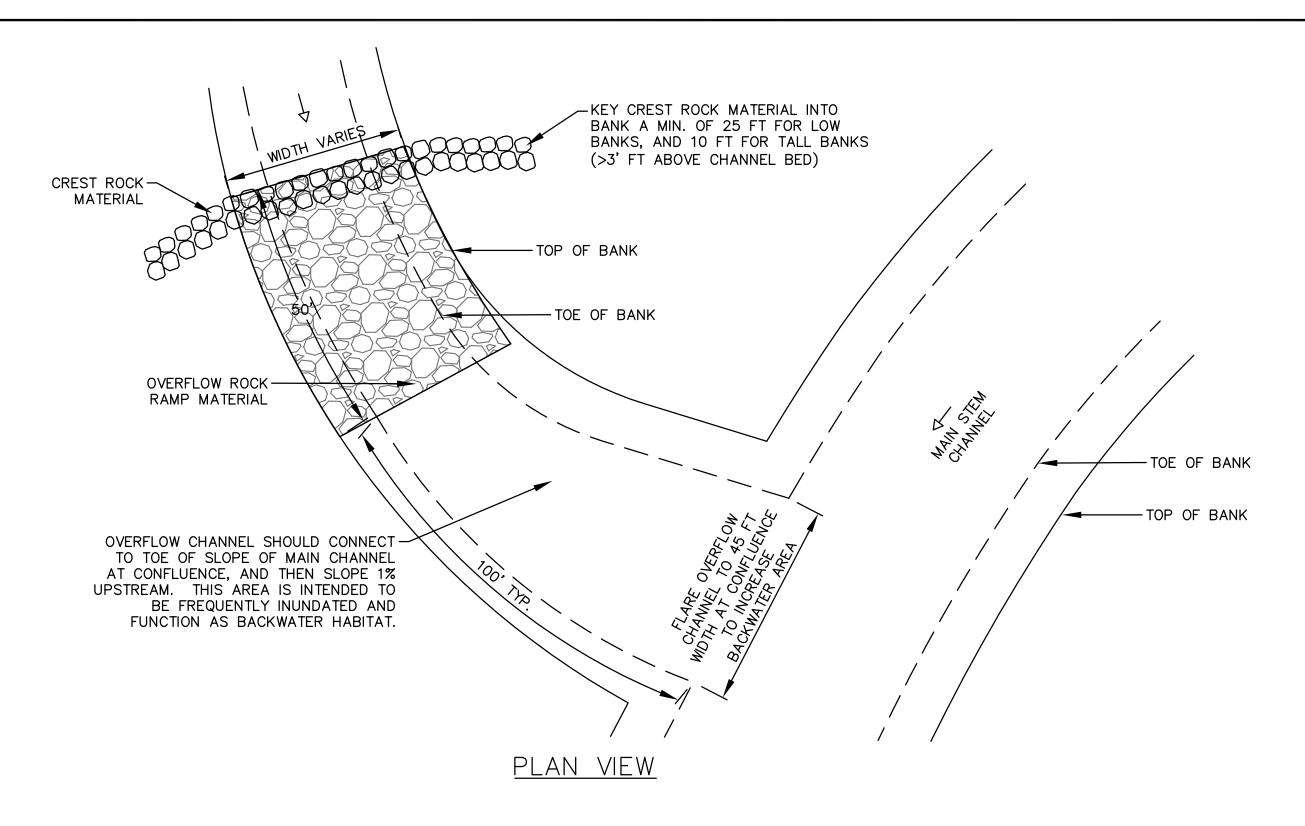
PROJECT No. 16.812.003

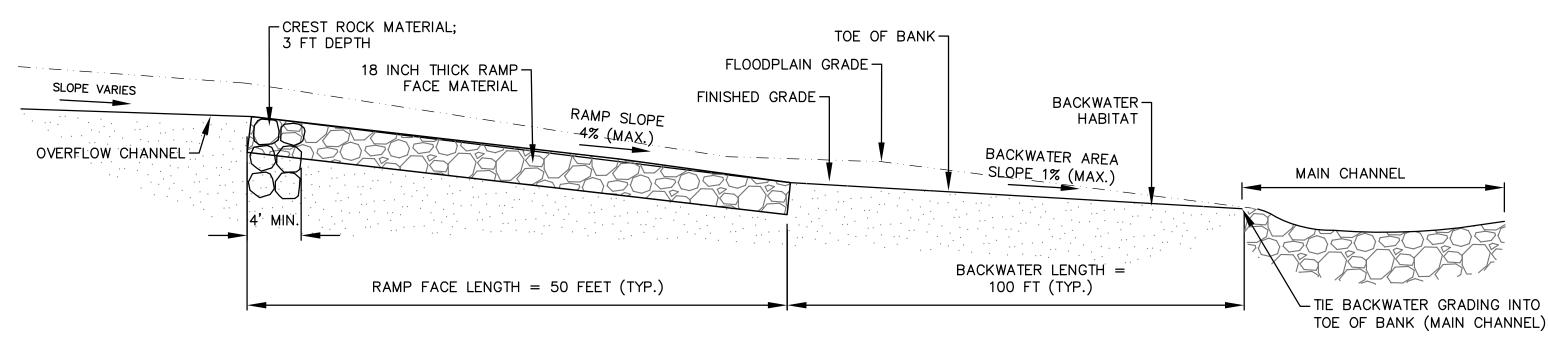
SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

OVERFLOW CHANNEL DETAILS

RAWN BY: RB HORIZ. NTS SHEET 62 OF 83 DET 3	ESIGNED BY: I	MGR	SCALE (22"	X 34")	DATE ISSUED:		02/03/17	DRAWING No.
				-	SHEET	62	OF 83	DET 3





PROFILE VIEW

ROCK RAMP DETAIL NOT TO SCALE

ROCK RAMP GENERAL NOTES:

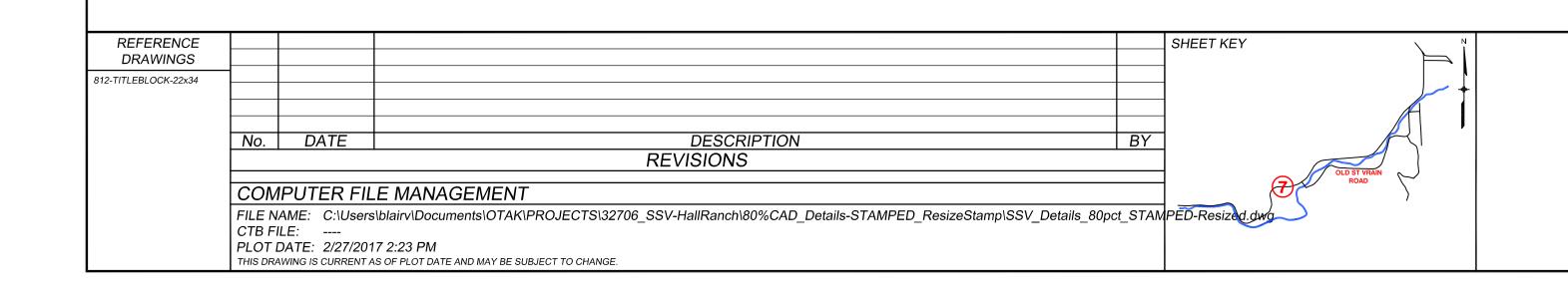
- OVERFLOW ROCK RAMP STRUCTURES ARE INTENDED TO PROTECT AGAINST HEADCUTTING AT THE CONFLUENCE WITH THE MAIN STEM AND QUICKLY TRANSITION GRADE IN ORDER TO CREATE BACKWATER HABITAT.
 TO PROTECT BANKS FROM EROSION IN THE VICINITY OF THE STRUCTURE,
- THE CONTRACTOR SHALL EXTEND RAMP ROCK PLACEMENT TO TOP OF CHANNEL BANKS.

 3) THE SOURCE OF CREST ROCK SHALL PREFERENTIALLY BE SALVAGED
- MATERIAL DURING EARTHWORK ACTIVITIES, ALTHOUGH THE CONTRACTOR
 MAY NEED TO IMPORT A PORTION OF THE FLOODPLAIN SILL MIX. THE
 CREST BOULDERS MAY BE ANGULAR. REFER TO PROJECT
 SPECIFICATIONS FOR MORE INFORMATION.
- 4) THE SOURCE OF BED MATERIAL FOR THE ROCK RAMP FACE SHALL BE NATIVE STREAMBED MATERIAL SALVAGED FROM THE MAIN CHANNEL.
- REFER TO PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.
 ROCK RAMP LAYOUT, POSITION, AND ELEVATION MAY BE REFINED IN FIELD PER DIRECTION BY ENGINEER TO ACHIEVE DESIRED LEVEL OF INUNDATION OF BACKWATER HABITAT.

C	VERFLOW F	RAMP CRES	T TABLE		EXTEND RAMP		
CHANNEL ID	STATION	ON ELEV. SLO		WIDTH (FT)	LENGTH (FT)	CREST ACROSS FLOODPLAIN?	
OFC A	4+98	5441.11	4.00%	32	50	BOTH BANKS	
OFC B	5+05	5438.22	4.00%	32	50	NONE	
OFC F	2+71	5388.46	4.00%	32	50	LEFT BANK	

OVERFLOW RAMP CREST ROCK GRADATION								
FLOODPLAIN SILL MIX								
GRAIN SIZE	DIA (IN)							
D,MIN	SAND							
D16	4							
D50	12							
D84	24							
D,MAX	36							

OVERFLOW RAMP FACE ROCK GRADATION					
NATIVE STREAMBED MIX					
GRAIN SIZE	DIA (IN)				
D,MIN	SAND				
D16	0.75				
D50	3				
D84	7				
D,MAX	24				





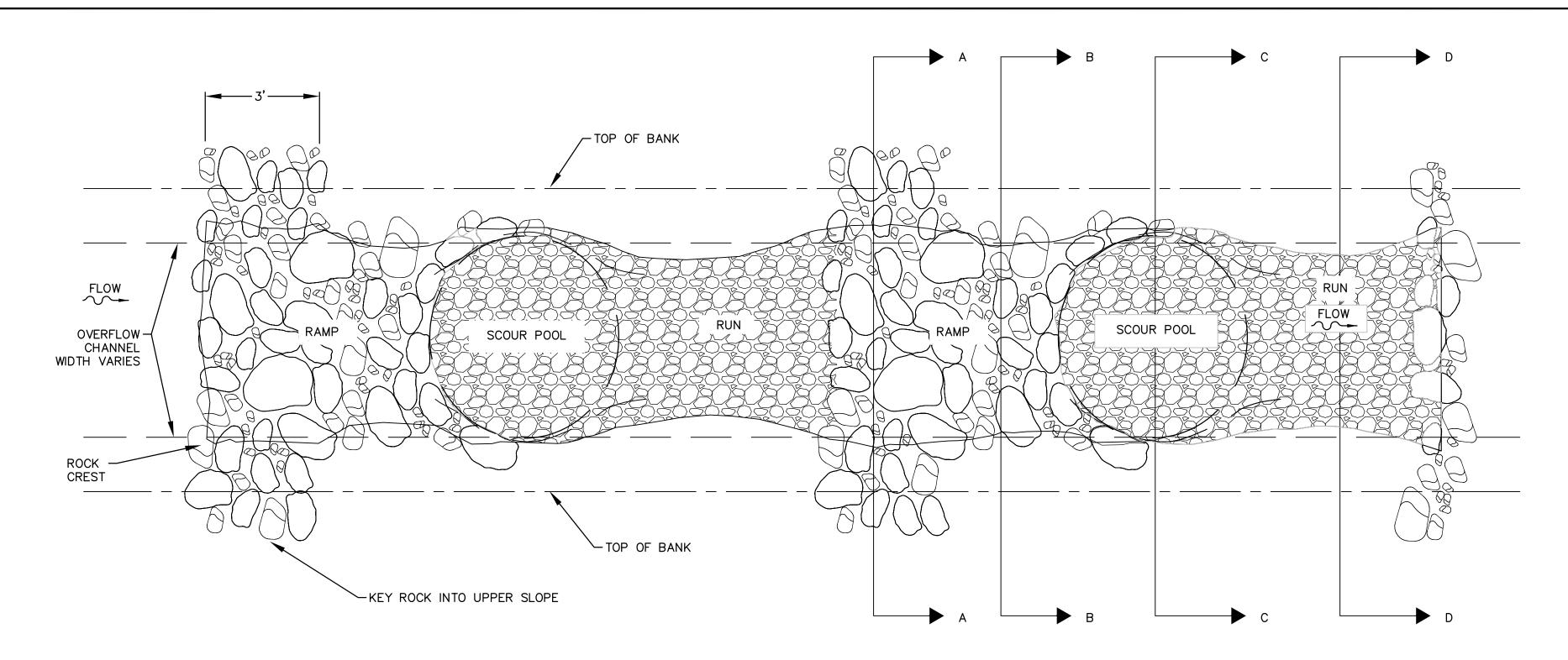


SOUTH ST. VRAIN CREEK RESTORATION

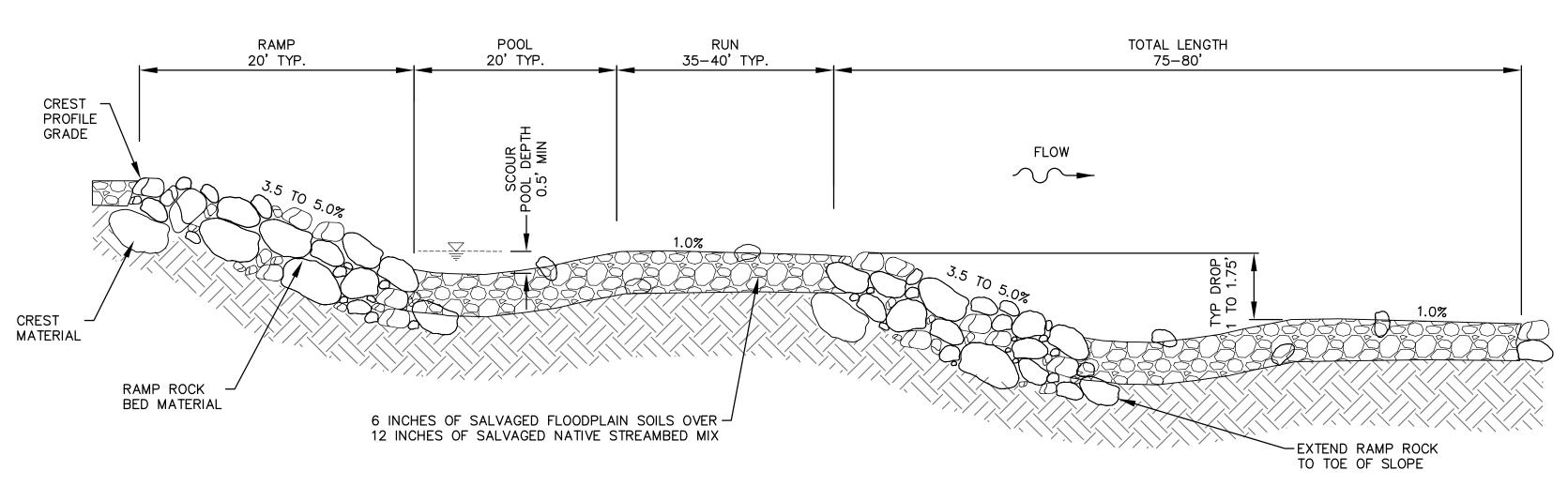
BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

ROCK RAMP DETAILS

DESIGNED BY: M	IGR	SCALE (22" .	X 34")	DATE ISSUED:		02/03	3/17	DRAWING No.
DRAWN BY: CHECKED BY:	RB LS	HORIZ. VERT.	NTS NTS	SHEET	63	OF	83	DET 4



KNICKPOINT STABILIZATION PLAN VIEW NOT TO SCALE



KNICKPOINT STABILIZATION PROFILE VIEW NOT TO SCALE

KNICKPOINT STABILIZATION STRUCTURE GENERAL NOTES:

1) KNICKPOINT STABILIZATION STRUCTURES ARE INTENDED TO HALT THE MIGRATION OF A SERIES OF EXISTING KNICKPOINTS IN THE FLOODPLAIN IN THE VICINITY OF THE EXISTING WETLAND (OVERFLOW CHANNELS D, D MINOR, AND E).

2) TYPICAL SEQUENCE: RAMP, POOL, RUN, LIMITS OF EACH FEATURE ARE SHOWN ON

2) TYPICAL SEQUENCE: RAMP, POOL, RUN. LIMITS OF EACH FEATURE ARE SHOWN ON PROFILE.

3) INTERLOCK CREST ROCKS TO INCREASE STABILITY.

4) THE SOURCE OF BED MATERIAL FOR THE RAMP AND UNDERLYING POOL AND BED MATERIAL SHALL BE SALVAGED NATIVE STREAMBED MIX FROM THE MAIN STEM OF

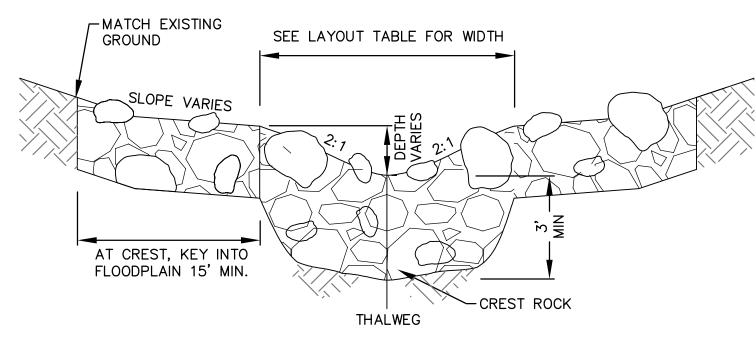
SOUTH ST. VRAIN CREEK.

6) THE SOURCE OF CREST ROCK SHALL PREFERENTIALLY BE SALVAGED MATERIAL DURING EARTHWORK ACTIVITIES, ALTHOUGH THE CONTRACTOR MAY NEED TO IMPORT A PORTION OF THIS SIZE ROCK. THE CREST BOULDERS MAY BE ANGULAR. REFER TO PROJECT SPECIFICATIONS FOR MORE INFORMATION.

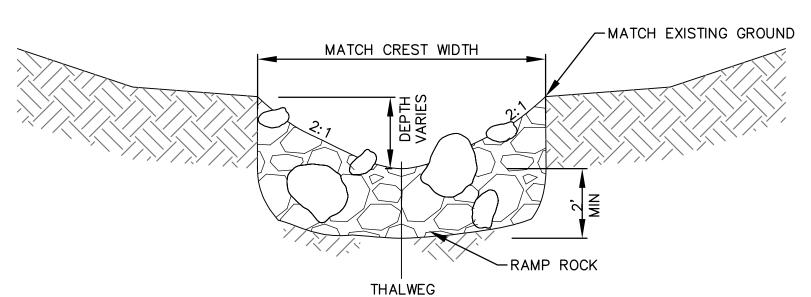
5) TO PROTECT BANKS FROM EROSION IN THE VICINITY OF THE STRUCTURE, THE CONTRACTOR SHALL EXTEND ROCK PLACEMENT TO TOP OF CHANNEL BANKS.
6) REFER TO PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.

7) STRUCTURE CONFIGURATION MAY BE REFINED IN FIELD BY ENGINEER TO AVOID

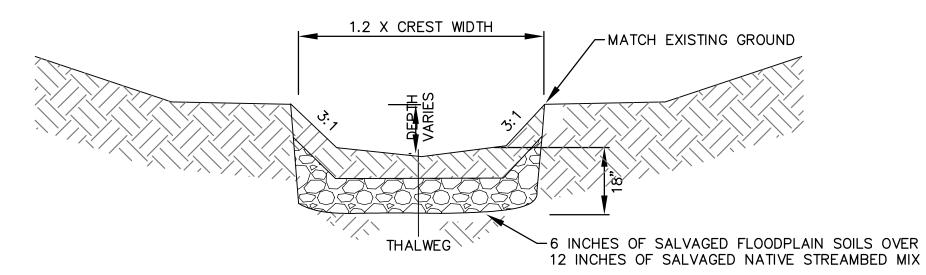
	KNICKPOI	NT STABILI	ZATION STF	RUCTURE	LAYOUT	TABLE
	CHANNEL ID	STATION	CREST ELEV.	SLOPE (%)	WIDTH (FT)	LENGTH (FT)
	OFC D	1+63	5414.43	5.00%	30	30
	OFC D MINOR	1+82	5414.60	5.00%	30	30
		5+90	5396.01	3.50%	15	60
	OFC E	9+16	5401.73	5.00%	15	30
		9+93	5403.10	5.00%	15	30
		10+70	5404.48	5.00%	15	30



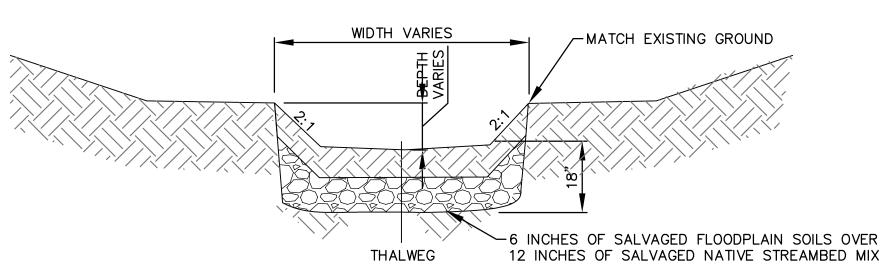
A CREST CROSS SECTION NOT TO SCALE



B RAMP CROSS SECTION NOT TO SCALE



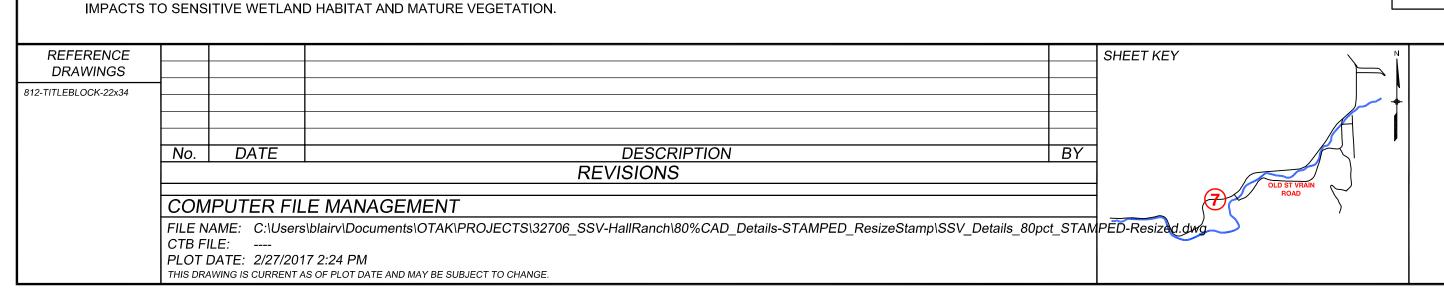
© POOL CROSS SECTION NOT TO SCALE



D RUN CROSS SECTION NOT TO SCALE

	STRUCTURE GRADATION						
FLOODPLAIN SILL MIX							
GRAIN SIZE	DIA (IN)						
D,MIN	SAND						
D16	4						
D50	12						
D84	24						
D,MAX	36						

KNICKPOINT ST	RUCTURE RAMP			
ROCK (AND UN	DERLYING POOL			
AND RUN)	GRADATION			
NATIVE STRI	EAMBED MIX			
GRAIN SIZE	DIA (IN)			
D,MIN	SAND 0.75			
D16				
D50	3			
D84	7			
D,MAX	24			





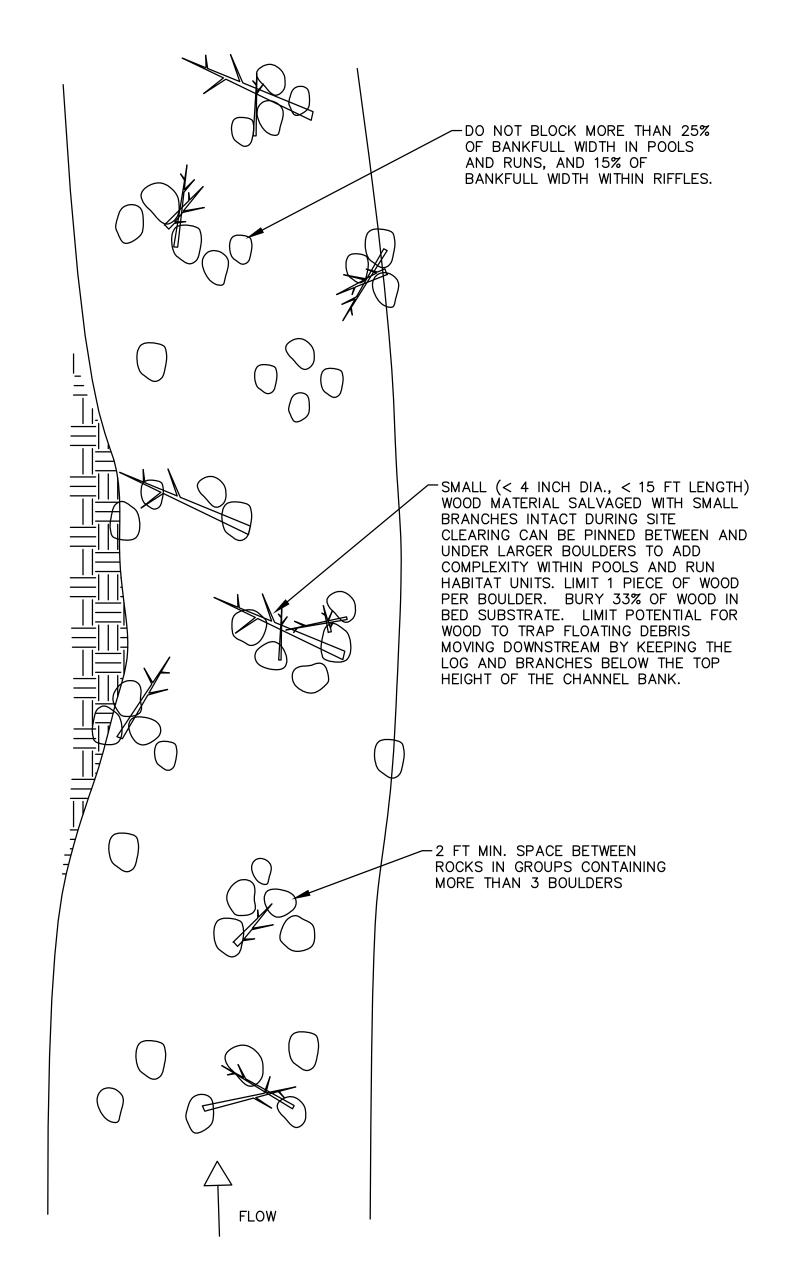
PROJECT No. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION

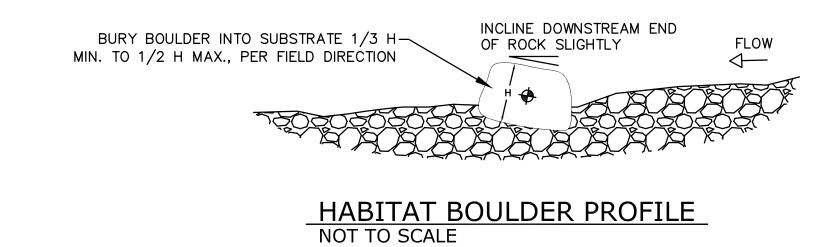
BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

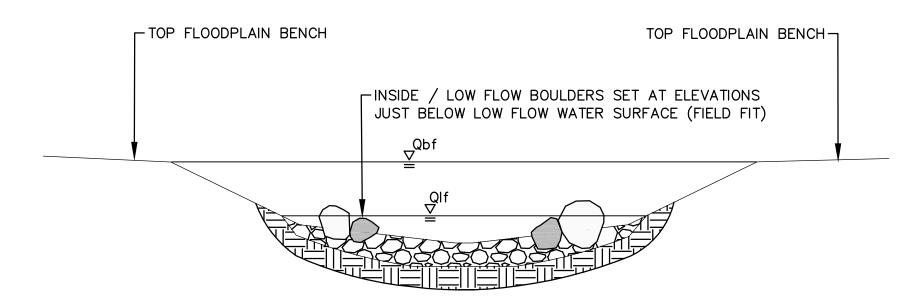
KNICKPOINT STABILIZATION DETAILS

ESIGNED BY:	MGR	SCALE (2.	2" X 34")	DATE ISSUED:		02/03/17	DRAWING No.	_
RAWN BY: HECKED BY:	RB LS	HORIZ. VERT.	NTS NTS	SHEET	64	OF 83	DET 5	
								_



HABITAT BOULDER CONCEPT CONFIGURATIONS
NOT TO SCALE





HABITAT BOULDER CROSS SECTION NOT TO SCALE

GENERAL NOTES:

1) PLACE HABITAT BOULDERS PER GUIDANCE ON THIS SHEET UNLESS

OTHERWISE DIRECTED BY ENGINEER IN THE FIELD.

2) SALVAGE OR IMPORT BOULDERS FOR USE IN RESTORED CHANNEL.

3) BOULDERS USED FOR HABITAT SHALL BE ROUNDED OR SUBANGULAR.
4) BOULDERS TO BE PLACED AT VARYING ELEVATIONS CORRESPONDING TO

LOW-FLOW WATER SURFACE AND BANKFULL WATER SURFACE.

5) BOULDERS PLACED AT LOW FLOW ELEVATION SHALL BE PLACED SO CREST

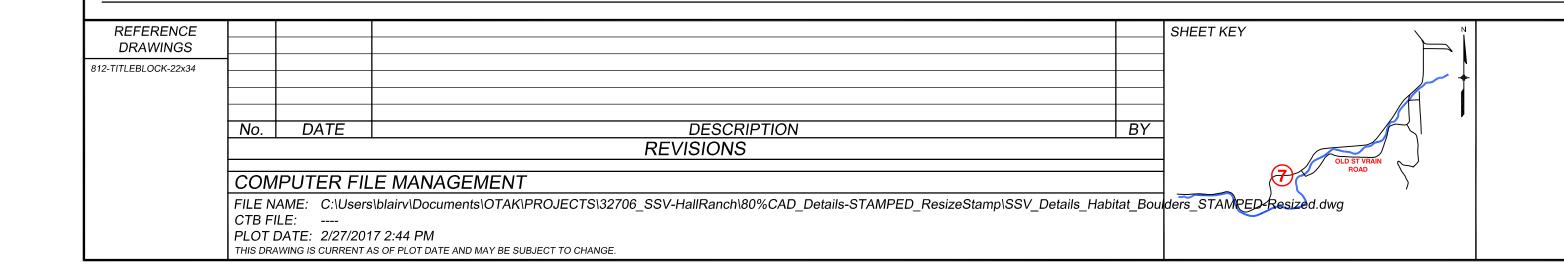
(HIGHEST PART) IS WITHIN 2 TO 4 INCHES OF THE WATER SURFACE.

6) LIMIT SIZE OF INDIVIDUAL BOULDER CLUSTER IN RIFFLE UNITS TO A MAXIMUM

OF 3 ROCKS.

HABITAT BOULDER							
BOOLBERT WIX							
GRAIN SIZE	DIA (IN)						
D,MIN	24						
D16	30						
D50	36						
D84	42						
D,MAX	48						

HA				
	QUANTIT	SUBTOTA		
HABITAT UNIT	MIN	MAX	L	
RIFFLE	6	8	10	145
POOL	0	2	4	30
RUN	200			
	375			







SOUTH ST. VRAIN CREEK RESTORATION BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

-									
	DESIGNED BY:	MGR	SCALE (2	22" X 34")	DATE ISSUED:		02/03/17	DRAWING No.	
	DRAWN BY:	RB	HORIZ.	NTS					
	CHECKED BY:	LS	VERT.	NTS	SHEET	65	OF 83	DE 1 6	
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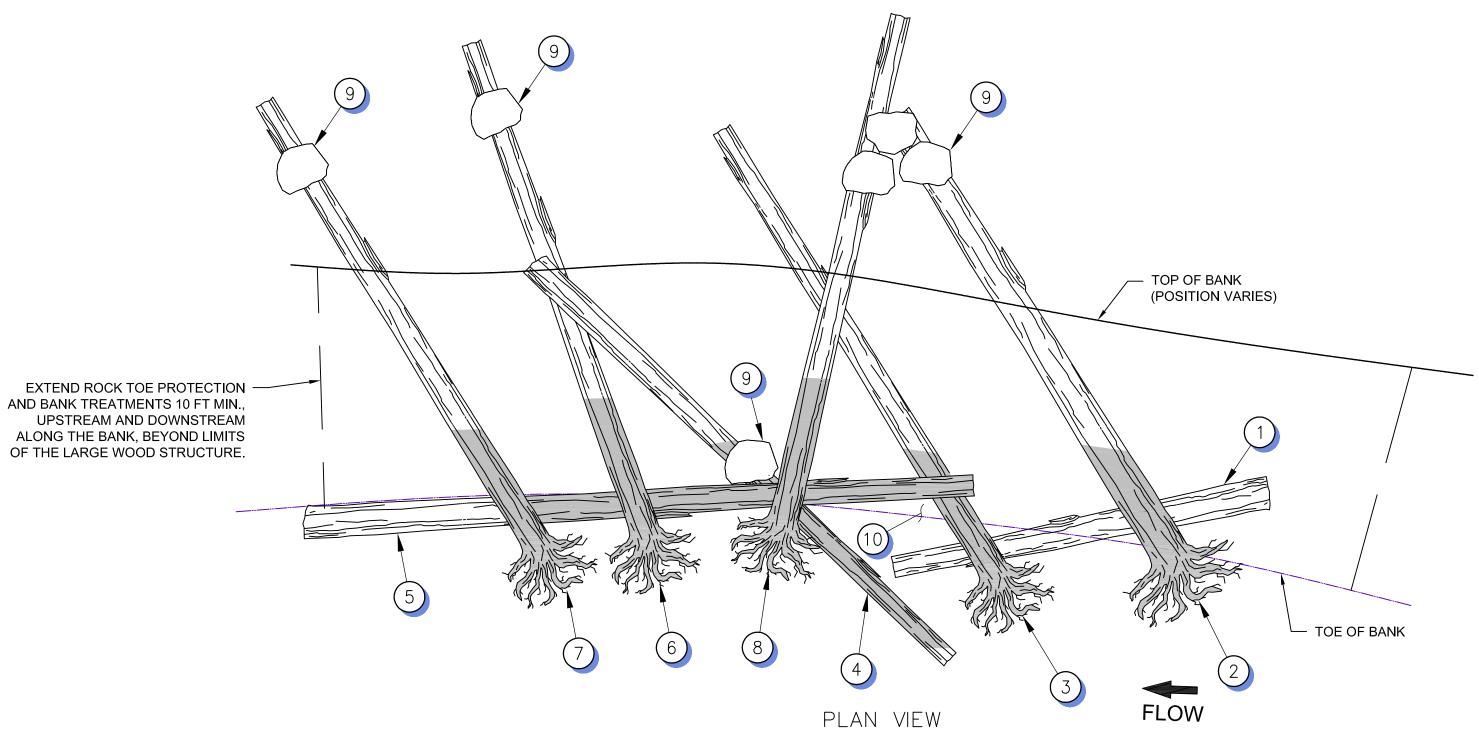
TYPICAL LOG REFERENCE KEY AND LEGEND

LARGE WOOD STRUCTURE CONSTRUCTION NOTES:

- 1. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE TRUCKS AND OPERATORS TO HAUL LARGE WOOD MATERIAL TO THE PROJECT SITE. LARGE WOOD MATERIAL FOR STRUCTURES SHALL BE SECURED FROM THE FOLLOWING SOURCES:
 - a. SALVAGED TREES REMOVED DURING CONSTRUCTION GRADING ACTIVITIES, AS APPROVED BY THE ENGINEER (LIMITED QUANTITY AVAILABLE)
- b. IMPORTED LARGE WOOD FROM AN OFF-SITE SOURCE (PROCURED BY CONTRACTOR)
- 2. THE CONTRACTOR SHALL TAKE CARE TO PROTECT THE ROOTWADS FROM DAMAGE DURING HANDLING OF LARGE WOOD MATERIAL.
- 3. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IF A SPECIFIED LOG SIZE IS NOT AVAILABLE.
- 4. THE CONTRACTOR SHALL PROVIDE A LIST OF THE LOGS THAT ARE AVAILABLE (ONSITE AND OFFSITE) TO BE USED FOR THE PROJECT. FOR EACH LOG, THE LIST SHALL DESCRIBE THE TREE SPECIES, DIAMETER (DBH), LENGTH, AND ROOTWAD DIAMETER. THE LARGE WOOD STRUCTURE CONFIGURATIONS AND MATERIAL SCHEDULES SHOWN IN THE PLANS ARE CONSIDERED PRELIMINARY, AND ARE SUBJECT TO REVISION BY THE ENGINEER UPON RECEIPT OF THE LIST OF LOG MATERIAL.
- 5. THE LOCATION AND CONFIGURATION OF LARGE WOOD STRUCTURES MAY VARY IN FIELD DUE TO SITE CONDITIONS, AND THE FINAL LOCATION OF THESE STRUCTURES WILL BE FLAGGED BY THE ENGINEER DURING CONSTRUCTION.
- 6. SPECIFIED DIAMETER OF LOGS SHALL BE MEASURED AT BREAST HEIGHT (DBH). LENGTHS OF LOGS SHALL INCLUDE THE ROOTWAD PORTIONS OF THE LOG, IF ROOTWAD IS PRESENT. LOG SIZE SHALL BE WITHIN 3 INCHES OF THE SPECIFIED DIAMETER. ROOTWAD DIAMETER SHALL TYPICALLY BE A MINIMUM OF 3 TIMES THE DBH OF THE LOG, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- 7. BURIAL DEPTH AND BURIAL LENGTH SHALL MATCH OR EXCEED SPECIFIED DIMENSIONS. BOTH DIMENSIONS ARE MEASURED FROM THE TOP OF THE LOG. THE TILT ANGLE OF THE LOG IS PROVIDED ONLY AS A RECOMMENDATION. FINAL TILT ANGLES MAY VARY FROM PLANS PROVIDED THE LOGS HAVE THE REQUIRED BURIAL DEPTHS AND BURIAL LENGTHS.
- 8. LOG ORIENTATION ANGLES ARE MEASURED BETWEEN THE LOG AND THE BANK. A LOG WITH AN ORIENTATION ANGLE OF 0 DEGREES SHALL BE PLACED PARALLEL TO THE BANK, AND A LOG WITH A 90 DEGREE ORIENTATION ANGLE SHALL BE PLACED PERPENDICULAR TO THE BANK. ORIENTATION OF LOGS SHALL BE WITHIN 10 DEGREES OF THE SPECIFIED ORIENTATION ANGLE, UNLESS APPROVED BY THE ENGINEER IN THE FIELD.
- 9. LIMIT TRENCH WIDTHS ASSOCIATED WITH LOG INSTALLATION TO THE LOG DIAMETER PLUS 2 FEET AND MINIMIZE BANK DISTURBANCE. FOLLOWING CONSTRUCTION, THE CONTRACTOR SHALL STABILIZE THE DISTURBED BANKS BY METHODS NOTED ON THESE PLANS.
- 10. BACKFILL LOG TRENCHES WITH NATIVE ALLUVIUM, MACHINE PACKING BY TRACKING OVER THE LOGS AND PATTING THE SOILS WITH THE BUCKET OF THE EXCAVATOR.
- 11. IF MULTIPLE ROOTWADS OR STRUCTURES ARE INSTALLED TO PROTECT A BANK FROM EROSION, POSITION THE LOGS SO THE ROOTWADS OVERLAP SLIGHTLY TO AVOID WATER JETTING BETWEEN LOGS. IF THESE LOGS ARE PLACED ON THE OUTSIDE BEND OF THE MEANDER, INSTALL BANK PROTECTION MEASURES AROUND THE LOGS, PER DETAILS IN PLANTING PLANS.
- 12. LARGE WOOD STRUCTURE TYPES 1, 2, AND 3 ARE DESIGNED WITH THE PURPOSE OF INCREASING HYDRAULIC DIVERSITY, SCOURING POOL HABITAT, AND STABILIZING BANKS BY DEFLECTING FLOWS. THESE STRUCTURES ARE PROPOSED IN AREAS WHERE POOLS ARE EXPECTED TO FORM NATURALLY, AND THEY ARE EXPECTED TO ENCOURAGE BED SCOUR TO INCREASE POOL DEPTH AND PROVIDE COVER HABITAT.
- 13. LARGE WOOD STRUCTURE TYPE 4 CAN BE PLACED IN AREAS WITH LOW BANKS AND ARE DESIGNED WITH THE PURPOSE OF DEFLECTING FLOW AND PROVIDING COVER HABITAT.
- 14. LARGE WOOD STRUCTURE TYPES 5 AND 6 ARE DESIGNED TO INCREASE FLOODPLAIN ROUGHNESS AND IMPROVE TERRESTRIAL HABITAT. THESE STRUCTURES WILL BE ENTIRELY CONSTRUCTED USING WOODY MATERIAL SALVAGED DURING SITE CLEARING AND REMOVAL OF EXISTING TREES. THE QUANTITY AND CONFIGURATION OF THESE STRUCTURES WILL VARY BASED ON THE AVAILABILITY OF SALVAGED WOOD OF THE SPECIFIED SIZE CLASSES AND OBSERVED SITE CONDITIONS. LOCATIONS OF STRUCTURE TYPES 5 AND 6 ARE CONCEPTUALLY SHOWN ON THE PLANS AND MAY VARY PER ENGINEER'S DIRECTION IN THE FIELD.

LARGE WOOL	STRU	CTURE LOCATIONS
SSV STATION	TYPE	POSITION
29+50	2	RIGHT BANK
32+25	2	RIGHT BANK
33+40	1	RIGHT FLOODPLAIN
50+50	6	LEFT FLOODPLAIN
51+90	2	RIGHT BANK
52+10	2	RIGHT BANK
56+55	3	LEFT BANK
60+00	5	RIGHT FLOODPLAIN
61+20	3	LEFT BANK
62+40	6	RIGHT FLOODPLAIN
63+35	6	LEFT FLOODPLAIN
63+40	5	RIGHT FLOODPLAIN
63+95	1	LEFT BANK
64+45	5	RIGHT FLOODPLAIN
66+65	5	RIGHT FLOODPLAIN
66+90	5	RIGHT FLOODPLAIN
67+90 TO 68+80	4	RIGHT BANK (x6)
69+40	1	RIGHT BANK
70+50	5	LEFT FLOODPLAIN
70+30	5	RIGHT FLOODPLAIN
71+10	5	LEFT FLOODPLAIN
71+60	5	LEFT FLOODPLAIN
71+80	1	LEFT PLOODPLAIN
72+20	5	LEFT FLOODPLAIN
74+10	5	LEFT FLOODPLAIN
74+80	3 6	RIGHT BANK LEFT FLOODPLAIN
75+50	6	
75+85		LEFT FLOODPLAIN LEFT BANK (×5)
76+30 TO 76+80	4	, ,
77+05	5	RIGHT FLOODPLAIN
79+10	5	LEFT FLOODPLAIN
81+10	5	RIGHT FLOODPLAIN
85+40	1	LEFT BANK
86+80	5	RIGHT FLOODPLAIN
86+80 TO 87+05	4	LEFT BANK (x4)
87+95	6	RIGHT FLOODPLAIN
88+15	5	LEFT FLOODPLAIN
89+75	6	LEFT FLOODPLAIN
89+90	2	RIGHT BANK
90+40	2	RIGHT BANK
91+00	5	LEFT FLOODPLAIN
91+20	6	LEFT FLOODPLAIN
91+65	5	LEFT FLOODPLAIN
92+50	3	LEFT BANK
92+70 TO 93+00	4	LEFT BANK (x4)
94+40	2	LEFT BANK
97+30	5	RIGHT FLOODPLAIN
97+55	5	LEFT FLOODPLAIN
98+50	5	LEFT FLOODPLAIN

	LAI	RGE WOOD STRI	UCTURE MATERI	AL SCHEDULE			
	QUANTITY OF	QUANTITY OF	HABITAT LOGS	(>12 IN DBH)	QUANTITY OF BALLAST BOULDERS		
STRUCTURE TYPE	STRUCTURE TYPE	BOLE + ROOTWAD	BOLE ONLY	SUBTOTAL	EACH STRUCTURE	SUBTOTAL	
TYPE 1	5	5	3	40	6	30	
TYPE 2	7	5	3	56	6	42	
TYPE 3	4	7	1	32	6	24	
TYPE 4	19	1	0	19	2	38	
TYPE 5	21	3	0	63	5	105	
TYPE 6	8	0	0	0	0	0	
TOTAL	64	_	_	210	_	239	
			·	· 	·	· 	



TYPE 1 LARGE WOOD STRUCTURE DETAIL

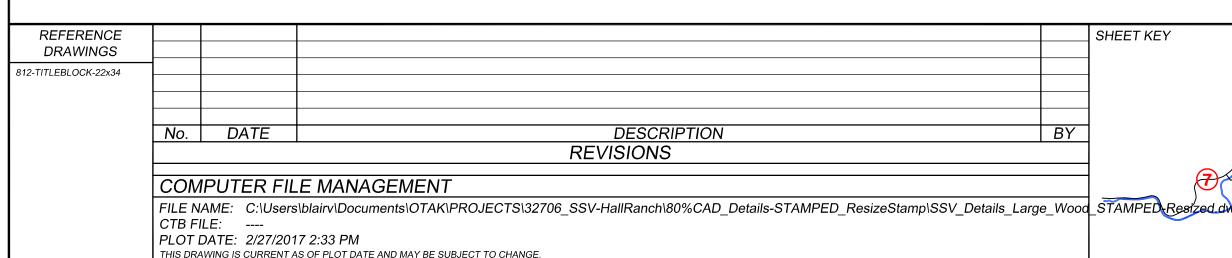
NOT TO SCALE

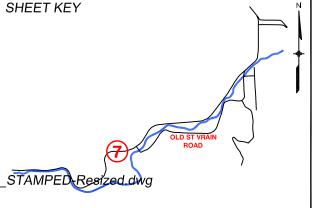
TYPE 1 LARGE WOOD STRUCTURE MATERIAL SCHEDULE (PER STRUCTURE)									
CONST. NOTE	DBH (IN)	LENGTH (FT)	ROOTWAD ATTACHED?	MIN. PERCENT OF LOG BURIED	MIN. END BURIAL DEPTH (FT)	STEM TILT ANGLE (DEG.)			
1	15	20	NO	100%	0.1	0			
2	24	30	YES	65%	4.5	5 DOWN			
3	18	30	YES	65%	4	3 DOWN			
4	12	30	NO	40%	1.5	8 DOWN			
5	15	35	NO	35%	0.5	6 UP			
6	18	30	YES	60%	4	5 DOWN			
7	18	30	YES	65%	4	2 DOWN			
8	15	30	YES	60%	4	10 DOWN			

CONSTRUCTION SEQUENCING:

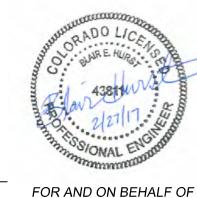
THE STEPS ABOVE.

- INSTALL FOOTER LOG AT TOE OF BANK ORIENTED DOWNSTREAM AT 10 DEG WITH BOTTOM OF LOG 1 FOOT BELOW THE THALWEG DEPTH AND TOP OF LOG COMPLETELY EMBEDDED.
- 2 PLACE LOG ON TOP OF FOOTER LOG AT TOE OF BANK AND ORIENTED UPSTREAM AT 60 DEG.
- (3) PLACE LOG ON TOP OF FOOTER LOG AT TOE OF BANK AND ORIENTED UPSTREAM AT 60 DEG.
- (4) PLACE LOG AT TOE OF BANK SO BOTTOM IS IN CONTACT WITH CHANNEL BED AND ORIENTED
- UPSTREAM AT 45 DEG. EMBED TIP OF LOG IN CHANNEL BED. $_{\fbox{5}}$ INSTALL LOG ON TOP OF LOGS PLACED IN STEPS 3 AND 4 AND SLIGHTLY BURY DOWNSTREAM
- END OF LOG. ORIENT DOWNSTREAM AT 5 DEG. (6) PLACE LOG AT TOE OF BANK ON TOP OF LOG PLACED IN STEP 5 AND ORIENTED UPSTREAM
- AT 75 DEG. WEDGE UNDER LOG PLACED IN STEP 4.
- 7 PLACE LOG AT TOE OF BANK ON TOP OF LOG PLACED IN STEP 5 AND ORIENTED UPSTREAM
- (8) INSTALL LOG ON TOP OF LOGS PLACED IN STEPS 3 AND 4 AND ORIENT DOWNSTREAM AT 75
- 9 PLACE SIX 30-INCH DIAMETER BOULDERS (ALTERNATIVELY TWELVE 24-INCH DIA BOULDERS) ON TOP OF LOGS PLACED IN STEPS 2, 4, 6, 7, AND 8.
- PLACE 6-INCH MINUS SLASH DEBRIS (SMALLER BRANCHES SALVAGED DURING GRADING ACTIVITIES) IN ALL VISIBLE VOID SPACES BETWEEN LOGS. PARTIALLY ANCHOR THE SLASH DEBRIS BY PINNING THE ENDS OF THE BRANCHES BENEATH THE KEY LOGS INSTALLED IN









MATRIX DESIGN GROUP, INC.

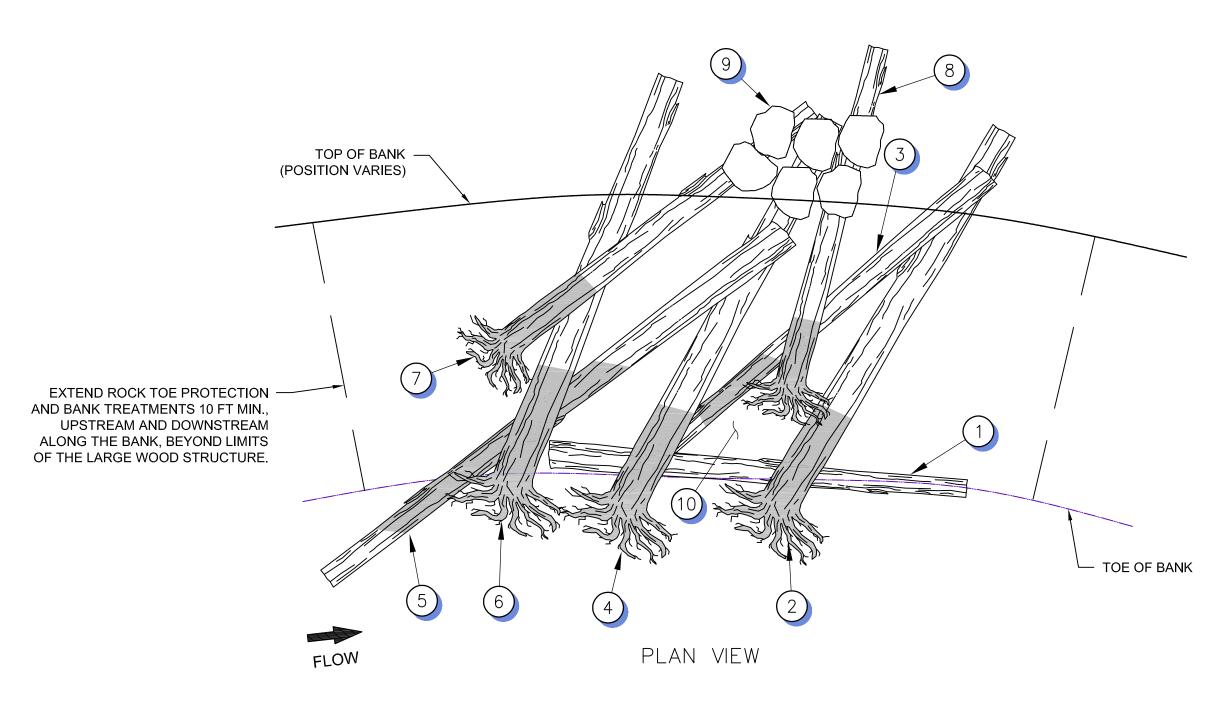
PROJECT No. 16.812.003

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

SOUTH ST. VRAIN CREEK RESTORATION

LARGE WOOD STRUCTURE DETAILS

			00415 (0	011 14 0 4111					_
	DESIGNED BY:	MGR	SCALE (2:	2" X 34")	DATE ISSUED:		02/03/17	DRAWING No.	
	DRAWN BY:	MGR	HORIZ.	NTS					
'	DICAMIN DI.	MOIN	HONE.	1410				DET 7	
	CHECKED BY:	LS	VERT.	NTS	SHEET	66	OF 83	DLII	
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TYPE 2 LARGE WOOD STRUCTURE DETAIL

NOT TO SCALE

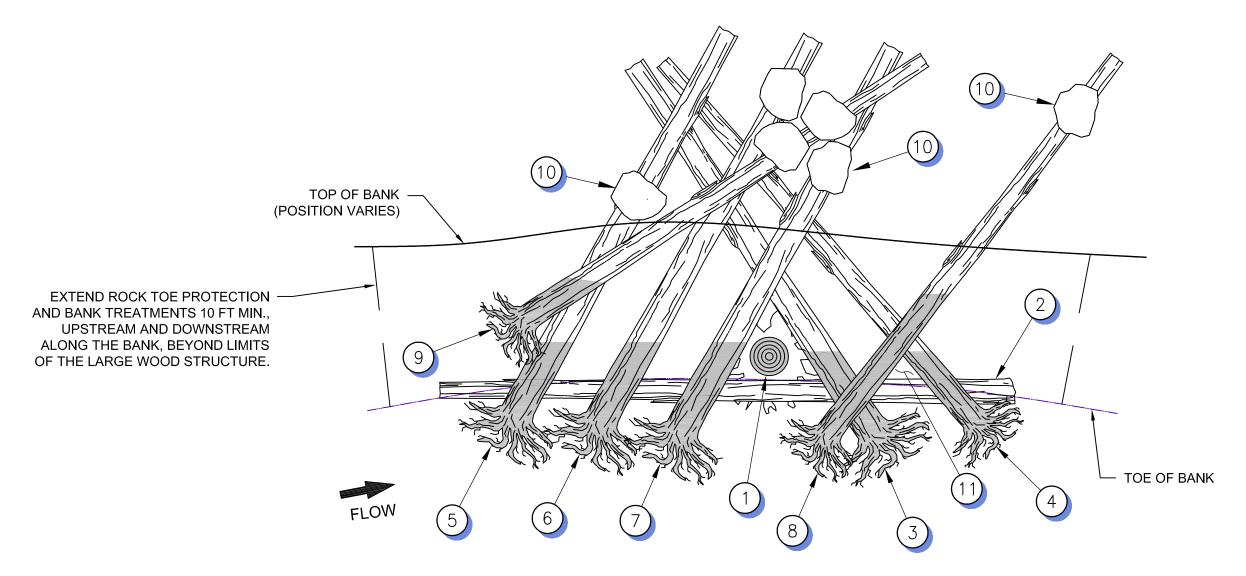
	TYPE 2 LARGE WOOD STRUCTURE MATERIAL SCHEDULE (PER STRUCTURE)										
CONST. NOTE	DBH (IN)	LENGTH (FT)	ROOTWAD ATTACHED?	MIN. PERCENT OF LOG BURIED	MIN. END BURIAL DEPTH (FT)	STEM TILT ANGLE (DEG.)					
1	15	20	NO	100%	0.1	0					
2	24	25	YES	65%	4	0					
3	15	25	NO	80%	1.25 & 1.5	15 DOWN					
4	24	25	YES	65%	4	0					
5	24	30	NO	50%	0.5 & 2	5 DOWN					
6	18	25	YES	65%	4	2 DOWN					
7	18	20	YES	65%	3.5	4 DOWN					
8	18	20	YES	65%	4	4 DOWN					

CONSTRUCTION SEQUENCING:

- 1 INSTALL FOOTER LOG PARALLEL TO TOE OF BANK WITH BOTTOM OF LOG 1 FOOT BELOW THE THALWEG DEPTH AND TOP OF LOG COMPLETELY EMBEDDED.
- 2 PLACE LOG ON TOP OF FOOTER LOG AT TOE OF BANK AND ORIENTED UPSTREAM AT 60 DEG.
- 3 INSTALL LOG ON TOP OF LOG PLACED IN STEP 2 AND WEDGE END BENEATH FOOTER LOG PLACED IN STEP 1. ORIENT UPSTREAM AT 40 DEG.
- PLACE LOG ON TOP OF FOOTER LOG AT TOE OF BANK AND ORIENTED UPSTREAM AT 60 DEG.
- (5) INSTALL LOG ON TOP OF LOG PLACED IN STEP 4 AND BURY TIP IN THE BED. ORIENT UPSTREAM AT 40 DEG.
- 6 PLACE LOG AT TOE OF BANK ON TOP OF LOG PLACED IN STEP 5 AND ORIENTED UPSTREAM AT 60 DEG.
- (7) INSTALL LOG ON TOP OF LOG PLACED IN STEP 6 AND ORIENT UPSTREAM AT 40 DEG.
- 8 INSTALL LOG ON TOP OF LOG PLACED IN STEP 3 AND ORIENT UPSTREAM AT 80 DEG.
- 9 PLACE SIX 30-INCH DIAMETER BOULDERS (ALTERNATIVELY TWELVE 24-INCH DIA BOULDERS) ON TOP OF LOGS PLACED IN STEPS 4, 7, AND 8.
- PLACE 6-INCH MINUS SLASH DEBRIS (SMALLER BRANCHES SALVAGED DURING GRADING ACTIVITIES) IN ALL VISIBLE VOID SPACES BETWEEN LOGS. PARTIALLY ANCHOR THE SLASH DEBRIS BY PINNING THE ENDS OF THE BRANCHES BENEATH THE KEY LOGS INSTALLED IN THE STEPS ABOVE.



REFERENCE PHOTO OF SLASH DEBRIS TO FILL VOID SPACES BETWEEN LOGS



PLAN VIEW

TYPE 3 LARGE WOOD STRUCTURE DETAIL

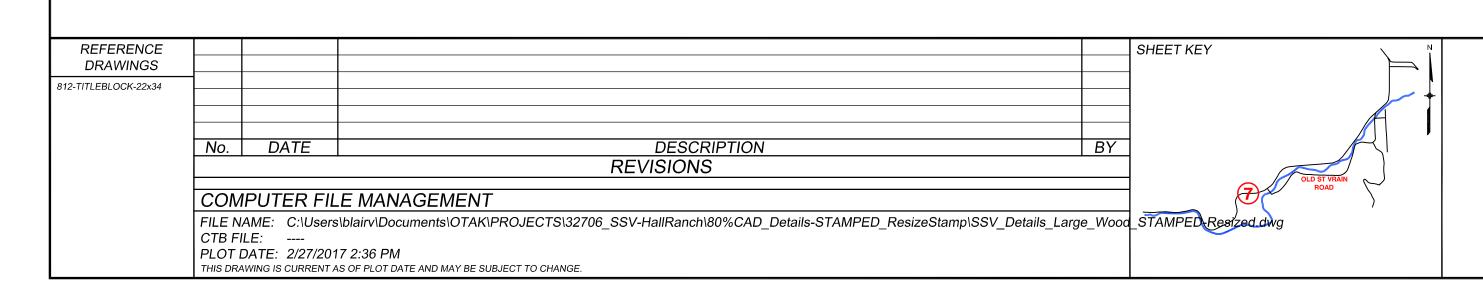
NOT TO SCALE

	TYPE 3 LARGE WOOD STRUCTURE MATERIAL SCHEDULE (PER STRUCTURE)										
CONST. NOTE	DBH (IN)	LENGTH (FT)	ROOTWAD ATTACHED?	MIN. PERCENT OF LOG BURIED	MIN. END BURIAL DEPTH (FT)	STEM TILT ANGLE (DEG.)					
1	24	10	YES	33%	2.5	90					
2	12	30	NO	100%	0.1	0					
3	18	25	YES	60%	4	1 DOWN					
4	15	25	YES	75%	4.5	2.5 DOWN					
5	18	25	YES	60%	4	3.5 DOWN					
6	18	25	YES	60%	4	3.5 DOWN					
7	18	25	YES	60%	4	3.5 DOWN					
8	15	30	YES	75%	4.5	2.5 DOWN					
9	15	30	YES	75%	4.5	0					

CONSTRUCTION SEQUENCING:

ORIENTED UPSTREAM AT 45 DEG.

- 1 PLACE ROOT LOG AT TOE OF SLOPE WITH ROOTWAD RESTING ON THE CHANNEL BED AND PARTIALLY EMBEDDED IN THE BANK. POINT STEM STRAIGHT UP IN THE AIR, AND THE ROOTWAD WILL BE PINNED BETWEEN THE SURROUNDING LOGS. UPON COMPLETION OF STRUCTURE, TRIM THE STEM TO LESS THAN 2 FEET ABOVE TOP OF WOOD STRUCTURE AND "ROUGHEN" TOP WITH BUCKET OF EXCAVATOR TO LOOK LIKE A MORE NATURAL SNAG.
- 2 EMBED FOOTER LOG AT TOE OF SLOPE PARALLEL TO FLOW WITH THE TOP OF LOG FLUSH WITH THE PROPOSED CHANNEL BED ELEVATION.
- ③ INSTALL LOG WITH ROOTWAD CROWN RESTING ON THE FOOTER LOG AT TOE OF BANK AND ORIENTED DOWNSTREAM AT 45 DEG.
- (4) INSTALL LOG WITH ROOTWAD CROWN RESTING ON THE FOOTER LOG AT TOE OF BANK AND ORIENTED DOWNSTREAM AT 45 DEG.
- (5) INSTALL LOG WITH ROOTWAD CROWN RESTING ON THE FOOTER LOG AT TOE OF BANK AND
- (6) INSTALL LOG WITH ROOTWAD CROWN RESTING ON THE FOOTER LOG AT TOE OF BANK AND
- ORIENTED UPSTREAM AT 45 DEG.
- 7 INSTALL LOG WITH ROOTWAD CROWN RESTING ON THE FOOTER LOG AT TOE OF BANK AND ORIENTED UPSTREAM AT 45 DEG.
- 8 INSTALL LOG WITH ROOTWAD CROWN RESTING ON THE BOTTOM ROOTWADS AND ORIENTED UPSTREAM AT 45 DEG.
- 9 INSTALL LOG WITH ROOTWAD CROWN RESTING ON THE BOTTOM ROOTWADS AND ORIENTED UPSTREAM AT 35 DEG.
- 10 PLACE SIX 30-INCH DIAMETER BOULDERS (ALTERNATIVELY TWELVE 24-INCH DIA BOULDERS) ON TOP OF LOGS PLACED IN STEPS 5, 6, 7, 8, AND 9.
- PLACE 6-INCH MINUS SLASH DEBRIS (SMALLER BRANCHES SALVAGED DURING GRADING ACTIVITIES) IN ALL VISIBLE VOID SPACES BETWEEN LOGS. PARTIALLY ANCHOR THE SLASH DEBRIS BY PINNING THE ENDS OF THE BRANCHES BENEATH THE KEY LOGS INSTALLED IN THE STEPS ABOVE.







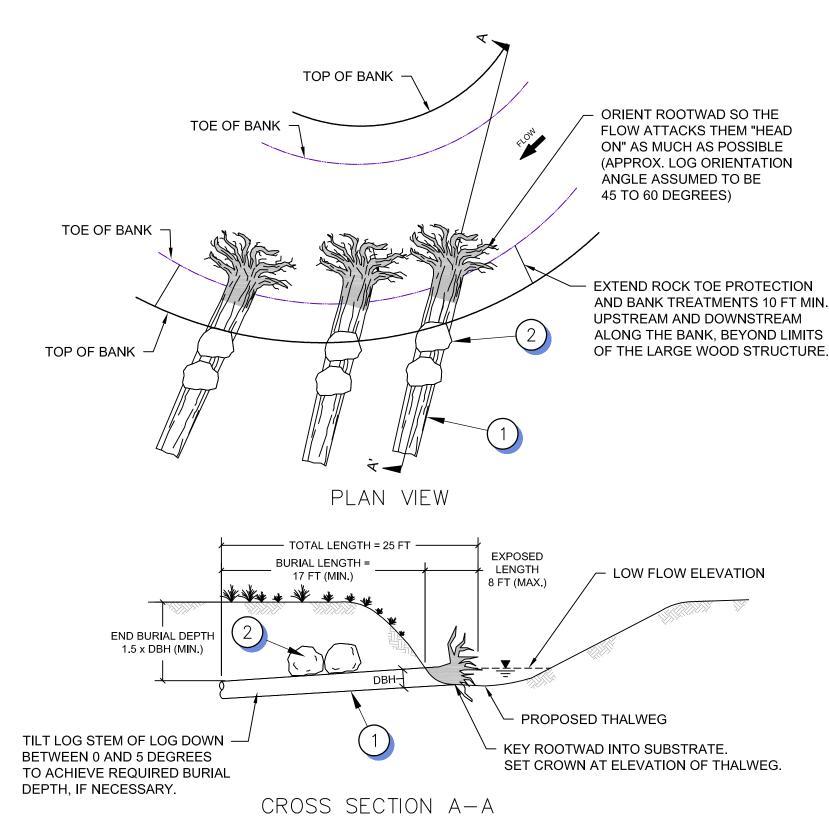
PROJECT No. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

LARGE WOOD STRUCTURE DETAILS

ESIGNED BY: MGR SCALE (22" X 34")		DATE ISSUED:		02/03/17	DRAWING No.		
DRAWN BY:	MGR	HORIZ.	NTS				DETO
CHECKED BY:	LS	VERT.	NTS	SHEET	67	OF 83	



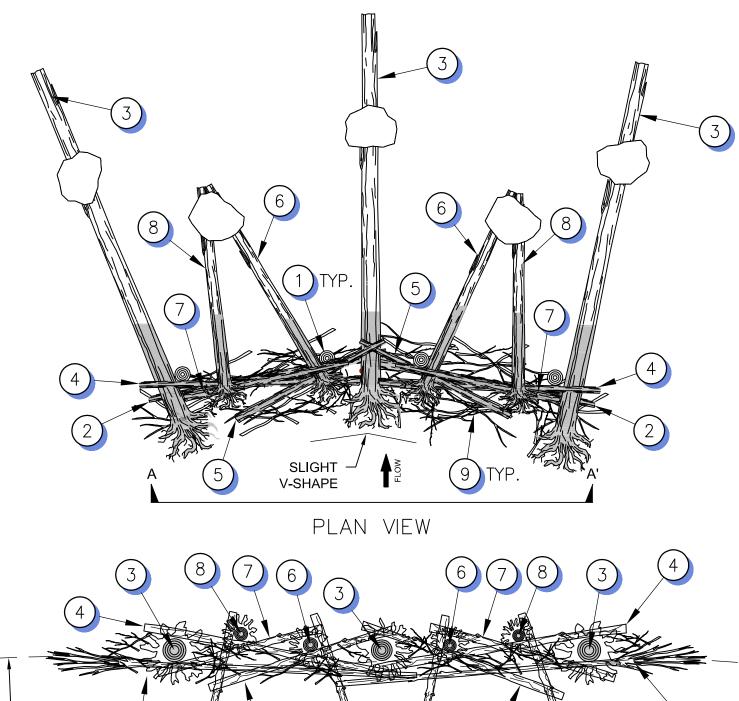
TYPE 4 LARGE WOOD STRUCTURE DETAIL

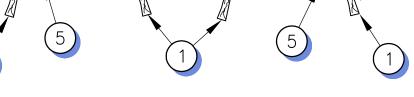
NOT TO SCALE

TYPE 4 LARGE WOOD STRUCTURE MATERIAL SCHEDULE (PER STRUCTURE)									
CONST. NOTE	DBH (IN)	LENGTH (FT)	ROOTWAD ATTACHED?	MIN. PERCENT OF LOG BURIED	MIN. END BURIAL DEPTH (FT)	STEM TILT ANGLE (DEG.)			
1	18	25	YES	65%	2.5	5 DOWN			

CONSTRUCTION SEQUENCING:

- PLACE LOG AT TOE OF BANK WITH BOTTOM CROWN OF BOLE AT ELEVATION OF PROPOSED THALWEG IN CHANNEL AND ORIENTED UPSTREAM AT 45 TO 60 DEG. KEY BOTTOM OF ROOTWAD INTO BED. SLIGHTLY OVERLAP OUTER DIAMETER OF ADJACENT ROOTWADS TO LIMIT HIGH VELOCITY FLOW HITTING
- 2 PLACE TWO 30-INCH DIA. BOULDERS ON LOG (ALTERNATIVELY PLACE 4 24-INCH BOULDERS). ENGINEER MAY APPROVE REDUCING REQUIRED QUANTITY OF 30-INCH BALLAST BOULDERS BY 1 FOR EVERY 1 FOOT OF ADDITIONAL BURIAL DEPTH AT END OF LOG.





CROSS-SECTION A-A VIEW

TYPE 5 LARGE WOOD STRUCTURE DETAIL

NOT TO SCALE

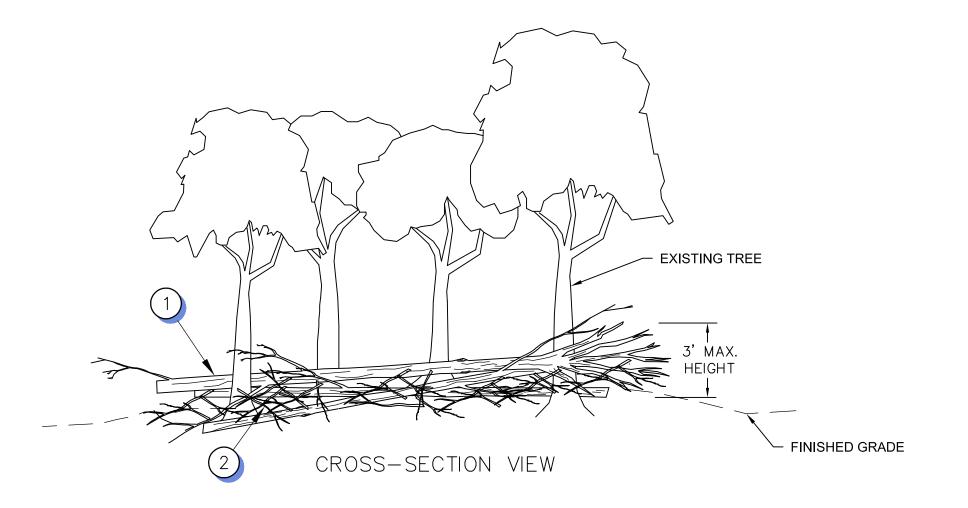
	TYPE 5 LARGE WOOD STRUCTURE MATERIAL SCHEDULE (PER STRUCTURE)										
00/45/.		LENGTH (FT)	ROOTWAD ATTACHED?	MIN. PERCENT OF LOG BURIED	MIN. END BURIAL DEPTH (FT)	QTY.					
1	8	10	NO	65%	5	4					
2	8 TO 10	25	NO	100%	0.1 TO 0.5	2					
3	12	30	YES	65%	6	3					
4	8 TO 10	25	NO	10%	0.1	2					
5	5 TO 7	15	NO	10%	1	2					
6	10	20	YES	60%	4	2					
7	5 TO 7	15	NO	10%	1	2					
8	10	20	YES	60%	4	2					

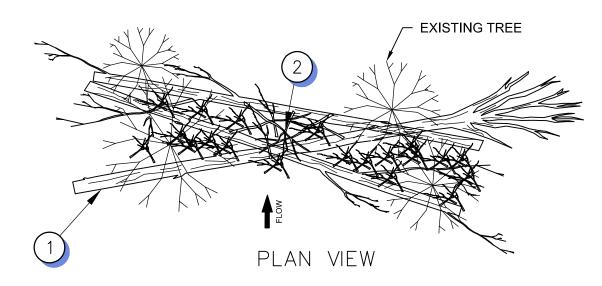
CONSTRUCTION SEQUENCING:

FINISHED

GRADE

- (1) INSTALL FOUR LOG PILES AT 10 FEET ON CENTER WITH INNER PILES PLACED APPROX. 3 FEET FURTHER DOWNSTREAM. 2/3 OF EACH PILE SHALL BE BURIED AT 5:1 BATTER. ROUGHEN EXPOSED END OF PILE WITH EXCAVATOR BUCKET TO MAKE IT LOOK LIKE A NATURAL SNAG.
- (2) EXCAVATE AN APPROX. 1 FOOT DEEP TRENCH IN FRONT OF THE LOG PILES AND PLACE TWO FOOTER LOG TO SPAN THE TRENCH. OVERLAP LOGS BY APROX, 5 FEET IN CENTER, AND COMPLETELY EMBED THE LOGS BY PLACING BACKFILL ON TOP.
- (3) PLACE THREE LOGS ON TOP OF THE FOOTER LOGS PLACED IN STEP 2 WITH ROOTWAD ENDS FACING UPSTREAM. ONE LOG SHOULD BE PLACED AT THE CENTER OF THE STRUCTURE, AND THE OTHER TWO SHOULD BE PLACED APPROX. 5 FT FROM EACH OUTER EDGE. BURY BOLE END OF LOG TO DEPTHS INDICATED ON THE TABLE ABOVE AND PLACE A 30-INCH BOULDER ON TOP FOR ADDED BALLAST.
- (4) PLACE TWO LOGS ON EITHER SIDE OF THE CENTER LOG PLACED IN STEP 3. EACH LOG SHOULD BE PLACED ON TOP OF THE OUTER LOGS PLACED IN STEP 3, IN FRONT OF THE OUTER PILES, AND SLIGHTLY BURIED IN FRONT OF THE FOOTER LOGS PLACED IN STEP 2.
- (5) PLACE TWO LOGS ON TOP OF THE CENTER LOG PLACED IN STEP 3 AND IN FRONT OF THE INNER PILES PLACED IN STEP 1. SLIGHTLY BURY OTHER END IN FLOODPLAIN.
- (6) PLACE TWO LOGS ON TOP OF LOGS PLACED IN STEP 5 WITH ROOTWAD END FACING UPSTREAM. BURY BOLE END OF LOG TO DEPTHS INDICATED ON THE TABLE ABOVE.
- 7) PLACE TWO LOGS ON TOP OF THE LOGS PLACED IN STEP 6 AND IN FRONT OF THE INNER
- PILES PLACED IN STEP 1. SLIGHTLY BURY OTHER END IN FLOODPLAIN.
- (8) PLACE TWO LOGS ON TOP OF LOGS PLACED IN STEPS 4 AND 6 WITH ROOTWAD END FACING UPSTREAM. BURY BOLE END OF LOG TO DEPTHS INDICATED ON THE TABLE ABOVE. PLACE A
- 30-INCH BOULDER ON TOP WHERE THIS LOG AND THE LOG PLACED IN STEP 6, AS SHOWN. 9 PLACE 3-INCH MINUS SLASH DEBRIS (SMALLER WOODY MATERIAL WITH BRANCHES INTACT SALVAGED DURING GRADING ACTIVITIES) IN ALL VISIBLE VOID SPACES BETWEEN LOGS. PARTIALLY ANCHOR THE SLASH DEBRIS BY PINNING THE ENDS OF THE BRANCHES BENEATH THE LOGS INSTALLED IN THE STEPS ABOVE.





TYPE 6 LARGE WOOD STRUCTURE DETAIL

NOT TO SCALE

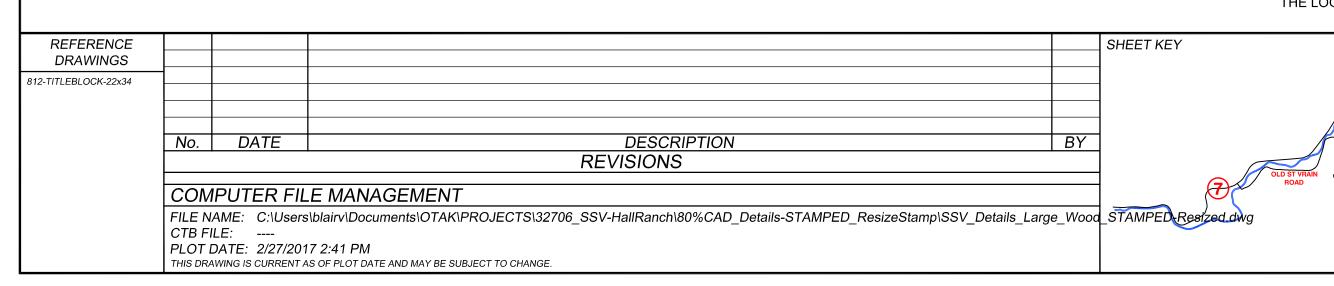
	TVDE 6 I ADGE WOOD STRUCTURE MATERIAL SCHEDULE (DER STRUCTURE)											
	TYPE 6 LARGE WOOD STRUCTURE MATERIAL SCHEDULE (PER STRUCTURE)											
CONST. NOTE	DBH (IN)	LENGTH (FT)	ROOTWAD ATTACHED?	MIN. PERCENT OF LOG BURIED	MIN. END BURIAL DEPTH (FT)	QTY.						
1	6 TO 11	30	OPTIONAL	0%	О	3						

CONSTRUCTION SEQUENCING:

- AFTER CONFIRMING THE LOCATION OF THE STRUCTURE WITH THE ENGINEER, WEDGE 3 OR MORE SALVAGED LOGS WITH LARGER BRANCHES INTACT BETWEEN AN EXISTING GROUP OF MATURE TREES TO SERVE AS BRACING FOR THE OVERALL STRUCTURE. USE LOGS WITH BRANCHES INTACT OR A WYE IN THE TRUNK TO FURTHER HELP PIN LOGS BETWEEN TREES. AIM FOR AT LEAST 3 POINTS OF CONTACT WITH EXISTING TREES TO LIMIT THE ABILITY FOR HIGH FLOW TO MOBILIZE THE WOOD. ROUGHEN UP EXPOSED ENDS OF LOGS USING EXCAVATOR BUCKET TO MAKE THEM LOOK MORE NATURAL.
- (2) DENSELY WEAVE SALVAGED 6-INCH MINUS SLASH DEBRIS WITH BRANCHES INTACT IN ALL VOID SPACES BETWEEN LOGS. PARTIALLY ANCHOR THE SLASH DEBRIS BY PINNING THE ENDS OF THE BRANCHES BETWEEN EXISTING TREES AND BENEATH THE BRACING LOGS INSTALLED IN THE STEP ABOVE. THE FINAL STRUCTURE SHOULD LOOK SIMILAR TO NATURAL WRACKED WOODY MATERIAL, AS SHOWN ON THE IMAGE BELOW.



REFERENCE PHOTO OF NATURALLY DEPOSITED FLOOD DEBRIS IN TREES





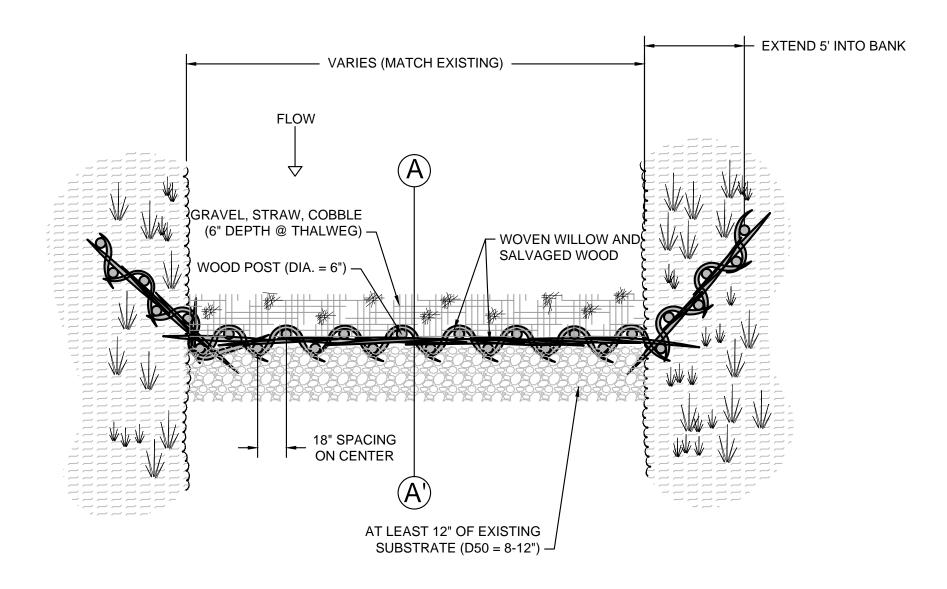


SOUTH ST. VRAIN CREEK RESTORATION

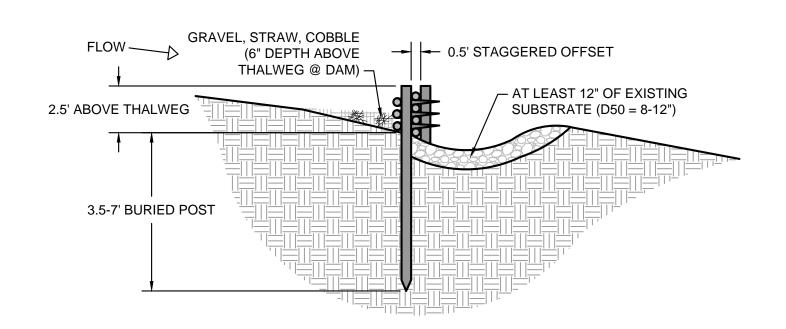
BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGN

LARGE WOOD STRUCTURE DETAILS

<u> </u>								
FOR AND ON BEHALF OF	DESIGNED BY:	MGR	SCALE (22	2" X 34")	DATE ISSUED:		02/03/17	DRAWING No.
MATRIX DESIGN GROUP, INC.	DRAWN BY:	MGR	HORIZ.	NTS				DETA
PROJECT No. 16.812.003	CHECKED BY:	LS	VERT.	NTS	SHEET	68	OF 83	DET 9

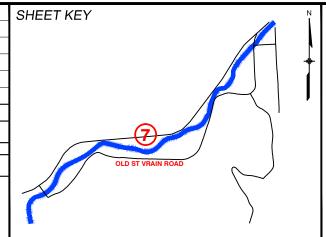


BEAVER DAM ANALOGUE PLAN VIEW NOT TO SCALE



BEAVER DAM ANALOGUE PROFILE VIEW (A-A') NOT TO SCALE

REFERENCE DRAWINGS					S
812-TITLEBLOCK-22x34					1
					-
					1
	No.	DATE	DESCRIPTION	BY	1
			REVISIONS		4
	COM	IPUTER FIL	E MANAGEMENT		1
	CTB FI PLOT I	ILE: DATE: 2/16/201	2.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans 80%\BDA DETAILS AND DUMMY SHEETS 80%.dwg 17 7:42 PM AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.] -





SURADO LICENTA	SC
46577	
2/17/17 ONAL ENGINEER	
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003	DESIGN DRAWN CHECK

SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE FINAL DESIGNS

CREEK DETAILS

SIGNED BY:	SDS	SCALE (22	?" X 34")	DATE ISSUED:		02/17/17	DRAWING No.	
AWN BY:	JDL	HORIZ.	N/A				D10	
ECKED BY:	RDK	VERT.	N/A	SHEET	69	OF 83	טוט	

CONSTRUCTION.

ELEVATION.

RECEDED.

ELEVATION.

SPECIFIED.

PLANTING.

TELECOMMUNICATION LINES.

WITH SEEDING (RIPARIAN)

SHALL BE SEEDED WITH COMBINED SEEDING.

MUST HIT WATER TABLE AT TIME OF PLANTING.

1. EXTENTS OF REVEGETATION MEASURES REPRESENT APPROXIMATE LOCATIONS FOR REVEGETATION TREATMENTS. APPROVAL MUST BE

GIVEN BY BCPOS AND LANDSCAPE DESIGNER PRIOR TO INSTALLATION OF

WILLOW CUTTINGS, MATURE WILLOWS AND PERENNIAL (TUBELINGS). 2. CONTRACTOR TO VERIFY FIELD CONDITIONS AND NOTIFY THE ENGINEER

OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH THE WORK. 3. NO WORK SHALL OCCUR UNTIL ALL EXISTING UNDERGROUND UTILITIES

HAVE BEEN LOCATED AND MARKED. CALL LOCAL UTILITY LOCATING SERVICE AT 1-800-922-1987 AT LEAST 48 HOURS PRIOR TO BEGINNING

4. TREES SHALL NOT BE PLANTED WITHIN 10 FEET OF WATER LINES AND 5 FEET OF SANITARY SEWER LINES. TREES AND SHRUBS SHALL NOT BE

5. SEEDING (RIPARIAN) MIX SHALL ONLY BE APPLIED TO AREAS THAT ARE LESS THAN 1.5' ABOVE THE BASE FLOW WATER SURFACE ELEVATION. 6. COMBINED SEEDING MIX SHALL ONLY BE APPLIED TO AREAS THAT ARE

7. SEEDING (UPLAND) MIX SHALL ONLY BE APPLIED TO AREAS THAT HAVE BEEN DISTURBED BY CONSTRUCTION ACTIVITIES, OR ON NON-WILLOW

8. AREAS TO BE PLANTED WITH PERENNIAL (TUBELINGS) SHALL BE SEEDED

9. AREAS TO BE PLANTED WITH MATURE WILLOWS OR WILLOW CUTTINGS

10. ALL WILLOW CUTTINGS, REGARDLESS OF STAKE LENGTH, SHALL BE

11. ALL PLANT MATERIAL SHALL BE INSTALLED AFTER HIGH FLOWS HAVE

12. MATURE WILLOWS SHALL BE USED IN AREAS WHERE BENCH HEIGHT IS NO

HEIGHT IS NO MORE THAN 4' ABOVE THE BASE FLOW WATER SURFACE

15. AREAS WITH A BENCH HEIGHT GREATER THAN 4' ABOVE WATER SURFACE

RECEIVE SEEDING (UPLAND) AND TREE AND SHRUB PLANTINGS AS

17. SMALL SHRUBS SHALL BE PLACED IN NATURALIZED GROUPINGS OF 1,3,5,7 AND 9. ALL SMALL SHRUBS SHALL BE FIELD LOCATED BY CONTRACTOR AND APPROVED BY BCPOS AND LANDSCAPE DESIGNER PRIOR TO

PERENNIALS (TUBELINGS) OR SEEDING (RIPARIAN). THESE AREAS SHALL

MORE THAN 3' ABOVE THE BASE FLOW WATER SURFACE ELEVATION. 13. 3-5' LONG WILLOW CUTTINGS SHALL BE USED IN AREAS WHERE BENCH

14. MATURE WILLOWS AND WILLOW CUTTINGS, REGARDLESS OF LENGTH

ELEVATION SHALL NOT BE PLANTED WITH WILLOW CUTTINGS,

16. LARGE TREES AND SHRUBS SHALL BE PLACED IN NATURALIZED

GROUPINGS OF PLANTS PER SPECIES. AS SHOWN ON PLANS.

INSTALLED WHEN THE WILLOW CUTTINGS ARE DORMANT.

BENCH AREAS THAT EXCEED 3' ABOVE THE WATER SURFACE ELEVATION

BETWEEN 1.5' AND 3' ABOVE THE BASE FLOW WATER SURFACE

PLANTED WITHIN 5 FEET OF BURIED ELECTRICAL, GAS AND

	SEEDING (UPLAND)						
COMMON NAME	BOTANICAL NAME	VARIETY	% OF MIX	PLS/ACRE			
Fringed sage	Artemisia frigida	VNS	2	0.02			
Showy milkweed	Asclepias speciosa	VNS	2	1.65			
Sideoats grama	Bouteloua curtipendula	Vaughn	7	1.92			
Blue grama	Bouteloua gracilis	Native	15	0.95			
Rabbitbrush	Chrysothamnus nauseosus	VNS	4	0.52			
Canada Wildrye	Elymus canadensis	VNS - Native	12	5.45			
Squirreltail	Elymus elymoides	BCPOS provided	10	2.72			
Slender wheatgrass	Elymus trachycaulus	San Luis	12	3.95			
Thickspike wheatgrass	Elymus lanceolatus	Critana	8	2.72			
Hairy golden aster	Heterotheca villosa	VNS	5	0.3			
Western wheatgrass	Pascopyrum smithii	Arriba	8	3.8			
Switchgrass	Panicum virgatum	Trailblazer	10	1.34			
Little bluestem	Schizachyrium scoparium	Cimarron or Pastura	5	1.01			
		TOTAL	400	20.25			

S	=	PURE	LIVE	SEED	

	SEEDING (RIPARIAN)					
COMMON NAME	BOTANICAL NAME		% OF MIX	PLS/ACRE		
Amariaan Claugharaaa	Deckmennia avrigachna		E	0.22		
American Sloughgrass	Beckmannia syzigachne		5	0.23		
American Mannagrass	Glyceria grandis		8	0.33		
Switchgrass	Panicum virgatum(var. Neb. 28)		7	0.94		
Indian Grass	Sorghastrum nutans		5	1.54		
Prairie Cordgrass	Spartina pectinata		10	3.48		
Wooly Sedge	Carex pellita		10	2.21		
Nebraska Sedge	Carex nebrascensis		10	0.57		
Meadow Sedge	Carex praegracilis		10	0.29		
Creeping Spikerush	Eleocharis palustris		5	0.42		
Baltic Rush	Juncus balticus		10	0.07		
Torrey's Rush	Juncus torreyi		2	0.01		
Three Square Bulrush	Schoenoplectus pungens		5	0.65		
Mash Milkweed	Asclepias incarnata		3	1.54		
Marsh Sunflower	helianthus nuttallii		4	0.96		
Canada Goldenrod	Solidago canadensis		3	0.08		
Blue Vervain	Verben hastata		3	0.09		
		TOTAL:	100	13.41		

* RATE GIVEN IS FOR BROADCAST SEED. DRILL SEEDING SHALL BE 1/2 OF GIVEN RATE BASED ON 120 SEEDS/SQ. FT.

PLS = PURE LIVE SEED

COMBINED SEEDING:

COMBINED SEEDING SHALL BE COMPRISED OF 70% SEEDING (NATIVE) AND 30% SEEDING (RIPARIAN). COMBINED SEEDING SHALL BE APPLIED AT THE PERCENT OF MIX (% OF MIX) AND APPLICATION RATE (PLS/ACRE) THAT IS DESIGNATED ON THE PLANS UNDER BOTH SEEDING (NATIVE) AND SEEDING (RIPARIAN).

WILLOW CUTTINGS

COMMON NAME	BOTANICAL*	SIZE / FORM	SPACING	PERCENT	QTY (PER AC.)	
COYOTE WILLOW BLUESTEM WILLOW	Salix exigua Salix irrorata	3-5' CUTTING 3-5' CUTTING	3' O.C. 3' O.C.	75% 25%	5605 1869	
			TOTAL	100%	7474	

- WILLOW CUTTINGS SHALL BE PLANTED IN AREAS SHOWN ON PLANS. QUANTITIES SHOWN IN THE WILLOW CUTTINGS TABLE ABOVE DO NOT REFLECT WILLOW CUTTING QUANTITIES FOR BANK STABILIZATION TREATMENTS. SEE BANK STABILIZATION TREATMENTS TABLE FOR WILLOW CUTTING QUANTITIES TO BE USED IN TREATMENTS.
- 3. WILLOW CUTTINGS SHALL BE PLANTED AS 1 STEM CUTTINGS 3' O.C. IN AREAS AS SHOWN IN THE REVEGETATION PLANS.
- 4. WILLOW CUTTINGS SHALL BE HARVESTED FROM AN APPROPRIATE LOCATION AS DESCRIBED IN SPECIFICATION SECTION 214 PLANTING.

REVEGETATION TIMELINE:

- 1. ALL WILLOW CUTTINGS, DORMANT LOG CUTTINGS (I.E. POLES) AND TREES AND SHRUBS SHALL BE PLANTED BETWEEN SEPTEMBER 1ST AND NOVEMBER 31ST.
- 2. ALL PERENNIAL (TUBELINGS) (10 CL) SHALL BE PLANTED AFTER SPRING RUN-OFF AND PRIOR TO OCTOBER 31ST.
- 3. ALL SEEDING SHALL OCCUR BETWEEN SEPTEMBER 15TH AND DECEMBER 31ST AS LONG AS THE GROUND IS NOT FROZEN OR TOO WET. BCPOS REPRESENTATIVE AND LANDSCAPE DESIGNER SHALL APPROVE THE ONSITE CONDITIONS ARE SUITABLE FOR SEEDING PRIOR TO SEEDING.
- 4. ADDITIONAL INFORMATION IS DESCRIBED IN SPECIFICATION SECTION 212 SEED AND SOIL CONDITIONING.

COMMON NAME	BOTANICAL NAME	VARIETY	% OF MIX	PLS/ACR
ringed sage	Artemisia frigida	VNS	2	0.02
Showy milkweed	Asclepias speciosa	VNS	2	1.65
Sideoats grama	Bouteloua curtipendula	Vaughn	7	1.92
Blue grama	Bouteloua gracilis	Native	15	0.95
Rabbitbrush	Chrysothamnus nauseosus	VNS	4	0.52
Canada Wildrye	Elymus canadensis	VNS - Native	12	5.45
Squirreltail	Elymus elymoides	BCPOS provided	10	2.72
Slender wheatgrass	Elymus trachycaulus	San Luis	12	3.95
hickspike wheatgrass	Elymus lanceolatus	Critana	8	2.72
lairy golden aster	Heterotheca villosa	VNS	5	0.3
Vestern wheatgrass	Pascopyrum smithii	Arriba	8	3.8
Switchgrass	Panicum virgatum	Trailblazer	10	1.34
ittle bluestem	Schizachyrium scoparium	Cimarron or Pastura	5	1.01
		TOTAL:	100	26.35

COMMON NAME	BOTANICAL NAME		
American Sloughgrass	Beckmannia syzigachne		
American Mannagrass	Glyceria grandis		
Switchgrass	Panicum virgatum(var. Neb. 28)		
Indian Grass	Sorghastrum nutans		
Prairie Cordgrass	Spartina pectinata		
Wooly Sedge	Carex pellita		
Nebraska Sedge	Carex nebrascensis		
l .			

18. ALL AREAS OF REVEGETATION SHALL BE AMENDED PER SPECIFICATION SECTION 212 SEED AND SOIL CONDITIONING. 19. SOIL RETENTION BLANKET (SPECIAL) SHALL BE INSTALLED IN LOCATIONS SEEDED WITH SEEDING (RIPARIAN) OR AREAS WHERE PERENNIAL

(TUBELINGS) ARE TO BE PLANTED. 20. CONTRACTOR SHALL NOTIFY BCPOS AND ENGINEER PRIOR TO ORDERING

SOIL RETENTION BLANKET (SPECIAL). 21. ALL QUANTITIES AND LOCATIONS OF SOIL RETENTION BLANKET (SPECIAL)

SHALL BE APPROVED BY BCPOS PRIOR TO INSTALLATION. 22. SPRAY ON MULCH BLANKET SHALL BE APPLIED TO ALL AREAS SEEDED WITH SEEDING (UPLAND) AND COMBINED SEEDING.

BOULDER COUNTY FLOOD RECOVERY PLANT MATERIALS LIST NOTES:

1. THE PLANT MATERIAL TO BE USED FOR REVEGETATION ON THIS PROJECT SHALL ADHERE TO THE CRITERIA OUTLINED IN THE RFP FOR PLANT MATERIAL SERVICES ISSUED BY BCPOS.

3. BCPOS SHALL PROVIDE AND DELIVER ALL CONTAINER PLANT MATERIAL FOR THIS PROJECT AS PART OF A SEPARATE CONTRACT.

4. PLANT SIZES ARE SUBJECT TO CHANGE BASED ON PLANT MATERIAL AND SIZES PROVIDED THE BCPOS CONTRACT FOR PLANT MATERIAL, BCPOS SHALL APPROVE ALL CHANGES PRIOR TO PLANTING.

5. CONTRACTOR MUST COORDINATE WITH BCPOS SO PLANTS ARE AVAILABLE WHEN NEEDED. RE: PLANTING SCHEDULE

BANK STABILIZATION TREATMENT	SYMBOL	QTY.	WILLOW CUTTINGS
WILLOW CUTTINGS IN EX. RIPRAP		544 LF	272
WILLOW CUTTINGS IN COBBLE TOE		2261 LF	1130
FASCINE		171 LF	890
BOULDER TOE		661 LF	436
NOTES:			

WILLOW CUTTINGS USED IN WILLOW CUTTINGS IN COBBLE TOE AND BOULDER TOE SHALL BE PAID FOR UNDER THE WILLOW CUTTINGS ITEM CODE. 2. WILLOW CUTTINGS USED FOR WILLOW CUTTINGS IN EX. RIPRAP AND FASCINES SHALL BE PAID FOR UNDER EACH RESPECTIVE ITEM CODE.

REVEGETATION TREATMENT	SYMBOL	AREA	QTY.
WILLOW CUTTINGS		1.34 AC	7474
PERENNIAL (TUBELINGS)		0.32 AC	5917
SEEDING (RIPARIAN)		0.72 AC	
SEEDING (UPLAND)		4.42 AC	
COMBINED SEEDING		12.52 AC	
MATURE WILLOWS	0	0.22 AC	298

THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.

REFERENCE DRAWINGS No. DATE DESCRIPTION REVISIONS COMPUTER FILE MANAGEMENT FILE NAME: L:\7774-000 Matrix-So St. Vrain\00_7774-001 So St Vrain-80% DESIGN\04_CAD\4.1_Sheets\L-Landscape Notes-80%.dwg CTB FILE: ----PLOT DATE: 2/2/2017 2:59 PM

SOUTH ST. VRAIN CREEK PLANTING LARGE TREES AND SHRUBS COMMON NAME **BOTANICAL NAME** SPACING REVEGETATION AREA % COVERAGE (PER AC) QTY (PER AC) QTY (TOTAL) TREES Water Birch Betula occidentalis AS SHOWN 148 Narrowleaf Cottonwood Populus angustifolia 14 INCH/Pole AS SHOWN 247 14 INCH/Pole AS SHOWN Plains Cottonwood Populus Deltoides Var. Monilifera 325 Peach Leaf Willow Salix amygdaliodes 14 INCH AS SHOWN 125 845 TOTAL: **EVERGREEN TREES** onderosa Pine Pinus ponderosa AS SHOWN TOTAL: 55 **SHRUBS** Thinleaf Alder Alnus incana ssp. Tenuifolia 40 CI AS SHOWN 252 Red-Osier Dogwood Cornus sericea Ssp. Sericea 40 CI AS SHOWN merican Plum Prunus americana 40 CI AS SHOWN 296 Prunus virginiana Var. Melanocarpa 40 Cl 370 Chokecherry AS SHOWN TOTAL: 1066

40 CI IS A 40 CUBIC INCH CONTAINER PLANT.

14 INCH CONTAINER PLANTS MAY BE SUBSTITUTED FOR 40 CI CONTAINER PLANTS. BCPOS REPRESENTATIVE SHALL APPROVE ALL SIZE SUBSTITUTIONS PRIOR TO PLANTING.

			SMALL SH	<u>IRUBS</u>			
Leadplant	Amorpha fruiticosa	40 CI	6' O.C.	RIPARIAN/UPLAND	1.64%	20	337
Rubber Rabbitbrush	Chrysothamnus nauseosus	40 CI	6' O.C.	RIPARIAN/UPLAND	1.64%	20	337
Golden Currant	Ribes aureum	40 CI	6' O.C.	RIPARIAN/UPLAND	0.81%	10	167
Wax Currant	Ribes cereum	40 CI	6' O.C.	RIPARIAN/UPLAND	0.81%	10	167
Wood's Rose	Rosa woodsii	40 CI	6' O.C.	RIPARIAN/UPLAND	2.02%	24	416
Common Snowberry	Symphoricarpos albus	40 CI	6' O.C.	RIPARIAN/UPLAND	1.09%	13	224
Western Snowberry	Symphoricarpos occidentalis	40 CI	6' O.C.	RIPARIAN/UPLAND	3.39%	41	697
				*11.40% COVERAGE	PER ACRE	TOTAL:	2345

			PERENNIAL (TUBELINGS)		
larsh Milkweed	Asclepias incarnata	10 CI	2' O.C.		85
howy Milkweed	Asclepias speciosa	10 CI	2' O.C.		85
luejoint Reedgrass	Calamagrostis canadensis	10 CI	2' O.C.		350
nory's Sedge	Carex emoryii	10 CI	2' O.C.		1210
ebraska Sedge	Carex nebrascensis	10 CI	2' O.C.		350
oolly Sedge	Carex pellita	10 CI	2' O.C.		235
lustered Field Sedge	Carex praegracilis	10 CI	2' O.C.		154
eeping Spikerush	Eleocharis palustris	10 CI	2' O.C.		349
nerican Mannagrass	Glyceria grandis	10 CI	2' O.C.		170
uttall's Sunflower	Helianthus nattalii	10 CI	2' O.C.		37
altic Rush	Juncus balticus	10 CI	2' O.C.		595
orrey's Rush	Juncus torreyi	10 CI	2' O.C.		154
vitchgrass	Panicum virgatum	10 CI	2' O.C.		870
anicled Bulrush	Scirpus microcarpus	10 CI	2' O.C.		349
airie Cordgrass	Spartina pectinata	10 CI	2' O.C.		860
lue Vervain	Verbena hastata	10 CI	2' O.C.		64
				TOTAL:	5917

- ALL PERENNIALS (TUBELINGS) SHALL BE PLANTED AT 2' O.C. IN TRIANGULAR SPACING. CONTRACTOR SHALL NOTIFY BCPOS PRIOR TO ORDERING OF PERENNIAL (TUBELINGS).
- ALL PERENNIAL (TUBELINGS) SHALL BE FIELD LOCATED BY CONTRACTOR AND LOCATIONS APPROVED BY BCPOS AND LANDSCAPE DESIGNER PRIOR TO PLANTING.



1124 FOR AND ON BEHALF OF

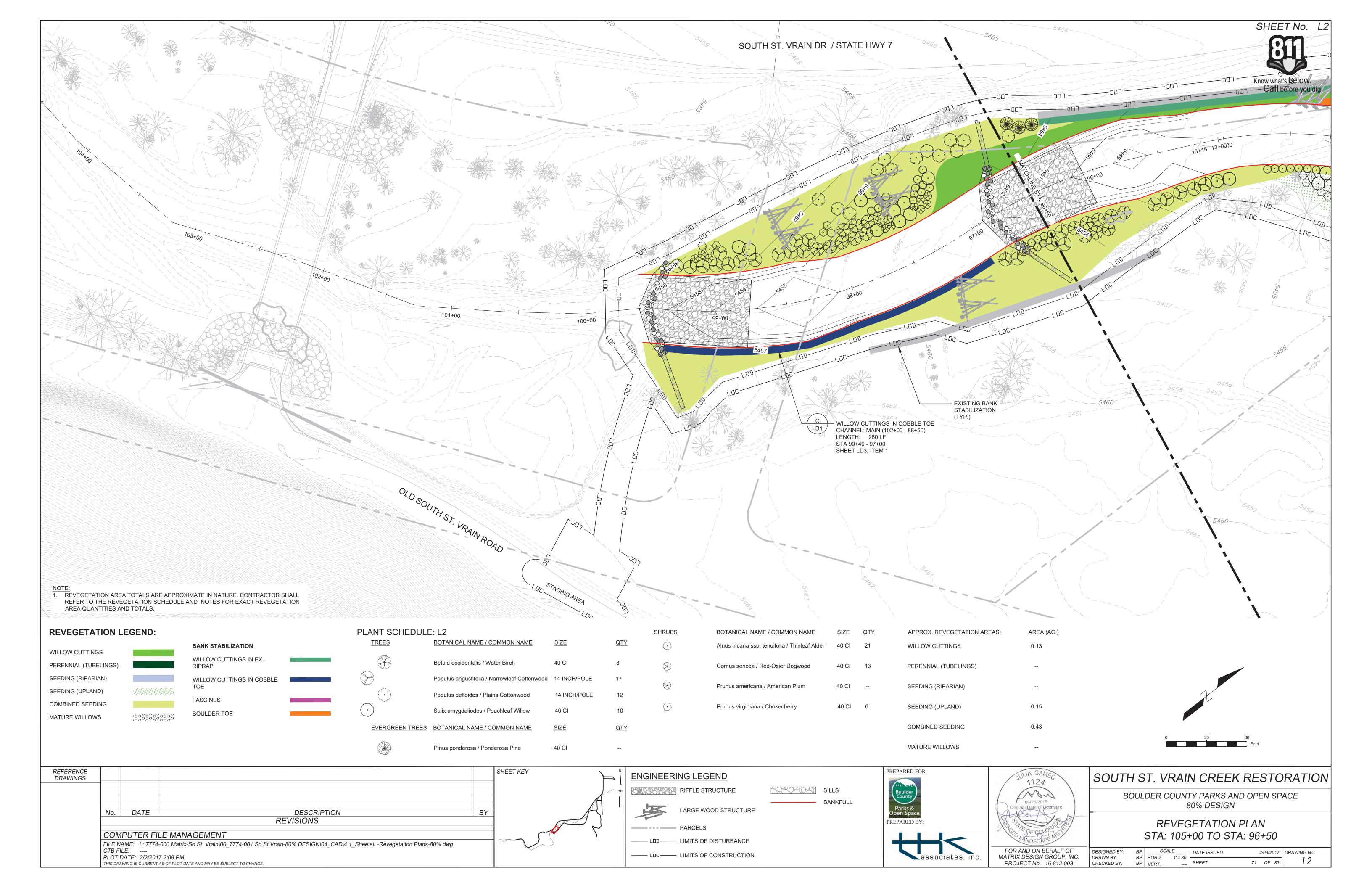
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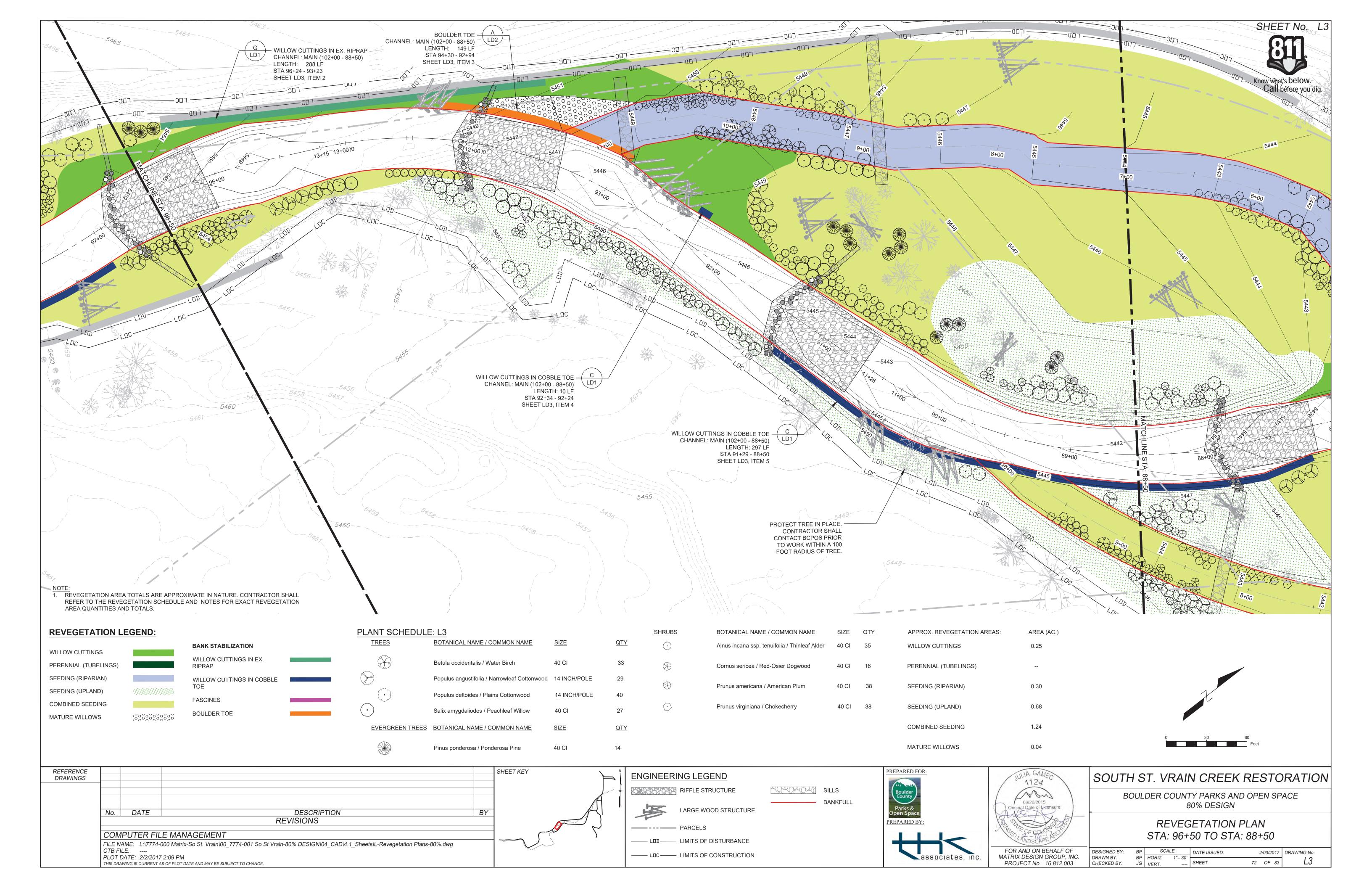
SOUTH ST. VRAIN CREEK RESTORATION

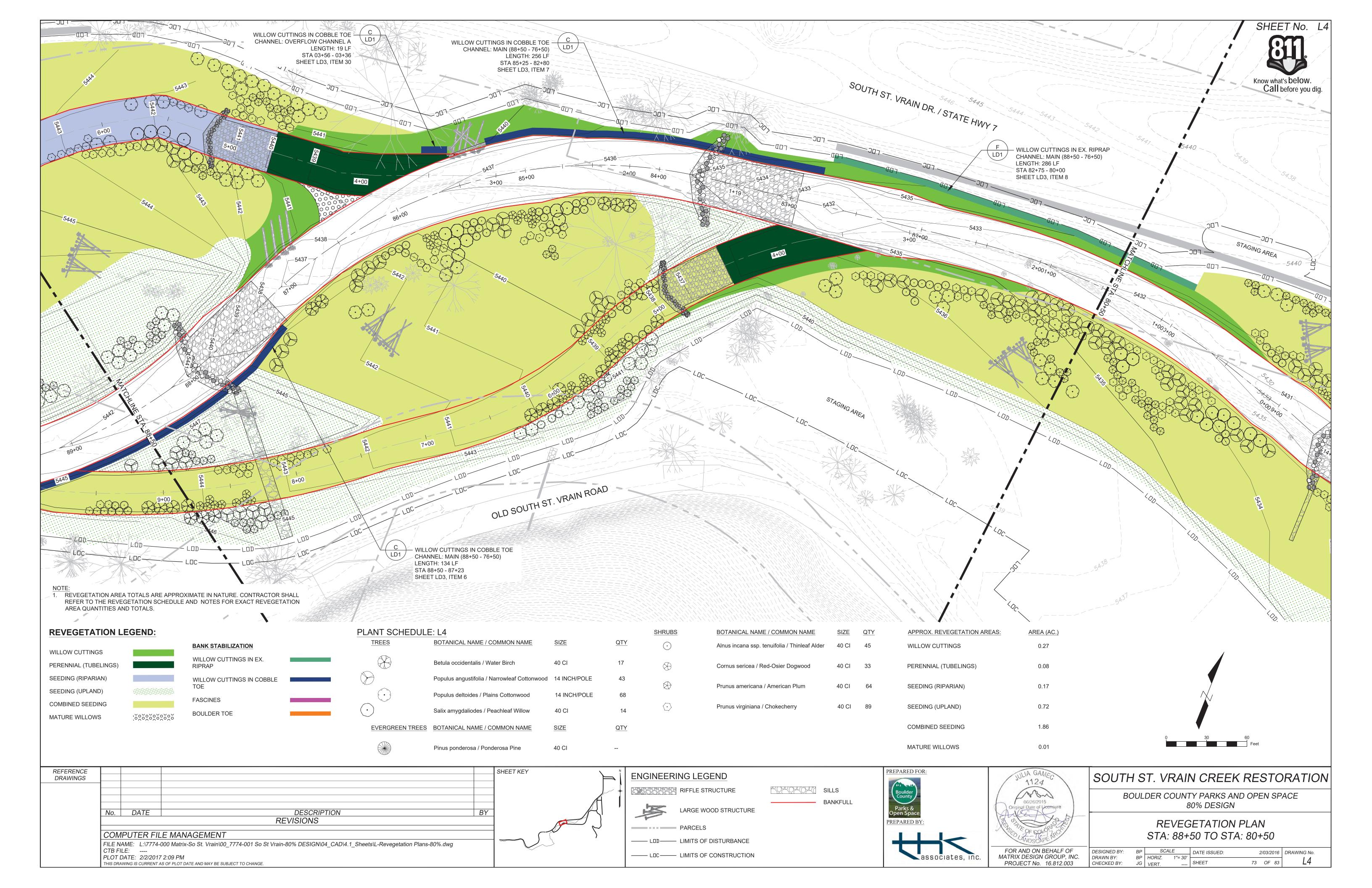
BOULDER COUNTY PARKS AND OPEN SPACE 80% DESIGN

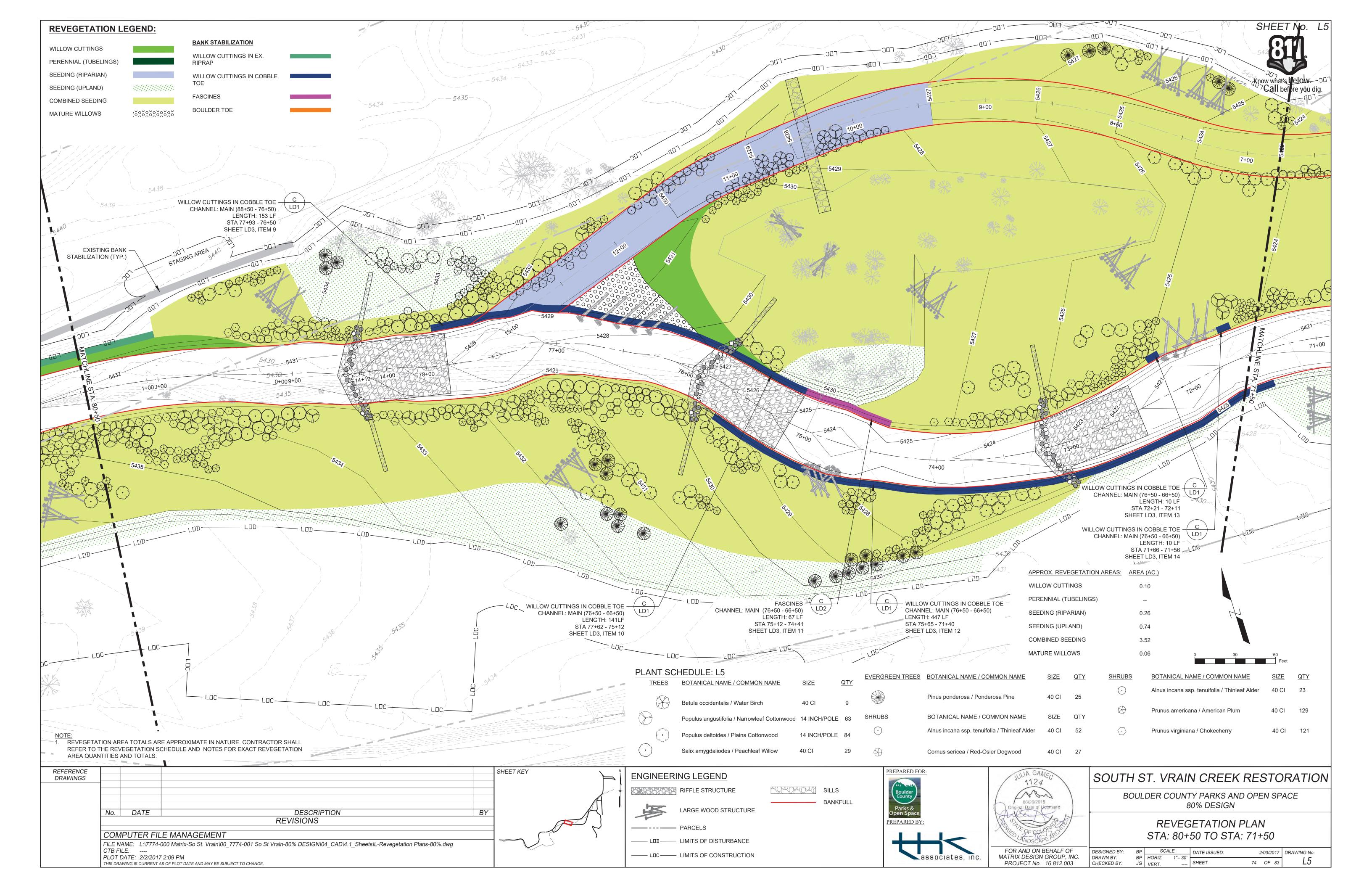
REVEGETATION SCHEDULE AND NOTES

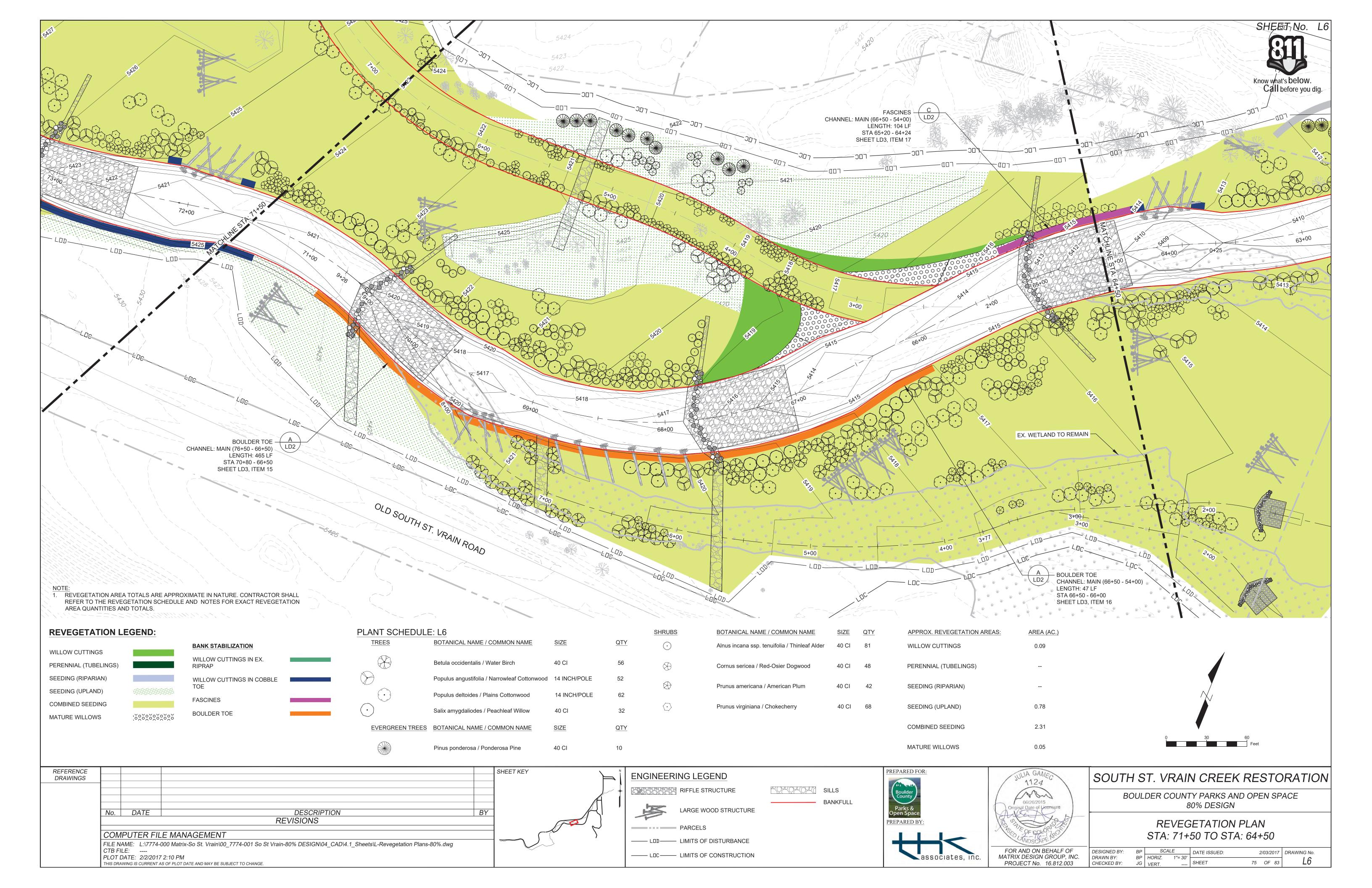
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	CHECKED BY:	JG	VERT.	NTS	SHEET	47	OF 62	L-I	

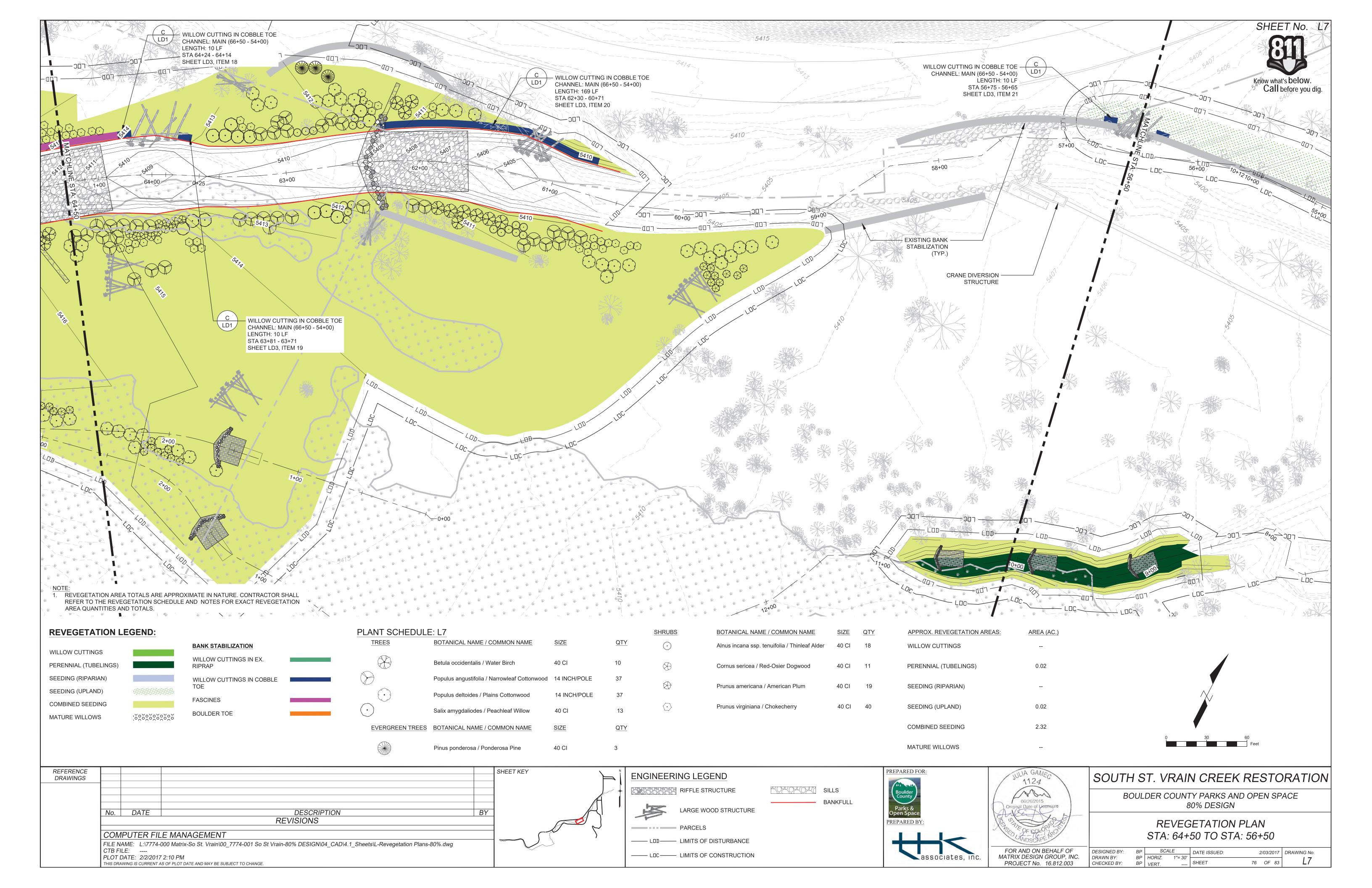


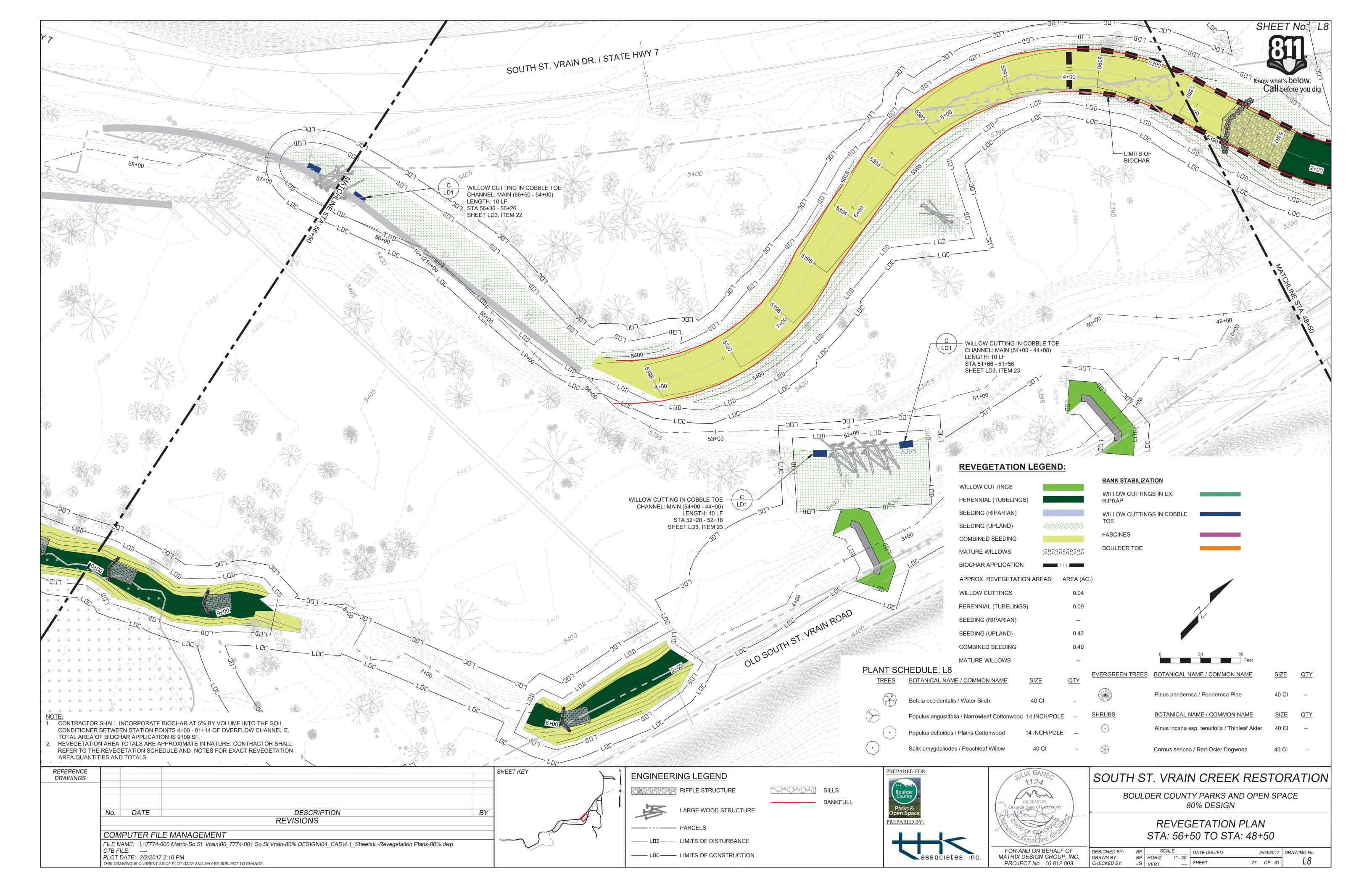


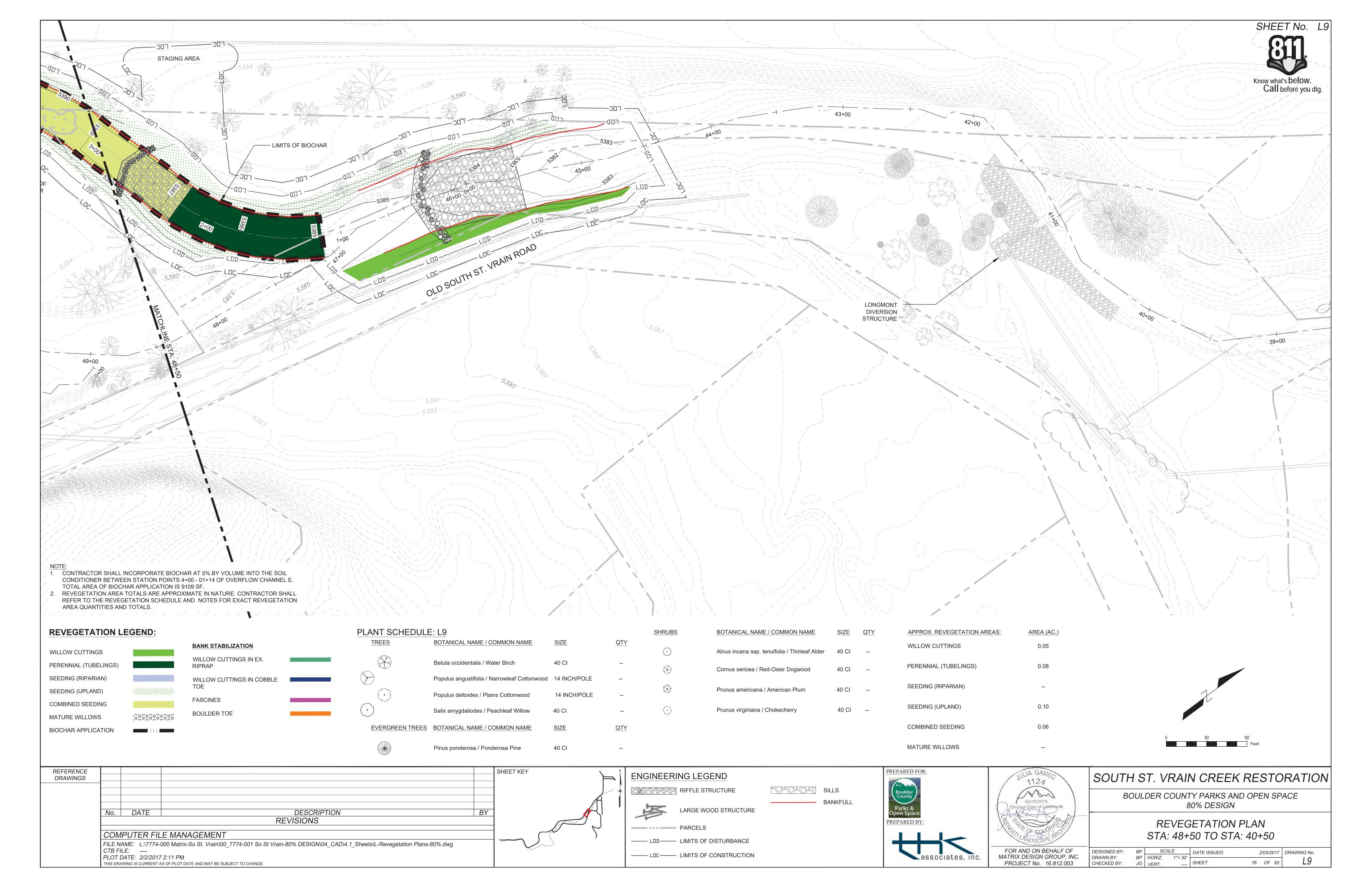


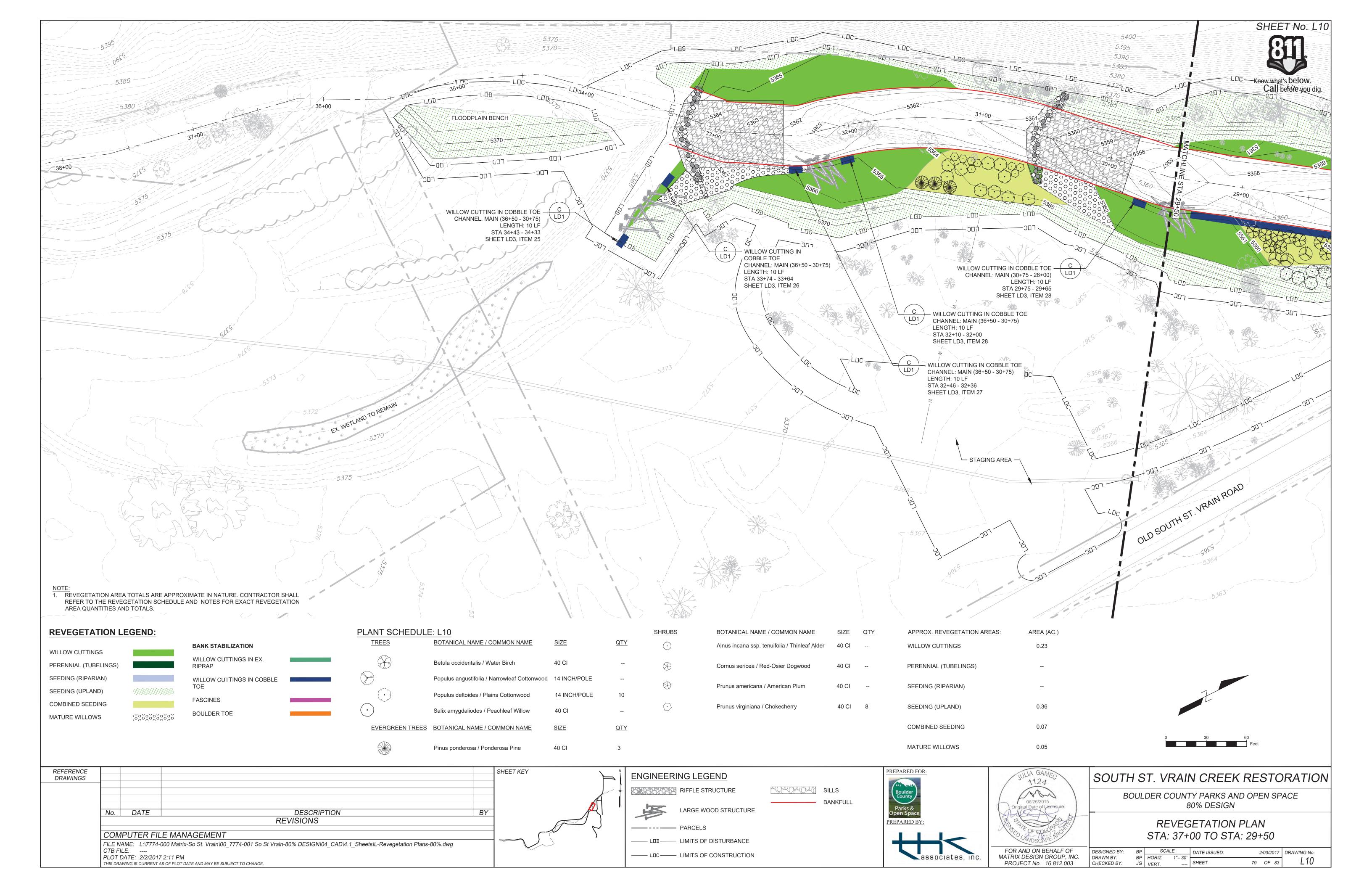


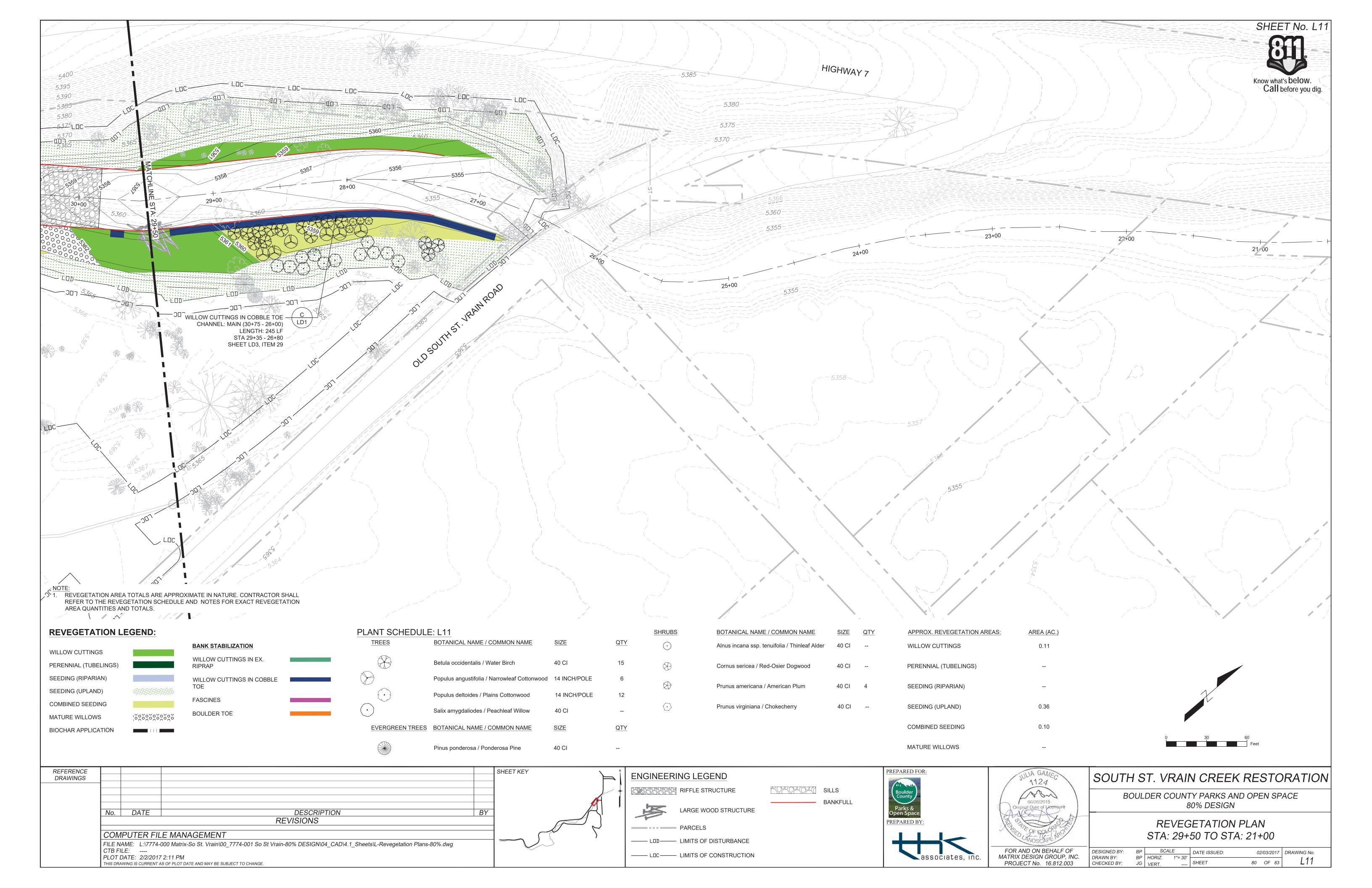


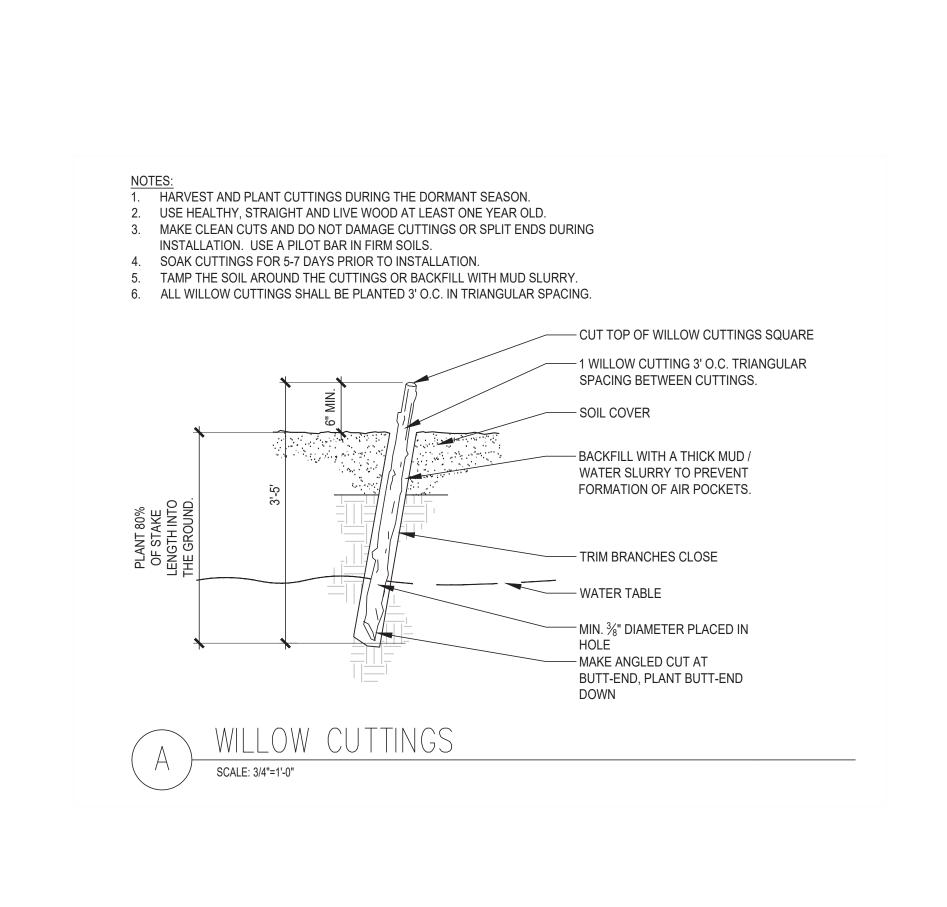


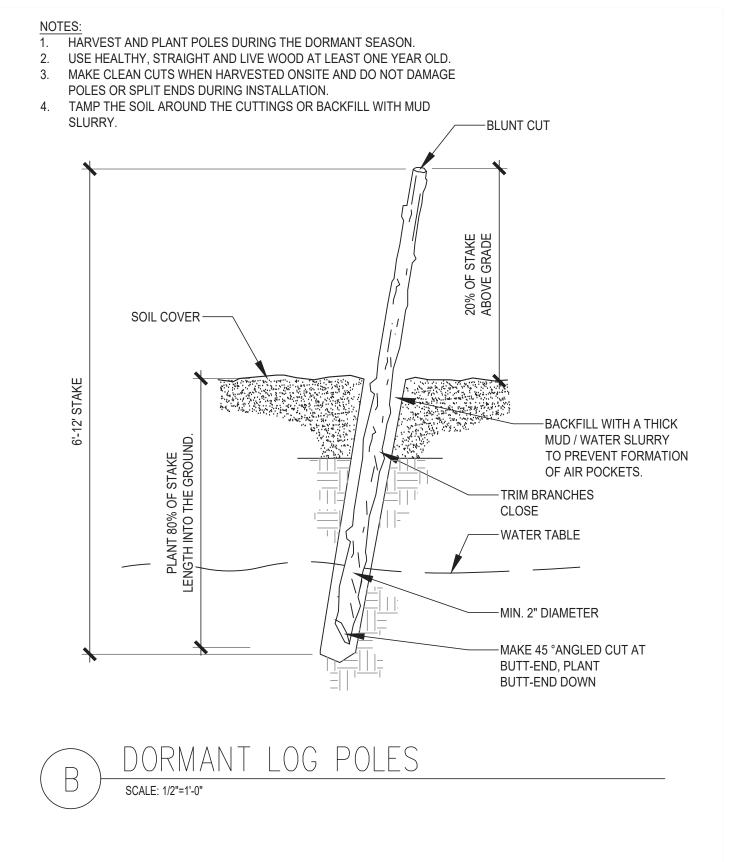


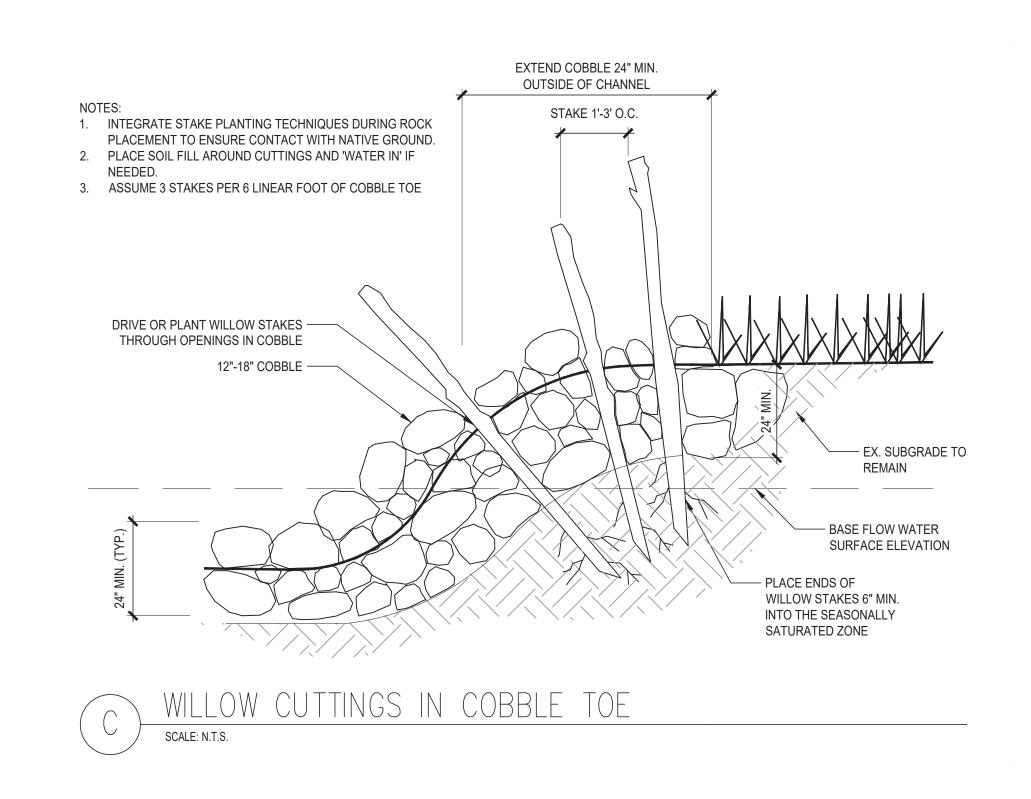


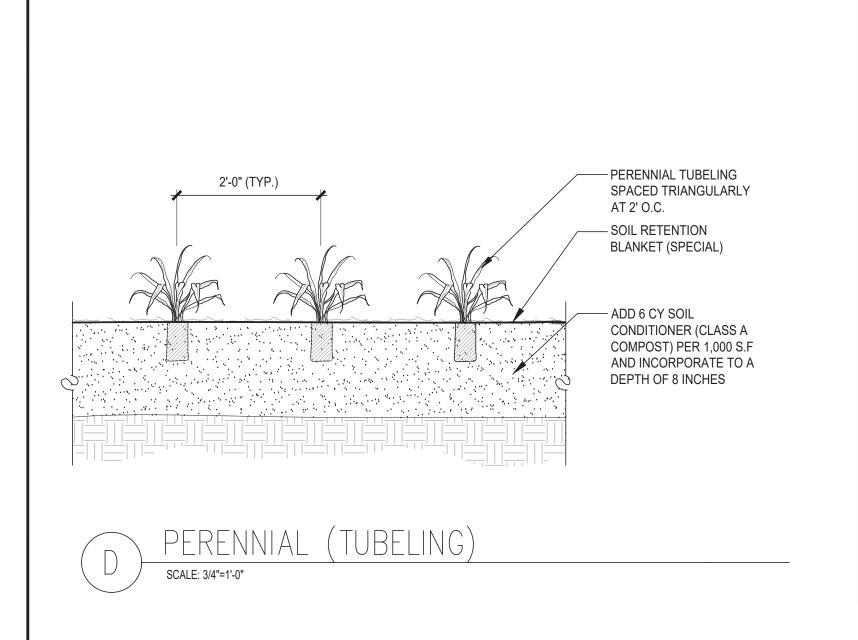


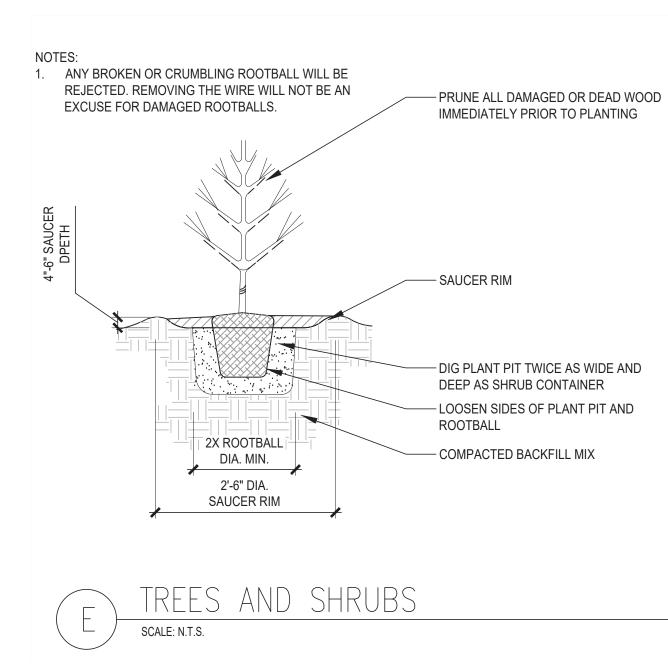


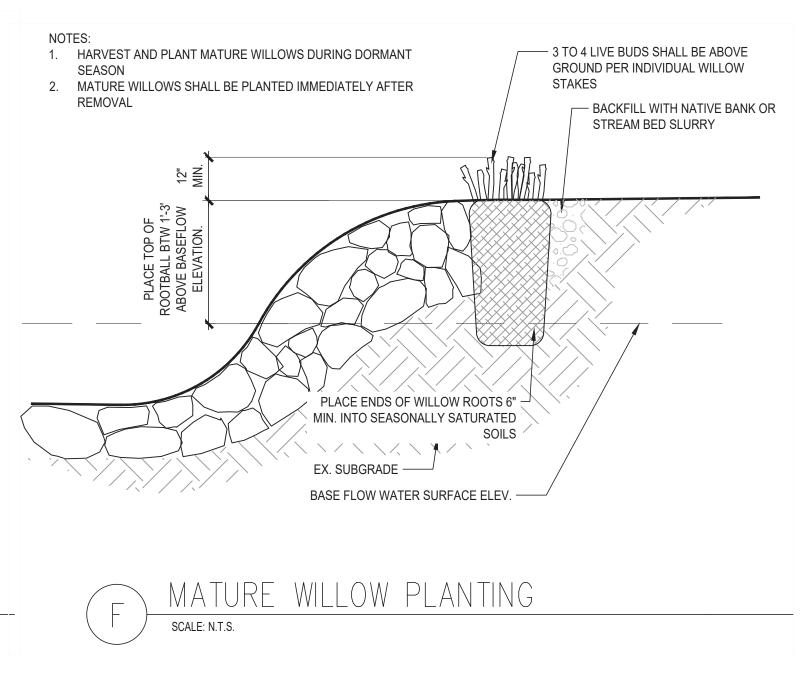


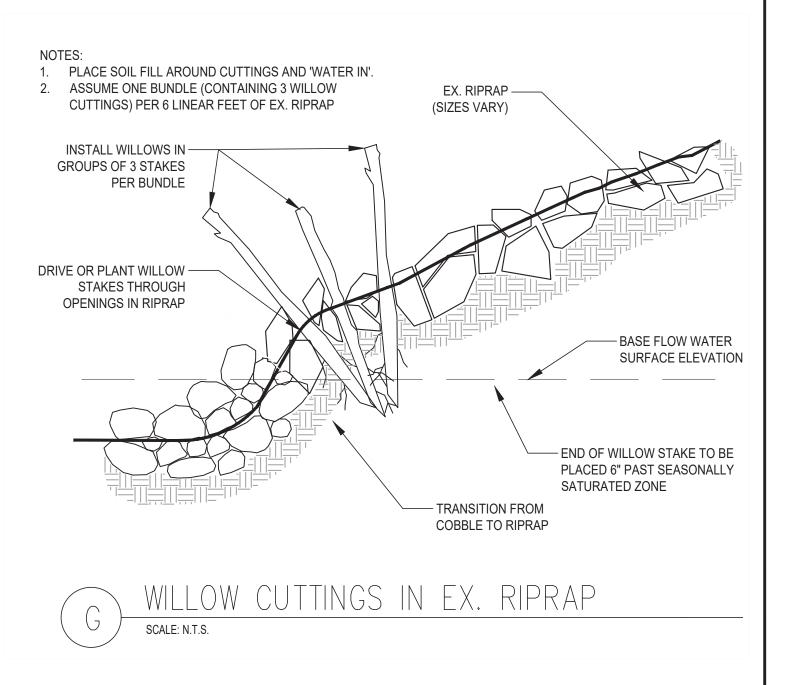












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		REVISIONS						
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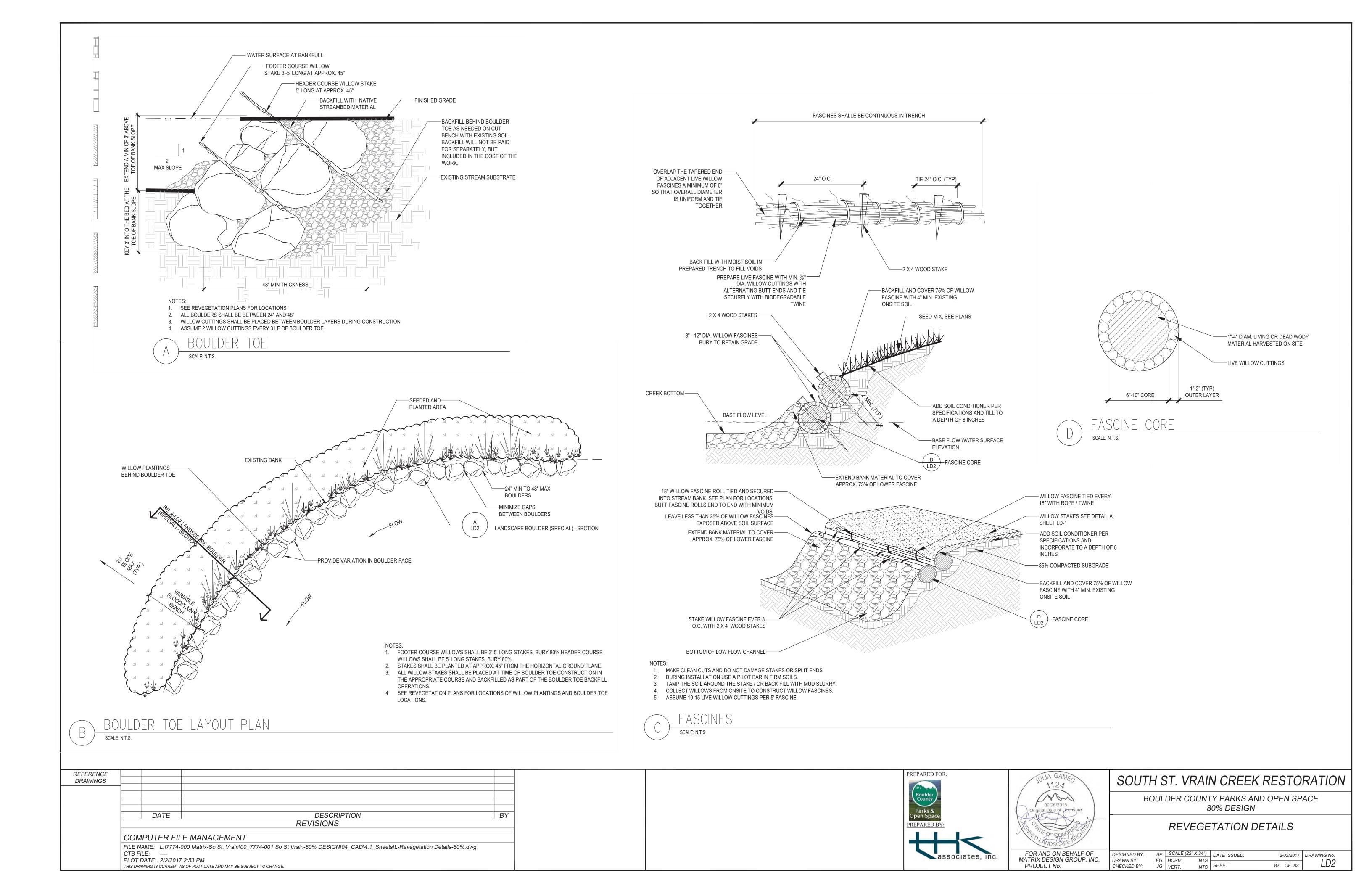
PROJECT No.

SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE 80% DESIGN

REVEGETATION DETAILS

DESIGNED BY:	BP	SCALE (2	22" X 34")	DATE ISSUED:	2/03/2017	DRAWING No.
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CHECKED BY:	JG	VERT.	NTS	SHEET	81 OF 83	LDT



Bank Stabilization: Bioengineering Treatments

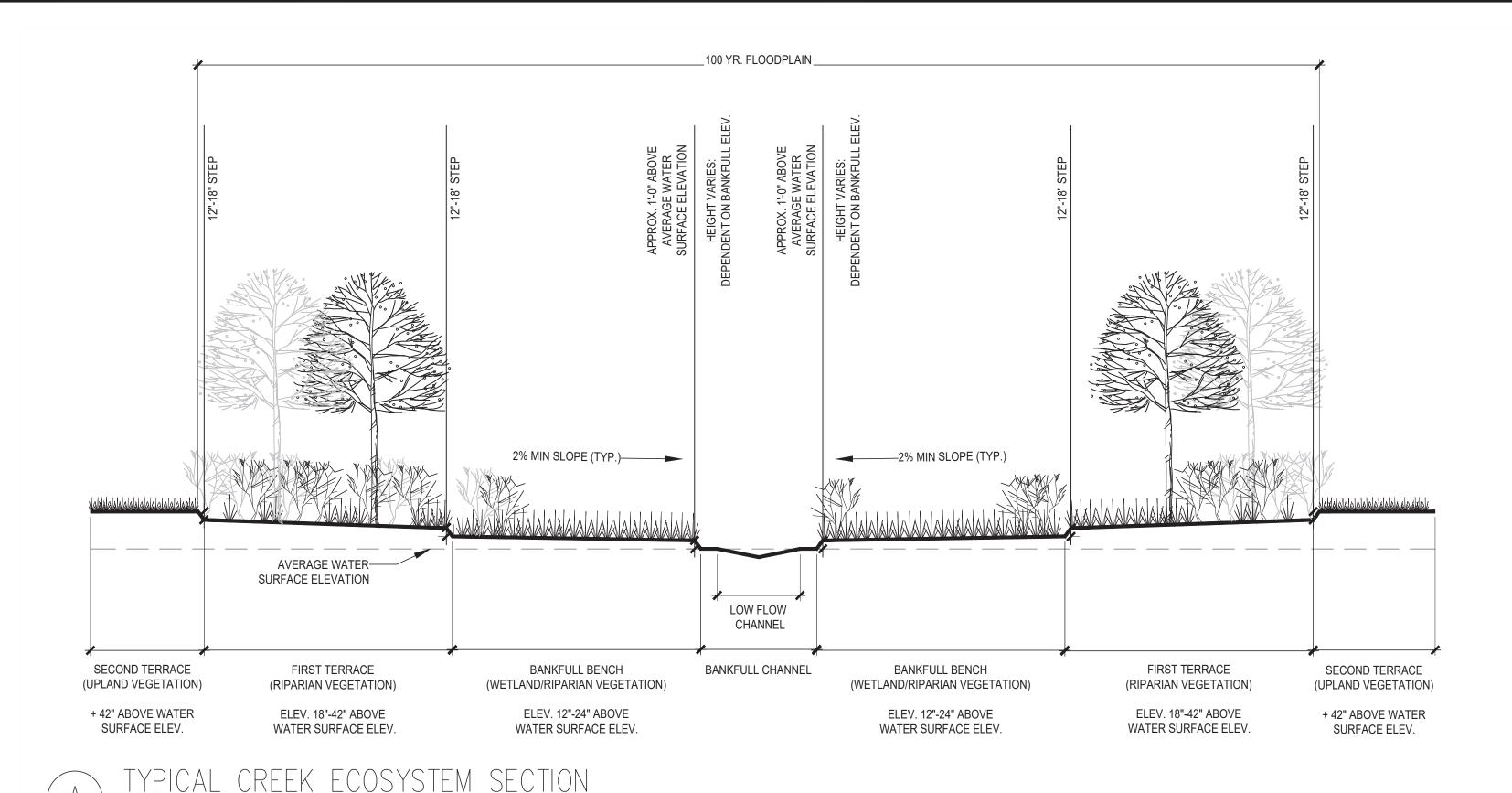
tem#	Bioengineering Treatment	Station Start	Location Station End	Left Bank	Right Bank	Total Length (L.F.)	SRH 2D Model Velocity (FT./S)	Initial Premissible Velocity (FT./S)	Established Premissible Veloci (FT./S)
em#	bloengineering Treatment	Station Start	Station End	Dalik	Dalik	(L.F.)	(F1./3)	(F1./3)	(F1./3)
		Main Channel	102+00 - 88+50						
1	Willow Cuttings in Cobble Toe	99+40	97+00	_	R	260	4 to 10	5 to 10	10+
2	Willow Cuttings in Ex. Riprap	96+24	93+23	L	_	288	4 to 10	5 to 10	12+
3	Boulder Toe	94+30	92+94	L	_	149	10 to 16	14 to 18	18+
4	Willow Cuttings in Cobble Toe	92+34	92+24	L	-	10	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	91+29	88+50	-	R	297	4 to 10	5 to 10	10+
	Millour Cuttings in Cabble Tee	Main Channel		T		124	4 to 40	5 to 10	101
	Willow Cuttings in Cobble Toe	88+50	87+23	-	R	134	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	82+25	82+80	L .	-	256	4 to 10	5 to 10	12+
	Willow Cuttings in Ex. Riprap	82+75	80+80	L	-	256	4 to 10	5 to 10	12+
9	Willow Cuttings in Cobble Toe	77+93	76+50	<u>L</u>	-	153	4 to 10	5 to 10	10+
		Main Channel	76+50 - 66+50						
10	Willow Cuttings in Cobble Toe	77+62	75+12	L	_	141	4 to 10	5 to 10	10+
	Fascines	75+12	74+41	L	_	67	4 to 10	5 to 8	8 to 10+
	Willow Cuttings in Cobble Toe	75+65	71+40	-	R	447	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	72+21	72+11	L	-	10	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	71+66	71+56	L	_	10	4 to 10	5 to 10	10+
	Boulder Toe	70+80	66+50	-	R	465	10 to 16	14 to 18	18+
			-	'					
		Main Channel		1		1		T	
	Boulder Toe	66+50	66+00	-	R	47	10 to 16	14 to 18	18+
	Fascines	65+20	64+64	L	-	104	4 to 10	5 to 8	8 to 10+
	Willow Cuttings in Cobble Toe	64+24	64+14	L	-	10	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	63+81	63+71	L	-	10	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	62+30	60+71	L	-	169	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	56+84	56+74	L	-	10	4 to 10	5 to 10	10+
22	Willow Cuttings in Cobble Toe	56+36	56+26	L	-	10	4 to 10	5 to 10	10+
		Main Channel	54+00 - 44+00						
23	Willow Cuttings in Cobble Toe	52+28	52+18	_	R	10	4 to 10	5 to 10	10+
24	Willow Cuttings in Cobble Toe	51+66	51+56	-	R	10	4 to 10	5 to 10	10+
25	Willow Cuttings in Cobble Toe	Main Channel	36+50 - 30+75 34+33	Т	В	10	4 to 10	5 to 10	10+
	_		33+64	-	R	<u> </u>	4 to 10		
	Willow Cuttings in Cobble Toe	33+74	32+36	-	R	10	4 to 10	5 to 10	10+ 10+
	Willow Cuttings in Cobble Toe Willow Cuttings in Cobble Toe	32+46 32+10	32+36	-	R R	10	4 to 10 4 to 10	5 to 10 5 to 10	10+
20	villow Cuttings in Cobble Toe	32+10	32+00	_	K	10	4 10 10	5 10 10	10+
		Main Channel	30+75 - 26+00						
28	Willow Cuttings in Cobble Toe	29+75	29+65	_	R	10	4 to 10	5 to 10	10+
	Willow Cuttings in Cobble Toe	29+35	26+80	-	R	245	4 to 10	5 to 10	10+
	-		•			·		•	
		Overflow Chai		T -	<u> </u>				
30	Willow Cuttings in Cobble Toe	03+56	03+36	L	-	19	4 to 10	5 to 10	10+

Total Willow Cuttings in Ex. Riprap 544
Total Willow Cuttings in Cobble Toe 2261
Total Boulder Toe 661
Total Fascines 171

Notes:

1. All bioengineering treatments and assicated permissable vocities were sourced from references in the Manual of Bioengineering Treatments for Colorado Streams.

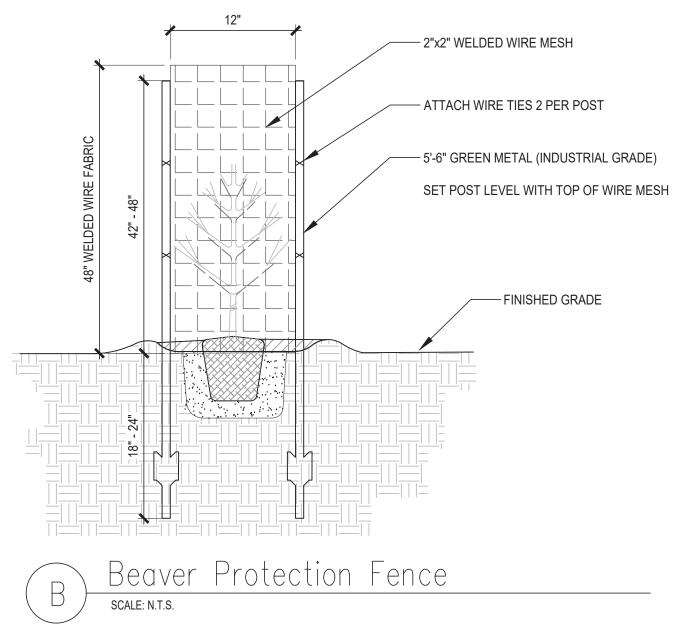
2. Permissable velocity for Willow Stakes in Cobble Toe was approximated by using the information from Table 4 - Permissible Shear and Velocity for Slected Lining Materials (Fischenich, 2001) and Table 5 - Permissible Shear Stress and Velocity Levels for Streambank Bioengineering Treatments found in the Living Streambanks: A Manual of Bioengineering Treatments for Colorado Streams (Living Streambanks, 2016)

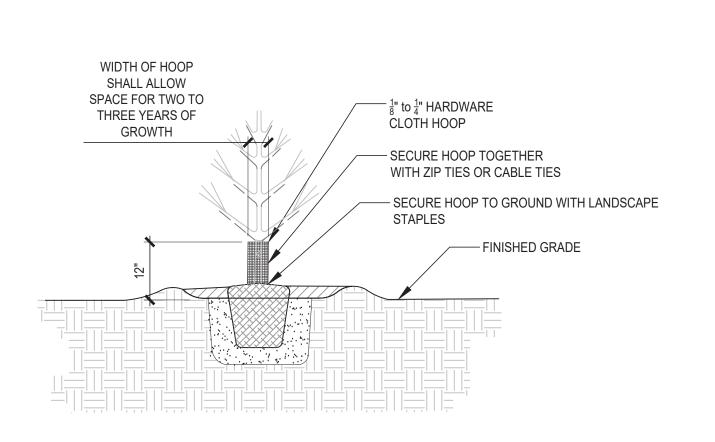


SCALE: 1/8"=1'-0"

12"

2"x2" WELDED WIRE MESH





Vole Protection Fence

scale: N.T.S.

REFERENCE DRAWINGS			
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PROJECT No.

SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE 80% DESIGN

REVEGETATION DETAILS

DESIGNED BY: BP SCALE (22" X 34") DATE ISSUED: 2/03/2017 DRAWING No. DRAWN BY: EG HORIZ. NTS CHECKED BY: JG VERT. NTS SHEET 83 OF 83